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THE AMERICAN BLACKSMITH

NUMBER 1

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO
N.Y. U.S.A.

OCTOBER, 1909

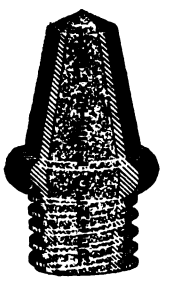
$1.00 A YEAR
10c A COPY



See that center.

Make Screw Calks Pay Big Profits

How the Rowe Calk Company Works With the Shoer to Build up for Him a Lasting and Paying Business.



See that center.

OLD SELLING POLICY IS WRONG.

The screw calk business in this country has been built up in the wrong way.

Most of the manufacturers have treated the horseshoers as final consumers and the horseshoers have had no help in selling the calks of such manufacturers.

In a few well-known cases the public has indeed been remembered as the real users of screw calks.

But in these cases the horseshoer has been treated with almost no consideration. The idea has been to force the shoer to buy and sell such calks whether he wanted to do so or not.

And if the shoer wouldn't handle the calks, they were sold to the horseowners, anyway.

Both kinds of manufacturers have, of course, stocked up the supply houses.

And so the horseshoer—one of the most important links in the screw calk business—has been in the game without any real standing of his own, pushed on one side and pulled on the other and more or less compelled to handle screw calks regardless of the question of profits.

At the same time, those manufacturers who have considered the horseowners as their final customers have been building up rivals to the horseshoers and at the expense of the horseshoers.

It has not been the horseshoer who has been supplied by such manufacturers with attractive literature for the horseowner bearing the dealer's name.

It has not been the horseshoer who has been furnished by such manufacturers with handsomely colored lithographs to put in his front window.

Nor is it the horseshoer who has been induced and helped by such manufacturers to advertise their screw calks in the home papers.

NEW POLICY—HORSESHOERS MUST BE RETAILERS.

We have no quarrel with those manufacturers. We do not criticize them. We say only that their judgment has been mistaken in not working with the horseshoers.

We believe that horseshoers are the natural distributors, the logical retailers of screw calks.

We believe that no big business in screw calks can be developed and kept without the friendly aid and the good will of horseshoers.

Upon these principles the selling of Rowe Calks has been built up and is now being carried on.

THE ROWE CALK PLATFORM.

We ask no horseshoer to buy and sell Rowe Calks unless we can prove to him that we have the best hard center calk on the market and that he can make more money handling Rowe Calks than any other kind.

ENORMOUS DEMAND FOR ROWE CALKS.

Since the coming of the new Rowe calk last year, with the **wedge-shape welded tool steel center** there has been no question that it is the king of calks.

These magnificent **welded tool steel centers**, expanding in width with the outer shell of the calk, produce the sharpest wearing and the longest-lived calks ever made. There is no other line on the market like it.

These new **wedge-shape welded tool steel center calks** also have well rounded, tapered threads, absolutely interchangeable with all other standard brands, the toughest thread shanks, and are perfectly hardened by a scientific process that has no equal anywhere.

These **wedge-shape welded tool steel center calks** swept the country last year. Almost everybody tried them and they gave universal satisfaction.

This year they will be used everywhere and a customer once will be always a customer.

Our sales to jobbers are double those of last year. Practically every jobber and supply house of any importance from Maine to the State of Washington is stocked with them.

In typewriter language, **Rowe welded tool steel centers** are the calks that everybody will eventually use.

HOW THE MONEY IS MADE.

And now, why can the horseshoer make more money on Rowe calks than on any other kind, it being understood, of course, that the percentage of profit on Rowe calks is the same as on the best of the other kinds?

The first reason, it goes almost without saying, has already been given—because the **Rowe welded tool steel center calks** are the best, and make permanent customers.

But the one great overwhelming reason is that the Rowe Company has provided an easy way for the shoer to let his customers and all the horseowners of his community know the many merits of Rowe calks, and that he handles them.

WE SEND BOOKLETS TO YOUR CUSTOMERS.

We have prepared an interesting illustrated, but short, booklet that cannot fail to convince any horseshoer or horseowner who reads it of the great advantage in using Rowe calks.

We want you to read it and we want all the horseowners in your town to read it because it gives more inside information about the manufacture of calks than has before been published.

Send in the names of the horseowners in your town today and the last of November we will mail to everyone this business-pulling booklet **bearing your name and address as a local agent.**

You will be surprised at the inquiries you will get for Rowe calks from people who have been buying other goods elsewhere.

And you will have no difficulty in showing them that they can make money, too, by using welded tool steel center calks, wearing so much longer than the steel pin kinds bought at stores.

WE HELP YOU ADVERTISE AT HOME.

But this is only the beginning. As a retailer, you should advertise the goods you carry and yourself in your home papers.

One of the greatest advertising experts in the country is now preparing a series of twenty-eight ads for Rowe **wedge-shape welded tool steel center calks** and the shoers who carry them. They are not so large as to make the advertising charges expensive.

All these, or any number, will be furnished in plates free of charge to any horseshoer who will run them over his name in his home paper.

This is an advertising age. Be the first in your town to catch the public eye and get the reputation of a leading shoer.

NATIONAL ADVERTISING CAMPAIGN.

And to drive all this home to the horseowners and to make your work count still more, we shall run a national advertising campaign of **Rowe wedge-shape tool steel center calks** in leading papers reaching farmers, horsemen, physicians, team owners and others.

Rowe welded tool steel center calks will become household words in the homes of horseowners throughout the American snow belt this winter. And every ad will state that Rowe calks are handled through horseshoers.

Hitch your wagon to this star by local advertising and get the full benefit of the national campaign.

Learn in this way how reaching the horseowner can be made to swell your business and profits instead of hurting them.

Don't let this opportunity slip. Write us now for that new Booklet A, and information about those free advertising plates, and you will have started on a new highway of prosperity.

It is Rowe Calks Now---Write Your Jobber Today.

Send your list of Horseowners for booklets at once. Address ROWE CALKS, Hartford, Conn.

THE SILVER MFG. CO.

365 BROADWAY SALEM, OHIO.



SILVER'S NEW JOINTERS

Five Sizes—8, 12, 16, 20 and 24 inch.
New "patent applied for" features.



SILVER'S SAW TABLES

Send for circular of Saw Tables and Swing Saws.



NEW PLANETARY BAND SAW

20-inch Foot or Combination.

New Wood-Working Tools for the Blacksmith



Silver's New Swing Saw. Four Lengths.

We have recently placed upon the market a splendid line of Jointers or Buzz Planers, Saw Tables, Swing Saws and Planetary Foot Power Band Saws. They have some especially strong features and will be money-makers for any Blacksmith who has much work to do in wood. See illustrations.

We do not know how well your shop is already equipped, but we ***do*** know that when you need tools—whether it's a Band Saw or Jointer, a Saw Table or a Swing Saw, a Post or Power Drill, a Portable Forge, or a machine for Boring Hubs or for Tenoning Spokes—we know you can't find more all-around satisfaction anywhere than in the "Silver-quality" tools.

That statement sounds a bit boastful, when you don't know our tools; but it sounds quite modest when you do.

Every one of these machines is built in our new factory with every facility for large output and for low cost of production. The materials used are of the best, the construction is strong and honest and all parts are properly fitted to work well before being sent out.

In short, we do not build ordinary machines at the cheapest prices, but the very best machines at as low a price as is possible.

The "Quality" kind is the only kind you get in Silver's machines.

SEND FOR OUR NEW MACHINERY CATALOG

or for any of the following booklets:

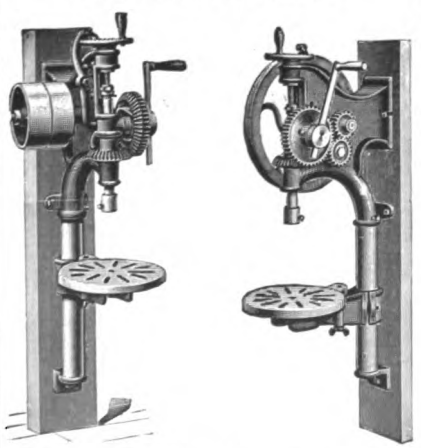
BAND SAWS AND JOINTERS—describing 20" Band Saws for foot or belt power or combination; also 26, 32, 36-inch Power Band Saws with new features.

HUB BORING AND SPOKE TENONING MACHINES—illustrating and describing several sizes of each.

PORTABLE FORGES—illustrating and describing 14 styles.

DRILLING MACHINES—covering our line of some 22 distinct machines.

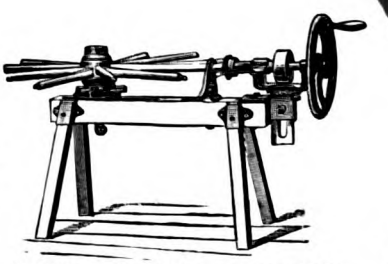
POWER DRILLS—illustrating our line of 20" machines with lever feed, lever and wheel feed, power feed with automatic stop, power feed with back gears and automatic stop.



Our Booklet, "Drilling Machines", illustrates 22 kinds we make.

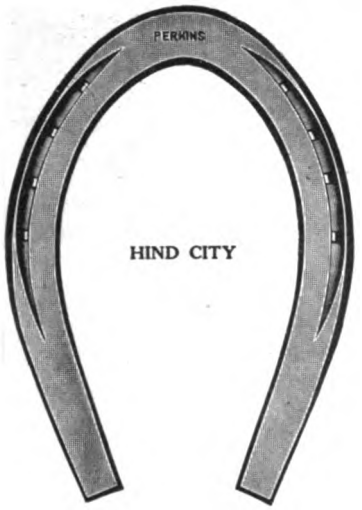


Our Portable Forge Booklet illustrates some 14 kinds. We have a size to suit your needs. Strong and durable. Attractive designs.



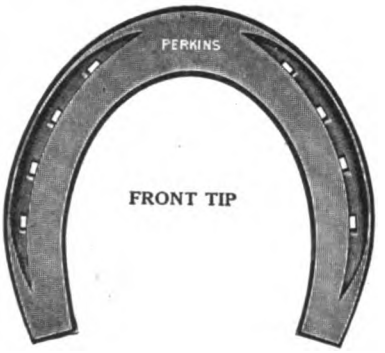
SPOKE TENON MACHINES

in Seven Sizes. Fitted with Star Hollow Auger.



HIND CITY

Look for this Trade Mark ★ The Star brand beats all others



FRONT TIP



FRONT STEEL COUNTERSUNK

★ PERKINS ★

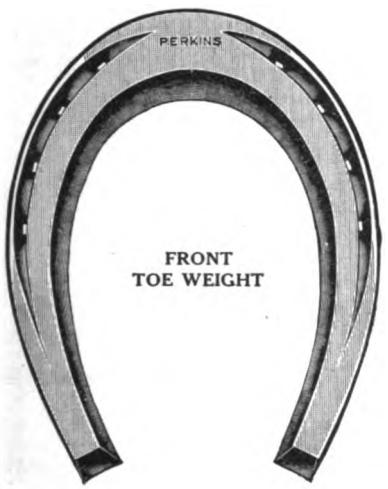
HORSE SHOES

AND

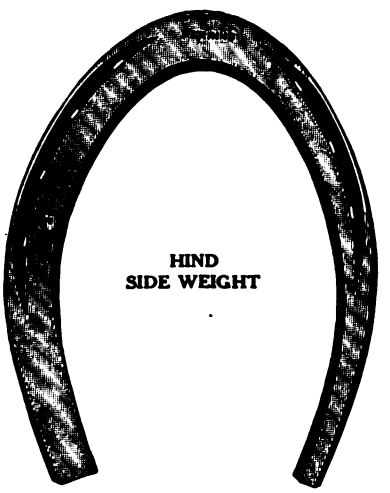
TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



FRONT TOE WEIGHT



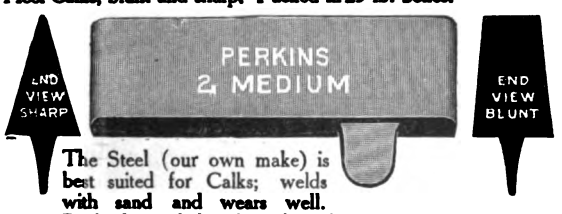
HIND SIDE WEIGHT

Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

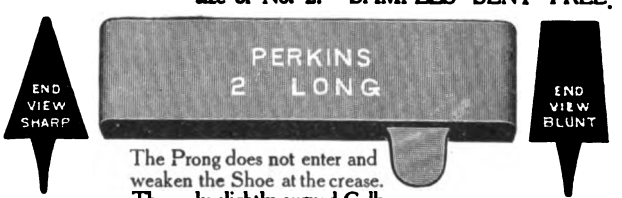


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



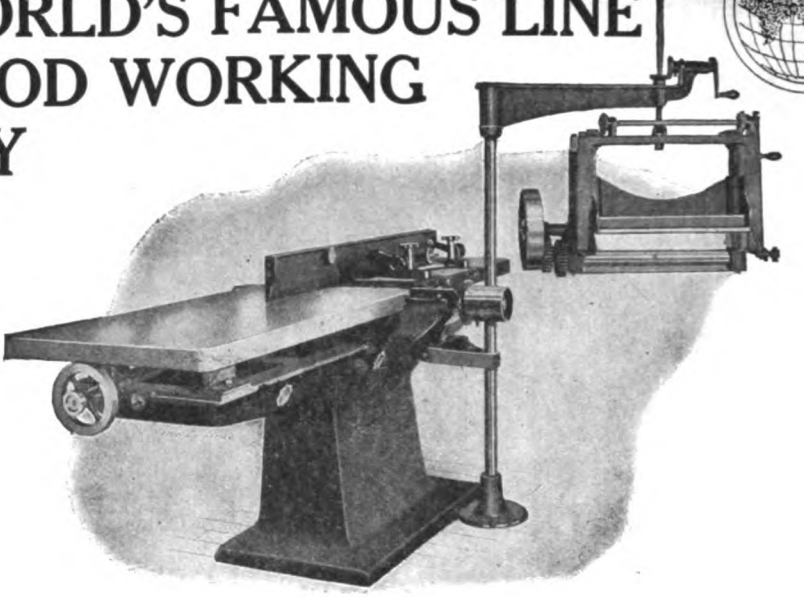
The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

THE WORLD'S FAMOUS LINE OF WOOD WORKING MACHINERY



Our power feed planer and jointer with the planer swung back out of the way, behind the machine, leaving the machine as a regular standard jointer. This change can be made in from one to two minutes, and it does not change the relations of the tables with the head. This attachment can be used on any jointer, and it is not absolutely necessary to be used on the Sidney machine.

Write us at once for catalogue and prices.

We also make a full line of Planers, Jointers, Saw Tables, Boring Machines, Band Saws, Shapers, Swing Cut-off Saws and Post Borers, and Variety Woodworkers.

Write us at once for particulars.

Sidney Tool Co., Sidney, Ohio, U. S. A.

COLD TIRE SETTING

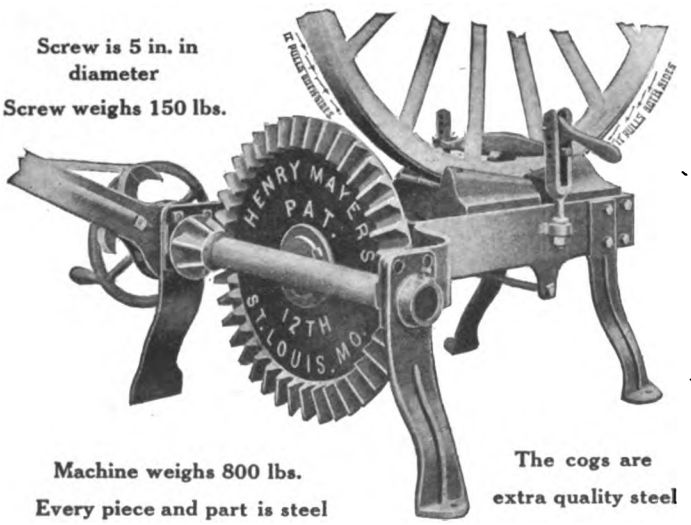
Is an admitted, proven fact, testified to by thousands and thousands of the best blacksmiths in America. And it is equally true that ALL cold tire setter machines DO SET TIRES. But is it not REASONABLE to say some do it BETTER than others? We say, and offer the proof, by a comparative test, that the

Mayers Cold Tire Setter is in a Class all by itself

for QUALITY of work. Why? Because it has the right PRINCIPLE and does what others, knowingly, wilfully and falsely claim, PULLS both sides at the same time. A THING to PULL must move, and this machine is the ONLY one in which BOTH HEADS move.

Screw is 5 in. in diameter

Screw weighs 150 lbs.



Machine weighs 800 lbs.

Every piece and part is steel

The cogs are extra quality steel

There is no jerk or strain to kink a tire.

The pressure from the screw is STEADY and continuous.

There is no "new hold" or slack to take up. No lost motion.

The heads open ANY distance wanted. Short space for small tire and long space for large ones. All other machines open the SAME for ALL sizes.

It is the simplest.

It is the most powerful.

It is ALL steel, heaviest, and weighs 800 lbs.

It is lowest in price, $85.00, but would be CHEAPER at any price.

An iron-clad guarantee makes you safe and you "try it before you buy it."

You ought to be a mechanic, if you are a blacksmith, and a JUDGE of machinery. If you are a JUDGE, just compare the cut of this machine with all the others. Then write for our guarantee and see our easy terms. Then PROVE it by a test in your own shop.

DON'T FORGET WE HANDLE ALL KINDS OF MACHINERY AND TOOLS.

MAYERS TIRE SETTER MANUFACTURING CO.

4028 and 4030 Forest Park Boulevard **ST. LOUIS, MO.**

"Little Giant"
PUNCHES AND SHEARS

Better than a Blacksmith Helper.

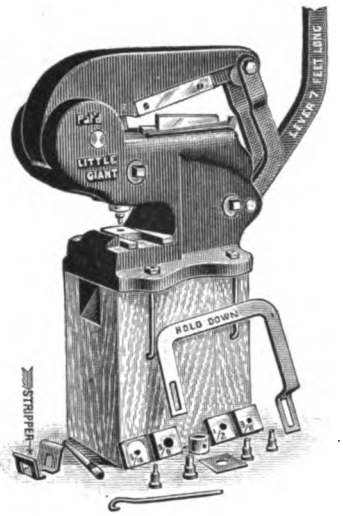
Over 3,000 in use. Good the world over.

WHY?

Kei Road, Cape Colony,
S. A., Aug. 12, 1909.
Little Giant Punch
& Shear Co.,
Sparta, Ill., U. S. A.

Dear Sirs: — Enclosed please find Money Order to the value of £1-11-0 in settlement of your acct, The Punch and Shear came safely to hand last Monday and I am very pleased with it indeed. If I can at any time sell one I will do so and will try to do all I can to forward the sale in the Cape Colony. The machine cost me landed here £13-10-0, and I consider it worth twice as much. I find it only takes one man to work the lever and I thought it could not be worked with less than two. I consider every blacksmith should have one, as they save a lot of labor and money.

Yours faithfully,
(Signed) pp
R. G. RISTROW.

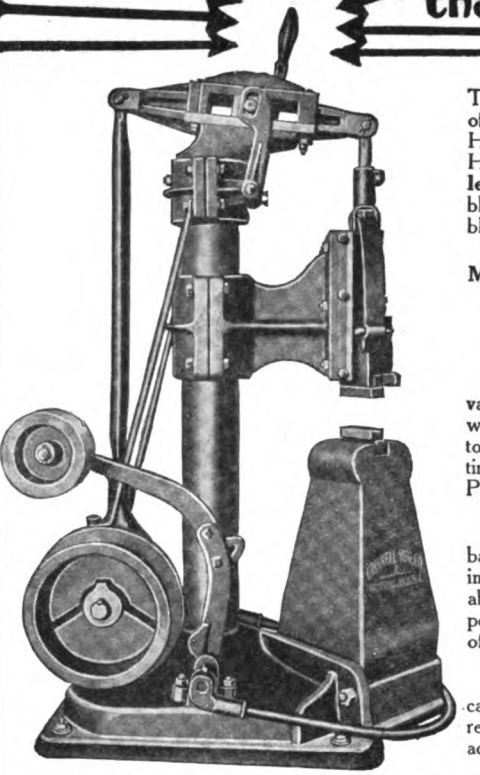


You don't have to take our word for it, but get our booklet of Testimonials.

WRITE FOR NEW CATALOGUE

Little Giant Punch & Shear Co.
210 S. Market St. SPARTA, ILLINOIS

See that lever



The exclusive feature of The Modern Hammer. The Only Hammer with **that lever** making possible a Light or Heavy blow at **full speed.**

MAKES SMITHING EASY

Think of the advantages of a helper with a blow of many tons who **never** gets tired. Mechanically Perfect.

The new square base is a marked improvement, adding about one hundred pounds to the weight of machine.

Look thru our **free** catalog sent on request to anyone addressing,

MODERN SALES CO., Licensed by Grinnell Mfg. Co. GRINNELL, IOWA.

INSIST ON "STANDARD" CALKS

BUY FROM YOUR DEALER

1895 STANDARD TOE CALKS 1909

HIGH GRADE STEEL HOT FORGED NIB DRIVES PERFECTLY



WELDS EASILY GIVE SATISFACTION

FRANKLIN STEEL WORKS

Joliet, Ill. Cambridge, Mass.

"CHICAGO"
EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



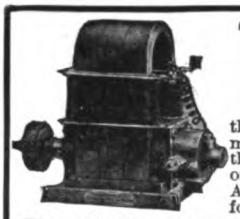
"CHICAGO"
WHEELS SAVE TIME

They're made of stuff that cuts

Emery Wheels, Glue, Emery, Polishing Wheels, Grinding Machinery

136 Page Catalogue for the Asking

Chicago Wheel & Mfg. Co.
41 SO. ABERDEEN ST.
CHICAGO, U. S. A.



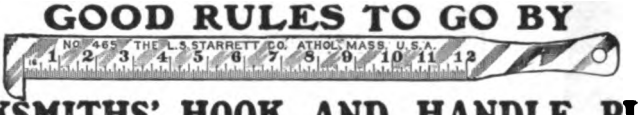
"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

The White Lily Gasoline Engine
is now made by
THE DAVENPORT ICE CLIPPING MACHINE CO.
1575 West Third St., Davenport, Ia.
Ask for *Special Offer* and *Free Catalog*

GOOD RULES TO GO BY

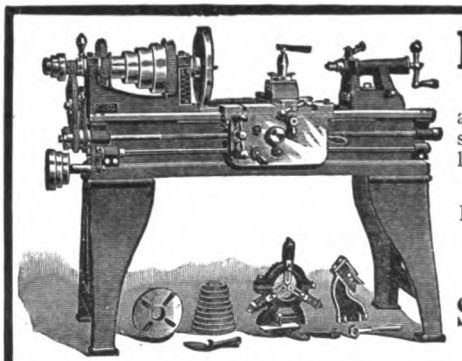


BLACKSMITHS' HOOK AND HANDLE RULES

Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have flat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, $1.15. Catalog No. 17 AH of fine Tools free.

The L. S. STARRETT CO., ATHOL, MASS.



Built For Business

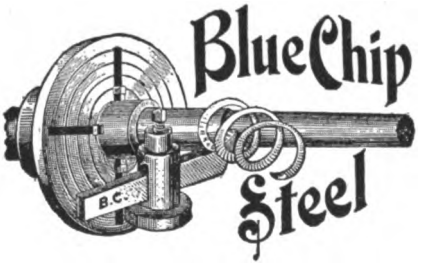
Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high-grade lathe, is the best for your shop.

It's a SEBASTIAN—a good lathe

Investigate its merits—Write for Catalog.

Foot and Power Lathes, 9 to 15 in. Swing
Tools and Supplies.

SEBASTIAN LATHE CO.
124-126 Culvert St., CINCINNATI, OHIO



Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.
McKEESPORT, PA.

Selling Agencies

NEW YORK CHICAGO
BOSTON PHILADELPHIA

SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades
Fully guaranteed
All sizes in stock

THE
BOURNE-FULLER CO.
IRON STEEL
PIG IRON
COKE

Cleveland, Ohio.

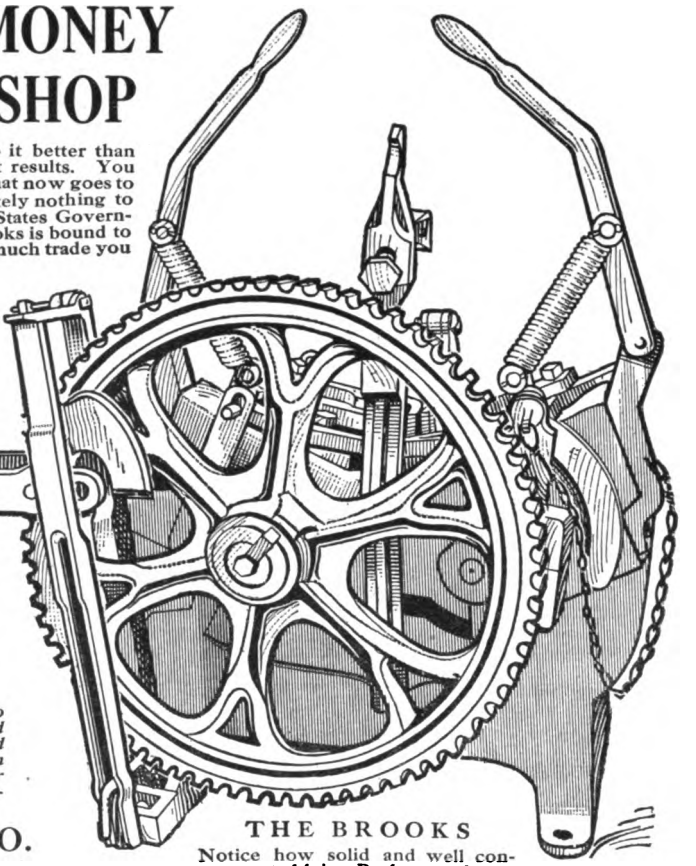
HERE IS THE BEST MONEY MAKER FOR YOUR SHOP

You can set tires with a Brooks in a few minutes' time and do it better than the old way. You can guarantee the work, for you get perfect results. You will get thousands of dollars' worth of business with a Brooks that now goes to other shops in your section. The Brooks is the best made, absolutely nothing to get out of order or break. Endorsed and in use by the United States Government. It is guaranteed and will last practically a lifetime. The Brooks is bound to increase your business, no matter where you are located or how much trade you have. Thousands of blacksmiths and wagon makers all over the United States and Canada have doubled and tripled their business after buying the

Brooks Cold Tire Setter

The Brooks is mechanically constructed in all its details. It is the only machine that has a key-adjusting device which forces the grip keys against the tire, making them work evenly and prevents their slipping on the tire. The Brooks is the only machine with Draw-heads moving on a circle to conform to the circle of the tire, and which has machine-finished guideways, thus making it impossible for the Draw-heads to raise and cause the tire to kink, which is often the result with other machines. The Draw-heads on the Brooks are constructed with lateral movement so that they are always in alignment with the tire, thus preventing bending the tire edgewise. The Brooks has bridge plates of different circles, thus fitting the machine closely to tires of different diameters, which is impossible with other makes using only one Bridge plate. The power is applied through Eccentrics. One man can apply the power to do the work that requires two or three men with other Cold Tire Setters. The Brooks is made of the best material and by expert tire setter builders. It is the simplest, most complete, strongest and most durable Cold Tire Setter built.

No bolts to remove from wheels; no expense for fuel; no guesswork. You can dish wheels just as much as you like and stop at any time. There are more Brooks Cold Tire Setters used today than all other makes of tire setters combined. A one-man machine operated by hand. Made in different sizes. Send for finely illustrated Catalogue and Prices. Also vest pocket memorandum book free. Our special time offer will interest you.



THE BROOKS
Notice how solid and well constructed it is. Perfect results guaranteed.

THE BROOKS TIRE MACHINE CO.

857-859 Ellicott Square, Buffalo, N. Y. — Write to nearest office — 121 N. Water Street, Wichita, Kansas

Equipped with the
Buffalo "200" Silent Blower
Guaranteed to produce a stronger blast than any other blower made; also against repairs for ten years.



Write today for our new Catalog No. 178 A. B., describing
Forges
Blowers
Drills
Punches
Shears
Blacksmiths' Tools

Always ask your Dealer for "Buffalo" Tools. If he does not supply you, write us, we will see that you get the right goods, at the right price. The name "Buffalo" is on every Tool—look for it.

Cast Iron Hearth, Deep Fire, Anti-Clinker, H H. Tuyere.

Buffalo Down Draft Forge
No. 660

Cast iron hood, tile stack, indestructible from heat, rust and gases

No Soot, No Smoke, No Gases

Your forge shop atmosphere always pure and clear. The down draft hood catches and removes all smoke and gases generated by the fire. It also supplies the fire with a hot blast of returned coal gases, which effects full consumption of, and

Saves 1-3 in Fuel

Notice the position of the crank on the blower. It is just where you want it. The hand falls naturally upon it, and you do not face the fire. The up-to-date forge for the modern shop.

BUFFALO FORGE CO.
BUFFALO, N. Y.



PIONEER BRAND

POLES AND SHAFTS

THE QUALITY MAKE

Recognized as best by experienced vehicle men everywhere.

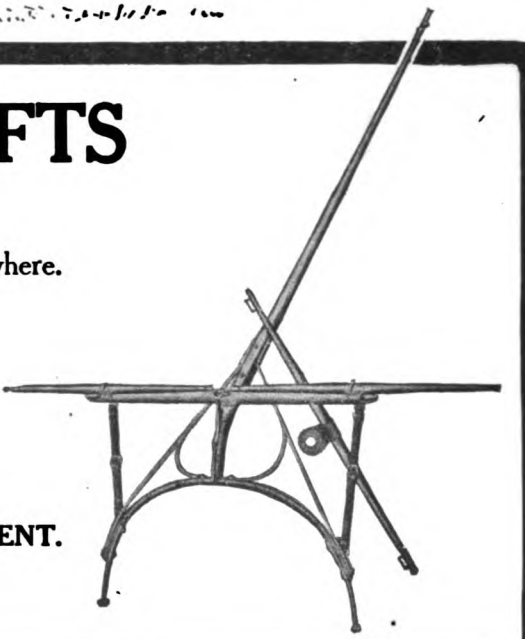
MADE BY

The Pioneer Pole & Shaft Co.

Headquarters and Sales Offices,

PIQUA, - OHIO.

Manufacturers of all styles and sizes of poles and shafts.
A complete line that will SUPPLY EVERY REQUIREMENT.
Have you our catalog and price list?
If not, we want to send you both.



No matter how seldom you use tools, you need the best.

"MORSE"

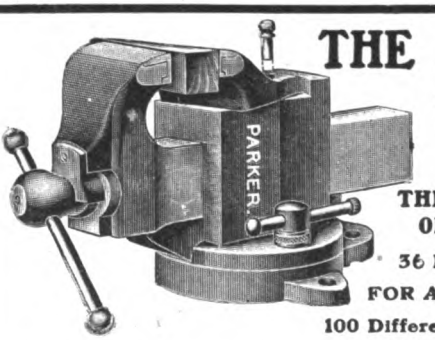
Drills, Reamers, Cutters, Chucks, Taps, Dies, Arbors, Counterbores, Countersinks, Gauges, Mandrels, Mills, Screw Plates, Sleeves, Sockets, Taper Pins, etc., are without question as good as can be made. Large manufacturers who have had a chance to try out different kinds already know this, and others are going to know it if telling will avail.



A postal card request will bring you a "MORSE" catalog. Better have it if you are in doubt as to what kind of tools you want.

Morse Twist Drill & Machine Co.

NEW BEDFORD, MASS., U. S. A.



THE PARKER VISES

THE MOST RELIABLE ON THE MARKET

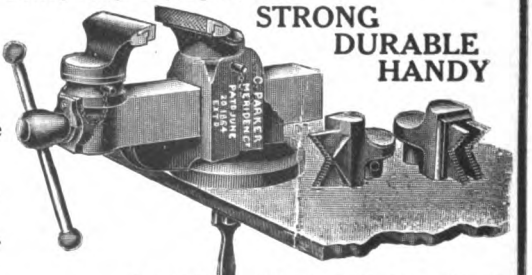
36 Different Styles, FOR ALL PURPOSES, 100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

STRONG
DURABLE
HANDY

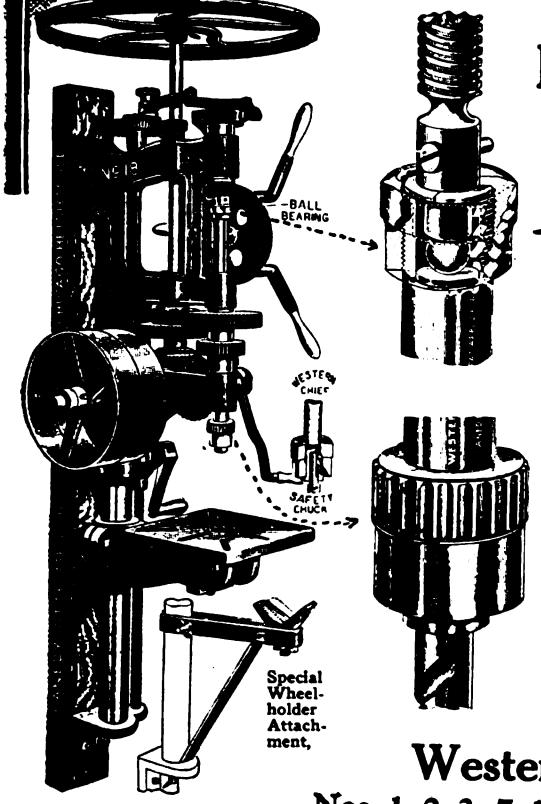


Our complete illustrated catalogue is free. Write today for price list also.

A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

THE CHAS. PARKER CO.,

MERIDEN, CONN.



Special Wheel-holder Attachment,

Ball-Bearing and Safety Chuck

Ball-Bearing

A single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate.

Safety Chuck

It is opened and closed with the hand.

No more set-screws to mar and bruise the shanks of bits.

No more wrenches to tighten and loosen set-screws.

No more twisting of bits in the chuck.

No more trouble in inserting and removing bits from chuck.

A Feature of TO-DAY

Wrench? NO!

Western Chief Drills

Nos. 1, 2, 3, 7, 12, 14, 15, 16, 17 and 18

FORGES—BLOWERS—DRILLS—



No. 100 Royal Forge

Fan, 12 inches.
Hearth, 31½ x 45½ in

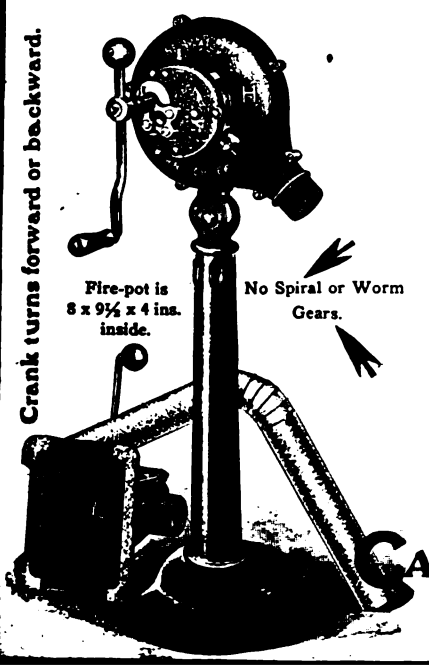
The Names — "ROYAL and WESTERN CHIEF"

When found on a Forge, Blower, Drill, or other Blacksmith Tool—mean that that article is better than the ordinary. They mean that in its construction the best materials and the highest skill obtainable have been employed. They mean that years of experience have served to perfect it. They mean the tool is a success, and quality alone has made it so. Dealers and Blacksmiths in general will procure what they like best. We must deserve before we can obtain trade. There is no doubt about our deserving, because our production grows rapidly.

There is a reason—Quality

They are all the Best!

Royal Blower



No. 1 Western Chief

(TIRE and AXLE SHRINKER)



Jaws Adjust Themselves to Uneven Thicknesses

MADE BY

CANEDY OTTO MFG. CO.

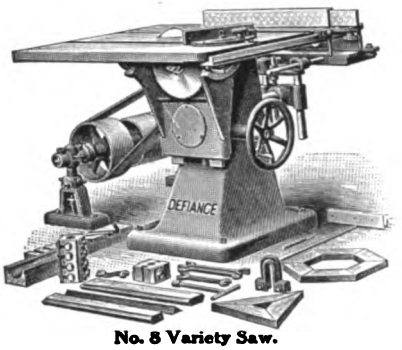
CHICAGO HEIGHTS, ILL.

"DEFIANCE" WOOD-WORKING MACHINERY

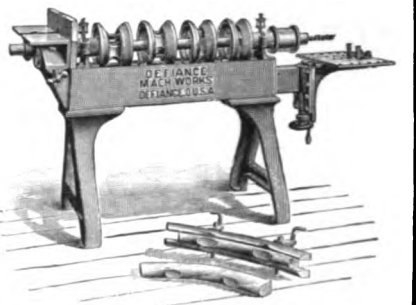
Invented and Built by
THE DEFIANCE MACHINE WORKS
DEFIANCE, OHIO

FOR MAKING

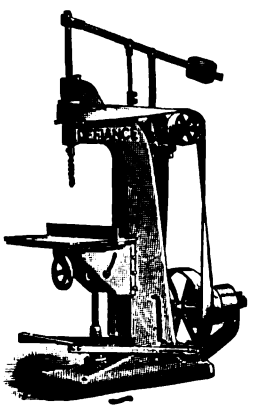
Wagons, Carriages, Automobiles,
Hubs, Spokes, Wheels, Rims,
Shafts, Poles, Neck-Yokes,
Single Trees, Hoops, Handles of all kinds,
Spools, Bobbins, Insulator Pins,
Shoe Lasts. Table Legs, Balusters,
Oval Wood Dishes & General Wood-Work.

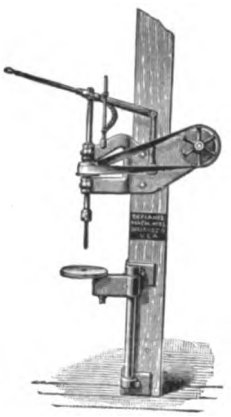


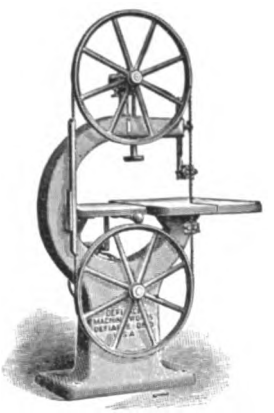
No. 8 Variety Saw.

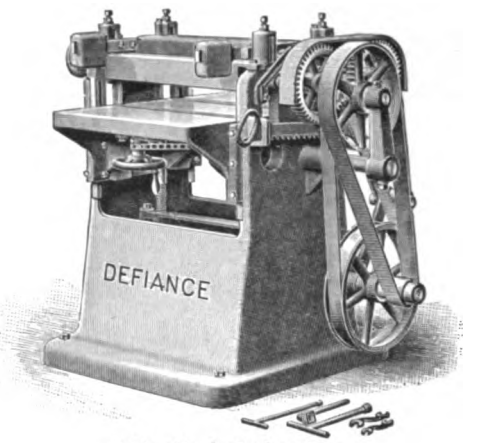


No. 2 Rounder with 6 in. Buzz Planer & Boring Attach.


No. 6 Vertical Borer.


No. 1 Post Borer.


28 in. Band Saw.



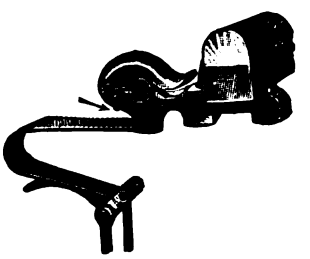
24 in. Single Surface Planer.

Eccles Ball Bearing Couplings

ALL OUR COUPLINGS ARE SHIPPED OUT WITH TWO-PIECE BUSHINGS FASTENED IN THE COUPLINGS

When Bushings are worn out by long use they can be instantly replaced and fastened into the socket by our special process.




Patented Nov. 25, 1902
Patented June 11, 1907

The spring is pivoted at the front so that it can be turned out of the way of the wrench while clipping Coupling to the axle.

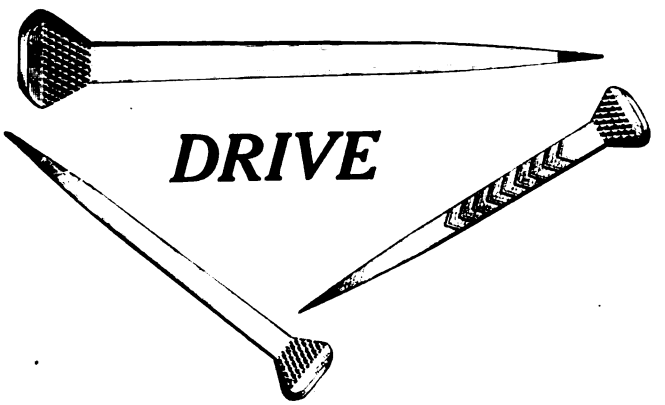
NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS

Catalog No. 15
is our Latest

We make a full line of
Carriage and Wagon Forgings

RICHARD ECCLES COMPANY, Auburn, N.Y.

CAPEWELL HORSE NAILS



SPECIAL MATERIALS AND PROCESSES

are required to produce the best driving horse nail. **We have both.** That is why "Capewell" nails excel all other brands.

It is an established fact—not something to be proved—that "Capewell" nails are the **easiest to drive.** We have assurances **from all parts of the world** that this is the truth of the matter.



Horseshoers in the United States and Canada who drive "Capewell" Nails far outnumber the combined users of other brands.

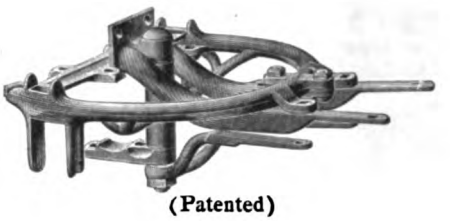
MADE BY

THE CAPEWELL HORSE NAIL CO.
HARTFORD, CONN.

The Largest Manufacturers of Horseshoe Nails in the World.

The Dayton Fifth Wheel
is sold by nearly every
Carriage Hardware Jobber

The Dayton Malleable Iron Co.
Dayton, Ohio


(Patented)

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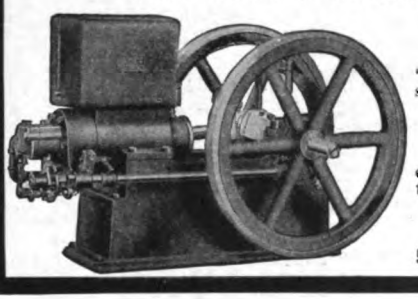
How would it suit you to take the agency for



WITTE GASOLINE ENGINES

Your experience is worth something. If you use a "Witte" your customers will want them; why not sell them and make the profit. Our engines are

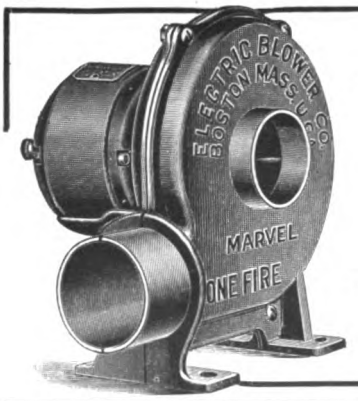
GUARANTEED FIVE YEARS

Have been on market 25 years; advertised and sold everywhere; lots of good selling points; write for introductory proposition stating size you can use.

WITTE IRON WORKS CO.
517 West 5th St., Kansas City, Mo.



INSIST ON "CLEVELAND" DRILLS
THEY'VE NEVER BEEN EQUALLED
The CLEVELAND Twist Drill Co.
NEW YORK CLEVELAND, OHIO CHICAGO



"MARVEL"
ELECTRIC BLOWERS

"ONE FIRE" Marvel, -	$28.00
For 4 Light Fires, - -	55.00
For 4 Medium Heavy Fires,	60.00
For 4 Heavy Fires, - -	80.00
For 8 Heavy Fires, - -	120.00

Ask your Dealer, the Electric Light Co., or write to
ELECTRIC BLOWER CO.,
352 Atlantic Avenue, BOSTON, MASS.

F. A. LESTER, who for several years past has had charge of the Carriage and Wagon Axle Department of the Timken Roller Bearing Axle Company, Canton, Ohio, will upon the first of September take charge of the Chicago branch of that company. Mr. Lester is no stranger to Chicago, having resided there for about twenty years, and has for a large portion of that time been identified with the carriage and wagon business. Therefore, the change will doubtless be quite agreeable to him and his return to that field will be a welcome by many friends.

HAVE YOU ANY FRIENDS? in the smithing craft whose good will you especially esteem? There is no better way of showing them your friendship than by a small gift; there is no gift which such a friend would appreciate more than a year's subscription to The American Blacksmith. It will remind him constantly of you for an entire year, and furnish him with interesting, valuable reading which he will greatly like. If you have any friends who are not subscribers, write us for terms of subscriptions for them.

AMERICAN BLACKSMITH COMPANY
P. O. Box 974 BUFFALO, N. Y., U. S. A.

Trade Literature and Notes.

OWING TO THE GREAT ATTENTION GIVEN lately to the high-wheel type motor buggy, we believe that many of our readers will be interested in the new catalog of the Economy Motor Buggy Company, which has just come into our hands. They undoubtedly make the best buggy of this kind on the market and at a price within the reach of all. By mentioning THE AMERICAN BLACKSMITH you can secure one of their handsome catalogs free.

HANDY LAMP GASOLINE LIGHTING SYSTEM is a new invention making gasoline lighting practical in every sense.

A three hundred Candle Power Shadowless Light that can be turned up or down instantly same as gas, and can be left burning at a dim light of one candle power, that costs less than generating, is always ready, and can be instantly turned higher any degree up to a dazzling white light of three hundred candle power of reflected downward rays.

This lamp is suitable for all uses and would be especially good for lighting blacksmith shops, as well as the home, churches, halls, factories and business places of every kind where a dependable light is needed. These lights require only one gallon of good clean gasoline for over forty to fifty hours burning at full power and longer in proportion when less light is used.

The installation of the Handy Lamp Lighting System is very simple and could be easily done by any mechanic. Every reader interested in better light should refer to the announcement on page 47 of this issue of the Brilliant Gas Lamp Company, 12 State Street, Chicago, who manufacture these lighting systems. They will be glad to furnish descriptive matter on request.

"DRILL GRINDING" is the title of a little booklet recently gotten out by the Cleveland Twist Drill Company, and tells how to grind drills properly. The life of a drill and the amount of work it will do depends in such large degree upon the proper grinding of the point that the right way to perform this operation cannot be too strongly impressed or too frequently insisted upon.

We are quite sure that this leaflet will be of considerable service to readers of THE AMERICAN BLACKSMITH. Address your request to the Cleveland Twist Drill Company, Cleveland, Ohio.

THE COYNE NATIONAL TRADE SCHOOLS, of Chicago, whose announcement appears for the first time in our pages on page 32, are the original schools of practical instruction in the building and electrical trades. It is the object of this modern trade school to furnish men and boys who are mechanically inclined an opportunity to learn a trade more thoroughly and in less time than under the old apprentice system.

During the last few years the industrial conditions throughout the United States have changed so materially that few employers care to assume the trouble, expense and responsibility of teaching young men a profession or trade. It is therefore, to the Practical Trade Schools that contractors will look for their Plumbers, Electricians and Bricklayers.

The instruction given in the Coyne National Trade Schools not only teaches the practical work thoroughly, but the courses in drawing, estimating and reading of plans for all classes of work in the trades, teach the students to use their heads as well as their hands, thereby fitting them for positions as foremen and superintendents, or to start into business for themselves.

Anyone who is thinking of learning the trades taught at this school or who is interested in someone who may be contemplating the study of some trade should write for a copy of the interesting booklet describing fully the course which this school teaches.

TRIMMINGS FOR EVERYTHING ON WHEELS



Wholesale Manufacturers

Write For Catalogue and Prices.

Export Work our Specialty.

TOPS FROM $4.40 UP.

INDIANA TOP & VEHICLE CO., Lawrenceburg, Indiana, U. S. A.

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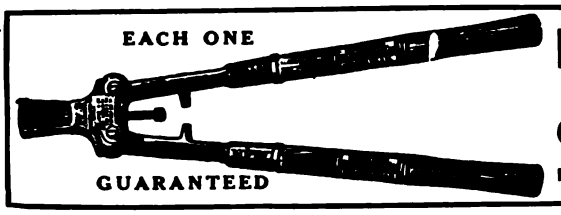
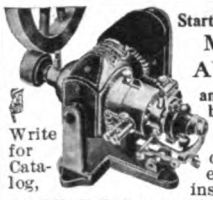


GUARANTEED

BOLT CLIPPERS

CHAMBERS BROS. CO.

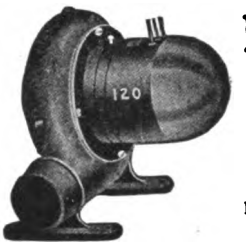
N. Fifty-Second St., PHILADELPHIA, PA.



Start your Gas Engine with the MOTSINGER AUTO-SPARKER and run it without the aid of batteries. Not a cheap magneto but the original high grade speed controlled friction driven dynamo. Perfectly insulated, "water and dust-proof." Fully guaranteed. Operates the "make and break" and "jump spark." Charges all storage batteries for ignition and lighting on a small scale perfectly with our special switch-board in the circuit. Ten years actual service with over 36,000 Auto-sparkers in operation to testify to its merit.

Write for Catalog,

MOTSINGER DEVICE MFG. CO.
33 Main Street PENDLETON, INDIANA. U. S. A.



Roth Forge Blowers

have for a long time been the leading Machines of their Type. Improvements are constantly being made to maintain this Lead.

ROTH BROS. & CO.

136 Liberty Street NEW YORK

1390 West Adams Street CHICAGO, ILL.



Every Up-to-date Enterprising Blacksmith Should know about the

No. 5 CLIMAX GRINDER

Price is O. K. Quality is first class and guaranteed. *Second* to Power Emery Grinders *Only*. *The Result* of Ten years' Experience in Experimenting and Marketing.

We sell in any quantity. Drop a card to "Emery Grinder Dept." for catalogue and prices.

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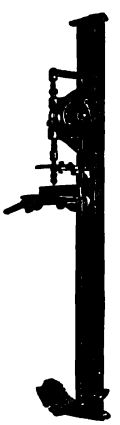
Vulcan Iron Works

(INCORPORATED)

Mason City, Iowa



Prices and goods right

Catalog free, write today

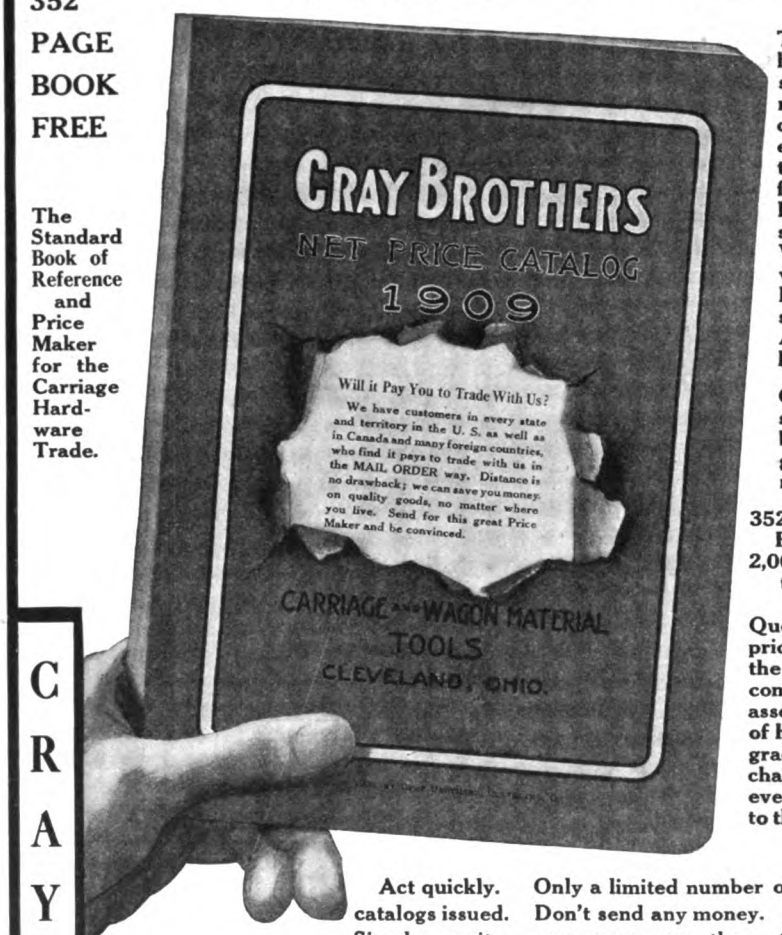
Universal Tenon and Boring Machine

for wagon repair shops. **Cuts tenons on set of wheels in twelve minutes.**

THIS 352 PAGE BOOK FREE

FALL CATALOG—NOW READY.
NEW PRICES NEW GOODS

The Standard Book of Reference and Price Maker for the Carriage Hardware Trade.



Tells how to save money on everything for the Blacksmith, Wheelwright, Horseshoer and Auto Repairer.

Cut shows book greatly reduced.

352 pages of Bargains, 2,000 Illustrations.

Quotes net prices on the most complete assortment of high grade merchandise ever offered to the trade.

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Act quickly. Only a limited number of catalogs issued. Don't send any money. Simply write your name on the Coupon and mail. We'll do the rest.

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CRAY BROTHERS, Cleveland, O.:
Please send me your 352-Page Free Fall Catalog and Price Maker.
Name.....
Occupation.....
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$665 BUYS THE MATERIAL TO BUILD THESE HOMES



HOUSE DESIGN NO. 126

This beautiful little house is a great favorite with those who like the old English style of architecture. There are three rooms, hallway and pantry on the first floor with four comfortable chambers and bath room on the second floor. Though of moderate size, it is compact and delightfully cosy. In design it shows a happy blending of the useful with the ornamental. Its cost is scarcely more than a cottage and its value more than a house double its size.

$1285



HOUSE DESIGN NO. 141

In the accompanying illustration we show a two-family flat building which is especially designed for those who want the comforts of a home and an income on the money invested as well. This house has seven rooms and bath on each floor, and while it supplies all the comforts of the modern home will give a good dividend on the money invested, as the upper floor may be easily rented. In appearance it gives the impression of a palatial private residence, and its compact arrangement makes its construction easy and cheap. It is a great bargain at the price at which we are offering it.

We Save You Big Money on Lumber and Building Material!

The Chicago House Wrecking Co. is the largest concern in the world devoted to the sale of Lumber, Plumbing, Heating Apparatus and Building Material direct to the consumer. No one else can make you an offer like the one shown above. We propose to furnish you everything needed for the construction of this building, except Plumbing, Heating and Masonry materials. Write for exact details of what we furnish. It will be in accordance with our specifications, which are so clear that there will be no possible misunderstanding.

HOW WE OPERATE:

We purchase at Sheriffs' Sales, Receivers' Sales and Manufacturers' Sales, besides owning outright sawmills and lumber yards. Usually when you purchase your building material for the complete home shown above, elsewhere, it will cost you from 50 to 60 per cent more than we ask for it. By our "direct to you" methods we eliminate several middlemen's profits. We can prove this to you.

WHAT OUR STOCK CONSISTS OF:

We have everything needed in Building Material for a building of any sort, Lumber, Sash, Doors, Millwork, Structural Iron, Pipe, Valves and Fittings, Steel and Prepared Roofing. We also have Machinery, Hardware, Furniture, Household Goods, Office Fixtures, Wire Fencing, in fact, anything required to build or equip. Everything for the Home, the Office, the Factory or the Field. Send us your carpenter's or contractor's bill for our low estimate. We will prove our ability to save you money. WRITE US TODAY, giving a complete list of everything you need.

FREE BOOK OF PLANS!

We publish a handsome, illustrated book containing designs of Cottages, Bungalows, Barns, Houses, etc. We can furnish the material complete for any of these designs. This book is mailed free to those who correctly fill in the coupon below. Even if you have no immediate intention of building, we advise that you obtain a copy of our FREE BOOK OF PLANS. It's a valuable book.

OUR GUARANTEE!

This company has a capital stock and a surplus of over $1,000,000.00. We guarantee absolute satisfaction in every detail. If you buy any material from us not as represented, we will take it back at our freight expense and return your money. We recognize the virtue of a satisfied customer. We will in every instance "Make Good." Thousands of satisfied customers prove this. We refer you to any bank or banker anywhere. Look us up in the Mercantile Agencies. Ask any Express Company. Write to the publisher of this publication. Our responsibility is unquestioned.

Upon Receipt of $2.00 We Will Furnish Complete Set of Blue Prints, Architect's Specifications and List of Material.

At this price we will furnish you a complete set of Blue Prints for the above house. It will include also complete Architect's specifications, full details, working plans and itemized list of material. It will be just the same kind of plans as any architect turns out. We will prepay all transportation charges. If upon receipt of plans you purchase the complete material from us, we will remit you the price of $2.00 in full. If you decide that you do not want the plans after you have had them in your possession, we will allow you to return them to us and will refund $1.50; thus, their use will cost you only the trifling sum of 50 cents, which does not cover the expense involved by us.

High Grade Bathroom Outfits!



Price of this Bathroom Outfit, $37.50

Strictly new and as good as anyone sells. We have everything needed in Plumbing material. Our prices mean a saving to you of 30 to 60 per cent. We can easily prove it if you will give us a chance.

Here is an illustration of a bathroom outfit we are selling at $37.50. Your plumber would ask you about $60.00 for this same outfit. This is a positive fact. It's only one of ten other complete outfits that we are offering at prices ranging from $25.00 to $100.00. Our catalog describes them in detail. You need the book if you want to keep posted on up-to-date business methods. Get our prices on Pipe and Fittings. Write us today

Hot Water Heating Plants!



We furnish new, complete hot water heating outfits at half the usual prices. Our proposition includes all necessary plans, specifications, blue prints and detailed instructions; so that any ordinary mechanic handy with the use of tools can easily install it. You can't go wrong when you deal with us. We stand back of every sale. You send us today a sketch of your building and we will make you a proposition to furnish you a complete steam or hot water heating outfit.

We also have hot air furnaces. Our booklet on heating plants tells every feature of the heating question. We can quote radiators and heaters separately. Whether you buy from us or not it is a valuable book for you to own. Write us today.



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Chicago House Wrecking Co.:

I saw this ad. in AMERICAN BLACKSMITH.

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Co._____ State_____

Free Publications!

Fill in the coupon to the left and we will send you such literature as best suits your needs. We publish a 500 page mammoth catalog fully illustrated, giving our business history and showing all the vast lines of merchandise that we have for sale. We buy our goods at Sheriffs', Receivers' and Manufacturers' Sales. Ask for Catalog No. 0. Our Book on Plumbing and Heating Apparatus contains 150 pages of useful information. Our free "Book of Plans" is described elsewhere in this advertisement.

Water Supply Outfits!

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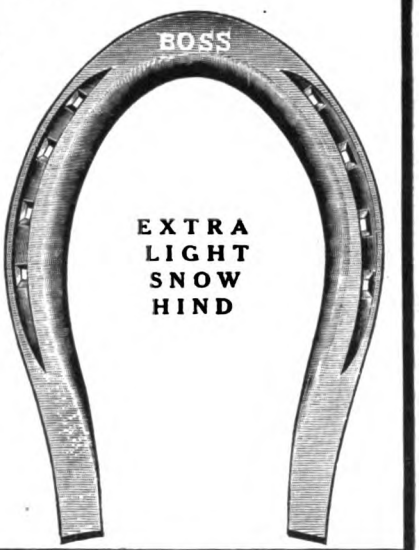

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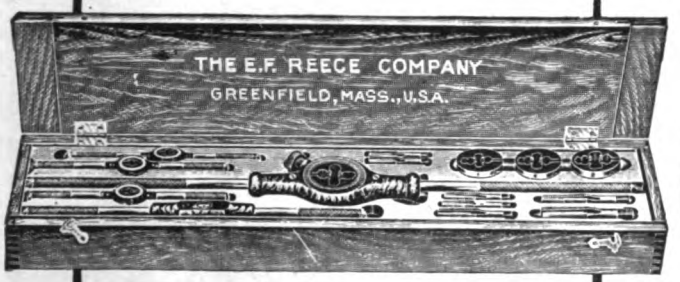

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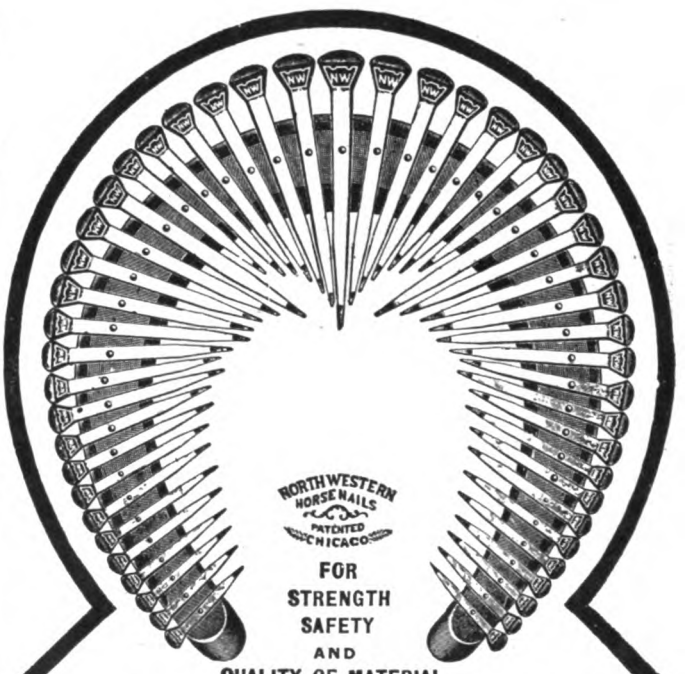

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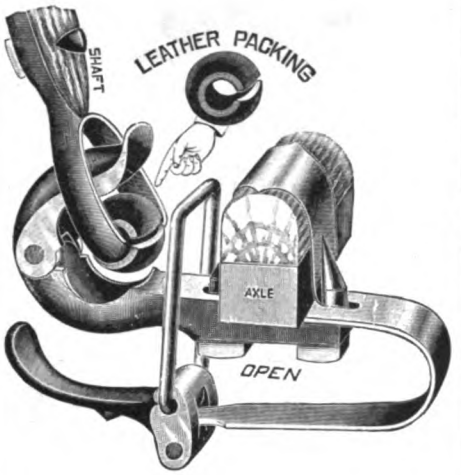

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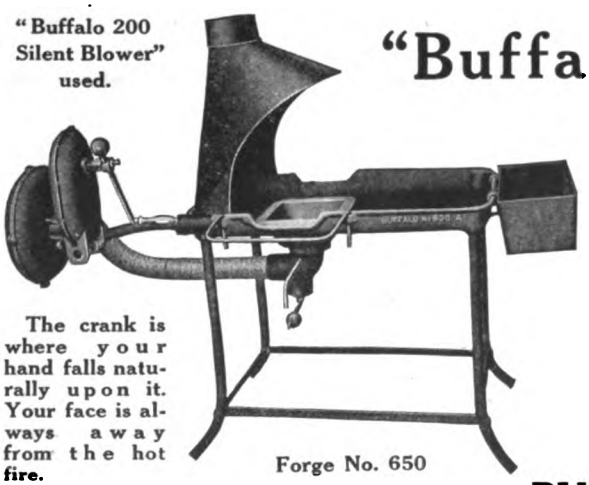

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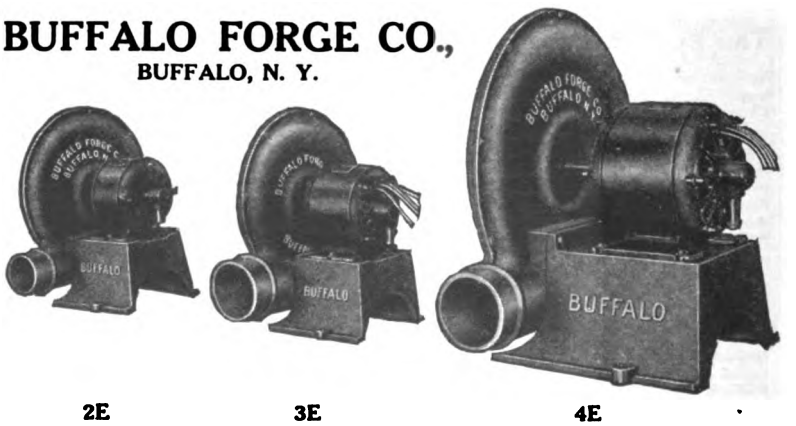

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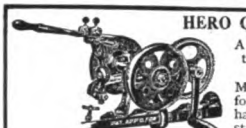

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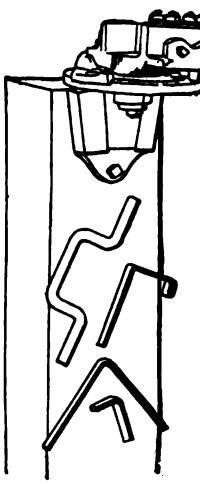

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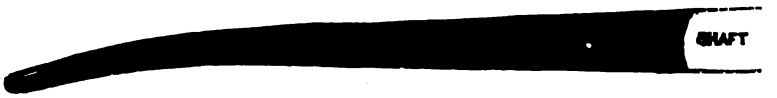

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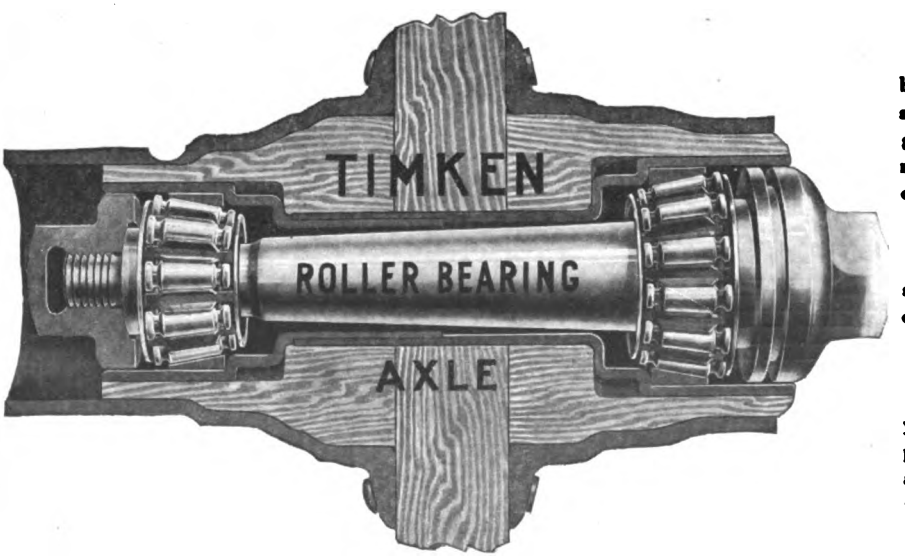

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Another New Volume.

When a magazine reaches that stage in its existence when its publishers think it cannot be improved or changed in some way for the better, decline is certain. We have not yet reached the stage of self-satisfaction, and hope we never will. Those of you who have been constant readers since the beginning have seen steady improvement, and this, the beginning of our ninth year, will see more improvement.

The program for this ninth volume plans for several new features, and a number of new contributors will make their bow to "Our Folks" in this volume. The series of articles on "Gun and Novelty Repairing," by Mr. W. G. Mumma, will continue and in this volume will run into the novelty repair line. Mr. Robert B. Kerr's series on "The Smith and His Work" will also continue into a major part of the ninth volume. A new series of articles by Mr. L. R. Swartz has already begun and will detail in a very thorough manner all sides of well-drilling and the making of well-drilling tools. Mr. Swartz needs no introduction to "Our Folks," for his many articles in the past have proved of much interest and value. To "New Folks" we would say that Mr. Swartz is an expert on well-drilling and well-drilling tools and knows how to tell what he knows. Mr. Nels Peterson will have some things to say about vehicle-building and we expect a number of good vehicle plans from him during the year. The new articles on "Trade and Technical Education in Foreign Countries," by Mr. William H. Dooley, have already begun, and those of "Our Folks" who read his initial paper in the September issue know just what to expect. This series should appeal especially strong to those of our readers who are instructors in manual-training and trade schools. This list will be reinforced by other able writers as the volume opens.

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Suggestions.

Suggestions for any department or section of "Our Journal" will be gladly welcomed by the Editors, and we want you to give us your opinions. If you have a criticism to offer let us have it. If you have a word of praise send it in. Both are welcome, the former as well as the latter.

Credit to Our Journal.

"We have been very busy. I have been getting work from such distances as has never before been experienced here. I credit this largely to 'Our Journal', as I have been getting pointers from THE AMERICAN BLACKSMITH for years, and many of these have helped me to do many a hard job and to do work better." This Nebraska smith has been a constant reader of "Our Journal" for the past five years. He runs a general shop—does all kinds of wood and iron work and horseshoeing. He reads THE AMERICAN BLACKSMITH because it's worth something to him. He reads it because it's a thoroughly practical paper, because it tells him how and why and wherefore. He says: "I would not do without the paper for a dollar a copy." He not only reads the paper, but studies it and tries the sound, practical hints and kinks. He reaps full benefit and gives the paper credit. A smith cannot hope to get all there is in a paper by simply reading it. He must study it and make use of the hints, kinks and practical information contained in it. He should write an occasional letter, ask for and give information. He should be active in the discussions on craft subjects. Then he will get full value out of his paper. He will grow and expand with the trade. And his business, his knowledge of the craft cannot help but grow. Read "Our Journal" regularly—study it—make use of the practical information. Then you'll get your money's worth and more—improve your trade knowledge—be better equipped for your fight for success.



THRESHING—A BUSY TIME ON THE FARM

Contraction and Its Cure

W. O. JULIUS

A HOOF that has changed from its natural form so that it is narrow and appears crowded together is said to be contracted. It is also known as hoof bound, and is usually caused by insufficient exercise, standing on hard, dry floors and improper shoeing. Contraction may affect the entire foot or it may be confined to that part known as the quarters. In the latter case it is usually known as contracted heels. It is principally an affection of the fore feet, though it is also seen in the hind feet.

Contraction of the foot may result from other diseases of the foot such as canker, thrush, corns, side bones, sprains and ringbones. But the cause that most directly concerns the shoer is faulty shoeing. High calks and nails driven into the foot too near the heels do not allow proper expansion and contraction of the frog and heels. It is, therefore, important to punch the nail holes properly in the shoe and to have calks, especially those at the heels, of a reasonable height. Other causes of contraction under the head of faulty shoeing are: rasping the foot wall and cutting and paring of the frog, heels and bars. It is rarely necessary to use the knife on the frog and bars. When the knife is used here it should simply be used to trim and not to pare and diminish the size of the frog or to "open the bars," which some shoers think so necessary. The frog is necessary to the health of the foot. If it is cut away so as to make no contact with the ground the heels of the foot naturally shrink and the foot becomes contracted.

The suffering of an animal afflicted with contraction may be likened to a man's suffering from footwear that is too tight. When contraction continues for any length of time the hoof presses on the blood vessels and nerves of the foot and impedes the circulation; naturally great pain results, often causing the animal to attempt to walk on his toes.

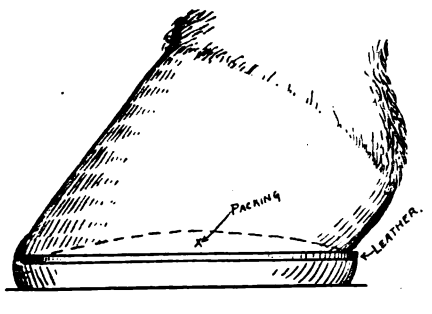


FIG. 1.—CONTRACTION MAY RESULT FROM OTHER DISEASES

The cure or treatment of contraction is, of course, first of all to relieve the pinching or compressing of the foot, to apply frog pressure by any of the several means at the disposal of the shoer and to keep the affected feet moist and as soft as possible.

There are many devices for spreading the feet and for forcing the heels apart, but it is usually preferable to allow nature to do her work in her own way, with perhaps a little help. The writer believes it not especially pleasant to his horse to have his foot forced open by mechanical means. The user of hoof spreaders is usually too ambitious to use them as they should be used and generally applies too much pressure at one time. If the hoof expander or the expanding shoe is used with common sense and the opening pressure applied very gradually the spreading influence is more natural.

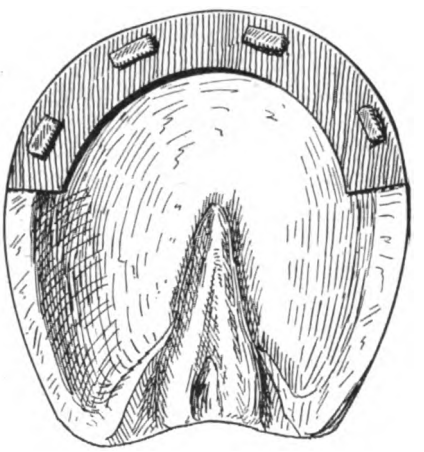


FIG. 2.—FAULTY SHOEING ALSO CAUSES CONTRACTION

To get a foot back to normal shape by the most natural means, allow the horse to run in a pasture that is rather marshy or one that borders on a creek or river. But if the horse cannot be taken from his work, shoe with an open bar shoe, giving frog pressure according to the state or condition of the frog. If the frog is hard, give slight pressure only. Full pressure on a frog in such condition will force it into the foot and

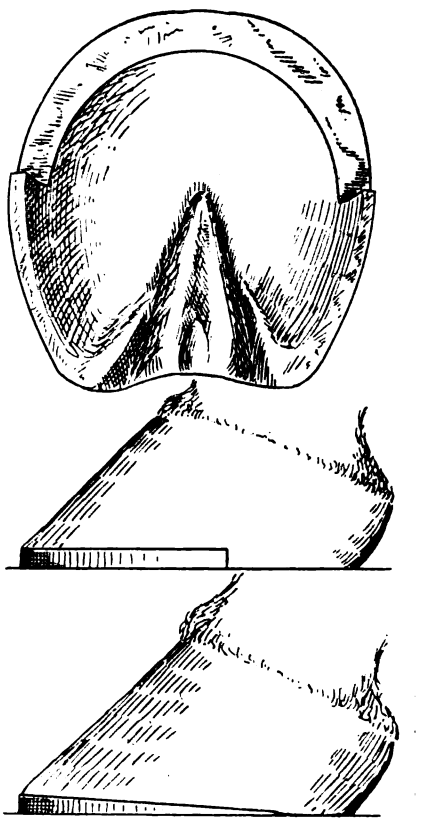


FIG. 3.—THE TIP IS USEFUL IN CURING CONTRACTION

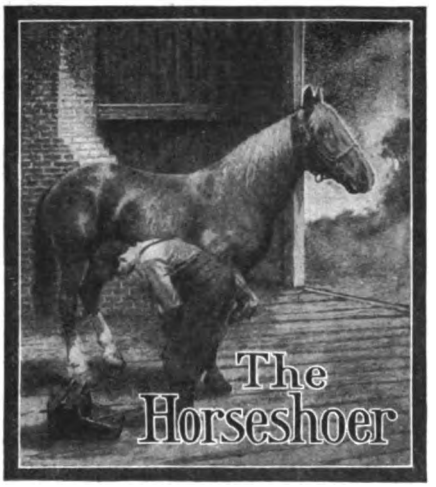
make the condition worse. The foot should also be packed with some hoof-softening agent, a leather applied and then the bar shoe.

If the animal is worked on dirt roads, a tip may be applied to protect the toe, the heels and frog being allowed to come into free contact with the ground. The tip may be made tapering at both ends or it may be let into the wall by cutting out a block of the horn. If the tapered tip is used it should begin to taper at the toe and it should be the usual width with both hoof and ground surfaces flat.

Of course, if the case has been of long standing and the internal structures of the foot have become shrunken and wasted it is rarely possible to affect an entire cure. However, much relief may be secured for the animal by following the foregoing curative

measures. It necessarily follows that a quicker and more complete cure may be secured if the animal is taken out of active service and allowed the freedom of the pasture. If the field into which the animal is allowed to run is dry and hard it will assist the cure very materially to soak the feet first in cold water to soften them. Of course, if the field border on a creek or river this soaking can be accomplished by making the animal stand in the water for a time until the hoofs are soft.

If the affected animal must be used on city pavements, shoe with an open bar shoe, as stated, placing the nails well forward and leaving the heels as free as possible for expansion. If the stable is very dry, instruct the owner or driver to place the animal's feet in a box half filled with well-dampened sawdust or clay. The shoes should in no case stay on longer than four weeks and a good hoof ointment should be used liberally.



The Bar Shoe, while not a cure-all for every ill of the horse, can still be used more often than it is and with good results. There is no doubt about the bar shoe being excellent for many diseased feet. Then why not use it on healthy feet and keep them healthy? Of course, when the animal has natural frog pressure, it is folly to use the bar shoe.

F. O. D., Illinois.

The Angle of the Foot varies in different horses. It is, therefore, impossible to make a rule saying that the angle of the foot wall should be of a certain number of degrees. Of course, there is the ideal angle, but the practical shoer so seldom comes into contact with an ideal horse that he need pay but small attention to the angle of the foot as it might have been. R. T. G., Ohio.

Horses suffer more from their feet than from any other part of their body. It is, therefore, up to the shoer to see that the animal has good feet and that the good feet are kept in condition. The usefulness of the horse depends upon the shoer more than anyone else, not excepting the owner.

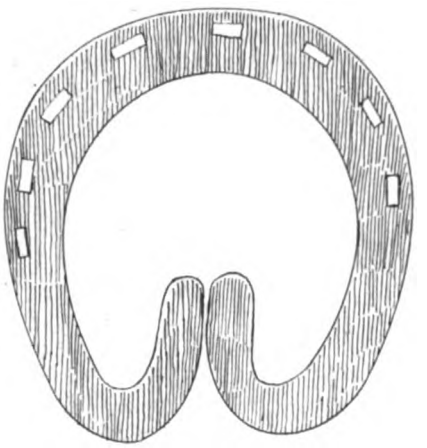


FIG. 4.—A GOOD HOOF OINTMENT IS ALSO USEFUL

For the horse will stand more abuse from a driver or owner than the animal's feet can stand from the shoer. It's up to you, Mr. Horseshoer, to see that the horse is kept in condition for work.

H. P. B., New York.

Seedy Toe and Parted Wall.

F. J. MILLS.

There have been quite a number of inquiries in "Our Journal" recently on how to treat seedy toe or, as some call it, parted wall. The treatment is so simple, compared with some things we are called upon to do, and has been explained in these columns so often that I can't understand why some smith is always asking about this trouble. I will endeavor to explain how to cure the trouble and hope that my explanation will simplify matters for some of "Our Folks."

Seedy toe and parted wall may be considered as being different stages of the same trouble. Seedy toe is the first stage and the name is taken from the seedy, granular and cheesy appearance of the hoof fibers directly beneath the hoof wall at the toe. If at this stage a knife or other thin instrument is run up into the foot just under the toe the matter can be easily removed without apparent pain to the animal. If the trouble is allowed to go untreated this cheesy substance seems to fall away unassisted and a cavity appears; see Fig. 1. In some cases this cavity will be small, perhaps easily receiving the head of a number ten nail. In other cases it is large enough to take two fingers of the hand, and I have heard of one case where the entire handle of the paring knife could be placed in the opening.

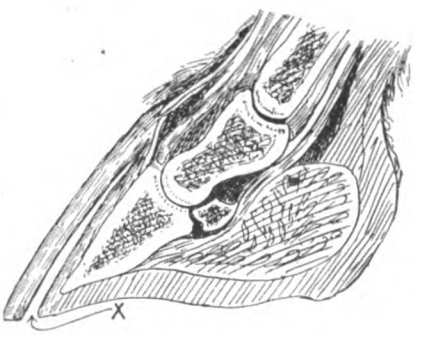


FIG. 1—A CAVITY APPEARS.

As to treatment, some advocate cleaning the cavity and filling with some stimulating hoof packing or healing ointment. This method, however, is wrong, according to my ideas. The packing has a tendency to keep the cavity open, to work up into the opening and to cause the new growth of horn to part from the foot proper.

The correct method of treating the trouble is, I believe, to cut away all of the parted wall and all the wall covering the cheesy secretion. This, of course, lays bare the sensitive part of the foot. This bared surface is carefully cleaned and a neat bandage applied with a liberal quantity of beef tallow on the exposed portion of the foot. If the horse is a heavy worker it may be necessary to shoe the affected foot with a special shoe with a protector for the toe. But a light horse will require nothing but a good bandage.

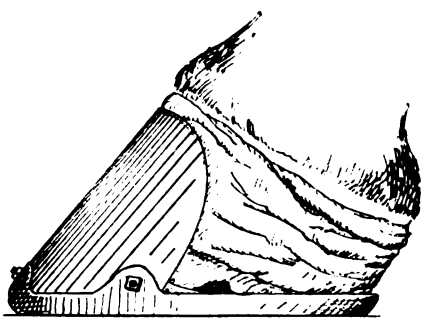


FIG. 2.—THE TOE SHOULD BE PROTECTED

A shoe for protecting the toe is shown in Fig. 2. It is a regular bar shoe with a shield made of stove pipe iron, fastened by means of bolts and large clips, as shown. Being concerned mainly with the cure of diseased feet I cannot say what causes seedy toe or wall separation.

A Short Talk on Mule Shoeing.

S. F. RICHEY.

The mule is greatly misjudged by those who are not well acquainted with this excellent worker. It is not my intention to place him above the horse, but there are many ways in which the mule is better than the horse.

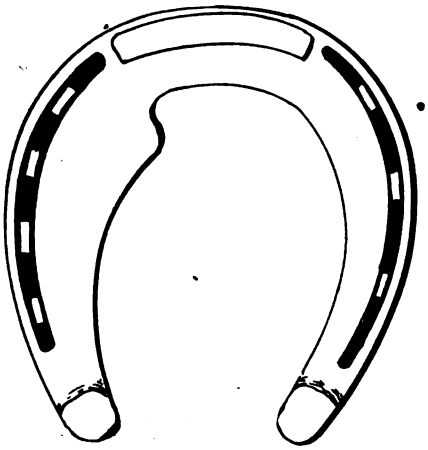


FIG. 1.—FOR INTERFERING IN FRONT

The mule is less liable to disease than the horse, and if trained properly the mule is docile, reliable, sure footed and very seldom gets frightened. The mule if given proper treatment and fed liberally will be good for twice the number of work-years usually accorded a horse.

The reputation for kicking and viciousness, which is generally held by the mule, is not at all deserved. Mules that are vicious at maturity are made so by bad training and poor management. The same treatment accorded a colt will produce a vicious horse.

The foot of the mule differs from that of the horse in that, while the front or toe is rounded, from the quarters back to the heels it is straight, more on the order of a horse's foot contracted at the heels. Care must be exercised to keep the foot from growing out too long at the toe and too high at the heels. The frog of the foot must touch the ground to keep the foot healthy. The mule's foot has a tendency to contract at the ground surface, and if not cared for properly the heels may shrink in to such an extent as to touch each other at the ground surface, thus crowding the frog out of sight.

The mule should have his shoes replaced every three weeks if the foot grows rapidly, and in no case should his feet go longer than four weeks without being trimmed. The feet should be trimmed as much as possible, consistent with the size, weight and work of the animal. The frog should go untouched, as should also the bars. The general instructions followed in the trimming of horses' feet may be observed in mule shoeing.

The shoe for the mule should, of course, follow the bearing surface of the foot-wall and may be fitted with both heel and toe calks, if necessary. These should, however, be as low as possible and all of the same height, so as to give a level bearing surface. The nail holes should be punched straight and as small nails as possible used. The weight of the shoe, of course, depends upon the size of the animal, but, as a rule, a mule will wear a lighter shoe than a horse.

Some Shoes to Prevent Interfering.

R. J. COUSE.

The interfering animal can in most every case be cured by shoeing. The point to observe in preventing interfering is to weight the feet of the horse in such a way as to cause the animal to throw them away from each other, instead of toward each other. In weighting shoes for the prevention of interfering it is important to remember that all weight

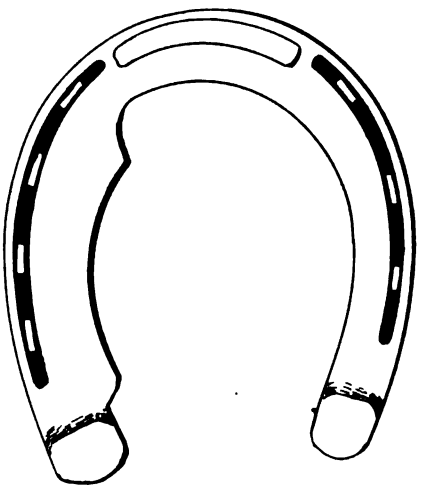


FIG. 2.—A HIND SHOE FOR INTERFERING

on the inside tends to overcome the weight on the outer branch. It is, therefore, really the difference in the weight of the inner and outer branches that causes the animal to throw his feet outward. It is by no means necessary to attach a great deal of weight to an animal's foot in order to overcome interfering. The shoes should be as light as consistent with the weight and size of the animal. Of course, if an animal interferes badly, more weight will be necessary to divert the foot. But never use any more weight than is necessary to make the horse travel clear.

In Fig. 1 in the engraving is shown a weighted shoe to prevent interfering in front. A weight like this will generally cure the interfering animal. However, if more weight is needed have a wider web at the outer heel branch. If the animal is used only on light work a lighter inner branch can be employed. The shoe in Fig. 2 is for a hind foot. The weight of this shoe can also be increased, but it is well to remember that it is the contrast in the weights of the inner and outer branches, rather than the great amount of weight on the outer branch.

Some animals are given to traveling too wide in front, i. e., they swing the front feet out sideways and forward. In this case put a slight weight inside instead of outside, thus causing the horse to travel closer. Care should be exercised, however, in weighting inside or the horse may be made to interfere and strike his other leg.

How to Treat Cracks in Horses Hoofs.

G. F. STEVENS.

The only cracks we have ever been called upon to treat have been, with but very few exceptions, in hoofs belonging to animals that have come from other shops, either in or out of town. The horses that we take care of regularly receive preventative treatment before it is necessary for curative measures. When a horse comes in with hard, brittle feet we pack with pine tar and oakum, apply leathers and a bar shoe if necessary. Occasionally, however, one of our regular animals will develop a small crack in the hot, dry spell, and it is then necessary to treat a real crack.

Our treatment of cracks depends upon the condition of the foot, the thickness of the foot wall and the work the animal is called upon to do.

In Fig. 1, of the engravings, is shown the cracks we have been called upon to treat. The small crack with proper methods will succumb readily. The long crack we have never found in any horses shod by us regularly. It requires persistent treatment and the shoer must be patient.

To begin with it is impossible to grow the cracked hoof together. Some shoers think that the parted wall may be made to grow together. This is impossible. All curative measures tend toward keeping the edges of the crack from moving and to prevent it from

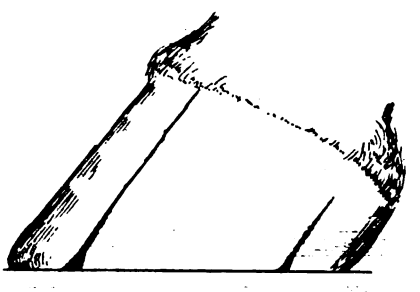


FIG. 1.—CRACKS IN THE HOOF WALL

spreading to the new horn that continually grows down. There are several methods of holding the edges of the crack, though all are not equally effective.

To treat the short, or quarter crack, clean the fissure thoroughly and apply a shoe as in Fig. 2, cutting away a part of the hoof as at X, so that the shoe will have a tendency toward pushing

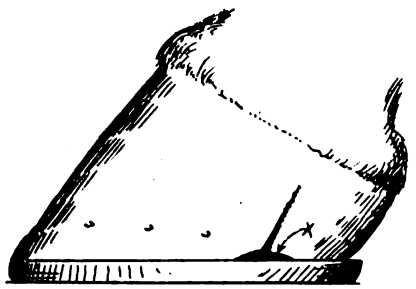


FIG. 2.—RELIEVE THE BEARING AT THE CRACK

the edges of the upper end of the crack together. If the thickness of the horn permits, drive a thick, tough nail into the wall and across the crack and clinch tightly, as shown in Fig. 4, in the case of a long crack. If the thickness of the wall will not allow of this treatment, easing the bearing on the shoe and the application of stimulants to encourage the growth of healthy horn will generally suffice. Any good hoof ointment to promote the health of the hoof will also assist in the cure.

A good hoof remedy can be made by the shoer himself as follows:

Linseed Oil.....	8	ounces
Oil of Turpentine.....	4	"
Oil of Tar.....	6	"
Oil of Organum.....	12	"

Mix all thoroughly and apply it every day to the crack. This will stimulate the hoof and is excellent for most every kind of foot trouble resulting in hard or tender feet.

In the treatment of sand and toe cracks we find that the edges of the crack can be held very well with the nails, as in Fig. 4. To apply this treatment, clean the crack thoroughly of all foreign matter and prepare the

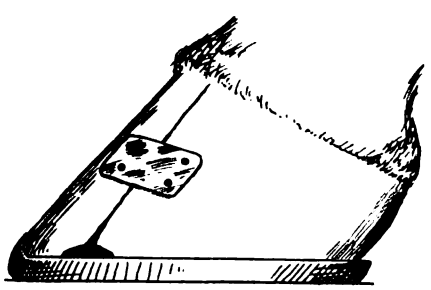


FIG. 3.—A BRASS PLATE IS SOMETIMES USED

hoof for a good stiff shoe. Before applying it relieve the pressure at the bottom end of the crack by cutting the horn away as shown in the engravings.

Some shoers use a brass plate for holding the crack edges, as in Fig. 3. After several trials, however, we find the nails more effective, as they hold the horn better. In applying the nails take a small gimlet and bore from both sides toward the crack. Then take a good tough nail, hammer it thin, if necessary, and bend it slightly to conform to the hole already made. Now drive the nail in carefully and clinch, pulling it up as tight as possible.

Another method that is very effective for use on heavy hoofs is that illustrated in Fig. 5. Small tough bolts and nuts are used to hold the edges of the crack. The nuts can be tightened upon the bolts as the new horn grows down, thus there is little possibility of the crack spreading into the new horn. To assist in the cure, a clip is turned on the shoe where it comes on either side of the crack, as in Fig. 5.

Any measures that will assist the growth of healthy horn or aid in keeping the hoof soft will very materially help the cure. It seems hardly necessary to say that the horn should be tough and soft rather than hard and brittle when either the bolts or nails are applied. If hoofs are extremely hard it would be best to soften them by soaking.

A Blacksmith at Ninety-One and Still Active.

Probably the oldest active blacksmith today is William H. Wood, of Lansing, Mich. Mr. Wood is ninety-one years old and works every day in his blacksmith shop. He has been following the trade since he was ten years old. His father was a blacksmith in the State of New York and William, as a tow-headed boy, was wont to work about the shop.

The father observing the keen interest which the lad displayed in his chosen profession took delight in instructing him in the craft. One day during the same year William's uncle came to the shop with a horse, known as Old Jen. As this was the first horse William's father had shod, the uncle suggested that William should set the shoes this time. The father consented and the boy performed the work. Old Jen was twenty-six years old. From that time until four years ago, when William was eighty-eight, he continued to shoe horses, but still he works at the anvil manufacturing steel wagon jacks.

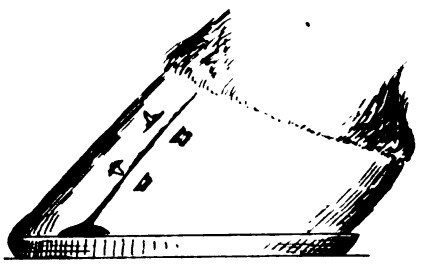


FIG. 4.—NAILS WILL HOLD THE EDGES FIRMLY

Mr. Wood accounts for his longevity by the fact that he was never given to dissipation and never had any bad habits until he was eighty-six years old, when he began smoking. He doesn't call this a bad habit. He began smoking cigars because he thought he would find comfort in it, and so he has.

"I don't think, though, since I began smoking I have paid out over twenty-five cents in cigars, but I have them by the box. My friends and neighbors keep me supplied."

Mr. Wood has possession of all his faculties, says he sleeps perfectly every night and has a spendid appetite. He hopes to reach the century mark and

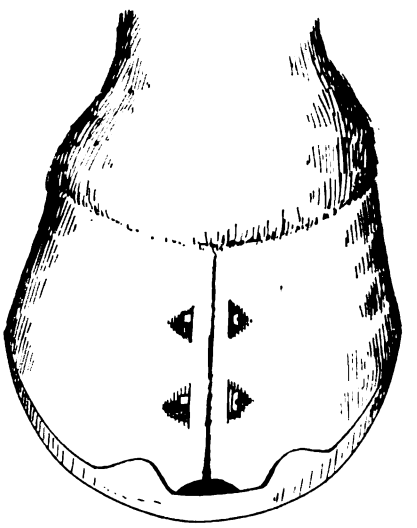


FIG. 5.—SMALL BOLTS ARE ALSO EMPLOYED

declares he will continue hammering at the anvil as long as he can, although he has a good home, surrounded by comfort with his son.

An Old One On The New Man.

C. F. WEBSTER.

The boss hired a new man at the general fire last week and, of course, the boys had to initiate him into his job. The new chap came on Wednesday and lost no time in showing that he knew what he was about. He turned out some good work, show

that he knows something about smithing and incidentally about things that are not exactly in line with the best of smithing practice.

Monday is usually a slack day for the general man, so a couple of the boys put up a job on the new man. While he was eating his lunch at noon they disconnected his draft pipe and stuffed it with some old rags and then connected it up again. Well, it didn't take the new smith long to know what was the matter and haul out the obstruction. After shaking out the old, dirty cloths he tacked them up on the wall with this notice: "The owner of this shirt can have same by applying to forge number 3." Ever since, the boys have been guying Tim Harris.



When painting an automobile much trouble will be saved for the owner if you plug all oil holes with felt or waste. This will prevent the holes from becoming clogged with paint and thus interfering with proper lubrication. This seems a small matter, but failure to protect the oil holes may cause great damage.

E. E. Lyons, New York.

Rubber connections wherever used in the circulating system of a motor car are best renewed once a year. The rubber deteriorates in use and is best if renewed each season. It is also important to have all hose connections free from kinks and sharp bends. Where a sharp angle is unavoidable the hose may be reinforced by running it through a coil spring of the proper size. M. M. New York.

How to Time the Valves.

The Method Employed in "Laying Out" on the Face of the Flywheel. How to Use this Layout in Checking Valve Action.

P. S. Tice in Motor.

Modern valve-timing practice agrees that the exhaust valves of four-cycle engines shall be opened thirty or more degrees before the crank reaches the outer center on the power stroke, that it shall remain open until the crank is several degrees past the next inner center and started on the suction stroke, that the intake need not be opened until a few degrees after the exhaust valve has closed, and that it will remain open during the first twenty or so degrees of the next return or compression stroke.

The reasons for these settings are briefly stated as follows: In order that the exhaustion of the burned gases may be as complete as possible and occur with the least expenditure of energy it is necessary that the pressure within the cylinder be as nearly atmospheric as possible at the time the piston is starting on its return or exhausting stroke. If the exhaust valve were to remain closed until the piston reached the outer dead center the cylinder pressure would be in the neighborhood of forty pounds per square inch at the time of opening. Since it requires upward from forty degrees or more of crank rotation for the area of the valve to progress between zero and maximum values and since the piston would be traveling at about its maximum rate by the time the valve was fully opened, with the opening started at the dead center, as above, a considerable pressure would be maintained throughout the exhausting stroke, because of the inability of the gas to escape with sufficient rapidity through the small opening areas during the early stages of the valve lift and before the increased speed of the piston nullifies the effects of the increased area of valve opening.

This partial imprisonment of the burned gases results in the imposition of negative work during the exhaust stroke and causes the retention of a considerable portion of the burned and inactive gases at the time the exhaust closes. This imprisonment of inert gas at pressures above atmospheric reduces the amount of fresh charge that can be aspirated during the next stroke, in that the retained gas must be expanded to below atmospheric pressure before any fresh charge can be drawn in. Besides reducing the quantity of fresh mixture that can be aspirated, these gases being inert, act to dilute the charges and weaken the combustion through a retardation of the rate of propagation of the flame which is started upon the occurrence of the ignition spark.

Holding the exhaust valve open for several degrees after the inner center is passed facilitates the reduction of the cylinder pressure before the opening of the intake valve, but this purpose can be better served by causing the exhaust valve to be opened before the outer center of the power stroke is reached. In this way cylinder pressures can be but little above atmospheric throughout the exhaust stroke and all, or nearly all, of the above-noted negative work is obviated. When a properly "early" opening is combined with a properly "late" closing in the timing of the exhaust valve, the points for both the opening and the closing having been determined for any particular engine by tests run under full load, at about the mean speed at which the engine will

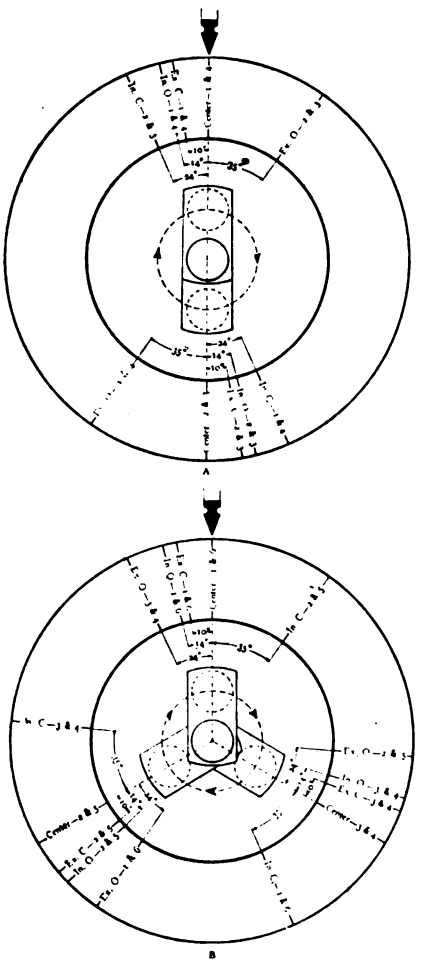
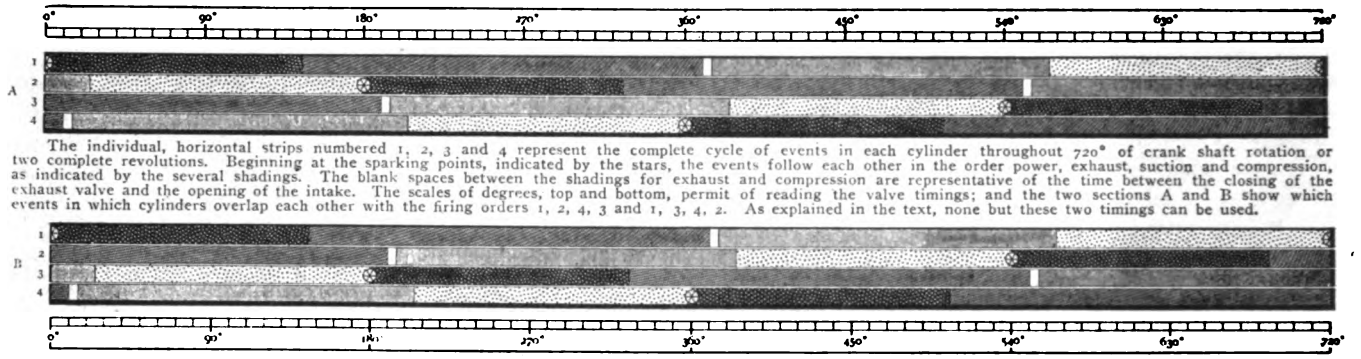


FIG. 1.—FLYWHEEL MARKINGS, SHOWING VALVE TIMING IN (A) FOUR AND (B) SIX-CYLINDER ENGINES



The individual, horizontal strips numbered 1, 2, 3 and 4 represent the complete cycle of events in each cylinder throughout 720° of crank shaft rotation or two complete revolutions. Beginning at the sparking points, indicated by the stars, the events follow each other in the order power, exhaust, suction and compression, as indicated by the several shadings. The blank spaces between the shadings for exhaust and compression are representative of the time between the closing of the exhaust valve and the opening of the intake. The scales of degrees, top and bottom, permit of reading the valve timings; and the two sections A and B show which events in which cylinders overlap each other with the firing orders 1, 2, 4, 3 and 1, 3, 4, 2. As explained in the text, none but these two timings can be used.

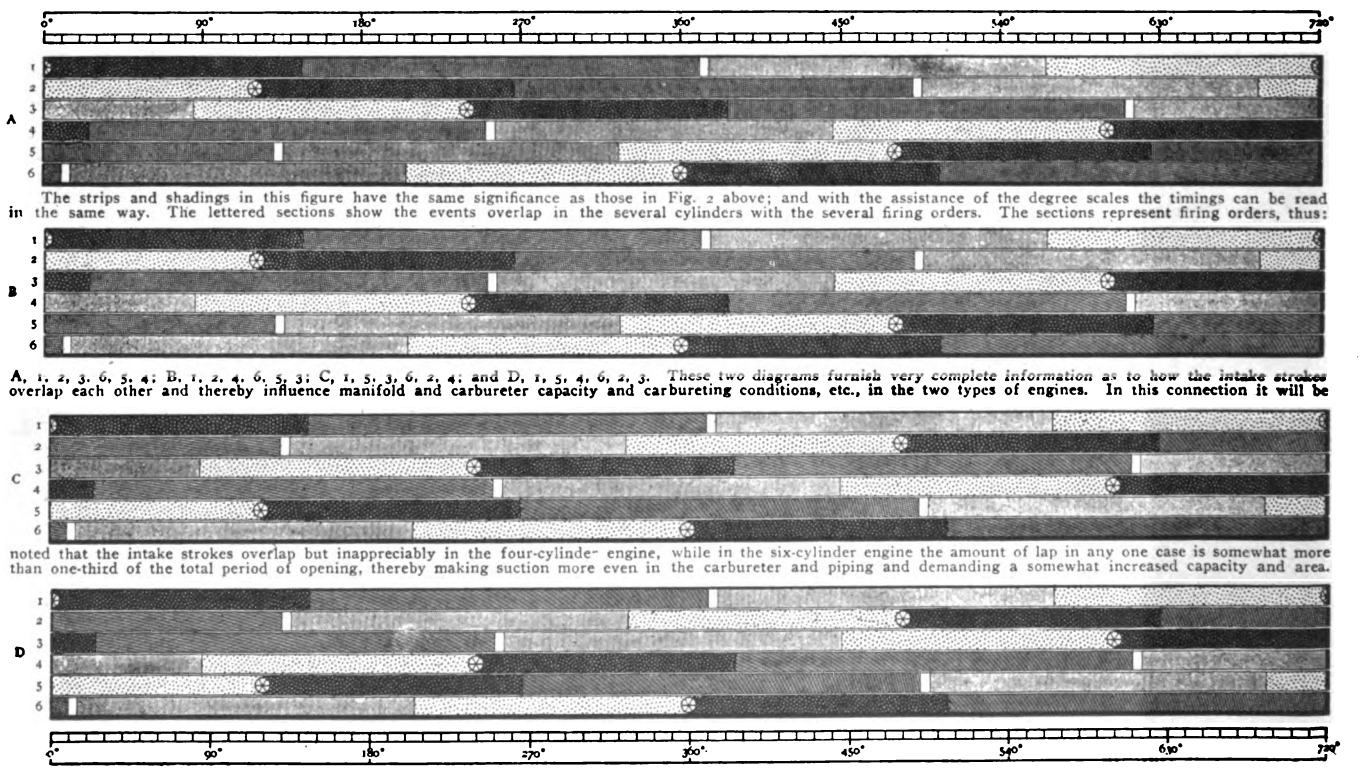
FIG. 2.—VALVE TIMING DIAGRAMS FOR FOUR-CYLINDER, FOUR-CYCLE ENGINES

be called upon to operate in service, it is possible to practically eliminate all negative work during the exhaust stroke and to start the suction or aspiration of the fresh charge almost immediately upon the closure of the exhaust valve, with the cylinder pressure at or even slightly below atmospheric.

It is found to make but an inappreciable difference in the negative work during the suction stroke if the intake valve is opened anywhere between five degrees and twenty degrees after the piston has started on the aspiration stroke. It is usual practice, however, in order that its period of opening may be as great as possible, to start the opening of this valve immediately after or within a very few degrees of the closure of the exhaust valve. The lengthening of the period of intake valve opening in each cylinder of multi-cylinder engines tends to minimize pressure fluctuations during which the piston is virtually at rest, the cylinder pressure will rise to atmospheric through the entrance of additional charge and maximum compression pressure and power will be obtained.

In the foregoing it has been briefly shown why it is that the valves should not be opened and closed on the dead centers, and the directions in which the lappings of the centers should take place. Practice in this regard has become so nearly standard that it is possible to state a mean best timing for the valves of motor car engines designed and geared to run between speeds of two hundred and fifty and twelve hundred revolutions per minute. Exhaust opening thirty-five degrees before outer center, exhaust closing ten degrees after inner center; in the mixture supply system, carburetor and manifold, and therefore creates a better set of carbureting conditions.

In a similar way that the exhaust valve's "early" opening is an advantage, except that the pressure conditions are inverted; a "late" closing of the intake is also an advantage. That is, while the piston is on its out-sweep, during the aspiration stroke, the pressure within the cylinder is at all times below atmospheric. If, therefore, the intake valve were to be closed at the outer dead center, the cylinder would be but incompletely filled with fresh charge, which condition would result in a loss of power, flexibility and thermal efficiency. If the intake valve is maintained in its open position during the period of outer dead center and beyond into the compression stroke, throughout that period intake opening fifteen degrees after inner center, or five degrees after exhaust closure, and intake closing twenty-five degrees after outer center. This timing will give very nearly the



The strips and shadings in this figure have the same significance as those in Fig. 2 above; and with the assistance of the degree scales the timings can be read in the same way. The lettered sections show the events overlap in the several cylinders with the several firing orders. The sections represent firing orders, thus: A, 1, 2, 3, 6, 5, 4; B, 1, 2, 4, 6, 5, 3; C, 1, 5, 3, 6, 2, 4; and D, 1, 5, 4, 6, 2, 3. These two diagrams furnish very complete information as to how the intake strokes overlap each other and thereby influence manifold and carbureter capacity and carbureting conditions, etc., in the two types of engines. In this connection it will be noted that the intake strokes overlap but inappreciably in the four-cylinder engine, while in the six-cylinder engine the amount of lap in any one case is somewhat more than one-third of the total period of opening, thereby making suction more even in the carbureter and piping and demanding a somewhat increased capacity and area.

FIG. 3—VALVE TIMING DIAGRAMS FOR SIX-CYLINDER, FOUR-CYCLE ENGINES

maximum results in power and flexibility, together with minimum fuel consumption per horsepower hour in almost every motor car engine. Of course, a shifting of every one, or several, of these timings through a distance of four degrees or five degrees either way may be made to give improved results in particular cases.

Table 1.
Orders of Events in Four-Cylinder Engines.

Firing Order		A 1-2-4-3	B 1-3-4-2
Order of Events.	1	*Spark —1	*Spark —1
	2	Ex. C.—4	Ex. C.—4
	3	In. O.—4	In. O.—4
	4	In. C.—2	In. C.—3
	5	Ex. O.—1	Ex. O.—1
	6	*Spark —2	*Spark —3
	7	Ex. C —3	Ex. C.—2
	8	In. O.—3	In. O.—2
	9	In. C.—4	In. C.—4
	10	Ex. O.—2	Ex. O.—3
	11	*Spark —4	*Spark —4
	12	Ex. C —1	Ex. C.—1
	13	In. O.—1	In. O.—1
	14	In. C.—3	In. C.—2
	15	Ex. O.—4	Ex. O.—4
	16	*Spark —3	*Spark —2
	17	Ex. C.—2	Ex. C.—3
	18	In. O.—2	In. O.—3
	19	In. C.—1	In. C.—1
	20	Ex. O.—3	Ex. O.—2

It is usual for manufacturers to have determined the timings with which their engines prove most satisfactory and to require that the valves be so set in the assembling of the engines. To facilitate this work in the factory, and also to insure that the timings will be returned to their proper positions in the repair shop in the event of a replacement or overhauling, most makers now lay out the timing on the flywheel periphery, marking each event with steel stencil letter. This timing layout is always made with reference to a pointer attached to a crank case, or some adjacent part of the engine, and the event indicated in each instance should occur just as the tip of the pointer is brought into coincidence with the mark on the flywheel, the latter being turned in the direction in which it rotates, with the engine running while such determinations are being made.

While all expert repairmen are, or should be, capable of properly interpreting and using these flywheel markings, they are such as to cause considerable confusion in the mind of him who has had no experience in setting valve timings. This is a state of affairs which should not exist, since it is very important that the valve timing be maintained against wear and lost motion if the greatest satisfaction is to be had uniformly from the engine. The diagrams and tables herewith are presented in the belief that they will serve to elucidate not only the method employed in laying out the timing on the flywheel, but also the manner in which the markings are used in checking up the timing of an engine which has been in service for some time, with consequent wear in the valve operating parts.

When the engine has but one cylinder there is no chance to go astray in laying out or using a set of flywheel markings, since after the centers are marked to coincide with the tip of the pointer when the crank is on dead centers all that is necessary is that the proper event be indicated at its proper distance from the center marking. In the factory the events are first laid out at the proper angular distance on a circle equal in diameter to the flywheel of the engine, and the distances from the center markings, measured linearly on the perimeter of the circle, are then determined. The engine builders then use these linear distances in the actual laying off of the flywheel, using a steel tape scale for the purpose.

Fig. 1 shows clearly the relationship existing between the cranks, the flywheel markings and the pointer for both four and six-cylinder engines, A and B, respectively. The flywheel layout for two-cylinder opposed and two-cylinder vertical engines with cranks in line is identical with that for a single cylinder, since similar events occur in these latter engines exactly three hundred and sixty degrees, or one revolution, apart. The layout for two-cylinder vertical engines with cranks at one hundred and eighty degrees is shown in Fig. 1, A, if cylinders three and four are omitted.

It will be noted in Fig. 1 that similar events are coincident on the crank circle, although displaced by three hundred and sixty degrees from each other, for those cranks which are in line. Thus the same markings serve for cylinders one and four and for cylinders two and three in the four-cylinder layout, and for one and six, two and five, and three and four in the six-cylinder layout. It is in this particular that confusion is apt to arise when this matter is being handled by a novice, and it is for the obviation of this confusion that the accompanying tables, 1 and 2, and the diagrams, Figs. 2 and 3, are presented.

In the tables and the diagrams operations are uniformly started at the firing point of cylinder No. 1 and the sequence of events given for the several possible firing orders. Since cranks one and four, likewise two and three, in four-cylinder engines, have coincident axes, either two or three may be made the next in firing order after one. This in no way affects the timing layout on the flywheel, but it does affect the sequence or order of events, as shown in Table 1.

Table 2.
Orders of Events in Six-Cylinder Engines.

Firing Order		A 1-2-3-6-5-4	B 1-2-4-6-5-3	C 1-5-3-6-2-4	D 1-5-4-6-2-3
Order of Events.	1	*Spark —1	*Spark —1	*Spark —1	*Spark —1
	2	Ex. C.—6	Ex. C.—6	Ex. C.—6	Ex. C.—6
	3	In. O.—6	In. O.—6	In. O.—6	In. O.—6
	4	Ex. O.—4	Ex. O.—3	Ex. O.—4	Ex. O.—3
	5	In. C.—3	In. C.—4	In. C.—3	In. C.—4
	6	*Spark —2	*Spark —2	*Spark —5	*Spark —5
	7	Ex. C.—5	Ex. C.—5	Ex. C.—2	Ex. C.—2
	8	In. O.—5	In. O.—5	In. O.—2	In. O.—2
	9	Ex. O.—1	Ex. O.—1	Ex. O.—1	Ex. O.—1
	10	In. C.—6	In. C.—6	In. C.—6	In. C.—6
	11	*Spark —3	*Spark —4	*Spark —3	*Spark —4
	12	Ex. C.—4	Ex. C.—3	Ex. C.—4	Ex. C.—3
	13	In. O.—4	In. O.—3	In. O.—4	In. O.—3
	14	Ex. O.—2	Ex. O.—2	Ex. O.—5	Ex. O.—5
	15	In. C.—5	In. C.—5	In. C.—2	In. C.—2
	16	*Spark —6	*Spark —6	*Spark —6	*Spark—6
	17	Ex. C.—1	Ex. C.—1	Ex. C.—1	Ex. C.—1
	18	In. O.—1	In. O.—1	In. O.—1	In. O.—1
	19	Ex. O.—3	Ex. O.—4	Ex. O.—3	Ex. O.—4
	20	In. C.—4	In. C.—3	In. C.—4	In. C.—3
	21	*Spark —5	*Spark —5	*Spark —2	*Spark —2
	22	Ex. C.—2	Ex. C.—2	Ex. C.—5	Ex. C.—5
	23	In. O.—2	In. O.—2	In. O.—5	In. O.—5
	24	Ex. O.—6	Ex. O.—6	Ex. O.—6	Ex. O.—6
	25	In. C.—1	In. C.—1	In. C.—1	In. C.—1
	26	*Spark —4	*Spark —3	*Spark —4	*Spark —3
	27	Ex. C.—3	Ex. C.—4	Ex. C.—3	Ex. C.—4
	28	In. O.—3	In. O.—4	In. O.—3	In. O.—4
	29	Ex. O.—5	Ex. O.—5	Ex. O.—2	Ex. O.—2
	30	In. C.—2	In. C.—2	In. C.—5	In. C.—5

As there are but two cylinders for choice as second in order, with four cylinders and no choice for third in order, it follows that there are but two possible firing orders—1-2-4-3 and 1-3-4-2, A and B, respectively, in the diagram and table.

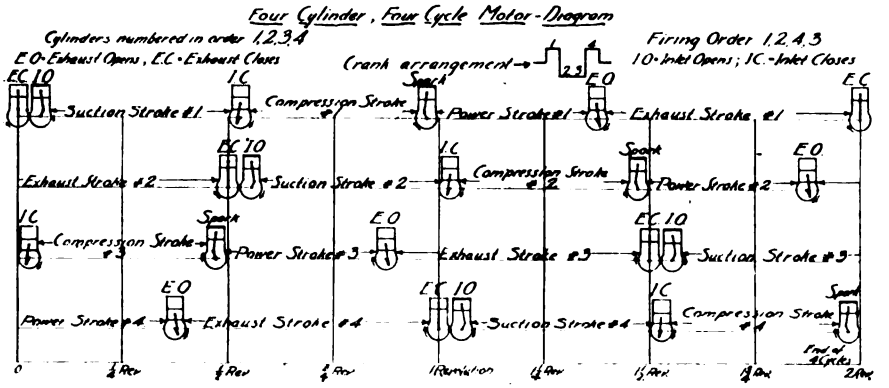


FIG. 4.—A VALVE DIAGRAM FOR A FOUR-CYLINDER MOTOR

With six cylinders, however, while that above regarding the coincidence of events in the layout is true, there are two choices for second in order, and also for third. Therefore, there are four possible firing orders—1-2-3-6-5-4, 1-2-5-4-6-3, 1-5-3-6-2-4 and 1-5-4-6-2-3. These orders are designated by the letters A, B, C, and D, respectively, in the diagram and table.

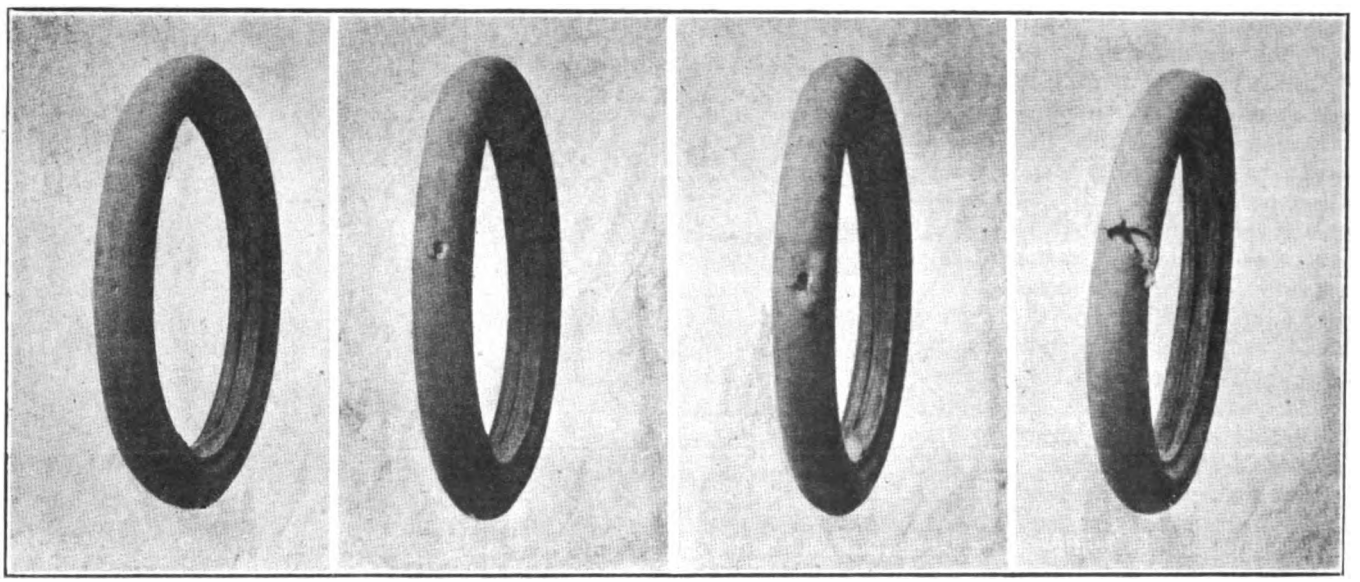
In order to make use of these tables of sequences of events it is first necessary to determine the firing order of the engine. This is most readily done by opening the relief cocks and cranking slowly and observing the order in which the coil vibrators act, if the engine is fitted with this type of ignition system, and tracing the high tension leads to their respective cylinders. The same may be done with either the single coil and distributor system, or with an engine fitted with magneto, removing the distributor cover in each case. If the engine is fitted with make-and-break ignition, observe, instead, the order in which the ignitors are actuated.

After making note of the firing order, as above, cut several slips of very thin, but tough, tissue paper. Sheet steel is much more serviceable, but is not so readily obtainable, since to be of any service in this work it must not exceed three thousandths of an inch in thickness.

For example, let us take the four-cylinder firing order, A. Before commencing the actual checking up, insert a slip of paper between each of the cam follower or tappet lever ends and its valve stem ends. Then turn the engine over, with relief cocks open or spark plugs removed until the ignition spark occurs in cylinder 1. We are now ready to start the checking. Either turn, or have someone else turn, the engine over very slowly, while exerting a slight pull on the slip between the follower and exhaust valve stem of 4, ceasing the turning of the engine as soon as the slip is felt to give. This should occur just as the mark Ex. C.—1 & 4 comes opposite the pointer. If the engine has been in service for some time without adjustment to those parts, it will undoubtedly be found that the paper slip will become free before the mark reaches the pointer. This indicates a too early closure of the valve. To remedy, free the locking device on the adjustment of the cam follower end and set up until the paper is just free when the mark coincides with the pointer tip. The adjustment should be locked at this point.

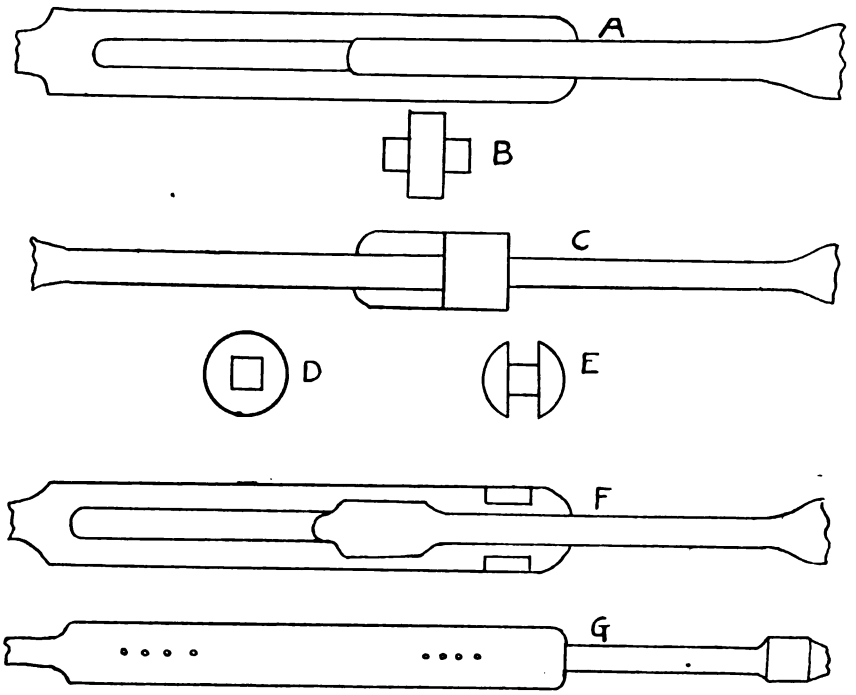
The paper slip under the intake valve stem in 4 will be free at the time that under the exhaust stem is freed, but a further motion of the crankshaft will cause it to be held. Proceeding as before but noting, instead, the instant at which the slip is held, the adjustment can be made so that the opening of the intake will occur at the proper mark. If the parts are somewhat worn this opening will be late and the flywheel should be turned back and the adjustment made so that the valve will pinch the paper just as the mark is brought opposite the pointer tip, of course, turning the wheel in the direction in which the engine runs. By consulting the table and proceeding as above it is possible to run through the whole set of valves in a very short time.

Before checking with the slips it should be noted if the abutting surfaces of the valve stem and cam follower are



THE EVOLUTION OF A TIRE, FROM THE PIN HOLE TO THE BLOW-OUT

truly flat. This is a very important point, since if one of them has worn a depression in the other no proper adjustment can be made. If either is found to have a hollow it should be filed or ground flat and hardened before resetting by the above method.



THE WELL-DRILLING JARS MOST COMMONLY USED

The Use of Portable Vulcanizers.

H. W. SLAWSON

in Motor.

It has been pointed out time and again that with "let downs" and "rim cuts" and "blow-outs," as with influenza, pneumonia and smallpox, the preventive ounce is worth at least as much as, if not several times more, than the curative pound. And it is true that many a tire is now on the scrap heap or made into rubber boots which, if its first symptoms had been heeded and properly ministered to, might still be raising dust upon the highway. The proper care of tires, however, is a subject to be dealt with extensively by several authorities, and it is not the intention of the writer hereof to go over any of this well-trodden ground. The purpose of the present article is to endeavor to aid the reader to a better knowledge of how simple and easy it is to take care of tires by the methods and appliances now offered by a number of manufacturers of portable vulcanizers.

Vulcanizing is the only permanent form of repair for the most ills of either the inner tube or the outer casing of pneumatic tires, and when properly performed vulcanization renders the tire practically as good as new; so far, at least, as the rubber is concerned. It will be understood that vulcanizing does not affect any repair to cuts or other weakening of the fabric.

The term "vulcanizing" means the chemical curing of raw rubber by causing it to combine with a certain proportion of sulphur by the application of heat, thereby changing its properties—a process discovered after many years of patient research by Goodyear. As applied to the repair of tires, the term is understood to relate more specifically to the process by which a patch or even a whole new tread of raw rubber is made to unite with the already vulcanized or cured rubber of the tire by the application of heat until it forms one homogeneous piece with it. It is a more complicated process than the welding of two pieces of metal together, because there occurs simultaneously a complete change in the nature of the new rubber and a perfect union of the new with the old rubber, which has previously been treated with sulphur and heat. It is asserted that at the place where two pieces of rubber have been vulcanized together the union is stronger than any other place throughout the individual length of either piece.

It will not be difficult to understand, then, why it is that the prompt vulcanization of small cuts, punctures, blisters, etc., as they come to notice, will greatly prolong the life of the tires and prove far more satisfactory than the temporary expedient of patching.

(To be continued.)

More Well-Drilling Jars.

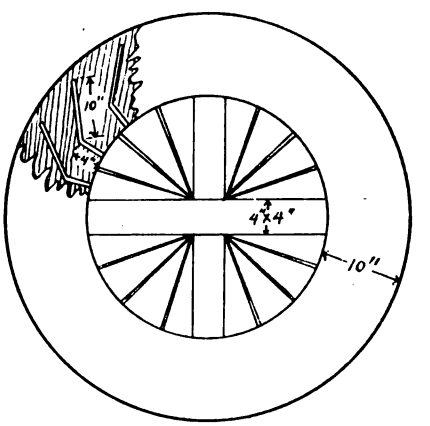
L. R. SWARTZ.

The accompanying engravings illustrate the form of jars most commonly used, but, as the girl said about her fellow, "There are still others."

The square link jars first illustrated at A are probably the oldest form of jars of any consequence. They were in use in the sixties and seventies. At B is shown a cross-section taken through the heads. They are of simple construction, the heads and reins being built up of square stock of suitable size into flat-headed links.

The piston and pole tool jars come later on. I cannot now tell the order of their coming.

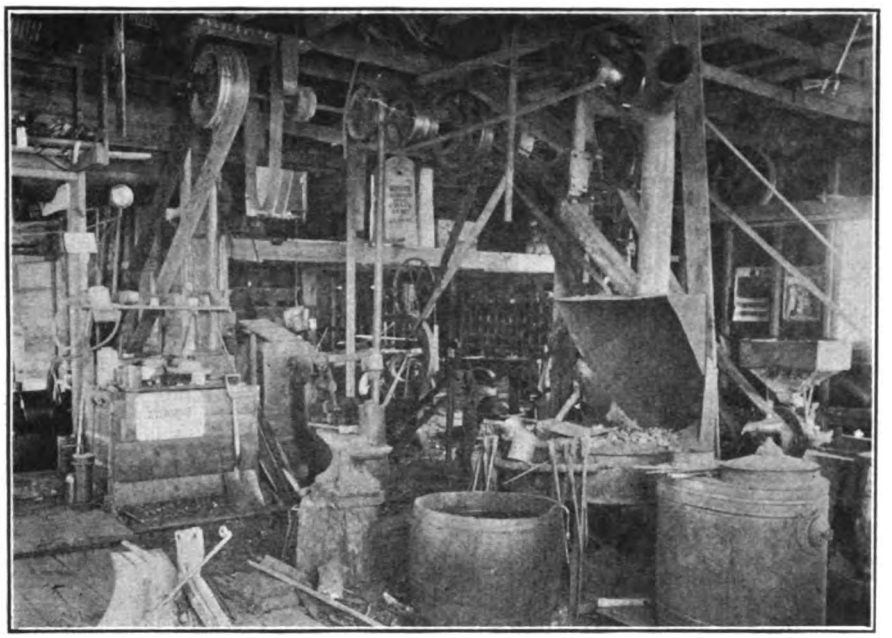
The piston jars are shown at C. An end view of the jar head is shown at D and is connected to two reins which are welded to the box. An end view, E, of the piston is worked out so as to engage three sides of each rein and is attached to the piston stem, which is welded to the pin. These jars have a larger striking and guiding surface and could be used either with pole or cable rigs. Next come the pole tool jars, such as are used on Canadian or pole tool rigs; they are an improved form of square-link jars. The heads of these jars are upset and worked so as to form guides on three sides of each rein. In their way they are very serviceable jars, but not so strong as round-link jars. (These latter will be the subject of a later article.)



HOW TO BUILD A WATER-POWER WHEEL

Next comes the self-turning jars, gotten up by the Keystone Driller Company, of Beaver Falls, Pa., for use on

their wire line machines early in the nineties, and it is well enough to state here that this is the only form of jars that will give satisfactory service with wire cable and that wire cable will not give satisfaction if used without these jars. The downward rush of the cable and the rebound of the tools meeting at each stroke soon breaks the wire cable at the rope socket. The jars prevent this and also utilize the twisting springs of the cable (whether wire or rope) in turning the tools, which they do with absolute certainty at every stroke of the drill. Full and complete directions for making this style of jars were printed several years ago in THE AMERICAN BLACKSMITH. They are made of heavy pipe and round steel stem and which is welded to pin or rope sockets, as desired. I have seen tools in use having the jar shell welded to the auger stem and rope socket welded to the jar stem. They are very good jars, but for all-around hard knocks there is nothing can be compared to good, round jars.



A GENERAL SMITH SHOP OF MISSOURI

How to Build a Water-Power Wheel.

P. J. O'CONNOR.

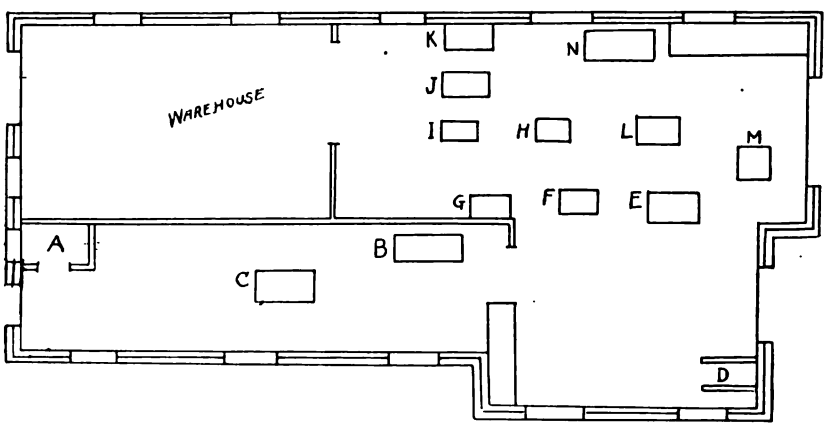
As this is a mining district and everybody uses water power I will try and give Brother Wood a few pointers. The accompanying engraving represents a W. We use 4 by 4 timbers as a wheel foundation. The rim of the wheel is 10 inches deep and 1 inch thick; the buckets go inside of it. The buckets are made of two boards, the first 1 by 4, set on the wheel in a straight line with the center of the shaft. The second board is fitted on top of the first and is 1 by 10 inches, set on a slant so that it will be 1 inch below the rim of the wheel, which is 10 inches deep. That will give the right pitch to the buckets. For a shaft we use 2½-inch water pipe. You can use cast flanges on the wheel to fasten the shaft to. We use ⅜-inch boiler plate, 14 by 20 inches; drill 1-inch hole in the center, then get it hot and hold it over a large hole on the swage-block and pull the edge of the hole down to one side; then drift from the same side until you have the hole large enough for the shaft, and you have a boss on the other side 1 inch deep. Then crimp an inch-square iron collar on the boss and then you will have a flange that will hold a shaft and never come loose. Then drill six ⅝-inch holes around the edge of the flange to bolt to the wheel. Always get your power from the main draft if possible, otherwise you are losing power. Be sure to have your wheel high enough at the bottom of the sluice, so that it will not back water.

Repaired Locomotive Frames.

JOHN M'NALLY.

We have not made any new frames in the C. & N. W. Shop for several years; we have bought all our engines for the past six years. We are, however, constantly repairing a great many broken frames. Our repairs consist of renewing worn and broken parts of iron and steel frames and welding in new iron and steel sections. Our heaviest repairs are welding in new steel sections. This section is welded in at the front jaw and to the main frame bar just back of the cylinder, making what we call a continuous frame and doing away with the troublesome splice just ahead of the front jaw. Of seventy-five sections thus welded we have not had one failure in the welds. Most of these frames are steel. Our method of welding is as follows:

After tramming the frame carefully, so that the frame will be exact length when finished, we prepare the parts to be welded. Our opening for the V is made to a 90° angle. I am very much in favor of this angle, particularly for steel frames, as it makes practically a lap weld. We do all this welding under a long stroke hammer. After we weld in the V's we trim off the surplus stock and return soon as possible to the fire. In all cases we take good side heats on the frame. After this we size frame to thickness and tram to proper length and then trim off surplus stock on sides.



FLOOR PLAN OF GENERAL SHOP OF MISSOURI

It takes a little more trouble to get a good heat where wide openings are made for the V, and requires a little more skill on the part of the heater to heat a wide opening in a steel frame

than it does a narrow one, but you can get a better job, and an experienced heater can get the required heat without any trouble.

All breaks in heavy sections of frame, and breaks, especially between the jaw, are welded with Thermit. This work is not under my supervision, but is taken care of by the erecting shop people. At the present time they are using at this work one handy man and two laborers and the results obtained are remarkable. They have made during the past year 26 welds, with no failures up to date, which seems to me quite a record for Thermit. We also do quite a lot of frame welding with oil. One of these welds failed the first trip; others are still in service. About this time the Thermit man came along and he welded the broken frame that had failed, and it is still in service. Of 47 welds we have made on frames with oil we have had less than 1% of failures. I believe all sections of frames from the smallest to 4 by 4½ inches can be successfully welded with oil, but above these sizes, after you get your heat, you have to depend on squeezing to bring the heavy parts together. With sections of frames, 3 to 4 inches, we are able to make good, solid welds that will compare with anything that can be done in the smithshop, where we have every facility for making a good weld. When we go above these sizes a 14 to 16-pound sledge handled by a good, experienced man will penetrate only 1½ to 1½ inches.

I cannot give you the figures, but I know Thermit and oil welding when properly done will save considerable money. As an illustration, some time ago we had an engine come into the roundhouse with the bottom brace on the frame broken. The size of section was 2½ by 4½ inches. The old method of repairing would be to drop the wheels down, drill several holes in the pedestal and brace, make template, take to the smithshop and have a patch made. Time, two to four hours, according to size of patch, and machinist's time six to ten hours to fit and put same on. In this case engine came in on drop pit, wheels were dropped, frame trammed, air hammer man chipped ½-inch opening in one hour; frame welder had 1-inch piece prepared to go in opening, built small, loose brick furnace around it and in two and one half hours frame was welded and ready for the machinist.

From my experience during the past year I am satisfied Thermit and oil welding are here to stay, and offer an opportunity to considerably reduce the cost of repairing frames, not because this method is any better than welding frames in the smithshop, but because if properly done it will be just as good and at a greatly reduced cost.

A General Shop of Missouri.

ALBERT SCHULTZ.

The accompanying engraving shows a photographic view of the interior of my shop, and also a ground plan. The machines in the picture appear crowded, but they are not, as may be seen in the plan. We do a general smithing business, build buggies and wagons, handle repairs for machinery and deal in hardware, pumps, agricultural implements, pipe, engine repairs, brass goods, hose, belting, binder twine and oils.

The location of the machines is shown in the accompanying plan: A represents the office; B, the gas engine; C, the tire setter; D, shoeing stocks; E, forge; F, power hammer; G, grindstone; H, drill; I, band saw; J, circular saw; K, jointer; L, feed mill; M, emery stand; N, punch and shear.



"I see, by the paper, that horseshoers think their business is being ruined by the automobile," said Benton, dropping into his accustomed seat.

"Yes, I read that article," returned the Editor, without looking up from his desk.

"What's your opinion?" questioned Benton, lighting a cigar. "Do you think that the horseless vehicle has affected the trade as much as the newspaper says?"

"Yes and no," replied the Editor turning in his chair to discuss the matter. "It depends upon the shop, its location and its trade. Now, there's Brown's shop over on the next street. Before the coming of the automobile Brown had a big trade—all the swells brought their high steppers to Brown's shop. He got good prices and had good men. And his shop was always busy. But high steppers are not in style now. Those who formerly kept from four to ten and twelve horses now have one or two riding horses and from one to five automobiles of assorted sizes. Of course, Brown's business has suffered. Brown says himself that he should have jumped into the auto field when he had the chance.

"Charley Root's shop in the downtown district is just the opposite. He caters more especially to the teaming and transfer companies. His trade is better today than it was two years ago. That section has grown and the motor vehicle hasn't cut into the heavy work as it has into the light and pleasure class. That's why some shoers find business getting worse, while others find it as good and even better than last year.

"As for the horse himself, there's a bigger demand for good horses now than there has been for some time and prices are up. Just recently a firm down East tried to secure twenty big draft horses. A buyer had to spend two weeks at the Chicago market before he filled the order. If that's any indication good horses are in big demand."

"Do you think the motor car will ever entirely replace the horse?" Asked Benton, relighting his cigar.

"If it does it won't be in our time." returned the other. "But there is no contradicting the fact that the motor vehicle is becoming more popular every day. Motor cars for immediate delivery cannot be found. A large western distributor advertised some months ago for one hundred cars to be delivered immediately but they have never received a reply to the ad. And many other cases of the demand for automobiles can be cited. Those smiths who have taken up this work are glad they have gone into it and while there may be some who haven't as yet made a great deal of money in this field the time is fast approaching when they will reap considerable profit. There are some smiths who will find this business out of their reach if they don't work into it now and develop as their trade grows."

Sam Shipney came in at this point with a question for Benton. He said he wanted a good bath for hardening high-speed steel.

"I've tried linseed oil, but it doesn't seem to give the result it should," continued Sam.

"Why I just picked up something good on that very subject just recently," said Benton, turning the pages of his notebook. "Here it is. Make a bath of two gallons of pure paraffine oil and two pounds of common table salt. After mixing the bath heat your tools to a lemon and quench by keeping the tool in motion until cold. This will give good results on any of the well-known brands of high-speed metal."

"How should the steel look in coming from the bath?" questioned Shipney.

"Your metal should be gray after cooling in the bath and few black spots showing."

And after thanking Benton and bidding good-day to the Editor, Sam went out.

The Man Behind.

W. O. B.

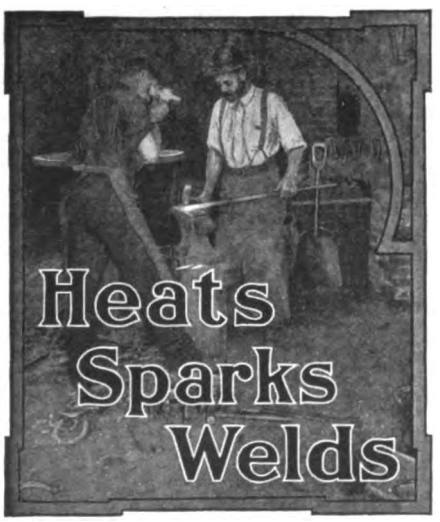
You've heard about the man behind
The shovel and the pick.
The one who comes from o'er the sea
Where lemons grow quite thick.
Of soldier boys you've heard enough—
"The man behind the gun,"
Who's said to be so fearless and
To never turn and run.

And then you've read about the man
Behind the President,
Who really rules our land, 'tis said
With little good intent.
You know about the sleepy man,
The man behind the times.
His time is mostly taken up
With pennies—never dimes.

You've stood before a counter fine,
Talked to the man behind,
Have purchased bread and screws and things
Or hinges for a blind.
The "little man" behind the fence
Who with a ball of snow
Knocks off your hat and runs away—
Of him you've heard, I know.

If you're a "fan" you know about
The man behind the bat.
He makes a play and wins the game,
You shout and toss your hat.
And still another you've read about—
The man behind the bars.
He's stolen bonds or wrecked a bank
Or either wrecked some cars.

You've heard about the man behind
The kodak, book and tree,
The men behind most everything
Are heroes you agree.
But best of all the men behind,
E'en he behind "Big Bill,"
The man with forge and hammer big
Behind an Old Anvil.



"**Success** comes in cans—failure in cant's."

A miss is usually the result of a guess. A guess in business is usually a miss at profits.

'Tis not enough to tell the new shop kid to do—show him how and why and wherefore.

The days grow shorter and the nights are long. Do you use candles or electricity for lighting?

A good investment is our long-time rates. Ask how you can save money on your subscription.

A result is never without a cause. There must be a good reason for your competitor's success.

The fire usually occurs just after the policy has lapsed. Keep an eye on your insurance contract and be on the safe side.

John Hogan says: "What good's a silver-trimmed harness if the horse's not shod right?"

Suggestions and criticisms are always welcome. Compare these pages with a year ago and then write a letter to the Editor.

Using them liberally are you? We've plenty of Pink Buffalo Stamps on hand—don't hesitate to ask for more when you need them.

A bob sled or two built during the fall will turn spare time into profit. Bobs are always handy on the farm and can usually be quickly sold.

A penny postal will bring practical plans for procuring trade protection. Address the secretary today and solve your smithing problems.

Turn out the hard jobs first. Better able are you to cope with the hard tasks when fresh to your work than after you have disposed of the easier jobs.

The long winter evenings are just the time for bracing up your craft knowledge. Ask our book department for suggestions on the subjects you want to read about.

It's not so much the number you shoe as it is the way in which you shoe them. Better far a reputation for shoeing honestly and scientifically than be called the "lightning shoer."

We must wish for a thing before we can work to get it. Backbone is more dependable than wishbone, but if we had no wishbone, backbone would never be necessary.

How can a smith know what is going on in the trade if he doesn't read a good craft journal? There's danger of the trade traveling beyond his reach if he does not keep in touch with it.

Uncle Billy Martin says: "After all is sed our oppertunity fer salvation is to live right as we live—gew-gaws and make-believes may count with the naybors, but we kan't fule the Almighty."

Work alone isn't what makes your business a success. It's getting your money after doing the work that counts most. Keep after the slow payers—send out bills and statements at regular intervals.

A shingle or two may do, but sometimes a layer of good roofing will pay better than another repatching. Before snow flies is the time. These new roofings are easily applied and a good one lasts a long time.

'Twill help him—'twill help us. A post-card bearing the name of some smith unacquainted with "Our Journal" will have our prompt attention. Do you know any smith who does not know THE AMERICAN BLACKSMITH?

Have you asked someone to subscribe to "Our Journal" this month? If you and every other reader made it a point to invite some brother to become one of "Our Folks" we'd soon double our family of readers. Will you do it?

What will it profit a man if he read every hour of the twenty-four for seven times his natural life,—but he fail in his reading to separate the chaff from the wheat? We must read to gain knowledge, but it does not come without thinking.

A good business man first finds out what a customer wants and then he supplies it just as the customer wants it. If the customer doesn't know what he wants the good business man gently tells him what he thinks he wants and needs.

Like slaves do some smiths work, because of lack of proper tools. Modern machines take much of the drudgery out of smith work. There's no reason for working like your great-grandfather did. Take advantage of the progressive times.

After he's left town it's pretty hard to collect. Keep eyes and ears wide open to the movements of customers and delinquents. It's sometimes necessary to insist on immediate payment—when that time comes insist until you get your money.

Never mount grinding wheels without flanges and see that these are at least one third the diameter of the wheel, while one half is best. The flanges should be concave in form and pulp or rubber washers should be used somewhat larger than the flanges.

The Governorship of Texas is again being sought by Mr. E. R. Williams, the Hopkins County blacksmith. There are ten or twelve other candidates in the race this year. Williams should be able to forge ahead and hammer out a "Lone Star" for himself.

A blacksmith strikes quite a number of blows in a day, but compared to the number of impacts made by the roller jewel in a watch his labor is but child's play. This little watch mechanism strikes the fork 432,000 times every day or 157,680,000 blows in one year.

A blacksmith is said to have discovered silver at what is now known as Cobalt in Canada. Several stories are told of the discovery, but perhaps the most likely is one telling of the blacksmith, La Rose by name, stubbing his toe on a rock which upon examination proved to be a silver nugget.

A smooth-tongued stranger sold Tom a little blue bottle of steel-welding compound, the other day, for the small (?) sum of two dollars. When our subscription solicitor called the day before Tom said: "Can't afford a paper—I know it's good, but money's scarce just now." When Friend Tardy opened the bottle of welding compound he found it contained about a half ounce of good borax and the balance was dirty sawdust and iron filings Tom would have done better to invest a dollar in a good paper that will tell him how to make his own welding compounds.

American Association of Blacksmiths and Horseshoers.

The busy season in smithing circles is just before us. Why not make a special effort to get an organization in full swing in your county before snow flies? Sitting idly in the shop and pulling away at a pipe won't bring better craft conditions. Picturing better prices in the smoke from your pipe won't make them real prices. Good, live, brisk action is necessary to get the reforms you ought to have. Why not get the smiths of your locality together? They realize the need of better prices, better harmony and better craft conditions generally. They want these reforms as well as you do. The price problem is but one of the many problems that can be solved by organization. And there is no reason why you cannot organize a strong and growing county association. Start the ball rolling in your county. All the thing needs is a start—it will then practically run itself.

Why don't you give it the start? Other counties have organized; other counties have raised their prices; other counties enjoy harmony. Why not your county?

A few cents' advance now will mean dollars to your bank account at the end of the busy season. Just five cents more will make a big difference. Sharpen your pencil and figure how much more money you would have right now if you had advanced your prices but five cents per shoe the first of last month. And this at no extra cost for fuel, rent or taxes, insurance or any other standing expense. And this to say nothing about the other good reforms that are possible and are really needed.

Will you, Mr. Reader, just drop me a postal asking for my easy plans for forming branch associations? A postal will bring them by return mail. It will take but a minute to write me. Just address me P. O. Box 974, Buffalo, N. Y. And better write right now before you forget.

THE SECRETARY.

Trade and Technical Education in Other Countries.

2.—Belgium.

WILLIAM H. DOOLEY.

As one passes from Holland into Belgium he is greatly surprised at the differences in the characteristics of the people of the two countries and the methods of transacting business. The Belgians have been honored since the days of Julius Cæsar for their heroic deeds and their spirit of liberty and independence.

Another distinctive feature of the national character of the workman and the manufacturers of Belgium is the sentiment which makes him so friendly and so hospitable. He opens his shop to the foreigner with as much willingness and pleasure as he would to his brother. This is the reason why so many international gatherings, congresses and conferences of all kinds have held their sessions there. These characteristics have placed Belgium among the leading and most prosperous manufacturing nations of Europe.

Their industrial communities are like busy hives, everywhere and in every direction, striving to produce quickly, well and much. Coal mines, iron works, blast furnaces, steel works, glass and china works, spinning and weaving mills, firearms and engine foundries, in short, all that modern life comprises in its most refined, luxurious wants is to be found in this small country, which has become equal to countries ten times its area.

The characteristics of the people are found in their institutions, particularly their educational institutions. The Belgian institutions proclaim absolute liberty in teaching. There is no compulsory educations, but most of the people feel that education is a necessity and send their children to school. They are firm believers in industrial education, believing that every person should have a vocation to justify his existence. The government has taken the stand that industrial and technical schools should be organized with a view of meeting local needs, hence they should be considered from a local point of view—by the character of industries that are in existence in that particular section of the country. This is a very wise provision.

This small country supports upwards of six hundred industrial and technical schools of higher or lower grades and provides for these schools over three thousand teachers to meet the every-day needs of her many and varied industrial workers. In the Belgian instruction great emphasis is laid upon the neat and artistic construction of products, and this work is carried on in much the same spirit as it is in France. The great variety of trade taught is surprising, but in all this instruction the fact is constantly before the pupil that the schools cannot turn out finished workmen. A competent workman is the result of technical education plus subsequent shop experience.

These schools may be roughly divided into the following classes: Trade Schools, Trade Courses, Apprenticeship Shops, Industrial Schools and Housekeeping Schools.

The trade schools are intended to teach boys the practical work of trades. In some schools the pupils are instructed in shop work, theory and general subjects during the whole day. In other schools part-time courses are given at intermittent times during the day. In still others night and Sunday instruction is given. The trade schools are becoming more and more popular with all classes in Belgium. The pupils of the regular trade schools have fifty to sixty hours per week of school work, and the evening pupils six to twelve hours. The length of the course varies from three to five years. The tuition in most of these schools is very low.

One of the best organized trade schools is the professional trade school for carpentry. This school, which is entirely free to pupils, has for its object the development of competent carpenters, not only as workmen, but also as regards the general knowledge of the trade. Although only established three years ago this school is housed in a commodious building and all branches of carpentry are taught. At the present time there are eighty-five pupils, but the school has accommodation for twice that number.

The course covers four years. In the first year the line of study is general, while the last year is a finishing year. In the ordinary course of apprenticeship a boy is trained from fourteen to twenty-one, but rarely becomes thoroughly efficient until he is thirty years of age. Pupils can enter this school between fourteen and eighteen years of age. They must be in good physical condition and have completed the elementary school course. The aim of the school is to turn out a good workman, after his four years' training, at eighteen to twenty years of age.

The schools hold two four-hour sessions each day. Four hours a day are devoted to drawing and book-work and four to manual work. The teachers are master workmen, drawn from the best shops, who have also been required to pass a special qualifying examination.

Each boy is provided with a tool box, made in the school, and many of the benches are also made in the school. Provision for first aid to the injured is made.

Parents are asked to make monthly visits to the schools to view the progress made by the students. Every month, also, there is a meeting of the teachers, at which one delivers an address on methods of teaching, to be criticised oftentimes by the others. The discipline in this school is more rigid than in the elementary schools. It approximates that existing in workshops and construction work. There are no home lessons given. No special text books are used. The courses are given by means of notes prepared by the instructors and given out to the pupils to make their own notes. This saves considerable time. Everything required in the school is supplied to the pupils without charge.

As a result of this school instruction apprenticeship may be completed in one third the time usually necessary, and the general information acquired is of great advantage, since all such instruction is lacking in the shops. This school greatly increases the interests of pupils in their trade and employers prefer its pupils, because they are more capable than those who have not attended such a school. The standard of the trade is raised much higher by reason of the school, because the value of the workers in it increases through attendance at the school. All classes appreciate its utility.

A recent exhibition of its work showed clearly the value of the system of instruction followed here by the teaching staff. This instruction, which has given excellent and quick results, has been developed intelligently along lines which furnish a solid groundwork for the carpentry trade.

In the treatment of drawing, for instance, an interesting method is followed out. In free-hand drawing attention has been given chiefly to making sketches of objects taken from the trade. Much time being given to practice in visual measurement. In mechanical drawing a study of projections is made, progress in which is much facilitated by a few exercises in free perspective. Thus is established firmly and surely the foundation for preparing the technical sketches, which are essential to the modern practice of workers in wood.

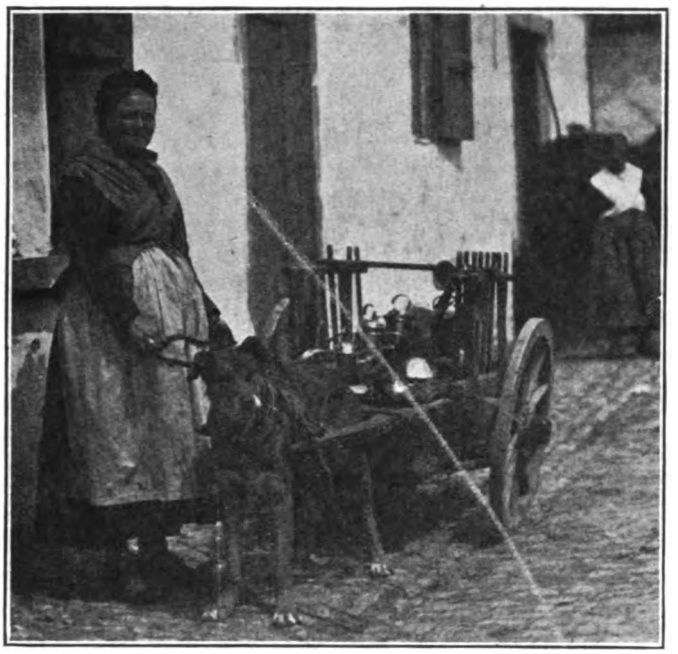
One of the most interesting branches of drawing is the technical drawing for carpenters, which is a real innovation for its form and extended study into those fields of work which the carpenters up to the present have been in the habit of executing only by bringing into play their experience and skill. Through this study the pupil from the start is equipped with the means of overcoming the serious difficulties of his work, surmounting them, not after a long time, aided by examination of the work of others, but directly, by the use of the knowledge acquired. The shop work is very well planned for exercising the skill of the youth in the use of principal tools—saw, chisel, plane, etc.,—and is carried on in conjunction with explanatory notes on the technology of wood and handling of tools.

Each piece of wood is first studied in the drawing lesson. Then the study is continued in the shop, where the pupil before starting work first makes sketch, reduced or enlarged, and later a tracing on the wood, just as is done in actual shop work. In the first year of study the pieces of work are carefully selected, so that the difficulties of the work will be overcome gradually and the various principles successively brought out.

In the second year of study the pupils begin to make small and large pieces of doors and frames, thus using hand tools and working at the bench. In the third year the difficulties of the work are noticeably increased, although the execution is no less perfect. Among other things made by pupils of this class is a partition, built between two of the workshops, entirely executed by the pupils themselves. It is remarkably well finished and of very good design.

In order to further complete the work of some of the trade schools apprentice-shop courses are offered for apprentices to acquire all the knowledge necessary to become a high-grade workman or foreman of a shop. These courses are given on weekday evenings and Sunday mornings. Trade courses are offered for those already engaged in the trade.

Industrial schools in Belgium are institutions of popular education, comprising a course of study useful to young men who desire to enter industrial life. These schools open up the opportunities and the avenues to the difficult industries. The essential feature of all these schools is that they supply especially



THE WOMEN WITH DOGS AND CARTS DELIVER THE MILK



IN BELGIUM THE DOG IS A BEAST OF BURDEN

theoretical instruction. The object is to give such knowledge as cannot be obtained in the shop, to develop indus-



NO FROG—NO FOOT; NO FOOT—NO HORSE

trial intelligence by initiating the pupil to the knowledge of the general principles underlying industrial work.

The reasons for establishing such schools might be of interest. The manufacturers of Belgium have noticed that the principal obstacle to intellectual and artistic development, to the attainment of thorough knowledge of the trade and to sound, methodical and reasonable apprenticeship is to be found in the modern shop, with its present-day requirements and demands.

Once located in a shop the worker is obliged to specialize on a portion of the work without having opportunity to learn it in its entirety, and the disadvantages arising from this condition of affairs are evident. If the workman happens to lose his place and does not at once succeed in finding a similar place elsewhere he is obliged to remain idle. Specialization also has the result of producing only incomplete workmen. Moreover, the demands of the trade, competition and the manufacture of popular goods, which often are lacking in taste and artistic character, all lead to the suppression of artistic trade. On the part of the workman, interest in the work disappears; it becomes mechanical. The spirit of the artisan is not stimulated by difficulties to be overcome, his talent and his national taste are stifled by the demands of the trade and competition.

From a moral point of view this state of things is equally disastrous, for the workman performing his work mechanically no longer lives up to his thoughts and, after finishing his day's work, he is no longer preoccupied with what is interesting and elevating in his craft and his hopes come to rest on the number of hours he has worked and idle conversation.

In addition to schools for boys and men the Belgians pay special attention to the trade education of their young women. In fact, Belgium may claim the honor of having taken the initiative of organizing practically the domestic training education. The first schools of this description were established in 1889.

In any great movement to improve the condition of the poor working classes it is evident that if permanent good were to be accomplished attention must be given to the way in which the working classes expend their earnings. Hence the need of housekeeping classes, for it is noted that the poor condition under which working men are living is due as much to the wasteful way in which the earnings were spent as to the faulty manner in which their food was prepared for the table, lack of proper rules of

THE OTHER DAY

a man came in and asked for another box of "blackhorse" hoof ointment. Of course we had what he wanted and sold him a box of the best hoof remedy we ever saw. It was his way of asking for the famous "Black Beauty Brand" Hoof Remedy. The man said he never saw anything like it—"seems to heal like magic" said this owner of some twelve teams. Ask about "Black Beauty," the best hoof remedy made.

FIG. 1.—MAKE YOUR ADVERTISING INTERESTING

hygiene, poor way in which clothing is made or repaired and lack of judgment regarding the suitability of different seasons.

By establishing schools to meet these needs the Belgians have shown the world that they are capable of meeting and solving any educational problem that may confront them. The United States can derive a great many useful and profitable suggestions from this country in solving this great industrial educational problem.

Some Smith-Shop Advertising.

A very good circular recently sent out by Correll & Son, of Illinois, took the shape of a "Summons Release," space does not allow for a complete reproduction of the circular, but the following is quoted:

"Your release to summons previously served is hereby acknowledged.

The Plaintiff in that action—Correll & Son, who have the BEST blacksmith shop, and the CHEAPEST hardware and implement store in Southern Illinois, admits that the Defendant in action—Fred H. Correll, has used all due care and proper precaution in the management and the distribution of our advertising to the people of this country and hereby withdraws its suit in Action against the said Defendant.

The Plaintiff sayeth to the Defendant in giving you this release, that for first-class work, there is not today, one single shop in the State that surpasses us.

The Plaintiff sayeth further, that the people can not help but know that our Horseshoeing is the BEST in the country: and that we excel all others.

The Plaintiff knows it to be a fact that there's no place on Earth where such close attention is paid to the details of wheel work; and said Plaintiff sayeth to the Defendant that if the people will take their wheels to a BOTCHSmith shop and get 'em ruined: to let 'em go for they certainly know that at THE CORRELL BLACKSMITH SHOP THEY'LL BE FIXED RIGHT.

The Defendant says, a large stock of material, for doing all work promptly, is now on hand, and if YOU want GOOD WORK you know where 'tis done.

Defendant sayeth also, that our hardware prices speak for themselves: OUR CUSTOMERS KNOW WHO SAVES THEM MONEY ON EVERYTHING THEY BUY."

Another good idea is made use of on the letterhead of Mr. J. B. McCluskey, of Montana, who makes a specialty of shoeing horses as they

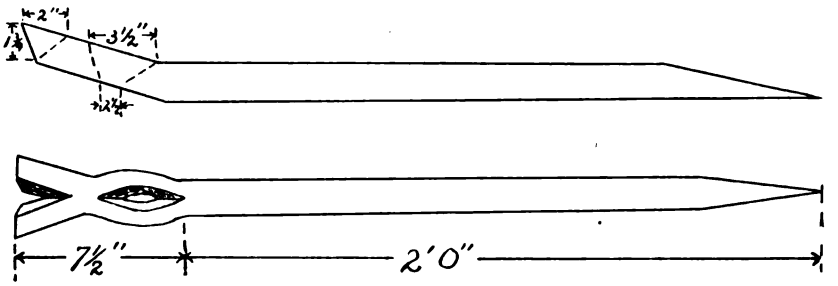
NOTHING

is cheap unless it is good. Good work gives satisfaction. To be satisfied means a good deal to everyone, whether beggar, laborer or millionaire. The man who wants 50 cents worth of repairing wants 50 cents worth of satisfaction, and the man who buys a hundred-dollar buggy wants a hundred dollars worth of satisfaction. To be satisfied with any kind of smith work from the resetting of a shoe to the building of a buggy the work must be done right, look well and wear.

FIG. 2.—A TALK ON QUALITY

should be shod. The engraving is a reproduction of the illustration he uses on his letter head.

That advertising will and does help smith-shop business is being proved every day. Every smith who is looking for more business can prove this to his entire satisfaction. There are lots of ways of advertising the shop. The daily or weekly newspaper, special circulars, personal letters and personal calls are the usual methods, but the different methods are almost without number.



A VERY HANDY TOOL EASILY MADE

A smith must be guided largely by his location, his particular field and his facilities for doing work. But whatever his work, whatever his method of advertising he should bear in mind that the aim of his advertising is to advertise his own shop and business. There is little that reflects more discredit upon any advertiser than to knock his competitor or to knock anyone for that matter.

When you say anything in your advertising, say it as though you meant it. Don't say it in a half-hearted apologetic manner. If you know how to repair plows so they will work as they ought to work, say so in your advertising as though you meant it.

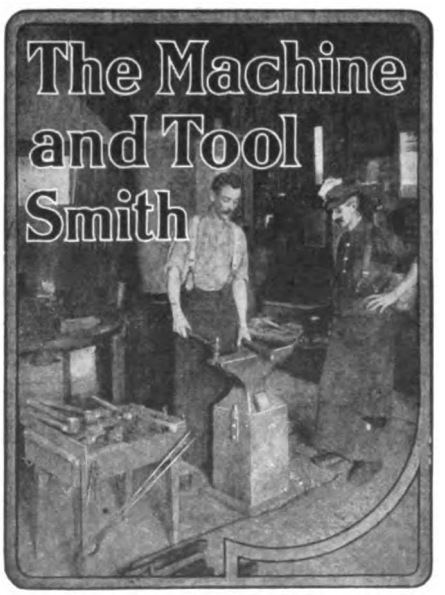
Don't talk price in your advertising unless it is necessary. And then always couple it with quality. For instance, let us suppose Fig. 2 to be the introduction to an ad on quality and price. It is an acknowledged fact that price talk hits the customer in the pocketbook—a vital point. But if you are doing work as it should be done and your competitor is cutting prices, the best and the only talking point is quality. And if talked up right, if presented correctly, it will win every time.

If you run an ad in a daily paper, you can make your ads very interesting by getting in a little shop incident occasionally. The advertisement in Fig. 1 is an example. Little items of this kind compel attention and hold interest. When you build a new wagon, tell about it in your advertising. If a wagon you made five or ten years ago is still in active service, tell about it. There are occasions almost without number that can be called upon to make your advertising interesting.

A General Handy Tool.

MAT GELSON.

The accompanying engraving shows a very handy tool for pulling nails and for tearing up old work. The stock used is octagon steel. The entire tool is two feet seven and a half inches long. The handle from A to B is two feet, the claw and eye from B to C is seven and a half inches. Other dimensions are shown in the engraving. This claw bar will find many uses in the general shop and it may even prove a source of profit as a side line. Merchants, grocers, shipping rooms, should find this tool handy for opening barrels, boxes and crates.



The Smith and His Work—7.

ROBT. B. KERR.

Hardening and Tempering.

For this most important process the chief essential is again uniformity in heating, coupled with as low a heat as possible, consistent with getting the work hard enough.

A high heat will loosen the grains of the steel and leave it brittle, and the piece being now finished it is impossible to hammer it. So it follows that any high degree of heat for hardening will give a coarse grain; an irregular heat will give an irregular grain, consequently, strains and cracks.

Heat slowly, protect finished parts and especially cutting edges from jets of hot flame. Turn the piece frequently to get it hot on all sides alike. Follow suggestions given in a previous article on care of the fire. Remove from the fire whenever ready; do not allow it to soak and scale.

Tools with fine cutting edges, such as taps, wood-machine knives, milling cutters, or small, complicated dies, etc., can be heated, with perfect uniformity and safety, in lead. This excellent method is too little used.

Secure a cast iron vessel of any description—a large lead ladle, or molder's hand ladle will answer the purpose—together with sufficient lead. Place in the fire and bring up to the required heat. The work will come out heated perfectly, without scale and with the finest cutting edge untouched. Half an inch or so of powdered charcoal sprinkled on top of the lead will prevent it scumming.

Sometimes there is trouble with the lead sticking to the work, notably in the case of milling cutters. This can be avoided by slightly warming the tool before putting in the bath and dipping in a strong brine solution.

The cooling bath may be composed of water (either fresh or salt), oil, or a hardening solution. Every second smith, especially of the old school, seems to have a pet theory of his own on this subject; especially is this true of hardening solutions. Some little time ago, while preparing these articles, I came across a published recipe for a hardening solution of which the basis was water. One of the ingredients of this solution is a chemical that is not even soluble in water, nor would be by any combination of the other components named.

My own experience leads me to believe that for all ordinary purposes plenty of clean, soft water, at a temperature of between 50° and 60° F., is the best and safest hardening agent known.

For hardening thin pieces that are liable to warp or buckle, such as springs, knife blades, etc., oil is preferable, being milder in its action and more dense,

but oil will not refine steel so well, nor will it harden it at so low a heat as water. Lard or fish oil will be found most suitable.

Where for any reason an unusual degree of hardness is required and no temper is to be drawn, or on special steels, such as soft center plow steel, a salt solution is useful.

The best solution of this kind known is plain sea water, but this, of course, is not available in the vast majority of cases, so as a substitute we can use

Carbonate of soda..... 2 lbs.
Salt peter..... 2 "
Salt.....20 "

Dissolve and add to a barrel of soft water. This is an excellent solution for plow shares or cultivator shovels, as it will make them extremely hard at a very low heat.

Use plenty of water to harden. If running water is available, so much the better; if not, replenish frequently to keep the water about the same temperature. The work being cooled should be moved about in the water to prevent steam being formed, thus keeping the water away from the steel. Long tools that are liable to spring, such as reamers, mandrels, drills, etc., should be plunged vertically and moved up and down—not sideways.

Shear blades should be suspended by a couple of hooks inserted in the bolt holes and plunged, cutting edge up, moving vertically.

Leave all tools in the hardening bath until thoroughly cold. In hardening hammer dies bend a couple of rods and lay them across the bath, leaving them about one and one half or two inches below the surface of the water. Allow the heated die to rest on them, face down. Keep the water stirred up, or, if running water is used, fix a flat spray nozzle so it will force the water upwards against the work. Let it remain in the bath until just enough heat remains to draw temper. Remove, turn face up, brighten the surface and draw just enough to remove strains, or until a faint color shows.

It is sometimes necessary to use a hardening compound on cutting tools that are up against very hard metal, such as chilled rolls, or even hard, spotty castings. The following will answer the purpose: One part each of copperas, salt peter, sal soda and common salt; four parts black oxide of manganese. Pulverize the ingredients separately, mix well and dry before using. Apply like borax after tool is hot; plunge; draw no temper.

For hardening small pieces that should be extremely hard use one pound citric acid crystals dissolved in one gallon of water; plunge, but do not draw.

Carbon steel twist drills can be tempered without drawing with the following:

Salt peter .....1 oz.
White vitriol (sulphate of zinc).....¼ oz.
Soft water.....1 gal.

Heat to a dull red; plunge; draw no temper. This is also sometimes used for cold chisels.

Various methods are employed to draw tools to the required temper and, of course, each tool should be tempered to fit it for its particular work.

The great majority of tools can be most conveniently drawn on a flat piece of iron. For taps, twist drills, reamers or tools of similar shape a large nut or collar will be found suitable. Pass the work through it until the required temper is obtained.

The color is usually depended upon to give results, but is not absolutely reliable. Color merely indicates the temperature of the piece, irrespective of the quality or carbon content of the steel or the intensity of the heat treatment to which it has been previously subjected; so where any doubt exists the work should be tested with a fine file—and sometimes files vary.

Presuming, however, that the previous treatment was right and the steel suitable for its purpose the accompanying table for tools in general use will be found reliable.

Temper	Color	Temp. Fahr.	Suitable for
Very high	Faint yellow	430	Hammer faces, files, engraving, speed lathe tools, mill picks, scrapers.
High	Straw color to	460	Lathe and planer tools, milling cutters, screw
High	Dark straw	470	cutting tools, taps, reamers, twist drills, wood-working tools.
High medium	Brown	500	Wood-working bits, cutlery, large twist drills, slotting tools, plane irons, shear blades.
Medium	Purple	540	Hack saws, axes, wood chisels, punches; High-speed steel milling cutters, taps and similar tools.
Low medium	Light blue to	575	Cold chisels, pneumatic tools, high-speed drills, etc. The proper temper for all metal-
Low medium	Blue	600	cutting tools subject to concussion.
Low	Greenish blue	640	Too soft to be useful.

N. B.—Colors and temperatures from observed pyrometer readings.

TEMPER CHART TELLING COLORS AND USES

Springs of all descriptions are best hardened in oil, its action being less severe than that of water. In tempering them, much depends, of course, on the strength of the spring, the purpose for which it is to be used and whether a hard or soft spring is desired.

The average spring, made from a good grade of spring steel should be heated to a dark red and hardened in oil, or if water is to be used it should be hot. The temper should be drawn to a light blue. A common way is to pass the hardened spring slowly over the fire until the oil burns evenly all over it; let it then cool off in the air.

To temper small springs use the following:

1 gallon lard or fish oil.
¼ pound gum arabic.
1 ounce common salt—mix well.

Heat spring to a dark red; quench; draw no temper.

The best and safest way to temper, however, and unfortunately one that is unavailable to the ordinary smith, is the method of drawing temper in hot oil. The pieces are first heated in a gas furnace or in lead. A pyrometer is attached so that any required degree of heat can be obtained.

After being hardened the tools are suspended in a vessel containing lard or fish oil, which is kept at any required heat by gas burners, a thermometer being inserted in the oil. The work comes out perfectly uniform. This method reduces the art of tempering to an exact science.

Hardening High Speed Steel Tools.

Lathe and planer tools should be slowly brought up to a bright, white heat, almost to the melting point. You will note that it oxidizes very rapidly at this heat. This oxide, or scum, should be brushed off and the tool immediately plunged into oil or placed in a compressed air blast to cool off. Draw no temper. Either oil or air seems to answer equally well. Their use is merely a matter of convenience or preference, the object being to get the tool cooled off as rapidly as possible. Do not allow high-speed steel near water.

Owing to the high heat required it is almost impossible to harden finished tools, such as milling cutters, taps, threading dies, drills, etc., successfully in the forge. The cutting edges round off and the tool scales and blisters. If such is attempted be sure to heat inside of a tube. All such tools should be hardened in a gas furnace, preferably suspended in a crucible and should always be brought to a red heat before being placed therein; if a cold tool is placed in a hot furnace it will scale.

The latest method of heating is to suspend the tools in a crucible filled with barium chloride, heated to about 2000° F. The work comes out perfectly clean and free from scale and with all the cutting edges intact. They are then hardened in oil and drawn back to temper in the usual way. The temper should be drawn considerably more than that of carbon steel tools of a similar kind (see temper chart).

Casehardening.

Closely allied to tempering is the process known as casehardening, which is employed where a hard surface is required, such as on wearing parts of machinery, collars, jigs, spindles, gun parts, wrench jaws, etc.

It virtually consists of converting the outer surface of iron or mild steel into carbon steel by the addition of free carbon, which can be transmitted to the metal from any substance containing it if subjected to heat in an air-tight receptacle.

To do this properly, an air-tight iron box must be provided. Fill with ground bone, leather parings or pulverized charcoal, or all three mixed. Pack the pieces to be treated in with it, being careful not to allow them to touch the sides of the box or each other. Seal up the box with fire clay or, if the lid is made to clamp on, a sheet of asbestos packing will do, but in any case make sure that it is air-tight.

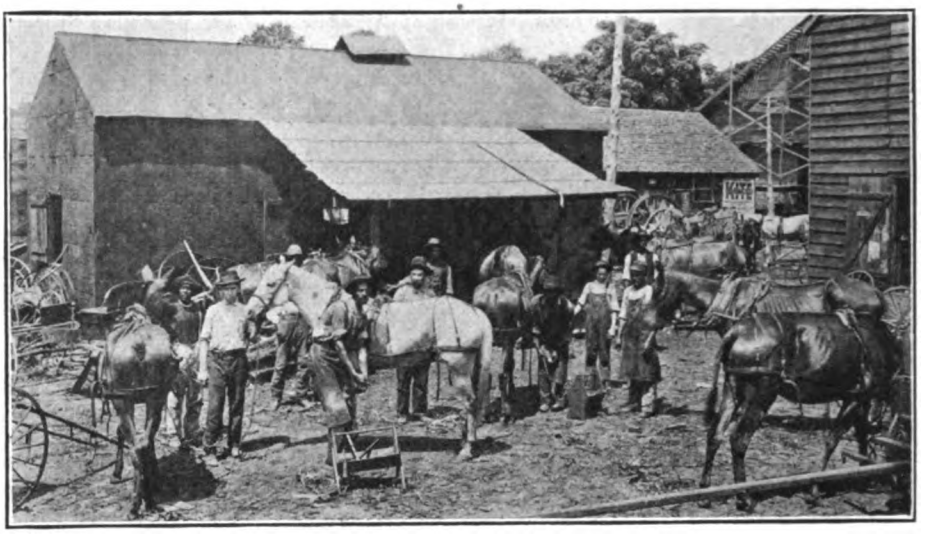
Place the box in a furnace, bring to a red heat and let it remain over night. If a furnace cannot be had a hollow forge fire will answer the purpose. After about twelve hours remove the pieces; let them cool off. Then reheat in the forge and plunge in cold water.

There will be a coating of steel, glass-hard, at least one-sixteenth inch thick on the work. The thickness of the coating can be increased by repeating the process, but one treatment is usually enough.

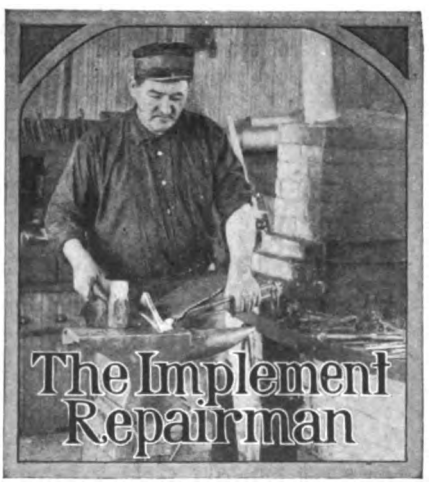
A quicker way, and the one commonly used, however, is to heat the pieces red and apply yellow prussiate of potash, or cyanide of potash, to the parts to be hardened. Reheat and cool off in cold water. In casehardening small pieces by this method it is good practice to melt the cyanide over the fire and immerse the job in it, letting it remain a few minutes. Be careful not to let water, or even a pair of wet tongs, come in contact with the melted chemical, or it will fly all over the place.

The results obtained by the quicker method are not so good as by the first described, the coating being thinner. Bear in mind that both chemicals are DANGEROUS POISONS and should be treated as such.

(*To be continued.*)



A BUSY DAY AT MR. J. B. IVY'S SHOP, GEORGIA



Gun and Novelty Repairing—9.

W. G. MUMMA.*

Ribs, Nipples and other Fixtures.

Ribs are bought ready-made. They are rolled out of iron or steel. In fitting ribs the first thing to do is to straighten them—hammer out all kinks, short bends, and then fit them to the barrel closely by filing until they fit exactly. Have them and the barrels bright and clean and then tin each surface. Then fit rib to the barrel, with a strip of solder inside, and clamp up tight. Then proceed to soak the joints thoroughly with soft solder. When done, scrape and clean off all surplus solder at the joint and finally finish up smoothly. Sometimes a gun comes in on which the rib is partly loose. Solder it by raising the rib up and then clean the surfaces and work solder in the joint; then clamp up and soak the joint with soft solder and after cool proceed to clean up.

The old-time gunsmith used to make his nipples, but now they can be had ready-made. A few old-time guns will sometimes come into the shop to have the old nipples taken out and new ones put in. If the old one cannot be taken out with the wrench, heat it hot with the torch until the rust and dirt is burned loose; then use the wrench. If the nipple is broken off so that the wrench can't be used, drive a square punch in nipple hole and then turn out by using brace or wrench on square part of punch. If all else fails to get the nipple out drill it out, but be careful that the

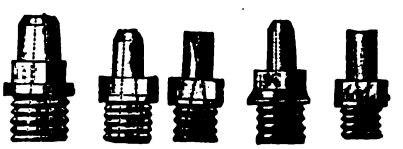


FIG. 1—SEVERAL STYLES OF NIPPLES

threads are not injured. Sometimes the seat that the nipple rests on is powder-burned and rusted. Face it up by using a small counterbore. When done select nipples that will fit. Most nipples are made with certain standard threads. There are about six different sizes of

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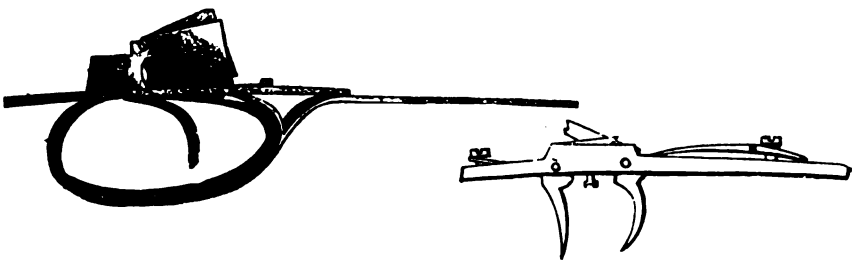
nipples, from the small rifle tip to the heavy musket nipples. The holes drilled through each nipple are generally quite large at the bottom and taper off smaller at top, with a small cup drilled out at top, see engraving, Fig. 1. Some are made tapering from each end and meeting in the middle. Some are an even size throughout the entire length. In all cases when working on nipples, be sure that there is no load in the barrel.

There are two kinds of triggers—double, or set, and single. Most all the breech-loading rifles and shot guns are made with single trigger, which take a steady, straight pull. Most all the old-time rifles were made with double, or set, triggers; the front trigger was set to pull easy, which released a spring acting on the back trigger, which struck the dog or sear of the lock. Some few breech-loading rifles are made with double triggers upon order. For off-hand shooting with the rifle perhaps the double trigger is best, but it is all in getting used to the different kinds of triggers. The parts of the triggers that are liable to get out of order are: The notches will become worn, the springs will break, or need to be renewed. These parts can be easily repaired, see engraving, Figs. 2 and 3.



FIGS. 2 and 3—SHOWING SINGLE AND SET TRIGGERS

The guards, Fig. 4, for the triggers are either made out of iron or brass, cast in a mold, then finished up by file and emery paper. The iron ones are sometimes casehardened; these are always bought ready-made.

Thimbles are made from sheet iron, or steel and brass, about $\frac{1}{16}$ inch thick. They are bent to shape around a mandrel of iron of the size required to fit the ramrods, etc.; then solder to place with soft solder.

Butt plates, Fig. 5, are made in several varieties and forms of iron or brass, cast in molds and afterwards finished up by file and emery paper. Some of the cheap guns are fitted with hard rubber butt plates. Some have recoil pads fitted to the butt plates.

Cleaning rods are generally made of soft steel, or brass, for small calibers and for large caliber of hickory, or some other woods. These can be bought ready-made in all kinds of makes, or they can be made by the gun and novelty worker very easily. They generally have a ring on one end and a slot or notch at the other end and are long enough to suit length of barrel. The old-style hickory had a large hand-hold.

It will be necessary sometimes to make wooden ramrods for cleaning, loading and other purposes. Hickory is the best wood to use. Get a good, fine-grain, tough wood, with a straight grain; split out to about the right size required while green or partly so, then thoroughly season, keeping them straight. Then work down with a draw knife and small plane perfectly straight. One good way is, if possible to first square up the stick to about the right size, then work off the corners with plane, or otherwise, then finish up with a piece of glass and sandpaper until smooth and perfectly straight. Then lay aside, well oiled, until ready to use. Some ramrods used for muzzle-loaders have a ferrule put on one end and screw-point on the other end. Ramrods are sometimes made of soft steel, or brass, for small calibers.

Escutcheons are made of sheet brass, German silver and pure silver. These can be made easily to any desired pattern and fastened on the stock, or any piece wood by two small screws. They are used for ornaments or to protect the wood against screw-head bolts, etc. They should be let into the wood for the thickness of the metal. Sometimes they are engraved with various patterns.

If occasion should occur that any patent breech pins will have to be replaced, they can be had ready-made.

On the old-style muzzle loaders—on the half stock ends—it will be necessary to cast a metal tip which should be of block tin. Carve out any desired pattern on the end and wrap stiff paper around the stock, seeing that it is the proper distance from the wood, so that the melted metal will run and fill the pattern cut out; also see that the paper is perfectly tight all around in every part, so that the metal will not run through. Then melt the metal in a ladle until it is pretty hot. Now pour in the open top, having the stock and barrel standing as near perpendicular as possible. The stock should be placed on the barrel, with a short piece of wood the size of the ramrod in place where the ramrod is to go in the barrel. After the metal is cast and if the job is well done and fills properly, finish up with file and sandpaper.

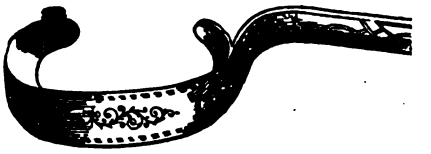


FIG. 4—A TRIGGER GUARD

Where the lugs are to be located and fitted on the barrel they should be soldered or brazed on, as the case may be. There are many other articles that belong or are classed as fixtures, or gun implements, such as fore-end tips and catches, extractors, side and top levers, wad cutters, worms, ferrules or rod tips, carrying swivels, cleaning tools of all kinds, loading tools of all kinds, recoil pads, bolts, screws, molds, etc., etc. These can all be had of the dealers, as well as all of the component parts of the various kinds of guns made. Most all of these parts are easily fitted or finished. Should any of these parts become

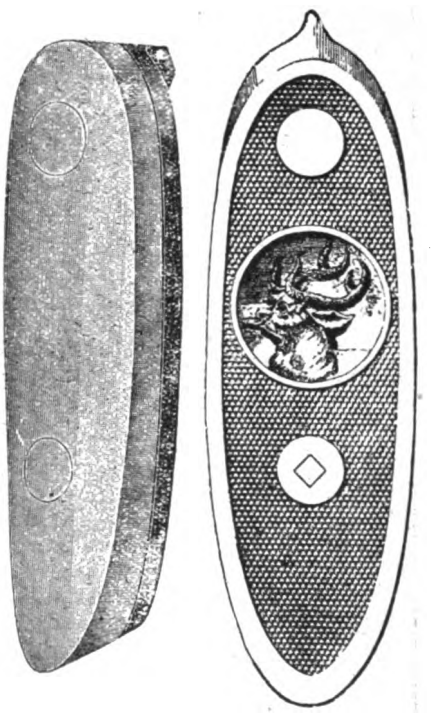


FIG. 5—PLAIN AND ORNAMENTED BUTT PLATE

broken, except nipples, they can be brazed. Gun nipples can be purchased

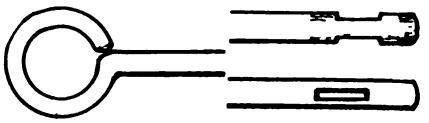


FIG. 6.—CLEANING RODS

so very reasonably at any supply house that it does not pay to waste time on a broken one.

(To be continued.)

The Blacksmith Shop at the Gary Steel Plant.

The engravings herewith show a photographic view and also a ground plan of the blacksmith shop at the Gary plant of the Indiana Steel Company.

The shop is a steel structure, with brick curtain walls and tile roof. It is 62 by 160 feet in its main section, with a boiler room 31½ by 60 feet. The stock-yard, which is between the blacksmith shop and the boiler shops, is spanned by a traveling crane, while a tram track extends to the center of the smith shop from the stock yard. From the railroad switch track, traversing the yard, material is unloaded to either side, picked up at any point in the yard by the cranes and deposited on the tram car for transfer into the shop. The forges, of which there are eleven, are of the down-draft type. They are operated by motor-driven fans, one for blast and one for exhaust, the pipes being all run under the floor.

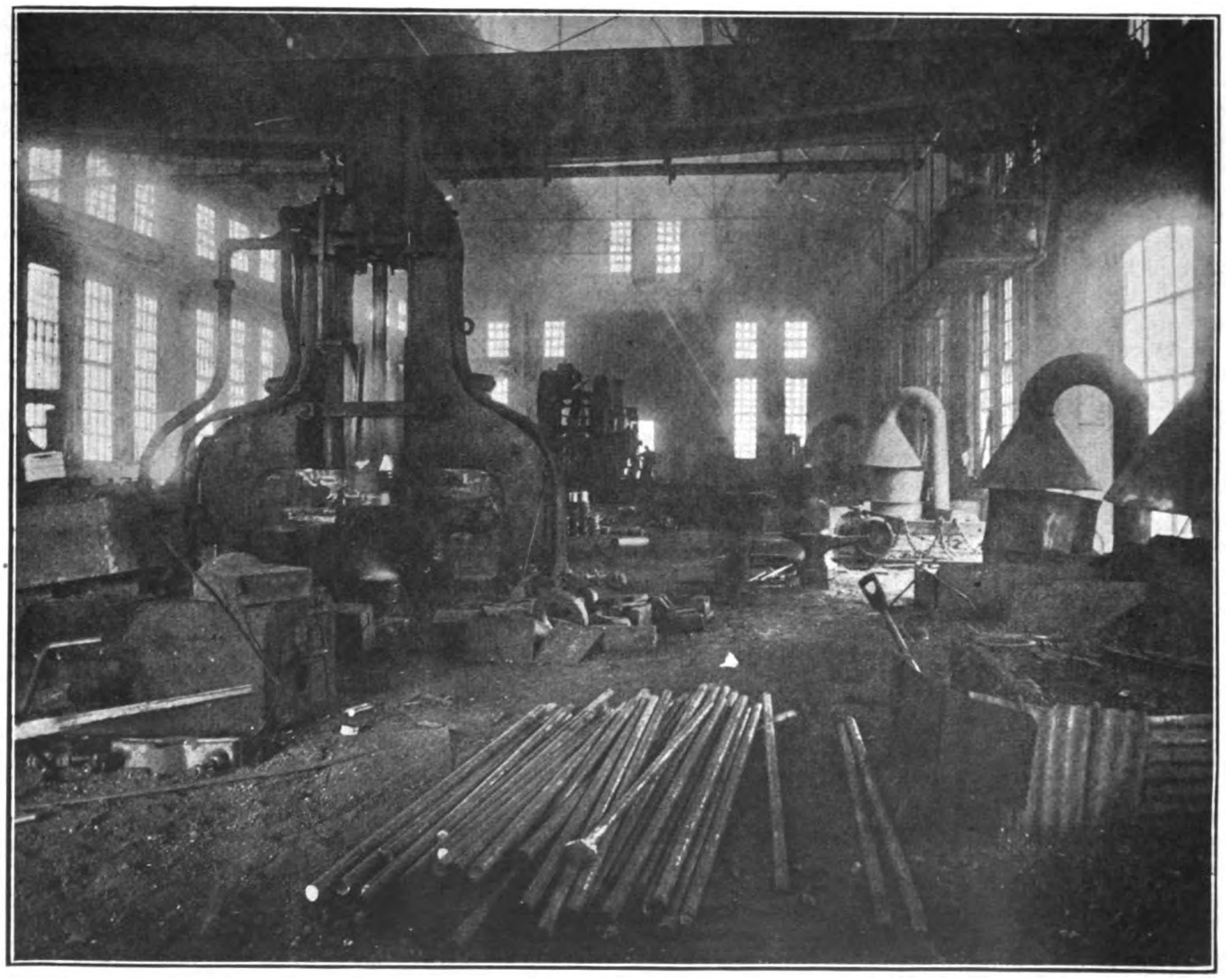
Occupying the middle of the shop, from front to rear, are the heavy tools, which include two steam hammers of one and three tons' capacity each, with provision for a third of two tons capacity, a large double-end punch and shear and two single punches. Liberal space is provided between each of these machines for the handling of work. An electric crane, with twenty feet headroom, spans the floor from end to end. In the east end of the building are installed a bolt cutter and two bolt headers and a bulldozer, all motor-driven, and a bolt-heating furnace.

A battery of two Sterling boilers, housed in the ell portion of the building, produces steam for driving the steam hammers—the only steam-driven tools in all the group—and for supplying steam heat to other shops. A large heating furnace for the heavier work is located partly in the main shop and partly in the boiler room; the furnace doors open into the former, and it is fired on the other side from the boiler room firing floor. The coal bin is conveniently accessible to both the boilers and furnace and is filled direct from cars on a coal track outside.

A Shop-Made Lever Post Punch.

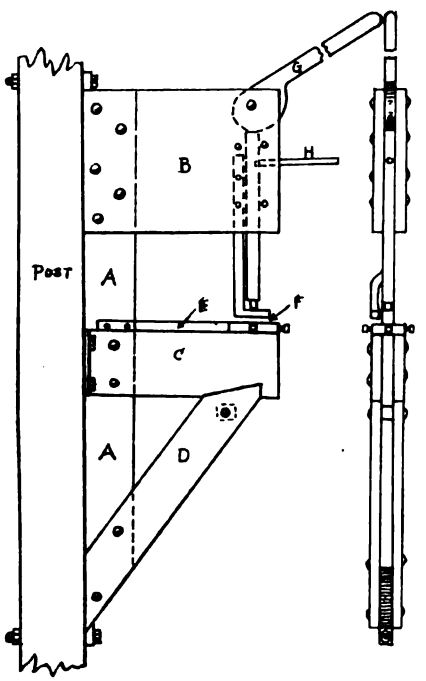
BERNARD JOKEWAY.

The engraving shows a very useful and easily made post punch. It is very handy for punching light stock and saves time over the hand hammer and hand punch method.



INTERIOR VIEW OF THE BLACKSMITH SHOP AT THE GARY STEEL PLANT, GARY, INDIANA

In the illustration A is a piece of stock ½-inch thick by three inches by two feet long. At both the upper and lower end are flanges or bosses for bolting the piece to the post. The piece B is three eighths by six by eight inches. There are two of these; one on each side of A. The piece C is three eighths by two by nine and a half inches long. There are also two of these pieces; one to go on each side of A. As shown, one and a half inches of one end of C is bent at right angles for bolting to the post. These two pieces are also bolted to the piece A. The brace D, of which there are two also, is of ⅜-inch stock of a size to fit



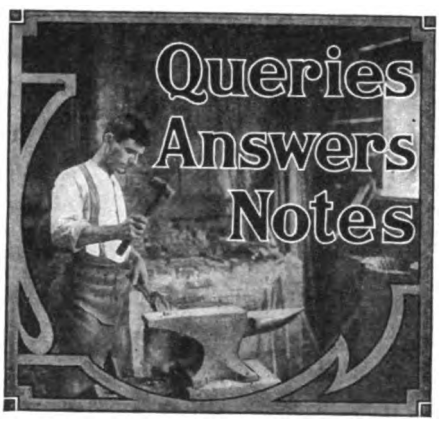
AN EASILY MADE POST PUNCH

in as shown. The piece E may be shaped up from an old tire, it holds the punch die at F. The lever G operates an eccentric as shown which forces the punch down. The lever at H is for raising the punch. The die at F is held in place by three set screws.

How to Build Good Sarven Wheels.

L. N. STEELE.

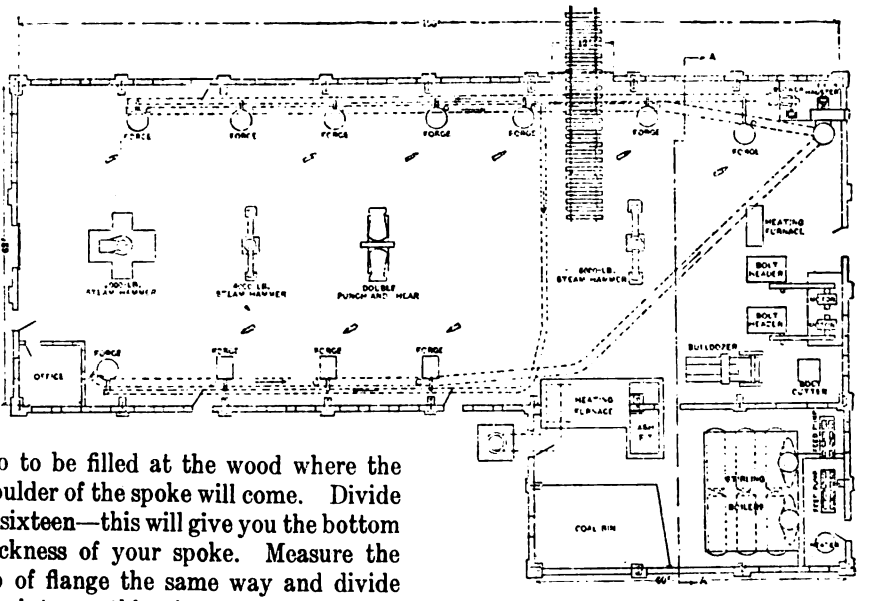
I see letters from boys all over the United States, Canada, Australia and Africa, in fact all over the civilized world, that show us that our foreign brothers are interested in American ideas and American ways of work and teach us that we are in the lead and up-to-date in blacksmithing and woodworking. For Brother Isaac Barton, of Australia, who inquires as to building Sarven wheels, I will explain my method. Take your clippers and get circumference of the hub to be filled at the wood where the shoulder of the spoke will come. Divide by sixteen—this will give you the bottom thickness of your spoke. Measure the top of flange the same way and divide by sixteen—this gives you the top of your spoke. Shape all of your spokes by this rule and you will have a perfect wheel. Drive your spokes in fish glue, bare the holes for hub rivets and set aside the next day. Then put on your rim, leaving $\frac{1}{16}$-inch opening. Put on tires and give rims two turns in boiling linseed oil. Rivet hub and bolt tires, and you have the best job that can possibly be done on a Sarven wheel. I have a set of 1⅜-inch wheels built this way that have run twenty miles a day for eighteen months, making 10,800 miles without the tires being reset. THE AMERICAN BLACKSMITH is O. K. Let the good work go on.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

A Question on Tuyeres.—Why is it that the forges in the United States are not made with a heavy water Tuyere, same as in use in this country? From what I can see in the journal they are altogether different. They seem to be made with a cast iron fire pot. BERT BAKER, England.

Wants a Good Smithing Coal.—I would like some smith to tell me where I can get



THE FLOOR PLAN OF THE SMITH SHOP AT GARY

a first-class blacksmith coal and the best way to keep it—in sacks, or in the bin? The coal we get here loses its strength in about three to six weeks after purchasing and then turns into light dust and chaff and will not coke at all. T. E. W., Missouri.

An Opportunity.—I have just read the latest AMERICAN BLACKSMITH and must say that W. J. K's column on high-speed steels is very good. The article on welding axles and heavy iron, by W. H. Gunn, is very valuable information. I think the automobile repairing department is fine and I also like the information on gas and gasoline engines which are taking the place of the steam engine.

A good horseshoer will find a splendid place to start a shoeing shop at Fertile, Polk County, Minnesota. A letter to the Citizens State Bank, or to Andrew P. Hanson, both of Fertile, will secure full particulars regarding the town.

J. A. L., Minnesota.

To Prevent Forging.—I shod a pacer here that used to step right up on his heel, above the hair, when he was doing a three-minute clip and then mixed in his gait. I cured him by paring down his front feet on the toes as low as I could without drawing blood and left his heels high, and cut down his heels on the hind feet as much as possible and left the toes long. I then shod him with toe weight in front, with rolled toe and heel weight behind, but not much weight inside, with a long heel outside, with plenty of weight. I shod him like this for nearly a year until his feet had grown right. Now I shoe him with ordinary shoes and he never touches; he stands with his four feet under him and only fifteen inches apart from front to hind.

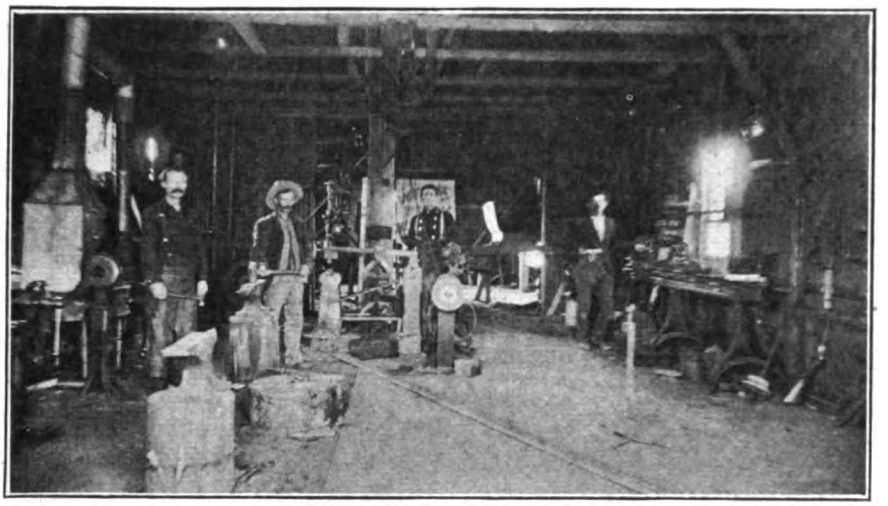
P. J. O'CONNOR, British Columbia.

How to Temper Plow Lays.—I saw an inquiry in "Our Paper" a short time ago which has been answered by several subscribers to the possible confusion of the one who asked the question. In asking how to temper plow lays the writer should have stated if he was using soft center or crucible steel lays. Plow lays are never tempered,

at least not here in Kansas, but they are hardened just as hard as they can be made to stand the rocks. We could not use crucible steel. Crucible steel might be casehardened with prussiate of potash so that it would answer under ordinary conditions, but where soil is very sticky it would not be practical. We have sticky soil and I will describe the process of hardening soft center steel. Get a barrel and stand on end and fill with soft water and then put in about a peck of salt. While there are many other formulas for this purpose this is the cheapest. Heat your lay to an even, bright red and let the edge cool a little, then dip it in the salt water bath. Some steel requires a bright red heat and some not so hot, but where the soil is very sticky I would not recommend heating them below a good red heat. NICK JACOBS, Kansas.

located one fine old gentleman who at the extreme old age of ninety-four years was still doing some work and, to use his own words, "Could still shoe a kicking mule." If I remember rightly he had spent over seventy-five years at the forge and anvil. Just think of the changes that must have come into his life in that length of time. I suppose by this time the grand old veteran has passed to his reward, but I can't help but think of the long life of toil and faithfulness at one trade. That old man had the "true blue" in his makeup, and it should be a lesson to us to stick to the good old trade and make things move along, and place our trade on the higher plane that it deserves.

But the idea I had in mind when commencing this letter was—wouldn't it be



T J. PARKER'S SMITH AND MACHINE SHOP, OKLAHOMA

Those Fifty Lister Lays.—We have had a great many cyclones and tornadoes through Iowa, North Dakota, South Dakota and through some of the southern states, and it has always been a mystery to me where the center of gravity or the magnetic point, was. But I have it solved now. When I was reading over the Queries, Answers and Notes I ran across Mr. D. J. Couch's article, from Kansas. He says that on the first day of May he sharpened fifty-one lister lays. I know now that that is where all of the wind passed through Kansas. I would like to see this gentleman, but as we are a long ways apart I will give him fifty cents for his photograph, with his right arm bare so I can see what muscle he has to perform such work. I have worked at the trade now twenty-eight years and I always use from a five to a six-pound hammer, and I can strike as hard a blow as any man of my weight (I weigh one hundred and ninety-five pounds), but I can't sharpen fifty lister lays in one day. I would like him to explain his method of doing such work. I would be very glad to learn if he will be so kind as to send in his plans.

C. W. METCALF, Iowa.

Wanted: Old Shops.—Some time ago you will remember THE AMERICAN BLACKSMITH undertook the task of finding the oldest living blacksmith actively engaged in the trade. The result was that they interesting to try and locate the oldest blacksmith shop still in use for blacksmithing. It would interest me very much to read the descriptions and see the pictures of the old shops, for I am always interested in shops and equipments.

P. V. BURGESS, Missouri.

Another Side to License Law.—I notice there are readers of THE AMERICAN BLACKSMITH who would feel satisfied to see a horseshoer's license. The question is—would there be as many horseshoers, either as journeymen or masters, as at the present time? It must be remembered that there are throughout the country at present lots of shops where no blacksmith wages are paid at horseshoeing. At the same time the master of such a shop would feel satisfied to see examination laws. What I wish to impress on each and every reader's mind is that just as soon as such a law is in effect all men that qualify will hold a diploma according to law, either as master or journeymen horseshoers, but what wages will the journeymen ask per day and what hours will they work to consist of a day's work? What will they ask for overtime? Remember, they have a state law that protects them now; you can't get hold of some good, handy fellow that has no diploma and pay about $10.00 a week in order to save paying $15.00 to a man that has a diploma. As far as I have noticed there seems to be a feeling with some of the masters that are conducting shops if there was a law to license shoers there would be someone put out of business and naturally things would heap up at their door, never regarding that the journeymen would get a strong protection, according to law. I say that men who shoe horses should make it a complete study and business, should have not less than $15.00 a week and from that up, and if a man can't earn $15.00 a week at horseshoeing he is not a horseshoer.

ALBERT MEIER, Pennsylvania.

Wants a Good Hoof Remedy.—Will some able shoer tell me through the columns of "Our Journal" some good caustic or disinfectant to use in the treatment of punctures, bruises, canker, thrush, etc., in horses' feet? Some solution that is good and that will do away with poultices and such like. Now, I might say a few words more, so that the readers will understand that I am into such work continually. I have charge of the shoeing of thirty-one horses, of which most are used on heavy spring wagons. This is a large wholesale produce firm I am working for. We have a veterinary to look after the horses when they need the least of anything in that line. In a stable of this size and working as lively as these animals do there is a bruise or a case of thrush, a horse getting a nail in his foot, or something like that all the time.

In case of a horse getting a rusty nail in his foot I first pull it out if this is not already done, and then with my knife I pare around the puncture quite a large spot and open up where the nail went in, say as big as a five-cent piece (Canadian money). Then we fasten absorbent cotton, saturated with a solution, into the foot and if quite sore let him stand a day or two, just as the case requires. Or it may be he is ready for work. Now, this does away with the poultices, as this solution keeps poison out and kills anything that might arise from the wound. Now, I want to try something else that is good, as I may have better results in some ways. I would like to hear from some good heads on this question. I would like to hear from E. W. Perrin on this, and others, too. C. CRAIG, Canada.

Once a Month Enough.—For some time I have read considerable in the pages of "Our Journal" in regard to having it printed twice a month. Now, for my part, I am well satisfied with it just as it is and I always enjoy it when it does come. Then, again, I think I read from time to time of someone finding fault with what is printed in the journal, as it does not seem to me to suit them; now, I think in order to meet the many demands of all the people who read THE AMERICAN BLACKSMITH there must be a great variety of reading, and to my mind THE AMERICAN BLACKSMITH has it. It does amuse me sometimes to read some articles that I see, but, then, I suppose there are lots of good articles on some lines of work that are away from my line of work altogether, which I never read at all. But, then, look how many there are to read the paper. Perhaps the very next fellow will be greatly interested in the article I did not care to read. Then, again, I read pieces and the fellow is advocating something which would be altogether wrong, from my point of view, but some fellow will catch right onto it, perhaps, and make him feel

there is no paper like THE AMERICAN BLACKSMITH, and I don't, or would not, blame him one bit.

So it is a good thing everyone is not alike, as it would be worse still, as the saying is, "It takes all kinds of people to make a world." In closing will say, for my part "Our Journal" is O. K. just as it is. As someone said lately in the paper—if they don't get enough about horseshoeing in its pages, buy some good work on horseshoeing then, and read about shoeing until sick of it. With best respects for the journal and its readers. C. CRAIG, Canada.

Some Practical Hints from Missouri.—Times are pretty good down here in Old Missouri, so just thought I would drop you a line and let the boys know we were still in the business. Have an old-fashioned shop, 26 by 40, and use a Fairbanks-Morse gasoline engine for power and make it do everything I can to save hard work and increase the profits, and find it a very faithful standby. For a side-line I handle Fairbanks-Morse engines, engine supplies, cylinder oil, gasoline, etc. People having an engine think that the gasoline I keep is better for their engine than that they get at the grocery store, because I use it myself and have little trouble in selling it, and the more callers the more trade.

Will give you a few little items that may be of interest to some. For a dowel cutter I take a piece of old wagon tire and drill a ¾-inch hole, and then from the under side countersink until it leaves a thin, sharp edge; point a piece and take a hammer and drive it through. When you wish to jump a spoke in a buggy wheel use a wagon jack for a lever and it is easy; put the base against the hub and the arm against the rim and the trick is finished. When you weld a mower cycle be sure to leave the rivets in the first two holes and see how much neater and stronger job it makes after welding; punch them out before bar gets cold. For drilling a hard piece of steel use turpentine instead of oil. When you have tried every way you can think of and your box puller won't remove that box from an old wheel take a piece of iron about the size of the spindle, heat to a sparkling heat and place wheel in an upright position and the iron in the box. In a very few minutes a slight tap with a hammer and it will fall out, without injuring wheel or box and much relieve your ruffled temper.

T. E. W., Missouri.

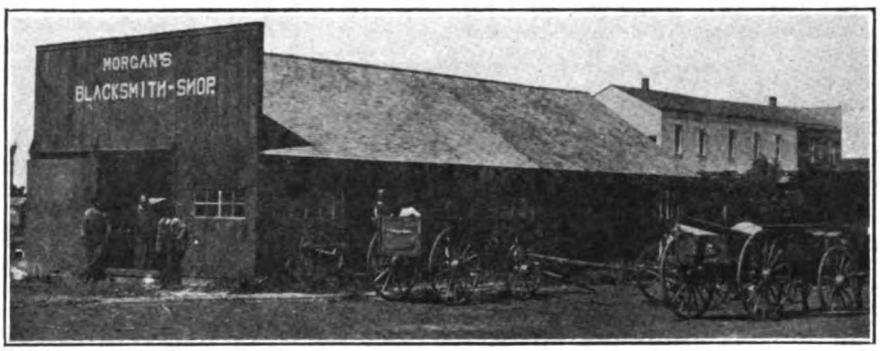
An American Blacksmith.—The writer first saw the light in Newton, N. J. Soon after my parents moved to Owego, N. Y., where my father started a shop and I began my experience as a wagonmaker when I was about eight years old. I made a little boy's wagon at that time, and from a boy's standpoint it was a pretty good wagon. That was sixty-three years ago, and I have been making wagons of all descriptions ever since. I was in Owego when the New York and Erie Railroad celebrated its opening with a great demonstration and barbecue. My father at the time had the contract for making and furnishing all of the picks used in the work of the road for fifty miles of that section. That is where I saw some good forging. When a boy I went to school there and a few years later came to Wisconsin. (I notice in reading the reminiscences of John D. Rockefeller in the "World's Work" of February that he went to the same school about the same time that I did, but, of course, I did not know at the time that I was schoolmate of the boy that was to become such a distinguished gentleman.)

We came to Wisconsin at the time of the discovery of gold in California. Horses and ox teams were in great demand in those days, for everybody that could go and had a team or yoke of oxen pulled out for the land of gold. Our shop was the outfitting center for such teams. We had a great many horses and oxen to shoe, as well as wagons to equip and fit out. Although but a boy I helped father in his shoeing and general job work in the shop. Being of a mechanical turn of mind more than a desire for schooling, I soon went into the shop for good. I was earning fair wages at sixteen and at the present time, at the age of seventy-one, I still retain my forge and work at it most every day.

My shop is 25 by 150 feet, with three floors. I have a fourteen-foot water wheel in the rear of the shop, which gives us power, and a five-horsepower electric motor, when the water in the river gets too low. My shop extends from the main street in the very heart of the city, back to the river, so I am very nicely situated for business in the front and power and scenery in the rear. I employ on an average twelve men; three forges, three woodworkers, four painters, one trimmer and blacksmiths' helper. Tools consist of one planer, a jointer, a buzz saw, emery wheels, drills, a bolt cutter and everything I need but a band saw. My work consists of all kinds of wagons and carriages, from the grocer's delivery wagon to milk wagons, bakery, laundry, tea and coffee, advertising, medicine and gipsy wagons, carry-alls and busses, fire department and ladder trucks, ambulance and undertaking wagons and hearses and funeral cars. We also make a special camp wagon and a bicycle boat. We build and put out the finest funeral car in this part of the country. You will notice our range of work is quite extensive. We also do horseshoeing for a particular set of customers, and I keep a first-class horseshoer for their benefit.

In my early days we made all our horseshoes and horse nails by hand and many an evening in the busy season I went to the shop, after supper, and made two hundred horse nails for my "stunt." We had good Norway iron rods to make nails of, but if a farmer wanted a specially good job of shoeing he brought an old scythe with him and we would break off the back and make our nails from that. The scythe back was a good quality of Swedish iron and that was all. It was hard to get good horseshoe iron those days, that is, making shoes that would crease without splitting. So we worked up all the old shoes we had by doubling up two together and driving out and welding. Two old shoes made one good one and the best were probably no better than the soft steel shoes we get now. We used iron toe calks except when we had a worn-out rasp. Toe calk steel was not in the market then. We did good shoeing fifty years ago and we did not make such monstrosities of shoes as we see depicted in the horseshoeing journals of today, either. I like to follow nature in a horse's foot and admire a nice job of shoeing, with the nails driven in a neat row and the clinches showing like polished silver and the hoof not covered with a black hoof dressing. The hoof dressing is all right, but doesn't look nice.

But to get back to the forge or the office. When I put in time in the office it is such a relief to get back to the forge and do a nice job forging, and as I am blest with the best of health, rugged and strong, it is a pleasure and not work as some would term it. Of course, I let the other boys do all the heavy work as I am over seventy-one now, so I must begin to think about taking care of myself in a measure, and while I am possessed of no great wealth I own and live in a modest house in the center of a group of four bankers, three of them active presidents and one cashier. Yes, and while Mr. John D. Rockefeller is a multi-millionaire and went to the same school that I did I am just an American Blacksmith.—E. KINGSLEY, Wisconsin.



A GENERAL SHOP OF OKLAHOMA, DOING A GOOD BUSINESS AND GETTING GOOD PRICES

Only a Blacksmith.—I am not talking politics, but I will take the meat of the nut. Snobbishness versus Gentleman. The term American Gentleman I understand to be the Honest Toiler. He may be a banker with millions at his back, a man who does good with his money, or the honest artisan, mechanic or ordinary laborer, with nothing but his hands, energy and aggressiveness. But under no circumstances would I recognize Cholly Sapleigh a gentleman. I mean a fellow who inherits money from his father, or other relative, who with their

aggressiveness and energy made this money. Lincoln did not say "the common people," but he said "the poor people are always with us." Lincoln was a gentleman who did not learn to be a gentleman by hanging around manicuring shops or who spend a few paltry hundreds on wine. He learned to be a gentleman and one of the foremost gentlemen when he was splitting rails.

As you may see by articles of Mr. Creel and the nameless gentleman (?)—near gentleman, I should say—Mr. Roady Kenehan is simply attacked because he is an aggressive and energetic horseshoer and an honest gentleman.

I do not personally know Mr. Kenehan, but I am sure that Mr. Saphead never paid for any soup tickets for Mr. Kenehan, if he ever paid for any. But I do also know that the sovereign people of Colorado elected Mr. Kenehan State Auditor because he is an honest gentleman and an aggressive and energetic worker. And I hope the sovereign people will uphold him and elect him again. May he some day be President of the United States. I do know positively that a fellow who thinks like an automobile has probably debts he never can pay, nor intends to pay. Gentility is more to be desired than honesty. One more thing, Mr. Creel cites Joan of Arc and Andrew Jackson, but did not mention our rail-splitting President, Honest Abe Lincoln—but then, maybe he is not sufficiently acquainted with United States history. FRANZ WENKE, Horseshoer and Gentleman not afraid of what he writes.

EDITOR'S NOTE.—Space does not permit us to reprint the articles referred to in the "Denver Post," but the following extracts will give the reader an idea of what the Denver paper published. The first article was written by one, George Creel, while the second article was simply signed "A Gentleman."

EXTRACTS FROM THE FIRST ARTICLE.

State Auditor Roady Kenehan should be ousted from the very important office that some grievous mischance permits him to hold. He is a Trouble-Maker, and, unless removed, will continue to engender bitterness, confusion and embarrassment.

There are two things the matter with this man, Kenehan. In the first place, he is a blacksmith and utterly without the careful education and gentlemanly traditions that are so necessary to the proper discharge of official duties. Instead of drawing his own salary in dignified serenity and holding himself scrupulously aloof from the concerns of others, as a gentleman would, he runs about with his coat off, putting his nose into other people's business.

. . . . . .

Joan of Arc was a milkmaid; Cromwell had common blood in his veins; Danton sprang from nothing: Andrew Jackson came from the plain people and look at all the trouble they made.

. . . . . .

Mr. Kenehan finds by scrutinizing the records:

That the auditor not only has the RIGHT to pass upon the legality and propriety of warrants presented to him for payment, but INVESTIGATION of their rightfulness is his DUTY.

That all trips outside the state must be at the official's expense, regardless of the purpose of the visit, or its usefulness, insomuch as the law makes no provision for them.

Armed with this authority, that no gentleman would have ever thought of using, Kenehan grew in odiousness. Mr. Stracy and Mr. Dutcher were out of office, yet he commenced to insist that they pay back the money they had taken from a cash fund. And he has actually forced the board of commissioners to pass a resolution to that effect, and unless stopped in his mad career will succeed in his base attempt.



A NEW JERSEY GENERAL SHOP

Not satisfied with this unseemly exhibition of blacksmith tactics, Kenehan went further. He found that sundry other former state officials had traveled and lived well at the state's expense. He accordingly drew up formal communications to the governor demanding that the state sue for the recovery of these paltry thousands.

. . . . . .

And Kenehan has also embarrassed the state by refusing to let money go for the printing of the Session Laws. Of course, the general appropriation bill, designed to cover ALL the expenses of the seventeenth general assembly, did allow $20,000 for printing, but what's $20,000?

That's gone and $2,100 more that isn't paid. Kenehan asserts that "the law is the law"; says the legislature knew exactly what it had to spend and intimates that much of the money was spent on "absolutely worthless" printing.

When was state printing ever expected to be useful? But it's what people get for lifting a working man above his sphere.

EXTRACTS FROM SECOND ARTICLE.

I have been reading Mr. Creel's splendid attacks on State Auditor Kenehan with much interest and am glad to see that you have finally been forced to an admission of class distinctions. Print more such articles and I am sure many gentlemen will commence taking The Post as well as The Republican.

When Mr. Creel declared that Kenehan was a blacksmith and therefore no gentleman he expressed my thought precisely. It stands to reason that no working man can possibly be a gentleman. They haven't the time for it, don't you know.

To be a gentleman one must be fastidious in the matter of apparel, careful as to his nails and somewhat of a connoisseur as to foods. No artisan can afford the time for these things, even did he have the necessary inclinations for that calmness, leisure and repose that set the gentleman apart from the aggressiveness and energy of the worker.

. . . . . .

Many a man has been elected or appointed to state office who was not a gentleman at the time, but associations and atmosphere lifted him and polished him. The leisure gives them time for study and care of person and attire; and travel at the state's expense affords them opportunity to attain culture, refinement and knowledge of the world. What does it matter when a few paltry hundreds are spent on wines, foods and hotels if the evolution of a GENTLEMAN is the final result?

Kenehan should not be allowed to interfere with this. There are entirely too few gentlemen in the world as it is. As Lincoln, or was it some other person, once said, "The common people are always with us." Very true, for common people seem to increase without care or effort, while it really takes a lot of trouble to be a gentleman and remain one.

I do not wish anyone to think that I am narrow or at all snobbish. I like working people and I respect them; that is, when they know their place. I always say "Good morning" to my servants and quite frequently address them remarks that are in no wise connected with their labors.

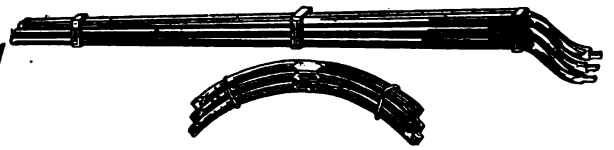
But I believe in distinctions between people and insist that the country is better for an Upper Class. Where would the poor get Christmas dinners and soup tickets if it were not for the Upper Class? If we worked, what would any number of people do for positions?

Kenehan is a common fellow and should not be allowed to remain in office. He has shown himself absolutely unable to receive polish and is clearly antagonistic to gentlemen and gentlemanly habits. I do not say that he isn't honest, but what of that? Gentility is a much more desirable attribute than honesty.

I am a taxpayer and make no objections to the beggarly thousands that have been taken from the state's treasury for the manufacture and education of gentlemen. If I do not, why should this Kenehan?

A GENTLEMAN.

A Smith Shop of New Jersey.—The accompanying engraving shows a picture of the shop of Mr. I. J. Stiles, of New Jersey. The owner and his son, Morris, stand on the left, outside the shop. Mr. Stiles built the shop a year ago. It is modern in every respect, equipped with electric light and blowers and is situated on the main street. The building is a credit to the town. Mr. Stiles, by the way, is town collector and also treasurer of the Methodist Church, and holds the respect of the entire community. He owns his home and has brought up a large family.—"A credit to the craft is he." The hope of the craft lies in just such men as he and in due time such members shall lift the trade to that place of respect in the community to which it belongs by right. A FRIEND OF THE CRAFT.



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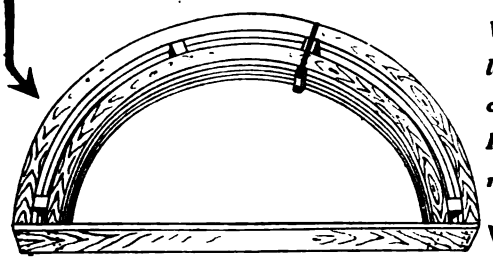

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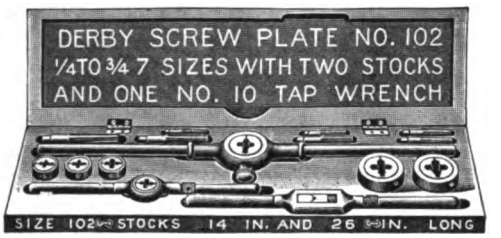

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Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, Sept. 14, 1909, and are subject to fluctuations. Corrected for **The American Blacksmith** by The National Heavy Hardware Reporter, Chicago.

With the exception of changes in market quotations on iron and steel, correspondents report no changes from last month. The iron and steel market seems very firm and prices have advanced several times.

Correspondents report trade very irregular, but generally better than last year at this time.

Collections are getting better and special efforts should be made at this time to clean up old accounts. Farmers generally have had a good season and will settle if pressed for payment.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—
$1.85 rates full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$1.85 rates, full extras.

Toe Calks—

	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—
6 x ½ and smaller 60–10%
Larger and longer 50%

Machine Bolts—
4 x ½ and smaller 60–10%
Larger and longer 50%

Nuts—
Less than 10 lbs. of a size ..... $2.50 off
From 10 to 50 lbs. ..... 3.00 off

Washers— Same price as nuts.

Skeins— Cast 65%

Malleables— Common ..... $ .09

Half Patent Axles— 65%

Springs—

Single Spring, each	$1.25
Springs, black and half bright	.06

Hickory Lumber—Per Foot—

1 to 2½	$.09½
2½ to 4½	.11

Ash and Oak Lumber—Per Foot—

1–1½	$ .07½	2½–3	$.08½
1½–2	.08	3½–4	.09½

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
1"	$65.00	$65.00	$75.00
1¼"	65.00	68.00	80.00
1½"	68.00	75.00	85.00
1¾" and 2"	72.00	80.00	104.00

Rough Hickory Axles—

	Each.
3 x 4 6 ft	$ .60
3½ x 4½ 6 ft	1.00
4 x 5 6 ft	1.20
5 x 6 6 ft	2.20
4 x 5 6½ ft	1.30
4½ x 5½ 6½ and 7 ft	2.00
5 x 6 6½ and 7 ft	3.00
5½ x 6½ 7 ft	3.50

Finished Hickory Axles—

For 2½ and 2¾ Skeins	$1.00
For 3 Skeins	1.20
For 3¼ Skeins	1.45
For 3½ Skeins	1.60
For 3¾ Skeins	1.95
For 4 Skeins	2.25

Rough Oak Bolsters—

Short	$ .08
12–14–16 ft.	.09

Finished Oak Bolsters—

2¾ x 3¾ and under	$ .65
3 x 4	.70
3¾ x 4¾	.90

Rough Oak Wagon Tongues—
4 x 4 x 2 x 4 x 12 and smaller $1.00

Finished Oak Wagon Tongues—

3½ and smaller	$1.25
3¾	1.30
4	1.40

Two Inch Sawed Hounds

	Per Pair
Tongues	$ .40
Front	.45
Hind	.55

Patent Wheels—

A. B. No. 13 and under	45 c.
D. No. 13 and under	35–5 c.
All Grades, No. 17 to 33	35–5 c.
All Grades, No. 39 and Larger	25–5 c.
C. No. 13 and under	40–2½ c.

Cupped Oak Hubs—

Set.	
7 x 8 x 9	$1.40
7 x 9 x 10	1.60
8 x 9 x 10	1.65
8 x 10 x 11	1.90
9 x 10 x 12	2.05
9 x 11 x 12	2.10
10 x 12 x 13	3.20
11 x 13 x 14	4.45
12 x 14 x 15	5.35

Plain End Oak Hubs—Set.

10 x 14	$3.45
11 x 14	4.50
11 x 15	4.75
11 x 16	5.35
12 x 16	6.00
12 x 17	6.55
13 x 18	7.50

Rough Sawed Felloes—

1½ x 2"	$1.55	2 x 2½"	2.00
1¾ x 2½"	1.75	2½ x 2"	4.75
1¾ x 2¾"	1.85	3 x 3"	5.75
3 x 3½"	6.00		

Ironed Poles, White, XXX—

1¾ x 2½" No. 2	$4.00
2 x 2¾" No. 3	4.00

Ironed Shafts, White, XXX—

1¾" x 2" and smaller	$2.15
1½ x 2"	2.35
1½ x 2½"	2.90

Farm Wagon Bows—

Round Top, ½ x 2"	$ .65
Flat Top, ½ x 2"	.80
Round Top, ⅝ x 2½"	1.40

Standard size Piano Bodies with Seats—
Each $4.25

Plow Beams—

1 Horse	$ .70
2 Horse	.85
3 Horse	1.00

All Hickory and Oak Spokes and Patent Spokes—
Discount from Weis & Lesh List No. 5 .. 5%

Wagon Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2½ x 38"	$2.15	$2.95	$4.25
2½ x 42"	2.90	4.05	5.50
2⅝ x 46"	4.40		
3 x 44"	4.70	6.95	8.90
3 x 48"	5.50	7.85	10.50

Single Trees—Oval—

	Mixed Forest Second Growth	White Second Growth
2½"	$1.60	$2.90	$3.50
2⅝"	1.70	2.95	3.60
2¾"	1.80	3.05	3.80
3 x 36"	2.45	3.55	4.20
3 x 38"	2.50		
3 x 40"	2.65	4.00	4.85

Single Trees—Round—

	Forest Second Growth
2½"	$2.10	$3.60
2⅝"	2.10	3.65
2¾"	2.15	3.75
2⅞"	2.85	4.25
3"	3.45	4.80

Oval Plow Doubletrees—

2¾ x 36"	$1.75
3 x 40"	2.55

Flat Plow Doubletrees—
1¾ x 3½ x 42" $3.00

Wagon Doubletrees—

2 x 4 x 48"	$3.60
2½ x 48"	4.80
2½ x 4½ x 50"	5.20
2½ x 4½ x 52"	5.60
2½ x 5 x 52"	6.40
2½ x 5 x 54"	7.20
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—

	Forest
2½ x 30" and under	$1.00
2½ x 30" and under	1.25

Buggy Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½" and smaller	$2.65	$3.65	$4.65

Express Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.95	$3.65	$5.00
2⅝"	3.55	4.15	5.50
3"	3.55	4.30	5.75

Express Singletrees, Turned—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.50	$2.65	$3.75
2⅝"	2.90	3.65	4.00
2¾"	3.50	4.00	4.75

Express Singletrees, Square Center—

	Mixed Forest Second Growth	White Second Growth
2½"	$3.00	$4.15	$5.25
2¾"	3.50	5.45	6.00

Buggy Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2 x 42"	$2.75	$3.50	$4.50
2¼ x 2¼ x 42"	3.15	3.75	5.45

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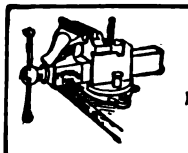
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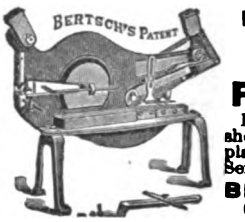

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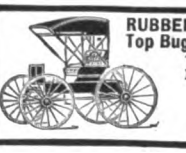
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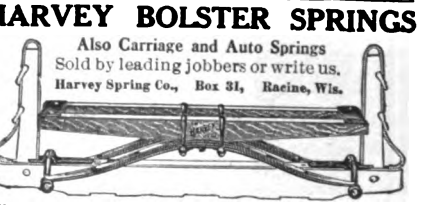
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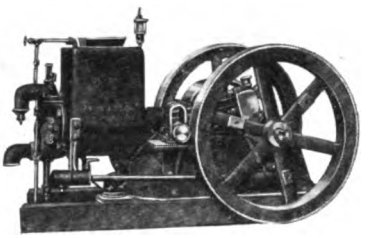

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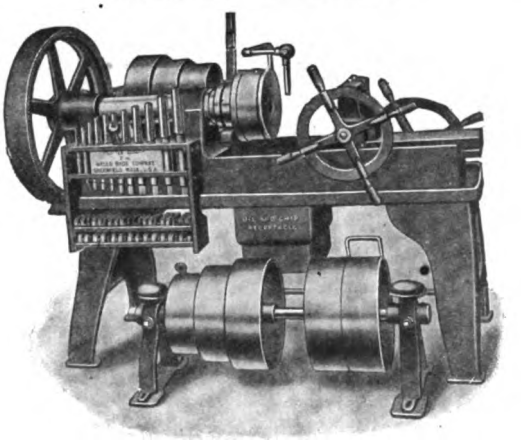

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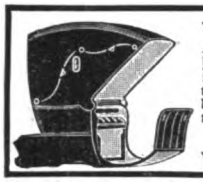

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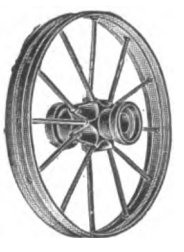

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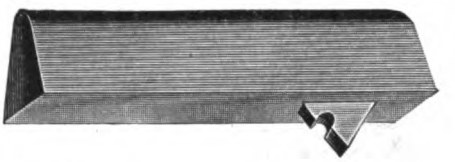

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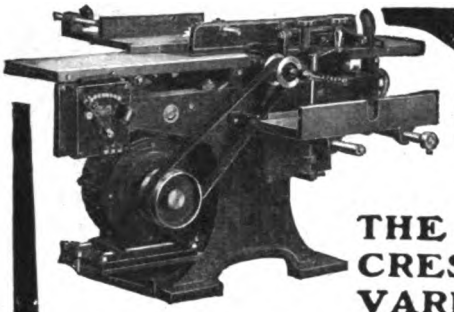

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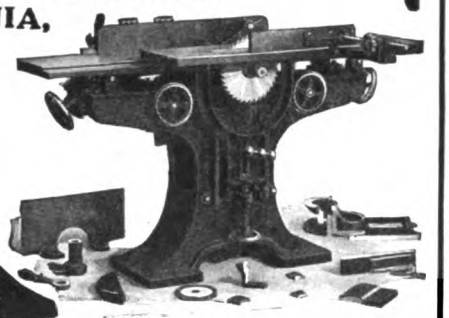

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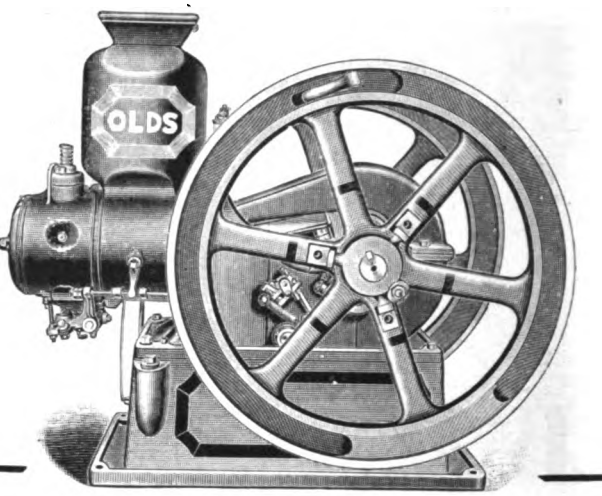

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is the most economical engine to run.

(1) The gasoline cost is very low because the new Seager mixer automatically makes exactly the right mixture of gas and air all the time.

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(4) The Seager mixer has **no moving parts**—once adjusted it is adjusted for a lifetime.

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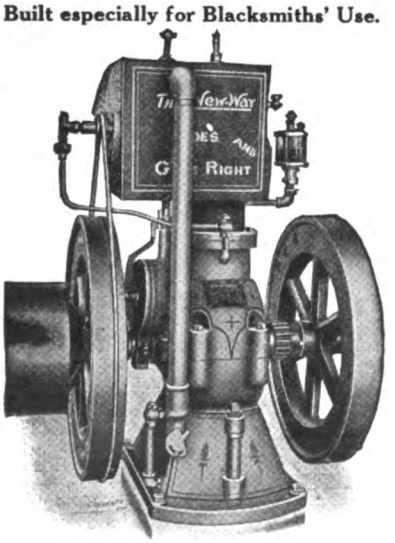

Look at the other engines first. Note the multitude of rods, springs and triggers described as simple. Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water-cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power sometime.

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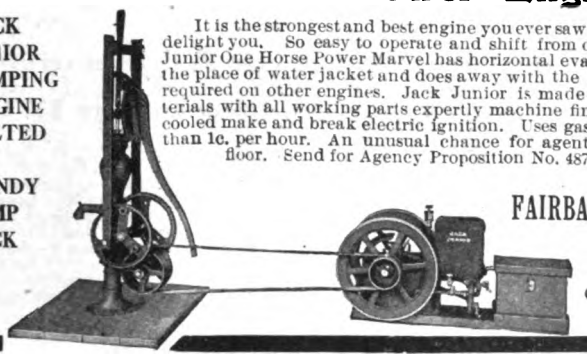

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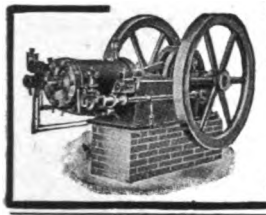

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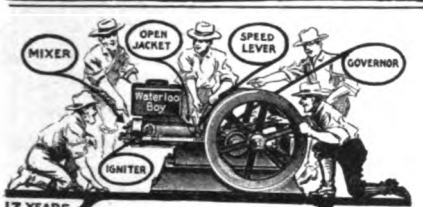

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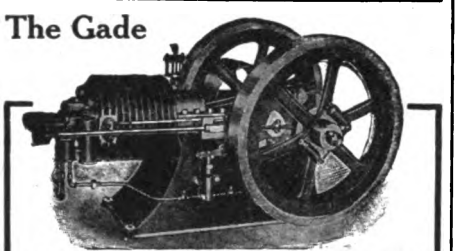

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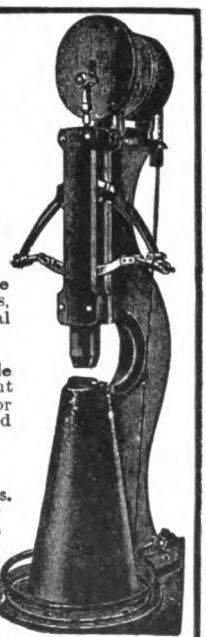

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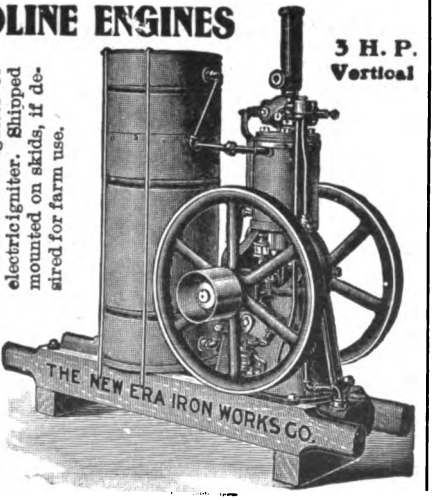

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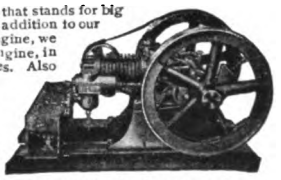
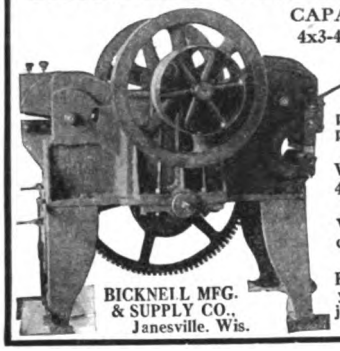
THE NEW ERA GAS ENGINE CO.
No. 63 Dale Ave., DAYTON, OHIO.

"STEINER," the name that stands for big power at low cost. In addition to our famous water-cooled engine, we make this air-cooled engine, in 1½, 2½ and 3 h. p. sizes. Also Pumps and Jacks.
When writing state size wanted, etc.
Catalogue free.



M. STEINER & CO.
242 S. Torrence St.
Dayton Ohio
Mention The American Blacksmith when you write.

BICKNELL'S IRON EATER
CAPACITY
4x3-4, 6x3-8,
and
punches in proportion.
Weight 4,000 lbs.
Write for catalogue.
For sale by your jobber.



BICKNELL MFG. & SUPPLY CO.,
Janesville. Wis.

HAUSAUER-JONES PRINTING COMPANY
253-257 Ellicott St., Buffalo, N. Y.
PRINTERS
PUBLISHERS
BOOKBINDERS
Let us submit an estimate on your printing requirements whether they be large or small.
Our facilities enable us to do work reasonably.
: Our organization enables us to do work well. :

ONLY 60 CENTS Did you ever try to shoe a horse that would not stand still? By the use of my great *Pulley Breaking Bridle* you can make the most restless horse stand as quiet as a lamb—even ugly horses, stallions, etc., completely subdued while being shod. Price, **Only 60c postpaid.** You should own one. Will bring business to you. Send for circular telling all about it.



PROF. J. W. BEERY, PLEASANT HILL, OHIO.

CLASSIFIED BUYER'S GUIDE.

To Find Address of any Firm given here, consult their advertisement.

For its location in this issue, see Index on Page 17.

Anvils.
Columbus Forge & Iron Co.
Columbus Anvil & Forging Co.
Eagle Anvil Works.
Hay-Budden Mfg. Co.
Wiebusch & Hilger.
Peter Wright & Sons.

Axles.
National Tubular Axle Co.
Timken Roller Bearing Axle Co

Axle Gauge.
Cray Bros.

Axle Nuts.
Hardware Co.

Awls.
C. A. Myers & Co.

Blacksmiths & Wagon Builders Tools & Supplies.
Beals & Co.
Buffalo Forge Co.
Campbell Iron Co.
Canedy-Otto.
Champion Blower & Forge Co.
Champion Tool Co.
Cray Bros.
Cummings & Emerson.
Estep & Dolan.
Heller Bros.
Montgomery & Co.
E. F. Reece Co.
Silver Mfg. Co.
Wells Bros.
Wiley & Russell.

Blowers.
Buffalo Forge Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Electric Blower Co.
Roth Bros. & Co.

Bolt Clippers.
Chambers Bros. Co.
Champion Tool Co.
H. K. Porter.

Bolt Cutters.
H. B. Brown & Co.
Wells Bros.

Books.
Prof. Geo. E. Rich.

Building Materials.
Chicago Housewrecking Co.

Built Up Wood.
Joel H. Woodman.

Calks.
Franklin Steel Works
Ludvigsen Bros.
Rhode Island Perkins Horseshoe Co.
Rowe Calk Selling Co.
Phœnix Horseshoe Co.

Calking Machines.
American Calking Mach. Co.

Carriage Top Dressing.
West Mfg. Co.

Carriage Specialties.
C. C. Bradley & Sons.
Crandal, Stone & Co.
Richard Eccles Co.
J. H. Sessions & Son.

Clipping Machines.
Chicago Flexible Shaft Co.

Coke.
Bourne Fuller Co.

Disc Grinders.
F. H. Klenke & Co.

Drills.
Buffalo Forge Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Silver Mfg. Co.

Drill Chucks.
Detroit Twist Drill Co.

Emery Grinders.
Kerrihard Company.
Crescent Machine Co.
Redlinger & Angle Mfg. Co.
Robertson Mfg. Co.

Emery Wheels.
Chicago Wheel & Mfg. Co.
Sterling Emery Wheel Mfg. Co.

Fifth Wheels.
Dayton Fifth Wheel Co.

Files & Rasps.
Heller Bros. Co.
Nicholson File Co.

Flexible Shafts.
Chicago Flexible Shaft Co.

Forges.
Buffalo Forge Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Silver Mfg. Co.

Gas & Gasoline Engines.
Air Cooled Motor Co.
Ajax Iron Works.
Davenport Ice Clipping Machine Co.
Fairbanks-Morse & Co.
Foos Gas Engine Co.
Gade Bros. Mfg. Co.
Gardner Motor Co.
Wm. Galloway Co.
Gilson Mfg. Co.
International Harvester Co.
Kansas City Hay Press Co.
New Era Gas Engine Co.
New Way Motor Co.
Seager Engine Works
Sidney Tool Co.
Temple Pump Co.
Waterloo Gasoline Engine Co.
Witte Iron Works.

Gas Lamps.
Brilliant Gas Lamp Co.

Gears.
Akron Selle Co.
Parry Mfg. Co.

Hammers.
Champion Tool Co.
Heller Bros.

Hand Bending Tools
Estep & Dolan.

Hardening Solutions.
Metal Hardening Solution Co.

High Wheel Motors.
Hastings Motor Buggy Co.

Horseshoes.
American Horseshoe Co.
Bryden Horseshoe Co.
Burlington Horseshoe Co.
Humane Horseshoe Co.
Phœnix Horseshoe Co.
Rhode Island Perkins Horseshoe Co.
U. S. Horseshoe Co.

Horseshoe Nails.
Capewell Horse Nail Co.
Union Horse Nail Co.

Horseshoe Pads.
Goodyear Tire & Rubber Co.
Morgan & Wright.
Revere Rubber Co.
Scientific Hoof Pad Co.

Horse Stocks.
Geo. Barcus & Co.
Hemphill Horse Stocks Co.

Horse Training.
Prof. Jesse Beery.

Hub Borers.
Abbott & Co.
Silver Mfg. Co.

Igniters.
Dayton Electrical Mfg. Co.
Knoblock-Heideman Mfg. Co.
Motsinger Device Mfg. Co.
Remy Electric Co.

A A A A



Horseshoes of all Descriptions

The most complete line for you to select from. Material and workmanship guaranteed to be the best. Our shoes always give satisfaction.

The best Horse Shoes in the land bear this trade-mark, the stamp of quality (A) Find this trade-mark stenciled in red on all kegs and boxes

COMPLETE CATALOGUE FREE
Showing all Styles of our Shoes

AMERICAN HORSE SHOE COMPANY
Phillipsburg, N. J. - - - U. S. A.

Iron.
Bourne Fuller Co.
Campbell Iron Co.
Milton Mfg. Co.

Knives.
Woodworth Knife Works.

Lathes.
Sebastian Lathe Co.
Sidney Tool Co.

Lawn Mower Grinders.
Chicago Wheel & Mfg. Co.

Machinists' Tools.
Morse Twist Drill & Machine Co.
L. S. Starrett & Co.

Magnetos.
Dayton Electrical Mfg. Co.
Knoblock-Heideman Mfg. Co.
Motsinger Device Mfg. Co.
Remy Electrical Co.

Nuts.
Hardware Co.
Milton Mfg. Co.

Paints & Varnishes.
Campbell Iron Co.
Felton, Sibley & Co.

Patent Attorneys.
Chandlee & Chandlee.
Watson E. Coleman.
F. A. Dietrich & Co.
Herbert Jenner.
R. S. & A. B. Lacey.
C. L. Parker.
Milo B. Stevens.

Plow Shares.
Crescent Forge & Shovel Co.
Star Mfg. Co.

Plumbing Supplies.
Chicago Housewrecking Co.

Poles.
Parry Mfg. Co.
Pioneer Pole and Shaft Co.
Warner Pole & Top Co.

Power Hammers.
Bicknell Mfg. & Supply Co.
Fairbanks, Morse & Co.
Kerrihard Company.
Macgowan & Finigan.
Mayers Bros.
Modern Sales Co.
Novelty Iron Works.
Star Foundry Co.
Vulcan Iron Works.
West Tire Setter Co.

Pulley Breaking Bridles.
Prof. Jesse Beery.

Punches.
Bertsch & Co.
Bicknell Mfg. & Supply Co.
Buffalo Forge Co.
Little Giant Punch & Shear Co.

Rubber Horse Shoes.
Humane Horseshoe Co.

Rules.
L. S. Starrett & Co.

Saws, Band.
Crescent Machine Co.
Sidney Tool Co.
Silver Mfg. Co.
Defiance Machine Works.

Schools.
American Correspondence Schools.
Coyne National Trade School.
Highland Park College of Engineering.
International Correspondence School.

Screw Plates.
A. J. Smart Mfg. Co.
Butterfield & Co.
Hart Mfg. Co.
E. F. Reece Co.
Wells Bros. Co.
Wiley & Russell Mfg. Co.

Self-Locking Foot Vise.
Hamilton Mfg. Co.

Shafts.
Parry Mfg. Co.
Pioneer Pole and Shaft Co.
Warner Pole & Top Co.

Shaft Couplings.
C. C. Bradley & Son.
Richard Eccles Co.

Shears.
Bertsch & Co.
Bicknell Mfg. & Supply Co.
Buffalo Forge Co.
Little Giant Punch & Shear Co.

Springs.
Harvey Spring Co.
Raymond Mfg. Co.
J. H. Sessions & Son.

Steel Stamps.
Fred C. Kauts & Co.
Geo. M. Ness, Jr.

Steel.
Bourne Fuller Co.
Firth Sterling Steel Co.

Steel Shapes.
Crescent Forge & Shovel Co.
Star Mfg. Co.

Stocks & Dies.
Butterfield & Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Hart Mfg. Co.
E. F. Reece Co.
A. J. Smart Mfg. Co.
Wells Bros. Co.
Wiley & Russell.

Tenoning & Boring Machines.
Silver Mfg. Co.
Sidney Tool Co.
Vulcan Iron Works.
Bicknell Mfg. & Supply Co.

Tire Bending Machines.
National Tubular Axle Co.

Tire Heaters.
Rochester Tire Heater Co.
West Tire Setter Co.

Tires, Rubber.
Goodyear Tire & Rubber Co.
Morgan & Wright.

Tire Setters.
Brooks Tire Machine Co.
House Cold Tire Setter Co.
Mayers Tire Setter Co.
National Hydraulic Tire Setter Co.
Rochester Tire Heater Co.
West Tire Setter Co.

Tire Shrinkers.
Buffalo Forge Co.

Tools.
Estep & Dolan.
Sidney Tool Co.

Tops & Trimmings.
Buob & Scheu.
Indiana Top & Vehicle Co
Parry Mfg. Co.
Warner Pole and Top Co.

Transfer Signs.
Palm, Fechteler Co.

Twist Drills.
Cleveland Twist Drill Co.
Morse Twist Drill & Machine Co.

Vehicles.
Buob & Scheu.
Parry Mfg. Co.

Veterinary Remedies.
Newton Horse Remedy Co.
W. F. Young.

Vises.
Eagle Anvil Works.
Hamilton Mfg. Co.
Chas. Parker Co.
Prentiss Vise Co.

Wagon Standards.
A. H. Harshbarger.

Welding Compound.
Cortland Welding Compound Co.
Phillips-Laffitte Co.
Weldarine Mfg. Co

Welding Plates.
Phillips-Laffitte Co.

Wheels.
Boob Wheel Co.
Parry Mfg. Co.
Cray Bros.

Wheels, Metal.
Electric Wheel Co.
Empire Mfg. Co.

Wood Working Machinery.
Bicknell Mfg. & Supply Co.
Buffalo Forge Co.
Crescent Machine Co.
Defiance Machine Works.
Sidney Tool Co.
Silver Mfg. Co.

HORSESHOERS AS RETAIL MERCHANTS.

Manufacturers of horseshoers' supplies and heavy hardware jobbers have, as a rule, considered horseshoers and blacksmiths as final consumers of their products. This has been true of detachable screw calks that are worn in winter time, even though attempts have occasionally been made to make the merits of some of these goods known to the horseowning public.

Something over a year ago one of the organizations of horseshoers attempted to have the manufacturers of adjustable calks treat them on the basis of retail merchants in the handling of calks. This was to be accomplished by making the prices to horseshoers and retail hardware stores the same.

This plan did not work out well in practice because the manufacturers found that all retail hardware stores did more or less business with horseshoers, and that, therefore, they were entitled to jobbers' rates. But even when this effort was made there was no real attempt to deal with the horseshoers consistently as retail merchants.

Consequently, the announcement of the Rowe Calk Selling Company made elsewhere in this issue, of new selling plans, making the horseshoers retail merchants in fact, is of considerable interest to horseshoers everywhere. Not only are the horseshoers to get the benefit of retail dealers' prices, but they are also to be co-operated with in disposing of Rowe Calks to horseowners.

This co-operation will be made in three ways: First, a National advertising campaign in journals and periodicals reaching the customers of the horseshoers will be made. Secondly, booklets describing the Rowe calk will be sent out by mail to the customers of the shoers, and the shoer's name will appear upon each booklet as a local agent handling these goods. In the third place, and most important, every effort is to be made to induce the horseshoer to advertise in his home papers like other retail merchants.

In order to encourage such home advertising, the Rowe Calk Selling Company has planned to furnish to all horseshoers who desire them plates or ready-made advertisements of a "catchy" and attractive sort to which the shoer's name will be attached. These plates, while large enough to attract attention, will not be so large as to make the advertising charges expensive.

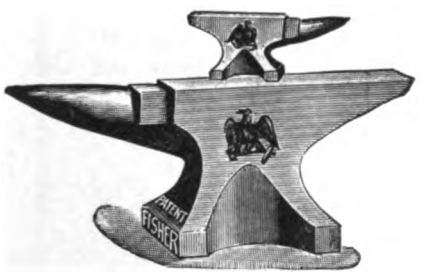
This new departure will undoubtedly stimulate the horseshoeing and blacksmith business throughout the country, and will do a great deal to put the business on the same plane as other retail businesses of various sorts.

Of course, it will also take the horseshoeing business out of a rut. And it may lead to a re-distribution of business in many localities, because the vigorous advertiser will undoubtedly pull away much trade from his slower rivals who do not advertise.

The outcome of this advertising campaign will be watched with much interest by manufacturers and jobbers of horseshoers' supplies, because the publicity fever cannot fail in this case to do what it always does, and that is to make the horseshoer more discriminating in his purchases of supplies and materials. He will want the best in order to cater to the best trade and to have talking points for his advertising.

"EAGLE" ANVIL WORKS ESTABLISHED 1843

200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



NONE BETTER MADE OVER 300,000 IN USE

THE ANVIL OF MANY MEDALS.

The "EAGLE ANVIL" has taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always says: "Nothing but an Eagle for me." Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few years' use.

VISES OF MERIT

The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last a lifetime.

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base.

Write for our descriptive Anvil and Vise Catalog.

Our goods are handled by reliable dealers everywhere.



PARALLEL STRONG AND DURABLE.

FISHER & NORRIS, 33-47 Fair St., TRENTON, N. J.



When You Buy Horse Shoes

Is it not preferable to make your selection from the most complete line and the best shoes on the market?

United States Horse Shoes

"In a Class by Themselves"

Our Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today.

We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.

United States Horse Shoe Company

Rolling Mills and Factory, ERIE, PA.

A NEW PROCESS IN ANVIL MANUFACTURING.

There are today three distinct classes of Anvils on the market, the Forged Anvil, the Cast Iron Anvil, and the Cast Steel Anvil.

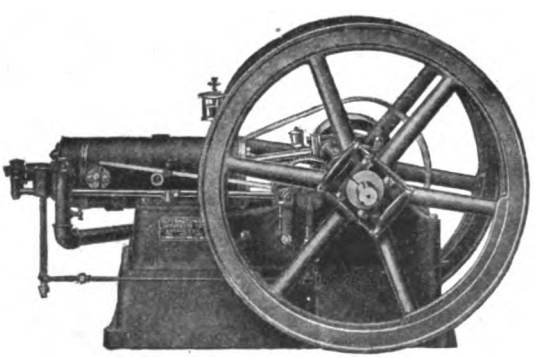
Most of the Wrought Anvils have heretofore been made by welding a solid forged iron top to a forged bottom, and welding a steel face plate to the same. This is the method that has been used by the leading Wrought Anvil manufacturers for years, but the HAY-BUDDEN MANUFACTURING CO. have, during the past year, made up most of their anvils in a manner which does away with the welding on of the steel face plate.

After considerable experimenting they have succeeded in obtaining for the entire top of their Anvil, a steel of such analysis that will take a satisfactory temper and yet be sufficiently strong and tough to stand the usage for which the tool is intended.

This steel top is forged in such a manner as to impart additional strength and toughness to the material. By this method they overcome what has been a weakness in the Wrought Anvil, that of loose faces, for by this process it is obvious that there cannot be any loose faces. By a process of their own the steel top is welded to the forged base in such a manner as to insure a lasting union at that point.

An earlier announcement of this step forward in their method of manufacture had not been made for the reason that they desired a number of these Anvils to be placed in actual use and a working test made, and they report that during the past 14 months over 10,000 of these New Process Anvils have been shipped out with entirely satisfactory results. Their advertisement will be found on our rear cover.

THE MONEY-MAKING ENGINE
FOR BLACKSMITHS



The smith's first requirement in an engine is that it be dependable. It must be quick and sure starting, because he wants to start and stop his engine scores of times in a day. He gets very unsatisfactory service out of a power that has to be coaxed and adjusted every time he wants to use it.

The Dependability of

I. H. C. GASOLINE ENGINES

has made them strong favorites, not only with blacksmiths, but with other mechanics.

They are sure, dependable starters because they are made on the right plan and in the right way.

They are regular, smooth runners and they deliver power at the lowest cost of production and with the minimum of attention.

There are many styles and sizes:

Verticals—2, 3 and 25 horsepower.
Horizontals (portable and stationary)—in 4, 6, 8, 10, 12, 15 and 20 horsepower.
Air-Cooled Engines—in 1 and 2 horsepower.

Ask local agents for catalogs of the style you are interested in, or write direct to us.

INTERNATIONAL HARVESTER COMPANY OF AMERICA

(INCORPORATED)

13 Harvester Building ***CHICAGO, U. S. A.***

PROF. GEORGE E. RICH'S
$25.00 Mail Course on Practical Horse Shoeing and latest book for only $8.00

Testimonials on application. Send money by Post Office Order or Registered Letter. Address

PROF. GEO. E. RICH
27 N. Main Street ***AKRON, O.***

? Do YOU Wish for a Long Life? ?

Even if you should achieve this desire your tools will survive you, if they are tempered by Kalux Steel Hardening Solution; mix in water; that's all. We will be pleased to advise you if you will tell us the nature of your steel hardening work and the name of your supply dealer at once. Address

KALUX STEEL HARDENING SOLUTION

METAL HARDENING SOLUTION CO.
Granite Building **Rochester, N. Y., U. S. A.**

Canadian Distributor, H. W. Petrie, Ltd., Toronto, Montreal, Vancouver, Cobalt.
Agents, Beals & Co., Buffalo, N. Y.

! !

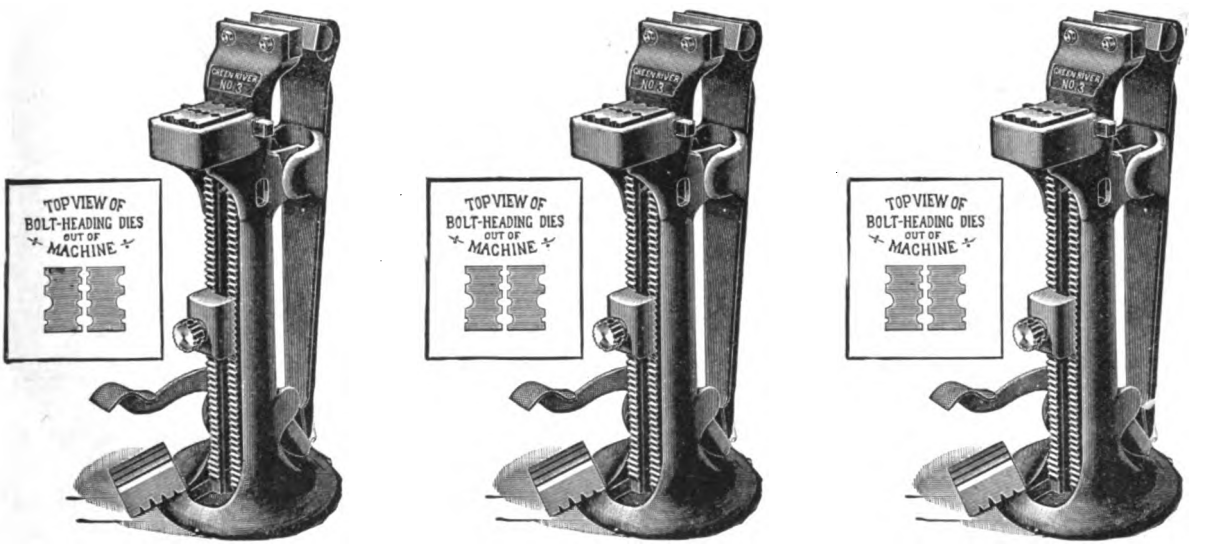


Every "F-S" order is a "rush" order—put on a time schedule, and hurried through. We are famous for prompt shipments.

You can't go wrong when you use "F-S" Enamel Top Dressing. It combines high finish with durability—and won't injure the leather.

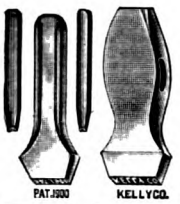
FELTON, SIBLEY & CO.
Manufacturers of Paints, Colors and Varnishes
136-140 N. 4th St., PHILADELPHIA

Green River Shoeing Vise and Bolt Header



Every blacksmith should have one of these vises. They are cheap, they are strong; they will save you time.
Send for catalog 34D and prices.

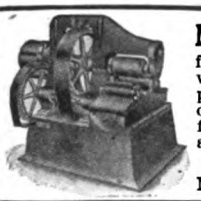
WILEY & RUSSELL MFG. CO., Greenfield, Mass., U.S.A.



STEEL STAMPS AND MACHINE PLATES

We make stamps for blacksmiths for any purpose. Makers of Machine Name Plates, Checks, Stencils, Badges. No matter what your needs may be in the Stamp or Tag line. We'll guarantee satisfaction.

FRED C. KAUTZ & CO.
2633-2635 W. Lake St., Chicago, Ill.



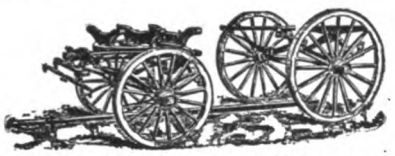
NATIONAL TIRE BENDING MACHINE

for rolling steel and iron tire for wheels to a circle of any desired diameter. It will bend tire from the lightest to 10" wide by 1" thick. Is heavy and well proportioned. Furnished with tight and loose pulleys, with friction clutch pulley, or direct connected motor, if desired at an additional charge. We also manufacture solid steel loose collar axles and the National self-oiling tubular axles and steel stock and hog troughs.

WRITE FOR CIRCULARS AND PRICES.

NATIONAL TUBULAR AXLE COMPANY, EMIGSVILLE, PA.

Selle Gears



All Styles and Sizes

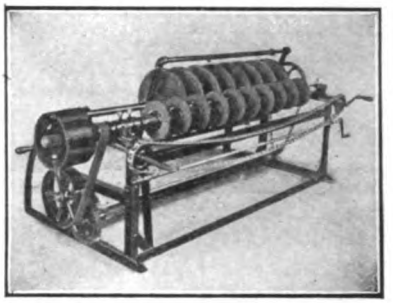
THE AKRON-SELLE CO.
CAT, 4. AKRON, O.

ENGINEERING: CIVIL, ELECTRICAL, MECHANICAL, TELEPHONE, MACHINIST, STEAM GAS.

A thoroughly equipped College of Engineering. Standard four-year courses, also one year courses in Steam and Electrical Engineering. Three months' courses in Traction and Gas Engineering. One-year Machinist's Course. **Shop work from the beginning.** Send for catalogue giving full information.

Highland Park College of Engineering, Des Moines, Iowa.

Blacksmith



Attention!

The ECONOMICAL Disc Sharpener is one recognized by blacksmiths as the leading sharpener of the day. Save time, save labor. One man can sharpen more discs, do it better, and do it easier and more economical than any other way. Simply roll disc under machine; tighten end screw; machine will take up disc and sharpen whole section at once. During spring rush truly a time and labor saver; does away with employed labor, thereby increasing profits.

Write for circulars and full information.

F. H. KLENKE & CO.
ASHTON, ILLINOIS



EVERYTHING NEEDED FOR IGNITION

The Dayton Electrical Mfg. Co.
152 St. Clair St.,
DAYTON, - OHIO.

Apple Ignition Dynamo

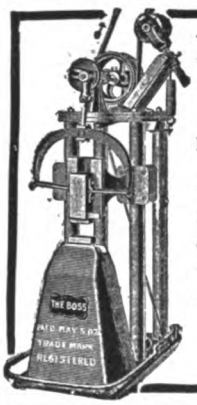
LAFFITTE WELDING PLATES

SEND FOR SAMPLE



AND OUR BOOKLET

THE PHILLIPS-LAFFITTE CO.
PHILADELPHIA, PA.



NOVELTY IRON WORKS BOSS HAMMER

For Plow Work, Wagon Work, Heavy Work, Any Work.

"Will strike as you like." Heavy or light at full speed or less. A broken anvil will cripple no other part of the hammer.

G. E. DAVIS, Mgr.
DUBUQUE, IOWA.



The New Little Giant Trip Hammer

Made in 3 sizes

25 lbs. 50 lbs. 100 lbs.

Over 2,000 Now Sold

The Best Power Hammer on the market. Works material up to 5 in. round.

FULLY GUARANTEED

MAYER BROTHERS, Inc.,
MANKATO, MINN.

United States, All Jobbers. New Zealand Agents, Alex. Storrie, Ltd., Invercargill. Manitoba, Saskatchewan and Alberta, Melotte Cream Separator Co., Winnipeg.

Humane Cushion Heel Horse Shoes.



ARE SUPERIOR TO ALL OTHER SOFT TREAD HORSE SHOES.

Because they positively prevent the concussion and jar.
Because the soles are exposed and admits air to the feet which is according to nature.
Because the rubber does not come in contact with the hoof or the ground.
Because the shoes have as much cushion when practically worn out as when first put on.
Because they are the only cushion shoes that can be heated for fitting to the feet, etc.

The HUMANE ARE THE ONLY CUSHION SHOES on the market that can be equipped with a sharp ice calk. For sale by all leading dealers.

THE HUMANE HORSE SHOE CO., LIMA, O.

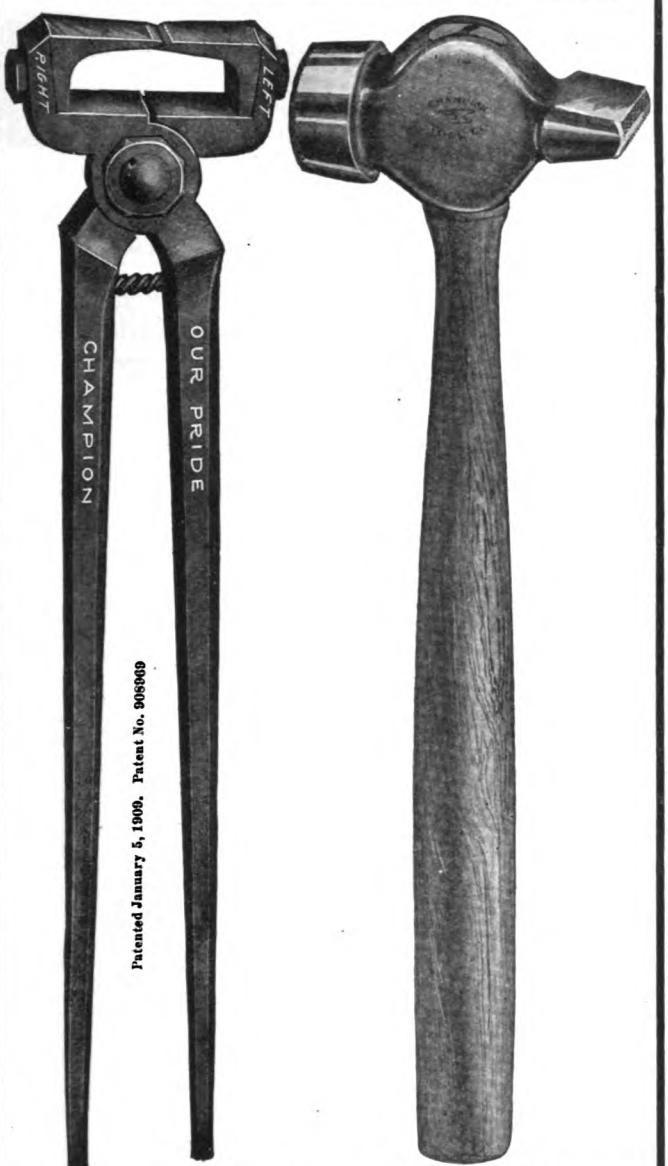
ONE CENT

spent for a postal card is all our

Forty Eight Page Catalog

will cost you. You should have this book, which shows

86 Labor-Saving Tools



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12 inch 14 inch
BALL BEARING JOINT
Interchangeable Blades
Drop Forged

No. 12 Electric Sharpening Hammer
Weighs 1 3-4 lbs. to 3 lbs.
Swings Just Right
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Our tools are tempered in PLAIN COLD WATER and can be redressed and retempered by any practical man.

CHAMPION TOOL CO.

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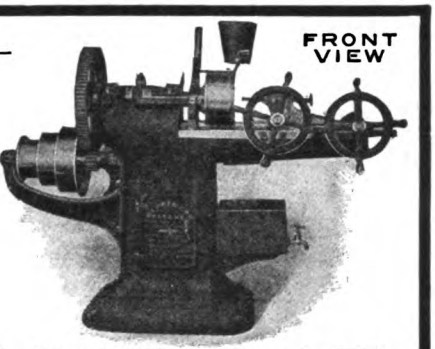
Bolt Threader

Best on Earth



A Bolt Cutter is Much Like a Man in This THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly.

THE H. B. BROWN CO.,
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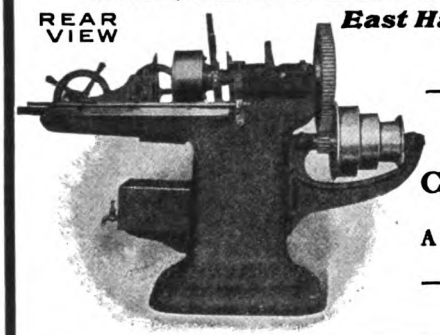

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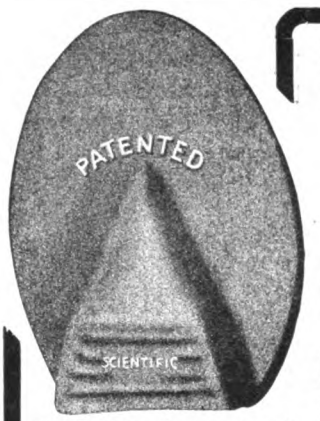
A Postcard will bring it.



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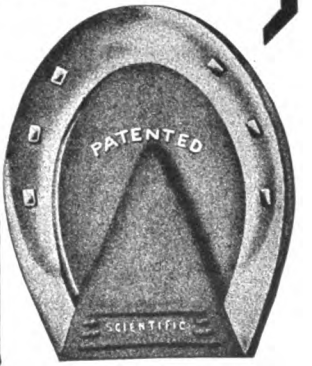
IT conforms scientifically to the requirements of the hoof, having full width of rubber at the heel and permitting full shoe at the walls of the hoof. It conforms exactly to the frog, which is thereby permitted to perform its natural functions of feeling the footing. Comfortable, clean and sanitary; always affording a perfect grip on slippery pavement.

The "Scientific" hoof pad is the only hoof pad on the market which can be fitted with any style of full length shoe with sharp or dull calks, and which has at the same time a full width of rubber at the heel.

The Acme of Perfection in Hoof Pad Construction.

Order a few trial sets from your jobber, watch their good service and performance on a few of your best customers' horses and you'll tie up to the "Scientific" for sound business reasons.



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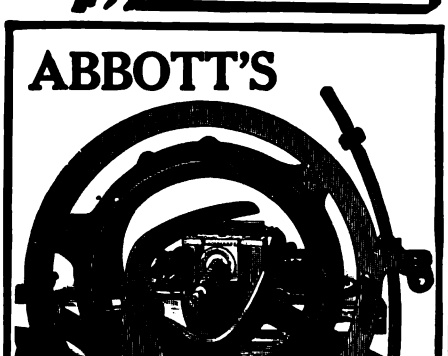

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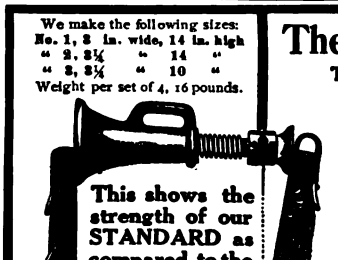
" 3, 3¼ " 10 "
Weight per set of 4, 16 pounds.



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Tested thoroughly and guaranteed strictly as represented.
Note its great advantages over the old style.

1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.
2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.
3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only a ⅞-in. face.
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If you have never tried the Bruce Standard, write today and ask for prices.

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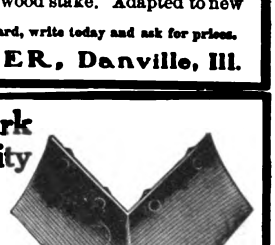

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THE KEYSTONE TRACE OR DRAFT SPRING RELIEVES THE HORSE OF ALL THOSE JARS CAUSED BY THE UNEVENNESS OF THE ROAD AND WHEN TAXED TO ITS FULLEST CAPACITY SIMPLY CLOSES, THUS FURNISHING A SOLID CONNECTING LINK AND AVOIDING ALL POSSIBILITY OF BREAKAGE.

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The *Incomparable* 400 Blower, the one great *Heirloom* that will be handed down *from one generation to the other. Ask what the owners say*

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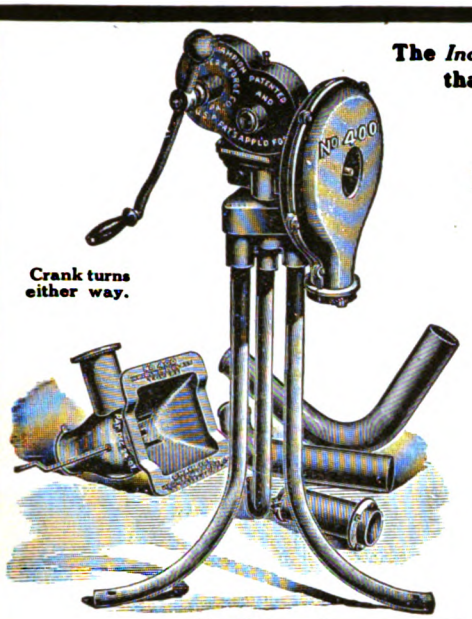
The No. 400 is the Blower that has REVOLUTIONIZED the World in Making Hand Blast



Crank turns either way.

No. 400

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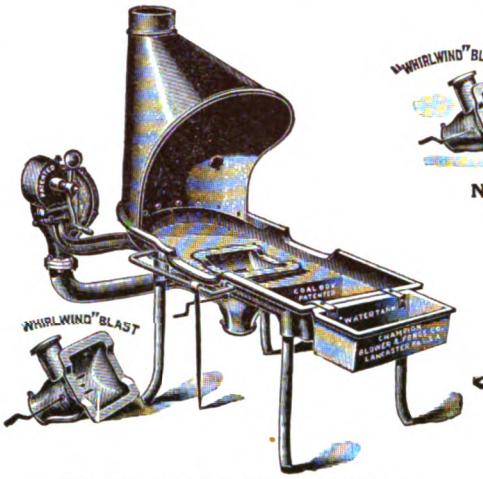
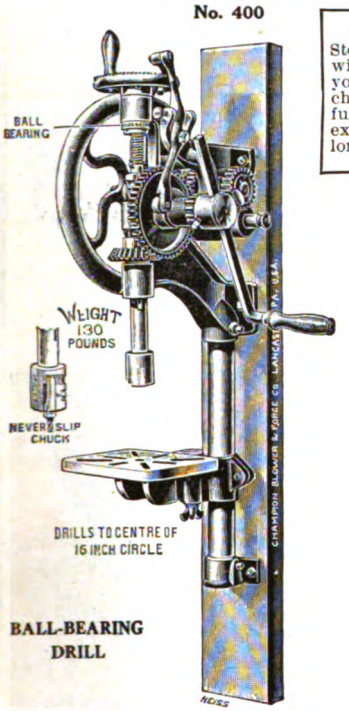
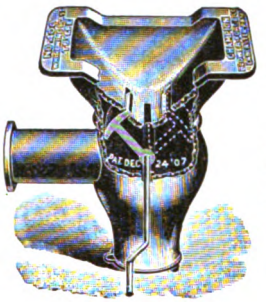


No. 433. Cast Iron Blacksmiths' Forge



BALL-BEARING DRILL



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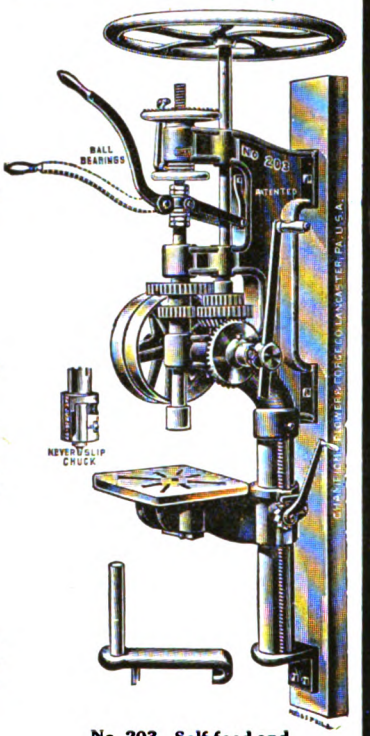

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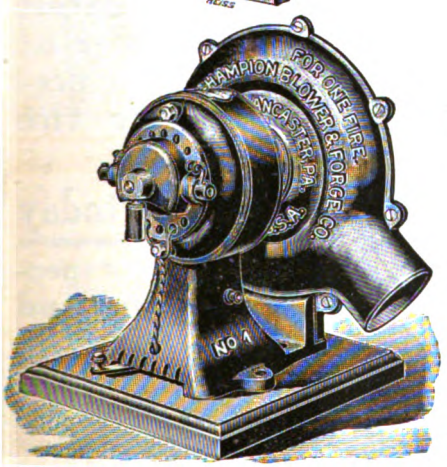

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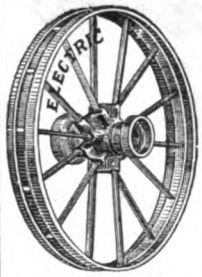

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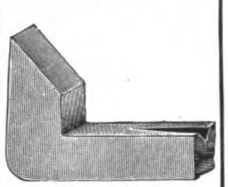
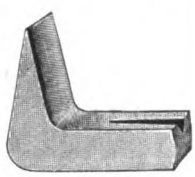


Medium, City or Chicago Sharp



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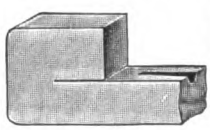

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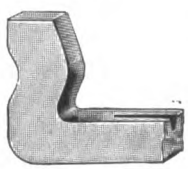
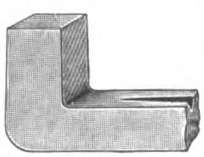


A Blunt Philadelphia Kink



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forms any calk on a horse shoe that a horse-shoer can make with a hammer. Just heat the shoe and one pull of the lever forms the calk.



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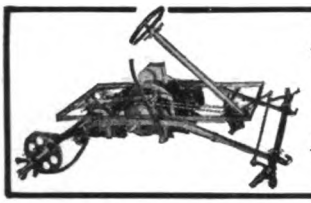

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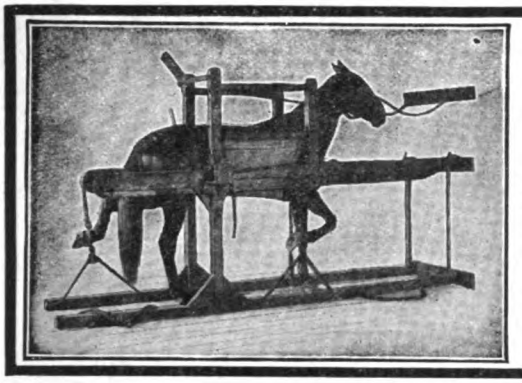

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Shoes the most vicious horse in twenty minutes.

No payment required until you test stocks.

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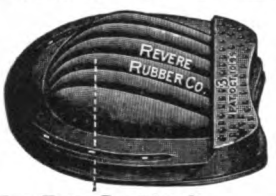

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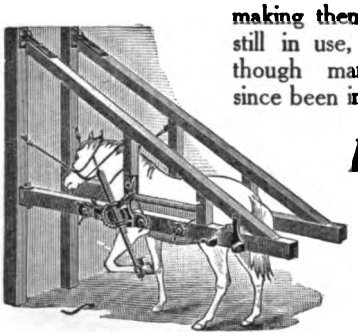

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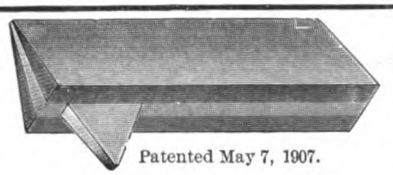

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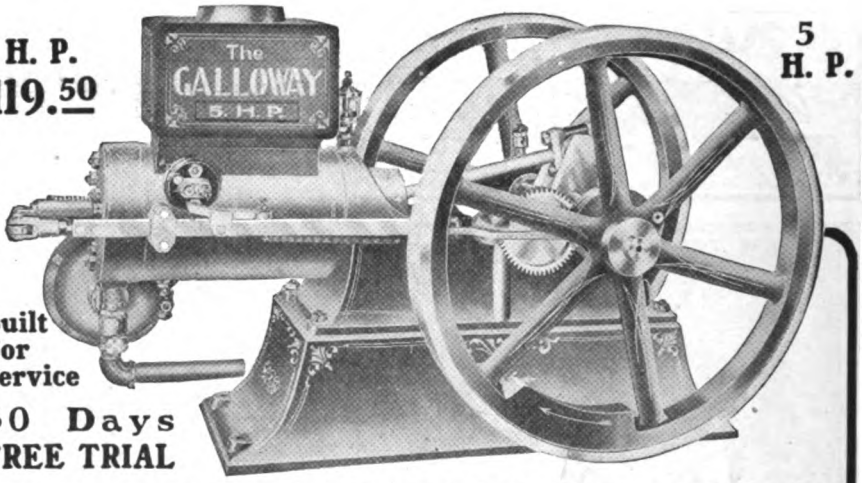

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Only four things to do: **Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start,** and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high-grade engine for 15 years. Over 2,500 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember the bore and stroke counts and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests.

On the larger sizes, if it is not entirely convenient for you to pay all cash, I will take your note for the balance at the regular rate of interest for 6 months.

The price given is for the 5-horse power only, but we make these engines in seven sizes.

Note my special proposition to blacksmiths.

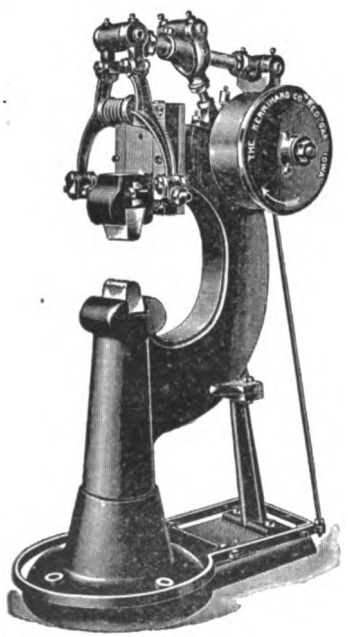
I have a plan by which every blacksmith can partly or entirely pay for his own machine. It's good; it's away out of the ordinary; and you will be overlooking a big chance if you don't write for my proposition.

Ask for my free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure.

WRITE TODAY. WILLIAM GALLOWAY, President.

THE WILLIAM GALLOWAY COMPANY, 577 Jefferson St., Waterloo, Iowa.

Kerrihard Power Hammers Sold on Ten Days' Approval Test



POWER HAMMER

and guarantee that they are the best that brains and money can devise.

We make no inferior goods because we are young in the business and we are building a reputation for honest values.

Every man in our shops understands that he is to make perfect every piece that makes up this wonderful, ingenious, labor-saving KERRIHARD POWER HAMMER.

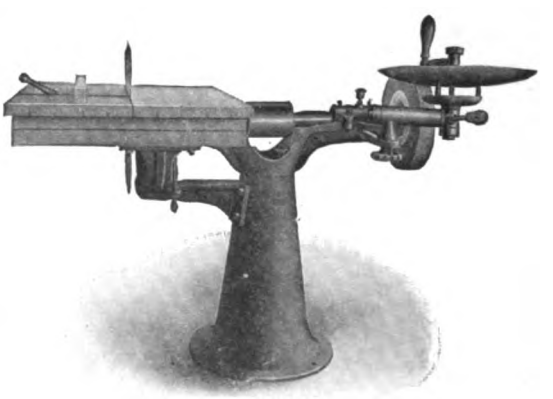
We expect every buyer of a KERRIHARD POWER HAMMER to be perfectly satisfied. He must be satisfied. We must be fair and we shall see that every man gets his money's worth.

A few years ago we started with practically nothing. Now we have a large and growing manufacturing plant. Why? Because we have satisfied the POWER HAMMER USER that we are on the square and that we make the best and simplest hammer in the world and sold at a price that is within the reach of every blacksmith the world over.

A shipment to Dresden, Germany, one to the British Isles, and another to Durban, South Africa, and still another to South Australia. We just mention a scattering here and there to show that she is making good world-wide, and say, believe us, it is the only real power hammer ever produced anyway. That's our story, you say, but listen: they tell us when they have used it that money could not buy their KERRIHARD if another was never to be made. But then, leave that to us.

Drop us a line today. Quit fooling with the old fashioned armstrong and elbow grease. Do three times as much money-getting work, and cut out the night sweats and worries.

Write us at once.



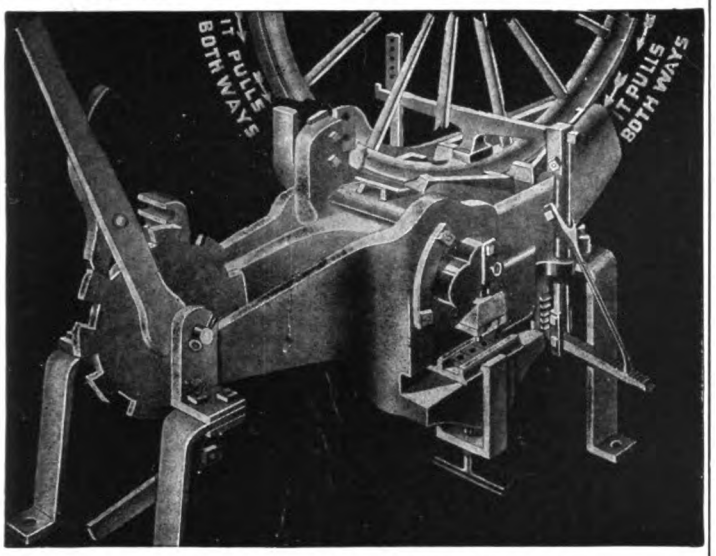
COMBINATION SAW AND GRINDER

THE KERRIHARD COMPANY

RED OAK, IOWA
Box 423

SPRINGFIELD, ILL.
315 E. Monroe Street

HOUSE COLD TIRE SETTER



Here are four reasons why this is the Cold Tire Setter to buy:

First: They set a tire easier, quicker and better than it can be done the old way or with any other cold tire setter.

Second: They never wear out nor get out of fix.

Third: They are the cheapest machine on the market that will do the work they do, and besides have a shear and punch thrown in.

Fourth: All the above claims are positively true and are proven by the fact that there are more of them in successful use today than there are of all the other makes put together.

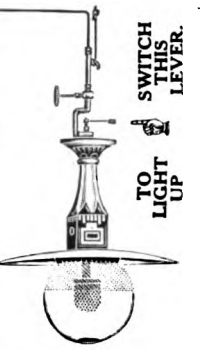
HOUSE COLD TIRE SETTER CO.

216-218 S. Third St., ST. LOUIS, MO.

J. H. HOUSE, 201 Church St., Toronto, Ont.

HANDY LAMP
Gasoline Lighting System





The most practical invention since the introduction of Gasoline for lighting purposes, satisfying a necessity and overcoming obstacles to its use never before successfully accomplished.

A SHADOWLESS 300-CANDLE POWER LIGHT

that can be turned up or down instantly, same as gas, or can be left burning continuously, day or night, at a dim light of one (or low) candle power, or less, at almost no expense. It can be turned up instantly to a **dazzling, bright 300-candle power light** that will flood a 30-foot room with light as bright as day at less than 1-2 cent an hour.

IT WILL SAVE FIVE TIMES ITS COST

in a year over Kerosene, Gas or Electricity. The **Handy Lamp System** is free from smoke, smell or danger. One gallon of gasoline will last from 40 to 50 hours. It is the **simplest** and **safest system** ever devised, and it is equally attractive and appropriate for use in your **Home** or **Blacksmith Shop**, store, church or wherever good light is needed.

If you knew from actual experience how handy, how economical and how satisfactory this system is you would not be without one for ten times its cost. Write at once for AB Catalogue and particulars.

BRILLIANT GAS LAMP CO., Dept. 6,
12 State Street, CHICAGO, ILL.

CANCELLED ORDERS

From a large carriage manufacturer that went in the hands of a receiver leaves on our hands a large stock of wheels of the following sizes. Here is your chance to get good wheels at low prices, but you must act at once.

Kind of Wheel.	Tread.	Grade.	Height.	Can have flat tire on. Size of tire and price per set.	Can have channel tire on. Price per set.	Can have rubber tire on. Price per set; wheels and rubber.	Can be sold without tire. Price per set.	Screws in rims.
Sar. Pat.	1"	D	36 and 40	1x1. $5.40	$5.65	$11.90	$4.00	yes
" "	1"	D	39 and 43	1x1 5.50	5.75	12.50	No	yes
" "	1"	D	40 and 44	1x1. 5.50	5.75	12.50	4.00	yes
" "	1"	D	42 and 46	1x1. 5.50	5.75	12.80	4.00	yes
" "	1"	D	38 and 42	No	5.25	12.95	No	No
" "	1"	D	39 and 43	No	5.50	13.50	No	No
" "	1"	D	39 and 43	1x1 5.75	6.00	14.00	4.15	yes
" "	1"	D	42 and 46	1x1. 5.75	6.00	14.30	4.15	yes
" "	1"	D	39 and 43	1x5-16. 5.90	No		No	yes
" "	1"	D	42 and 46	1x5-16. 5.90	No		No	yes
" "	1"	D	34 and 36	No	3.90	11.15	No	No
" "	1"	D	40 and 44	1x1. 5.25	5.60	13.60	3.85	No
" "	1"	D	39 and 43	1x1. 6.25	6.50	14.50	No	Yes
" "	1"	D	40 and 42	1x1. 4.25	4.50		3.00	Yes
" "	1"	D	40 and 43	1x1. 4.50	4.75		3.25	Yes
" "	1"	D	all 39	No	4.00	10.65	No	Yes
" "	1"	D	all 42	1x1. 3.90	No		No	Yes
" "	1"	D	all 43	1x1. 3.90	No		No	Yes
" "	1"	D	all 42	1x5-16. 4.10	No		No	Yes
" "	1"	D	all 39	1x1. 4.50	No		No	Yes
" "	1"	D	all 39	1x5-16. 4.60	No		No	Yes
" "	1"	D	36 and 46	1" cush. C. $5		18.40	No	Yes
" "	1"	D	39 and 40	1" cush C. $6		18.40	No	Yes
" "	1"	D	36 and 40	1¼" cush. C. $6		21.00	No	Yes
" "	1"	D	39 and 43	1" cush. C. $6		21.00	No	Yes
C. B.	1"	D	35 and 37	1" cush. C. $5		15.40	No	No
"	1"	D	38 and 40	1¼" cush. C. $5		17.50	No	No
"	1"	D	35 and 37	1x1. $3.90	4.10	10.35	No	No
"	1"	D	35 and 37	1x1. 3.90	4.10	11.35	No	No
"	1"	D	38 and 42	1x1. 5.25	5.50	12.00	4.10	No
"	1"	D	38 and 42	1x1. 5.50	5.75	13.45	4.35	No
"	1"	D	all 46	1x1. 3.90	4.15	12.75	2.60	No
"	1"	D	all 35	1x1. 3.90	4.15	11.40	2.60	No
War. Pat.	1"	C	42 and 46	1x1. 5.25	5.50	12.45	3.85	Yes
" "	1"	C	42 and 46	1x1. 5.50	5.75	14.00	3.95	Yes

Rubber tire used on above wheels we guarantee to wear one year. If unguaranteed tire is wanted deduct 75c. per set. The above wheels are good stock and condition, only a little shopworn.

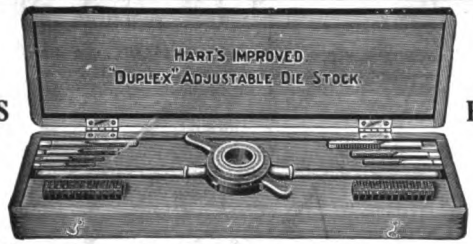
Five set orders we allow 15c. per set freight allowance. Ten set, 25c. per set. Prices are only made subject to prior sale. Positively can give only sizes listed at this extreme low price. Our object is to sell what we have in stock. For other sizes not listed above write for our No. 33 catalogue.

We also manufacture poles and shafts. Get our catalogue. We can save you money. Let us get acquainted or we both lose.

Yours respectfully,

A. BOOB WHEEL CO., Cincinnati, Ohio.

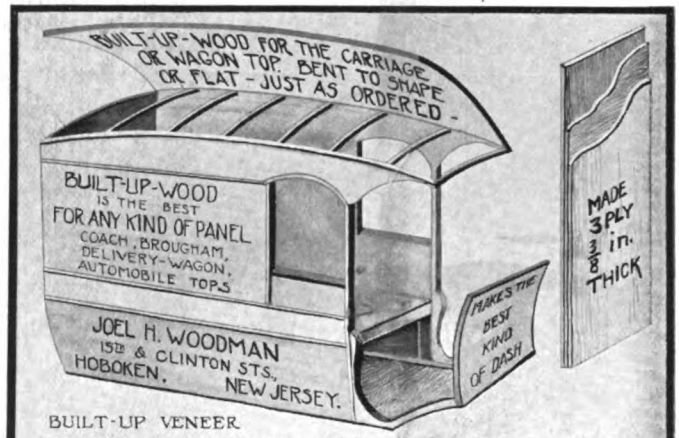
HART'S HART'S



A Threading Outfit that is suitable for general shop use—the **"DUPLEX" Bolt Die Stock Set "A"**, range ¼ to ¾ in. It contains dies that adjust without a wrench and require no reversing when cut is finished. A variety of sets with desirable ranges.

THE HART MFG. CO.

50 Wood Street CLEVELAND, O., U. S. A.



BUILT-UP VENEER
ANY SHAPE OR THICKNESS FOR AUTOMOBILES & WAGONS

Buffalo 200 Silent Blower exceeds every claim.

JOHN GLACKEN

Practical Horseshoer,
Blacksmithing, Rubber Tire Work, Carriage and Wagon Building.

23 Bridge Street.

Amsterdam, N. Y., July 21, 1909.

BUFFALO FORGE CO., Buffalo, N. Y.

Gentlemen:—

In reply to yours of the 9th inst. would say I am using your No. 200 Hand Blower and find it does all you claim for it and more. No man can make a mistake in buying your No. 200 Hand Blower. They work fine.

Yours truly,

JOHN GLACKEN.

See pages 7, 15, 34, 39.



Say! Mr. Blacksmith,
have you heard about the new tire setter called

THE SCIENTIFIC HYDRAULIC?

Blacksmiths are just wild about it where it is used, and the manufacturers are either **crazy** or **dead sure** they have a "cinch" on the other fellows for they actually **warrant** it to be **better** than any other and will let you be the judge.

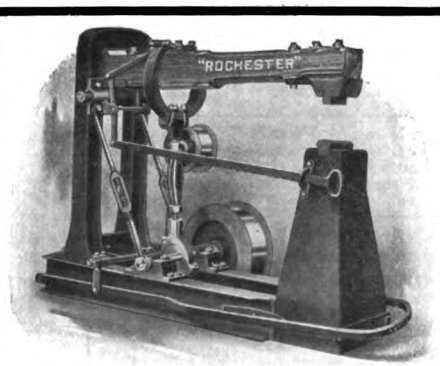
GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

Write for information at once to

National Hydraulic Tire Setter Co.

KEOKUK, IOWA.



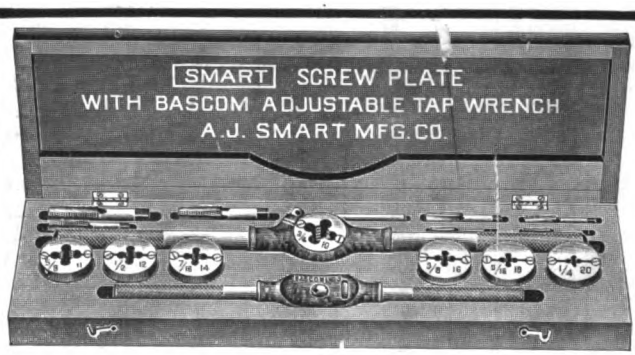


"Rochester" Helve Hammer

"The Hardest Hitter"

For catalog address,

THE WEST TIRE SETTER CO., Rochester, N. Y.



Our Taps and Dies are the best that 34 years' experience and up-to-date methods can make them. The easiest cutting and longest wearing screw cutting tools made. Send for free catalog.

A. J. SMART MFG. CO., Greenfield, Mass.

HAY-BUDDEN SOLID WROUGHT ANVILS

FIRST MADE IN AMERICA

The Gold Medal Anvil
HIGHEST AWARD
OMAHA, 1898 PAN-AMERICAN, 1901

Every genuine "Hay-Budden" Anvil is made of the best **American Wrought Iron** and faced with the best **Crucible Cast Steel.** Every genuine "Hay-Budden" Anvil is made by the latest improved methods.



Over 150,000 in Use
WARRANTED

WEIGHTS FROM 10 to 800 LBS.

Experience has proved their worth and demonstrated that **"HAY-BUDDEN" Anvils** are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., - - - BROOKLYN, N. Y.

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VOLUME 9 NUMBER 2

THE AMERICAN BLACKSMITH

BUFFALO N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

NOVEMBER, 1909

$1.00 A YEAR
10c A COPY

Your Business and Our Business | To Put Money Into Your Pocket

That is what YOU are working for and WE can't make money unless you succeed

Our Job

It is money that you are after in shoeing horses.
It is money that we are after in selling calks.
You have got to make profits that satisfy you or you won't sell the calks.
You might for a little while, if your customers asked for them; but you would soon quit the business if it didn't pay you.
And if we are to make money you have got to buy the calks from us.
So it is our job to see that you make money first before we can expect to make any.
But our job is harder than that.
We have got to show you that you can make **more** money on **Rowe welded tool steel center calks** than on any other kind.
And that is not all.
To prove that you can make more money on our calks we must show you that they are the best.
You can't always make the most money on the best goods; but where the amount of profit on a box of calks is the same for all brands it is a "cinch" that the best calk will make you the most money IF the manufacturer will push the goods and help you sell them.
We meet the issue squarely.

The Rowe Calk Platform

We ask no horseshoer to buy and sell Rowe Calks unless we can prove to him that we have the best hard center calks on the market and that he can make more money handling Rowe Calks than any other kind.

The King of Calks

That the new **Rowe Welded Tool Steel Center Calks** are the finest and most satisfactory screw calks ever put on the market is conceded by everybody—even by our competitors, strange as it may seem.
The "cuts" on this page showing the **wedge of satin-like tool steel** following the taper end of the calk and running clear through tell the story.
These **welded tool steel center calks** positively will wear sharper and longer than any other calks—wear longer by days and in some cases by weeks.
Horseshoers are sending letters from all over the ice belt asking for our new booklet and saying things like this:

> "Having used your Rowe calks all last winter, I expect to use them forever. Here is a list of horseowners for booklets."

It is easy to satisfy yourself.
We will send split samples anywhere and also samples to test out in wear.
Then you will know that the old-fashioned screw calk with a pin stuck in a hole in the center, fast-wearing and likely to drop out, is a back number.
Your jobber and every other one knows this. That is why practically every supply house in the ice belt from the Atlantic to the Pacific has bought **Rowe welded tool steel center calks.**

Since these welded tool steel center calks came on the market last year our sales have increased about two hundred per cent.

Your Profit

The profit on a thousand **Rowe welded tool steel center calks** is the same as on other inferior and unsatisfactory calks.
How we give a better calk for the same money and allow the shoer the same profit is a story that our booklet tells. Send for it on a postal today.

Why You Sell More Rowe Calks

But it is easier to sell **Rowe welded tool steel center calks** and you can sell more of them than any other kind.
In fact, we will almost sell them for you.

General Advertising to Horseowners

These great calks will be advertised in a striking way direct to the horseowner in leading papers reaching farmers, horsemen, physicians, team owners and others.
And the flood of new business so created will be directed to your shop and to horseshoers everywhere.

Advertising For You At Home

To give you the full benefit of this national advertising campaign we have had prepared a series of twenty-eight ads., ready-made and illustrated for you to run over your own name in your own paper.
Try them and you will find the gate to a golden highway.

Booklets For Your Customers

And on the top of everything we will send our new, handsome, illustrated and very clever booklet bearing your name and address as a local agent to every one of your customers and to every horseowner in your town.
Send in the names and addresses today and the booklets will go out the last of November.

Can You Beat It?

1. The best calk by far.
2. Margin of profit as big as any.
3. National newspaper advertising.
4. Free plates, all set up, for advertising yourself in home papers.
5. Booklets to horseowners with your name and address.
6. Biggest returns and Happiness and Prosperity.

Take this minute to write for samples on a postal and we will send with the samples our booklet and full information about free advertising plates. We must have your jobber's name and address. Mail to "Rowe Calks," Hartford, Conn.



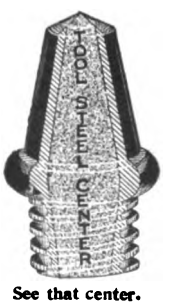
See that center.

Rowe Welded Tool Steel Centers Are The Calks of The Century

Send your list of Horseowners for Booklets at once

Address, ROWE CALKS, HARTFORD, CONN.

Shipping Warerooms in Hartford, Chicago and Montreal



See that center.

THE SILVER MFG. CO.

365 BROADWAY SALEM, OHIO.



SILVER'S NEW JOINTERS

Five Sizes—8, 12, 16, 20 and 24 inch. New "patent applied for" features.



SILVER'S SAW TABLES

Send for circular of Saw Tables and Swing Saws.

Bigger Profits Using Silver's Tools



Silver's New Swing Saw. Four Lengths.

Is your shop paying as big a profit as you would like, or are you simply "working for your health?"

Are you not sometimes handicapped by lack of proper tools to work with?

Doesn't the "quality" of your work or the speed and ease of getting it out suffer at times?

Profits are what you are looking for—as much of them as you can get.

An inquiry for our catalog or booklets is all it will cost you to find out about many tools that will surely save you money. That's what they have done for thousands of others.

SEND FOR OUR NEW MACHINERY CATALOG

or for any of the following booklets:

BAND SAWS AND JOINTERS—describing 20" Band Saws for foot or belt power or combination; also 26, 32, 36-inch Power Band Saws with new features; also five sizes of Jointers.

HUB BORING AND SPOKE TENONING MACHINES—illustrating and describing several sizes of each.

PORTABLE FORGES—illustrating and describing 14 styles.

DRILLING MACHINES—covering our line of some 22 distinct machines.

POWER DRILLS—illustrating our line of 20" machines with lever feed, lever and wheel feed, power feed with automatic stop, power feed with back gears and automatic stop.

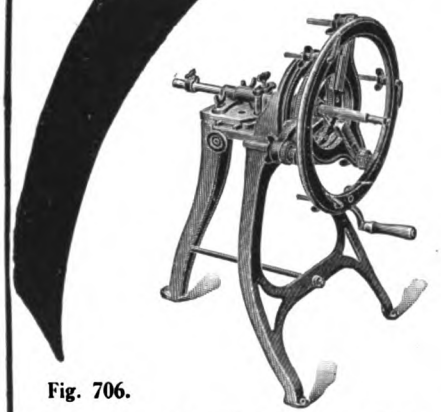
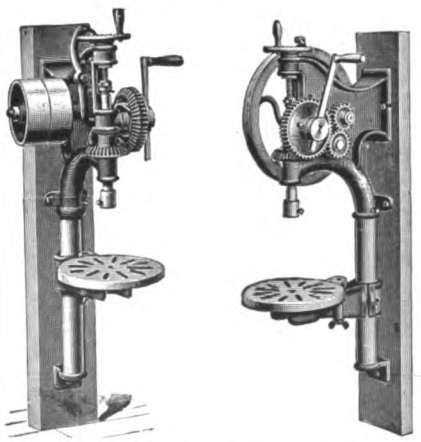


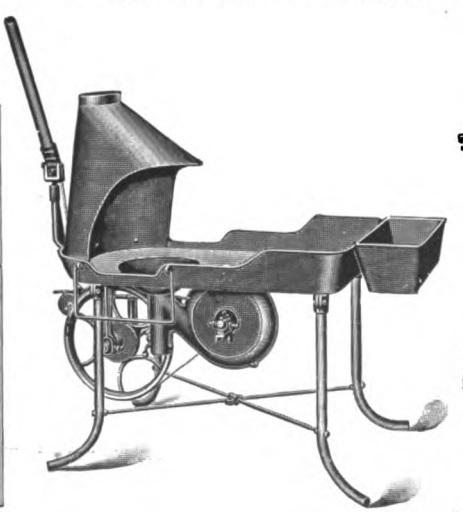
Fig. 706.

TAYLOR'S NEW TAPER HUB BORING MACHINE.

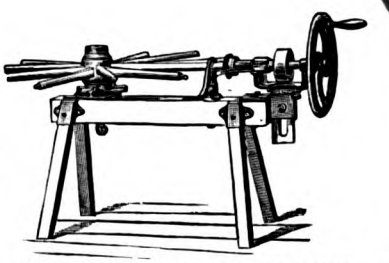
Hand wheel regulates cut. Bores any size hole or taper without changing bit.



Our Booklet, "Drilling Machines", illustrates 22 kinds we make.



Our Portable Forge Booklet illustrates some 14 kinds. We have a size to suit your needs. Strong and durable. Attractive designs.



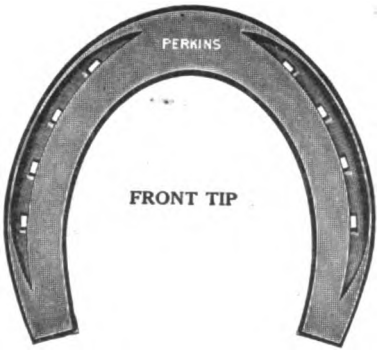
SPOKE TENON MACHINES

in Seven Sizes. Fitted with Star Hollow Auger.



HIND CITY

Look for this Trade Mark ★ The Star brand beats all others



FRONT TIP



FRONT STEEL COUNTERSUNK

★ PERKINS ★

HORSE SHOES

AND

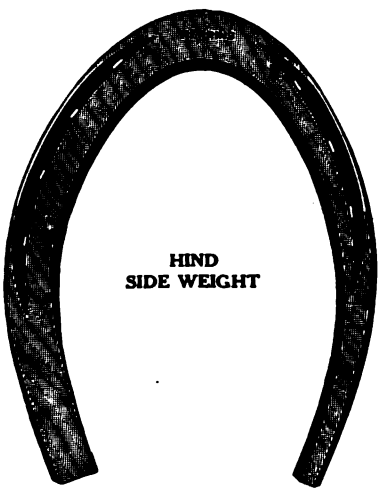
TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



FRONT TOE WEIGHT



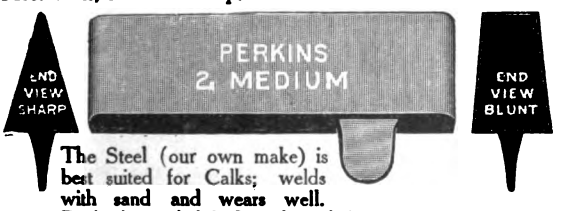
HIND SIDE WEIGHT

Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

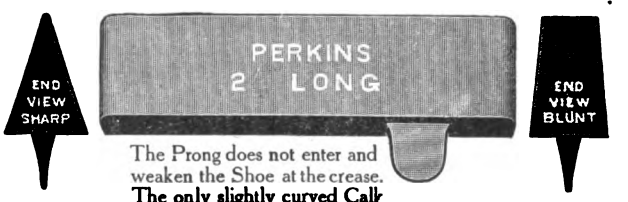


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.

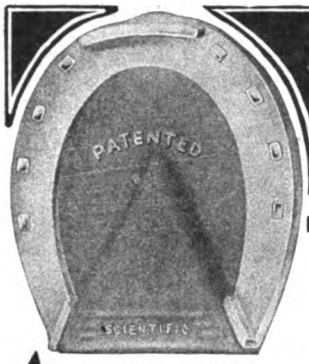


The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.



IT WILL PAY YOU TO STUDY THIS SCIENTIFIC HOOF PAD

IT conforms scientifically to the requirements of the hoof, having full width of rubber at the heel and permitting full shoe at the walls of the hoof.

It conforms exactly to the frog, which is thereby permitted to perform its natural functions of feeling the footing. Comfortable, clean and sanitary; always affording a perfect grip on slippery pavement.

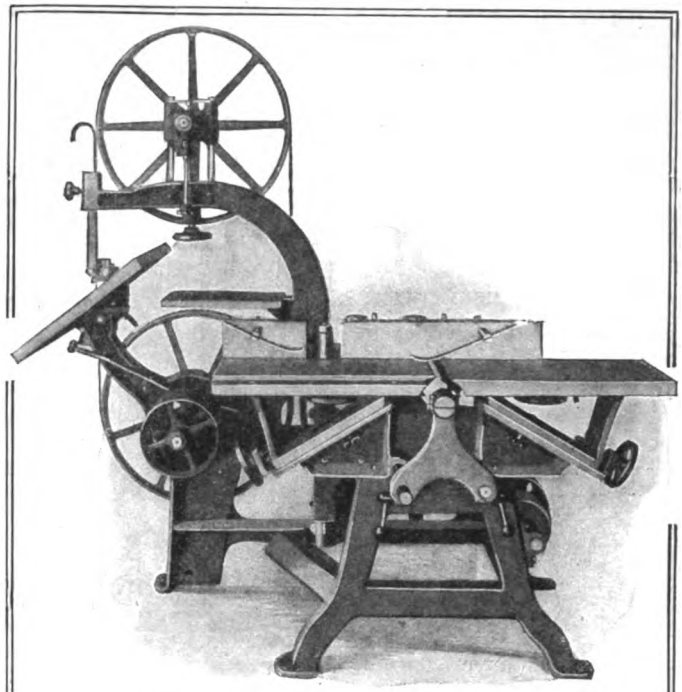
The "Scientific" hoof pad is the only hoof pad on the market which can be fitted with any style of full length shoe with sharp or dull calks, and which has at the same time a full width of rubber at the heel.

The Acme of Perfection in Hoof Pad Construction

Order a few trial sets from your jobber, watch their good service and performance on a few of your best customers' horses, and you'll tie up to the "Scientific" for sound business reasons. Quality guaranteed.

We are now manufacturing a new, improved **Bar** Rubber Hoof Pad and leather soles, which we are selling in addition to our Scientific Hoof Pad.

THE SCIENTIFIC HOOF PAD CO., Youngstown, O.



THE ACCOMPANYING CUT REPRESENTS OUR

Famous Universal Wood Worker

Eight machines combined in one.

Write us for prices and latest catalog

THE SIDNEY TOOL COMPANY, SIDNEY, OHIO.

A NEW IDEA

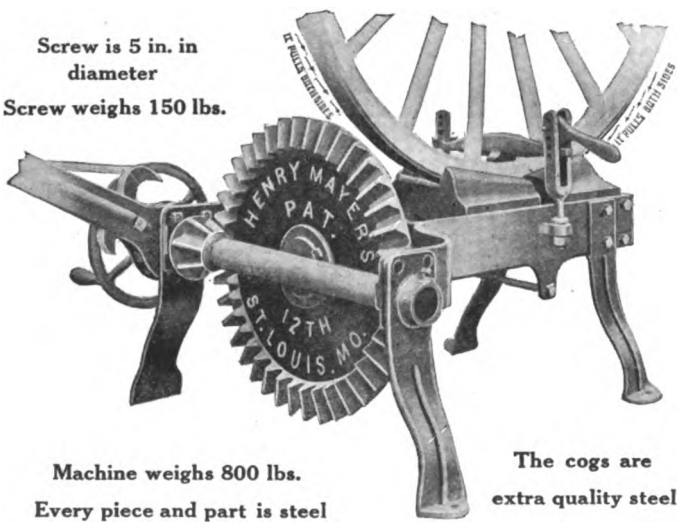
Mayers Tire Setter Manufacturing Co. have discovered that their machine is just as good "hot" setter as it is "cold" setter, and YOU can take your choice and set tires

COLD OR HOT

as YOU or your customers desire. While our machine has always been in a class by itself for QUALITY of work, this new IDEA adds great value to it and overcomes all PREJUDICE anyone may have against COLD SETTING.

Screw is 5 in. in diameter

Screw weighs 150 lbs.



Machine weighs 800 lbs.

Every piece and part is steel

The cogs are extra quality steel

You can set a tire HOT on the wheel just as if you took it off and heated it, or you can set it COLD on the wheel. Your customer TAKES HIS CHOICE.

The machine is not CHANGED one particle, but a new IDEA is used. We furnish a gasoline HAND TORCH, made especially for this purpose. The flame is very small and sharp pointed and furnishes 3,000 degrees of heat.

This flame is held against the tire and in ONE minute the tire is HOT for a space of TWO feet. But it is not hot enough to burn the rim, nor does the flame touch the rim or even burn the varnish off the rim.

You then put the wheel in the machine and set the tire in this HOT space and you have set it HOT on a COLD SETTER.

It's simply the "good old way," applying the quick, labor-saving, up-to-date, money-making machinery way.

You are enabled to PLEASE your customer and at the same time "do it quick."

Don't say "it can't be done." It is TRUE.

Write us today for full particulars and remember this: Every statement we make is backed up with the test, "You try it before you buy it."

If you need any kind of machinery it will pay you to get our prices and terms.

MAYERS TIRE SETTER MANUFACTURING CO.

4028 and 4030 Forest Park Boulevard **ST. LOUIS, MO.**

The Reasons Why "Capewell" Nails are the Best in the World

THEY DRIVE THE BEST—because: They are the most perfect in form and the finest in finish.

They are absolutely uniform in length, breadth and thickness.

They have keen and symmetrical points, which penetrate easily the hardest hoof.

They are stiff enough to drive where wanted, while sufficiently ductile to clinch without breaking, and firm enough to hold securely at the clinch.

They never buckle in driving.

The set of head, neck and blade is faultless, according to the opinion of instructors in training schools for farriers of the United States Army, veterinaries of eminence in this country and abroad, and horseshoers of long experience on the Grand Circuit, as well as masters and journeymen in successful practice of their work throughout the United States.

THEY HOLD THE BEST—a most important requirement for horsemen and farriers, because of the time of horse and driver lost tightening or replacing shoes loosened or thrown; because of the danger in military operations and of the hazard on race tracks when nails fail to hold the shoe, and because of the loss of time of the horseshoer in repairing his work, as well as the loss of business when customers are dissatisfied.

A nail that holds the shoe holds the customer.

There are no loose shoes to tighten for nothing when "The Capewell" is used.

There are no old, broken nails to take out before the hoof can be trimmed, where "Capewell" nails have been driven.

"The Capewell" will last until the shoe is worn out.

Even in fly time "The Capewell" will stand the strain of restless stamping, where all other nails fail.

This is one of the chief reasons why horseshoers who have the largest and best business invariably use "The Capewell," and it is one of the principal reasons why "The Capewell" is used where the service is most trying —in the armies of the United States and other countries; on the heavy horses of fire departments, breweries, mines, quarries and trucking concerns; on all circus horses of the country, and on the race tracks of the world, where the smallest possible nail is used, where the strain on the metal is tremendous at the great speed attained and where the hazard of a fortune often depends upon the farrier's work.

THEY ARE THE SAFEST—As an experienced farrier has said: "They are so perfect in shape and so uniform in all dimensions that a man may drive them in the dark." And another, a well-known instructor in horseshoeing, has stated that "On account of the perfect set from head to point they are safe even in the hands of a man learning his trade." While a third remarks that he has only one answer for all his pupils who ask what nails should be driven, and that is, "Use The Capewell."

Because they have keen and uniform points they do not damage the most brittle hoof.

On account of their superior strength a nail of the smallest size can be used, thus avoiding the damage done by a heavy nail in a delicate hoof, or where shoes are frequently changed, as on race tracks.

Even in hot and dry climates, where hoofs become exceedingly hard, "The Capewell" can be driven without crimping the nail or splitting the hoof.

THEY ARE THE MOST ECONOMICAL—when both time and money are considered.

They have more nails to the pound than inferior brands.

It is the number of good nails that you buy and not the weight of iron that counts in the number of horses shod.

There are no imperfect nails among "The Capewell" and no scrap.

When a man buys "Capewell" nails he gets good nails for his money, and he loses no time picking out scrap or selecting nails fit to drive.

A size smaller can be used of "The Capewell" than of any other brand. This is a point that counts in the number of horses that can be shod with a dollar's worth, or a hundred dollars' worth of nails.

"Capewell" nails, which hold the shoe and do not damage the hoof, suit the customer and hold his trade. This counts in the year's profits.

There is no time lost fixing loose shoes for nothing.

There is no time lost in a busy day drawing nails that buckle or go wrong.

There is no time lost extracting broken nails from the hoof when "Capewell" nails are used.

They can safely be driven in the dusk of a short winter's day, when there is a rush of sharpening.

INFINITE CARE IS TAKEN IN THEIR MANUFACTURE.

It is an exceedingly difficult problem to produce a piece of metal so small as a horseshoe nail which will endure the tremendous strain and wear to which nails are often subjected, and last without breaking until the shoe is worn out, or the horse must be re-shod for the good of the hoof.

The essential conditions of the problem are that the nail must be so pliable as to clinch without breaking, yet stiff enough to drive where sent without crimping in the hardest hoof, and have sufficient spring to accommodate itself to the jar of the moving and pounding of the foot.

Where competitors have failed The Capewell Horse Nail Company has succeeded in producing a nail which serves perfectly all these requirements, by the employment of the best mechanical skill, by long and costly study and experiment, by the use of the best material which can be found in the world and by developing by thorough, painstaking care a process of manufacture unique and unequaled which this company controls exclusively.

All the material which we use is prepared for us under the most exact specifications, and when it arrives at the works it is subjected to minute inspection, as well as mechanical and chemical tests, to prove its quality. After treatment by our own method to increase its tenacity and uniformity of temper, the perfected material is made into nails by our special process.

Then they are not sorted and packed by machinery, but the nails are carefully inspected one by one and packed by hand in one-pound, five-pound and twenty-five-pound boxes.

By these careful methods we produce the best horse nail ever made in the world, and make it certain that every box sent out to our patrons contains only absolutely perfect horseshoe nails.

MADE IN ALL SIZES AND STYLES OF HEAD



You can tell "The Capewell" nail by the Check Mark on the Head. It is our Trade Mark.

The Capewell Horse Nail Company is the largest manufacturer of horseshoe nails in the world.



"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

The White Lily Gasoline Engine
is now made by
THE DAVENPORT ICE CLIPPING MACHINE CO.
1575 West Third St., Davenport, Ia.
Ask for *Special Offer* and *Free Catalog*

"CHICAGO"
EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



"CHICAGO"
WHEELS SAVE TIME
They're made of stuff that cuts
Emery Wheels, Glue, Emery, Polishing Wheels, Grinding Machinery
136 Page Catalogue for the Asking
Chicago Wheel & Mfg. Co.
108 So. ABERDEEN ST.
CHICAGO, U. S. A.

GOOD RULES TO GO BY

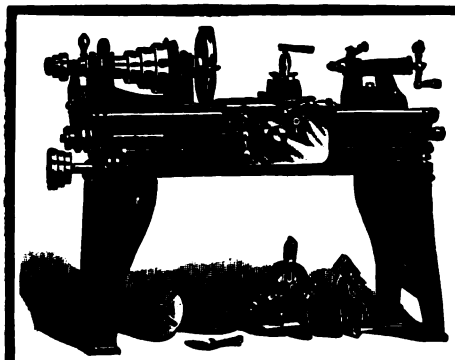


BLACKSMITHS' HOOK AND HANDLE RULES

Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have flat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, $1.15. Catalog No. 17 AH of fine Tools free.

The L. S. STARRETT CO., ATHOL, MASS.



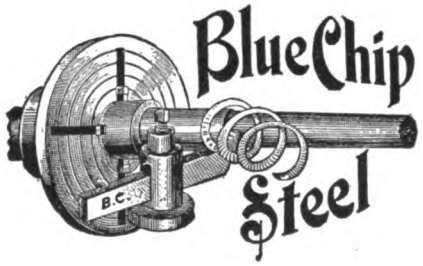
Built For Business

Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high-grade lathe, is the best for your shop.

It's a SEBASTIAN—a good lathe
Investigate its merits—Write for Catalog.

Foot and Power Lathes, 9 to 15 in. Swing
Tools and Supplies.

SEBASTIAN LATHE CO.
124-126 Culvert St., CINCINNATI, OHIO



Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.
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SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades
Fully guaranteed
All sizes in stock

THE
BOURNE-FULLER CO.
IRON STEEL
PIG IRON
COKE

Cleveland, Ohio.

The Brooks endorsed and used by the United States Gov't

Makes $165 in a Month with His Brooks Cold Tire Setter

is the report we received from M. T. Hanning, Wewoka, Oklahoma. Read what he says:

THE BROOKS TIRE MACHINE CO.

Gentlemen:—I bought one of your Brooks machines about three years ago, and to say I am well pleased with it is putting it mildly. My competitors are all fighting my BROOKS, but it does no good, as I get the business, do good work and please all my customers. Last August I set $165.00 worth of tires. Success to the BROOKS.

Yours truly,
M. T. HANNING.

SET 100 TIRES IN TWO WEEKS WITH HIS BROOKS COLD TIRE SETTER,

writes A. M. Jones, Raymond, Ill.

THE BROOKS TIRE MACHINE CO.

Dear Sirs:—Your machine received. I have set one hundred tires in two weeks. Could have set four times that many had they come in. The machine is all O. K. Would have written sooner, but waited to try it and give it a good test.

Respectfully yours, A. M. JONES.

Are You Interested? Can You Afford to Be Without A Brooks Cold Tire Setter

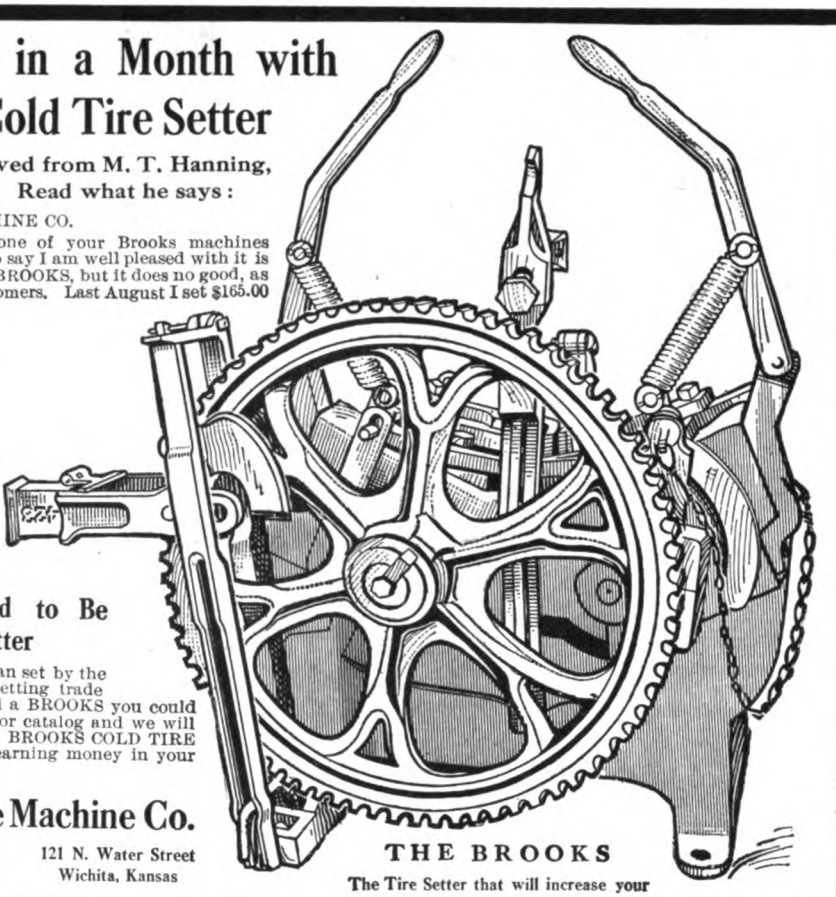
which will set ten times as many tires in a day as you can set by the old hot process. Do you have your share of the tire setting trade in your locality? If you had a BROOKS you could control the business. Send for catalog and we will write you how you can buy a BROOKS COLD TIRE SETTER and pay while it is earning money in your shop.

The Brooks makes the Smith rich

The Brooks Tire Machine Co.

857-859 Ellicott Square, Buffalo, N. Y.
121 N. Water Street, Wichita, Kansas

Write to nearest office



THE BROOKS

The Tire Setter that will increase your business. Guaranteed.

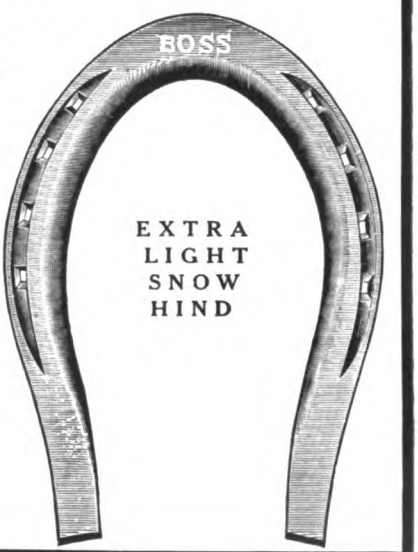


Don't Forget How Well the

BOSS EXTRA LIGHT IRON SNOW SHOES

Suited you last winter—they are better than ever and are

MADE IN SIZES 1 to 5 Inclusive.



WRITE FOR SAMPLES.

QUALITY The *popularity* of BOSS horse and mule shoes is due to their *superior quality.*

VARIETY We make shoes for all purposes.

WRITE FOR CATALOGUE.

Bryden Horse Shoe Company,

CATASAUQUA, PENNSYLVANIA



PIONEER BRAND

POLES AND SHAFTS

THE QUALITY MAKE

Recognized as best by experienced vehicle men everywhere.

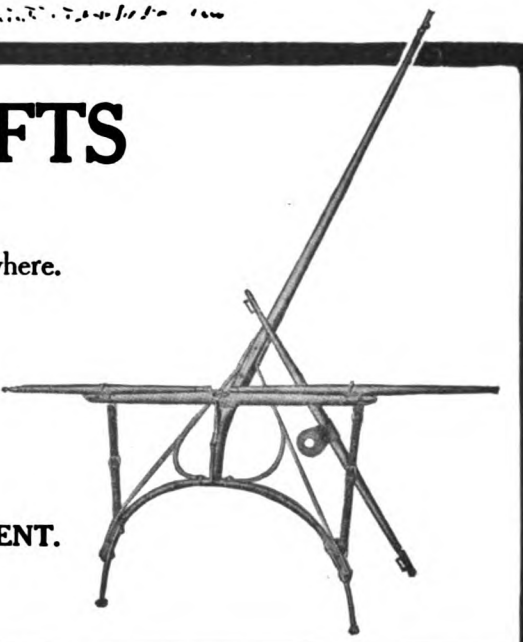
MADE BY

The Pioneer Pole & Shaft Co.

Headquarters and Sales Offices,

PIQUA, - OHIO.

Manufacturers of all styles and sizes of poles and shafts.
A complete line that will SUPPLY EVERY REQUIREMENT.
Have you our catalog and price list?
If not, we want to send you both.



No matter how seldom you use tools, you need the best.

"MORSE"

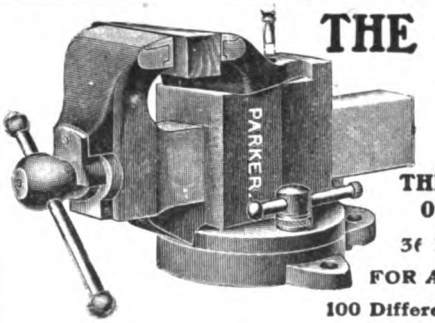
Drills, Reamers, Cutters, Chucks, Taps, Dies, Arbors, Counterbores, Countersinks, Gauges, Mandrels, Mills, Screw Plates, Sleeves, Sockets, Taper Pins, etc., are without question as good as can be made. Large manufacturers who have had a chance to try out different kinds already know this, and others are going to know it if telling will avail.



A postal card request will bring you a "MORSE" catalog. Better have it if you are in doubt as to what kind of tools you want.

Morse Twist Drill & Machine Co.

NEW BEDFORD, MASS., U. S. A.



THE PARKER VISES

THE MOST RELIABLE ON THE MARKET

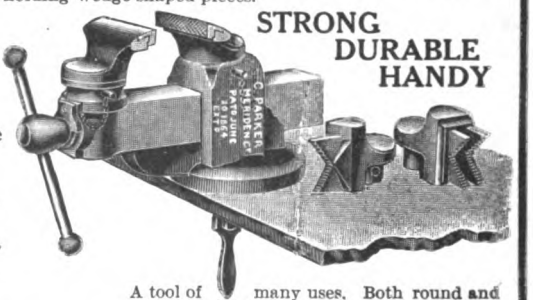
36 Different Styles, FOR ALL PURPOSES, 100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

STRONG
DURABLE
HANDY

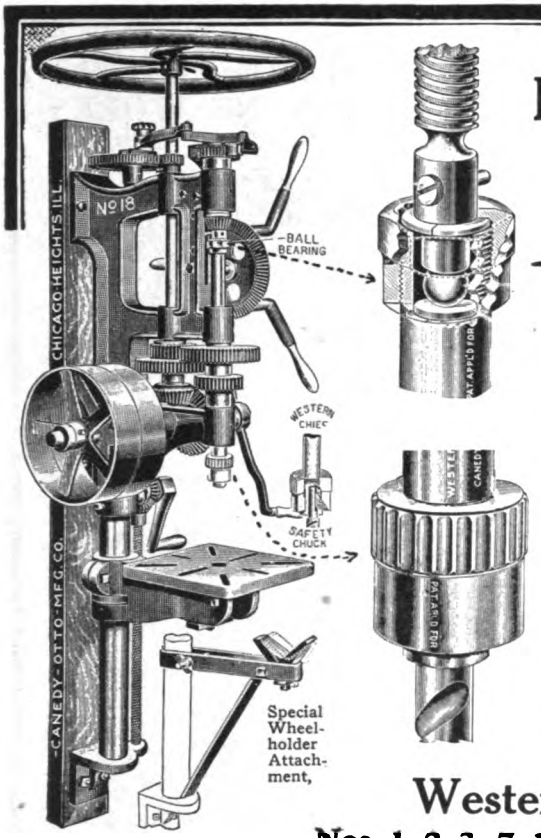


Our complete illustrated catalogue is free. Write today for price list also.

A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

THE CHAS. PARKER CO.,

MERIDEN, CONN.



Special Wheel-holder Attachment,

Ball-Bearing and Safety Chuck

Ball-Bearing

A single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate.

Safety Chuck

It is opened and closed with the hand.

No more set-screws to mar and bruise the shanks of bits.

No more wrenches to tighten and loosen set-screws.

No more twisting of bits in the chuck.

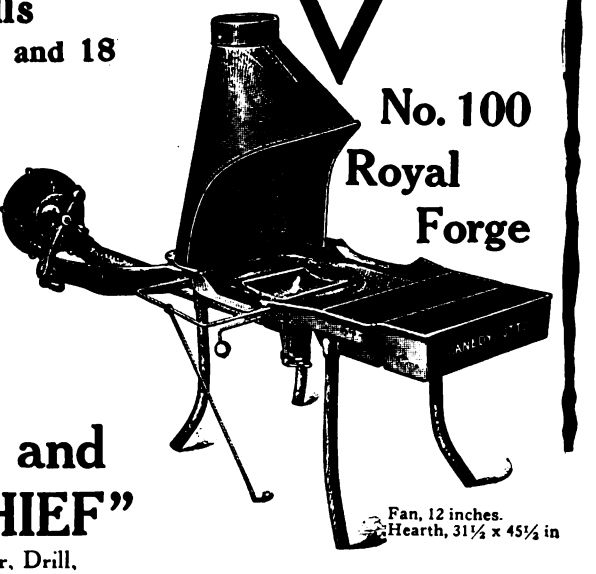
No more trouble in inserting and removing bits from chuck.

A Feature of TO-DAY Wrench? NO!

Western Chief Drills

Nos. 1, 2, 3, 7, 12, 14, 15, 16, 17 and 18

FORGES—BLOWERS—DRILLS

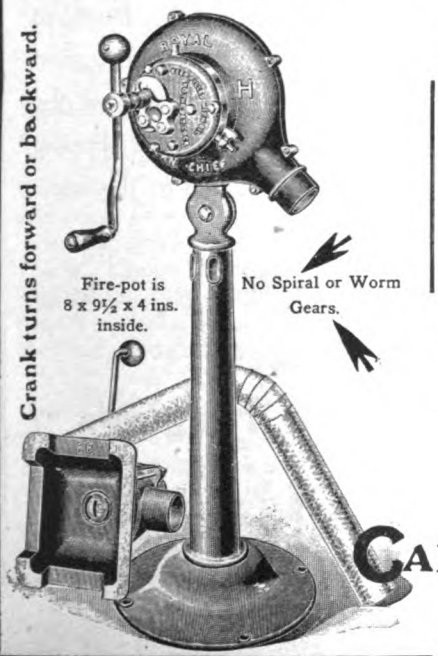


No. 100 Royal Forge

Fan, 12 inches. Hearth, 31½ x 45½ in

The Names — **"ROYAL and WESTERN CHIEF"**

Royal Blower



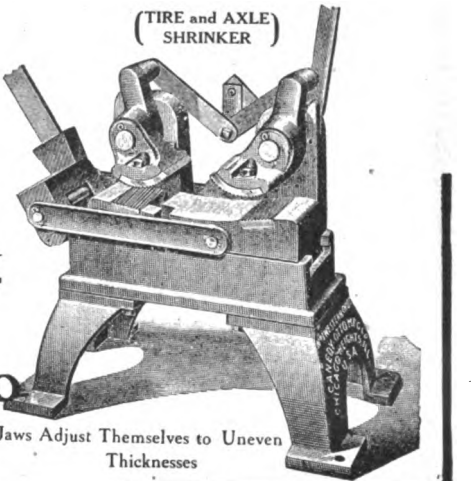
When found on a Forge, Blower, Drill, or other Blacksmith Tool—mean that that article is better than the ordinary. They mean that in its construction the best materials and the highest skill obtainable have been employed. They mean that years of experience have served to perfect it. They mean the tool is a success, and quality alone has made it so. Dealers and Blacksmiths in general will procure what they like best. We must deserve before we can obtain trade. There is no doubt about our deserving, because our production grows rapidly.

There is a reason—Quality

They are all the Best!

No. 1 Western Chief

(TIRE and AXLE SHRINKER)



Jaws Adjust Themselves to Uneven Thicknesses

MADE BY

CANEDY OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

"DEFIANCE" WOOD-WORKING MACHINERY

Invented and Built by
THE DEFIANCE MACHINE WORKS
DEFIANCE, OHIO



No. 8 Variety Saw.

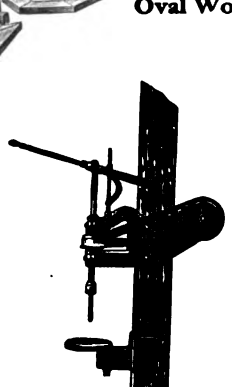
FOR MAKING

Wagons, Carriages, Automobiles,
Hubs, Spokes, Wheels, Rims,
Shafts, Poles, Neck-Yokes,
Single Trees, Hoops, Handles of all kinds,
Spools, Bobbins, Insulator Pins,
Shoe Lasts. Table Legs, Balusters,
Oval Wood Dishes & General Wood-Work.

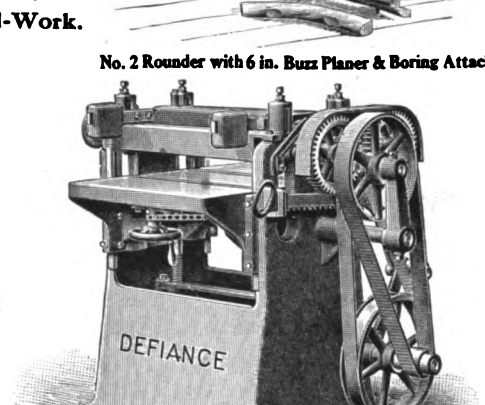

No. 2 Rounder with 6 in. Buzz Planer & Boring Attach.



No. 6 Vertical Borer.


No. 1 Post Borer.


28 in. Band Saw.



24 in. Single Surface Planer.

Eccles Ball Bearing Couplings

ALL OUR COUPLINGS ARE SHIPPED OUT WITH TWO-PIECE BUSHINGS FASTENED IN THE COUPLINGS

When Bushings are worn out by long use they can be instantly replaced and fastened into the socket by our special process.




Patented Nov. 25, 1902
Patented June 11, 1907

The spring is pivoted at the front so that it can be turned out of the way of the wrench while clipping Coupling to the axle.

NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS

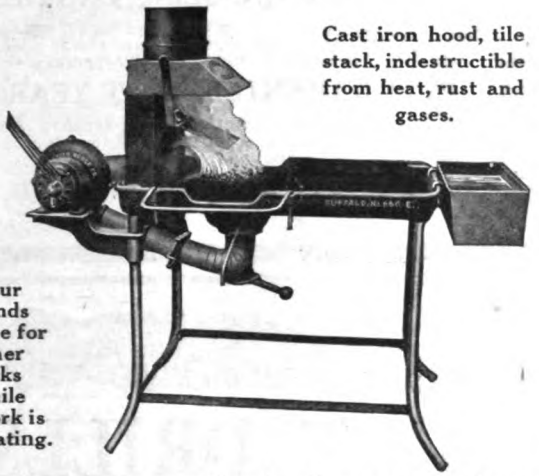
Catalog No. 15
is our Latest

We make a full line of
Carriage and Wagon Forgings

RICHARD ECCLES COMPANY, Auburn, N.Y.

Buffalo Down Draft Forge

660 E



Cast iron hood, tile stack, indestructible from heat, rust and gases.

Your hands free for other tasks while work is heating.

A steady, constant blast, insuring an even fire, is supplied by the electrically-driven blower. No expensive or complicated wiring is required. Just connect the blower to a convenient lamp socket on the lighting circuit.

Power costs less than a 16-candle power lamp.

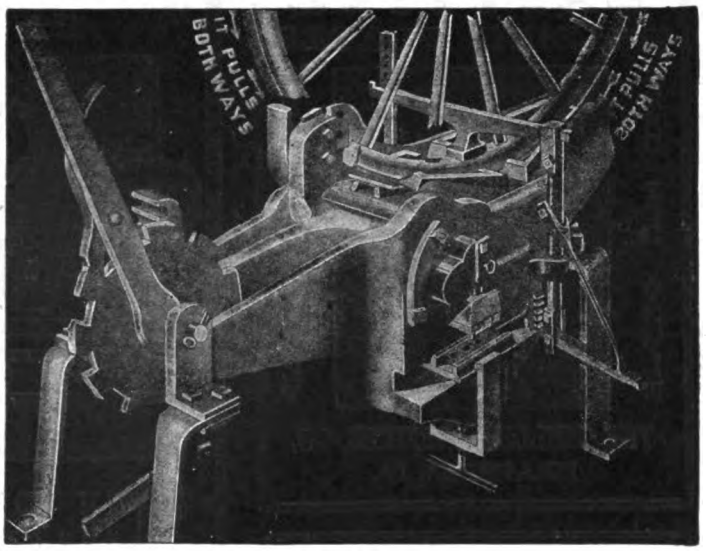
The down draft hood catches and removes all smoke and gases generated by the fire. Your shop is clean; the air pure and clear.

No smoke. No soot. No gases.

Send for New Catalog 178 A. B.

Buffalo Forge Co., Buffalo, N. Y., U. S. A.

HOUSE COLD TIRE SETTER



Here are four reasons why this is the Cold Tire Setter to buy:

First: They set a tire easier, quicker and better than it can be done the old way or with any other cold tire setter.

Second: They never wear out nor get out of fix.

Third: They are the cheapest machine on the market that will do the work they do, and besides have a shear and punch thrown in.

Fourth: All the above claims are positively true and are proven by the fact that there are more of them in successful use today than there are of all the other makes put together.

HOUSE COLD TIRE SETTER CO.

216-218 S. Third St., ST. LOUIS, MO.

J. H. HOUSE, 201 Church St., Toronto, Ont.

Auto Repairs at Wholesale Prices



The profitable field of Auto Repairing is now within the reach of wide-awake blacksmiths and hundreds of progressive smiths are doing a splendid business in this line.

Let us send you our Free Net Price Catalog of Motor Car Supplies. This book quotes lowest wholesale prices on strictly First Quality Auto Repairers' Tools, Tool Kits, Spark Plugs, Batteries, Coils, Magnetos, Switches, Horns, Lamps, Pumps, Tires, Springs, Forgings, Brass Fittings and in fact everything used on a car.

You can't afford to be without this valuable catalog. It is absolutely free and we want you to have a copy. ***Write us.***

CRAY BROTHERS

Jobbers of Motor Car Supplies and Carriage Hardware.

1117 W. 11th St., CLEVELAND, O., U. S. A.



When Ordering ANYTHING in the line of

STEEL SHAPES

for repairing plows, cultivators and other instruments, be sure to ask for "STAR" goods and get the best. ——— All qualities and sizes, and everything guaranteed.

Star Manufacturing Co.

CARPENTERSVILLE, ILL.

LAFFITTE
WELDING PLATES

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AND OUR BOOKLET

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Prices and goods right



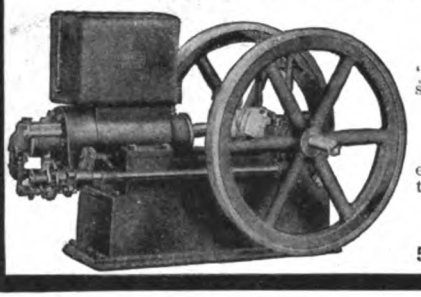
Catalog free, write today

Universal Tenon and Boring Machine

for wagon repair shops. **Cuts tenons on set of wheels in twelve minutes.**

When you write to an advertiser, name The American Blacksmith.

$ MORE DOLLARS; LESS WORK $
How would it suit you to take the agency for



WITTE GASOLINE ENGINES
Your experience is worth something. If you use a "Witte" your customers will want them; why not sell them and make the profit. Our engines are

GUARANTEED FIVE YEARS
Have been on market 25 years; advertised and sold everywhere; lots of good selling points; write for introductory proposition stating size you can use.

WITTE IRON WORKS CO.
517 West 5th St., Kansas City, Mo.



"CLEVELAND" DRILLS
Can always be depended on
The CLEVELAND Twist Drill Co.
NEW YORK CLEVELAND, OHIO CHICAGO



Roth Forge Blowers
properly used lessen the labor of the workman, making him more contented. He appreciates UP-TO-DATE Equipment.

ROTH BROS. & CO.
136 Liberty Street, NEW YORK
1390 West Adams Street, CHICAGO, ILL.



"MARVEL" ELECTRIC BLOWERS

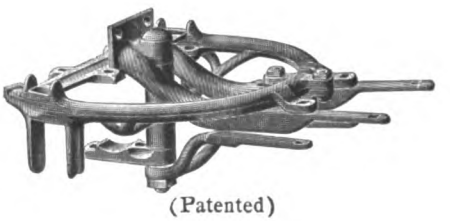
"ONE FIRE" Marvel, -	$28.00
For 4 Light Fires, - -	55.00
For 4 Medium Heavy Fires,	60.00
For 4 Heavy Fires, - -	80.00
For 8 Heavy Fires, - -	120.00

Ask your Dealer, the Electric Light Co., or write to

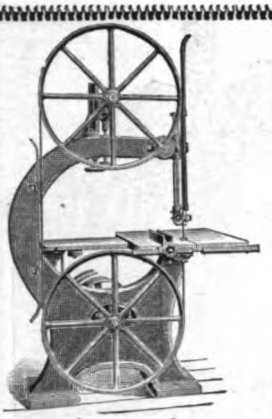
ELECTRIC BLOWER CO.,
352 Atlantic Avenue, BOSTON, MASS.

The Dayton Fifth Wheel is sold by nearly every Carriage Hardware Jobber

The Dayton Malleable Iron Co.
Dayton, Ohio



(Patented)



Your Shop Equipment

should include a Crescent Variety Wood Worker and a Crescent Band Saw. With these two splendid machines you can do any ordinary job of wood work that is brought to you. Both machines are well built, will give you entire satisfaction, save money for you, and you will be surprised to know how reasonable the price is.

Ask us today for our 80-page catalogue telling about our elegant line of jointers, saw tables, planers, shapers, planer and matcher



WOOD WORKING MACHINERY CRESCENT TRADE MARK

THE CRESCENT MACHINE COMPANY,

245 Main Street,

LEETONIA, :-: :-: OHIO.

Nothing Like It

It Will Surprise You

how easily and quickly the blow can be regulated from lightest to heaviest.

The Lever Does It

Our new model is without question the most powerful, most convenient hammer yet designed. It will save you time, labor and money.

Makes Smithing Easy

Send for free catalog NOW.

The new square base is a marked improvement, adding about one hundred pounds to the weight of machine.



Modern Sales Co.

GRINNELL, IOWA

KERRIHARD POWER HAMMERS

Spell Success to the Blacksmith



POWER HAMMER

No workman stands in greater need of the best tools—the best equipment than the blacksmith. It makes no difference where you're located—in a small town or in a large city—your shop is only partly equipped without a power hammer.

Think of the way you're limited on rush jobs—when depending on hand labor.

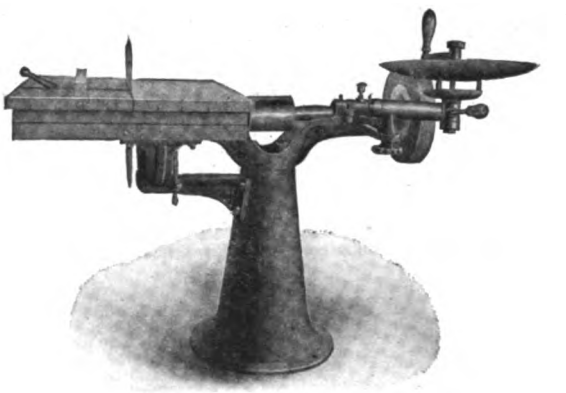
You'll recall—that more than once—a good pay customer has gone to your competitor—just because you could not get the work out on time.

How different it is with the power hammer. Limitless in its work. You crowd it when necessary. Push it hard as you like—and there'll be no strike for more pay.

Every job that comes your way can be accepted and executed. And just when your customers want it.

No more business to go elsewhere. You control—the situation.

There is a difference in power hammers. As much of a difference as between—hand-work and that executed by a power hammer.



COMBINATION SAW AND GRINDER

You can't afford any other than—the best. Don't consider half-way methods. Determine to secure the best—and at the right price. The hammer that's best in construction—best in the amount of work it's capable of getting out, is the one for your shop. That hammer is the **KERRIHARD POWER HAMMER.**

Here is a hammer—built from a practical knowledge of the blacksmith's daily needs. From actual experience we know—the work that comes and goes through the average shop. The Kerrihard—is built on this—know how. Further—it is built for accurate work. No false blows—from a Kerrihard in operation. Every bit of energy is applied—when and where 'tis needed most. The life—of this hammer—is longest. Every ounce of material is the best. Scrap iron—painted over—might make a pretty good hammer to look upon—but a mighty poor one for dependable work. Only the best pig iron goes into the Kerrihard—and properly moulded. Each line of this hammer is a line of greatest strength—with every element of weakness cut out. The price—Mr. Blacksmith is important. Selling direct—we save you from $20 to $50. At our price of $60 you secure the greatest value in quality and price in any power hammer—and we except none. Don't lay this paper aside without at least writing for complete information. Or you may safely order direct from this ad—with the understanding we'll send your money back promptly if the Kerrihard Hammer—proves other than entirely satisfactory.

Write direct to

Kerrihard Station Red Oak, Iowa., U.S.A. **THE KERRIHARD COMPANY** *315 E. Monroe St.* SPRINGFIELD, ILL.

Name _____

Address _____

Box _____

$800 BUYS THE MATERIAL TO BUILD THESE HOMES $790



HOUSE DESIGN NO. 131

Here is a handsome Colonial residence of eight rooms, bath, pantry and numerous closets. It is 28 feet square, not including porches; full two stories high, and provided with every modern labor-saving convenience. Every detail has been carefully worked out, so that the finished product shows a happy blending of the useful with the ornamental. If you intend to build it will pay you to investigate our offer. This house will please you. You will enjoy it while you use it, and when you are through with it you can easily sell it at a good profit.



HOUSE DESIGN NO. 139

Here is a house that will please the most exacting. It is 29 feet wide by 34 feet deep, not including front porch or rear extension. It has eight spacious rooms, bath and large pantry and washroom. The fireplace in the parlor is flanked on either side by casement sash with leaded art glass. Another art glass window is placed in rear of dining room and still another on the stair platform. The rooms are all large, convenient and well lighted. Perfect ventilation throughout. In external appearance it is pleasing and attractive. It is easy to build and easy to sell.

We Save You Big Money on Lumber and Building Material!

The Chicago House Wrecking Co. is the largest concern in the world devoted to the sale of Lumber, Plumbing, Heating Apparatus and Building Material direct to the consumer. No one else can make you an offer like the one shown above. We propose to furnish you everything needed for the construction of this building, except Plumbing, Heating and Masonry materials. Write for exact details of what we furnish. It will be in accordance with our specifications, which are so clear that there will be no possible misunderstanding.

HOW WE OPERATE:

We purchase at Sheriffs' Sales, Receivers' Sales and Manufacturers' Sales, besides owning outright sawmills and lumber yards. Usually when you purchase your building material for the complete home shown above, elsewhere, it will cost you from 50 to 60 per cent more than we ask for it. By our "direct to you" methods we eliminate several middlemen's profits. We can prove this to you.

WHAT OUR STOCK CONSISTS OF:

We have everything needed in Building Material for a building of any sort. Lumber, Sash, Doors, Millwork, Structural Iron, Pipe, Valves and Fittings, Steel and Prepared Roofing. We also have Machinery, Hardware, Furniture, Household Goods, Office Fixtures, Wire Fencing, in fact, anything required to build or equip. Everything for the Home, the Office, the Factory or the Field. Send us your carpenter's or contractor's bill for our low estimate. We will prove our ability to save you money. WRITE US TODAY, giving a complete list of everything you need.

FREE BOOK OF PLANS!

We publish a handsome, illustrated book containing designs of Cottages, Bungalows, Barns, Houses, etc. We can furnish the material complete for any of these designs. This book is mailed free to those who correctly fill in the coupon below. Even if you have no immediate intention of building, we advise that you obtain a copy of our FREE BOOK OF PLANS. It's a valuable book.

OUR GUARANTEE!

This company has a capital stock and a surplus of over $1,000,000.00. We guarantee absolute satisfaction in every detail. If you buy any material from us not as represented, we will take it back at our freight expense and return your money. We recognize the virtue of a satisfied customer. We will in every instance "Make Good." Thousands of satisfied customers prove this. We refer you to any bank or banker anywhere. Look us up in the Mercantile Agencies. Ask any Express Company. Write to the publisher of this publication. Our responsibility is unquestioned.

Upon Receipt of $2.00 We Will Furnish Complete Set of Blue Prints, Architect's Specifications and List of Material.

At this price we will furnish you a complete set of Blue Prints for the above house. It will include also complete Architect's specifications, full details, working plans and itemized list of material. It will be just the same kind of plans as any architect turns out. We will prepay all transportation charges. If upon receipt of plans you purchase the complete material from us, we will remit you the price of $2.00 in full. If you decide that you do not want the plans after you have had them in your possession, we will allow you to return them to us and will refund $1.50; thus, their use will cost you only the trifling sum of 50 cents, which does not cover the expense involved by us.

High Grade Bathroom Outfits!



Price of this Bathroom Outfit, $37.50

Strictly new and as good as anyone sells. We have everything needed in Plumbing material. Our prices mean a saving to you of 30 to 60 per cent. We can easily prove it if you will give us a chance.

Here is an illustration of a bathroom outfit we are selling at $37.50. Your plumber would ask you about $60.00 for this same outfit. This is a positive fact. It's only one of ten other complete outfits that we are offering at prices ranging from $25.00 to $100.00. Our catalog describes them in detail. You need the book if you want to keep posted on up-to-date business methods. Get our prices on Pipe and Fittings. Write us today.

Hot Water Heating Plants!



We furnish new, complete hot water heating outfits at half the usual prices. Our proposition includes all necessary plans, specifications, blue prints and detailed instructions; so that any ordinary mechanic handy with the use of tools can easily install it. You can't go wrong when you deal with us. We stand back of every sale. You send us today a sketch of your building and we will make you a proposition to furnish you a complete steam or hot water heating outfit.



We also have hot air furnaces. Our booklet on heating plants tells every feature of the heating question. We can qucte radiaters and heaters separately. Whether you buy from us or not it is a valuable book for you to own. Write us today.

Send Us This Coupon

Chicago House Wrecking Co.:

I saw this ad. in AMERICAN BLACKSMITH.

I am interested in _____

_____

Name _____

Town _____

Co. _____ State _____

Free Publications!

Fill in the coupon to the left and we will send you such literature as best suits your needs. We publish a 500 page mammoth catalog fully illustrated, giving our business history and showing all the vast lines of merchandise that we have for sale. We buy our goods at Sheriffs', Receivers' and Manufacturers' Sales. Ask for Catalog No. 920. Our Book on Plumbing and Heating Apparatus contains 150 pages of useful information. Our free "Book of Plans" is described elsewhere in this advertisement.

Water Supply Outfits!

Modern Air Pressure Water Supply Systems at prices ranging from $48.00 to $200.00. They are strictly new, first-class and complete in every detail. It makes no difference whether you live in the country, you can enjoy every city comfort at little expense. Why not investigate this? We are ready to furnish you with all facts free of charge. All material fully guaranteed. We also have a complete stock of Pipe, Valves and Fittings at 40 to 60 per cent saving. Gasoline Engines at low prices.

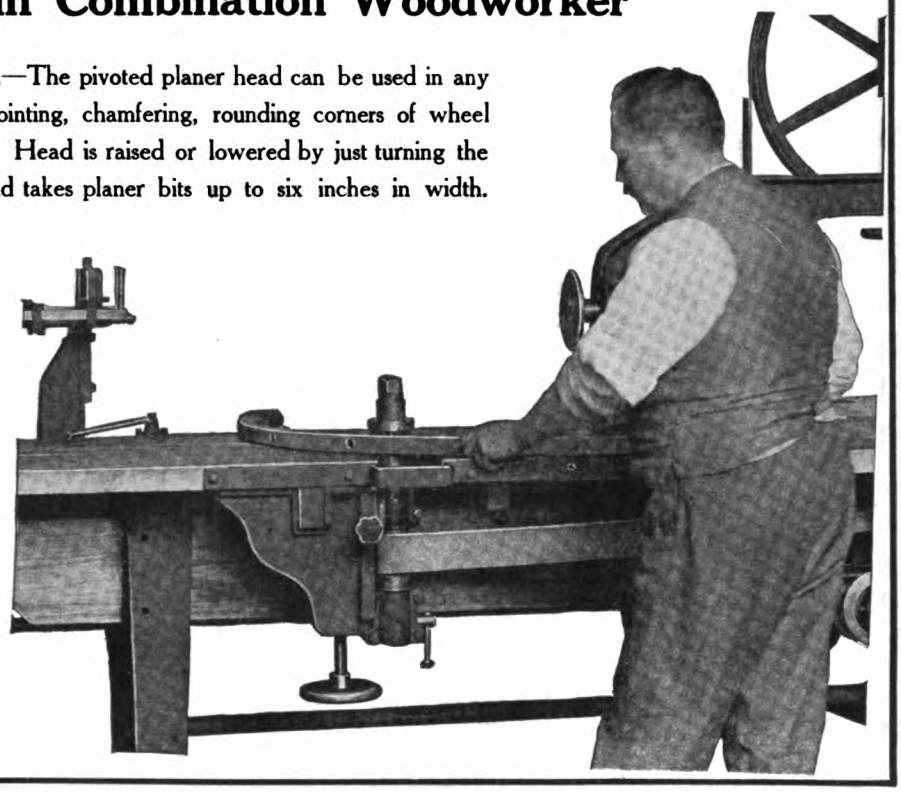
CHICAGO HOUSE WRECKING CO., 35th and Iron Sts., Chicago.

One of Many Operations

on

The Crain Combination Woodworker

Rounding the edge of a wheel rim—The pivoted planer head can be used in any position—horizontal to vertical; for jointing, chamfering, rounding corners of wheel rims or work of any irregular shape. Head is raised or lowered by just turning the adjustment screw located below. Head takes planer bits up to six inches in width. Bits are easily and quickly changed. This machine is a band saw, rip saw, cut-off saw, planer, lathe, boring machine, drill, shaper, sizer, without an extra attachment, just a change of tools.



4 horsepower runs it

Send for Woodworker Catalog A. B.

Buffalo Forge Company

Buffalo, N. Y., U. S. A.

TRADE WELDARINE MARK

REGISTERED
Patented March 24, 1908

15,000 Sets

WELDARINE

Sold in 1908 spells SATISFACTION

Prices reduced for 1909

Large Sets, $3.00 **Small Sets, $2.00**

Jumbo Sets, $10.00

DON'T FORGET

First—Weldarine is the only successful compound for brazing cast iron on the market.

Second—We can show you a greater net profit by using Weldarine than on anything else you have in your blacksmith or machine shop.

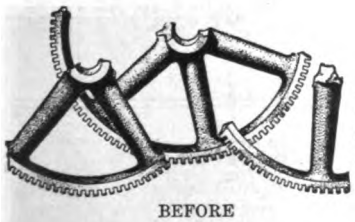
Third—Weldarine is sold under a positive guarantee.

Fourth—We can prove every statement we make. Will you let us?

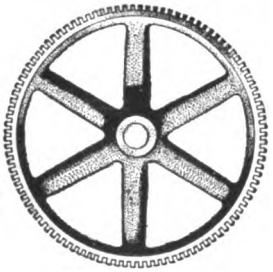
Weldarine is handled by 150 of the best Heavy Hardware Jobbers in the United States. Write your Jobber, or

THE WELDARINE MFG. CO.

700 Kansas Avenue **TOPEKA, KANSAS**



BEFORE



AFTER

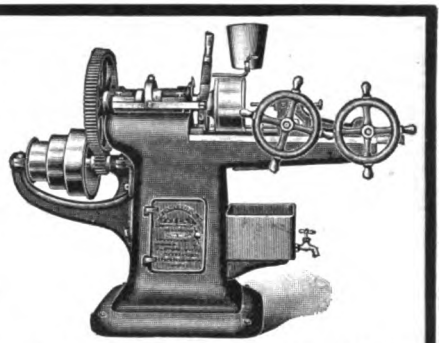
One large set will do from $75 to $90 worth of work; small set from $30 to $40 worth.

THE

MERRIMAN

Bolt Threader

Best on Earth



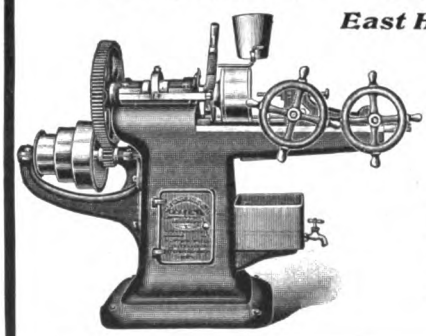
A Bolt Cutter is Much Like a Man in This

THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly.

THE H. B. BROWN CO.,

East Hampton, Conn.



Send for

Catalog No. 11

A Postcard will bring it

THE ONLY CALKING MACHINE THAT CALKS A HORSESHOE COMPLETE

We make 25 different style Heel Calks.

Pat'd Sept. 14, 1909



The only Calking Machine that with one pull of lever makes a heel calk complete, blunt or sharp, also makes double kink for the famous block calk, or sharpens side calk, with one pull of lever, welds blunt or sharp toe calks and forms toe clip with one pull of lever, also, has a shear to cut off either end of shoe.

Works equally as well on old shoes. The machine takes up but 8x16 inches floor space, and stands 3 feet 3 inches high, and weighs 131 lbs. All the working parts made of a special grade of steel. Fully warranted. Write now for circulars and prices.

L. S. P. CALKING MACHINE CO.,

WYALUSING, PA., U. S. A.

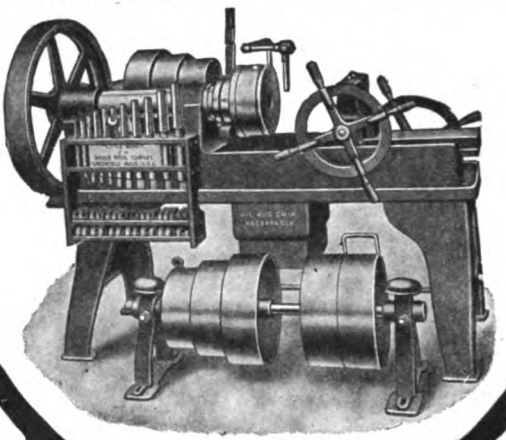
Little Giant.

Bolt Cutters

can't be made better anywhere, and you will be pleased with our price. Write at once for free catalog.

Capacity ½ to 2 inch bolts and ¼ to 2 inch pipe, right and left hand. Complete with Oil Pump and Tank, Gear Guards, Die Head Dies, Tap Holding Jaws, Machine Nut Taps in eleven sizes, Hand Opening Die Haad, etc.

WELLS BROS. CO., Greenfield, Mass.



"PUZZLE No. 1"

A protective arrangement which protects the retail hardware dealer in the sale of Adjustable Toe Calks and forces the horseshoer to grow near sighted, watching for customers who never come, is a bully good thing—for the hardware man—he comes out mighty well and makes money, but,

Where does the Horseshoer get off?

What is the answer?

We stand for WILLING protection for the Horseshoer and believe that he is entitled to the profits on sales of Calks to horse owners.

VERY RESPECTFULLY



AMERICAN CALK CO.

DETROIT, MICH.

Manufacturers of Suregrip Calks

5-16, 3-8, 7-16, 1-2, 9-16, 5-8, both round and square shoulder.

THE WILLIAMS DROP FORGING CO.

SCRANTON, PA.

Manufacturers of Cantslip Calks

5-16, 3-8, 7-16, 1-2, 9-16, 5-8.



STANDARD THE WORLD OVER

INDIAN CHIEF

AMERICAN TRENTON ANVILS

"IT RINGS LIKE A BELL"

TRENTON ANVILS Are forged, hot from scrap, but from two pieces of new, solid ingot Steel, welded at the waist, and faced with one solid piece of Special, High-Grade Tool Steel.

These Anvils are endorsed by leading Blacksmiths and Horseshoers *everywhere*, who express a decided preference for them.

Features of special note are:

1.—Long, perfectly shaped horn and long heel.

2.—Base with greatest possible area, or spread, insuring greater stability and absence of tipping when heavy work is done at the end of horn or heel.

3.—Base which does not require strapping down and which sits firm without shifting or rocking.

4.—Special temper of edges to prevent chipping.

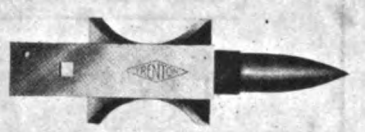
5.—Faces level and true, and of correct proportion for practical work.

6.—Hardie Holes and Pritchell Holes and other mechanical details of exact accuracy.

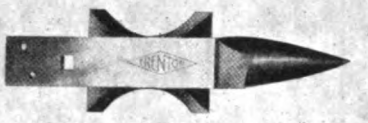
7.—Trenton Anvils are unequalled for superior shape, graceful design, stability on the block and the absence of superfluous weight in the base.



Bottom View, Showing Base Hollowed Out, Permitting Anvil to Stand Firm Without Rocking



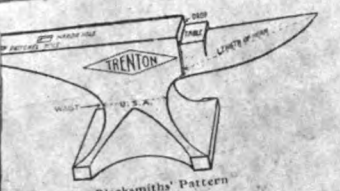
General Blacksmiths' Anvil



Horseshoers' Plain Horn Anvil



Horseshoers' Clip Horn Anvil



Blacksmiths' Pattern

Principal Dimensions of Regular Blacksmiths' Anvil

Face	Horn	Waist	Heel	Drop	Hardie Hole	Approximate Weight
						100 lbs.
						125 lbs.
3½ x 14	9½	5	1⅝	1⅝	⅞	160 lbs.
3¾ x 15½	10½	5½	1⅝	1⅝	1	200 lbs.
4 x 17½	11½	5½	1⅝	1	1⅛	225 lbs.
4½ x 19	12	6	1	1	1⅛	
4½ x 19½	12½	6½	1⅛	1⅛	1⅛	

Other sizes from 10 lbs. to 1000 lbs. in proportion.

Principal Dimensions of Standard Horseshoers' Anvil

Face	Horn	Waist	Heel	Drop	Hardie Hole	Approximate Weight
						100 lbs.
						125 lbs.
3½ x 15	10	5	1⅝	1⅝	⅞	160 lbs.
3½ x 16	11	5½	1⅝	1⅝	1	200 lbs.
3½ x 18½	12	5½	1⅝	1	1⅛	225 lbs.
4 x 19½	12½	6	1	1	1⅛	
4½ x 21	13½	6½	1⅛	1⅛	1⅛	

TRENTON

SOLD BY LEADING DEALERS EVERYWHERE

INDIAN CHIEF

Indian Chief Solid Box Vises

Improved design to give strength, power of grip, and uniformity of design.

Jaws solid steel Drop Forging, faced with one-half inch of Crucible Tool Steel.

SOLID BOX Screw a solid one-piece steel forging. Thread of 29° angle, which is a great improvement on the old square thread, as it is stronger at the root and moves with less friction.

The concave and convex surfaces on Box and Screw and Washers make a perfect ball bearing at whatever point the Vise is opened; it is therefore impossible to break, bend or strip the thread.

Every Vise is inspected and tested at our factory before shipment.

Made by American Mechanics of experience. Comparison invited. We claim not "as good," but superior to any other Vise.

HORSE-SHOERS' VISE After consulting with and studying the needs of Shoers, we have improved the design of our Horseshoers' Vise. Note the ample depth of jaws and flat top of front jaw, also the shapeliness and design of Vise.



Box and Screw

See table for sizes and dimensions.

Indian Chief Warranted Vises

HIGH GRADE SOLID BOX

Blacksmiths'

No.	Weight, Pounds	Length of Jaws, Inches	Depth from Top of Jaw to Top of Box, Inches	Vise Opens, Inches
25	25	3¼	3½	3½
30	30	3⅜	3⅝	3⅝
35	35	3½	3¾	3¾
40	40	4	3⅞	4
45	45	4⅛	4	4⅛
50	50	4⅛	4⅛	4⅛
55	55	4⅜	4⅛	4⅜
60	60	5	4⅛	5
65	65	5	4⅛	5
70	70	5⅛	4⅜	5⅛
75	75	5⅛	4⅜	5⅛
80	80	5⅛	5	5⅛
85	85	5⅛	5	5⅛
90	90	5¼	5⅛	5¼
95	95	5¼	5⅛	5¼
100	100	6	5⅛	6
110	110	6	5⅛	6
120	120	6⅛	6	6⅛
130	130	6⅛	6	6⅛
140	140	7	6⅛	7
150	150	7	6⅛	7
160	160	7⅛	7	7⅛
170	170	7⅛	7	8
180	180	7⅛	7⅛	8
200	200	8	7⅛	8

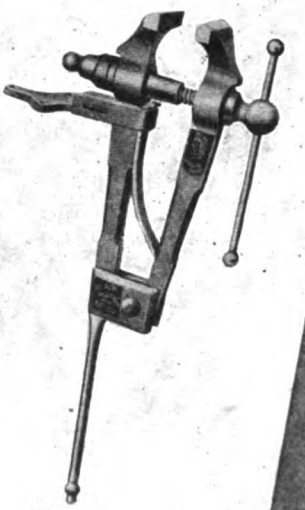
Horseshoers'

No.	Weight, Pounds	Length of Jaws, Inches	Depth from Top of Jaw to Top of Box, Inches	Vise Opens, Inches
60	60	6	6	8
65	65	6	6	8
70	70	6	6	8
80	80	6	7	8

Boxes and Screws

No.	Diameter, Inches	For Vise No.
1	1	25-40
2	1¼	45-55
3	1⅜	60-75
4	1⅝	80-95
5	1⅞	100-150
6	2	160-200

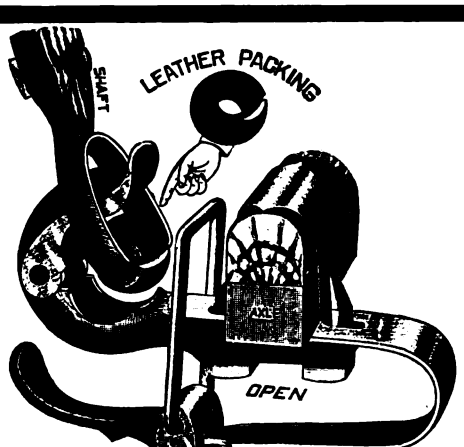
Indian Chief Blacksmiths' Vise



SOLID BOX

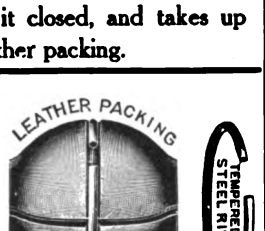
TRENTON

THE COLUMBUS FORGE & IRON CO. COLUMBUS, OHIO, U.S.A.



Placing the loop over the end of the cap and drawing the thumb lever back until it rests against the flat spring closes the coupler, keeps it closed, and takes up the wear of the leather packing.

Unless a Carriage Coupler is furnished with a moulded leather bushing and steel spring just like this it is not a **Bradley.**



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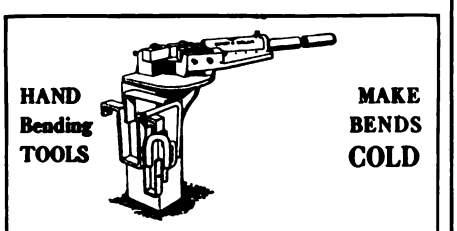

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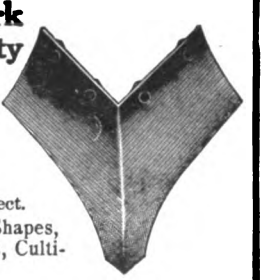

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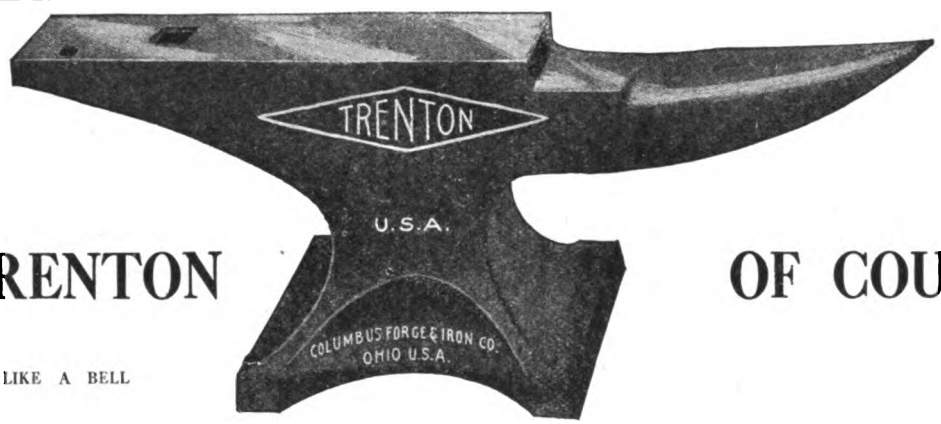

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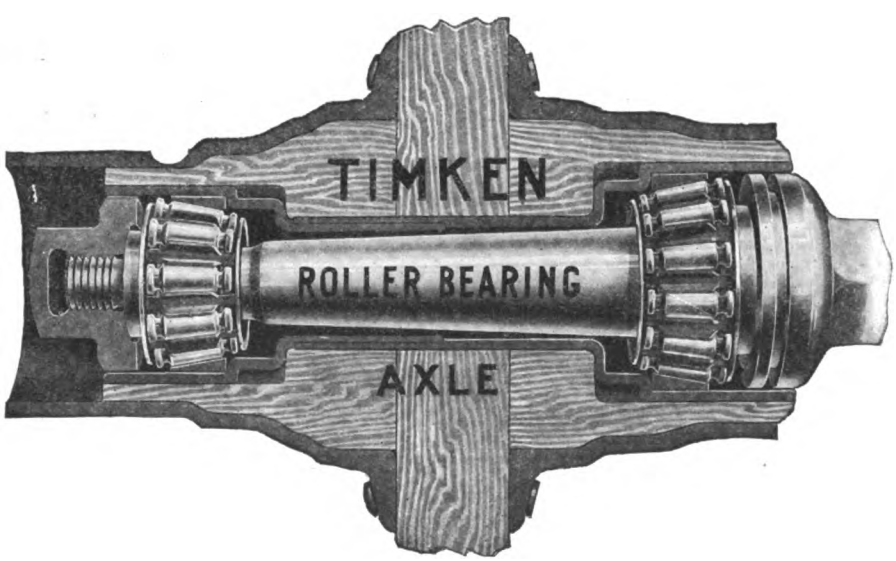

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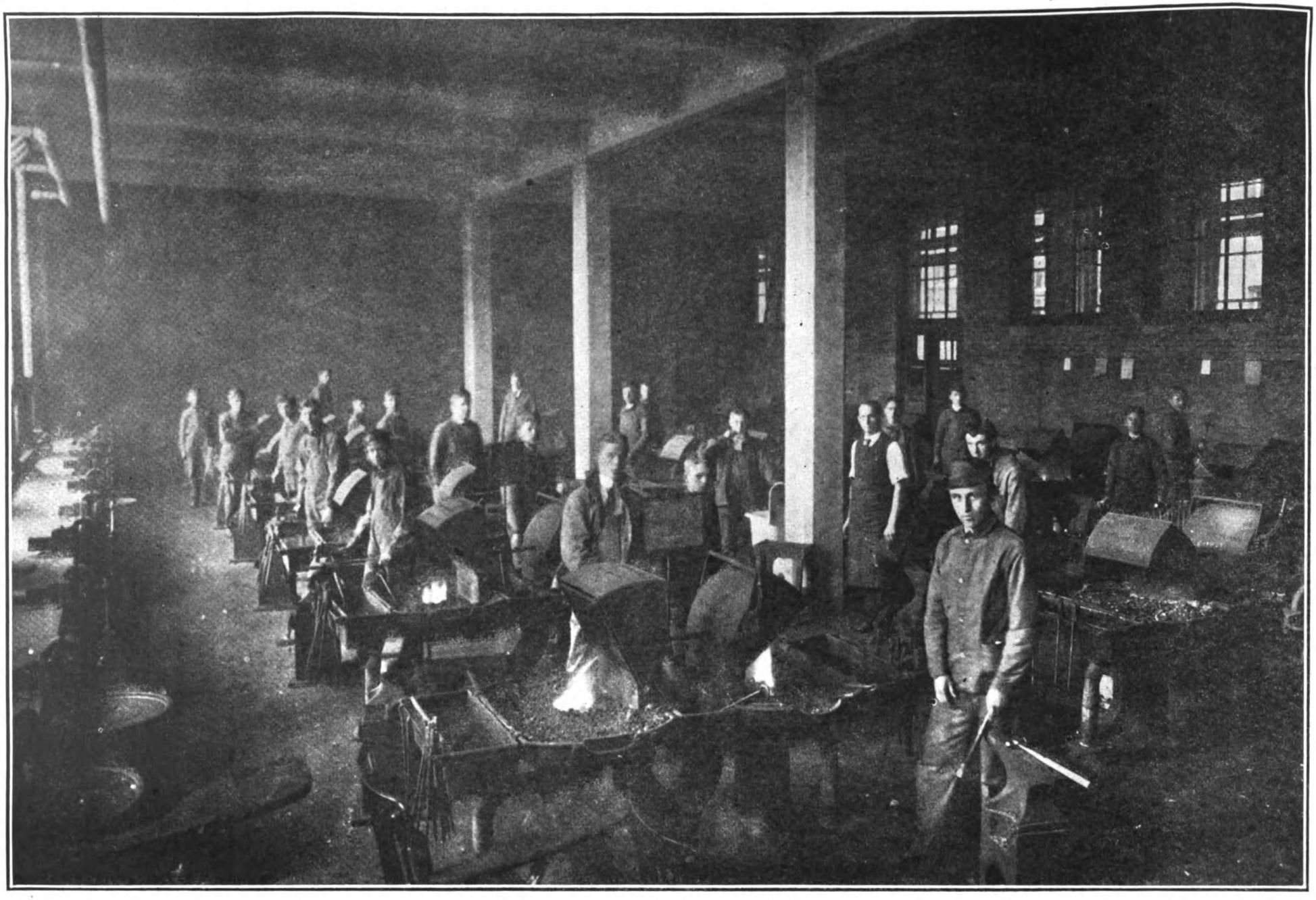
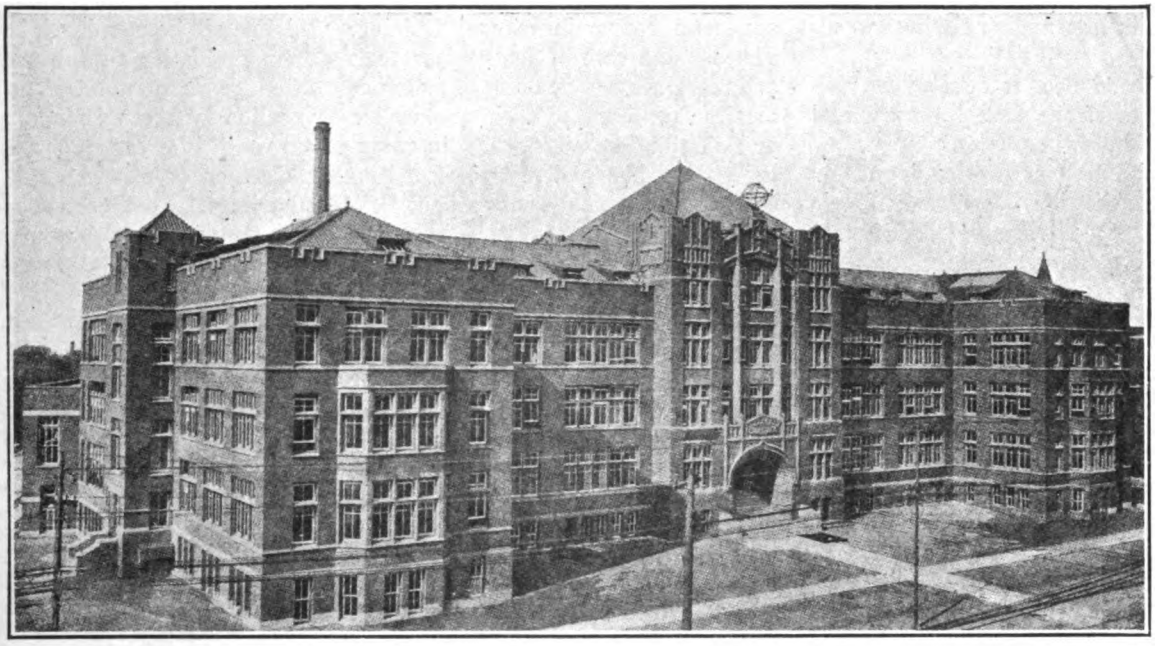


THE FORGE SHOP AT THE TECHNICAL HIGH SCHOOL, CLEVELAND, OHIO



THE TECHNICAL HIGH SCHOOL AT CLEVELAND

The Technical High School at Cleveland

A. W. FOSTER



THE Technical High School at Cleveland, Ohio, probably comes nearer to offering a thoroughly practical and at the same time cultural education than any other high school in the country. The most striking feature of this school is that it is in session throughout the entire year. There are four terms or quarters of twelve weeks each, with a week's vacation after each quarter. No pupil attends all quarters and no teacher need teach all the year.

The technical work at this school is made the more prominent feature, and this is supplemented with the academic in such a way that the latter is made to strengthen and assist the technical.

The style of the building is English Gothic. It is a dark reddish brown superstructure, with terra cotta trimming, and rests upon a heavy stone water table, which gives an effect of strength and massiveness well calculated to offset the usual amount of wall space sacrificed to ample lighting. Upon entering the building from the main entrance there is a large reception room at the right, while at the left are the offices. Directly opposite the entrance across the main corridor, which connects the north and south wings, is the spacious auditorium with a seating capacity of nearly fourteen hundred. The lecture rooms and laboratories for physics and chemistry are at each end of the main building. In the north wing the entire area is devoted to a lunch room, with large kitchen and serving rooms. The main dining room for pupils seats about three hundred, and a smaller room for teachers accommodates about twenty-five, where noonday lunch is served at nominal cost.

The entire south wing basement, as well as the first floor, is occupied by the shops. The pottery department is well equipped with potters' wheels, lathes for turning models, a slip house and a glass room set, kilns, cabinets, etc. Adjacent to this is the forge shop with provisions for a blacksmith class of thirty-six. The forges have down draft and the entire equipment is thoroughly modern. The next room is the machine shop with heavy machinery suitable for the very best of trade instruction. At the end of the corridor is a foundry with a cupola for the melting of iron, a brass furnace, suitable core oven, etc. At the extreme rear of the building the heating and power plant is installed. This furnishes heat, ventilation, electric light and power and has a capacity of over four hundred horsepower.

On the first floor of the main building at the front corners are two large rooms, with seating capacity of two hundred and fifty, reserved as study halls, one for boys and one for girls. In the wing above the shops are five woodworking shops, including joinery, turning, cabinetmaking and patternmaking shops and a room for resawing and storing stock. In addition to the usual hand tools in these rooms suitable woodworking machinery has been installed to meet the requirements of modern methods of manufacture. Opposite the entrance to this corridor is a drafting room for the preparation of designs for school problems. There is also a room

for varnishing and finishing woodwork.

The second floor is devoted to recitation rooms, the school library and mechanical drawing rooms.

The third floor, north wing, is entirely devoted to the girls' departments. Here are located the kitchen for instruction in cooking, the dining rooms for lessons in table service, and the laundry. Rooms for instruction in plain sewing, dressmaking and millinery are situated in the corner of the building. Additional mechanical drawing and freehand drawing, applied arts and recitation rooms, a clubroom for school organizations and a rest room occupy the remaining floor space.

The fourth floor is occupied by additional rooms of the department of applied arts and by the printing department.

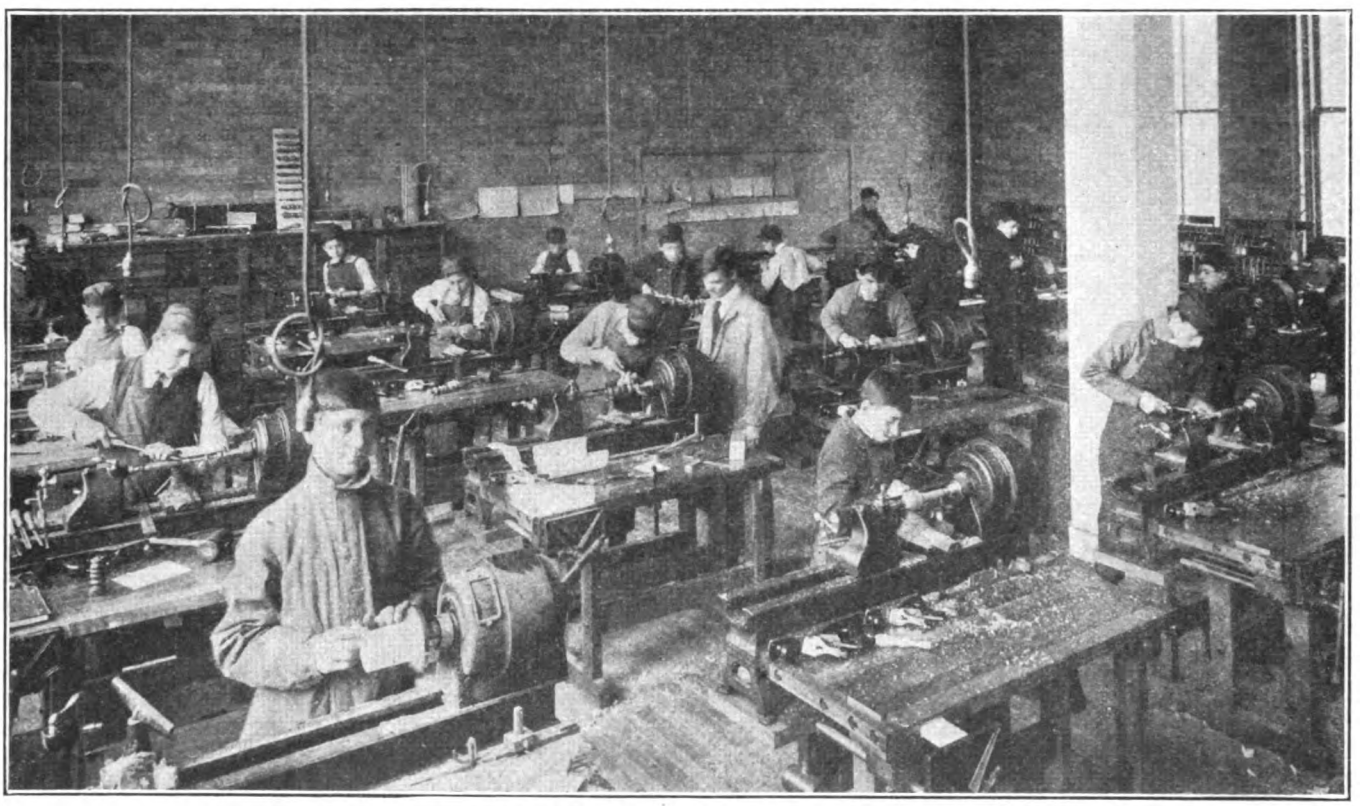
The Cleveland Technical High School has two immediate ends in view: 1, To prepare youth of both sexes for a definite vocation and for efficient industrial citizenship. 2. To help men and women already engaged in a vocation to better their condition by increasing their technical knowledge and skill.

Since the fundamental principles underlying all art are identical, during the first two years a more or less definitely prescribed outline of instruction must be laid down. The shop work of these two years is therefore practically a general course in manual training. The use and care of the various tools and machines, the qualities of materials and the processes of their preparation and distribution, and facility in applying the fundamental principles of construction are the chief ends sought.

This work is intended to be educative and creative, as well as technically constructive. From elements and principles taught in the mechanical drawing and shop classes each pupil makes his own designs, which, when approved by the instructors concerned, he executes from working drawings. Within due limitations as to practicability and suitability of form and material, free scope is given to his inventive talent in the making of his design; but this once decided upon he is held to strict accuracy and workmanship in its execution.

The course prescribed for the first two years is: turning, first quarter; cabinetmaking, second and third quarters; patternmaking and foundry practice, first quarter of second year; forging, second and third quarters, second year.

One quarter is also required in machine shop practice at the beginning of the third year. If at the end of this time peculiar adaptability in any given direction becomes evident to pupil, parent or teacher, specialization along this line will be permitted, in order that upon graduation a pupil may be better fitted for his life work. The choice of a vocation is forced upon a majority of our youth at an early age, and if a proper choice can then be made it is a great advantage. To illustrate more clearly, take the case of a young man who finds that his tastes and talents run along the line of machinery construction. After completing his two preliminary years in wood and iron working and in mechanical drawing, he may then devote a major part of his last two years to the particular branch along which his abilities lie. In this selection of a vocation and helping a boy to "find himself" the school can exercise an important function.



THE WOODWORKING SHOP AT CLEVELAND TECHNICAL HIGH SCHOOL

Trade and Technical Education in Other Countries.—3.

WILLIAM H. DOOLEY.

Germany.

Germany has the best and most efficient school system in the world. The reason I say this is because Germany has an educational institution for meeting every existing educational need in the country. The striking point in Germany's educational system is that every worker in a profession, trade or a commercial pursuit must not only have a general education, but technical

preparation for a supplementary to the particular work selected by him as an apprentice. In America we believe in the same policy, but apply it to those entering the professions only, disregarding the ninety-five persons in every hundred who do not enter the professions.

As a result of the excellent facilities for industrial education in Germany the German mechanic is the best trained mechanic in the world, not because he is more intelligent, but because an important part of his schooling prepares him specifically for his trade. An employer of labor and a student of industrial life in America recently declared before the National Educational Association that already fifty per cent of America's skilled mechanics are born and trained in European countries that have excellent industrial schools. Later investigations show that ninety-eight per cent of the foremen, bosses, etc., in the manufactories of New York State were educated across the water. And of all the foreign countries Germany leads.

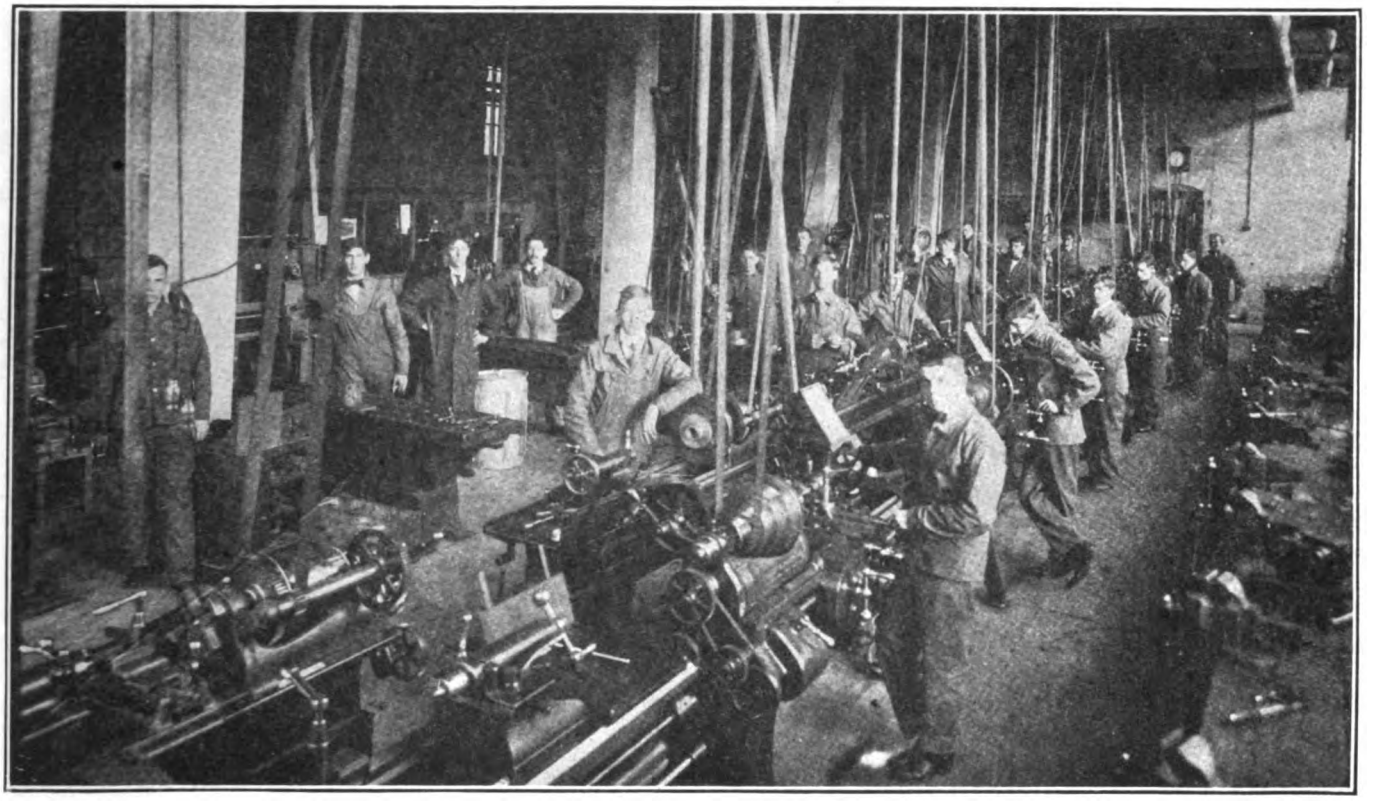
Thirty years ago Germany was a poor, unpopulated country, with practically no natural resources. After the Franco-Prussian War the country was in a deplorable condition. In fact, Germany had been the battleground of a great many nations for many years. The leaders of the country saw that Germany in order to be a prosperous country must be one filled with skilled workers, striving to produce quickly, well and much. They realized that industrial efficiency depends to a great degree on industrial education, and they set to work and organized an excellent system of industrial and technical schools. The development of the country during these years is full of suggestions to the communities in this country lacking in natural resources.

During these years thinking Americans have noticed by the Consular reports that there was a rapidly increasing exportation by Germany to America and other rival markets of a vast quantity of German products of the kind that show superior workmanship. The single item of machinery and tools to the United States has doubled in five years. Meanwhile, American sales to Germany in this time are about one third of the totals of five years.

Germany now sends to England twice as much finished product, while England sends two thirds of its former exports. To Sweden, Denmark, Argentina and Chile Germany sends double the quantity of machinery and tools exported five years ago. The cause of this outburst of efficiency during the last years is industrial and technical education.

Every child must attend school until he is fourteen. The common school is called the "Volkschulen." At the age of ten every child has the choice between continuing in the common school till fourteen and then going to work and attend evening school, or leave the common school and attend a high school and prepare for college or higher technical school.

The different kinds of schools existing are, roughly speaking, technical colleges, secondary or intermediate technical schools, schools and museums of industrial art, schools for foremen, schools for the building trades, schools for the textile trades, trade and industrial combination schools and industrial drawing schools.

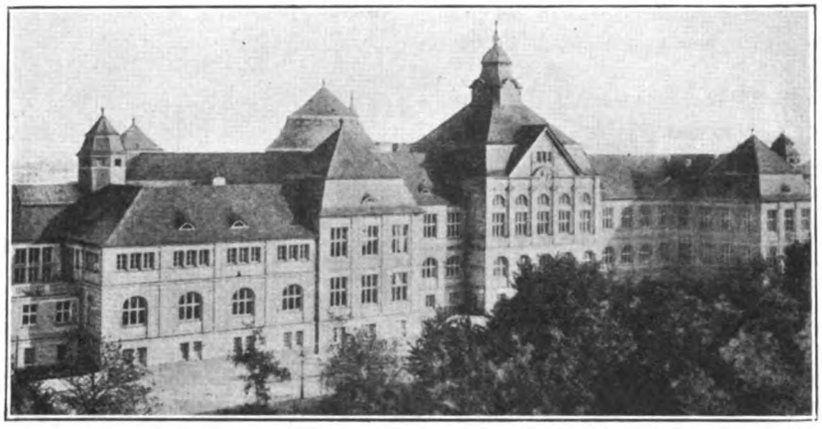


THE MACHINE SHOP AT THE CLEVELAND TECHNICAL HIGH SCHOOL

Each of these schools has a definite aim and is meeting a definite educational need in the community. At the head of industrial education stands the great University of Science (technical school). The purpose of this is to give not only the highest possible instruction in science but the application of this knowledge to the operations of industry. It is really an engineering school and quite similar to the Massachusetts Institute of Technology. In order to enter, students must have received a thorough preparatory training in an academy.

These schools are scattered through Germany and found in all of the large cities. The Technical University at

Berlin is one of the best and will serve as a model. This school has departments in architecture, building construction, mechanical engineering (including electro technics), marine designing and engineering, chemistry and mineralogy and in general sciences, especially in mathematics and the physical sciences. In each of these divisions of study there are workshops and experimental stations for research and practice in special scientific and technical subjects. The lectures in the various departments are supplemented by practical work in the draughting rooms, the laboratories, workshops, experimental stations and expeditions.

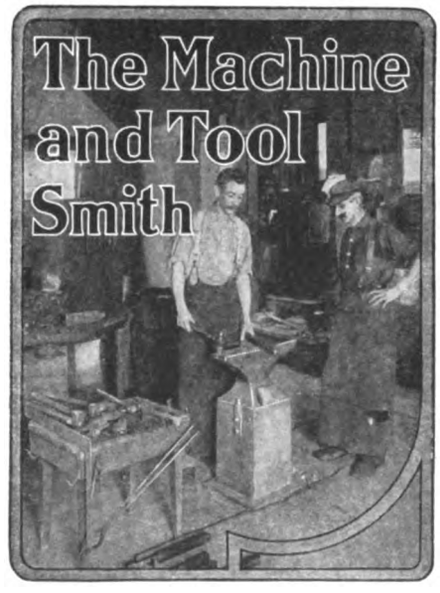


COMMERCIAL HIGH SCHOOL, COLOGNE, GERMANY

The instruction is arranged in annual courses, the whole Technical University course covering four years. The school year begins on October first.

The Germans have realized that the education received in these great technical schools prepare for experts, and the knowledge received often exceeds the real needs of the many branches of industry. In other words, a man preparing to be an overseer would not need all the knowledge that the scientific investigator or expert would need. Hence, the German government has considered that there is a need of technical schools somewhat less pretentious in their programs or courses of studies, lower in their requirements and giving instruction of a character more directly vocational or conceived with industrial work. In this way they prevent a loss of time which can be devoted to obtaining practical skill. Then, again, the matter of expense—it costs more to provide an expert training than a mere industrial training. These schools are called secondary industrial or technical schools. These schools are found in every manufacturing community. It is in this respect that Germany is far ahead of the United States. In this country every one who is to receive a technical training receives a learning for a position of captain or general in the industrial world, and no provision is made for the great bulk of "noncommissioned privates and officers," workers and foremen, etc., that the industrial world rests upon. The State of Massachusetts has started a movement to establish these schools, but it only shows how far we are behind Germany in this phase of education.

(To be continued.)



The Smith and His Work—8.

ROBT. B. KERR.

On Tools.

The smith is the universal provider of tools; in fact, is the only craftsman who has to provide not only his own but those used by every other trade. Of such an infinite variety are they that to attempt to enumerate them all is manifestly impossible in this article.

"Charity begins at home," so the wise smith will fully provide himself first before starting to make them for others. First comes the hammer.

Hammers should be made from a good grade of steel, of medium temper. Seventy to eighty-point carbon is about right. If made of high carbon steel they are more liable to break in service.

Punch the eye first, using a small oval-shaped eye punch; use from both sides, being sure to have the hole perfectly fair and in the middle of the stock; everything depends on this.

Break down on both sides of the eye all around, using a small fuller at first. The eye drift, or pin, should be oval in shape—no flat sides or sharp corners, and should be tapered all the way up. Work out the eye to width with a fuller and set hammer; heat frequently and carefully and work the drift from both sides.

Before completing the eye finish the hammer at both ends, then drift the eye to size the last thing.

The hammer being forged, heat to a dark red all over and strike it an upsetting blow on the end to relieve forging strains across the eye—anneal. This blow on the end should be given to all steel tools in which an eye has been punched; it relieves strains and, if practiced, will save many a break.

To temper a hand hammer or sledge heat evenly all over, catch by the eye and dip the ends, both face and pene, alternately, until there is just heat enough left to temper. Draw to a dark straw.

The same directions will serve for flatters, set hammers, chisels, swages, etc., which are of great variety, according to the work to be done.

All bottom swages, or other forming tools should be made from mild steel and faced with cast steel, hardened. The latter is too brittle for the body of the tool; they invariably break at the neck of the shank after a little service. Even mild steel swages that are much used should be annealed from time to time to prevent crystalization. If this is done, the tools will last a lifetime.

A flat piece of copper or soft brass laid across the anvil will save the edges of many hot chisels. If copper is used it can be forged like a bottom swage to fit the anvil.

The saddle will be found a most convenient tool for working out small wrench jaws, or anything of that nature that is too narrow to go over the heel of the anvil. In Fig. 1 is shown an improvement on the usual type.

Take a piece of 3 by 1-inch mild steel,

square one end to fit the anvil and drive down to a shoulder, making a snug fit. Bend over with a square corner so that it will stand up about two inches from the shoulder to the inside. Take another piece of the same stock, form up a lip scarf on it and jump on the under side, far enough from the squared end so that it will form a support resting on the heel of the anvil. Taper the straight piece outwards from the support, letting it project over the anvil five or six inches at will, or it can be rounded up cone shape. This makes a solid, convenient tool, useful for a variety of purposes.

Among metal-cutting tools the cold chisel easily leads the procession in general utility and when properly dressed and tempered is a most valuable tool. It is, therefore, most important that the smith give it the attention which it deserves.

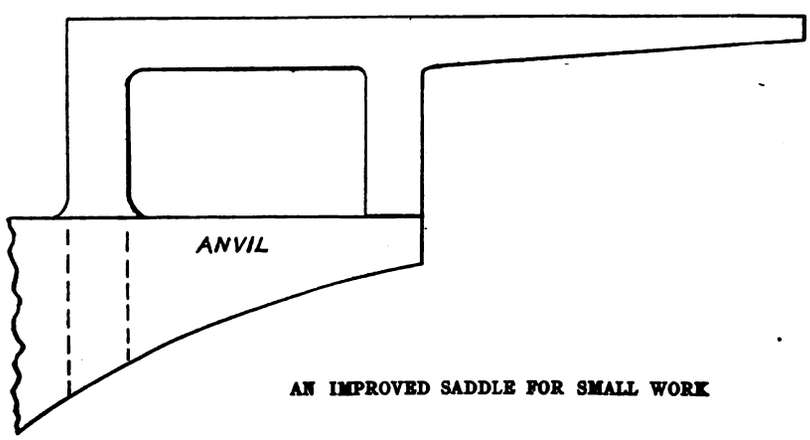
A cold chisel should be made of the same quality of steel as that used for a hammer. The making of a good cold chisel lies largely in the heating and forging. Heat moderately and slowly. Start drawing down the bit in a square; slightly tapering towards the end. This taper is most important. It should be just enough so that when the chisel point is flattened out it will be of the required width and thickness, without hammering on the edges. In spreading out the bit use a flater, so that the steel will spread evenly. Pack the steel at the point with quick, light blows of the hand hammer; do not touch the edges and do not hammer the steel after it is black. Never mind if the edges do not look exactly trim the first few times; a little practice will enable you to judge the taper so it will come out just right. The essential part is that the chisel

For ordinary clipping a chisel made from ¾-inch octagon steel should be about one eighth thick at the point, running almost parallel back three quarters, so that the tool can be ground a few times without having to be redressed. Trim the rough edge off with a sharp chisel. If it is found necessary to hammer the edges reheat before doing so, but always finish on the flat. To temper: heat slowly to a dark red; plunge straight down in the bath and work slowly up and down a few times, so that there will be no sharp dividing line between the chilled part and that which remains above the water. Draw slowly to a blue, or until a sharp, fine file catches it readily. If the temper runs down too fast check it by dipping. The slower the drawing is done the better. The temper should be equal at least an inch back.

Chisels should really be ground before being tempered, although this is not often done. If ground after tempering they should never be put on a dry wheel. This applies to all cutting tools. Many good tools are ruined by carelessness in this respect.

The directions given above for forging chisels will apply generally to all cutting tools. There are, of course, variations in form and temper to suit the work, but the underlying principles of heating and forging are the same in all cases, and they are so important that every smith, if he would master the art of working steel successfully, must be governed thereby.

Heat slowly and uniformly, forge evenly, heat frequently, do not strike flat cutting tools on the edge while finishing—are points that must be kept in mind.



AN IMPROVED SADDLE FOR SMALL WORK

shall stand the racket; beauty is of secondary consideration.

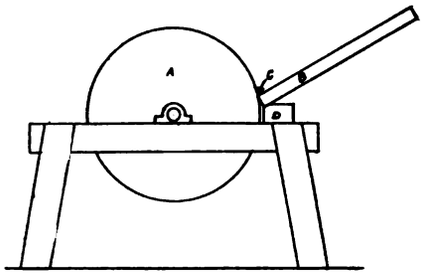
The bit should be of moderate taper, slightly wider than the stock from which it is made, with a slight round in towards the point, to give a stiff corner.

Ordinary lathe and planer tools of carbon steel, after being forged to required shape, should be rough ground before tempering and after being hardened should be drawn just enough to relieve strains, the color at the cutting edge barely showing. The temper table already given, however, covers the various classes of tools and it is unnecessary to further refer to that point.

Plain Machine Work for the Blacksmith.

GEO. CORMACK, JR.

Whilst traveling over the country in connection with my business—gasoline engines—it has been my lot to visit a

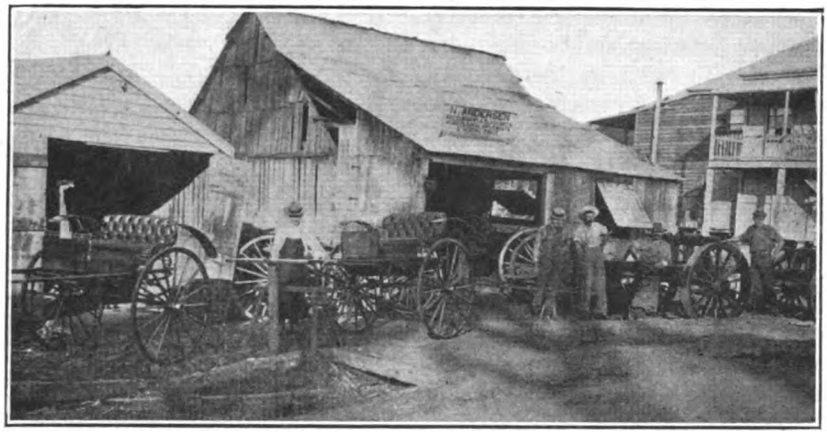


TRUING THE GRINDSTONE

good many blacksmith and wagon repair shops, more especially in the smaller towns. Quite frequently I have had to resort to these shops in order to have some little repair work done, and during these visits I have often observed that, whilst the shop-owner has deemed it advisable to invest his money in such machine tools as a drill press or a lathe, and in some cases a small planer or shaper, these are too often in such condition through neglect and abuse as to be practically useless and are really dead stock on his hands. Many of the machines which come under my notice are really good machines and with a little fixing and adjustment are capable of doing good work. The condition of these machines is mainly due to the fact that a majority of the men who own them are practically without any training, experience or knowledge of how to take care of and operate machine tools.

Taking these things into consideration, it shall be my endeavor in a series of short articles to explain in a simple manner, free from unnecessary technicalities, the principles which underly ordinary plain work on these machines. This will include illustrations showing the proper shape of the different cutting tools and also their correct positions in the machines, together with illustrations showing some samples of plain work, the different operations and the established ways of doing them. How to readjust or bring a machine tool, such as a lathe, drill, press or planer, back into good shape again, and how to take care of and keep it in shape to do good and profitable work will be fully gone into.

It is a well-known fact that good work can be done on a poor machine by a good workman who knows how to adjust and manipulate it so as to overcome the inaccuracies in the machine, but it is also equally true that an inexperienced and



ANYTHING FROM A TWO-WHEELED GIG TO A TEN TON WAGON. MR. N. ANDERSON'S SHOP, QUEENSLAND, AUSTRALIA

ignorant workman can do but an indifferent job on the best of machines. It is undoubtedly true that you cannot become a finished machinist by reading about how to do machine work, no more than you can make a good weld by reading a book on forging, but you can learn much by reading, which will help you to more quickly gain the practical experience, because the points where your closest observation of details will be necessary will likely be most heavily emphasized in what you read, especially so if written by a practical man. In connection with any trade, profession or calling there is a certain knowledge which is a product of personal experience only. An individual knowledge gained by the closest observation of minute details. This knowledge cannot be transferred from one person to another—it is the accumulated observations from many trials, many failures, and its amount determines the difference between the expert and the average workman. There is no reason why a good blacksmith cannot become proficient in handling machine tools. In his own work, in welding two pieces of iron together, he performs an operation which requires the highest degree of individual skill. An operation which in this respect is unsurpassed by even the most delicate and accurate machine work. In machine work there are many precise means of measuring and safeguarding the job, but in making a weld the blacksmith has to rely entirely on his own judgment and an exact knowledge of heat, etc., matured by the very closest of observations. If, by chance, any machinists or toolmakers should read the above statement and think that I am going too far I would recommend them to take a couple of pieces of iron and, starting with a cold forge, weld them together. By the time you get through, if you ever get them stuck together at all, you will have a good deal more respect for the blacksmith than you ever had before, and when you see him pull a couple of pieces out of the fire and pound them together on the anvil, apparently without any effort whatsoever, you will know that it is not as simple as it looks. I am convinced that a good blacksmith who owns some machine tools has in learning his own trade developed that faculty of close observation which, if properly directed, will make him a good machinist.

An old friend of mine, a machinist who in his day had traveled from end to end of the country and had worked in hundreds of different machine shops, told me that when he entered a strange shop looking for work the first thing he did was to look at the grindstone. If it was in good condition, running true and means provided for flooding it with water, he asked for a job. On the other hand, if the grindstone showed that it had not been trued up for months and the water keg looked as though it had not seen water for a week he walked out of the shop without interviewing the boss. Now, there is no joke about this; the condition of the grindstone, emery wheel, or whatever means are employed in sharpening the every-day tools of the shop, is a very reliable indicator of the quality of the work turned out and the general methods pursued in the shop. If there are no adequate means provided for properly grinding lathe tools, drills, chisels, etc., the work cannot possibly be of a high standard, and such conditions indicate a slovenly system of management which must handicap the shop in every way. Assuming that some of my friends, the blacksmiths, have a grindstone and really do not know an easy way to true it up I refer them to Fig. 1, where a common grindstone is shown. A is the stone, B is a piece of either ¾ or 1-inch common iron gas pipe, about two feet long—any old piece will do—and D is a wooden block spiked or screwed onto the frame to act as a rest. In using this simple method of truing up a grindstone the stone is run without water and the piece of pipe is held in the position shown and slowly rolled around, the upper edge of the pipe at C digging into the stone. A little practice will make anyone an expert at trueing up grindstones by this method, and it is surprising how quickly it can be done. If the stone is much out of true a piece of a broken emery wheel can be used at first. The emery wheel being forced against the revolving grindstone by means of a wooden lever; this will cut the stone down very fast, but as it crushes or abrades the particles, leaving them in a poor condition for cutting, the gas pipe should be used as a finishing tool. In trueing up a grindstone it ought to be left a little high in the center, and in grinding sharp-cornered tools the tool should be traversed backwards and forwards across the face of the stone, thus preventing the digging of grooves.

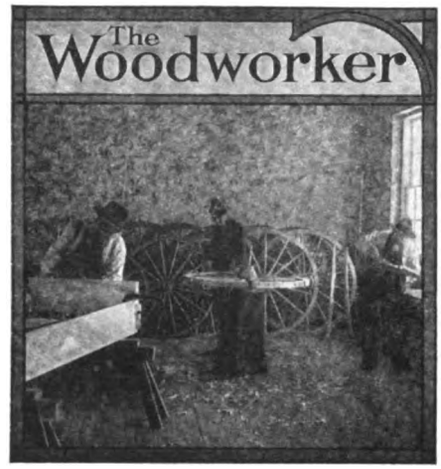
If common sense and ordinary care are exercised in using the grindstone, very little trueing up will be necessary after it has been once put in good shape. And if the grindstone is in good shape grinding a tool on it becomes a pleasure, instead of a job to be avoided as long as possible. Never use a grindstone dry, have plenty of water and if there is a trough under the stone do not allow water to remain in this over night, or whilst the stone is not running. If you do, the water will soak into the stone, making one side the heavier. In consequence, when the stone is not running, this side will naturally assume the lower position, to be still further soaked. This will eventually soften the stone on this side, and in consequence it will wear away faster on this side than on the other and more frequent trueing up will become necessary.

There does not seem to be a very definite idea regarding the speed of grindstones. One authority gives a speed of six hundred feet per minute for woodworking tools and nine hundred feet per minute for machinists' tools, whilst another gives the safe limit of speed for

Ohio grindstones at three thousand feet per minute. In such cases, where such a wide divergency exists between authorities, the ordinary man is always safe to adopt an average, and if the speed of a grindstone is around fifteen hundred feet per minute it ought to be pretty nearly right. The term feet per minute is used in regard to grindstones and emery wheels in preference to revolutions per minute, because the diameter of a grindstone and an emery wheel is always decreasing, and in order to keep up the proper cutting speed of the face of the wheel as it wears down the number of revolutions per minute will have to be increased. The feet per minute is obtained by multiplying the circumference of the grindstone by the R. P. M., and conversely the R. P. M. in order to run a certain number of feet per minute will be obtained by dividing the feet per minute by the circumference of the grindstone in feet. For example: How fast must a grindstone, thirty inches in diameter, be run in order to obtain a cutting speed of fifteen hundred feet per minute. Thirty inches equals two and a half feet, then the R. P. M. $= \frac{1500}{2\ 1\text{-}2 \times 3\ 1\text{-}7}$ or $\frac{1500}{25 \times 3.1416} = 190$ R. P. M. When the stone is worn down to twenty-four inches it is obvious that we must run it faster in order to maintain the same cutting speed. The speed will then be R. P. M. $= \frac{1500}{2 \times 3.1416} = 238$ R. P. M.

Now, some may think that this subject of cutting speed feet per minute in relation to grindstones is going too far, and maybe it is, but I have taken up this aspect of the subject because as we progress in the discussion of the lathe, drill press, etc., we will find the importance of correct cutting speeds for all tools employed in cutting metals. In fact, in machine work good work depends mainly on correct tool grinding, and rapid work upon a definite, practical comprehension of cutting speeds. I intended to say something about the emery wheel as a tool-grinder, but will leave that until the next article.

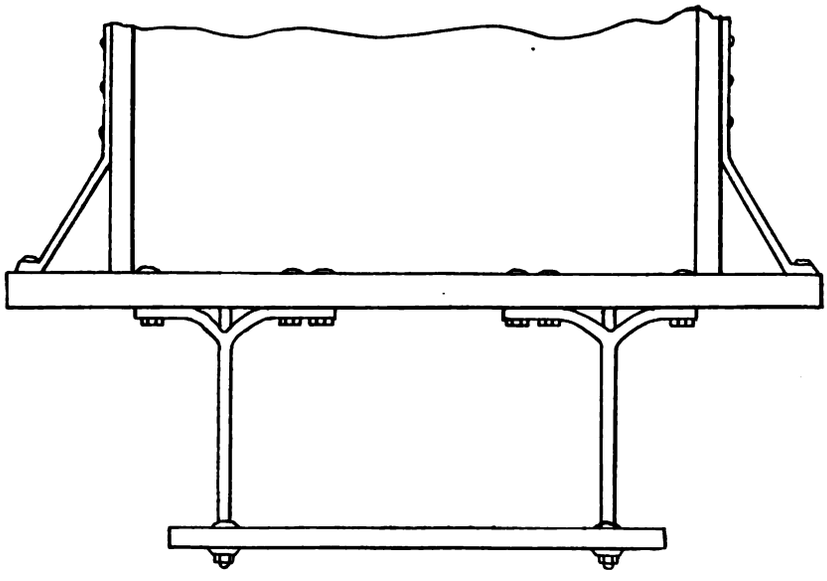
(To be continued.)



How to Build an Ice Wagon.

W. H. GUNN.

To properly construct a substantial ice wagon without using material of extra heavy weight is one of the most difficult problems in vehicle building. Twenty blocks of ice, weighing three hundred pounds each, is enough to load any ordinary wagon, but this three-ton wagon must frequently carry seven or eight thousand pounds, therefore, we must figure along those lines.



THE BACK STEP IS THOROUGHLY BRACED

The side sills should be 2¼ by 4½ inches, of oak. The bottom should be 1¼ by 6-inch oak, with openings of about one half inch between the boards, so the water may drain off. The sides are ⅞-inch tongue-and-grooved poplar, if possible. A slot, about one by twelve inches, should be left open in three places to let the water out. Unless this precaution is taken the wagon sills and bottom will soon rot. These vents also give the air a chance to circulate through the bottom. There is no need of center lengthwise sills. Have cross bars, two by four inches. Cut a one-inch notch and bolt to sills with two $\frac{7}{8}$-inch countersunk bolts in each end. Bars should be about two feet apart, equally divided between front and back cross end sills. No mortising is necessary. Let the cross timbers all be notched out, so as to be one and a quarter inches below the side sills, and the bottom will be even. The inside space must be determined by the size of the blocks of ice.

The back step is the most difficult piece of work about an ice wagon. It must be *very strong* every way or there is trouble. The engraving, showing a back view of the body and step or footboard, shows a style of step iron which I adopted for these very reasons. This step is braced every way to prevent a see-saw movement. Then the bolts, which should be one half inch, with countersunk heads, can be easily gotten out or screwed up. This board should be one and a half by fourteen inches, of oak.

The top bows, of which there are five, should all be cut the same length. Let the two end bows be set at thirty degrees from a perpendicular, the next two about twenty degrees and the center bow plumb. This will give the top a pretty oval shape. The bonnets should be eighteen inches deep and raised one and a half inches from a straight line behind, and one inch in front.

The gears to ice wagons ought to be very strong, on account of the swaying force of the top, especially when loaded. The springs should be three inches wide, both front and hind. The back axle should be two and a half inches and the front two and a quarter inches. Hang the body one inch higher behind, as it will settle there first. The right side of these wagons ought to be slightly higher than the left side, for the reason that if the street is oval from gutter to gutter, by driving to the right all the time the wagon will list that way and soon become much lower on the right and out of plumb.

The wheel bands should be even with the hub and the hub cupped so the nut can be easily unscrewed. The tires should be ⅛-inch and ¼-inch wider than the wheel rim.

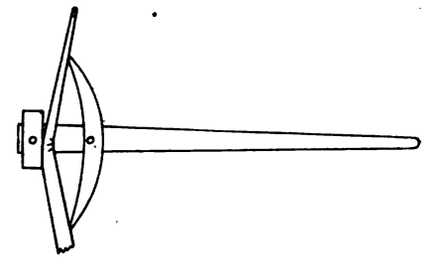
In making the front top bars of the gear have the center bar one inch wider than the others, so the king bolt hole will not cause it to break.

A Device for Straightening Buggy Bows.

J. W. JEFFRIES.

This device is a very useful one for straightening bent bows. The engraving shows how it is made. The main piece used as a handle is three feet long and may be of any good, suitable stock. The curved piece is two feet long, while the short piece bolted to the big end of the handle is six inches long. The pieces are bolted together as shown and in such a manner as to work or hinge easily on the bolts.

In use, place the bent bow between the curved piece of wood and the short piece as in the engraving and pull on the handle until the bow is straight. It may be reversed and worked right and left. It will easily straighten any bent bow and if the bow is not kinked it can be straightened without denting or marking, and in most cases without even breaking the enamel on the bow.



FOR STRAIGHTENING BUGGY BOWS

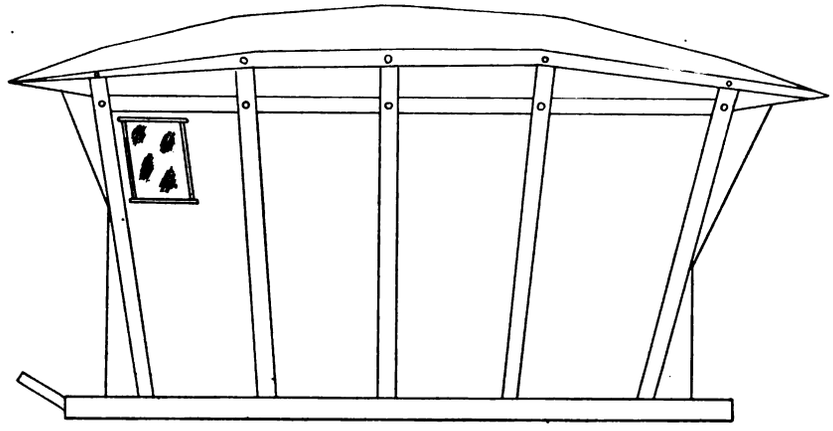
Collecting Bills and Handling Customers.

C. W. C.

Among the many matters connected with the blacksmith business there is none more important than collecting; especially in a location where there are many "slow pays." When I started in the blacksmith and wagon business there were three who had failed in my neighborhood and many people told me that I would soon fail, but I determined to show them, so I made up my mind not only to get their work, but to get their money for the work. The important point is to get the trade and also the money and still not offend anyone. The following is the way I have done and it has proven very satisfactory. There are several different classes of people to deal with and you must study the case of each one. In a country place one way will not suit all.

Now, we will first take the man who can pay and will pay, but still wants to run an account. This is the method I would suggest. Say this to Mr. A: "I want your trade and assure you satisfaction. Send your work along, I will keep account of it and it will be all right. You can pay me every thirty or sixty days, as I have to pay my bills that way." He will then see that you want his business and he will give it to you. Now, on the first of each month send him a statement showing the amount due, all carefully itemized, and should you need money or desire him to settle account make a remark below the statement something like this—"I can use this very handily at present. Can you not let me have check for same this week"?

Next comes Mr. B—a man who is worth the money, but is a little hard pay. Go at him like this if he asks for credit: "Mr. B, I am glad to have your work, but as you know, I have to pay my bills very promptly and ask you either to pay cash or pay every thirty days." When you send him a statement make a brief remark at the bottom —"I have a *special* use for money just now and, as this is due, please let me have the above at once."



THE BOWS ARE ALL THE SAME LENGTH

Next comes Mr. C. He is not worth anything and still has the name of being honest. If Mr. C asks for credit, go at him like this: "Mr. C, as you are aware, my prices are very low and I have all of my men to pay every Saturday, and it takes a considerable amount to do so. I am always glad to accommodate when possible, but I must ask for the cash."

If he says that he cannot pay cash then ask him how long he wishes to wait. He will probably say a few weeks. Then say about the first of the month will be all right, but you need it then. By getting him to specify a certain date he will be more likely to make an effort to meet that date. Now, if Mr. C should want a new cart, wagon, etc., then go at him like this: "Mr. C, you know I don't think that you are dishonest, but as I need the money, suppose you give me your note for the amount. The bank requires two names on a note, so just get some of the merchants here in town to put their name on it with you; by so doing you will have the time and I the use of the money, as I can discount it at our bank." After you put same in bank keep the date when due so you may send him a notice like the following: "Your note is due in bank the tenth of this month and I have many notes in bank. Try and pay same if possible, if you cannot possibly do so let me know before it becomes due." By so doing he will not get mad and at the same time will make an effort to pay same.

Next we will say something about Mr. D, a man who is a regular beat and wont pay anyone, but is still bold to ask you to trust him. If Mr. D wants only a small job done tell him that you have to require the cash, but if he wants a large amount of work done look into his case and if you cannot get the cash out of him question him as to where he is going to sell his berry or tomato crop. He will probably say that he has contracted with Mr. P or Mr. W. Then you go at him like this: "Well, Mr. D, I don't want you to think I take you to be dishonest, but as you will grow tomatoes for Mr. W, you get Mr. W to sign this order," At the same time commence to write an order as follows:

Mr. Blacksmith: Smithville, N.Y. (date).

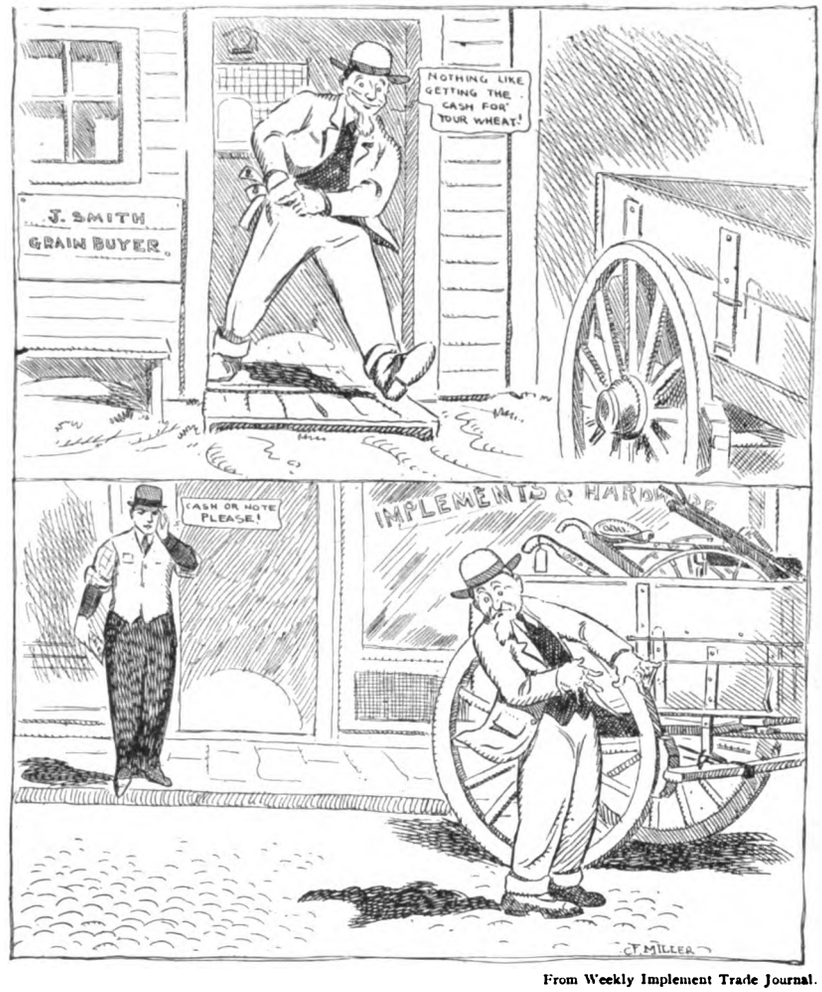
Let Mr. D have what he wants up to the amount of (whatever the bill will

be) and I will be responsible to you for same on or before (date). Witness my hand and seal. Mr. W.

When you hand him the order tell him: "I have to do things in a business way." He may refuse, but hold him to it or do not let him have his work. If the man is working for Mr. W or has contracted with Mr. W to sell him his crop of tomatoes, corn or anything else, then Mr. W will sign the order all O. K. Then charge Mr. W's account with the bill and have him give you credit for same. In this way Mr. W will not overlook the matter when settling time comes and you will be sure of your money.

We still have another class to deal with. Mr. E is a perfect stranger who comes to the shop and makes himself known as a first-class farmer. He wants a new wagon, cart or some job work and remarks to you that he will pay when he gets his berry crop off. You don't want to offend this new customer by telling him that you don't trust people you don't know, but take him around the shop and tell him some new point about your work and the different kinds of wagons you build, prices of same, etc. Show him that he is welcome and that you would like to have him order, but before he leaves say: "You are a stranger to me and in that case I will have to require the cash or good recommendations from some people who know you." By doing this way you will get the order if he intended to give it to you. I remember having a case of this kind with a stranger last year. He ordered a wagon and never said anything about whether he was going to pay cash, so I inquired about him and I was informed by a merchant that he was a bad beat and to watch him, as he already owed him a large bill and would not pay. He was not worth anything and so he could not collect it. After getting his wagon done I notified him and one morning he and a friend came after it. As it was outside of the shop they just tied it right onto their rig and started away without saying a word about pay. I had to work quick. I did not want to make him mad before a crowd by telling him that he should not take that wagon away without paying for it, so I just said, "Hold on a minute, Mr. T, you had better let me grease that wagon before you start home with it." At the same time I told one of my men to grease the wagon and winking at him at the same time because I knew he had once greased the wagon. While the man was greasing the wagon I called Mr. T in the office and said: "Do you want a receipt for this wagon?" He said, "Receipt! No! you better wait until I sell enough berries to pay for it." I then politely told him that I must have the cash, but he said he did not have a cent. I kept in good humor and then said: "I tell you what you can do. If you want the wagon you can give me a note and get Mr. M or Mr. P to endorse it for you." Then he said I was afraid he was going to beat me, but I just told him that it was my way of doing business and I began writing up the note. After I got it written he said: "You need not do that. I can pay you the last of this week." I then pulled out a bill which was for $320.00 and told him that it was due and that I must have the money or the note to use in the bank. He saw I wanted him to do as I said. He finally took the note and got one of the brokers in town to endorse it for him by agreeing to sell him his berries the coming week. You can readily see that if I had not been quick I would have lost the value of the wagon.

But we may be very particular and after all will get beat some time. One very good point is to ask a man for money when he knows that you know he has just been paid a large sum. Go at him like this: "Mr. Brown, I understand you farmers have settled up for your tomatoes, and as I am very short I have brought your little bill. I am collecting my little bills and most everybody is paying me what they owe." Talk as if you knew he was going to pay. He is then more likely to pay than if you asked him if it was convenient for him. The old saying is, "Catch fish while they are up." In this case it is a true one. If you don't catch them first you cannot catch them after someone else has them. My advice is, be sure and watch the game and get what you work hard for.



From Weekly Implement Trade Journal.

"SAUCE FOR THE GOOSE IS SAUCE FOR THE GANDER"
A SUGGESTION FOR THE BLACKSMITH

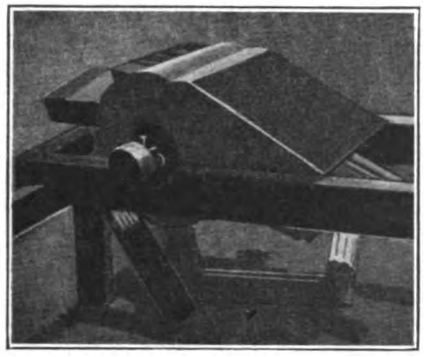
A Short Talk on Soldering.

A. G. WILLIAMS.

There have been several requests lately for information on soldering, and in reply the following points are offered:

The first essential to a good job of soldering is to have the surfaces to be

soldered perfectly clean and free from all grease and grime. Cleaning the parts may be accomplished by scraping, filing,



A SHOP-MADE FAN BLOWER

burning, or a soda bath. The next point of importance is to have a well-tinned soldering iron, free from grease or dirt.

Resin may be used as a flux, but some prefer acid. Before attempting to apply the solder heat the surfaces to be soldered. This is necessary to make the solder stick. If not heated the cold metal will cool the solder before it has a chance to adhere.

Don't get the soldering iron so hot as to burn the solder, but get it just hot enough so the solder will work well. If the iron is too hot the solder will work too quickly, also. There are various mixtures of solder—see that you use the one intended for the work in hand.

A Shop-Made Fan Blower.

J. A. L.

The accompanying engravings show a good home-made fan blower and also the details for building it. It has two outlets at the forge and when not used for blowing a fire the fan is used for cooling the shop and promoting a free circulation of air.

The fan case is fifteen inches in diameter and eleven inches wide. The fan is made of sheet iron and has four blades, each of which is four inches wide and ten and a half inches long. The pulley on the fan shaft is a four-inch and the fan is run at a speed of 700 revolutions per minute. The pipe used to connect the blower with the tuyere is common ordinary corrugated conductor pipe, or the pipe ordinarily used to drain eave troughs.

The engraving in Fig. 1 is from a photographic view of the finished blower. Fig. 2 shows a sectional view of the blower at A and a top view at B.

Prices and Some Pointers.

J. G.

It is a shame for some smiths to set buggy tires at $2.00 a set. My tire setter gets $2.50 a day and the helper $1.50. If I give them three set of tires to set in a day they do well. There are one hundred and eighty tire bolts to be removed by driving out. Some must be cut off and replaced by new bolts and then there are other incidentals about those wheels. Where is the profit? I charge $4.00 a set and occasionally by contract $3.00. Then, again, some smiths paint buggies for $5.00. Why, a good buggy cannot be taken apart and cleaned ready for painting less than $5.00. I get $15.00, or there is no money in it.

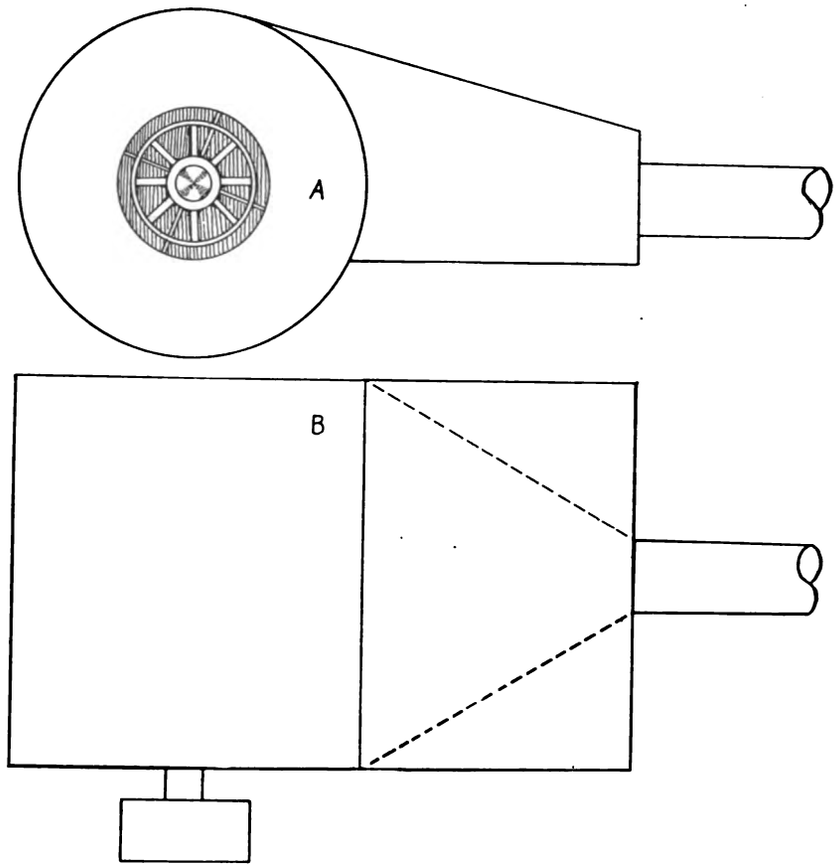
As to horseshoeing—I have a horseshoeing shop within a square from me. Some price lists show $1.00 for new shoes all around. My neighbor gets $2.00 for ordinary shoeing and $2.25 from the fire department. He pays his fitter $3.00, floor man $2.75, flunky $1.00, for shop rent $1.00, boss $3.00, or $10.75 per day all together. For shoes, nails and coal I don't know. At some smith's figures he would have to average sixteen horses a day. Where is the shop that does that?

One smith urges the boys to make knives. He says in hog-killing time he can make good money. He said he makes them out of files. Now, steel in files is good for files and nothing else. He says he grinds the teeth off. He can grind all day and the teeth wont be off. Where there is no more than one quarter of a pound of steel in a knife blade take five per cent Jessup or Sander English steel of the right size, then it doesn't need but a few licks on the edge and very little tempering.

A Concrete Engine Foundation.

E. C. WHITE.

In reply to Mr. Tedford's request for a concrete bed for his eight-horsepower engine will say that I have put down several concrete beds for engines ranging from six to thirty-five horsepower, and I believe the best results have been obtained as follows: First, ascertain the height of the engine bed and where the engine base is to be placed. Then dig a hole about twice as large as the base of the engine and three feet from base to bottom of hole. Now take some gravel or sand, six bucketfuls to one of cement, and mix well; then wet about like plaster. Fill this cement-mortar with bricks or stones well broken up and place in the hole for about six inches deep. This large base helps to prevent vibration. Now put template in place and hang anchor bolts, which should be five eighths or three quarters of an inch by two and a half feet long. I usually



THE CASE IS OF SHEET IRON AND IS ELEVEN INCHES WIDE

put a piece of pipe around each bolt, which is held to place by a pasteboard washer top and bottom; the top of the pipe to be one half inch below the engine base. This gives a chance to change the engine slightly if any change should be necessary.

Now, with good solid plank, make a box one and a half times the size of the engine base and sixteen inches deep and fill with gravel, four buckets of cement and one of brick, well stamped down. Now make a box one and a half inches wider and four inches longer than base and up within one half inch of base. Fill with gravel and cement in proportion of three to one. When this is set well put the engine in place, wedge up to a level and flow under it sand (two parts) and cement (one part) to fill pipes and make engine set steady and solid on bed. Now screw down taps and anchor bolts and engine will run steady.

It will take about three and a half barrels of cement and three or four loads of good gravel for your eight-horsepower engine. There should be a crossbar of one half by two inches of iron across head of anchor bolts.

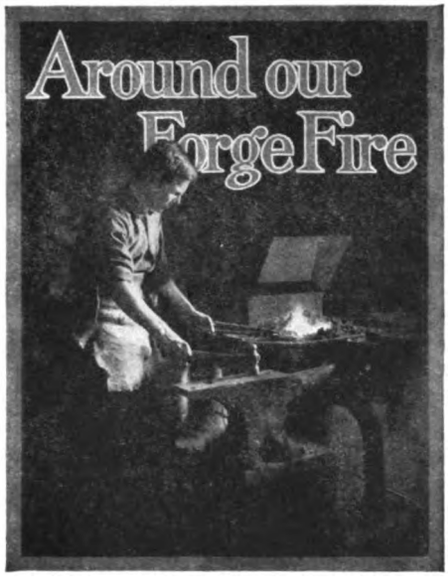
A Talk on Welding Steel.

WM. W. WATT.

In welding cast steel rock drills it is quite easy to split up the long piece and short scarf the ends, slip the short piece in between and when the steel is a little hot lay a piece of Laffitte welding plate on the steel, put gently into a clean coke fire, put on the blast and weld at a low heat. When welding, hammer gently at first and then as hard and fast as possible and a good job is the result.

Another method is to scarf in the regular way and then cut into and roughen the faces of the scarfs. Steel is rather inclined to slip at first and if the scarfs are treated in this manner slipping is overcome. A little practice in this will soon give the desired result.

I may mention that this Laffitte plate is also very valuable in welding carriage and wagon springs. In welding springs I jump up the ends a little and also narrow the spring which broadens out in welding. Put a little of the plate on the faces that are to be united, lay in the fire face uppermost and turn on the blast. When the plate is melted sufficiently to hold on the spring, turn the pieces over and the rest is as simple as welding a piece of iron, only a little more care is needed in this. Time is also saved by using the above plates and a first-class job insured. Bear in mind that in welding steel a clean fire is essential and quick, sharp blows.



While on his vacation the Editor ran across one of those old-fashioned, sturdily built smith shops erected in our grandfathers' days. He describes the shop in the following little sketch:

The Old Village Smithy.

Through the purple-white mists of the dawn comes the sound of a far-away cock's crow. Another is heard close at hand and then another, and soon the chill air is filled with sounds of the early morning. The sun peers over the edge of a distant farmhouse and as the mists rise before the warm rays a solitary figure advances along the deserted road. He stops before a squat, barn-like structure near the lumber yard and advances to the big door, fumbles for a moment in his pocket and finally produces a key. He opens the big, old-fashioned padlock, and as the ponderous door is pushed back the stale odor of burnt hoofs and heated iron issues into the crisp morning air. The man looks about and then disappears through the interior darkness. A door creaks loudly upon its hinges and a few minutes later is heard to slam. The figure reappears with shirt sleeves rolled to the armpits and an apron of leather about his waist. The village smith—for it is he—has opened shop for the day.

* * * * *

The shop was built in the early days. The floor of broad, heavy timbers has been worn and burned and charred until the hard, stubborn knots stand out in high relief. On the left wall are two auction notices, yellow with age, an old play-bill and a highly colored poster, announcing the county fair of last year. Below these are a number of iron rings of several sizes from which hang rusty chains of various lengths. In the corner hangs a "fly switch" and there stands an empty shoe keg, turned bottom up and worn smooth by many trouser-seats.

And the ring of the anvil is heard.

On the other side of the shop is a soot-covered brick forge, with several long-handled tongs and a small poker lying on the hearth. In a long box half filled with wet, dull-black coal, is a long-handled shovel, the scoop of which looks like a sieve. On the soot-black chimney of the forge are a number of figures in white chalk, and within easy reach hangs a pair of soot-covered dividers. Behind the forge is the ponderous bellows, breathing and blowing life into the glowing coals.

The ring of the anvil continues.

Beside the forge and a little toward the door stands the anvil, with its smooth, shining face, square heel and rounding horn. It is held by a number of bent rods and spikes on a section of tree trunk. At a little distance is another block, supporting a large, heavy vise with broad, wide jaws. A thick rasp with sharp teeth and a long, heavy, wood-handled file rest upon the block.

The ring of the anvil continues.

Behind the bellows, behind the forge, stands a long bench, supporting a short, chunky vise. A collection of many shaped hammers, punches, chisels, files, wrenches, an old gasoline torch and an endless variety of other things are scattered over the greasy, black surface of the bench, while on the wall between the many-paned windows are racks and boxes for tools and supplies. Beside the foremost window is a large, clumsy-looking drill, well blackened with soot and oil. The table contains the drillings of the last job and upon the floor is a small mound of bright metal chips.

The ring of the anvil continues.

Beside the rearmost window is an old-fashioned desk, hanging from two large nails in the sturdy wall timbers. Most of the papers are soot-covered and yellow. There is a gray-covered catalog in one of the pigeonholes, a packet of papers tied with a coarse string in another, a package of yellow envelopes in the third and a roll of old handbills in the last one.

The ring of the anvil continues.

The remains of an old spring wagon, metal parts, heavy with rust, lean against the rear wall. Here, also, is a collection of old springs, tires, rods and horseshoes, worn and rust covered. A pair of old bobsleighs, a partly dismantled sewing machine, a squat, round-barreled stove and an old wicker baby carriage fill the two corners. The heavy rear door is nailed shut, and just beside it lie all that remains of the inventive smith's early dreams—a motor that wouldn't go—now a heap of scrap.

But the sound of the anvil has ceased.

The whistle at the lumber yard announced "quitting time" an hour or more ago. The smith removes his apron, places it on the anvil and "washes up." A door creaks loudly upon its hinges, a few minutes later is heard to slam and the smith appears, with coat and hat, ready for home. He advances to the doorway, looks about, pulls the ponderous door shut, fumbles for a moment in his pocket and finally produces a key. He opens the big, old-fashioned padlock, places the big hasp over its staple, catches the lock into place and turns the key. He pulls on the lock several times and then turns his back upon the big door and the squat, barn-like structure near the lumber yard. The sun sinks behind a distant crest like a ball of flaming gold as a solitary figure disappears down the deserted road and into the gathering gloom. Through the dusk comes the chirp of a far-away cricket. Another is heard close at hand and then another and soon the chill air is filled with sounds of the evening.

The Old Ranchman's Favorite.

W. O. B.

I've handled horseflesh in my time—
'Was eighty when they reaped—
I played with ponies 'stead o' boys
And rode 'em 'fore I creeped.

I've throwed a foot o'er backs of brown
And over backs of grey;
Of roan and black I've seen a score,
And I've sold a thousand bay.

I've bought and sold and traded 'em,
I've roped and branded, too.
I've trained and broken vicious ones,
Some tough boys, I-tell-you.

I've raised about all sorts o' flesh,
Some runts and some good breeds.
Have raised 'em by the score an' more
For most all kinds o' needs.

The stately Arab, brave and swift,
The pure bred bay from York,
The sturdy Clydesdale, big and strong,
Unsurpassed for work.

The coach from France—a graceful beast,
The Morgan, hard to beat,
The bright-eyed Hackney, closely built.
The Norman, with hard feet.

The thoroughbred with silky coat,
For grace and beauty famed,
The Percheron for heavy work,
With limbs and barrel well framed.

The 'shire so strong and powerful,
With long-haired limb and slow,
The hunter, 'most a perfect horse—
Good temper, wind and go.

The little Shetland, small but strong,
The kiddie's favorite pet;
And mules—I've had 'em large and small,
Both Jimmy and Jinnette.

I've bought and sold 'em worth real gold
And some worth not a red,
I've seen 'em young and big and strong
And some were almost dead.

But you just paste this in your hat,
And on your spurs and whip—
I wouldn't sell that pony there
For all the gold you ship.

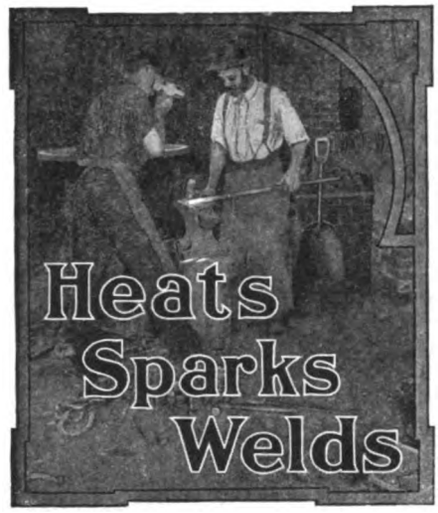
I raised her mother and her dad,
Her grand dad and *his* dad
I know the stock she comes from
For centuries back, my lad.

We've jogged about the country some,
In storm and wind and rain,
In scorching sun and biting frost
We've shared both fun an' pain.

She doesn't know the weight of lash—
A spur I do not own.
And none but me a ridin' leg
Across her back has thrown.

You could not get her for a sum
Ten times a thousand gold.
A kingly ransom could not buy—
Though I am getting old.

I'm not as spry as years ago—
I'm old, and bent, and grey,
But Nell and me will never part
Until I pass away.



The man who is no bigger than his job will never get a bigger job.

Of course, you have reason for observing Thanksgiving Day in the proper way.

We can help you if you'll tell us what you want to know. That's our mission.

If you are making expenses instead of profits—write to the Secretary. You need an association quick.

Prices won't raise themselves. You must do your part. Write the secretary right now— he has ideas on the subject.

John Hogan says "a five-dollar whip wont take you to town if your horse is lame."

Right now is none too early to order your calendars for 1910, if you haven't already done so. Some were disappointed last year. Better write your order right now.

Take care of the pennies and the dollars will—. Take care of the minutes and the hours will—. Take care of the pennies and the minutes and you can't keep yourself from success.

Unwise training will develop and often impart vices and faults to the colt which do not belong to its disposition. And the same is also true of the training of young men. Train the apprentice judiciously.

A modern forge and blast system will go a long way toward making the shop pleasant this coming winter. Most of a smith's waking hours are spent beside the forge. He deserves well-ventilated quarters.

Have you contributed to these pages recently? How long must we wait for that item you've been intending to write? Let the editors have something from you today. It wont take you a minute to write it.

Experts predict that within one thousand years human beings will have hoofs instead of feet. Then some so-called shoers can try out their pet shoeing schemes on themselves and go through some of the horse's sensations.

Don't start work on a new grinding wheel until you know it runs true. And when truing a wheel hold the dresser in a rigid tool post on the machine. To get a true surface on your work you must have a true face on the wheel. You can't get a true face on the wheel by attempting to true a wheel without a support for the dresser.

The time for association activity is NOW. If you are not getting all you should for your work, an organization will help you get it. If you are up against unfair competition, if your neighbor smiths are continually fighting, if you are doing business at a loss—you need an association. Kick hard—get your neighbors kicking and then kick up an organization. Keep at the matter until you get what you want, what you need, what you deserve. Ask the Secretary for help.

A Horseless Sunday is to be tried in London. For eight hours all horse-drawn vehicles will be excluded from the area in the Westminster district, their places being taken by auto cabs and busses. The cost of diverting horse traffic and providing automobiles to give free transit for those who otherwise would cross the area in horse-drawn vehicles is estimated at about one thousand pounds, which sum is being raised by voluntary subscription.

It is anticipated that the experiment will have the effect of demonstrating very clearly the advantage of automobiles over horse traffic, especially from the standpoints of cleanliness, silence, speed and control ability.

Talking of side-lines, here's an advertisement in a Kentucky paper that takes the prize:

Notice:

Know all men by these presents that I, Shadrach H. Armstrong, have coal-oil for sale at fifteen cents a gallon. Some say it ain't good oil, but I say it is. I will also tie your broomcorn, one half for the other. I crush corn every Thursday by toll gate. Turkeys picked very promptly any day of the week. Horseshoeing a specialty, at six bits around. Watch and pistol repairing guaranteed. Shoes half soled while you wait. Umbrellas fixed and axe handles made for fifteen cents. Will teach Southern harmony and the fiddle combined for $3 mo. Pictures enlarged by a new process, and my hot tamale and hair oil receipt go 330 days for twenty-five cents. Hair cutting only on Saturday evening, twenty cents a head. A good stripper cow for sale. Also agent for the Jones Wagon Hoist, the Tom McEirath Tobacco Duster and Foot's Medical Advertiser. Rufe Langston is my attorney and my terms is cash—first, because I know you; second, because I don't know you.

Little Business Stories No. 2.—Why do some men, and they call themselves business men, too, frown and answer gruffly when a courteous reply would result in more business and profit for them? A case in mind: A man entered a hardware store, purchased several articles and in re-counting his change after leaving the store noticed that the storekeeper had given him a five-dollar bill in place of a one. "Haven't you made a mistake in my change?" Asked the customer, returning to the store. "Oh, I guess not," replied the storekeeper, "We're not in the habit of making mistakes." Naturally the customer walked out without another word. And the storekeeper not only threw away some money, but a good customer as well.

American Association of Blacksmiths and Horseshoers.

Don't let a postcard stand between you and better prices, better profits, better trade conditions. You want these better conditions. You want better harmony in the trade. You want the money you ought to have—every craftsman does. But why let a postcard stand in the way? You would gladly spend a penny to gain these better trade conditions, wouldn't you? Then spend a penny for a postcard— address it to the "Secretary" and ask for "Easy Plans."

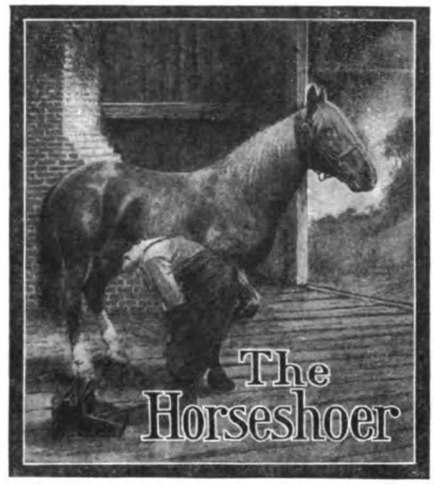
The ease with which my plans can be carried out will surprise you. There is little effort necessary to start an organization, and after once started it practically runs itself. To get things going this winter write now, this very minute, and get my instructions. You'll want the protection of an organization as soon as you can get it—so don't delay.

If any craftworker in the world deserves his earnings it is the smith. The only way to get it, in this age, is to organize and insist upon it. No good will ever come of a lot of smiths pulling this way and that, trying to get what they deserve. Constant coöperation and persistent pulling together will accomplish most any good and desirable thing. The other smiths in your locality realize that better craft conditions are necessary. The steady advances in all lines have made them realize this need. Why not organize, raise your prices and get what you deserve? There is no reason why you cannot start a protective movement in your county. Ask for my help. I will give you every help and assistance, supply instructions and organization literature, call meetings and put forth every effort to form a healthy, growing association in your county.

But write today.

It will take less than a minute to address a postal card to me, P. O. Box 974, Buffalo, N. Y., and by next mail you'll get complete easy plans for building a strong association in your county. Don't let a penny postal stand between you and better prices, better profits, better trade conditions. Do it now.

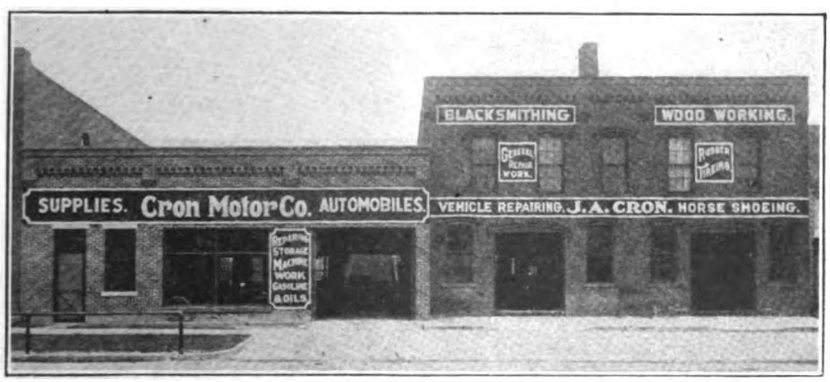
THE SECRETARY.



Horseshoes and Shoeing.

The horny casing of the foot of the horse, while quite sufficient to protect the extremity of the limb under natural conditions, says the Encyclopaedia Britannica, is found to wear away and break, especially in moist climates, when the animal is subjected to hard work of any kind. This, however, can be obviated by attaching to the hoof a rim of iron—a simple device which has been probably not surpassed in its beneficial effects by the introduction of steam-power locomotion. The animal itself has been in a very marked manner modified by shoeing, for without this we could have had neither the fleet racers nor the heavy and powerful cart horses of the present day.

Shoeing does not appear to have been practiced by either Greeks or Romans, but there is evidence that the art was known to the Celts and that the practice became common after the overthrow of the Western empire towards the close of the fifth century. It is only recently that horseshoeing was introduced in Japan, where the former practice was to attach to the horses' feet slippers of straw, which were renewed when necessary. In modern times much attention has been devoted to horseshoeing, with the result of showing that methods formerly adopted caused cruel injury to horses and serious loss to their owners. The evils, as summarized by Mr. George Fleming, army (British) veterinary inspector, were caused by (1) paring the sole and frog; (2) applying shoes too heavy or faulty in shape; (3) employing too many and too large nails; (4) applying shoes too small and removing the wall of the hoof to make the feet fit the shoes, and (5) rasping the front of the hoof. According to modern principles, (1) shoes should be as light as compatible with the wear demanded of them; (2) the ground face of the shoe should be concave and the face applied to the foot plain; (3) heavy draught horses alone should have toe and heel calks on their shoes to increase foothold; (4) the excess growth of the wall or outer portion of horny matter should only be removed in re-shoeing, care being taken to keep both sides of the hoof of equal height; (5) the shoe should fit accurately to the circumference of the hoof and project slightly beyond the heel; (6) the shoes should be fixed with as few nails as possible; six, seven in fore shoes and eight in hind shoes; and (7) the nails should take a short, thick hold of the wall, so that old nail holes may be removed with the natural growth and paring of the horny matter. Horseshoes and nails are now made with great economy by machinery. In rural districts, where the art of the farrier is sometimes combined with blacksmith work, too little attention is in general given to considerations which have an important bearing on the comfort, usefulness and life of the horse.



HOW ONE OF OUR READERS SOLVES THE AUTOMOBILE QUESTION

A Remedy for Corns.

S. W. H.

Corns are bruises of the sensitive sole in the inside quarter of one or both fore feet. The primary cause is shoeing in such a manner as to keep the frog from touching the ground. When shoeing, the frog should not be cut out or trimmed off unless it is ragged, and then only a very little, as it acts as a cushion to the foot and lessens and sometimes even prevents bruising when the foot strikes a stone or other hard substance.

It is not always easy to detect corns, but in bad cases lameness ensues, and

they may be suspected where the horse stands uneasily on its fore feet or tries to bear its weight on their outer side. The shoes should then be removed and



A WELL-BRED ANIMAL

the sole in the angle between the inner quarter and the bars of the lame feet pared. If corns are present the foot will have an inflamed appearance and the horn will be soft and spongy and in neglected cases suppurated. This morbid substance should all be removed, leaving the frog untouched. Then the following dressing may be used: Four ounces each of bees' wax and tar melted together, then add six ounces of glycerine and two drachms of nitric acid and apply when cold. The foot should now be shod so as to give the frog its natural action, and it is a better way to shoe the foot so that the frog will touch the ground at every step. If the horse is not to be driven on hard pavements tips are sufficient; but otherwise light shoes without calks should be used.

If the cure is to be permanent, proper shoeing must continue, as a departure from correct and proper shoeing principles will cause the corns to reappear.

Tips and Toe Clips.

C. W. PHELPS.

I have been a regular reader of your paper for a number of years and am interested in what the brother blacksmiths and other tradesmen have to say. I have run a shop of my own until the past twelve years, which I have spent in the United States Service. I have been shoeing horses and mules and doing general repairing in several states and I find different ways of shoeing, according to the use and roads. But I want to say for the benefit of young smiths to "cut out" toe clips and tips. You are only wasting time and injuring the horse's feet. Some old-timers will tell you differently, but every smith that cannot make a shoe stay tight and snug for six weeks without a tip is not fit to nail on a shoe. Make the nail holes to fit the shoe and use the proper size nail and your shoe will stay. A tip on the side, or two tips in case of a cracked hoof is all right, but to use them on a sound foot you will have to show me the reason why. You will find very few smiths that can give a good reason for using them and a man should have a good reason for doing everything. I can fit a great many more shoes in a day without tips than with them and my time is money when working. I find that in winter sharp calks will last much longer and wear sharp if they are chilled.

What is an Ideal Bearing?

HENRY H. FAILING, JR.

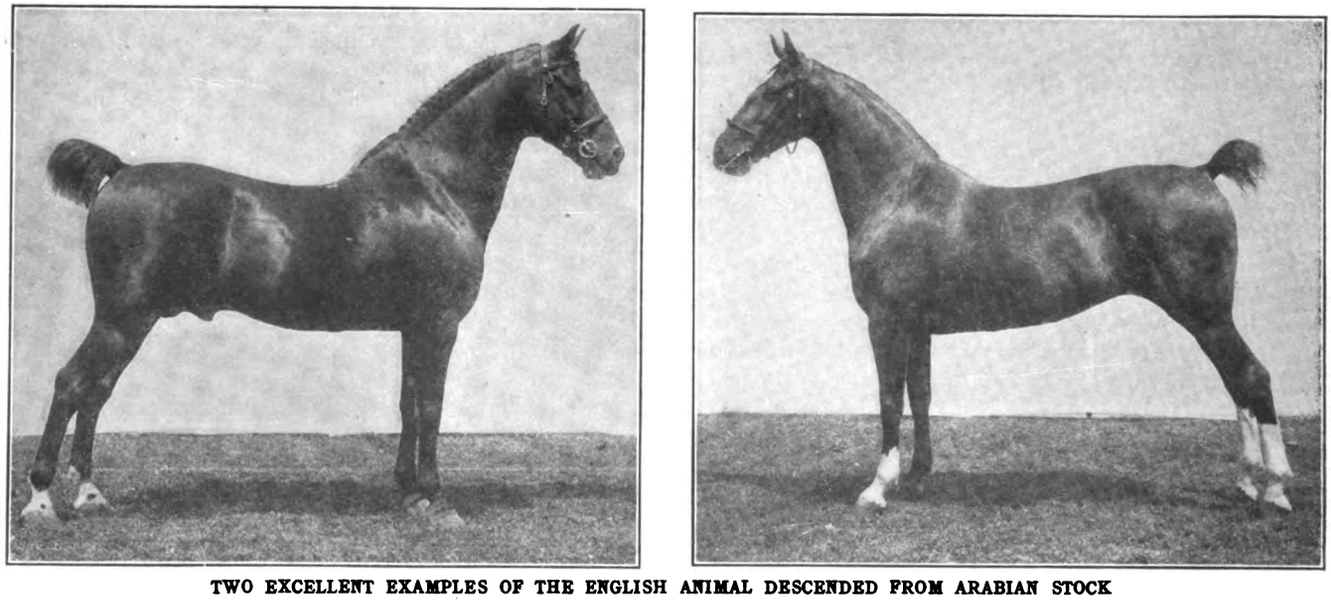
After reading Mr. G. F. Stevens' article in the August number, "That Ideal Bearing and the Evil (?) of Shoeing," it seems to me Brother Stevens must be hard to make understand. He has described or pretended to describe



A SPANISH STALLION

my ideas and principles of shoeing and in so doing it seems he has so misconstrued my statements that I feel an explanation is necessary.

Mr. Stevens says "Let us look at the horse in his natural state, for this is really the basis upon which all shoeing for healthy feet should be done. Without shoes the horse carries weight on every part of the ground surface." I agree with him in saying we should imitate nature in shoeing. This is one step in the right direction. But, does the horse without shoes in his natural state carry weight on every part of the ground surface? I say he does not, and if Mr. Stevens will examine a healthy foot of a horse that has never been shod, running in pasture, he will find that his foot is not flat, but cupped out, and that the wall projects from a quarter to a half inch below the sole of the foot, and the weight is carried on



TWO EXCELLENT EXAMPLES OF THE ENGLISH ANIMAL DESCENDED FROM ARABIAN STOCK

the wall and the frog and not the sole.

One of the principal causes of lameness in horses that are not properly shod is the corn. What is a corn and what causes it? There is a cause for everything and this is no exception. We are told by the best authorities that a corn is caused by undue pressure on the sensitive part or sole of the foot, at the quarters. When the pressure becomes too severe it causes a blood vessel to burst. The longer the pressure remains the worse the corn becomes until the horse becomes so lame as to be unfit for use. Take away the pressure and in a short time the lameness will disappear, but the corn still remains. Now, then, if the pressure on the sole of the foot at the quarters causes corns and Brother Stevens is shoeing to prevent corns, why does he set a shoe so the weight is carried on the sole of the foot?

When I said shoeing was a necessary evil I didn't suppose anyone would get the idea that I meant horses should be worked without shoes, as it seems Mr. Stevens has done. It is a settled fact that the horse must be shod in order to accomplish the work he is compelled to do.

But because the horse must be shod is no reason for saying it is a benefit, as Mr. Stevens asserts.

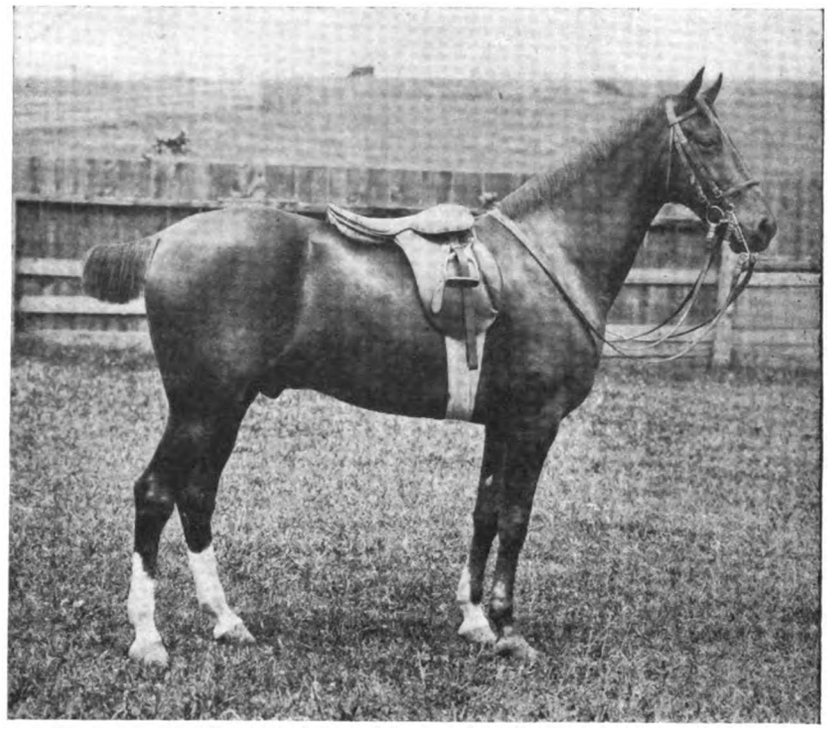
When a smith takes a horse's foot off the ground and sets a shoe under it he violates nature. The foot must become



AN AMERICAN ANIMAL OF HIGH BREEDING

dry by not coming in contact with the ground. He removes the frog pressure, which is another injury to the foot. Every four to six weeks he drives seven or eight nails through the foot. How can we expect that foot to be perfect as it was when it was brought in from pasture, after eight, ten or twelve years of steady shoeing, as Mr. Stevens says can be done. Though the work may be done by an expert at his trade and the best methods known to science be used his feet will never be the same as they were before he was shod.

Now, I hope I have made myself clearly understood and Brother Stevens will have no trouble understanding what I meant when I said shoeing is a necessary evil.



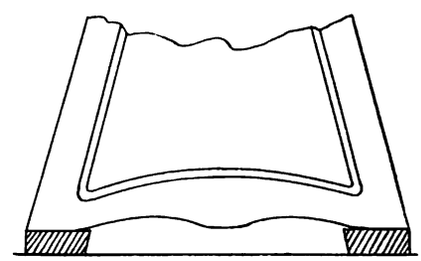
EXCELLENT TYPE OF SADDLE HORSE

Stubbing Axles and an Oklahama Shop.

V. S. SMITH.

I have had twelve years' experience as a blacksmith, working in several shops and for the last five years running a shop of my own, alone, with the exception of the last four months when I took in an apprentice. Being alone, I had to scheme to save time and labor. For one thing, I cut my stubs off on a bevel and upset just a little. Cut just half way on the line that you cut when cutting square, as this saves the hard work of chamfering them. I use this plan in all welding over three quarters of an inch. I have put on lots of stubs in this way, as this is a sandy country, and a 1 and a 1¼-inch stub is a pretty good job for one man, but in this way it is not nearly so hard a job. Tires may be cut V-shape when they are to be welded, and it saves lots of work on the edge of the tire, and they weld easier, too. I have seen the tire cut in this way, but never saw anyone cut log stubs or other heavy welding in this manner. Those of you who have not tried this should do so, as it saves a third of the work.

I have a shop 20 by 44 feet, two Royal Western Chief blowers, two Fisher anvils, one Edwards shear, a Western Chief drill, a Little Giant hollow auger, two vises and a Little Giant axle setter, and the best of all my tools is a Scientific Hydraulic cold tire setter, which is a great time and labor-saver and a great machine if properly used. I remove all the bolts and wedge spokes on buggy wheels and then put in one bolt at each joint and set, and if very loose set three or four different places so the bolt holes will come right. You can't make a good job and leave the bolts in, notwithstanding that some claim it can be done. I am going to put in a trip hammer and power this winter. I have all the work that I can do most all the time. I have all kinds of farm work, from a garden hoe to a thresher. There is not much shoeing in this locality.



AN IDEAL BEARING

Corn crop is light here this year; oats and wheat good; the cotton prospect good, and the people generally doing well for a new country. Some people

become spongy and soft and another blow-out will be likely to occur in a short time.

If the place to be repaired consists merely of a cut in the inner tube a strip of the filler may be rolled in the proper shape and, after being softened on the warm surface of the vulcanizer, should be forced into the opening which will then be ready for the application of the heat. A strip of cloth or paper should always be laid between the instrument and the rubber to be vulcanized in order to prevent the two from sticking together. Before this paper or cloth is applied, some French chalk may be sprinkled on the surface of the rubber, but it should not be used to excess, and it is necessary to exercise great care that all parts with which the chalk comes in contact are perfectly dry. When wet, French chalk assumes the consistency of plaster of Paris, adheres like mortar and finally becomes very hard. When in this condition it is likely to abraid and possibly puncture the inner tube and to wear the inside surface of the casing. The same precaution applies to two rubber surfaces which are in contact under the vulcanizer, but which it is desired to keep separated.

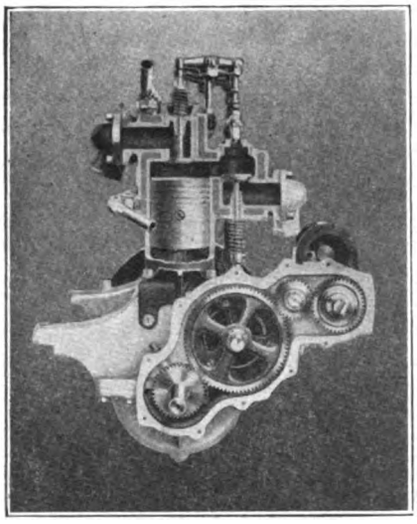


FIG. 3—CROSS SECTION OF CYLINDER AND FRONT END OF MOTOR

The Mitchell Motor Car.

The Mitchell motor car, shown in the accompanying engraving, is a four-cylinder, thirty-horsepower car. It has a wheel base of 105 inches, magneto and dry cell ignition and a capacity for five persons, with a detachable tonneau. Fig. 2 is a top view of the chassis, with all parts plainly shown. Practically all parts and connections can here be traced from the crank, radiator and fan to the muffler and brakes. In Fig. 3 is shown a cross section of one of the cylinders and also the front of the motor, showing the valve-operating mechanism. A comparison of this engraving with Fig. 4, showing the intake side of the motor, will simplify the operations and workings of the valve-operating device for the reader. Those readers who have followed these articles each month will find no difficulty in tracing the various workings of the Mitchell motor in the engravings and in easily understanding the various parts and their workings.

Adjusting, Repairing and Caring for the Automobile—12.

Miscellaneous Pointers.

Every car should be equipped with a small odometer, so that an exact account of the mileage can be kept. This enables the operator of the car to keep an accurate gauge on the gasoline, oil and battery consumption, and also on tire cost.

When a car develops an apparent looseness everywhere—so noisy and rattle-y it seems as if every part of the machine is hopelessly worn out—try recharging the storage batteries, or installing a fresh set of dry cells—you will find the trouble was due to irregular firing of the cylinders—lagging, so that the interval between impulses causes back lash in gears, excessive vibration and jerky running of the car. It's remarkable what a lot of ills a fresh battery will cure.

Tires not in use should be kept in some dark place, where the atmosphere is moist, preferably in a cellar. When storing cars for the winter the wheels should be raised off the floor and the air pressure reduced just enough to keep the tires distended. It may also be noted that tires deteriorate less under moderate usage than when stored away. It should also be remembered that tires are one of the chief items of expense in the maintenance of a car and that proper care will more than double the life of a set of them.

Carbon deposit in the cylinder is one of the most fruitful sources of trouble in a gas engine. If the cylinders get too much oil a portion of it will work up past the pistons; the intense heat will consume or evaporate the oil, leaving a deposit of carbon; this may be augmented by too rich a mixture, which serves to deposit lamp black or carbon in a film on the inside and top of the compression chamber and on the heads of the pistons. The films thus formed will in time commence to scale and, the projections becoming fused by the heat of the explosions, will serve to prematurely ignite the charge.

The symptoms are back-firing and knocking in the cylinders, as if the spark were too far advanced. An almost infallible symptom of excessive carbon deposit in the cylinders is the motor showing plenty of power at high speed, but deficient in hill-climbing on high gear. At low engine speeds the incandescent carbon projections serve to pre-ignite the charge, thereby reducing the power of the motor. The cure is to take off the cylinders and scrape off the carbon deposit, being careful not to

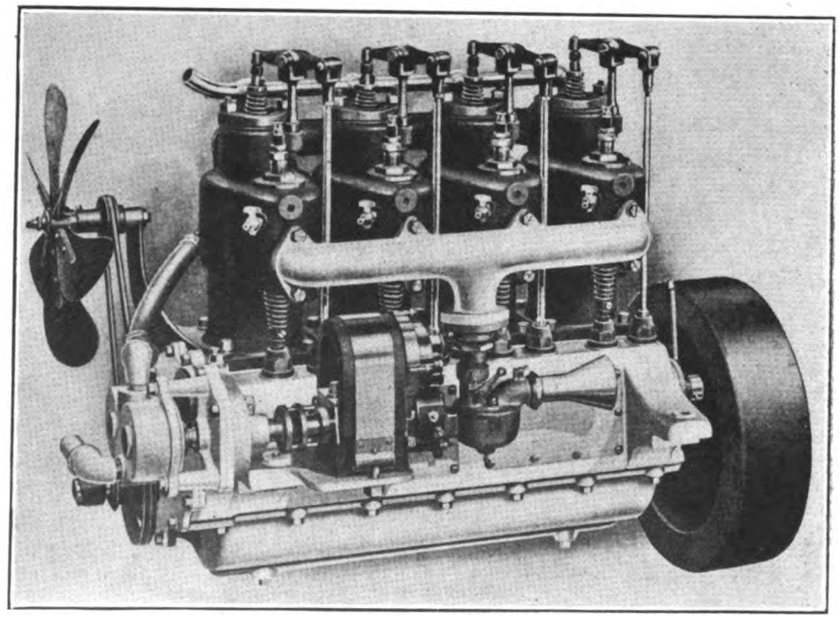
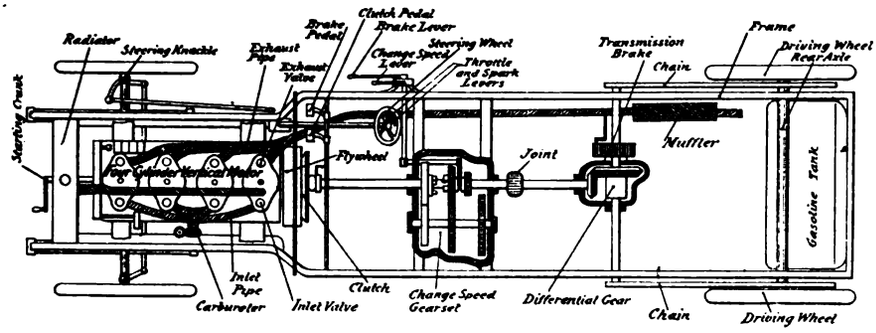


FIG. 4—INTAKE SIDE OF MOTOR SHOWING MAGNETO, FAN, PUMP AND FLY WHEEL

scratch the cylinder walls. The preventative is to so regulate the oil feed as to give the cylinders plenty, but not too much, oil.



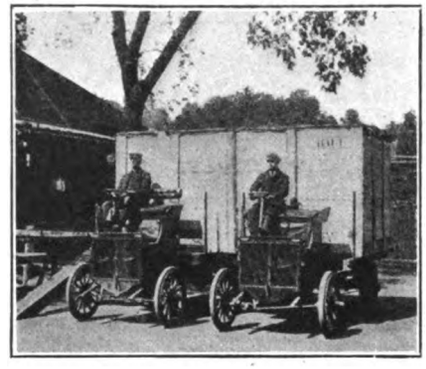
CONVENTIONAL PLAN VIEW OF THE CHASSIS OF A FOUR-CYLINDER GAS MOTOR TRUCK

Carbon will also form on the porcelain portion of the spark plugs, thereby furnishing a circuit, which the high tension current may travel over rather than jump between the sparking points of the plug. Usually only a part of the current will pass by way of the carbon film, still leaving a weak spark at the points. This causes intermittent firing. The symptoms are similar to a poor contact in the commutator.

This condition is difficult to detect, for the reason that when the plug is subject to the usual test of removing from the cylinder and closing the electrical circuit the spark is seen to jump free and "fat" between the points. This, because the electrical energy which is sufficient to jump between two points one-half inch apart in the open air will jump less than $\frac{1}{16}$ of an inch in the chamber under sixty pounds' compression. The cause of overheating in motors may be summed up as follows: Poor oil, insufficient oil, bad mixture, weak spark, slow spark, obstructed muffler, broken pump, flat or obstructed water pipe, low water, and valves out of time. The pump may be broken and still circulate the water. The radiator will get hot because slow circulating water does not cool as fast as fast circulating water. Occasionally the pin which holds the pump on shaft may shear off. Remove cover plate and replace pin.

There are a few common sources of trouble which may affect the operations of a gasoline-driven carriage and which we have mentioned in the order of their possible occurrence. Following these will be noted the remedy. Familiarity with an automobile does not call for special mechanical ability; only careful study and application of common sense to the car.

(1) IMPERFECT VIBRATOR ACTION.—The vibrator can be seen by opening the top of the spark coil box; and this trouble can generally be corrected by changing the position of the adjusting screw on the top of the coil or by cleaning the platinum points. The indications of this trouble are uncertainty in starting, skipping of explosions and irregular action when running.



TWO MACHINES WITH ONE LOAD

The machines are light Franklin trucks and are engaged in hauling a boxed automobile. It is unnecessary to say that it required considerable skill on the part of the drivers to transport the load, not only in turning corners but in traveling straight ahead as well.

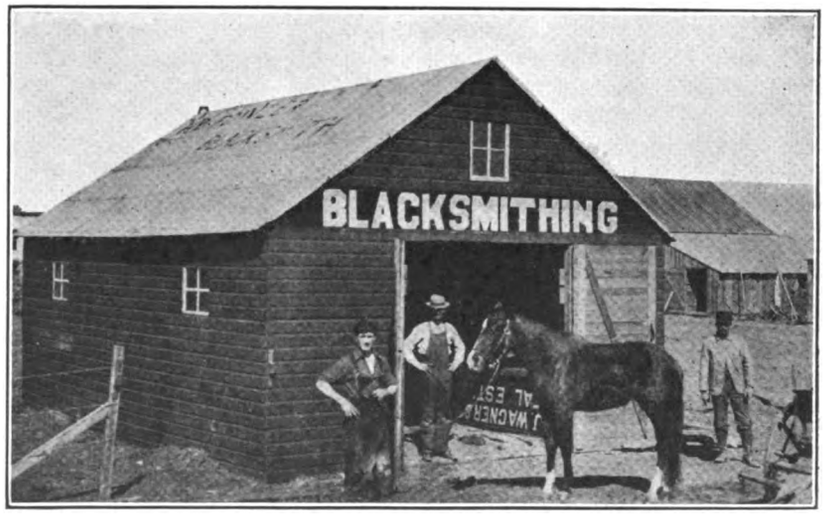
(2) DIRTY SPARK PLUG.—This trouble can be corrected by removing the spark plug with an ordinary monkey wrench. The plug can then be cleaned, using brush or emery cloth together with some clean gasoline. If the spark plug points are badly burned they may be cleaned with very fine emery paper or cloth, or fine sandpaper. The points on the spark plug should be $\frac{1}{32}$ of an inch apart.

(3) EXHAUSTED BATTERIES.—The remedy is obvious.

(4) LOOSE OR BROKEN WIRES.—Troubles Nos. 4 and 5 must be discovered by inspection. In an engine well cared for and properly adjusted so as to turn easily, nearly all failures to start promptly and run regularly are electrical, easily found and quickly remedied. Do not waste time and patience in cranking an engine, for, if in proper condition, it will start as surely and run as regularly as a locomotive. One of the most annoying troubles to locate is a wire which is broken in the insulation. This can only be discovered by taking the cable in each hand between the forefingers and thumbs and going over the wiring inch by inch.

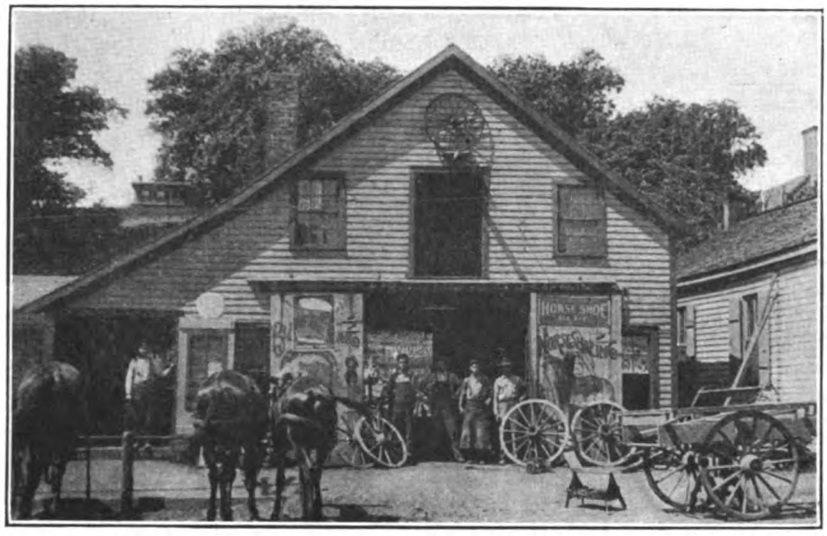
(5) A WEAK COMMUTATOR SPRING.—This will give all the symptoms of No. 1. That is, unncertainty in startig, skipping of explosions and irregular action when running. It is the least liable to occur and the easiest to discover. If this trouble is suspected, remove the cover on the commutator, when it can be easily located.

(6) WORN COMMUTATOR.—The symptoms of this are similar to Nos. 1 and 5. It results from failure to keep a supply of lubricant in the commutator.



TWENTY-FIVE MILES FROM A RAILROAD. SHOP OF MR. H. R. FOWLER OF SOUTH DAKOTA

The arc formed by the break in the current as the roller leaves the bronze segments gradually burns the metal away, causing uncertainty of conduct



MR. F. H. VOELKER'S MISSOURI POWER SHOP

and hence weak or uneven explosions. Take off the commutator, put in a lathe and turn about $\frac{1}{64}$ inch or less off from the inside, being careful to turn it evenly.

(7) WATER OR DIRT IN GASOLINE.—A globular trap is provided below the gasoline tank to catch sediment or water and prevent it getting into the carburetor. This will arrest a limited amount of water or sediment, but it should be drained frequently. This should never happen if the gasoline is strained through a chamois skin. The remedy is to disconnect gasoline pipe from the carburetor and drain thoroughly. It may be well to completely drain the tank and refill with fresh, clear gasoline.

(8) FROZEN WATER IN CIRCULATING PIPES AND PUMPS.—This must never be permitted to occur, as the operator should use an anti-freezing mixture in cold weather, or else drain the tanks and water system after the return from every run. No attempt should be made to run the engine when in a frozen condition, as it is liable to break the pump and damage the engine beyond repair. The water-cooling system must be thawed out by the use of warm water.

(9) STICKY VALVE STEMS.—One of the most annoying troubles and sometimes one difficult for the amateur to locate is a sticky valve stem, causing the valve to stay off its seat and thus lose compression, or else seat itself so slowly that the engine will not run up to speed. This trouble can be remedied by removing the plug over the valve. The valve will then be exposed. Use plenty of gasoline or kerosene to wash the thick oil off the stem, turning the valve by hand. In most cases it can be cleaned sufficiently without dismounting it.

(10) LEAKY VALVES.—These make themselves manifest by loss of compression, easily discoverable by cranking the engine. When this trouble occurs the valves should be ground to a good seat, using the process described elsewhere.

(11) WEAK VALVE SPRINGS.—When the valves fail to seat themselves promptly the springs may be weak and should be looked after. A weak inlet valve spring makes itself evident by backfiring through the carburetor. A broken inlet valve key will give much the same indication. Substitution of new springs or parts is the obvious remedy.

Painting.

Once a year every car should have a thorough inspection and overhauling, replacing worn bushings and other parts. This is also the time to enhance the outward appearance of the car by repainting. A properly painted car looks as good as new and if properly cared for it usually is.

It is well to avoid flashy colors, or freakish combinations, especially if the car is to be sold or exchanged. Stick to standard colors, as these are always more in demand than freaks and flashy combinations. The same may be said of any changes in body, fenders and other details—the standard as turned out by the factory will always appeal more readily to average taste.

For repainting a car of the two- or four-cylinder roadster or runabout type a price of $35.00 may be charged, while the larger models may be charged for accordingly. In repainting a car time is the essential—time to let each coat dry thoroughly.

The washing of an automobile, like the washing of a highly finished carriage, may ruin the finish if not done properly. The car should be thoroughly rinsed off with cold water by means of a hose, being careful not to get water on the ignition apparatus and wires. Until the mud has been thoroughly softened and rinsed off by the water, do not rub it, as the particles of sand and grit will scratch the varnish. After the dirt has been loosened and washed off, the carriage should be gone over with a coarse sponge (a large sponge is essential) and a fair quantity of good, soft automobile body soap. This removes the surplus oil and grease from the running gear and body and adds a luster to the finish. The soap should then be washed off with the sponge, together with the hose and cold water, after which the car should be rubbed perfectly dry with a soft, clean chamois.



A GENERAL SMITH SHOP OF INDIANA

A satisfactory anti-freezing mixture must offer protection against freezing down to reasonably low temperatures and must not injure any part of the mechanism nor cause any chemical action to take place, neither should it leave any insoluble deposits on the internal parts.

There are several excellent formulas for anti-freezing mixtures, and here is a good one: Equal parts of glycerine, wood alcohol and water. A solution of calcium chloride is cheaper, but must be used with caution, as too much will injure the radiator and other metal parts. Two and one half pounds of chloride to one gallon of water is about the proper proportion. A little glycerine, about one pound, added will tend to neutralize the injurious effects of the chloride.

A Simple Way to Remove Broken Studs.

M. A. SAVAGE.

No matter how much care is exercised in tightening a nut on a stud there are times when the studs break off short. It is no simple matter at times to remove the broken end so as to replace it with a new stud and the ingenuity of the repairman is often taxed. A simple way we find is to drill a hole exactly through the center of the broken stub end, care being taken not to injure the thread. After the hole is drilled a square, sharp-cornered, tapered punch is driven into the hole and then used to turn the broken stub out.

This method usually is effective, but if the stub is badly rusted in place it may be cut out with a chisel, extreme care being exercised in cutting so as not to injure the threads of the hole. By this means the shell of the stub, left after drilling a hole through its center, can be easily broken up and then removed with a long-nosed tweezers or pliers.

In fitting a new stud or in removing a whole stud it is, of course, important that the threads be uninjured. If pliers or pipe tongs are used to turn the stud injury to the thread is unavoidable. A good way and one that will not injure the threads is to use two lock nuts. Run the nuts on the stud and turn them tight against each other. Then if turning the stub in place use the top nut and if removing the stub place your wrench on the bottom nut and turn.

An Opportunity.

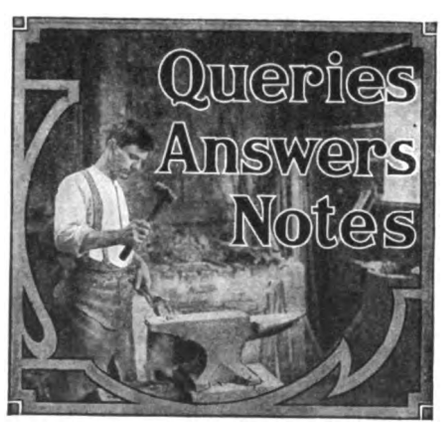
Your satisfied customers are your best advertisers when they advertise you. But—do they go out of their way to mention your name, your business or the quality of your work? You can make them advertise you every day in the year. You can make them advertise you willingly. Give your satisfied customers artistic, worth-having, worth-keeping calendars, with your business card neatly showing, and they will advertise you every day in the year in places that you cannot reach in any other way.

Give your customer something worth while for the privilege of hanging your business card in his office, his store or his home. The American Blacksmith calendar for 1910 is worth while. It is a worth-having calendar that is worth keeping. Fifty or a hundred with your name on them will help your business. They will be your calendars—customers will "go wild" about them. Better not wait too long before you order a lot for advertising your shop and business.

Smile A Few and Boost a Bit.

Here! you discontented knocker
Growlin' 'bout the country's ills,
Chloroform your dismal talker;
Take a course of liver pills.
Stop yer durn ki-o-tee howlin',
Chaw some sand an' git some grit;
Don't sit in the dumps a-growlin',
Smile a few
An' boost a bit.

Fall in while the band's a-playin',
Ketch the step an' march along;
'Stead o' pessimistic brayin,'
Jine the halleluja song.
Drop yer hammer—do some rootin'
Grab a horn, you cuss, an' split
Every echo with yer tootin',
Smile a few
An' boost a bit.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

A Shoeing Question.—I would like some brother to tell me how to stop a horse from hitting his hind hoof on top against the front shoe. I shoe one horse that almots wears through the wall of his foot.

H. E. P., Georgia.

Marking Tools.—An easy way to mark your tools is to etch your name on them with acid. Heat the tool gently and then sprinkle wax scrapings on the heated surface. Allow wax to cool and then, with a sharp steel point, write name or initials in the wax, cutting down to the metal. Then fill wax impression with one part nitric acid to two parts water. After a few minutes wash and remove wax.

F. R. S., New York.

A Letter from Pennsylvania.—I do all kinds of work—shoeing, wagon work, painting and buggy work and handle new buggies. The shop is 20 by 30 feet and two stories high. I have worked at the trade for eight years now and like it very much. Here are some of my prices:

New shoes, each	$ .40
Resetting "	.20
Buggy rims, "	.75
Wagon rims, "	1.00
Setting Tires "	.50
Filling new buggy wheels	2.50
Filling new wagon wheels	3.00

I am doing a nice business and run my shop alone. This is a good farming country. W. F. SHOOP, Pennsylvania.

Plow Beams and Malleable Iron.—To set a plow beam, first set your plow on the level floor and then set the beam so that the front end of it measures fourteen inches from under side of beam to floor. This for a fourteen-inch plow, while for a sixteen-inch it should measure fourteen and a half inches. For a steel beam heat back about a foot from the front end and spring it down to the required point. The beam should also run to the right about two and a half or three inches and line up with the land side. This wings the nose to land in both wood and iron beams.

To weld malleable iron and cast steel I use Cherry Heat-Welding Compound with good success. B. HARNISH, Iowa.

Repairing the Big Fly Wheel.—In reply to our Australian brother would suggest the following method for repairing that fly wheel. Place the wheel on its side on the ground and then dig a hole, directly under the break, about six or seven inches deep. Start a good coke or charcoal fire in this and pile live coals over and on top of the break. If you have one, use a hand bellows for producing a blast. When the parts are hot enough proceed in the usual way with the brazing.

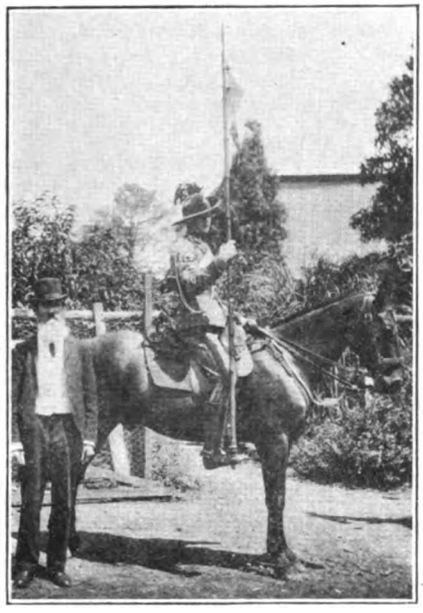
If you can secure oil for fuel, use a pressure oil burner for heating. This is much simpler and the heat can be more easily watched. In both cases it is necessary to build a housing of fire brick around the break to confine the heat.

If you cannot apply either of the above methods I would recommend the Thermit method of welding.

R. A. RICHARDS, New York.

Salt as a Hoof Remedy.—Brother Craig, of Canada, wants a good hoof remedy, one he can apply to disinfect and sterilize punctures, wounds and the like in horses' feet. Now, if I were given to making great displays I would probably tell about some mixture of peculiarly named drugs, but I just want to recommend a good, homely remedy—salt. I've used it for bad cuts, for nail wounds, for punctures and for most everything that happens to a horse's foot and results in a cut or abrasion. I've pulled

fair-sized bolts out of horses' feet, have cut away the outer horn, dampened some clean, common salt and forced it lightly into the wound. Then apply the bandage. This is



TWO AUSTRALIAN ADMIRERS OF OUR JOURNAL

simple, yet more effective than lots of patented and complicated remedies. The salt has a faculty of working upward into diseased parts and cleansing them out.

Turpentine is also a good remedy and some horsemen prefer it, but I don't consider it any better than the salt for the above purposes. L. M. MARTIN, Ohio.

Brazing and Smithing.—I would like to see some articles on the brazing of cast iron. This is a very important item with me, as we do lots of brazing and have found it to be very profitable, and it also brings other work a long way to our shop. We do not turn any job away or tell a customer it can not be repaired. If it cannot be welded we braze it. We can put steel or wrought iron or brass to cast iron and guarantee it not to break in the same place. This brazing is a very nice thing. If we were in a big town like Chicago or Philadelphia you boys could take all the blacksmithing while we took the brazing of cast iron. We can make seventy-five dollars off of a four-dollar investment. I would like any of you boys to show me where you can do that in any other work of any kind in the shop. We are now trying to get more brazing, and if we do you boys will get our share of the blacksmithing. We should like to hear from some of the other boys. Write on brazing and we will tell how to do the work in our next. If there is anybody wants to ask questions we will answer them.

S. J. PEMBERTON, Kansas.

About "Our Journal."—A few words for THE AMERICAN BLACKSMITH Company, the President, the Editor and the Manager. I think and know your journal is one good monthly blacksmith helper. It's not only a good guide for a good mechanic, but also for the man that learned his trade in six months and thinks he knows it all. You have been asked many questions from these six-months mechanics and I think you are doing a lot of good for them. Also, it's a grand good journal for the manufacturing company.

I was a subscriber for "Our Journal" in Troy, N. Y., and I found it a pleasure to have your paper to read. After I sold out in Troy I went to Colorado and was there about two years, and I found it there in the shops, and it was sent to me at Center, Colorado. Then I came back to New York State in June and bought out a man who did a little repair blacksmith business. I moved the old shop back, built a new one in front and with the old and new shop it gives me 20 by 55 feet of space. I haven't it finished, but I am doing business just the same. I expect to make this my home hereafter, unless something better turns up. I will close, hoping to receive the journal as I have before. W. B. ABELL, New York.

A Letter from Australia.—I have not had a week's vacation in the last twenty-eight years. In 1881 I had one. That was the week before I started business in this suburban town. Now I would like a holiday and have a trip around. I want to sell out—property, business and all—or take in a partner. A great business can be built up here in motor cars and coaches, and I have the pick of the shoeing around the city, with tip-top prices.

I like your paper, as there is a good deal of originality about it. I am sure it is a great boon to young smiths and aged ones, too. We are never too old to learn. I was farrier at a veterinary college in Edinburg, Scotland, at twenty-four years of age. I learned all about shoeing, bad feet, etc. I followed up my study after starting for myself, attended night classes at Technical College and night classes at University College on veterinary science and pharmacy, etc.

This is the best country under Heaven today if the rulers would let it alone. Too many laws and too many lawyers. However, the laws rather favor me in many ways. Here we can work at any hour. There are four boys and five girls, living, in my family. Eldest, close on twenty-two, is a farrier in the New South Wales Lancers, the crack regiment.

If a man with a connection in U. S. A. got here, many things could be imported from there, and so on. There's a great field for horse and cattle medicines and poultry species, etc., also for motor car building and repairing. The number on this road keep on the increase monthly. They are just starting their manufactures.

I have now at Rudder's office, in Sydney, ten cwt of machine-made shoes from the firm of John Pender, Brunswick, near Melbourne. The Penders are Canadians and started with horseshoe nails and bolts some years ago. Now, they put down thousands of pounds' worth of machinery, manufacture shoes and work up old shoes.

P. DOLAN, New South Wales.

A Question on Automobile Work.—I would like to have the following question answered: What is the trouble in a single-cylinder car of ten or twelve horsepower that is said not to have power enough? I worked over the machine until the owner said the power was good, but after he ran it three or four times it went back in the old condition again, that is, it will only run several times in good shape after repairing. I changed the spark lever so that when the engine is on its highest compression point the lever is as far back as I can get it to



MR. P. DOLAN AND FAMILY, OF NEW SOUTH WALES, AUSTRALIA

make its spark. In other words, when the engine is on its highest compression I made the spark just as early as I could so the engine would not kick back, and I wish to know if this is right. After I tried to get this car to run right and keep on running right, but failed, the owner took it to another repair shop and that fellow claimed the valves were out of order. He set them and also changed the spark back as in the first place, so that when it was on its highest compression you could advance the spark almost half way in the segment before it would spark, thus making the spark a good deal later than I had it. Tell me if I had that spark right or the other repairman. The same old trouble of not enough power was apparent after the second time the machine was run when it came back from the other shop. Will someone explain through THE AMERICAN BLACKSMITH the right way to set the valves on a two-cylinder car, twenty-two horsepower, and explain how to give or change the air on the Kingston carburetor. C. C. HOLLINGER, Ohio.

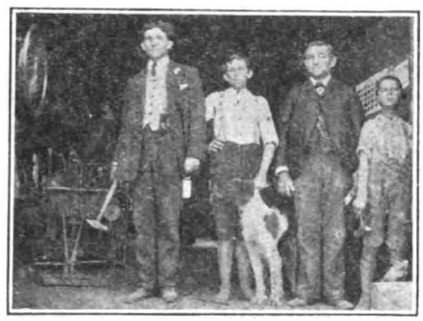
Cold Setting and Other Things.—In the June issue "Old Timer" talks about cold tire setting, claiming the same to be a success if the machine is operated by the right person. I do not believe that the best workman that ever set a tire can, in some cases, do a first-class job with a cold tire setter. Every one that has any knowledge of tire setting has often noticed when a tire is removed that the spokes stick through the rim, sometimes one sixteenth of an inch or more. This has to be cut off in order to make a good job. How can you do this without removing the tire? Another thing for consideration is the fact that when a tire loosens up sand and dirt get in between the tire and the rim, and you doubtless have noticed in other cases rust on the inside of the tire. When the tire gets loose this will dislodge and fall out, and no matter how tight you set the tire there will always be some openings between the rim and the tire.

I have set a lot of tires in cold machines, and while I have taken the best care to do a good job I have failed a good many times on the above-mentioned account. Above, I said that a man cannot do a good job with a cold tire setter, but I take it back, because, if you remove the tire entirely from the rim and cut off the spokes you can slip the tire back on again and then set it cold and do a good job, but this way does not save very much time.

THE AMERICAN BLACKSMITH is fine and I would not do without it. I have been in this place a little over a year. Things were in a bad shape when I came, but have everything in pretty good order now. I wish I could put on a hundred and thirty-six shoes a day. "Gee," wouldn't I be making money here in the winter time! but I have not enough "hot" wind about me to accomplish anything so great. I picked up the December issue for 1908 a while ago and noticed a brother in Kansas works in the shop three hundred and sixty-five days a year. Now, Sam, change your habits and take your wife to church on Sundays and work six days of the seven. That's what I do and everybody calls me a good boy. A. W. SWANSON, Iowa.

A California Letter.—I am in the southeastern part of the state and close to the line of Nevada, and we depend mostly on the mining industry around this community and Nevada, although there is a good deal of farming here as well. In regard to wages, I have been paying $4.00 per day for first-class smiths, or $3.00 and board. For a poorer class of smiths I pay less, say from $2.75 to $3.50 per day, and they board themselves. Board costs from $22.50 to $30.00 per month. This country has been very prosperous for the last six or seven years, or ever since the Goldfield and Tonopah mines were struck, and we are near enough to them to derive a great deal of benefit from them.

We are somewhat locked in here, as there is only a little narrow gorge railroad and only runs about fifty miles south of this place and then turns around and goes back,



MR. J. L. MONCLA AND HELPERS, OF LOUISIANA

and this makes our freight very high for the distance it is hauled.

The kind of blacksmith work done in this valley is from the very heaviest wagons that have 4-inch steel axles, 1¼ by 8-inch tire and down to the lightest ⅞-inch axles, buggies and all kinds of farming implements, mining tools and machinery, automobiles, bicycles, traction engines, baby buggies, plumbing, gun repairing, tin smithing and all kinds of woodwork, painting wagons and buggies. We also have a variety of shoeing here, from the largest draft horses, who take the largest shoes, and mules who have bad dispositions, down to the smallest burros that take shoes about the size of a dollar piece. I have a Barcus horse stock, which is a very fine thing for this part of the country, as we have lots of bad actors here. I have a five-horsepower Fairbanks-Morse gasoline engine which has certainly proven to be a good one, as I have had no trouble with it so far. I have a band saw, a buzz saw, a planer, an emery stand and a drill press that are all run by this engine. My shop is 26 feet wide and 70 feet long and an engine room on the end. I have to keep a good big stock of material on hand in the shape of hard wood, timber, iron, shoes, coal, nails, chain and other things too numerous to mention. I am compelled to keep this material for the reason that it takes so long to get material in here. The prices we get here for blacksmithing are rather low for the prices we have to pay for our material and wages, and one has to figure very close every way to make it pay at all, and there is not enough work of either one of these lines that I have mentioned to pick one out and make a specialty of it, as it takes the whole combination to keep my shop going. J. H. KISPERT, California.

A Louisiana General Shop.—The accompanying engraving shows my shop with myself and help standing in the doorway. The shop is 40 by 40 feet in size. I use an eight-horsepower steam boiler and engine and my machine equipment consists of one band saw, a lathe, a drill press, a spoke machine, a tire shrinker, a rip and cut-off saw, a tenoning machine and a hub-boring machine. I also have a Champion Blower and a good assortment of small tools. I build wagons and carriages and do general repairing and horseshoeing. I have been in business about seven years and always have plenty of work. I also do work on guns and bicycles. J. T. MONCLA, Louisiana.

A SHORT STORY OF HENRY MAUDSLEY.*

The Originator of Modern Tools.

Henry Maudsley was the originator of modern machine tools. He came of an old English family who had their seat near Ormskirk, but who became scattered during the eighteenth century. William Maudsley, father of Henry, was a joiner, working in the neighborhood of Bolton. He got into some trouble and joined the Royal Artillery, to be sent soon afterward to the West Indies, where he was badly wounded. He was sent home and afterwards discharged, but, being a handy workman, was soon employed in the arsenal. Here he was married and Henry was born in August, 1770. When twelve years of age he was sent to work filling cartridges, and two years later he was set at work in the carpenters' shop. His heart, however, was in the nearby blacksmith shop, and after several reprimands for neglecting his work he was transferred to the smithy when fifteen years of age.

His heart was in this work and he rapidly became an expert craftsman, especially in forging light iron work, and in the use of the file he soon surpassed all others.

At this time Joseph Bramah had taken out patents for improved locks of the now well-known tumbler type. These were a great improvement over previous locks. Bramah challenged any one to pick a lock of his manufacture and the challenge was unaccepted until fifty years later, when Hobbs, an American expert, after sixteen days of effort, finally succeeded.

This lock was so delicate a mechanism that he found difficulty in securing workmen skillful enough to make them. Maudsley was recommended to him, but when Bramah saw how young he was, at that time only eighteen, he hesitated to employ him. His need was so great, however, that he finally hired him. When Maudsley presented himself for service a new difficulty arose. He had not served the requisite seven years of apprenticeship and the other workmen refused to receive him.

Maudsley himself solved the difficulty by proposing the repair of a worn-out and broken bench vise before six o'clock, and if his workmanship did not commend him he would withdraw. His success was complete. The most exacting of the workmen acknowledged his skill. The tact and good sense thus early shown were characteristic of him in all his relations with his workmen.

Maudsley soon proved himself to be the

*Copyrighted by Wyman & Gorman.

most skillful of them all. It is interesting to note that the very padlock that fifty years later withstood the American expert for sixteen days was one made by Maudsley's own hands when in the employ of Bramah.

He had the surest eye and the best judgment in undertaking any new work, and it was more and more referred to him.

Notwithstanding his youth, he was advanced from place to place until, by unanimous consent, he was made the head foreman.

Maudsley saw at once that it was essential if the locks were to be manufactured in any quantity that the parts must be made by machines that would be independent of men's carelessness. Skilled hand work could make a few, but the number was limited, the expense great and the merit very unequal. He became especially useful in designing special tools for making the patent locks. Smiles says: "In this department Maudsley was eminently successful, and to his laborious ingenuity, as first displayed in Bramah's workshops and afterwards in his own establishment, we unquestionably owe much of the power and accuracy of our present self-acting machinery"

Another of his inventions that alone should bring him fame was the leather self-tightening collar for packing hydraulic presses. It was Bramah again who patented the press, but its usefulness was nullified by the packing necessary to withstand the enormous pressure. It was Maudsley who designed the leather cup that clings the closer with added pressure, but without noticeably increasing friction.

Maudsley staid with Bramah eight years with but slight increase of wages, and when he at last asked for an increase was refused so brusquely that he resigned, and in 1797 opened a small shop of his own, near Oxford Street. Little by little, work came to him and every task was so nicely done that it invariably brought him new work. Maudsley continued to apply himself to the invention and improvement of tools that would insure precision of work and make him, in a measure, independent of the carelessness of workmen. It was in this endeavor that he brought to perfection that great improvement with which his name is usually connected, the invention of the slide rest. The first he ever made was while he was still at Bramah's shop, but with his additional improvements he brought the lathe, for the first time, to be a machine of precision and laid the foundation for the success of all our modern machine tools. Before this nicety of construction depended altogether on correctness of eye and manual dexterity, with consequent high cost and unequal merit. Thereafter followed that correctness, uniformity and economy that has increasingly marked the machine construction of the nineteenth century.

One of the early tasks that came to Maudsley was brought by Brunel. He had been granted a patent for tackle blocks, which had been adopted by the admiralty. Maudsley's high reputation came to Brunel's attention and he was engaged to perfect the machinery for their manufacture.

Maudsley, who was a fine draftsman, made the drawings and the working models in 1801. Before beginning construction he removed his shop to Margaret Street. The whole of the machinery was there constructed by Maudsley. It took six long years and was not ready for operation until 1808. It required no less than forty-four different machines to do the work, every one of which embodied some more or less radical invention and improvement by Maudsley. These machines were in regular employment at the Portsmouth dockyard for upwards of fifty years.

The success of this block-making machinery brought Maudsley added fame and prosperity.

He moved again, this time to Lambeth, and took in a partner in 1810, the company thereafter being known as Maudsley & Field. They made many and various kinds of machinery; flour mills, saw mills, mint machinery, machine tools and engines of all kinds, especially marine engines. A patent granted in 1807 for improvement in steam engines, specified, among other things, the now common pyramidal type of marine engine, with direct connections from piston to crank. He invented a machine for punching boiler plates, and continued to improve the lathe as long as he lived. He made some large machines, but he took the greatest interest in machines of delicacy and precision.

His love for accuracy early led him to give thought to improvement in screw-cutting. He made a machine for cutting original screws and from that made the first screw-cutting lathe. He also took the first steps for securing uniformity and standard pitch.

Like all good workmen he took great pride in keeping his tools in good order and condition. Every machine to which he gave thought came from his hand simplified, improved, and with the impress of his personality upon it.

But that for which Maudsley is most worthy of remembrance is not the machinery he built, but the men he trained. His exceedingly attractive nature, his tall, fine presence, his genial ways, bound men to him; not only his friends, but his workmen loved him as a man, while honoring him as a master workman. It was quite natural that there should gather around him a group of assistants who were young men of ability and worth. In fact, his shop came to have a reputation all over England as the place for securing the best mechanical training. It was with him that such men as James Nasmyth, Sir Joseph Whitworth, Joseph Clement, and a host of others received their training. This training was not in mechanics alone, but in the wise comments and advice that fell from his lips, and, like seed falling in good ground, sprang up in the years that followed in the able life of his "boys."

He had his friends also, among the foremost scholars and scientists of the day, who made his private workshop a favorite rendezvous. From his shop radiated an influence that is plainly seen in the wonderful development of mechanical engineering in England from his time on. Under his training such men as Nasmyth, Clement and Whitworth, and others received their training and from them his influence passed on to Sellers and Colt, to E. K. Root and Francis A. Pratt, to shape also our American practice.

In personal appearance he was of commanding stature, six feet two inches tall, and massively built. He had a high forehead, eyes bright and keen, lips expressive of good humor, but strong and alert. He was cheerful, honest, intellectual and energetic.

He went to France to see a friend who was very sick, and on returning caught a severe cold, from which he died in 1831.

DWIGHT GODDARD.



THE ELECTRICALLY-OPERATED SHOPS AND THE HOME OF MR. GUY THOMAS, WASHINGTON STATE

A General Shop of Washington State.—The accompanying engraving shows my shops and also my home, which is at the extreme right of the picture. The general shop is 20 by 65 feet and the shoeing shop is 16 by 30 feet. The lot upon which my buildings stand is 150 by 140 feet. The shops are run and lighted by electric power and I also have electric lights in the house. This is a good wheat-raising section and we do all kinds of general blacksmith work.

GUS. THOMAS, Washington.

The Tires for Satisfaction

Goodyear Wing Carriage Tires and Goodyear Eccentric Cavity Cushion Tires with canvas guides are tires that wear—that give satisfaction and increase the dealer's trade. For all

GOODYEAR

tires are made of new, pure rubber, not of reclaimed "rubber" from the junk heap, nor any low grade. They sell easily because they save the user money—which pleases him—and he tells his friends.

Write today for free booklet showing how Goodyear Carriage Tires are built. Ask for sample section.

The Goodyear Tire & Rubber Co., Carr St., Akron, O.

Boston	Philadelphia	Chicago	Buffalo	Pittsburg
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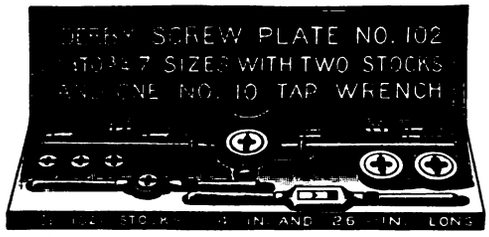
DERBY SCREW PLATES



are known for their uniform accuracy and strength. The careful mechanic relies on them for perfect work. If you're not using Derby tools ask your dealer for them the next time you buy. They will satisfy.

Write for COMPLETE CATALOG of up-to-date screw-cutting tools. Sent Free.

BUTTERFIELD & CO., Derby Line, Vt., U. S. A.

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For 30 Days Only

Mail us this coupon and $1.00 and we will send you prepaid, 2 pair of our Fibre Pads for sample trial —any size up to No. 4.

AMERICAN FIBRE HORSEPAD CO.

355 Ellicott Square *Buffalo, N. Y.*

Cut out along dotted line.

Why You Should Use This Pad

Will Not Slip on Wet and Greasy Pavements

If samples are satisfactory order through your jobber

SPECIAL INDUCEMENT TO JOBBING SALESMEN

Does not heat the hoof like rubber, is lighter and wears longer.

GUARANTEED

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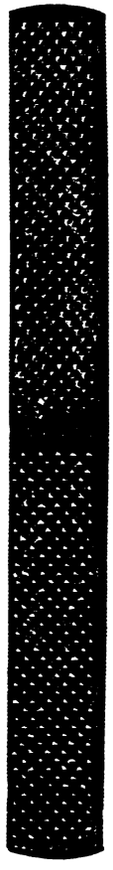

SUPERIOR
HORSE RASPS
THE BEST YET

Best High-grade Steel,
Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

EVERY RASP PERFECT AND WARRANTED

Made in all regular sizes, and in the new 18-inch Slim, which gives the user the advantage of a long stroke, and at the same time a rasp of medium weight.

ASK YOUR DEALER FOR THEM

Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, Oct. 14, 1909, and are subject to fluctuations. Corrected for **The American Blacksmith** by The National Heavy Hardware Reporter, Chicago.

Except for iron and steel no changes in quotations are reported by correspondents.

Jobbers report difficulty in getting deliveries of steel and that mills are from six weeks to two months behind. The mills report plenty of business and do not hesitate to turn down specifications which are wanted promptly. Trade is reported as better all along the line, and while collections have improved they are not as good as they should be.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—
$1.90 rates full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$1.90 rates, full extras.

Toe Calks—	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—	
6 x ½ and smaller	60–10%
Larger and longer	50%

Machine Bolts—	
4 x ½ and smaller	60–10%
Larger and longer	50%

Nuts—	
Less than 10 lbs. of a size	$2.50 off
From 10 to 50 lbs.	3.00 off

Washers—	**Skeins—**
Same price as nuts.	Cast 65%

Malleables—	**Half Patent Axles—**
Common $ .09	65%

Springs—	
Single Spring, each	$1.25
Springs, black and half bright	.06

Hickory Lumber—Per Foot—	
1 to 2½	$.09½
2½ to 4½	.11

Ash and Oak Lumber—Per Foot—			
1–1½	$ .07½	2½–3	$.08½
1½–2	.08	3½–4	.09½

Yellow Poplar Lumber—Per M. Feet—	6 to 12	13 to 17	18 to 24
½"	$65.00	$65.00	$75.00
¾"	65.00	68.00	80.00
1"	68.00	75.00	85.00
1¼" 1½" 1¾" 2"	72.00	80.00	104.00

Rough Hickory Axles—	Each.
3 x 4 6 ft	$ .60
3½ x 4½ 6 ft	1.00
4 x 5 6 ft	1.20
5 x 6 6 ft	2.20
4 x 5 6½ ft	1.30
4½ x 5½ 6½ and 7 ft	2.00
5 x 6 6½ and 7 ft	3.00
5½ x 6½ 7 ft	3.50

Finished Hickory Axles—	
For 2½ and 2¾ Skeins	$1.00
For 3 Skeins	1.20
For 3¼ Skeins	1.45
For 3½ Skeins	1.60
For 3¾ Skeins	1.95
For 4 Skeins	2.25

Rough Oak Bolsters—	
Short	$ .08
12–14–16 ft.	.09

Finished Oak Bolsters—	
2¾ x 3¾ and under	$ .65
3 x 4	.70
3¾ x 4¾	.90

Rough Oak Wagon Tongues—	
4 x 4 x 2 x 4 x 12 and smaller	$1.00

Finished Oak Wagon Tongues—	
3½ and smaller	$1.25
3¾	1.30
4	1.40

Two Inch Sawed Hounds	Per Pair.
Tongues	$ .40
Front	.45
Hind	.55

Patent Wheels—	
A. B. No. 13 and under	45 %
D. No. 13 and under	35–5 %
All Grades, No. 17 to 33	35–5 %
All Grades, No. 39 and Larger	25–5 %
C. No. 13 and under	40–2½ %

Cupped Oak Hubs— Set.		**Plain End Oak Hubs-** Set.	
7 x 8 x 9	$1.40	10 x 14	$3.45
7 x 9 x 10	1.60	11 x 14	4.50
8 x 9 x 10	1.65	11 x 15	4.75
8 x 10 x 11	1.90	11 x 16	5.35
9 x 10 x 12	2.05	12 x 16	6.00
9 x 11 x 12	2.10	12 x 17	6.55
10 x 12 x 13	3.20	13 x 18	7.50
11 x 13 x 14	4.45		
12 x 14 x 15	5.35		

Rough Sawed Felloes-			
1½ x 2 "	$1.55	2 x 2½"	2.00
1¾ x 2½"	1.75	2½ x 2 "	4.75
1¾ x 2¾"	1.85	3 x 3 "	5.75
3 x 3½"	6.00		

Ironed Poles, White, XXX—	
1¾ x 2½" No. 2	$4.00
2 x 2½" No. 3	4.00

Ironed Shafts, White, XXX—	
1⅜" x 2 " and smaller	$2.15
1½ x 2 "	2.35
1½ x 2½"	2.90

Farm Wagon Bows—	
Round Top, ½ x 2 "	$ .65
Flat Top, ½ x 2 "	.80
Round Top, ⅝ x 2½"	1.40

Standard size Piano Bodies with Seats—	
Each	$4.25

Plow Beams—	
1 Horse	$ .70
2 Horse	.85
3 Horse	1.00

All Hickory and Oak Spokes and Patent Spokes-	
Discount from Weis & Lesh List No. 5	5%

Wagon Neck Yokes—

	Mixed Forest	Second Growth	White Second Growth
2½ x 38"	$2.15	$2.95	$4.25
2½ x 42"	2.90	4.05	5.50
2¾ x 46"	4.40		
3 x 44"	4.70	6.95	8.90
3 x 48"	5.50	7.85	10.50

Single Trees—Oval—

	Mixed Forest	Second Growth	White Second Growth
2½"	$1.60	$2.90	$3.50
2⅝"	1.70	2.95	3.60
2¾"	1.80	3.05	3.80
3 x 36"	2.45	3.55	4.20
3 x 38"	2.50		
3 x 40"	2.65	4.00	4.85

Single Trees—Round—

	Forest	Second Growth
2½"	$2.10	$3.60
2⅝"	2.10	3.65
2¾"	2.15	3.75
2½"	2.85	4.25
3 "	3.45	4.80

Oval Plow Doubletrees—		**Flat Plow Doubletrees—**	
2¾ x 36"	$1.75	1¾ x 3½ x 42"	$3.00
3 x 40"	2.55		

Wagon Doubletrees—

2 x 4 x 48"	$3.60
2½ x 48"	4.80
2½ x 4½ x 50"	5.20
2½ x 4½ x 52"	5.60
2½ x 5 x 52"	6.40
2½ x 5 x 54"	7.20
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—	Forest
2½ x 30" and under	$1.00
2¾ x 30" and under	1.25

Buggy Doubletrees—

	Mixed Forest	Second Growth	White Second Growth
2½" and smaller	$2.65	$3.65	$4.65

Express Doubletrees—

	Mixed Forest	Second Growth	White Second Growth
2½"	$2.95	$3.65	$5.00
2¾"	3.55	4.15	5.50
3 "	3.55	4.30	5.75

Express Singletrees, Turned—

	Mixed Forest	Second Growth	White Second Growth
2½"	$2.50	$2.65	$3.75
2¾"	2.90	3.65	4.00
2½"	3.50	4.00	4.75

Express Singletrees, Square Center—

	Mixed Forest	Second Growth	White Second Growth
2½"	$3.00	$4.15	$5.25
2½"	3.50	5.45	6.00

Buggy Neck Yokes—

	Mixed Forest	Second Growth	White Second Growth
2 x 42"	$2.75	$3.50	$4.50
2½ x 2¼ x 42"	3.15	3.75	5.45

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Blacksmith and Wagon Makers' Supplies,
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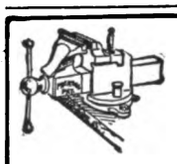
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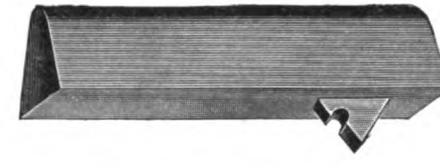

you can see at a glance is better than the old style. You see the advantage of the new point. It is the best calk made because it cannot twist, and will not split the shoe. Easy to drive. Welds perfectly, and cannot drop off in the fire.

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WANTED—Mechanics to use and sell my graduated Calipers; best proposition out. Catalog free.
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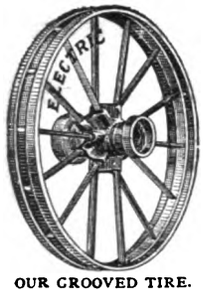

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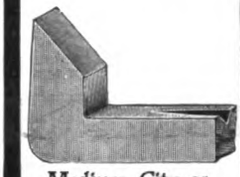
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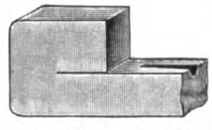
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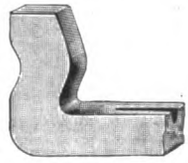
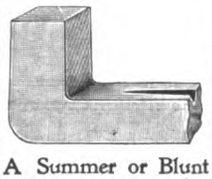

A Blunt Philadelphia Kink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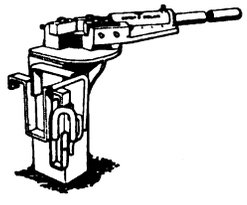
Trade Literature and Notes.

THE AMERICAN FIBRE HORSE PAD, advertised in THE AMERICAN BLACKSMITH for the first time on page 27, presents new features in pad constructions and is very different from the every-day rubber pad. Its manufacturers, The American Fibre Horse Pad Co., 335 Ellicott Square, Buffalo, N. Y., make the following claims for it: The small amount of rubber in it prevents it heating the hoof. The wood pulp and fibre in it make it rough and prickly until worn out; also make it cling to greasy pavements when the rubber slips. It is light, elastic and will outwear other pads. Their advertisement makes a special offer to horseshoers for sample pair.

ESTEP & DOLAN, Sandwich, Ill., manufacturers of hand-bending machines, have recently placed on the market an angle bender considerably larger than those previously listed by them. The machine is especially designed for bending large



stock cold, such as rods (round, square and twisted stock), for reinforcing concrete work, etc., and it is reported as meeting with much favor wherever introduced. It will bend stock cold up to and including 1¼-inch, round or square to right angle, and by using higher dies than the regular for rounds and squares will bend ½ x 4-inch stock cold.

The manufacturers state that this bender is substantially made, has wonderful leverage, is portable, covers a wide range of work and possesses more points of advantage for heavy hand work than any machine yet produced.

THE MYERS LOCK STITCH SEWING AWL. In this issue will be found the announcement of the C. A. Myers Co., Woodlawn Ave., Chicago, Ill., describing very clearly their awl for sewing leather. Every blacksmith shop can use one of these awls, because it often happens that a customer breaks a bit of harness and this awl will repair it very quickly. Readers would do well to send for their booklet A. B., giving full particulars, which will be forwarded free of charge. Blacksmiths can act as agents for the sale of this little awl to advantage. Every farmer—in fact, every man who owns a team finds them very useful.

THERE HAS JUST COME INTO OUR HANDS a very attractive catalog issued by Wells Bros. Co., Greenfield, Mass., containing a full description of their Little Giant tools. They will be very glad to send this catalog to anyone mentioning THE AMERICAN BLACKSMITH.

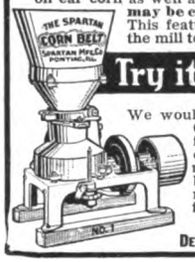
FAIRBANKS, MORSE & CO. have just issued a new catalog of wood and steel windmills. The theory and details of constructions are analyzed and published in this book.

Pumping Systems and the new "Femco Underground Force Pump" are described in detail. The technical information and practical suggestions contained in this book ought to be read by all of those interested in windmill pumping.

Send to Fairbanks, Morse & Co., Chicago, Ill., for a copy of this catalog, mentioning THE AMERICAN BLACKSMITH.

CORN BELT MILL

This mill is strongly constructed, and takes less power than any other mill of its capacity. The lathe-centered burrs insure fine, even grinding. The new feed regulator gives perfect regulation on ear corn as well as small grain. **The burrs may be changed in three minutes.** This feature is worth the price of the mill to a good many.



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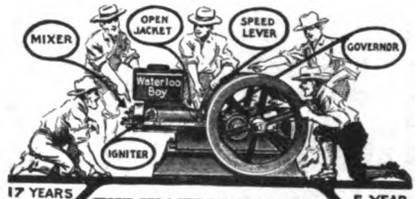
THE PARRY MANUFACTURING CO., Indianapolis, Ind., have just issued what they claim to be the best example of the printer's art in a vehicle catalog ever published, and the goods described have a reputation for equally high quality. This catalog is beautifully illustrated in colors and is printed on the finest paper. We believe that our readers would like to have this catalog for their own reference or to show to their customers and would suggest that they write The Parry Mfg. Co., mentioning THE AMERICAN BLACKSMITH.

THE FIRESTONE TIRE & RUBBER CO. have issued a new booklet, 24A, prepared with much taste and care, giving a detailed account of the way in which they get their rubber and its manufacture into tires, etc. This booklet should be interesting to our readers, and The Firestone Tire & Rubber Co., Akron, Ohio, will be very glad to send it to any reader free.

THE METZ PLAN CAR CO. have an unique method of selling automobiles in installments. We have just received a most attractive pamphlet, giving the proposition in detail. Their plan makes it possible to get an auto at minimum cost, and places it within the reach of all. You can make these cars yourself and sell them to your customers at 100% profit. This should interest most of our readers, and we would suggest that they write us for complete information.



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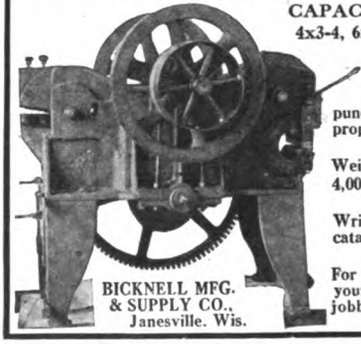
BICKNELL'S IRON EATER

CAPACITY 4x3-4, 6x3-8, and punches in proportion.



Weight 4,000 lbs.

Write for catalogue.

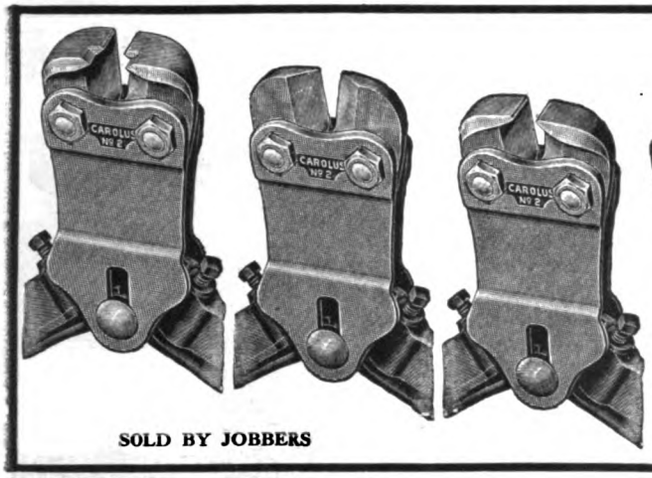
For sale by your jobber.

BICKNELL MFG. & SUPPLY CO., Janesville. Wis.

CAROLUS MFG. CO. Our readers will notice that The Carolus Mfg. Co., of Sterling, Ill., have resumed their advertisment in THE AMERICAN BLACKSMITH. It would probably pay to write for their free catalog, A. B., of bolt clippers and nut splitters, of which they carry a most comprehensive line.

New Books.

METAL SPINNING, by Prof. F. D. Crawshaw, eighty pages, 33 illustrations, cloth. Price, 25c. This is said to be the only book published on the art of metal spinning. It is a working manual of explicit instructions which is concise, yet complete and adapted to the use of manual training and industrial schools, as well as those who desire to spin metal as an art creation, or to followit as a trade.



SOLD BY JOBBERS

CAROLUS



Nut Splitters and Bolt Clippers

Most Complete, Practical and Durable Manufactured.

MADE IN THREE STYLES

Enlarged views of cutting blades at left. Write for Circulars and Prices.

CAROLUS MANUFACTURING COMPANY

STERLING, ILL., U. S. A.

FOUR CENTS



THAT'S all it will cost you to advertise your business for twelve months—one whole year—to the man you want as a customer. We offer these calendars at cost.

The calendar is finished in ten colors and is 8 by 9½ inches in size, on heavy cardboard. The 1910 date pad is of harmonious tint and of convenient size. The picture is in full color, as in life, making a calendar unsurpassed as a means of advertising the shop.

The Calendars Will Bear No Advertising

except your own business card, of ten words or less. This will be printed very neatly at the top of the calendar in the space for that purpose. We offer these calendars to subscribers of The American Blacksmith only—you must be, or become, a regular reader before you can get any of these calendars. Offers 2, 3 and 4 present exceptional chances to become a subscriber or to pay your subscription well in advance.

(1) 50 Calendars postpaid (for subscribers only), $2.00
(2) 50 Calendars and one year's subscription, 2.50
(3) 50 Calendars and two years' subscription, 3.25
(4) 50 Calendars and four years' subscription, 4.00

In large lots at rate of $1.75 per additional 50. Write for special quotation if you want 500 or more.

The prices include printing your business card of ten words or less on each calendar, also packing and delivery charges.

But, Order Now, you may be disappointed if you wait.

Lots of "Our Folks" were disappointed last year—if you were one of the disappointed ones, send your order NOW and be sure of a supply.

Remit by Money Order, Express Order, Check or Registered Letter.

AMERICAN BLACKSMITH COMPANY

P. O. Box 974 **Calendar Department** **Buffalo, N. Y., U. S. A.**

We guarantee satisfaction or refund your money.

Buffalo Ball Bearing Blacksmiths' Drill No. 89

The planetary geared fly-wheel revolves at a speed three times that of a wheel keyed to the shaft. This

Multiplies Energy and Insures Smooth Running

Ball bearings practically applied reduce friction below any unit of measure. Increase the efficiency of power applied 50 per cent.

Long journal bearings bored and reamed in the solid metal of the frame, machine-cut gears, perfect fitting parts, insure easy operation, without noise, loose motion or back lash.

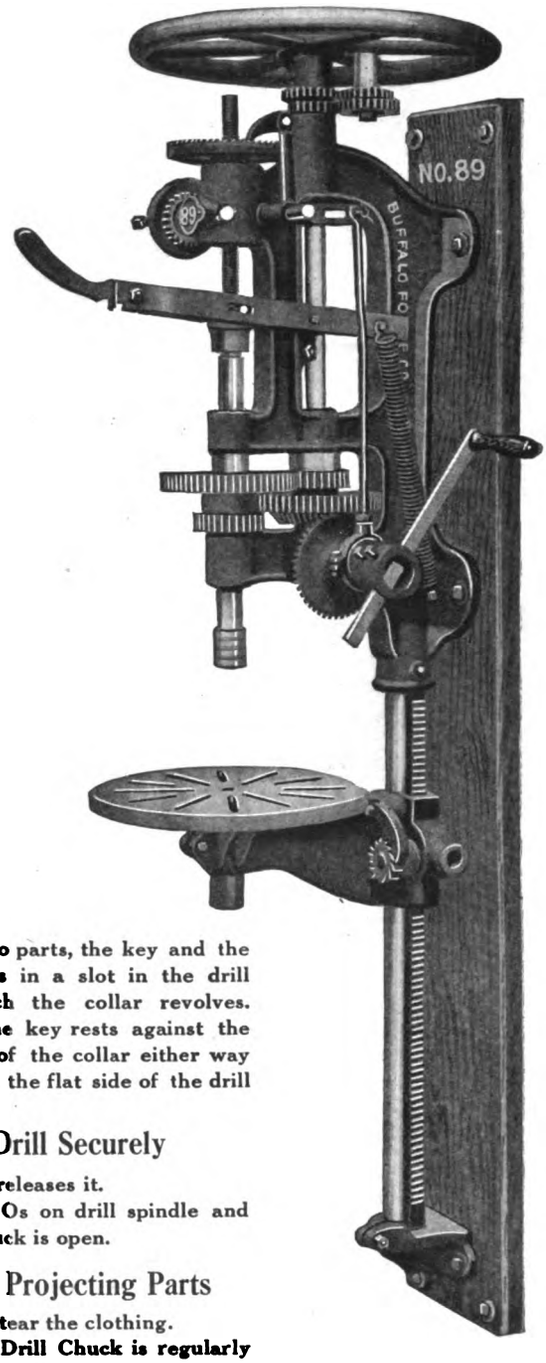
Instant, Full Feed Run Return of Drill

A half turn of the small wheel at the left of the feed screw head gives lever control, with instant return of drill spindle the full length of drill.

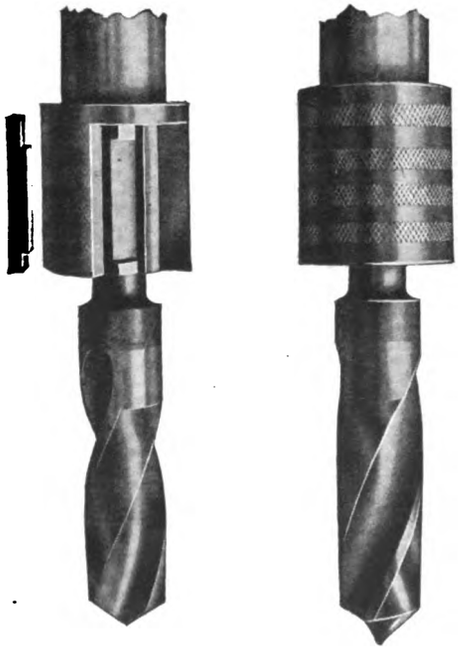
Drill a Hole, Let Go. You Are Instantly Ready for More

Turn the wheel back, it immediately and positively locks the power feed.

Equipped with Buffalo "Suregrip" Drill Chuck.



Buffalo "Suregrip" Drill Chuck



Consists of only two parts, the key and the **collar. The key rests** in a slot in the drill **spindle, around which** the collar revolves. **The outer side of the** key rests against the **collar. A half turn of** the collar either way **forces the key against** the flat side of the drill **and**

Locks the Drill Securely

until a half turn back releases it.

When in line the Os on drill spindle and **chuck indicate the chuck** is open.

No Screws or Projecting Parts

to injure the hands or tear the clothing.

Buffalo "Suregrip" Drill Chuck is regularly furnished on Buffalo Drills 89, 90, 94, 96, 98 and 99.

List Price, Separately, $2.00

Send today for New Blacksmith Tool Catalog No. 178 A. B.

Buffalo Forge Company
Buffalo, N.Y.

Ask your dealer for and insist upon "Buffalo" Tools. Look for the name, it's cast on every tool. If he does not supply you, write us. We will see that you get the right goods at the right price.

Air-Cooled Motors

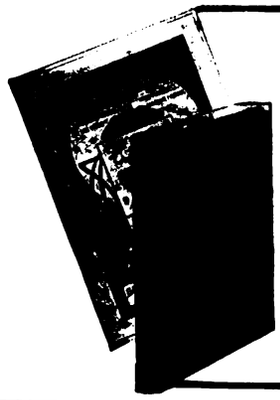


1 1-2 to 10 H.P.

THE BEST ON THE MARKET

Agents Wanted Write for Prices

The Air-Cooled Motor Co.
LANSING, MICH.



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Devoted exclusively to the gas and gasoline engine subject. It will tell you how to keep your engine running and save you money in expensive repairs. Its contents are of a semi-technical character that cannot fail to interest people operating or contemplating the purchase of a combustion engine.

PLAIN GAS ENGINE SENSE

Presenting the primary principles of Gas and Oil Engines in simple language—but supplying enough practical knowledge to successfully operate a gas engine.

Regular subscription price of Gas Power $1.00 a year.
Plain Gas Engine Sense sells for 50 cents a copy.

A special limited offer is now open of GAS POWER, one year, and one copy of PLAIN GAS ENGINE SENSE, both for $1.00.

Mail Orders at once to

Gas Power Publishing Co., 16 Court St., St. Joseph, Mich.

FOOS GAS AND GASOLINE ENGINES

FOR THE BUSY BLACKSMITH

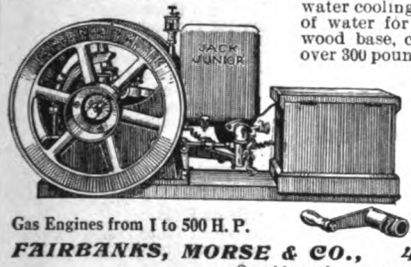
The man who wants an engine that is easy to start, simple to operate and cheaply maintained, should write for FREE BOOK No. 49, and learn why the Foos WILL SAVE HIM MONEY.

THE FOOS GAS ENGINE CO., Springfield, Ohio.

PERFECT ONE HORSE-POWER ENGINE

This great pumping or power engine is within the reach of every blacksmith's pocket book. At last blacksmiths can obtain a one horse-power high grade at a very low price. "Jack Junior" is a four cycle gasoline or kerosene engine with a hopper water cooling jacket, which does away with the large quantity of water for cooling required by other engines. Mounted on wood base, complete with battery, all ready to run. Weight, over 300 pounds. Don't confuse this sturdy worker with toy air cooled engines made merely to sell.

Fairbanks-Morse Engine



Jack Junior is as durable and reliable as the highest priced engines you can buy, and should give perfect service for years at less than 1 cent per hour for fuel. Will run any machine that does not require over one horse-power. **The livest proposition on the market for agents.** Send for catalog and agency proposition. Catalog No. 487 A H. Pumping Engines, Pumps, Pump Jacks, Electric Lighting Outfits, Saw Frame, Grinders, Shellers and Supplies.

Gas Engines from 1 to 500 H. P.

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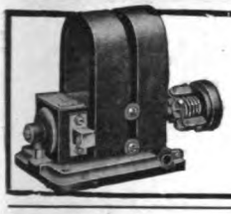
Or address the nearest one of our 27 Branch Houses.



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Will start and run your Gas or Gasoline Engine without the aid of batteries. Inexpensive and absolutely reliable for either make and break or jump spark ignition. Information sent on request.

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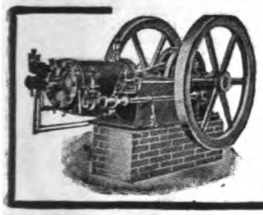

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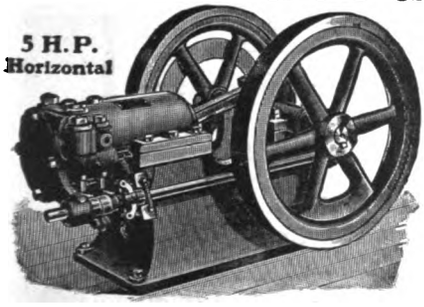
For the small power user there are no better engines made. Their construction combines strength, simplicity and economy. Backed by the most accurate workmanship, made of the highest grade of material, every part interchangeable, our engines give years of satisfactory service. Learn more about them. Our big illustrated catalog mailed free on request,

AJAX IRON WORKS, CORRY, PA.

LITTLE GIANT GAS & GASOLINE ENGINES

5 H.P. Horizontal



Sizes, 1½, 3, 4½ H. P. Vertical, 6 to 25 H. P. Horizontal. Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.

3 H. P. Vertical



Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 4 to 100 H. P. Special inducements to dealers as agents.

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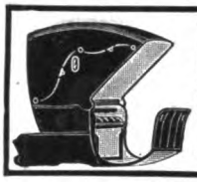
STEINER, the name that stands for big power at low cost. Here is our water cooled engine, with slipwater jacket, water cooled exhaust valve.



We build these in 3, 6 and 8-H. P. sizes. Also air cooled in 1½, 2½ and 3-H. P. sizes, Also Pumps and Jacks. *When writing state size wanted, etc. Catalogue free.*

M. STEINER & CO.,
242 S. Torrence St., Dayton, Ohio

Mention The American Blacksmith when you write.



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Send for Sample.

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When you want the best Foot Vise, Positive Grip, Automatic adjustment, instant release.

Full of good points. Write for full description and price.

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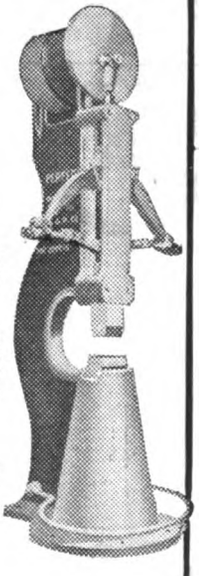

The Only Hammer Made with extra long guides, insuring a direct vertical stroke of the ram.

The Only Hammer Made with a disk attachment with a special anvil for sharpening plow and harrow disks.

Made in three sizes:

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3 " " " " 40 "
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Prices are right.
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To Find Address of any Firm given here, consult their advertisement.

For its location in this issue, see Index on Page 19.

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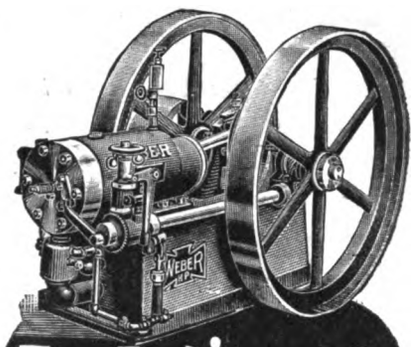

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The "EAGLE ANVIL" has taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always says: "Nothing but an Eagle for me." Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few years' use.

VISES OF MERIT

The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last a lifetime.

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base.

Write for our descriptive Anvil and Vise Catalog.

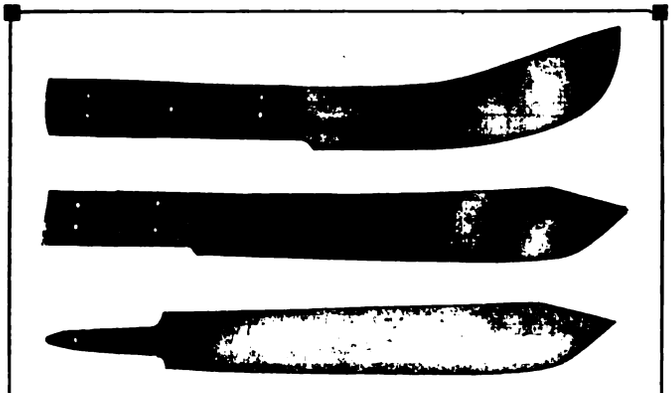
Our goods are handled by reliable dealers everywhere.



PARALLEL STRONG AND DURABLE.

FISHER & NORRIS, 33-47 Fair St., TRENTON, N. J.

BLACKSMITHS MAKE MONEY



HAND FORGED, WARRANTED KNIFE BLADES
Price to you, ONLY $1.50 per dozen. You sell at 50 cents each.
Knives finished complete, nicely polished, only $2.00 per dozen.

HAND FORGED

Butcher Knives

WARRANTED

YOU can make good money selling our HAND FORGED, WARRANTED KNIFE BLADES made especially for BLACKSMITHS, from the very best crucible tool steel, tempered by our special oil-drawn process, and ground ready for use. No marks or brand, excepting the word "warranted." Handles ready to be put on sent with each knife.

Send us your order TODAY for a few dozen and supply your friends and customers with the best knives they have ever used. You can also put out agents.

We warrant every knife and agree to replace each poor one with TWO good ones.

We refer you to the NUNDA BANK of NUNDA, N. Y., as to our reliability.

Providing you would like to see samples, send $1.50 TODAY and we will send you 12 of our best sellers, all shapes and sizes.

WOODWORTH KNIFE WORKS, NUNDA, N. Y.

Established 1876 ***F. E. WOODWORTH, Proprietor***

FOR STRENGTH, SAFETY, AND QUALITY OF MATERIAL

NORTHWESTERN HORSE NAILS
ARE THE BEST ALL AROUND
Perfection in form and finish. Made of the best Swedish iron
Union Horse Nail Co., Chicago, Ill.

Saves Figuring

You will not have to stop to figure out this or that dimension on a piece of work. Just refer to

FODEN'S MECHANICAL TABLES

This book gives Circumferences of Circles by eighth inches up to twenty feet, weight of Rectangular Iron, Round and Square Bar Iron, Angle and Sheet Iron, and other miscellaneous tables. Cloth Bound. Price, 50 Cents, Sent to any part of the world postage prepaid.

American Blacksmith Company, P. O. Box 974, Buffalo, N. Y., U. S. A.

YOUR LAST CHANCE

CANCELLED ORDERS—From a large carriage manufacturer that went into the hands of a receiver leaves on our hands a large stock of wheels of the following sizes. Here is your chance to get good wheels at low prices, but you must act at once.

Kind of Wheel.	Tread.	Grade.	Height.	Can have flat tire on. Size of tire and price per set.	Can have channel tire on. Price per set.	Can have rubber tire on. Price per set, wheels and rubber.	Can be sold without tire. Price per set.	Screw in rims.
Sar. Pat.	¾"	D	42 and 46	¾x¼ $5.50	$5.75	$12.80	$4.00	yes
" "	¾"	D	38 and 42	No	5.25	12.95	No	No
" "	¾"	D	39 and 43	⅞x¼ 5.75	6.00	14.00	4.15	yes
" "	¾"	D	42 and 46	⅞x¼ 5.75	6.00	14.30	4.15	yes
" "	¾"	D	34 and 36	No	3.90	11.15	No	No
" "	⅞" 3 piece rim	D	40 and 44	⅞x¼ 5.25	5.60	13.60	3.85	No
" "	1"	D	39 and 43	1x¼ 6.25	6.50	14.50	No	Yes
" "	¾"	D	all 39	No	4.00	10.65	No	Yes
" "	¾"	D	36 and 40	1" cush. C. $5		18.40	No	Yes
C. B.	¾"	D	35 and 37	¾x¼ $3.90	4.10	10.35	No	No
"	¾"	D	38 and 42	¾x¼ 5.25	5.50	12.00	4.10	No
"	¾"	D	38 and 42	¾x¼ 5.50	5.75	13.45	4.35	No
"	¾"	D	all 46	¾x¼ 3.90	4.15	12.75	2.60	No
"	¾"	D	all 35	¾x¼ 3.90	4.15	11.40	2.60	No
War. Pat.	¾"	C	42 and 46	¾x¼ 5.25	5.50	12.45	3.85	Yes

Rubber tire used on above wheels, we guarantee to wear one year. If unguaranteed tire is wanted deduct 75c per set. The above wheels are good stock and condition only a little shop-worn. Five set orders we allow 25c per set freight allowance. Ten set, 25c per set. Prices are only made subject to prior sale. Positively can give only sizes listed at this extreme low price. Our object is to sell what we have in stock. For other sizes not listed above write for our No. 33 catalogue. We also manufacture poles and shafts. Get our catalogue. We can save you money. Let us get acquainted or we both lose. Yours respectfully, **A. BOOB WHEEL CO., Cincinnati, O.**

HARDEN

Your Tools With KALUX FREE



We will send you a liberal sample if you will tell us the nature of your steel hardening work, the results of your experience, and the name of your supply dealer. KALUX makes your tools last from three to four times as long; and increases their efficiency in proportion. WRITE AT ONCE.

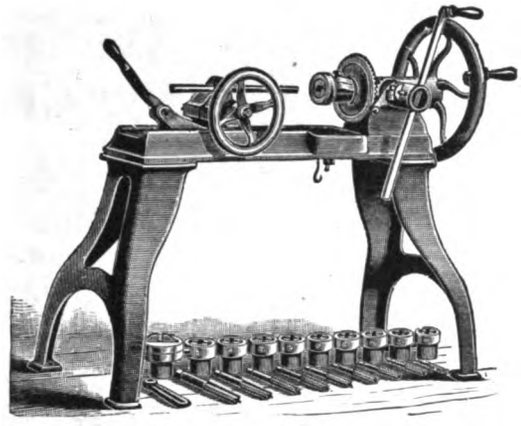
AGENTS—Beals & Co., Buffalo, N. Y. Fueth Iron Co., Kansas City, Mo. L. J. Kingsley Co., Binghamton, N. Y.
H. W. Petrie, Ltd., Toronto, Montreal, Cobalt, Vancouver.
LABORATORIES—Rochester, N. Y. Toronto, Canada.

METAL HARDENING SOLUTION CO.,
Granite Building, Rochester, N. Y., U. S. A.

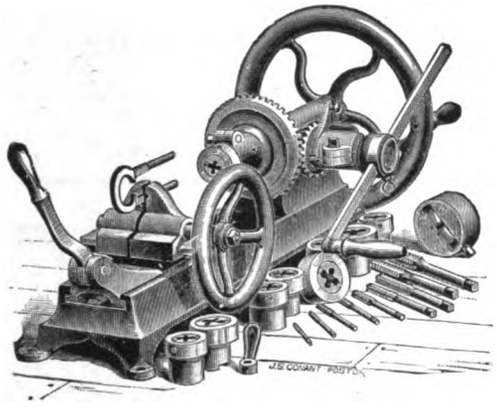
Never Accept Imitations

When a dealer or jobber tries to impose substitutes for the *good advertised articles,* write us or the manufacturer. We will see that you get the genuine—what you want.

Green River Hand Bolt-Cutter and Nut-Tapper, No. 20



No. 20. MOUNTED. No. 755.



No. 20. FOR BENCH. No. 754.

The Cheapest and Best Machines made for Blacksmiths' use. They are "fast threaders," and a blacksmith and carriage repairer will soon earn their cost in time saved. Get our catalog 34D and special prices to Blacksmiths.

Sole Makers

WILEY & RUSSELL MFG. CO.

GREENFIELD, MASS., U. S. A.



The only **really cheap** paint is the paint that laughs at time. It takes years to find out how cheap "F-S" products are.

Many are learning that "F-S" Brushes are as good as "F-S" Colors. That's why our Brush business is steadily on the increase.

FELTON, SIBLEY & CO.

Manufacturers of Paints, Colors and Varnishes

136-140 N. 4th St., PHILADELPHIA

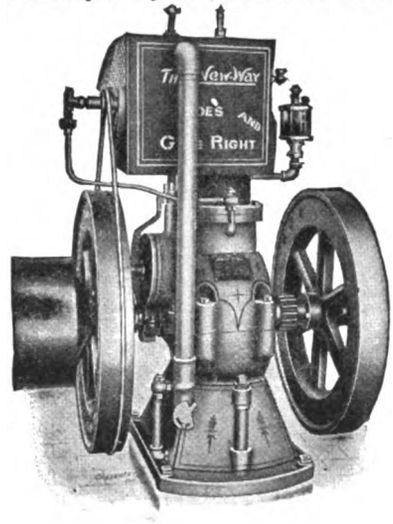
NOTICE TO BLACKSMITHS

THE "NEW-WAY" Air Cooled

IS THE ONLY

GASOLINE ENGINE

Built especially for Blacksmiths' Use. 2½, 3½, and 6 H. P.



Look at the other engines first. Note the multitude of rods, springs and triggers described as **simple**. Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water-cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power sometime.

Then look at an engine that IS simple

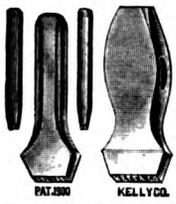
One-piece cylinder—no chance to leak—grows stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—any length of time. Your judgment tells you to

WRITE FOR CATALOG "K." DO IT NOW.

THE "NEW-WAY" MOTOR COMPANY

LANSING, MICHIGAN, U. S. A.

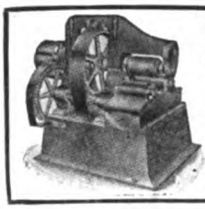
60 SHERIDAN ST.



STEEL STAMPS AND MACHINE PLATES

We make stamps for blacksmiths for any purpose. Makers of Machine Name Plates, Checks, Stencils, Badges. No matter what your needs may be in the Stamp or Tag line. We'll guarantee satisfaction.

FRED C. KAUTZ & CO.
2633-2635 W. Lake St., Chicago, Ill.



NATIONAL TIRE BENDING MACHINE

for rolling steel and iron tire for wheels to a circle of any desired diameter. It will bend tire from the lightest to 10" wide by 1" thick. Is heavy and well proportioned. Furnished with tight and loose pulleys, with friction clutch pulley, or direct connected motor, if desired at an additional charge. We also manufacture solid steel loose collar axles and the National self-oiling tubular axles and steel stock and hog troughs.

WRITE FOR CIRCULARS AND PRICES.

NATIONAL TUBULAR AXLE COMPANY, EMIGSVILLE, PA.

Selle Gears



All Styles and Sizes

THE AKRON-SELLE CO.
CAT, 4. AKRON, O.

ENGINEERING: CIVIL, ELECTRICAL, MECHANICAL, TELEPHONE, MACHINIST, STEAM GAS.

A thoroughly equipped College of Engineering. Standard four-year courses, also one year courses in Steam and Electrical Engineering. Three months' courses in Traction and Gas Engineering. One-year Machinist's Course. **Shop work from the beginning.** Send for catalogue giving full information.

Highland Park College of Engineering, Des Moines, Iowa.



Apple Ignition Dynamo

EVERYTHING NEEDED FOR IGNITION

The Dayton Electrical Mfg. Co.
152 St. Clair St.,
DAYTON, - OHIO.



The New Little Giant Trip Hammer

Made in 3 sizes

25 lbs. 50 lbs. 100 lbs.

Over 2,000 Now Sold

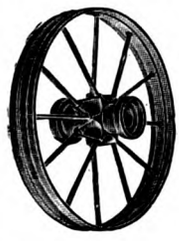
The Best Power Hammer on the market. Works material up to 5 in. round.

FULLY GUARANTEED

MAYER BROTHERS, Inc.,
MANKATO, MINN.

United States, All Jobbers. New Zealand Agents, Alex. Storrie, Ltd., Invercargill.
Manitoba, Saskatchewan and Alberta, Melotte Cream Separator Co., Winnipeg.

STEEL WHEELS



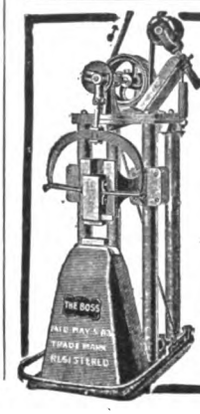
To Fit Any Wagon
Plain or Grooved Tire

Farmer's Handy Wagons
All Standard Types

Special Inducements to Blacksmiths

Write Today for Agency

EMPIRE MFG. CO., P. O. Box 300. Quincy, Ill.



NOVELTY IRON WORKS BOSS HAMMER

For Plow Work, Wagon Work, Heavy Work, Any Work.

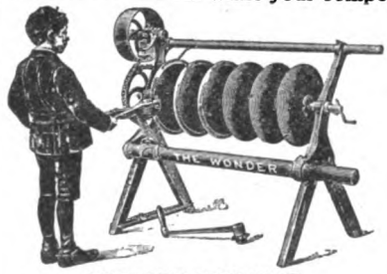
"Will strike as you like." Heavy or light at full speed or less. A broken anvil will cripple no other part of the hammer.

G. E. DAVIS, Mgr.
DUBUQUE, IOWA.

WONDER DISC SHARPENERS

SAVE ½ THE TIME AND ALL THE LABOR.

The Wonder Disc Sharpeners save over one-half the time and labor. Every wide-awake and up-to-date shop owner who has sharpening of disc harrows and disc plows should have one of my Wonder Disc Sharpeners. With these machines youcansharpen a whole set of discs while your competitor is taking off the shaft in the old fashioned way.



THE LITTLE WONDER.

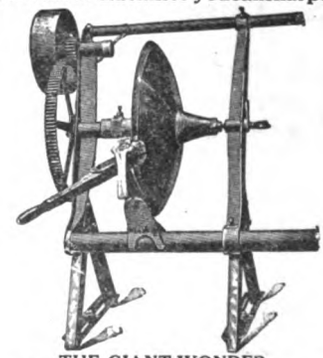
The LITTLE WONDER will sharpen any size disc up to 22 inches in diameter. The accompanying cut shows the LITTLE WONDER at work on a whole section of discs. This machine is especially adapted for sharpening Disc Harrows.

You Can Increase Your Earnings.

when you have one of my machines as you can turn out more work and please your customers better than by sharpening in the old way.

Operated either by hand or power.

Can shear any part of edge to any bevel. Also shear back from edge as far as required. The tool can be used on either side of the disc and can be shifted from one disc to the other. All these things can be done without the turn of a set screw or nut. Is a positive feed; *automatically adjusts itself to wobbling or bent discs.* Knives made of best grade self-tempering steel and will last a lifetime for hand or power.



THE GIANT WONDER.

The GIANT WONDER is a larger and heavier machine; has ho der attachments for rolling coulters and **DISC PLOWS**; will take in discs up to 32 inches in diameter; is a geared machine and will also take in disc harrow sections same as the Little Wonder and do the work equally as well. The only machine on the market with these advantages.

ALL OUR MACHINES GUARANTEED.

We will take back and pay the freight both ways on any machine which does not prove to be exactly as represented and satisfactory in every way. You cannot lose in buying a machine with this liberal guarantee. Most all dealers sell Wonder Machines, but if yours does not, write us direct and please send us his name. Be sure to write at once for descriptive circulars. Don't let another season go by without making money by installing a Wonder Machine in your shop. Address all communications to

A. E. DURNER, Sole Manufacturer, Main Office, **Evansville, Wis.** CANADIAN BRANCH: London, Ontario, Canada

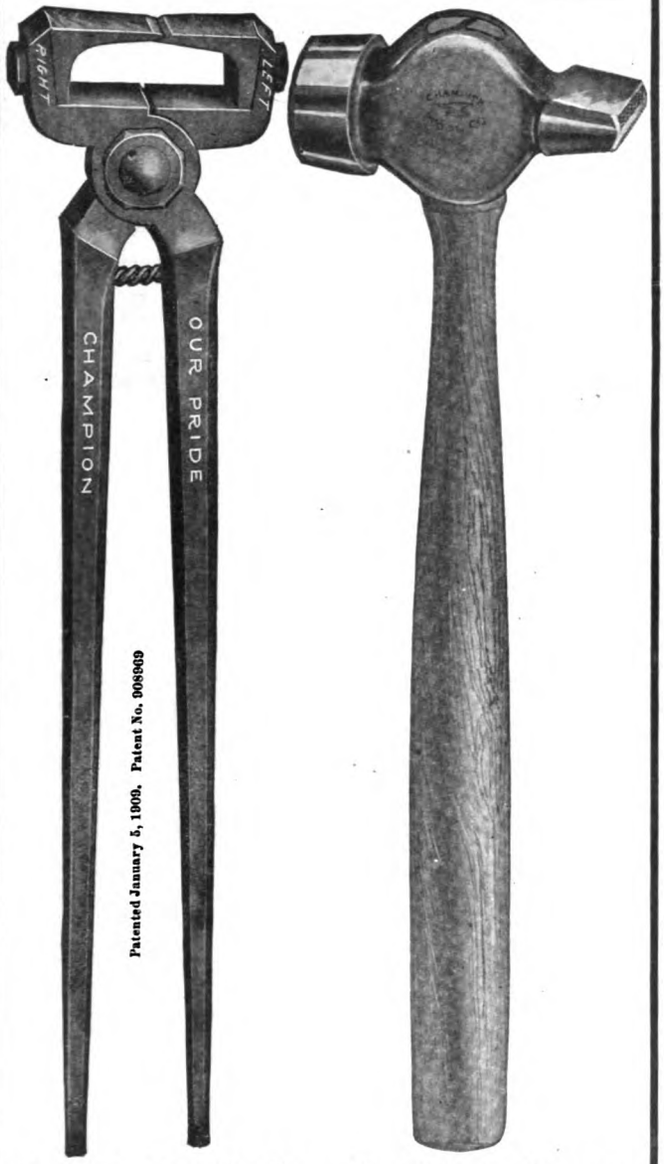
ONE CENT

spent for a postal card is all our

Forty Eight Page Catalog

will cost you. You should have this book, which shows

86 Labor-Saving Tools



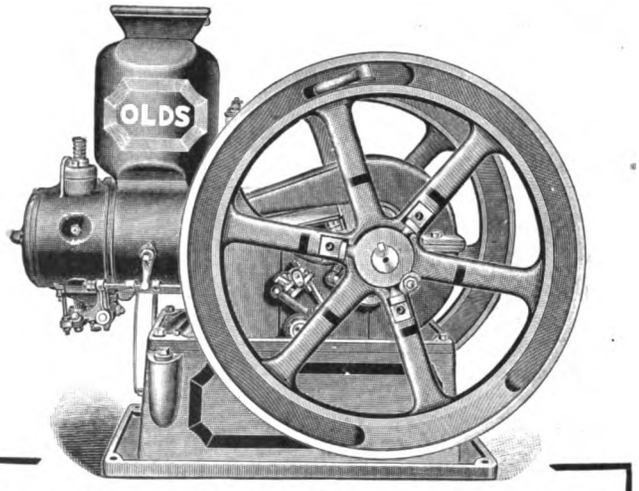
No. 81 Our Pride No. 81 Ball Bearing Hoof Shear
12 inch 14 inch
BALL BEARING JOINT
Interchangeable Blades
Drop Forged

No. 12 Electric Sharpening Hammer
Weighs 1 3-4 lbs. to 3 lbs.
Swings Just Right
Drop Forged

Our tools are tempered in PLAIN COLD WATER and can be redressed and retempered by any practical man.

CHAMPION TOOL CO.

Dept. A. MEADVILLE, PENNA.



Send for Our New Catalog

Do Not Think of Buying a Gasoline Engine Without It

The things that should decide you in selecting the right engine are: **What will it cost to run the engine**—(1) how much gasoline does it use; (2) how many parts are there to get out of order; (3) what will the repairs cost; (4) will the mixer always work; (5) will the gasoline pump get out of order; (6) if water is left in the engine and it freezes, what will have to be replaced; (7) if it is guaranteed, what is the guarantee worth.

THE OLDS ENGINE

is the most economical engine to run.

(1) The gasoline cost is very low because the new Seager mixer automatically makes exactly the right mixture of gas and air all the time.

(2) It is the simplest because it has no small, delicate parts to get out of adjustment.

(3) You are guaranteed against buying any repairs for one year because we make the following proposition:

We agree to replace, free of charge, any part of an Olds Engine that breaks or becomes worn, from ANY CAUSE WHATSOEVER, within one year from date of shipment, provided the replacement is one you think should be borne by the manufacturer. YOU ARE TO BE THE ONLY JUDGE. There is to be no argument, no delay in returning old parts and getting new ones, you decide and I abide by your decision.

This makes a big possible saving to you the first year when 99 per cent of your troubles would naturally come.

(4) The Seager mixer has **no moving parts**—once adjusted it is adjusted for a lifetime.

(5) **The Olds Type A Engine has no gasoline pump. The piston sucks the gasoline into the mixer automatically.**

(6) The Olds water jacket is a separate casting. In case of freezing this part alone can be replaced at slight expense instead of having to buy a whole engine bed and cylinder.

(7) A guarantee is limited by the financial responsibility of the concern making it. Ask your banker whether we are good for what we say.

There are cheaper engines made that are painted just as prettily as ours, and their catalogues contain many tempting claims and make many attractive promises, but in spite of all that has been claimed and promised about other gasoline engines selling at all kinds of prices, we have been making steadily for **30 years an engine that has become the standard of the world.**

An engine that is as finely built as the Olds, that has Olds quality of material and workmanship, backed by our kind of guarantee, or with a record of so many thousands of satisfied customers, **could not be successfully sold for any less than our price.**

Our catalogue mailed you free, tells you just what you should know about an engine. Write for it today before you forget it.

Write me personally, telling me what you want the engine to do, and you will get a personal letter from me that will give you the facts you want. To save time you can write to my nearest representative.

SEAGER ENGINE WORKS

J. B. SEAGER, Gen. Man. **Formerly Olds Gas Power Co.**

Main Office and Factory, 1020 Seager Street

LANSING, MICHIGAN

Olds Gas Power Company Branches:—Boston, R. W. Hart, Beverly St.; Philadelphia, Mallalieu & Conrey, Market St.; Binghamton, N. Y., R. H. Deyo & Co., Washington St.; Kansas City, F. W. Berks, W. 11th St.; Omaha, Neb., W. S. Weaver, Farnum St.; Minneapolis, E. S. Wood, So. Third St.



Clip Horses For Profit

This splendid machine only $7.50. It is the **Stewart No. 1.** **Send $2** and we will ship it C. O. D. for the balance. If you are not pleased, return at our expense and get your money.

CHICAGO FLEXIBLE SHAFT CO.
186 Ontario Street Chicago



STEEL STAMPS

Steel Letters and Figures
BURNING BRANDS
Stencil Dies, Stencils, Etc.

Geo. M. Ness, Jr.,
61 Fulton Street, N. Y.
Price List sent upon application.





BUGGY TOPS, $4.60
TOP BUGGIES, $35.00
RUNABOUTS, $32.00
Cushion Backs, Storm Fronts, Poles & Shafts.
Write for 100-page Catalog.
BUOB & SCHEU,
500-520 Court Street,
Cincinnati, Ohio

"Tools That Wear"

HELLER'S CELEBRATED AMERICAN HORSE RASPS, FILES AND FARRIER'S TOOLS

will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process. New Catalogue Mailed Free on Application.



"FITTING HAMMER."

HELLER BROTHERS CO., Newark, N. J., U. S. A.



Try Borax-ette for Welding Toe-Calks

THEY WON'T KNOCK OFF

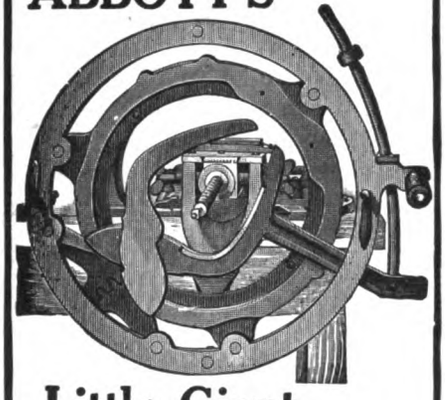
It makes steel weld like iron. It has no equal for welding tires, axles and springs

FOR SALE BY ALL DEALERS

SAMPLES FREE

CORTLAND WELDING COMPOUND CO., Cortland, N. Y.

ABBOTT'S



Little Giant Hub Borers

AND Abbott's Box Puller

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

PHINEAS JONES & CO., Newark, N.J.
General Agents for the Eastern States

We make the following sizes:
No. 1, 3 in. wide, 14 in. high
" 2, 3¼ " 14 "
" 3, 3¼ " 10 "
Weight per set of 4, 16 pounds.



This shows the strength of our STANDARD as compared to the old style.

The Bruce Malleable Wagon Standard

Tested thoroughly and guaranteed strictly as represented. Note its great advantages over the old style.

1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.
2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.
3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only a ⅞-in. face.
4. Great time saver. Can be attached to bolster in one fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, write today and ask for prices.

A. H. HARSHBARGER, Danville, Ill.

THE HITCH THAT HOLDS



Safety Springs FOR Whiffletrees and Neck Yokes

Used with Wrought, Forged, or Malleable Hooks. Send for descriptive circular. Simple in construction; cannot get out of order; easily operated

Helical spring don't set; durability tested by hard service.

FOR SALE BY JOBBERS

Manufactured by

J. H. SESSIONS & SON,
Bristol, Connecticut, U. S. A.

- USE HORSE SENSE -



KEYSTONE DRAFT SPRING

Ask Your Jobber About It!

MANUFACTURED BY

RAYMOND MANUFACTURING CO., Ltd.
CORRY, PENNSYLVANIA

THE KEYSTONE TRACE OR DRAFT SPRING RELIEVES THE HORSE OF ALL THOSE JARS CAUSED BY THE UNEVENNESS OF THE ROAD AND WHEN TAXED TO ITS FULLEST CAPACITY SIMPLY CLOSES, THUS FURNISHING A SOLID CONNECTING LINK AND AVOIDING ALL POSSIBILITY OF BREAKAGE.

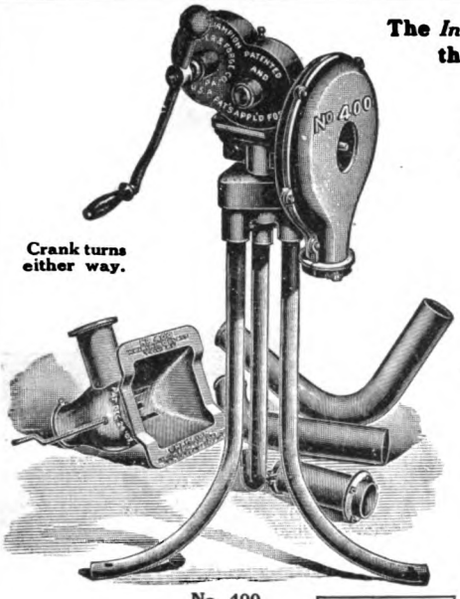
LOOK INTO IT!

The *Incomparable* 400 Blower, the one great *Heirloom* that will be handed down *from one generation to the other. Ask what the owners say*

MADE WITH BALL BEARINGS ONLY

Nearly Half A Million in Use

The No. 400 is the Blower that has REVOLUTIONIZED the World in Making Hand Blast



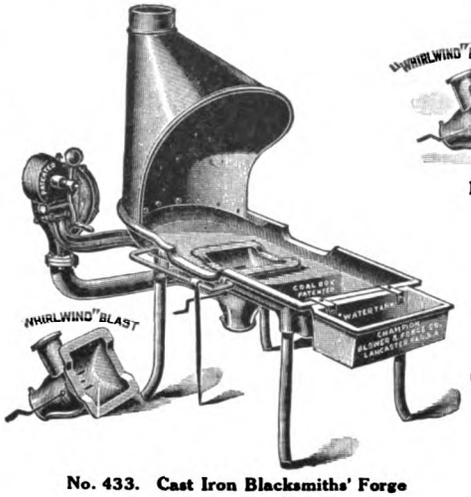
Crank turns either way.

No. 400

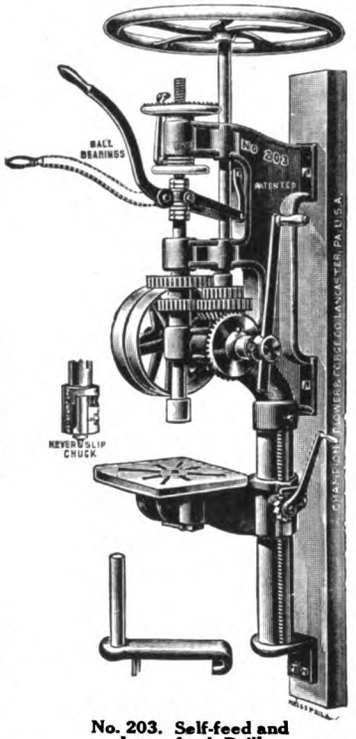
The No. 400 Steel Blower will serve the youngest mechanic faithfully without expense for a long lifetime.



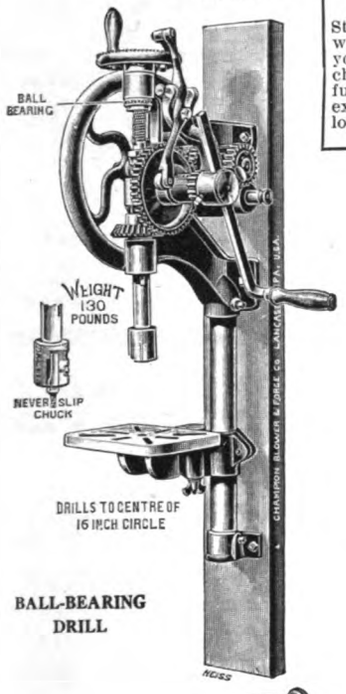
No. 408. Steel Blacksmiths' Forge



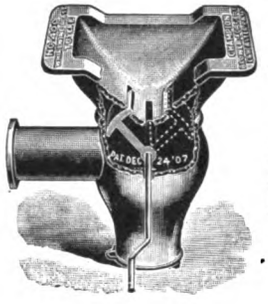
No. 433. Cast Iron Blacksmiths' Forge



No. 203. Self-feed and Lever-feed Drill



BALL-BEARING DRILL



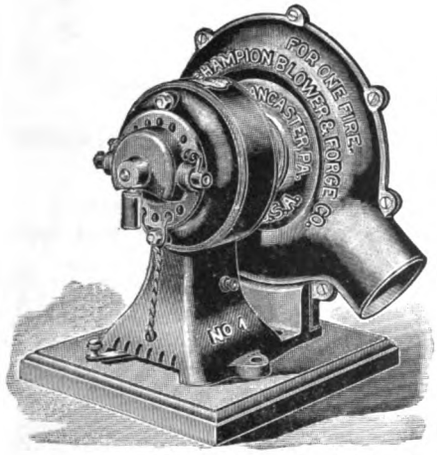
A Tuyere Iron That Makes A Whirlwind Blast.

The No. 400 Champion "Whirlwind" Blast Anti-Clinker, Heavy Nest Tuyere Iron is furnished with all No. 400 Blowers WITHOUT EXTRA COST.

The "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron produces a circular, rotary whirlwind blast and concentrates the heat in the tuyere nest, not permitting it to blow up and out of the chimney, therefore, makes a hotter fire and heats the iron one third quicker, saving much coal.



The Champion Patented Never-Slip Chuck is applied to all CHAMPION DRILL SPINDLES without extra charge

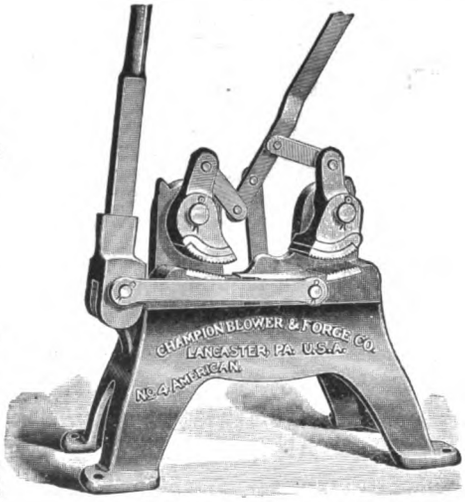


No. 1—One-Fire Variable Speed Electric Blacksmiths' Blower, with five speeds for LIGHT, MEDIUM and HEAVY fires.



Screw Plates in four styles, cutting up to 1½ in.

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power Blower, or Electric Blower, write for our free catalogue, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



No. 4. American Tire and Axle Shrinker.
Will shrink up to 4 x 1 inches round edge tire, and axles up to 1¼ inches.

THE CHAMPION BLOWER & FORGE CO., Lancaster, Pa., U. S. A.

Is Your Anvil Worn Out?

But it's NOT beyond repair for we can REPAIR old wrought anvils no matter how badly they are broken.



Before buying a new anvil write for our prices—it will pay you.

The Columbus Anvil & Forging Co.

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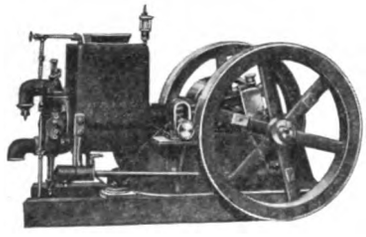
K. C. Junior Gasoline Engines

STEAM COOLED SINGLE PISTON



3-5-8-10 H.P.

Power Guaranteed

SIMPLE
ECONOMICAL
LOW PRICED

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The Village Blacksmith's Forge

Compact
Economical
Durable

THE "BUFFALO" 651



Ask your dealer for and insist upon "Buffalo" Tools. Look for the name, it's cast on every tool.

Ask for New Catalog 178 AB.

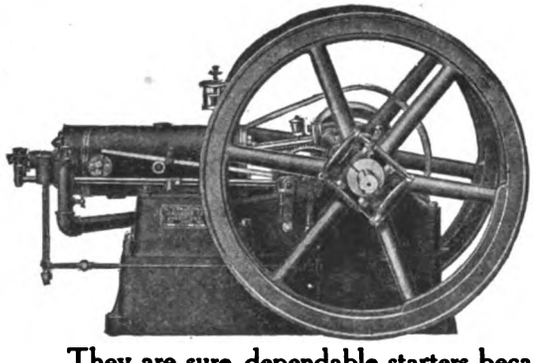
The heavy cast iron fire pan is mounted upon wrought iron legs rigidly braced. This produces a forge of great strength.

Equipped with the "Buffalo 200 Silent Blower" placed at right angles to the front of the forge. The hand falls naturally upon the crank. At the same time, it keeps the face away from the fire. A convenience appreciated by the careful smith.

Buffalo Forge Company,

BUFFALO, N. Y.

THE MONEY-MAKING ENGINE
FOR BLACKSMITHS



The smith's first requirement in an engine is that it be dependable. It must be quick and sure starting, because he wants to start and stop his engine scores of times in a day. He gets very unsatisfactory service out of a power that has to be coaxed and adjusted every time he wants to use it.

The Dependability of
I. H. C. GASOLINE ENGINES

has made them strong favorites, not only with blacksmiths, but with other mechanics.

They are sure, dependable starters because they are made on the right plan and in the right way.

They are regular, smooth runners and they deliver power at the lowest cost of production and with the minimum of attention.

There are many styles and sizes:

Verticals—2, 3 and 25 horsepower.
Horizontals (portable and stationary)—in 4, 6, 8, 10, 12, 15 and 20 horsepower.
Air-Cooled Engines—in 1 and 2 horsepower.

Ask local agents for catalogs of the style you are interested in, or write direct to us.

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(INCORPORATED)

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BOLT CLIPPERS

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TRIMMINGS FOR EVERYTHING ON WHEELS

Wholesale Manufacturers

Write For Catalogue and Prices.

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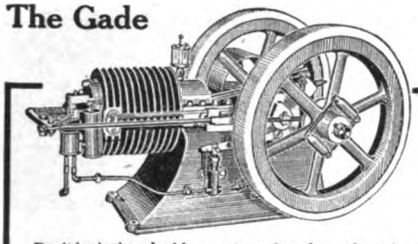
TOPS FROM $4.40 UP.

INDIANA TOP & VEHICLE CO., Lawrenceburg, Indiana, U. S. A.

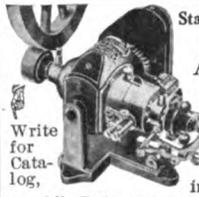
The Gade



Don't be bothered with a water tank and run the risk of having a "freeze up" in cold weather. Order this engine on 30 days' free trial without signing your name to any papers or binding yourself in any way whatever. We stand back of it with a 5-year Guarantee. Ask us how we cool without a fan, and why we use one third less gasoline than other makes. Address,

GADE BROS. MFG. CO., North High, Iowa Falls, Iowa





Start your Gas Engine with the MOTSINGER AUTO-SPARKER and run it without the aid of batteries. Not a cheap magneto but the original high grade speed controlled friction driven dynamo. Perfectly insulated, "water and dust-proof." Fully guaranteed. Operates the "make and break" and "jump spark." Charges all storage batteries for ignition and lighting on a small scale perfectly with our special switch-board in the circuit. Ten years actual service with over 36,000 Auto-sparkers in operation to testify to its merit.

Write for Catalog,

MOTSINGER DEVICE MFG. CO.

33 Main Street PENDLETON, INDIANA. U. S. A.

AIR CUSHION RUBBER HORSESHOE PADS



See That Cushion?

It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



Heavy Leather Back



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NO LAMENESS NO SLIPPING CHEAPEST AND BEST

REVERE RUBBER CO.

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The Sterling Emery Wheel Mfg. Co.

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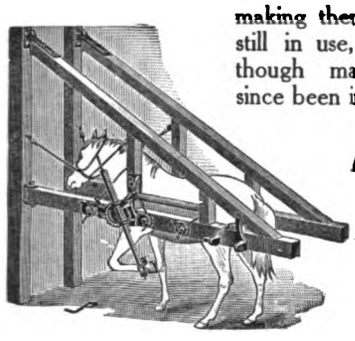
made the first horse stock and is making them today; the first stock is still in use, giving good service, although many improvements have since been inaugurated.



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is unable to injure itself or *you* while in the stock, saves TIME, TEMPER and TROUBLE.

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are an ornament to your shop, and will win you more and satisfied customers. The triangle gives strength, durability and ease of operation. By writing immediately, you can secure our beautifully illustrated catalog free.

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For the auto painter who has exhausted his ideas on distinctive color combinations.

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67 Fifth Ave., NEW YORK

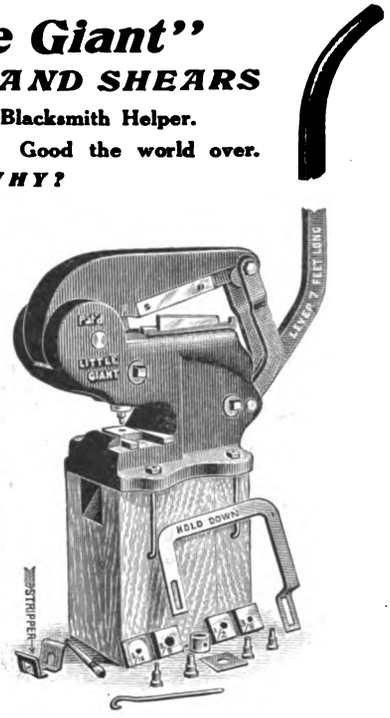
CHICAGO ST. LOUIS MONTREAL TORONTO

"Little Giant"
PUNCHES AND SHEARS

Better than a Blacksmith Helper.

Over 3,000 in use. Good the world over.

WHY?



Kei Road, Cape Colony, S. A., Aug. 12, 1909.
Little Giant Punch & Shear Co.,
Sparta, Ill., U. S. A.

Dear Sirs: — Enclosed please find Money Order to the value of £1-11-0 in settlement of your acct, The Punch and Shear came safely to hand last Monday and I am very pleased with it indeed. If I can at any time sell one I will do so and will try to do all I can to forward the sale in the Cape Colony. The machine cost me landed here £13-10-0, and I consider it worth twice as much. I find it only takes one man to work the lever and I thought it could not be worked with less than two. I consider every blacksmith should have one, as they save a lot of labor and money.

Yours faithfully,
(Signed) pp
R. G. RISTROW.

You don't have to take our word for it, but get our booklet of Testimonials.

WRITE FOR NEW CATALOGUE

Little Giant Punch & Shear Co.
210 S. Market St. SPARTA, ILLINOIS

Reece Combination Screw Plate No. 103

$8.25 NET WILL BUY ONE



The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16 — 18, 3-8 — 16, 7-16 — 14, 1-2 — 12, 5-8 — 11, 3-4 — 10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustable, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only $8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

THE E. F. REECE CO., Greenfield, Mass., U. S. A.

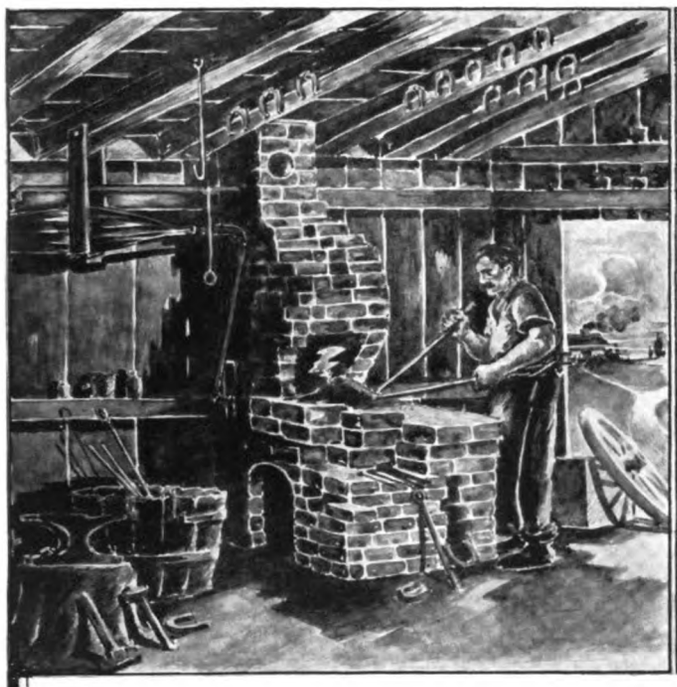
INSIST ON "STANDARD" CALKS

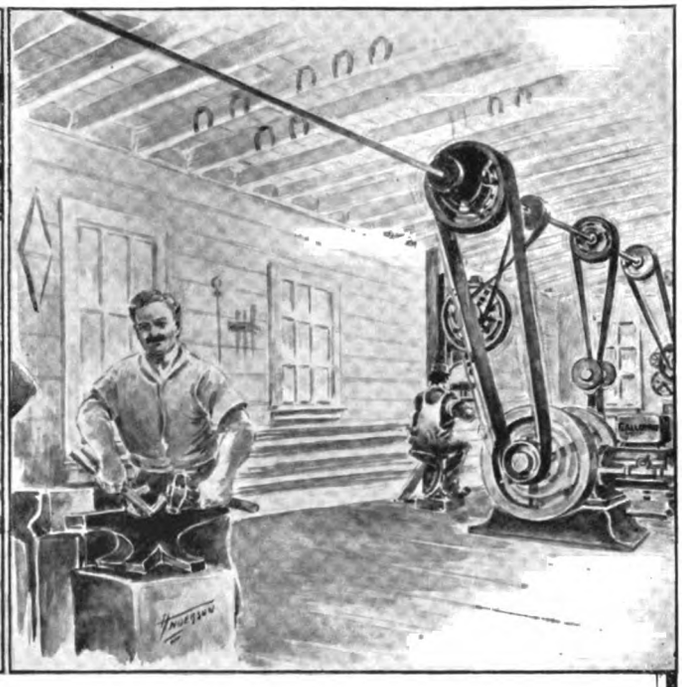
BUY FROM YOUR DEALER



FRANKLIN STEEL WORKS

Joliet, Ill.
Cambridge, Mass.





Increase your capacity. Modern machinery cannot be repaired or renewed in the old fashioned way.

Are there lots of jobs that come to your shop that you are not able to handle? Is there business that you could bring your way if you could handle it? You have the skill, you have the room, but you lack one thing. That thing is **Power.** The big money jobs cannot be handled without **Power.** On the other hand, if you had **Power,** you could handle twice the volume of the smaller jobs, and at a much increased profit per job.

What do you think you ought to do about it? You can do good work in the old way, but why not do better work and more of it in the new? The Galloway 5 h. p. gasoline engine gives you **Power** to handle almost any repair job that will come to you. The automobile jobs, the big machinery jobs. It will surprise you to find how much you have enlarged your capacity, how much easier it is to do your work. And the Galloway is the best engine for the purpose.

Think of it! A 5 h. p. engine at only $119.50. Absolutely guaranteed. You can try it in your own shop for 30 days. Make it pull anything an engine of its rated power ought to pull. It's got to please you or it's no sale. The engine is built right. It has drop-forged connecting rods and crank shafts, high-class bearings, hard oilers, high compression. It's long-lived. It's everything that a high-class engine ought to be. It's an engine that has been on the market 15 years. It's been getting better all the time. It has no equal anywhere on the market.

There are only four things to do. 1. Turn on the oil. 2. Turn on the gasoline. 3. Turn on the battery. 4. Give the flywheel a whirl.

It's the simplest engine built.

You want to know about my special proposition for blacksmiths, the proposition that will enable you to partly or entirely pay for your engine. It's brand new and original.

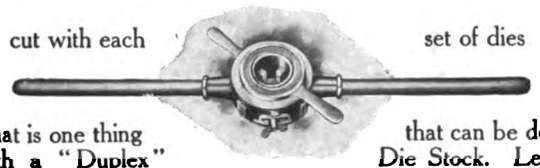
Send today for my fine engine catalog fully illustrated. It will give you many gasoline engine pointers that you have to have in buying any engine. Write today.

The William Galloway Company,

1855 GALLOWAY STATION, :-: :-: WATERLOO, IOWA.

—BOTH—

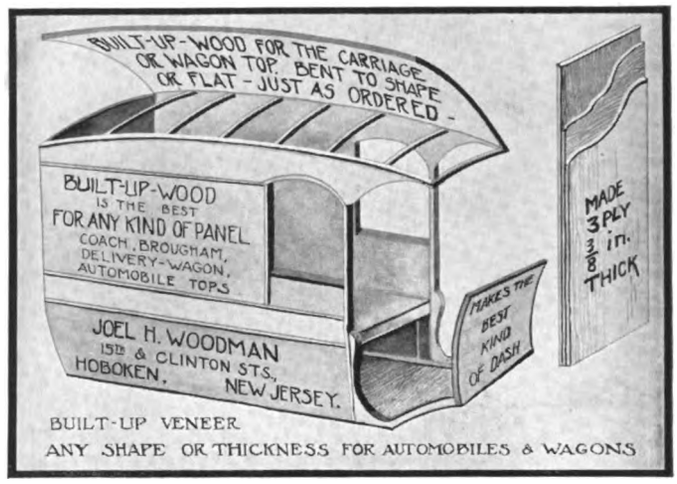
EVEN AND OVER-SIZE THREADS

cut with each  set of dies

That is one thing that can be done with a "Duplex" Die Stock. Learn of the further points of difference between it and others.

THE HART MFG. CO.

50 Wood Street CLEVELAND, O., U. S. A.



Gives Satisfaction In Every Respect.

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BUFFALO FORGE CO.,
Buffalo, N. Y.

Gentlemen :—I have waited quite a while to report on Blower No. 200. I wanted to give it a good trial. It is giving satisfaction in every respect and every one who sees it says it's a dandy.

I am well pleased and highly appreciate your kind and fair treatment.

Wishing you success, I remain,

Yours respectfully,
J. J. SMELTZER.



Say! Mr. Blacksmith,

have you heard about the new tire setter called

THE SCIENTIFIC HYDRAULIC?

Blacksmiths are just wild about it where it is used, and the manufacturers are either **crazy** or **dead sure** they have a "cinch" on the other fellows for they actually **warrant** it to be **better** than any other and will let you be the judge.

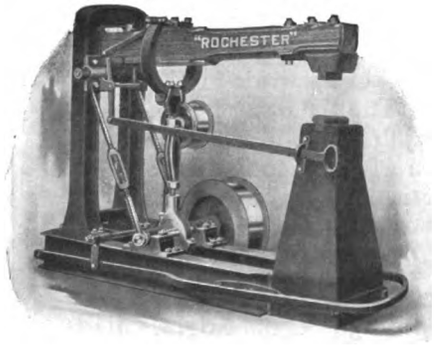
GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

Write for information at once to

National Hydraulic Tire Setter Co.

KEOKUK, IOWA.



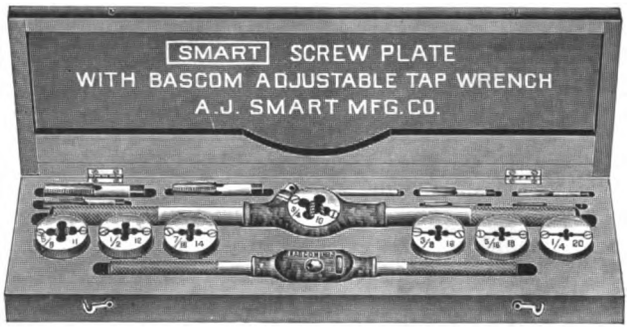


"Rochester" Helve Hammer

"The Hardest Hitter"

For catalog address,

THE WEST TIRE SETTER CO., Rochester, N. Y.



Our Taps and Dies are the best that 34 years' experience and up-to-date methods can make them. The easiest cutting and longest wearing screw cutting tools made. Send for free catalog.

A. J. SMART MFG. CO., Greenfield, Mass.

FIRST MADE IN AMERICA

HAY-BUDDEN SOLID FORGED ANVILS

A LONG STEP FORWARD

SOLID FORGED STEEL TOP
Welded to a
SOLID FORGED BASE
Making a
SOLID FORGED ANVIL

The Gold Medal Anvil

HIGHEST AWARD
Omaha 1898 Pan-American 1901



OVER 150,000 IN USE

The **ENTIRE TOP** being one piece of high grade **FORGED STEEL** makes a loose face impossible.

TEMPERED "JUST RIGHT".

By our own process, the weld at the waist is a **LASTING UNION.**

Experience has proved their worth and demonstrated that **"HAY-BUDDEN" Anvils** are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., 254 NORTH HENRY ST. BROOKLYN, N. Y.

VOLUME 9

THE AMERICAN BLACKSMITH

NUMBER 3

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

DECEMBER, 1909

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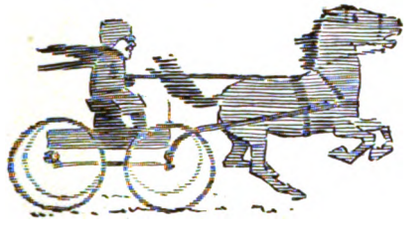


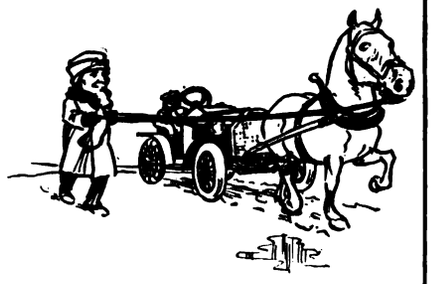
It's fine to be able to go "lickety split" over the icy winter roads--with the horse and yourself confident. You'll get there when you plan, "WEATHER or no"-- if you'll stop at the shop to-day and let me make a set of

ROWE WELDED TOOL-STEEL CENTER **CALKS**

to be ready for your first emergency.

WILLIAM A. KING,
Elmwood, Conn.





The Auto may be powerless on some of our icy country roads, but the horse with

ROWE WELDED TOOL STEEL CENTER **CALKS**

goes along SURELY and SAFELY, and CAN PULL A HEAVY LOAD EASILY.

Drive your horse down to the shop TO-DAY, and let me fix him up so that you will be ready for any icy emergency and friendly assistance.

The Profits They Will Bring You

Get the full benefit of our great national advertising campaign among horseowners, which now begins in leading papers reaching farmers, teamowners, physicians horsemen and horseowners everywhere.

Let the people in your town know that you are the local agent for these longest and sharpest wearing calks and get the cream of this flood of new business.

Write today, GIVING NAME AND ADDRESS OF YOUR JOBBER, and we will send you by return mail copies of these entire 28 great ads, and you may select from the free plates whatever you desire.

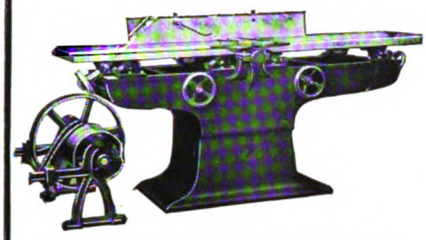
We will also send you one of those now famous Rowe booklets and a split Rowe welded tool steel center calk. **Do it now, as this ad will not appear again.**

Rowe Calks, 600 Mechanic Street, Hartford, Connecticut

Shipping Warerooms in Hartford, Chicago and Montreal

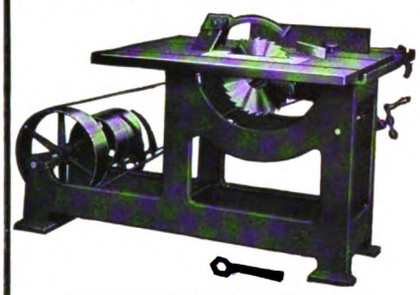
THE SILVER MFG. CO.

365 BROADWAY SALEM, OHIO.



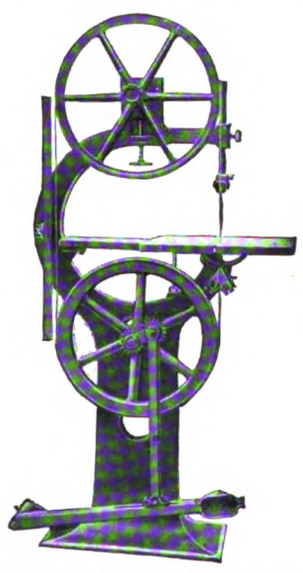
SILVER'S NEW JOINTERS

Five Sizes—8, 12, 16, 20 and 24 inch. New "patent applied for" features.



SILVER'S SAW TABLES

Send for circular of Saw Tables and Swing Saws.



NEW PLANETARY BAND SAW

20-inch Foot or Combination.

Get One For Xmas. Start The New Year Right



Silver's New Swing Saw. Four Lengths.

Boost your profits in 1910 by investing in some of these splendid money-saving machines.

Profit is what you are looking for, as much of it as you can get.

Let the "Silver" machines do your work for you—and YOU pocket the profits.

Be good to yourself this Christmas. Buy yourself a present—a "Silver" tool—and watch the pleasing results.

Insist on the "Silver" kind—don't take any other—then you'll have no cause for regret.

We wish you the Greetings of the Season, but we know they will be happier for both of us if you follow our suggestion and

SEND FOR OUR NEW MACHINERY CATALOG

or for any of the following booklets:

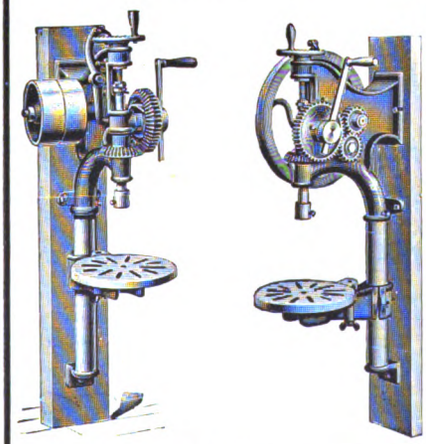
BAND SAWS AND JOINTERS—describing 20" Band Saws for foot or belt power or combination; also 26, 32, 36-inch Power Band Saws with new features; also five sizes of Jointers.

HUB BORING AND SPOKE TENONING MACHINES—illustrating and describing several sizes of each.

PORTABLE FORGES—illustrating and describing 14 styles.

DRILLING MACHINES—covering our line of some 22 distinct machines.

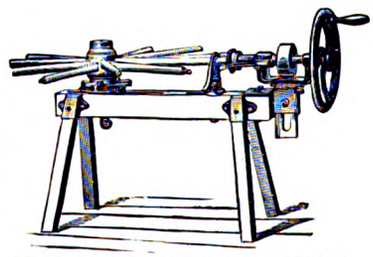
POWER DRILLS—illustrating our line of 20" machines with lever feed, lever and wheel feed, power feed with automatic stop power feed with back gears and automatic stop



Our Booklet, "Drilling Machines", illustrates 22 kinds we make.



Our Portable Forge Booklet illustrates some 14 kinds. We have a size to suit your needs. Strong and durable. Attractive designs.



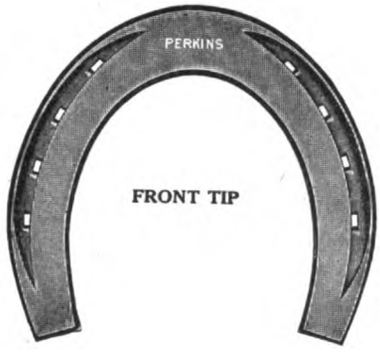
SPOKE TENON MACHINES

in Seven Sizes. Fitted with Star Hollow Auger.



HIND CITY

Look for this Trade Mark ★ The Star brand beats all others



FRONT TIP



FRONT STEEL COUNTERSUNK

★ PERKINS ★

HORSE SHOES

AND

TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



FRONT TOE WEIGHT



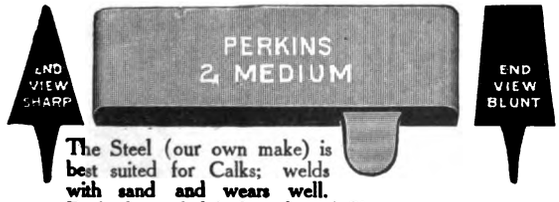
HIND SIDE WEIGHT

Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

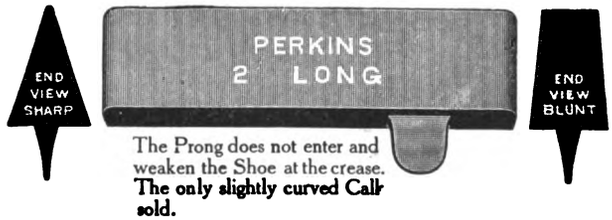


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS.

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

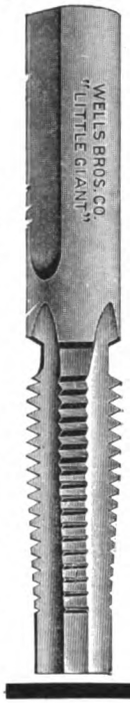
PROVIDENCE, RHODE ISLAND.

Horse-Shoe Calk Taps



You can always **guarantee** your work if you use taps stamped with this trademark

Little Giant.



These machines and hand taps will give you the **best service** for the **longest time.** Be sure to ask for them by name.
At most dealers—if not at **yours,** write to us.

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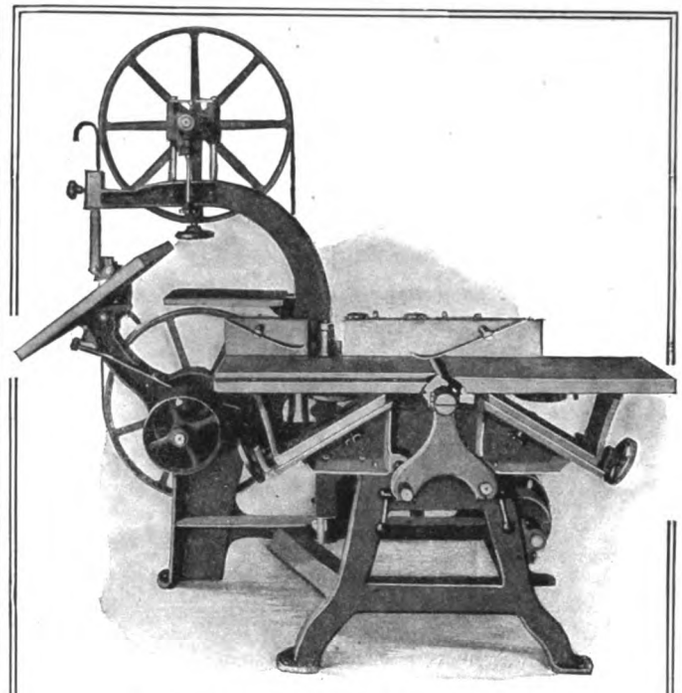
GREENFIELD, MASS., U. S. A.



THE ACCOMPANYING CUT REPRESENTS OUR

Famous Universal Wood Worker

Eight machines combined in one.

Write us for prices and latest catalog

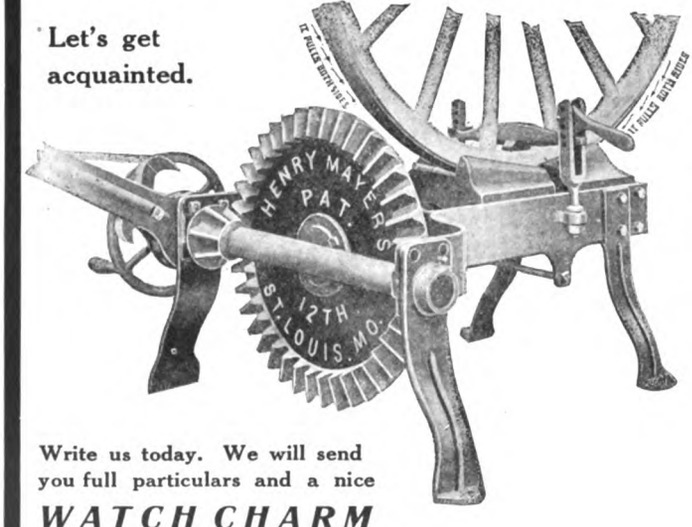
THE SIDNEY TOOL COMPANY, SIDNEY, OHIO.

OUR NEW IDEA!

Sets Tires Cold or Hot on the Wheel

WILL POUR $ $ $ IN YOUR HANDS

Let's get acquainted.



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Write us today. We will send you full particulars and a nice

WATCH CHARM

FREE if you mention this journal.

MAYERS TIRE SETTER MFG. CO.

4028-30 Forest Park Boulevard, ST. LOUIS, MO.

Of The Greatest Benefit To Horseshoers

the

Infinite Care Taken In The Manufacture Of Our Nails

It is an exceedingly difficult problem to produce a piece of metal so small as a horseshoe nail which will endure the tremendous strain and wear to which nails are often subjected, and last without breaking until the shoe is worn out, or the horse must be re-shod for the good of the hoof.

The essential conditions of the problem are that the nail must be so pliable as to clinch without breaking, yet stiff enough to drive where sent without crimping in the hardest hoof, and have sufficient spring to accommodate itself to the jar of the moving and pounding of the foot. Where competitors have failed The Capewell Horse Nail Company has succeeded in producing a nail which serves perfectly all these requirements, by the employment of the best mechanical skill, by long and costly study and experiment, by the use of the best material which can be found in the world and by developing by thorough, painstaking care, a process of manufacture unique and unequalled which this company controls exclusively.

"The Capewell" Horse Nail

is made of material prepared for us under the most exact specifications, and when it arrives at the works it is subjected to minute inspection, as well as mechanical and chemical tests, to prove its quality. After treatment by our own method to increase its tenacity and uniformity of temper, the perfected material is made into nails by our special process. Then they are not sorted and packed by machinery, but the nails are carefully inspected one by one and packed by hand in one pound, five pound and twenty-five pound boxes.

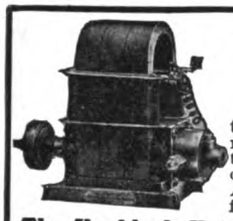
By these careful methods we produce the best horse nail ever made in the world, and make it certain that every box sent out to our patrons contains only absolutely perfect horseshoe nails.

Made by

THE CAPEWELL HORSE NAIL CO.

HARTFORD, CONN., U. S. A.

The Largest Manufacturers of Horseshoe Nails in the World



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IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

THE BEST MECHANICS use
COLUMBIA CALIPERS
THERE'S A LITTLE BOOK—TELLS WHY
E.G. SMITH, COLUMBIA, PA.

WHEN WRITING TO ADVERTISERS
MENTION THE AMERICAN BLACKSMITH.

GOOD RULES TO GO BY

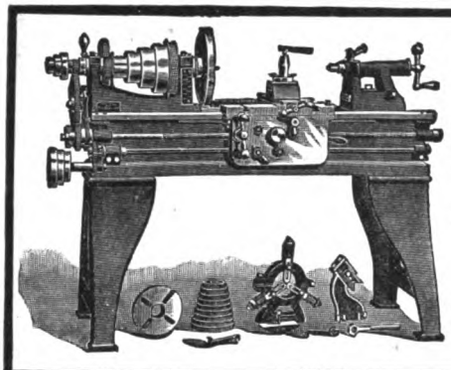


BLACKSMITHS' HOOK AND HANDLE RULES

Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have flat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, $1.15. Catalog No. 17 AH of fine Tools free.

The L. S. STARRETT CO., ATHOL, MASS.



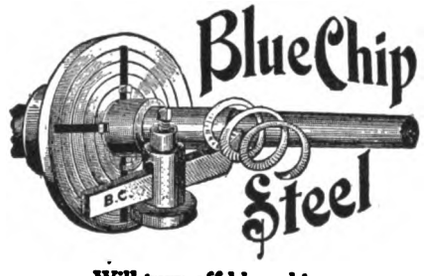
Built For Business

Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high-grade lathe, is the best for your shop.

It's a SEBASTIAN—a good lathe
Investigate its merits—Write for Catalog.

Foot and Power Lathes, 9 to 15 in. Swing
Tools and Supplies.

SEBASTIAN LATHE CO.
124-126 Culvert St., CINCINNATI, OHIO



Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.

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EMERY WHEELS
CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



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WHEELS SAVE TIME

They're made of stuff that cuts

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Made in all grades
Fully guaranteed
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IRON STEEL
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Cleveland, Ohio.

The Brooks endorsed and used by the United States Gov't

STOP!!

We want every blacksmith and wagonmaker who is energetic and desires to make his shop pay bigger profits to write us at once about our special winter proposition to install in his shop

The Brooks Cold Tire Setter

Here is an opportunity of a lifetime, and you will make a mistake if you do not write us now and find out about it. We will also send you illustrated catalog and vest pocket memorandum book free. The Brooks Cold Tire Setter

Is the Greatest Money-Maker For Your Shop.

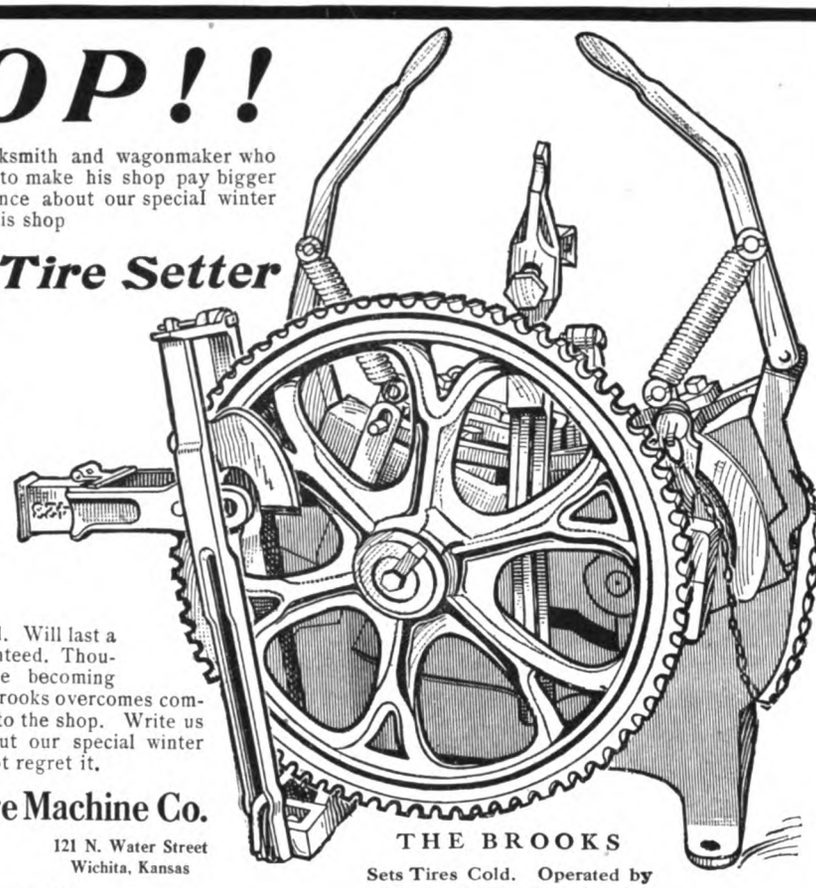
It is the best cold tire setter made in the world. Will last a lifetime. Nothing to break or wear out. Guaranteed. Thousands of smiths who have Brooks machines are becoming prosperous because the Brooks overcomes competition and brings trade to the shop. Write us today for particulars about our special winter proposition. You will not regret it.

The Brooks makes the Smith rich

The Brooks Tire Machine Co.

857-859 Ellicott Square, Buffalo, N. Y.
121 N. Water Street, Wichita, Kansas

Write to nearest office



THE BROOKS
Sets Tires Cold. Operated by Hand. Results Guaranteed.



Don't Forget How Well the

BOSS EXTRA LIGHT IRON SNOW SHOES

Suited you last winter—they are better than ever and are

MADE IN SIZES 1 to 5 Inclusive.



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QUALITY The *popularity* of BOSS horse and mule shoes is due to their *superior quality.*

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POLES AND SHAFTS

THE QUALITY MAKE

Recognized as best by experienced vehicle men everywhere.

MADE BY

The Pioneer Pole & Shaft Co.

Headquarters and Sales Offices,

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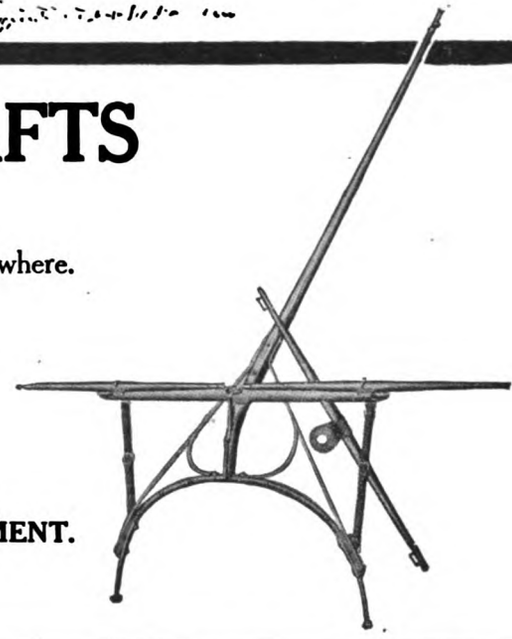
Manufacturers of all styles and sizes of poles and shafts.
A complete line that will SUPPLY EVERY REQUIREMENT.
Have you our catalog and price list?
If not, we want to send you both.



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Prominent among them are

"MORSE" DRILLS

fitting the different presses made especially for blacksmiths' use. Shanks are furnished round or flattened for set screw, as desired.

None Better. A Trial Is Proof.

Send for an illustrated catalogue and a Young Machinist's Practical Guide. Free to all.

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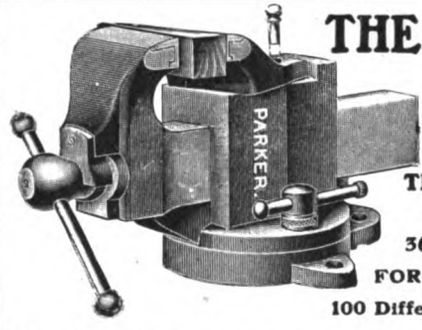


THE MOST RELIABLE ON THE MARKET

36 Different Styles.

FOR ALL PURPOSES.

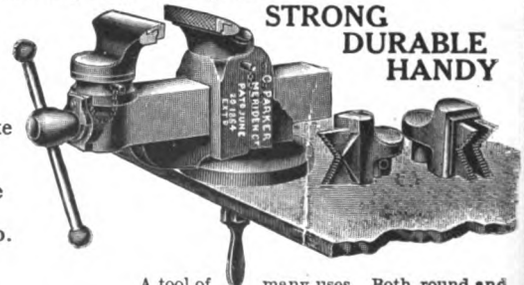
100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

STRONG
DURABLE
HANDY



Our complete illustrated catalogue is free. Write today for price list also.

A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

THE CHAS. PARKER CO.,

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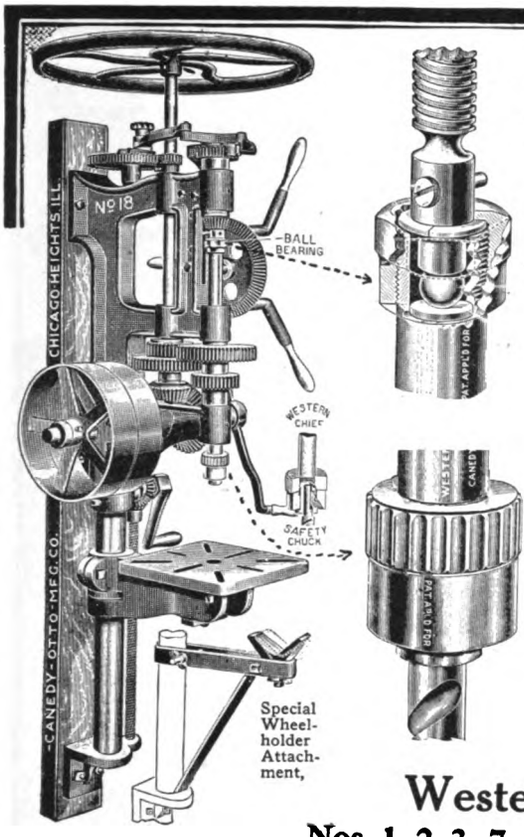


Special Wheel-holder Attachment,

Ball-Bearing and Safety Chuck

Ball-Bearing

A single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate.

Safety Chuck

It is opened and closed with the hand.

No more set-screws to mar and bruise the shanks of bits.

No more wrenches to tighten and loosen set-screws.

No more twisting of bits in the chuck.

No more trouble in inserting and removing bits from chuck.

A Feature of TO-DAY

Wrench? NO!

Western Chief Drills

Nos. 1, 2, 3, 7, 12, 14, 15, 16, 17 and 18

FORGES—BLOWERS—DRILLS



No. 100 Royal Forge

Fan, 12 inches.
Hearth, 31½ x 45½ in

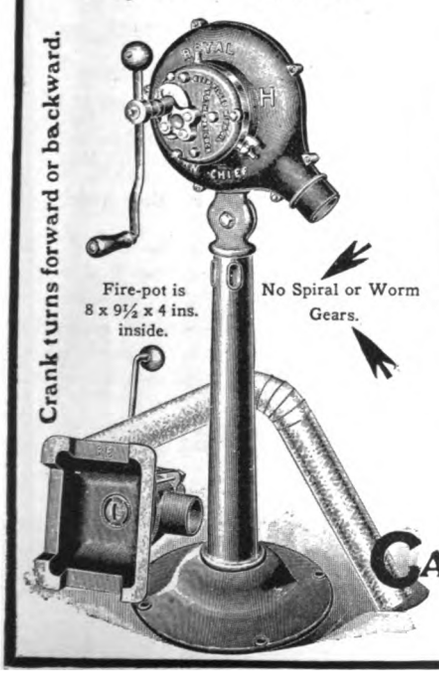
The Names — "ROYAL and WESTERN CHIEF"

When found on a Forge, Blower, Drill, or other Blacksmith Tool—mean that that article is better than the ordinary. They mean that in its construction the best materials and the highest skill obtainable have been employed. They mean that years of experience have served to perfect it. They mean the tool is a success, and quality alone has made it so. Dealers and Blacksmiths in general will procure what they like best. We must deserve before we can obtain trade. There is no doubt about our deserving, because our production grows rapidly.

There is a reason—Quality

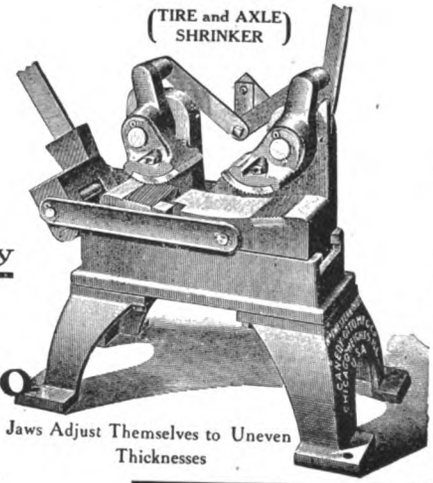
They are all the Best!

Royal Blower



No. 1 Western Chief

(TIRE and AXLE SHRINKER)



Jaws Adjust Themselves to Uneven Thicknesses

MADE BY

CANEDY OTTO MFG. CO.

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"DEFIANCE" WOOD-WORKING MACHINERY

Invented and Built by
THE DEFIANCE MACHINE WORKS
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FOR MAKING

Wagons, Carriages, Automobiles,
Hubs, Spokes, Wheels, Rims,
Shafts, Poles, Neck-Yokes,
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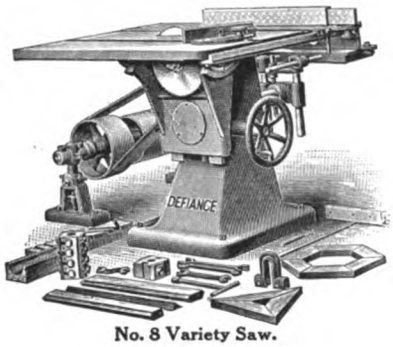
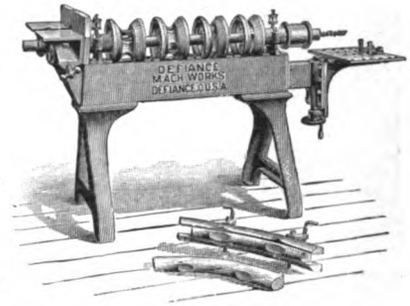
Spools, Bobbins, Insulator Pins,
Shoe Lasts. Table Legs, Balusters,
Oval Wood Dishes & General Wood-Work.



No. 8 Variety Saw.

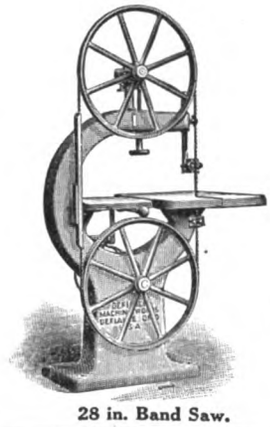


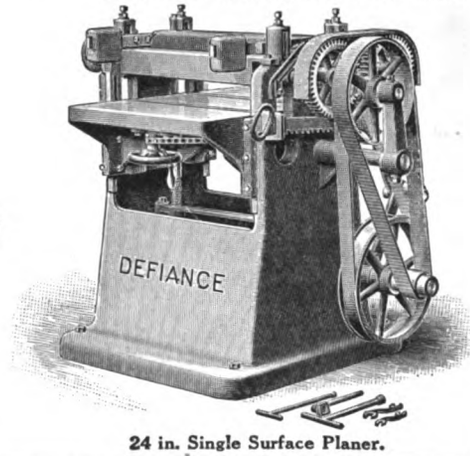
No. 2 Rounder with 6 in. Buzz Planer & Boring Attach.



No. 6 Vertical Borer.


No. 1 Post Borer.


28 in. Band Saw.



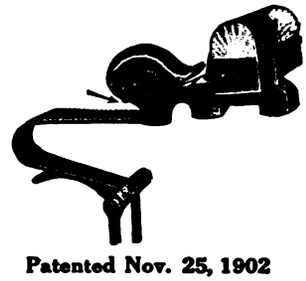
24 in. Single Surface Planer.

Eccles Ball Bearing Couplings

ALL OUR COUPLINGS ARE SHIPPED OUT WITH TWO-PIECE BUSHINGS FASTENED IN THE COUPLINGS

When Bushings are worn out by long use they can be instantly replaced and fastened into the socket by our special process.




Patented Nov. 25, 1902
Patented June 11, 1907

The spring is pivoted at the front so that it can be turned out of the way of the wrench while clipping Coupling to the axle.

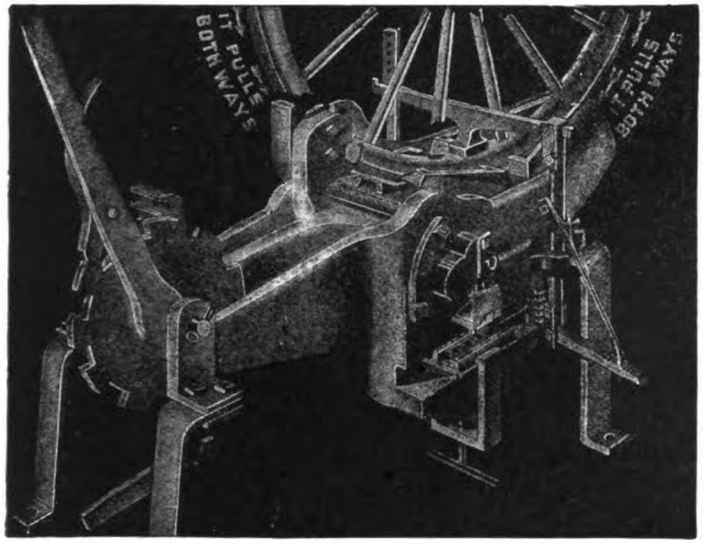
NO LOST BUSHINGS WHEN YOU USE OUR COUPLINGS

Catalog No. 15
is our Latest

We make a full line of
Carriage and Wagon Forgings

RICHARD ECCLES COMPANY, Auburn, N.Y.

HOUSE COLD TIRE SETTER



Here are four reasons why this is the Cold Tire Setter to buy:

First: **They set a tire easier, quicker and better than it can be done the old way or with any other cold tire setter.**

Second: **They never wear out nor get out of fix.**

Third: **They are the cheapest machine on the market that will do the work they do, and besides have a shear and punch thrown in.**

Fourth: **All the above claims are positively true and are proven by the fact that there are more of them in successful use today than there are of all the other makes put together.**

HOUSE COLD TIRE SETTER CO.

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J. H. HOUSE, 201 Church St., Toronto, Ont.

The Bradley Patent NON-SLIPPING HORSESHOE



Mr. Horseshoer:

If you are satisfied with the old conditions of horseshoeing—making a Rolling Mill of yourself—you will **not** want the Bradley Shoe; but if you are looking for a shoe whereby your profits will be just as large with one half of the labor you will want the Bradley Shoe.

It is the man who keeps abreast of the Times who is successful in every business.

The Bradley is the only practical shoe today that contains all the merits of all other shoes combined and merits that no other shoe has.

The shoe that is practical for all kinds of horses under all kinds of conditions—Summer and Winter—can be bent or shaped to fit any horse under the sun.

We will send prepaid to any address in the United States for $1.00 one set of either of the four sizes 3, 4, 5 and 6. If your jobber does not handle these shoes send to us for wholesale prices and further particulars at once.

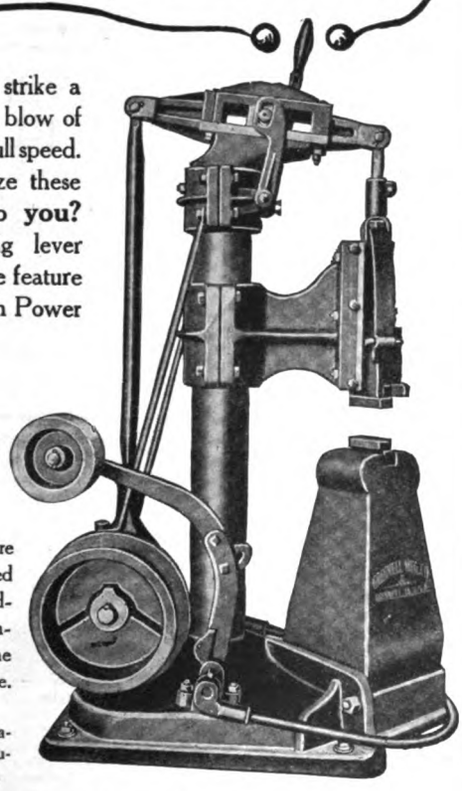
THE BRADLEY PATENT HORSESHOE CO.

CHESTER, DELAWARE COUNTY, PA.

TOUCH THE LEVER

and you can strike a light or heavy blow of many tons at full speed. Do you realize these advantages to **you?** The regulating lever is the exclusive feature of the Modern Power Hammer.

Makes Smithing Easy.



The new square base is a marked improvement, adding about one hundred pounds to the weight of machine.

For illustrated Catalog and full particulars free, Address,

MODERN SALES CO.,

GRINNELL, IOWA.

Star Steel Shapes

Now is the time to order them for Your Spring Business.

Plow Share Blanks,
Quick Repair Shares,
Landside Plates,
Moldboards,
Cultivator Shovels,
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Shovel Points,
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All sizes and qualities; every one guaranteed.
All Jobbers handle them.

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Carpentersville, Ill.

LAFFITTE
WELDING PLATES

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AND OUR BOOKLET

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PHILADELPHIA, PA.

Vulcan Iron Works
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Prices and goods right



Catalog free, write today

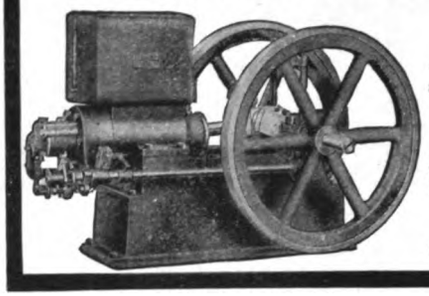
Universal Tenon and Boring Machine

for wagon repair shops. **Cuts tenons on set of wheels in twelve minutes.**

When you write to an advertiser, name The American Blacksmith.

$ MORE DOLLARS; LESS WORK $

How would it suit you to take the agency for



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Your experience is worth something. If you use a "Witte" your customers will want them; why not sell them and make the profit. Our engines are

GUARANTEED FIVE YEARS

Have been on market 25 years; advertised and sold everywhere; lots of good selling points; write for introductory proposition stating size you can use.

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Might as well say, "A watch is a watch."
It pays in the long run to get the best.
Insist on the ◈ a perfect Guarantee.

The ~~CLEVELAND~~ Twist Drill Co.
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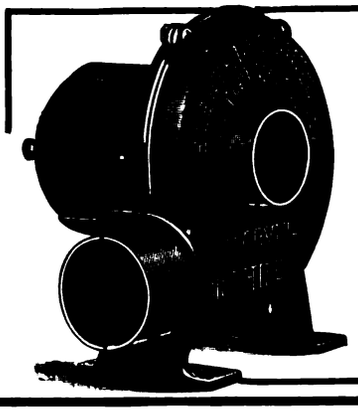
Roth Forge Blowers

BLOW! BLOW! BLOW!
for you. for themselves. for US.

ROTH BROS. & CO.
136 Liberty Street, NEW YORK
1390 West Adams Street, CHICAGO, ILL.



"MARVEL" ELECTRIC BLOWERS

"ONE FIRE" Marvel, -	$28.00
For 4 Light Fires, - -	55.00
For 4 Medium Heavy Fires,	70.00
For 4 Heavy Fires, - -	80.00
For 8 Heavy Fires, - -	120.00

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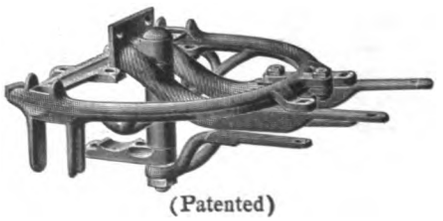
ELECTRIC BLOWER CO.,
352 Atlantic Avenue, BOSTON, MASS.

The Dayton Fifth Wheel is sold by nearly every Carriage Hardware Jobber

The Dayton Malleable Iron Co.
Dayton, Ohio



(Patented)

Blacksmiths Should Clip Horses

A profitable branch of a blacksmith's business is that of clipping horses. It's a branch which requires no previous experience, which is busy when other branches are quiet, and which can be installed at a total cost of $7.50.



For $7.50 buys the best horse clipping machine on earth—the Stewart. For this small outlay blacksmiths can add many dollars to their regular profit, and can earn it in the season *when their other business is dull.*

The Stewart No. 1

is a ball-bearing horse clipping machine. Its gears are inclosed away from dirt and dust and run continually in an oil bath. Operates practically without friction or wear.

The *Stewart* does *not* require experts to operate it. The action is entirely automatic. A slow turn of the handle gives great speed to the cutting knives. Horses can be clipped in a fraction of the time required by the hand clipper methods, and inexperienced labor can do the work. Furthermore, the clipping is cleaner and easier.

Price of $7.50 is for the outfit *complete.* It comprises a machine of first class materials and construction, six feet of easy running flexible shaft, and the same Stewart one-nut tension knife as is fitted to our highest priced machines.

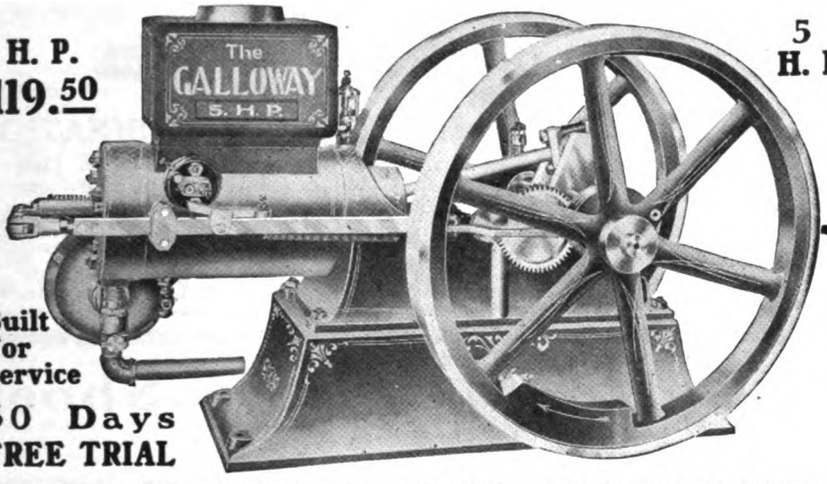
Get one from your supply house, or send $2.00 for one today, balance C. O. D. We guarantee satisfaction. Start making *more* money.

Chicago Flexible Shaft Company
186 Ontario Street, Chicago

When Writing to Advertisers Mention The American Blacksmith

5 H. P. $119.50

5 H. P.



Built For Service

30 Days FREE TRIAL

THE GALLOWAY GASOLINE ENGINE

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa

will run your shop at several times its present capacity and enable you to take lots of jobs that you have to turn down now because you have not the capacity.

Only four things to do: **Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start,** and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high-grade engine for 15 years. Over 2,500 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember the bore and stroke counts and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests.

On the larger sizes, if it is not entirely convenient for you to pay all cash, I will take your note for the balance at the regular rate of interest for 6 months.

The price given is for the 5-horse power only, but we make these engines in seven sizes.

Note my special proposition to blacksmiths.

I have a plan by which every blacksmith can partly or entirely pay for his own machine. It's good; it's away out of the ordinary; and you will be overlooking a big chance if you don't write for my proposition.

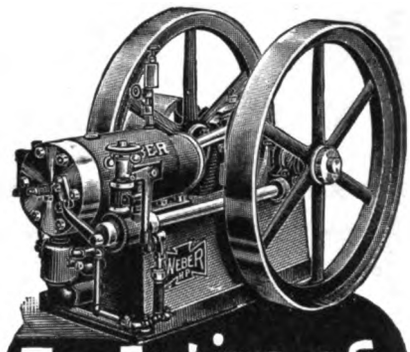
Ask for my free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure.

WRITE TODAY. WILLIAM GALLOWAY, President.

THE WILLIAM GALLOWAY COMPANY, 577 Jefferson St., Waterloo, Iowa.



See pages 36 and 37 for Classified Buyers' Guide.



The Engine of Reliable Records

Getting the most engine for your money does not mean buying the cheapest—it is a matter of securing an engine that will give reliable results year in, year out—the speed must be steady and uniform—absolute interchangeability of parts assured—actual power must equal rating. Every requirement of the blacksmith who wants a simple, reliable, powerful engine for all light work—running drills, emery wheels, blowers, etc.—is met by the

Weber Gas or Gasoline Engine

Some of its special features are—underground gasoline reservoir for main gasoline supply—gasoline pump, pumping supply to engine; surplus returning to reservoir—electric igniter—heavy and rigid construction (see cut)—a perfect control governor by which the operator can change speed instantly—all parts easy of access and guaranteed interchangeable—small number of moving parts. It takes but little room, adds to capacity of shop and costs little to operate.

Sold Under Our Absolute Guarantee

Write today, telling us for what you need power and we will send you our new handsomely illustrated catalog fully describing the Weber Engine best suited to your requirements.

Sheffield Gas Power Co.
121 Winchester Place **Kansas City, Mo.**

Let it Furnish Power for You

BLACKSMITHS MAKE MONEY



HAND FORGED, WARRANTED KNIFE BLADES
Price to you, ONLY $1.50 per dozen. You sell at 50 cents each.
Knives finished complete, nicely polished, only $2.00 per dozen.

HAND FORGED
Butcher Knives
WARRANTED

YOU can make good money selling our **HAND FORGED, WARRANTED KNIFE BLADES** made especially for **BLACKSMITHS,** from the very best crucible tool steel, tempered by our special oil-drawn process, and ground ready for use. No marks or brand, excepting the word "warranted." Handles ready to be put on sent with each knife.

Send us your order **TODAY** for a few dozen and supply your friends and customers with the best knives they have ever used. You can also put out agents.

We warrant every knife and agree to replace each poor one with **TWO** good ones.

We refer you to the **NUNDA BANK** of NUNDA, N. Y., as to our reliability.

Providing you would like to see samples, send $1.50 TODAY and we will send you 12 of our best sellers, all shapes and sizes.

WOODWORTH KNIFE WORKS, NUNDA, N. Y.

Established 1876 ***F. E. WOODWORTH, Proprietor***

CORN BELT MILL

This mill is strongly constructed, and takes less power than any other mill of its capacity. The lathe-centered burrs insure fine, even grinding. The new feed regulator gives perfect regulation on ear corn as well as small grain. **The burrs may be changed in three minutes.** This feature is worth the price of the mill to a good many.



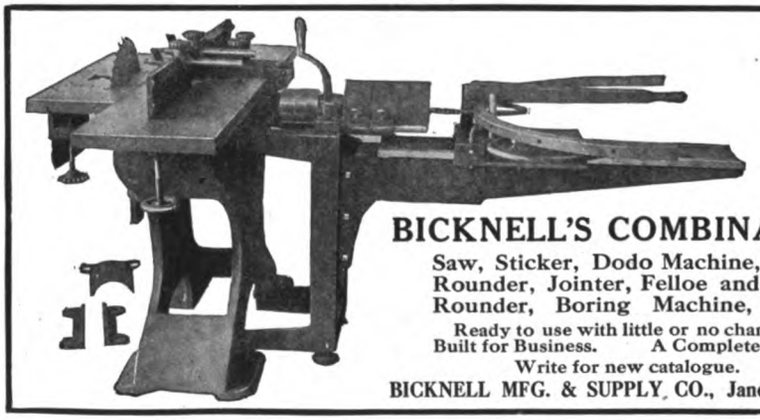
Try it 20 days FREE

We would like to have you test a Corn Belt Mill on your farm for 20 days. If it doesn't do its work better than any mill you ever used, send it back at our expense. Learn more about this mill. Write for booklet to-day.

SPARTAN MANUFACTURING CO.
DEPT 51 PONTIAC, ILL.

Saves Figuring You will not have to stop to figure out this or that dimension on a piece of work. Just refer to **FODEN'S MECHANICAL TABLES.** This book gives Circumferences of Circles by eighth inches up to twenty feet, weight of Rectangular Iron, Round and Square Bar Iron, Angle and Sheet Iron, and other miscellaneous tables. Cloth Bound. Price, 50 Cents. Sent to any part of the world postage prepaid.
AMERICAN BLACKSMITH COMPANY, P. O. Box 974. Buffalo, N. Y., U. S. A.

See page 19 for Index to Advertisers.



BICKNELL'S COMBINATION

Saw, Sticker, Dodo Machine, Pole Rounder, Jointer, Felloe and Gear Rounder, Boring Machine, Etc.

Ready to use with little or no changes.
Built for Business. A Complete Outfit.
Write for new catalogue.

BICKNELL MFG. & SUPPLY CO., Janesville, Wis.



When You Buy Horse Shoes

Is it not preferable to make your selection from the most complete line and the best shoes on the market?

United States Horse Shoes

"In a Class by Themselves"

Our Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today.

We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.

United States Horse Shoe Company

Rolling Mills and Factory, ERIE, PA.

Start Saving 25 to 40% on Tools and Supplies

MR. BLACKSMITH AND MR. WAGONMAKER:

You're the man we want to talk to. Tell you how to save money. By taking advantage of the bargains, we secure at

Sheriffs' Sales = Receivers' Sales = Manufacturers' Sales

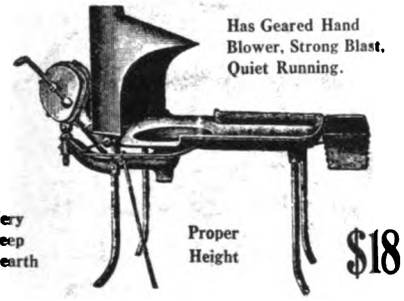
We have 400 buyers scouring this country for the best grades only of goods that you use daily, and we have just printed a mammoth catalog listing all these items. Every article guaranteed, and will save you 25 to 40 per cent.

You should have this Catalog. It costs us a dollar to print, but it's free to you for the asking. So "start saving money" by sending for this Catalog today. (Tear out coupon below.)

Very truly yours,
CHICAGO HOUSE WRECKING CO.

"EXTRACTS" from our NEW MAMMOTH CATALOG—ON ITEMS YOU BUY DAILY

Your Favorite Forge, $18.00



Dimensions

Height, 30 in.; size of hearth, 31x53 in.; diameter of fan, 12 in; weight about 290 lbs.

Catalog No. 4-A-459. Price, with Water Tank, as shown $18.00

Ball Bearing Spiral Geared Blower . . $14.95



Spur and gearing made of the finest hardened phosphur bronze and Swiss steel, with steel ball bearings. Runs smooth and noiseless. The perfect ball bearings and oiling devices prevent wear and friction.

We guarantee this blower makes more powerful blast than any other hand blower made, and produces a white heat nearly equal to the best power blast.

The height of crank is adjustable from 41 to 45 inches. Is equipped with center and side blast. Deep fire tuyere blower. Size 7½x9x4 inches. Has 13 inch fan case. Shipping weight, 135 pounds.

Catalog No. 4-A-461. Price, complete with tuyere, as shown $14.95

Green River Screw Plates, $7.96



Quality of Green River Plates is unquestioned. Make a perfect thread with a single cut; dies are adjustable.

Our Catalog No. 4-A-346. 5 each, Taps, Dies, and Guides, complete with tap wrench and stock, in hardwood case. Cuts ¼x20, ⅜x16, ½x12, ⅝x11 and ¾x10 threads.

Our price, complete $7.96

Premier Wrought Iron Anvils

Catalog No. 4-A-115.

Best in quality, form and finish. Steel face is a solid piece planed smooth after welded.



Absolutely Guaranteed

Weight.	Price lb.	Weight.	Price lb.
150 to 200 lbs.	7c.	70 to 79 lbs.	10½c.
120 to 145 lbs.	9c.	60 to 69 lbs.	11c.
80 to 119 lbs.	9½c.	50 to 59 lbs.	12½c.

Advance Self Feed Drill, $15



For Belt or Hand Power. Will drill 1 1-4 in. hole to center of 18 in. circle. Has special automatic feed device, located back of spindle. Has cam arrangement so as to give continuous feed. Stand heaviest service, yet is simple in construction, with a very few parts.

Dimensions—Height, 50 in. Table, 11 in. diameter. Gear Wheels, 8 in. Spindle, 1¼ in. Run of Spindle, 3 in. Size Column, 2 in. Greatest Spread of spindle to table, 16½ in. Spindle bored for ½ in. rounk shank drills.

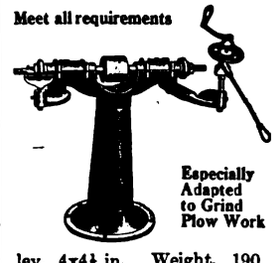
Catalog No. 4-A-34.

Weight, 190 lbs.

Price, ... $15.00

Up-to-date Emery Grinder, $14.25

Meet all requirements



Made for general shop work and grinding plows. Note Disc Grinding Attachment shown on right hand.

Dimensions—Height, 30 in. Base, 18 in. Arbor, 36 in. Shaft 1¼ in. Collar, 3¼ in. Bearings, 1¼x8 in. Pulley, 4x4½ in. Weight, 190 lbs. Will carry wheels 14x3 in.

Catalog No. 4-A-591.

Price with two rests $14.25

Extra for Disc Grinder Attachment, add .. 3.00

Get our prices on Lumber, Roofing, Tanks, Pipe, Plumbing and Heating Goods and save 30% to 50%. Our catalog shows over 50,000 bargains, in almost everything you use or buy daily. You need this catalog.

Horseshoe Nails 5 1-2c. per Pound.



Catalog No. 4-A. B.-96.

2,000 boxes of Bay State cold rolled Horseshoe Nails, made of best Norway Iron, sizes, 6, 7, 8, 9 and 10.

Price in bulk, 25 lbs. to box, 5½c. lb.

Or in 5 lb. cartons ..... 7½c. lb.

Queen City Special, cold rolled Horseshoe Nails, sizes, 6, 7, 8, 9, put up 25 lbs. bulk in a box, price per lb ..... 5½c.

"Bonanza," forged and pointed, warranted Horseshoe Nails, made of best Swedish stock, sizes, 6, 7, 8, 9, put up in bulk, 25 lbs to box, price per lb ..... 6c.

Ball Bearing Grindstones, $2.95



Catalog No. 4-A-1266. Strongest and easiest running grindstone on the market.

Frame made of angle steel. Ball bearings on journals and cups.

60 lb. stone, 22x2½.

Weight, complete, 85 lbs.

Price $2.95

Premier Double Geared Tiro Bender

First Class Tool in every detail.



Catalog No. 4-A-110.

Will bend 5 in. tire. or smaller to circle 24 in. in diameter or larger.

Price $6.75

Send Us This Coupon

Chicago House Wrecking Co., Chicago.

I saw this ad in AMERICAN BLACKSMITH.

Send me your Mammoth Catalog free of any expense.

Name.....

920 Town..... .....

Co..... State.....

CHICAGO HOUSE WRECKING CO.

35th and IRON STREETS, CHICAGO



Here Is The Proposition:

You take a KERRIHARD POWER HAMMER—put it in your shop for ten days. Test it in every conceivable way, and if it fails to make good with you—put the crate on it and return it to us.

We save you $25.00 to $50.00 on a hammer, under our plan, complete details of which will be sent on application, together with a handy pocket souvenir and book of Testimonials.



THE KERRIHARD COMPANY

RED OAK, IOWA **U. S. A.**

Sales Office: 315 E. Monroe St., Springfield, Ill.

FULL MOUNTED LIGHTNING SCREW PLATES

A handsome and durable set of Stocks and Dies at a very reasonable price. :-: :-: Send for catalog 34D.





Style of Stock used.

The style of Tap Wrenches used.



WILEY & RUSSELL MFG. CO., Greenfield, Mass., U. S. A.

STANDARD THE WORLD OVER

INDIAN CHIEF

AMERICAN TRENTON ANVILS

IT RINGS LIKE A BELL

TRENTON ANVILS Are forged, hot from scrap, but from two pieces of new, solid ingot Steel, welded at the waist, and faced with one solid piece of Special, High-Grade Tool Steel.

These Anvils are endorsed by leading Blacksmiths and Horseshoers *everywhere*, who express a decided preference for them.

Features of special note are:

1.—Long, perfectly shaped horn and long heel.

2.—Base with greatest possible area, or spread, insuring greater stability and absence of tipping when heavy work is done at the end of horn or heel.

3.—Base which does not require strapping down and which sits firm without shifting or rocking.

4.—Special temper of edges to prevent chipping.

5.—Faces level and true, and of correct proportion for practical work.

6.—Hardie Holes and Pritchell Holes and other mechanical details of exact accuracy.

7.—Trenton Anvils are unequalled for superior shape, graceful design, stability on the block and the absence of superfluous weight in the base.



Bottom View, Showing Base Hollowed Out, Permitting Anvil to Stand Firm Without Rocking



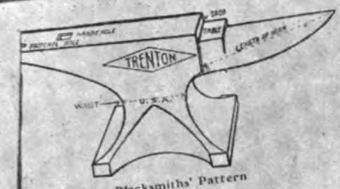
General Blacksmiths' Anvil



Horseshoers' Plain Horn Anvil



Horseshoers' Clip Horn Anvil



Blacksmiths' Pattern

Principal Dimensions of Regular Blacksmiths' Anvil

Face	Horn	Waist	Heel	Drop	Hardie Hole	Approximate Weight
3½ x 14	9½	5	1⅜	1⅜	1⅛	100 lbs.
3½ x 15½	10½	5½	1⅜	1⅜	1¼	125 lbs.
4 x 17½	11½	6	1⅜	1⅜	1⅜	160 lbs.
4½ x 19	12	6½	1	1	1⅜	200 lbs.
4½ x 19½	12½		1⅛	1⅛	1⅜	225 lbs.

Other sizes from 10 lbs. to 1600 lbs. in proportion.

Principal Dimensions of Standard Horseshoers' Anvil

Face	Horn	Waist	Heel	Drop	Hardie Hole	Approximate Weight
3½ x 15	10	5	1⅜	1⅜	1⅛	100 lbs.
3½ x 16	11	5½	1⅜	1⅜	1¼	125 lbs.
3½ x 18½	12	5½	1⅜	1⅜	1⅜	160 lbs.
4 x 19½	12½	6	1	1	1⅜	200 lbs.
4½ x 21	13½	6½	1⅛	1⅛	1⅜	225 lbs.

TRENTON

SOLD BY LEADING DEALERS EVERYWHERE

INDIAN CHIEF

Indian Chief Solid Box Vises

Improved design to give strength, power of grip, and uniformity of design.

Jaws solid steel Drop Forging, faced with one-half inch of Crucible Tool Steel.

SOLID BOX

Screw a solid one-piece steel forging. Thread of 20° angle, which is a great improvement on the old square thread, as it is stronger at the root and moves with less friction.

The concave and convex surfaces on Box and Screw and Washers make a perfect ball bearing at whatever point the Vise is opened; it is therefore impossible to break, bend or strip the thread.

Every Vise is inspected and tested at our factory before shipment.

Made by American Mechanics of experience. Comparison invited. We claim not "as good," but superior to any other Vise.

HORSE-SHOERS' VISE

After consulting with and studying the needs of Shoers, we have improved the design of our Horseshoers' Vise. Note the ample depth of jaws and flat top of front jaw, also the shapeliness and design of Vise.



Box and Screw

See table for sizes and dimensions.

Indian Chief Warranted Vises

HIGH GRADE SOLID BOX

Blacksmiths'

No.	Weight, Pounds	Length of Jaws, Inches	Depth from Top of Jaw to Top of Box, Inches	Vise Opens, Inches
25	25	3⅝	3¼	3½
30	30	3⅝	3¼	3½
35	35	3⅝	3½	3⅝
40	40	4	3½	4
45	45	4⅛	3¾	4⅛
50	50	4⅛	4⅛	4⅛
55	55	4⅛	4⅛	4½
60	60	5	4⅛	5
65	65	5	4⅛	5
70	70	5⅛	4⅜	5⅛
75	75	5⅛	4¾	5⅛
80	80	5⅛	5	5½
85	85	5⅛	5	5½
90	90	5¾	5⅛	5⅝
95	95	5¾	5½	5¾
100	100	6	5½	6
110	110	6	5½	6
120	120	6⅛	6	6⅛
130	130	6⅛	6	6⅛
140	140	7	6⅛	6⅛
150	150	7	6¾	7
160	160	7⅛	7	7⅛
170	170	7⅛	7	8
180	180	7⅛	7⅛	8
200	200	8	7⅛	8

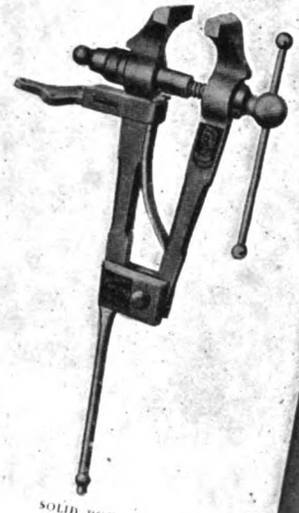
Horseshoers'

No.	Weight, Pounds	Length of Jaws, Inches	Depth from Top of Jaw to Top of Box, Inches	Vise Opens, Inches
60	60	6	6	6
65	65	6	6	6
70	70	6	6	6
80	80	6	7	6

Boxes and Screws

No.	Diameter, Inches	For Vise No.
1	⅞	25- 40
2	1⅛	45- 55
3	1¼	60- 75
4	1⅜	80- 95
5	1½	100-150
6	2	160-200

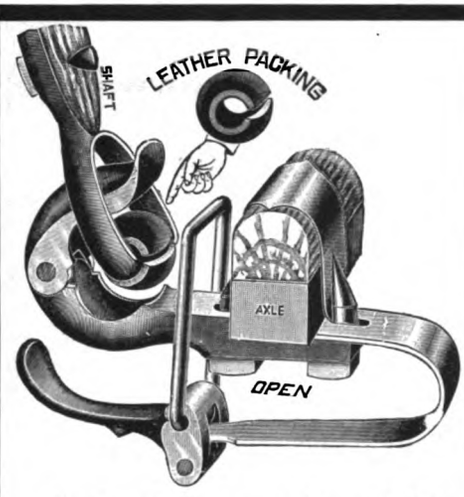
Indian Chief Blacksmiths' Vise



SOLID BOX

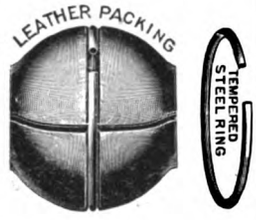
TRENTON

THE COLUMBUS FORGE & IRON CO. COLUMBUS, OHIO, U.S.A.



Placing the loop over the end of the cap and drawing the thumb lever back until it rests against the flat spring closes the coupler, keeps it closed, and takes up the wear of the leather packing.

Unless a Carriage Coupler is furnished with a moulded leather bushing and steel spring **just like this** it is **not a Bradley.**



THE

BRADLEY Carriage Coupler

All Steel, Noiseless, Quick Shifting, Ball Bearing.

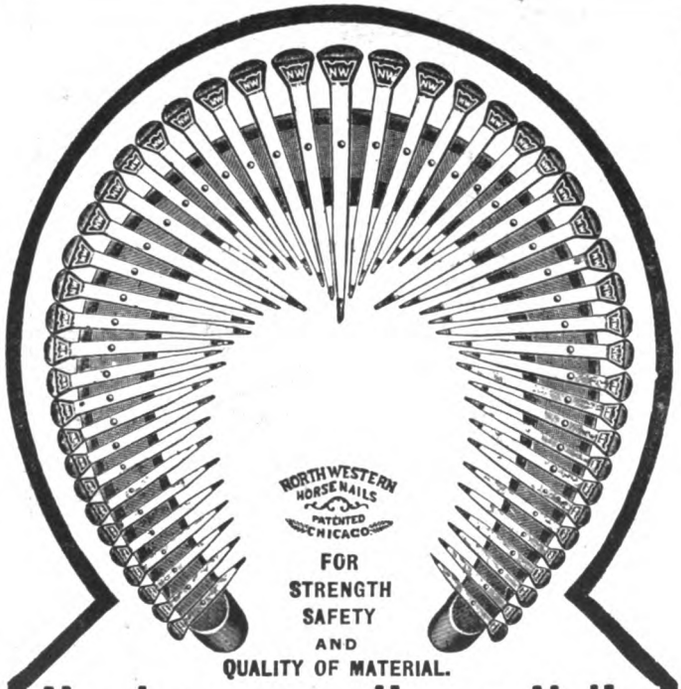
The ONLY Carriage Shaft Coupler that is furnished with a

One-Piece Moulded Leather Packing

A packing that will outwear any other packing ever made. It fits the ball and socket. It is held in place by a spring steel retaining ring. It may be put on and taken off in a jiffy, and it stays where it is put.

C. C. BRADLEY & SON

SYRACUSE, N. Y.



FOR STRENGTH SAFETY AND QUALITY OF MATERIAL.

Northwestern Horse Nails

ARE THE BEST ALL AROUND

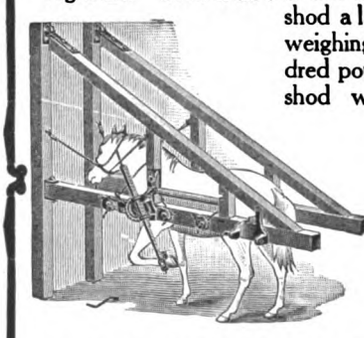
The most perfect in form and finish. Made of the best Swedish Iron. Will hold a shoe longer than any other nail made. Note the re-enforced point—makes it easiest to drive and the safest to use.

UNION HORSE NAIL CO., CHICAGO, ILL.

GEO. BARCUS & CO.,

P. O. Box 45, Wabash, Indiana.

Gentlemen:—Your favor at hand. Glad to know I can get repairs. The stocks are just as necessary to the shoer as his anvil. Each pair stocks need two leg arms. That is all that can be used safely. I have shod a large number of horses weighing over nineteen hundred pounds that could not be shod without being tied up some way. All these stocks need is a good, level headed operator, and they will handle any kind of vicious horses. I will go out of the shoeing shop when we have no stocks, as I am tired of throwing horses to shoe them.



Hoping you can fill my order satisfactorily, I remain,

Respectfully yours, W. B. KIRKER.

Worthington, Ohio.

Write us *your* experience with

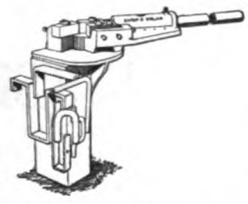
THE BARCUS HORSE STOCK

BOLT CLIPPERS
PORTER PORTER PORTER
EVERETT, MASS. U.S.A.

THE HITCH THAT HOLDS
An entirely different Spring, for use with forged, malleable or wrought hooks; foolproof, and last as long as the wagon.
Send for free sample and folder "K".
J. H. SESSIONS & SON, Bristol, Ct., U. S. A.

LEARN THE AUTOMOBILE TRADE

With Dyke's Course—only $5.00 cash needed. New system by Working Models, Charts and Lessons. Run a Repair Shop. Drive a Car—big demand, big pay. Satisfaction guaranteed. Sent on trial. Send for Free Instructive Pamphlet now.
Our Books actually Sell. Dyke's Cor'p School, Dpt. B, St. Louis, Mo.

Bend It Right
WRITE TO—

FREE catalog
Estep & Dolan
Sandwich Box 117 Illinois

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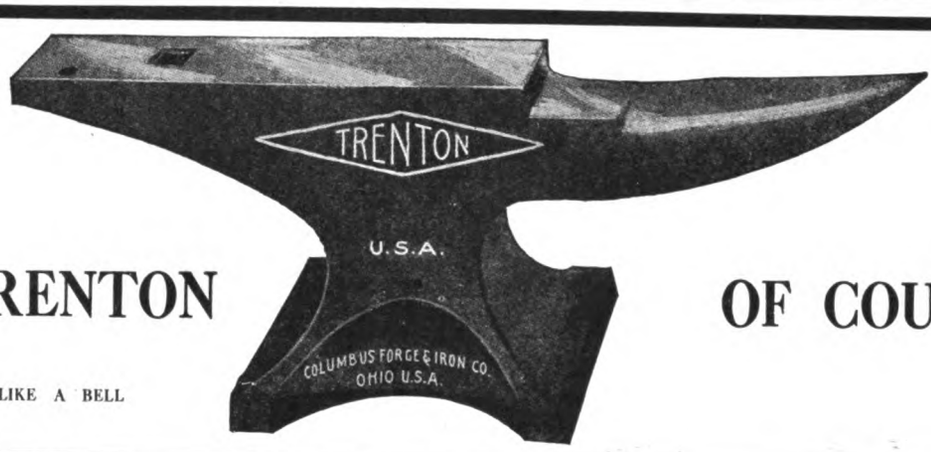

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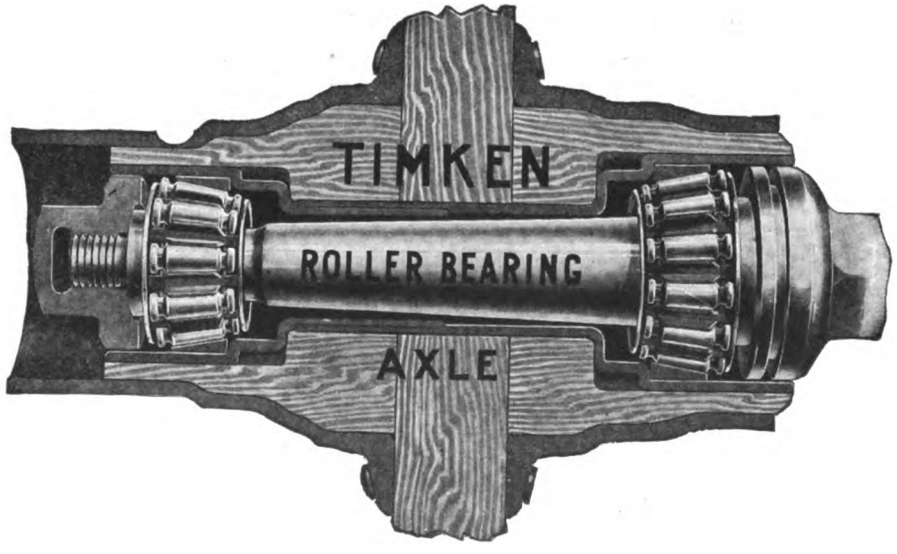

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Your Needs.

Do you need a new shop, a helper, a new boss, a partner, or do you need machinery? Do you want to sell something to your brother readers? Then just read this letter from a Minnesota smith, who has a little four-line want advertisement in a recent issue: "That little ad in THE AMERICAN BLACKSMITH brought results in a hurry. We had so many inquiries that we didn't know what to do with them all. We had letters from blacksmiths in at least twenty different states." And that from a little four-line ad. If you want to buy, sell or exchange something make it known to the thousands of AMERICAN BLACKSMITH readers by means of a want ad. The cost is nothing compared with the circulation. Ask the advertising department.

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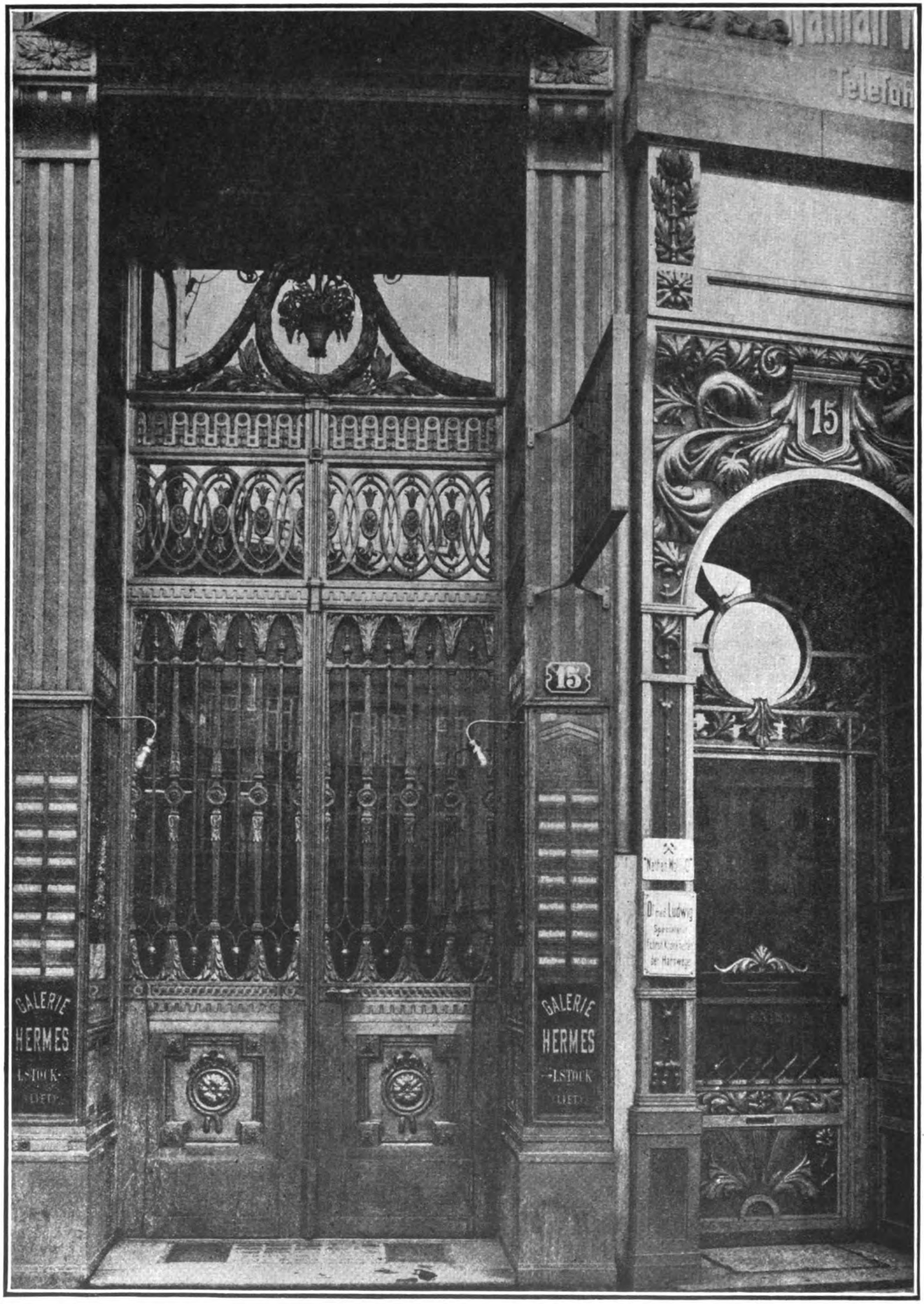
Last season lots of "Our Folks" waited too long before ordering their calendars and, consequently, many were disappointed because our supply was exhausted. This season we want every one of our friends to get some of these excellent trade winners. We don't want you to be disappointed. And you wont be if you send in your order now, right away. We've still got a number of calendars for those readers who could not order before. But, if you don't order by return mail, you're likely to be disappointed. **Sit right down now** and write out your order for some of these calendars. You'll never regret spending such a small amount to bring you such an increase in business. Read "Advertising Your Shop" on page 74 of this paper—Then act.

Change of Address.

Don't forget to give both your old and also your new address when notifying us of a change. This is important to you as well as to us. If you don't give both addresses it may mean your missing one or more issues of the paper. So kindly bear this little matter in mind



SOME EXAMPLES OF GERMAN ORNAMENTAL WORK IN BRONZE



Art Work in Iron

Some Beautiful Examples of Hand-Wrought Work



ORDINARILY we look upon a rose as a beautiful creation of nature, and when a man attempts to imitate nature we say—impossible, but when a man tries to simulate the rose in iron and comes as close to nature as the accompanying engravings show we describe the accomplishment as nothing less than wonderful. And the reader will admit that the examples of hand-forged work shown in the accompanying engravings are really wonderful examples of the art smith's work.

These pieces of iron floriculture were all made by Mr. James Cran, of New Jersey. Mr. Cran has contributed several articles to these columns and was introduced to our readers some time ago as the first to make an iron golf club in this country. He has had a wide experience in almost all lines of smith work and can weld 6-inch shafting as well as turn the delicate petals of an iron rose.

In forging and imitating nature in iron Mr. Cran has used the natural rose and its leaves for his "blue-print." He has gotten as close to his model in nature as it is possible to get, and, withal, the only tools used are the forge, the anvil, the hammer and several pairs of different sized tongs. No riveting or pinning is used to hold the parts together—nothing but out-of-the-ordinary forging with a hammer and some very neat welding.

The delicacy of the pieces forged may be judged from their size and the extreme lightness in comparison. The example shown at the top of page 55, for instance, is 16 inches long by 9 inches wide and weighs but 34 ounces. The piece comprises 2 roses, 2 buds, 7 leaves and consists of 108 separate pieces of Swedish iron, all welded together. The time to make the piece complete from start to finish was fourteen hours. The piece shown at the bottom of page 56 is a card-tray and represents 3 roses, 2 buds and 14 leaves, forming a spray around the edges of a large leaf which is 10 inches long and forms the tray proper. The entire piece consists of 178 separate pieces welded together. The length over all is 16 inches, while the greatest width is 12 inches, yet the weight is but 64 ounces. The time required to forge this piece was 27 hours.

In Fig. 2, page 55, is an ornamental



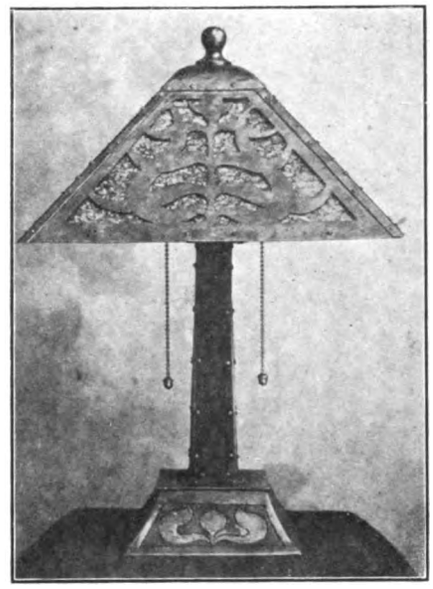
FIG. 2—AN ORNAMENTAL SPRIG

sprig, consisting of 1 rose, a bud and 5 leaves. 60 separate pieces were used in making this and the time required was 8½ hours. The height of this piece is 9 inches, the width 7 inches, while the weight is less than 15 ounces.

The next rose spray, Fig. 4, consists of 2 roses, 1 bud and 6 leaves, made of 94 separate pieces of Swedish iron, all welded together. The bottom leaves with the stem form the base on which the piece stands. The height of this piece is 13 inches, the width 9½ inches and the weight 27 ounces. The time required to complete this piece was 13 hours.

The next piece shown is a spray of thistles, consisting of 3 thistle flowers and 14 leaves. The exact number of pieces required to make this spray is unknown, as there are over 100 pieces in each of the thistle flowers. The piece rests on the 3 lower leaves and the stem. The height of this piece is 12½ inches, the width 10¼ inches, while the weight is 38½ ounces, extremely light when one considers the amount of metal in the piece. The time necessary to complete the spray was 20 hours.

The examples of other work shown on these pages are from the forge of Mr. Thomas F. Googerty, instructor of forging at the Illinois State Reformatory. Mr. Googerty's work is very artistic and beautifully executed. The lamp is especially pleasing to the eye; free from over-ornamentation and well proportioned. The candlesticks are exquisite in their apparent simplicity, and show not only skill with the hammer,



AN ARTISTIC HAND-WROUGHT LAMP

but artistic ability as well. The smoker's cabinet is of oak with fittings of wrought iron and copper. It is very neat in design and well made. Mr. Googerty has devoted no little amount of attention to ornamental work in iron, brass and copper, and all of his pieces are excellent examples of the true art worker's art.

Iron Working and Ornamental Iron Work in Germany.

J. E. SCHWARZ.

Germany has always paid earnest attention to smithing and iron working. We find early reference to the steel weapons of the Teutonic nations, and throughout the middle ages Cologne, Innsbruck, Passau and other centers of the iron industry were already famous. In England we find German ironworkers hired by Henry VIII to revive the armorer's art. The smiths of Augsburg, Nuremberg and Munich were world-famous as armorers and produced the most costly suits of armor now found in most all of the famous collections. These German masters, besides embossing and encrusting the suits of armor with precious metals, added engraving, etching, gilding and painting. They were experts and were peculiarly painstaking in forging all manner of tools, utensils, instruments and weapons. Their shields were exquisite, their sword-hilts most wonderful in execution, and even instruments of torture were highly ornamented and embellished. Beautiful work was also done on strong boxes, domestic utensils and on statuettes.

In Germany, unlike other countries,

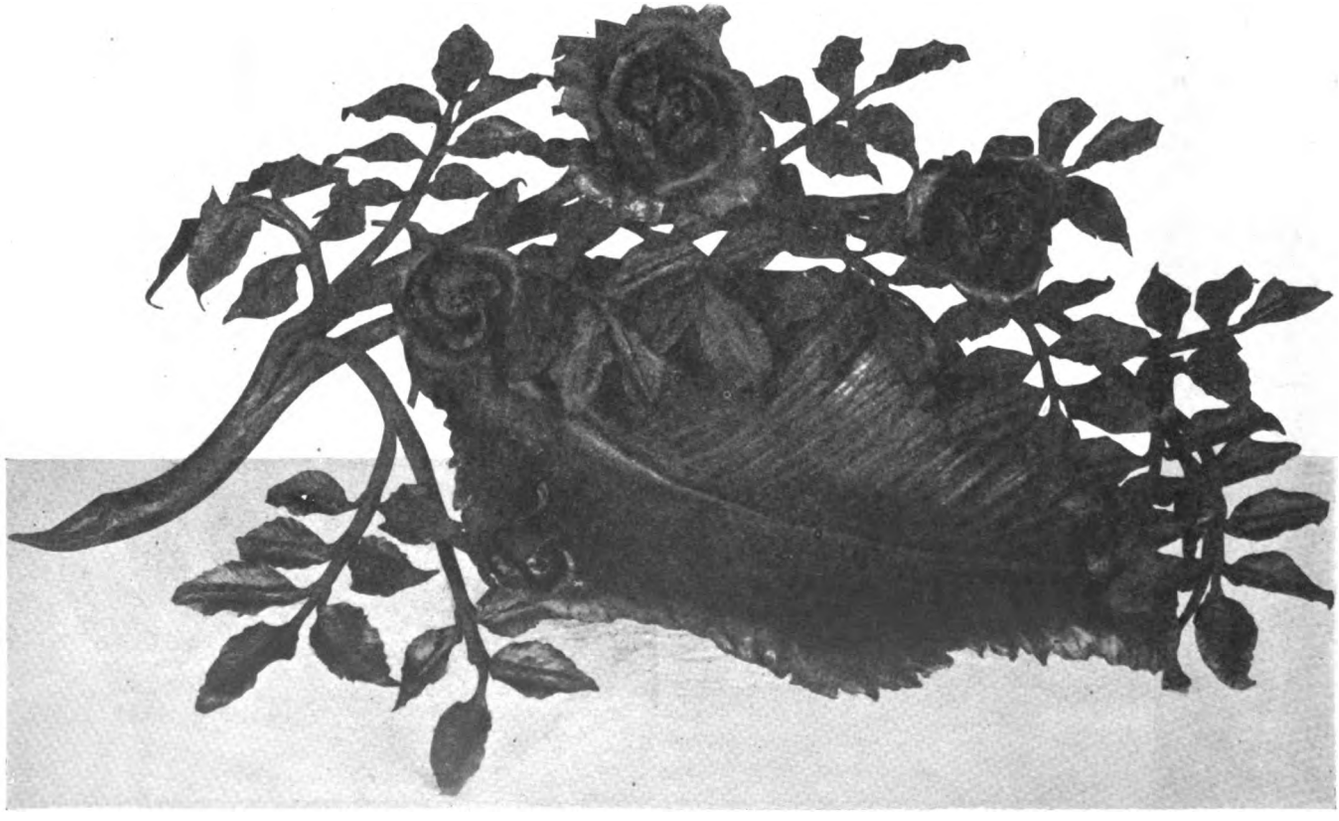


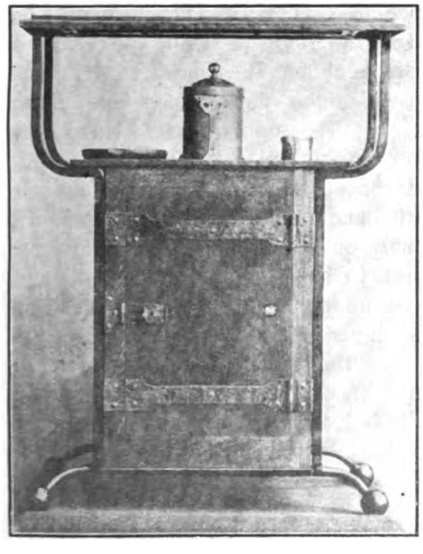
FIG. 3—A SPRAY OF ROSES AND A LARGE LEAF FORMING A CARD TRAY



FIG. 4.—FORGED IN THIRTEEN HOURS

the smithing craft has developed almost continuously since the thirteenth century. In France, Spain, England and Italy, while the iron industries were in full swing at times, they suffered much inactivity, often verging upon extinction. Nor were the opportunities for development limited to time alone. The Germans had space and the advantage of racial divergence, as smithing was practiced in some manner in every corner comprising the present empire.

In the 13th century German smithing exhibited characteristics distinct and

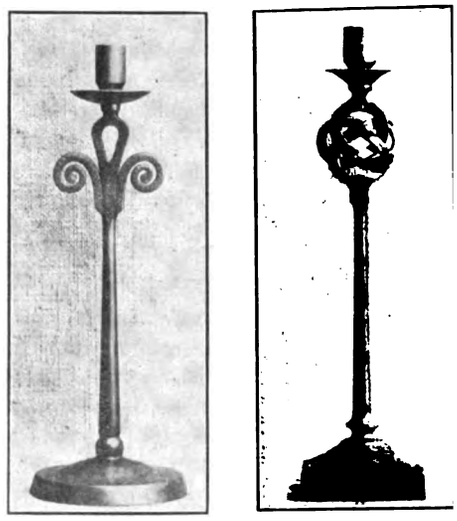


SMOKER'S CABINET IN WROUGHT IRON AND COPPER

most unique field for the study of the smithing craft. The development of smithing was left entirely in the hands of the workers themselves. Architects gave the smith a free hand and imposed no conditions, apparently, as to design. Of course, there were designers of armor who achieved great renown, but in other fields the artist did not meddle with the iron worker and the latter was consequently allowed to develop his own designs. There were no schools for teaching the art, but the apprentice and assistant was taught by the master and thus were traditions of style and design passed from master to helper. The work for most part was produced without drawings, the design being developed and worked out at the same time. Thus, the centers of grilles were worked with more or less complexity, with the loose ends ending in

apart from the styles and designs hitherto taken from the French, and from that time the German designs have changed and developed independently to a great extent. For instance, in the 15th century a distinctly new style of work appears, based on the thistle, the origin of which is assigned to the Matsys of Louvain, a family of smiths of singular renown.

In the Renaissance period Germany presents a



OF WROUGHT IRON AND VERY ARTISTIC

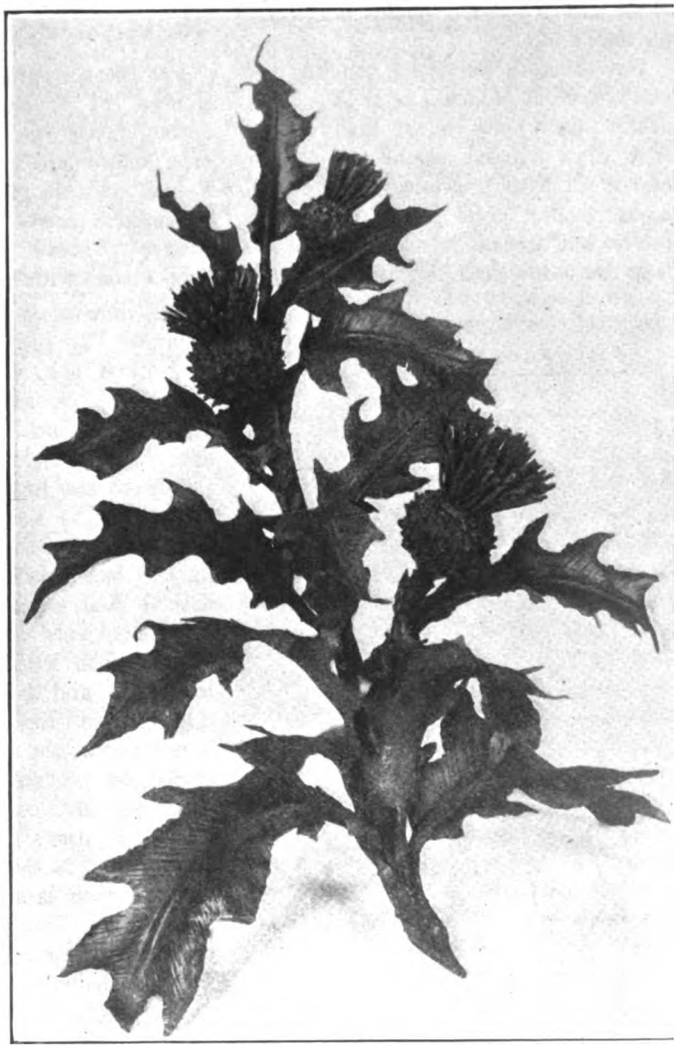


FIG. 5—EXTREMELY LIGHT FOR THE AMOUNT OF METAL IT CONTAINS

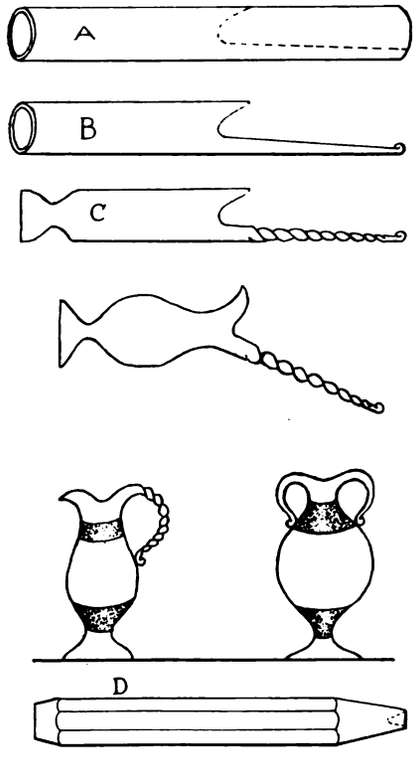
the traditional floral ornaments. There is no record of any illustration or drawing being made as a design or pattern for the guidance of the smith, and this is the more remarkable in that the age was prolific in designs and patterns for the worker of precious metals.

How to Forge Cups and Vases.

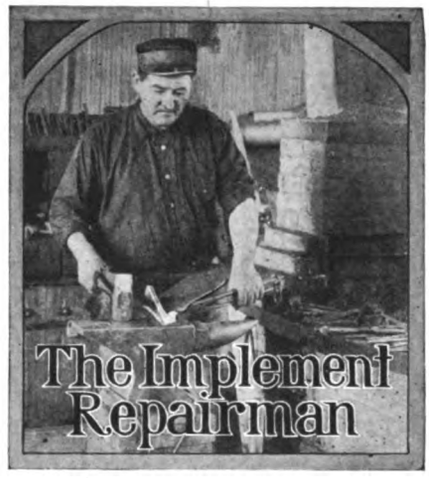
BERT HILLYER.

Take a piece of 2½ or 3-inch pipe, or a piece of seamless tubing is better, as it is not so liable to split when working it out, and mark and cut out as shown in the engraving. The piece for the handle should be about ⅝ of an inch wide and drawn down tapering, leaving a small knob or ornament on end. It may also be twisted about half way down. Now take a top and bottom necking fuller and close in about the diameter of your pipe from the end—say for a 3-inch pipe 3 inches from the bottom end start to fuller in as in engraving C. Now take a large fuller, put pipe over horn of anvil and shape up the bowl carefully, hammering it into the shape desired. Now take a wooden mallet and shape up the handle.

Now make a punch by grinding the end of a piece of stock, as at D. Put a center punch mark in end, then temper. Now draw a band around the pitcher and mark with this punch, which will make round dots. Then polish up bright and it can be nickel-plated, or heat very low and dip in linseed oil mixed with tannic acid (one gallon of oil to a tablespoon of tannic acid). Be sure and take it out while there is heat enough to burn the oil in while it smokes. Let it cool and it will be hard and glossy. The vases can also be made by leaving two handles on in place of the spout and one handle.



HOW TO FORGE CUPS AND VASES



How to Make a Wagon Jack.

W. H. GUNN.

For the accommodation of Mr. C. L. George, of Wyoming, I submit the accompanying description and sketch of a shop-made wagon jack. I made a jack on this plan for myself. The principle is correct and the jack itself is easy to make. One man can raise 3 or 4 tons with it.

The dimensions of the parts are as follows: The piece A at the bottom is 2 by 4 oak, 40 inches long. The upright pieces, of which there are 4, are 1 by 2½ inches in section and of oak. The uprights at B are bolted solidly to the base with an axle support at C to keep them rigid. The uprights at D are not solidly fastened to the base piece, but are attached with 1 bolt, so as to allow them to move backward and forward to some extent. The wheel E is placed on a long bolt and between the two uprights, to run freely. The top piece F is notched as shown and is then neatly ironed to prevent undue wear. The axle rests on this top piece when the jack is in use. The end of the lever G should fall to the bottom of the jack, where a cross latch should be located to hold it. Two irons 1½ by ⅛ inch are used to hold the lever in position and 7/16-inch bolts are used throughout.

The height of the jack is governed by the height of the average wheel to be raised. Between 3 and 4 feet is about correct.

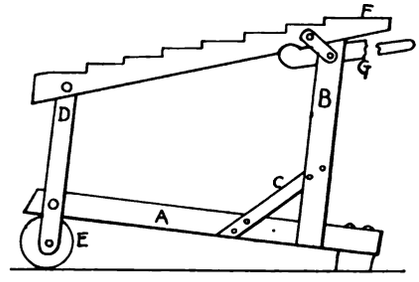
This vehicle jack is easily constructed and is quick acting. It is simply pushed under the vehicle until the axle rests on the step of the required height, when the handle is pushed down, thus lifting the wheel off the floor.

How to Point an Old Plow Lay.

C. W. METCALF.

There are so many different ways for pointing plow lays that it is hard to give the best way, but I will try and give Mr. Peckham a sketch of my way, which I have found to be, in my opinion, the best way. I generally use old plow lays. First cut a piece as shown in Fig. 1. A is about 5 by 2 inches and makes a good point. At B it is cut about ¾ inch wide and 4 inches long. Of course it depends largely on how bad the lay is worn. If worn very badly the point at B should be cut 5 by 1 inch and then hammer it together edgeways until it is of the same width as the land side. When you have this piece cut, scarf it as shown in Fig. 2, so that when you place the point, as shown at C, on the shin of your lay the point at D will just come to the edge of the lay.

Now to weld it on you want a pair of tongs with one long jaw, as shown



A SERVICEABLE WAGON JACK

in Fig. 3 at E, to reach down and catch the point F while you take a light heat on the point at G. You then remove your tongs and finish welding the upper part. Now take your chisel and cut the point about half off, cutting from the upper side and bend point back so it will fit snugly on the land side part and draw point to suit. Never bend the point back underneath before you weld on the upper part. Let it stick straight out as the dotted lines show and always knock off all scales that may be collected on point or land side before bending point back onto the land side to insure a perfect weld. This point, if properly made, when welded and drawn out needs no trimming at all. I hope this article will be satisfactory to my brother, and if there is anything

more that I can help him out with I would be very glad to do so.

Gun and Novelty Repairing—10.

W. G. MUMMA.*

Bluing and Browning.

In order to impart a finish and to subdue the brightness that all polished steel or iron has naturally, gun barrels and other work is either blued or browned. It prevents rusting, brings out the fiber of the metal and greatly enhances the appearance of the barrel.

Recipes.

Several recipes will now be given, from the cheapest to the most expensive.

1.—To get a cheap dark color for small parts heat quite hot then dip in linseed oil or coat the articles with linseed oil and burn off. If one time is not enough repeat the operation.

2.—To blue small parts heat a piece of iron to a red heat, then lay the articles on it until the desired color is had. This is a cheap way of bluing.

3.—To get a good cheap brown stain on gun barrels, one that is easily applied, is to take tincture of iodine diluted with one part of water, apply on barrel with a swab and let the barrel stand a while. Then repeat until the desired color is had, let stand about a day when the barrel will have a coat of stain on it. Then rub down with linseed oil, and afterwards varnish with shellac, when it will have a nice brown finish.

4.—Make a solution as follows: ¾ ounce spirits of niter, ¾ ounce tincture of steel, ¼ ounce black brimstone, ½ ounce blue vitriol, ¼ ounce corrosive sublimate, ¼ ounce copperas, 1 dram nitric acid and 1 pint of rain water. Mix in a glass vessel and bottle for use. Sometimes the tincture of steel is not to be had, then use a medicated tincture of iron, it will do reasonably well. This solution will brown barrels beautifully, and in case of twist leaves the marks prominent.

5.—One ounce sulphate of copper, 1 ounce sweet spirits of niter, 1 pint of water. Mix and in a few days it will be ready for use.

6.—One ounce tincture of muriate of iron, 1 ounce nitrate of ether, 4 scruples sulphate of copper, 3 grains muriate of mercury, 1 pint of rain water. Put in lime water to neutralize acid.

7.—One pound of sulphate of niter, 1 ounce of corrosive sublimate, 1 pound of alcohol. Mix and cork for use.

8.—One ounce of tincture of muriate of iron, 1 ounce of nitric acid, 4 scruples sulphate of copper, 1 pint of rain water. Mix well and bottle for use.

9.—One and a half ounces of alcohol, 1½ ounces of tincture of steel or iron, 1½ ounces of corrosive sublimate, 1½ ounces of sweet spirits of niter, 1 ounce of blue vitriol, ¾ ounce of nitric acid, 1 quart of rain water. Mix and dissolve in the water and keep in glass bottles.

10.—Two parts of crystalized chloride of iron, 2 parts of chloride of antimony, 1 part of gallic acid, 4 parts of water, soft. Mix and keep in bottles. This gives a brown tint and will resist moisture. The chloride of antimony should be as free from acid as possible. Apply with a sponge or cloth and let dry in a warm place and then wash with warm water and dry and rub with boiled linseed oil.

11.—For twist or laminated barrels: ½ ounce of tincture of sequia chloride of iron, 1 dram of corrosive sublimate, ½ dram of sulphate of copper, 1 dram of nitric acid, 6 drams of alcohol, 8 ounces water. Dissolve the corrosive sublimate in alcohol, then add the solution to the other ingredients and let the whole stand for a month or six weeks when it is ready for use.

12.—One half ounce of sweet spirits of niter, ¼ ounce of tincture of steel or iron, ½ ounce of corrosive sublimate, 60 drops of aqua fortis, 4 grains of nitrate of silver, 1 pint of rain water and a small lump of chalk.

13.—To brown barrels by other methods than the above recipes is to enclose the barrel in a tight chamber and then exposing it to a vapor of muriatic acid; a rust or browning coat can be had quickly. The barrels must be plugged up at the ends so as to prevent the vapor from getting inside the barrel. The same result can be had by applying to the surface a diluted muriatic acid or nitric acid. Butter or chloride of antimony is sometimes used. In using it a uniform mixture is made with olive oil. This is rubbed on the barrel which is heated, then expose it to the air until the brown is of the desired color. By using a little aqua fortis the action of the antimony is quickened. Damascus barrels are browned by first burnishing the barrels very nicely. Then cover with bone oil and then strew or drop wood ashes all over them. Now, heat in charcoal enclosed in a wire cage until the first dark blue is had. When the

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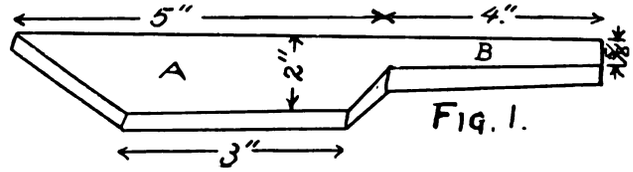


FIG. 1.

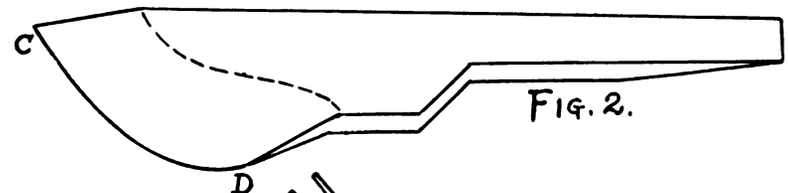


FIG. 2.

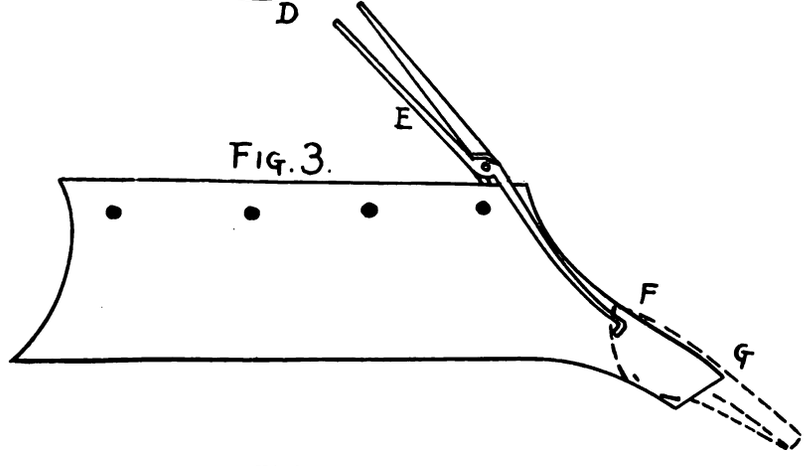


FIG. 3.

HOW TO POINT AN OLD PLOW LAY

barrels are cold mix some sulphuric acid in water and with a hard brush apply to the barrel. The acid will remove the browning from the steel portion of the barrel. The iron on account of its greater adhesion still retaining its blue color. Take care to keep a good color and not extract too much.

Belgian barrels can be browned by what is called "eat up", thereby getting that bright, wavy appearance sometimes called pickling, by eating the softer metals from the harder. The solution used is: 1 pound of blue vitriol, dissolved in 1 gallon soft water, boiling hot, which continue until the mixture is reduced to about one-fourth, then let it cool and pour out into a lead trough. Plug the barrels at the breech and muzzle so that the liquid cannot get into the barrel. When the barrels are immersed in the solution it will act on the metal in 15 or 20 minutes remove it and wash in water. If not satisfactory, immerse again until the operation is complete, then take out and pour boiling water over them and scratch the wall with the steel brush or card, which will give them the bright, beautiful, wavy appearance. Laminated steel barrels may be subjected to the same operation.



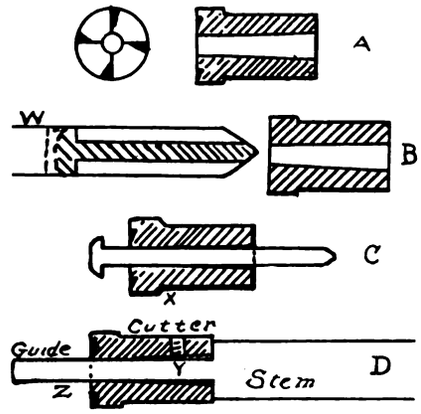
A NEAT LITTLE SHOP OF NORTH CAROLINA

Cheap, inferior barrels can be browned as follows: Dissolve as much muriate of mercury as can be taken up in a glass full of alcohol and mix this solution in one pint of water. A small quantity is poured on a little whiting and laid on the barrel with a sponge rather lightly, as soon as dry brush off, and lay on a fresh coating. Proceed thus until the barrel is dark enough, which will take two or three days. The rusting process is stopped by washing in hot water, after which the barrels are suddenly immersed in cold water. This has the effect of heightening the brightness of both colors; the solution causing the softer portions of the metal to turn a beautiful brown, while the other portions remain quite light.

To make plain welded barrels resemble twist can be done by wetting a thread or narrow card with diluted acid and wind it around the barrel so as to have spiral lines running all along the surface. Wherever the thread touches, a light coating of rust will be formed. The thread can be wound better by putting the barrel in a lathe and turned while the threads upon it are being guided by the hands. The barrel may be treated this way two or three times and the spiral windings of the thread will show the dark lines resembling twist.

Barrels can also be colored by what is called smoke staining. First, the barrels are washed with a little sulphuric acid to cause the metal to receive the effects of the gas more easily, it is then washed off and the barrel rubbed dry. A fire is built with coal possessing as much hydrogen gas and as little sulphur as possible. Burn the coals until they give a clear white flame with no black smoke, pass the barrels through that flame backward and forward until the whole is covered with a black, sooty coating, then place them in a damp, cool cellar and keep there about 24 hours, and if the place is sufficiently damp the iron parts will be covered with a red rust while the steel portions still retain the sooty coat. Scratch them off with a wire card and rub with a piece of cloth and wash or polish with water, using on the cloth a little flour of emery. The steel will be found to be an original bright color while the iron will be a little darker, rub dry and pass the barrels through the flames again, let them stand about 12 hours again to rust and then polish as before. The color will be darker every time it is smoked. A fine purple black for the iron and copper color for the steel are the darkest colors to be had. The principle of this stain is simply the hydrogen gas of the coal acting on the iron and the iron being of a softer nature than the steel which it does not affect. The flame also having a quantity of tar it is imparted to the iron by action of the oxide and when finished by filling up the space created it becomes more impervious to damp or wet than other stain or browning which is composed entirely of oxide of iron.

Sometimes in rebrowning old work the old browning still stays on in patches. These should be removed before the new is put on. Proceed as follows—put plugs in the breech and muzzle of barrel, then immerse the



MAKING SPECIAL SCREWS

barrel in hot lime water or strong lye for about 1 hour to remove the varnish, grease or stains, and wipe them off. Then put in vinegar in a wooden trough for an hour or so when the old browning can be wiped off with a rag.

To blue gun barrels finish the barrels with fine emery paper or they can be cleaned by the other methods to be described and then rub over quickly with nitric acid. When the desired depth of color is secured wash off with clean water, rub dry with a soft cloth and then rub with linseed oil to prevent any further action of the acid.

To get a transparent blue for iron or steel take Damar varnish, 1 quart, and fine ground Prussian blue, ¼ ounce. Polish the metal to brightness and put on thinly with a varnish brush. A fine and beautiful blue color will be had, but it will not stand rough usage.

To prevent barrels from rusting, heat the barrels gently and apply a coat of copal varnish. This will fill the pores sufficiently so that rust will not take effect. This will answer well while handling or keeping in the stores, but if the barrels are browned rightly they will not rust.

To apply the browning the barrels must be finished and polished; the more perfect the better the browning. No file marks or scratches or other defects must be left on the barrels. They must be cleaned of all dirt or grease, which is done by rubbing with lime, and the barrels should be plugged at muzzle or breech with wooden

plugs waxed, which serve as hand-holds, for the hands must be kept off the gun while staining. Do not let any of the mixture get inside of the barrels. Apply the solution with a sponge or cloth wrapped around a stick and the barrel should be evenly covered and let stand in a warm place about 24 hours, then rub off with a stiff brush or wire card. If the barrel is dry enough the rust will fly off quickly when using the brush, but if the barrel is not dry enough it will look streaky. Some solutions will dry sooner than others. The process of wetting and carding is repeated until the barrel has acquired the right or desired color. Then the barrel is freely washed with hot water in which a little potash is mixed, and washed again with clean water and dried thoroughly. A little lime water may be used to destroy any free acid that may be in the pores of the metal. Lastly rub with boiled linseed oil. There are many ways and methods of finishing barrels after browning. One way is to warm the barrels and rub them while quite warm with a flannel cloth and finish with a little beeswax and turpentine. Some use a steel burnisher and rub with white wax. Shellac varnish with a little dragon blood cut in alcohol mixed in and carefully applied with a fine brush makes a good finish.

Screw Making and Screw Cutting.

There are several different kinds of screws used in gun and novelty work, which all mechanics are familiar with, so it will not be necessary to give an extended description of them. Most of the screws can be had ready made and are made to certain standard sizes—but sometimes the mechanic will have to make them, especially the odd sizes and those used for special purposes. It will, therefore, be necessary to give some instructions as to how they are made, besides the mechanic can make some kinds quicker than he can get them from the maker. One can get quite a variety from old sewing machines, etc., at some junk yard. A list is given of the kinds most in use—such as flat heads, round heads, fillet heads, square and hexagon heads for set screws, which are also made with slots and are made in an endless variety as regards to sizes and lengths, all with the common V threads also some with square threads, and also some with round threads, all from coarse to fine.

TABLE OF MACHINE SCREW SIZES.

A table is given of the different sizes of machine screws.

Nos.	Dec. Equiv.	Nearest Fraction	Sizes of Taps.	No. of Threads Stand'd	No. of Drill to drill hole.
2	.084	5–64	Same as	56	46
3	.097	3–32	Gauge.	48	47
4	.110	7–64		36	44
5	.124	1–8		36	41
6	.137	9–64		32	37
7	.150	5–32		32	32
8	.163	x x x		32	30
9	.176	11–64		30	26
10	.189	3–16		24	26
11	.203	13–64		24	21
12	.216	7-32		24	19
13	.229	15–64		22	17
14	.242	1–4		20	13
15	.255	x x x		20	10
16	.268	7–64		18	8
17	.281	9–32		18	4
18	.295	19–64		18	2
20	.321	21–64		16	L'r B
24	.374	3–8		16	" L

JEWELERS' SIZES.

	.066		80	
	.055		100	
	.045		120	
	.038		140	

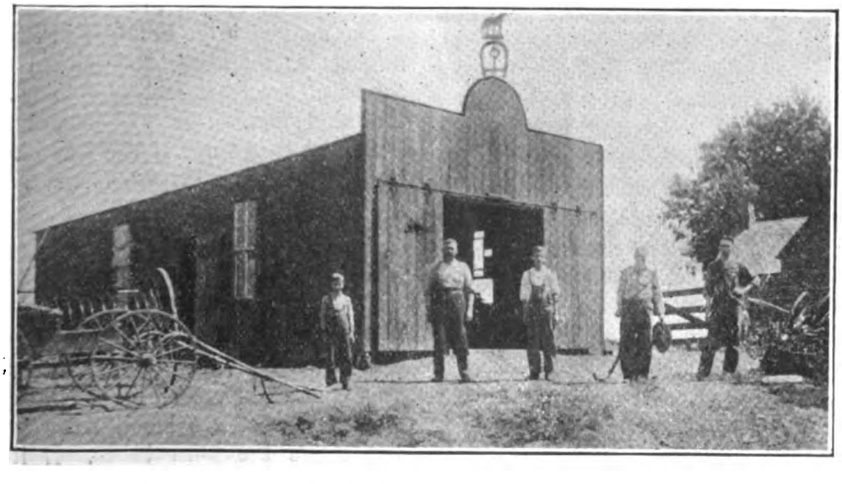
Screws are also made in fractional sizes. This is a list of the small sizes mostly with fine threads: $\frac{1}{16}$, $\frac{3}{32}$, $\frac{1}{8}$, $\frac{5}{32}$, $\frac{3}{16}$, $\frac{7}{32}$, $\frac{1}{4}$ and the machinist sizes above $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$, $\frac{11}{16}$, $\frac{3}{4}$, $\frac{13}{16}$, $\frac{7}{8}$ and up to any size.

The foregoing table corresponds to the sizes of taps and dies according to standard sizes that screws are made in. They are made in several forms such as plug, taper and bottoming. Nearly all blacksmith taps are made tapering. The above tables are given for V threads or U. S. S. threads.

Most all kinds of screws are made by screw machines adapted especially for the manufacture of them on a large scale. But the mechanic will have occasion to make them often by hand for he cannot wait to get them by sending off to some dealer. So a description of the tools to make them with will be given and he can make them himself according to standard sizes or even any other sizes. First take a piece of the best of tool steel of the proper size or large enough to make any size that he wishes to, then make an end mill as shown in Fig. 1. Say that a screw needs to be made No. 10—$\frac{3}{16}$ inch. Take a piece of steel about $\frac{3}{4}$-inch diameter and cut it off 1 inch long. Then drill a hole exactly in center lengthways, enough larger than $\frac{3}{16}$ so as to have plenty to cut the thread on with the die that is to be used to cut the thread on screw. Now, after the hole is drilled turn the outside up correctly, then cut 4 or 5 saw-like teeth on the end. Then ream out the hole on a slight taper from the back to the teeth or front. This is to keep the mill from sticking fast and heating when cutting the screw. When the tool is done put it into the brace then take a piece of steel the size of the head of screw and sharpen one end as in B, Fig. 1, so the tool will take hold. Then cut down to the length required, as shown. When this is done cut thread on screw, and saw off at W. The head of the screw can be finished up by chucking in lathe and turning rapidly against a file which will finish it nicely. Then cut slot in head. The reason that the thread is cut before cutting off for head is that the piece can be held in the vise much better.

A tool will have to be made for each separate size of screw. It is best to have a small shoulder at X to keep the tool from pushing up into the chuck of brace or lathe. Tools can be made to size up screw heads and also to round the heads, but if one has a lathe it can be done much better.

A set of counterbores can be made out of these tools by turning up a shank-

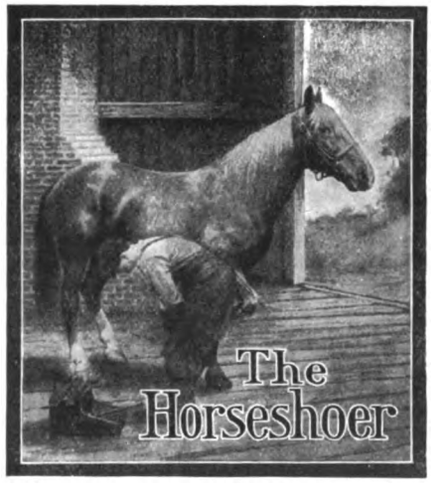


A GENERAL SHOP OF MISSOURI, RUN BY MR. B. A. VAN BIBBER

thus—4 or 5 inches long and of a size to correspond to the tools. Put in a set screw at Y. The part Z will serve as a guide. These tools can be used in a lathe by putting them in the chuck and push up the work by the tail stock of lathe when the screw can be made very rapidly. The slots in the heads can be made by using a hack saw or thin file. The old-time gunsmith used to make the screws by using these end mills in a brace, but a much better way is to use them in a lathe. They can be polished and finished up in the lathe. The screws should be hardened in oil so as to have them tough and hard. They can be blued after finishing by the methods heretofore described. The screws should be made to fit the nuts fairly tight—not loose.

In cutting the screws the dies should be worked backward and forward with plenty of oil. Keep the chips cleared away and do not let the dies choke up or stick fast, or they may become broken. The taps should be used in the same manner.

(*To be continued.*)

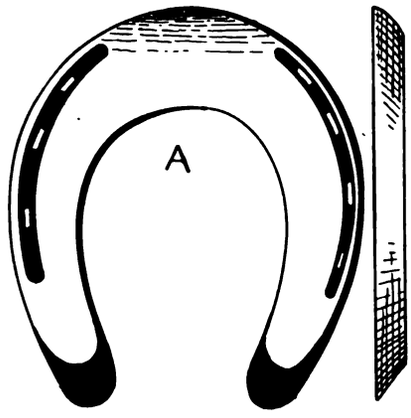


Forging and Its Cure.

W. O. JULIUS.

When the ends of the branches of the front shoe are struck by the toe of the hind shoe a horse is said to forge, and the defect is known as forging. The act is dangerous to the animal and is very liable to result in serious injury to both the front and hind foot. Forging is the natural result when the animal does not bring his front feet out of the way of the hind ones.

The causes contributing to forging are fatigue, faulty shoeing, careless driving and faulty conformation. In fatigue the horse's feet lag, thus

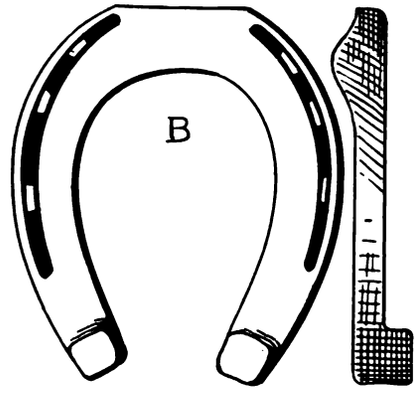


THE FRONT SHOES ARE BEVELED AT THE HEELS

causing the hind feet to strike the front ones at about the time that the front ones are leaving the ground. Even well-built, well-shod horses may forge when fatigued but, of course, the defect is only temporary then and the animal will return to his accustomed clear gait when fresh. Faulty shoeing will cause forging, especially when the toes of both hind and front feet are left too long and the heels of the front shoes are left too long. Carelessly driven horses may also be given to forging, especially if the animal is usually driven with a firm rein. And forging is especially liable to result if the animal is traveling over uneven ground. Horses whose conformation is faulty, those who stand higher at croup than at the withers, those who "stand under" both in front and behind and horses with legs too long and out of proportion to the length of their bodies, will naturally forge.

The cure or treatment of forging depends, of course, upon the cause, and this should, by the way, determine the treatment in any defect, disease or other trouble. Very little, if any, good can come of treatment administered at random or without attention to the causes contributing to the trouble. And the treatment of forging is no exception to these rules. In the case of fatigue there is nothing to do but to allow the animal sufficient rest to overcome his tendency toward slovenly going. When faulty shoeing is the cause of forging the remedy is, naturally, correct and scientific shoeing. The front shoes should be fitted close all around the foot; the shoe should be no longer and no wider than the foot. To increase the action the front shoe may also be forged with a toe weight, thus bringing the foot out of the way of the hind feet. The front shoes should also be finished with a bevel at the ends of the heels, as shown in the engraving at A.

The hind shoes should be formed as shown at B. The toe shortened and fitted with two clips, if necessary to have any, one on each side of the toe. If the shoer can attach a shoe so it will hold without the aid of clips I recommend that he dispense with the clips. Clips in my opinion are entirely unnecessary if the shoer knows his business, and if not properly applied clips cause more injury than they are worth. In fitting the shoe, do not, as some writers recommend, fit so that some of the foot extends for any distance beyond the toe of the shoe. The practice of fitting the shoe back from the edge of the toe stops the unpleasant noise of "clicking," but it wears away the toe of the foot. It were better to put up with the clicking for a time until the feet have been brought to their correct and normal action. To quicken the action of the front feet the toe of the front shoes should be made rolling motion, i. e., the ground corner of the shoe beveled



THE HIND SHOES ARE SLIGHTLY SHORTENED AT THE TOES

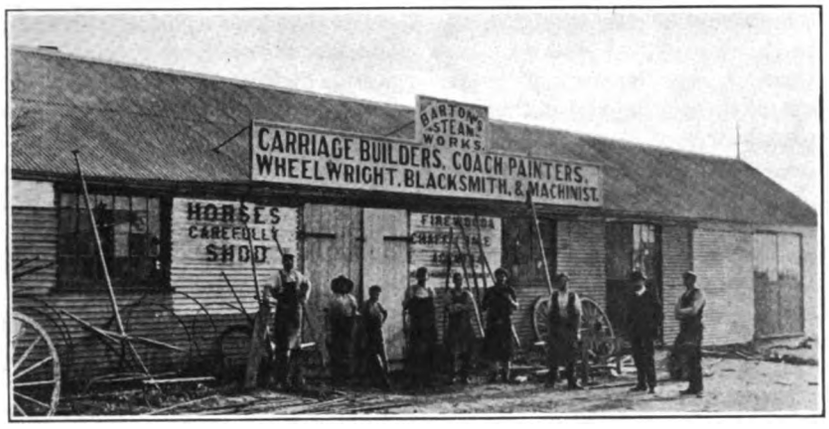
or rounded so that the foot will break over easily and quickly.

The method to be followed in curing forging is, therefore, to quicken the action of the front feet and to retard the hind feet. This will enable the front feet to get out of the way before the hind ones are thrown forward.

Corns and Their Causes.

A. F. LIBBEY.

There has been more written on this one point than on any other part of the horse's foot. Nearly all claim that it is a rupture of the small capillaries, and that the blood leaks down and colors the horn tubes. If it is a rupture of small arteries, what is



A GENERAL SHOP OF AUSTRALIA

the reason they do not heal and send off branches forming a new round of circulation? If it were a rupture, the blood would form in a sack similar to a blood blister on the flesh. If there were a rupture and it did not heal, but was absorbed, we would have enlarged arteries or veins and in a short time blood poison.

I consider that the corn is one of the first stages of change in the lateral cartilage, caused either by having the outer point of the toe low, which throws the heft on the inside quarter, or from high heels in the cup foot.

I have seen corns in low-heeled horses caused by raising the heels abnormally high with pads. Such feet usually have a slight arch in front of hoof. The pedal bone has settled at the point. The higher the heels are raised the more pressure we get on the bottom at point of toe, and the more congealed blood in the heels at the curve of the lateral cartilage. This will change the color of the horn.

We say the horse has corns. Well, why shouldn't he have? If we used a bar shoe for such feet with short ground bearing, that is, with toe calk set back on web of shoe and low heel calks, or for the lateral contraction a half-bar shoe with only two nails on the inside so that the foot can expand, we would not be bothered much with corns.

The inside quarter of nearly all driving horses is weaker than the outer. They are so formed in the normal hoof that they will fall in line with the center of gravity in the body when the horse is in motion.

A General Shop of South Australia.

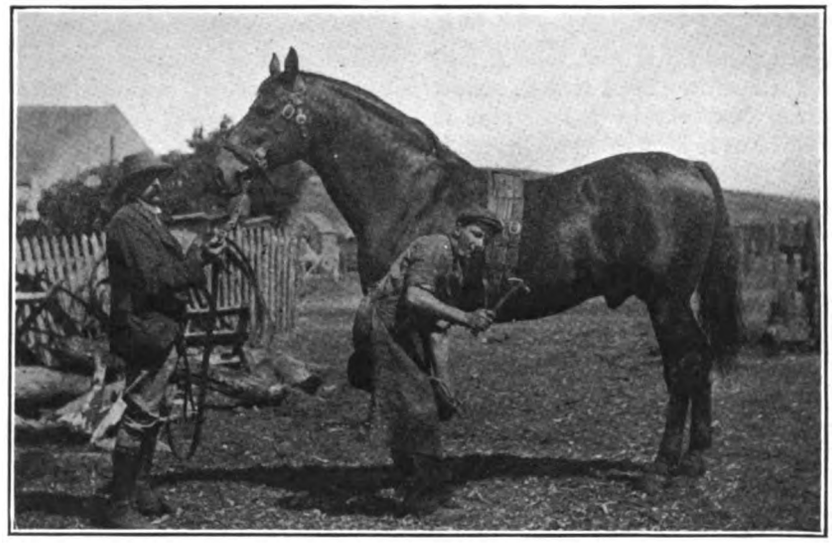
J. H. BARTON.

The accompanying pictures show an outside view of our shop and a stallion imported from England. The shop was established by our father in 1874 as a steam-power shop. But we have now a ten-horsepower Blackston oil engine, with which steam cannot compare. The engine runs a large lathe for turning wheels, a rip saw, a band saw, two drilling machines, two emery wheels, one tanging and boring machine, a wood lathe, an iron lathe and a tire-bending machine. We can bend a 7 by 1⅜-inch tire, if necessary. We also have three forges and put out a number of new vehicles every year. We do lots of repairing and painting, and are kept busy all the year round.

The vehicles we build here comprise the sulky express, Abbott, Marnj, Eureka, curved-panel dog cart, concord buggy, Rosa buggies, rustic carts, masher, light spring dray, farmers' spring van and large trolleys. We find them all to be popular in our locality, though it is common for us to send vehicles as far as 200 and 300 miles. There are five brothers of us in the firm and each one takes a different department of the business.

Our town is a watering place in the summer, when we work on vehicles from all parts of Australia. The farming in this locality is mixed, while sheep are raised in considerable number and bees are also given much attention. Some of us expect to visit America shortly, when we shall be pleased to become acquainted with some of our American brothers and their ways and methods.

The stallion shown is "King Frederick the Great." The animal has taken a number of prizes both in England and Australia.



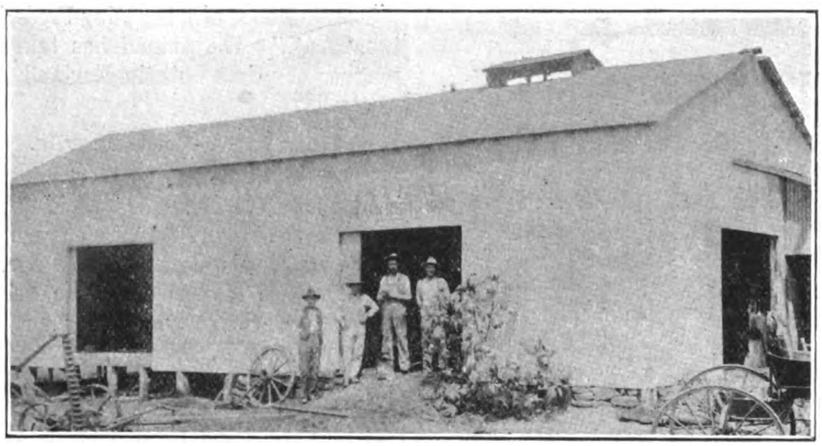
"KING FREDERICK THE GREAT"; A PRIZE WINNER OF ENGLAND AND AUSTRALIA

How to Re-Dress Anvils.

C. W. METCALF.

In answer to Mr. H. C. Heithecker, who has been unfortunate enough to have his goods destroyed by fire, I would advise him to employ a helper and a good sledge and flatter and do the work himself. That is my method when I have an anvil that needs redressing. I will explain how I do it. In the first place take two pieces of 1-inch round iron about 4 feet each in length and square one end to fit in the holes in the front and back of the anvil. There are a great many blacksmiths that do not know what those holes are made for. After you have your irons ready, build a good, large fire on your forge and place your anvil face down in the fire, placing heavy pieces of iron under both horn and tail. Then place some pieces of wood on each side of the anvil and heat slowly till you have the entire face of anvil to a good, bright heat. Now insert your irons in the two holes that

they are made to fit and take the anvil from the fire and lay it on its side on the ground. Now hold your flatter on the edge and let the helper strike with good, hard blows, then turn it over and give the other side the same. Now set it up and with your flatter smooth the face down as best you can and so on until you get it to suit you, then let it cool off. When cold, lay a plank on a couple of nail kegs or boxes and set your anvil up on this plank.



MR. J. M. W. GRAY'S GENERAL SHOP IN TEXAS

Now with a good 16-inch file get astride of the plank, take hold of each end of your file as if it were a drawing knife and go over the face with a full stroke from tail to horn. In this way it doesn't take very long to plane down the face of an anvil.

When you have it filed to suit, heat it and temper it. For a tank to temper in there ought to be a feed pipe in bottom so as to keep cold water running on the face of anvil constantly, or else you have to keep stirring the water so as to keep the steam from collecting on the face and prevent the face from hardening. It is a simple and easy job to dress and temper an anvil after you get the hang of it. I wish I were there to dress one for the brother just to show him how it is done, but I think he can understand the way I have explained it. As to the other tools he mentions if they haven't been over-heated so as to make them brittle he might temper them over and save them.

Trade and Technical Education in Other Countries—4.

WILLIAM H. DOOLEY.

Germany.

(Continued.)

The schools of industry and the master workman's schools which have existed for many years in some sections were for the purpose of offering higher education to the skilled and ambitious workman. The master workman's schools differ from the first in that they were established more for the difficult trades—preparing apprentice journeymen to become master workmen. No pupil is admitted before the age of sixteen and he is expected to have had two or three years of practical experience in the trade. The studies are chiefly in the direct line of a trade and the course required is from one to two years. The pupil must devote his whole time to the course—the tuition fees are small.

The higher trade school is in some respects the most advanced type of these middle technical schools, since they demand for entrance a free degree of advancement in elementary mathematics and physical science and well developed skill as a workman. In studying the student enrollment of some of the best of the German schools of this type one is struck by the fact that the greater number of such students come from families where the father pursues some other calling than that taught in the school.

The Technikum has in many instances a lower age limit than the other schools, no pupil under fifteen years of age being admitted, and requires for admission a year or two of high school study and only a year of workshop experience. Thus it becomes essentially a low-grade school of practical technology.

Perhaps it would be right to say that these schools are all intended to fulfill the same general object, but that differences in details arise from different ideas as to the manner in which results may be attained, as well as the different local conditions which exist and the different classes of persons to be provided for.

There are various international museums that have called attention to the fact that the products of some countries possess higher qualities of artistic finish and design than others. The German states set about some twenty years ago to make the German design the finest in the world. In order to do this they have so persistently established museums and schools for industrial art training that there is no important city in the empire which does not possess one or more of the institutions.

Industrial schools have not yet placed their work on an artistic plane. Schools of industrial art apply principles of art to the trades and raise the standard of taste and incidentally to bring to the work the increased remuneration of a higher class of product.

Since the founding of the institution foreign products have been generally driven from their former controlling positions in the German market.

In most of these art schools applicants must show that they have had practical experience in the branch in which they seek instruction. This relieves the schools from the necessary elementary instruction and permits the instructors to give helpful and advanced work from the start. It also encourages the attendance of amateurs and keeps the practical side of the work prominent.

One of the most effective ways of educating young people in Germany who are obliged to work at an early age is the industrial continuation school. Industrial education by means of the industrial continuation schools has been arranged so that the pupils in the schools are not in any way obliged or permitted to forego their technical manual labor. In order to accomplish this and to provide for the many-sided teaching which must be carried on, it has been found necessary to provide workshop apparatus for each separate industrial school.

The city of Munich is divided into four continuation school districts which will illustrate the organization of these schools, each of which has a continuation school building with the necessary instruction rooms and workshops, an assembly and exhibition room, besides a collection of models and a laboratory. The apprentices are obliged to attend these schools. The obligatory instruction covers at least eight hours a week and embraces German literature and business composition, technical arithmetic and bookkeeping, stock and goods, working tools, machinery, training in life and citizenship, and practical instruction.

After seven o'clock in the evening no

obligatory instruction is given, it being the endeavor to give all instruction to apprentices in the daytime.

It might be of interest to learn the history of these continuation schools. Before the beginning of the eighteenth century trade regulations were controlled by the guilds, and it was not necessary for the state to take the initiative. Instruction in the trade was given by the master in whose house the apprentice lived. It extended over a term of years and was broad and thorough, covering all the features of the trade. He also frequently was obliged to assist the master in bookkeeping and other business and instruction of a general nature was also provided. These guilds became very powerful and took sides in political questions and independent and powerful provinces supported industries which proved to be the downfall of the guild.

The elementary branches and Latin under the old traditions of monastic tendencies assumed the work of giving instruction and did not concern itself with vocational work.

On account of competition of masters with wealthy princes, the masters were obliged to subdivide work, neglecting the instruction and limiting the vocational training to the necessities of the moment. Then, later, came the introduction of piece work and the apprenticeship system failed to furnish the all-around vocational training. Neither was there any other agency Hence, the government stepped in and provided a system of education.

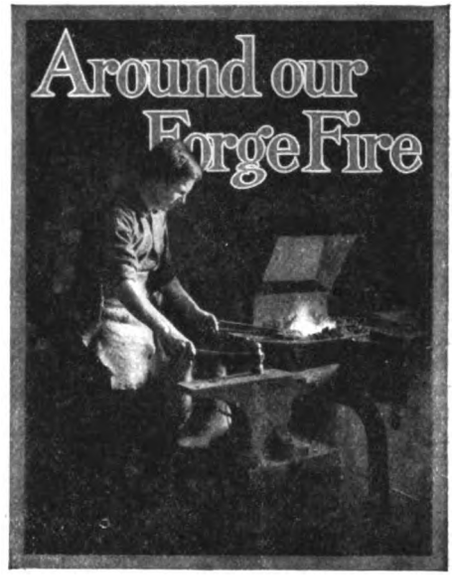
There are few, if any, of the factory industries in which a greater and more successful application of technical school training has been made than in the textile trades. In this industry Germany is the pioneer and its schools hold high rank. To illustrate the progress of the textile industry the town of Munchen-Gladbach is the center of the cotton district in Prussia. Germany is not famous for this industry, which is still in a comparatively early stage of development and, consequently, the town is but little known to the world. Here is to be seen a branch of manufacture in which Germany does not excel and the manner of the cultivation and growth is worth noting.

In 1860 the population was about seventeen thousand. It is now over sixty thousand, and increase is due to cotton. No city in the south of the United States can compare with this. There is no doubt that Germany means to go forward with this branch of textiles. This progress has been due in main to the textile education furnished by the textile school, costing $145,995. This school is the latest thing of its kind and surpasses most of the schools in the United States.

(To be continued.)



THE MORNING TRY-OUT



"Hello, there! Mr. Editor," exclaimed Benton as he burst into the Editor's "forge room." "How are you?" and the man of receipts grasped the Editor's hand as though the latter were a long lost brother.

"Why, I'm feeling very well" replied the other, motioning Benton to a chair and passing the cigars. "Where have you been all this time? Haven't seen you for an age."

"Well, I've been several places," returned the Editor's visitor after lighting a cigar and settling himself into his chair. "I guess it's just about a month since I've seen you and since then I've wandered into and out of about two dozen small shops and about four big construction shops. Met several men whom I haven't seen since I left active shop service and with two exceptions they are all holding down the same jobs they had when I worked with them. The two exceptions are now foremen."



READY FOR THE RACE

"I suppose you've got a lot of new ideas and receipts?" ventured the Editor.

"Yes I've got enough information to start a correspondence school of handy kinks. I've got several corking good things that I think your folks will appreciate," and Benton opened a small valise and held up a brand new receipt book and said, "Had to start another new one. This is the third one and there's a good big batch of good stuff in this already."

"Got anything new on aluminum soldering?" asked the Editor. "Jim North has been in here a number of times lately looking for you. I've given him all the pointers I had on soldering aluminum, but he doesn't seem to have the right thing for his special case."

Just then the door opened and North himself walked in. "Well, Benton, been looking for you for some time. I've been having some trouble with an aluminum job and I want you to tell what and how to do it," and North made himself comfortable in a chair at the table.

"We were just speaking of you, Jim," returned Benton, "and I've got just what you want. This is from an old friend of mine. He's foreman in a big Pennsylvania shop and as they do considerable aluminum work he knows something about the metal. He says they make a special aluminum solder that they use without acid. This is the formula as he gave it, though, of course, you can make any quantity, but must keep the proportions the same: Take 32 ounces of tin; 15 ounces of zinc, ½ ounce of lead and a small piece of rozin and melt all together, mixing thoroughly while liquid. When thoroughly mixed allow to cool in forms or molds. In using this you must, of course, thoroughly clean the surfaces to be joined, and just before applying the solder heat the parts carefully."

"Well, I've tried about everything else, but I will certainly give that a test," said North. "Did he show you any work done with this solder?"

"Yes, I saw several jobs and they looked very neat. I understand that this stuff is about the best that has been gotten up for aluminum work."

"Well, it should fit my job exactly, then," and, after thanking Benton, North went out.

The King of Toilers.

W. O. B.

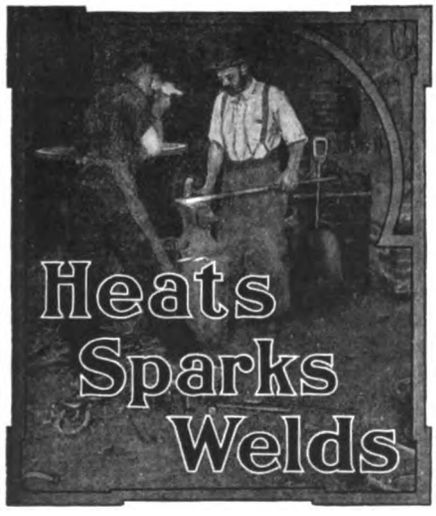
Oh! ye who guide the humble plow
The virgin land to break,
And pray for sun and quenching rain
Thy slumbering seed to wake;
Ye tillers of the soil of earth,
Ye sowers of the clay—
Who made thy plow to turn the clod?
Who made thy share, I say?

Oh! ye who burrow gopher-like,
Who toil with pick and drill
For precious gold or useful coal,
And honeycomb the hill;
Ye gnomes in mine, in drift, in shaft,
Coquetting with death's call—
Who made thy tools so sharp and strong,
To cut the granite wall?

Oh! ye who sail the pathless sea,
In fortress huge and grim;
Disciples of the god of war
With ship of steel so trim;
Ye sons of Neptune's mighty deep,
With heart as true as steel—
Who shaped the armor for your decks?
Who shaped the warship's keel?

Oh! ye who drive the iron horse,
And fly o'er rail of steel;
Ye rulers of the seething steam
That turns the whirling wheel;
Sons of Pegasus winged of old,
Ye laugh and mock at space,—
Who made the rail and whirling wheel.
On which you rush and race?

Oh! ye who toil in furnace glare,
At forge in scorching heat—
Ye shapers of unyielding mass
Who sing to hammer beat—
Ye sons of Vulcan great and strong.
All hail! The King of Steel!
Ye shape the drill, the toiler's plow,
The keel, the rail, the wheel.



Don't forget—"1910" after the thirty-first.

The smith who sets a tire correctly also sets a good example.

A steady worker is far more valuable than a phenomenal one.

A very Happy and Joyous Christmas to every one of "Our Folks."

Mighty big clouds are often dispersed by a little smile. Try it the next time.

Any machine, no matter how good or well built, can be ruined by indifferent care.

Better to put the energy into your own work rather than into knocking your competitor.

Yes—how can we make this publication more valuable to you? We want a word from you.

He who is afraid to hustle for business need never fear that his business will make him hustle.

Take an inventory now of the past year's errors and thus prevent their recurrence during 1910.

Faults in horses seldom grow less, but are more likely to grow worse. How much like faults in men!

Don't use a grinding wheel as though it were made of cast iron. It is meant for work, not for abuse.

Delaware State smiths, under a new law just issued, must pay a state license to conduct their business.

"What you do not like to see other people do, see to it that you do not do it yourself" says D. J. Dodrill, of Colorado.

Uncle Billy Martin says "Ever notis' how few prisoners are brought into court on the Monday after a Sunday baseball game?"

We don't expect you to agree with everything said in "Our Journal," but we do expect you to tell your side of the story. Will you do it?

Are you going to wait until the last minute? Better to get your order in now right away. Then you'll be sure of some of those calendars.

A horse in the shop is worth two on the road, but while the horse in the shop will keep you busy for a while, 'tis well to keep an eye on the road.

Do you know we give several very neat premiums for new subscribers? They're all of good, standard make and useful, too. Ask the subscription department.

Some horses are injured for life by being made to work too hard when young. How true also of boys! Be careful of the youngster. Don't let him "overlift himself."

John Hogan says "Siven years of my life was spint in just larnin'—and I'm larnin' yit. A man can't larn all there is to harse shoein' in a month or a year."

A little more care devoted to the gas engine these cold days will not be wasted. Also drain the cylinder at night—then you won't find your engine useless in the morning.

Sharpen your pencil and figure it out yourself if you don't think a better price is necessary. Figures are convincing. Show your neighbors and write the Secretary for plans.

Among the strange monuments described in an exchange is a blacksmith's monument at Oneida, N Y. This monument is a large anvil and block of granite mounted on a granite pedestal 10 feet high.

Back up your greeting by presenting your neighbor with a copy of "Our Journal." Then get his subscription and he'll have a real "Merry Christmas" and "A Happy New Year," too. Will you do it?

Get in touch with the book department now. The long winter evenings present excellent opportunities for brushing up on your knowledge of the craft. Write for information on books on any subject.

Turn spare time into profit by building a sleigh or bob during slack time. Or a wagon especially suited to your section may find a more ready market; but don't allow slack time to eat up profit—keep busy.

Your business grows—your profits increase only by adding new customers. Those who have never heard of you or your shop never can become your customers. Advertise and keep advertising—that's the solution.

Charles Reustrom, a St. Paul smith, is deserving of a medal. When a leopard broke from its cage some time ago, nearly killed a boy and endangered the lives of some 300 persons, Reustrom rushed from his shop and killed the animal with one blow of his sledge hammer.

Remember? some time ago the old shop stove tumbled over on Tom's foot. Well, he got at the stove last week—was going to set it up for the winter. So he bought some new pipe, a leg for the corner that crushed his foot and a new grate. But he had no sooner got the stove in position when the two rear legs went through the floor. The stove is now lying in a worse heap than before.

Does advertising pay? In 1852 Studebaker Brothers started in business as blacksmiths in a small, poorly-equipped log hut. Their business has grown from 2 wagons, the first year's output, to over 125,000 vehicles a year. The Ohio Carriage Manufacturing Company started in business in 1901. They advertised without a single customer on the books. The first year 1,000 buggies were sold. Their output is now 15,000 a year.

When Tom passed the shop just at dusk the other evening he found a scrap of paper pinned to the door. Thinking it was a note from some customer, he took it home. This is what he read by the light of the evening lamp:

"Thomas Tardy's out today,
He cannot wait on you;
Fish are biting in the bay—
So his fire is out, too."

Little Business Stories—No. 3. A smith now in his seventies, instead of using tobacco, has, ever since his nineteenth year, put aside ten cents a day, and now boasts of a very neat sum, so placed as to care for himself and wife should anything unforeseen happen. "It's been a fight at times to pay the little bank its dime, but I am well repaid by the comforting thought that we'll never be a public charge, nor dependent upon the children." The money has been invested carefully and only where absolutely safe.

The canning industry was started by Nathan Winslow, a blacksmith of Quaker stock. He took a section of ordinary waterspout, put some corn in it, closed up the ends except for a small hole to let the steam escape and set it over a hot fire to cook. When the steam ceased he soldered up the hole. In that little smithy on the banks of the Presumpscot River, near Portland, Maine originated one of the greatest and most important industries of the age. Forty years after Nathan Winslow died one of his water-pipe cans was opened and the corn was found to be perfectly sweet and eatable.

American Association of Blacksmiths and Horseshoers.

Independence to a certain degree and along certain channels is commendable, but there is no call for a balky horse in the team when you want to pull the wagon out of a mud hole. Did you ever see a big, powerful team trying to get a big loaded wagon out of a mud hole? They never did very much until both horses pulled together, did they? One horse alone couldn't budge the load an inch and just as long as the animals sawed back and forth on the whipple trees just so long did the load remain unmoved. But when the animals get right down to work, pull strong and pull together, then the load comes out without trouble.

Just so with smiths and the association. One or two smiths pulling this way and that for protection and better prices will not pull the trade out of the rut. You must work together. Organize—pull strong and pull together for the one common cause.

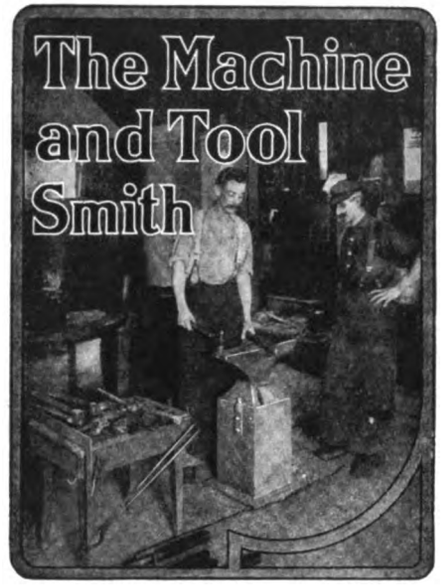
Talk to your neighbors about this matter, ask them what they think. You'll find them one and all willing to join hands—willing to raise prices to where they should be—willing to come to a mutual agreement and understanding. Make plans for the first meeting and you'll find the rest easy sailing. A small advance in prices is welcome at any time, but just at this season it is most welcome. Make the start NOW.

It's not at all necessary to work at starvation prices in order to do business. If you've been cutting and chopping prices, if you've been at "needle points" with your competitors, if the steady advances in the cost of supplies have absorbed your profits, get the association habit. My easy plans for the formation of branch associations are extremely easy to apply, and when you read them you'll wonder why you didn't grasp this opportunity before.

And a raise in prices is not the only advantage to be gained by an association. An organization of good, loyal smiths naturally promotes a better feeling among its members. It shows them that nothing at all is to be gained by price-cutting and trade-fighting. It shows them how to protect themselves from the dead beat and unreliable customers. It affords them, at reasonable cost, a collection department which, making a specialty of one class of accounts, is more likely to succeed than the professional collector handling all kinds.

But whole pages could be written on the advantages of an association. The best way to get some idea of what an association can really do for you and your brother smiths is to form an association and to install such reforms as are necessary in your locality. Write me at P. O. Box 974, Buffalo, N. Y. Just ask for those plans and then start something in your county. You can't write too soon to suit me. Don't lay this paper down before you ask for my easy plans. Do it NOW.

THE SECRETARY.



The Smith and His Work—9.

ROBT. B. KERR.

On Tools.

Knives that are subjected to rough usage, such as butchers' meat-cutting knives, are excellent made in this way, only the steel should be welded between two strips of mild steel and drawn out to required size. They are not usually made in this way because of the extra labor involved, but a butcher once having used one will be more than willing to pay the additional cost.

By far the best steel for purposes of this kind is the old-fashioned blister or shear steel. It stands a higher heat, welds readily, and if well hammered has a close, fine grain, holding a splendid edge when tempered. I have seen excellent butchers' cutting knives and cleavers made by being rough forged from fine Swedish iron and placed in the casehardening box over night. This has the result of turning the thin blade into solid steel, except at the extreme back. The blades are then well hammered, finished and hardened in the usual way. Blades of this description take a beautiful polish and are almost unbreakable.

There are many tools as above that are best made from soft steel, with cast steel edges or faces, and, as pointed out in a previous article, the utmost care must be taken in welding, as the two metals weld at different temperatures, and a heat suitable for mild steel is ruination to high carbon, unless it is well protected. Even if it should stand the forging heat without flying to pieces it will not temper properly. Such a tool is the carpenters' hatchet, which requires a thin, wide eye, a broad, tough bit, with a keen cutting edge and a steel head. A description of the proper method of forging this tool will about cover the ground.

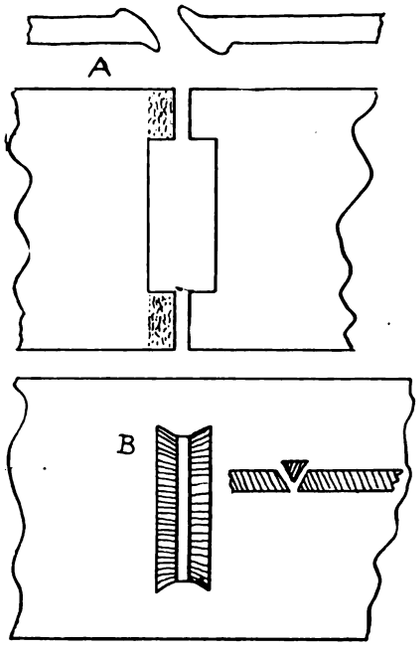
Take a short piece of mild steel of suitable size, say two inches by one-half inch. Mark the center; drive a small fuller into it, square across the bar on each side of the center mark, leaving about an inch and a quarter. Now spread the stock on both sides, wide enough to form the eye; do not get them too long. Shape them up nicely and be sure they are alike. Bend in at both sides of the head for convenience in handling. Prepare two pieces of tool steel, one flat, about three-quarter inch thick for the head, the other wedge-shaped for the bit. Weld on the steel head, taking separate heats; be sure that it is solid. Work up the head to required shape. Shape the eye up over the mandrel. Now catch the head with a pair of tongs and take a short, sharp head below the eye and weld firmly together. Weld only at the neck and while still hot open up the end, sprinkle in some flux and drive the cold cast steel well up to place. Take another heat, weld all firmly together, let it come to width all it wants, trim off to shape, draw out the cutting edge, trim and finish.

Wrenches are tools that the smith is often called upon to forge and they are of a variety of shapes. Small wrenches are usually made from tool steel, larger sizes from mild steel, with the jaws casehardened.

To make a wrench of medium size take a piece of round steel, heavy enough for the jaw. Fuller it all around, at a distance back from the end equal to the diameter of the stock used; form the end into a ball. Flatten the ball down to the required thickness; mark the center. Punch a hole, not too large, through it, letting the *edge* of the punch come just to the center mark. The point will push out and be slightly thinner.

Now hold the hole on the point of the horn and strike a few sharp blows on

the end of the jaw. This will widen the hole and upset the point to the proper thickness. Cut out the jaw with a sharp chisel; draw shank to suit. For double-ended wrenches repeat the process, leaving just enough stock in between to draw to required length. The jaws can, of course, be cut out to any angle.



WIDE STOCK IS EASILY WELDED

Wrenches made in this way are neat, serviceable and of proper proportions. The ball when flattened gives nicely rounded edges without any trouble.

Wrenches for hard service, or where they are liable to slip, are frequently made solid. A simple and good way to forge. Take a piece of round, mild steel, the proper size, and with a sharp chisel or thin, flat punch cut a slot through it at a safe distance from the end. Spread the slot by upsetting. Fuller the neck, drift out the hole to required size, either square or hexagon, as the case may be, trim off surplus stock at the point, draw shank. In working out a wrench of this kind do not let the steel come to a welding heat, else it will certainly split.

Small socket wrenches are most conveniently made solid, a hole of the required depth and size drilled in the end and then drifted out to size and shape. For large wrenches, however, the following method is best:

Take a short piece of round, mild steel, slightly larger in diameter than the distance across the face of the nut to be fitted. Fuller all around and draw away stock for the shank, leaving sufficient stock for the head. Now form up the sleeve; this latter may be of mild or tool steel, according to requirements. Weld up solidly, except about an inch on the one end. Heat the stub end, sprinkle with flux and slip into the unwelded end of the sleeve, closing the latter down firmly over it. Now drop the stub into a heading tool or swage block and with a long, blunt punch or bob tool pack the end of it solid up against the sleeve, on the inside, so it will weld thoroughly. Get a good, clean heat, weld solidly in a swage, fuller up the neck neatly and drift out sleeve to shape. The shank can then be finished to specification.

Those, of course, are only a few of the jobs that the toolsmith gets every day in the course of his work. The list could be extended indefinitely.

In giving the above examples I have endeavored to select only such as illustrate different points in forging.

The toolsmith to be a success must be thoroughly initiative, adaptable and inventive. He must be possessed of a keen, bright mind, a quick, true eye and a steady hand. A thorough master of his craft, of infinite patience, and possessing that rare and indefinite quality of brain and hand which being, as it were, unconsciously imparted to his work stamps upon it a certain individuality of its own—the hallmark of the true mechanic.

Welding Wide Stock.

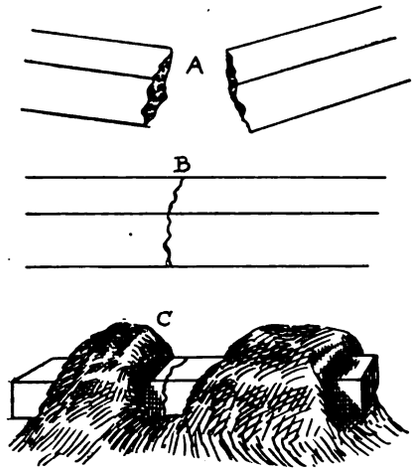
BERT HILLYER.

Difficulty is usually experienced in welding extra wide stock in an ordinary fire, but the following method will simplify the operation. Let us suppose that two pieces 1¼ inches thick by 20 inches wide are to be welded. First prepare the ends as shown in the engraving at A, cutting out a 12-inch piece in the center of each end and leaving a piece 4 inches wide to project at each side. The projections are carefully scarfed as shown in the edge view. Now heat the two projections at one side and weld them and then weld the other side, thus leaving a section 12 inches long unwelded as at B. Now fuller in this unwelded portion in a V-shape, leaving a narrow slot at the bottom of the V for the fire to come through. After preparing the slot take a good piece of Swedish iron and forge it to a V shape to fill the V slot. Now heat the wide piece in one fire and the V piece of Swedish iron in another, heating each for about 4 inches. When heating the wide piece lay a fire brick on top of the slot so as to heat the metal thoroughly. When heated weld in 4 inches of the V piece, using good, hard blows. Then proceed with another heat until the slot is filled. If good, clean heats are taken you will have a good, strong job.

A Practical Talk on Brazing Cast Iron.

C. F. BRAXTON.

There have been a number of articles on brazing in these pages lately, but there are always more inquiries on the subject. It is the writer's intention to explain the brazing of cast iron so as to make it entirely clear and plain.



A TALK ON BRAZING CAST IRON

The main point in brazing cast iron is to have the ends of the pieces to be brazed perfectly clean. Have the edges that are to be joined entirely free from all grease or dirt. Also see that the pieces fit perfectly. In cleaning the edges of the parts don't use a file, as it will change the edges to be joined, thus making a perfect fit impossible. Use a stiff brush to clean the pieces and don't think that the pieces can be cleaned too well. If there is any grease even remotely located from the break it is better to clean it off than to run the risk of it flowing into the break when the pieces are heated. A little dirt in the break may not only make a perfect braze impossible, but may actually become a source of accident, in that the brazed joint may appear strong yet be imperfect beneath the surface. The necessity for cleanliness in brazing operations cannot be too strongly emphasized. Better by far to have the pieces bright and shining with cleanliness than to run the risk of attempting to braze over one speck of rust or dirt.

Having gotten your pieces as clean as possible, then build a clean fire. Don't use a fire in which you have been heating shoes or tires all day.

Build a new fire, preferably of charcoal. Or if you have a brazing forge so much the better. But the majority of smiths will want to do their work in the regular forge and it is, therefore, best to build a good, clean fire, preferably of charcoal.

When heating your work place it in the forge in such a way as to have fire on all sides of the break, if possible. Start the fire and allow it to burn several minutes before placing the work in and then place two or three large pieces of charcoal on top of the break in order to heat the pieces thoroughly. It is not necessary to heat the pieces for any distance back from the break, but it is necessary to heat the broken ends thoroughly. When heated to a cherry red on both sides of the break apply some good, clean borax to the break, assisting it to flow into the break with a long-handled spoon. Immediately after applying the borax place your spelter on the break, cutting down the blast slightly so as not to burn the spelter. Be liberal with the flux and also with the spelter and see that both run freely into the break. *Don't* assist the flow of the flux and spelter by opening the break. The broken ends should be clamped as tightly as possible, as the spelter will run in without difficulty, no matter how tight the break may be held. As the flux and spelter run into the break increase the blast gradually, seeing that there is plenty of burning fuel between the work and tuyere. This latter is important, for heat is what is needed.

When you are sure that the spelter has flowed all around the break and thoroughly filled it, cut off the blast and allow the work to cool in the forge. Do not remove until perfectly cool, so as to be easily handled.

In closing, let me emphasize the following: Have work perfectly clean; have clean fire; have plenty of fire; use as little blast as possible, but get plenty of heat; don't apply flux or spelter too soon; don't hurry; keep cool, and with a good, liberal amount of common sense you will be sure of success.

Some Steam-Hammer Tools.

BERT HILLYER.

To make a shear for cutting iron and soft steel under the power hammer take a piece of tool steel 1 by 2 inches in section, and draw the two ends to ⅝ by 1¼ inches, leaving one end about 3 inches long and the other 18 inches. Leave the cutting part the full size of the stock, 1 by 2 by 4½ inches long. Then bend as if making a spring wedge, only instead of bending the stock the flat way bend it edgewise. Now temper the cutting edges and rivet the two parts together as shown in the engraving. The end of the long part should be flattened out to 2⅝ inches wide for a distance of about 3 inches. Then rivet the two pieces together and bend the surplus stock over the narrow piece as at X. Now fit the cutting parts so they will just pass each other. This tool will cut 1 by 4-inch stock with one blow and cut it clean. This beats the old way of putting a piece of short steel above and below the work. There is no liability of being hit by a flying piece of metal.

I have another tool which works on the same principle. It cuts a round end on the stock and punches a hole in the opposite end at the same time. Of course, all pieces are the same size and the holes are all in the same position. The engraving shows a top view and also a side view of this tool. The part at X should be slightly higher than the other part so that the hammer will not close the jaw. The tool should be arranged so that the hammer will strike the punch just before it touches the shear.

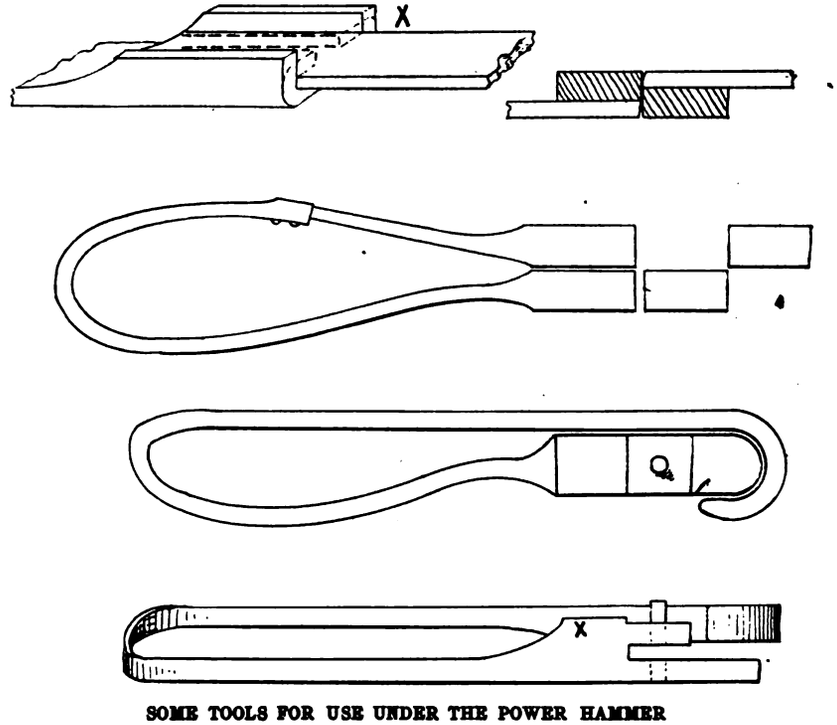
Plain Machine Work for the Blacksmith—2.

GEORGE CORMACK, JR.

The Emery Wheel.

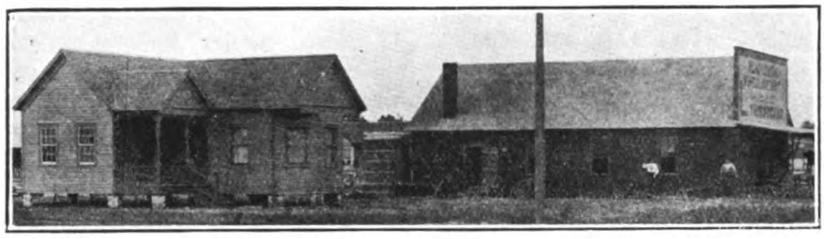
In many machine shops the grindstone has been entirely superseded by the more modern and efficient emery wheel. This is equally true of blacksmith and repair shops, there is hardly a blacksmith shop of even the most primitive type where any attempt at plow repairing is made but has an emery wheel of some sort in its equipment. An emery wheel of the proper grain and grade for the work in hand is one of the most efficient machines in any shop where metals are worked, but no emery wheel ever invented will successfully grind everything. It is useless to try to properly grind drills, lathe tools, etc., on an emery wheel intended for grinding plow boards and general rough work, and it is equally absurd to use a wheel intended for tool grinding on rough and general work. Emery wheels are built for special work and are all right when used on the work for which they are intended. It would be just as sensible to use a wood chisel to cut an iron bar, instead of a cold chisel, as it is to use an emery wheel on work for which it is not intended. True, you can cut an iron bar with a wood chisel, and you can grind a plow board on an emery wheel made for grinding tools, but these would be very inefficient methods of doing the work.

Emery wheels are designated by two characteristics—grade and grain. The grade of a wheel indicates its hardness; it is really the hardness of the bond which binds the particles of emery or other substances together. The system adopted by many manufacturers of emery wheels to designate



SOME TOOLS FOR USE UNDER THE POWER HAMMER

the different grades or degrees of hardness of their wheels is by letters. Unfortunately, so far, there is no uniformity or standardization of this system amongst the different manufacturers of emery wheels, and to make the condition more perplexing the alphabetical progression is reversed in some systems. Thus, the Norton Emery Wheel Company—possibly the oldest manufacturers of wheels—adopted



THE RESIDENCE AND GENERAL SHOP OF MR. LAURENT THIBODEAU, LOUISIANA

a system where the letter M indicates wheels of medium hardness, the letter A the softest and Z the hardest, but the Carborundum Company, while also using M to indicate medium hardness, use A as an indication of extreme hardness and Z for their softest wheels. It is to be hoped that in these days of standardization a system of uniform grading will be adopted by all emery-wheel manufacturers. Such a system would be a great convenience to the buyer and would help to avoid much confusion.

The grain of an emery wheel denotes the size of the particles of emery composing the wheel, and is indicated by a series of numbers running from 16 upwards, the larger numbers denoting the smaller particles or grains. This series of numbers is happily standardized, and the same number always stands for the same-sized grains in any make of wheel. In the selection of emery wheels for certain work it is well to remember that irrespective of the grain of the wheel the harder the material to be ground the softer the wheel should be and, conversely, the softer the material the harder the wheel. In ordering wheels, unless the buyer is familiar with the system used in grading the make of wheel he intends to purchase, the only safe course is to mention the kind of work for which the wheel is intended. An emery wheel, suitable for grinding lathe tools, drills, cold chisels and the ordinary tools around the shop, should be of medium grade and from 30 to 60 grain.

An emery wheel when properly operated and cared for is a very efficient method of removing surplus metal and, when you come down to it, the quick and accurate removal of surplus metal is the machinist's principal occupation. On the other hand, if the emery wheel is abused and neglected and used on work it never was intended for, it is of little value, and furthermore it is positively dangerous. An emery wheel to be efficient must in the first place be run at the proper speed. If run too fast it is dangerous, and if run too slow it wears away very rapidly and gets out of true. The speed of emery wheels is based on the rate that the cutting surface or face of the wheel travels in feet per minute. A safe speed which will give good results is about 5,000 feet per minute; about a mile a minute. The following table gives the number of revolutions per minute of wheels of different diameters, running at 5,000 feet per minute:

6-inch	Diameter	....	3,183	R. P.	M.
8- "	"	....	2,387	" "	"
10- "	"	....	1,910	" "	"
12 "	"	....	1,592	" "	"
14- "	"	....	1,364	" "	"
16- "	"	....	1,194	" "	"
18- "	"	....	1,061	" "	"
20- "	"	....	955	" "	"
24- "	"	....	796	" "	"

It is evident, therefore, that with an emery wheel mandrel running at the proper speed for a 12-inch wheel it is useless to put on a 6-inch wheel, and it would be decidedly dangerous to put on an 18-inch wheel. The bearings on an emery-wheel stand should always be kept up tight to the mandrel. If the babbitt is badly worn the bearings should be re-babbitted and the mandrel properly fitted in. Loose emery-wheel mandrels are frequently the cause of broken wheels, even when the wheels are run at the proper and safe speed.

In order that an emery wheel do its best and fastest work it should always be kept true. Doubtless the best method of truing up emery wheels is turning them with a diamond tool. This is, however, an expensive tool and rarely found outside of first-class machine shops, and even in them the diamond tool is only used by skilled men on the best wheels in the shop. There are, however, many cheap emery wheel dressers on the market, which for all ordinary purposes give good results. These dressers are usually composed of a number of pointed or corrugated disks of hardened steel revolving on a pin or small shaft at the end of a metal handle. Such dressers only cost a few cents, and are more or less familiar to all users of emery wheels. The action of these hardened disks is to break or pry off small particles of the wheel, thus exposing fresh and sharp particles. In applying the ordinary emery wheel dresser it should be held solidly on the work rest and pressed firmly against the wheel, moving it backwards and forwards across the face of the wheel. If the dresser is applied with too light a pressure the hardened disks will be ground off very rapidly, this action will be evidenced by sparking at the point of contact between the disks and the wheel, showing that the steel is being ground away. If sufficient pressure is employed very little sparking will result and the disks will last much longer. In order that the dresser do effective work it must be forced against the face of the wheel firmly enough to cause the disks to revolve at the same velocity as the face of the wheel, otherwise, if the disks lag behind, the wheel has a chance to grind them off. The wheel when properly trued up should be kept so by frequent applications of the dresser. Not only is this frequent dressing necessary to keep the wheel true, but it is also necessary in order to keep the face of the wheel sharp and in good cutting shape. It is false economy to let an emery wheel go without frequent dressing. True, the dresser may wear down the wheel, but the difference in time and power consumed in grinding a piece of work or a tool on a dull and out-of-true emery wheel, compared with that consumed when the wheel is sharp and in good shape, will far more than offset the wear on the wheel due to frequent dressing. Furthermore, there can be no comparison in the quality of the work in the two cases.

In using an emery wheel the work should not be applied to the face of the wheel with too much pressure, neither should it be held stationary on one part of the wheel, but wherever possible should be traversed backwards and forwards across the face of the wheel. This movement of the

work will cause the wheel to cut faster, wear evener and the work will not get nearly so hot. When the work gets red hot on the wheel, particles of the soft red-hot metal stick to the face of the wheel and prevent the sharp particles of emery getting up against the metal to do their work. It is too often supposed that anybody can grind on an emery wheel, which in some respects is true enough, but it is equally true that the art of grinding on an emery wheel has to be learned the same as anything else. In most cases the man who does not know how to grind will make too hard work of it; he will push too hard on the work, and the wheel will slow down until it almost stops, the belts will slip and squeak, and he will have to let up and allow the speed to assume the normal again. Such a method of grinding wears the wheel unevenly, strains the mandrel, stretches the belts, tires out the workman and produces the poorest class of work. Furthermore, the power consumed in the process is far in excess of what it should be. The good workman who knows how to grind applies the work to the wheel with an even pressure—just enough pressure to still allow the wheel to keep up its full speed—and he moves the work backwards and forwards across the face of the wheel. This method wears the wheel but little, strains neither the machine nor the workman, and the work is done well and quickly with the minimum of power. Too many who use emery wheels do not realize that the pressure necessary in grinding on a grindstone is altogether unnecessary with the emery wheel. In grinding the shop tools a special wheel for tool grinding should be used, and used exclusively for such purposes. A tool-grinding wheel should never be used for general work. In such grinding the tool should be applied to the wheel very lightly, in order to avoid overheating and the consequent drawing of the temper. The right grade and grain of a wheel for tool grinding will cut very fast with even a light pressure on the work if the wheel is run up to its proper speed. To avoid any danger of drawing the temper in grinding tools they should be dipped every few moments into water placed convenient to the wheel. Avoid, as far as possible, grinding on the side of the wheel, and do not allow sharp pointed tools to dig grooves in the face of the wheel. Use good common sense in using the emery wheel, and you will find that with proper attention it is a very efficient machine and capable of doing good work and lots of it.

I suppose some of my readers will be saying "I don't see where machine tools come in these articles, so far it's been only grindstones and emery wheels," let me tell you something. My reason for taking up the discussion of the grindstone and the emery wheel is because that all good machine work done on such tools as drill presses, lathes, etc., depends in a very great measure on the proper grinding of the tools which do the cutting in these machines. In the following articles where I shall take up the various machine tools and illustrate many of the ordinary operations performed on them, which will necessarily include the proper grinding of the tools to do the work, I want to feel that I will not have to continually caution my readers about using the right kind of an emery wheel or keep telling them to true up the grindstone.

(To be continued.)



The 1910 Models.

M. A. HARPER.

If you think that the superlative degree of beauty was reached in the 1909 automobiles you will be pleasantly surprised when viewing the 1910 models. Appearance and comfort seem to be the governing factors in 1910 plans. From the fussy little runabout with its trim little body to the great touring car and the luxurious limousine, most all seem to be planned with graceful lines. There are, of course, as ever some cars planned on "freakish" lines, but these will ever be found, no matter what the progress in automobile construction.

Some of the 1910 models are shown in the accompanying engravings. In Fig. 1 is shown the Chalmers-Detroit, 30 horsepower, four-cylinder touring car. A front end view of the engine in this car is shown in Fig. 2.

In Fig. 3 is shown the Maxwell 1910 model with runabout body. The motor is shown in Fig. 4. The clutch on this car will perhaps need explanation. It is shown in Fig. 5 and consists of 15 saw-steel disks. Each disk is slightly concave, thus causing the clutch to engage gradually. A feature of the Maxwell transmission is the positive gear lock which prevents the shifting of gears when the clutch is engaged.

The chassis shown in Fig. 6 is from the Knox 1910 four-cylinder, 40 horsepower. Here is plainly shown the power plant, the change gear case and the transmission. A front end

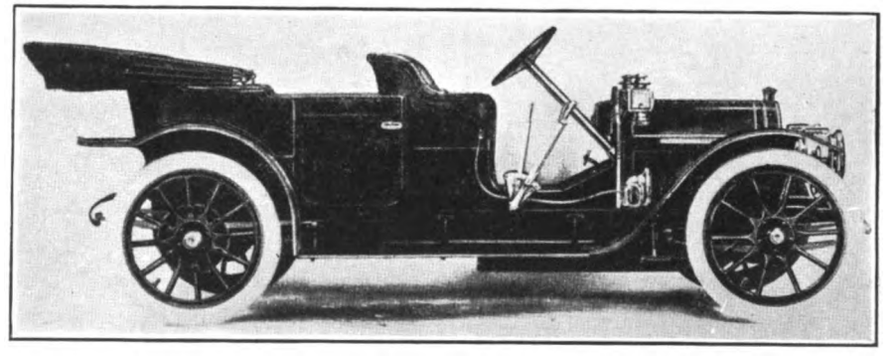


FIG. 1—THE CHALMERS-DETROIT, 30 HORSEPOWER, FOUR-CYLINDER TOURING CAR

view of the motor with gear cover removed is shown in Fig. 7, showing the gearing which operates the cam shaft, the pump and the magneto.

Automobile Troubles.

A. C. CARPENTER.

To simplify the finding of simple automobile troubles, difficulties which stop the machine, the smaller troubles have been detailed in table form. Of course it is understood that in a car with more than one cylinder the difficulty may be due to any one cylinder, and in such event it is necessary to find the cylinder that is causing the trouble.

1. Sudden stopping of engine:
   - (a) Switch jolted off.
   - (b) Fuel supply exhausted.
   - (c) Choking or clogging of fuel pipe.
   - (d) Breakage of wiring.
   - (e) Breaking of valve, if single cylinder.
2. Misfiring and then stopping:
   - (a) Too weak, or too strong, fuel mixture.
   - (b) Water or dirt in carburetor.
   - (c) Clogged fuel tank vent.
   - (d) Exhausted batteries.
   - (e) Damaged spark plug.
   - (f) Short circuit in sparking current.
   - (g) Loose or disconnected terminal
   - (h) Overheating caused by:
     - (1) Improper lubrication.
     - (2) Faulty cooling.
     - (3) Choking of exhaust port.
     - (4) Improper working of exhaust valve.
3. Gradual loss of power:
   - (a) Loss of compression.
   - (b) Clogged fuel tank vent.

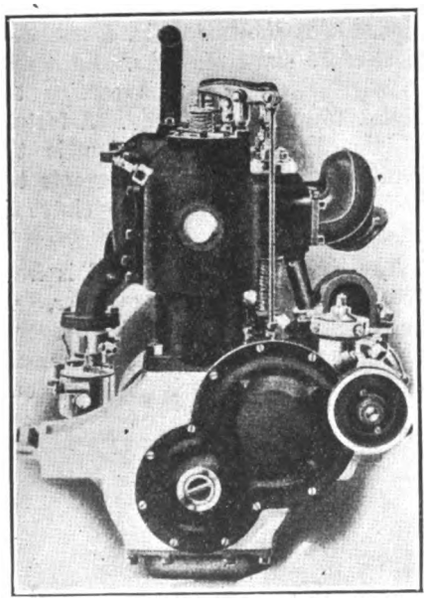


FIG. 2—FRONT VIEW OF CHALMERS-DETROIT ENGINE

   - (c) Water or dirt in carburetor.
   - (d) Frozen carburetor.
   - (e) Continued flooding of carburetor
   - (f) Improper mixture.
   - (g) Improper timing.
   - (h) Overheating.
   - (i) Valves working improperly.
   - (j) Exhaust clogged or choked.
4. Overheating:
   - (a) Leakage of cooling water.
   - (b) Faulty lubrication.
   - (c) Faulty pump.
   - (d) Clogged radiator.
   - (e) Air-lock in cooling system.
   - (f) Improper working of exhaust valve.
   - (g) Clogged exhaust.
5. Knocking:
   - (a) Spark set too early.
   - (b) Worn bearings.
   - (c) Improper lubrication.
   - (d) Loose flywheel.
   - (e) Loose bolts.
   - (f) Water in cylinder.
   - (g) Pre-ignition.
6. Pre-ignition:
   - (a) Overheated engine.
   - (b) Carbon deposit in cylinder.
   - (c) Incandescent sparking points.
   - (d) Other incandescent particles in cylinder.
7. Failure to start:
   - (a) Exhausted fuel supply.
   - (b) Fuel not turned on.
   - (c) Clogged fuel pipe.
   - (d) Flooded carburetor.
   - (e) Stuck inlet valve.
   - (f) Condensation of fuel in cold weather.
   - (g) Switch not turned on.
   - (h) Spark too early or too late.
   - (i) Disconnected terminal.
   - (j) Broken valve.
   - (k) Exhausted batteries.
   - (l) Broken wiring.
   - (m) Faulty spark plug.
8. Faulty compression
   - (a) Piston ring slots in line.
   - (b) Improperly fitted piston rings.
   - (c) Leaking at joints or valves.
   - (d) Valves working improperly.
   - (e) Porous cylinder walls.
9. Explosions in muffler:
   - (a) Misfiring.
   - (b) One or more cylinders not working.
   - (c) Valves working improperly.
10. Misfiring:
    - (a) Disconnected terminal.
    - (b) Broken wiring.
    - (c) Dirty commutator.
    - (d) Commutator out of adjustment.
    - (e) Sooted spark plug.
    - (f) Spark plug cracked.
    - (g) Spark plug points out of adjustment.
    - (h) Short circuit.
    - (i) Coil trembler out of adjustment.
    - (j) Water in carburetor.
    - (k) Valves working improperly.
    - (l) Switch doesn't stay set.
11. Engine operates with switch off.
    - (a) Faulty switch.
    - (b) Incandescent particle in cylinder.
    - (c) Engine overheated.
    - (d) Short circuit
12. Starts poor, but runs good at speed:
    - (a) Spark set too early.
    - (b) Partly clogged fuel pipe.
    - (c) Too much air to carburetor.
    - (d) Faulty inlet valve.
13. Starts well, but runs badly:
    - (a) Spark set too late.
    - (b) Fuel mixture too rich.
    - (c) Carburetor flooded.
    - (d) Faulty carburetor air inlet.
    - (e) Clogged exhaust.
    - (f) Inlet-valve spring too weak.

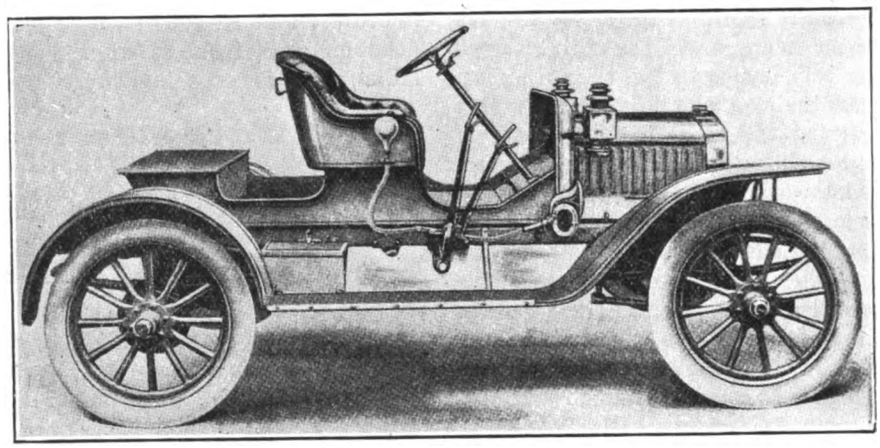


FIG. 3—THE MAXWELL 1910 MODEL WITH RUNABOUT BODY

It would, of course, be impossible to detail all of the troubles to which an automobile power plant is liable, for in many cases the trouble is out of the ordinary. The foregoing tables detail some of the common troubles, with the most likely causes. The remedy is generally easy to apply when one knows the cause. It is, therefore, unnecessary to detail the proper way to overcome the difficulty. Any practical man knows that if a short circuit is the cause of a difficulty it is necessary to correct the cause either by wrapping a bared wire or removing the metal causing the "short." A sooted spark plug should naturally be cleaned, and an old tooth brush is a very good tool to use. If spark points or coil trembler are out of adjustment it is necessary to bend them into correct position. If the engine fails to start on account of clogged fuel pipe it is necessary to clean out the obstruction either in pipe to carburetor, carburetor itself or the pipe to combustion chamber. So it is plain that a little common sense will overcome the trouble when the cause is found.

Another point; when a difficulty presents itself, say for instance that the engine fails to start, begin with (*A*) and see if the fuel is exhausted.

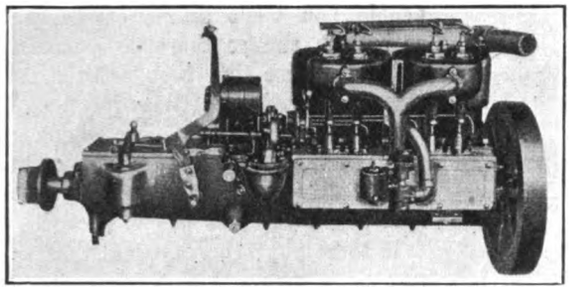


FIG. 4—INTAKE SIDE OF MAXWELL ENGINE

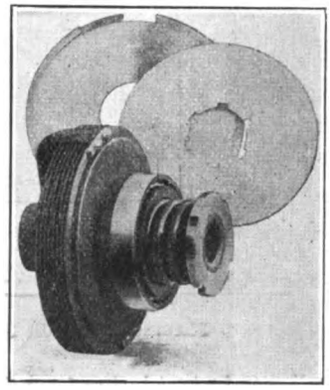


FIG. 5—THE MAXWELL DISK CLUTCH

Then if you find plenty of gasoline in the tank, see if it is turned on (*B*). Then look into the other simpler difficulties, such as broken wiring, switch, spark timing, disconnected terminal, exhausted batteries, etc. Don't try one thing and then another in a haphazard manner. Keep cool and tackle the trouble with common sense, and the difficulty will fade away as if it were a mist.

Building Business—1.

W. O. B.

Personal Interest.

There is perhaps no one thing that enters so largely into the building of a business and to the holding of the business when built up as *personal interest.* By this is meant, not especially personal interest in your end of the business, but personal interest in the customer and his end of his dealings with you. Show your customer that you have an interest in him and that you insist upon giving him one hundred cents for his dollar.

There are lots of smiths who, when they sell a man a wagon, repair his plow or shoe his horse, simply pocket their money and say "Thank you, come again." That may be considered good business and sufficient courtesy for some smiths, but how much better it would be, when you sell him a wagon, to incidentally mention various points about the vehicle—how he can preserve its protective coat, lengthen its life, guard its wear. You are taking a personal interest in his purchase—you are paving the way for other orders. If a customer's horse is in need of special shoes let the customer know that you are giving his animal what he needs. If the animal has some ailment which you know can be cured by some easily applied remedy tell the customer all you can about it. Tell him what to do and how to do it. When you sell a nicely finished buggy or delivery wagon tell the customer about the effect of ammonia gases and fumes from the stable upon the varnish. Tell him about washing the vehicle and how easy it is to scratch the mirror-like finish. Warn him against repeatedly allowing mud to dry on the vehicle. Tell him about the bad effect of sun and rain on the finely finished surface and advise him against leaving the vehicle exposed to the elements when not in use. Get some good brand of axle grease and present him with a small can of it and a wrench to fit the vehicle; and see that the vehicle leaves your shop clean and with axles well greased.

And the same idea can be followed out in other work. Show the customer that you are personally interested in his dealings with you. Show him that you want him satisfied. The attention will require little of your time and will cost you but a trifle compared with the effect on the customer. It will mean more business to you and more business means more profits. Don't lose any opportunity which may come up for showing your customer that you are always willing to assist him in getting full value for his money.

Of course, there are customers who may resent your interest in their affairs, but a fund of practical suggestions and a liberal amount of tact will secure their good will and business. And the smith with tact and common sense will find that his little drops of information, suggestion and personal interest have turned to gold.

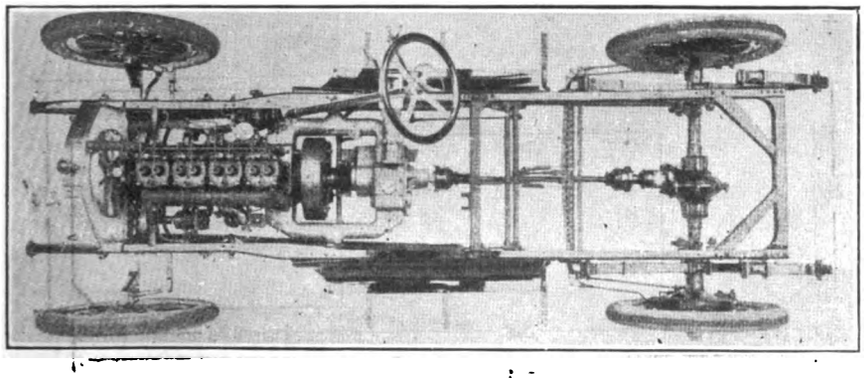


FIG. 6—THE CHASSIS OF THE KNOX 1910 FOUR-CYLINDER, 40-HORSEPOWER CAR

How to Build a Concrete Forge.

J. A. L.

The accompanying engravings show a forge that I built myself and one which you will find is hard to beat for either light or heavy fires. It has a

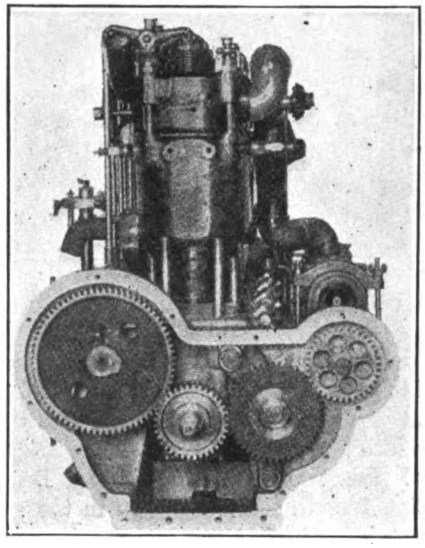


FIG. 7—FRONT END OF KNOX MOTOR WITH GEAR COVER REMOVED

self-cleaning shaker grate, an under-cleaning ash pit and a branch pipe to fan hot air away from forge and anvil. The top part of the forge has a 30 by 3-inch wheel, with the spokes broken out, imbedded in the cement to form the nest. The nest itself is ¾ of an inch lower than the surrounding forge top. I use red clay for firepot lining and find it better than fire clay The forge is 3 feet 10 inches square with 14 inches of the corners taken off. I used 2½ barrels of Portland cement, with stones, scrap iron, old brick and wire netting as a binder. The cement must, of course, be placed in a wooden form and the boards allowed to remain for about two days, at the end of which time they can be

removed. The top of the forge has a hard face made of equal parts of sand and cement, while the last half inch is clear cement. This gives it a good finish. Engine foundations can be built in the same way and are better than brick. The tuyere iron is shown on top of the forge and weighs 140 pounds. This is also of my own make.

Placing Rub Irons.

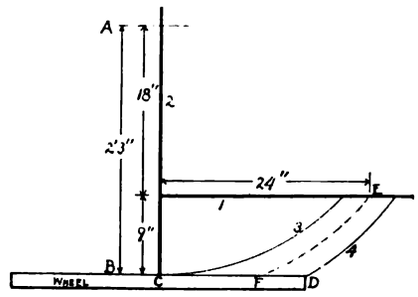
C. W. METCALF

Some brother wants to know how to place the rub irons on a 3-spring wagon without putting on the gear. It is, of course, understood that he



A CONCRETE FORGE IS EASILY CONSTRUCTED

knows the length of the axle from kingbolt to the center of the spokes at the hub and that he knows the width of the wagon box and the height of the wheel. To illustrate: Draw line 1 and line 2, as shown in the engraving, at right angles to each other. Line number 1 represents the center of the front axle, while number 2 represents the side of the box. Now suppose the box to be 3 feet wide or 36 inches. We measure just half that distance, or 18 inches from where line 1 and 2 meet to the center, or where the kingbolt would come at A. Now suppose the wagon tread is 4½ feet; extend line number 1 for a distance equal to half the tread, measuring from A. In this instance the distance from A is 2¼ feet. Now draw the lines at B to represent the wheel. Then with a pair of compasses, with one point set at A and with the other point at C on the wheel, mark the line 3 from C to line number 2. Then open the dividers to strike D and make line number 4. Now mark a dotted line equidistant between lines numbers 3 and 4. This will strike the box, or



PLACING THE RUB IRON

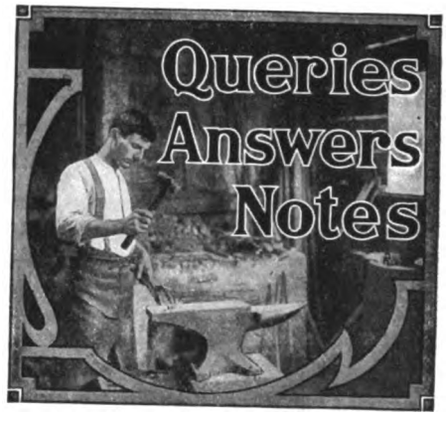
line 2, just 24 inches from line 1. Place the center of your rub iron at E, and if your measurements have been correct your rub iron will be found correct.

Advertising Your Shop.

The sign over your door is seen and read only by the people who pass your shop. If you do no other advertising your business must depend on the people who pass your shop and read your sign. If you could bring your sign to every person you wanted as a customer, your business would increase proportionately—isn't that reasonable? And if you could place your sign just where these "wanted customers" would see it every day, you would stand a good chance—in fact, an exceptionally good chance—of getting their trade.

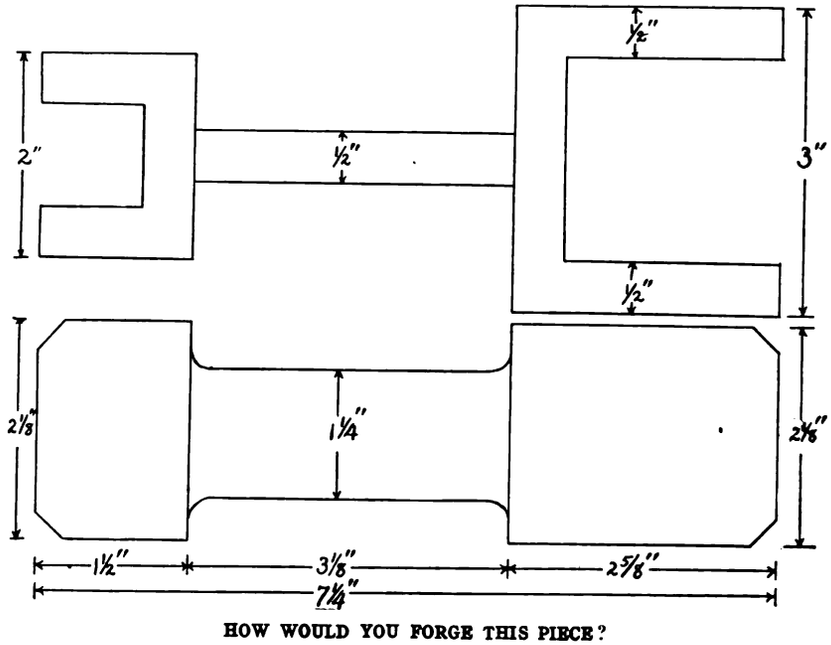
You can place your sign where the people you want as customers will see it every day of the year. You can place your sign where the need of your services and goods originates. A 1910 AMERICAN BLACKSMITH calendar will carry your sign into the office, the store and the home of the people you want as customers. It's so artistic and so thoroughly pleasing in every sense that the "wanted customer" will willingly place it where he can see it every day. And where the calendar goes, there also goes your sign, neatly printed, telling your business and where you can be found.

Is there any other medium that will reach the "wanted customer" oftener or better than a calendar? Is there any other calendar better suited to advertising smith-shop business? Get in touch with the calendar department today. If you haven't ordered some calendars, order them today.



The following columns are intended for the convenience of all readers for discussions upon blacksmithing, horseshoeing, carriage building and allied topics. Questions, answers and comments are solicited and are always acceptable. Names omitted and addresses supplied upon request.

Can You Tell Him?—The accompanying engraving shows a special forging which I would like to know how to make correctly. The dimensions are given for the finished piece. Will the readers please tell how



HOW WOULD YOU FORGE THIS PIECE?

they would make it? What size stock to use and how to do each step? E. A , Ohio.

How to Solder Iron.—In reply to Mr. G. B. Hodges, of Mississippi, I offer the following receipt: Into 12 ounces of muriatic acid place all the zinc that it will cut and then add 6 ounces of sal ammoniac and when this is dissolved it is ready for use. Remove all scales from the iron and heat it as warm as can be comfortably borne with the hands. Now, with a feather, dampen the surface to be soldered and proceed as in soldering tin. C. W. METCALF, Iowa.

Speaking of Thrush, there is one puzzling peculiarity about this disease. Mares usually are afflicted on the hind feet, while geldings and stallions develop it more readily on the forefeet. Why this is so has never been fully understood by those who have made an exhaustive study of hoof troubles. Treatment consists in thoroughly cleaning out the diseased sections and cutting away the ragged parts of the frog. The pus should be removed from the cleft of the frog, after which the sore should be cleaned out with hydrogen peroxide, using the drug at its full strength. After this, pack the cleft with calomel. If this will not remain in the sore, use a bandage to hold it in place. Keep everything clean and remove all manure and urine as fast as it accumulates.—*Horse World.*

From an Iowa Friend.—I love to help out my brother craftsmen in everything that I can. Of course, I haven't worked at the trade long enough to know very much. I have only been at it now 27½ years and I think by 15 or 20 years more I will begin to learn something about the trade, if I keep on reading THE AMERICAN BLACKSMITH. I take the ideas from it and add them to mine and then I have two ideas and then I work them out and see which is the best. C. W. METCALF, Iowa.

and be better satisfied, and the craft would be in a more healthy state. I would be glad if the horseshoers would have to pass an examination before they could conduct a business. Any man that does not thoroughly understand the anatomy of the horse's foot should not be allowed to drive a nail into the horse's foot.

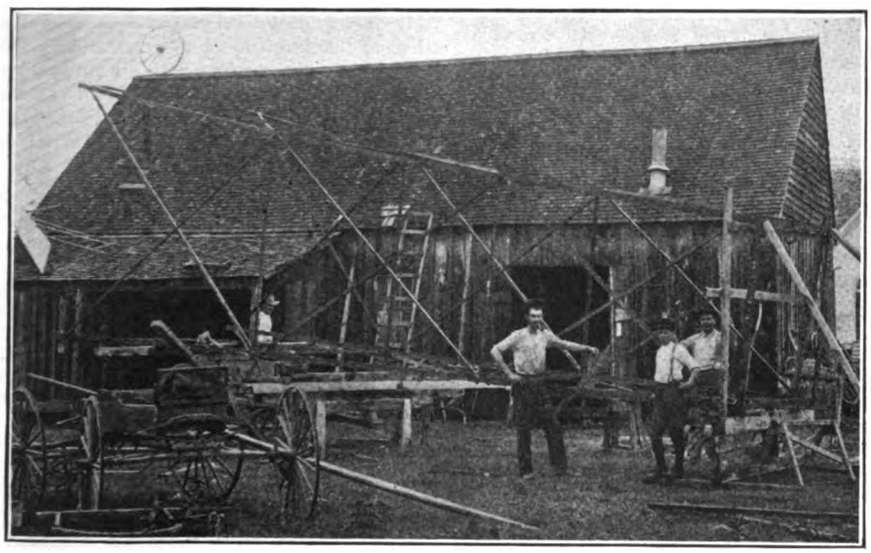
C. L. MORMAN, New York.

A Short Talk on Shoeing.—I have so much work to do that I haven't had time to write much. I work one man and myself. My work is repair work and shoeing. I do not believe in fitting the foot to the shoe and I don't believe in hot fitting, as I think it is not natural for a horse's hoof to be burnt. If anyone who burns a horse's hoof with a shoe would stick one to his own foot he would have a sore foot, and I think the same about a horse. I first take my nippers and take all the hoof off that is necessary and then I take a rasp and level my hoof. Then with my knife I pare the hoof out; then I fit the shoe to the foot and I have good success with my shoeing. I think your paper is all O. K.

W. W. MEADORS, Arkansas.

Did He Charge Enough?—The accompanying picture of my shop also shows a tower that I just built out of angle iron. The tower is 30 feet high, the main uprights 2-inch angle iron and the braces 1½-inch angle iron. I cut the bars, drilled all the holes and built the whole thing during spare time. I charged the man $25 for it. Was that enough? What does the brotherhood say? A. T. W., Texas.

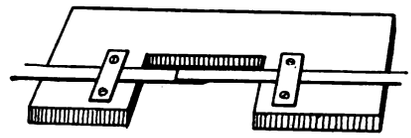
Replies on Several Topics.—In reply to E. W. Patisshall, Georgia, there are several good hoof remedies upon the market. Fiebing's Hoof Dressing is excellent. I agree with W. H. Chambers, Washington, on a little sermon every month, but let the topic be on our trade and others and also on carpentry. The fellow that



A TEXAS GENERAL SHOP SHOWING A TOWER BUILT TO ORDER

Wants to See It.—In regard to Brother Andrew McLain turning a shoe in one heat I would like to see a cut of this so-called "shoe." If the horseshoers would put more stress on how well they did their work, and not how quickly, the public in general would pay better prices for work did such fast shoeing must be a magician. I wish he would teach me how. Henry C. Heithecker, Indiana, in regard to the sickle sections,—try heating to a bright red and drive into the moist ground edgewise. Heat the drill bits, also twist bits to a cherry red or low red and immerse in tallow. As to the anvils, Hay-Budden Company, Brooklyn, N. Y., I think will do it. G. B. Jewett, Nebraska, your letter is a dandy. You hit the nail on the head that time. Come again. D. J. DODRILL, Colorado.

How to Braze Band Saws.—I saw in one number of the paper an inquiry on how to braze band saws. Take a piece of board about 7 inches wide and cut a notch in it, as shown, about half way through. Have two small plates to go across saw with a hole in each end for screws. Now halve down each end of saw about 2 teeth, fit them together, letting the joint come in the center of the notch and screw down the



A GOOD CLAMP EASILY MADE

plates to keep in place. Have a piece of small iron wire to bind joint to keep from slipping, and then bind with small brass wire enough to make a good job. Now put on some clean borax. Have a pair of close tongs with about 1¼ by ¼-inch jaws to hold a heat long enough to get them white hot and grasp the saw with them until the brass is melted. You will find you will have a good job. Now let the saw get cold and then clean off. This is very simple and a good way. I have done a lot of saws and they hardly ever break in the same place. F. SPINKS, England.

More Side Lines.—I am a reader of your paper and have been for five years and I must say I couldn't do without the paper, for it is the backbone of blacksmithing. It has helped me out many a time, especially in taking up side lines. I boil apple butter and make cider in season and then, too, I have a shingle mill, besides. Making cider and boiling apple butter is a very profitable business and in a good season we make $800, and, besides, it brings people from a great distance to the shop. In this way we advertise our shop in different sections. This is all due to THE AMERICAN BLACKSMITH.

I have a two-story building, 20 by 84 feet. In my shop I have a 20-horsepower boiler. 15-horsepower engine, one emery stand, one power drill press, one No. 1 Little Giant Punch and Shear, one trip hammer, two forges, a hand blower, a steam blower, a tire bolt machine, an 18-inch jointer, a 36-inch band saw, a mortise machine and all the other tools that are necessary. W. IRA BAKER, Pennsylvania.

Wants to Remove Broken Stud.—Will you please inform me through your valuable paper how to remove a broken stud from the cylinder head of my engine? It is broken ¼ inch below the head of the cylinder. H. KELLOGG.

In Reply.—If the stud to which you refer is broken below the surface of the metal, making it impossible for you to grasp it with a wrench we would suggest drilling a hole through the center of the stud and then driving a square, tapering punch into the hole, and by this means turning the stud out. The sharp, square corners of the punch will cut into the stud sufficiently to enable you to turn it with a wrench.

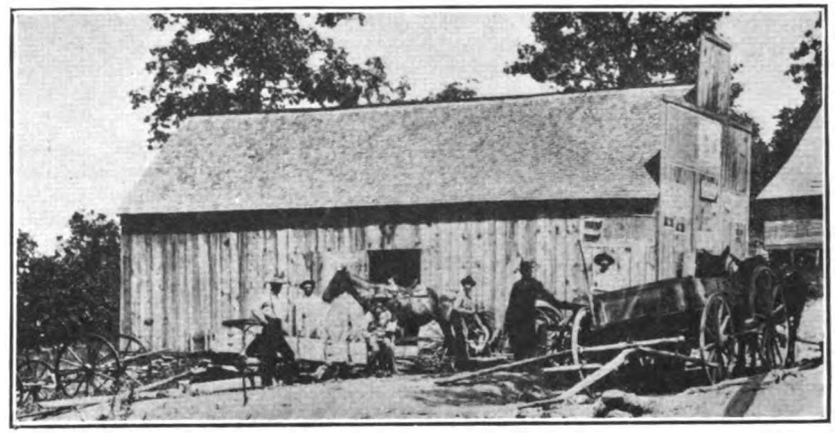
If, however, you find the stud badly rusted into place drill a hole through the center of the stud of just as large a diameter as possible without injuring the threads, and then chip out the shell of the stud with a chisel. You, of course, understand that extreme care will be necessary in order to avoid injuring the threads.

F. H. J., New York.

A Letter from Ohio.—I enjoy reading "Our Journal" because the writers know what they are talking about. It is a very useful book in many ways. I often read with interest some talks on organization for the betterment of trade and prices. This has so far always failed with the existing condition of the trade; the only way I can solve the problem is to form a brotherhood of the craft with a view to having a benefit association connected with it, to be used as agreed upon by the brethren. If they so desired they could establish an Insurance Agency and with the proceeds of that establish a school where boys can be taught the trade in a scientific way, same as a doctor, lawyer or any other professional man. When they have their diploma they can charge their price without being questioned, as we all know people always say they work cheap because they do not have their trade very well learned. This plan will put the cheap man out of our class. The way I figure is this: If a man can with instruction learn in 4 years what it takes 20 or 30 years to learn without instruction, at a very low estimate it is worth $75,000 or more to any man who wishes to do business. W. B. K., Ohio.

A Letter from Texas.—As I have not seen many letters from this part of the country, thought I would write. I live 'way down here, where the people do not know much about blacksmithing and there is not much to do in that line. I work alone, have a small shop 20 by 36, with the old-fashioned bellows, one press drill, a Mole tire shrinker, a 100-pound Peter Wright anvil, and a few other tools, and I have not had an idle day in 3 months. I do not know anything much about blacksmithing, as I have only had 9 years' experience, so I cannot tell those fine smiths anything to interest them as a side line. I have a farm to rent and a nice home with 25 acres of land in this place. I think 'Our Journal'' is splendid, as it has much information and good advice. Probably some of you would like to see some of my prices. Shoeing and furnishing shoes, 65 cents; shrinking buggy tires and rebolting, 75 cents; wagon tires, 50 cents per wheel; wagon axles, $2.50 and $3; wagon spokes, 25 cents, buggy spokes, 25 cents; plow shares, 10 and 15 cents each; and other work in proportion as near as I can compute it. I am thinking of buying a cold tire shrinker. I like to improve my shop and my work. Good luck to the craftsmen and best wishes to "Our Journal." WM. BATES, Texas.

A Good Friend of the Craft.—I have been taking your paper for a long time and I have seen so many valuable things in it that it is hard to get up anything new. But if these sketches suit I will give you some more as I have plenty of time to write, on account of a serious accident that I met with at a factory where I was foreman smith. This is an up-to-date shop and we do both heavy and light work with power and steam hammers. We also have the Autogenous welding outfit, the Oxy-Acetylene process with which we weld angle iron, the ends in tanks, cast iron, copper and all kinds of metal. When handled right it makes a good weld, melting the metal together, no hammering being done. It can also be used in cutting iron or steel; the cut is narrow and smooth. It takes about 2 weeks to learn to work it properly. It is great for doing work that looks impossible, copper pipe being welded to steel pipe easily. It takes the place of rivets in tanks and does away with calking, making a good, clean job. But for work that is heavy and straight it is cheapest to weld in the smith fire. But for welding angle steel rings and such work it can be done while you are getting one side welded the old way. I guess I will have to stop, because I get so wound up when I start to talk blacksmithing that I hate to leave off. BERT HILLYER, New York.



AN ARKANSAS SHOP WHERE GENERAL WORK IS DONE

A Talk on Plow Work.—Mr. Frank H. Peckham, Iowa, wants information on plow work. A good way to point an old plow lay is to loosen the point of the old lay with a thin chisel and put the point between the steel and land side point; weld along land side first and nearest heat in throat. Apply nothing but borax for welding, then double point around, like you would when making a new lay and weld same way. After you have all parts thoroughly welded take your hot chisel and trim your lay same as a new lay. With a little practice you will have a fine job, and if you scarf the old lay well you won't see anything of the weld from the top side. You have got to make your points according to the wear of the lay.

If you have to harden your lays do as follows: Heat your lay to an even red, then sprinkle with hardening compound. I use cyanide. See that your lay is not warped; then take hold with common tongs in throat of lay and plunge in a lot of cold water. By the time you plunge your lay you will have a cherry heat and it will scour in any kind of soil and will stand stones quite well. Don't heat after you put on your compound and don't be in too big a hurry to cool and take out of the bed. To cool it too quickly after you heat it will warp a lay and to take it out too soon will crack it. I have done plow work for 15 years with great success and if I can give you any more information, or if you would like to know still another way of pointing and hardening, I'd be glad to help any brother of THE AMERICAN BLACKSMITH family. ANDREW PETERS, Minnesota.

A General Shop of Arkansas.—I am not a fine smith, but I am a better smith than I am a penman. My shop, which was just completed, is 18 by 40 feet and is situated in a nice country town. I am in a good farming country and 6 miles from any shop. I get plenty of farm tools to work on and am in the center of the sawmill district. I am kept busy 10 hours a day this dry, hot weather. I learn some valuable things from "Our Journal", and can't do without it. I would as soon try to run a camp meeting without religion as a shop without THE AMERICAN BLACKSMITH. I have plenty of work all the year around and work 10 hours a day and sometimes borrow some of the night. There isn't any organization here, but I wish there was. Prices are low. By the way, boys, did you ever see a wooden-legged blacksmith? I am one and so you see I can make my own legs. I am in favor of the journal coming 2 to 1. If it costs us more we will leave off a few Havana cigars and add it to our subscription. What do you say?

Will some brother smith tell me how to braze cast iron? I guess I had better close as this is my first letter to the journal. I will give a few of our prices:

Four new shoes	$ .90
Four reset	.30
Plow lays	.30
Wagon tongues	2.00
Bolsters, hind and front	1.00
Axles	$1.75 and 2.00
Spokes	.15
Felloes	.20
Shrinking 4 tires	1.50
Making new tire	2.50

Other prices are about in the same proportion. J. C. CARRICO, Arkansas.

An Alabama Letter.—I am always looking forward to the coming of the journal. I like it and read all of it. I notice the boys are still pounding Mr. Deremer for his swift horseshoeing, and will say I think it is impossible to put on 136 shoes in 9 hours and do a good job. I am not that fast. It takes me nine hours to drive 60 shoes and I think I have done a good day's work. I have run a shop here for 13 years and I

have a 3-horsepower gasoline engine, 20-inch Silver band saw, a Sidney saw, a planer, a boring machine, a Champion drill, an emery stand, a Champion blower, a House cold tire setter, a hot setter, Green River stocks and dies and the regular hand tools.

I am doing horseshoeing and repair work of all kinds and am selling buggies, wagons and harness. Our prices are low here. I have one steady helper and part of the time two, and we have plenty of work at all times. Our prices are:

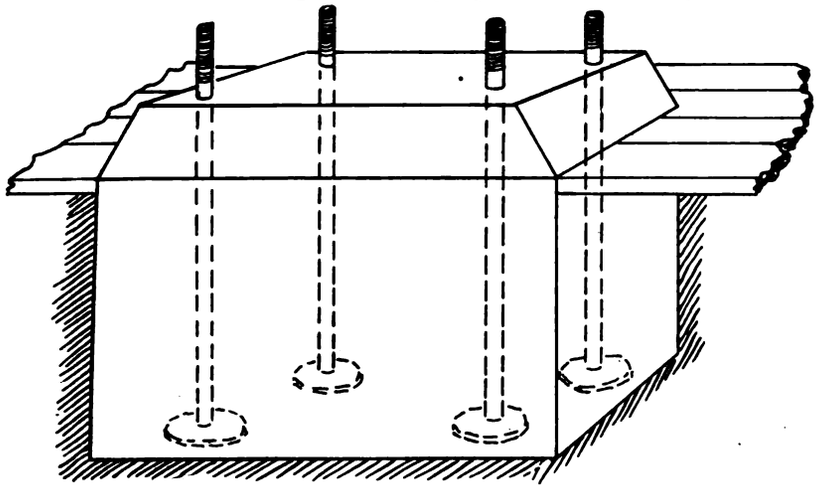
Horseshoeing ..... plain	$1.00
Horseshoeing ..... with toes	1.40
Tire setting	$ .40 and .50
Wagon tongues	2.00
Wagon bolsters ..... from	$1.00 to 2.50
Wagon axles	2.50 to 3.00
Wagon hounds	3.00
Buggy shaft complete in white	2.25
Painting buggies ..... from	$5.00 to 7.00
New buggy tires, 1 inch	5.00
New axle points, 1 inch	4.00
New axle points, dust-proof	5.00
New body	5.00
Pointing 8-inch pony plows	.25
Dray work:	
For filling wheels	3.50
New tire, 3 by ⅛ inch, each	2.00
Hounds, new, old irons	3.00
Pole, new, old irons	3.00

All other work in proportion.

CARL LANGEVILLE, Alabama.

Building an Engine Foundation.—In answer to Mr. W. H. Tedford about how to build an engine foundation of concrete I have had very good results from one built in the following way: Make a frame of 1-inch boards (boards must be as wide as you want your engine high off the ground) just a little larger than the base of the engine; it will make a better and neater job if you make the frame a little larger at the bottom than at the top, that is, make it funnel-shaped. Then dig a hole in the ground exactly where you want your engine to be when finished, just the same size as the larger end of your frame and about 2½ feet deep, depending on the soil. Then put your frame over the hole and level it up and put your 4 or 6 bolts in properly, spaced to bolt the engine down with. Very large washers should be put on the heads of the bolts to keep them from pulling through the concrete.

Now you are ready to pour in the following mixture: 1½ parts good cement, 3 parts clean sand and 4 parts gravel. Fill up the hole and form to the top of the frame and let the cement set. Then take away the plank frame and let dry, when it is ready for the engine. L. A. CUPP, Mexico.



CONCRETE MAKES AN EXCELLENT FOUNDATION FOR THE ENGINE



THE GENERAL SHOP OF MR. L. J. LABOUNTA, VERMONT

A Letter from Australia.—The work we have to do in Australia is somewhat different to the work of blacksmiths in America. I suppose if some of the American blacksmiths were to start business in any of the farming districts here they would make a good many blunders until they got acquainted with the class of work that would be brought in for them to do. Would some reader of this paper kindly inform me the right method for nickeling buggy and sulky ware or anything that requires nickeling? If any reader would like to know what chemicals to use for welding file steel or spring steel without any exertion and would cost only a few cents I would be too pleased to give them the information. I might also say in axle setting that I am not in favor of gather on a light vehicle and not on a load carrier, unless same travels through boggy country, cutting down to the nave. Then it requires a little gather. But what would rectify that would be to pull from the cap of the axle with the two outside draw bars. As for cut-under, I like a little, but very little will do. I agree with subscribers in asking a good price and giving good work. I always work according to the price I am getting for the job. I am also in favor of an association among blacksmiths. I must say that the blacksmith trade is the most abused trade on earth. Botches work for little money and are the biggest critics. Any reader of this paper giving me the necessary information about nickeling I will send him drawing of an implement that I have just had patented for Australia. I don't wish to have same patented in America and would give some reader of this paper the opportunity of greatly increasing his trade.

W. H. NELMES, West Australia.

A General Shop of Vermont.—I have been a reader of THE AMERICAN BLACKSMITH for about five years and appreciate the helpful hints on horseshoeing and general blacksmithing. It has helped me in many ways, for I came here 3 years ago and commenced business for myself, although I was only 22 years old and had to work up a business, for the shop had been closed for some time. I enclose a picture of my shop, which is 24 by 40. I have all the latest improved tools, have worked up a good business and have work enough now for two men, but do it all myself.

I do all kinds of woodwork as well as ironwork. I build all kinds of sleds and find a ready sale for them. I also make several useful tools, although most of my work is horseshoeing, including green western horses and colts. I feel proud of my business and take delight in keeping my shop clean and up-to-date.

L. J. LABOUNTA, Vermont.

A Letter from Texas.—I will try to write my thanks to you for the information that I have gotten out of "Our Paper." I like it O. K. Horseshoeing seems to be the main thing with all smiths and should be, for when we go to shoe a poor, humble, dumb brute we should know how to fit his shoes to his feet. He can't tell us how and where they hurt, if they don't fit. There are more horses ruined from shoeing than any other one thing. The farmers and their boys will run out and jerk up a horse's foot, take a stock shoe and put it on any old way, so he can go. Then when they take him to the smith and if the smith doesn't do a first-class job they will cut the smith. I wish there was some way to stop that.

I am 26 years old and have been in this business only 2 years. I went in with a good smith. He stayed with me 10 months,

got dissatisfied and I had to buy him out. Not knowing much about the work I went at it and can now do most any kind of work and have got a good trade, and I thank the good Lord for it. I will get a better trade from now on, for the people who have seen my work tested like it. I do my own work good and charge plenty. Some kick at my prices, but I can't help that. I can't do my work for nothing, nor can you if you make anything at it. There is good money in blacksmithing if you do the right kind of work, charge plenty for it and treat your customers right. Don't go home at night all greasy. If you do, go up some alley, for the people will say: "That man is a smith," and then make some slighting remark about him. That is what disgusts so many people with the craft today. Will someone send me through the journal or privately a plan for a 3-horse evener that has not got any side draft, for wagon or planter. C. C. DONNELL, Texas.

An Interesting Letter from Kentucky.—I have been reading your paper most of the time for about 8 years and I have often wondered why I see so few letters from Kentucky. Surely it cannot be because there are none capable of writing on smithing! Surely they are not all so busy that not one has time to write a short article each month! It cannot be because prices are so low that they are ashamed of them! for they could write and say nothing about prices. They are shoeing horses all around me at 75 and 80 cents, though I never shoe one for less than one dollar, and I am proud to say that many horses pass the door of other shops and come to me. Don't try to build up trade by price-cutting. It won't stand. Honest, fair dealings and the best of work will build a trade that will stand, regardless of a few cents in the price.

I notice in the September issue, where W. H. Smith, of Tennessee, shod a 3-weeks-old mule, with good results. I had the pleasure of shoeing a nice horse colt about twice that age that had been shod by one of my neighbor smiths who was shoeing at 75 cents. He had cut off a No. 1 shoe and used No. 5 nails to shoe the colt with, and the result was he drove a nail to the quick and made a bad sore. The shoe stayed on only a day or two and came off, leaving the colt in worse condition than ever. Then it was brought to me. I made a shoe to fit, trimmed the foot to the proper angle, nailed it on with special nails for colt shoeing. The colt came back in about a month with the shoe still on and walking almost straight. I took it off and made another a little larger and put on and am satisfied that this shoeing will fully cure the colt.

I would like to shake hands with Mr. Andrew Peters, of Minnesota, on his last sentence in the September issue. In my opinion the secret organizations of today are drawing more loose change from the common people and causing more strife, envy and trouble than anything else that the sun shines on. You can't make a gentleman out of a rascal by organization. It's only a blind for him to hide behind. He will still cut prices on the sly. I don't doubt but that there are some good rules about all organizations, but there is nothing about any of them but that a true man ought to do, though he belong to none of them. I consider the Bible our only guide and I consider its rules better than all organizations combined. Please have a letter each month from some one in the land of the free and the home of the brave: Kentucky. E. E. SMITH, Kentucky.

A General Shop of Ontario.—The accompanying engraving shows our shop which is run by electric power. We also use electricity for lighting. The power is supplied by the town and costs us $16 per horsepower for a 24-hour service, the light costing $1 a year for each 16-candlepower lamp. We are equipped with the following machines: A drill, a thread-cutting machine, a power hammer, a band saw, a planer, a jointer, a hub-boring machine, a sand drum, a sand belt, a boring machine, a spoke-tenoning machine, a double emery grinder, besides three fires with power blast. We have room on our shoeing floor for 20 horses and have a good shoeing trade. Besides shoeing, we do all kinds of repairing, and



THE LARGE GENERAL SHOP IN ONTARIO RUN BY CHURCH BROTHERS

our 11 employees are kept busy for 10 hours a day. We started in business nearly 10 years ago in a small shop and on a very small scale. CHURCH BROS., Ontario.

An Interesting Letter from York State.—In looking over "Our Journal" last evening I read the letter of Mr. Reckner, a New York blacksmith, and although I never saw the gentleman I feel quite acquainted with him, having met so many men just like him. He says among other things that he doesn't care how good the man is who taught himself the trade, he should be considered only a "botch," and then goes on to say that he served seven years as an apprentice.

Now he knows, if he knows anything, that if his words were true, which they are not, that the trade would be no further advanced today than it was in the days of Tubal Cain. One man would learn from the other all he knew and nothing more, for he says a man cannot teach himself. I would like to ask Mr. Reckner who taught Edison to make the phonograph, Morse, the telegraph, saying nothing of Watts, Fulton and other great inventors? Did he in all those 7 years' apprenticeship learn as much as those men taught themselves?

Brother Jewett in the same issue gives us a lengthy article on the apprentice question. The subject is very well handled, but I notice he carries the idea that he served 7 years as an apprentice, which seems to be the proportion in order to master the art thoroughly.

If I had not been one of those botches Mr. Reckner refers to I would not have joined issue with him, but I am now rounding out my 21st year at the forge, and never worked under instruction or served an apprenticeship. I have a good trade, do all kinds of blacksmith work and shoeing, get good prices for everything, build wagons and sleighs, ornamental ironwork, etc. In fact, anything and everything that I am called upon to do that can be done by any man with the tools and facilities at my command.

I think the less of this spouting about some other fellow one does the better it is for all concerned. I have always made it a practice to never say anything about a fellow worker unless it is in his favor. If he is a poor workman or "botch," as Mr. Reckner would say, I do my work so much better than he as I can, and if he is a good workman (having served 7 years, perhaps) I try and do my work as well and say nothing.

I have a new shop, 26 by 46, with 2½ stories, a complete stock of tools, gasoline engine, band saws and a good equipment of machines. Keep one man the year around and an extra man in winter.

I do not burn horses' feet to make the shoe fit, neither do I go to the other extreme and cool the shoe before trying it. Neither do I fit the shoe to the foot all around. And I never touch the rasp to the outside of the foot, as some theoretic horseshoers and cranks tell us to do.

There is reason in everything. I have taken THE AMERICAN BLACKSMITH for a number of years and expect to take it as long as I am in the business. I think if a man read "Our Journal" for several years he would learn something, even if he did not sweep the shop and do chores for somebody for 7 years. JOHN F. BUYCE, New York.

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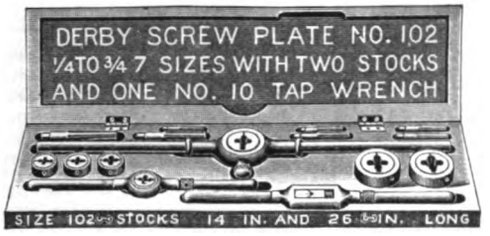

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Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, Nov. 15, 1909, and are subject to fluctuations. Corrected for The American Blacksmith by The National Heavy Hardware Reporter, Chicago.

Iron and steel quotations have again advanced, but no changes are reported on other items. Jobbers at Davenport and Minneapolis are quoting $2.20 rates on iron and steel, while Kansas City is quoting $2.30 rates, full extras, and 20c. extra for broken bundles.

Jobbers report light trade in wood stock items and the demand running toward the cheaper grade of staples.

Manufacturers advanced the price on toe calks 20c. per hundred pounds, and this will no doubt stiffen prices on this item.

Trade generally is reported as good, while collections are reported as very good.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—
$2.00 rates, full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$2.00 rates, full extras.

Toe Calks—	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—	
6 x ½ and smaller	60–10%
Larger and longer	50%

Machine Bolts—	
4 x ½ and smaller	60–10%
Larger and longer	50%

Nuts—	
Less than 10 lbs. of a size	$2.50 off
From 10 to 50 lbs.	3.00 off

Washers—	**Skeins—**	
Same price as nuts.	Cast	65%

Malleables—	**Half Patent Axles—**	
Common $ .09		65%

Springs—	
Single Spring, each	$1.25
Springs, black and half bright	.06

Hickory Lumber—Per Foot—	
1 to 2½	$.09½
2½ to 4½	.11

Ash and Oak Lumber—Per Foot—			
1–1½	$ .07½	2½–3	$.08½
1½–2	.08	3½–4	.09½

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
1″	$65.00	$65.00	$75.00
1¼″	65.00	68.00	80.00
1½″	68.00	75.00	85.00
1¾″ 2″	72.00	80.00	104.00

Rough Hickory Axles—		Each.
3 x 4	6 ft	$ .60
3½ x 4½	6 ft	1.00
4 x 5	6 ft	1.20
5 x 6	6 ft	2.20
4 x 5	6½ ft	1.30
4½ x 5½	6½ and 7 ft	2.00
5 x 6	6½ and 7 ft	3.00
5½ x 6½	7 ft	3.50

Finished Hickory Axles—	
For 2½ and 2¾ Skeins	$1.00
For 3 Skeins	1.20
For 3¼ Skeins	1.45
For 3½ Skeins	1.60
For 3¾ Skeins	1.95
For 4 Skeins	2.25

Rough Oak Bolsters—	
Short	$ .08
12–14–16 ft.	.09

Finished Oak Bolsters—	
2½ x 3½ and under	$ .65
3 x 4	.70
3½ x 4½	.90

Rough Oak Wagon Tongues—	
4 x 4 x 2 x 4 x 12 and smaller	$1.00

Finished Oak Wagon Tongues—	
3½ and smaller	$1.25
3¾	1.30
4	1.40

Two Inch Sawed Hounds	Per Pair.
Tongues	$ .40
Front	.45
Hind	.55

Patent Wheels—	
A. B. No. 13 and under	45 %
D. No. 13 and under	35–5 %
All Grades, No. 17 to 33	35–5 %
All Grades, No. 39 and Larger	25–5 %
C. No. 13 and under	40–2½ %

Cupped Oak Hubs— Set.		**Plain End Oak Hubs-Set.**	
7 x 8 x 9	$1.40	10 x 14	$3.45
7 x 9 x 10	1.60	11 x 14	4.50
8 x 9 x 10	1.65	11 x 15	4.75
8 x 10 x 11	1.90	11 x 16	5.35
9 x 10 x 12	2.05	12 x 16	6.00
9 x 11 x 12	2.10	12 x 17	6.55
10 x 12 x 13	3.20	13 x 18	7.50
11 x 13 x 14	4.45		
12 x 14 x 15	5.35		

Rough Sawed Felloes—			
1½ x 2″	$1.55	2 x 2½″	2.00
1½ x 2½″	1.75	2½ x 2″	4.75
1½ x 2½″	1.85	3 x 3″	5.75
3 x 3½″	6.00		

Ironed Poles, White, XXX—	
1¾ x 2½″ No. 2	$4.00
2 x 2½″ No. 3	4.00

Ironed Shafts, White, XXX—	
1¾″ x 2″ and smaller	$2.15
1½ x 2″	2.35
1½ x 2½″	2.90

Farm Wagon Bows—	
Round Top, ½ x 2″	$ .65
Flat Top, ½ x 2″	.80
Round Top, ½ x 2½″	1.40

Standard size Piano Bodies with Seats—	
Each	$4.25

Plow Beams—	
1 Horse	$ .70
2 Horse	.85
3 Horse	1.00

All Hickory and Oak Spokes and Patent Spokes—	
Discount from Weis & Lesh List No. 5	5%

Wagon Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2½ x 38″	$2.15	$2.95	$4.25
2½ x 42″	2.90	4.05	5.50
2¾ x 46″	4.40		
3 x 44″	4.70	6.95	8.90
3 x 48″	5.50	7.85	10.50

Single Trees—Oval—

	Mixed Forest Second Growth	White Second Growth
2½″	$1.60	$2.90	$3.50
2¾″	1.70	2.95	3.60
2¾″	1.80	3.05	3.80
3 x 36″	2.45	3.55	4.20
3 x 38″	2.50		
3 x 40″	2.65	4.00	4.85

Single Trees—Round—

	Forest Second Growth	
2½″	$2.10	$3.60
2¾″	2.10	3.65
2¾″	2.15	3.75
2¾″	2.85	4.25
3″	3.45	4.80

Oval Plow Doubletrees—		**Flat Plow Doubletrees—**	
2½ x 36″	$1.75	1¼ x 3½ x 42″	$3.00
3 x 40″	2.55		

Wagon Doubletrees—	
2 x 4 x 48″	$3.60
2½ x 48″	4.80
2½ x 4½ x 50″	5.20
2½ x 4½ x 52″	5.60
2½ x 5 x 52″	6.40
2½ x 5 x 54″	7.20
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—	Forest
2½ x 30″ and under	$1.00
2½ x 30″ and under	1.25

Buggy Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½″ and smaller	$2.65	$3.65	$4.65

Express Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½″	$2.95	$3.65	$5.00
2¾″	3.55	4.15	5.50
3″	3.55	4.30	5.75

Express Singletrees, Turned—

	Mixed Forest Second Growth	White Second Growth
2½″	$2.50	$2.65	$3.75
2¾″	2.90	3.65	4.00
2¾″	3.50	4.00	4.75

Express Singletrees, Square Center—

	Mixed Forest Second Growth	White Second Growth
2½″	$3.00	$4.15	$5.25
2¾″	3.50	5.45	6.00

Buggy Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2 x 42″	$2.75	$3.50	$4.50
2¼ x 2¼ x 42″	3.15	3.75	5.45

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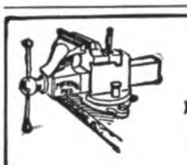
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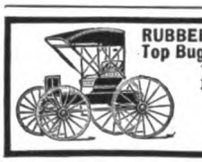
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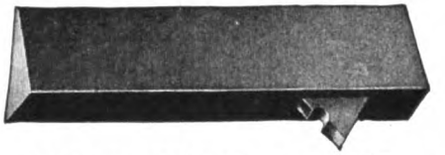

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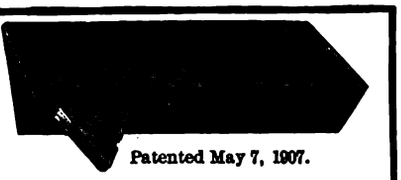
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There are two classes of workers—head workers and hand workers. **Are you one of the hands?** The man who works with his hands does labor which thousands of others can do as well. He is hired or discharged at will; if he loses his time he loses his earnings. The man who works with his head, the specially trained man, holds a permanent position at a high salary, is employed by the month or year, has short hours of work, and loses no salary on account of sickness.

The I. C. S. for the last 18 years have been training hand workers to hold the high-salaried positions of the head workers. If you mark and mail the coupon below, this great institution will tell you how it can help you in your spare time at home to gain a better position, increased earnings, and a successful future.

Use the coupon NOW.

International Correspondence Schools
Box 1302, Scranton, Pa.

Please explain, without further obligation on my part, how I can qualify for a larger salary and advancement to the position before which I have marked X.

Foreman Molder	Electrician
Foreman Blacksmith	Architect
Foreman Machinist	Structural Engineer
Foreman Toolmaker	Contractor & Builder
Foreman Patternmaker	Foreman Plumber
Mechanical Engineer	Civil Engineer
Machine Designer	Surveyor
Mechanical Draftsman	Mining Engineer
Stationary Engineer	Bookkeeper
Electrical Engineer	Stenographer
Electric-Lighting Supt.	U. S. Civil Service Exam.
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Name _____

St. & No. _____

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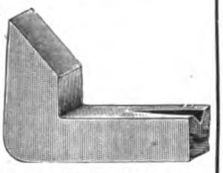
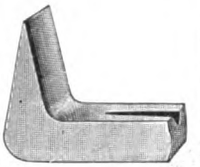
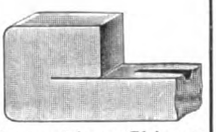
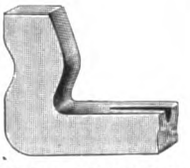
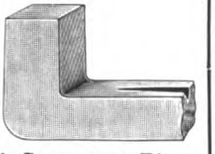
Some of the Calks made by our Machine


Medium, City or Chicago Sharp


Medium, Ordinary or Country Sharp


Large, City or Chicago Block


A Blunt Philadelphia Kink


A Summer or Blunt Calk, any desired Length

The American Calking Machine

Was Demonstrated during the
Master Horseshoers' Convention
At Davenport, and was
pronounced by all the greatest success and saver of labor ever presented to the craft.

Sent on Ten Days' Trial.

Write today for our Special Offer and Folder.



No Hammering for Sharp Shoeing

Just heat the shoe and one pull of the lever makes any calk.

American Calking Machine Co.
First National Bank Building, Chicago

DON'T BUY GASOLINE ENGINES UNTIL YOU INVESTIGATE "THE MASTER WORKMAN," a two-cylinder gasoline, kerosene or alcohol engine, superior to any one-cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE. THE TEMPLE ENGINE MFG. CO., 492 West 15th St., Chicago. THIS IS OUR FIFTY SIXTH YEAR.

Trade Literature and Notes.

BLACKSMITHS AND SHOP OWNERS can make good profits from clipping horses for their customers and others. We wish to call our readers' attention to The Chicago Flexible Shaft Co's very complete line of these machines. They are the best made today. A great many of our readers could be benefited by writing The Chicago Flexible Shaft Co., Chicago, Ill., for proof of the profits to be made by means of these clippers.

THE WILLIAM GALLOWAY COMPANY, Waterloo, Iowa, announces an increase in its capitalization totaling $3,500,000. This company has done great service to the community at large, and well merits the success which it has achieved. We are quoting a few extracts from the Waterloo Evening Courier to show how they are regarded in their own town.

"The William Galloway Company is the largest manufacturing enterprise in the United States of its kind. In fact, this firm is recognized, today, as the largest firm in the world which manufactures manure spreaders, cream separators, gasoline engines, et cetera, selling them direct to the people. The security and permanency of the business which this company has built up will remain as steadfast as the Rock of Gibraltar. This business has been built up by advertising alone, not a single salesman on the route, and, as Mr. Galloway told one of the reporters of this paper the other day, when he was showing him thru his factory, 'The only thing that makes the wheels of these factories go around is advertising."

The William Galloway Company will be glad to send free information regarding their goods and selling plans to anyone inquiring who mentions THE AMERICAN BLACKSMITH.

THE L. S. P. CALKING MACHINE COMPANY, of Wyalusing, Pa., tell us that they have received a great many testimonials concerning the good work done by their calking machines, and they will be pleased to forward information to anyone interested in it.

NOT SO MANY YEARS AGO people would have regarded a Correspondence School of Motoring with wonder. Today, however, there is such a school, whose course of instruction is proving a great help to the mechanic or others interested in the automobile and its construction. Their course is a complete practical teaching on how to run, care for and repair an automobile. We would suggest to interested readers that they write the Dyke's Correspondence School of Motoring, Dept. B., Wash. Ave., St. Louis, Mo.

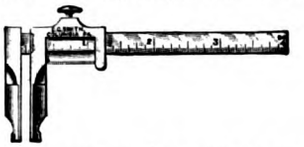
W. F. YOUNG, P. D. F., 230 Temple St., Springfield, Mass., writes us that he has received many testimonial letters from blacksmiths and others who have used his famous Absorbine, which they say is the best cure they have ever tried for Inflamed, Swollen Joints, Bruises, Shoe Boils, Capped Hock, Bursitis, Soft Bunches, Boils, Fistula, or any unhealthy sore and kindred diseases. He will be very glad to send complete information to any reader free.

THE SILVER MANUFACTURING COMPANY, 365 Broadway, Salem, Ohio, have just gotten out a new swing cut-off saw, which is an



addition to their line of wood-working and other machinery, which will be greatly appreciated by our readers. It is intended not only for the rough cutting usually done by such saws, but also for rapid, accurate and reliable results for fine work on hard wood, et cetera. It is a strong, carefully designed machine in all its details, and of many different sizes. A full description of this very useful saw will be sent to any reader who is interested.

THE ACCOMPANYING ILLUSTRATION represents a Caliper, not as well known to the average mechanic as it should be. It possesses many advantages over the old Caliper and rule methods,



in the way of saving time and doing better work. It is not necessary to first adjust your Calipers over the work, and then measure on a rule to see what size it is. You simply put this Caliper over your work with one hand, and you can read right from the Caliper the exact size.

The Sliding head fits on the scale with a set screw, so it will always stay where it is pushed to. They are made in all graduations, English or metric measures, reading 8ths, 16ths and 64ths and as fine as thousandths by means of the Vernier. In millimeters you can read as fine as 10ths and hundredths of millimeters.

With these Calipers you lose no time guessing at sizes. Put them over your work and you know exactly how much to take off, or how much you have taken off.

Mr. E. G. Smith, of Columbia, Pa., the manufacturer, issues a little pamphlet illustrating a number of styles and giving a general idea of these Caliper squares, which he would be pleased to send to anyone interested.

EXPERIENCED STOCK RAISERS are practically unanimous in stating that cattle and horses should be fed ground feed. The Bulletins of the Experiment Stations prove that grinding the feed will produce more milk, more beef, more pork, more mutton—and more work from the horse. The "Corn Belt" Feed Mill is a strongly built machine. All parts are interchangeable. A system of knife rings in the cutting head of this mill chops up the corn or grain before it goes to the grinding rings, thus greatly lessening power necessary to run the mill. On account of the slow speed the feed is not warmed. This mill handles new, soft or spongy corn, giving a fine, even grade of work on the corn and cob, with exceedingly light draft. The "Corn Belt" Mill has lathe-centered



burrs, insuring fine, even grinding. The burrs may be changed in three minutes, permitting your using the dull burrs for fine grinding and saving your sharp burrs for corn and cob. This is impossible with many mills, on which it takes from one half hour to two hours to change the burrs. This feature, users say, is worth the price of the grinder. The Spartan Mfg. Co., of Pontiac, Ill., makers of the "Corn Belt" Mill, have such faith in their product that they are willing to place a mill in the hands of a prospective customer for twenty days' free trial, and let him be the sole judge of its merits. Certainly no fairer offer could be made. Mention THE AMERICAN BLACKSMITH.

THE USE OF BRICK AND ASPHALT for the paving of streets in the cities has made the driving of horses at times very disagreeable and often of great danger. The Rubber Pad and the Shoe have helped matters materially, but added to this danger in recent years has been that of the oil dropped from the automobile, making the pavement at all times greasy. And, as the rubber does not seem to correct this slipping on the grease, it has become quite a problem. We understand, however, that it has been solved by the American Fibre Horse Pad Co., of 355 Ellicott Sq., Buffalo, N. Y., using a combination of Rubber and Fibre, the rubber giving elasticity to the pad, and the mixture of the Fibre causing the same in the wear to present at all times a rough surface, causing it to cling to pavements. The people who have used this pad are speaking of it in the highest terms.

WE HAVE JUST RECEIVED a most attractive catalog issued by the L. S. Starrett Co., Athol, Mass., in which they illustrate and describe a very extensive line of Bevel Protractors, Combination Sets, et cetera. They embody many improvements over the older styles. Catalog sent free.

"TALKS ABOUT TALKS" is the title of a booklet received from The Rowe Calk Selling Co., of Hartford, Conn. It is one of the most interesting catalogs which has come to our offices for a long time and contains information of vital interest to every horseshoer. We want to urge all of our subscribers who have not already received a copy of this booklet to send a request to the above company, who will be very glad to forward one.

THE IMPLEMENT BLUE BOOK, a 460-page volume, weighing two pounds, listing and describing every agricultural implement, wagon, vehicle and automobile made in the United States, together with the names and address of the Manufacturers, is published by the Midland Publishing Co., Midland Building, St. Louis, Mo., exclusively for the dealers, at $2.00 per copy. The publishers have several hundred copies of the 1909 edition on hand, which they agree to send to subscribers of this paper who will send 20 cents to pay for packing, postage, etc.

AS NOTED some time ago in the news dispatches, the Jury of Awards of the Alaska-Yukon-Pacific Exposition awarded to the Witte Iron Works Co., of Kansas City, Mo., through their representatives, the Moran Engineering Co., of Seattle, Wash., the Medal of Highest Award on Witte Stationary Gasoline Engines. This result must be gratifying to the Witte Iron Works Co. It is a recognition worthy of note in these columns, and we are pleased to extend our congratulations to the company on the success won by merit in this competition.

PRACTICAL MEN WANT PRACTICAL BOOKS

THE Books listed below are practical, every one of them. The prices, too, are practical—just as low as possible consistent with good quality. Practical men want practical books by practical writers. You know the writers mentioned below.

The American Steelworker, by E. R. Markham. This is an excellent book on the subject of steel working by a man with over twenty-seven years of practical experience in this branch of smithing. It covers the subject of steel thoroughly, from the purchasing of the material to the polishing of the finished product. Over 150 illustrations and 340 pages. Very substantially bound in green and gold. Price, $2.50.

Rich's New Artistic Horseshoeing, by Prof. Geo. E. Rich. This book contains photographic illustrations of over 280 styles of shoes and twelve full page plates, two of which are colored. It contains over 200 pages of practical scientific matter on anatomy of the foot, how the hoof grows, curing lameness and faulty action, the bar shoe, specific diseases and accidents, formulas, recipes, etc. Over 200 pages and bound in green library cloth. Price, $2.00.

Forge Practice, by John L. Bacon. This is a most valuable treatise on forge work of all kinds. Mr. Bacon is instructor in forging at a large training school. The book is profuse with illustrations, tables and formulas, and is altogether an excellent book for the practical blacksmith. Over 250 pages, bound in red cloth. Price, $1.50.

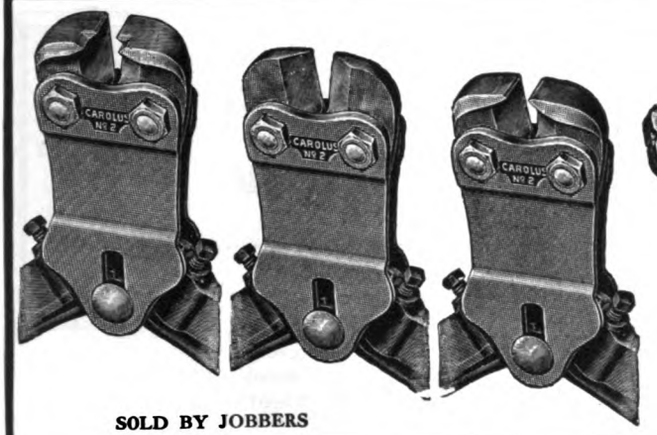
Practical Carriage and Wagon Painting, by H. C. Hillick. A very complete book on the painting of vehicles, from the most delicately colored carriage to the rough and ready farm wagon. Receipts, formulas and mixtures. Full directions for every kind of vehicle painting. Also tells how to equip the paint shop. Fully illustrated and well bound in silk library cloth. Over 100 pages. Price, $1.00.

Plain Gas Engine Sense, by E. L. Osborne. This is a very neat pocket-sized book which tells you just what you want to know about your gas engine. It is well illustrated and prepared especially for the beginner. Technical terms have been avoided and the matter is classified and indexed for ready reference. Over 150 pages, strongly bound between boards. Price, $0.50.

Can you afford to do without these books? Any of them will be sent postpaid on receipt of price.

American Blacksmith Company
P. O. Box 974 BUFFALO, N. Y. U. S. A.

CAROLUS





Nut Splitters and Bolt Clippers

Most Complete, Practical and Durable Manufactured.

MADE IN THREE STYLES

Enlarged views of cutting blades at left. Write for Circulars and Prices.

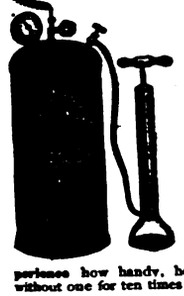
CAROLUS MANUFACTURING COMPANY

STERLING, ILL., U. S. A.

SOLD BY JOBBERS

HANDY LAMP

Gasoline Lighting System





The most practical invention since the introduction of Gasoline for lighting purposes.

A Shadowless 300-Candle Power Light that can be turned up or down instantly, same as gas, or can be left burning continuously, day or night, at a dim light of one (or low) candle power, or less, at almost no expense.

It can be turned up instantly to a **dazzling, bright 300-candle power** light that will flood a 30-foot room with light as bright as day at less than ½ cent an hour. **IT WILL SAVE FIVE TIMES ITS COST** in a year over Kerosene, Gas or Electricity. The **Handy Lamp System** is free from smoke, smell or danger. One gallon of gasoline will last 40 to 50 hours. It is the **simplest** and **safest system** ever devised, and it is equally attractive and appropriate for use in your **Home** or **Blacksmith Shop**, store, church or wherever good light is needed. **If you know from actual experience** how handy, how economical and how satisfactory this system is you would not be without one for ten times its cost. Write at once for AB Catalogue and particulars.

Brilliant Gas Lamp Co., Dept. 12, 42 State Street, Chicago, Ill.

AGENTS,

Beals & Co., Buffalo, N. Y.

Faeth Iron Co., Kansas City, Mo.

L. J. Kingsley Co., Binghamton, N. Y.

H. W. Petrie, Ltd., Toronto, Montreal, Cobalt, Vancouver.

Your Children

and your successors in business will not need new tools if you temper them with KALUX,—means *efficiency* and *durability*. Write immediately for information.

For

KALUX STEEL HARDENING SOLUTION

Metal Hardening Solution Co.,

Laboratories:

Rochester, N. Y. **Toronto, Canada**

Granite Bldg., **ROCHESTER, N. Y.**

Do Not Accept Imitations

WHEN you ask for an article you have seen advertised in The American Blacksmith, see that you get it. Don't let your dealer sell you something which he calls *"Just as Good."* Don't let a traveling man talk you into buying an inferior make. The goods advertised in these columns are made by firms whose reliability **WE GUARANTEE.** You run no risk whatever in buying these goods. Refuse imitations.

Insist On Getting What You Ask For

It Will Pay You To Trade With Us

Our Catalog will show you how to save money on your purchases, no matter where you live.
We handle first quality merchandise and sell

BY MAIL ONLY

No travelers' expenses or hotel bills added to cost of our goods. Our prices represent actual cost of merchandise with but one small profit added.

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Our "Money Back If You Are Not Pleased" Plan. Try Us

Send for our 352-page NET PRICE CATALOG For Fall and Winter, and see for yourself what exceptional values we are offering. It's the PRICE MAKER for the CARRIAGE HARDWARE and BLACKSMITH TRADE. Used as a book of reference by Blacksmiths, Wagonmakers, Horseshoers, Industrial Schools, Government Institutions, Railroad Shops, Mines, Factories, etc.

This book is absolutely FREE, and, we want every reader of this journal to have a copy. DO NOT PUT THIS OFF. FILL OUT AND MAIL COUPON NOW.

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Manufacturers, Jobbers Carriage Hardware, Motor Car Supplies

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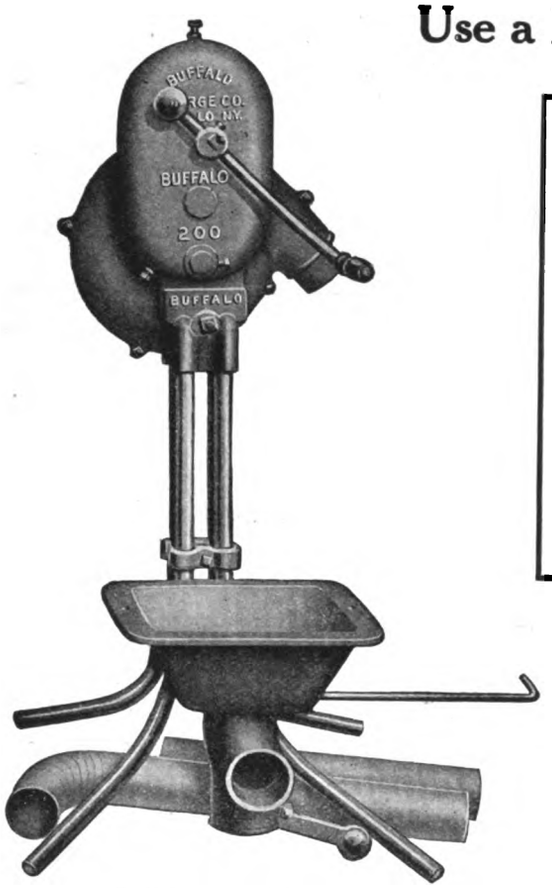
Do You Repair Autos?

The Best Tools—The Best Work.

Use a Buffalo "200" Silent Blower.



Buffalo, "200" Silent Blower.

Our Guarantee

For and in consideration of the purchase price of this machine **we hereby guarantee to replace,** free of charge, f. o. b. cars Buffalo, N. Y., any parts of the **"Buffalo 200 Silent Blower"** wearing out within ten (10) years.

We also guarantee this Blower to produce a stronger blast with the same number of turns of the crank than any other blower built.

Run this Blower 24 hours per day and the guarantee still holds good.

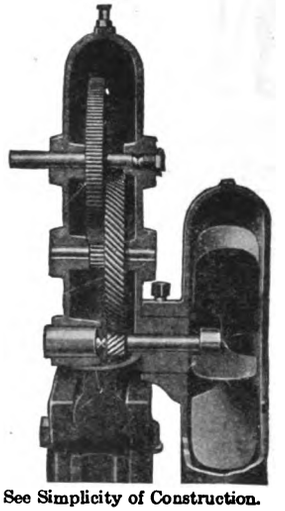
BUFFALO FORGE COMPANY.

W. F. Mudt

President.

Reasons.

Machine-cut gears—spur drive—helical speed—mesh perfectly. Gears run in extra long journal bearings, bored and reamed in the solid metal of the case. Perfect alignment always retained. End thrust balanced on ball bearings. No appreciable friction.



See Simplicity of Construction.

Improves with Use. All enclosed in oil and dust-proof case. The construction of the fan case is such that it **Delivers More Air per Turn of Crank** than any other blower made. Nature's law is observed, The delivery is along the line of least resistance and without any loss.

Equipped with the

Buffalo "200" Silent Blower

guaranteed against repairs for 10 years.



Notice the position of the crank. Just where your hand falls naturally upon it. Keeps your face away from the fire.

Buffalo Down Draft Forge

No. 660

Cast Iron Hood, tile stack, indestructible, from heat, rust and gases.

No Soot—No Smoke—No Gases

Your forge shop atmosphere always pure and clear. The down draft hood catches and removes all smoke and gases generated by the fire. It also supplies the fire with a hot blast of returned coal gases, which effects full consumption of fuel, saving one third.

Send for Catalog 178 A. B.

Which describes our Blacksmiths' Tools.

Buffalo Forge Company

Buffalo, N. Y.

Air-Cooled Motors



1 1-2 to 10 H.P.

THE BEST ON THE MARKET

Agents Wanted Write for Prices

The Air-Cooled Motor Co.
LANSING, MICH.



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Devoted exclusively to the gas and gasoline engine subject. It will tell you how to keep your engine running and save you money in expensive repairs. Its contents are of a semi-technical character that cannot fail to interest people operating or contemplating the purchase of a combustion engine.

PLAIN GAS ENGINE SENSE

Presenting the primary principles of Gas and Oil Engines in simple language—but supplying enough practical knowledge to successfully operate a gas engine.

Regular subscription price of Gas Power $1.00 a year.
Plain Gas Engine Sense sells for 50 cents a copy.

A special limited offer is now open of GAS POWER, one year, and one copy of PLAIN GAS ENGINE SENSE, both for $1.00.

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FOOS GAS AND GASOLINE ENGINES

ARE NOT EXPERIMENTS

Twenty-one years' experience has eliminated all weak points. Horizontal and vertical, one, two and three cylinders. 2 to 500 Horse Power. **You will lose more than we do if you do not investigate the FOOS.** Write for **FREE BOOK No. 16,** telling why the **FOOS** has points of superiority not found on other engines.

THE FOOS GAS ENGINE COMPANY, :-: Springfield, Ohio

"STEINER," the name that stands for big power at low cost. In addition to our famous water-cooled engine, we make this air-cooled engine, in 1½, 2½ and 3 h. p. sizes. Also Pumps and Jacks.

When writing state size wanted, etc.

Catalogue free.

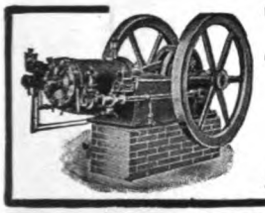


M. STEINER & CO.
242 S. Torrence St.
Dayton Ohio

Mention The American Blacksmith when you write.

THE AJAX GAS AND GASOLINE ENGINES

4 Cycle 5 to 10 H. P.



For the small power user there are no better engines made. Their construction combines strength, simplicity and economy. Backed by the most accurate workmanship, made of the highest grade of material, every part interchangeable, our engines give years of satisfactory service. Learn more about them. Our big illustrated catalog mailed **free** on request,

AJAX IRON WORKS, CORRY, PA.



WEST'S CARRIAGE AND AUTOMOBILE TOP DRESSINGS. For rubber, leather, and imitation leathers. Preserves all tops permanently. Will not get brittle or crackle. Finish equal to new top.

Send for Sample.

West Mfg. Co., Rockford, Ill.

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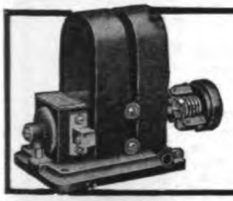
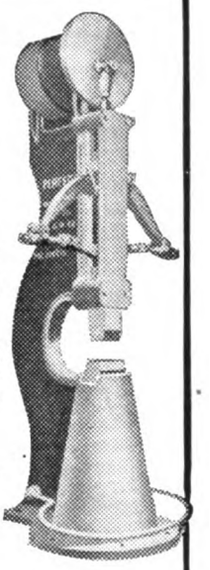


Furnish an intensely hot spark under all conditions, developing the maximum power of the gas or gasoline motor. A perfect mechanical ignition system—absolutely dependable—not affected by oil, water, dirt or mechanical strains. Built in the world's largest exclusive Magneto factory. Write today, stating type, size and use of your engine.

REMY ELECTRIC COMPANY, :-: Anderson, Indiana.

THE PERFECT POWER HAMMER



The Only Hammer Made with extra long guides, insuring a direct vertical stroke of the ram.

The Only Hammer Made with a disk attachment with a special anvil for sharpening plow and harrow disks.

Made in three sizes:

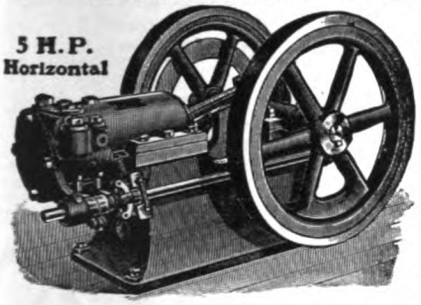
2½ in. Sq. Ram, Wt. 30 lbs.
3 " " " " 40 "
4 " " " " 80 "

Prices are right.
Write any jobber or

MACGOWAN & FINIGAN FOUNDRY AND MACHINE CO.
ST. LOUIS, MO.

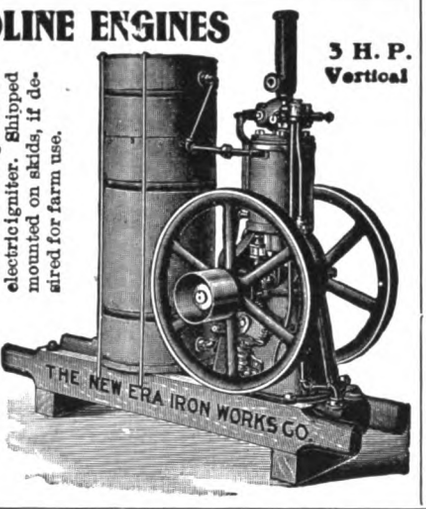
LITTLE GIANT GAS & GASOLINE ENGINES

5 H.P. Horizontal



Sizes, 1½, 3, 4½ H. P. Vertical, 5 to 25 H. P. Horizontal. Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.

5 H. P. Vertical



Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 4 to 100 H. P. Special inducements to dealers as agents.

THE NEW ERA GAS ENGINE CO.
No. 63 Dale Ave., DAYTON, OHIO.

BUY A FULLER



When you want the best Foot Vise, Positive Grip, Automatic adjustment, instant release.

Full of good points. Write for full description and price.

Hamilton Mfg. Co.
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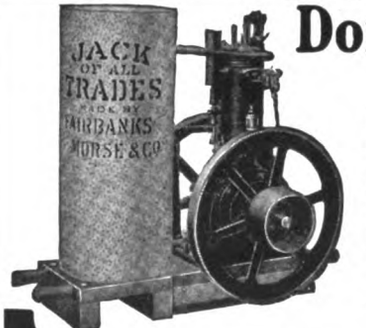

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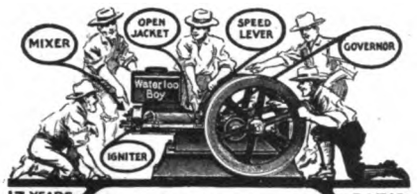

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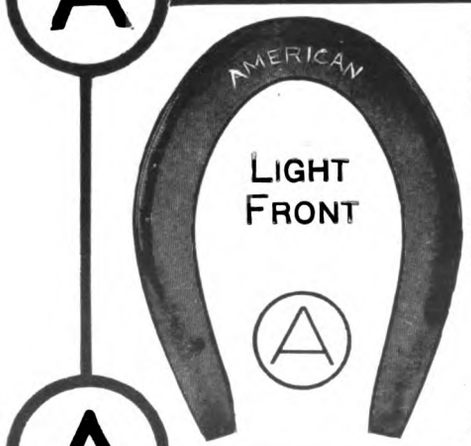

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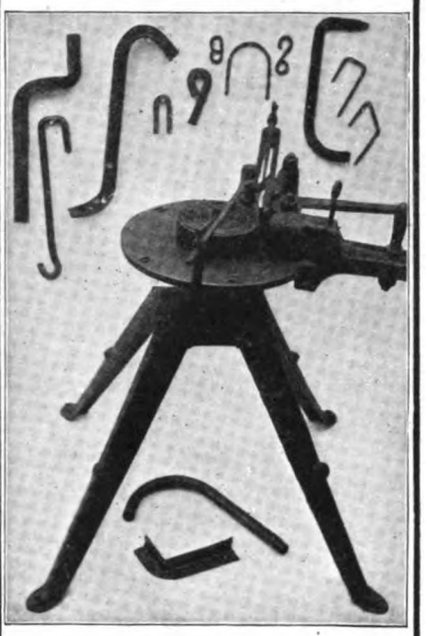

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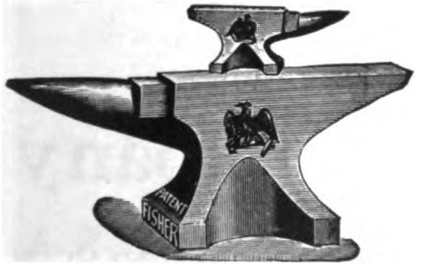
200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



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It is made heavy enough to withstand all strains and will last a lifetime.

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base.

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Our goods are handled by reliable dealers everywhere.



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THAT'S all it will cost you to advertise your business for twelve months—one whole year—to the man you want as a customer. We offer these calendars at cost.

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We guarantee satisfaction or refund your money.

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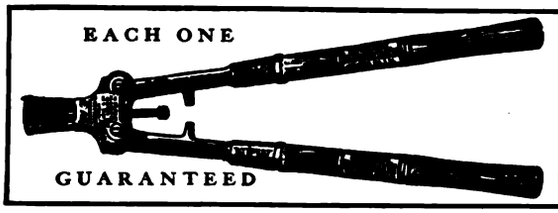

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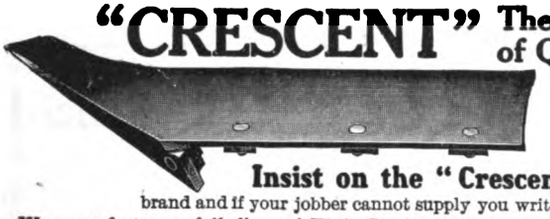

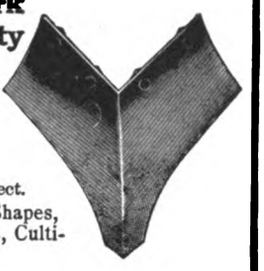

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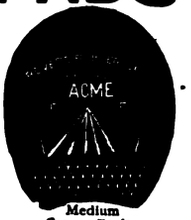

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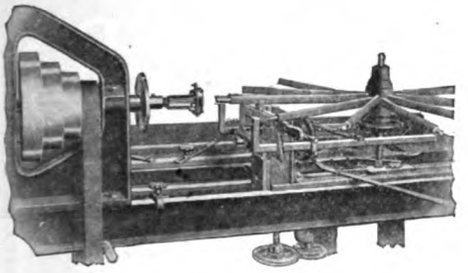

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Two More Operations On The Crain Combination Woodworker

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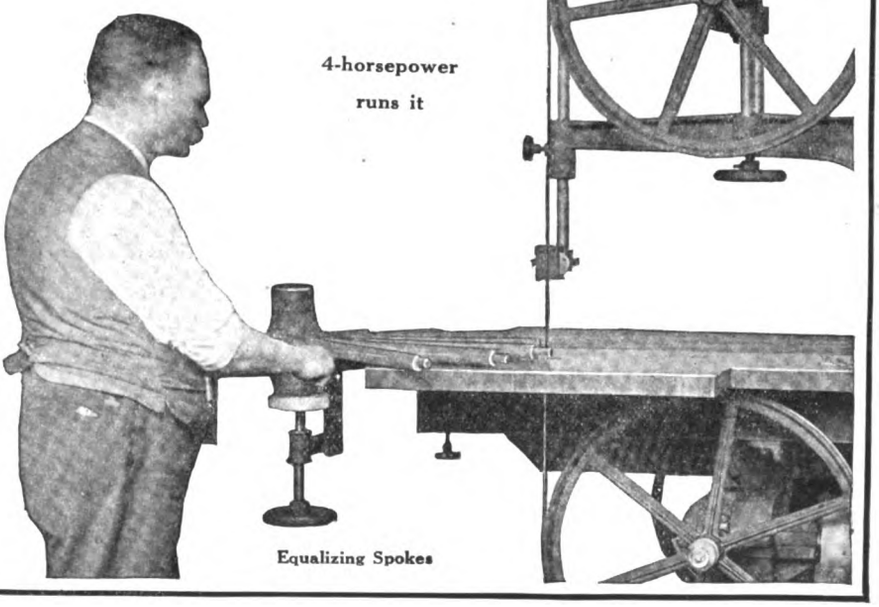
Buffalo, N. Y., U. S. A.

4-horsepower runs it



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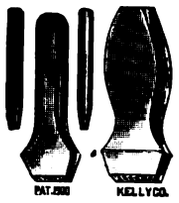

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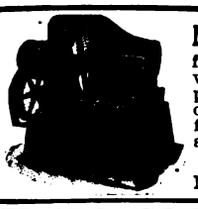

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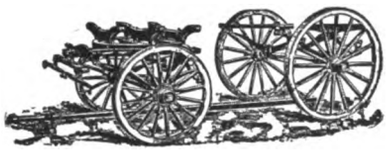

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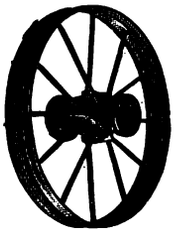

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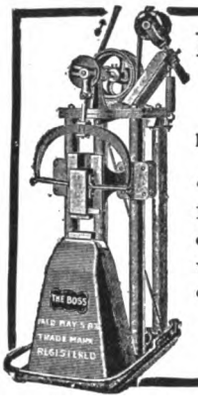


NOVELTY IRON WORKS BOSS HAMMER

For Plow Work, Wagon Work, Heavy Work, Any Work.

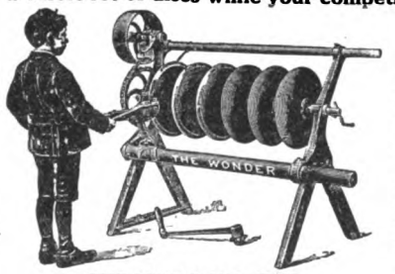
"Will strike as you like." Heavy or light at full speed or less. A broken anvil will cripple no other part of the hammer.

G. E. DAVIS, Mgr.
DUBUQUE, IOWA.

WONDER DISC SHARPENERS

SAVE ½ THE TIME AND ALL THE LABOR.

The Wonder Disc Sharpeners save over one-half the time and labor. Every wide-awake and up-to-date shop owner who has sharpening of disc harrows and disc plows should have one of my Wonder Disc Sharpeners. With these machines youcansharpen a whole set of discs while your competitor is taking off the shaft in the old fashioned way.



THE LITTLE WONDER.

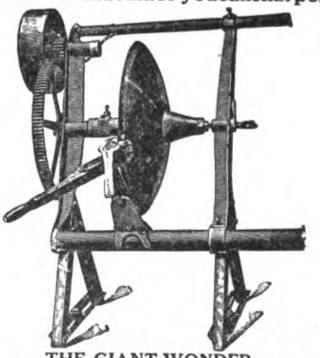
The LITTLE WONDER will sharpen any size disc up to 22 inches in diameter. The accompanying cut shows the LITTLE WONDER at work on a whole section of discs. This machine is especially adapted for sharpening Disc Harrows.

You Can Increase Your Earnings.

when you have one of my machines as you can turn out more work and please your customers better than by sharpening in the old way.

Operated either by hand or power.

Can shear any part of edge to any bevel. Also shear back from edge as far as required. The tool can be used on either side of the disc and can be shifted from one disc to the other. All these things can be done without the turn of a set screw or nut. Is a positive feed; *automatically adjusts itself to wobbling or bent discs.* Knives made of best grade self-tempering steel and will last a lifetime for hand or power.



THE GIANT WONDER.

The GIANT WONDER is a larger and heavier machine; has holder attachments for rolling coulters and **DISC PLOWS**; will take in discs up to 32 inches in diameter; is a geared machine and will also take in disc harrow sections same as the Little Wonder and do the work equally as well. The only machine on the market with these advantages.

ALL OUR MACHINES GUARANTEED.

We will take back and pay the freight both ways on any machine which does not prove to be exactly as represented and satisfactory in every way. You cannot lose in buying a machine with this liberal guarantee. Most all dealers sell Wonder Machines, but if yours does not, write us direct and please send us his name. Be sure to write at once for descriptive circulars. Don't let another season go by without making money by installing a Wonder Machine in your shop. Address all communications to

A. E. DURNER, Sole Manufacturer, Main Office, **Evansville, Wis.** CANADIAN BRANCH: London, Ontario, Canada

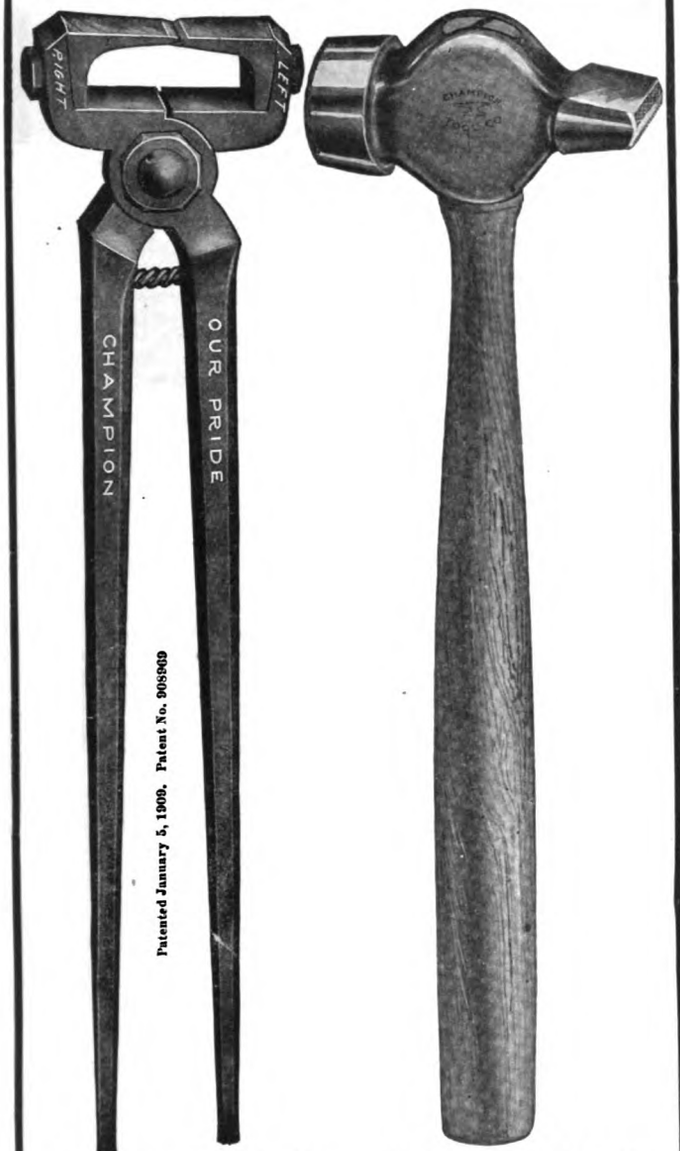
ONE CENT

spent for a postal card is all our

Forty Eight Page Catalog

will cost you. You should have this book, which shows

86 Labor-Saving Tools



No. 81 Our Pride No. 81 Ball Bearing Hoof Shear
12 inch 14 inch
BALL BEARING JOINT
Interchangeable Blades
Drop Forged

No. 12 Electric Sharpening Hammer
Weighs 1 3-4 lbs. to 3 lbs.
Swings Just Right
Drop Forged

Our tools are tempered in PLAIN COLD WATER and can be redressed and retempered by any practical man.

CHAMPION TOOL CO.
Dept. A. MEADVILLE, PENNA.



Don't buy **just varnish.** Insist on "F-S" products—and be **sure** of the quality.

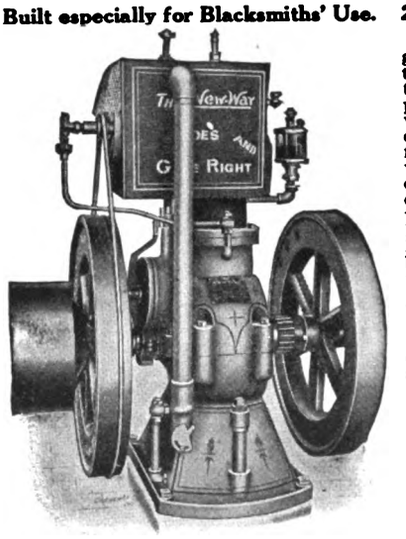
"F-S" High Grade Varnishes are made in our own special factory, and we know that they **are** high grade.

FELTON, SIBLEY & CO.
Manufacturers of Paints, Colors and Varnishes
136-140 N. 4th St., PHILADELPHIA

NOTICE TO BLACKSMITHS

The "New-Way" Air Cooled
IS THE ONLY
GASOLINE ENGINE

Built especially for Blacksmiths' Use. **2½, 3½, and 6 H. P.**



Look at the other engines first. Note the multitude of rods, springs and triggers described as **simple.** Remember that the water tank (always left out of the cut) has to be filled and emptied every winter day. To forget it once may mean a ruined engine. Remember that water-cooled engines all have packed cylinder heads. Packing leaks and blows out. Inevitable trouble and loss of power sometime.

Then look at an engine that IS simple

One-piece cylinder—no chance to leak—grows stronger with use. Everything enclosed—no frail parts—no water—not a piece of packing or a gasket in it—no gasoline pump troubles. It absolutely cannot be overheated under full load—any temperature—any length of time. Your judgment tells you to

WRITE FOR CATALOG "K." DO IT NOW.

The "New-Way" Motor Company
Lansing, Michigan, U.S.A.
60 SHERIDAN ST.



Clip Horses For Profit

This splendid machine only $7.50. It is the **Stewart No. 1.** **Send $2** and we will ship it C. O. D. for the balance. If you are not pleased, return at our expense and get your money.

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Little Giant Hub Borers

AND **Abbott's Box Puller**

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

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General Agents for the Eastern States

"Tools That Wear" **HELLERS'** **CELEBRATED AMERICAN HORSE RASPS FILES AND FARRIERS' TOOLS**

will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process. New Catalogue Mailed Free on Application.



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A PERFECT WELDING FLUX.
PREPARED ESPECIALLY FOR WELDING
FAR SUPERIOR TO COMMON BORAX.

Try Borax-ette for Welding Toe-Calks

THEY WON'T KNOCK OFF

It makes steel weld like iron. It has no equal for welding tires, axles and springs

FOR SALE BY ALL DEALERS

SAMPLES FREE

CORTLAND WELDING COMPOUND CO., Cortland, N. Y.

We make the following sizes:
No. 1, 3 in. wide, 14 in. high
" 2, 3½ " 14 "
" 3, 3½ " 10 "
Weight per set of 4, 16 pounds.



This shows the strength of our STANDARD as compared to the old style.

The Bruce Malleable Wagon Standard

Tested thoroughly and guaranteed strictly as represented.
Note its great advantages over the old style.

1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.
2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.
3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only a ⅞-in. face.
4. Great time saver. Can be attached to bolster in one fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, write today and ask for prices.

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Our facilities enable us to do work reasonably.

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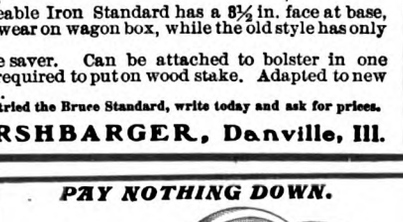

Don't deposit the money for any engine before you try it 30 days free. Don't get stung. Don't run the risk of a "freeze up." Don't do another thing until you drop us a card for special prices to blacksmiths on our air cooler. We make TERMS TO SUIT YOU. Do it now before we place an agent in your town.

GADE BROS. MFG. CO., 18 North Street, Iowa Falls, Iowa

- USE HORSE SENSE -



KEYSTONE DRAFT SPRING

Ask Your Jobber About It!

MANUFACTURED BY

RAYMOND MANUFACTURING CO., Ltd.
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THE KEYSTONE TRACE OR DRAFT SPRING
RELIEVES THE HORSE OF ALL THOSE JARS CAUSED BY THE UNEVENNESS OF THE ROAD AND WHEN TAXED TO ITS FULLEST CAPACITY SIMPLY CLOSES, THUS FURNISHING A SOLID CONNECTING LINK AND AVOIDING ALL POSSIBILITY OF BREAKAGE.

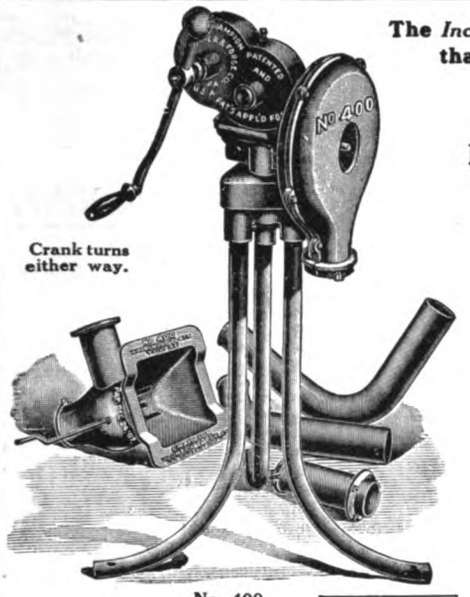
LOOK INTO IT!

The *Incomparable* 400 Blower, the one great *Heirloom* that will be handed down *from one generation to the other. Ask what the owners say*

MADE WITH BALL BEARINGS ONLY

Nearly Half A Million in Use

The No. 400 is the Blower that has REVOLUTIONIZED the World in Making Hand Blast

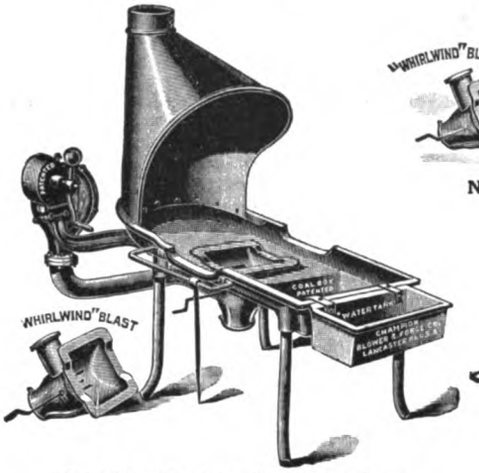


Crank turns either way.

No. 400

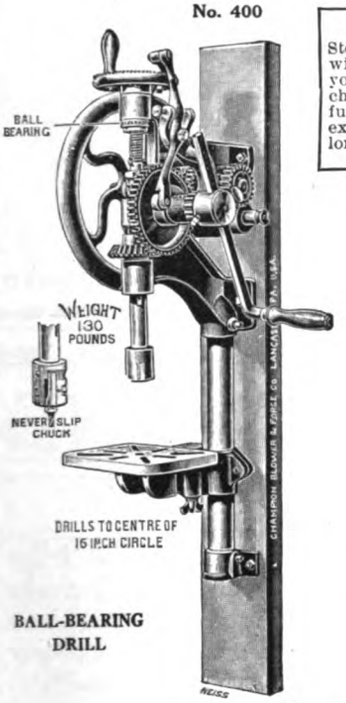


No. 408. Steel Blacksmiths' Forge

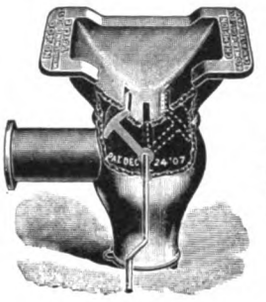


No. 433. Cast Iron Blacksmiths' Forge

The No. 400 Steel Blower will serve the youngest mechanic faithfully without expense for a long lifetime.



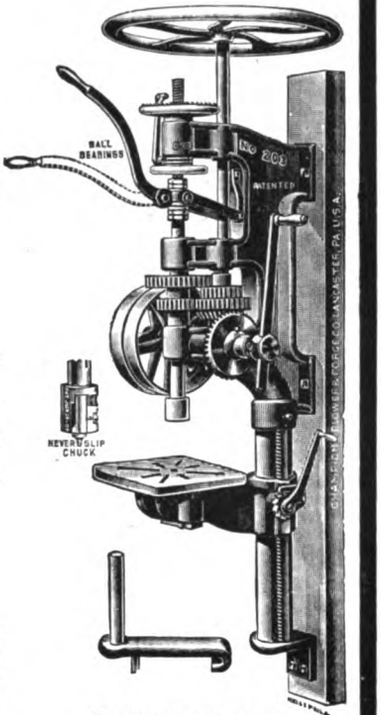
BALL-BEARING DRILL



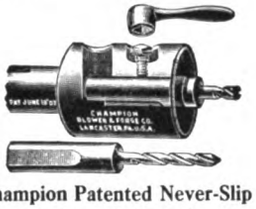
A Tuyere Iron That Makes A Whirlwind Blast.

The No. 400 Champion "Whirlwind" Blast Anti-Clinker, Heavy Nest Tuyere Iron is furnished with all No. 400 Blowers WITHOUT EXTRA COST.

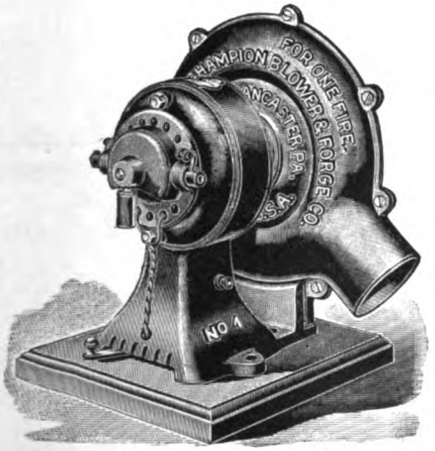
The "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron produces a circular, rotary whirlwind blast and concentrates the heat in the tuyere nest, not permitting it to blow up and out of the chimney, therefore, makes a hotter fire and heats the iron one third quicker, saving much coal.



No. 203. Self-feed and Lever-feed Drill



The Champion Patented Never-Slip Chuck is applied to all CHAMPION DRILL SPINDLES without extra charge

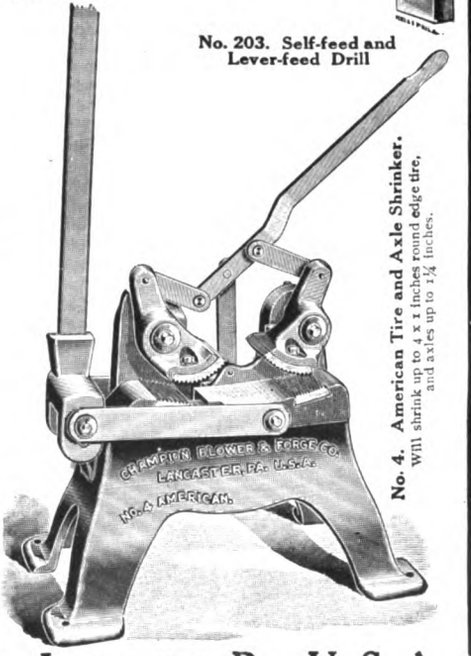


No. 1—One-Fire Variable Speed Electric Blacksmiths' Blower, with five speeds for LIGHT, MEDIUM and HEAVY fires.



Screw Plates in four styles, cutting up to 1½ in.

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power Blower, or Electric Blower, write for our free catalogue, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4 x 1 inches round edge tire, and axles up to 1¼ inches.

THE CHAMPION BLOWER & FORGE CO., Lancaster, Pa., U. S. A.



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DON'T FAIL TO INVESTIGATE THE

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OF WROUGHT IRON ANVILS

ASK YOUR DEALER OR WRITE FOR PRICES

The Columbus Anvil & Forging Co.

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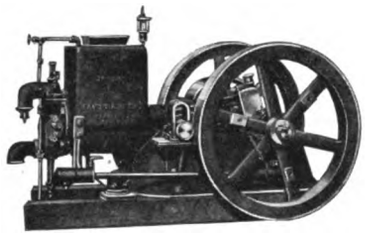

3-5-8-10 H.P.

Power Guaranteed

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Special Name Plates of all descriptions. Buggy Ornaments in sets. No Shop Complete without our Catalog.

New Catalog will be ready this spring, sent on receipt of $1.00, which will be rebated on first order for more than this amount, or sent gratis with first order for $1.00 or more. Plaid designs for automobile panels. Cane work effects. Basket work effects.

For the auto painter who has exhausted his ideas on distinctive color combinations.

Inexpensive New Stylish

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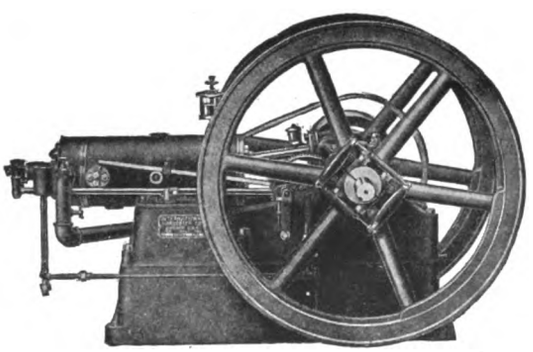
CHICAGO ST. LOUIS MONTREAL TORONTO

THE MONEY-MAKING ENGINE
FOR BLACKSMITHS



The smith's first requirement in an engine is that it be dependable. It must be quick and sure starting, because he wants to start and stop his engine scores of times in a day. He gets very unsatisfactory service out of a power that has to be coaxed and adjusted every time he wants to use it.

The Dependability of

I. H. C. GASOLINE ENGINES

has made them strong favorites, not only with blacksmiths, but with other mechanics.

They are sure, dependable starters because they are made on the right plan and in the right way.

They are regular, smooth runners and they deliver power at the lowest cost of production and with the minimum of attention.

There are many styles and sizes:

Verticals—2, 3 and 25 horsepower.
Horizontals (portable and stationary)—in 4, 6, 8, 10, 12, 15 and 20 horsepower.
Air-Cooled Engines—in 1 and 2 horsepower.

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INTERNATIONAL HARVESTER COMPANY OF AMERICA

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13 Harvester Building ***CHICAGO, U. S. A.***

THE ONLY CALKING MACHINE THAT CALKS A HORSESHOE COMPLETE

We make 25 different style Heel Calks.



The only Calking Machine that with one pull of lever makes a heel calk complete, blunt or sharp, also makes double kink for the famous block calk, or sharpens side calk, with one pull of lever, welds blunt or sharp toe calks and forms toe clip with one pull of lever, also, has a shear to cut off either end of shoe.

Works equally as well on old shoes. The machine takes up but 8x16 inches floor space, and stands 3 feet 3 inches high, and weighs 131 lbs. All the working parts made of a special grade of steel. Fully warranted. Write now for circulars and prices.

L. S. P. CALKING MACHINE CO.,

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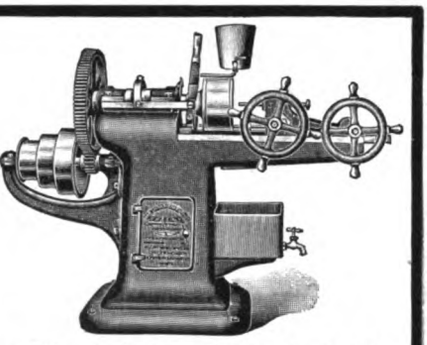
THE

MERRIMAN

Bolt Threader

Best on Earth

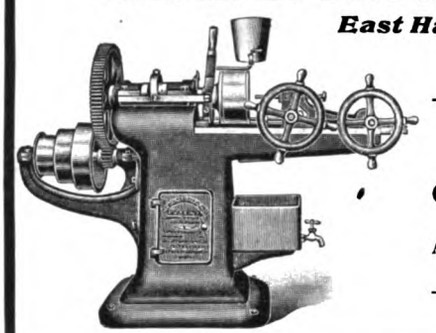


A Bolt Cutter is Much Like a Man in This THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly.

THE H. B. BROWN CO.,

East Hampton, Conn.



Send for Catalog No. 11

A Postcard will bring it

"PUZZLE No. 2"

A protective arrangement which protects the manufacturer in the sale of Adjustable Toe Calks to both retail hardware dealers and Horseshoers is a dandy good thing for the manufacturer, as it gives ***him*** a larger market for his goods—and for the hardware dealer, as it provides business for ***him*** that he has not heretofore enjoyed—but what of the Horseshoer for whose benefit the protective (?) agreement was designed?

In days gone by the Horseshoer either had sharpening to do or supplied the deficiency by selling Adjustable Calks at a good profit.

Where does the Horseshoer get off?
What is the answer?

We stand for WILLING protection for the Horseshoer and believe that he is entitled to the profits on sales of Calks to horse owners.

VERY RESPECTFULLY



AMERICAN CALK CO.

DETROIT, MICH.

Manufacturers of Suregrip Calks

5-16, 3-8, 7-16, 1-2, 9-16, 5-8, both round and square shoulder.

THE WILLIAMS DROP FORGING CO.

SCRANTON, PA.

Manufacturers of Cantslip Calks

5-16, 3-8, 7-16, 1-2, 9-16, 5-8.



"Little Giant"
PUNCHES AND SHEARS

Better than a Blacksmith Helper.

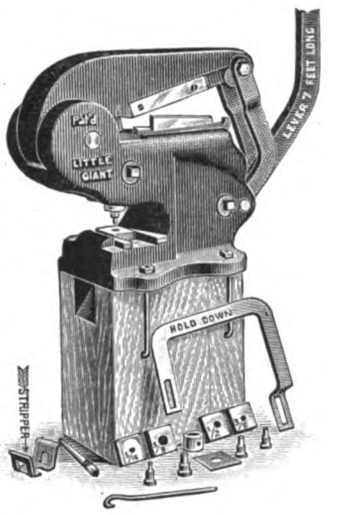
Over 3,000 in use. Good the world over.

WHY?

Kei Road, Cape Colony,
S. A., Aug. 12, 1909.
Little Giant Punch
& Shear Co.,
Sparta, Ill., U. S. A.

Dear Sirs: — Enclosed please find Money Order to the value of £1-11-0 in settlement of your acct, The Punch and Shear came safely to hand last Monday and I am very pleased with it indeed. If I can at any time sell one I will do so and will try to do all I can to forward the sale in the Cape Colony. The machine cost me landed here £13-10-0, and I consider it worth twice as much. I find it only takes one man to work the lever and I thought it could not be worked with less than two. I consider every blacksmith should have one, as they save a lot of labor and money.

Yours faithfully,
(Signed) pp
R. G. RISTROW.



You don't have to take our word for it, but get our booklet of Testimonials.

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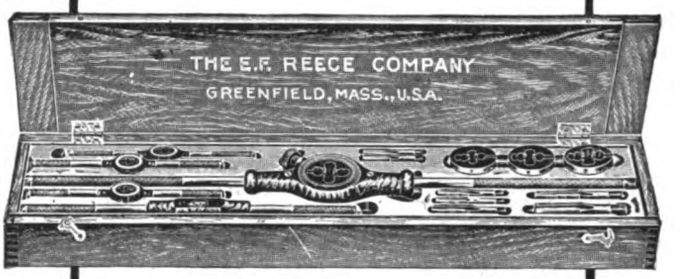
Little Giant Punch & Shear Co.
210 S. Market St. SPARTA, ILLINOIS

Reece Combination Screw Plate No. 103

$8.25 NET WILL BUY ONE



The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16 — 18, 3-8 — 16, 7-16 — 14, 1-2 — 12, 5-8 — 11, 3-4 — 10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustable, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only $8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

THE E. F. REECE CO., Greenfield, Mass., U. S. A.

INSIST ON "STANDARD" CALKS

BUY FROM YOUR DEALER

1895 - STANDARD TOE CALKS - 1909

HIGH GRADE STEEL — HOT FORGED NIB — DRIVES PERFECTLY



WELDS EASILY — GIVE SATISFACTION

FRANKLIN STEEL WORKS

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H-CALK

Best Calks

MONEY CAN BUY

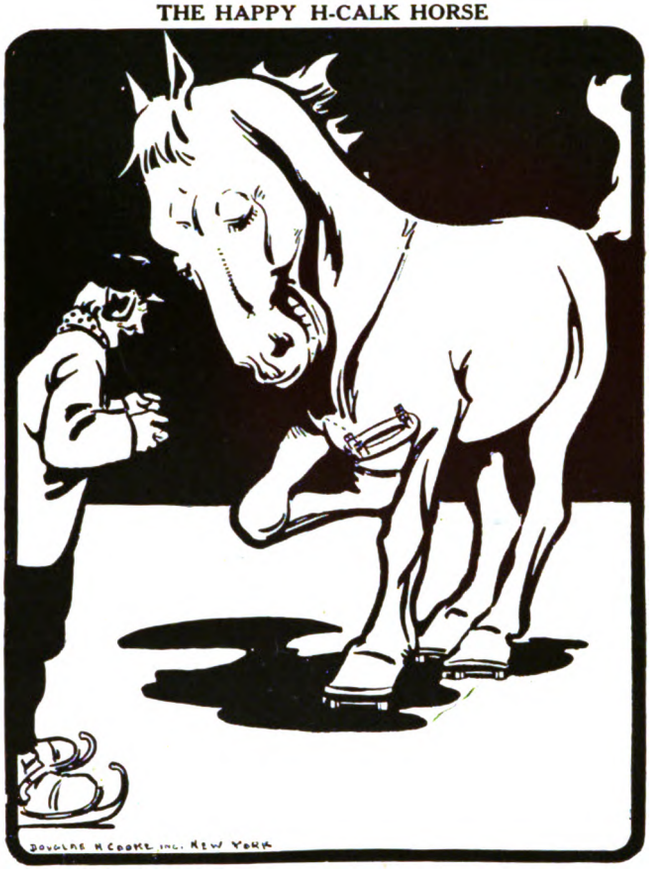
If you cannot obtain them at your dealers

We Will Sell You Direct



STEEL CENTER CALK

THE HAPPY H-CALK HORSE





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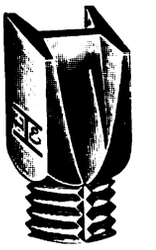
CHEAPEST

Of All Good Calks

If you don't know them, ask for

Free Samples and Prices

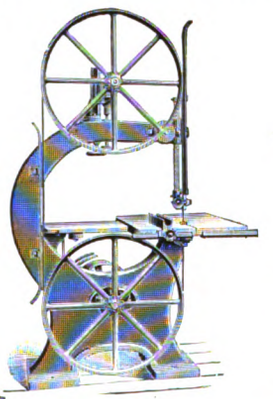


H-CALK

THE H-CALK CO., 116 Broad Street, NEW YORK

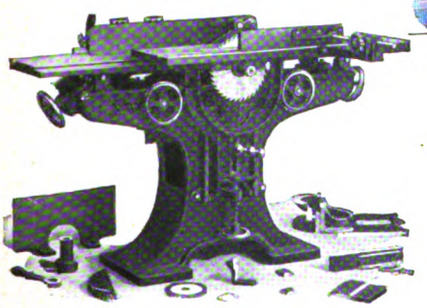
With a Crescent Variety Wood Worker and a Crescent Band Saw

you can do most any ordinary job of wood work that comes to you. These two machines will pay for themselves in a remarkably short time. Both machines are built for the hardest kind of service.

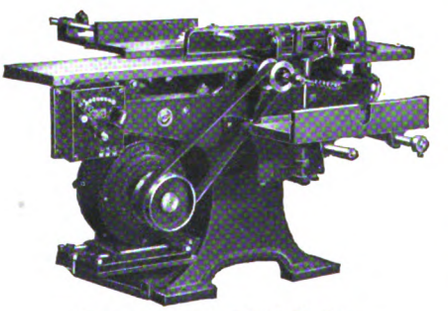


We do not aim to compete in price with other manufacturers, but in these tools you will be surprised how much machine you get for your money.

Send today for catalog giving complete description and telling about our line of Saw Tables, Jointers, Shapers, Planers, Planer and Matcher, Swing Cut-off Saws, Disk Grinders.



Crescent Variety Wood Worker, showing Jointer and Saw Table.



Crescent Variety Wood Worker, showing Jointer and Borer.

THE CRESCENT MACHINE COMPANY

245 MAIN STREET LEETONIA, OHIO U. S. A.

SHARP DIES

are what are needed in order to cut good threads, and you can always have them if you use a

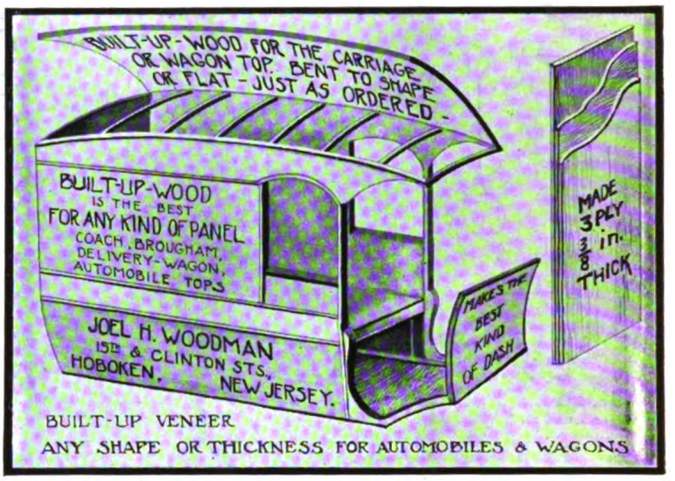


"DUPLEX" DIE STOCK SET

The dies in these sets are easier to sharpen than a knife; this fact enables you to get the full wear out of them. *Write us.*

THE HART MANUFACTURING CO.,

50 Wood Street, :: :: Cleveland, O., U. S. A.



Gives Satisfaction In Every Respect.

Gallipolis, O., 9, 29, '09.

BUFFALO FORGE CO.,
Buffalo, N. Y.

Gentlemen :—I have waited quite a while to report on Blower No. 200. I wanted to give it a good trial. It is giving satisfaction in every respect and every one who sees it says it's a dandy.

I am well pleased and highly appreciate your kind and fair treatment.

Wishing you success, I remain,

Yours respectfully,
J. J. SMELTZER.



Say! Mr. Blacksmith,

have you heard about the new tire setter called

THE SCIENTIFIC HYDRAULIC?

Blacksmiths are just wild about it where it is used, and the manufacturers are either crazy or dead sure they have a "cinch" on the other fellows for they actually warrant it to be better than any other and will let you be the judge.

GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

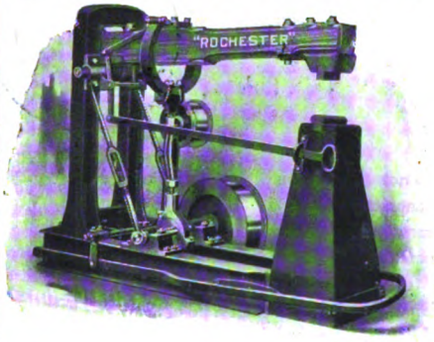
Write for information at once to

National Hydraulic Tire Setter Co.

KEOKUK, IOWA.



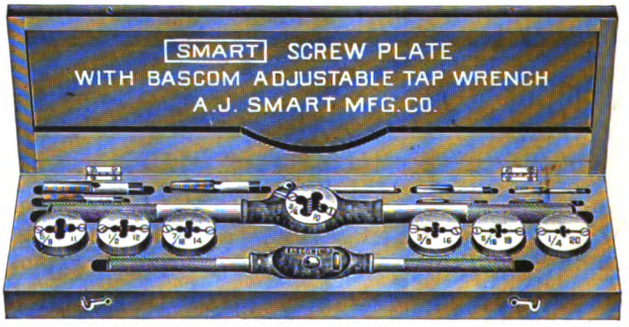
ROCHESTER HELVE HAMMER



(The Hardest Hitter)

Not only does general and special forging, but is a first class **tire welder** also. Made in six sizes.

THE WEST TIRE SETTER CO., Rochester, N. Y.



Our Taps and Dies are the best that 34 years' experience and up-to-date methods can make them. The easiest cutting and longest wearing screw cutting tools made. Send for free catalog.

A. J. SMART MFG. CO., Greenfield, Mass.

FIRST MADE IN AMERICA

HAY-BUDDEN SOLID FORGED ANVILS

A LONG STEP FORWARD

SOLID FORGED STEEL TOP
Welded to a
SOLID FORGED BASE
Making a
SOLID FORGED ANVIL

The Gold Medal Anvil

HIGHEST AWARD
Omaha 1898 Pan-American 1901



OVER 150,000 IN USE

The **ENTIRE TOP** being one piece of high grade **FORGED STEEL** makes a **LOOSE FACE IMPOSSIBLE.**

TEMPERED "JUST RIGHT".

By our own process, the weld at the waist is a **LASTING UNION.**

Experience has proved their worth and demonstrated that **"HAY-BUDDEN" Anvils** are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., 254 NORTH HENRY ST. BROOKLYN, N. Y.

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JAN 28 1910

VOLUME 9 NUMBER

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO N.Y. U.S.A. JANUARY, 1910 $1.00 A YEAR 10c A COPY

Don't Let the Stores Take Your Screw Calk Profits

If the Stores Sell Calks to Your Customers for the Prices You Pay for Them, You Have a Right to Kick.

Every one of the calk companies has separately **promised you** in one way or another not to sell its calks through the stores to horseowners at anything less than 33⅓ to 50 per cent above what you pay for them.

And yet there are manufacturers, and big ones as you all know, who each year have been selling more and more of your customers through the local stores at the same prices you pay for the calks.

We try to keep our business as far as possible in the hands of those jobbers from whom you buy.

To protect you, every purchaser from us has signed a contract not to permit any of our calks to be sold in any event to consumers at less than the advances stated above in the first paragraph.

Dealers handling our calks who willfully break that agreement cannot buy our goods again.

If you know of any dealers who are selling Rowe calks at cut prices, write us and we will remove the trouble as quickly as we can.

But we will do more than this for you.

We will try to stop the cutting of prices to your customers on any kind of calks made by any manufacturer.

If you are in trouble because the corner store sells anybody's calks—no matter whose—at prices that you cannot meet, fill out the coupon below and write us any other particulars you may have, as we think we can help you to put things right.

There is no plan to force or threaten other manufacturers.

We shall simply give them a chance to make good on their **promises to you horseshoers.**

Don't delay. Strike while the iron is hot. If you wait until the end of the season before kicking, it will be forgotten before next winter.

And next year it may be too late.

Fill out and send in the coupon now and let us put the screw-calk business in your hands while we can and for all time.

ROWE CALK SELLING CO. A. B.—1-10.
Hartford, Conn.

The following dealer is selling calks at cut prices :

.....
(Name of Dealer)

.....
(Address of Dealer)

.....
(Kind of Calks Dealer is selling at cut prices)

.....
(Give prices Dealer asks for different sizes)

My name is.....

My address is.....

(Give name of Horseshoers' Association, if any, to which you belong)

Do You Approve Our Plan to Bring Back to You Those Customers Now Buying Calks at the Stores?

We are spending thousands of dollars this year in work that will bring back to you many of your customers who have been buying screw calks at the stores at cut prices.

Over 2,000,000 horseowners in the snow belt are being offered free trial sets of 16 Rowe welded tool steel center calks.

But the horseowners must get them from you horseshoers and we pay you a profit of 33⅓ to 50 per cent on these calks that you give away.

This is done by sending the horseowner a certificate worth so much money, according to the size of calks he wants and good only when presented to horseshoers.

This certificate you use as cash in paying your dealer or jobber and the jobber turns it in to us as cash.

For years manufacturers of calks have been giving away free trial sets to horseowners, but we are the first to pay the horseshoers and the jobbers profits on the calks we give away.

Could anything be fairer to the horseshoers?

Yet this plan has raised a terrific howl among other manufacturers.

They claim that we have no right to ask horseshoers to sell calks in lots of less than fifty.

How absurd, when every horseshoer does this every day.

But we don't even ask you to do this. We simply ask you to accept a profit on samples that we give away and in doing this we bring back to you old customers.

And then these other manufacturers impliedly threaten us with all kinds of terrible things if we don't stop.

But this is the real reason of their anger.

We are turning away from their stores the trade that they have spent years in building up and we are sending it to you horseshoers, because no horseowner can get these free sets of calks from any store. He must go to you horseshoers.

After that, he will not return to the stores for his screw calks because, as we and the other manufacturers know, Rowe calks wear sharper and longer than all others.

If this were not so, we couldn't afford to spend tremendous sums in giving them away now and waiting for future profits.

Where do you stand in this battle?

Are you with us or are you going to let the fellows who take away your trade and your profits carry out their threats to us?

You can help us and help yourself by filling out the coupon below.

Do it now and start the New Year right—for a squarer deal and better times.

ROWE CALK SELLING CO., Hartford, Conn. B-1-10

I have read through your plan of giving horseowners free trial sets of your calks and paying the horseshoers the stated profits on them. As a horseshoer, I heartily approve of this plan and will stand behind you as far as I can.

Name .....

Address.....

Date .....

PHOENIX



HORSE AND MULE SHOES
BULL-DOG TOE CALKS

PHOENIX HORSE SHOE CO.

Largest Manufacturers of Horse and Mule Shoes in the World

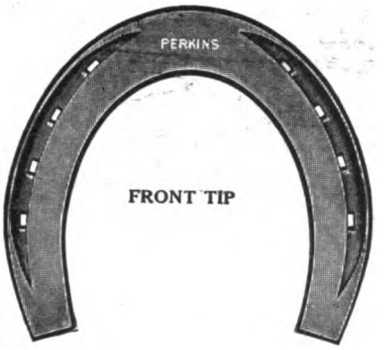
Rolling Mills and Factories:
Joliet, Ill., and Poughkeepsie, N. Y.

General Offices:
Rookery Building, Chicago, Illinois



HIND CITY

Look for this Trade Mark ★ The Star brand beats all others



FRONT TIP



FRONT STEEL COUNTERSUNK

★ PERKINS ★

HORSE SHOES

AND

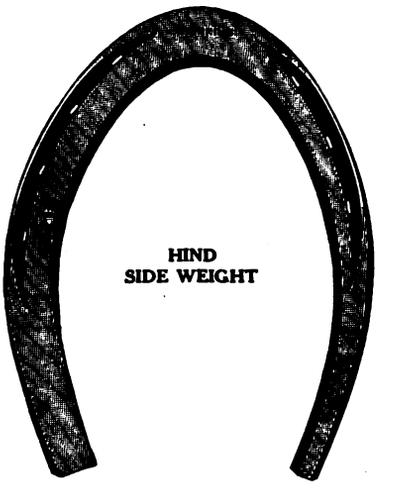
TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



FRONT TOE WEIGHT

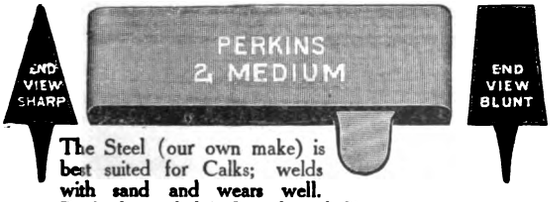

HIND SIDE WEIGHT

Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

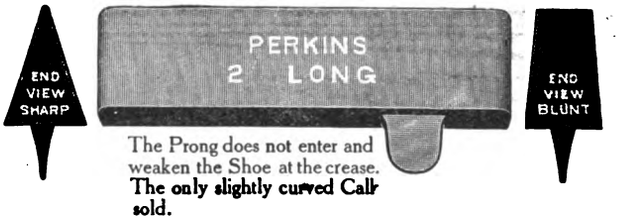


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

PHOENIX



HORSE AND MULE SHOES
BULL-DOG TOE CALKS

PHOENIX HORSE SHOE CO.

Largest Manufacturers of Horse and Mule Shoes in the World

Rolling Mills and Factories:
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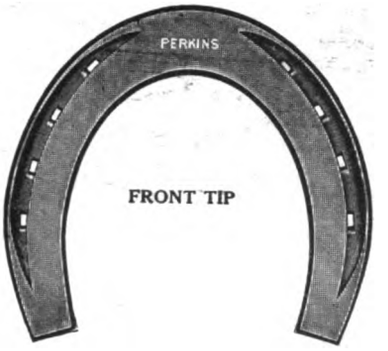
Look for this Trade Mark ★ The Star brand beats all others



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FRONT STEEL COUNTERSUNK

★ PERKINS ★

HORSE SHOES

AND

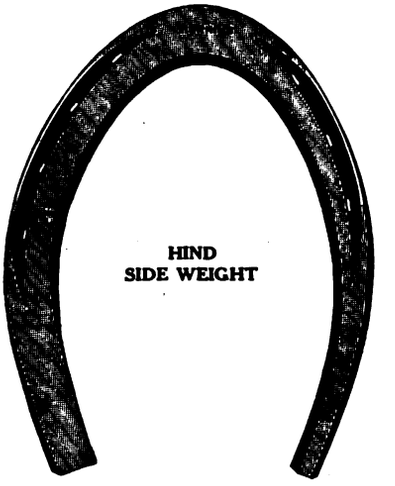
TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



FRONT TOE WEIGHT



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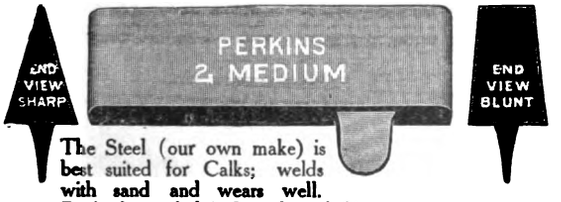

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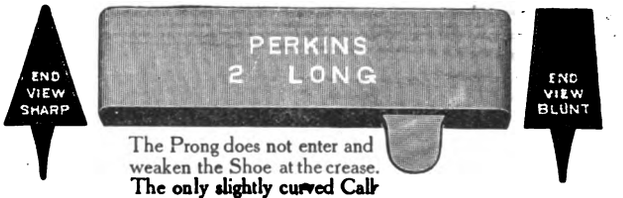


The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

Try BORAX-ETTE for Welding Toe-Calks

THEY WON'T KNOCK OFF

It makes steel weld like iron. It has no equal for welding tires, axles and springs.

BORAX-ETTE FOR STEEL TRADE MARK
REGISTERED AUG. 22 1905
A PERFECT WELDING FLUX
PREPARED ESPECIALLY FOR WELDING
FAR SUPERIOR TO COMMON BORAX

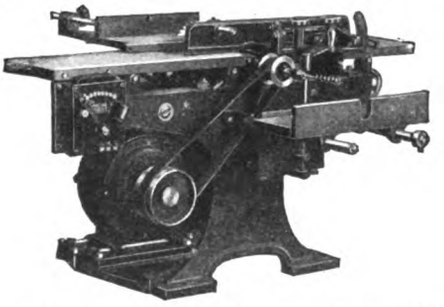
For Sale by all Dealers. ***SAMPLES FREE.***

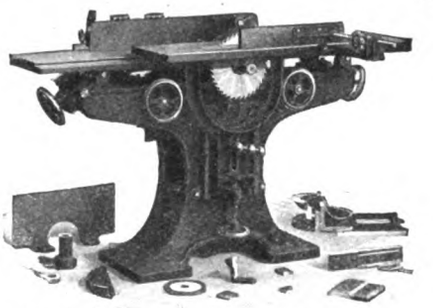
CORTLAND WELDING COMPOUND CO., Cortland, N. Y.

CRESCENT

Some of Your Competitors Have Bought

and more are considering the purchase of Crescent Variety Wood Workers. Those who were first to put in these splendid tools are getting good returns on their investment. The machine is simple, substantial, thoroughly practical and the price is right.





We can furnish it motor driven if you want it that way. We make no extravagant claims for the machine, but invite you to get our catalog giving complete description and telling about our fine line of Band Saws, Saw Tables, Planers, Shapers, Borers, Planers and Matchers, Disk Grinders, Variety Wood Workers.

ASK FOR IT TODAY.

CRESCENT

THE CRESCENT MACHINE COMPANY
245 MAIN STREET,
LEETONIA, OHIO, U.S.A.

The Brooks endorsed and used by the United States Gov't

RESULTS

THAT WILL BRING YOU MORE BUSINESS—
THAT WILL INCREASE YOUR INCOME

The Brooks makes the Smith rich

That's what counts in every business. Are you getting your share of the trade in your locality? Are you anxious to increase your business? Then profit by the experience of thousands of Blacksmiths and Wagonmakers who have built up their trade and increased their incomes with

BROOKS COLD TIRE SETTERS

GUARANTEED ——— OPERATED BY HAND

Get a Brooks in your shop and show the people you can set their tires better and quicker than can be done by the old hot process or by any other kind of machine. Show them results and they will come to your shop again and bring their other work also. With the Brooks you can set tires in a few minutes' time, while customers wait. Results that count. You can turn out first class jobs, no burning the paint, no charred surface to wear away and loosen the tire. Results that count. No overdishing wheels or splitting felloes or cutting out too much of the rim. Results that count. The Brooks sets tires in a mechanical and scientific way. It has been recognized for years everywhere as the best Cold Tire Setter made. Thousands of Blacksmiths and Wagonmakers who have Brooks machines testify it is the biggest money maker in the shop. The Brooks Cold Tire Setter is an investment, not an expense. It will pay for itself in a remarkably short time in your shop. Can you afford to be without this machine?

The United States Government Finds the Cold Process the Best and has Adopted the BROOKS at the Shops of the U. S. Forts and the Department of the Interior

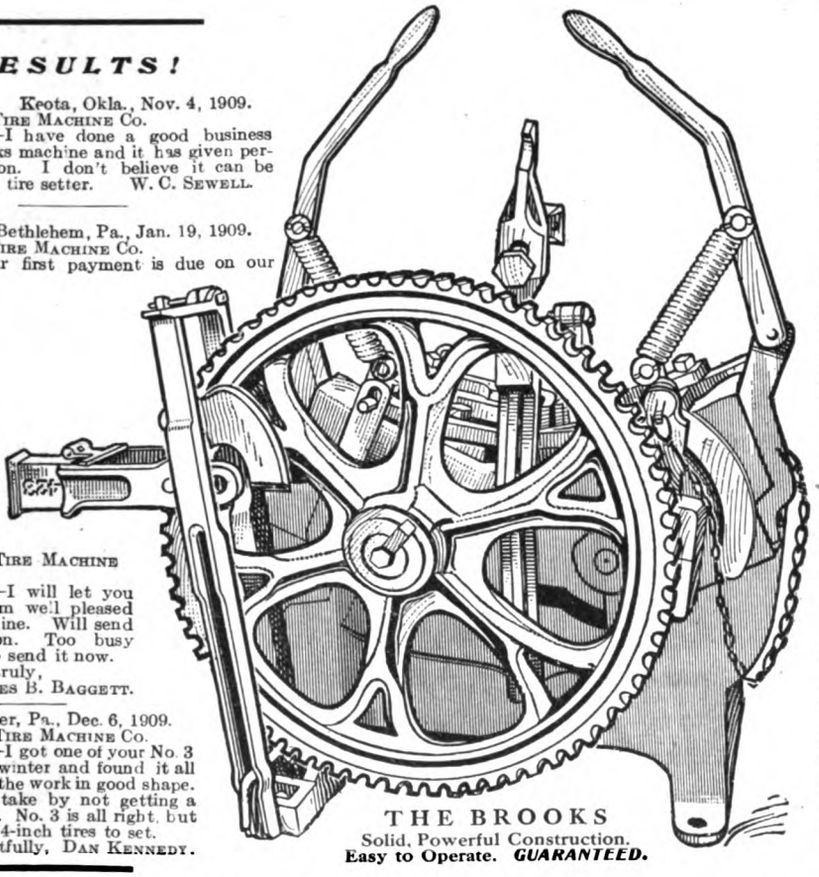
RESULTS!

Keota, Okla., Nov. 4, 1909.
THE BROOKS TIRE MACHINE CO.
Gentlemen—I have done a good business with the Brooks machine and it has given perfect satisfaction. I don't believe it can be beat for a cold tire setter. W. C. SEWELL.

New Bethlehem, Pa., Jan. 19, 1909.
THE BROOKS TIRE MACHINE CO.
Sirs—As our first payment is due on our Brooks Cold Tire Setter we are writing you. The machine works fine and we like it very much.
Yours truly,
A. SCHRECENGOST & SON.

Springdale, Ark., Oct. 8, 1909.
THE BROOKS TIRE MACHINE CO.
Gentlemen—I will let you know that I am well pleased with the machine. Will send a report soon. Too busy setting tires to send it now.
Yours truly,
JAMES B. BAGGETT.

Butler, Pa., Dec. 6, 1909.
THE BROOKS TIRE MACHINE CO.
Gentlemen—I got one of your No. 3 machines last winter and found it all right. It does the work in good shape. I made a mistake by not getting a No. 4 machine. No. 3 is all right, but we have some 4-inch tires to set.
Yours respectfully, DAN KENNEDY.



THE BROOKS
Solid, Powerful Construction.
Easy to Operate. *GUARANTEED.*

RESULTS!

New Bedford, Mass., Nov. 20, 1909.
THE BROOKS TIRE MACHINE CO.
Gentlemen—I have had one of your No. 2A Brooks Cold Tire Setters now for six months, and am very much pleased with the way it works.
Yours truly,
N. T. FULLER.

Eupora, Miss., Oct. 8, 1909.
THE BROOKS TIRE MACHINE CO.
Dear Sirs—I have one of your cold tire machines and would not exchange it for any other machine I ever saw. With the help of another hand we set eighty-four tires in four days, and did the other repair work that came in.
Yours respectfully,
J. W. BLAIN.

Rectortown, Va., Nov. 22, 1909.
THE BROOKS TIRE MACHINE CO.
Gentlemen—I have a No. 2A Brooks Cold Tire Setter in my shop. For its size it does the work nicely, although I would like to have one of your largest size machines.
Very respectfully,
A. L. WADDELL.

Clinton, Ill., Oct. 9, 1909.
THE BROOKS TIRE MACHINE CO.
Gentlemen—I purchased one of your cold tire setters over a year ago, and wish to inform you that it has given me entire satisfaction, both to myself and my customers. It is a time saver and a money maker, and is the best Cold Tire Setter that I know of. I can give several points of advantage that the Brooks Cold Tire Setter has over the old way.
Yours truly,
L. F. SLICK.

SPECIAL WINTER OFFER

GET READY NOW FOR NEXT SUMMER'S BUSINESS

For a limited time we will accept orders for Brooks Cold Tire Setters on our special winter offer. This is an exceptional opportunity to get a Brooks on very easy terms. It will pay you to write us about this at once and be one of the lucky smiths. This special winter offer is good only for a short time, so if you are interested write us a postal today and we will give you full particulars by return mail. Illustrated catalog and vest pocket memorandum book will also be sent to you free. Write us today.

The Brooks makes the Smith rich

The Brooks Tire Machine Co.

857-859 Ellicott Square
BUFFALO, N. Y.

121 North Water Street
WICHITA, KANSAS

Write to Nearest Office

The Brooks endorsed and used by the United States Gov't



"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

THE BEST MECHANICS USE
COLUMBIA CALIPERS
THERE'S A LITTLE BOOK—TELLS WHY
E. G. SMITH, COLUMBIA, PA.

WHEN WRITING TO ADVERTISERS
MENTION THE AMERICAN BLACKSMITH

"CHICAGO"
EMERY WHEELS
CUT QUICK

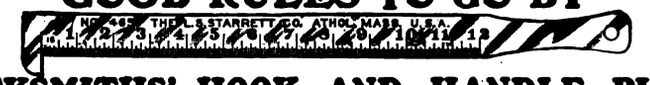
A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



"CHICAGO"
WHEELS SAVE TIME
They're made of stuff that cuts
Emery Wheels, Glue, Emery, Polishing Wheels, Grinding Machinery
136 Page Catalogue for the Asking

Chicago Wheel & Mfg. Co.
108 SO. ABERDEEN ST.
CHICAGO, U. S. A.

GOOD RULES TO GO BY

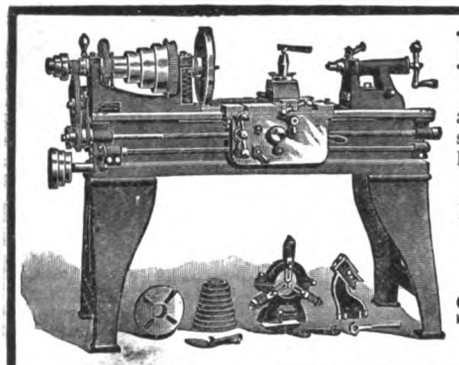


BLACKSMITHS' HOOK AND HANDLE RULES

Made from hard rolled sheet brass, one-tenth inch thick, one and one-sixteenth inch wide, with heavy gradations and figures, graduated from the end in sixteenths of an inch on one side and from the inside of the hook in sixteenths of an inch on the other, adapting them for taking correct measurements from either the outside edge of a hot piece of iron, or from the inside when held against a corner. Graduated twelve inches, have flat handles and measure over all sixteen and three-fourths inches.

Price, postpaid, $1.15. Catalog No. 17 AH of fine Tools free.

The L. S. STARRETT CO., ATHOL, MASS.



Built For Business

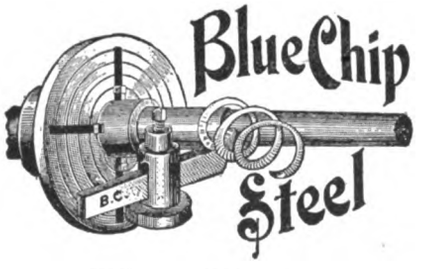
Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high-grade lathe, is the best for your shop.

It's a SEBASTIAN—a good lathe

Investigate its merits—Write for Catalog.

Foot and Power Lathes, 9 to 15 in. Swing
Tools and Supplies.

SEBASTIAN LATHE CO.
124-126 Culvert St., CINCINNATI, OHIO



Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.

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Selling Agencies

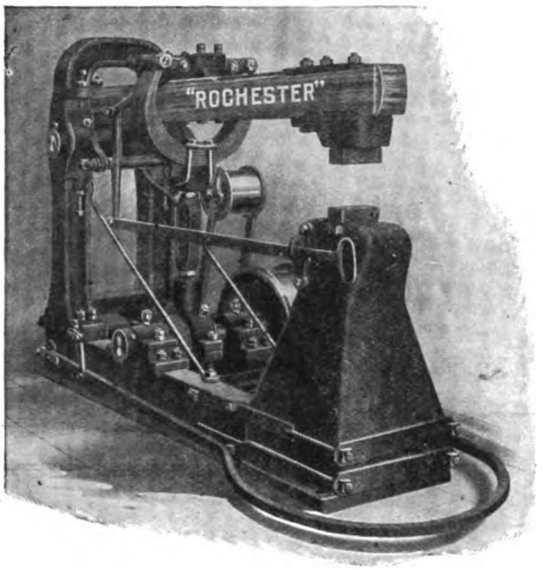
NEW YORK CHICAGO
BOSTON PHILADELPHIA

SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades
Fully guaranteed
All sizes in stock

THE
BOURNE-FULLER CO.
IRON STEEL
PIG IRON
COKE

Cleveland, Ohio.



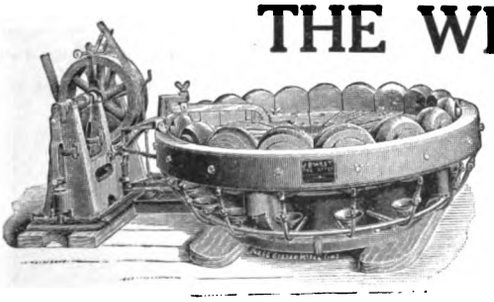
ROCHESTER HELVE HAMMER

THE HARDEST HITTER

Excels in simplicity of design, durability of construction and efficiency of service.

Made in Six Sizes

The numerous special features of our hammers should not be overlooked. First grade hickory helve; exceptionally heavy anvil, giving greatest resistance to blow struck; steel base; long bearings for helve pivot. Fine for welding tires, work which cannot be done under most upright hammers. Our hammers being made in six different sizes makes them suitable for all classes of work. Write for descriptive booklet. Dies can be furnished either lengthways or crossways of helve, without additional cost, if specified with order. **Write for booklet today.**



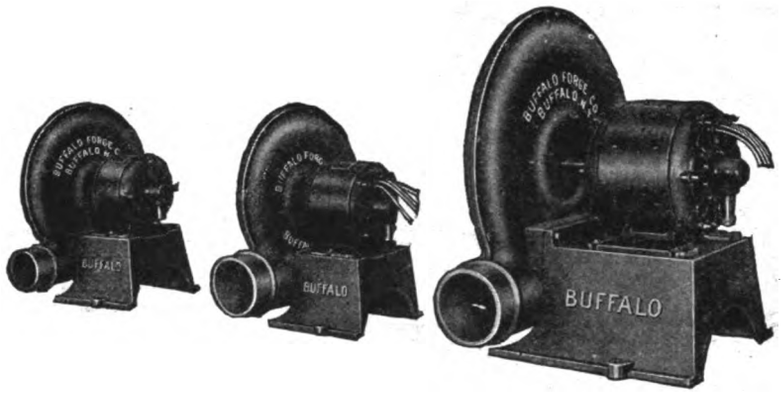
THE WEST TIRE SETTER

The machine used by the greatest number of well-known manufacturers and responsible repairmen. This machine has won its popularity by proving dependable. A tire setter that always does the job. The care in construction and the mechanical principles involved in this machine enable you to get results not obtainable in any other machine. Let us give you details. ***Write today.***

THE WEST TIRE SETTER CO.

ROCHESTER, N. Y.

Buffalo Improved Electric Blowers



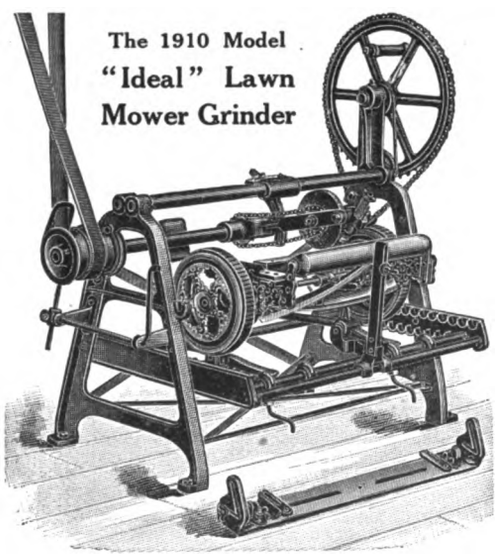
"Buffalo" Improved Electric Blowers No. 2E, 3E & 4E

Require no complicated wiring. Just connect the motor to any lamp socket on the lighting circuit. To start or stop, turn on or off just as you do a lamp. Power per forge costs less than a 16 candle power lamp. The all steel fan with side enclosed vanes, is mounted directly on the motor shaft. Air delivery is on line of least resistance, giving the greatest blast with the least power.

Buffalo Forge Company
Buffalo, N.Y.

"You Grind It As You Find It"

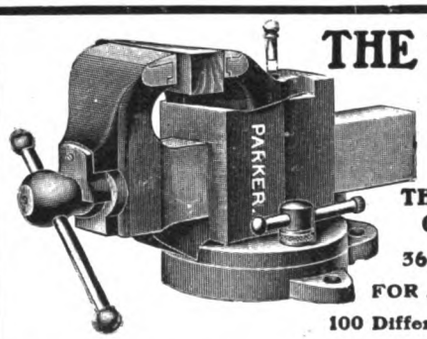
THE 1910 MODEL OF THE
"Ideal" Lawn Mower Grinder



grinds the Reel Knives to fit the straight blade, even if the latter is bent and out of shape—something never done before, and the most important feature of Lawnmower sharpening. Has 5 in. ball-bearing grinding wheel, ground and polished shaft, babbited bearings, twice as easy running as any other. Grinds either right or left hand Mowers perfectly in 15 minutes, without removing ratchets or wheels. We are the originators, and seven years' experience has shown us how to make them perfect.

Send for circular giving full information and prices. **Write Today.**

THE HEATH FOUNDRY & MFG. CO.
Successors to The Root Brothers Co.
PLYMOUTH, OHIO



THE PARKER VISES

THE MOST RELIABLE ON THE MARKET
36 Different Styles,
FOR ALL PURPOSES,
100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

STRONG
DURABLE
HANDY



Our complete illustrated catalogue is free. Write today for price list also.

A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

THE CHAS. PARKER CO.,
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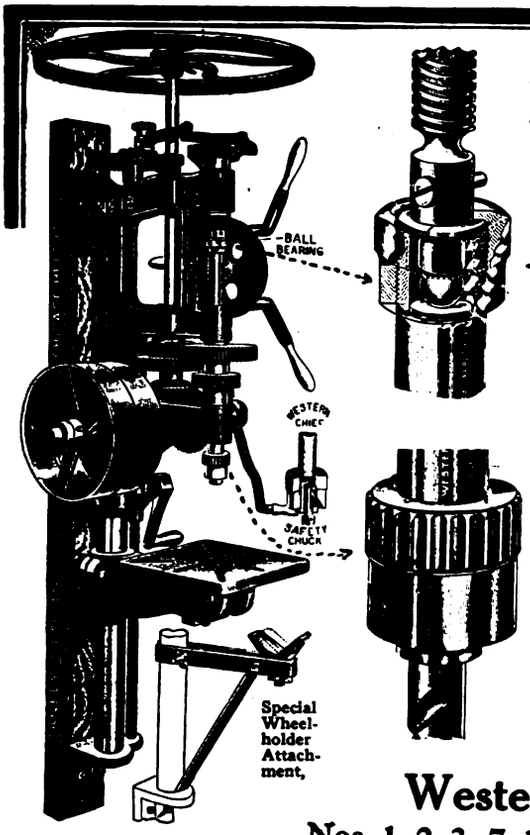


Special Wheel-holder Attachment,

Ball-Bearing and Safety Chuck

Ball-Bearing

A single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate.

Safety Chuck

It is opened and closed with the hand.

No more set-screws to mar and bruise the shanks of bits.

No more wrenches to tighten and loosen set-screws.

No more twisting of bits in the chuck.

No more trouble in inserting and removing bits from chuck.

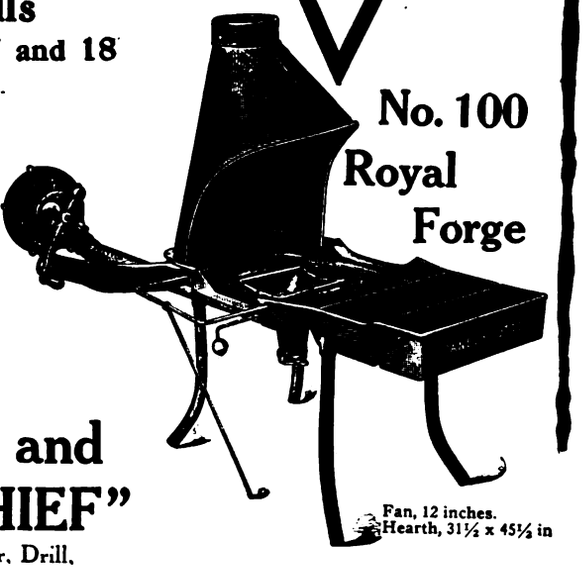
A Feature of TO-DAY

Wrench? NO!

Western Chief Drills

Nos. 1, 2, 3, 7, 12, 14, 15, 16, 17 and 18

FORGES—BLOWERS—DRILLS



No. 100 Royal Forge

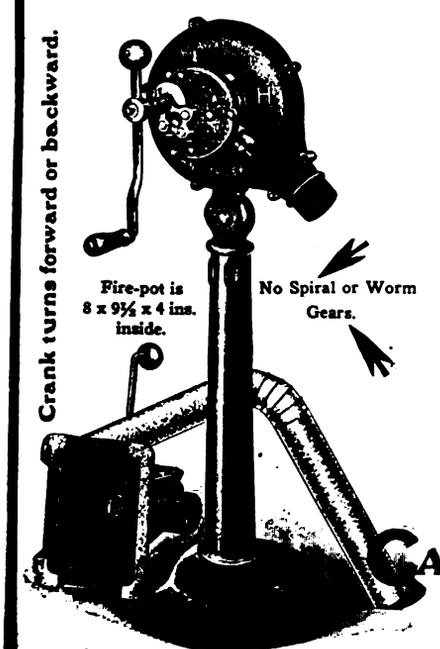
Fan, 12 inches. Hearth, 31½ x 45½ in

The Names — "ROYAL and WESTERN CHIEF"

When found on a Forge, Blower, Drill, or other Blacksmith Tool—mean that that article is better than the ordinary. They mean that in its construction the best materials and the highest skill obtainable have been employed. They mean that years of experience have served to perfect it. They mean the tool is a success, and quality alone has made it so. Dealers and Blacksmiths in general will procure what they like best. We must deserve before we can obtain trade. There is no doubt about our deserving, because our production grows rapidly.

There is a reason — Quality

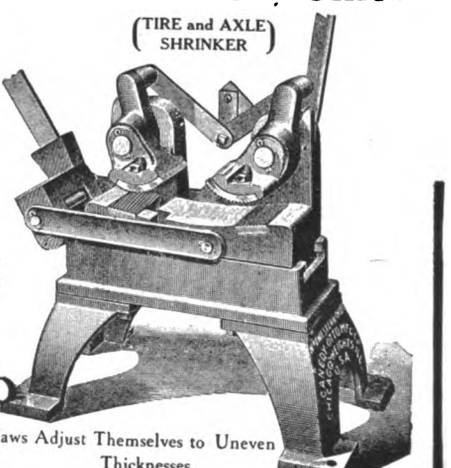
Royal Blower



They are all the Best!

No. 1 Western Chief

(TIRE and AXLE SHRINKER)



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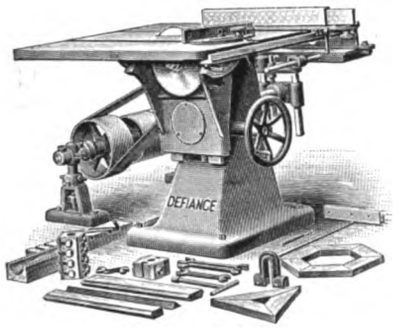
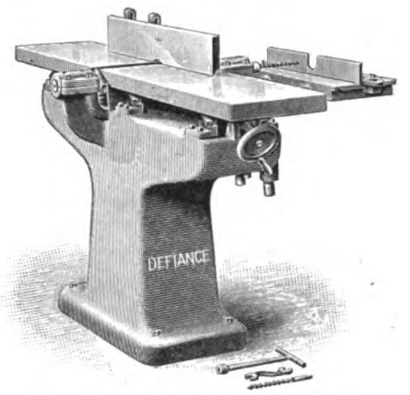
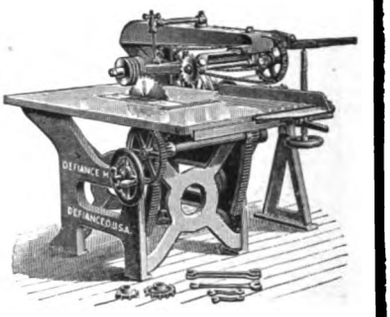


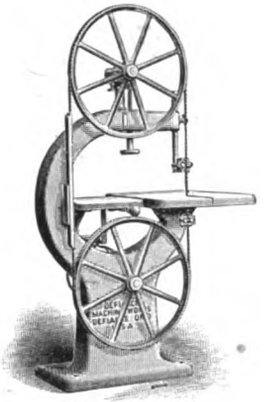
No. 8 Variety Saw.



12" Hand Planer with Boring Attachment.



No. 3 Power Feed Rip Saw.



28" Band Saw.

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Patent Woodworking Machinery

SPECIAL LABOR-SAVING MACHINES FOR BLACKSMITHS and WHEELWRIGHTS

Modern High Grade Machines for rapidly and accurately producing Automobile Wheels and Bodies, Hubs, Spokes, Wheels, Wagons, Carriages, Rims, Shafts, Poles, Neckyokes, Single Trees, Hoops, Handles of all kinds, Spools, Bobbins, Insulator Pins, Table Legs, Balusters, Oval Wood Dishes, and for

GENERAL WOODWORK

Invented and Built by

The Defiance Machine Works

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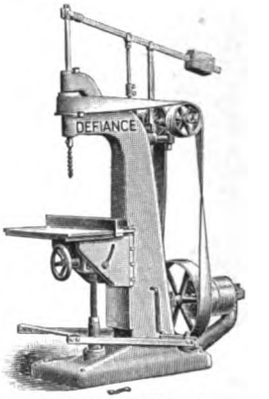
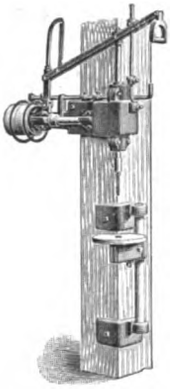
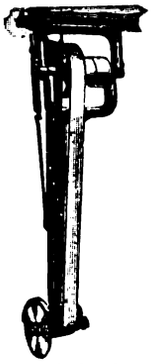


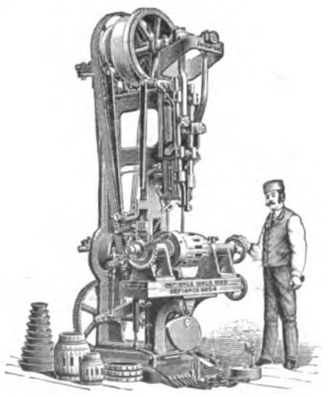
No. 6 Vertical Borer.



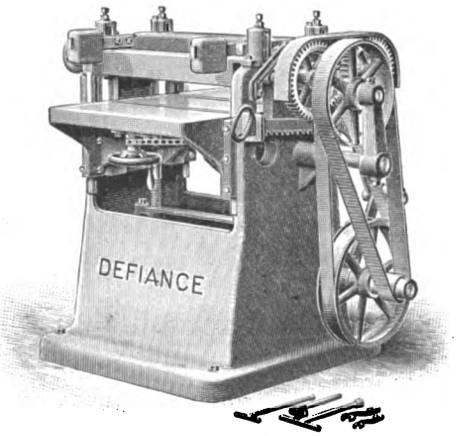
No. 15 Post Borer.



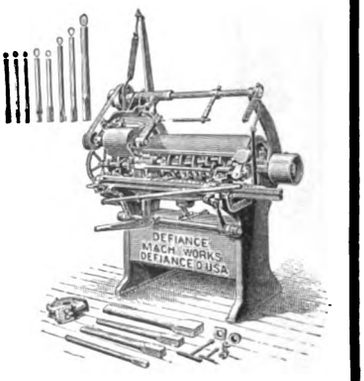
No. 1 Swing Saw.



No. 2 Hub Mortiser.



24" Single Surface Planer.



32" Spoke Lathe.



HORSE RASPS
That Are Superior

Best High Grade Steel.
Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

They Are Warranted
USE NO OTHERS

Made in all regular sizes, and in the new 18-inch Slim, which gives the user the advantage of a long stroke, and at the same time a rasp of medium weight.

ASK YOUR DEALER FOR THEM

LAFFITTE
WELDING PLATES

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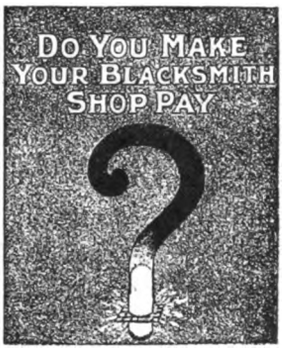

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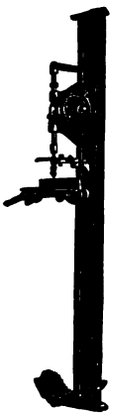
THE PHILLIPS-LAFFITTE CO.
PHILADELPHIA, PA.

Vulcan Iron Works
(INCORPORATED)
Mason City, Iowa

Prices and goods right

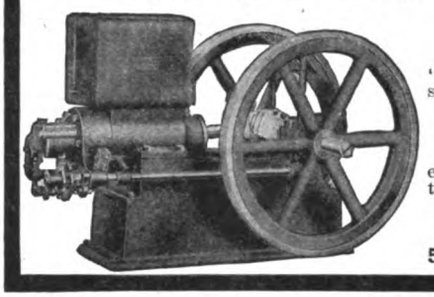


Catalog free, write today

Universal Tenon and Boring Machine
for wagon repair shops. **Cuts tenons on set of wheels in twelve minutes.**

When you write to an advertiser, name The American Blacksmith.

$ MORE DOLLARS; LESS WORK $
How would it suit you to take the agency for



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Your experience is worth something. If you use a "Witte" your customers will want them; why not sell them and make the profit. Our engines are

GUARANTEED FIVE YEARS
Have been on market 25 years; advertised and sold everywhere; lots of good selling points; write for introductory proposition stating size you can use.

WITTE IRON WORKS CO.
517 West 5th St., Kansas City, Mo.



Long Service is the Real Test
Just give "CLEVELAND" Blacksmith Drills a thorough tryout alongside of any other make. We'll leave the rest to you.

The CLEVELAND Twist Drill Co.
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Roth Forge Blowers
A Cast Iron Cover with machined joints protects the WORKS. Cover can be easily opened on its hinge to see the WORKS. Ask for information.

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Let us submit an estimate on your printing requirements whether they be large or small.

Our facilities enable us to do work reasonably.

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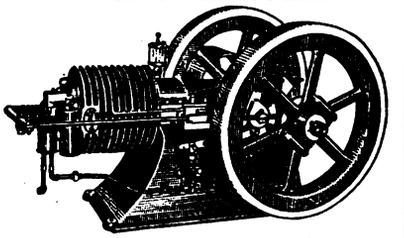
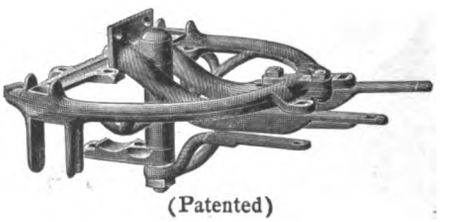


Don't deposit the money for any engine before you try it 30 days free. Don't get stung. Don't run the risk of a "freeze up." Don't do another thing until you drop us a card for special prices to blacksmiths on our air cooler. We make TERMS TO SUIT YOU. Do it now before we place an agent in your town.

GADE BROS. MFG. CO., 18 North Street, Iowa Falls, Iowa

The Dayton Fifth Wheel is sold by nearly every Carriage Hardware Jobber

The Dayton Malleable Iron Co.
Dayton, Ohio



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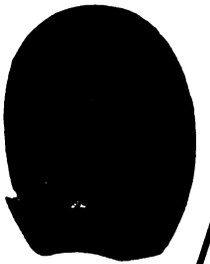
AJAX
Heavy Leather Back



FEDERAL
Medium Canvas Back



NATIONAL
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CARROLL
Red Rubber, Leather Back

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PADS

will put your pad business on a solid foundation of profit and customer satisfaction.

The way they wear will soon convince even the most skeptical of the actual economy of shoeing with GOOD PADS.

The styles shown here are our best sellers.

Made of tough, springy rubber.

Any dealer can supply you.

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SAMSON
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RACING
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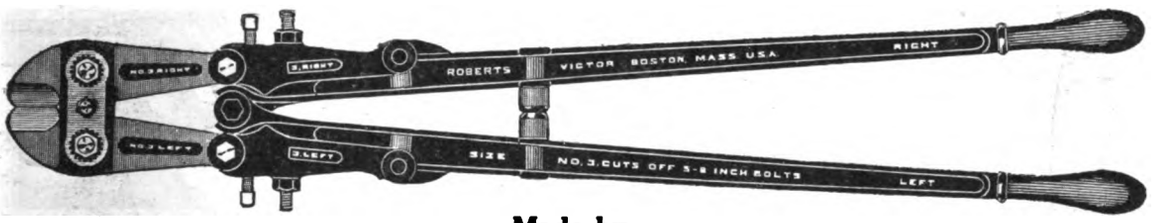
RAMBLER
White Rubber, Exposed Leather



PEERLESS
Cushion Leather Back

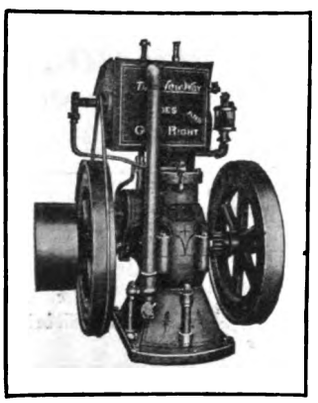
THE VICTOR BOLT CLIPPERS



Made by

ROBERTS MANUFACTURING CO., Somerville, Mass.

ASK YOUR JOBBER, OR WRITE US



THE "New-Way" AIR COOLED ENGINES

For Blacksmith Shop Use

No Water to Freeze—No Tank to Fill

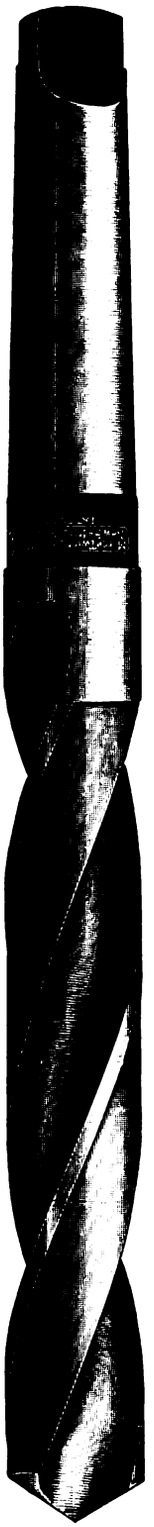
You ought to know what Blacksmiths who are using The "NEW WAY" Engines say about them. A post card will bring our catalog and a book of letters from users, that may save you buying two engines to get one you can use.

WRITE FOR CATALOG K.

THE "New-Way" MOTOR COMPANY
LANSING, MICHIGAN, U.S.A.

60 Sheridan Street

"MORSE" DRILLS



Large and small, from .0135 of an inch diameter to 6 inches.

Made for all kinds of work that a twist drill can be used for. Either of carbon or high-speed steel, and in many styles.

Each process in the making of "MORSE" DRILLS is important in itself, and much depends upon the skill and care used in hardening and tempering. This we have acquired in nearly fifty years of experience.

Our facilities for making the *very best* Drills are the *very best.*

A Trial is the Best Proof

Other lines of our make are equally as good as "MORSE" DRILLS, viz.: Reamers, Chucks, Cutters, Taps, Dies, etc., etc. These are fully illustrated in our catalogue, which with the Young Machinists' Practical Guide, we would like to send you.

Morse Twist Drill & Machine Co.

NEW BEDFORD, MASS. U. S. A.



In the long run, and every run, "F-S" products win.

How does it **wear**, that's the question. "F S" Coach, Car and Automobile Colors **look** right, and **they last!**

FELTON, SIBLEY & CO.

Manufacturers of Paints, Colors and Varnishes

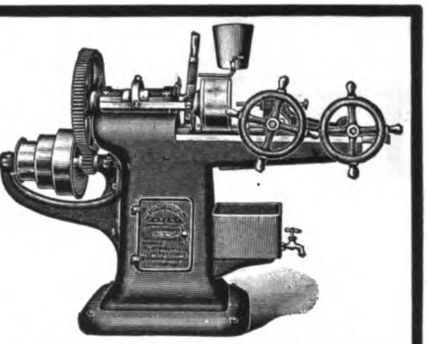
136-140 N. 4th St., PHILADELPHIA

THE

MERRIMAN

Bolt Threader

Best on Earth



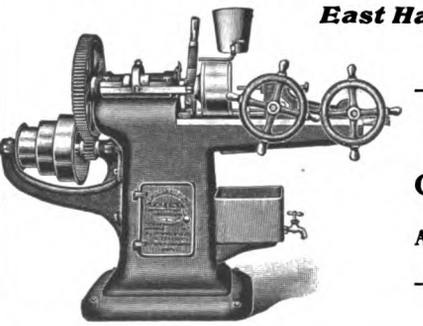
A Bolt Cutter is Much Like a Man in This

THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly.

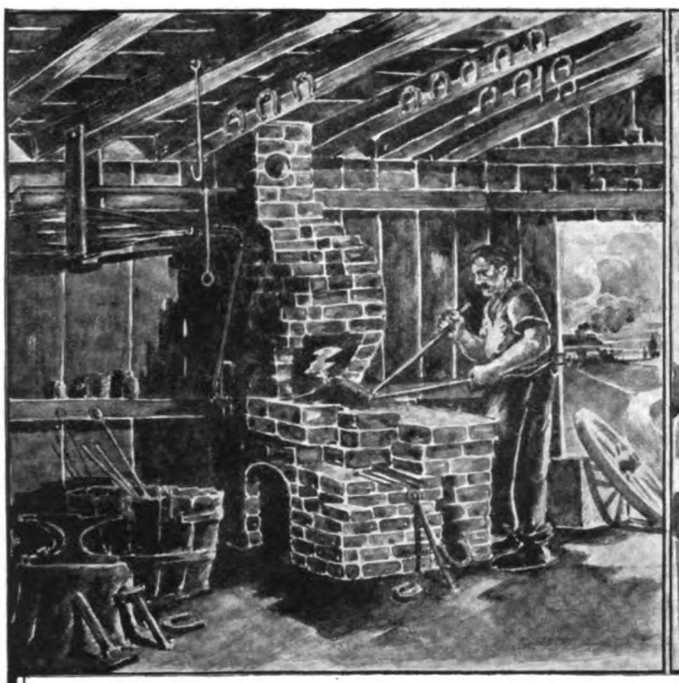
THE H. B. BROWN CO.,

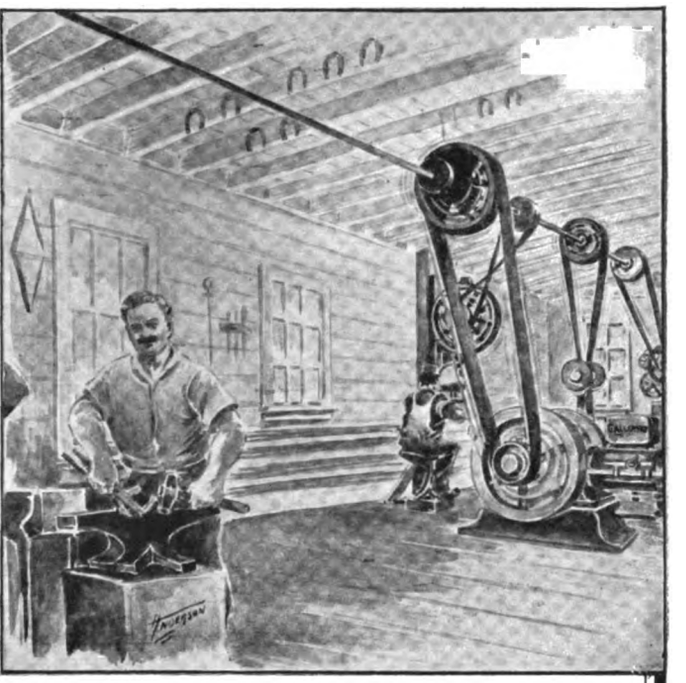
East Hampton, Conn.



Send for Catalog No. 11

A Postcard will bring it





Increase your capacity. Modern machinery cannot be repaired or renewed in the old fashioned way.

Are there lots of jobs that come to your shop that you are not able to handle? Is there business that you could bring your way if you could handle it? You have the skill, you have the room, but you lack one thing. That thing is **Power.** The big money jobs cannot be handled without **Power.** On the other hand, if you had **Power,** you could handle twice the volume of the smaller jobs, and at a much increased profit per job.

What do you think you ought to do about it? You can do good work in the old way, but why not do better work and more of it in the new? The Galloway 5 h. p. gasoline engine gives you **Power** to handle almost any repair job that will come to you. The automobile jobs, the big machinery jobs. It will surprise you to find how much you have enlarged your capacity, how much easier it is to do your work. And the Galloway is the best engine for the purpose.

Think of it! A 5 h. p. engine at only $119.50. Absolutely guaranteed. You can try it in your own shop for 30 days. Make it pull anything an engine of its rated power ought to pull. It's got to please you or it's no sale. The engine is built right. It has drop-forged connecting rods and crank shafts, high-class bearings, hard oilers, high compression. It's long-lived. It's everything that a high-class engine ought to be. It's an engine that has been on the market 15 years. It's been getting better all the time. It has no equal anywhere on the market.

There are only four things to do. 1. Turn on the oil. 2. Turn on the gasoline. 3. Turn on the battery. 4. Give the flywheel a whirl.

It's the simplest engine built.

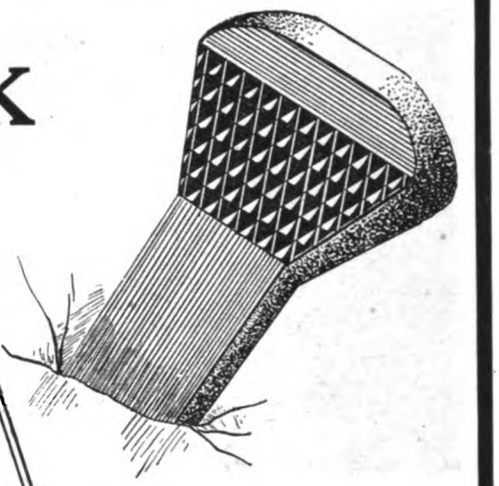
You want to know about my special proposition for blacksmiths, the proposition that will enable you to partly or entirely pay for your engine. It's brand new and original.

Send today for my fine engine catalog fully illustrated. It will give you many gasoline engine pointers that you have to have in buying any engine. Write today.

The William Galloway Company,

575 GALLOWAY STATION, :-: :-: WATERLOO, IOWA.

See the CHECK MARK on the Head?



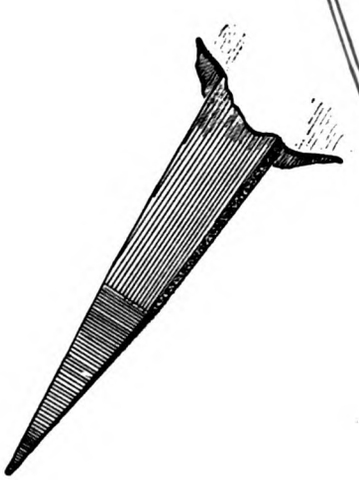
It's "THE CAPEWELL" **trade mark**—registered at the Patent Office and legally recognized as our exclusive property—a distinguishing feature of the **best horse nail** in the world.

The easiest, slickest nail to drive which was ever manufactured.

Horseshoers find that it makes the day's work easier and that far better satisfaction results to all concerned wherever "THE CAPEWELL" is used.

Be sure to look for the CHECK MARK on the heads of the nails you drive, for remember—"THE CAPEWELL" has no equal.

Every shoer needs it in his business if he expects the **largest measure of success.**



MADE BY

THE CAPEWELL HORSE NAIL CO.

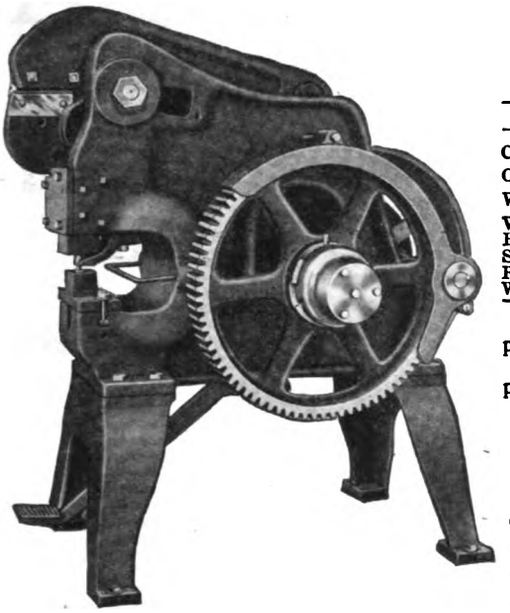
HARTFORD, CONN., U. S. A.

The Largest Manufacturers of Horseshoe Nails in the World.

Wills' Automatic Micrometer Axle Gauge



THE AXLE GAUGE THAT SAVES TIME AND MONEY



Combined Power Punch and Shear

BUILT IN FOUR SIZES

	No. 10½	No. 11½	No. 12	No. 17
Cuts Flat Iron	½ to 4 inches ¼x6 band iron	½ x 6 inches	⅝ x 6 inches	¾ x 6 inches
Cuts Round Iron	1 inch	1¼ inches	1⅜ inches	1½ inches
Will Punch	½ inch hole in ½ inch iron	⅝ inch hole in ⅝ inch iron	¾ inch hole in ¾ inch iron	1 inch hole in ¾ inch iron
Will Punch to center of	12 inches	14 inches	16 inches	20 inches
Back Geared	7 to 1.	7½ to 1	9 to 1	8 to 1
Size of Tight and Loose Pulleys	12 inches	16 inches	18 inches	20 inches
Revolutions of Pulleys	225	220	220	200
Weight	1600 lbs.	2600 lbs.	3200 lbs.	5000 lbs.

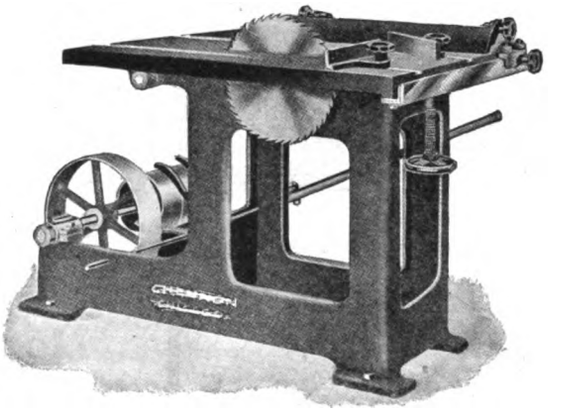
Machines that can be used for shearing both flat and round bars, and also punching without any changes.

Write for large cut and full description, and see for yourself how many good points they have.

No. 5 Combination Saw Table

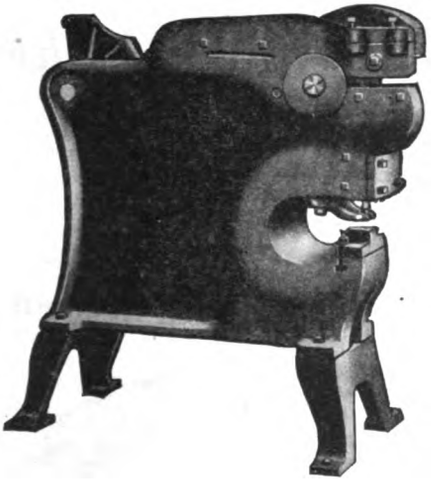
This machine is extremely simple in design, convenient in operation, and suitable for those desiring a reliable piece of apparatus at a low cost.

Frame cast in one piece; adjustable iron table. Tilting rip gauge and adjustable cut-off gauges, and many other good features.



Large Illustrated circular tells you all about the machine. Write for it. It's FREE for the asking.

No. 5 Combined Punch and Shear

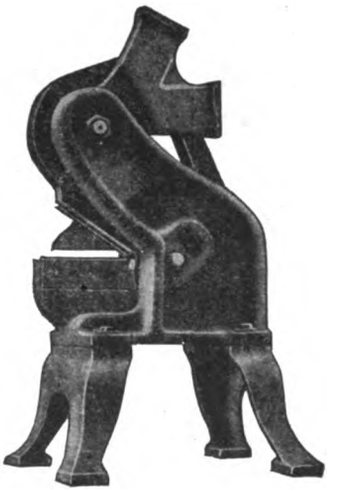


This machine has been designed for blacksmiths, machine shops, implement manufacturers and carriage and wagon makers, whose work requires the heaviest punching and shearing.

Punches a ⅝ in. hole in ⅝ in. iron; cuts 5 x ½ in. flat bar iron; 1½ in. round iron and 8x¼ in. band iron or plow steel. Punches to center of 16 inches. The knives for flat and round iron are independent of each other and of punch, and machine is always ready for cutting or punching without any change. We send with the machine three punches and dies, and all necessary knives. Machine, when shipped, is complete, ready for use. Weight 950 pounds.

Lever Shears

Built in Seven Sizes



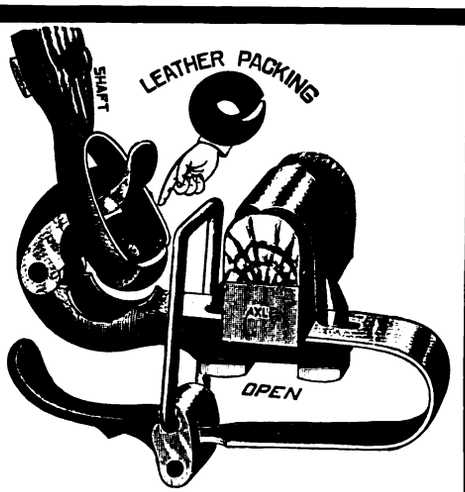
The knives or shear blades for shearing round and flat bars are independent of each other, and the machines are always ready for cutting without any change.

The lever works toward the front in cutting both flat and round bars.

When required, we can furnish iron legs for any of the above machines, but only do so on special order and at additional cost.

No. 5 "A" cuts flat iron ½ x 4 in.
No. 5 "B" cuts flat iron ½ x 4 in. or 1 in. round iron bars.
No. 5 "C" cuts flat iron ⅝ x 3 in.
No. 5 "D" cuts flat iron ⅝ x 3 in. or ¾ in. round iron bars.
No. 5 "E" cuts flat iron ⅝ x 4 in. or 1 in. round iron bars.
No. 5 "F" cuts flat iron ⅝ x 5 in.
No. 5 "G" cuts flat iron ⅝ x 5 in. or 1¼ in. round iron bars.

Badger State Machine Co., Makers, 19 - 23 Trinity Street, JANESVILLE, WIS., U. S. A.



Placing the loop over the end of the cap and drawing the thumb lever back until it rests against the flat spring closes the coupler, keeps it closed, and takes up the wear of the leather packing.

Unless a Carriage Coupler is furnished with a moulded leather bushing and steel spring just like this it is not a Bradley.



THE

BRADLEY Carriage Coupler

All Steel, Noiseless, Quick Shifting, Ball Bearing.

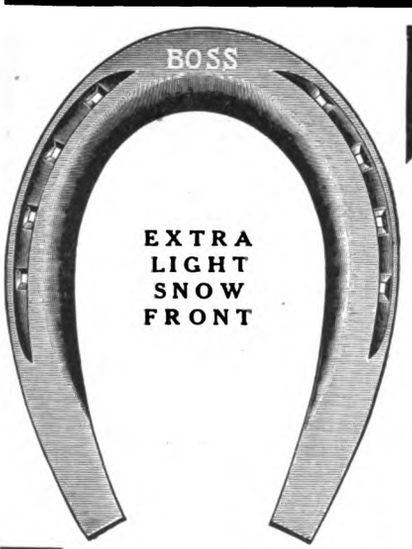
The ONLY Carriage Shaft Coupler that is furnished with a

One-Piece Moulded Leather Packing

A packing that will outwear any other packing ever made. It fits the ball and socket. It is held in place by a spring steel retaining ring. It may be put on and taken off in a jiffy, and it stays where it is put.

C. C. BRADLEY & SON

SYRACUSE, N. Y.

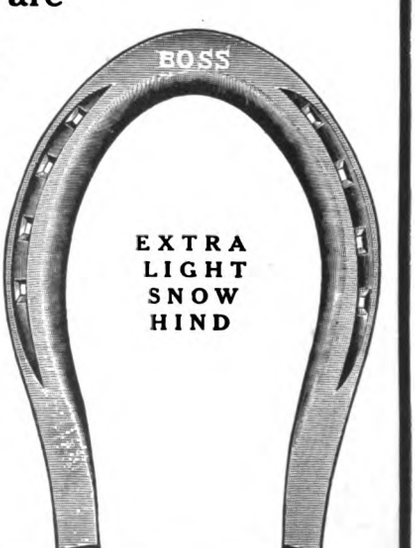


Don't Forget How Well the

BOSS EXTRA LIGHT IRON SNOW SHOES

Suited you last winter—they are better than ever and are

MADE IN SIZES 1 to 5 Inclusive.



WRITE FOR SAMPLES.

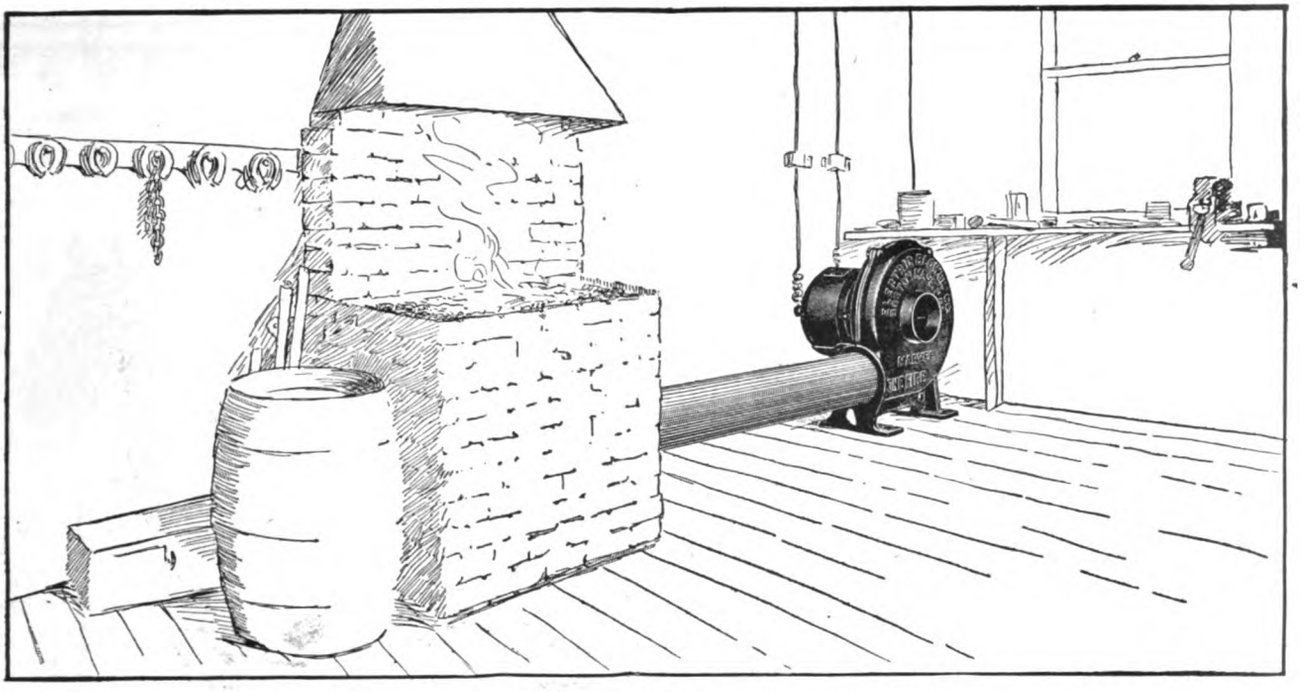
QUALITY The *popularity* of BOSS horse and mule shoes is due to their *superior quality*.

VARIETY We make shoes for all purposes.

WRITE FOR CATALOGUE.

Bryden Horse Shoe Company,

CATASAUQUA, PENNSYLVANIA



MR. BLACKSMITH:

It costs from 40 CENTS to 70 CENTS A MONTH for Electricity to operate a "ONE FIRE" MARVEL Blower.

Can YOU blow YOUR fire by hand for 3 CENTS A DAY.

The 1910 "ONE FIRE" MARVEL Blowers, BOTH Alternating Current and Direct Current, are furnished with a SEVEN POINT SPEED REGULATOR giving SIX different speeds, or air pressures.

The MARVEL "ONE FIRE" gives from 70 to 100 per cent GREATER AIR PRESSURE, which means that much HOTTER fire than any of the other so-called "one fire" blowers on the market.

We will ship the MARVEL Blower *"suited to your work,"* to any part of the United States, on 30 days' trial, in competition with ANY other Electric Blower, and it may be returned to us at OUR expense, if you are WILLING to part with it at the end of that time.

We make this proposition to you through YOUR DEALER.

3,500 shops are using MARVEL BLOWERS

Order the "Marvel" Blower That is Suited For Your Work

No. of Blower	Height	Electric Current	H. P. of Motor	Speed of Fan	Air Pressure	Blower is For	Net Price
One Fire	10 in.	A. C. D. C.	1–15	3600	1 1-2 oz.	1 fire	$28.00
18 in.	18 in.	A. C. any phase	1-8	1800	1 1-2 oz.	4 light fires	55.00
18 in.	18 in.	D. C.	1–6	2300	2 oz.	4 medium heavy fires	55.00
No. 2	24 in.	A. C. any phase	1–6	1800	2 1-4 oz.	4 medium heavy fires	70.00
No. 3	18 in.	A. C. any phase	1–4	3600	3 1-4 oz.	4 heavy fires	80.00
No. 5	30 in.	A. C.* D. C.	1 H. P.	1800 2000	3 1-2 oz.	8 heavy fires	120.00
No. 5	30 in.	A. C. single phase	1 H. P.	1800	3 1-2 oz.	8 heavy fires	140.00
18 in.	18 in.	A. C. 2 or 3 phase	1 1-2	3600	5 oz.	8 very heavy fires	130.00
18 in.	18 in.	A. C. single phase	1 1-2	3600	5 oz.	8 very heavy fires	150.00
No. 5	30 in.	A. C. 2 or 3 ph. only	7 1-2	3600	10 oz.	15 very heavy fires	250.00

*2 or 3 phase. Special Blowers made to order.

No. 5 Exhauster, 29 in., outlet 9 in., inlet 9 in., is used for various purposes: for Drying, Heating, Ventilating, Exhausting shavings, dust, etc., and for forced Draft on Boilers, and is equipped with the proper motor to suit the requirements of each case. Price on application.

The 18 in. $55.00 Marvel is also used for small boilers and as an exhauster.

All parts of our Motors are interchangeable.

New Bronze Bearings for small motors, 50 cents each.



A 7 Point Speed Controller puts our blowers in a class by themselves

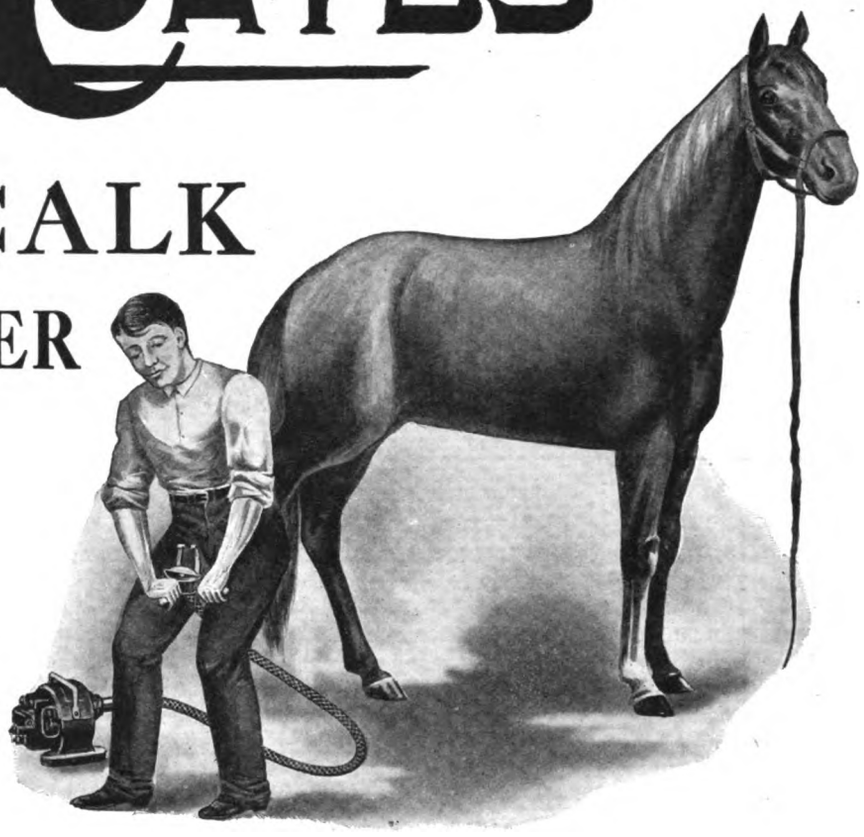
Shipped on 30 Days' Trial Through Your Dealer

ELECTRIC BLOWER CO., 352 Atlantic Avenue, Boston, Mass.

COATES

TOE CALK SHARPENER AND HORSE CLIPPER

FOR THE BLACKSMITH



No matter whether it's an inserted screw calk or the old "stand by" you can sharpen it easily and thoroughly in the fraction of a minute with our Sharpener. It can be run by an electric motor or can be attached to your engine. And when a horse is to be clipped remove the sharpening device, insert the clipper and go to work.

The same flexible shaft can be used for polishing and cleaning metal articles and brass work on automobiles, drilling in unhandy places and a hundred and one other things that you are called upon to do.



Let us send you one for a *10 days' trial* right in your own shop. You can send it back if not satisfied.

WRITE US TODAY.

COATES CLIPPER MFG. CO.

WORCESTER, MASS., U. S. A.

WE SAVE YOU MONEY

ON TOOLS AND SUPPLIES

No concern on earth can make you such low prices as you get from us.
We don't do business in the old fashioned or regular way, but buy complete, brand new stocks, in many instances at less than cost to make.

Sheriffs' Sales | Receivers' Sales | Manufacturers' Sales

OUR CATALOG SHOWS 50,000 BARGAINS, "SUCH AS WE QUOTE BELOW."

You need this great "price-maker"—it's free to you.
Fill out and mail coupon for our catalog today.

Horseshoe Nails 5 1-4c. per Pound.



Catalog No. 4-A. B.-96.
2,000 boxes of Bay State cold rolled Horseshoe Nails, made of best Norway Iron, sizes, 6, 7, 8, 9 and 10.
Price in bulk, 25 lbs. to box, 5¼c. lb.
Or in 5 lb. cartons..... 7¼c. lb.

Queen City Special, cold rolled Horseshoe Nails, sizes, 6, 7, 8, 9, put up 25 lbs. bulk in a box, price per lb..... 5¼c.

"Bonanza," forged and pointed, warranted Horseshoe Nails, made of best Swedish stock, sizes, 6, 7, 8, 9, put up in bulk, 25 lbs. to box, price per lb..... 6c.

Ball Bearing Grindstones, $2.95



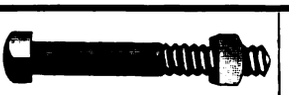
Catalog No. 4-A-1266.
Strongest and easiest running grindstone on the market.
Frame made of angle steel. Ball bearings on journals and cups.
60 lb. stone, 22x2½.
Weight, complete, 85 lbs.
Price $2.95

"O. K." Emery Grinder, $14.25.



Made for general shop work and grinding plows. Note Disc Grinding Attachment shown on right hand.
Dimensions—Height, 30 in. Base, 18 in. Arbor, 36 in. Shaft, 1¼ in. Collar, 3¾ in. Bearings, 1¼x8 in. Pulley, 4x4½ in. Weight, 190 lbs. Will carry wheels 14x3 in.
Catalog No. 4-A-591.
Price with two rests $14.25
Extra for Disc Grinder Attachment, add.. 3.00

Bolts 2½c lb.



About 10 tons brand new Machine and Carriage Bolts, all in first class condition, various sizes mixed together, ranging from ¾ to 1 inch diameter and from 2 to 10 inches long.
Price in lots of 25 to 100 lbs..... 3c per lb.
Price in lots of 100 to 500 lbs.....2½c per lb.
Price in lots of 500 lbs. or more .....2¼c per lb.

Plow and Tire Bolts

All brand new Bolts from a jobber's stock, mixed together in various sizes, diameter from 3-16 to 5-16 inch and lengths from 1½ to 2½ inches. Absolutely brand new and in first-class order.

Special prices, while they last, as follows:
Mixed Plow Bolts, 25 lbs. or more.... 2c per lb.
Mixed Tire Bolts, 25 lbs. or more..... 2½c per lb.

Premier Wrought Iron Anvils



Catalog No. 4-A-115.
Best in quality, form and finish. Steel face is a solid piece planed smooth after welded.
Absolutely Guaranteed

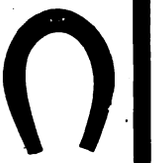
Weight.	Price lb.	Weight.	Price lb.
150 to 200 lbs.	7c.	70 to 79 lbs.	10½c.
120 to 145 lbs.	9c.	60 to 69 lbs.	11c.
80 to 119 lbs.	9¾c.	50 to 59 lbs.	12½c.

Advance Self Feed Drill, $15



For Belt or Hand Power. Will drill 1 1-4 in. hole to center of 18 in. circle. Has special automatic feed device, located back of spindle. Has cam arrangement so as to give continuous feed. Stands heaviest service, yet is simple in construction, with a very few parts.
Dimensions—Height, 50 in. Table, 11 in. diameter. Gear Wheels, 8 in. Spindle, 1¼ in. Run of Spindle, 3 in. Size Column, 2 in. Greatest Spread of spindle to table, 16½ in. Spindle bored for ½ in. rounk shank drills.
Catalog No. 4-A-34.
Weight, 190 lbs.
Price, ...$15.00

Horseshoes



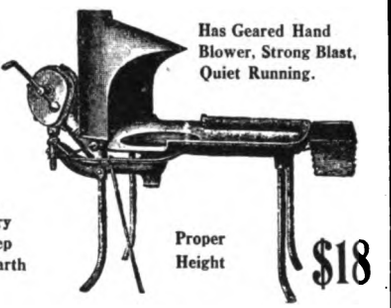
Brand New Horseshoes made by the Eagle Horseshoe Company. Absolutely new and in first class order. Stock consists of

25 kegs.....No. 0
22 kegs.....No. 1

Price per 100 lb. kegs.....$3.50.

Mail orders accepted for any item quoted on this page.

Your Favorite Forge, $18.00



Dimensions
Height, 30 in.; size of hearth, 31x53 in.; diameter of fan, 12 in; weight about 290 lbs.
Catalog No. 4-A-459. Price, with Water Tank, as shown $18.00

Send Us This Coupon

Chicago House Wrecking Co., Chicago,

I saw this ad in AMERICAN BLACKSMITH.
Send me your Mammoth Catalog free of any expense.

I am interested in.....

Name .....

920 Town .....

Co..... State .....

Am. Blk. Jan. 1910.

CHICAGO HOUSE WRECKING CO.

35th and IRON STREETS, CHICAGO, ILL.

STANDARD THE WORLD OVER

INDIAN CHIEF

AMERICAN TRENTON TRADE MARK ANVILS

(IT RINGS LIKE A BELL)

TRENTON ANVILS Are forged, not from scrap, but from two pieces of new, solid ingot Steel, welded at the waist, and faced with one solid piece of Special, High-Grade Tool Steel.

These Anvils are endorsed by leading Blacksmiths and Horseshoers *everywhere*, who express a decided preference for them.

Features of special note are:

1.—Long, perfectly shaped horn and long heel.

2.—Base with greatest possible area, or spread, insuring greater stability and absence of tipping when heavy work is done at the end of horn or heel.

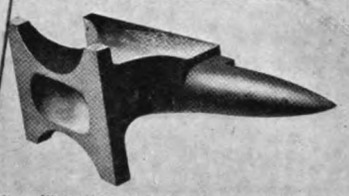
3.—Base which does not require strapping down and which sits firm without shifting or rocking.

4.—Special temper of edges to prevent chipping.

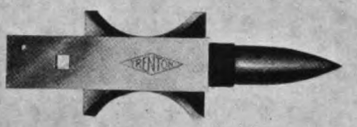
5.—Faces level and true, and of correct proportion for practical work.

6.—Hardie Holes and Pritchell Holes and other mechanical details of exact accuracy.

7.—Trenton Anvils are unequalled for superior shape, graceful design, stability on the block and the absence of superfluous weight in the base.



Bottom View, Showing Base Hollowed Out, Permitting Anvil to Stand Firm Without Rocking



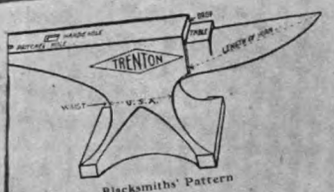
General Blacksmiths' Anvil



Horseshoers' Plain Horn Anvil



Horseshoers' Clip Horn Anvil



Blacksmiths' Pattern

Principal Dimensions of Regular Blacksmiths' Anvil

Face	Horn	Waist	Heel	Drop	Hardie Hole	Approximate Weight
						100 lbs.
3½ x 14	9¼	5	1⅛	1⅜	⅞	125 lbs.
3¾ x 15½	10¼	5½	1¼	1½	1	160 lbs.
4 x 17½	11¼	6	1⅜	1⅝	1⅛	200 lbs.
4½ x 19	12	6½	1⅜	1⅝	1⅛	225 lbs.
4½ x 19½	12½					

Other sizes from 10 lbs. to 1000 lbs. in proportion.

Principal Dimensions of Standard Horseshoers' Anvil

Face	Horn	Waist	Heel	Drop	Hardie Hole	Approximate Weight
						100 lbs.
3½ x 15	10	5	1⅛	1⅜	⅞	125 lbs.
3¾ x 16	11	5½	1¼	1½	1	160 lbs.
3¾ x 18½	12	5½	1⅜	1⅝	1⅛	200 lbs.
4 x 19½	12½	6	1⅜	1⅝	1⅛	225 lbs.
4½ x 21	13½	6½				

TRENTON

SOLD BY LEADING DEALERS EVERYWHERE

INDIAN CHIEF

Indian Chief Solid Box Vises

Improved design to give strength, power of grip, and uniformity of design.

Jaws solid steel Drop Forging, faced with one-half inch of Crucible Tool Steel.

SOLID BOX

Screw a solid one-piece steel forging. Thread of 29° angle, which is a great improvement on the old square thread, as it is stronger at the root and moves with less friction.

The concave and convex surfaces on Box and Screw and Washers make a perfect ball bearing at whatever point the Vise is opened; it is therefore impossible to break, bend or strip the thread.

Every Vise is inspected and tested at our factory before shipment.

Made by American Mechanics of experience. Comparison invited. We claim not "as good," but superior to any other Vise.

HORSE-SHOERS' VISE

After consulting with and studying the needs of Shoers, we have improved the design of our Horseshoers' Vise. Note the ample depth of jaws and flat top of front jaw, also the shapeliness and design of Vise.



Box and Screw

See table for sizes and dimensions.

Indian Chief Warranted Vises

HIGH GRADE SOLID BOX

Blacksmiths'

No.	Weight, Pounds	Length of Jaws, Inches	Depth from Top of Jaw to Top of Box, Inches	Vise Opens, Inches
25	25	3½	3¼	3½
30	30	3⅝	3⅜	3⅝
35	35	3¾	3½	3¾
40	40	4	3⅝	4
45	45	4⅛	3¾	4⅛
50	50	4⅛	4⅛	4⅛
55	55	4⅜	4⅛	4⅜
60	60	5	4⅛	5
65	65	5	4⅜	5
70	70	5⅛	4⅜	5⅛
75	75	5⅛	4⅜	5⅛
80	80	5⅛	5	5⅛
85	85	5⅛	5	5⅛
90	90	5⅜	5⅛	5⅜
95	95	5¾	5⅛	5¾
100	100	6	5⅜	6
110	110	6	5⅜	6
120	120	6⅛	6	6⅛
130	130	6⅛	6	6⅛
140	140	7	6⅛	6⅛
150	150	7	6⅛	7
160	160	7⅛	7	7⅛
170	170	7¼	7	8
180	180	7⅜	7⅛	8
200	200	8	7⅛	8

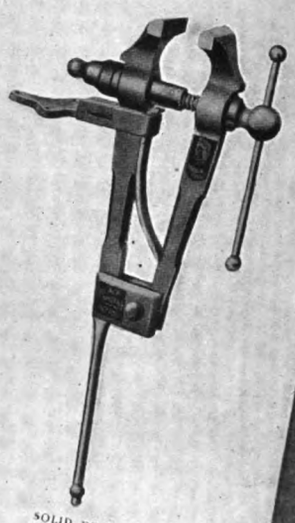
Horseshoers'

No.	Weight, Pounds	Length of Jaws, Inches	Depth from Top of Jaw to Top of Box, Inches	Vise Opens, Inches
60	60	6	6	6
65	65	6	6	6
70	70	6	6	6
80	80	6	7	6

Boxes and Screws

No.	Diameter, Inches	For Vise No.
1	1	25- 40
2	1⅛	45- 55
3	1¼	60- 75
4	1⅜	80- 95
5	1¾	100-150
6	2	160-200

Indian Chief Blacksmiths' Vise



SOLID BOX

TRENTON

THE COLUMBUS FORGE & IRON CO. COLUMBUS, OHIO, U.S.A.

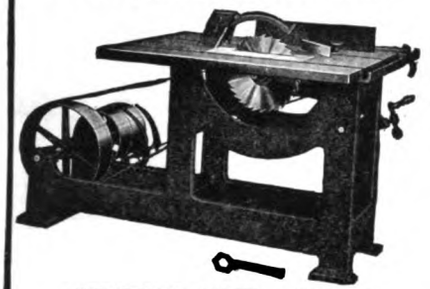
THE SILVER MFG. CO.

365 BROADWAY SALEM, OHIO.



SILVER'S NEW JOINTERS

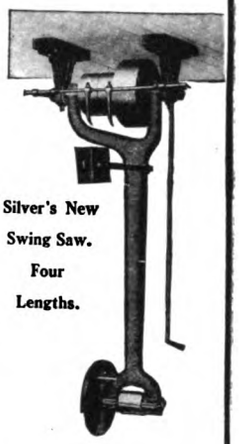
Five Sizes—8, 12, 16, 20 and 24 inch. New "patent applied for" features.



SILVER'S SAW TABLES

Send for circular of Saw Tables and Swing Saws.

You Should Get Our Printed Matter About These Tools



Silver's New Swing Saw. Four Lengths.

Tools for all kinds of work—drilling, boring carriage and wagon hubs, forging, tenoning spokes, buzz planing, sawing.

Tools as strong, as simple, as well built as skill and experience can make them.

Tools that are reliable, that you can depend on, that have only the best of iron, steel and wood; we've been making them right here since long before the Civil War.

Tools that will outwear your own sturdy muscle. You pay one price, and the price stops when you buy—there are practically no repairs. Silver tools are built right in the first place.

It will pay you in dollars and cents to

SEND FOR OUR NEW MACHINERY CATALOG

or for any of the following booklets:

BAND SAWS AND JOINTERS—describing 20" Band Saws for foot or belt power or combination; also 26, 32, 36-inch Power Band Saws with new features; also five sizes of Jointers.

HUB BORING AND SPOKE TENONING MACHINES—illustrating and describing several sizes of each.

PORTABLE FORGES—illustrating and describing 14 styles.

DRILLING MACHINES—covering our line of some 22 distinct machines.

POWER DRILLS—illustrating our line of 20" machines with lever feed, lever and wheel feed, power feed with automatic stop, power feed with back gears and automatic stop.

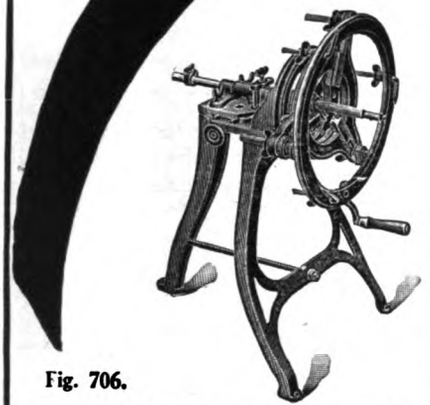
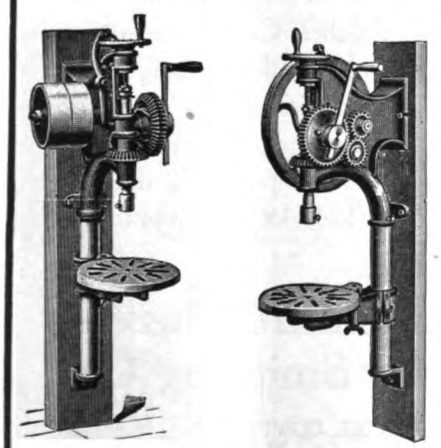


Fig. 706.

TAYLOR'S NEW TAPER HUB BORING MACHINE.

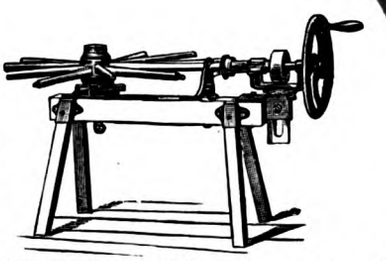
Hand wheel regulates cut. Bores any size hole or taper without changing bit.



Our Booklet, "Drilling Machines", illustrates 22 kinds we make.



Our Portable Forge Booklet illustrates some 14 kinds. We have a size to suit your needs. Strong and durable. Attractive designs.



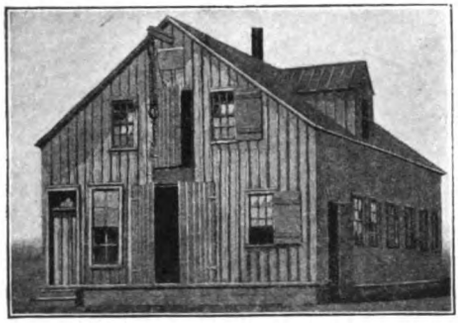
SPOKE TENON MACHINES

in Seven Sizes. Fitted with Star Hollow Auger.

32 Years' Progress

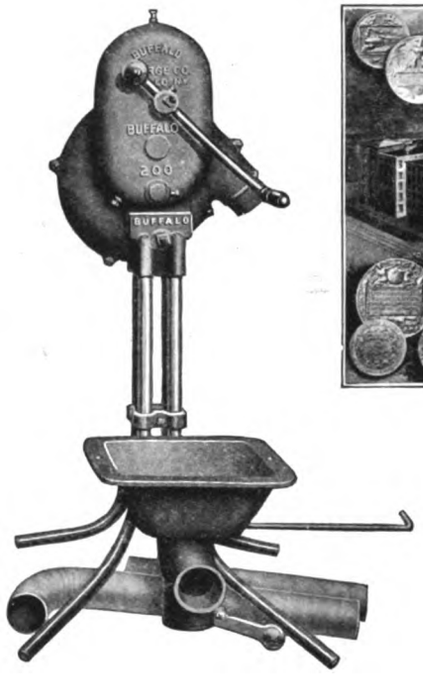
Buffalo Forge Company

Buffalo, New York

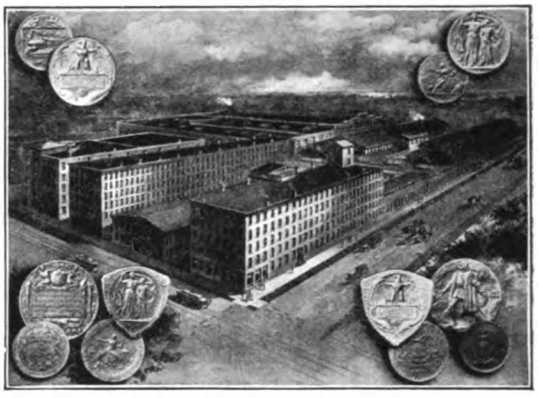


1878

1,300,000 Buffalo Blowers have been made and sold in all countries on the globe. Every Government uses them, because they are the world's best production, carefully designed on true scientific principles and built by experienced mechanics.



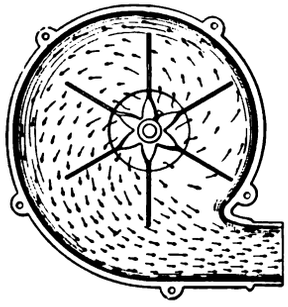
Buffalo 200 Silent Blower



1910

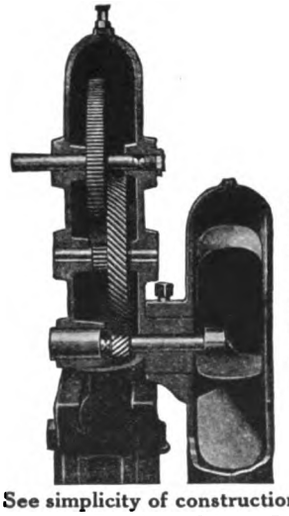
The Buffalo 200 Silent Blower can be had on trial. Try it. Don't be deceived by the arguments inspired by larger profits on inferior goods. Insist on Buffalo and the 10-year guarantee.

The Buffalo Way



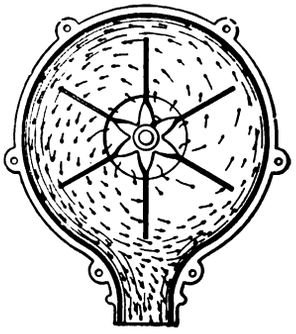
No Waste

The fan case of the Buffalo 200 Silent Blower is so constructed that the blast is delivered along the line of least resistance. The blast wheel is hung to one side, completely clearing the outlet channel, insuring a steady and constant delivery of air to the fullest capacity. Study the illustrations.



See simplicity of construction
Long Journal Bearings, Direct Drive

The Other Way



One half of blast lost

This Tag is attached to every Buffalo "200" Silent Blower

10 YEAR GUARANTEE

BUFFALO 200 SILENT BLOWER.

For, and in consideration of the purchase price of this machine, ***WE HEREBY GUARANTEE*** to replace, free of charge, f. o. b. cars Buffalo, N. Y., any parts of the 200 Blower wearing out within ***TEN YEARS.***

We also guarantee this blower to produce a stronger blast with the same number of turns of the crank, and with less power than any other blower built.

Run this blower 24 hours per day and the guarantee still holds.

W. F. Mudd

BUFFALO FORGE CO.

PRES.

DATE_____

Look for this tag It means no repairs for ten (10) years



H-CALK

Best Calks

MONEY CAN BUY

If you cannot obtain them at your dealers

We Will Sell You Direct



STEEL CENTER CALK

THE HAPPY H-CALK HORSE





STEEL CENTER CALK

CHEAPEST

Of All Good Calks

If you don't know them, ask for

Free Samples and Prices



H-CALK

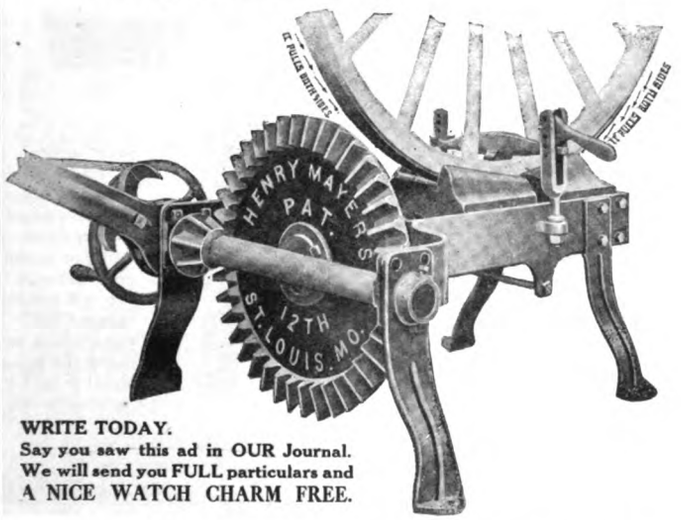
THE H-CALK CO., 116 Broad Street, NEW YORK

Sets Tires Cold or Hot ☛ On the Wheel

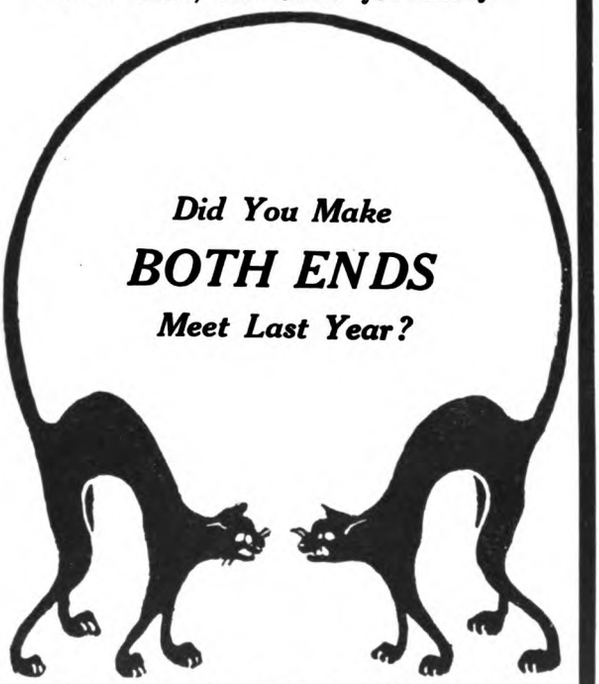
Our Interests Are Mutual

LET'S GET ACQUAINTED?

Our New Idea will not only make BOTH ENDS meet, but COIN you money.

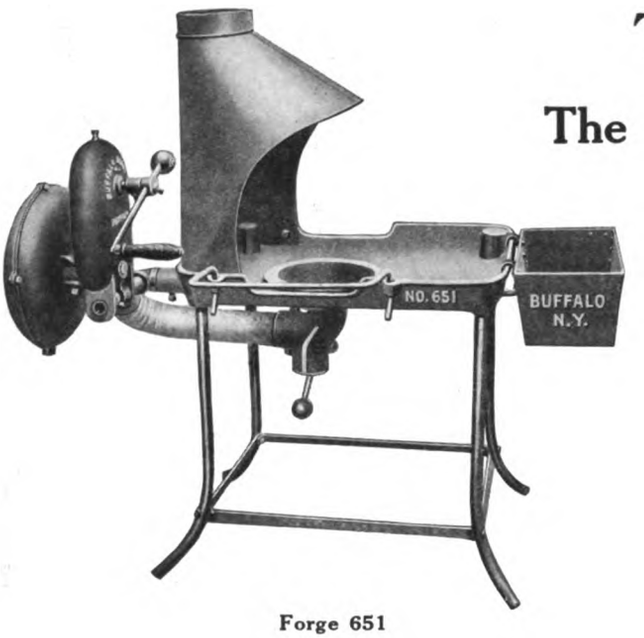


WRITE TODAY.
Say you saw this ad in OUR Journal.
We will send you FULL particulars and
A NICE WATCH CHARM FREE.



MAYERS TIRE SETTER MFG. CO., 4028-30 Forest Park Blvd., ST. LOUIS, MO.

Buffalo Forges



Forge 651

The Buffalo 651

The Village Horseshoer's Forge

The heavy cast iron fire pan is mounted upon wrought iron legs, rigidly braced. This produces a forge of great strength.

Equipped with the "Buffalo 200 Silent Blower" placed at right angles to the front of the forge. The hand falls naturally upon the crank. At the same time it keeps the face away from the fire. A convenience appreciated by the careful smith.

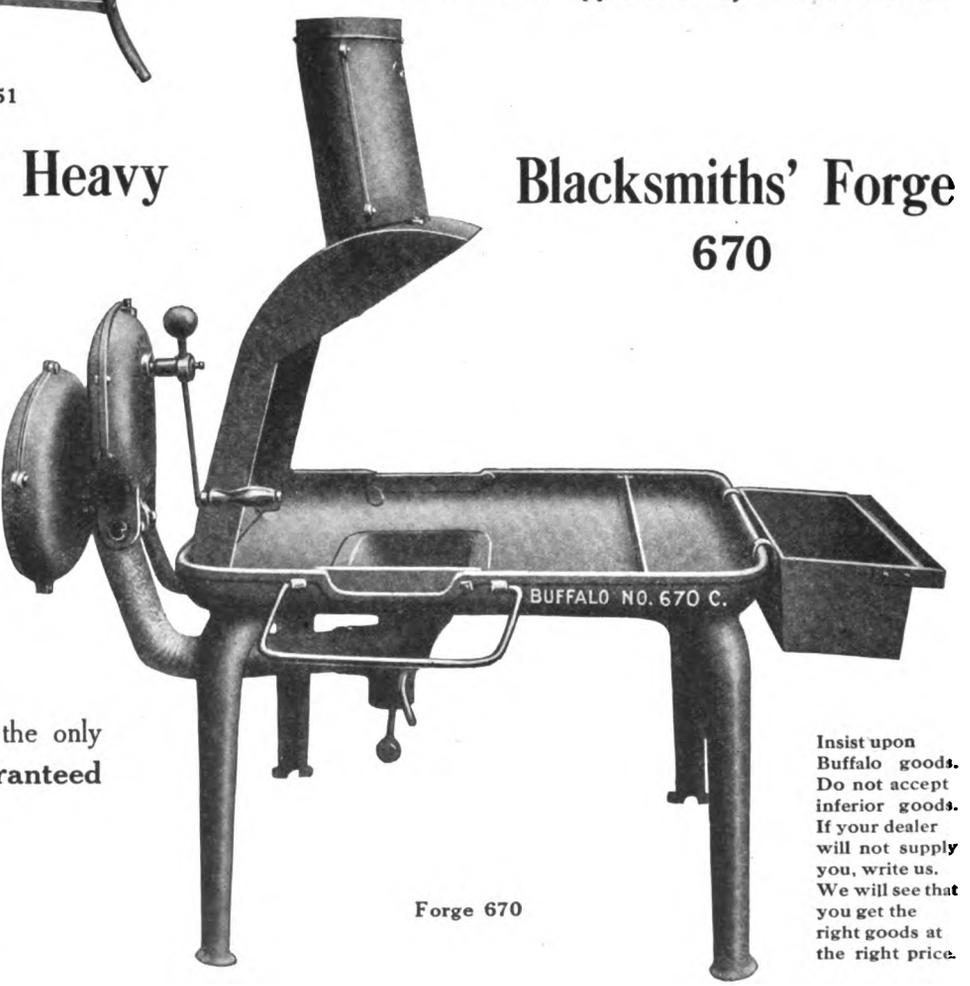
Buffalo Heavy Blacksmiths' Forge 670

The forge that possesses every advantage of the brick forge without a single disadvantage.

It is heavily and strongly built, to resist the strains of heavy work. The fire pan is built low down, for convenience in handling the heaviest work.

Equipped with the reliable "Buffalo 200 Silent Blower," the only blower built that is **guaranteed** against repairs for **10 years.**

Ask for Catalog A. B.



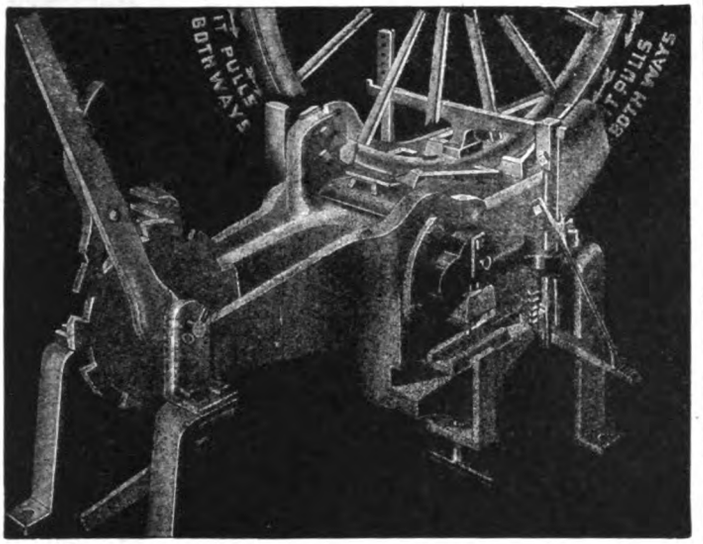
Forge 670

Insist upon Buffalo goods. Do not accept inferior goods. If your dealer will not supply you, write us. We will see that you get the right goods at the right price.

Buffalo Forge Company

Buffalo, New York

HOUSE COLD TIRE SETTER



TAKE NOTICE.

We have cut prices to suit the times. If you just want a machine without shear and punch, we will sell it to you for $90.00 guaranteed to set all tires up to two inches, one man to do the work, and the tires will not have to be heated, either. No one can beat us in price or quality. They have not touched us in the past, as shown by the facts, for instance, we have in use about 3000, which beats all our competitors put together. We make machines for all classes of shops and they range in price from $90.00 to $365.00. They are used by our Government and in nine foreign countries. **See our Spoke Auger Adv. on page 48.**

HOUSE COLD TIRE SETTER CO.

216-218 S. Third St., ST. LOUIS, MO.



THE BRADLEY

NON-SLIPPING

HORSESHOE

is the only shoe that will not slip on any slippery country road or any slippery city street. A shoe that stays sharp until it is worn out without the dangerous calks or sharpened toes.

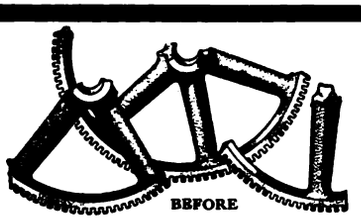
There are no calks to break on the Bradley, as the shoe is forged in one piece from open hearth steel.

It is the only shoe that fills every requirement of modern conditions that a shoe needs. No horseowner will object to paying more for these shoes if you explain their merits and superiority over other shoes.

It is the shoe that will better your conditions. Write today for wholesale prices.

The Bradley Patent Horseshoe Co.

CHESTER, DEL. CO. PA.



TRADE **WELDARINE.** MARK.

REGISTERED
United States Patent, March 24, 1908.
Canadian Patent, April 6, 1909.
Other Patents Pending.

Weldarine is the only compound that will braze cast iron.
Weldarine will braze any form of iron or steel.
Weldarine is, or ought to be, in every up-to-date shop.
Weldarine is sold by the leading Heavy Hardware houses in America, and is used in every civilized country in the world.

WHAT THEY SAY—Copy of Testimonial, dated 11th September, 1907, from WILLIAM JAMES, Engineer of Kameruka Estate, via Bega, N. S. W.

Dear Sirs:—Referring to yours of the 9th instant, it gives me great pleasure to say that the WELDARINE set supplied by you last month has given entire satisfaction on the jobs we have had occasion to use it. We welded a rocker arm bracket on a steam pump which had broken across the middle. This was repaired about three weeks ago and now is stronger than ever. We also put two new cogs in a cog wheel of a corn and cob mill. The great tenacity of WELDARINE in repairing broken castings has surprised me. Yours faithfully, WILLIAM JAMES.

Concord, Illinois.

I ordered a sample package of your WELDARINE with but little faith in it. Am happy to say I have made a success of every job I have undertaken, and believe anyone can do the same by following the simple instructions sent with it. I am satisfied it will do all you claim for it.
JOHN N. ERIXON.

EVERY SET GUARANTEED **PUT UP IN THREE SIZES**

Small set	**$ 2.00,**	**weighs**	**2**	**lbs.,**	**will do from**	**$ 30**	**to**	**$ 40**	**worth of work.**
Large	" 3.00,	"	4	"	"	75	to	90	" " "
Jumbo	" 10.00,	"	25	"	"	400	to	500	" " "

If your dealer cannot supply you, fill out the attached coupon and mail today. Order now. Prices liable to advance.

The Weldarine Mfg. Co., Topeka, Kansas, U. S. A.

COUPON

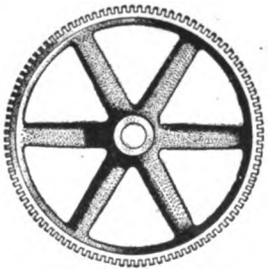
The Weldarine Mfg. Co., 700 Kans. Ave., Topeka, Kans.

Please find enclosed $....., for which send one set of Weldarine.

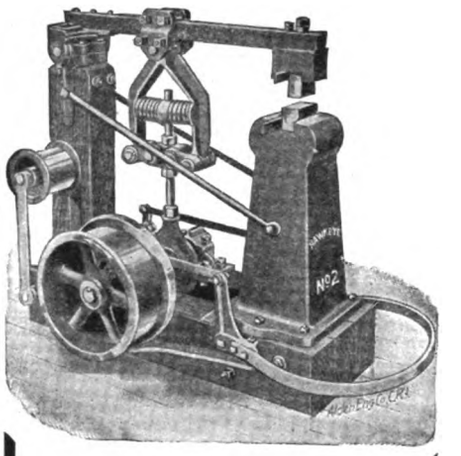
Name.....

Address.....

Date.....



AFTER



The Hawkeye Power Hammers

Now Built in Three Sizes

Buy a Guaranteed Hawkeye Helve Hammer,—you will then be fixed to handle both light and heavy forging, also long work and tire welding. They have double the capacity of any upright hammer of the same weight and price. Why not have the best?

Hawkeye Manufacturing Company,

Cedar Rapids, Iowa, U. S. A.

HERE'S AN ITEM

on **STAR HACK SAWS**

Better Blades (harder and tougher)

AT GREATLY REDUCED PRICES

New and increased facilities for production have reduced our cost and we propose to give the public the benefit of this reduction and then some more. Make a note of this new list of prices.

$3.50	3.75	4.00	4.50	5.00	5.50	6.00	per gross
6	7	8	9	10	11	12	inch.

Millers Falls Company, 28 Warren St., New York, N. Y.

Trade Literature and Notes.

THERE HAS JUST COME to the Advertising Department a copy of a booklet issued by the "New Way" Motor Company, of Lansing, Michigan. It deals with important questions on the subject of buying engines, and explains the advantages of an air-cooled engine over a water-cooled. The illustrations are very good, and we are sure that any of our subscribers who request a copy of this booklet will be very well pleased.

THE SARVEN WHEEL COMPANY, manufacturers of carriage wheels and carriage wheel stock, whose place of business is Indianapolis, Indiana, advised us that they had limited their output to buggies, surreys and other light vehicles, but, inasmuch as they are located in a hotbed of other manufacturers, they have decided to install a complete equipment for manufacturing automobile wheels. They say that this step comes after numerous requests from various automobile manufacturers.

FOR BLACKSMITHS, the William Galloway Company, of Waterloo, Iowa, have what they claim to be the most satisfactory gasoline engine on the market. The sizes they make, 5 H. P., 7½ H. P. and 10 H. P., are particularly useful for the smaller shops, but they also make engines up to 22 H. P. The Galloway people claim that for simplicity their engines can hardly be excelled, and that they use the very best of material. This house also announces to us that they have sold a large number of Galloway engines through the advertising columns of this magazine, and that none of our readers have expressed dissatisfaction in any way with the Galloway goods. We would suggest that those interested in gasoline engines get into communication with the William Galloway Company, mentioning The American Blacksmith.

THE HOUSE COLD TIRE SETTER COMPANY have for the past nine years been planning and perfecting a spoke auger, and are now manufacturing what they consider a very successful implement. They appreciate that to suit the needs of wagon builders it should be reasonable in price; heretofore, machines, to do the work required, had been so costly as not to come within reach of the men by whom they were needed, but the House people believe they have overcome this objection. The new machine will bore spoke tenons, and, mechanically, they say it is practically perfect. We would suggest that any of our friends who are interested in such a device write to the manufacturers, House Cold Tire Company, 216 South 3rd St., St. Louis, Mo

CRAY BROTHERS, the large manufacturers and jobbers of carriage and wagon hardware, of Cleveland, Ohio, are, at present, preparing a splendid catalog and work of reference. This book will be much larger and more complete than anything they have ever issued before, and Cray Brothers do not understand how any reader of our journal can afford to be without it. It will be sent to anyone upon request.

BLACKSMITHS CAN MAKE MORE MONEY and they can do it easily if they are equipped to clip their customers' horses. Thousands of blacksmiths are making a very snug amount every month in the year out of their clipping trade and once started it grows fast. The cost of having an up-to-date clipping machine is very slight and it will pay for itself in any blacksmith shop in a short time. You can buy a machine as low as $7.50 which will do good work, and other machines for hand and power as your trade increases. The Chicago Flexible Shaft Company, Chicago, Ill., are the largest manufacturers of clipping machines in the world and they make a specialty of horse clippers for your purpose. Write for a copy of their catalog which illustrates the various style clippers and they will tell you something about the profits you can make without much effort if you just make up your mind to be ready to clip your customers' horses.

HOW OFTEN have you needed a piece of Sheet Steel about an eighth of an inch thick and six inches square? Hard to get it outside the cities, too. We illustrate on page 46 a bundle of this material which is being put on the market by the JARVIS ENGINE & MACHINE WORKS, Lansing, Mich. This is new stock which is cut from sheets during the process of manufacturing other articles and runs all the way from ⅛" to ½" in thickness, and in sizes from 2" x 6" up to 12" x 48". There are 100 pounds in a bundle, and it is the handiest and greatest money-making "buy" a Blacksmith or Wagon repairer can make. The JARVIS COMPANY are offering this $2.00 per bundle, cash with the order, and *They Pay the Freight.*

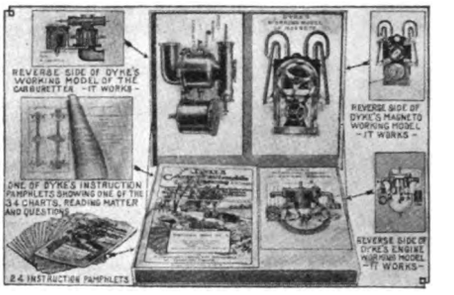
W. F. YOUNG, P. D. F., Springfield, Mass., has recently sent to us a new edition of a pamphlet entitled, "Evidence," which explains the wonderful cures effected with ABSORBINE, JR. There is an advertisement of this firm in another section of our magazine, and we are sure that it will pay our readers to get in touch with W. F. Young, P. D. F., if they are at all interested in any of the remedies prepared by him.

A BOOKLET recently came into our hands called "16 Reasons." It is sent out by the Temple Engine Mfg. Company of Chicago. They state very plainly and to the point sixteen reasons why their "2 in 1" Master Workman gasoline engines are, from their standpoint, superior to other engines. The Master Workman is a 2-Cylinder engine so adjusted that two cylinders are used for heavy work and one for light work, built on the inverted, vertical principle. The manufacturers claim that the Master Workman engine is the only gas engine that runs successfully with gas, gasoline, distillate kerosene or alcohol without change of mixers or other expensive alterations. We suggest that this booklet is well worth the attention of everyone contemplating buying a gasoline engine, as it contains many other items of interest descriptive of their engines

WE CALL THE ATTENTION OF OUR READERS to the advertisement of the Bradley Patent Horseshoe Company on page 29 of this issue. The Bradley people claim that much time can be saved by the blacksmith through the use of their shoe and that it is practical for all kinds of horses under all conditions of winter and summer. The shoe is steel forged and non-slipping and can be bent or shaped to fit any hoof. The manufacturers tell us that these shoes are having a great run in the southeastern section of Pennsylvania where their factory is located and they are just now beginning to introduce them in other sections of the country. Horseshoers everywhere, it is said, are beginning to appreciate the advantages of the Bradley shoe and their plant is kept running night and day to supply the largely increasing demand for this new shoe. For further particulars, we would suggest addressing the makers, The Bradley Patent Horse Shoe Company, Chester, Pa.

ONE OF THE MOST ATTRACTIVE and interesting little booklets we ever saw came into our hands the other day, from the Modern Sales Company, called "Makes Smithing Easy." The booklet is well written, and the phrases which they used describe excellently the qualities of their power hammers. It will pay anyone interested to write the Modern Sales Company, Grinnell, Iowa, for this booklet.

THE PIONEER POLE & SHAFT COMPANY of Piqua, Ohio, has just issued a circular entitled, "Straight Talk on a Bent Subject." This little circular describes their new Twentieth Century Shaft, and enumerates the various advantages of this type. We are sure our readers will be interested in their circular, which will be sent free upon requesting the manufacturers.



OF A SPECIAL INTEREST to those of ou readers who have taken up automobile work is Dyke's Auto Instruction. This is a home-study course of automobile engineering and is not only intended for the novice, but for the expert as well.

By means of these instructions, you not only learn the operation and construction of the automobile, its engine and various other parts, but by using the practical knowledge thus gained are better able to overcome the many repair problems that are being brought to you constantly. Dyke's Auto Instructions consist of twenty-four lessons and several working models of various parts. If you are interested in automobile repairing or contemplate taking up this work, write for circulars and explanatory literature to A. L. Dyke, Dept. B, 3947 Washington Ave., St. Louis, Mo.

THE BUSINESS HERETOFORE CONDUCTED under the firm name of Sebastian Lathe Company, of Cincinnati, Ohio, builders of High Grade Engine Lathes, etc., has been incorporated under the name of THE SEBASTIAN LATHE COMPANY, with a paid up capital of one hundred thousand dollars. With increased capital and greatly enlarged facilities, we will be in a better position than ever before to take care of the rapidly growing demand for our line of lathes. The new company will maintain the high grade of workmanship and finish as well as the low prices which has made this line of lathes so popular in the past. New features will be added as it may be deemed advisable. They invite correspondence, and mail should be addressed Cincinnati, Ohio.

PROF. JESSE BEERY OF PLEASANT HILL, OHIO, renowned as the world's master horseman, is issuing a very interesting book entitled, "The Story of Kate and Queen." This story is written as though told by the horses themselves, and publishers say it rivals the famous book, "Black Beauty," which many of our readers doubtless have read. The story deals with the life history of two horses, one of which becomes an outlaw and the other the Family Driver. The book is full of interest and explains why some horses develop into man-killers and others into gentle, tractable animals. The retail price of this book is 50 cents. But we have arranged with the publisher to send a copy free to every reader of this paper. If you will write Mr. Beery direct, at Pleasant Hill, Ohio, and tell him you are a subscriber of our paper, and send two 2 cent stamps, to pay cost of postage and packing, Mr. Beery will be glad to send you the book by return mail without extra charge. We were greatly interested in reading this book and hope all our readers will take advantage of the offer.

THERE IS ADVERTISED IN THIS ISSUE of THE AMERICAN BLACKSMITH a new style of pipe. The manufacturers claim that it is absolutely sanitary and free from the infections of ordinary pipes. The bowl is made with the inner walls vertical and the bottom flat like a pan. This shape of bowl prevents the tobacco from becoming packed solidly, and the makers claim that there is a free circulation of air through parts of the tobacco when smoking. The bottom of the bowl has a series of holes angling through solid Vienna meerschaum to a point at the apex of the bowl. This construction assists in the free circulation of the air through the tobacco, the result is a very pleasant, cool smoke, equal to that of a fine cigar. Owing to the air chambers of the pipe, the manufacturers claim that the pipe will never get wet or soggy, as in ordinary pipes. For full information we refer you to the firm of Acme Pipe Company, A. B. Station M, Cincinnati, Ohio, whose advertisement appears on page 31 of this issue.

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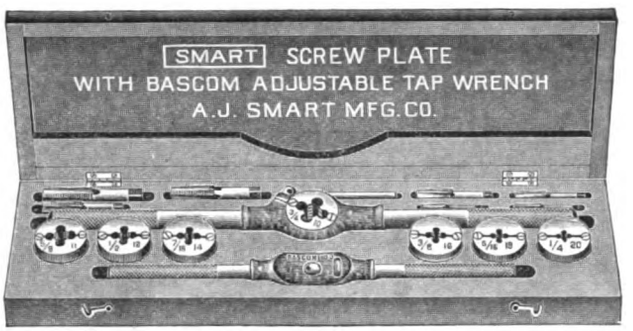

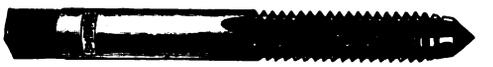









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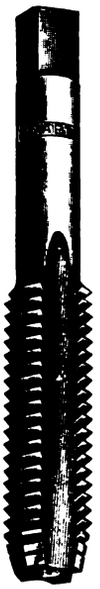

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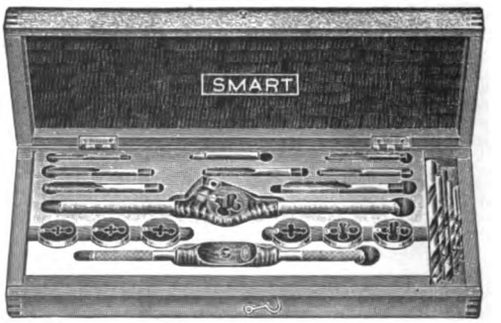



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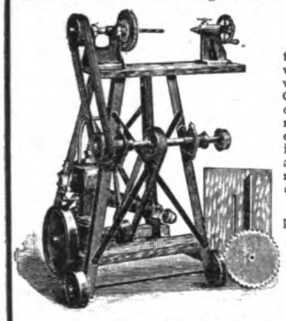

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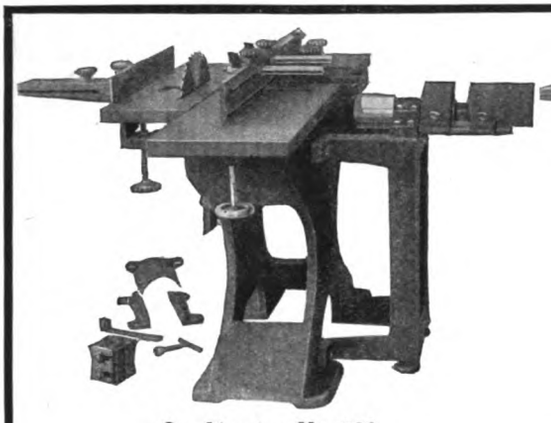

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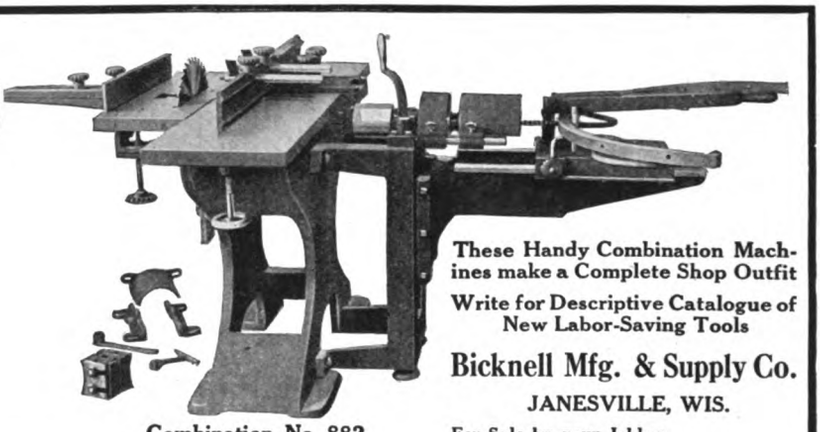

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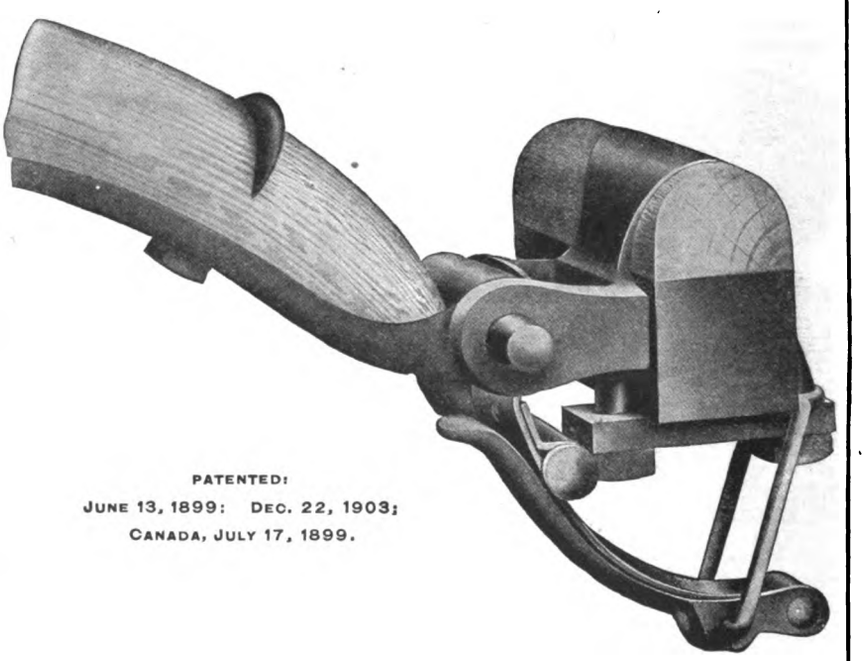

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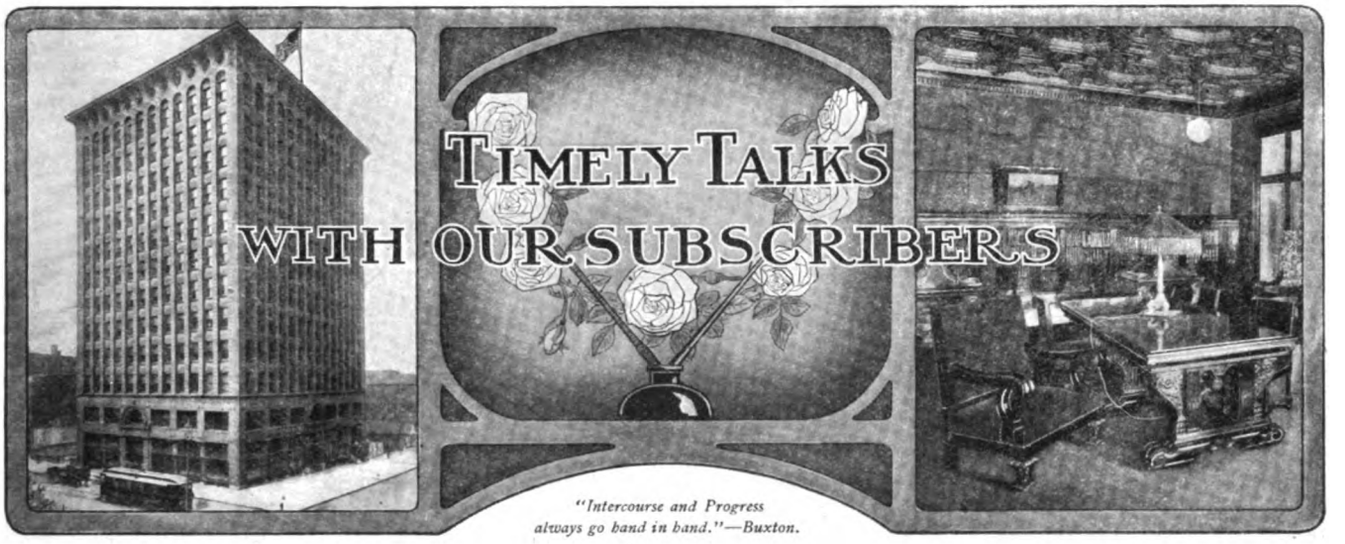

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To the New Folks.

As this issue will go to many craftsmen who have never before seen a copy of THE AMERICAN BLACKSMITH, a word or two about "Our Journal" will therefore be timely. Every number of this paper contains never less than 26 reading pages; and each page is brimful of sound, practical shop reading. No part of these pages is taken up with trade puffs, stale clippings or matter of similar low standing. Our writers and regular contributors are authorities in their fields. They give "Our Folks" their experiences and practical hints and kinks on shop work. Not theory, but sound, practical, money-saving, profit-increasing information that will actually help the practical man with his shop work.

THE AMERICAN BLACKSMITH gives the practical craftsman just such information as will enable him to climb higher on the ladder of success. It doesn't carry the social news, nor the political news, but just the practical, usable craft news, that will enable the good craftsman to become a better one.

Protection That Means Something.

AMERICAN BLACKSMITH readers are protected against loss in their dealings with advertisers and others by the Pink Buffalo Stamps. These little pink squares have been supplied to "Our Folks" for several years now and are doing their work better today than ever. Lots and lots of our friends consider them almost as necessary to their business as their hammers and anvils. They use them on all their correspondence with jobbers, manufacturers and brother craftsmen. They know their value. When your stock is low send for more and don't hesitate to use them freely. This protective feature is worth money to you, so use the stamps freely. Send in a postcard request right now if you need some. And don't forget that "Honest Dealings" paragraph which appears in every issue. It works hand in hand with the Pink Buffalo Stamps.

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After the First Two Issues.

When a big company *not* actively engaged in blacksmithing says: "One item alone pays many years' subscription," how much more valuable must "Our Journal" be to those who are actively engaged in blacksmithing? Just read this letter recently received from The Goldfields Diamond Drilling Company, Limited, of Australia:

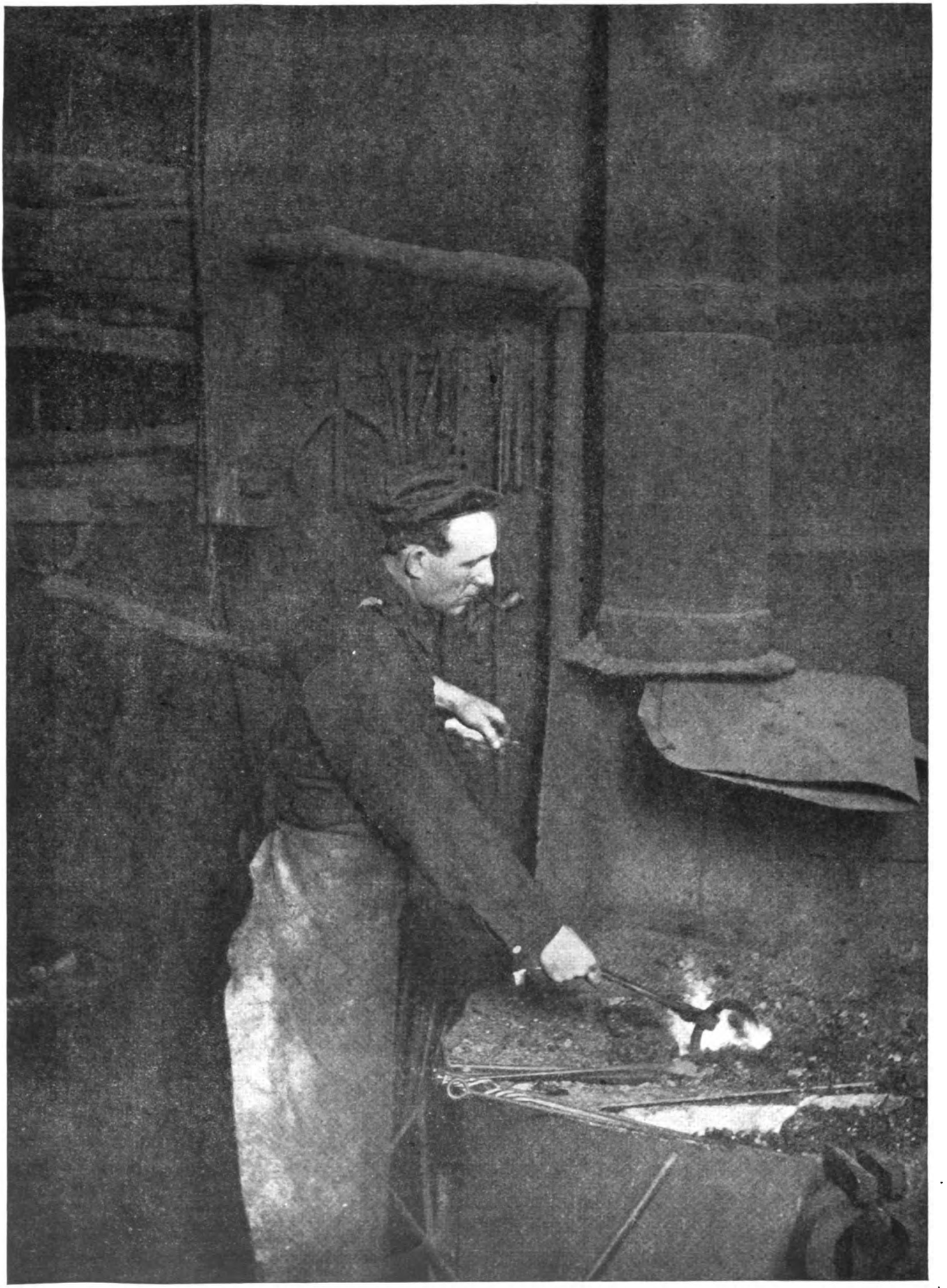
"We take pleasure in enclosing herewith 6s. (six shillings) for renewal of AMERICAN BLACKSMITH. Although we are not actively engaged in blacksmith work, still we get to the "try-out" end by using tools and materials made by the smith's art: therefore we are keenly interested in your paper.

"As for its worth, we are well satisfied with our investment. One item alone from your paper pays many years' subscription and will amount to a big saving. Little things like this show the widespread value obtainable through the discussions of knotty problems in your paper.

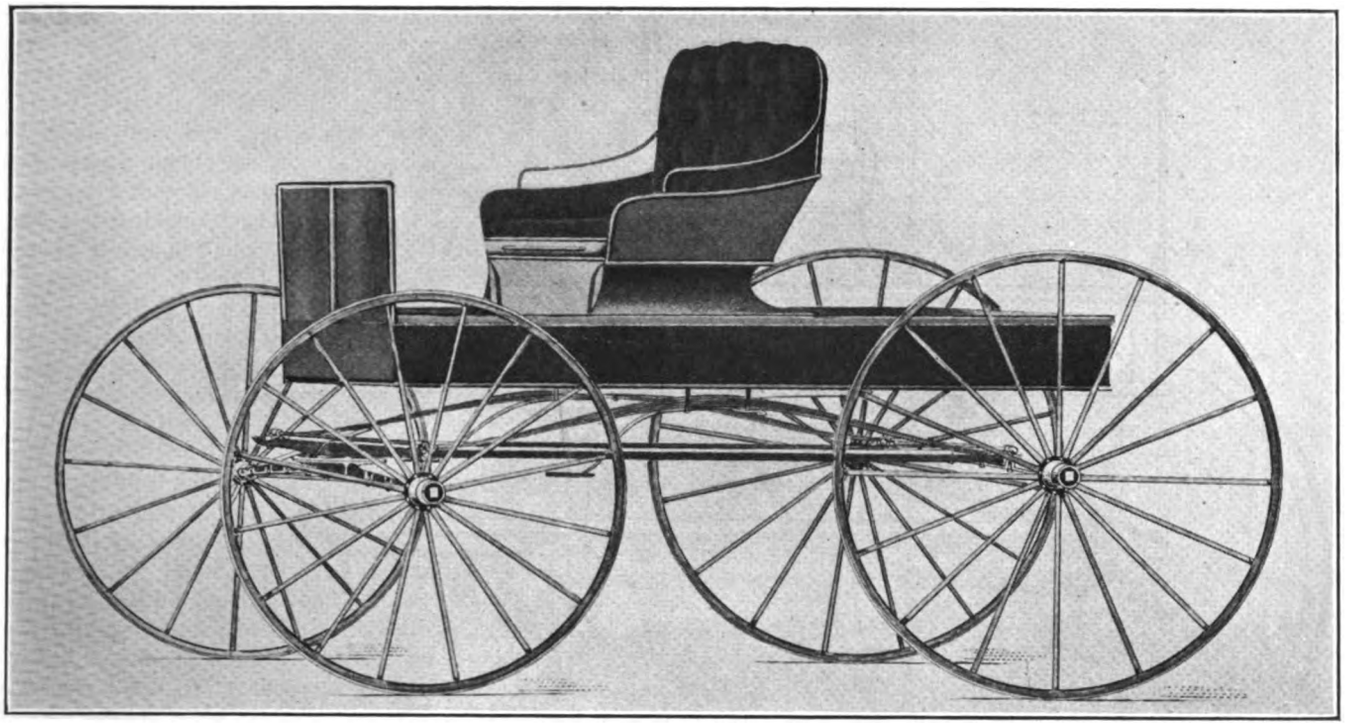
"When you first asked us to subscribe, we were very skeptical about its being of any value to us. We assumed there was little in common between shoeing horses and general repair work and our own line as Diamond Drill Contractors. After reading the first couple of issues we changed our minds on this point, as we found many ideas in both businesses that dovetailed into each other.

"We also feel the value of rubbing shoulders with men who are experts at their work, as such is sure to be a benefit to all concerned, even if in widely different trades. We expect to get other valuable hints from your paper."

The company from whom this letter was received are "contractors for all kinds of prospecting by means of diamond drills; with steam, compressed air or electric power." In their work of contracting they find THE AMERICAN BLACKSMITH full of valuable ideas. There's a reason—THE AMERICAN BLACKSMITH is full of sound, practical articles, written by practical men—experts in their lines.



THE HORSESHOER



A LIGHT ONE-HORSE VEHICLE FOR DELIVERING SMALL PARCELS

Plans for Building a Light, One-Horse Delivery Wagon

NELS PETERSON



THE accompanying plans are for a light, one-horse delivery wagon, built especially for delivering small orders quickly. There is perhaps not a great deal of profit in building wagons on a small scale, but it is nevertheless done to a great extent in this part of the country, as it serves to fill in the time and keep the men at work when repairing is slack. Then, too, there is a great deal of prejudice against factory-made vehicles, as it is claimed that they are built to sell rather than to last, and in no place has a man a better opportunity to study these conditions than in the repair shop. One thing is certain, a good hand-made wagon, if put up of good material by experienced workmen, will outlast two factory jobs, and that with less expense for repairing. This being a well-known fact, a good price can usually be obtained for a custom shop-made wagon.

The wagon shown in the accompanying engravings is built entirely on straight lines. The body has sills of 3¼ by 1¼ and is 6 feet 5 inches long by 3 feet wide, outside measurements. The panels are 7½ inches deep, finished off with a 1½-inch rail on top of the panels. The rear crossbar is 3 by 2 inches and projects 5 inches outside of the body to support a body brace, as shown at A, Fig. 3. To facilitate the handling of goods the body is provided with an end gate fastened with 3 hangers and held in place by means of end-gate springs, as shown at B, Fig. 1. An ordinary leather dash 18 inches high, and the width of the body, finishes off the front of the body.

The running gear, as shown in Fig. 4, is of the side-spring type, commonly known as the Concord gear, with 3 reaches. The center reach is 1¼ inches, the two side reaches are 1⅛ inches, and all are 5 feet 3 inches long from center to center of axles. The springs are 1¾—7 leaves 57 inches long. The axles are 1¼ inches Concord with 7-inch spindles. A 14-inch fifth-wheel is used on this gear and is a full circle, braced in front from the kingbolt and head block, as shown at C, Figs. 1 and 4. This with the usual kingbolt brace running to the center reach ought to make it sufficiently strong to withstand any ordinary usage.

The wagon being built heavy throughout, the wheels must be in proportion. In this case they have 1⅜-inch spokes and are 40 inches high in front and 48 inches behind. With the dimensions given and a glance at the different views it would seem that a man with a little knowledge of wagon building ought to be able to duplicate this job. The painting as to colors are usually a matter of choice with the customer. This particular job was painted a light yellow or cream color with black striping on body and gear. The side panels of the body and on the back of the seat was used for lettering, displaying the owner's business and address.

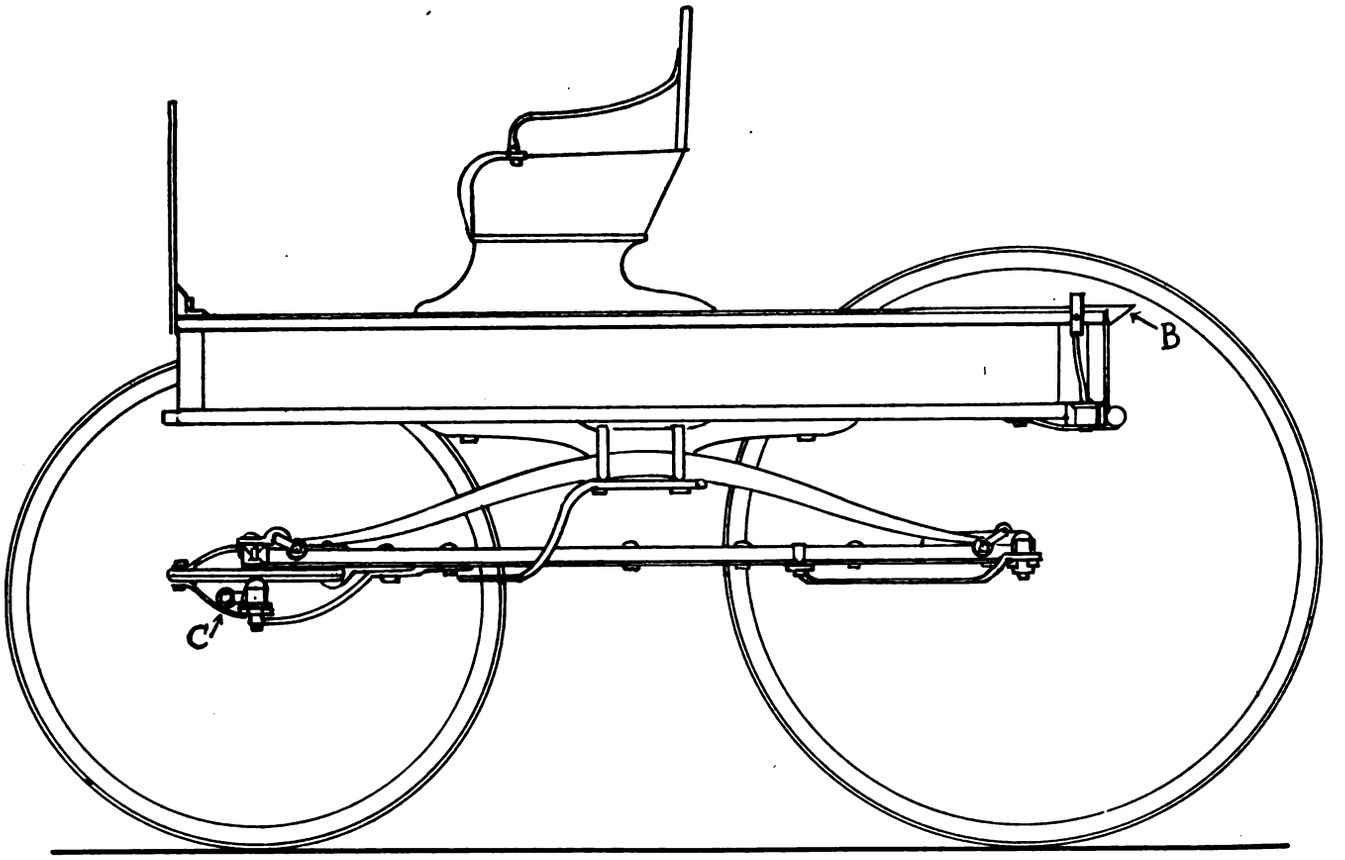
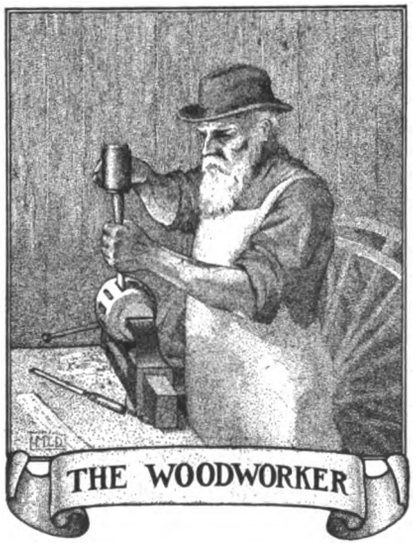


FIG. 1.—SIDE VIEW SHOWING THE GENERAL LINES OF THE VEHICLE

This style of vehicle is very popular and will stand any reasonable usage. In the city it makes an excellent light delivery, and for country use is especially adapted for quick trips to town.



Try chalking your sandpaper the next time you use any and see if it doesn't work better, cleaner and without the tendency to fill up. If you haven't a piece of chalk get a lump of starch from the Mrs. Try this on your next job of sandpapering.

W. H. B., Michigan.

When you buy a new plane, treat the face of it with raw linseed oil by letting the plane rest in a shallow pan of the oil with about one eighth of an inch of oil in the pan. Also rub oil well into the surface of the wooden stock each day for four or five days. Allow the plane to rest in the oil for about three days. The oil hardens the face and causes it to work better. WOOD PLANE, Indiana.

Another Wagon Jack.

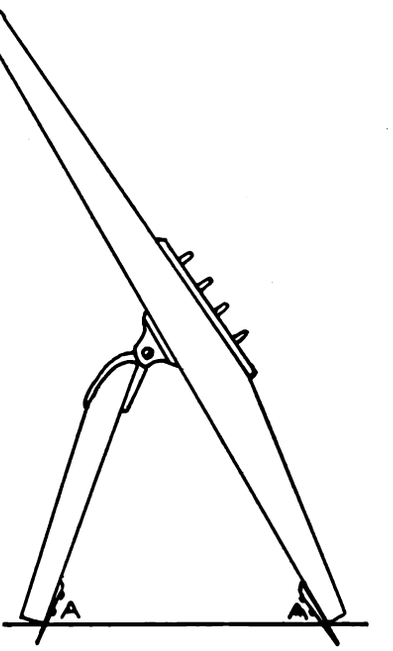
C. L. MORMAN.

The accompanying engraving shows a serviceable wagon jack that is easily made. It is composed principally of two pieces of good, solid, straight-grained hard wood stock. The long piece is 1½ by 2¼ inches by 4½ feet long, while the shorter piece is 1½ by 1½ inches by 1 foot 10 inches long. The irons for the hinge joint can be made by any practical smith, and need no explanation. The short piece should be hinged to the longer piece about 2 feet 4 inches from the bottom end of the long piece. The plates for catching under the axle are fastened to the face of the long piece about 2 feet 3 inches from the bottom end. The points at AA should be sharpened so as to keep the jack from slipping.

How to Build Manure Spreaders From Old Binders.

C. M. SOWARD.

The primary object was to produce a machine, built, as far as it was possible, from the material available in old binders. So the first step is to dissemble the old machine. Do this in a systematic way, placing all bolts and nuts in a tight box, all rods in one pile, flat bars in another, angles in still another and so on. When you have your material assorted, begin by making the rear axle, which I made by taking a square pipe and inserting an 1¼-inch shaft in each end and securing the pieces with rivets. These



A SERVICEABLE WAGON JACK

shafts are found in the head of the binder. Next take the side bars, which are a double angle in section, as at A, Fig. 1. These must be spliced to make them the right length. Use any heavy angle iron, splicing at the front end where the least strain occurs, and attach these directly to the rear axle by means of clamps, using a double truss rod across and close to axle with a yoke in the center. Now cut a piece from the main frame of binder for cross girth at the front end of the side sills and make your sill 1½ inches narrower at front than at the rear. This prevents all tendency to the binding of the load. Place good diagonal braces in the frame. Take another piece of main binder frame, which is usually 3 by ½ inch, and bend it into a stirrup shape for the front bolster, as it must be open to allow conveyor chains to pass through it. Now bend another 3 by ½-inch piece to match, which fasten onto the front axle. These two pieces should resemble B, Fig 1, and should be high enough to allow the front wheels, which are the transporting truckwheels, to turn under the machine. Place your large master wheels on the rear axle and your running gear is done.

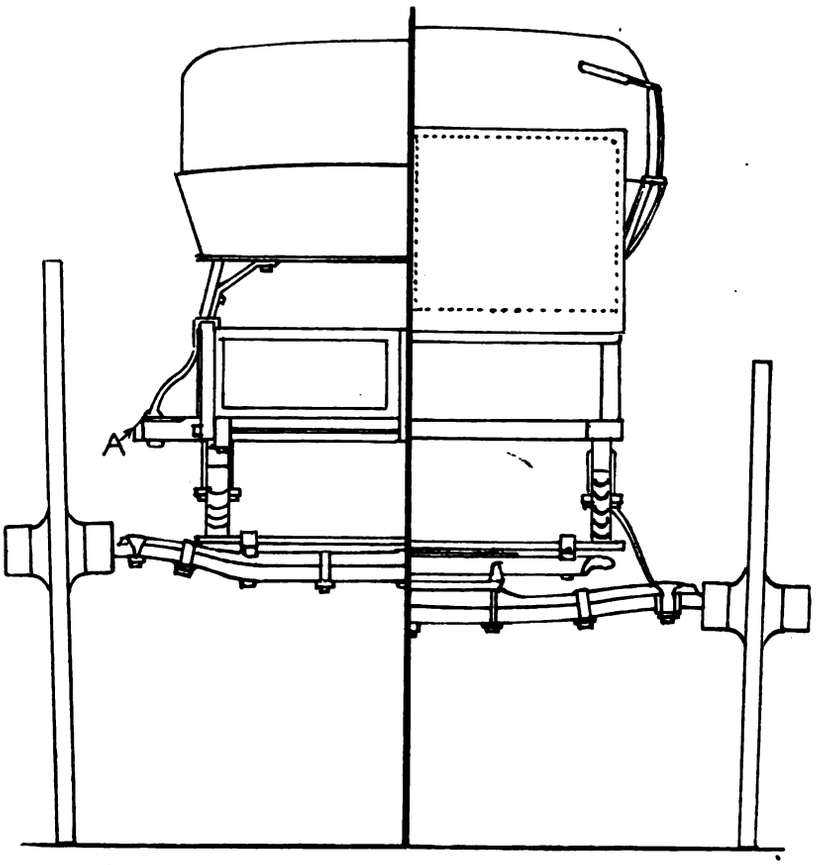


FIG. 3—SHOWING REAR HALF OF VEHICLE

FIG. 2—SHOWING FRONT HALF OF VEHICLE

Take the pitman shaft and key on two sprocket wheels, which should be about 10 inches diameter and 36 inches apart on the shaft. Now take six 2 by 4's—44 inches long and dress to fit the circle of the sprocket

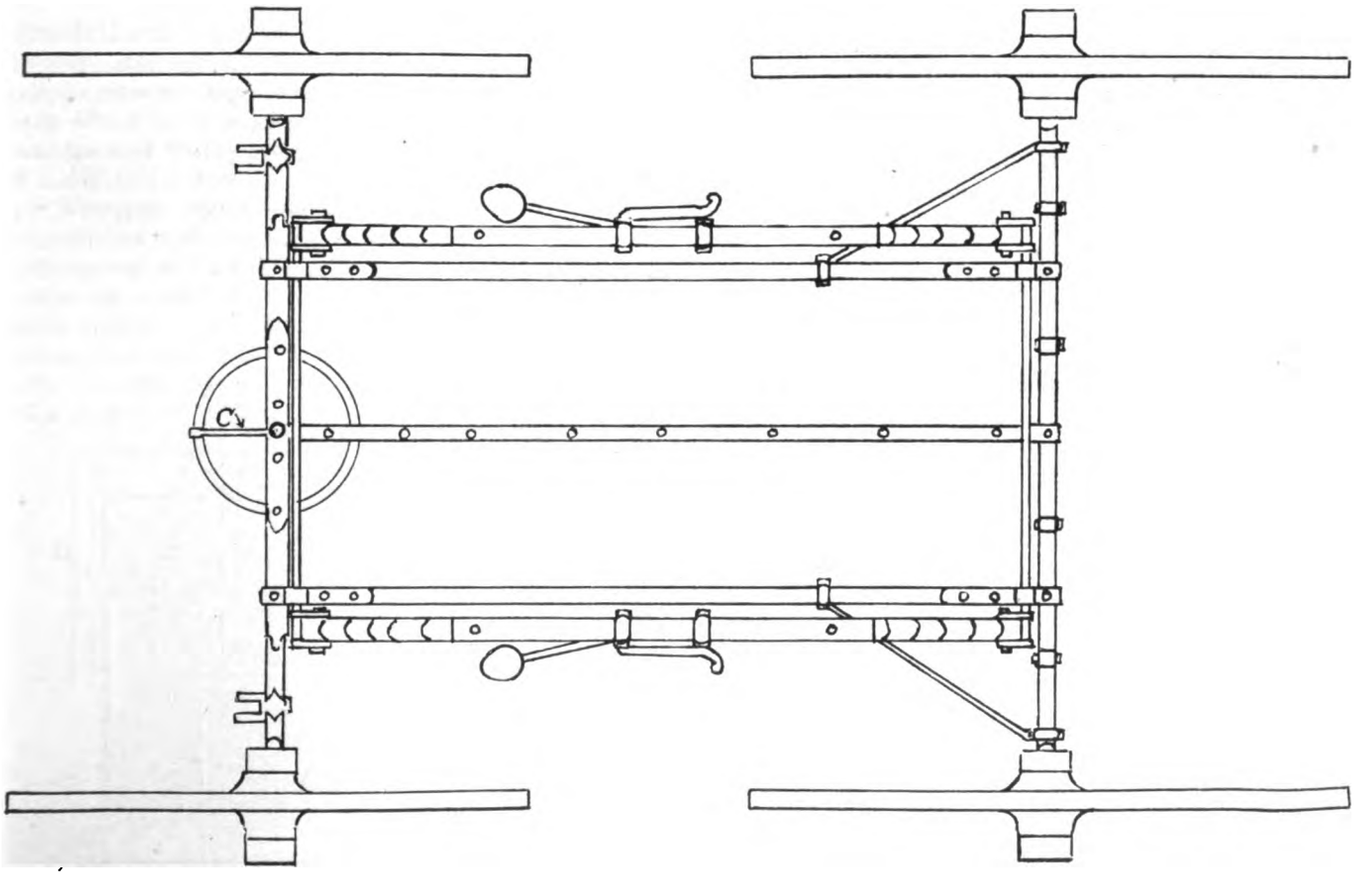


FIG. 4—SHOWING THE PLAN OF THE RUNNING GEAR OF THIS LIGHT VEHICLE

wheels. Bore holes in these pieces about 4 inches apart for the teeth, which I cut from the fingers of the bundle carrier. Secure the bars to the wheels by a hook bolt to the teeth on the wheels to prevent slipping. Now take two pieces of stock, 1½ by ½ and 24 inches long, and secure one end to the rear end of the sills, standing them vertically. Then secure the boxings for your beater shaft, so that the teeth will clear the bottom by about 4 inches. Take the second pitman shaft and place boxings for it at the extreme end of the sills and place two 8-tooth sprocket wheels near each sill. These wheels must carry a No. 55 chain, as nothing smaller will do. One of the canvas rollers placed at the front end, so that it may be moved backward or forward to tighten the conveyor, will work very satisfactorily.

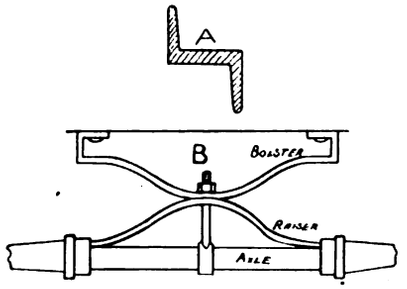


FIG. 1—FRONT AXLE OF MANURE SPREADER

The feed mechanism on my machine is made as follows: A large spur wheel, such as operates the binder head, is secured to the outer end of the conveyor shaft, while another wheel with a small pinion attached is fitted to mesh with this first. A ratchet is then fitted to the second wheel. The pitman crank, being left on the end of the beater shaft, is connected to operate a vertical bar. A slide is placed upon this with a rod connected to the ratchet, and as this slide is raised nearer the top a longer stroke is imparted to the ratchet, giving a higher rate of speed to the conveyor.

The power is transmitted in the following manner: An intermediate shaft is placed just back of the axle carrying the two ratchet wheels used on the binders, and the large master chain is placed on them and carried on an idler at the other end, the supporting arm being pivoted at the lower end and so arranged as to swing forward and drop the chains onto the sprocket of the master wheels. A large wheel is also keyed to this shaft and transfers the power to the left-hand end of the feeder shaft, the rear axle being only

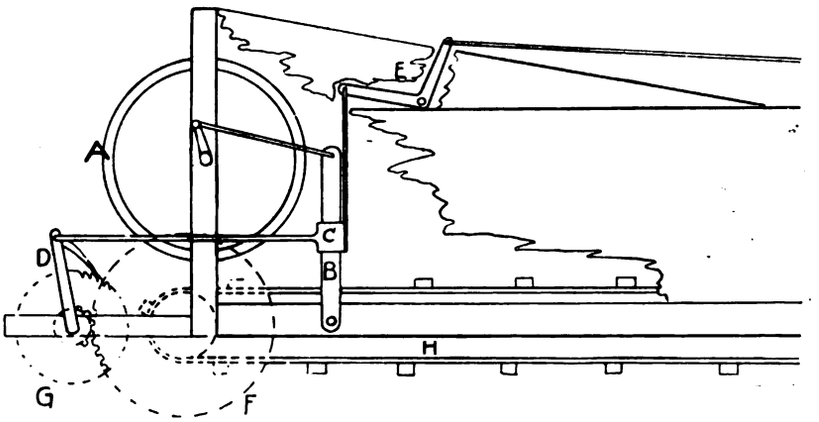


FIG. 2—DETAILS OF THE DELIVERY APPARATUS

1¼ inch will not be sufficiently strong to support the heavy loads, unless supported in some way to do this. I took some of the heavy framework and cut a bar the exact length of the axle and cut two pieces of angle iron 3 feet long, bolting to sill and box and standing upright. Across the top of these directly over the axle I bolted the heavy arm and placed a bar down to the point of the axle. This gives support to the axle on both sides of the wheel so it will carry almost any load.

In the engravings showing the details of construction, Fig. 2, A, is the beater shaft with crank and rod connections to bar B. The slide at C connects with ratchet at D. At E is a quadrant for raising or lowering the slide C to increase or decrease the speed of the conveyor. The large gear wheel F is attached to the conveyor shaft, while G is the pinion and ratchet wheel, and H shows a part of the conveyor and its construction. In Fig. 3 is shown the rear axle construction; A is the axle; B the truss rods; C the supplementary axle; DDDD the supporting bars, while EE are the rear wheels. In Fig. 4 is shown the arrangement for throwing the conveyor into or out of action; A represents master wheel with large sprocket; B, small ratchet sprocket; C, arm supporting idler D over which chain E runs; the rod F connects idler with lever at driver's seat and throws both drive chains on or off at one time. Dotted lines show position of chain and idler when in gear. The finished machine is shown in Fig. 5.

A Practical Spoke Puller.

BY A NEW ZEALANDER.

The accompanying engraving shows a very practical device for pulling spokes. A very powerful pull can be exerted on the spoke and few, if any, spokes will be found so tight as to be impossible of removal with this device. The device is adapted to slip over the end of the spoke and is provided with a clamp A by which it is made fast to the spoke. The opposite end of the device is a U-shaped piece B, the ends of the branches of which bear against the hub of the wheel. The piece B and the clamp A are connected by means of toggle levers which are operated by a handle C and a connecting yoke D. The yoke D is fulcrumed to the links E at their junction point, while the handle C is formed with two branches and fulcrumed to the links F. The head of the handle C is formed with

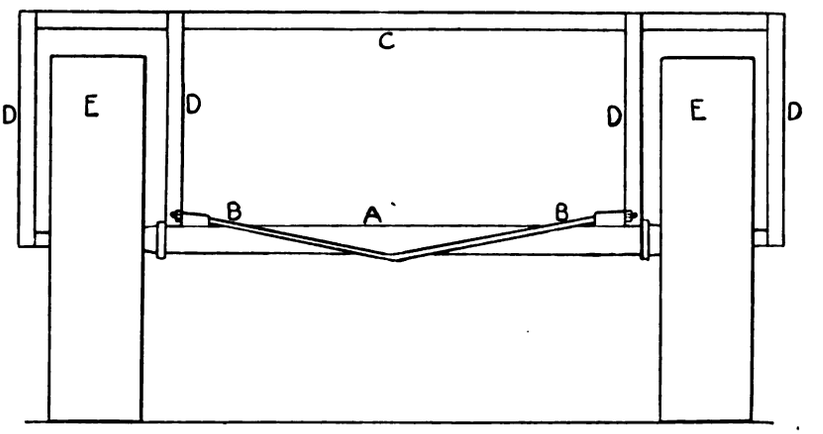


FIG. 3—SHOWING CONSTRUCTION TO STRENGTHEN REAR AXLE

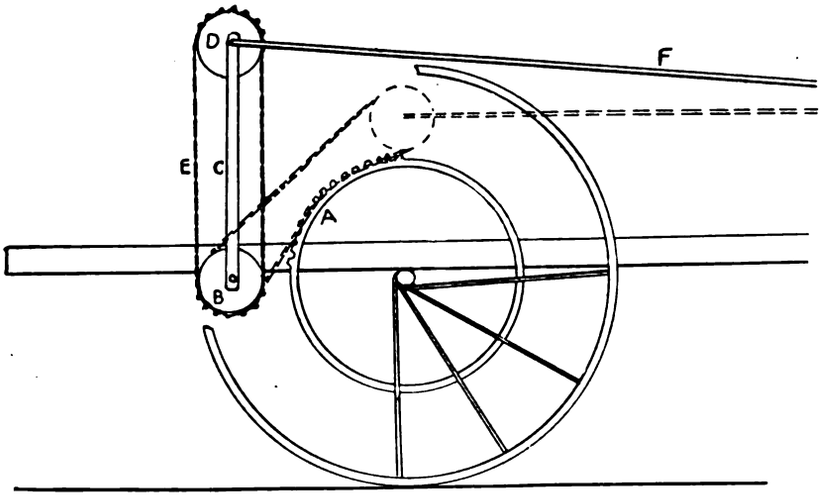


FIG. 4—SHOWING GEARING FOR THROWING CONVEYOR INTO AND OUT OF ACTION

a pair of angular extensions, which are connected to the free ends of the yoke D. It will be evident that when the handle C is pulled away from the hub of the wheel it will draw the toggle links F and E toward each other, as indicated by the dotted lines in the engraving. This serves to move the clamp A in a straight line away from the piece B and draw the spoke from the hub. The device can be applied to any spoke without interfering with the rest of the spokes.

How to Set Axles.

L. VAN DORIN.

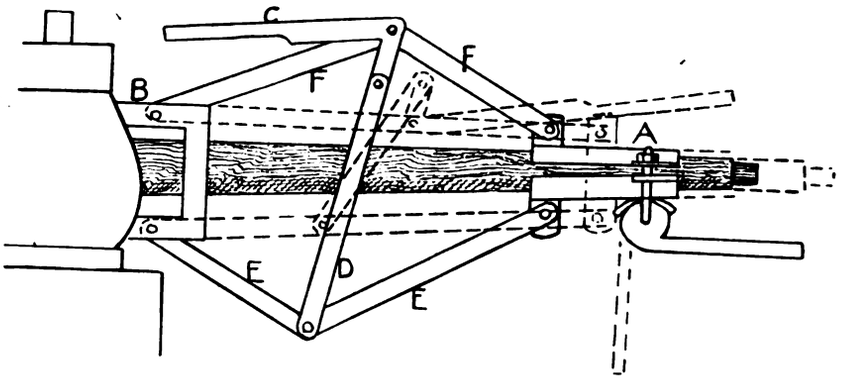
I will once more try to give my method of properly setting wagon axles, with engravings of the necessary appliances with which to do the trick. In Fig. 1 is shown an axle set; Fig. 2 is a board from which set is adjusted, and Fig. 3 is one part of axle to be set.

The first thing to do is to draw a chalk line, A, across board, at a distance from notch B in the corner of the board, the same as the length of the axle between the collars. Don't forget that the gage mark always represents the bottom of the axle. Then make chalk line C the length of the spindle from A. Now chalk mark D one-half the height of wheel from A, now measure up one-half the size of the axle above base (or gage) mark on line A and mark with sharp instrument. Then the same at D, to which add the amount of dish in the wheel and make another mark. Now with a straight edge placed at marks (in circles) on chalk lines A and D mark where it crosses chalk line C, which locates the center of the spindle at the point. Then from that point measure down half the size of the spindle at point which locates the bottom at the point, while the gage or base line (as intimated above) always represents bottom at collar.

Now adjust the set, so that end X of the movable cross piece at left will set in the notch at the left end of the board, while piece Y at the right hand should touch the base line at chalk line A and the mark representing bottom of spindle at point. If the set is adjusted as above described, while the cross piece X sets on the bottom of the axle near the collar and the piece Y fits the bottom of the opposite spindle, the wheel must necessarily stand on a plumb spoke.

I want to say right here this rule works the same on all axles, regardless of taper in spindles. One more thing I wish to impress on the minds of those not familiar with axle setting, and that is, the center of all spindles should set the same, regardless of the taper, but as we can't reach the center with a set we are forced to employ means by which we can locate it from the surface, hence the great mystery and difference of opinion about setting axles. Use the other side of the set for the back and the front of the axle, but give no gather.

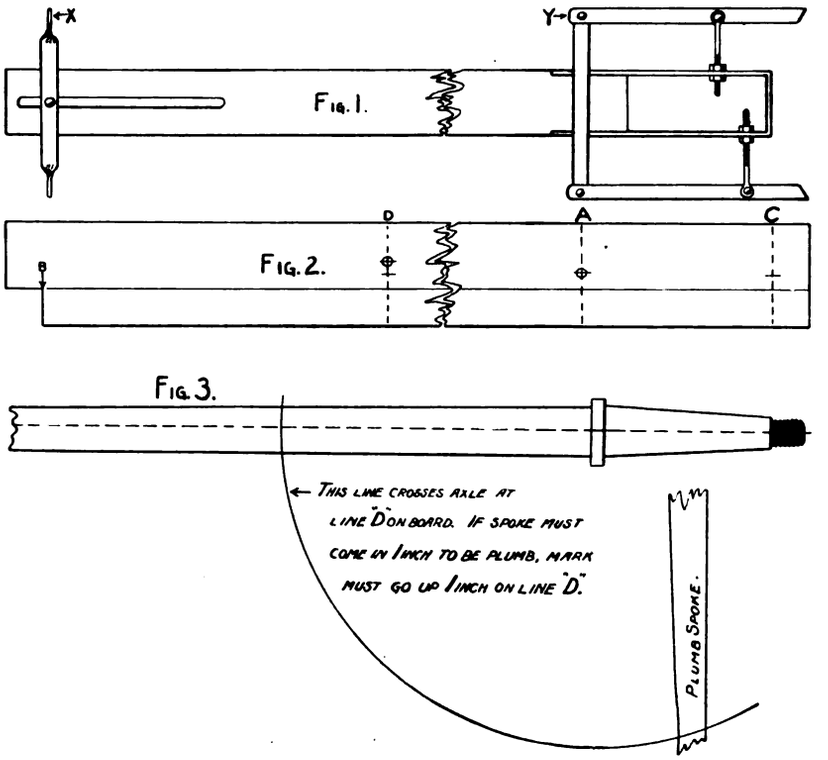
I think Fig. 3 will assist in enabling anyone to grasp the idea I have tried to make plain. While it looks or seems *so* simple to one who thoroughly understands it, it's hard for me to get it on paper, I fear, without its appearing ambiguous to some. However, I am not afraid to trust THE AMERICAN BLACKSMITH to make it so plain that a wayfaring man need not err therein. Yes, THE AMERICAN BLACKSMITH is a



A PRACTICAL AND EASILY MADE SPOKE PULLER



A PRACTICAL MANURE SPREADER BUILT FROM WASTE MATERIAL



THE SETTING OF THE AXLE IS EASY WHEN YOU KNOW HOW

great help to those trying to improve on what we know. Sorry your humble servant couldn't enjoy its influence when wrestling with the rudiments of blacksmithing.

Some Observations on Cold-Tire Setting.

JAMES BAIN,

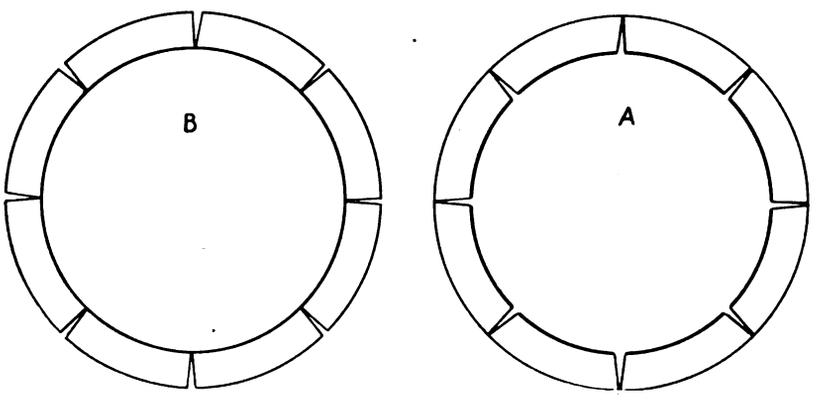
South Africa.

There has been a good deal of what might be termed "ink slinging" as well as good argument in "Our Paper" about the advantages of cold-tire setting over hot setting, but I have never read of any one bringing forward the matter of how to set a tire or wheel which has been put together with iron dowels at the felloe joints. Assuming that a wheel comes for repair with the spokes slightly loose at the nave or hub and not quite "up" at the felloes the putting of that wheel in the cold-tire setter will probably ruin it. As it is already rim-bound, and requires to have a piece cut out of the felloes, the latter may be open at the "chins," (not an uncommon trouble) so that every felloe should be rejointed to get the joints altered from A to B in the engraving.

I once saw a set of wheels in the condition I mention taken to one of the leading wagonmakers in Maritzburg. The wheels were put into that awful machine and crushed together and they were in a ruined condition after three weeks' use. The result was a threatened court case, which the wagonmaker averted by supplying a set of wheels at one-third the price. Here was an instance where the cold setting was a failure.

Another instance came before me shortly afterward when I saw a front wagon wheel have three new felloes put in. In this case the tire was not "true," and when the wheel came out of the machine part of the felloes projected three-quarters of an inch out from the edge of the tire. The machinist tried with a flatter to straighten or to set the felloes to the tire, with the result that two felloes split from end to end.

Had the tires, in the first instance, been removed, the wheels properly jointed and the tires reset there would have been an end to the trouble. In the second instance had the tire been put on red hot and the wheel screwed to a level bed the tire could have been hammered level and a good job done. Leading wagonmakers advertise "tires set while you wait," but the wheels are put into the machine without being jointed and are crushed tight—that is all. Can't see myself how a good job can be made without the wheel being rejointed and all loose spokes driven "home." Pardon me for making those observations, but am only quoting cases which came under my notice.



SOME OBSERVATIONS ON SETTING TIRES COLD

The Smithing Coal Problem.

C. W. METCALF.

According to my experience I say buy the Blosburg coal, which is the best smithing coal in the world. As to the best way to keep it, in sacks or in a bin, I will say keep it in a bin, by all means, and keep it so covered as to keep out all dirt, but not so tight as to prevent water from getting to it, for the water will add to it. Coal that gets light and turns into dust in about three to six weeks is known as slack. That will happen to all coal after being exposed to the air for a period of time, but of course some coal will crumble in less time than others, for the simple reason it hasn't the life in it to begin with.

Some few years ago I was working at a place where there was another smith who had come in about the same time that I did; the man in charge of the shop was an old blacksmith, or at least claimed to be. One morning we were building our fires for a big day's work, and our coal was dry and chaffy. We were sprinkling our fires with water and the boss remarked to a bystander "I wonder what them fools are pouring water on their fires for?" He finally came to me and asked me the reason, and I told him for several reasons. "The first reason," I said, "to

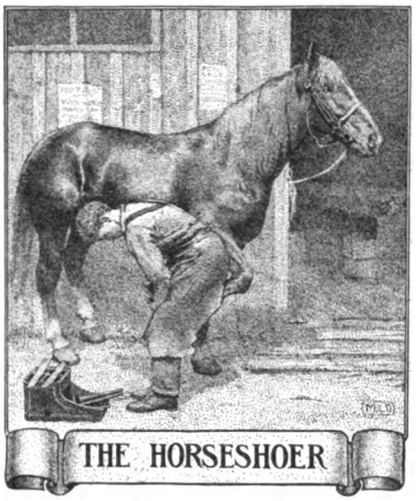


MASTER LAWRENCE CRASS, 12 YEARS OLD WHO 'TIS SAID CAN FORGE AND TURN SHOES BETTER THAN SOME OF THE OLD HANDS

get the sulphur out of the coal; the second, to make more heat; the third, to hold my fire in place; the fourth, to insure a clean fire; the fifth, to be positive of a perfect weld, sixth, to make the coal coke up nice and the seventh to get the smoke out of it." "Well, he said, "I never heard of such a thing."

That is where lots of smiths are lame. They will build up a fire, turn on the wind and shove in the iron, and if they get a heat, all right, and if not, all right, too. They never stop to consider or study the nature of a blacksmith's fire, and they don't know when they put an iron in the fire whether they are going to take out an iron or whether they will have anything to take out at all. The first thing an apprentice should learn, if he wants to succeed as a mechanic, is the nature of his fire and how to handle it, for a poor fire will result in poor work. Now don't misunderstand me, I don't intend to criticize any brother in particular, unless I know positively that he is wrong.

But I am overreaching the coal question. When you fill your coal box be sure and pick out all slate and rock and dead coal which will form into slag, for it is of no use. What I mean by "dead coal" is chunks of hard coal that have a dull and muddy color. There is more or less slag in it and it has no heat in it to speak of. It oftimes spoils a weld, and the smith doesn't understand what is wrong, and when he takes his iron from the fire it will sputter and sizzle, and when he puts the two pieces of iron together it won't stick any more than if the iron was cold. And if you will get a snuff of the steam that rises from the iron you can smell strong sulphur. Where did it come from? Why, it simply came from one of those dead and muddy-colored chunks of coal that should have been thrown out. You will need to clean out your fire before you can get a decent weld.



Pricking the foot when driving a nail is not always the result of ignorance or want of skill. More often than not it's the form and position of the nail holes that cause the nail to drive wrongly. Careful attention to the punching of the nail holes will prevent this trouble. H. S., New York.

'Tis well to know that exercise, regular dressing and running barefoot occasionally favor the growth of the horn. These, in connection with a moistening and softening agent, should be applied when the hoof becomes dry, hot and hard, or in any of the diseases of the feet resulting from dry, hard hoofs. G. H. W., Missouri.

Clips may cause lameness if not properly made and fitted. A clip should not pinch the foot. It should lie just tight enough against the wall to hold the shoe solidly. If possible to fasten your shoes without the aid of clips do so. Shoes can be fastened well without clips, and the practice is better for the health of the foot.

SHOER, Ohio.

When removing an old shoe don't wrench it as though it were a piece of boiler iron, Draw the shoe off carefully. How many times we see a shoer wrench and twist at the shoe until you'd almost expect to see the entire foot come off. Some shoers don't know that the inside structure of the foot is likely to be injured by the above methods. If the shoe is pulled off carefully it wont take any longer, and is not so likely to injure a ligament. Of course it is understood that clinches are carefully lifted before attempting to pull the shoe.

R. O. S., Connecticut.

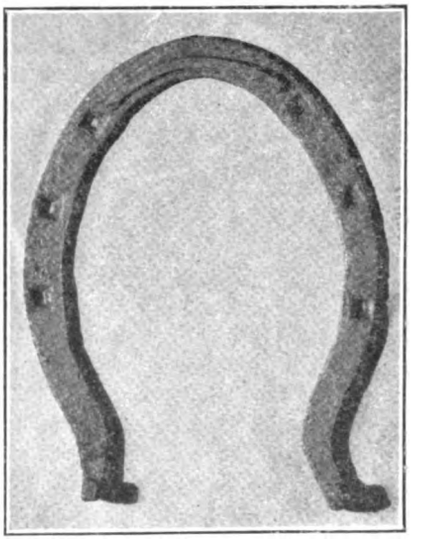
Shoeing Horses With Dropped Soles.

JOHN KEENAN.

I have had considerable success in treating this trouble, and it will no doubt interest others how I have shod these horses. I take a good wide-webbed shoe, concave the inside from $\frac{1}{8}$ to $\frac{1}{4}$ of an inch for a distance of about two inches from the heels around the toe. This keeps the bearing on the wall of the foot. Then I take a piece of iron about 2 or $2\frac{1}{2}$ by $\frac{1}{4}$ inch and weld it across the stock, after I have shaped it to the width of the foot. This piece is arched to fit the shape of the sole, and should clear the bottom of the sole, by about $\frac{1}{4}$ of an inch. This protects the tender part of the foot between the frog and the toe.

I generally punch an extra hole in each branch of the shoe toward the heel, as in most cases there is not a very good hold for a nail at the toe. I find that the longer the old, laminated toe is allowed to remain the longer it takes for the new, healthy wall to grow down. Therefore, I take the foot up in front and rasp off all the foot will stand. That is where most shoers make a mistake. They are afraid to touch this long toe for fear that they would have nothing to nail the shoe to.

I also cut the heel down as much as it will stand, as it grows rapidly when so diseased. I fit the shoe French or roller style, turning the toe up considerably, and never putting any calk there, as the horse only stumbles over



SHOE FORGED BY MASTER LAWRENCE CRASS



AN ADVERTISING SUGGESTION FOR AMERICAN BLACKSMITHS

it. If calks are wanted I put one on each side between the first and second nail holes, and good long block heels.

Sometimes, instead of welding the crossplate on, I drill and tap two ⅜-inch holes between the middle nail holes, after the shoe is fitted. Then I cut a piece of ⅛-inch sheet steel to fit inside between the creases in the shoe, and fit two ⅜-inch tap and screw bolts, about ⅜-inch long. The bolt heads serve as calks, and then I also drill and fit two in the heels.

How I Treat Toe Cracks.

A. R. PACE.

A doctor rode up to my shop some time ago and called me out and said he would give twenty-five dollars if I would cure his mare of toe cracks. The crack was open from toe to hair on her front feet. I trimmed her feet, made a shoe to fit the foot and turned two strong clips between the first and second nail holes. Now the shoe fitted the foot, but I heated the shoe and began to widen it at the second nail from the toe and made the shoe three quarters of an inch wide at the calks. After fitting the shoe accurately around the toe, filing a good bearing for the clips to rest against and leaving the shoe three-quarters inch wide at the calks, I put the shoe on the foot by driving the four front nails and clinching down good. I then hammered the clips solidly to the wall of the foot and then closed the shoe on the foot until it fitted at the calks. Then I drove and clinched the four back nails. This closes the crack at the toe and prevents it from working. In about twelve months the new wall grew on, but it had no crack in it. This vice-like grip at the toe has more tendency to widen the wall at heel than it does to contract it. I closed the shoe by holding a sledge to the shoe and hitting the opposite edge of shoe with hand hammer, but presently I used a screw clamp.

An Advertising Stunt.

GEORGE DASH.

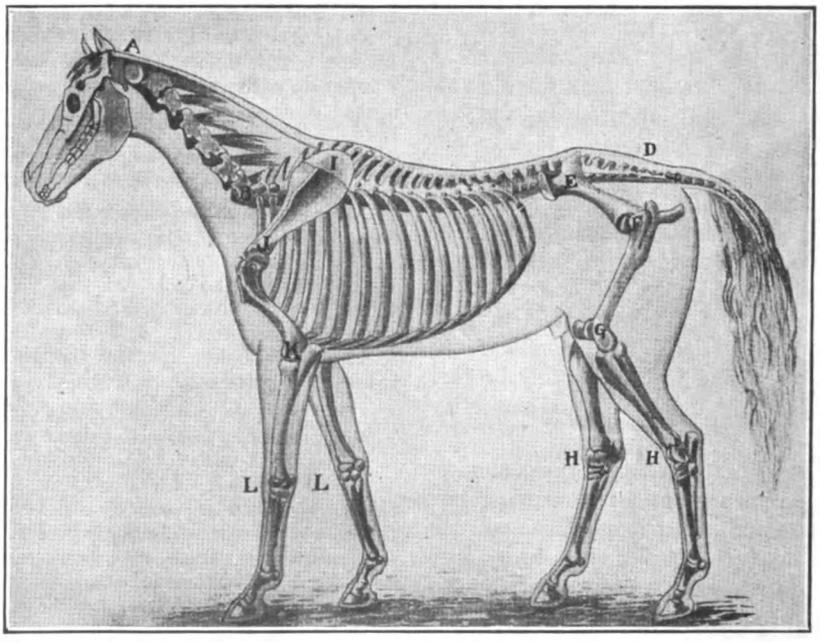
In New Zealand it is very common to use "wheeled huts" or large covered vans in the agricultural districts. These vans accompany the traveling chaff-cutting outfits or the grain-threshing machines, and are also used by plowmen and other farm workers employed at out stations. The writer conceived the idea of advertising on these wheeled huts, and herewith is reproduced a photograph of one of the huts that travels many miles in this district each year. There is a gleam of humor in the treatment the artist has given to the animal and the message. This may also contain a suggestion for American brothers.

The Muscles of the Horse.

A. F. LIBBEY.

In the last sixty-four years the trotting horse has gradually lowered its speed mark. It might be of interest to have the names of such horses that were first to lower the records. On October 13, 1845, Lady Suffolk lowered the 2.30 mark to 2.29½. In 1859, Flora Temple, 2.20 to 2.19¾. Later, Maud S. lowered the 2.10 mark to 2.08¾, and within a few years Lou Dillon was driven a mile in 1.58½.

When we stop and think that a two-minute horse is driven forty-four feet per second, we should consider what a strain there is on the deep-seated body muscles in which the power lies. The skeleton or framework must first be considered. The structure on which we build is the spine or vertebræ. This is divided into five sections: The cervical for the neck; the eighteen dorsal for the ribs; (the fourteenth marked C is the center of the body). The lumbar support the loins; the sacral for the sacram, and the coccygeal, which decrease in size, form the tail. The vertebræ have two anterior and two posterior supports:



THE SKELETON OR FRAME WORK OF THE HORSE

the scapular J and the humeras K. The radior and ulna extend to the knee, L, and as far as the muscles extend. The bones of the hind parts are the same in number, with the exception of the patella at G, which does not show in the engraving.

The muscles of the body furnish the power and the animal heat. They should have the power to contract one-third of their length. Thus, if a muscle is fifteen inches long it should contract five inches when in use.

Parts of the body are controlled by four different muscles, abductors, adductors, flexors and extensors. The abductors draw the parts outward; adductors draw inward; extensors forward, and the flexors backward.

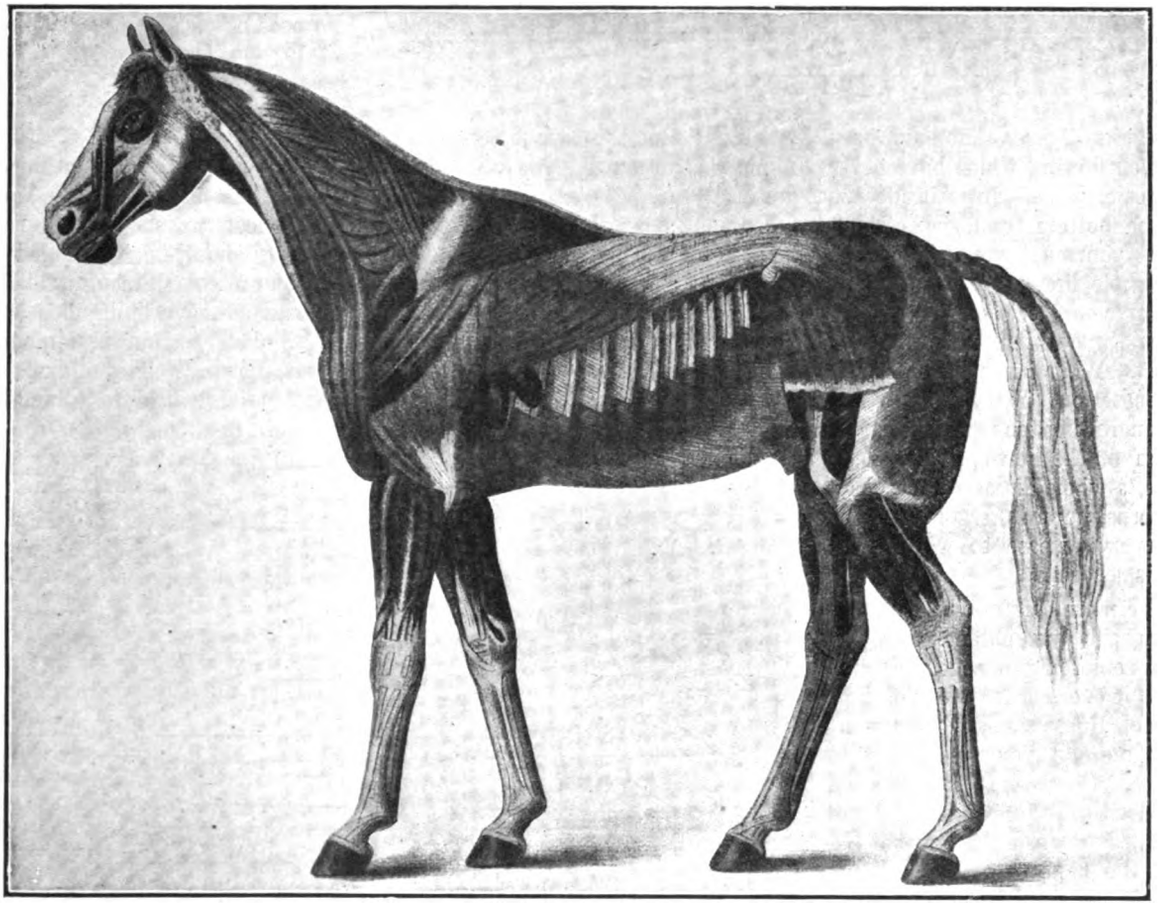
On each side of the vertebræ we have a muscle which extends from B to D. It fills the space on each side of the spine and is called the iliospinolis. It is enclosed in a membrane which is closely connected to the vertebræ. The use of this muscle is to bind the different sections of the back together. From A to the withers we have the ligamentum nucha. This is an elastic ligament and largely supports the head.

On the inside of the shoulder blade, near I, we have a large, heavy muscle which spreads fan shape and is attached to the first eight ribs. It is a flexor muscle to those of the neck.

Between E and F and attached to G about one third of the way up we have a large muscle twenty-six inches long and weighing about sixteen pounds in a horse of twelve hundred pounds. This muscle is fastened to the lumbar and sacrum sections of the spine. On these two muscles the speed of the horse depend largely. The muscles to the perferands and perforated tendon run parallel with each other and are attached to the bone at G, the perferands at the joint, the perforated muscle about two and a half inches up on the bone.

We have many smaller muscles which are of assistance to these which we have mentioned, but which would only confuse the reader. Outside of these muscles we have long, thin muscles which bind the different parts together and greatly strengthen the body.

We can see enough from these cuts to understand the necessity of having the foot properly balanced. And too much importance cannot be attached to the necessity of balancing the horse's feet properly.

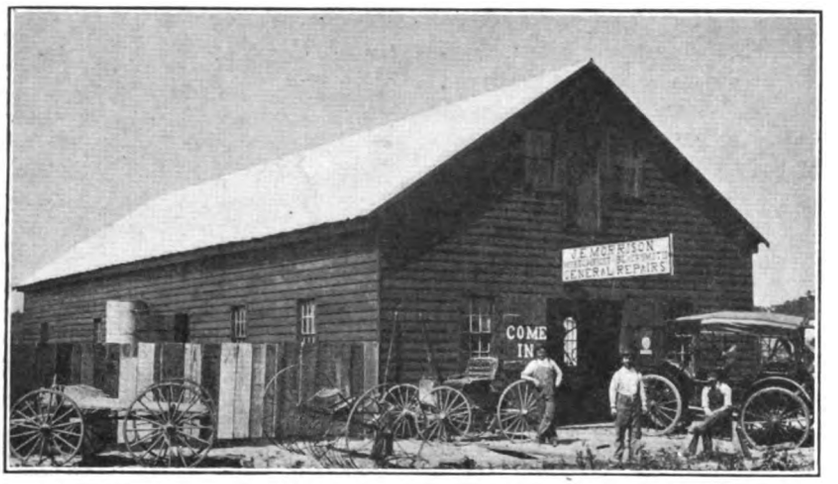


THE MUSCLES OF THE BODY FURNISH THE POWER

A Talk on Shoeing and Handling Horses.

L. E. PHIFER.

Many men think that when they can drive a number twelve fencing nail through a two-inch white pine board that then they have become professional horseshoers. They should be compelled to study the anatomy of the horse's leg from the knee to the very bottom of the horse's foot. They ought to know this perfectly; so they know the names of all the bones, the location of each, why they are there and what work each one performs. And then right here is where the common-sense part comes in. Place yourself in the position of the horse, if you were bow-legged how would you have your own shoes made for your comfort and ease in your daily walks? Then, if you have corns, of course you don't want any pressure on them, do you? Neither does the horse. If you get yourself balanced correctly, then you can travel with more ease and make better time. So can the horse, if he has his feet trimmed level and shoes made to fit



A WELL EQUIPPED SOUTH CAROLINA SHOP

him. There are horses that have been shod all their lifetime which have never had the scale, which grows inside the hoof in the bottom, removed. Think how you yourself, would like this. Living a whole life without your nails trimmed or your feet washed, which means the same thing as paring the horse's foot. What have you contracted in this transaction? You can readily see you have ingrowing toe nails (similar to contraction of the horse's foot). You have more, a whole diseased foot. You develop corns, bunions, swollen ankles, in fact every disease to which this anatomy is subject.

Let us be more careful and see if we cannot improve over old methods and bring out something beneficial in the new. Has it ever occurred to you how to cure an obstinate case of contraction? If not, let me give you my experience and advice. Do I put the shoe on and spread with the tongs? Not much! I am not as unreasonable as that. I first pare the hoof as short as I can get it, especially at the heels. Then I make my shoe wider than the hoof, not to go to extremes, and commence driving the nails at the toe, first on one side, then the other. For instance, I drive the toe nail at the right, then the left, and one nail at a time until the shoe is on. Then use pine tar.

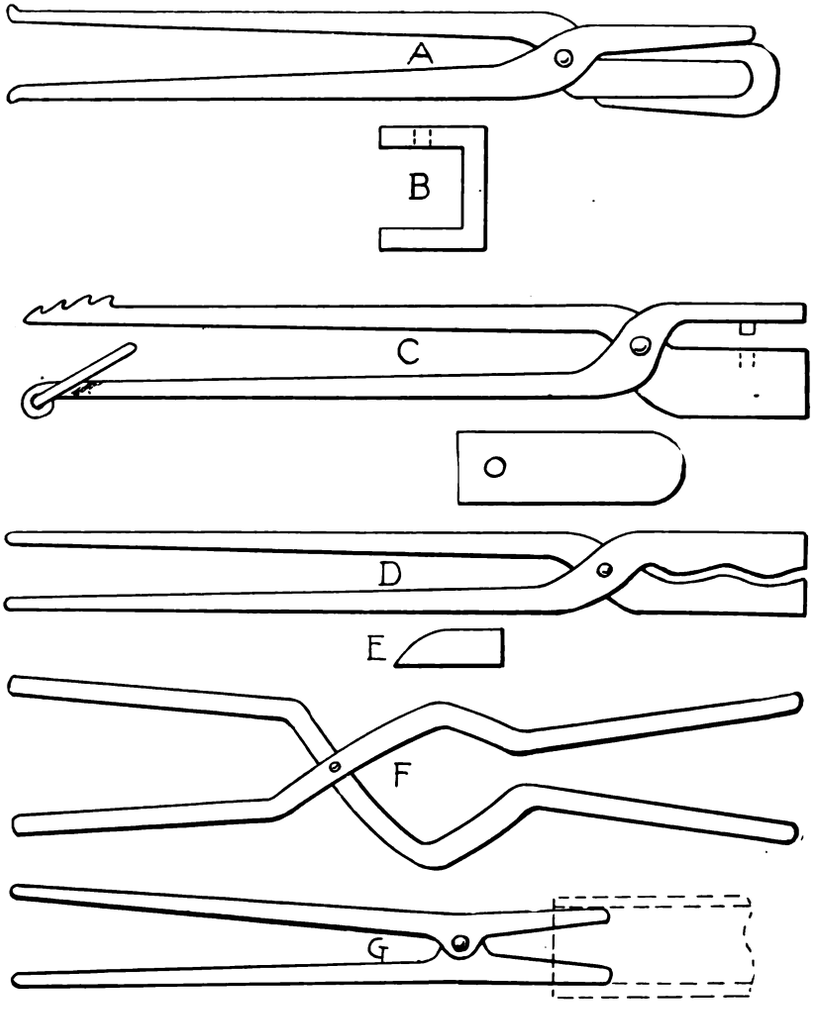
In the handling of horses the first law to be observed is patience. The next is quiet, especially of the tongue. Isn't it peculiar how these qualities can conquer the most vicious horses? You know what patience means, so let us study the word "quiet" for a while. First we will quote from James, third chapter, seventh and eighth verses. "For every kind of beasts and of birds and of serpents and of things in the sea is tamed and hath been tamed of mankind: But the tongue can no man tame, it is an unruly evil, full of deadly poison."

Do you know, of every case where I have heard of horseshoers getting hurt it was by neglect. Why is this? you ask. Simply this, as long as you have your mind on the horse you are shoeing you will never get hurt or crippled. But, as long as a conversation is going on between the shoer and others there is danger even in the gentlest ones becoming fractious. When I shoe a horse I never talk to anyone but the horse. I will not have anyone at the horse's head who cannot keep his mind on the horse while I nail two or four shoes on him. I find that most of the mean horses are made so by the shoer himself or the owner. I always go to the horse's head and say "whoa," once or twice, real sharp, and that is all they hear from me until the shoes are on. I have never shod a horse under the rope or in the swing, as yet, and there is no need of it.

A Well-Equipped Power Shop of South Carolina.

J. E. MORRISON.

I have been in the smithing business for the last fifteen years. Three years ago I lost my shop by fire and, after looking about, finally settled where I am at present. Since establishing myself here I have built up a large business. This section is famous for its great, flowing wells, and naturally presents a large field for plumbing work,



PRACTICAL TOOLS ENABLE THE SMITH TO DO WORK QUICKLY

which I am pushing. We have a Sebastian 15-inch engine lathe, a Macgowan & Finnigan power hammer, a jig saw, a power forge, an 8-horse-power gasoline engine, also a 2-horse-power gasoline engine, a Green River power drill, a rip saw and all other necessary tools.

How to Make Staples and Small Forgings in Quantity.

BERT HILLYER.

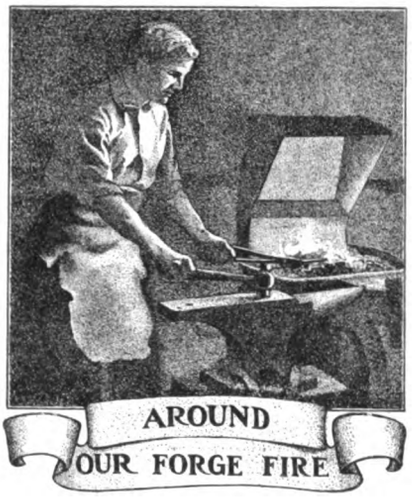
At one time I had a large number of staples to make and found this tool (see A in engraving) quite handy. It is a pair of tongs with one jaw made the exact shape of the inside of the staple, the top jaw holding the stock in place, while it is being hammered round. Another time I had a number of pieces like B to make with a ½-inch hole a certain distance from the inside corner. To make them quickly they were punched and sheared with one blow with the tool described in another article and then they were bent in tongs as shown at C. The pin was forged in the upper jaw and went through the hole in the plate and held it securely, and when bent down it was the correct distance from the edge.

Another time I had a quantity of small springs to make of 1 by ⅛-inch steel. I shaped them in tongs as shown at D. All I had to do was to open the tongs, put the straight piece in hot, shut tongs tight and then open them and let the spring drop out all ready for tempering.

Any medium sized tongs can be made very quickly under a steam hammer. Take a piece of 1 by 2-inch iron and knock down one edge beveling it as at E. Now lay on die of hammer, sharp edge in front of you and take two pieces of iron the right size to make the tongs and heat them both at once. then take one in each hand and place both pieces far enough over the 1 by 2-inch piece to make the reins. Hold them at a slight angle to the left and let hammer hit them one or two blows to flatten out place where rivet goes. Then turn the two pieces upward to the right and pull them away from the 1 by 2-inch piece for about 1¼ inches and hit another blow or two with hammer. Now draw out reins and cut off.

A good many blacksmiths might think it is a hard thing to draw out both handles of a pair of tongs at the same time under a steam hammer, but you will find it easy after you make the first pair, and both pieces will be alike and come in very good when you are in a hurry. I have taken two pieces of round iron and have drawn one out hexagonal and the other octagonal, but it kept me busy all the time, but on small, straight work in which two or more pieces are alike it is easy.

Another pair of tongs to hold big, bulky stock that you want to upset under the hammer is made as at F. These tongs are made with handles on each end, and are made for two men. They can be used for carrying anything heavy with one end up, the piece to be gripped with the middle of the tongs. Another pair of tongs made for holding short pieces of pipe that have a threaded end are shown at G. The jaws go inside of the pipe to hold it, as they are so fitted that by closing the handles the jaws spread out inside of pipe. The jaws are not crossed, and so work the reverse of other tongs.



"Well, Benton, you are just the man I am looking for," said the Editor, as the man of receipts dropped into his favorite chair. "I've got a batch of questions here that have been waiting for you."

"All right, Mr. Editor," returned Benton, lighting a cigar and opening his book of receipts. "Fire away. I am prepared for most anything."

The Editor took up a pile of letters from his desk and said: "Here's a letter from a man in Pennsylvania who wants to make a cheap metal polish that, besides being cheap, is also good."

"Why, I just came across one the other day that I think will just suit your man. I was down to see Tom Hughes and discovered him burning some oyster shells in the fire. Tom is a peculiar sort, so I just watched to see what he was going to do with them. After burning them in the forge for perhaps twenty minutes he put them into an old iron pot, and with an old potato-masher pounded them up as fine as he could. Then he got out a mortar such as chemists use, and he ground a small quantity in this until the shells were almost to a powder. He continued grinding in the mortar until he had filled a medium sized bottle. When I asked him what it was he said that the powder in the bottle was the best metal polish he had ever used."

"I guess that will fill this man's requirements." said the Editor. "I suppose one can get the shells for nothing and then practically the only cost is the little time and labor."

"I saw some of the powder used on a brass plate," continued Benton, "and it certainly did its work in fine style."

"This next man wants to know how to fasten tools in their handles. He says he is continually bothered by having his tools come out of their sockets."

Benton turned over the leaves of his notebook for several seconds and finally said: "Here's a cement that is recommended as very good for holding tools in their handles. It consists of a mixture made of 4 parts of black rosin and 1 part each of real fine brick dust and beeswax. This, it is said, will hold the handles and tools together strongly."

The Editor then picked up the next letter. "Here's a request that I think will keep you hunting for a reply. It is somewhat out of the ordinary, yet a receipt which would naturally prove quite useful and valuable to the blacksmith. This man wants to know of a good covering for burns that will not make a bandage a necessity. He says a bandage is unhandy, and yet it is necessary to keep a burn clean. If you've got a receipt covering those specifications I think you will do the craft some real good by telling about it."

Benton looked through his receipt book in silence for some time, and finally announced: "Here we have it—just the thing you want. This is not affected by water, requires no bandage and is practically a skin-like dressing or covering for the wound. Take one part gun cotton and dissolve it in 20 parts of sulphuric ether, then dissolve 1 part Venice turpentine in the same and bottle in a tightly stoppered bottle. This is excellent and is probably the very thing wanted."

"I'm quite surprised," returned the Editor. "I really did not suppose you had anything along that line. Now, I wonder —" but just then Will Reid came in.

"Hello, folks!" exclaimed the newcomer. "How are you?" But before either Benton or the Editor could reply, Reid continued: "I want to get a good fire-clay mixture. Can either of you gentlemen give me something on the subject?"

"I think Benton can help you, Will. I've been questioning him and I guess your request can be filled easily."

"Here's just the thing for you," put in Benton. "Take 10 parts of fire clay, 9 parts of pulverized fire brick and 1 part of clean, sharp sand. Mix thoroughly and then moisten and knead into a thick paste. This will stand a very high heat, and after being thoroughly pounded into place should be burned dry."

"I guess that is just the thing I want," said Reid. "I'll try that out and let you know how it works," and with a nod of thanks Reid went out.

"Keep a' Hammerin'"!

W. O. B.

Thur wus a chap down Bingville way
Who run a shop so small, they say
No bigger 'n yer hat.
He was a most pe-culiar cuss,
An' seemed to leave the talk an' fuss
To me, an' Sam, an' Mat.
He'd hammer early, hammer late,
An' make a bolt er iron gate,
An' ef y' ast him what he did,
He'd smile, an' say, an' touch his lid:
"I—keep a' hammerin'."

Thur are some smiths, y' must admit
Thet seldom work, they'd ruther sit
Aroun' the stove an' chat.
But this here chap I tell about
When he'd no work, was on the scout
Fer more—jes' think o' that!
His work was good, his price was, too,
He'd fix up things t' look like new.
An' when he built the shed behind
He smiled a smile, a funny kind,
and—kept a' hammerin'.

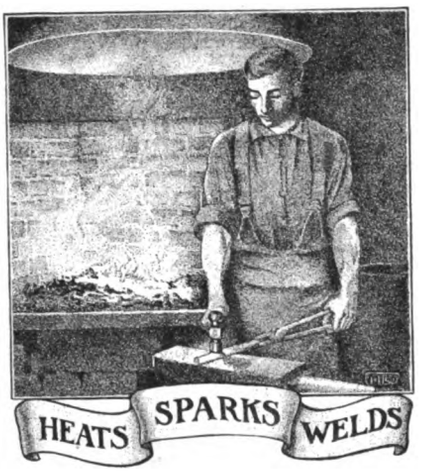
An' gradual-like, he added on
To thet ole shop, till, why, doggon—
He had a place es big
Es any shop in this here state,
Er in the county 't any rate.
An' then he bo't a rig.
He never used it, I could see,
'Cept on Sundays, an' then, by Gee,
He'd drive ter church an' Sunday School,
An' all he'd say, like some ole fool,
was—"keep a' hammerin'."

Then shortly arter las' year's crop,
He built the fines' kind o' shop
Thet ever was built, I bet.
'Twas made o' this here new concrete,
It looks like stone, an 's hard t' beat.
Thet shop wus t' fines' yet.
An' then one day I says t' him:
"Where'd y' get yer money, Jim?"
But he jes' smiled, an' scratched his he'd,
An' smiled sum more, an' then he sed:
"I—keep a' hammerin'."

Jed Thurber says—an' he can tell—
Thet thurs a moral, "best heed it well,"
In this here bit o' ryme.
When y'er a'tryin' hard an' 't seems
Thet nachure's de'd agin' yer schemes,
An' busts 'em every time,
Jes' think o' this ole funny cuss—
T'aint much bad, but 't mite be wuss—
An' then take off yer coat an' say
In eny ole kind of smilin' way,
"I'll—keep a' hammerin'."

ENVOY.

Keep a' hammerin'
When the day is blue,
An' when the day is bright.
Keep a' hammerin'
In the mornin' dew,
An' in the de'd o'nite.
Don't y' ever hesitate
Ner fer some one else await.
Jes' y' keep a' hammerin' hard
Till y've won success, ole pard.
Jes' keep on a' hammerin'.



TO EVERY ONE OF "OUR FOLKS" a Very Happy and Prosperous 1910. May each day find you with a larger store of this world's goods.

If you forget, you'll regret. Send in your subscription right now. Write now.

Do you think prices will raise themselves? Better get in touch with the Secretary today. The cost of supplies is not diminishing.

Ask our book department to help you if you want to improve your knowledge along any particular lines. Write right now.

Always open for new ideas are these columns. Don't forget your brother craftsmen when you "get next" to a new kink.

It's our business to help our readers, and when puzzled over any shop problem tell your trouble to us. We'll help you if anybody can.

The real craftsman gets good tools in the first place, takes care of them in the second place, and then keeps them in place when not in use.

Cold weather doesn't chill the business-pushing ability of the business smith; it but makes his body tingle and glow with renewed energy.

Get him to subscribe to "Our Journal," and start your neighbor on the road to a real Happy and Prosperous New Year. Get his order today.

They mean money in your pocket—the long-time rates do—and you can better take advantage of them than not. If you don't know about them, ask.

Uncle Billy Martin says: "A half hour o' cussin' the day arter New Year an' a wish ain't goin' to bust no habit what's had hold o' you for five or ten years."

Nothing is done so well but it might be better, nor so badly but it might be worse. Better to be guided by the first part of this maxim than by the latter part.

A big belt for transmitting power was recently completed in Philadelphia. This immense belt is 3-ply, 150 feet long by 5 feet wide, and required 300 hides.

A grinding wheel is affected by its treatment. Don't condemn a wheel without studying the grinding problem that is placed before it. The wheel may be just right.

Comparisons are always good and generally interesting. Compare this issue with a year ago and let us know your opinion. We say we're better than ever—what say you?

Lots easier is the smith's lot these days. Modern tools and machines have made it so. Are you still using your grandaddy's methods? Better switch before you're a grandaddy.

Clip horses—it's a good side-line, pays well, and if you get a clipping machine right now you'll have a good trade worked up before your competitor wakes up to the opportunity.

Sixty thousand horses is said to be the shoeing record of Mr. J. F. Cox, a Massachusetts veteran of 63 years. He has seen 54 years of active service in the craft and claims to have shod that number of animals.

Who is caring for the automobiles in your section? You are entitled to this chance for extra profits and can easily get the business if you'll try for it. Read our "horseless department," and increase your profits.

It isn't *necessary* to offend a customer when you approach him with a bill that is due. Go at it then in the right way. A bill paid when due never gets to be an old account, and the older an account, the harder to collect it.

Did you ever see a quack medicine, a fake gold mine or other questionable advertisement in this journal? No, Sir! you never did and you never will. THE AMERICAN BLACKSMITH is published in the interests of the craft. We protect "Our Folks."

A novel scheme for advertising the shop was used by a Pennsylvania smith. He inaugurated a potato contest among the farmers, and to the farmer bringing the six largest potatoes to his shop he gave as a prize one complete shoeing, with four new shoes.

Competitor worry you? Push with all your might and energy for more business, and then you'll keep so busy attending to your own business that you'll not have time to watch your competitor. And if you pay no attention to him he can't worry you.

The largest wagon wheels ever made, 'tis said, have just been finished by a Washington State shop, for use in Nome, Alaska. The wheels are 12 feet high and weigh 3,500 pounds each. They are of fir, with the exception of the tire, which is, naturally, of iron, and is 14 inches wide by ⅝ of an inch thick. The tire is really made up of two separate tires, each 7 inches wide. There are 20 spokes to each wheel and each spoke is 9 inches wide by 5 inches thick. The felloes are about 40 feet in circumference, 7½ inches thick and 14 inches wide.

Mrs. Tardy wanted Tom to invest in some new shop equipment when Tom was left a neat sum by his uncle. But Tom said: "Ain't any money in smithin'," and then he sent $500 to a New York company for shares in a new-fangled invention. When we suggested that he ask a banker about the stock he found that the nicely printed certificates were good for nothing but starting the fire. Tom doesn't know that it's far better to put money in shop tools, where you can watch it, than into the hands of strangers, who will promise anything under heaven to get it.

American Association of Blacksmiths and Horseshoers.

To those craftsmen who will learn of The American Association of Blacksmiths and Horseshoers for the first time through this issue a word of explanation is due.

There are many reasons why every competent blacksmith, wheelwright and horseshoer should band himself with his fellow craftsmen in an association for mutual interests and proper prices, and so few reasons why any man can afford to stay out, that no smith who has his own interest at heart should pass by an opportuinty for securing the benefits thus proposed.

Organization is the order of the day and, with living expenses and cost of stock as high as they now are, coöperation becomes almost absolutely necessary, if the smith wishes to make a reasonable living for himself and his family. Isn't this so?

In the first place, it has been shown and positively proven that a successful working association can be formed which absolutely will prevent price-cutting. Such an association means dollars in your pocket if you are a member. It is most evidently to your interest to support and join.

Do not think you will get more work from your customers because you do it cheaper. A set of shoes which you will put on for a dollar or less will wear as long as a set for which you get one dollar and a quarter, and no one would drive his horse barefooted because it costs twenty-five cents more to get it shod.

Don't be afraid that your trade will leave you. You are the next man's neighbor, and he will join if you do. If the price is uniform your *skill* will hold your trade. It is often said that when a blacksmith cuts prices he admits that he is not as skilled as his brother smith. A good mechanic will always get his share of the work at a reasonable price.

Would you rather have five dollars for shoeing five horses or six dollars for the same work? You may think that you will lose some of your trade, but your customers will not leave if they have to pay the same prices elsewhere. The object of the Association is to get a uniform scale of prices throughout the county.

Figure out how many horses there are in the county and how many times they are shod. If prices are raised five cents a shoe, how many thousands of dollars more would that mean to the shoers of the county? Figure it out! Will you do your part and share in the increased profit?

Even supposing that you did lose one fifth of your trade, which is not likely, you will still get the same amount of money for less work and save one out of every five sets of shoes, to say nothing of time, nails and coal. Wouldn't you rather have six dollars for shoeing five horses than six dollars for shoeing six?

Don't you think that the cost of your stock and material is somewhat exorbitant? Is it not reasonable to suppose that a dealer will make a better price if a county or several of them as a whole ask for better prices on stock? This is a benefit which can probably be obtained, and which none but members of the Association will participate in.

We are confident that you recognize the great advantages of coöperation and organization for mutual interests, and that you will not hesitate to take advantage of the opportunity for organizing.

But you can't reap the benefits of organization by sitting in the shop and blowing smoke pictures of what an Association can do. It requires prompt action and work—and to help you is the object of The American Association of Blacksmiths and Horseshoers. Just address a postal to The Secretary, P. O. Box 974, Buffalo, N. Y., and by return mail you will receive my easy plans for the formation of a branch Association. But get these plans today—write, right now.

THE SECRETARY.

Building Business—2.

W. O. B.

System.

System is as necessary to the proper management of a smithing business as it is to the proper administration of larger businesses. Much has been written and said by experts and others concerning system in business; but, generally speaking, the system habit has not taken hold in the smith shop. Of course there are many smith shops that are operated in a systematic manner; they are the exception rather than the rule.

The reason for this lack of system may be ascribed to the usual small beginnings of a smithing business. When the shop owner is alone in the shop he can, of course, care for all business simply and easily. But as the business grows and the shop is enlarged help is hired, and the management should receive more careful consideration.

It is, of course, impossible to lay down a system or plan that can be applied in every case, but a few suggestions will not come amiss. In the first place know your costs. Have a simple way of tabulating these so you know where your stand. Profits are based on costs, and if you don't know your costs you can't know your profits.

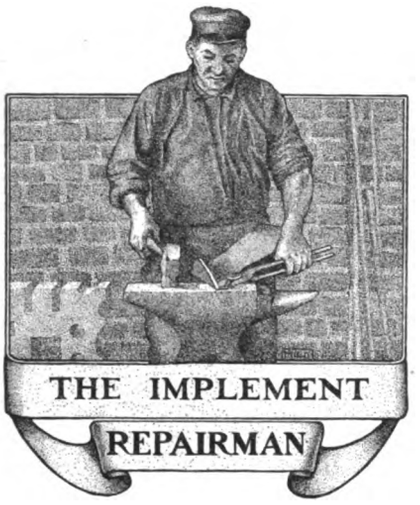
Then have a plan of caring for customers' accounts so that you can tell at a moment's notice just what anyone owes. You can't take care of accounts with a piece of wrapping paper and the nub end of a pencil. The spindle-pin system is out of date and unreliable, and when you have your accounts in business shape all the time you'll have no trouble in billing your customers regularly and when they should be billed.

Card systems are very efficient, and they are not expensive. You can install one and allow it to grow up with your business. A card system is especially suited for working into a blacksmith business, and there is no excuse for the slip-shod systems sometimes found in the smith shop.

Every job that goes through the shop should bear a card upon which each workman should enter the time spent on that particular work. He should tell what material was used and everything else that has a bearing on the profit end of the business. Every bit of work turned out of the shop should carry a certain percentage of the rent or taxes, fuel, light, insurance and other expenses.

But no matter what your system is see that it is not "red tape." See that it is free from time-killing, profit-eating detail. Make it just as simple as possible, consistent with thoroughness. Don't have it working to perfection in the woodshop while the paint-shop is allowed to treat it indifferently. Have it working uniformly all over your establishment, so that if one department is absorbing the profits of another you'll know it, and can remedy the leaks. You'll not be puzzled about the leaks if you have a good system. Keep track of every job from the time it comes in to the time it is delivered to the customer. Know where you stand in every department of your business. And if you know your business as you should

you'll not go far astray at the profit end—and you can't build a business without profit.



To remove the old sections in a sickle bar don't attempt to punch each rivet separately, but place the bar in the vise with the back up, the side bars of the sickle resting on the jaws of the vise. Now strike the backs of the sections, and they will shear off the rivet and drop out.

T. I. R., Ontario.

Never fail to heat the box before pouring the babbit. It not only helps the flow of metal, but it dries the box thoroughly before the hot metal is poured, and thus prevents the possibility of a blow-out or explosion, caused by the moisture turning to steam. Don't run any chances, or you may never be able to pour another box.

BABBIT, Texas.

How to Do Nickle-Silver Plating.

A READER.

The winter months are now here, and the work in the shop allows the smith time to take up other work. Here is one job I started during the dull winter months, and have done considerable work, in fact making as high as three dollars on some days. I do what is called nickle-silver plating on small articles, such as knives, forks, spoons, fine tools and, in fact, there is no limit to the articles to be plated, especially harness fittings. I bought my first outfit, paying twenty-five dollars for it, but it was so simple I sold it at a good price and made one.

To make the crucible I took the box out of a heavy spring wagon wheel and put a cap over the bottom. I then cut out a piece of sheet iron so that when bent round it would be just the size of the box below the shoulder, while at the bottom it would be about ten inches across, as shown in the engraving.

I use a gasoline stove to heat with. The top of the sheet-iron cone should be small enough so the shoulder of the box will rest upon it. The heat then all goes up around the box so the metal will melt easily.

The metal is melted in the box and the article to be plated is dipped in a solution of sulphuric acid one part, to water three parts. This cleans all grease, etc., from the piece. It is now dipped in a sal-ammoniac solution, made by placing all the sal-ammoniac in the water that the latter will dissolve. It is then dipped in the melted metal and left for a few seconds, then taken out and dipped immediately in cold water. This makes a beautiful silver plate that looks well and will wear for three or four years.

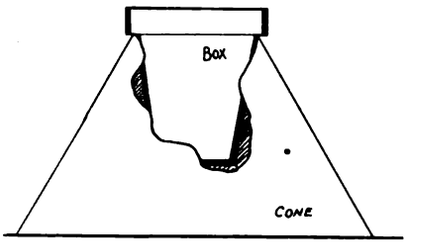
The profits on this work are enormous. I get fifty cents a set for spoons, knives or forks, and my customers are well satisfied with the price. It costs me about two cents. The metal is the only part you have to buy, and it costs seventy-two cents per pound.

To any reader who wishes to make an outfit I will send address of several firms who sell it, if they will send a stamped self-addressed envelope. Will also answer any questions to those who do not understand. Address Lock Box 425, Pomona, Cal. I will later on give full directions how I made a complete electro-plating outfit for plating with gold, silver, copper and zinc, or galvanizing.

A Handy Tool in the Shop.

J. W. ELROD.

This tool is made of octagonal tool steel stock $\frac{7}{8}$ by 30 inches and is handier



A SIMPLE OUTFIT FOR PLATING

for many things, I believe, than that shown by Brother Mat Gelson in the October number of our journal. Forge a claw on one end similar to a claw hammer and bend it back with a nice turn till the point of the claws are



AN EVERY-DAY HANDY TOOL

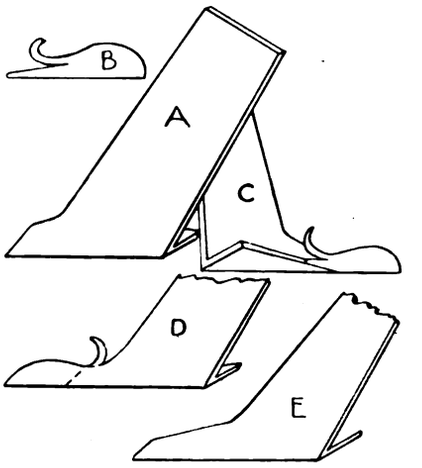


FIG. 1—THE SMITH SHOULD KNOW PLOWS

nearly parallel with the handle. Then temper as you would a claw hammer. On the other end make a chisel point and bend at an angle of about fifteen degrees. It is the handiest tool that I ever saw for pulling tire bolts after they have been started with the hammer, and they sell to carpenters like hot cakes. Any craftsman who can work steel can make one, and it is so simple no further explanation is needed.

A Practical Talk on Plow Work.

LOUIS FERRELL.

The share shown at A, Fig. 1, is to be pointed. The first thing to do is to make a point out of an old horse rasp, German lay steel or slab plow steel. This point I make as shown at B, and I begin welding it to the share as at C. At D the point is shown welded to the bottom and the pieces are ready for turning over to bend the "hog tusk" back on top to be welded. When welded on top along the bar turn plow over, weld remaining part of point and finish up as shown at E, Fig. 1.

When forging the point to be welded split the piece for a short way and then draw down. The piece that goes on the bar at the bottom should be very thin at the end and the "hog tooth" should be drawn to a point, and the inside edge should be very thin, while the outside edge is left its natural thickness. When a plow is worn out in the throat I don't use the "hog tooth" on the point.

Now a word on new ground plow work. In Fig. 2, A, is a plow to be

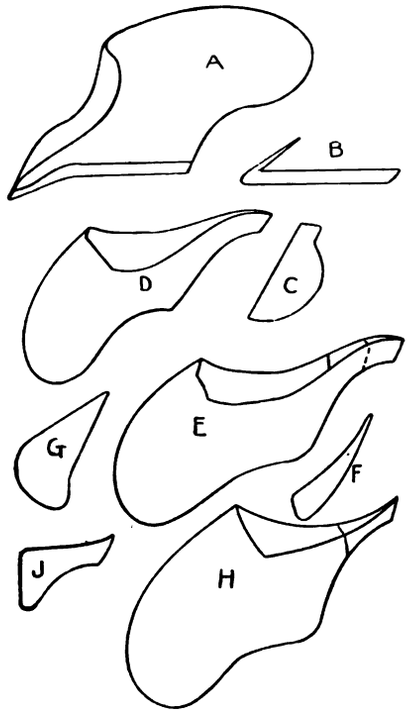


FIG. 2—PLOW SENSE IS ESSENTIAL TO SUCCESSFUL PLOW REPAIRING

laid and pointed. I take some German lay steel or a horse rasp and make a lay, as shown at B, drawing the back edge of lay down very thin and drawing out one end and turning back to fit on the bar of the plow. I commence at the point, weld that first, and then continue to the heel, welding back edge first. When lay is welded good all the way I turn over and point it from the top. I make a point, as shown at C. The part of the lay that turns back on the bar also forms a part of the point. If one understands the work at all he will soon see that the piece turned on the lay is a great help sometimes. Fig. 2, D represents the plow laid, pointed and ready to use.

Figure 2, E, shows a plow on which the bar has worn in two. The top of share has worn until it is thin and bent down at dotted line across. To repair this plow, I take a piece of soft steel or good iron and shape as shown at F, to fit the land side of bar. I weld it on good and solid and then I patch the top part with a good piece of plow steel, the shape as shown at G. I have my steel long enough to project over the bottom of bar and turn over, as shown in the slip share pointing. Then weld up bar on top side and draw the point to shape, as shown at D, Fig. 2.

At H, Fig. 2, is shown a plow with the point split and the top pulled off the bar and broken at line. For repairing this plow I take a good piece of plow steel and shape as shown at J. I draw the top edge, that comes up on mold board, very thin, and commence to weld at point onto the bar. Then I weld good and solidly at edge. Then I shape and sharpen it and have a very good plow for some time.

The Making of Round Drilling Jars.

L. R. SWARTZ.

A glance at the engraving of the jars assembled will show that in this form of drill jar the greatest possible amount of metal is placed just where it is needed to make a strong job.

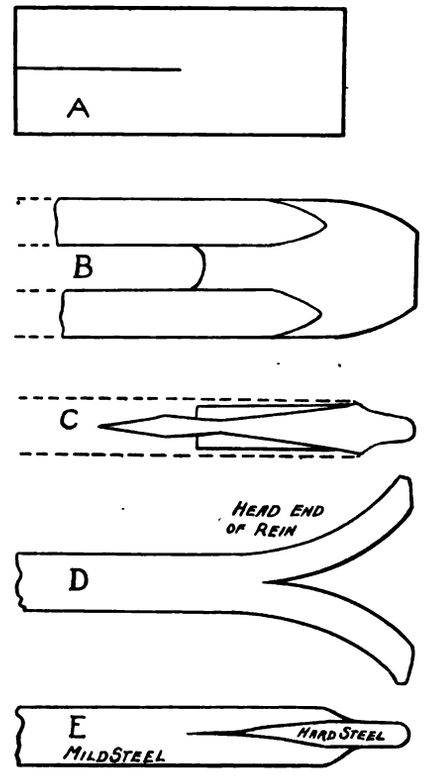


FIG. 1—A TOUGH REIN AND A LONG-WEARING HEAD IS DESIRED

There are various methods pursued in the making of this style of jars. The accompanying engravings, A to E, will make clear a very good plan of making the heads and tongues so as to afford a strong, tough rein and a hard, long wearing head. A piece of flat stock of suitable dimensions to suit the size of jars is punched and split as at A; this piece ought to be 50 or 60 point

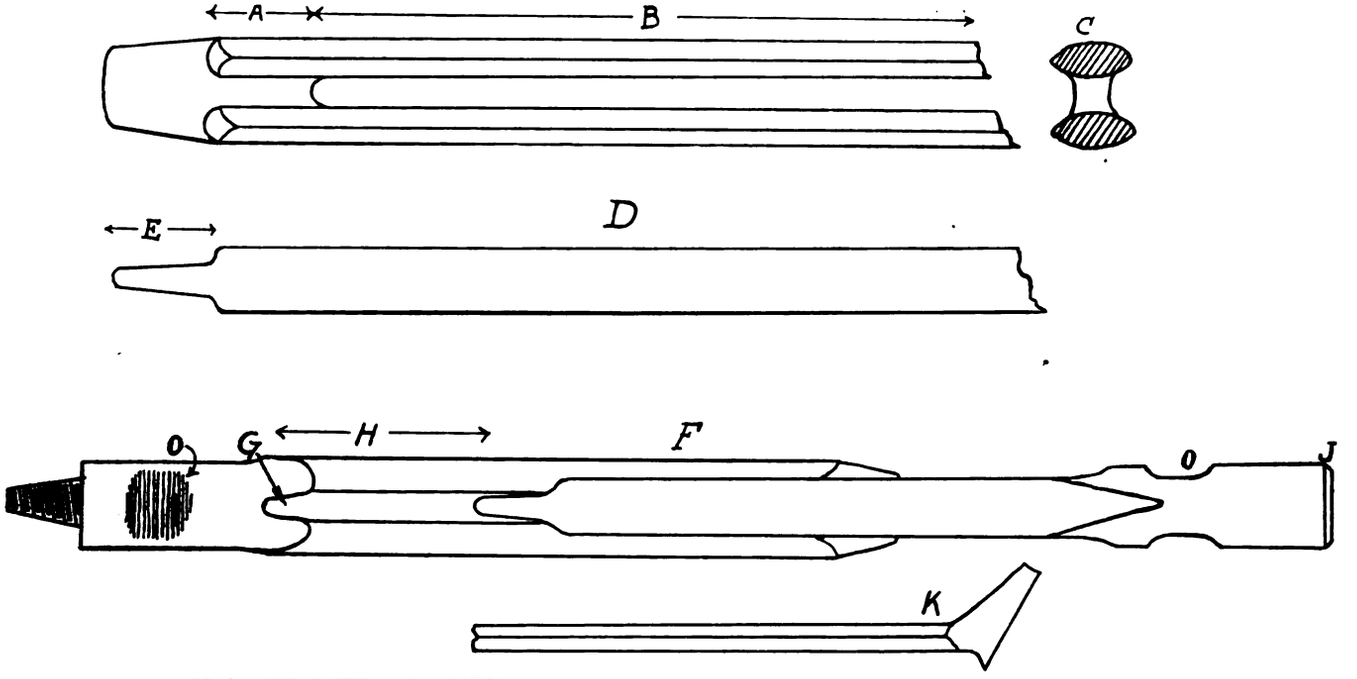
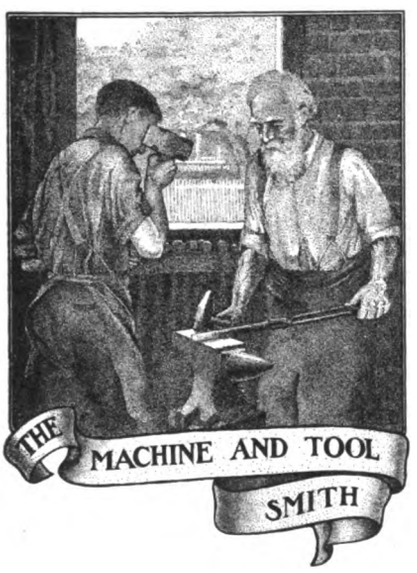


FIG. 2—THE ROUND JARS CONTAIN THE GREATEST AMOUNT OF METAL JUST WHERE IT IS NEEDED

carbon steel just a little lower than for making bits. Then forge and scarf into shape as at B and C. Split the head end of rein and weld up, as shown at D.

After both links are worked up to shape they are put together and the crotch ends welded together and scarfed so as to be welded to the box and pin with good cleft welds. Several forms of swages and fullers will be suggested in making jars, and perhaps some may be on hand ready for use.

In Fig. 2, A is the head; B, the reins and C shows a cross section of the head. At D is shown a side view of the link of which E is the tongue. The engraving at F represents the assembled jars, of which G is the crotch, H the stroke, J the bead and OO are wrench holds. At K is shown the crotch end of a rein.



If knife blades are hardened in water draw the temper to a purple. If hardened in oil or grease draw to a straw color.

HARDENER, New York.

For burns of all kinds a mixture of equal parts of lime water and linseed oil will be found excellent. Shake well before using, and put on immediately after burning. Keep in a bottle in a handy place.

"Doc.," Ohio.

A good welding compound may be made as follows: One pound of powdered borax, two ounces of black oxide of manganese, two ounces of carbonate of iron and two ounces of muriate of ammonia.

C. P. R., Ontario.

A welding compound especially good for springs is made by mixing one ounce of calcined borax, two ounces of beeswax and two ounces of resin. Mix thoroughly and pulverize well and then use as ordinary borax.

W. F. G., Missouri.

When welding steel to iron always fork the iron and insert the steel. The iron requires to be at a higher heat than the steel, and should also be placed in the fire earlier, so as to have both pieces come to a welding heat at the same time.

E. W. H., New York.

Eight Ways of Making Square Corners.

BERT HILLYER.

The bending of square or flat stock and the forming of the square corner seems to puzzle some smiths. In the accompanying engravings are shown eight methods of forming a square corner when desiring to make a forging with two pieces of stock at right angles to each other.

In A the straight piece is heated at the point where it is to be bent, and a piece drawn out as shown. The stock is then bent over the edge of the anvil and corner squared up.

In example B the stock is bent and after bending at right angles the corner is cut out and a square-corner piece set or welded in. It is almost unnecessary to say that the welding must be of first-class quality.

At C the stock at the bending point is upset sufficiently to fill out the corner squarely.

In method D, the stock is bent, a cut made in the corner with the hot chisel and a wedge is welded in solidly. Care must again be exercised here to get a perfect weld.

In the case of E, two pieces are used. Each piece is scarfed carefully as shown, a good welding heat taken, and then carefully and thoroughly welded.

A piece of stock just twice the size across one dimension is used at F. The stock is then split as shown, the upper corner cut off and the left-hand half bent out and up until it is at right angles with the other half.

At G the stock is drawn out on the end and then bent over upon itself and welded at the bend. Now bend at right angles and then weld down the corner and tip of lap.

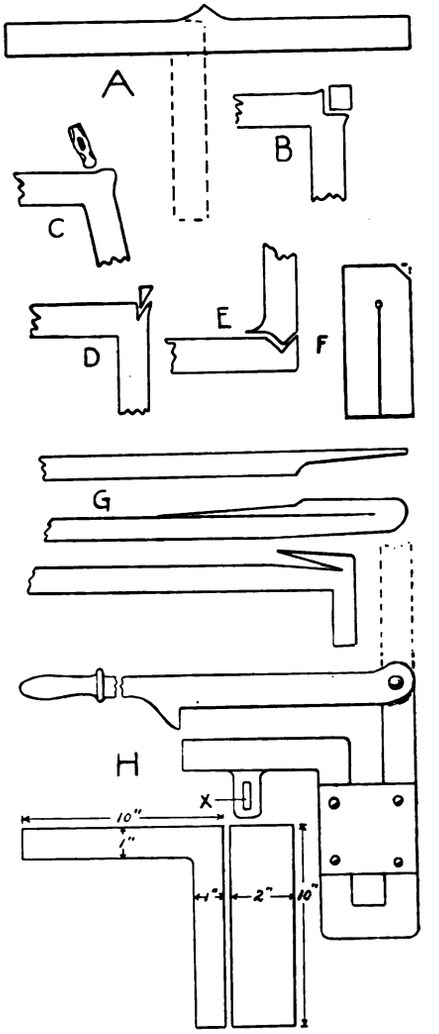
The method at H requires a special tool, but is extremely quick when turning out a number of bent angles of the same size. The stock to be bent in this case is one by two inches in section, and the angle is to measure ten inches from corner to end on each arm. The tool should be forged from heavy stock so as to be strong and rigid. The plates riveted on each side of the slot keep the stock straight. The lever should be long, so as to be powerful enough to bend the stock into shape. If necessary a pipe should be slipped over the handle to operate lever properly. The key-way at X is for keying the tool to the anvil by means of the hardy hole and a drift key. In use, take a piece of stock twenty inches long and take a good, short heat in the middle of it. Now put it in the tool and pull the lever down. Ordinarily the angle would be made of a piece of straight stock nineteen and a quarter inches long. That extra three quarters of an inch must go somewhere, so it upsets in the corner where it is hot and forms. Now, remove from the tool, trim and square up.

Plain Machine Work for the Blacksmith—3.

GEORGE CORMACK, JR.

Drills, Drilling and Drill Presses.

In nearly every case when the blacksmith feels that he needs to enlarge the usual shop equipment he buys a drill press. The good blacksmith can and does *punch* many holes, but there are many places where this method of making holes is entirely out of the question. In many cases the blacksmith will select for his first drill press



SQUARE CORNERS ARE FORGED IN SEVERAL WAYS

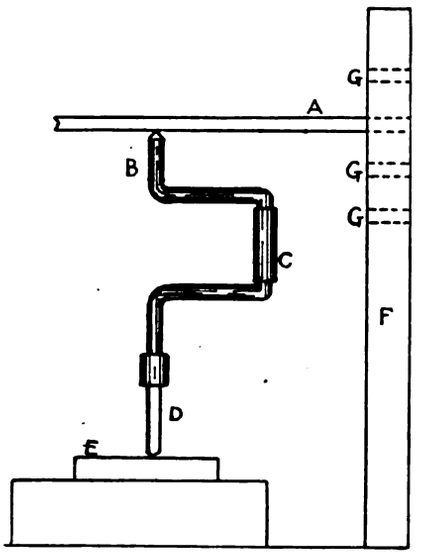


FIG 1—AN OLD METHOD, BUT STILL USEFUL

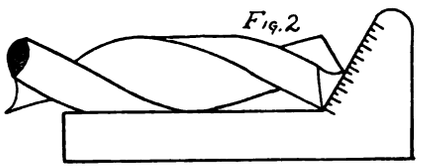
one of the numerous hand machines, but if he has a gasoline engine he will show wisdom if he picks out a machine capable of being operated by power. However simple a drill press may seem in its operation there is much to learn about running it, and although the man who runs a drill press is hardly recognized as a machinist it is also a fact that first-class drill press men—men capable of producing rapid and accurate work, are extremely scarce. However simple drilling may seem, the laying out of a hole and the drilling of it exactly in the desired place really requires a high degree of skill. It is easy enough to lay out the exact location and place a punch mark there, but a few trials and experiments will quickly convince anyone that drills seem to have an insane facility in not drilling the hole exactly where the punch mark seemed to be.

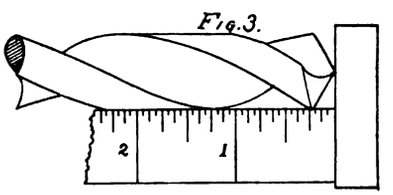
Before, however, going into the methods employed in compelling a drill to make the hole in the right place, I would like to say a few words about hand drilling without the aid of a drill press. A great deal of drilling can be done satisfactorily and quickly by hand, using only a small breast drill and an ordinary boring brace. Many people consider the drilling of a hole in metal without the aid of a drill press as being almost a superhuman undertaking, but such is not the case. Holes up to and even beyond ½ inch in diameter can be readily drilled by hand in cast iron or steel. In order to drill them quickly, however, you have to know how to go about it.

Not long ago when out on a gas-engine repair job I had to drill a $\frac{7}{16}$-inch hole through three inches of cast iron, all the tools available being a small breast drill, an ordinary brace and an assortment of twist drills. As usual on such occasions there was a very interested audience of loafers around, ever ready to give opinions and advice. As I was picking out the tools for drilling, one of the audience remarked that he would come around in the morning, when I would probably be through drilling that hole. I offered to bet ten dollars that the hole would be finished in fifteen minutes. He didn't have the ten, but said he would bet a dollar it wouldn't. We put up the money, and the hole was finished in eleven and a half minutes, and the fellow said it was worth the dollar to learn how it was done. This fellow supposed, like many others, that in drilling such a hole the only method to pursue was to stick the $\frac{7}{16}$-inch drill in the brace and go to it. He doubtless had either tried such a method or seen it tried and knew that drilling a hole that way was a slow and painful process.

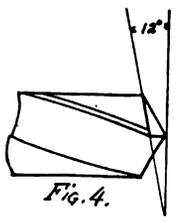
I didn't drill it that way, and will now explain why and how I did drill it. If you will look at the point of a twist drill you will observe that the very tip is without cutting edges, and has to be forced into the metal by sheer pressure. The larger the drill the larger this tip, and the more pressure necessary to press it in. In drilling metal by hand the proper method to pursue if the hole is over $\frac{5}{16}$ inch in diameter is to use a small drill, say about ¼ inch in a breast drill, first. (Let me say here that if you ever buy a breast drill don't buy one of those which have a chuck for square shank drills, but buy a light one with a chuck which will hold straight shank drills up to about ¼ inch. A ¼-inch drill is as large a drill as can be run easily in a breast drill. Above that size the ordinary brace beats the breast drill all to pieces.) The ⅛-inch drill has only a very small point which does not cut, and if operated with an even pressure it will cut into the metal very fast. After the center of the hole is removed you will find that a larger drill used in the brace will cut with very little pressure. In fact, if the drill is sharp and has the proper clearance at the lips, it will incline to feed almost too fast.

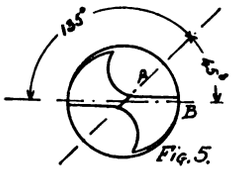
All drills used in hand drilling should be kept sharp. It pays to grind them often. In drilling a ½-inch hole by hand three different-sized drills should be used: First ⅛ run by a small breast drill, then a $\frac{5}{16}$ and ½ both used in the brace. For holes over ½ inch a ratchet is often used, but it is slow and laborious, and usually requires considerable rigging up for each hole. A simple method of drilling, used a good many years ago, is shown in Fig. 1. When the writer was a boy he worked at one time in a small combination machine shop and blacksmith's shop in Scotland; where in spite of very limited facilities a good many machines were built and well built, too, and in this shop the only methods of drilling holes were either by using a foot-power lathe, drilling between the centers, or by such a contraption as shown in Fig. 1. This arrangement has the advantage of extreme simplicity, and can be made by any blacksmith. Many people today may laugh at such an arrangement, but with a good, husky fellow to swing the brace the amount of work turned out would surprise them. Even at the present day with all our improved machinery I have often found just such a method extremely handy at times for odd jobs that couldn't very well be handled in the ordinary drill press. In the engraving, A is a flat piece of steel about 8 feet long, 2 inches wide and 1 inch thick. A number of center punch marks are hammered into its lower face in order to accommodate the sharp point at the upper end of the brace B. The brace is bent up from 1-inch round iron with a square





TO CUT RIGHT A DRILL MUST BE GROUND RIGHT





BOTH LIPS MUST BE THE SAME



FIG. 1—INSERTING THE SHORT-STEMMED TIRE LUGS

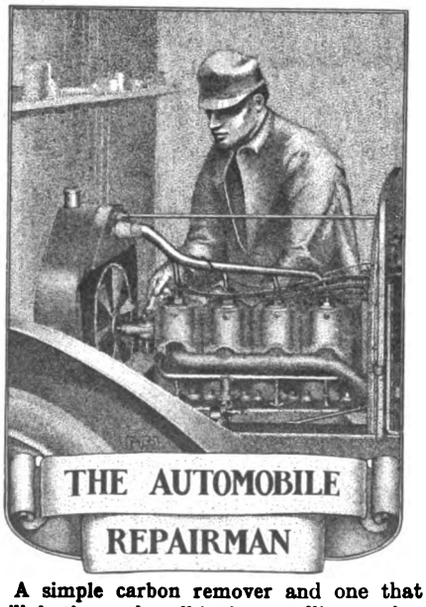
socket at lower end D to receive the drills. The handle C is a piece of sheet iron bent around the brace sweep loose enough to turn easily. The post F is spiked against the wall or placed in any convenient location. Five or six holes G are provided in this post at different heights to accommodate the end of bar A. The work E is either placed on the floor or blocked up as occasion may require. With a boy pressing down on the end of the bar A at H and a man to turn the brace it is surprising how fast a hole can be drilled.

I want to impress on all that the most important thing about drilling is the drill itself. Good work is impossible if the drill is not properly sharpened. In the instructions which follow regarding the grinding of drills let it be understood that these relate to twist drills. At the price at which twist drills can be bought I do not believe it pays to fuss with hand-forged flat drills. Comparatively few men who use drills really know how to grind a twist drill properly. There is nothing really difficult about the sharpening of a drill, but somehow otherwise careful men will slight it, or else they don't realize the extreme importance of correctly sharpened drills. In the first place I would suggest that the best way for the amateur who desires to grind his drills properly is for him to buy say a ½-inch drill and keep it unused as a sample. Drills when new are either ground on a machine which gives them the proper lip angle and clearance, or else by experts who do nothing but grind drills.

In sharpening drills the principal object in view is to have the drill cut the right size and to do the work with as little power as possible. In order that a drill cut the right size both lips must be the same length and ground to the same angle. Figure 2 shows a drill-grinding gauge which can be bought or easily made from a piece of thin sheet steel. This gauge will help both to get the lip angle right and also to get the point central. As shown the lip angle is fifty-nine degrees, which has been found to give the best results, and has long been adopted as correct and standard. Figure 3 shows a method whereby it can be readily ascertained if both lips are ground alike, but it does not give the angle. This is done by butting the end of an ordinary steel scale and the point of the drill against a straight-finished metal surface. Revolving the drill will show if both lips are the same distance back from the drill point, and it will also show whether the clearance is the same on both lips. The clearance as shown in Fig. 4 should be from twelve to fifteen degrees—twelve degrees being the usual angle adopted. If the drill is ground properly it will appear on the end as in Fig. 5, where it will be observed that the line across the drill web at A is at forty-five degrees to the cutting edge of lip B.

In drilling brass the face of the lips are usually ground parallel with the axis or center line of the drill, that is, the hook or rake of the cutting edges is removed to prevent the drill from digging in. When this is done the drill is practically the same as a flat drill.

(To be continued.)



A simple carbon remover and one that will do the work well is the metallic scouring rag, made of a number of interlocking rings. These scouring rags are generally used by housekeepers for scouring pots and pans.



FIG. 2—INSERTING THE TUBE—VALVE STEM FIRST

To use this device, drop it into one of the motor cylinders and run the other one, three or five cylinders, as the case may be, for about ten or fifteen minutes, when the carbon will be completely removed. Then proceed in like manner with the other cylinders. MOTOR, New York.

A radiator with the filler badly dented was brought in the shop the other day, and this is how we went about repairing the dent: We got a good, stout board and cut a hole in it so the plank would just fit over the filler when the cap was removed. We now placed the board over the filler, screwed the filler cap into place and with a plank standing on its end, under one end of the board, the filler was gradually pulled into place and the dents gradually removed with a little hammering. R. A. S., Ohio.

How to Put Tires on Demountable Rims.

MOTOR.

For the purpose of this explanation, a demountable clincher rim was selected, since it is undoubtedly the hardest to handle. Incidentally, the tire shown in the several views is a thirty-six by five-inch heavy tread type, and was readily applied by one man, the photographs being obtained through the courtesy of the Diamond Rubber Company.

Laying the rim flat on the floor or ground, with the shoe resting upon it, the lower bead is forced over the edge of the rim with the aid of the longer tire iron or lever and pushed down toward the lower clincher edge of the rim. In the tire establishments and larger garages it is usual for two men to work together, with the tire and rim lying upon a table, in order that the job may be gotten out with the greatest possible despatch; but when the tire must be applied by one man the work is greatly facilitated if the

tire is lower, but slightly above the floor, so that one's weight can be better and more easily utilized.

With one bead of the shoe over the rim, as above, the upper bead is hooked back opposite one of the holes for the tire lugs, as in Fig. 1, the iron with the swinging double hook being held by one's thigh, and a retaining lug held in place by one hand, while the eye-ended manipulating stem is screwed upon it. The extension stems are attached in this way to all of the security bolts or lugs before proceeding with the insertion of the tube. This latter operation is accomplished readily, using the same tire tool and engaging it opposite the hole in the rim for the accommodation of the tire valve. With the shoe bead held back at this point, Fig. 2, the tire valve is inserted first, after which the remainder of the tube is readily placed within the shoe without the use of irons or tools, care being taken to have the security lugs lie flat against the rim with no portion of the tube beneath them. The operations in Figs. 1 and 2 are most conveniently accomplished with that edge of the tire and rim upon which one is working projecting an inch or so over the edge of a box or similar means for raising it free of the ground. This is necessary because of the fact that in placing the security bolts and entering the valve stem the shoe is forced down beyond the rim edge.

After the tube is fully inserted, and it is ascertained that the lugs are all free of the tube and that they all lie above the lower bead of the shoe, it is slightly inflated, as in Fig. 3, so that the lugs are held firmly but lightly against the rim. This being accomplished, one proceeds to insert the upper



FIG. 3—INFLATING LIGHTLY BEFORE SECURING THE SHOE BEAD



FIG. 4—CATCHING THE BEAD UNDER THE RIM; SHOWING THE MANIPULATION OF EYE-HEADED AUXILIARY LUG STEMS

bead of the shoe under the upper clincher edge of the rim. This is done as in Fig. 4, the straight lever being inserted under the bead and over the rim at a point opposite one of the lugs. The latter is pushed in by means of the attached extension stem so that when the bead has been forced back far enough to slip under the rim it will also slip under the head of the lug. This operation is repeated around the tire till the entire bead is in place under the rim.

With this operation completed, the extensions of the security lugs are each worked in and out to make sure that all is properly located, and then the tire is fully inflated. The inflation to proper working pressure forces the lugs tightly against the shoe beads and causes their short, threaded stems to pass as far as may be through the holes in the rim. With the lugs thus held, the manipulating extension stems are unscrewed and the nuts provided for the purpose are then set up tightly in their places by means of a socket wrench, as in Fig. 5. This completes the operation of applying the tire to the rim, which is then ready for placing upon the wheel or in the tire carrier for use as a spare.

Precautions to be Taken in Repairing an Automobile.

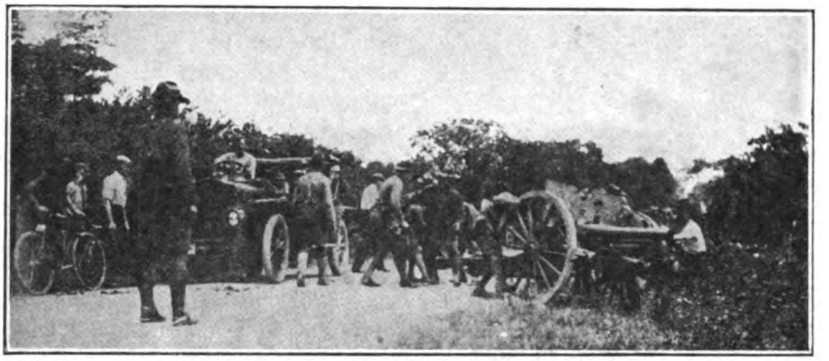
HAROLD WHITING SLAUSON, M. E.

There is a great difference between the methods of repairing the horse-drawn and the self-propelled vehicle. Repairs cannot be improvised on the automobile as they can on the carriage or wagon, for the complicated parts of the former, its great weight and the speed with which it is driven necessitate the use of special pieces and materials not generally found in the ordinary blacksmith or machine shop. The special steel alloys used in many of the parts do not allow of the heat treating which can ordinarily be bestowed upon a wrought-iron framework, and the finely adjusted bearings and joints require much more particular work than any part of a carriage. To complicate matters it often happens that a comparatively simple break in the motor can only be reached by taking apart intricate valves, cams and electrical apparatus; and a knowledge of modern gasoline-engine construction is necessary in order that such a repair may be made intelligently.

The wonderful increase in the use of the automobile and the popularity of long tours through all parts of the country have created a demand for emergency repair work that many of the roadside blacksmith shops find it hard to fill, on account of the lack of proper equipment and the necessary knowledge and experience. The repair of motor cars which have come to grief by the wayside and of those which are owned at nearby residences is an increasing and profitable adjunct to the business of the country blacksmith, however, and the one who has a reputation around the neighborhood as being a capable and efficient "automobile doctor" can be assured of a good trade. Even though most of the extra parts for a motor car can be obtained only at the factory, some of the simpler pieces can be made in an ordinary machine shop, and the addition of a good lathe, drill press and emery grinder to a well-equipped blacksmith and forge shop should constitute a plant which, when located on a



FIG. 5—APPLYING NUTS TO THE SHORT-STEMMED LUGS



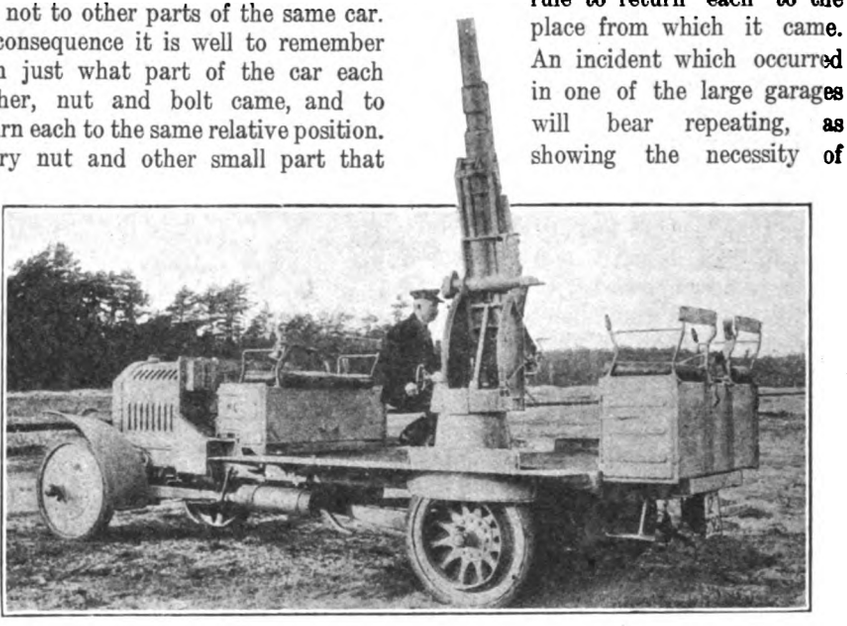
THE AUTOMOBILE IN WAR—A WHITE STEAMER

popular highway, will soon pay for the extra investment required.

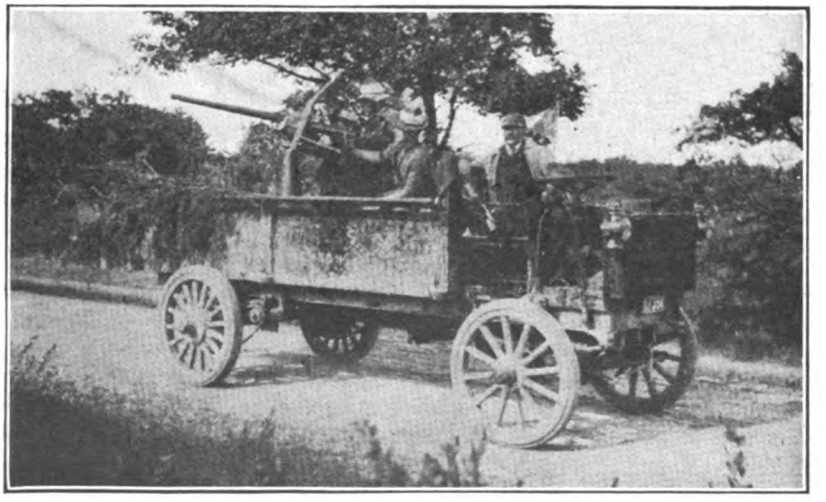
It is probable that the country blacksmith will be called upon to make all kinds of repairs to automobiles, from a bent axle or frame to a broken transmission gear or crank shaft. The ordinary motor car should be overhauled thoroughly every one or two years, and it is quite probable that the blacksmith who possesses the reputation of being a good repair man will be called upon for many of these jobs. Although in this case there may be no broken parts to replace, the assembling of the car after all pieces have been cleaned thoroughly and adjusted requires a good general knowledge of motor-car construction on the part of the workman. Any workman with a mechanical turn of mind can understand the principle of the construction of a car, such as the connection between the rear wheels and the motor through the transmission and clutch, but when it comes to reinstalling each of the thousand and one parts in its proper place and its adjustment to exactly the right position, a rather complicated job is presented to the man unaccustomed to such work.

In the first place it must be remembered that, while many parts of a car are said to be interchangeable, this applies only to other cars of a like model, and not to other parts of the same car. In consequence it is well to remember from just what part of the car each washer, nut and bolt came, and to return each to the same relative position. Every nut and other small part that is removed should be placed in a box where there is no danger of its being lost, for, while every motorist should carry an extra supply of nuts and bolts with him, many neglect to attend to this, and as some of these parts are made of special materials and would not be carried in stock in the ordinary machine shop, great inconvenience may be caused by a single missing piece. If all of the small parts are kept in a box and each piece designated with one or two prick punch marks to denote from which side of the car it was taken, much confusion may be saved before the job is completed.

Even though a piece taken from one side of a car may appear to be of exactly the same size and shape as that removed from the opposite side it is far better to make an invariable rule to return each to the place from which it came. An incident which occurred in one of the large garages will bear repeating, as showing the necessity of paying the strictest observance to this rule. An expensive foreign car of the shaft-drive type was brought into the garage for a thorough overhauling and cleaning. All parts of the motor, transmission and running gear were "taken down," examined, cleaned and then reassembled. The two halves of the housing for the rear axle and differential were similar in every respect, and the man who had charge of this section of the job neglected to look for the distinguishing prick punch marks. When the car was, to all appearances, ready for operation, the motor was started, and ran with a vim and energy that spoke well for the man who had attended to that part of the work. The driver took his seat, shifted into the low speed ahead, threw in the clutch, and the car started—backwards! A shift into the reverse notch moved the car slowly ahead, and it



THE AUTOMOBILE IN WAR—AN AIRSHIP GUN



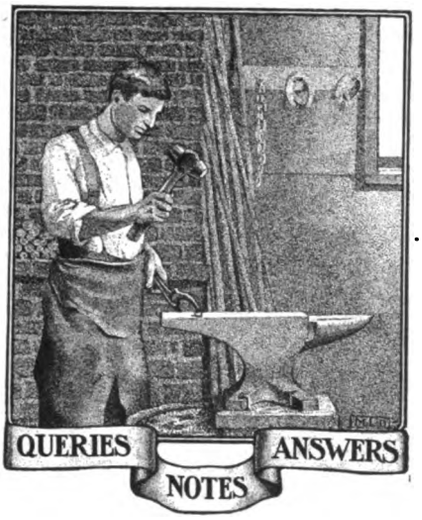
THE AUTOMOBILE IN WAR—A MASKED BATTERY

was found upon investigation that the automobile had one forward and three reverse speeds. The cause was simple, but it required a half day's work to take down and reassemble the rear axle and running gear before the trouble could be remedied. The two halves of the rear axle and differential housing had been reversed, and although they fitted perfectly in this position the large bevel gear on the live axle meshed on the opposite side of the driving shaft pinion from what should have been the case and, consequently, the axle and wheels turned backward for a forward rotation of the driving shaft.

More important, even, than designating the side of the car from which a certain piece was taken is the marking of the exact relative position of all the gears of the train at the front of the motor. There are from three to six of these gears, depending upon the style of motor, and they are used for driving the pump, magneto, valve and timer shafts. Some motors use but a single cam shaft for operating both the inlet and exhaust valves, while others have these located on opposite sides of the cylinders, and employ two cam shafts. The timer is often driven by a bevel gear operated on the pump or magneto shaft, but in many cases a separate spur gear is connected to the crank shaft of the motor. Whatever design is followed, however, these gears serve the purpose of keeping the operation of all the valves and the timer in the proper relation to the position of the crank shaft. If the cam shaft is set wrong, for example, the exhaust valves may be opened when the piston is nearing the top of its stroke and as ignition is about to take place, it is evident that the motor could not run under these conditions. If the timing shaft was set improperly the spark would occur at the wrong position of the piston, possibly at the end of its stroke when the exhaust valves were open, and in this case, too, the motor would refuse to run. The timing of the pump shaft in itself is not of importance, but, as the magneto or timer gear may be connected to it, it is best to take the greatest of care to return *all* gears to the same relative positions which they occupied when removed.

A good practice to follow is first to mark the end of the shaft to which the gear is keyed and then make a corresponding mark on the hub of the gear itself. Each shaft and gear, of course, should have a different mark.

(To be continued.)



Wants to Set Axles.—Could I get information on the setting of skened axles; that is, the fitting, what draw, including the rule throughout?

CHAS. H. AYERS, Virginia.

Several Practical Hints.—To remove old spokes quickly and easily make a ring or link of a piece of old buggy tire; slip it over the spoke, insert a wedge to fit, and then force out the spoke by hammering on the wedge.

When countersunk holes are wanted use a tapering punch and drive the punch in hard from the face side. Then turn piece over and close the hole to fit the size of screw to be used and the hole is finished.

A good compound for welding practically anything up to buggy springs may be made of drill press cuttings and borax.

B. C. HALL, Nova Scotia.

A Short Talk on Power.—I would not do without "Our Journal" for $2.00 a year. I would say in regard to power—I don't see how a man can get along without it. To parties putting in power, first consider what kind of power machines pay best and what are most needed. Then buy power machines to suit the work. I have a gasoline



THE AUTOMOBILE IN WAR—A RAPID-FIRE GUN

engine, a Mayers' cold tire setter, a Kerrihard power hammer, a lathe, a rip saw, a drill press, an emery stand and a Little Giant punch and shear. In short, I have as good a shop as you generally find in a country town consisting of three thousand or more inhabitants. We are kept busy and get a fair price for our work. We find credit business the worst feature, and are doing our best to cut it out.

ED. SMITH, Mississippi.

A Thread-Cutting Kink.—I will explain a job that I did today. It was a simple one, but there are many smiths who do not know how it is done, and maybe it will help some brother smith to get his work off his hands sooner. I had to drill holes in a 2-inch steam pipe and fit on a lubricator. The lower hole I threaded with a ½-inch pipe plug tap, but the top hole received a ¼-inch pipe. I had no ¼-inch plug or boiler tap, so I threaded it with a ½-inch bolt die and threaded the hole with a ½-inch taper pin. But it did not cut the hole large enough to receive the pipe, even when it was threaded, so I opened the dies as wide as they would go to thread the pipe, and then I ran my pin through, cutting a good thread. Then I took a large copper wire and made a wedge with one side flat and one side round. I took the pin out and slipped the wedge in the chip groove, so as to crowd the pin to the other side and cut the threads. The copper wedge saved the threads and forced the tool to one side to make the hole as large as wanted.

A. T. WRIGHT, Texas.

To Weld Channel Tires.—Can some craftsman tell me how to weld channel tires for a buggy? I would like to know how to weld them. THOS. LONG, New York.

In Reply.—Heat your tire and, with the ball part of your hammer, scarf both ends of the tire, the flat part and also the flanges. Now place both ends in fire and heat. When hot put them together on the bottom tool, fit both the flat part and the flanges snug, and pin with center punch. Care should be taken when trying the top tool so that it starts to go over the tire tight, without tearing away the edge. Now place a pinch of welding compound between the parts, as well as on the top, and then take a slow heat, so as not to burn the edges. When your heat is ready lift tire out on bottom swage and place top tool upon it quickly. Have the helper ready to strike four or five sharp, quick blows, and then knock the tool off endways and your weld is ready to chisel and grind on emery wheel or to file smooth. If the first heat did not weld as good as it should take a light borax, heat and place it on the bottom swage and tap lightly on the edges and the flat part with hand hammer. Then put on top swage to smooth up. Now run the tire and see how it is for size. If to be upset place in shrinker or, if too small, stretch upon the bottom swage with a fuller. Now heat and put on and fit the tire to the wheel and proceed with the next. W. H. OBLAD.

A Busy Pennsylvania Shop.—We have been in business at this stand for 35 years, and at present have the best equipment within the range of several counties. We have a 12-horsepower gasoline and also a 6-horsepower engine. Then we use a 10-horsepower steam boiler for steaming our rims. We use all sizes of rims, including wheelbarrow rims. We make all parts of our wagons, from beginning to end, as our equipment includes a spoke lathe, hub lathe, a sander, a shaper and moulder, a planer,

rip and cross-cut saws, a felloe rounder, a spoke tenoning machine, a rim and hub-boring machine, hot and cold tire setters, a punch and shear, bolt and nut-threading machine, emery wheels, and a special machine which we made for manufacturing toy fence rails. The rails are ¾ of an inch square by 7 inches long, with a $\frac{3}{32}$-inch hole in each end. The machine turns out 12,000 of these per hour, and we now have orders for 500,000, with more coming.

We have 4,000 feet of floor space and use the second floor for stock and painting. All machines are on the ground floor. We get repairing to do from all points for a radius of about 100 miles. These jobs from a distance we make it a point to do immediately and to return the next day. We have already built eight wagons this year and have orders for three more. We get $90 for a two-horse wagon and $110 for a four-horse wagon. Last winter we built a wagon for a sawmill, which they wanted to carry six tons. They have had nine tons of green lumber on it and it has not yet come to the shop for repairs.

J. J. DEWALT & SON, Pennsylvania.

A Letter from Indiana.—I have been in hopes that the smiths would get together and organize in this county. I have done enough hard work to kill four good mules, and I haven't got but a very little. I can do any kind of work. I shod three sucking colts this year (one yearling for crooked feet), and two of them are all O. K. now, but it will take about two more settings for the other. I do all kinds of shoeing. I saw where one smith told about how to shoe a hoof-bound horse. It is all right. I have been shoeing horses of that kind that way for nine or ten years. My father was a blacksmith and a wagonmaker. I have some tools used on a wagon with solid wooden wheels, made about eighty years ago. My father wore himself out at the trade, and a better and stronger man is seldom found. All he had was a lot of old bills that nobody could get. We should get cash for our work, like the farmers do for everything they sell. Some get their money before they fetch in their grain, but we must wait till they get ready to pay. I sold my shop about a year ago and have since worked for a smith for $2.50 per day, and he learned his trade in Denmark, but he is in for better prices. I am 44 years old, and never used anything to hold a horse except a rope until I came here, and I would rather have a good man and a rope than any horse stock. By using a good rope and having a good man that will stay with you you can get any of them shod. I have shod as bad mules as any man ever saw, but it's the bad stallions that weigh a ton that try our muscles. I will give you a few of our prices:

Setting old shoes.....each	$ .25
New shoes.....	1.50
Never slips.....per team	5.00
Plow sharpening.....	.25
Plow points.....	.50
Plow heels.....	.50
New shares.....from $3.00 to	4.00

We get just half pay, I call it, according to the way everything else is.

G. E. HALL, Indiana.

A Very Bad Case.—I would like to ask some brother smith through the columns of "Our Journal" how to treat and shoe a horse that has no frog in his foot. I had to shoe one today and was a bit puzzled for the first time in my life, for the animal had four bad feet and three of them had no frog, and the fourth was fly-blown and the worms almost full grown. His feet had an enormous growth on them. I dare say about twelve months' growth over the sole. What I did was first to clip all the hair from around the hoof and fetlock, which was a great length. Then I poured methelated spirits on the place where the frog had been to kill the maggots. This eased the animal so that I could work at him. I next washed the spot clean, then clipped the hoof down to normal size, cutting away fully three inches. Now I fitted a shoe to each foot and welded a bar across to hold the heels together. The reason I did this was that when he put his hoof to the ground it used to spread out and did not come back into position, and the ordinary shoe of 1¼ by ½ inch would open with the foot and hold it out. Have I done right in this case, and how am I to continue to shoe him to effect a cure? HENRY NEILSEN, Australia.

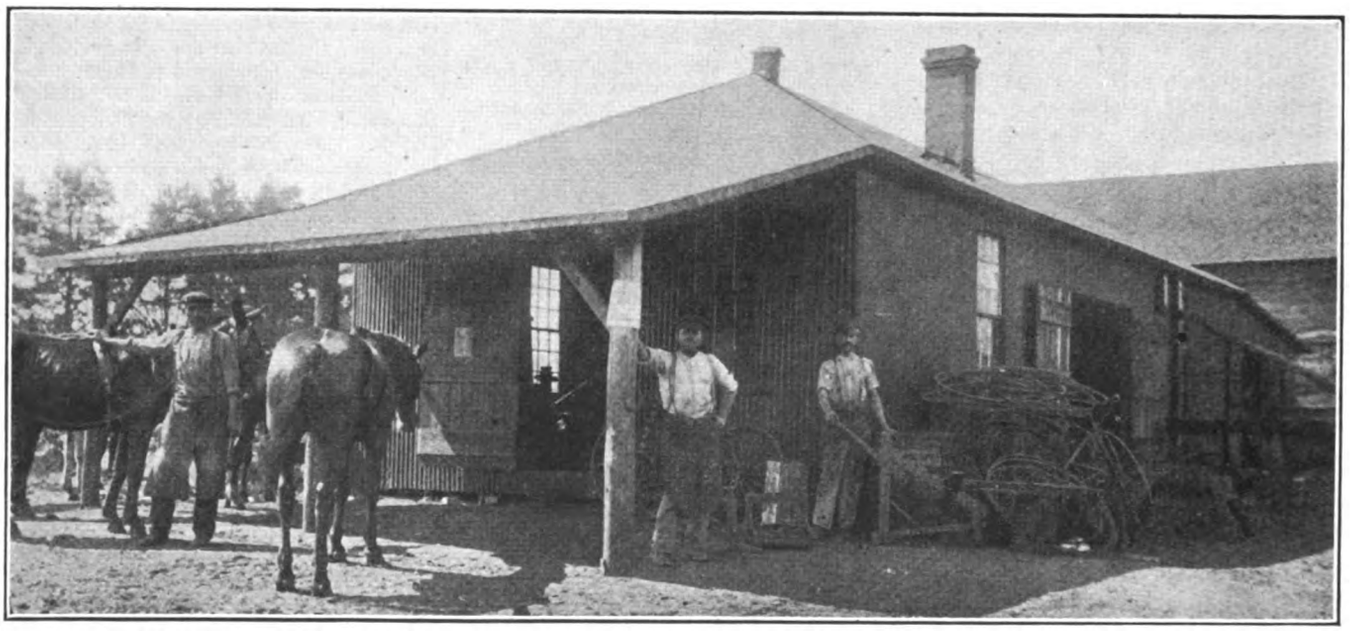
In Reply.—The animal's feet are without question in extremely bad condition. It fairly makes one boil with indignation to even think of a human being allowing an animal's feet to go without attention for so long a time as to allow them to become fly-blown. Your reader has, I believe, made a good start for bringing the animal's feet into healthy condition. A bar shoe should be used, with leathers and antiseptic dressings. Do all possible to soften the hoofs and allow your bars to gradually increase the pressure on the frogs or what is left of the frogs. It would be well to allow the animal to roam freely in the pasture for some time without shoes, if possible. Or, if he must be worked, shoe as above, or with tips. Read "Contraction and Its Cure," in the October paper of 1909.

W. O. J., New York.

Seth Boyden—Blacksmith.

Seth Boyden was born on a farm in Foxborough, Mass., in 1788, and there spent his childhood. Like many boys he took a great interest in the work at the village blacksmith shop. As he grew older he learned that trade. At the age of 21 he invented and constructed a machine for cutting files and another for making nails. His life is a continuous story of new ideas, suggestions, guesses, experiments, failures and many successes. He made improvements in leather-splitting machines.

Later he became interested in locomotives and constructed the first one to climb the steep hill on the Morris & Essex road from Newark to Roseville. He is said also to have discovered the art of making patent leather. Perhaps his most



A GENERAL SHOP OPERATED BY MESSRS. STANSELL & RAPE, OF GEORGIA

notable discovery was connected with the casting of malleable iron. His whole life was devoted to improvements in machinery and discoveries in chemistry.

It is reported that when he was quite an old man he said that if he were to try to make practical use of all the ideas he still had in his head it would take him another lifetime. Like many other inventors he remained poor to the end of his days. He devoted the latter years of his life to the cultivation of the strawberry, and one of the finest varieties of the Hilton berry is still called by his name.

Seth Boyden went to Newark in 1815 when he was 27 years old, and lived there until his death in 1870. Soon after the civil war a movement was started to erect a statue to his honor, but nothing definite was done about it until 1887. Then the Board of Trade took up the subject. In May, 1890, a bronze statue, more than life-size, which represents Seth Boyden wearing a blacksmith's apron, standing by an anvil with a model of a locomotive in his hand, was erected in Washington Park. This statue it is said is the only one in the world erected in honor of a blacksmith.

Of this statue and the man it represents Grace V. Halsey wrote this poem:

This carven bronze! In face and form it stands
To honor him, a son of toil so true
That from his brain and never tiring hands
Labor was crowned with dignity anew!
For him dull iron welded firmest bar,
And steam and gold gave out a secret lore,
The round sunlight beams sent him from afar,
And silver wielded best of molten ore.

With cunning tools he fashioned, wondrous, true,
Earth's many forms; for near to nature's heart
He dwelt, and ceaseless gave who never knew
How great the learning of his life's low part.
A barefoot boy! He loved the earth's brown breast,
And ever found new beauties in each flower,
Her fruits she yielded to him first, and best
Growth of the sunshine, dews, and quickening shower.

ENVOY

Seth Boyden! dear thy bronzed form and face.
No grander words ere spake or writ by pen
Than these, which unto thy loved name we trace:
"A workingman, who loved his fellowmen!"

Among the Boyden relics at Newark are a bust and two large paintings of the inventor, letters patent bearing the signature of President Andrew Jackson for improvement in the manufacture of malleable iron, an improvement in applying the power of steam to machinery, and an improved furnace for smelting zinc. Also, these things made by his own hands: A telescope lens, forks, spoons, watchcase and ring made from the metal oroide; the watchcase having been made after Boyden was 80 years old; an air gun, a razor and a miniature painting of the inventor, made by himself when a young man.

A Smith Shop of Missouri.—I have seen so many small, dark shops that I do not think I need feel ashamed of my place. I have a nice run of work. The country here is rocky and wears out horseshoes and tires, as well as plows. I keep but one helper, except during the busy season, when I need another one. I do no woodwork at all. The woodworker runs his shop independently of mine. That is one advantage I have over some smiths who have to take the wagonmaker in as a partner in order to have one at all. In the winter, when the wagonmaker is toasting his shins, the smith must shoe horses all day, and at night divide the profits.

I have been in business for myself ten years, beside working in different parts of the state since 1893. I do not intend to continue at the trade any longer than spring, when I expect to move on a farm and live independent. Knowing when I start at some work I will be able to complete the job without having to do anything else between heats. O. L. Stolz, Missouri.



MR. O. L. STOLZ CARRIES ON A GENERAL SMITHING BUSINESS, BUT DOES NO WOODWORK

A Complete Price List.—The following price list is complete for a general blacksmith shop, though the prices will not apply for all parts of the country:

Horseshoeing.

New shoes, 1 horse		$1.50
Re-setting	each	.25
Stallion shoes	"	1.00
Stallion shoes, re-set	"	1.00
Bar shoes, common	"	.75
Bar shoes, hand-made	"	1.00
Trotting horse, hand-turned	"	1.00
Side and toe weight	"	.75
One horse leather pads with packing	extra	.15
Air cushion pads,	extra	1.25
Paring horses' feet,	each horse	.25
Shoeing bronchos and fractious horses,	extra	1.00

Hay Press Repairs.

Plunger in press	$4.50
Labor plunger	$2.50
Press spring	3.00
Half spring	1.50
Buzzard wings	.25

Wagon Ironwork.

Irons on front bolster	$ 1.00
Irons on hind bolster	1.00
New bolster end irons, each bolster	.30
New bolster stake irons, each stake	.50
1 pair bolster plates	1.50
1 new sand board plate put on	1.25
4 wagon tire cut and set	2.50
4 tire re-set	2.00
4 tire re-set and bolted	3.00
4 tire pinned	2.50
4 tire 3-inch re-set	3.00
1 rake tire re-set	$ .50
4 log wagon tires set	4.00
1 set new tire, 3-inch	12.00
1 set new tire, 1¾-inch	8.00
3 ½-inch tire	3.50
4-inch new tire	12.50
Kingbolt for log bunk	.75
All bolts 2 feet and over, per lb	.09
New hay frames painted	13.00
Log bunks with bar	10.00
Log bunks with braces	12.00
1 new rub iron put on	.50
Old tongue iron replaced	.50
Old tongue hound irons replaced, per pair	.75
1 new hind hound plate	1.00
New hound irons braces	each .50
New hammer strap	.35
New circle post	each .25
New tongue cap	.50
New tongue rod	.50
New tongue plate	.25
1 new wagon wrench	.35
Hub bands, old	each .15
Hub bands, new	" .25
Kingbolt	" .50
Box strap irons put on	" .25
Seat springs	" .75
4, 3¼ x 10 new skeins with boxing put in	8.00
1 new skein only put in	2.00
1 new skein boxing only	1.00
4, 3¼ x 10 steel skeins	extra 2.00
Top iron on box, bottom box	1.00
Box rods	each .25
New center clips on singletrees	" .20
New ferrule on singletrees	" .15
New neckyoke center	" .35

Neckyoke ferrules	each	$ .15
Seat hooks set		.60
Rub irons, not put on	each	.25
Hub band, not put on	"	.25

Wagon Woodwork.

Bolsters, front or hind	each	$ 2.00
Bolster stakes, front or hind		.40
Set of rims, 1¾-inch tread		7.50
¼ rim, 1¾-inch tread		1.00
Set of rims, 2½ x 2		9.00
¼ rim, 2½ x 2		1.25
Set truck rims, 3 x 1¾		12.00
¼ rim, 4 x 1¾		1.65
Truck felloes, 2½ or 3-inch	each	1.00
Truck felloes, 3½ or 4-inch	"	1.25
Wagon felloes	"	.30
Wagon felloes, set		7.00
Spokes, single	each	.25
Spokes, whole wheel	"	.20
Hubs, per set		4.00
Hubs, one		1.00
Reaches, 8 ft		1.10
Reaches, 10 ft		1.25
Reaches, 12 ft		1.50
New tongues, oak or ash with irons		4.00
Plow tongues, oak or ash		2.75
Harvester tongues		4.00
Tongue hounds, new, per pair		1.50
Tongue hounds, new	each	.75
Front hounds, per pair		2.25
Front hounds	each	1.25
Hind hounds, per pair		2.25
Hind hounds	each	1.25
Bent hounds		3.50
Singletrees	each	.50
Doubletrees	"	.75
Neckyokes, old irons		.50
Hub, boxed	each	.50
Axles, 3½ x 4½, hickory		3.50
Axles, 4 x 5, hickory		4.00
Sand boards		1.50
Wagon stakes		.25
Box bottom, labor		2.00
Box bottom, cross piece center		.75
Box bottom, cross piece end		.50
Box bottom, per set		4.50
Spring seat, wood		2.50
Seats, old iron	each	1.50
Seats, new iron	"	4.00
Wagon shafts, 1¾ x 2¼	"	3.50
Dump end gate	"	1.25
Plain end gate	"	1.00
Wheels cut down, per set complete, and old tires set		12.00
Setting boxing, new		.50
Setting boxing, old		.25
Setting skein	each	.50
Eveners, 4-horse, 6 ft		1.50
Eveners, 4-horse, 7 ft		1.75
Eveners, 4-horse, 8 ft		2.00
Wagon boxes, 12-inch		12.50
Wagon boxes, 14-inch		14.00
Wagon boxes, 16-inch		16.00
Double box, 12 and 14-inch		18.00
Triple box, 10, 12 and 14-inch		22.00

Buggy Ironwork.

Buggy axles, put on, job complete, up to 1 in		$8.00
Buggy axles, each, put on, up to 1 in.		2.50
Axles set	each	1.00
Four buggy tires, set hot		2.50
Four buggy tires, set cold		2.00
Re-setting one old tire		.60
Four buggy tires, new		6.75
New, one tire		2.00
Buggy springs welded, per leaf		.50
Iron replaced on shafts		.25
Shaft iron welded		.35
Shaft shackles	each	.50
Shaft eye		.50
Pole irons, replaced		.50
Pole circle irons, replaced		.50
Pole brace, welded		.50
Pole eye		.50
New T hammer strap		.65
Axle clip		.20
Saddle clips		.25
Steel bow socket		.75
One buggy singletree clevis		$ .25
One buggy singletree clevis bolt		.10
One buggy singletree ferrules	each	.10
One buggy singletree cock-eye	"	.10
One buggy clip kingbolt		1.00



MR. J. B. HARRIS OF YORK STATE, SHOWING HIS HANDY TIRE HOLDER

One buggy reach, iron welded on old reach		$ .50
One new whip socket, put on		.50
One new top prop, put on		.20
One new top prop nut, put on		.15
One new bow rivet		.10
One new buggy spring		$2.50 to 3.00
One new buggy spring clip, put on		.35
One new buggy shackle clip, put on		.50
Buggy box in new wheel	each	.50
Buggy box in old wheel	"	.25

Buggy Woodwork.

Shafts, new, with old irons, per pair		$3.00
Shafts, ironed and painted, complete.		4.50
Shafts, cross bars, old irons		1.00
Pole only		3.00
Pole, ironed and painted, complete, no neckyoke		7.00
Pole circles	each	1.00
Buggy singletrees		.50
Buggy doubletrees		.75
Buggy neckyokes		1.25
Patent spokes, single	each	.25
Patent spokes, 4 or more	"	.18
Rims, set ⅞ and 1 inch		5.00
Rims, set over 1 inch		6.00
One-half rim		75
One rim only		1.50
Axle bed		1.00
Reach, single		1.00
Reach, pair		2.00
Head block		1.00
Spring bar, scrolled		1.00
Spring bar, plain		.75
Body panel side, one coat and priming		$2.50
Body panel end, one coat and priming		1.25
Wheels cut down, tire set, per set		8.00
Piano box (one seat), with old irons		10.00
Spring wagon box, with two seats		12.50
Bow sockets	each	1.00
Buggy and surrey dashes		$1.50 to 3.50
Buggy side curtains, per pair		2.50
Surrey side curtains		5.00 to 6.00
Buggy boots		1.00 to 2.00
Buggy side bars		1.50 to 1.00
Wood buggy bows, put in	each	1.75
New wheel, complete, C grade, 1 inch, with new tire, not painted		5.00
New wheel, set, C grade, 1 inch, with new tire, not painted		12.00
New wheel, for 1⅛ inch, add extra per set		1.50
New wheel, for 1¼ inch, add extra per set		3.00
Buggy seat, one new side		.75
Buggy seat, one new back		1.25
Buggy seat, one new piece in seat frame	each	.75
Painting buggy, one coat		6.00
Painting buggy, two coats and varnish		10.00

Plow Work.

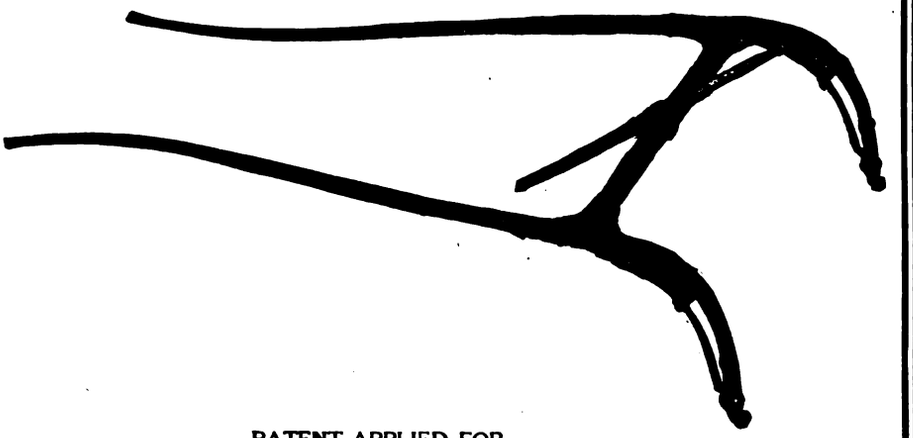
Plow beams, 1-horse		$1.50
Plow beams, 2-horse		2.00
Plow beams, 3-horse		3.50
Setting plow beams		.75
Plow rounds	each	.25
Plow handles, straight	"	.75
Plow handles, bent	"	1.00
New cultivator singletree	"	.35
Polish plow, complete		$1.00 to 1.50
New land side plate		1.50
New iron land side		1.00
New cross clevis		.35
Plow evener, wood		.40
Plow singletree, wood		.35
Sharpen pulverizer, per disc		.25
Sharpen Cotton Scraper		.25
Cotton Shovel, under 10 in., 2 for		.25
Cotton Shovel, over 10 in		.20
Pulverizer tongue		2.25
Four-horse pulverizer evener		1.00
Standing coulter for breaking way		.75
Re-stubbing riding plow axle		.75
Riding plow tongue		1.75
Sharpening harrow tooth	each	.02
Sharpen seeder teeth	"	.10
Sharpen drill shoes	"	.20
Sharpen road grader	"	3.50
New lay, 12-inch crucible cast		3.00
New lay, 14-inch crucible cast		3.50
New lay, 16-inch crucible cast		4.00
New lay, 18-inch crucible cast		4.50
New Lister lay, crucible cast		4.00
Add 50c each, net, where soft center lays are used.		
Point and sharpen lays	each	1.00
Point and sharpen Lister lay		1.25
Sharpen Lister lay		.50
Sharpening 12-inch lay		.25
Sharpening 16-inch lay		.30
New cultivator shovels, 4 in set, crucible cast		4.00
New cultivator shovels, 6 in set, crucible cast		4.00
Point and sharpen shovels, 4 in set		2.00
Point and sharpen shovels, 6 in set		3.00
Sharpen set of 4 shovels		.75
Sharpen set of 6 shovels		1.00
Land side plates		1.50
Land side, heeled		.50
Stalk cutter blade		.50

Mower Repairs.

Welding pitman		$ .50
New hook on pitman		.50
Putting straps on wooden pitman		.20
Welding sickle for mower		.75
Welding sickle for binder		1.00
Odd work per hour (stock extra)		.50
Putting sections on		1.00
Filing harvester sickle		1.00
Putting plates on		1.00
New mower tongue		3.50

The Sensation of the Season

Our Twentieth Century Shaft



PATENT APPLIED FOR

The Reason Why

¶ Why have we gotten up this very superior Shaft—this Twentieth Century Shaft?

¶ Because any other type has weak points. The Twentieth Century has no weak point.

¶ Look at it! Any willing eye can see and learn its safety and strength instantly.

¶ A special shaft, if you please. Skeleton heel—brace of same bend as heel of shaft. And completely locked at each end to both T plate and shaft eye.

¶ That's it in a nutshell. Sounds sturdy and secure, doesn't it? It is that.

¶ The weakness of other types? Well, a heel brace with merely lugs at each end is not safe. Nuts come off, you know. Not seldom—often. And without notice. Then look out for trouble with a big T. Heel brace, thus weakened, splits heel. Cold fact, that. No idle statement.

¶ But Twentieth Century Shaft has locks—(locks, not bolts and nuts) these locks are forged at each end of heel brace. Result, perfect safety. Notice also the lug in center of heel brace taking steel tube and bolt, a very rigid connection with heel.

Talking and Selling Points

¶ Lock Heel Braces insure absolute safety under all conditions.

¶ Brace follows bend of heel, thus eliminates ungainly appearance of all other heel brace shafts.

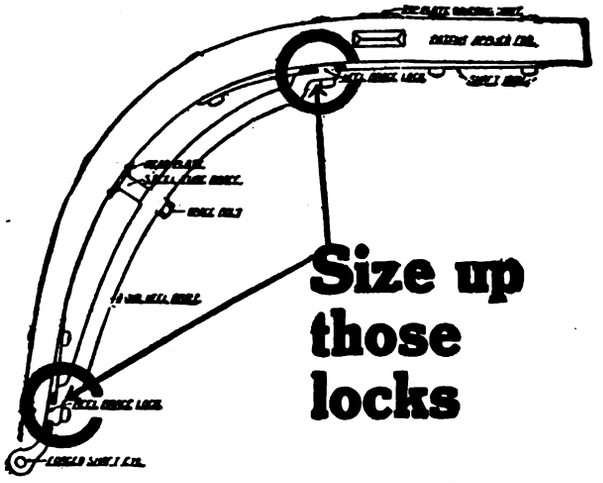
¶ Heel of Shaft is rounded, both top and bottom—neat, tasteful, workmanlike.

¶ T Plate and Double Corner Brace are pressed steel, one solid piece. Tests demonstrated this new solid plate of ours without welds, has twice the strength of solid wrought or malleable iron.

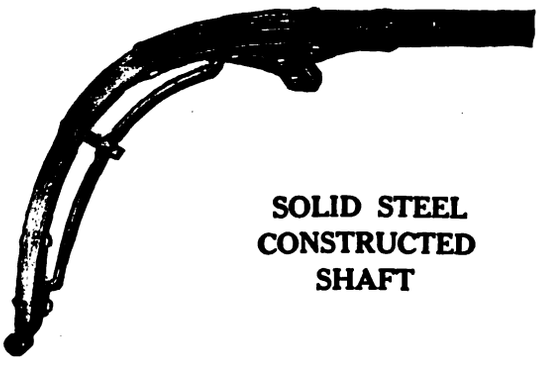
¶ Construction of this Twentieth Century Shaft has eliminated all welds—no more trouble due to welds if you pin your faith to it. In fact, no trouble due to any of the weaknesses which other constructions have suffered from.

¶ And don't let this escape you—the forgings on this shaft are all drop forged. Heel braces drop forged with locks at each end and lug in center.

¶ It is important to you—as well as to us—that you place sample order now, and get the advantage these talking points give you.



Size up those locks



SOLID STEEL CONSTRUCTED SHAFT

SEND FOR CATALOGUE AND PRICES

The Pioneer Pole & Shaft Co., PIQUA, OHIO

IRONING FACTORIES: Anderson, Ind.; Troy, O.; Cincinnati, O.; Sidney, O.; St. Louis, Mo.

BENDING FACTORIES: Piqua, O.; Troy, O.; Akron, O.; Wellington, O.; Ashtabula, O.; Muncie, Ind.; Anderson, Ind.; Memphis, Tenn.

Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, Dec. 22, 1909, and are subject to fluctuations. Corrected for **The American Blacksmith** by the National Heavy Hardware Reporter, Chicago.

No changes are reported in quotations as announced last month.

Light trading in wood stock is usual at this season, while horseshoers' items are generally in strong demand.

The seasonable weather has naturally made business brisk for the shoer, and all sections report trade as exceedingly good.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—
$2.00 rates, full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$2.00 rates, full extras.

Toe Calks—	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—	
6 x ½ and smaller	60–10%
Larger and longer	50%

Machine Bolts—	
4 x ½ and smaller	60–10%
Larger and longer	50%

Nuts—	
Less than 10 lbs. of a size	$2.50 off
From 10 to 50 lbs.	3.00 off

Washers—	**Skeins—**
Same price as nuts.	Cast 65%

Malleables—	**Half Patent Axles—**
Common $ .09	65%

Springs—	
Single Spring, each	$1.25
Springs, black and half bright	.06

Hickory Lumber—Per Foot—	
1 to 2½	$.09½
2½ to 4¼	.11

Ash and Oak Lumber—Per Foot—			
1–1½	$ .07½	2½–3	$.08½
1½–2	.08	3½–4	.09½

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
¾"	$65.00	$65.00	$75.00
1"	65.00	68.00	80.00
1¼"	68.00	75.00	85.00
1½" and 1¾"	72.00	80.00	104.00

Rough Hickory Axles—	Each.
3 x 4 6 ft	$ .60
3½ x 4½ 6 ft	1.00
4 x 5 6 ft	1.20
5 x 6 6 ft	2.20
4 x 5 6½ ft	1.30
4½ x 5½ 6½ and 7 ft	2.00
5 x 6 6½ and 7 ft	3.00
5½ x 6½ 7 ft	3.50

Finished Hickory Axles—	
For 2½ and 2¾ Skeins	$1.00
For 3 Skeins	1.20
For 3¼ Skeins	1.45
For 3½ Skeins	1.60
For 3¾ Skeins	1.95
For 4 Skeins	2.25

Rough Oak Bolsters—	
Short	$ .08
12–14–16 ft.	.09

Finished Oak Bolsters—	
2¾ x 3¾ and under	$ .65
3 x 4	.70
3¾ x 4¾	.90

Rough Oak Wagon Tongues—	
4 x 4 x 2 x 4 x 12 and smaller	$1.00

Finished Oak Wagon Tongues—	
3½ and smaller	$1.25
3¾	1.30
4	1.40

Two Inch Sawed Hounds	Per Pair.
Tongues	$ .40
Front	45
Hind	.55

Patent Wheels—	
A. B. No. 13 and under	45 %
D. No. 13 and under	35–5 %
All Grades, No. 17 to 33	35–5 %
All Grades, No. 39 and Larger	25–5 %
C. No. 13 and under	40–2½ %

Cupped Oak Hubs— Set.		**Plain End Oak Hubs—** Set.	
7 x 8 x 9	$1.40	10 x 14	$3.45
7 x 9 x 10	1.60	11 x 14	4.50
8 x 9 x 10	1.65	11 x 15	4.75
8 x 10 x 11	1.90	11 x 16	5.35
9 x 10 x 12	2.05	12 x 16	6.00
9 x 11 x 12	2.10	12 x 17	6.55
10 x 12 x 13	3.20	13 x 18	7.50
11 x 13 x 14	4.45		
12 x 14 x 15	5.35		

Rough Sawed Felloes—			
1½ x 2 "	$1.55	2 x 2½"	2.00
1½ x 2¼"	1.75	2½ x 2 "	4.75
1½ x 2½"	1.85	3 x 3 "	5.75
		3 x 3½"	6.00

Ironed Poles, White, XXX—	
1¾" x 2 " No. 2	$4.00
2 x 2½" No. 3	4.00

Ironed Shafts, White, XXX—	
1¾" x 2 " and smaller	$2.15
1½ x 2 "	2.35
1½ x 2¼"	2.90

Farm Wagon Bows—	
Round Top, ½ x 2 "	$ .65
Flat Top, ½ x 2 "	.80
Round Top, ⅝ x 2½"	1.40

Standard size Piano Bodies with Seats—	
Each	$4.25

Plow Beams—	
1 Horse	$ .70
2 Horse	.85
3 Horse	1.00

All Hickory and Oak Spokes and Patent Spokes— Discount from Weis & Lesh List No. 5.. 5%

Wagon Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2½ x 38"	$2.15	$2.95	$4.25
2¾ x 42"	2.90	4.05	5.50
2¾ x 46"	4.40		
3 x 44"	4.70	6.95	8.90
3 x 48"	5.50	7.85	10.50

Single Trees—Oval—

	Mixed Forest Second Growth	White Second Growth
2½"	$1.60	$2.90	$3.50
2¾"	1.70	2.95	3.60
2¾"	1.80	3.05	3.80
3 x 36"	2.45	3.55	4.20
3 x 38"	2.50		
3 x 40"	2.65	4.00	4.85

Single Trees—Round—

	Forest Second Growth	
2½"	$2.10	$3.60
2¾"	2.10	3.65
2¾"	2.15	3.75
2¾"	2.85	4.25
3 "	3.45	4.80

Oval Plow Doubletrees—		**Flat Plow Doubletrees—**	
2½ x 36"	$1.75	1¾ x 3½ x 42"	$3.00
3 x 40"	2.55		

Wagon Doubletrees—

2 x 4 x 48"	$3.60
2½ x 48"	4.80
2½ x 4½ x 50"	5.20
2½ x 4½ x 52"	5.60
2½ x 5 x 52"	6.40
2½ x 5 x 54"	7.20
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—	Forest
2½ x 30" and under	$1.00
2¾ x 30" and under	1.25

Buggy Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2¼" and smaller	$2.65	$3.65	$4.65

Express Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.95	$3.65	$5.00
2¾"	3.55	4.15	5.50
3 "	3.55	4.30	5.75

Express Singletrees, Turned—

	Mixed Forest Second Growth	White Second Growth
2¼"	$2.50	$2.65	$3.75
2½"	2.90	3.65	4.00
2½"	3.50	4.00	4.75

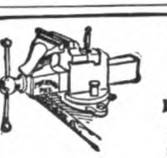
Express Singletrees, Square Center—

	Mixed Forest Second Growth	White Second Growth
2¼"	$3.00	$4.15	$5.25
2½"	3.50	5.45	6.00

Buggy Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2 x 42"	$2.75	$3.50	$4.50
2¼ x 2¼ x 42"	3.15	3.75	5.45

CUMMINGS & EMERSON
Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.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ALL STYLES AND SIZES FOR ALL USES
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We Manufacture
SHEARS AND PUNCHES
Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.
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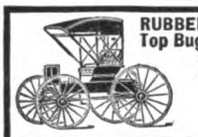
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Top Buggy, $35. Buggy Tops, $4.60
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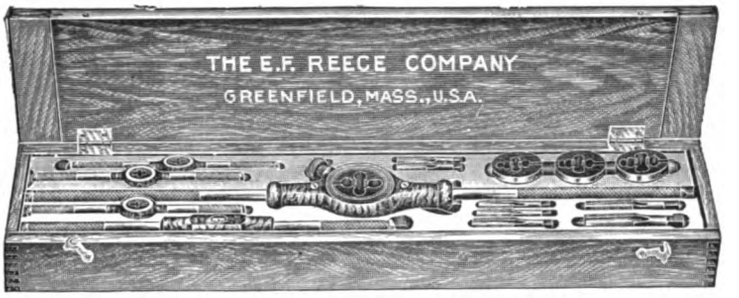
HERCULES

1847



1910

SET No. T-103 CUTS SEVEN SIZES—¼ TO ¾ IN. HAS TAP WRENCH $9.10 NET

A Reece Combination Screw Plate Set complete in handsome polished hardwood case

for $8.25 Net

including Reece Adjustable Guide Stock for Dies, 3 individual full mounted Stocks, 7 Plate Taps and 7 Reece Adjustable Dies, **making perfect threads at one cut.** There are 4 Stocks with mottled finish, so that 4 persons can use dies from this set at the same time. Guaranteed to give satisfaction or your money refunded.

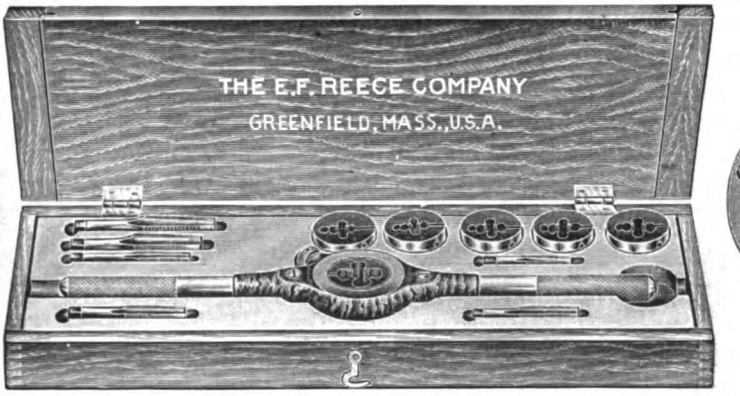
REECE REECE

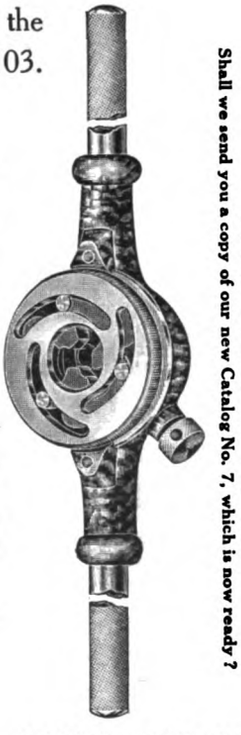
CAN YOU AFFORD TO NEGLECT THIS GREAT OPPORTUNITY?

We request you to place your order with your dealer. If for any reason he cannot fill your order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.



Top View—Adjustable Guide Stock





Bottom View—Guide Stock

Shall we send you a copy of our new Catalog No. 7, which is now ready?

For 35 years we have been in the Tap and Die Business and have learned by experience the best way to make Good Taps and Dies.

You can depend on it—whatever you get from REECE will be right.

The E. F. Reece Co.

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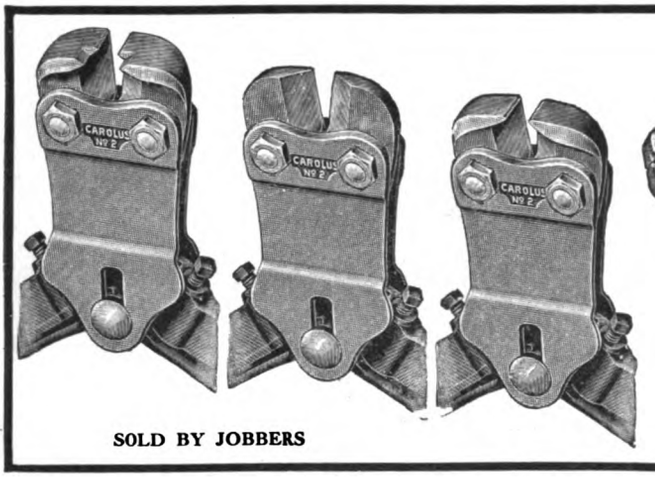

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Nut Splitters and Bolt Clippers

Most Complete, Practical and Durable Manufactured.

MADE IN THREE STYLES

Enlarged views of cutting blades at left. Write for Circulars and Prices.

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STERLING, ILL., U. S. A.

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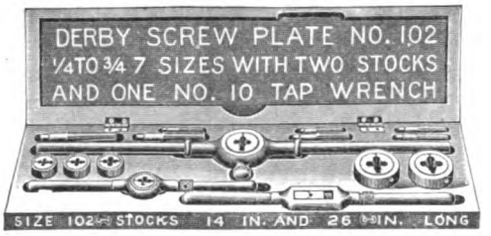
DERBY SCREW PLATES



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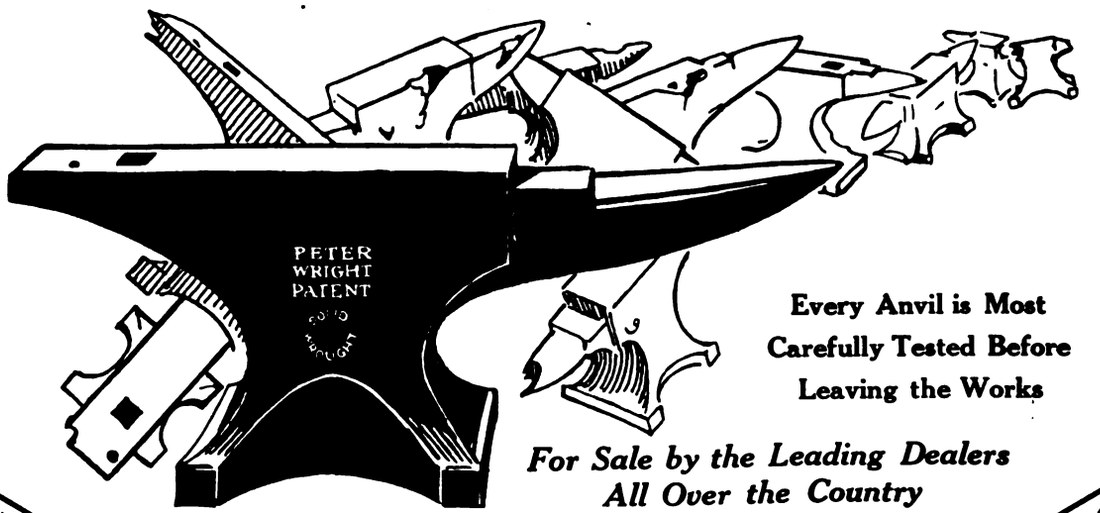

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You can always **guarantee** your work if you use taps stamped with this trademark

Little Giant



These machines and hand taps will give you the **best service** for the **longest time.** Be sure to ask for them by name.
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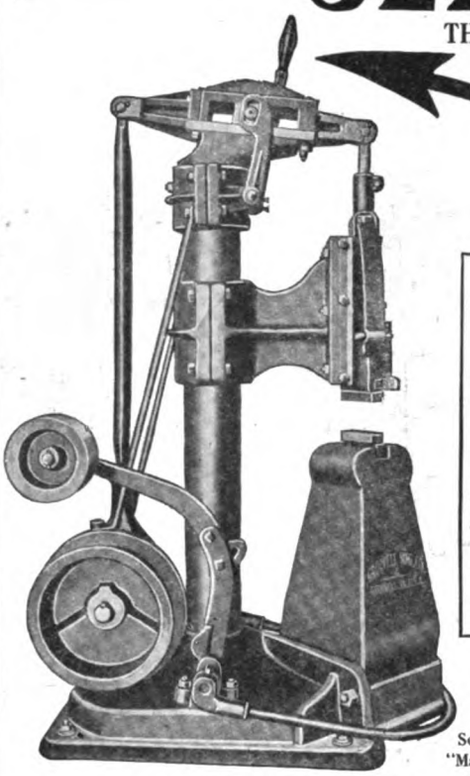

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Makes Smithing Easy
Ask the many users.
The new square base is a marked improvement, adding about one hundred pounds to the weight of machine.

Send now for booklet, "Makes Smithing Easy."

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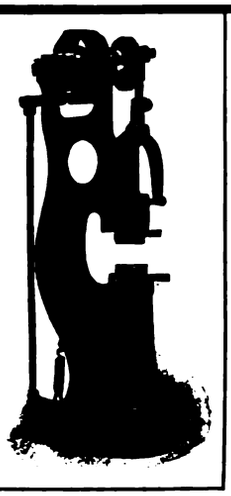

Hook'er to your lngin'

STAR POWER HAMMER

50-lb. Steel Head
Adjustable Stroke
Fully Warranted

All Jobbers or Write
STAR FOUNDRY CO.,
ALBERT LEA, MINN.,
For Circulars and Testimonials

BLANKET, TEXAS, 12-5-'09.

STAR FOUNDRY CO.,
Albert Lea, Minn.

Dear Sirs:—In regard to the Star Power Hammer will say it has given perfect satisfaction in every respect and we think there is no better hammer made. We have done a great deal of work this season on it.

Yours respectfully,
J. F. CARTWRIGHT & SON.

THAYER, IND., 11-9-'09.

STAR FOUNDRY CO.,
Albert Lea, Minn.

Gentlemen:—Your letter at hand and in reply will say that the Star Power Hammer is giving good satisfaction, and will say that I am well pleased with it.

I have followed factory work most of my life and have run a number of different makes of hammers and I find the Star Hammer to do as good work as any high priced hammer. I run a Bradley Cushen Helve Slip Belt Hammer for four years in the David Bradley Plow Works at Bradley, Ill., and for sharpening plowshares and other quick work give me the Star Hammer, as the thrust is direct vertical, makes it easier for the operator to handle his work.

Yours truly,
ALFRED WILLIAMSON.

Burlington Rubber Tire Machine



Our big No. 4 is the only machine made that will apply all kinds of solid and cushion rubber tires both internal and outside wires and close the joint on the same machine. One man can operate the machine easily without help. Put an end to your troubles in applying tires by investigating this machine. Write for description circulars and price.

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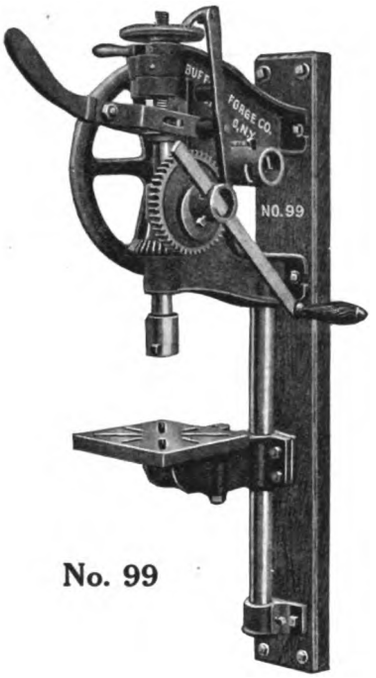

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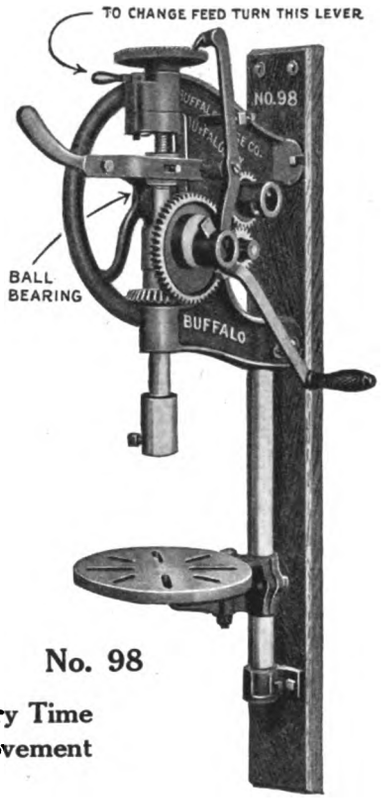
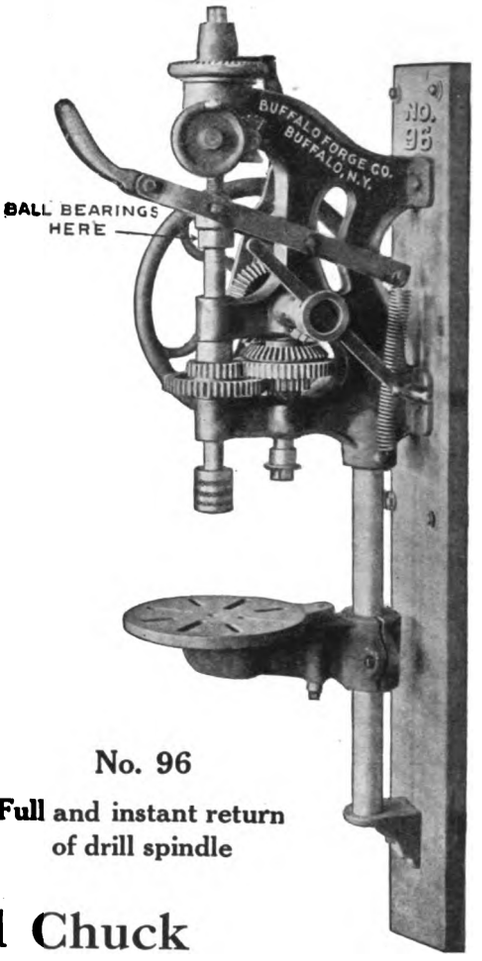


No. 98

These Drills Have Every Time and Labor Saving Improvement

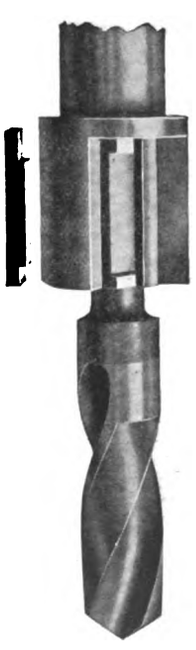
See Opposite Page



No. 96

Full and instant return of drill spindle

Buffalo "Suregrip" Drill Chuck



Cross Sectional View



The Chuck

Consists of only two parts, the key and the collar. The key rests in a slot in the drill spindle, around which the collar revolves. The outer side of the key rests against the collar. A half turn of the collar either way forces the key against the flat side of the drill and

Locks the Drill Securely

until a half turn back releases it.

When in line the Os on drill spindle and chuck indicate the chuck is open.

No Screws or Projecting Parts

to injure the hands or tear the clothing.

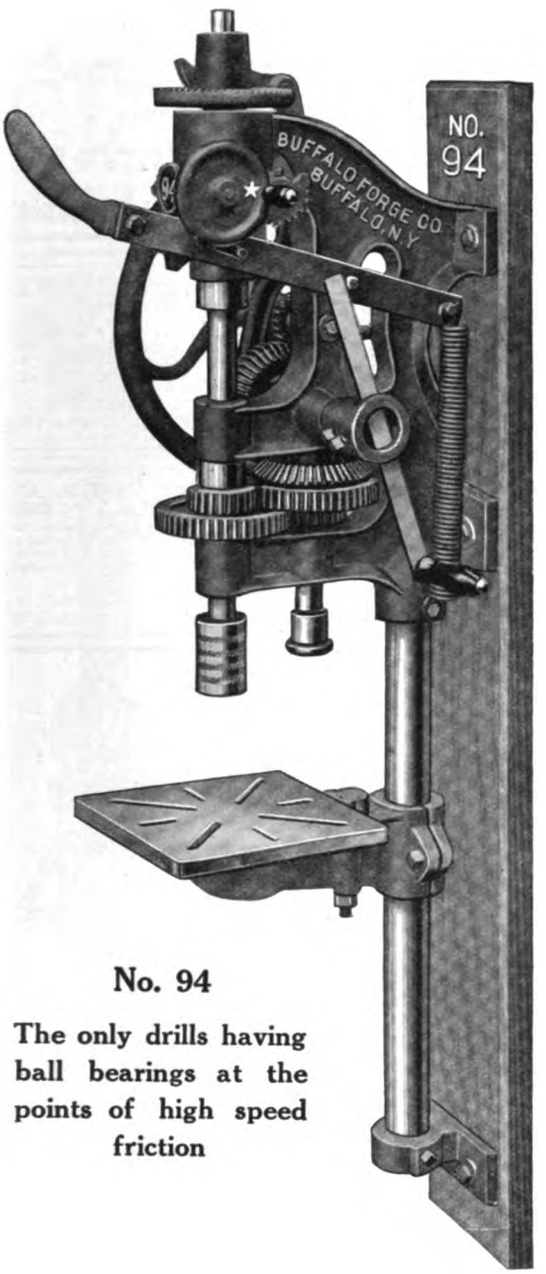
Buffalo "Suregrip" Drill Chuck is regularly furnished on Buffalo Drills 89, 90, 94, 96, 98 and 99.

List Price, Separately, $2.00

Ask for Blacksmith Tool Catalog A. B.

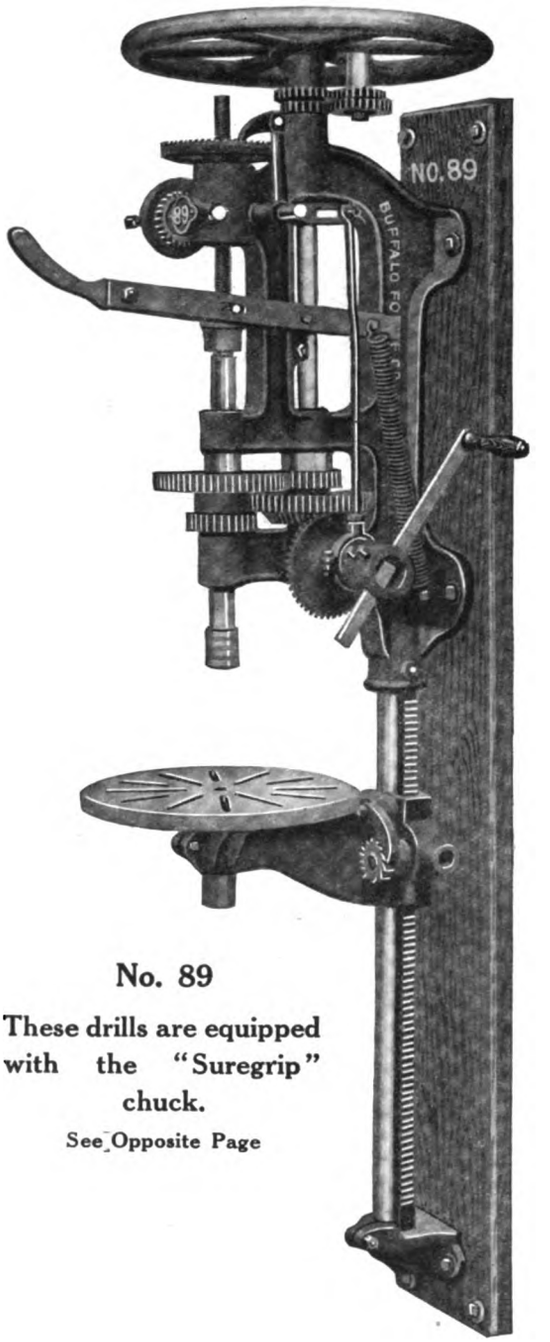
Buffalo Forge Company

Bearing Drills



No. 94

The only drills having ball bearings at the points of high speed friction



No. 89

These drills are equipped with the "Suregrip" chuck.

See Opposite Page

Ball bearings practically applied reduce friction below any unit of measure. Increase the efficiency of power applied 50 per cent.

Long journal bearings bored and reamed in the solid metal of the frame, machine-cut gears, perfect fitting parts, insure easy operation, without noise, loose motion or back lash.

Instant, Full Feed Run Return of Drill

A half turn of the handle at the feed screw head gives lever control, with instant return of drill spindle the full length of drill.

Drill a Hole, Let Go. You Are Ready for More

Turn the handle back, it immediately and positively locks the power feed. Equipped with Buffalo "Suregrip" Drill Chuck.

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1 1-2 to 10 H.P.

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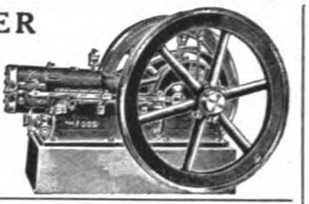

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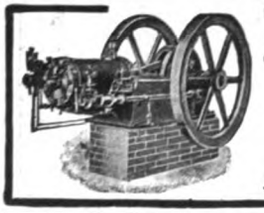

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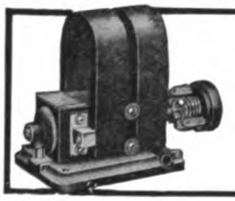

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Prices are right.
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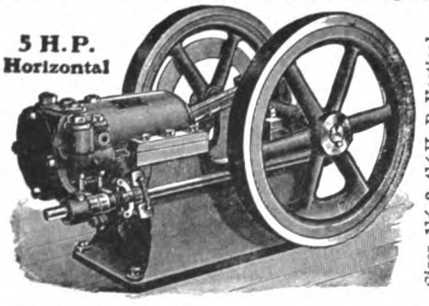

Sizes, 1¼, 3, 4½ H. P. Vertical, 5 to 25 H. P. Horizontal. Either tube igniter or electric igniter. Shipped mounted on skids, if desired for farm use.

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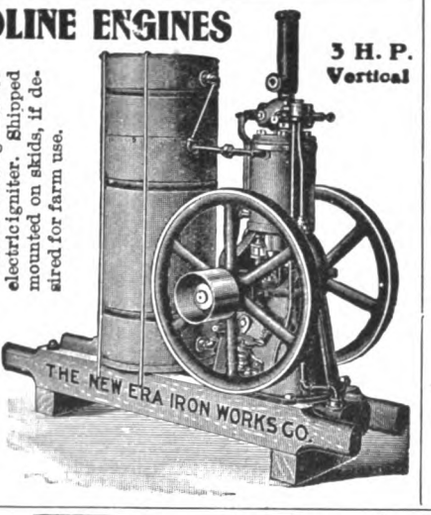

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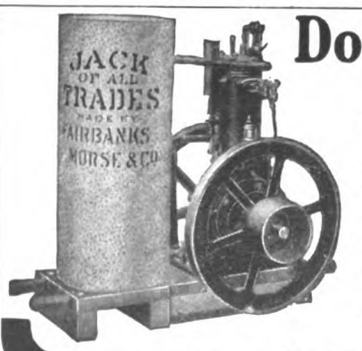

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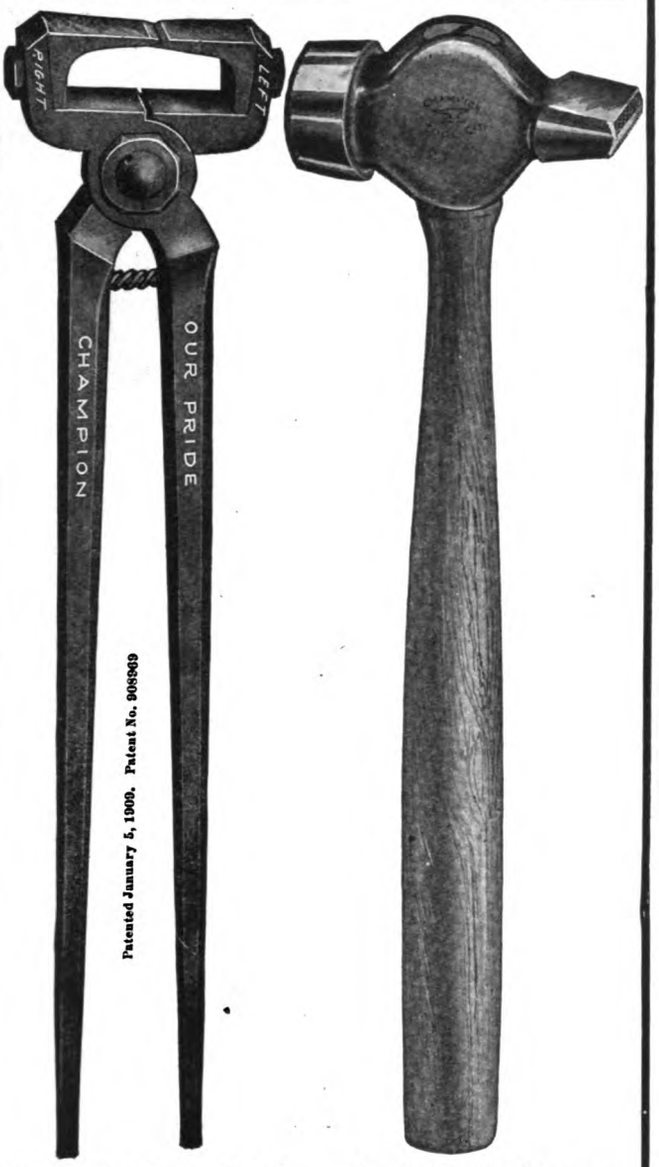

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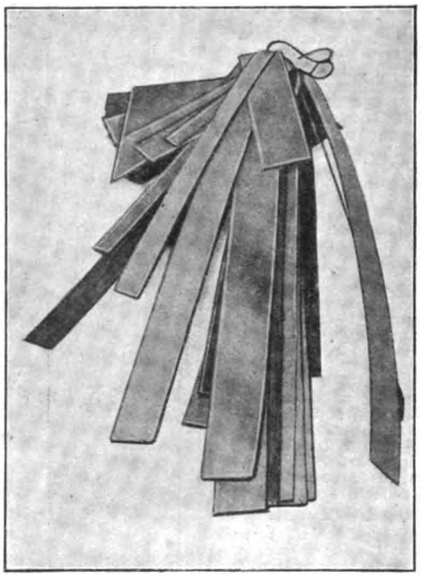

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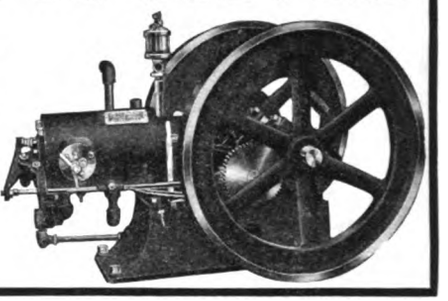

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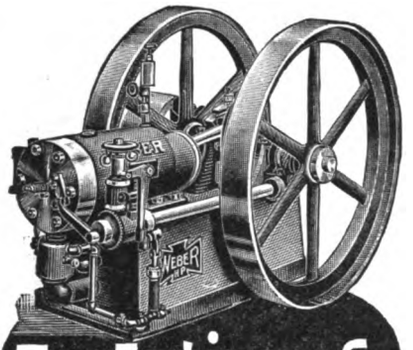

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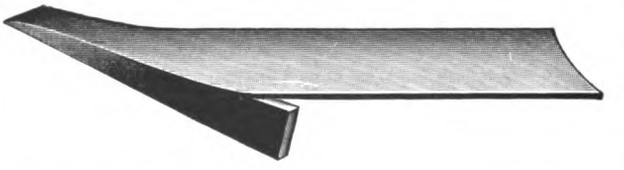

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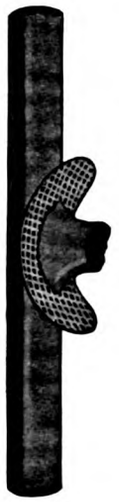

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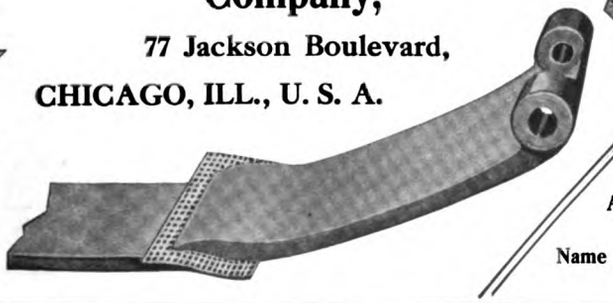





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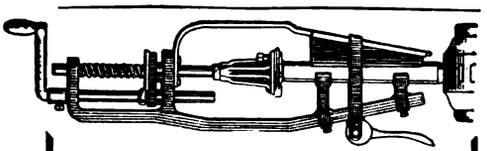
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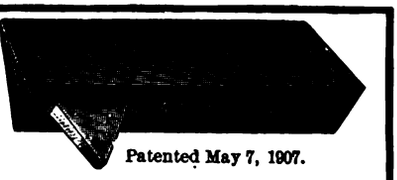
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Sample sent on request.
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Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in American Blacksmith advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

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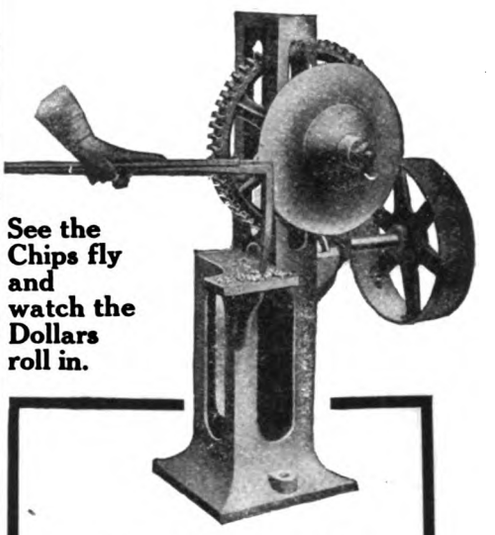

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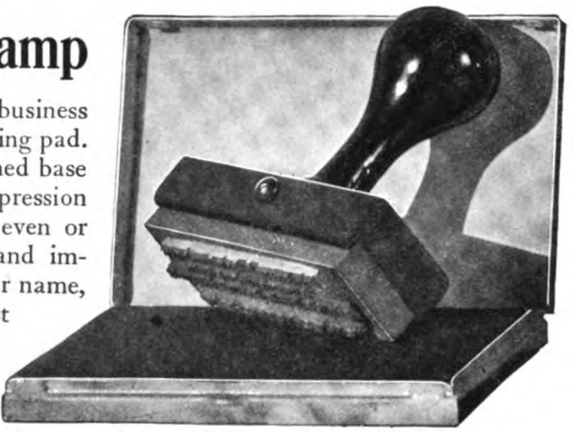
The subscription must be for some person whose name is not now upon our books. One new subscription must be sent for each premium desired. If you are not a subscriber send in your order with that of some other smith and get two premiums.

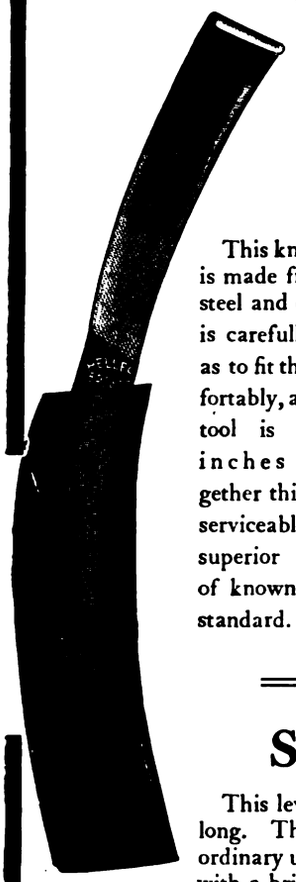
SEE NEXT PAGE.

SEE PRECEDING PAGE

Your Name on a Rubber Stamp

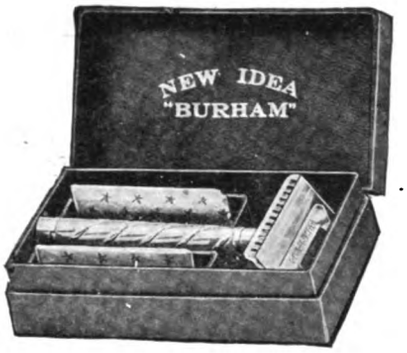
What is more useful than a rubber stamp bearing your business card? This outfit consists of one rubber stamp and an inking pad. The stamp itself is of the improved cushion style with polished base and handle. The cushion in the base insures a perfect impression regardless of whether the surface to be stamped is perfectly even or not. The pad is self-inking and is good for several thousand impressions. The stamp may have three lines on it. Your name, business and address. Can you suggest anything more useful for an up-to-date business smith?





HELLER'S Shoeing Knife

This knife is of the celebrated Heller Brothers make. The blade is made from their own production of special refined, clay crucible steel and carefully tempered by a secret process. The wood handle is carefully shaped so as to fit the hand comfortably, and the entire tool is about nine inches long. Altogether this is a very serviceable tool of superior quality and of known and tested standard.



Starrett's Spirit Level

This level is of the L. S. Starrett Co's make and is 3¼ inches long. The glass is well protected to prevent breakage under ordinary usage and the entire level is very neatly finished in Japan with a bright base. This little tool is guaranteed to be accurate and will be found very useful at the bench and about the shop.

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The greatest home comfort for any man is a good safety razor. The **New Idea "Burham"** is a full-sized, genuine safety razor that will insure ease and comfort in shaving. You cannot cut yourself with it, and will be able to shave in about one fourth the usual time. Of course, it is not to be compared with the expensive high-priced outfits, but the "Burham" outfit consists of one highly-finished plated holder and seven sharp "Burham" blades, all packed in a neat imitation leather box with a hinged cover. The blades are carefully packed in oiled paper and tinfoil, thus insuring their reaching you bright, clean and in perfect shaving condition. No honing or stropping required to enjoy a good, clean, easy shave—just insert a sharp blade in the holder and shave.



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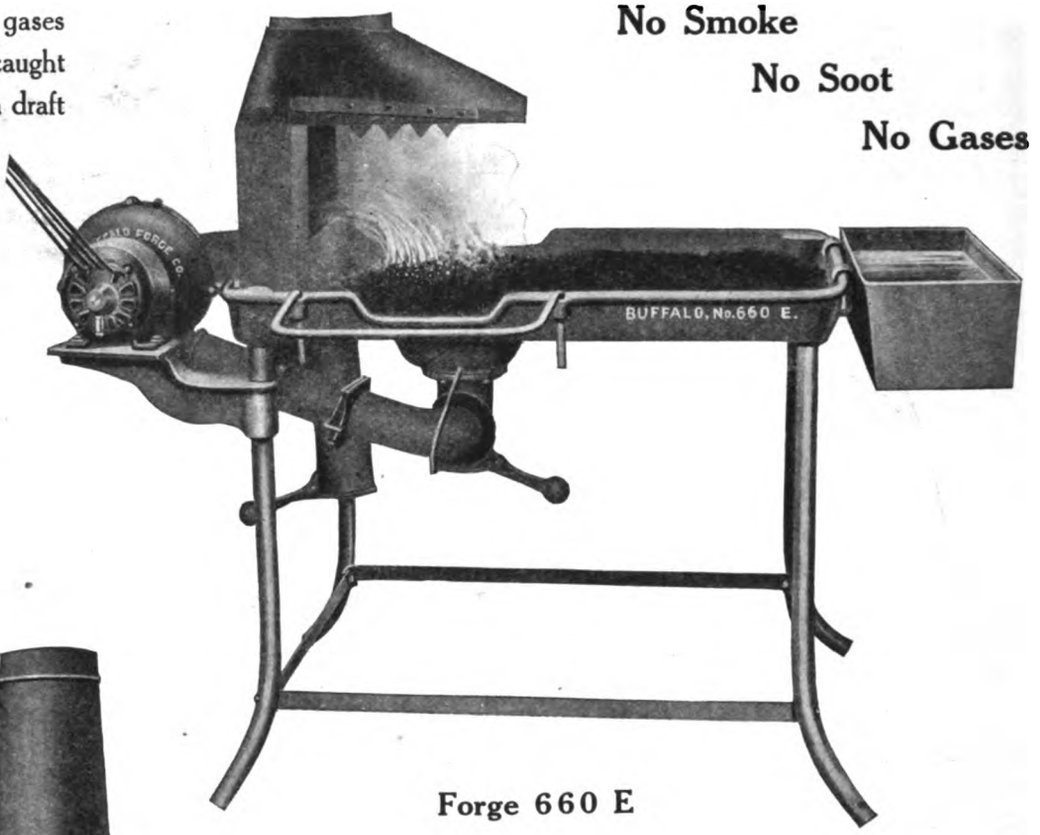

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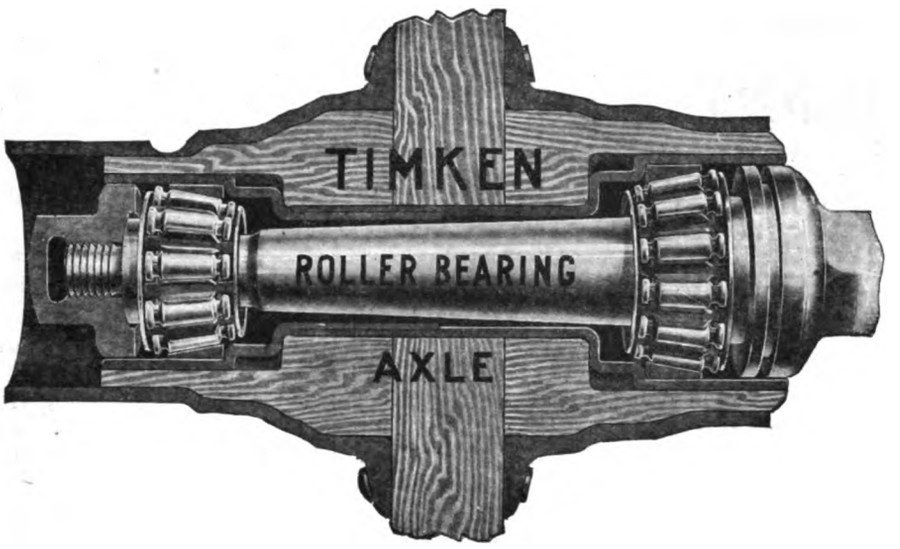

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For its location in this issue, see Index on Page 33.

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See page 27 for Index to Advertisers

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The Awl For All



This little tool is a marvel; regular hand sewing machine. Will mend anything from thin fabrics up to heavy shoe and harness leather. Worth its weight in gold. It is just the thing for sewing buggy tops. Every blacksmith or wagon-maker needs one. He would save ten times its cost every year. Only $1.00 postpaid. Special terms to agents. Great money maker.

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has all of the good points that go into any gasoline engine besides many exclusive patented features. A few days' trial will enable you to point out the superior points that make the

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the best engine for every conceivable purpose. We will send to any responsible person a Waterloo Boy on 30 days' free trial and if it does not do all and more than we claim, if you are not satisfied that it is the best, cheapest and most economical engine to operate, send it back and we will pay the freight both ways. Can you think of a more liberal proposition than this? Write today for our free catalogue, showing styles and sizes and our free trial offer blank.

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YEARLY CAPACITY 15000 ENGINES — 30 DAYS FREE TRIAL

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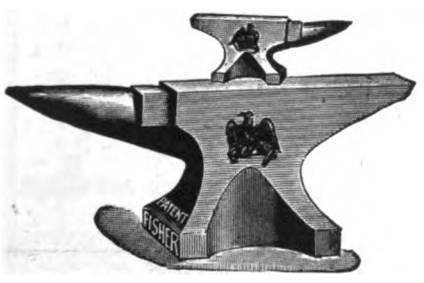
200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



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THE ANVIL OF MANY MEDALS.

The "EAGLE ANVIL" has taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always says: "Nothing but an Eagle for me." Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few years' use.

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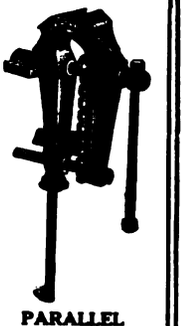
The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last a lifetime.

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base.

Write for our descriptive Anvil and Vise Catalog.

Our goods are handled by reliable dealers everywhere.



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FISHER & NORRIS, 33-47 Fair St., TRENTON, N. J.



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STEEL WHEELS
TO FIT ANY AXLE
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OUR GROOVED TIRE.

A FULL LINE OF
WOOD AND STEEL FARM TRUCKS
WITH STEEL OR WOOD WHEELS
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WORTH MORE
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Than Any 50-lb.
Steel Head
Hammer
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Hook'er to your Ingin.

Thousands of satisfied customers.
Send for letters and Catalogue.
Star Foundry Co., Albert Lea, Minn.
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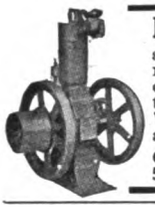

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and you will have the simplest, most reliable and cheapest to operate, engine on the market today. Built in all sizes. Write at once for catalogue and prices.
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LAMENESS from a Bone Spavin, Ring Bone,
SPLINT, CURB, SIDE BONE or similar trouble can be stopped with
ABSORBINE

Full directions in pamphlet with each bottle. $2.00 a bottle at dealers or delivered. **Horse Book 9 D free.**

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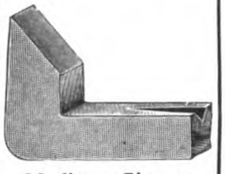
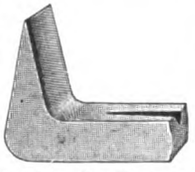
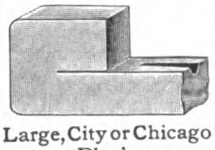
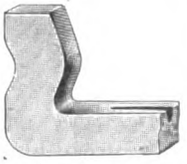
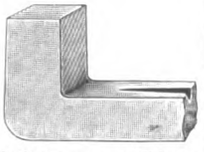
Some of the Calks made by our Machine


Medium, City or Chicago Sharp


Medium, Ordinary or Country Sharp


Large, City or Chicago Block


A Blunt Philadelphia Kink


A Summer or Blunt Calk, any desired Length

The American Calking Machine
Was Demonstrated during the Master Horseshoers' Convention
At Davenport, and was
pronounced by all the greatest success and saver of labor ever presented to the craft.

Sent on Ten Days' Trial.

Write today for our Special Offer and Folder.



No Hammering for Sharp Shoeing

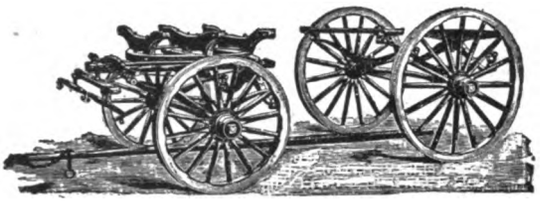
Just heat the shoe and one pull of the lever makes any calk.

American Calking Machine Co.
First National Bank Building, Chicago

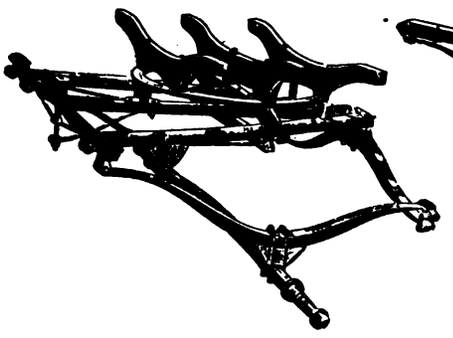
SELLE GEARS—1,000 STYLES AND SIZES

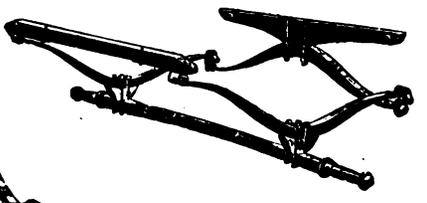


No. 60 L. Ready for body. 9 sizes—1¼ to 1¾ in. axles.



No. 32 H. Ready for body. 15 sizes—1⅛ to 2 in. axles.

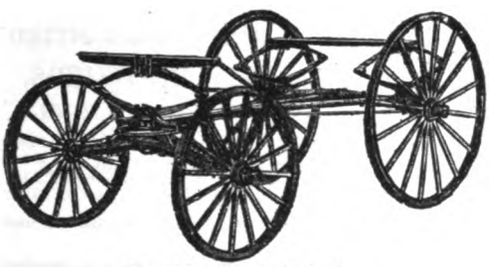




No. 16 H Clipped.
15 sizes—1⅛ to 2 in. axles.



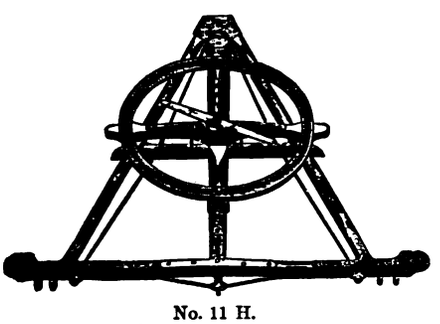
No. 40 B. L.
15 sizes—1⅛ to 2¼ in. axles.



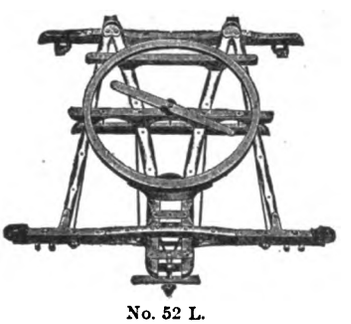
No. 301. Ready for body.
6 sizes—1½ to 1¾ in. axles.



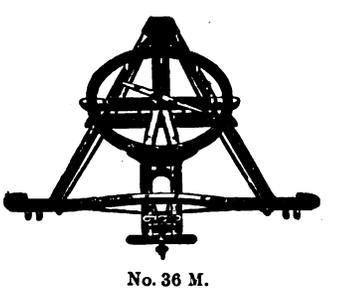
No. 0. Short Turn Gear.
4 sizes—1⅛ to 1⅜ in. axles.



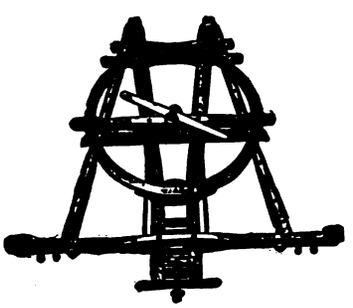
No. 11 H.
15 sizes—1⅛ to 1⅜ in. axles.



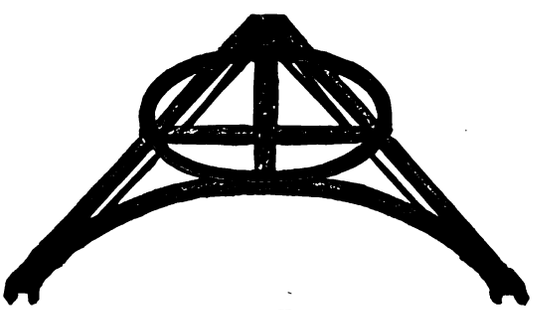
No. 52 L.
21 sizes—1½ to 3 in. axles.



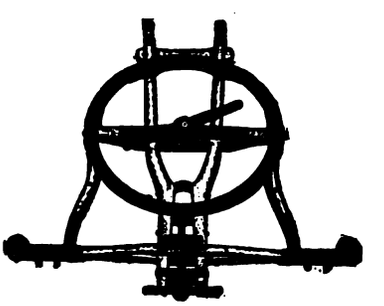
No. 36 M.
15 sizes—1⅛ to 2 in. axles.



No. 44 H
21 sizes—1½ to 3 in. axles.



No. 3 H.
13 sizes—1 1/16 to 1½ in. axles.



No. 64 M.
12 sizes—1⅜ to 2½ in. axles.

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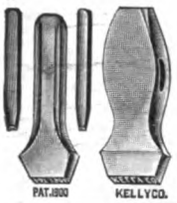

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We make stamps for blacksmiths for any purpose. Makers of Machine Name Plates, Checks, Stencils, Badges. No matter what your needs may be in the Stamp or Tag line. We'll guarantee satisfaction.

FRED C. KAUTZ & CO.
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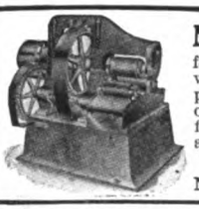

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for rolling steel and iron tire for wheels to a circle of any desired diameter. It will bend tire from the lightest to 10" wide by 1" thick. Is heavy and well proportioned. Furnished with tight and loose pulleys, with friction clutch pulley, or direct connected motor, if desired at an additional charge. We also manufacture solid steel loose collar axles and the National self-oiling tubular axles and steel stock and hog troughs.

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See That Cushion?

It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



Heavy Leather Back

NO LAMENESS
NO SLIPPING
CHEAPEST AND BEST



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REVERE RUBBER CO.
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The New Little Giant Trip Hammer

Made in 3 sizes
25 lbs. 50 lbs.
100 lbs.

Over 2,000 Now Sold

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Special Inducements to Blacksmiths

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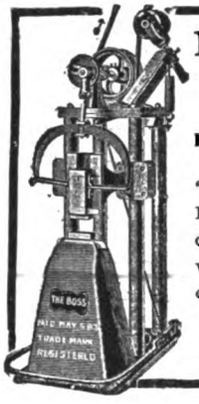

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For Plow Work, Wagon Work, Heavy Work, Any Work.

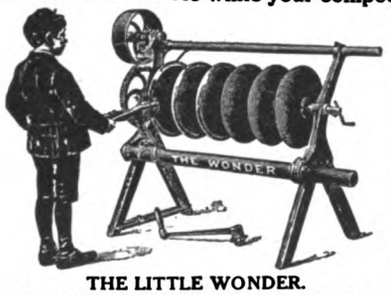
"Will strike as you like." Heavy or light at full speed or less. A broken anvil will cripple no other part of the hammer.

G. E. DAVIS, Mgr.
DUBUQUE, IOWA.

WONDER DISC SHARPENERS

SAVE ½ THE TIME AND ALL THE LABOR.

The Wonder Disc Sharpeners save over one-half the time and labor. Every wide-awake and up-to-date shop owner who has sharpening of disc harrows and disc plows should have one of my Wonder Disc Sharpeners. With these machines you can sharpen a whole set of discs while your competitor is taking off the shaft in the old fashioned way.



THE LITTLE WONDER.

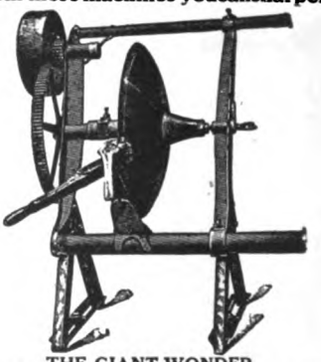
The LITTLE WONDER will sharpen any size disc up to 22 inches in diameter. The accompanying cut shows the LITTLE WONDER at work on a whole section of discs. This machine is especially adapted for sharpening Disc Harrows.

You Can Increase Your Earnings.

when you have one of my machines as you can turn out more work and please your customers better than by sharpening in the old way.

Operated either by hand or power.

Can shear any part of edge to any bevel. Also shear back from edge as far as required. The tool can be used on either side of the disc and can be shifted from one disc to the other. All these things can be done without the turn of a set screw or nut. Is a positive feed; *automatically adjusts itself to wobbling or bent discs.* Knives made of best grade self-tempering steel and will last a lifetime for hand or power.



THE GIANT WONDER.

The GIANT WONDER is a larger and heavier machine; has holder attachments for rolling coulters and DISC PLOWS; will take in discs up to 32 inches in diameter; is a geared machine and will also take in disc harrow sections same as the Little Wonder and do the work equally as well. The only machine on the market with these advantages.

ALL OUR MACHINES GUARANTEED.

We will take back and pay the freight both ways on any machine which does not prove to be exactly as represented and satisfactory in every way. You cannot lose in buying a machine with this liberal guarantee. Most all dealers sell Wonder Machines, but if yours does not, write us direct and please send us his name. Be sure to write at once for descriptive circulars. Don't let another season go by without making money by installing a Wonder Machine in your shop. Address all communications to

A. E. DURNER, Sole Manufacturer, Main Office, **Evansville, Wis.** CANADIAN BRANCH: London, Ontario, Canada

NW

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THE MARK OF QUALITY



NORTHWESTERN HORSE NAILS

Are now being used by the great majority of up-to-date Horse Shoers throughout the Country. Once used, you will use no other make — satisfaction to all. For Strength, Safety, and Quality of Material, they have no equal on earth. The Most Perfect in Form and Finish. The Re-enforced Point makes it the Easiest Nail to Drive and the Safest Nail to Use. Will hold a shoe longer than any other Nail on the market. Northwestern Horse Nails are made of the best Swedish Iron and every care is taken in manufacturing them.

TO the thousands of Horseshoers who number among our steady patrons, and likewise to the trade in general, we wish to say that during the year of 1910 the same High Standard of Quality will be maintained in the making of these Nails.

UNION HORSE NAIL COMPANY

SOLE MANUFACTURERS

CHICAGO, ILL.



Clip Horses For Profit

This splendid machine only $7.50. It is the **Stewart No. 1.** Send $2 and we will ship it C. O. D. for the balance. If you are not pleased, return at our expense and get your money.

CHICAGO FLEXIBLE SHAFT CO.
186 Ontario Street Chicago



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Steel Letters and Figures
BURNING BRANDS
Stencil Dies, Stencils, Etc.
Geo. M. Ness, Jr.,
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Price List sent upon application.





BUGGY TOPS, $4.60
TOP BUGGIES, $35.00
RUNABOUTS, $32.00
Cushion Backs, Storm Fronts, Poles & Shafts.
Write for 100-page Catalog.
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"Tools That Wear"

HELLER'S CELEBRATED AMERICAN HORSE RASPS, FILES AND FARRIER'S TOOLS

will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence All made from our own Production of Special Refined Clay Crucible Steel and tempered by a Secret Process. New Catalogue Mailed Free on Application.



"FITTING HAMMER."

HELLER BROTHERS CO., Newark, N. J., U. S. A.



Try Borax-ette for Welding Toe-Calks

THEY WON'T KNOCK OFF

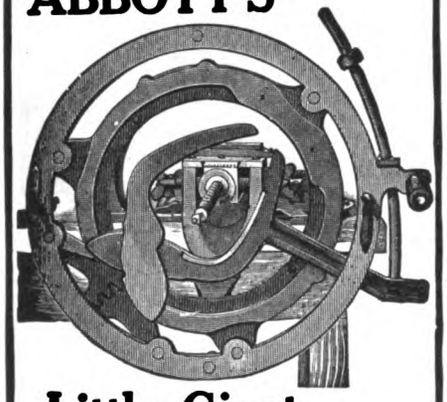
It makes steel weld like iron. It has no equal for welding tires, axles and springs

FOR SALE BY ALL DEALERS

SAMPLES FREE

CORTLAND WELDING COMPOUND CO., Cortland, N. Y.

ABBOTT'S



Little Giant Hub Borers

AND **Abbott's Box Puller**

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

PHINEAS JONES & CO., Newark, N.J.
General Agents for the Eastern States

We make the following sizes:
No. 1, 3 in. wide, 14 in. high
" 2, 3¼ " 14 "
" 3, 3¼ " 10 "
Weight per set of 4, 16 pounds.



This shows the strength of our STANDARD as compared to the old style.

The Bruce Malleable Wagon Standard

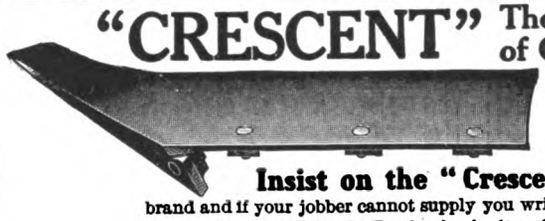
Tested thoroughly and guaranteed strictly as represented. Note its great advantages over the old style.

1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.
2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.
3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only a ⅞-in. face.
4. Great time saver. Can be attached to bolster in one fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, write today and ask for prices.

A. H. HARSHBARGER, Danville, Ill.

"CRESCENT" The Mark of Quality





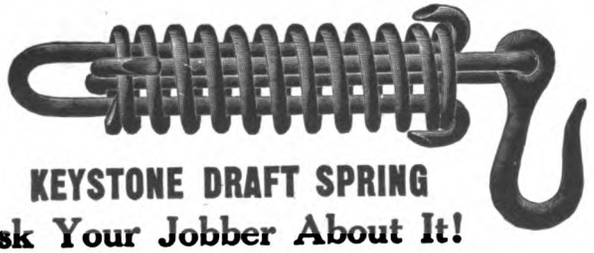
Insist on the "Crescent"
brand and if your jobber cannot supply you write us direct.

We manufacture a full line of High Grade Agricultural Steel Shapes, Fitted and Bolted Plow and Lister Shares, Merchant Plow Shares, Cultivator Blades, Subsoiler Blades, Landsides, etc., etc.

WRITE FOR CATALOGUE.

CRESCENT FORGE & SHOVEL CO., Havana, Ill., U. S. A.

- USE HORSE SENSE -



KEYSTONE DRAFT SPRING

Ask Your Jobber About It!

MANUFACTURED BY

RAYMOND MANUFACTURING CO., Ltd.
CORRY, PENNSYLVANIA

THE KEYSTONE TRACE OR DRAFT SPRING
RELIEVES THE HORSE OF ALL THOSE JARS CAUSED BY THE UNEVENNESS OF THE ROAD AND WHEN TAXED TO ITS FULLEST CAPACITY SIMPLY CLOSES, THUS FURNISHING A SOLID CONNECTING LINK AND AVOIDING ALL POSSIBILITY OF BREAKAGE.

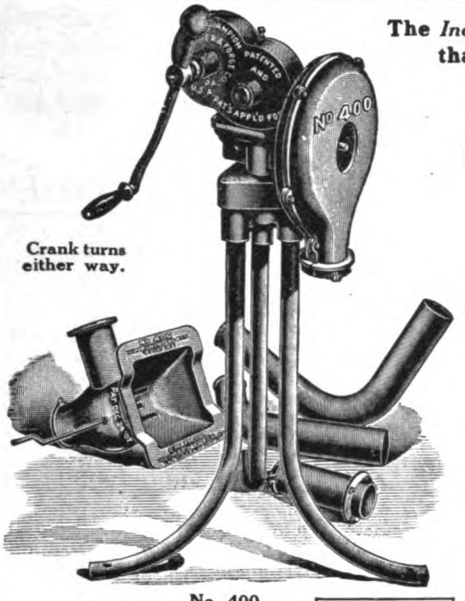
LOOK INTO IT!

The *Incomparable* 400 Blower, the one great *Heirloom* that will be handed down *from one generation to the other. Ask what the owners say*

MADE WITH BALL BEARINGS ONLY

Nearly Half A Million in Use

The No. 400 is the Blower that has REVOLUTIONIZED the World in Making Hand Blast



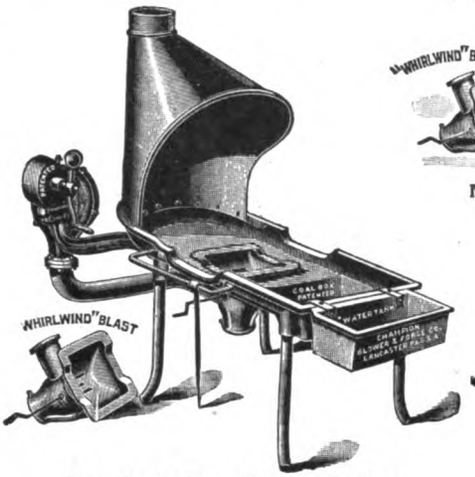
Crank turns either way.

No. 400

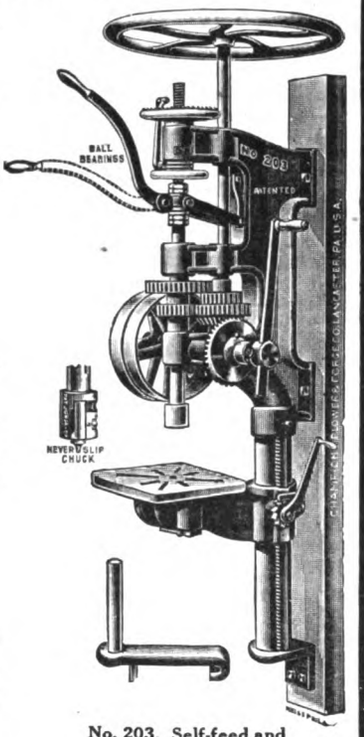
The No. 400 Steel Blower will serve the youngest mechanic faithfully without expense for a long lifetime.



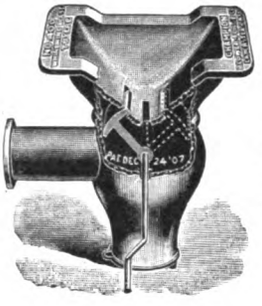
No. 408. Steel Blacksmiths' Forge



No. 433. Cast Iron Blacksmiths' Forge



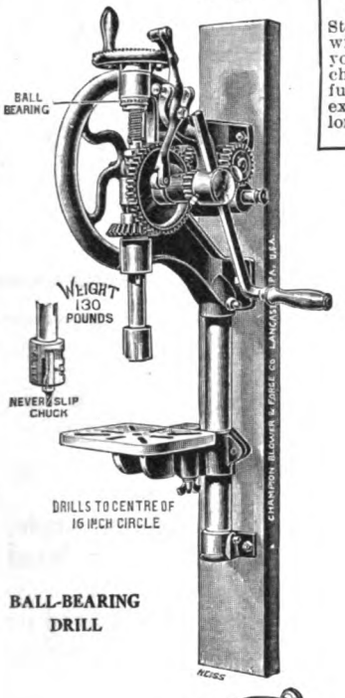
No. 203. Self-feed and Lever-feed Drill



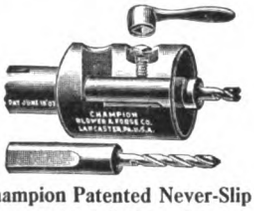
A Tuyere Iron That Makes A Whirlwind Blast.

The No. 400 Champion "Whirlwind" Blast Anti-Clinker, Heavy Nest Tuyere Iron is furnished with all No. 400 Blowers WITHOUT EXTRA COST.

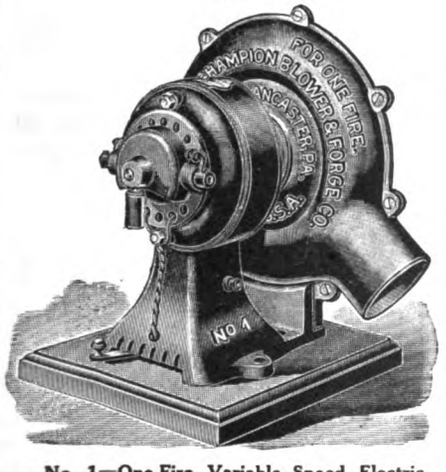
The "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron produces a circular, rotary whirlwind blast and concentrates the heat in the tuyere nest, not permitting it to blow up and out of the chimney, therefore, makes a hotter fire and heats the iron one third quicker, saving much coal.



BALL-BEARING DRILL



The Champion Patented Never-Slip Chuck is applied to all CHAMPION DRILL SPINDLES without extra charge

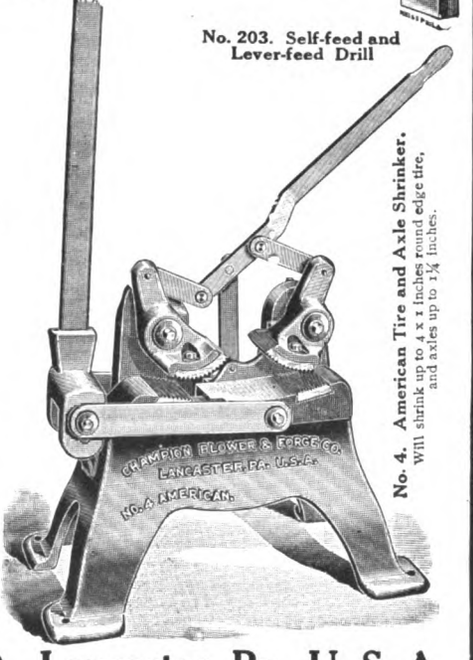


No. 1—One-Fire Variable Speed Electric Blacksmiths' Blower, with five speeds for LIGHT, MEDIUM and HEAVY fires.



Screw Plates in four styles, cutting up to 1½ in.

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power Blower, or Electric Blower, write for our free catalogue, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4 x 1 inches round edge tire, and axles up to 1¼ inches.

THE CHAMPION BLOWER & FORGE CO., Lancaster, Pa., U. S. A.

Is Your Anvil Worn Out?

But it's NOT beyond repair for we can REPAIR old wrought anvils no matter how badly they are broken.



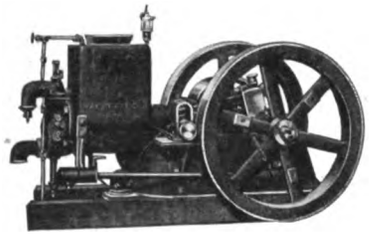
Before buying a new anvil write for our prices—it will pay you.

The Columbus Anvil & Forging Co.

Office, Wyandotte Building
Factory, West Frankfort St.
COLUMBUS, OHIO

K. C. Junior Gasoline Engines

STEAM COOLED **SINGLE PISTON**



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SIMPLE
ECONOMICAL
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For the auto painter who has exhausted his ideas on distinctive color combinations.

Inexpensive New Stylish
WRITE FOR SAMPLES

Palm, Fechteler & Co.

67 Fifth Ave., NEW YORK

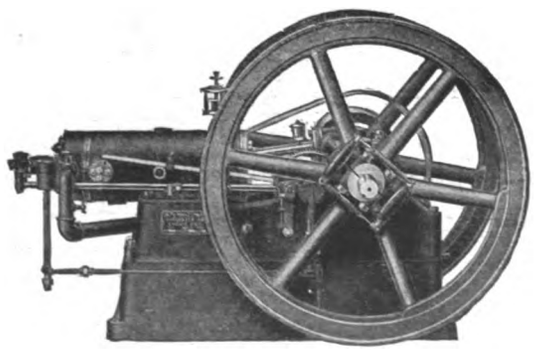
CHICAGO ST. LOUIS MONTREAL TORONTO

EVERY BLACKSMITH NEEDS AN I. H. C. GASOLINE ENGINE

You need an engine to get the most out of your efforts. Hundreds of times one of these simple, reliable powers will give you a more valuable service in a few minutes than you would get from a hired helper in a whole day.

Why not make an I. H. C. engine your handy man? You can call upon it whenever you need its service. You will find it ever ready. If it works for you steadily all day, its wages will be only a few cents expended for gasoline.

If you let it remain idle, its wages are nothing, its board is nothing, but it will be ready the next day to go right back on the job at your command.



Dependability, readiness, simplicity, economy, ease of operation—these are qualities that make I. H. C. gasoline engines appeal to all classes of mechanics. To no mechanic or shop worker is it more valuable than to the blacksmith.

You have your choice of many sizes and styles.

Verticals—2, 3, and 25-horsepower.

Horizontals (portable and stationary)—in 4, 6, 8, 10, 12, 15, 20 and 25-horsepower.

Air Cooled Engines—in 1, 2 and 3-horsepower.

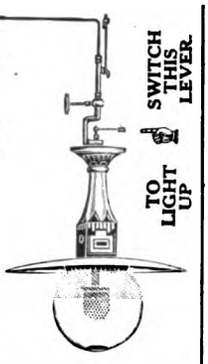
It will pay you to investigate these engines. It will interest you to look into their superior materials and the superior way in which they are constructed. Write for catalogues of the style in which you are interested.

INTERNATIONAL HARVESTER COMPANY OF AMERICA
(INCORPORATED)

13 Harvester Building *CHICAGO, U. S. A.*

HANDY LAMP
Gasoline Lighting System





The most practical invention since the introduction of Gasoline for lighting purposes, satisfying a necessity and overcoming obstacles to its use never before successfully accomplished.

A SHADOWLESS 300-CANDLE POWER LIGHT

that can be turned up or down instantly, same as gas, or can be left burning continuously, day or night, at a dim light of one (or low) candle power, or less, at almost no expense. It can be turned up instantly to a **dazzling, bright 300-candle power light** that will flood a 30-foot room with light as bright as day at less than 1-2 cent an hour.

IT WILL SAVE FIVE TIMES ITS COST

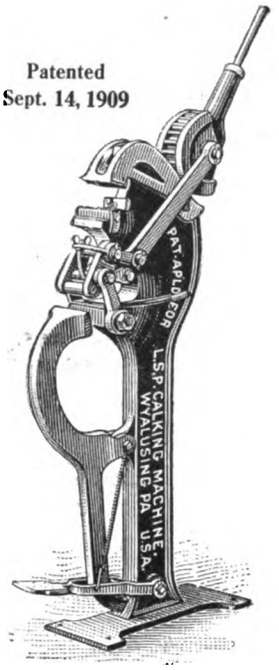
in a year over Kerosene, Gas or Electricity. The **Handy Lamp System** is free from smoke, smell or danger. One gallon of gasoline will last from 40 to 50 hours. It is the **simplest** and **safest system** ever devised, and it is equally attractive and appropriate for use in your **Home** or **Blacksmith Shop,** store, church or wherever good light is needed.

If you knew from actual experience how handy, how economical and how satisfactory this system is you would not be without one for ten times its cost. Write at once for AB Catalogue and particulars.

BRILLIANT GAS LAMP CO., Dept. 6,
12 State Street, CHICAGO, ILL.

THE ONLY CALKING MACHINE THAT CALKS A HORSESHOE COMPLETE

Patented Sept. 14, 1909



Makes 25 Different Styles Heel Calks

The only Calking Machine that with one pull of lever makes a heel calk complete, blunt or sharp, also makes double kink for the famous block calk, or sharpens side calk, with one pull of lever, welds blunt or sharp toe calks and forms toe clip with one pull of lever, also, has a shear to cut off either end of shoe.

Works equally as well on old shoes. The machine takes up but 8 x 16 inches floor space, and stands 3 feet 3 inches high, and weighs 131 lbs. All the working parts made of a special grade of steel. Fully warranted. Write now for circulars and prices.

Mt. Morris, N. Y., Nov. 15, 1909.
L. S. P. Calking Machine Co.,
Wyalusing, Pa.

Gentlemen:—I received my calking machine Oct. 26th, and I certainly can congratulate you on this machine, as it calks a shoe complete. It will be valuable to any blacksmith, and I most certainly say it is a decided success. We calked 33 shoes in 45 minutes. Every horseshoer should have one. Yours very truly,
(Signed) THOMAS WALSH.

L. S. P. CALKING MACHINE COMPANY
WYALUSING, PA., U. S. A.

KERRIHARD'S POWER HAMMER



does the work—while you smile on in contentment and satisfaction. There are no delays, starting and stopping by simple pressure of the toe of your shoe. Turns out three times the work in same length of time by hand. Never asks for more pay. Expects nothing.

Adds prestige to your shop and spells success for you.

You save $25.00 to $50.00 and get the only world's famous Hammer. Write today for full particulars and souvenir.



Hammer and Grinder Dept. **THE KERRIHARD COMPANY,** **RED OAK, IOWA, U. S. A.**

"Little Giant"

PUNCHES and SHEARS

NO SHOP COMPLETE WITHOUT ONE

Decidedly the BEST tool for the blacksmith shop.

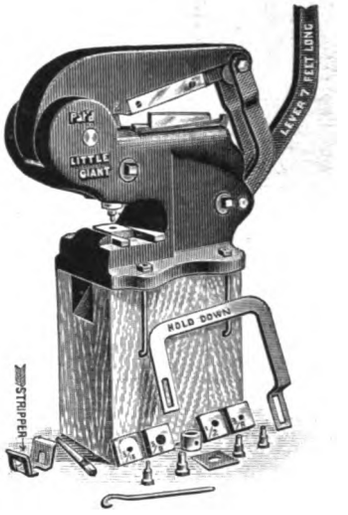
CHEAPEST IN PRICE—CONSIDERING CAPACITY AND EQUIPMENT.

Has been perfected over 15 years and they never wear out. Over 3000 in use today.

We make SEVEN other styles of Punches, Shears, etc.

Write for our new illustrated catalogue and price.

SOLD BY JOBBERS EVERYWHERE.



Little Giant Punch & Shear Co.

210 S. Market Street, SPARTA, ILLINOIS

INSIST ON "STANDARD" CALKS

BUY FROM YOUR DEALER

1895 - STANDARD TOE CALKS - 1909

HOT FORGED NIB

HIGH GRADE STEEL

DRIVES PERFECTLY



WELDS EASILY

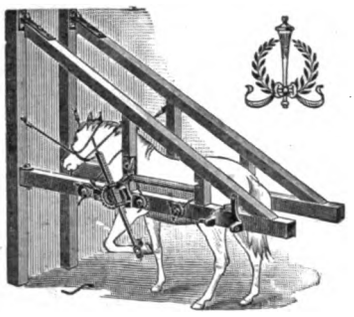
GIVE SATISFACTION

FRANKLIN STEEL WORKS

Joliet, Ill.
Cambridge, Mass.

Barcus Horse Stocks

are an ornament to your shop and will **attract** customers.



You would not hammer dynamite!
Why trust every horse? Some day—

As a time-saver; you will do twice your former amount of work. Will last a lifetime. Figure how much you gain. **Illustrated catalog sent free.**

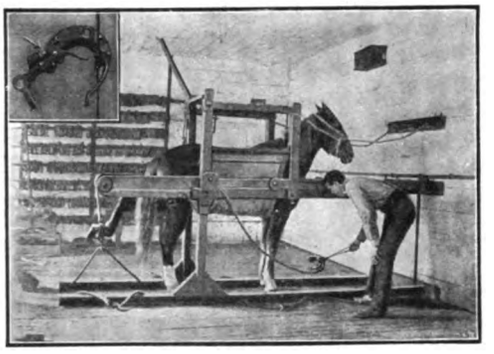
GEO. BARCUS & CO.

P. O. Box 45

WABASH, INDIANA

Home Telephone No. 725

HEMPHILL'S
NEW HORSE SHOEING STOCKS



The strongest stocks constructed, and consequently require no repairs and will last a lifetime. Our machine automatically adjusts itself to any sized horse, ranging from the smallest to one that will weigh 2400 lbs. Notice the only strictly automatic spring cuff. There is no time lost in securing the feet in preparation for shoeing.

Sold on 30 days' trial use and warranted to hold any horse and to give entire satisfaction.

Write for descriptive circular, giving detailed description and price.

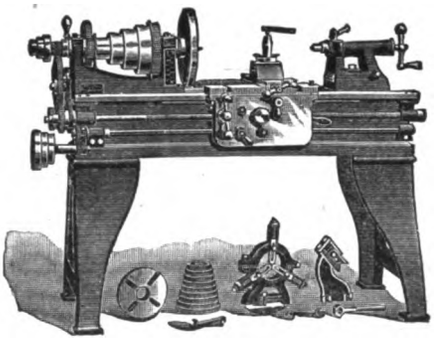
THE HEMPHILL HORSE STOCKS COMPANY

RENSSELAER INDIANA U. S. A.

THE SEBASTIAN 15" LATHE

Is the Standard Low Price High Grade Machine for

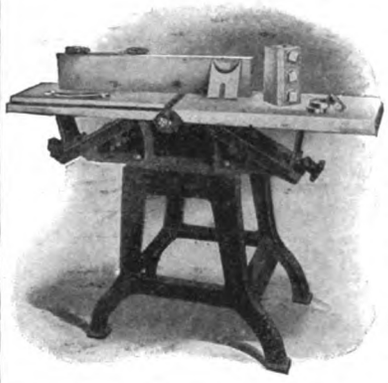
Automobile Builders, Repair Shops and General Jobbing Shops



This lathe handles the small and medium sized work that should never be allowed to tie up a big machine. Its work is accurate to a nicety and it turns it out at a very rapid rate. Convenience, rigidity and strength have been well looked out for in the design and construction. It has screw, rod and power cross feeds and cuts standard threads with furnished gears from 5 to 36. Let us send you the Lathe Book that describes in detail. Write for it.

The Sebastian Lathe Company, 124-126 Culvert St., Cincinnati, Ohio

THE WORLD'S FAMOUS LINE OF WOOD WORKING MACHINERY



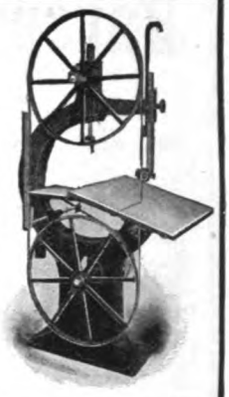
The view we show you here of our **Combination Jointer** and **Saw Table** is only one of the many attachments which we can furnish on this machine. We build it as a 6" or 8" jointer, with saw table attachment, 20" band saw attachment, boring machine, and an attachment for rounding wagon tongues and shafts and also an attachment for rounding fellies, in fact we can give you most anything you wish on this machine which is necessary to be used in a wagon or blacksmith shop. Get our prices on this **Famous** tool, either with band saw attachment or the band saw separate, same as shown in this Ad. Also get our special offer for sixty days.

THEY BOTH STAND FOR ECONOMY

Why our Band Saws are superior to any other machines on the market?

Because they are heavier, have greater capacity, more care is taken in the selecting of the materials, and the workmanship is thoroughly done. We build these machines in 20, 27, 32 and 36 inches, with either the ripping or resawing attachment for table, either with foot or belt power.

Get our Catalogue.



THE SIDNEY TOOL CO., :-: :-: Sidney, Ohio, U. S. A.



When You Buy Horse Shoes

Is it not preferable to make your selection from the most complete line and the best shoes on the market?

United States Horse Shoes

"In a Class by Themselves"

Our Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today.

We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.

United States Horse Shoe Company

Rolling Mills and Factory, ERIE, PA.

BLACKSMITHS MAKE MONEY



HAND FORGED, WARRANTED KNIFE BLADES
Price to you, ONLY $1.50 per dozen. You sell at 50 cents each. Knives finished complete, nicely polished, only $2.00 per dozen.

HAND FORGED

Butcher Knives

WARRANTED

YOU can make good money selling our HAND FORGED, WARRANTED KNIFE BLADES made especially for BLACKSMITHS, from the very best crucible tool steel, tempered by our special oil-drawn process, and ground ready for use. No marks or brand, excepting the word "warranted." Handles ready to be put on sent with each knife.

Send us your order TODAY for a few dozen and supply your friends and customers with the best knives they have ever used. You can also put out agents.

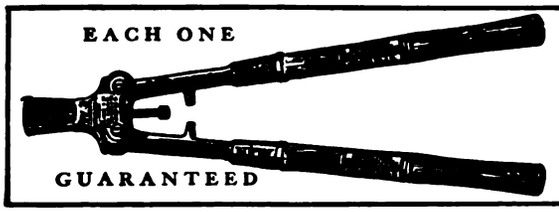
We warrant every knife and agree to replace each poor one with TWO good ones.

We refer you to the NUNDA BANK of NUNDA, N. Y., as to our reliability.

Providing you would like to see samples, send $1.50 TODAY and we will send you 12 of our best sellers, all shapes and sizes.

WOODWORTH KNIFE WORKS, NUNDA, N. Y.

Established 1876 ***F. E. WOODWORTH, Proprietor***



BOLT CLIPPERS

CHAMBERS BROS. CO.

N. Fifty-Second St., PHILADELPHIA, PA.

TRIMMINGS FOR EVERYTHING ON WHEELS

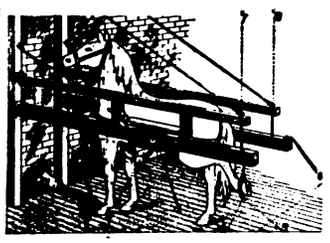
Wholesale Manufacturers

Write for Catalogue and Prices

Expert Work our Specialty.

TOPS FROM $4.40 UP.

INDIANA TOP & VEHICLE CO. Lawrenceburg, Indiana, U. S. A.



CHAMPION HORSE STOCK

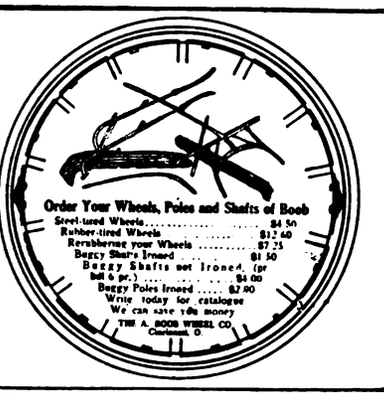
No Straps or Ropes used on Feet with these Stocks, but an Automatic Foot Clamp.

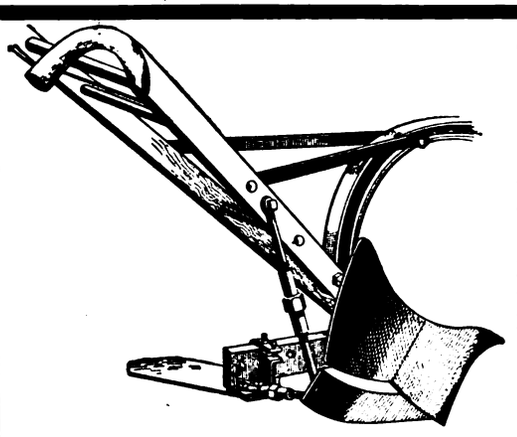
Make and hang frame.

We will furnish the rest and get the Best Stock for the least money. Testimonials furnished.

CHAMPION HORSE STOCK CO.,

LOS ANGELES, CAL., U. S. A.





The Covey Plow Attachment

will cut and turn one third more ground per day, used on any plow, than the same plow will cut without it, and does not increase the draft one pound.

A Great Money Maker for Blacksmiths

Write for terms and prices.

WALKER MANUFACTURING CO. :-: COUNCIL BLUFFS, IOWA

THE MAN who knows uses STERLING WHEELS They give results

STERLING

The Sterling Emery Wheel Mfg. Co.

TIFFIN, OHIO, U. S. A.

The Madison Wheel Co.

MANUFACTURE A FULL LINE OF

Vehicle and Automobile Wheels, All Sizes, Styles and Grades, also Gears, Axles, Poles, Shafts, Finished Rims, Finished Spokes, Etc.

QUALITY IS OUR MOTTO

All Goods Guaranteed. Prompt Shipments

The Madison Wheel Co.

MADISON, OHIO

Write today for our Catalog and Net Prices

Harvey Bolster Springs



CHANGE A FARM WAGON INTO A SPRING WAGON

They are made of the same grade of spring steel, formed, tempered and tested just as carefully as the finest carriage springs, and they ride just as easy.

They are designed to gain strength as the load increases. Every part is perfectly adapted to the strain put upon it.

This combination of easy riding qualities and strength is the result of twenty years' experience making Bolster Springs.

A good spring made of the best steel, tempered just right, will retain its strength and elasticity for years. An inferior spring will lose these qualities.

Insist On Getting Harvey Springs

They Ride Easier and Last Longer Than Any Others

The only way to be sure you are getting the best is to buy a spring with an old, established reputation.

You can always rely on **HARVEY** Springs.

SOLD BY JOBBERS

in all large cities, but not sold by mail order houses. Our stock is complete, and we are prepared to make prompt shipments.

We also make all styles of carriage and automobile springs.



SEND FOR OUR
BOLSTER SPRING CATALOGUE.
IT'S FREE TO YOU.

HARVEY SPRING COMPANY

Box 31 **RACINE JUNCTION, WIS.**

THANKS

To Blacksmiths, Horseshoers, Wagon Makers,
Everywhere:

This page belongs to us for this issue by purchase. We could use it selfishly for advertising purposes, fill it with pictures and profit by selling you something, if we desired to do so. BUT, there comes a time when it is proper and pleasant to express appreciation and thanks for past favors. Our success was never greater than today. Royal and Western Chief Forges, Blowers and Drills have found favor throughout the Blacksmith world. An ideal condition. Your confidence in us and ours has made all this possible. We make full acknowledgment of our obligation, and thank you sincerely.

The year 1910 will witness even more progress. Encouraged, we shall by merit alone endeavor to retain our present standing and obtain still further recognition from our Blacksmith friends.

Thanks.

CANEDY-OTTO MFG. CO.

Chicago Heights, Ill., :-: U. S. A.

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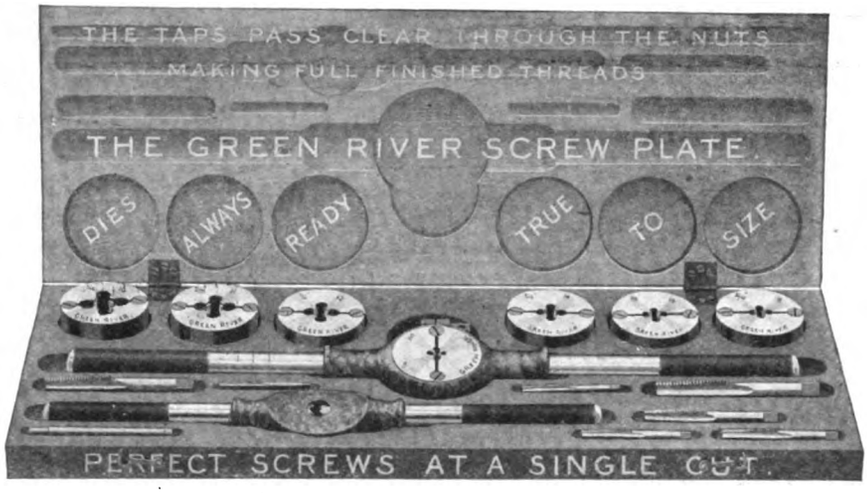
Green River Screw Plates

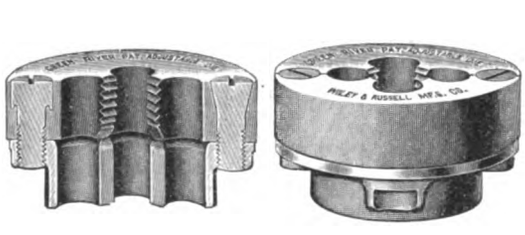


The dies are in two equal parts; the screws acting as a gauge, bring the dies ***central*** and thus ***distribute the work equally*** on the ***four*** cutting edges.

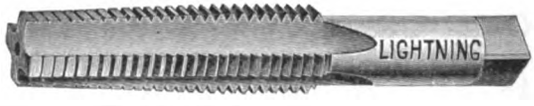
Dies are adjusted with ***one taper screw*** only.

It is unnecessary to remove dies from stock when adjusting.

The dies being ***in two parts,*** can be ***ground*** when dull.









Style of tap wrench supplied with Green River Screw Plates—***practically free of charge.***

Be sure to write for our large and handsome catalogue 34 D.

FREE TO ALL

Sole Makers

Wiley & Russell Mfg. Company

GREENFIELD, MASS., U. S. A.



Steel Tempering **KALUX** Hardening Solution



Registered at United States Patent Office.

ECONOMY, EFFICIENCY, SIMPLICITY,

The 20th Century method of hardening and tempering all water-hardening steels. A liquid. No cyanide of potassium. No prussiate of potash. No corrosive sublimate. Invaluable to the expert hardener and tool dresser. Indispensable to those with only limited experience. 30 to 150% efficiency gain.

Read the following, a few of the letters we get:

Lebanon, Pa.
Metal Hardening Solution Co.,
Gentlemen:
Have tried Kalux and find it just as you say. We get first-class tools out of second-class steel.
L. H. Hughes

Cleveland, Tenn.
Metal Hardening Solution Co.,
Gentlemen:
Kalux is just simply all right. It is the best solution I ever saw.
C. F. Carter

Fall River, Mass.
Metal Hardening Solution Co.,
Gentlemen:
I have tried Kalux steel hardening solution, and find it to be all that it is advertised.
John G. Brayton

Germantown, Md.
Metal Hardening Solution Co.,
Gentlemen:
We have had the greatest satisfaction with Kalux in tempering tools of all kinds.
Wm. G. Marth & Brother

Winona, Miss.
Metal Hardening Solution Co.,
Gentlemen:
Please give me prices on Kalux metal hardening solution. The sample sent me did fine work.
R. B. Mills

Kronstadt, Russia
Metal Hardening Solution Co.,
Gentlemen:
I take thisoccasion to confirm full satisfaction received from previous application of Kalux in my daily shop practice.
P. Wolkow

Melrose, N. Y.
Metal Hardening Solution Co.,
Gentlemen:
Kalux has given me the best results of anything I ever used.
Chas. H. Stearns

Huntington, Long Is., N. Y.
Metal Hardening Solution Co.,
Gentlemen:
Kindly send me a quart of your Kalux metal hardening solution. I find it to be the best solution I have ever used.
S. T. Cantrell

Atlanta, Ind.
Metal Hardening Solution Co.,
Gentlemen:
I wanted to test your solution on edge tools and find it all right, the best I have used in my line. Have worked in steel and iron for sixty years. Have tried a good many things, but I think this is the best.
S. H. Thomas

North Loup, Nebr.
Metal Hardening Solution Co.,
Gentlemen:
Kalux does more than you claim for it. My kid brother tempers a tool with it with more satisfaction than a skilled workman using water.
S. A. Beeson

Lone Tree, Wash.
Metal Hardening Solution Co.,
Gentlemen:
Have tried Kalux on cold chisels and think it increases their service 100%.
A. Cochran

Urbane, Kan.
Metal Hardening Solution Co.,
Gentlemen:—I have been using Kalux and have found it far beyond any solution I have ever seen. I have tested it in all ways, and can recommend it to any person in the craft.
M. E. Nobl .

ASK YOUR DEALER FOR IT

KALUX is in a class by itself. Have your Dealer get it for you or send us his address. :-:

PRICES

U. S. Wine Measure { **$1 per pint (16 fluid ounces, sufficient for 16 gallons of water).**
$2 per quart (32 fluid ounces, sufficient for 32 gallons of water).

In countries where the Imperial Gallon of 160 fluid ounces is the legal measure, equal to 25% greater than the United States wine measure, add 25% to the price. Either of these prices makes the solution cost only 6 1-4c per ounce. Even if the Hardening Bath be in continuous use, the average cost for one year would be about **one cent per gallon bath per week.**

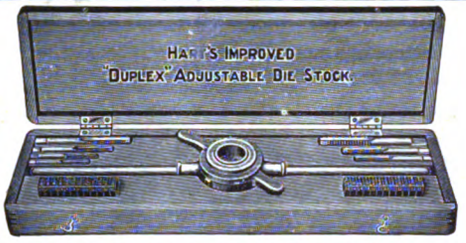
METAL HARDENING SOLUTION COMPANY,

TORONTO, CANADA. — **GRANITE BUILDING, ROCHESTER, N. Y., U. S. A.**

H. W. PETRIE, Ltd., Toronto, Montreal, Vancouver, Cobalt.
BEALS & CO., Buffalo, N. Y.
L. J. KINGSLEY CO., Binghamton, N. Y.
FAETH IRON CO. Kansas City, Mo.

SHARP DIES

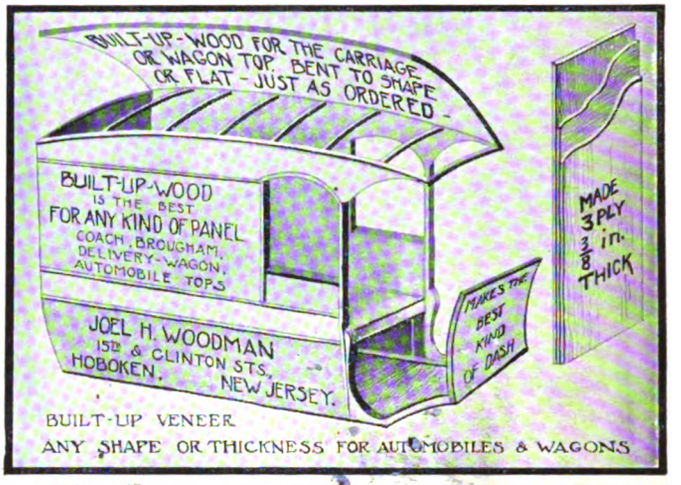
are what are needed in order to cut good threads, and you can always have them if you use a



"DUPLEX" DIE STOCK SET

The dies in these sets are easier to sharpen than a knife; this fact enables you to get the full wear out of them. *Write us.*

THE HART MANUFACTURING CO.,
50 Wood Street, :: :: Cleveland, O., U. S. A.



Gives Satisfaction In Every Respect.

Gallipolis, O., 9, 29, '09.

BUFFALO FORGE CO.,
Buffalo, N. Y.

Gentlemen :—I have waited quite a while to report on Blower No. 200. I wanted to give it a good trial. It is giving satisfaction in every respect and every one who sees it says it's a dandy.

I am well pleased and highly appreciate your kind and fair treatment.

Wishing you success, I remain,

Yours respectfully,
J. J. SMELTZER.



Say! Mr. Blacksmith,
have you heard about the new tire setter called

THE SCIENTIFIC HYDRAULIC?

Blacksmiths are just wild about it where it is used, and the manufacturers are either **crazy** or **dead sure** they have a "cinch" on the other fellows for they actually **warrant** it to be **better** than any other and will let you be the judge.

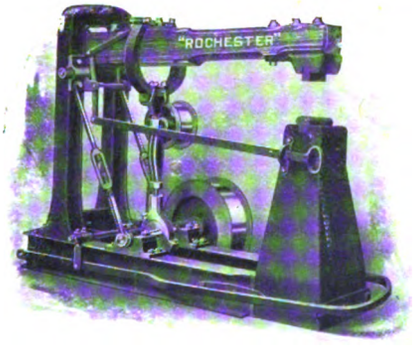
GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

Write for information at once to

National Hydraulic Tire Setter Co.
KEOKUK, IOWA.



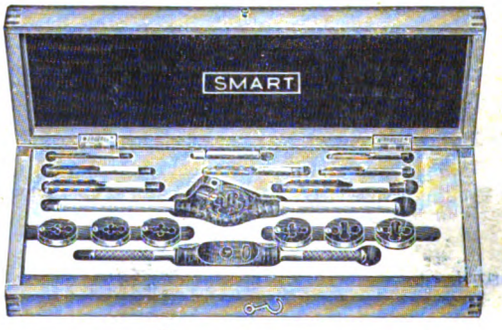
ROCHESTER HELVE HAMMER



(The Hardest Hitter)

Not only does general and special forging, but is a first class **tire welder also.** Made in six sizes.

THE WEST TIRE SETTER CO., Rochester, N. Y.



SEE OUR ADV. ON PAGE 32

A. J. SMART MANUFACTURING CO.
GREENFIELD, MASS.

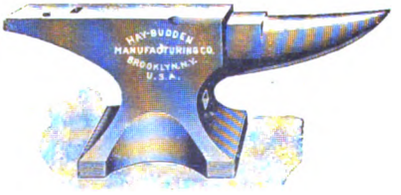
FIRST MADE IN AMERICA

HAY-BUDDEN SOLID FORGED ANVILS

A LONG STEP FORWARD

SOLID FORGED STEEL TOP
Welded to a
SOLID FORGED BASE
Making a
SOLID FORGED ANVIL

The Gold Medal Anvil
HIGHEST AWARD
Omaha 1898 Pan-American 1901



OVER 150,000 IN USE

The **ENTIRE TOP** being one piece of high grade **FORGED STEEL** makes a **LOOSE FACE IMPOSSIBLE.**

TEMPERED "JUST RIGHT".
By our own process, the weld at the waist is a **LASTING UNION.**

Experience has proved their worth and demonstrated that **"HAY-BUDDEN" Anvils** are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., 254 NORTH HENRY ST. BROOKLYN, N. Y.

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VOLUME 9 NUMBER 5

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO N.Y. U.S.A. FEBRUARY, 1910 $1.00 A YEAR 10c A COPY

PHOENIX

HORSE AND MULE SHOES
BULL-DOG TOE CALKS

ONLY ONE QUALITY



AND THAT THE BEST

BULL-DOG TOE CALKS



NEVER LET GO
EASY TO DRIVE
CAN NOT TWIST
WELD PERFECTLY



PHOENIX HORSE SHOE CO.

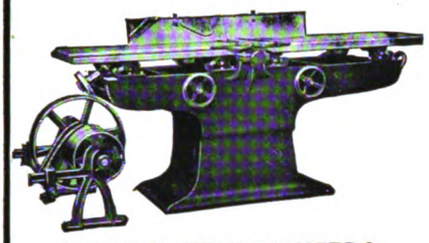
Largest Manufacturers of Horse and Mule Shoes in the World.

Rolling Mills and Factories:
Joliet, Ill., and Poughkeepsie, N. Y.

General Offices:
CHICAGO, ILL.

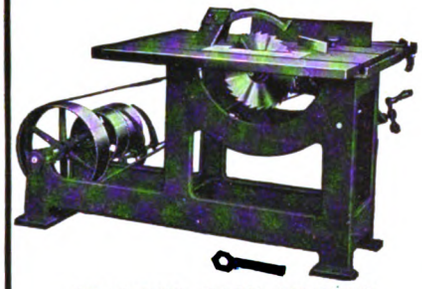
THE SILVER MFG. CO.

365 BROADWAY SALEM, OHIO.



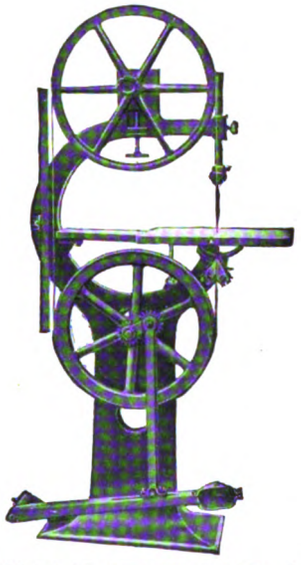
SILVER'S NEW JOINTERS

Five Sizes—8, 12, 16, 20 and 24 inch. New "patent applied for" features.



SILVER'S SAW TABLES

Send for circular of Saw Tables and Swing Saws.



NEW PLANETARY BAND SAW

20-inch Foot or Combination

YOUR NAME ON

A CARD BRINGS OUR NEW

1910

Machinery Catalog



Silver's New Swing Saw. Four Lengths.

The catalog—printed on the finest enameled paper made—fully illustrates and describes our complete lines of Band Saws, Jointers, Saw Tables, Swing Cut-off Saws, Hub Boring and Spoke Tenon machines, Portable Forges, Blacksmiths' Hand and Power Drills and 20-inch Power Base Drills.

Send for it today. Don't delay!

SPECIAL BOOKLETS READY FOR MAILING.

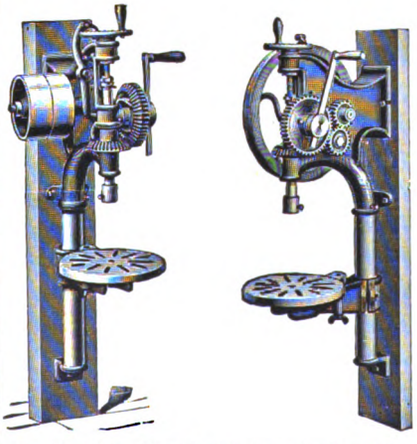
BAND SAWS AND JOINTERS—describing 20" Band Saws for foot or belt power or combination; also 26, 32, 36-inch Power Band Saws with new features; also five sizes of Jointers.

HUB BORING AND SPOKE TENONING MACHINES—illustrating and describing several sizes of each.

PORTABLE FORGES—illustrating and describing 14 styles.

DRILLING MACHINES—covering our line of some 22 distinct machines.

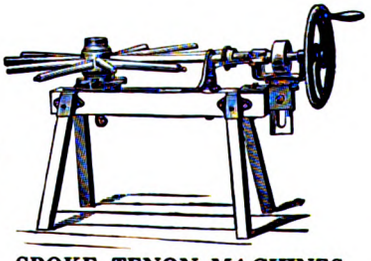
POWER DRILLS—illustrating our line of 20" machines with lever feed, lever and wheel feed, power feed with automatic stop, power feed with back gears and automatic stop.



Our Booklet, "Drilling Machines", illustrates 22 kinds we make.



Our Portable Forge Booklet illustrates some 14 kinds. We have a size to suit your needs. Strong and durable. Attractive designs.



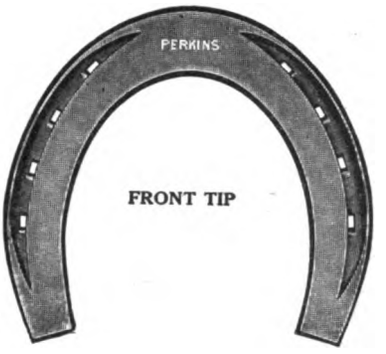
SPOKE TENON MACHINES

in Seven Sizes. Fitted with Star Hollow Auger.



HIND CITY

Look for this Trade Mark ★ The Star brand beats all others



FRONT TIP



FRONT STEEL COUNTERSUNK

★ PERKINS ★

HORSE SHOES

AND

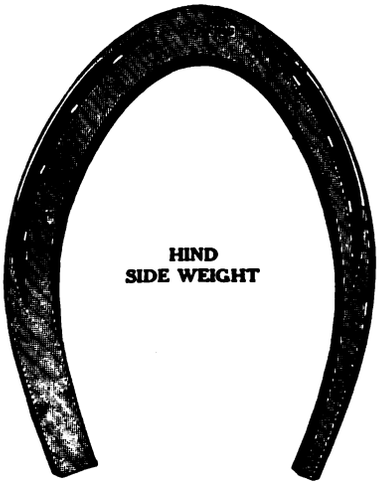
TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



FRONT TOE WEIGHT

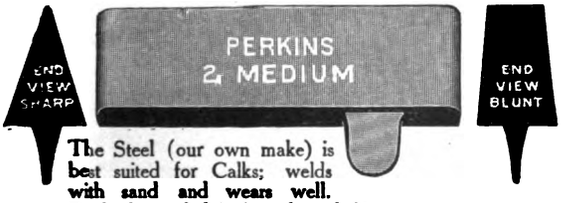

HIND SIDE WEIGHT

Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

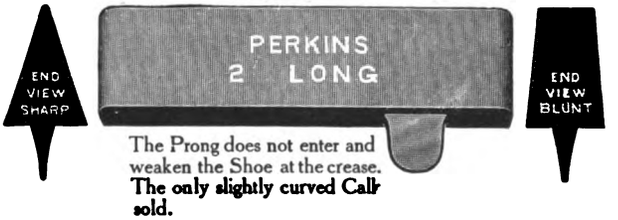


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

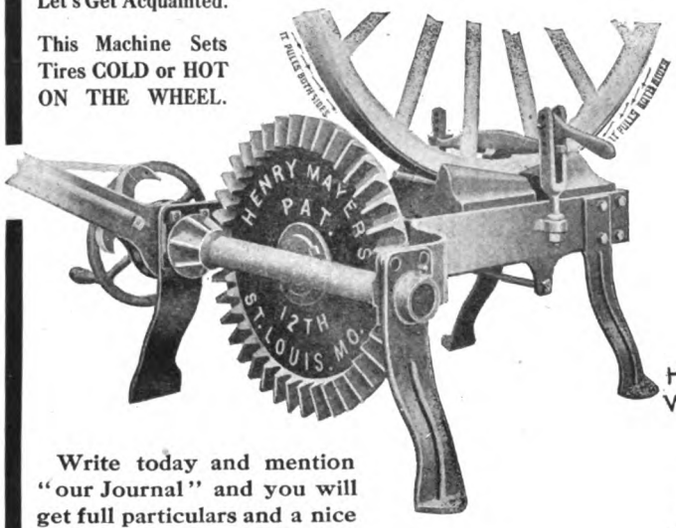
Which WAY are YOU hitting your WORK?

The DIFFERENCE in the ways is PROFIT.

By hand it is 50, by MACHINERY 500.

Let's Get Acquainted.

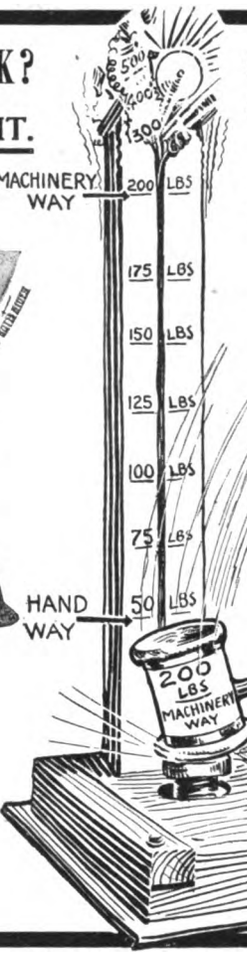
This Machine Sets Tires COLD or HOT ON THE WHEEL.



Write today and mention "our Journal" and you will get full particulars and a nice WATCH CHARM FREE for your trouble.

Mayers Tire Setter Mfg. Co.

4028-30 Forest Park Blvd., ST. LOUIS, MO.



OUR NEW POWER MACHINE
FOR WIDE, THIN TIRES
is ready for delivery.

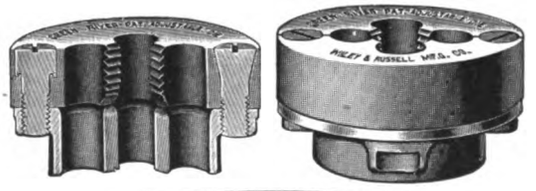
IT SETS 'EM COLD OR HOT
ON THE WHEEL

Our Guarantee is
YOU
MUST BE
SATISFIED

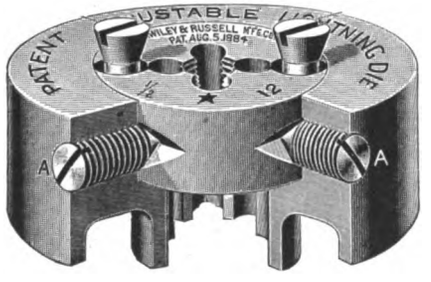


USE "ROUND ADJUSTABLE" DIES

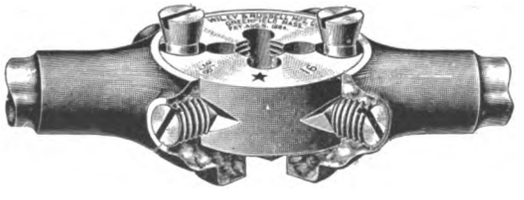
that are in "two equal" parts



Green River Style



Lightning Style with collet



Full mounted Lightning Style with stock

Notice the "taper head" screws. These act as "gauges." The cutting edges of dies are always central. This equally distributes the work, each of the four cutting edges doing equal amount of work.

Do your dies have such gauges?

Dies also in two parts.

Can be ground when dull.

You can't do this with dies "split one" side.

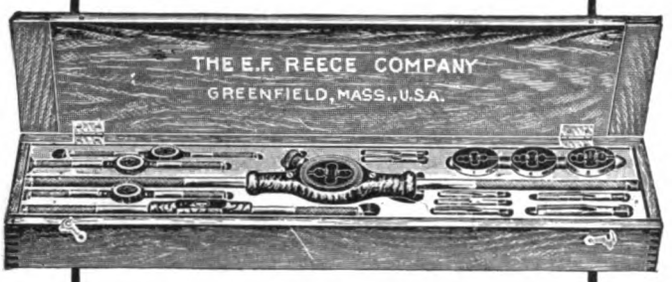
Send for catalog 34D, and full list of sets, with prices.

SOLE MAKERS

WILEY & RUSSELL MFG. CO., Greenfield, Mass., U. S. A.

Reece Combination Screw Plate No. 103

$8.25 NET WILL BUY ONE



The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16 — 18, 3-8 — 16, 7-16 — 14, 1-2 — 12, 5-8 — 11, 3-4 — 10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustable, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only $8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

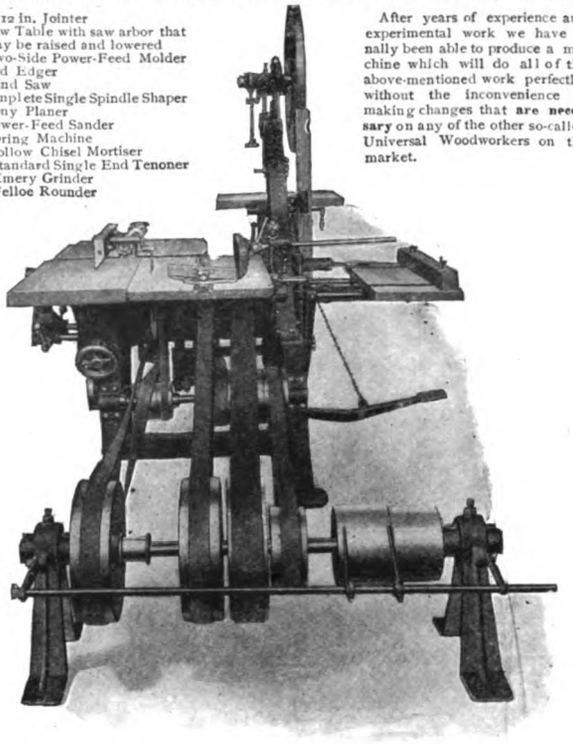
THE E. F. REECE CO., Greenfield, Mass., U. S. A.

One Machine Instead of Twelve

Combining the Following Twelve Wood Working Machines in One:

1—A 12 in. Jointer
2—Saw Table with saw arbor that may be raised and lowered
3—Two-Side Power-Feed Molder and Edger
4—Band Saw
5—Complete Single Spindle Shaper
6—Pony Planer
7—Power-Feed Sander
8—Boring Machine
9—Hollow Chisel Mortiser
10—Standard Single End Tenoner
11—Emery Grinder
12—Felloe Rounder

After years of experience and experimental work we have finally been able to produce a machine which will do all of the above-mentioned work perfectly, without the inconvenience of making changes that **are necessary** on any of the other so-called Universal Woodworkers on the market.



THE SIDNEY TOOL CO., SIDNEY, OHIO

HORSE SHOE *Little Giant* CALK TAPS





You can always ***guarantee*** your work if you use taps stamped with this trademark

Little Giant

Send for Catalog 22

These machines and hand taps will give you the ***best service*** for the ***longest time.*** Be sure to ask for them by name.
At most dealers—if not at ***yours,*** write to us.

WELLS BROS. COMPANY
GREENFIELD, MASS., U. S. A.

THE ONLY CALKING MACHINE THAT CALKS A HORSESHOE COMPLETE

Patented Sept. 14, 1909



Makes 25 Different Styles Heel Calks

The only Calking Machine that with one pull of lever makes a heel calk complete, blunt or sharp, also makes double kink for the famous block calk, or sharpens side calk, with one pull of lever, welds blunt or sharp toe calks and forms toe clip with one pull of lever, also, has a shear to cut off either end of shoe.

Works equally as well on old shoes. The machine takes up but 8 x 16 inches floor space, and stands 3 feet 3 inches high, and weighs 131 lbs. All the working parts made of a special grade of steel. Fully warranted. Write now for circulars and prices.

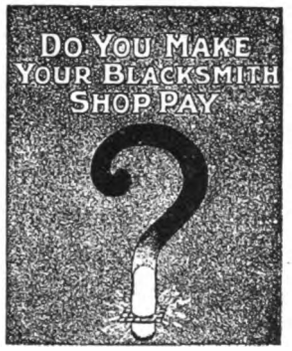
You Can Increase Your Earnings

When you have one of our machines you can turn out more work and please your customers better. If you let it remain idle, its wages and board are nothing.

L. S. P. CALKING MACHINE COMPANY
WYALUSING, PA., U. S. A.

LAFFITTE
WELDING PLATES

SEND FOR SAMPLE

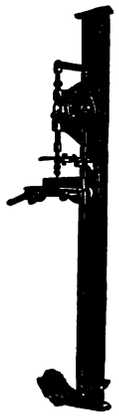


AND OUR BOOKLET

THE PHILLIPS-LAFFITTE CO.
PHILADELPHIA, PA.

Vulcan Iron Works
(INCORPORATED)
Mason City, Iowa

Prices and goods right

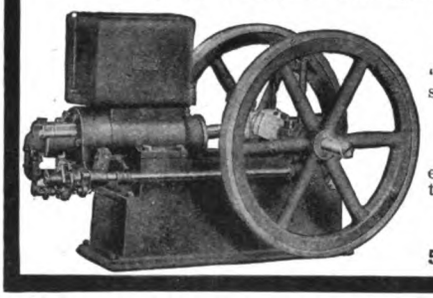


Catalog free, write today

Universal Tenon and Boring Machine
for wagon repair shops. **Cuts tenons on set of wheels in twelve minutes.**

When you write to an advertiser, name The American Blacksmith.

$ MORE DOLLARS; LESS WORK $
How would it suit you to take the agency for

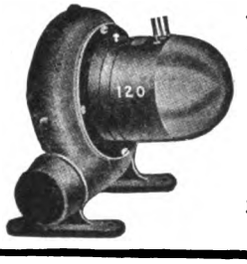


WITTE GASOLINE ENGINES
Your experience is worth something. If you use a "Witte" your customers will want them; why not sell them and make the profit. Our engines are
GUARANTEED FIVE YEARS
Have been on market 25 years; advertised and sold everywhere; lots of good selling points; write for introductory proposition stating size you can use.

WITTE IRON WORKS CO.
517 West 5th St., Kansas City, Mo.



"CLEVELAND" DRILLS
Can always be depended on
The CLEVELAND Twist Drill Co.
NEW YORK CLEVELAND, OHIO CHICAGO



Roth Forge Blowers
A Cast Iron Cover with machined joints protects the WORKS. Cover can be easily opened on its hinge to see the WORKS. Ask for information.

ROTH BROS. & CO.
136 Liberty Street, NEW YORK
1390 West Adams Street, CHICAGO, ILL.

HAUSAUER-JONES PRINTING COMPANY
253-257 Ellicott St., Buffalo, N. Y.

PRINTERS
PUBLISHERS
BOOKBINDERS

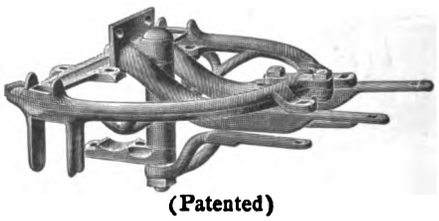
Let us submit an estimate on your printing requirements whether they be large or small.
Our facilities enable us to do work reasonably.
: Our organization enables us to do work well. :

Selle Gears



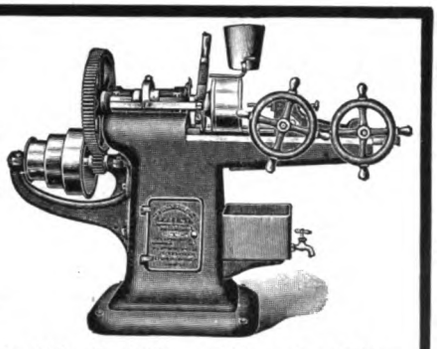
All Styles and Sizes
THE AKRON-SELLE CO.
CAT. 4. AKRON, O.

The Dayton Fifth Wheel is sold by nearly every Carriage Hardware Jobber
The Dayton Malleable Iron Co.
Dayton, Ohio



(Patented)

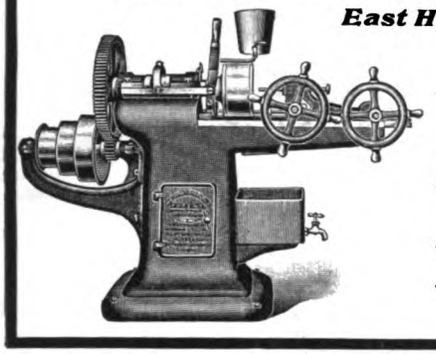
THE
MERRIMAN
Bolt Threader
Best on Earth



A Bolt Cutter is Much Like a Man in This THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly.

THE H. B. BROWN CO.,
East Hampton, Conn.



Send for Catalog No. 11

A Postcard will bring it



"Paint Wisdom" means—**getting the best value for your money.** Buy "F-S" products, and be **"paint-wise."**

You'll find just the shade you want among our "Superfine" Coach Colors—and every color backed by "F-S" quality.

FELTON, SIBLEY & CO.
Manufacturers of Paints, Colors and Varnishes
136-140 N. 4th St., PHILADELPHIA

"MORSE" TOOLS



Prominent among them are

"MORSE" DRILLS

fitting the different presses made especially for blacksmiths' use. Shanks are furnished round or flattened for set screw, as desired.

None Better. A Trial Is Proof.

Send for an illustrated catalogue and a Young Machinist's Practical Guide. Free to all.

Morse Twist Drill & Machine Co.
NEW BEDFORD, MASS., U.S.A.

Get This Book Free

Our New Net Price Catalog for 1910 will soon be ready.

448 pages. About 3,000 Illustrations.

A complete work of reference and **Price Maker** for the Blacksmith, Wheelwright, Horseshoer, Auto Repairer, Hardware Dealer, etc.

Used for reference by the Depot Quartermaster of the U. S. Army. Railroad Purchasing Agents, Industrial Schools and many other institutions throughout the country.

It is **absolutely free** to the trade and will be mailed postpaid to any part of the world.

You should have a copy. Write us or send Coupon today.

CRAY BROTHERS
Manufacturers and Jobbers
Carriage Hardware, Tools and
Automobile Supplies
1113 West 11th Street
CLEVELAND,
OHIO

CRAY

CRAY BROS., Cleveland, Ohio.
Gentlemen:—Please send me your 448-page Catalog for 1910.
Name.....
Occupation.....
Address.....
State.....
Do You Repair Autos?

Our Nails for 1910

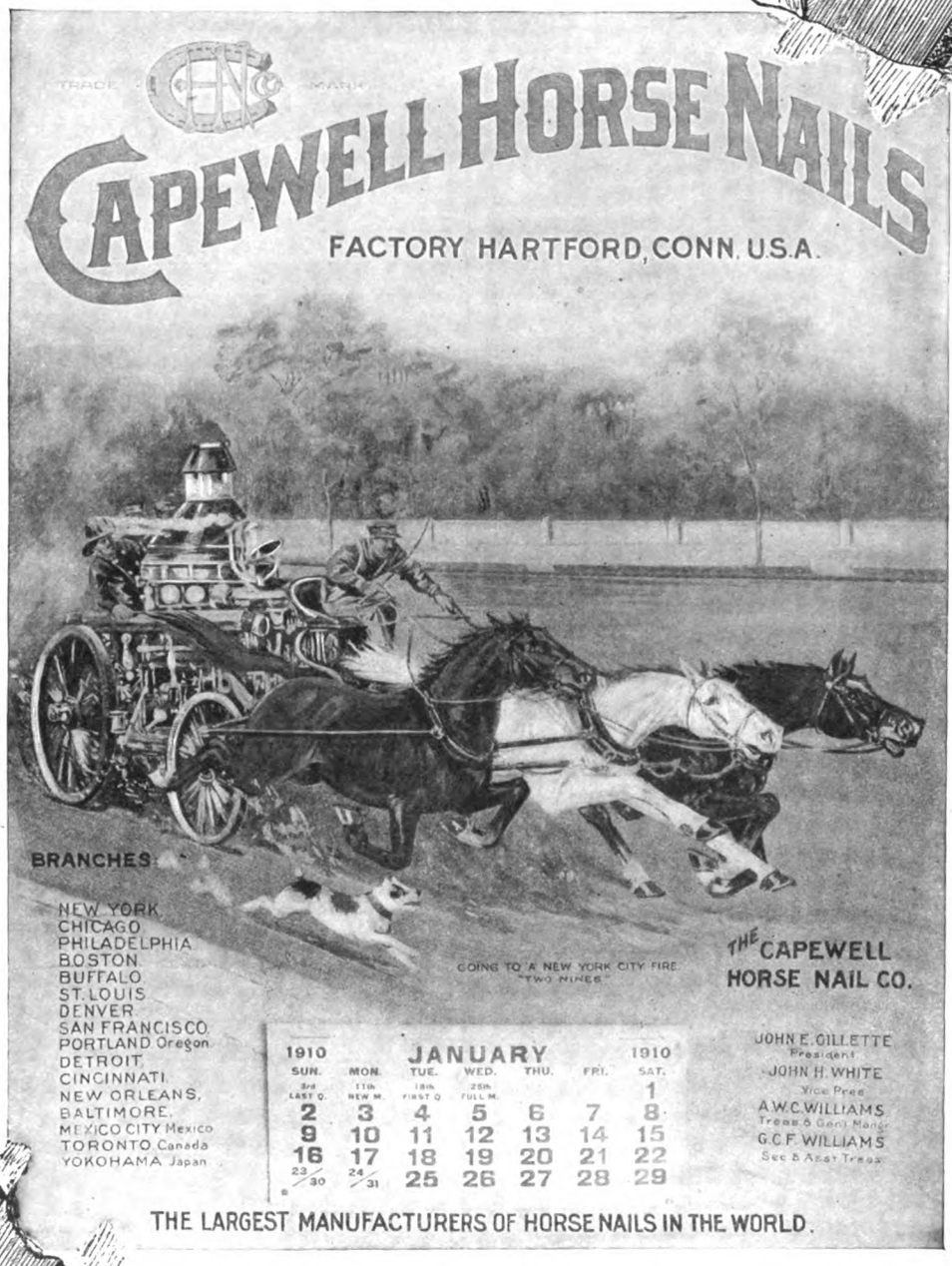
will **lead** as in the past. Everything now indicates a far larger demand for "Capewell" nails this year than ever. A vast multitude of shoers throughout the length and breadth of the land now drive this nail exclusively.

The ease with which "Capewell" nails can be driven, the satisfaction which they give to shoers and horse owners alike, the saving in time and money which they effect for **all users** causes them to be sought after by **all progressive horseshoers.**

Used on Fire Department Horses

of the great cities as well as on the majority of all classes of horses in all sections of the United States.

"The Capewell" nail holds under the greatest strains.



Note the Check Mark on the Head

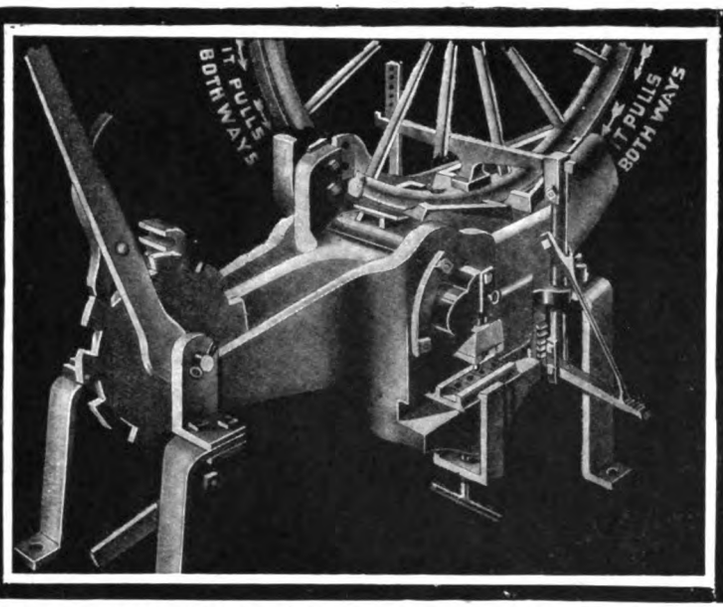
You can easily identify "The Capewell" by that mark—it's our trade mark, registered at Washington and legally recognized as belonging to the makers of "Capewell" nails.

Our Calendar for 1910

has been mailed to thousands of horseshoers in all parts of the world. If you've not received yours and care for one **a card addressed to our Hartford office will bring it promptly.**

This calendar is printed in 7 colors on a card 10 x 13 inches, and is a reproduction of a painting illustrating a furious drive to a big New York fire in response to a "Two Nines" alarm.

THE HOUSE COLD TIRE SETTER



WILL MAKE MORE MONEY FOR YOU

NOT ONLY THE BEST

BUT ALSO THE CHEAPEST

TAKE NOTICE We have cut prices to suit the times

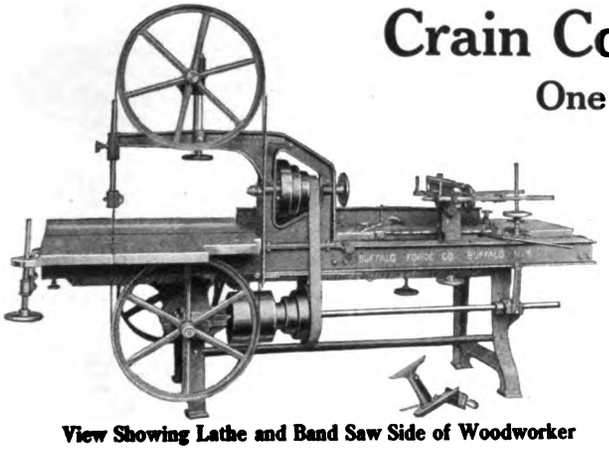
If you just want a machine without shear and punch, we will sell you a No. 1 guaranteed to set tires up to 2 inches for $90.00, or a No. 2 to set iron tires up to 4 inches or set steel tires up to 3 1-4 inches for $190.00. One man to do the work, and tires will not have to be heated, either. **We also make good prices and terms on all our other machines.** And now please notice our claims for accuracy, simplicity and great durability, for they work just like the old hot setters and are operated by plain direct leverage, and all bearings are tempered so can't wear out. No big screws to get full of sand and cut and stick. No oil pump valves to cut and leak the oil out. **And please notice also our heads move with the curve of the wheels, and therefore set tires perfectly.**

Now is the time to buy. Write us today, and get it advertised in time for the season's work.

HOUSE COLD TIRE SETTER CO., 216-218 S. Third Street, St. Louis, Mo. J. F. HOUSE, 201 Church St. Toronto, Ont., Canada.

Crain Combination Woodworker

One Machine Instead of Twelve



View Showing Lathe and Band Saw Side of Woodworker

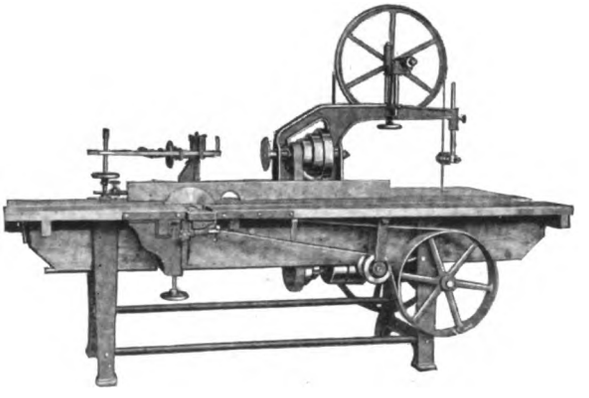
This woodworker combines in one machine, occupying a floor space 3½ x 9½ feet, all the operations possible on the following individual machines : lathe, boring machine, drill, band saw, rip saw, cross cut saw, planer, sander, sizer, equalizer, shaper, tenoner.

No extra attachments required—just insert the proper tool, as on the individual machine.

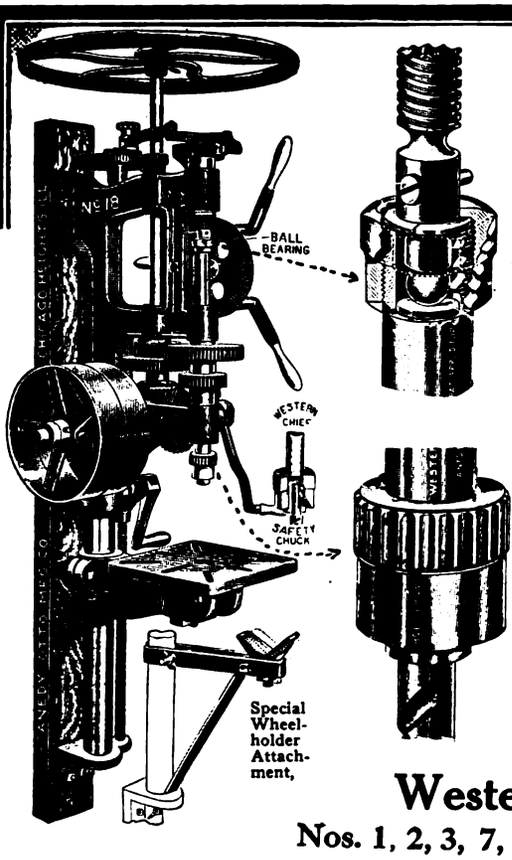
The design is the result of the efforts of a practical woodworker of over 30 years' experience. It is thoroughly practical, combining, as it does, the strength and utility of the individual machines.

Write for Special Catalog 178 H

Buffalo Forge Company
Buffalo, N.Y.



View Showing Circular Saw and Planer Head Side of Woodworker



Special Wheel-holder Attachment,

Ball-Bearing and Safety Chuck

Ball-Bearing

A single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate.

Safety Chuck

It is opened and closed with the hand.

No more set-screws to mar and bruise the shanks of bits.

No more wrenches to tighten and loosen set-screws.

No more twisting of bits in the chuck.

No more trouble in inserting and removing bits from chuck.

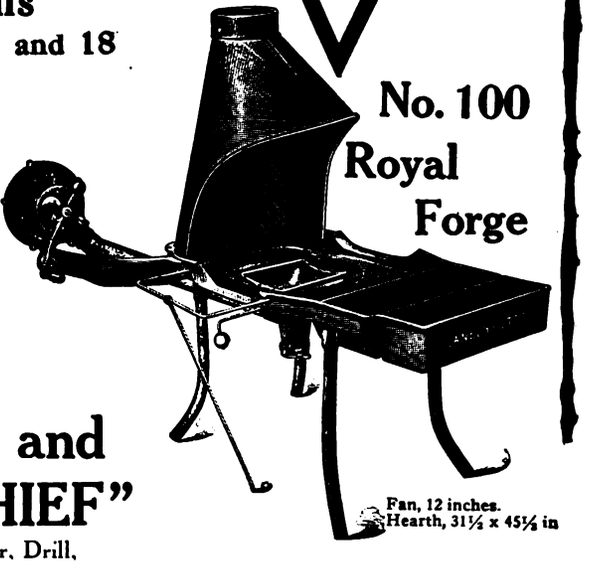
A Feature of TO-DAY

Wrench? NO!

Western Chief Drills

Nos. 1, 2, 3, 7, 12, 14, 15, 16, 17 and 18

FORGES—BLOWERS—DRILLS—



No. 100 Royal Forge

Fan, 12 inches. Hearth, 31½ x 45½ in

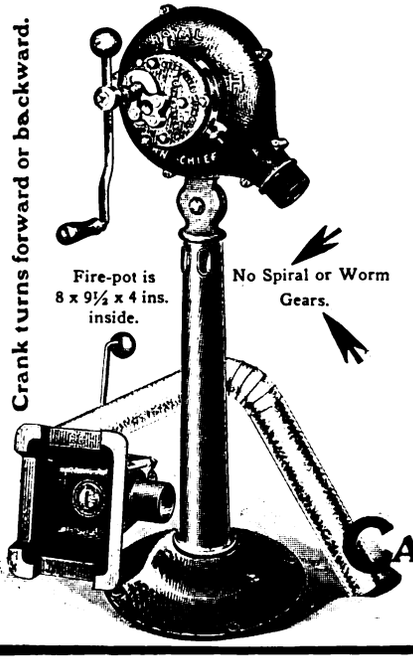
The Names — "ROYAL and WESTERN CHIEF"

When found on a Forge, Blower, Drill, or other Blacksmith Tool—mean that that article is better than the ordinary. They mean that in its construction the best materials and the highest skill obtainable have been employed. They mean that years of experience have served to perfect it. They mean the tool is a success, and quality alone has made it so. Dealers and Blacksmiths in general will procure what they like best. We must deserve before we can obtain trade. There is no doubt about our deserving, because our production grows rapidly.

There is a reason—Quality

They are all the Best!

Royal Blower



No. 1 Western Chief

(TIRE and AXLE SHRINKER)



Jaws Adjust Themselves to Uneven Thicknesses

MADE BY

CANEDY OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

For Sale, 50,000 Bargains

For Blacksmiths, Wagon Makers and Iron Workers. All brand new Materials, Tools and Supplies. Greatest Aggregation of Real Bargains Ever Offered You.

Sheriffs' Sales | Receivers' Sales | Manufacturers' Sales

To secure these Bargains and actually save 20 to 50%, fill out Coupon and send for our free Mammoth Catalog.

HERE ARE A FEW SAMPLES OF BARGAINS YOU CAN GET FROM US

Horseshoe Nails 5 1-4c. per Pound.



Catalog No. 4-A. B.-96.

2,000 boxes of Bay State cold rolled Horseshoe Nails, made of best Norway Iron, sizes, 6, 7, 8, 9 and 10.

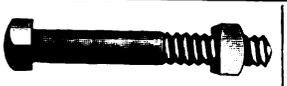
Price in bulk, 25 lbs. to box, 5¼c. lb.

Or in 5 lb. cartons..... 7¼c. lb.

Queen City Special, cold rolled Horseshoe Nails, sizes, 6, 7, 8, 9, put up 25 lbs. bulk in a box, price per lb..... 5¼c.

"Bonanza," forged and pointed, warranted Horseshoe Nails, made of best Swedish stock, sizes, 6, 7, 8, 9, put up in bulk, 25 lbs. to box, price per lb..... 6c.

Bolts 2¼c lb.



About 10 tons **brand new Machine and Carriage Bolts,** all in first class condition, various sizes mixed together, ranging from ⅜ to 1 inch diameter and from 2 to 10 inches long.

Price in lots of 25 to 100 lbs..... 3c per lb.
Price in lots of 100 to 500 lbs.....2¾c per lb.
Price in lots of 500 lbs. or more.....2¼c per lb.

Plow and Tire Bolts

All brand new Bolts from a jobber's stock, mixed together in various sizes, diameter from 3-16 to 5-16 inch and lengths from 1½ to 2½ inches. Absolutely brand new and in first-class order.

Special prices, while they last, as follows:
Mixed Plow Bolts, 25 lbs. or more.... 2c per lb.
Mixed Tire Bolts, 25 lbs. or more..... 2¼c per lb.

Horseshoes



Brand New Horseshoes made by the Eagle Horseshoe Company. Absolutely new and in first class order. Stock consists of

25 kegs.....No. 0
22 kegs.....No. 1

Price per 100 lb. kegs.....$3.50

Mail orders accepted for any item quoted on this page.

Ball Bearing Grindstones, $2.95



Catalog No. 4-A-1266.

Strongest and easiest running grindstone on the market.

Frame made of angle steel. Ball bearings on journals and cups.

60 lb. stone, 22x2½.

Weight, complete, 85 lbs.

Price.....$2.95

Premier Wrought Iron Anvils



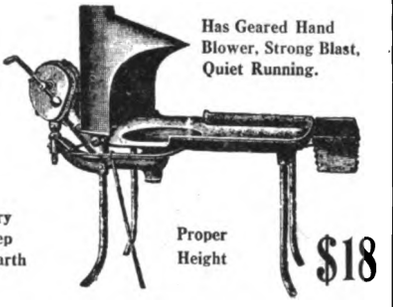
Catalog No. 4-A-115.

Best in quality, form and finish. Steel face is a solid piece planed smooth after welded.

Absolutely Guaranteed

Weight.	Price lb.	Weight.	Price lb.
150 to 200 lbs.	7c.	70 to 79 lbs.	10½c.
120 to 145 lbs.	9c.	60 to 69 lbs.	11c.
80 to 119 lbs.	9¾c.	50 to 59 lbs.	12½c.

Your Favorite Forge, $18.00



Dimensions

Height, 30 in.; size of hearth, 31x53 in.; diameter of fan, 12 in; weight about 290 lbs.

Catalog No. 4-A-459. Price, with Water Tank, as shown.....$18.00

Ball Bearing Spiral Geared Blower, . . $14.95



Spur and gearing made of the finest hardened phosphur bronze and Swiss steel, with steel ball bearings. Runs smooth and noiseless. The perfect ball bearings and oiling devices prevent wear and friction.

We guarantee this blower makes more powerful blast than any other hand blower made, and produces a white heat nearly equal to the best power blast.

The height of crank is adjustable from 41 to 45 inches. Is equipped with center and side blast. Deep fire tuyere blower. Size, 7½x9x4 inches. Has 13 inch fan case. Shipping weight, 135 pounds.

Catalog No. 4-A-461. Price, complete with tuyere, as shown.....$14.95

Advance Self Feed Drill, $15



For Belt or Hand Power. Will drill 1 1-4 in. hole to center of 18 in. circle. **Has special automatic feed device,** located back of spindle. **Has** cam arrangement so as to **give continuous feed.** Stands heaviest service, yet is simple in construction, with a very few parts.

Dimensions—Height, 50 in. **Table,** 11 in. diameter. **Gear Wheels,** 8 in. **Spindle,** 1¼ in. **Run of Spindle,** 3 in. **Size Column,** 2 in. **Greatest Spread** of spindle to table, 16½ in. Spindle bored for ½ in. rounk shank drills.

Catalog No. 4-A-34.

Weight, 190 lbs.

Price,.....$15.00

CHICAGO HOUSE WRECKING CO.

35th and IRON STREETS, CHICAGO, ILL.

Send Us This Coupon

Chicago House Wrecking Co., Chicago,

I saw this ad in AMERICAN BLACKSMITH.

Send me your Mammoth Catalog free of any expense.

I am interested in.....

Name .....

920 Town .....

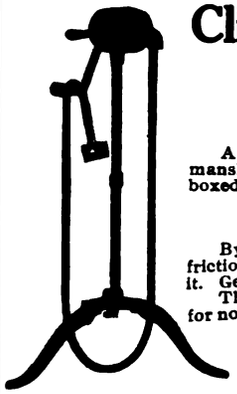
Co..... State .....

Am. Blk. Feb. 1910.

Every Blacksmith and Shoer

Should Have a Good Horse Clipping Machine

because there is big money in clipping horses and it usually comes when there is plenty of time to do it. Many blacksmiths make up in the hundreds of dollars every year from clipping, We have had blacksmiths who bought our highest priced Electric Clipping Machines, costing $85, write us that in a single season they have taken in from the clipping four times the cost of the outfit.



Stewart No. 1 Ball Bearing. Enclosed Type, HorseClipping Machine. Price complete, as shown above, $7.50.

Clipping Horses is Very Profitable

The Stewart No. 1 Ball Bearing Clipping Machine (Enclosed Type)

A new clipping machine, sturdy, compact, perfect in every detail of material and workmanship, and at a price within the reach of every blacksmith and shoer in the land. Weight boxed, 36 pounds.

Price, $7.50 F. O. B. Chicago

By far the most perfect clipping machine ever made. It operates practically without friction or wear. Crank handle turns slowly, machine works rapidly. It's mere play to run it. Gearing is enclosed in a case, beyond the reach of dust and dirt, and runs in oil.

This is a wonderful little machine that robs even the smallest shop owner of all excuse for not keeping a good clipping machine.

Because of the large number of these machines sold, we are able to make a remarkably low price on them.

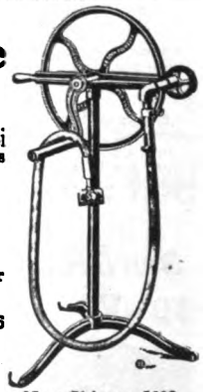
Everything entering into its construction is first-class. It has a solid tripod base, a strong upright, and the gears are all cut from solid steel and made file hard. It is fitted with six feet of our latest easy-running flexible shaft and the same Stewart one-nut tension knife and handle that we use on our highest priced machines. In fact so perfect is its construction that we guarantee the driving mechanism for 25 years. It is the clipping machine of the future.



Stewart No. 1 Enclosed Type Horse Clipping Machine at Work.

"1902 Chicago" Horse Clipping Machine

(Cut Gear, Stewart Patent)



New Chicago 1902 Stewart Patent Horse Clipping Machine.

For blacksmiths who do a great amount of clipping we recommend this machine. It has brought joy to thousands. It is a very widely used clipping machine. All gearing is cut from solid metal. Teeth are milled in the large drive wheel and engage with hardened steel pinion. Knives are Stewart one-nut, dust-proof, balance-pressure type. Bearing of knives is absolutely perfect—tension always perfectly balanced and even. No clogging possible.

Power is Direct and Positive

Every bit is utilized. No belts to slip and waste it. No retarded motion.

The crank wheel is large and machined all over. There's a balance wheel on the pinion shaft which absorbs the jar and imparts uniform motion.

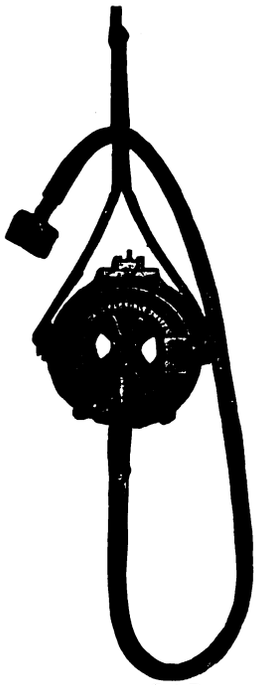
Working parts and flexible shaft are carried on a solid, substantial iron stand.

The machine is marvelously light running. A small boy can run it all day without tiring, using either hand. Net weight, 56 pounds. Weight, boxed, 70 pounds.

Price only $10.75

The price of the machine makes its acquisition easy for any blacksmith. The annual output of this machine is so large that we are able to sell it at a price beyond competition, and yet maintain its high quality.

We recommend this machine especially to those having a large number of horses to clip because it is the simplest, strongest and the most durable of all clipping machines.



Cut B.

Stewart Electric Clipping Machines

We strongly advise these clipping machines for blacksmith use because they are so convenient. A bracket goes with each one to hang it up and all you need do is to screw the attachment on any ordinary electric lamp socket, turn on the current and away she goes. They clip very fast, are noiseless and do not require the assistance of anyone. The man who runs the knife attends to the whole job.

Notice that we have two for Direct Current and one for Alternating Current

Do not order an electric machine until you find out from your electric light company whether they furnish you with direct or alternating current. If they supply you with direct current the alternating current machine will not work on it, and if they give you alternating current the direct current clipper will not work on it. In other words you must order the same kind of clipper as the current they will supply you. When you order state the number of volts in your current and if alternating state number of alternations. Your electric light company will give you this information.

Stewart Electric Clipping Machines will give better service than any other type of clipper wherever current is accessible. The flexible shaft on Stewart Electric Clippers is 6½ feet long and connects directly with the armature shaft of the motor, an arrangement which eliminates short bends in the former near the point of connection and gives it the utmost freedom of motion. The motors are perfectly made and self oiling. Connection is made by unscrewing incandescent lamp globe and screwing in a socket already connected to switch and motor by an extra long flexible cord conductor, which is a part of each outfit. Anyone can make this connection.



Stewart Electric Clipper at work.

The cost of operating a Stewart Electric Clipper IS ABOUT ONE CENT PER HOUR. It runs without noise. Can be started or stopped instantly. When not in use it can be hung up out of the way. The machine and its equipment are so simple that no mechanical knowledge is required for its installation or operation. Each direct current machine has an automatic starting box.

Price of electric machine complete for 110 volts direct current (Cut B) $40.00
Price of machine complete for 220 volts direct current (Cut B) . . . $60.00

When ordering, voltage should be specified if direct current is desired, and both voltage and number of alternations should be specified if alternating current is desired. If your electric light company supply you with an alternating current, you cannot use either of the above machines. You will require the alternating current machine.

Price of electric machine complete for alternating current, $85.00

Before ordering an electric machine find out from the electric company whether they supply direct or alternating current and order accordingly. Order the machine you need NOW, either from your supply house or direct from us.

Chicago Flexible Shaft Co., 186 Ontario St., Chicago

The iron on your anvil tells the story of the coal on your forge

PERHAPS you haven't realized how much quick work and a good job depend on the quality of coal you use. But you do appreciate a good, hot, steady fire.

Blacksmiths who have looked into the question and experimented have found that a high-grade coal especially adapted for smithing purposes is a wonderful saver of time, and remarkably increases the quality of work. They have found that

Webster Smithing Coal



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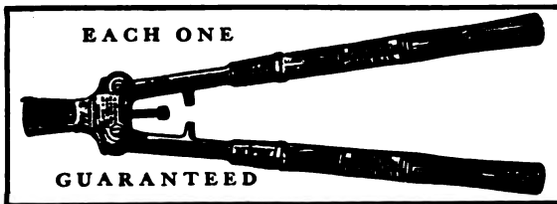

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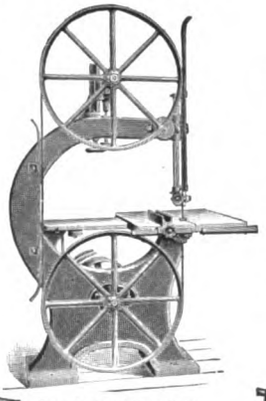

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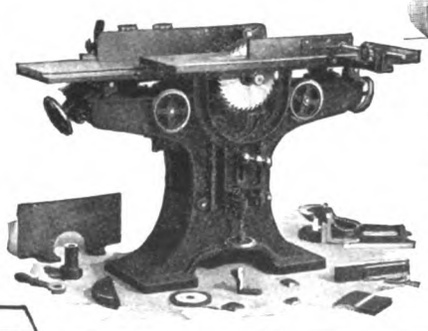

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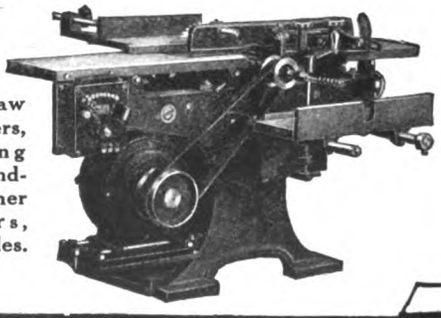

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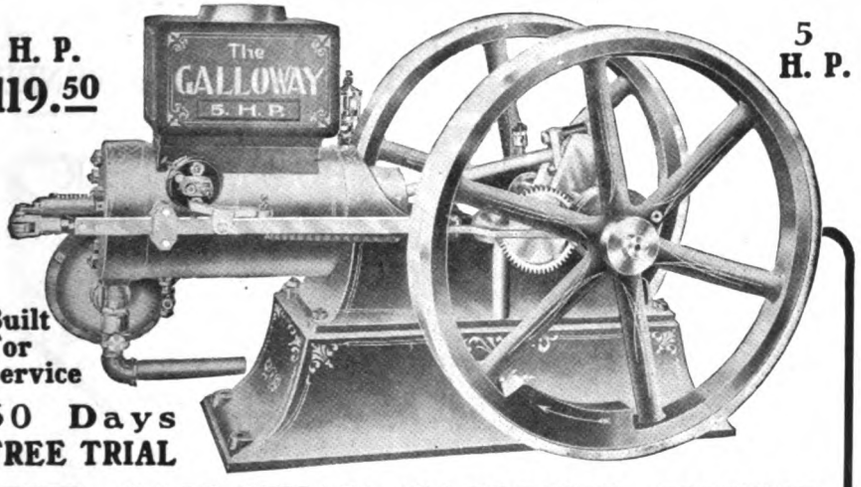

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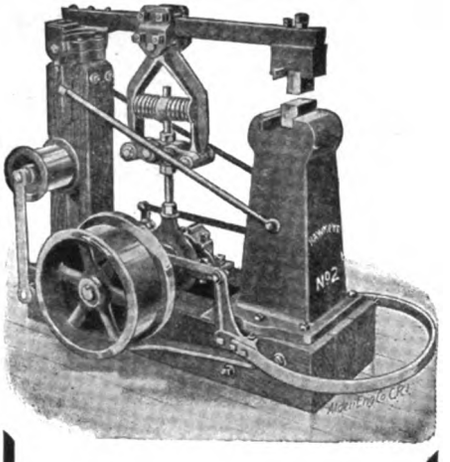

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Buy a Guaranteed Hawkeye Helve Hammer,—you will then be fixed to handle both light and heavy forging, also long work and tire welding. They have double the capacity of any upright hammer of the same weight and price. Why not have the best?

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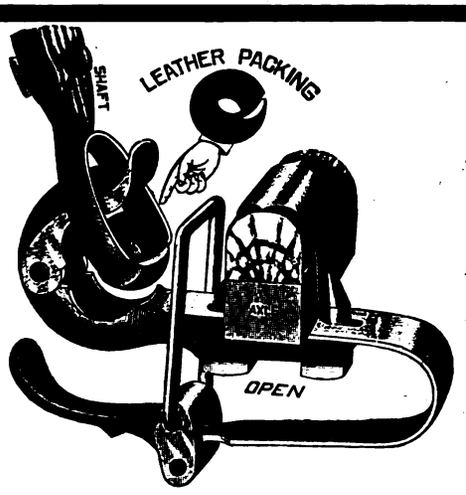

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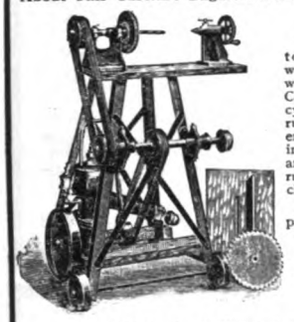

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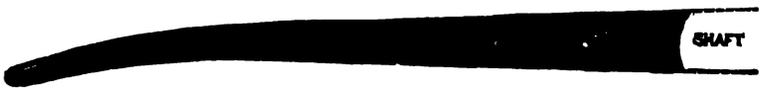

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Albert W. Bayard, - - Secretary.
Walter O. Bernhardt, - Editor.
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If you are a reader of magazines—and who is not in these days—you will want to write to your Congressman to protest against the proposed advance in second-class postal rates—the rate under which magazines come. This increase, if adopted, will necessitate an advance in the subscription price of all periodicals, and the dissemination of valuable information at low cost will be a thing of the past.

Now, the only apparent reason for this proposed increase in rates is the deficit in the United States Postal Department; yet, it is asserted by authorities—men who have been connected in one way or another with the post-office department—that the postage rate under which magazines are carried is not the cause of the postal deficit.

The benefit of a low postal rate is passed on to the subscriber.

Take the case of THE AMERICAN BLACKSMITH for example. The early issues contained twenty pages, and the price was one dollar per year. Steady growth and a low postal rate enabled us to increase the number of reading pages from twenty to twenty-four and then to twenty-six, without a penny advance in the subscription price. **This would not have been possible had postal rates advanced.** And should the proposed advance in rates be adopted by Congress it will be necessary, not only for THE AMERICAN BLACKSMITH, but for every magazine, to either cut down the number of their reading pages or to raise their subscription price, and the magazine-reader will, of course, be the loser.

Now—do you think it fair? Do you think that because the Government does not pay any postage whatsoever that you should be made to pay more for your magazines and periodicals? (It is an acknowledged fact that were each department of the Government charged for the mail matter it sent out there would be no deficit, but a large profit.) The Government Printing Office charges the various departments for all the work supplied, why not the same system for the postal department?

We ask you to aid in fighting this proposed advance. You don't want to see an advance in the subscription price of THE AMERICAN BLACKMITH any more than we want to make the advance. Therefore, won't you write to your representatives in Congress urging them to vote against this advance. These representatives are sent to Congress to do your bidding—to represent your interests. It is your duty to tell them what you want and what you don't want. There is no time to lose—write today. Tell Mr. Congressman that you want him to vote against any measure which has for its object the advancing or increasing of postal rates on magazines (second-class mail matter). Write to your representatives and senators in Washington, D. C., and protest against any changes in the postal laws and regulations relating to second-class mail matter. **Don't wait—write right now.**

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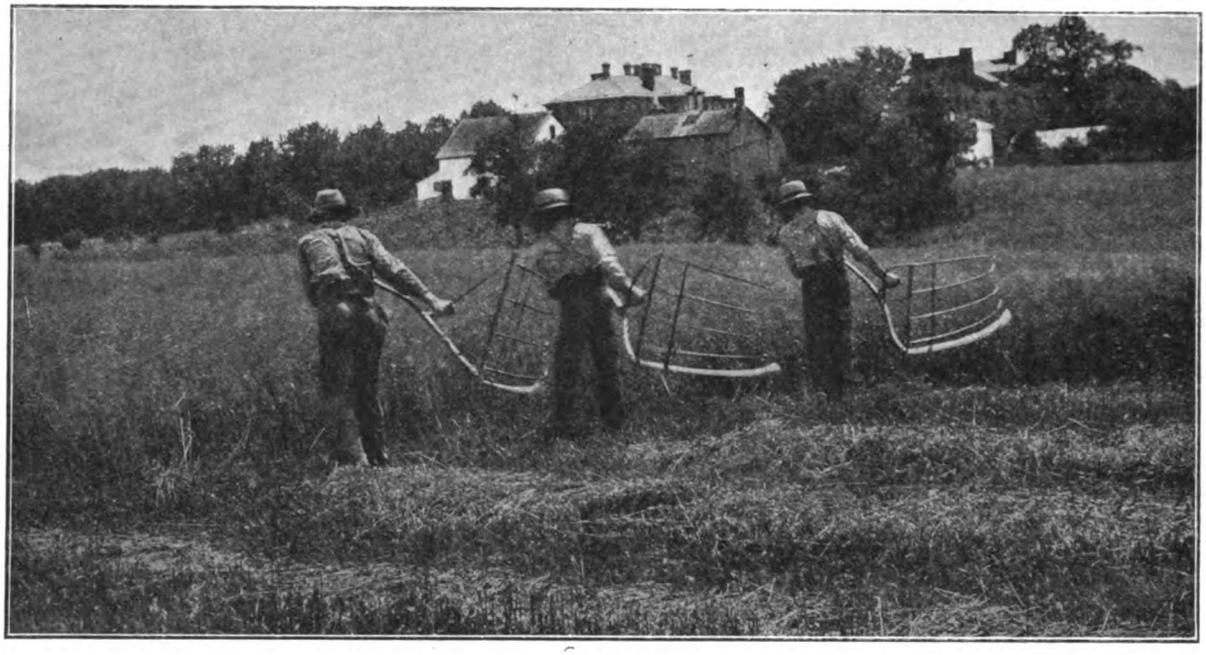
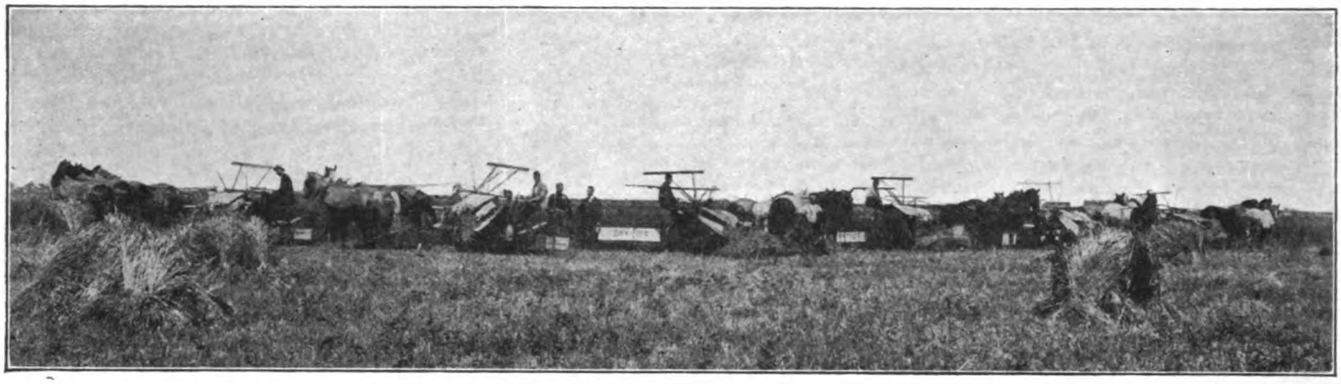
ACT ON THIS TODAY!

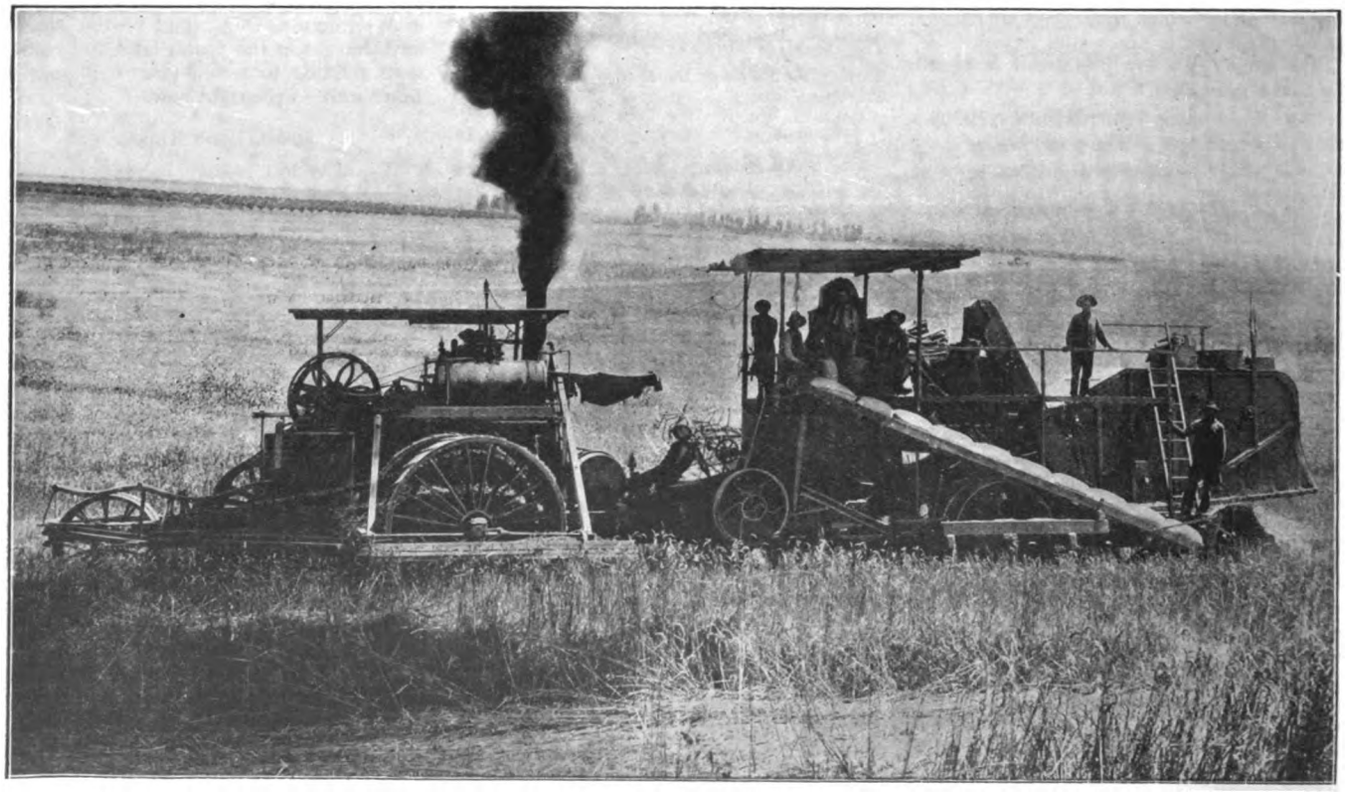
We ask you to aid in fighting this proposed advance. You don't want to see an advance in the subscription price of THE AMERICAN BLACKMITH any more than we want to make the advance. Therefore, won't you write to your representatives in Congress urging them to vote against this advance. These representatives are sent to Congress to do your bidding—to represent your interests. It is your duty to tell them what you want and what you don't want. There is no time to lose—write today. Tell Mr. Congressman that you want him to vote against any measure which has for its object the advancing or increasing of postal rates on magazines (second-class mail matter). Write to your representatives and senators in Washington, D. C., and protest against any changes in the postal laws and regulations relating to second-class mail matter. **Don't wait—write right now.**

Boost, Don't Knock.

If you didn't resolve on January First to boost the good old craft harder than ever, make such a resolution right now. Resolve to boost and boost hard. Resolve to coöperate with your brothers to make the craft still better; to make the load lighter for our brothers; to help and assist whenever and wherever we can. Let us all give freely and liberally of our hints, our short cuts, our methods. Let us look upon the craft through larger eyes and with broader thoughts. If we have been looking at the craft through narrow eyes, let us enlarge our vision, let us look upon all sides before we speak. Let us think not with the pessimist that the craft is getting worse each day and then give it a knock to help it down. Let us boost and boost hard. Let us all join hands for harmony and protection. Let each one of us put into the craft the best that is in us, and then we'll get out of it what we deserve—a good, honest living, fair, honest profits, a just and fair success. Let us, one and all, think on these things and resolve to carry out the suggestions.







FROM THE CRADLE TO THE MODERN HARVESTER-THRESHER, THAT REAPS, THRESHES AND SACKS THE GRAIN, AND BURNS THE STRAW TO PRODUCE POWER

Gun and Novelty Repairing

W. G. MUMMA

The Making of Springs

THE best steel for making springs that will stand severe use should be a fine-grained, tough, mild steel, with just enough carbon in it to harden at a low red heat, hard enough that a file will just cut it. The common cast steel is too hard and brittle to make springs that will stand severe strains. The springs that are used in guns and revolvers are the main spring, gear spring, trigger springs, break-off springs and spiral springs of all sizes and shapes. Door-lock springs are generally made of thin, flat, straight pieces of steel that can be bought already tempered for use. This steel could be used in some kinds of gun work, etc.

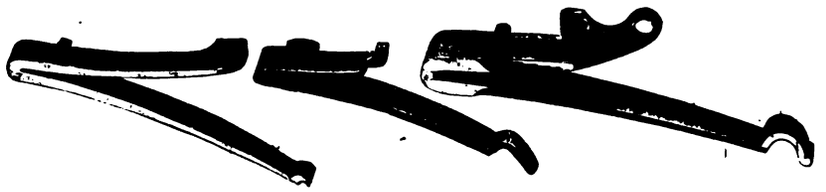


COMMON CAST STEEL IS NOT SUITABLE

To make any kind of springs one should get the steel as near the shape as possible, so as to make little forging necessary. They should be forged up with as low a heat as can be well worked with light blows of the hammer, and after being brought up to the shape as may be required they should be finished up with the file and emery paper. If a bright polished surface is necessary they are now ready for tempering, of which several methods will be given. This is the most difficult part of spring-making and one in which there is considerable difference of opinion as to the best methods. The temper of the springs should be just hard enough to give the proper elasticity. If too hard they will break and if too soft they will set without giving any elasticity. If a file will just cut the spring it is about the right hardness.

First: Heat carefully and evenly over a forge fire that has burned down. The fire should be as clean as possible. A gasoline or gas forge is the best, and for small work the gasoline torch will give a clean heat. Heat to a light red, then harden by plunging it in lard oil, or any animal oil—tallow will do. Remove from the oil and hold it, dripping with oil, over a clear fire until the oil takes fire and blazes off. If a file will not scratch it, it is too hard. Blaze off again until a file will just cut it. Then it has the proper hardness. The oil should be placed in a receptacle of the size so that the spring can be dipped entirely into the oil. It is best to temper each spring separately, as no uniformity can be had by tempering a number at the same time by using the ordinary method.

Second: Another way is to heat the spring to a light red (in the shade) and then plunge in water that is just warm. This is a cheap and easy way to temper springs and will give the right temper if properly done.



USE STEEL AS NEAR THE SHAPE OF THE FINISHED SPRING AS POSSIBLE

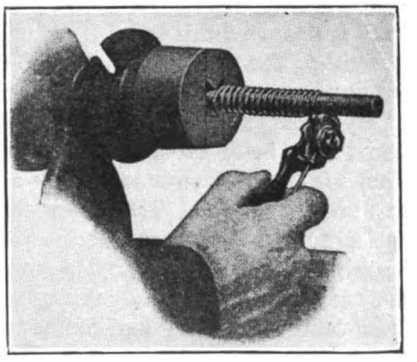
Third: In addition to the above, some, after plunging in the water, heat again until to a red, not as dark as before, by holding in a dark place; then let cool entirely.

Fourth: Take a piece of spring steel (not cast steel), or any steel that is not too hard, and forge it at a light red heat in a clean fire, free from sulphur. Then file up by using the file lengthways; never crossways, for that is apt to leave score marks crossways, causing breakage. Finish up true and smooth, and if any taper is to be had it should be gradual; in fact the springs should be finished up perfectly smooth without any marks or scores, etc., as that is apt to cause weakness. To temper: Heat to a dark red, dip in sperm or good lard oil, edgeways, let it cool and use a wire to take out from the oil; hold it over a fire until it blazes off. Do this several times until of the right hardness. Now put enough oil in an iron dish to cover the spring and then set it on the fire. When the oil is all out put the spring on the ashes of the forge and let cool gradually, or it can be placed on a piece of iron heated to a low heat; then let stand. A high carbon steel requires more drawing than a low carbon steel. It depends a great deal on the quality of steel as to the method of tempering, and one should test with the file so as to get the proper hardness.

Fifth: Heat to a cherry red and cool in water, then place spring in a ladle, cover with grease or tallow and hold over a fire until the grease burns off, leaving a crust on the steel; then cool in water.

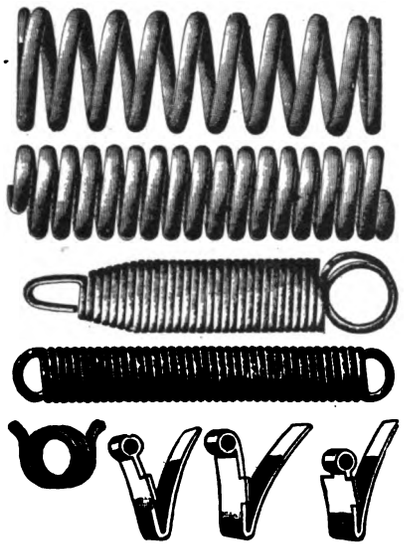
Sixth: In making the springs be careful not to heat the spring too hot, then fasten a small copper wire to spring and heat it evenly to bright cherry heat and plunge in water. Now take out and hold in tip end of tongs so as to be perpendicular; and hold in blaze of fire with the blast on until you can detect the faintest heat when the spring is set aside free from draft until cool. Then cover with oil and it is ready for use.

Seventh: Take a piece of good spring steel and shape it to fit and then heat it to bright orange color and drop it in



SPIRAL SPRINGS ARE EASILY MADE

clear water. It is then as hard as a piece of glass. Now polish a part of the small end and get a small piece of hoop



A FINE-GRAINED, TOUGH, MILD, LOW CARBON STEEL IS BEST

iron or something else like it; lay the spring on it, then put it in the fire and blow lightly. Watch the small end and as soon as the color changes to a gray take the spring and iron off and let all cool together. When cool repeat until you have done it three times.

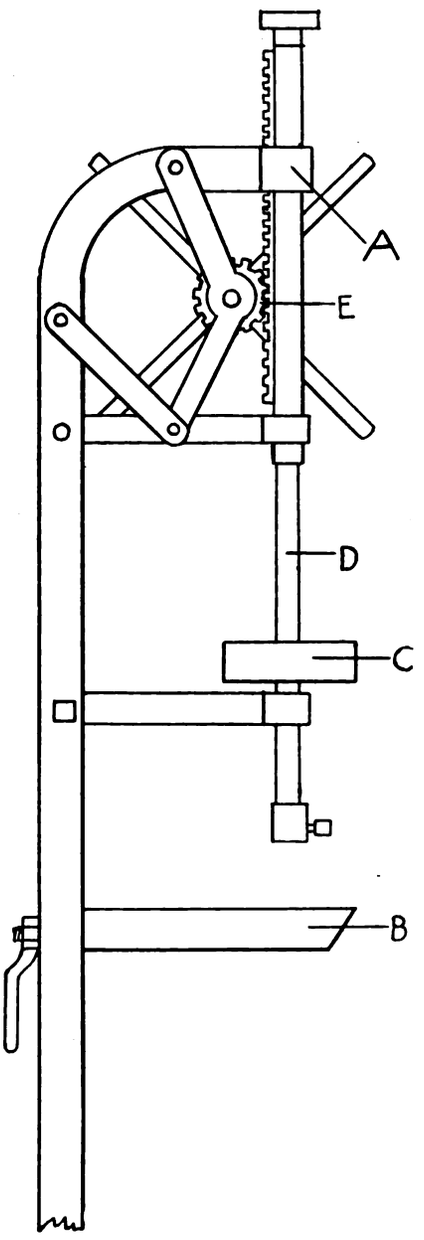
Eighth: Heat the spring evenly and cool in lard or fish oil, though for very small springs linseed oil is best. Then hold the spring over the fire by means of rod or wire until the oil blazes off. Then dip in oil again, place over the fire a second time and, if necessary, a third time. A thick, heavy spring will require more blazing off than a thin one. Then lay it by to cool. A little practice will be required to determine the number of blazings. Some, after hardening, draw their springs to a blue and then cool.

Ninth: Heat to a good red heat without forming any scale, then plunge into a bath of raw linseed oil, which will give the proper temper. Locomotive springs, carriage springs and other heavy work is tempered this way.

Tenth: The round rake teeth used in hay rakes, which can be had in plenty at the junk yards, are said to be tempered after being brought up to shape. They are heated almost to a white heat or a very light red. Then allowed to cool gradually in a warm place. Some of this steel is tough and fine grained and can be used for a variety of purposes.

Eleventh: Spiral springs can be tempered by most of the above methods, depending on the quality and kind of springs to be made. To make them: Make a mandrel the size the spring is to be on the inside. A small hole the size of the wire to be used is drilled into the mandrel to hold the wire by putting one end in it. Then wind the wire around the mandrel. Now take it off the mandrel; the end in the hole can be cut off or pulled out. The spring is now ready for tempering. Wire can be had already tempered, such as music wire or brass spring wire. Spiral springs are made in an endless variety of sizes and forms and can be had ready made. If it is desired to make a spiral spring with small ends and a large middle proceed to string a number of washers on an iron rod. Screw them up tight by having a nut at one end of rod; then place bolt in a lathe and turn the washers up to size required, then wind spring as heretofore described. The rod can be taken out of the washers by taking off nut, then the washers can be slipped out between the coils of wire.

(To be continued.)



A SHOP-MADE POWER DRILL



A Shop-Made Power Drill.

GEORGE NABLO.

The engraving shows a power drill designed by my son and built by myself. It is thoroughly practical and now in everyday use. The main frame is of $1\frac{3}{4}$ by $\frac{5}{8}$-inch stock in one piece. The piece is doubled or bent at A, running parallel its entire length and allowing a space of $\frac{3}{4}$ of an inch between the pieces for attaching the sliding rest B. In place of the screw feed usually found on a drill we employ four levers and a rack and pinion arrangement. The pulley is shown at C. The vertical sliding stem, D, is provided with a groove for its entire length, into which fits a loose key on the pulley. This grooved stem runs inside of a long sleeve which is provided with cogs. These cogs, or the toothed rack, was made from 1 by $\frac{1}{2}$-inch stock with a fuller in one piece and of a size to fit the teeth in the cog wheel or pinion. The rack is fastened securely to the sleeve by means of rivets.

The assembling of this machine may easily be seen from the engraving. When fastened to a post the drill is quicker in action than the usual run of screw-feed drills and the feed is more easily controlled. I use our drill for both iron and wood work and it gives the best of satisfaction. This machine costs but a trifle compared with the drills to be found on the market, and it is practically as serviceable for the general run of work. If further particulars are desired I will gladly furnish them.

Any practical smith can make a drill of this kind, and little or no extra material will need to be

purchased. I hope that this hint will be of practical worth and use to my brother readers.

An Improved Hand Punch.

E. ZABST.

The accompanying engraving shows a hand punch based upon Brother Bernard Jokeway's in the October issue. It will be noted that I have made some improvements and changes over his machine. I have already made six of these machines and they work fine. I have one that punches ½-inch holes in ¼-inch iron, and does it so easy and fast that I cannot see how any smith would want to do without it. This punch is better and cheaper than any I have ever seen and I am going to build them in quantities and place them on the market.

I have them down fine now—make them in four sizes to punch from ⅛ to ½-inch holes in ¼-inch iron, and I think I can make one that will punch ½-inch holes in ¼-inch iron. I would like to get it patented and would like to know if Brother Jokeway has any objection. This tool is certainly too good to let go. It can be sold for about half the price that is asked for other cast-iron punches and it cannot be broken. Any smith can make punches and dies for it to suit any job he may have on hand.

I am no blacksmith, but have been a horseshoer for forty years. I can make all kinds of horseshoes and have made tons of them in my experience; but I now want to do something else, so I'm reading every line of THE AMERICAN BLACKSMITH, and have learned a lot in the past year.

Paint Shop Short Talks.

Practical Suggestions for the Busy Painter.

M. C. HILLICK.

A shallow rake, or gouge, or a hollow spot in the carriage or wagon body may be brought up level and full with the rest of the surface by filling it with a quick, hard-drying putty, made of two-thirds dry white lead and one-third plaster of paris. Stir to right thickness in equal parts of rubbing varnish and coach Japan. Raise the putty a little above the surface, and the next day surface down with rubbing brick wet up with raw linseed oil.

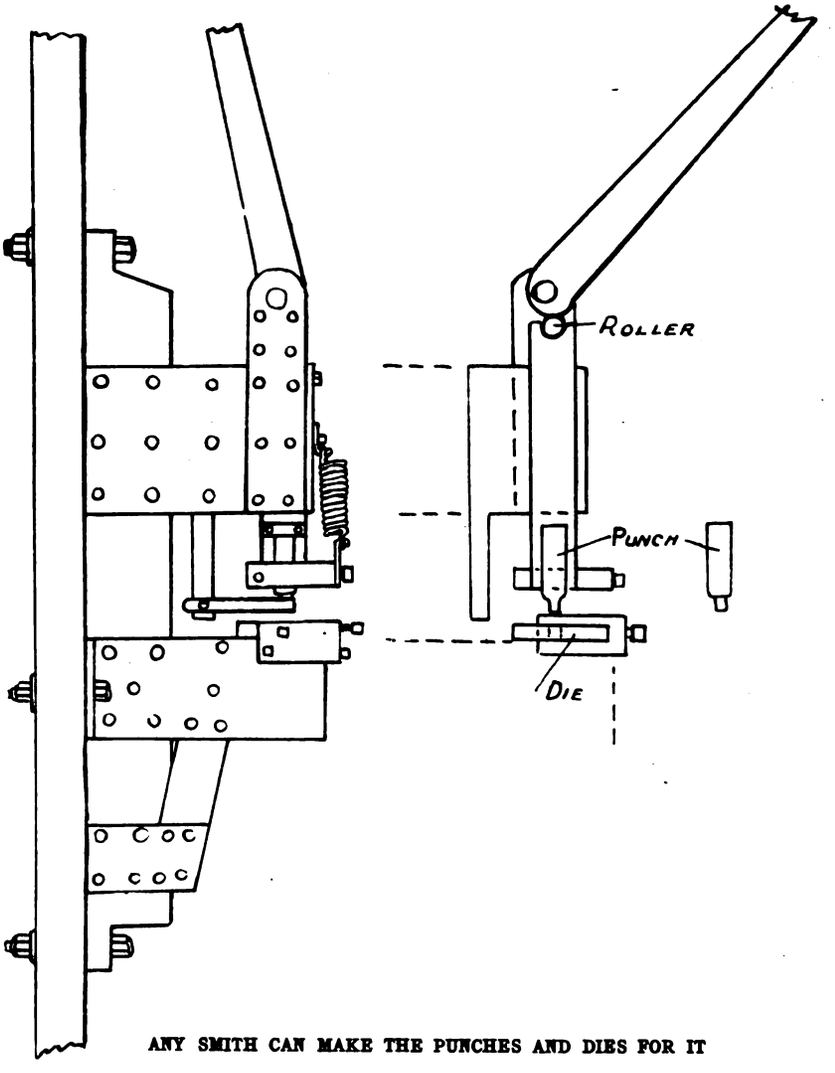
Old work that has splintery cracks and rough holes to be puttied needs an elastic putty to be applied smoothly, and not to be sandpapered. Make it of one-fourth white keg lead ground in oil, and one-fourth dry white lead and one-half bolted whiting. Mix to a consistency to be easily handled in two-thirds thick varnish and one-third raw linseed oil.

For resetting glass in coach or wagon window frames use a putty made up of equal parts of best bolted whiting and dry white lead, mixed to a thickness to handle without sticking to the fingers, in equal parts of raw linseed oil and Japan gold size. This putty dries firmly and holds everything solidly in place.

To cover up the cracks in a carriage or wagon or, for that matter, in an automobile body and make them stay covered for at least a reasonable length of time prepare a filler as follows: equal parts of any good American rough-stuff filler, dry white lead and whiting, mixed in equal parts of brown coach Japan and rubbing varnish. To this batter add one-third the quantity of rye flour paste, making the mass thick enough to apply with an old, well-worn paint brush. Let the heavily brushed on coat set up rather stiff, and then with a wide blade, half elastic French scraping knife go over the coat, knifing it down clean and smooth. After forty-eight hours rub the surface down level and smooth with a fine grade of rubbing brick dipped in raw linseed oil.

To give the inside of the coach or wagon body a rubbed varnish effect, as the owner sometimes wishes it to have, add to one-fourth gallon of finishing varnish a medium consisting of one-quarter pound of beeswax dissolved in turpentine. If more luster on the surface is desired cut the quantity of beeswax in half.

If any of your paint brushes, through accident or neglect, become clogged with paint and dry hard and look to be unfit for further use hang the brush up with the bristles in coal tar oil for two or three days. In the absence of this oil soak the brush in hot linseed oil. Now and then, under apparently the best use, the paint brush becomes "soggy," with no life or "spring" to it, in which case soak the tool in hot turpentine. To clean the brush



ANY SMITH CAN MAKE THE PUNCHES AND DIES FOR IT

handles, which get daubed and smeared with all sorts of paint substances, dip a wire scrub brush in a strong solution of sal soda and rub smartly.

During the cold weather when the water in which the paint brushes are kept is likely and, in fact, does freeze over, add to every ten quarts of water an ounce of glycerine.

The painter in the small shop buying brushes very often through the local dealer is apt to get something that is not all bristles. To test the brush stock remove some of the bristles and hold them over the fire. The real animal bristles over the flame twist and curl up and emit a peculiar animal odor. Spurious bristles burn like "spongy" wood or sea grass.

A top dressing, shop-made or bought ready for use, is a necessity in the jobbing shop. Some smiths running a paint shop in connection with their general business sell a considerable quantity of top dressing. In these days of cheap rubber and machine-buffed leather tops it is a necessity. A very good and comparatively cheap dressing for rubber tops may be made of one-quarter gallon liquid asphaltum one-eighth gallon elastic finishing varnish, one-eighth gallon boiled linseed oil, one-eighth gallon coach Japan, one quarter gallon turpentine and one-half pound of drop black. Put all the ingredients into an old varnish can and shake thoroughly to get a complete incorporation of the contents. Cork tightly and apply to the rubber or leather sparingly, just as all dressings for rubber or leather should be applied.

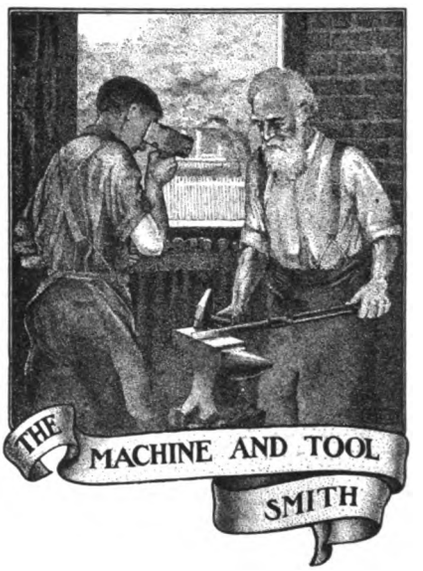
For a leather top from which the enamel has been worn darken sweet oil with drop black; wet a soft cloth with the mixture and rub out well, finally drying the leather off with a clean woolen cloth. To clean the shaft leather, dashes, etc., wet over with common kerosene and polish dry with soft woolen cloth or cotton waste.

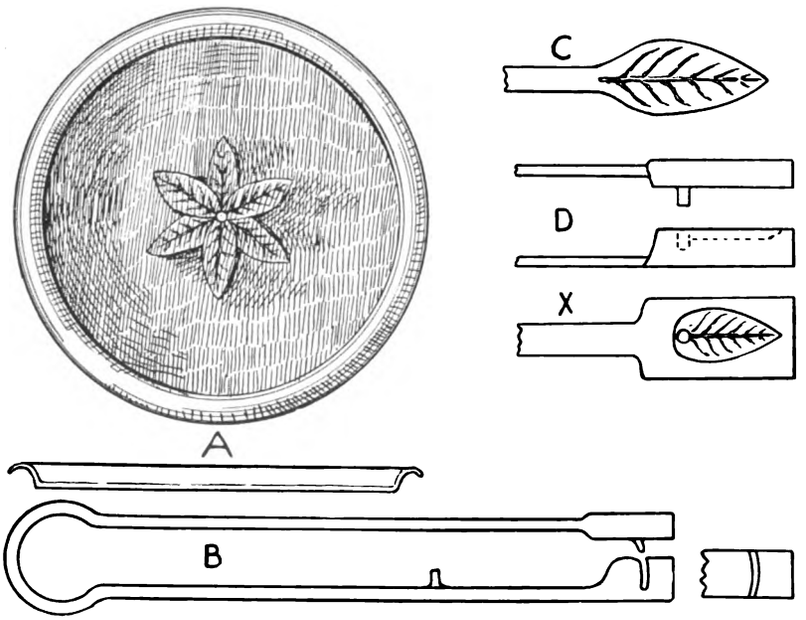
To clean the grease and sticky substances from axle arms, hubs, fifth-wheels, and from the mechanism of automobile running parts, saturate the parts first with a mixture of two parts crude oil and one part turpentine. Let this medium stand for a while and then with strips of burlap proceed to rub hard and dry. Loosen up the old, hard grease substances with a putty knife, ground with a bevel on one side. In the case the grease cannot be entirely removed, so that it will in no way affect the subsequent coats of paint or color, float with a soft brush a coat of thin orange shellac over the saturated parts. This will prevent the grease from striking through.

To paint canvas wagon tops and curtains at little expense use one-third pound of white vitriol in three-fourths gallon of soft water, to which add finely-ground whiting until the right brushing consistency is reached. Prime the outside of the top and curtains. Usually two coats of paint over this prime coat completes the job. Finish with an elastic coat of paint with some luster to it—a varnish color coat, in fact.

Buggy and carriage cushions and backs get worn and dull. To restore them in a measure to their original condition match some color with the color of the cloth or leather and then thin the match color to a stain-like consistency with turpentine. Apply a thin glaze of this color, and when dry coat it over with orange shellac thinned down to a grain-alcohol condition. Then wet the surface over with a medium made of equal parts of raw linseed oil, vinegar and turpentine, and polish dry with soft cotton or woolen fabric.

For a quick size upon which to lay aluminum or gold leaf, in case of a hurry-up job, use of Japan gold size, six parts; fat linseed oil, one part. Pinch a dash of chrome yellow into this size for gold leaf and a like quantity of silver white for aluminum or silver leaf.





SIMPLE TOOLS MAKE QUICK WORK POSSIBLE

Making Ornamental Pans.

BERT HILLYER.

Some time ago I had to make a lot of ornamental pans with a flanged edge and a leaf design and small hole in the center. The pan is shown at A in the engraving. To make them quickly, and all of them uniform, I make a spring tool as shown at B. The bottom part of tool was grooved, as shown, to the same radius as the rim of the finished pan. The pin on the lower arm of the tool went through the hole in the center of the pan and held it in place.

The blanks for the pans were all cut out of the required stock, cut round and then a center hole punched out. Then the blank was heated, placed on the pin of the tool and the top of the tool hit with light blows to flange the edge. The pan was turned after each blow until entire edge was flanged.

The leaf design in the center was made in another tool such as shown at D. To make the tool I first forged a pattern leaf as shown at C. This was

shaped up exactly the same as the leaf was to be on the pan; the veins were marked with a chisel and all parts of the leaf forged perfectly. Then I made the tool as at D, leaving the bottom and top jaws of the tool blank. Now, I heated the bottom jaw of the tool, laid the leaf pattern on the heated jaw with the vein side down and hammered the pattern into the hot metal. Now, heat the top jaw and after brushing off both top and bottom jaw faces hammer the top jaw into the bottom one bearing the impression of the leaf. A little oil spread on the bottom jaw before hammering will prevent sticking. The top jaw was now trimmed to make it slightly smaller than the bottom impression of the leaf. A pin at the base of the leaf went through the hole in the center of the pan and held it in position so the leaves would be marked in the proper position. The flanged pans were now heated, placed in the leaf die and the leaf pattern stamped in the center. The hole in the center of the pans were made so as to bolt the pans to a bracket by means of round-headed bolts.

An Easy Method for Roughening Foot Levers and Step Pads.

BERT HILLYER.

How many times have you seen a smith attempting to rough a foot lever or a step pad by using a hammer and cold chisel? Or have perhaps done the same job yourself! How often has the work resulted in a neat, real workmanship job? Not often, I venture, if ever. The next time you have a job of this kind to do and you want a neat job and want to do it quickly proceed as follows: Heat your pad or foot lever to a good, even heat and then take a piece of coarse wire netting, place it on the face of the pad and let your hammer come down on it. Use a wire netting of such a mesh to suit the job in hand. If you haven't a power hammer use the hand hammer and a flatter. This method will cut the pad regularly and make an easy job of an otherwise difficult one and one usually not accompanied by flattering results.

If you desire to cut the pad or foot lever with but one row of lines, i. e., lines running but one way and not crossed by others, proceed as follows: Take a 2½-inch pipe coupling or any other suitable size and cut it down one side so that when flattened out with a wooden mallet the threads on the coupling will present a row of straight lines. This flat piece may now be used the same as the wire netting was used.



A GENERAL SHOP OF ILLINOIS STATE

Hardening Steel.

The Metal, the Man, the Equipment.

E. R. MARKHAM.

To a man not thoroughly familiar with the subject the hardening of steel is a simple matter. All that is necessary is a fire, a little water and the article to be treated. The steel must be heated in the fire until it is red, then it must be plunged into the water; that's all. Well perhaps it is "all." If a pistol bullet is accidentally lodged in some part of your anatomy, all that is necessary for its removal is a lance, a probe and a pair of tweezers. Someone makes an incision with the lance after probing and locating the offending article, then with the tweezers it is removed. Easy, isn't it?

"Yes," you say, "but I wouldn't let *you* probe a wound in my body, then cut and 'fish' around for the bullet." I ask why? Your answer—and a very sensible one it would be—"You have not made a study of the human body, you don't know where the muscles, cords, veins and arteries are located, and while you might succeed in removing the bullet you would, in all probability, do me a serious injury."

Now, hundreds of manufacturing concerns are doing themselves and their customers a serious and a permanent injury by employing men to harden tools and parts of their manufactured article who know absolutely nothing about steel.

A man to be a successful hardener of steel must know the metal; must know its composition, its nature and peculiarities. Knowing these things, experience teaches him how to deal with the various problems as they arise.



A WELL-EQUIPPED SHOP OF NORTH DAKOTA, RUN BY MR J. W. SINCLAIR

I know a man who made a study of the metallurgy of steel, also the effect of sudden and uneven expansion and contraction occasioned by unequal heating and cooling. He has never done very much actual work in the line of hardening steel, yet he is extremely successful in straightening out troubles that arise in factories, occasioned by faulty treatment of steel when it is hardened, and the steel concern in whose employ he is has him spend a considerable portion of his time going from place to place, pointing out faulty methods of treating steel.

A young blacksmith or hardener who would make a success at present must put in considerable time in the study of the subject under consideration. There was a time when this was not absolutely necessary, but that time has passed. We are living in a progressive age, and in no one branch of mechanics has there been greater progress than in the manufacture and manipulation of steel.

A man who has spent a number of years in one shop hardening a certain line of articles may become quite skillful in treating those particular pieces, and yet find himself helpless when new problems arise. Whereas, if he throughly understood the metal, had a general idea of the effect of heat and cold on it, if he understood the practical, profitable experience increases a man's usefulness a thousandfold.

In an experience of years in charge of hardening rooms and also in teaching men to harden steel I have found that the truly successful men are those who study the subject as outlined in the preceding paragraph. In fact, I will not take as a student in this subject one who will not study it from both the theoretical and the practical standpoint.

A man to be a successful hardener must have good eyesight, he *must* be able to distinguish colors, he must be cool and collected under trying circumstances. If he gets nervous and is easily "rattled" he will never make a success of the business. I know a man who suddenly lost his ability to successfully harden pieces that he had been hardening for years with excellent results. He told me he "had lost his nerve." Being advised to take a month's trip in the woods, to go fishing and hunting, he packed his grip and after an outing of five or six weeks he returned and was as successful as ever.

A man who understands the importance of uniform, correct heats will insist on the proper location of his forge or furnace in order that he may accurately gauge the heats. A very common error consists in locating a furnace or forge near a window where the direct light shines on the fire. As a consequence, work is overheated before the operator knows it. Another serious mistake consists in locating it in a damp place where the operator runs the risk of getting rheumatism, pneumonia or some equally undesirable affliction. If the employer does not interest himself in the welfare of the operator to the extent of providing suitable facilities in a desirable location he cannot reasonably expect satisfactory results from the employee.



AN IDAHO GENERAL SHOP, RUN BY SWEARINGEN & GILL

composition and the result of an increase or reduction of the percentage of the various elements it is composed of, then he would be able to vary the practice to suit the conditions.

I do not wish to be understood as advocating the substitution of book knowledge for practical experience, but I do say the proper kind and amount of such knowledge combined with a

Many employers seem to be in the frame of mind described in the first paragraph of this article, namely, that in hardening steel the only things required were a red-hot piece of steel and a quantity of water to plunge it in. In fact, *no* job in the general run of shops requires greater display of ingenuity and good common sense than the hardening of steel to produce best results at the minimum of expense, on account of articles ruined in the process.

The steel used plays an important part in successful hardening. Now, under successful hardening I not only class the ability to bring articles through the process whole and without cracks, but the placing of them in condition to get the greatest usefulness possible out of the article after it is hardened. For instance: if a tool is heated red hot and plunged in a hardening bath, and on removal from the bath is found to be whole and free from cracks, at first sight we might say that it was successfully treated, but if on trial it proved to be soft and consequently not able to cut the work it was made to cut to shape, we could not class it under the head of successfully hardened tools. If it showed under test of a file to be hard, yet when put to work it was not hard enough to do the work expected of it, we could not look on our labor as successful. It is possible that a steel containing twenty-five points more of carbon would have worked all right if made into such a tool. At times a man uses a steel containing too high a percentage of carbon for the tool, and does not get satisfactory results. In either case a knowledge of steel would have enabled him to select a steel for tools exactly adapted to the tools to be made. At times a make of steel is condemned and discarded, because the particular temper suited to the particular piece of work was not used.

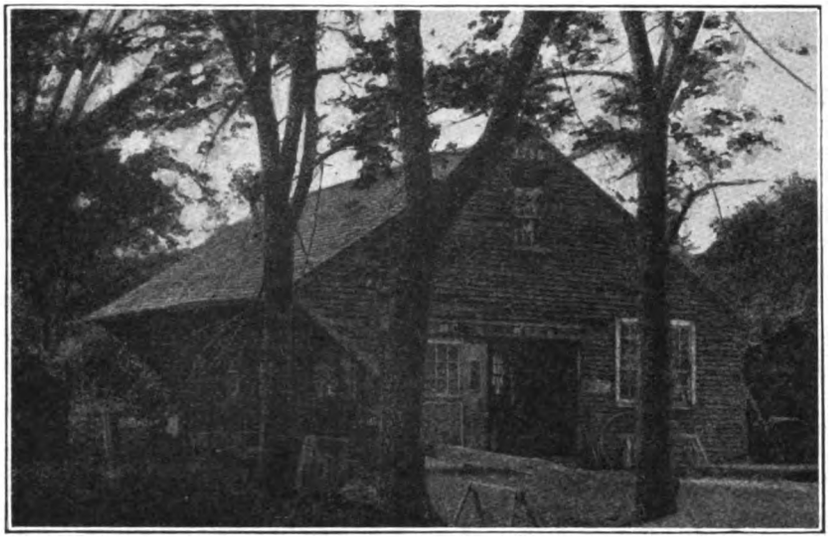
An experience of thirty years has taught me that a man to be a successful hardener of steel or a successful steel salesman, or if he is to have success in selecting stock to be used for tools, must understand the metal. I have been instrumental in teaching a number of men the art we are considering, and I have noticed that, everything being equal, the man who was the most willing to study, to commence with the ores then work his way through blast

furnace practice, puddling furnace practice, the Bessemer Converter, the open-hearth furnace, the crucible process, then through the processes until the metal was marketable, then to take up the effects of the various elements on the metals, the effect of heat, even and uneven, of cooling, evenly and unevenly, and so on; that man would make a decided success in his chosen line of business. A success far above the man who did not think it necessary to know anything, but how to heat and quench steel in the process of hardening.

The introduction of high-speed steels has revolutionized and turned upside down many of our ideas and methods of treatment. As a consequence, we find a hardener who, although he may have been at one time fairly successful in hardening tools made from carbon steels has, since treating the new steels for a time, lost the art of hardening successfully those made from carbon steels. This condition need not exist. If a man will occasionally—say once or twice a week—heat a piece of carbon steel to what appears to him to be the proper temperature, harden, break it and examine the appearance of the fracture, he can tell whether he has given it the proper heat. If the fracture does not look right, he can by varying the heats find the right temperature, and in this way keep his eyes in condition to properly discern heats.

A man familiar with the treatment of all kinds of steel and various forms and sizes of tools knows that the proper heat to give steel to get desired results varies with the composition of the steel and the form and size of the tool. The bath also plays a very important part, as a piece of steel heated to a certain temperature will harden much harder and deeper if quenched in a bath where the steam was forced away from the steel so the water could get at it in good shape. I have seen a circular-shaped tool that when hardened in a still bath showed but a slight penetration, which when hardened in a jet showed a depth of hardness at least four times that of the other. The heats were as nearly alike as it was possible to get them. At times a little fine salt sprinkled on the surface of the heated steel just as it is about to be plunged in the bath will result in a much harder surface and a deeper penetration, as the salt causes the "scale to strike," instantly the water touches the steel. In this way the scale of oxide which otherwise would remain on the surface and so shield it from the action of the water is removed, and the water getting right at the steel conducts the heat away more readily than would otherwise be the case if no salt was used.

he wanted to look at the steel as it was heating, when they were arranged so as to shut off the direct rays of light. As is the case with many hardeners he was a victim of too much light at times.



AN OLD NEW HAMPSHIRE SHOP

Built in 1780 by Noer and Joseph Marsh—business carried on by Amos Marsh, then by J. W. Marsh, and now by Willis B. Marsh, making four generations of one family.

Many times cyanide of potassium is placed on the surface of heated steel for the purpose named above. It is generally considered that "cyanide" is used to further carbonize the steel, and in the majority of cases it is used for this purpose, but at times it is applied to "strike the scale."

High heats and uneven heats are responsible for many of the troubles that arise when steel is hardened. I examined a large block of steel a few days ago that went to pieces when hardened. A glance at the fracture showed me that a heat far in excess of what it should have received had been given it. The hardener was amazed when I told him my decision, and attempted to convince me that such could not be the case. As he was then heating another piece of the same size and shape I waited until he thought it was all ready to dip in the bath. When he removed it from the furnace I held a large piece of black cloth between the heated steel and the window, instantly the appearance of the heated surface was changed; what had appeared to be a low heat for a block of that size was an extremely high heat; so high that the steel was rendered unfit for dipping. The hardener who was an experienced man in the business saw his mistake and placed dark shades in the windows, these shades were drawn out of the way to allow the air to circulate freely through the room until

As I am frequently called to shops where they are having trouble I find many causes for the trouble; but the troubles I discover are as a rule faulty methods of treatment. Once in a while I find piped steel or steel where some element has segregated when the steel was cooling in the ingot mould or, occasionally, I find a seamy bar of steel. Such cases, however, are rare where the parties are using any of the generally accepted steels. Of course, if a manufacturer gets the cheap-steel craze and does not care to pay the price of crucible steel of tool steel quality, preferring to get the so-called cheap tool steels, some of which are nothing, but high-carbon, open-hearth steel, he must expect trouble, and he generally gets it. A poor tool steel is about as expensive a luxury as a manufacturer can possibly indulge in, for it is costly, as a gift; while a steel exactly suited to one's needs is cheap at any price. To be sure, there are jobs where a moderate-priced steel answers the purpose as well as the most costly brand, but for other purposes the right steel is the cheaper, no matter what it costs.

I am often asked the question "Is a pyrometer a necessary part of the equipment of an up-to-date hardening room?" Yes! and no! If work of a kind is hardened in large quantities heated in a modern gas, coal or coke fire a *good* heat-measuring instrument is a valuable part of the equipment; for,

while it does not necessarily record the exact heat of the piece of steel in the furnace, it does enable the operator to maintain a uniform temperature in the furnace, regardless of the weather or light conditions out of doors. On the other hand, if the pieces to be hardened are of various sizes, shapes and qualities of steel, and the furnace conditions must vary with each piece, then such an instrument is of little value.

A mistake often made, and one that is many times fostered by the manufacturers of pyrometers, consists in thinking such an instrument will take the place of brains. At times it is a great help to a good, brainy hardener; but it can never when in conjunction with a poor workman take the place of brains.

A poor equipment manipulated by a good workman may turn out good work; but at a cost far in excess of what it would cost if a good equipment was furnished the man.

A poor workman cannot turn out good work even with the best equipment. I repeat what I have often written—a brainy man with good eyesight and a supply of good common sense is an absolute necessity in a hardening room if good results are desired, and no one can afford anything but good results at the present time, when the buying public are so exacting and competition is so strong.

Plain Machine Work for the Blacksmith—4.

GEORGE CORMACK, JR.

The Drill Press.

The ordinary drill press in its simplest form is familiar to everyone who has ever had any connection with mechanical work. Such a drill press is shown in the engraving, Fig. 1, and scarcely needs any explanation. In setting up a new drill press the arm E should be clamped to the column by means of the clamping screw provided for this purpose and the drill press adjusted so that the top of the table is level every way. To many this may not seem absolutely necessary and too often drill presses are not leveled up as they should be. For a great deal of work it certainly makes little difference whether the table is actually level or not, but in every machine shop there is always one or more drill presses which are leveled up perfectly and are used for work where a level table is a decided advantage. When a drill press is to be used in a blacksmith shop or a small repair shop the table should be as nearly level as it is possible to get it. The reason for this will be readily understood if it is remembered that a great deal of the work done in such shops is repair work, and often involves the drilling of holes in broken castings or other parts of machines; the holes requiring to be drilled at right angles to finished surfaces. Such pieces are often hard to set up for drilling, and it is a great convenience in many such cases if a level can be applied to a finished surface to test the setting. It therefore pays for the little extra time it takes in installing to level the table up as nearly perfect as possible. A drill press should be set up either on a concrete foundation or on a perfectly solid floor. All

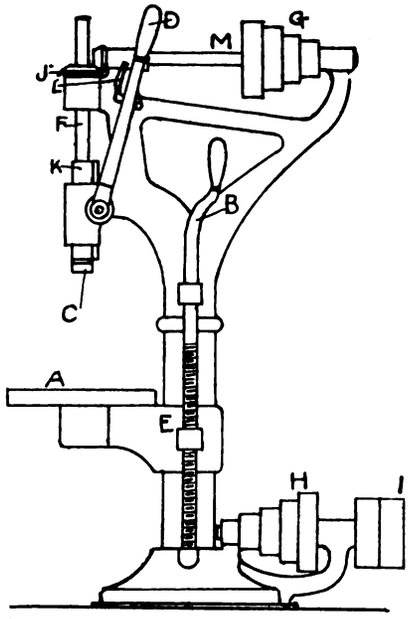


FIG. 1—A MODERN DRILL PRESS

drill presses are to a certain extent top-heavy and should be firmly bolted down.

Fig. 2 shows a detail view of the drill spindle, together with the sliding sleeve. In the engraving, A is the sliding sleeve; this is made of cast iron bored the full length to a running fit on the spindle proper, B, and turned on the outside a sliding fit to the hole in the frame. The spindle is of steel upset in the form of a collar at its lower end, F; this collar being usually turned to the same diameter as the outside of the sliding sleeve. The collar takes the end thrust of the drill: anti-friction collars, I, of babbitt, brass or wood fiber being placed between the upper face of the collar and the lower end face of the sliding sleeve. In many drill presses ball bearings are used instead of these collars. When drilling, the whole pressure necessary to force the drill into the metal comes on these collars or ball bearings, and it is very important that this part of the drill press be well oiled, especially in heavy drilling. At the upper end of the sliding sleeve there is another loose washer or collar, C, and a nut, D. This nut is for taking up the end wear on the spindle and to prevent the spindle from dropping out of the sliding sleeve. Neglect or carelessness in the proper adjustment of this nut is the cause of more small drill breakages than anything else. If this nut is not adjusted so that there is no lost motion vertically between the drill spindle and the sliding sleeve, it is almost impossible to use small drills without frequent breakages. The reason for this is obvious; if there is lost motion in the spindle, vertically, the moment the point of the drill starts to break through the work the spindle drops down the amount of this lost motion, giving the lips of the drill too big a bite and the drill breaks off. This dropping down of the spindle can, of course, be avoided by holding back on the feed lever the moment it is felt that the drill is breaking through, but this in many cases is leaving too much to the workman's carefulness, and where rapid drilling of small holes is desired always see that the lost motion between the spindle and the sliding sleeve is reduced to a minimum. With this properly adjusted small holes can be slammed right through with little danger of the drill breaking. Care, however, should be exercised in tightening nut D; if it is set too tight the spindle is apt to heat and cut the bearings in the sliding sleeve. At G Fig. 2, is shown the rack in which the gear on the feed lever spindle engages, thus giving the vertical motion to the spindle. This rack is solidly attached to the sliding sleeve and acts as a spline to keep the sliding sleeve from rotating with the spindle. The taper hole in the lower end of the spindle is usually what is known as the "Morse taper," this being the standard taper for drill shanks. At E a slot is cut in the sliding sleeve, coinciding with a similar slot in the spindle. In Fig. 2 the taper hole is shown by the dotted lines, and it will be observed that the taper hole ends where the slot in the spindle begins, the lower end of the slot cutting into the upper end of the taper hole. Fig. 3 shows a sectional view of the lower end of the spindle with a drill shank inserted in the taper hole: A is the drill spindle; B is the taper shank of the drill, and C is the flat part on the end of the drill shank, technically known as the tang of the drill. The tang fits up into the slot, E, thus giving a positive

drive to the drill, preventing it from slipping. It will be noticed that the drill tang does not fill the slot longitudinally, but leaves a space, D, between the upper end of the slot and the end of the tang. This opening is to allow of the easy removal of the drill by means of the taper drift J, Fig. 2. The correct taper for this drift is 1¾ inches to the foot. Most drifts I have seen, however, excepting those manufactured by people who make a business of drop-forging them, have been any old taper. The drift should be soft steel and rounded on one edge to fit the round of the end of the slot. However the drift may be made it should be such as will not damage the slot in the drill spindle. In removing drills or chucks from the drill spindle the spindle should be turned by hand until the slot in the spindle coincides with the slot in the sliding sleeve, the small end of the drift introduced into the slot and the large end given a tap with a hammer. If a drill chuck is used it must be fitted with a shank corresponding to the taper hole in the spindle. In removing drill chucks from the spindle the chuck should be grasped in one hand while the drift is driven into the slot, thus preventing the chuck from dropping down on the drill table, resulting in damage to both chuck and table.

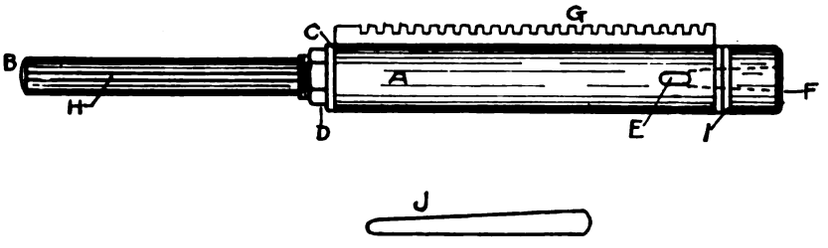


FIG. 2—THE DRILL SPINDLE IN DETAIL

For all drills smaller than ½ inch a drill chuck of some standard make should be used. There are many excellent drill chucks on the market, the best for small drills being those having three jaws closing concentrically. This style of chuck is not the cheapest, by any means, but for small drills they cannot be beat, and if handled with ordinary care will hold drills perfectly true for many years. Very accurate and close work is done in the manufacturing of such chucks, and they should never on any account be touched with a bare hammer. If at any time it becomes necessary to strike the chuck, a hard wood block should be used between the hammer and the chuck. If a drill starts to slip in the chuck, stop the drill press and tighten the chuck up a little more. Allowing the drill to slip in the chuck jaws will soon put the chuck in a condition in which it will be impossible to hold drills firm and true. If you are going to buy a drill chuck, buy a good one, even if it does cost a dollar or two more than a cheap one. A cheap drill chuck which quickly gets out of true is the most expensive tool you can buy; it will break more drills in a year than would buy two or three good chucks.

For sizes over ½ inch, drills with taper shanks should be used. Taper shank drills are more expensive than straight shank drills, but drills over ½ inch seldom break, except through carelessness on the part of the workman. Drills under ½ inch are apt to break, even when handled carefully, but straight shank small drills are very inexpensive. Before putting the drill chuck or taper shank drills into the hole in the drill spindle the hole should be carefully wiped out with waste or a rag and the chuck and drill shanks wiped and examined to see if they are free from burrs or bruises which would in any way damage the hole or prevent them from fitting clear up where they belong. If at any time a tang should break off or get damaged in such a way as to allow the drill or chuck to slip in the hole in the spindle do not try to make it hold by bearing down on the feed lever, but stop the drill press as quickly as possible and put in a drill with a perfect shank and tang. If a drill with an imperfect or damaged tang is allowed to slip in the spindle the tang will ream out the lower end of the slot, leaving it in such shape that it will always be difficult to prevent drills from slipping and, furthermore, when the slot is so damaged it will soon spoil the tangs on all the drills used in the drill press. Many drill press spindles are irretrievably damaged by carelessness in this respect, the only remedy being a new spindle. Never drill through the work into the drill table; it is a lamentable fact and shows the general carelessness of the average workman that, even in regular machine shops, drill presses will be found where you wouldn't find a piece of undamaged surface on the table which couldn't be covered with a silver dollar. In drilling always locate the table so that the drill in breaking through the work will enter one of the bolt slots in the table, or will go into the large hole in the center. If this is impossible, as it often is in drilling small pieces which are too small to bridge the holes or slots in the table, an iron plate should be used on top of the table. This plate can be of cast iron of liberal thickness, say a couple of inches, allowing it to be repeatedly planed off when it becomes too full of drill point holes. In drilling work demanding accuracy always be sure that the arm is tightened up on the column, and that the table is also tightened up in the arm. If this is not attended to, the hole in the work will not be square with the table and trouble will result. When the arm is loose on the column the table naturally sags down a little, due to its own weight, and when the pressure of the drill is also added to this the sag is increased, throwing the table considerably out of square with the spindle. In sweeping the chips from the drill table never sweep them towards the column; sweep them off in front or at the sides. If swept off towards the column the dust will work in between the column and the arm and will prevent the table from coming up square when the arm is tightened up on the column. This may seem to many to be too much of a refinement, but I know from my own experience in handling men in a machine shop that machine tools too often do not work as accurately as they should simply because the workmen do not exercise sufficient care in removing the chips from the machine; allowing them to enter the slides and moving parts, thereby throwing the several members out of alignment. As a man advances in experience as a mechanic he will find that the basic struggle of all machine work is to obtain an approximation of accuracy; absolute accuracy being practically unattainable. He will also realize that the closeness of this approximation

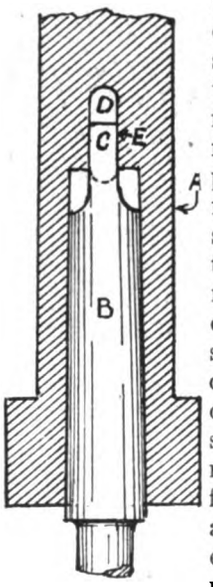


FIG. 3—SECTION OF LOWER END OF SPINDLE

to absolute accuracy depends solely on his appreciation of the importance of seemingly unimportant details.

(*To be continued.*)

A Visit to Tom Tardy's Shop.

FRANZ WENKE.

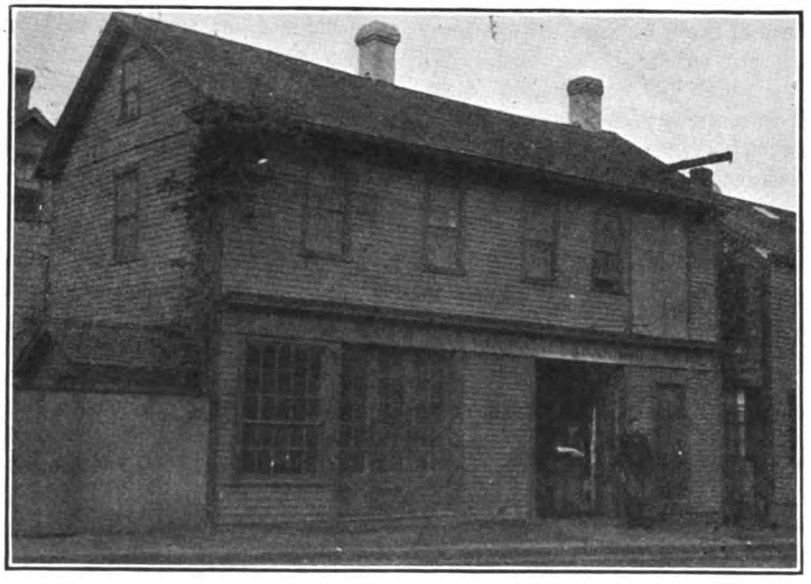
Some time ago there appeared in one of Denver's leading newspapers an announcement of a blacksmith shop for sale or rent. The name and address of the owner was given and, as I contemplated, at that time to make a change, a friend of mine, Mr. Foster, and myself went to look at the proposition. Previously, the owner of the shop had written to me to come and see him Sunday, as he would be working all day. Consequently, we drove there about ten o'clock in the morning and found our busy man in bed. Mr. Foster said, as the busy man appeared at the door, "There comes Tom Tardy."

After all three of us got into the buggy we drove about a half mile and arrived at a square box made up of old clapboards and hidden away in some tall weeds. Opening the door we looked into a space encircled by said boards, about 20 by 20. In the exact center stood a brick forge with an old-fashioned bellows. To the right was a pretty good portable forge, but the fan and tuyere taken apart and several parts missing. To the left was a very small post drill, a smaller vise bench and a still smaller vise. A few old battered hammers and tongs made up the remainder of the shop. A case of "Electric Screw Plates" also belonged to the shop, but they were up at the house, as they had been loaned to somebody. It was beautiful to behold the play of the sun through the different holes in the roof.

Of course, I got scared at Mr. Tardy's proposition right there, and left in such a hurry that I forgot a nice cane, a gift, which I valued very highly. The quicker, as there was nothing to be seen of the work that Sunday.

To recover my cane, Mr. Foster and myself concluded to make another trip to Mr. Tardy's shop in the afternoon.

Sure enough the shop was open for business. Mr. Tom was sitting on a box smoking a pipe. An old gray-haired country expressman was repairing an old pair of shafts for his old rattletrap wagon, stretching the old bolts till they looked like threads and, to make the holes meet, burned them out with a half-inch rod. This was truly Tom Tardy's shop all over. Mr. Tardy told me that morning that his was the only shop in the neighborhood, but on turning the corner we beheld another old battered frame blacksmith shop. And on the same lot and nearly finished was a two-story shop made of cement blocks. On inquiring, we learned the name of the owner, a Mr. Thrifty. Now, in the afternoon when we went to fetch my cane, Mr. Tardy did not know of the existence of the other shop, nor did he ever hear of THE AMERICAN BLACKSMITH, and I actually believe thought it something good to eat. Although Mr. Tom is a young man, about 36, he told me "No more of those new-fangled blowers." The best thing he ever found was the old-fashioned bellows. I didn't wait to hear more, for my ears were already burning with his long-drawn tales and I was glad to get out of earshot and into more pleasant surroundings.



SAID TO BE THE OLDEST SMITH SHOP IN THE UNITED STATES

The Oldest Shop in United States.

GEORGE W. CALLAHAN.

I accept Mr. Burgess's challenge—I claim that I own and conduct the oldest shop in the United States. The records of Newport show that this structure was a smith shop in 1715. Four different families have run the shop, and in each family the shop descended from father to son. Every one who ran the shop did a successful business and made money. The building, as shown in the engraving, has always been kept in the best of order, the outside always painted and in repair and the interior whitewashed. The shop has always been an ornament to the street, instead of an eyesore, as some old forges are. The following, taken from a recent newspaper clipping, gives a brief history of the shop:

"The ancient records of Newport show that John Warkham conducted a blacksmith shop there in 1715, and that he forged the keys for the front-door locks of the meeting house (Congregational) where the present Second Baptist Church on Clarke Street stands in 1733. He died in 1741. After his death he was succeeded by his son, John, who died in 1765.

"The property came into the possession of John W. Murphy after the Revolutionary War, who did a general jobbing and horseshoeing business. He was succeeded by his son; also named John W. Murphy, who carried on the business for a number of years. There is an iron railing on the front steps of one of the old mansions on Washington Street, still standing, which this blacksmith made and placed there in 1828.

"Still later the property was owned by Joseph Anthony, who served Newport in the State Legislature. He had a large pigeon loft in the attic of the old shop building, and some of the pigeon coops are there yet. He died in 1868.

"After the Murphys the shop was conducted by William White, and after him by his sons, George L. and Albert G. White, the former being the horseshoer while the latter did the jobbing work. The late Benjamin Bliven and Robert D. Coggeshall, both well-known citizens and master blacksmiths, served their apprenticeships in the old shop under the Messrs. White. George L.

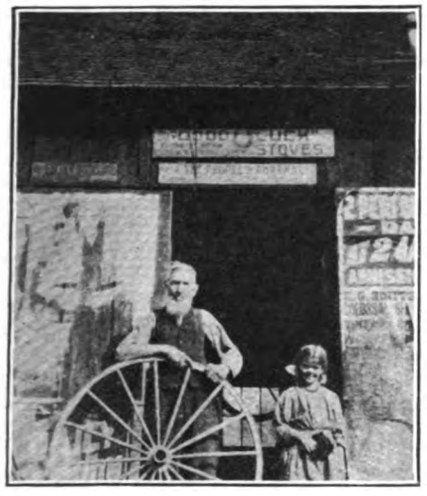
White in his time was a great horse trader and did a large business, numbering among his patrons the late John West, the elder Anthony Stuart, Edward A. Hassard, John F. Tennant and the leading livery-stable keepers of that time, having also a large local and summer-resident trade.

"In the spring of 1857, he hired Michael Callahan (father of George W. Callahan), who was his foreman until January, 1864, when Mr. White sold out to him. The new owner conducted the business successfully until 1881, when he sold out to ex-Alderman John E. Leddy. Mr. Callahan purchased the estate from John T. Bush, the executor of Joseph Anthony, in 1869, and made extensive improvements, putting in a new front and remodeling the interior, and erected a large addition on the rear to meet his increasing business.

"Mr. Leddy occupied it for five years, and on the expiration of his lease in January, 1886, G. W. Callahan, son of Michael, took the shop and has conducted it successfully since."

Eighty-Three and Still Active in the Craft.

Mr. James J. Stoner, the subject of this sketch, is one of the oldest members of the smithing craft in Pennsylvania State. He was born in January, 1827. His father was a stone mason,



EIGHTY-THREE AND STILL ACTIVE IN THE CRAFT

but died when James was a small boy. He attended school and received a fair education, until at the age of fifteen years he was apprenticed to the blacksmith trade, working for Mr. John Alexander, of Pulaski. After learning the trade he opened a shop of his own at Edenburg and ran it for four years. From Edenburg he went to New Bedford and ran a shop for eleven years, when he moved to a farm at Middlesex. About twenty-seven years ago he sold his farm and opened the shop at Wurtemburg, which he has operated ever since. Mr. Stoner has worked at the trade for over sixty years and has naturally seen many changes in the craft. The engraving shows Mr. Stoner and his granddaughter standing before the shop door.

Trade and Technical Education in Other Countries—5.

W. H. DOOLEY.

Sweden, Norway and Russia.

In Sweden the interests of technical education are promoted by means of many colleges of more or less importance. The technical high school stands for most in this work and the noted Technical School of Stockholm holds a place of its own. For the training of engineers, but possessing, however, fewer resources than the high school, are Chalmer's Technical Schools, in Gotchenburg and the four State elementary technical schools in Malmo, Worrkoping, Orebros and Boras. To these intermediate schools must be added the Technical Professional School at Eskilstuna and the State-supported lower technical professional schools—29 in number. There are, besides, the Lloyd Society School, in Gothenburg, and a newly established school in Lulea, which up to the present have worked without Government support.

The Technical High School at Stockholm, the principal polytechnical institute in Sweden, has for its object the scientific training of young students who intend to devote themselves to some technical occupation. The subjects of instruction at this high school are: mathematics, geodesy, topography, descriptive geometry, elementary mechanics, descriptive mechanics, construction of simple parts of machines, the theory and practice of machine construction, mechanical technology, mining mechanics, study of steamship construction, general and applied physics, general and analytical chemistry, chemical technology, laboratory work, mineralogy and geology, mining chemistry, general metallurgy, metallurgic laboratory work, mining, building, building estimates, architecture, history of architecture, construction of roads and waterways, linear mechanical drawing, free-hand drawing and factory work.

The high school includes the following 5 technical departments: (1) Machine construction and mechanical technology, with partly a 3-year and partly a 4-year course; (2) Technical chemistry, with a 3-year course—metallurgy in 3 subdivisions, the first for the mining mechanics (4-year course), the second for metallurgy and smelting, and the third for mining, the two latter divisions

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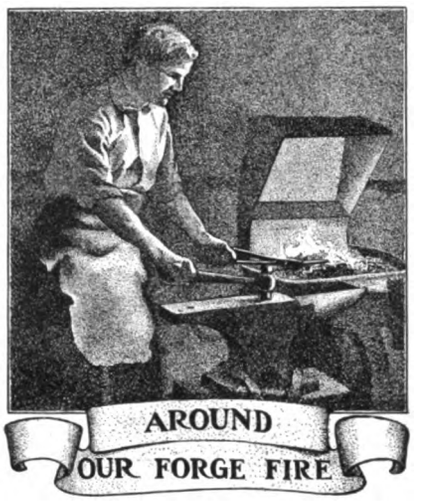


The Editor was talking about true economy. "It's not always the thing that appears the cheapest that is the cheapest or most economical in the end," he said. "For instance, there are certain makes of grinding wheels that cost considerably more than others. But those same wheels will do their work better, quicker and easier and they last twice as long as the cheaper wheels and, consequently, they are the most economical to buy, especially for the large manufacturer.

"Now, take heating appliances and systems. The difference in costs between a hot-air system for heating your home and a hot-water system is all in favor of the hot-air system. I am talking about the installation now. It will cost considerably less to put in the hot-air furnace and piping than it will to install the hot-water system. But when you come to the cost of operating the two systems—I mean the coal consumption—things generally favor the hot-water system, it being understood that the furnaces are equal in efficiency. Consequently, in the figuring of economy, in considering the total costs for a period of time, the hot-water system has the preference.

"Now let us look at the matter in another way. There are times when a cheap article is the most economical. For instance, a man was taking a carload of stock from a central New York point to New York City. He wanted a pail with which to water the animals. He bought the cheapest pail he could get, one which he could afford to throw away after using once or twice. As a usual thing, a man buys a pail that he is sure will be usable for some time. But here was a case where a pail guaranteed to fall apart after the second use made of it and one with a corresponding price was just about the thing wanted." And the Editor turned his attention to a batch of proof.

The Old Smith Shop at Swazy.

W. O. B.

Writ arter readin' "Swazy Folks an' Others"—a book o' mighty fine poetry by a feller o' the name o' Wells.

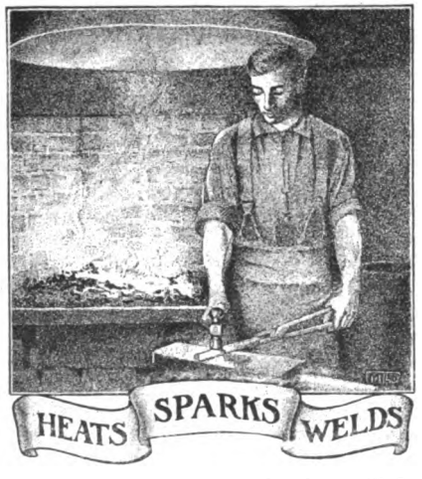
I've shet the book an' mem'ry sings
O' Swazy folks an' other things.
Ken almost see Ole Fren' Ben Tarr,
An' all the other folks—by gar.
But what I'm sorry fer t' note,
Is thet in all the pages rote
Ye've clean forgot the ole smith shop—
Thur's not a line from start t' stop.

To me it was importan-est—
Thet ole smith shop—why, I'll be blest,
Ef 'twar'n't built afore the store,
An' thet was built in fifty-four.
I wish 'at I could write a bit,
I betch y' I would make a hit
Describin' thet ole shop down there
At Swazy, kep' by ole Jim Fair.

Why, I ken see the ole shop now,
Es plain es eny thing, I vow.
Thur's rings an' chains along the side,
T' one o' which our Nell is tied.
With vendee notis' an' fair bill
The wall is kevered up until
Y' couldn't tell ef 'twere o' wood
Er brick er stone—y' never could.

An' at the other side, o' brick,
Thur is the forge with soot so thick
Y'd never guess 'at it was white-
Washed, cause it's jest as black as nite.
An' thur upon a block o' hard
Ole maple, with it's face all scar'd,
Is the ole anvil we would hear
From dawn till dark, year arter year.

Thur's lots o' other things about,
But I'm no poet, cannot shout
The fine things 'at I'd like to say
About the shop down Swazy way.
But I'll jest say afore I stop
Why I'm so fond o' that smith shop—
I knowed the smith, Ole Daddy Jim,
An' uster pump the blast fer him.



The man who sticks to the shop will find the shop sticking to him.

The man who does not expect much sometimes gets what he expects.

A photographic studio is the latest side-line. What do you do between jobs?

Don't remain silent—speak up, whether you agree or disagree with items in these pages.

John Hogan says: "A horse must be shod 'right by a shoer who knows his business."

Push for more business, if you want more business. Persistent, powerful pushing will place your business where you want it.

An employer exercises care in choosing an employee—why not the same discretion in choosing an employer?—and then stick.

Profit-eaters are the old, out-of-date tools. New tools are an investment, not an expense, when the old ones are worn out or antiquated.

It's none too early to think about spring business right now. Get things into shipshape for a busy spring period. Better early than too late.

Don't forget, Mr. Reader, that we want your own renewal, if due, and all the new subscriptions you can send us during the next three months.

You're not expected to know everything about grinding wheels. That is the manufacturers' business, and they will gladly help you, if you let them.

A job may be "long on looks," and yet not be right. It's not the surface that counts in the long run. It's good, solid, honest work and material.

Of two smiths, who will gain the better reputation, the one who attempts to demonstrate his work with loud talk, or the one who lets good work talk for itself?

And now comes a California smith who is said to have rediscovered the ancient process of hardening copper so it may be used in place of steel. Who is next?

The Worshipful Company of Farriers, an English society which examines horseshoers and issues a certificate to the successful entrant, was first established in 1356.

Uncle Billy Martin says "How we all pity the poor blind beggar who grinds a barrel-organ all day long! But don't it beat thunder how few nickels get into the cup!"

Don't think that because the boss sits down at a desk occasionally that he has a cinch. The privilege of being boss carries with it the privilege of working nights and overtime.

Did you ever hear of a woman putting off the family washing to go visiting? Yet some smiths will put off cleaning shop, or a hundred and one other important jobs, for less reason.

The more subscribers we get, the better can we make the paper, and every added subscriber helps. Do your part toward helping the paper. Get that subscriber now—today.

Cut the price if you are in business for your customers' profit. But, remember, when you cut prices you cut profits—and the customer is the only one that profits on a cut price.

We'll head a herd your way if you say the word. Don't let your supply of Pink Buffaloes get too low. A postal will bring a batch quickly. Let jobbers hear from your herd often.

You are behind when you allow a customer to get so far behind that he can't catch up. The younger a bill, the easier to collect—keep after the debtors and you'll not have any old bills to bury.

When a man says he's sorry he ever learned the smithing trade, you may be sure there is something the matter with the man. Surely, there is nothing the matter with the trade!

A certain quantity of wood and iron wont make a good vehicle without a certain quantity of good brains. It's not alone the materials we use, but their intelligent use as well that makes the perfect result.

Mason Grover, an Ohio smith, has discovered a simple process whereby iron is immediately converted into steel. He has sold the secret to the United States Steel Corporation for two hundred thousand dollars.

Run your shop into the ground by running it without regard to running expense. You wouldn't attempt to run a race blindfolded. If you don't know your costs you are going it blindfolded—you can't know profits, losses or anything else.

Attempting to run a smithing business without THE AMERICAN BLACKSMITH is like climbing the stairs to the top of a thirty-story building when the elevator is running. You'll find it lots easier going with "Our Journal" as a business companion.

A pure white coach is the latest for wedding use. It is intended to be drawn by a team of white horses, driven by a white coachman in a white uniform. The entire coach inside and out is white, except for a gold border around the edge of the body.

The Shop Number for this year must be the best one that we have ever published. The Shop Number of 1909 was excellent—most everyone said so—but 1910's must be better. Will you do your part? It's none too early to send in good pictures of good shops.

Coal mines under the sea sounds like a fairy tale, yet in Cape Breton Island there are a great number of colliers digging coal from under the sea. The area undermined now amounts to about 1,600 acres, and the outer end of the hole is more than a mile from shore.

"The Independent" is a new weekly newspaper of Norfolk, Virginia. Its Editor and Publisher is friend William H. Gunn, whose practical articles on vehicle work have interested "Our Folks" for some time. Of course, all of our readers join us in wishing every success to our Smithy-Editor-Publisher Friend.

An English Scientist is said to have discovered a process of hardening and toughening soft woods so they can be used in place of naturally hard woods. The process consists in saturating the wood with a sugar solution at the boiling point. The water is then evaporated, leaving the pores of the wood filled with solid matter. The treated wood is not brittle and shows no tendency to crack. The process is also preservative.

At last, Tom has fixed the big hole in the shop roof. We discovered him the other morning hard at work with a bundle of slats and several sheets of tar paper. Not one of the sheets was large enough to cover the hole, but, with Tom's natural genius for patching, the hole was soon covered. When we asked if it wouldn't be cheaper to get a new roof, Tom said: "This'll do 'till summer an' then I can fix up the place right." Tom probably means the summer of 1920. Let us hope not.

American Association of Blacksmiths and Horseshoers.

Feeling sorry now because you didn't raise your prices before winter set in won't result in any greater profit for you at the end of the month. Action is necessary. Good, prompt, brisk action. And if you get together now with your brother smiths, if you will organize an association NOW, and then will raise prices to where they should be you'll not feel sorry next month. You'll not need to feel sorry, and you'll be getting a fair and honest return for your money.

Why not write to me today—right now. Ask for my easy plans, and by return mail I will send you a simple plan whereby you can organize the craftsmen in your county. Craftsmen everywhere are organizing for protection and harmony—why not be the means of helping your brother craftsmen in your county?

Surely you will admit that an association is needed! Surely you believe that the members of the craft are entitled to protection! Surely you are not opposed to a fair price for your work! Then get busy now.

Every smith is entitled to a fair and honest return for his work. You can neither afford to work for no profit nor can you afford to work for the professional "dead beat." You are entitled to protection, and the only way to get it is to organize with your brother craftsmen.

You can't build a house on the foundation under your neighbor's residence, neither can you buy stock with the money you have outstanding. You must get your money for your work if you want to stay in business. And an organization of smiths will enable you to insist upon payment for work done.

Then there are other advantages to a smith's organization that will present themselves when the association is formed. In fact, there is hardly a limit to the reforms and advantages that may be gained through an association.

Send for my easy plans today. They won't cost you anything but the time to address a postal to me. Just write P. O. Box 974, Buffalo, N. Y., on the address side and say "Easy Plans," and you get them by return mail. Will you do it NOW?

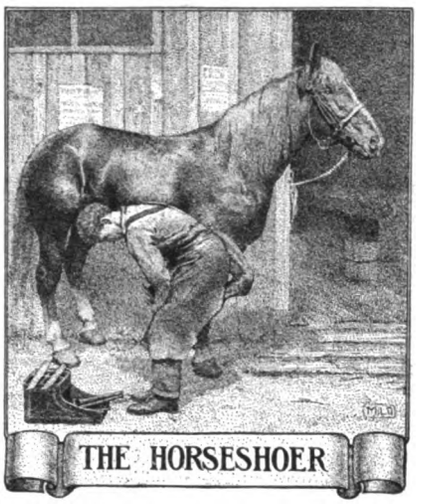
THE SECRETARY.

Turning the Tables on the Shop Joker.

E. S. S.

The "new man" turned the tables very neatly on one of the boys the other day. The "new man" had a special job of drilling to do and required a flat drill. So he went to one of the forges and dressed up a flat drill for his job. During his absence one of the boys crossed the belt of the drill press and told the others to watch the fun. But if ever there was a more surprised lot of men, I'd like to know it. The new man came in, inserted his drill, clamped his work to the table and brought his drill down to the work—the drill threw a good chip and went through the metal like cheese—and the drill spindle was running backward.

The men didn't recover until they found that the drill had been ground backward. They are still wondering if the new man saw Bill turn the belt and purposely ground the drill that way or whether he didn't know the difference.



Preparing the Healthy Foot and Nailing the Shoe.

W. O. JULIUS.

A Massachusetts brother asks: "Which is correct, to start the nail in the white line or in the wall?" Judging from the query, the brother is in need of information on the preparation of the foot as well as nailing.

Let us consider the shoeing of an animal from the removal of the old shoes to the clinching of the new nails.

Many shoers do not use proper care in the removal of the old shoes— they seem to be unaware of the fact that serious injury may result in the careless or violent removal of the old shoe. Don't attempt, under any circumstances, to wrench the shoe off of the foot violently. Lift the clinches carefully, using caution so as not to cut the wall of the foot or to injure it. After the clinches have been raised, use the big pincers and, grasping the shoe firmly, raise it carefully, thus pulling the nails for a short distance from their holes in the hoof. Now replace the shoe against the hoof, allowing the nails to protrude, when they may be easily withdrawn with the claw of the hammer. By this method excessive twisting and straining is prevented, and the hoof wall is not likely to be broken.

After carefully removing the shoe, the hoof is prepared for the new shoe. Naturally, this trimming depends upon the growth of the foot, the horse's gait, his standing position and the conformation of the limbs. Naturally, the shoer must use his own best judgment. In trimming each hoof correctly and to trim the foot as it should be trimmed the shoer must know something about anatomy of the horse's foot and limb. He must ask himself if horn is to be removed or not. If horn must be removed, where must it be taken off and how much? If there are any loose flakes of horn they must, in any case, be cut off. The frog must, of course, be let alone. Under no circumstance is it to be touched with a knife. when healthy. When the region of the frog is diseased or ragged it may then be trimmed, but in a healthy state the frog is best if let strictly alone. *Don't* shorten the bars and *Don't* open the heels. Many smiths seem to take pride in suggesting both these operations for most any foot ill. But the bars and heels should never be treated in this way. Finally, in paring the hoof, the bearing surface, i. e., the wall, white line and outer margin of the sole, must be rasped until they are perfectly horizontal.

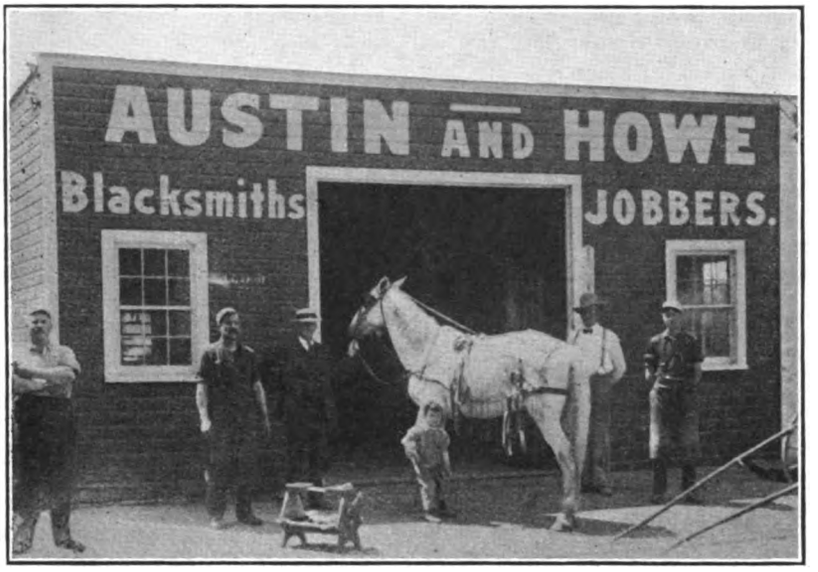
Now, a shoe is made suitable to the weight of the animal, his foot action, work and gait. And after *fitting the shoe to the foot* the shoe is nailed on.

It is, of course, understood that proper nails are at hand; that is, that nails of good make and proper size are to be used. After making certain that the shoes are perfect in fit, nail them on, the nails *penetrating the white line* in every case and passing through the wall in a straight line so as to appear neither too high nor too low on the outer surface of the wall. To tell if the nail is "going" right may be determined by the sound and the "feel." Under no circumstance continue driving when the nail produces pain or "drives soft."

The final steps in attaching a shoe are too well known to require mention here. Suffice it to say, that under no circumstance should the wall be rasped above the clinches, and as little as possible below them.

For the removal of the little piece of horn that is thrown out by the

point of the nail it is best to use a little gouge. The small amount of horn that projects beyond the shoe is carefully rasped away toward the toe and then a thin coat of hoof-dressing applied.



A YOUTHFUL SHOER AT A YORK STATE SHOP

Horse Clipping for Profit.

M. W. M.

The progressive shoer and blacksmith frequently adds many an extra dollar to his profits during the clipping season by doing that work for his patrons. Horse clipping is not by any means a side line for the shoer, but is a part of his regular business. He can make a profit by it, and a good profit, too; but to do the work right and make the maximum profit he should have a proper machine. It is economical to buy a good clipping machine. A poor machine is expensive at any price. If you have electricity in your shop an electric clipper will in the end prove by far the most economical. It is an ideal machine, but where electricity cannot be obtained or where the blacksmith considers the electric machine too expensive, the hand operated machine will be found very satisfactory, and is easily operated.

There is no reason at all why a shoer should not do clipping in every community. It is work that should come to him naturally, instead of going to the liveryman or the professional clipper. The investment of a good hand-clipping machine is very small, compared to the money received from the work done with it.

The majority of horses are benefited by clipping, although horses that have very tender skin or a skin that is sensitive or prone to disease may be better by permitting the hair to grow long, but the horse in good health will be greatly benefited by clipping. This is especially true in spring, when most horses are soft and are put at heavy spring work. The hair is long and they perspire freely, so that they soon become covered with sweat and dirt. If allowed to stand in that condition and the day is chilly they are apt to take cold or contract other diseases. The same thing is apt to occur if they are left to stand at night with a heavy, wet coat of hair and without other protection. As it takes a considerable time for a long, wet coat of hair to dry out, this has a tendency to chill the animal, as the pores of the skin open freely during perspiration. It may also be the cause of obstinate skin diseases, and the internal organs may be seriously affected. With the clipped horse all this danger is overcome.

A clipped horse's coat dries out quickly. The animal himself gets better rest and his food goes to nourish his body instead of furnishing animal heat. His spirits are heightened and he becomes more active and throws off any tendency towards sluggish movements. He accomplishes more work with less fatigue than the unclipped animal and it is a much easier matter to take care of him. He is more easily cleaned and kept clean than the unclipped horse and he also presents a much better appearance.

Shoers should know of these advantages of clipping and be able to talk them intelligently to their patron. With this information and a good clipping machine there is no reason why every shoer should not get a considerable extra profit from this source during the year, especially during the spring months.

A Youthful York State Shoer.

B. G. HOWE.

The accompanying engraving shows Master Bill Howe, Junior, son of the junior member of the firm of Austin & Howe. We think he does pretty good for a four-year old. We have our shop equipped with power; use an electric motor, run three fires, drill, emery wheel, and also have electric lights. We do all kinds of heavy forging, horse shoeing and general repair work, and have built several fire escapes. I have just been reading C. W. C.'s article on "Collecting Bills and Handling Customers." I will admit it requires considerable tact to collect a bill, sometimes, but as to soliciting for trade I don't just agree with him. The public knows where our shop is located, and if they want us to do their work they will come. When you ask a man to bring his work to you, you surely can't, at the end of thirty days, stick a bill under his nose. You have invited him to come. Better let him come of his own accord, then you are surely under no obligation. It is quite amusing at our local meetings to learn the different methods used in collecting. Some send statements, etc., but our method is to take our bills and start on the first day of the month, providing it doesn't fall on Sunday. It usually spoils the day, but when you get through you have something to show for it. If there is any mistake made in footing up the bill you can



FORGED BY FRANK CASEY, OF NEBRASKA

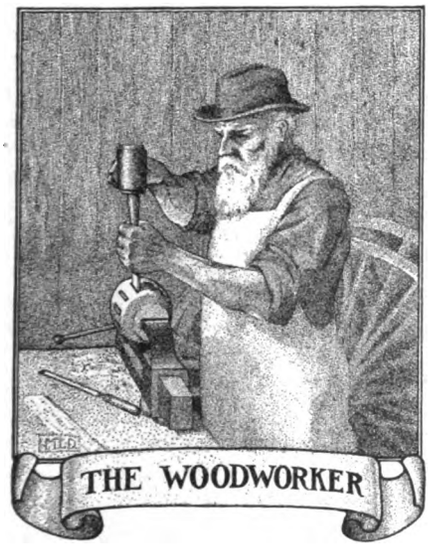
rectify it then, while if you had sent a statement the party wouldn't draw you a check with an error in the bill. Our motto is "Look after the shop, do the very best work, ask no one to patronize you." They will come if they choose, and at the end of thirty days present them their bill, hold your head up, make no excuses for bringing their bill. They have had value received. They will think more of you than they would if you tell them that you have a grocery bill to meet. Be independent. We like the journal and get many useful ideas. May you live and continue in the good work is my wish for the journal.

An Artistic Collection of Forgings.

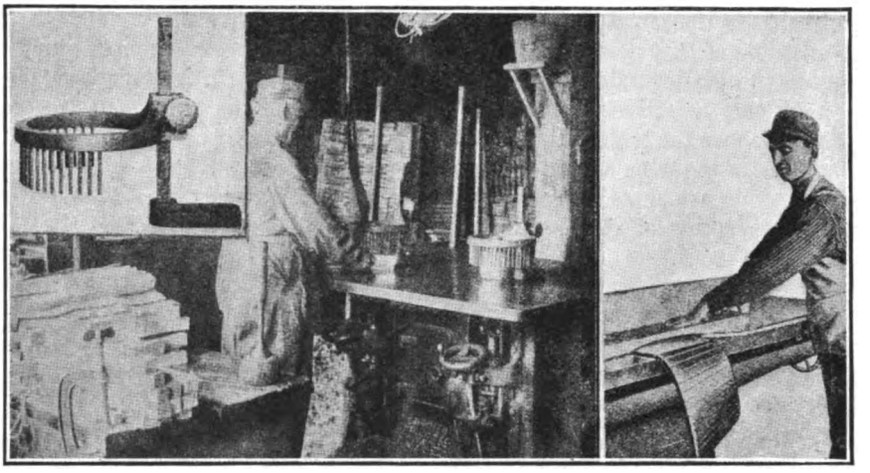
FRANK J. CASEY.

The accompanying engraving shows a case of small hand-forged horseshoes which I made from $\frac{3}{8}$-inch steel rod. The shoes are not quite as large as the top rim of an ordinary teacup. The anvil was forged from $\frac{5}{8}$-inch steel rod. Its face is $\frac{3}{4}$ of an inch long and $\frac{1}{8}$ inch wide. The tongs are one inch long and are forged from baling wire with a pin for the rivet. The hammer is $1\frac{1}{2}$ inches long with a piece of baling wire for a handle. The nails are factory made. The larger ones in the corners being No. 4's, while the smaller ones are No. 1—just one inch long.

If a man wants to advertise, I do not think there is anything better than to hang something of this kind in his shop. It seems to convey the impression to the average customer that you are an expert, while you don't necessarily have to be any more than an ordinary smith to do what looks wonderful to them, if you only take the time.



To make a waterproof glued joint with ordinary glue, rub chalk on the surfaces to be joined and then glue in the regular manner. Of course it is best to use waterproof glue, but the above will do in some cases. GLUE, California.

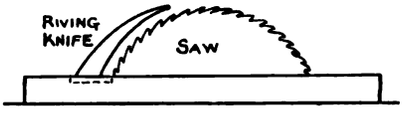


A GUARD FOR THE WOOD-SHAPER. A PLANER GUARD

Safety in the Woodworking Shop.

W. O. B.

Woodworking machinery generally is exceedingly dangerous, and in order to safeguard the operators working upon saws, jointers, shapers and the like, it is necessary to exercise utmost care and to utilize all practical safeguards. Exposed belts and pulleys in any department of the general shop are dangerous, but they are especially so in the wood department, by reason of the high speed at which they are usually operated. It is, of course, necessary that these exposed belts and pulleys be guarded. Suitable guards can usually be constructed in the shop at little or no cost. If the part or parts thus guarded must needs be easily accessible, the guards may be so made as to be easily removable.



CRAMPING IS PREVENTED BY THE USE OF A RIVING KNIFE

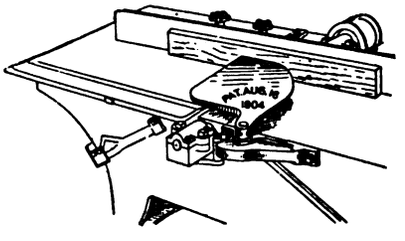
Another simple precaution that may often save a hand, an arm, or even more serious injury, is the use of rubber mats before the machines. The floor of the woodworking shop is usually very smooth and ofttimes slippery, by reason of the smoothing and polishing action of the sawdust under foot; but if a rubber mat of reasonable size is secured to the floor before each machine the machine operator is not so liable to fall into the machine.

The circular saw has probably claimed more fingers and thumbs as its toll than any other machine in the wood shop, and it is, of course, strongly urged that a suitable guard be placed on this machine. There are several efficient saw guards upon the market, and the wood-shop operator will do well to get one or more, according to his equipment.

Another "little trick" usually laid to the circular saw is the cramping of the saw, its stoppage and consequent throwing of its belt. This may be prevented by the use of a "riving knife." This is simply a piece of sheet metal—steel preferred—placed immediately back of the saw, so as to spread the cut as the work is pushed along. The edge of the riving knife, which is nearer the saw, should be slightly thinner than the saw, while the outer edge is slightly thicker.

In no case should a circular saw be allowed to run unguarded while the operator is away from it. It is best to stop the saw when it is unattended, but if it should be allowed to run for any time at all without work a box placed bottom side up over the saw will effectually guard against any person falling upon it accidentally in passing.

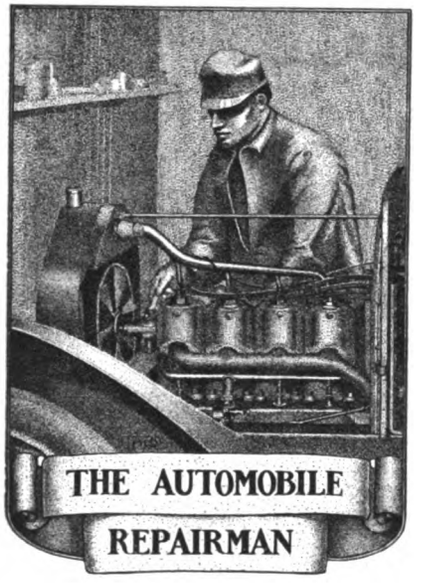
Band saws should have both their upper and lower wheels guarded, either with a wooden housing, sheet metal or wire mesh. The wood workman will probably find the wood housing the cheapest, for obvious reasons, and when it is correctly attached it is just as



A PRACTICAL GUARD FOR THE JOINTER

serviceable as the metal or mesh. For the guarding of that portion of the saw opposite the cutting table a tube may be used very effectively. The guard and guide above the table should always be as close to the table as the work will permit. This not alone for safety, but for the prevention of saw breakage as well.

There are several styles and makes of guards for planers or jointers, and the dangerous nature of this machine makes their use most necessary. Wood shapers are also easily safeguarded by various guards now upon the market and it is best to get one or the other of these guards rather than run the risk of serious injury.



To start "on the spark," speed up the motor just before stopping it by opening the throttle wide. Then, when the spark is cut off, a full charge is left in the cylinder to be ignited when again starting.

A. R. T., Pennsylvania.

Corrosion in battery boxes may be prevented by covering the bottom of the boxes with a layer of bicarbonate of soda. This is just a little item, but if mentioned to an auto customer will help him and help you, too. AUTO-SHOP, New York.

Fill the gasoline tank carefully. If some of the liquid should spill to the ground do not attempt to start the car immediately over the puddle. The starting of the car may ignite the gasoline under the vehicle and cause a bad fire. It is safer, cheaper and in every way better to push the car to dry, clean ground before starting it. Even if you haven't just filled the gasoline tank, better to look under the car before starting than to be sorry.

C. A. M., Illinois.

A Short Talk on the Adjustment of Coils.

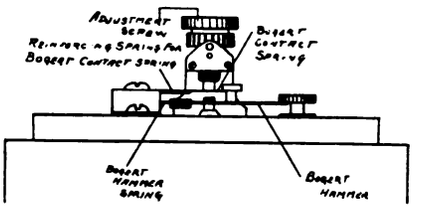
W. M. LARNER.

There is a tendency on the part of motor-car owners to make frequent adjustment of the spark coil, with the idea of improving the running condition of the engine. It is, therefore, often necessary for the repairman to know how to correctly adjust a coil. In some cases of trouble the cause may lie with the coil, and in that event proceed as follows:

For a standard Splitdorf coil, first remove the knurled adjusting screw (adjustment platinum contact screw), and remove any little "bunches" or knobs which may be formed on its platinum point or on the platinum contact point of the Bogert contact spring. These knobs may be removed with a very fine file or a sharp knife.

Next, close the throttle and open the cylinder relief cock; then turn the engine until the commutator is in contact, so that the primary circuit through the induction coil will be closed. Then, replacing the knurled adjusting screw, screw it down until the vibrator commences to buzz; then stop. After the vibrator commences to work, the knurled adjusting screw should be turned from three to six notches further down, stopping at the point which gives the best action of coil, spark and engine. *Do not*, at any time, try to adjust the coil until you are sure that there are no knobs on the platinum contact points.

The hammer and contact spring are set at the factory, and should not be changed unless they have met with an accident or have been tampered with. The position of the hammer and spring should be as follows: When the influence of the reinforcing spring and the contact spring has been entirely eliminated, which can be done by holding the ribbon down until it does not contact with the hammer or the button on the hammer, there should be just opening enough between the top of



THE REPAIRMAN MUST KNOW HOW TO ADJUST COILS

the hammer and the lower side of the hammer stop to see daylight through or, possibly, one sixty-fourth of an inch. This can only be altered by bending the hammer spring slightly and carefully. When the knurled adjusting screw has been backed out far enough so that the platinum contacts have separated, the reinforcing spring should lift the hammer so that it will contact lightly with the under side of the hammer stop. When the reinforcing spring and hammer are once set in proper position they should not be changed for some time. See illustration for explanation of coil parts.

Adjusting, Repairing and Caring for an Automobile—1.

With Special Reference to the Stevens-Duryea.

Water.

Strainer.—Soft water should invariably be used. In order to prevent damage from particles of dirt from getting into radiator, a fine wire strainer

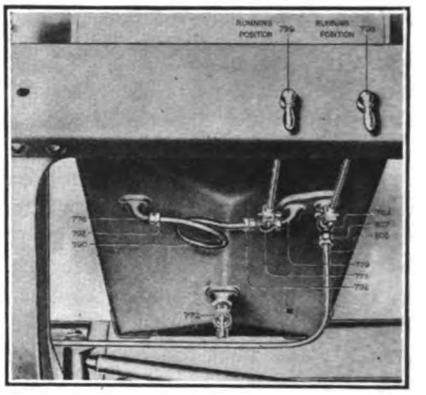


FIG. 1—THE FUEL TANK WITH SUPPLY VALVES

has been provided, which lies just inside of the cap.

This should never be removed when filling radiator. If you are unable to get very good water, the radiator should be drained out or, better still, flush, in the following manner: start engine, open pet-cock at bottom of radiator, and allow water from hose to enter at filler cap, which operation is continued until discharge is clear.

Drain.—To drain the car, open the pet cock on left side at bottom of radiator, also open the pet cock below the pump. Run motor for a minute or two (no longer) to throw water out of pump and piping.

Pump.—This is of the centrifugal type driven by a bevel gear integral with shaft meshing with bevel gear on lay shaft on right side of motor.

Anti-Freeze Mixtures.—Equal parts of wood alcohol, glycerine and water are extensively used. The wood alcohol will evaporate and must be replaced from time to time.

Do not use calcium chloride solution in Stevens-Duryea cars. A good rule is to look to the water supply in your radiator. While it may not be

necessary to replenish it very often, it is well to know that it is full.

Evaporation.—Excessive evaporation or extreme high temperature of water possible in the open air, and in no case allow lamps to be lighted.

Always in lighting lamps extinguish match before throwing on the ground.

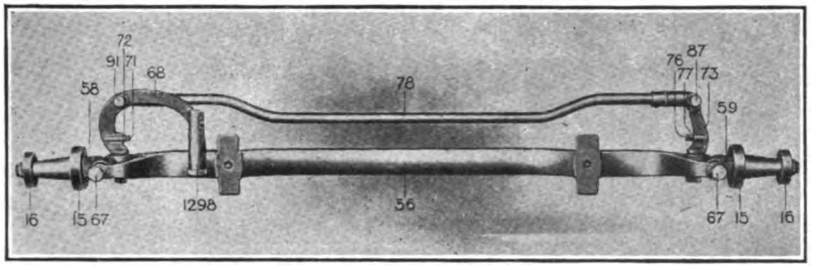


FIG. 2—FRONT AXLE AND STEERING KNUCKLES

can be easily detected and directly traced to a hot motor.

Cause.—Due to operating with open throttle and retarded spark.

Insufficient lubrication.

Frozen or clogged water pipes.

Pump not rotating.

Low water.

Fan not being driven at usual speed.

Give attention to entire circulating system, making sure that each part is working to its designed standard.

Gasoline.

Tanks.—The gasoline tank is placed under the front seats, the filling plug being under the seat at left of the car. This plug has an air-hole drilled through it to prevent tank from becoming air-bound. This hole should be kept clear.

Supply Valves. — To drain gasoline tank, open pet cock No 772 on bottom at right side. Two shut-off handles, Nos. 798 and 799, project through chassis frame on left side of the car. The one to the rear, No. 798, is the main supply valve and should point downward. The forward, No. 799, is for the reserve supply of three gallons. The running position of this is pointing down, but when the extra supply is wanted handle should point forward.

Front Axle.

Forging .— One piece I-beam forging (heat treated) carries forged knuckles, Nos. 58 and 59, into which are bolted, forged spindle steering arms, Nos. 68 and 73.

Adjusting Studs. — In right-hand steering arm No. 68, hexagon stop bolt No. 71 and nut No. 72 are to prevent front wheels from coming in contact with chassis frame. Hexagon bolt No. 76 and nut No. 77 are a part of the left hand steering arm No. 73, and act as a stop when wheels are turned in the extreme in the other direction.

Lubrication. — Grease cups No. 67, of which there are two, and Nos. 87 and 91, one each, should be given a turn or two every two hundred miles, and refilled every five hundred miles.

Annular bearings, of which there are two each, Nos. 15 and 16, should be packed with grease every thousand miles. This can be done by removing hub caps from front wheels, filling caps full, and as caps are replaced the grease will be forced through the outer to the inner bearings.

Battery.

Equipment.—Battery equipment consists of storage battery and dry cells. The storage battery charged should show from $5\frac{5}{6}$ to $6\frac{6}{6}$ volts. When the voltage drops below $5\frac{4}{6}$ the battery should be recharged immediately. Always have acid showing above plate (this is important). The dry cells should be replaced if they do not register more than 7 amperes to a cell.

Coil.

The coil is made up of 4 units, numbered from right to left on Model X and from left to right on Model XXX, and the sequence of the spark as the motor rotates is 1-2-4-3. The wires leading from the commutator are crossed from

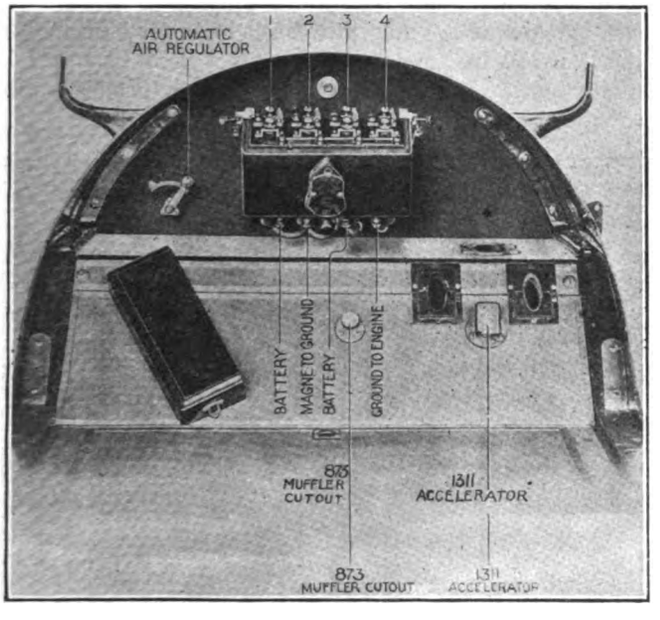


FIG. 3—THE DASH OF MODEL XXX—COIL SIDE

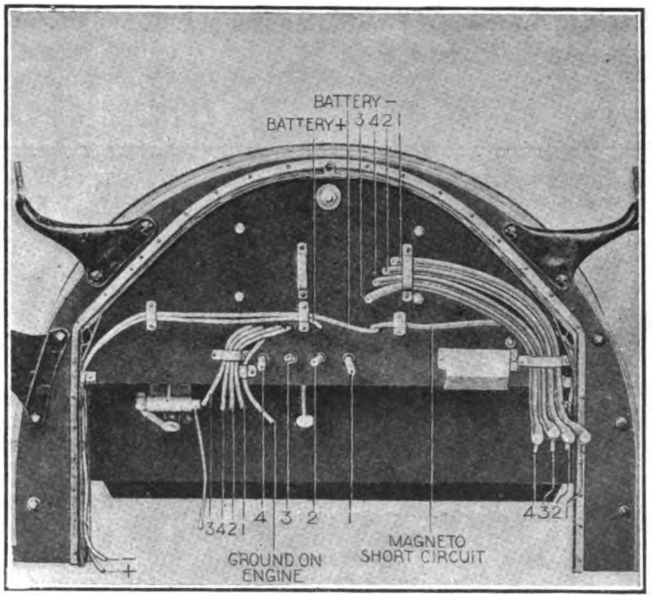


FIG. 4—THE MOTOR SIDE OF SAME DASH

Filling Tank, Caution. — In filling tank, strain all gasoline through a chamois skin, which removes all impurities and water. Fill tank when

No. 4 contact to No. 3 contact, which gives the proper firing.

If vibrator points become pitted do not try to adjust them until you have

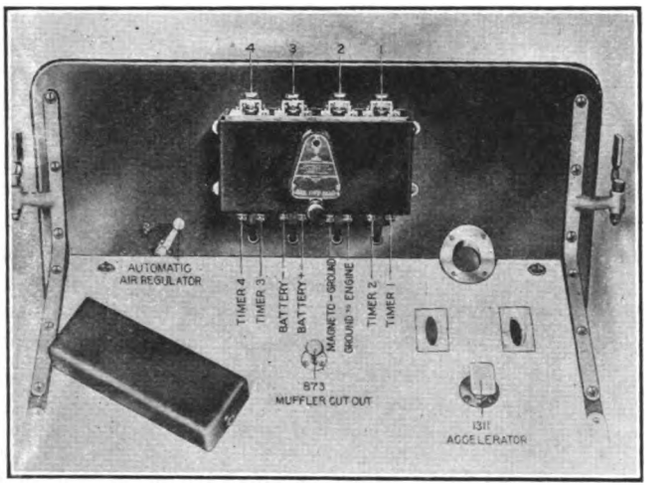


FIG. 5—THE COIL SIDE OF DASH ON MODEL X

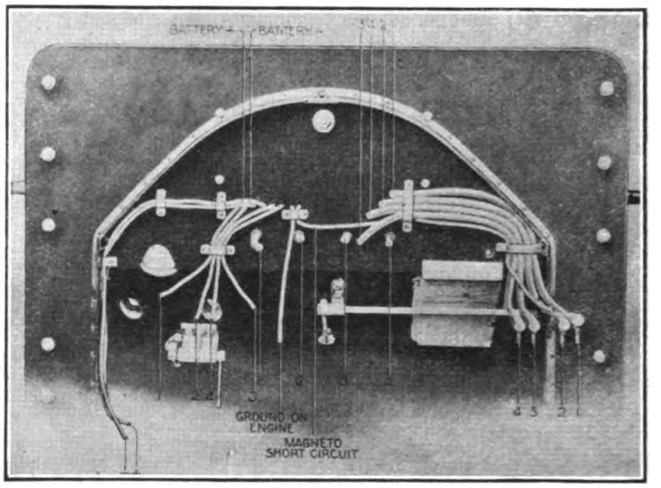


FIG. 6—THE SAME DASH FROM THE MOTOR SIDE

smoothed them down with a fine file. The units should be adjusted to draw not over $\frac{5}{10}$ of an ampere, which can be determined by the use of a low reading ammeter. If an ammeter is not at hand clean joints of vibrator and adjusting screw. Adjust vibrator spring away from iron core so that a ten-cent piece will readily slide between, then bring adjusting screw so that it just contacts, and one quarter of a turn more will give a very good adjustment.

The consumption of an unnecessary amount of current in the coils not only requires a frequent adjustment of the ignition system, but causes battery to exhaust quickly

Timing Ignition.

Control. — The upper lever on the steering post is the control of the ignition. An advancing of the lever on the quadrant advances the time of the spark in the cylinder.

Timing. — To determine the proper time for the spark to occur, retard spark lever, put the switch on battery, open pet cocks and rotate motor with crank. The spark should cease about 1½ inches (on fly wheel) before exhaust valve opens in the cylinder which you are observing. Mark E. O. on rim of fly wheel (exhaust valve opens).

The duration of the spark is about 10 inches on rim of fly wheel.

To adjust spark to proper position. — Have spark lever retarded. The roller brush should just be leaving the No. 1 contact in timer No. 566 (causing spark to cease) when No. 1 cylinder is in a position so that 1½ inch movement of fly wheel (in direction motor runs) would cause exhaust valve to open.

To adjust roller brush to proper position release set screws No. 580 in hub that fits on commutator shaft of engine.

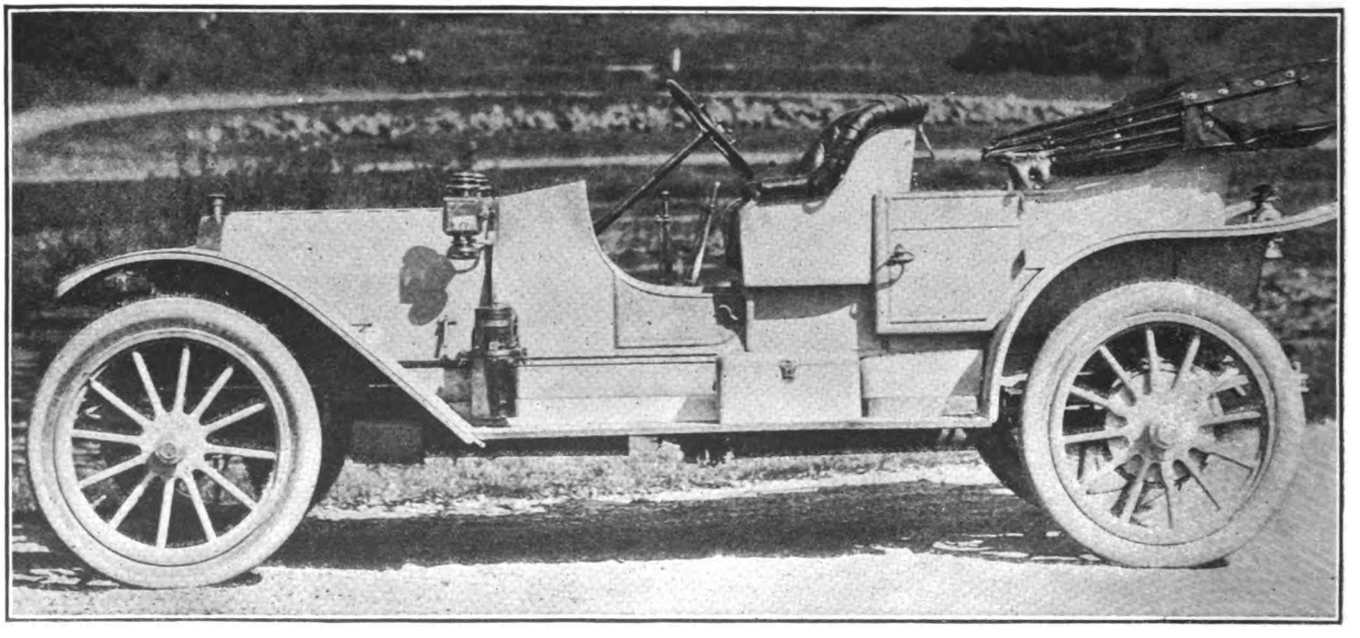
Trouble.

Trouble. — When your motor does not fire regularly, determine, are the batteries up to the standard?

Are all the electrical connections tight and not corroded? Is the insulation worn at any point? Is the ground wire connected to engine? Have you any broken spark plugs?—To locate which cylinder is missing, advance spark lever about two inches on quadrant, and hold down three of the vibrators at a time; or remove spark plugs and lay them on the cylinder with wires attached and rotate engine, noting if each produces a hot, steady spark.

After locating the cylinder "missing," unscrew the spark plug in that cylinder, leaving wire on plug.

Lay plug on cylinder and turn over motor until contact is made in the commutator No. 566 for this particular cylinder.



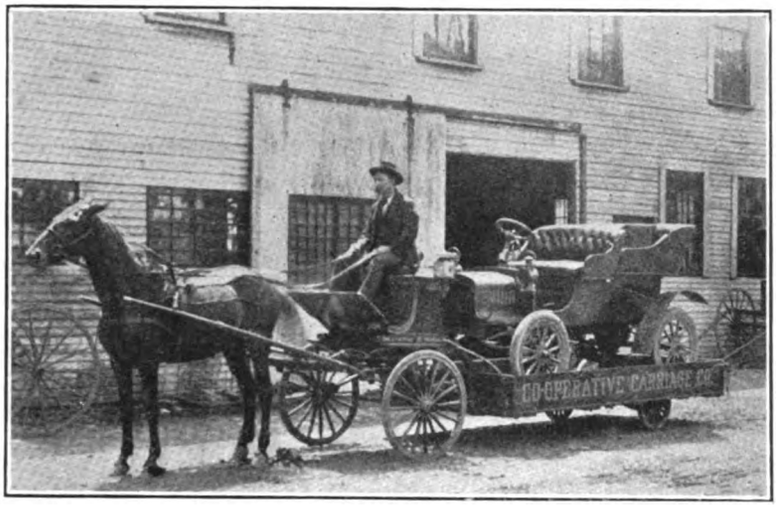
MODEL X, FOUR CYLINDER, STEVENS-DURYEA WITH TOURING BODY

Plugs. — If there is no spark in the plug, clean it out thoroughly and bring the points closer together. If now you do not get a spark, see that the plug is not short circuited or porcelain broken.

Connections. — If your connections are all tight, your battery charged, roller brush of commutator tight against contact block, contact blocks and studs tight in insulation of commutator, and you do not get a buzz of the coil, then you will have to adjust the unit. *Do not adjust units of coil until all other parts of the ignition system are found to be in proper condition.*

Should you get a good clear buzz and still no spark at the plug, it is evident that the current is interrupted between the coil and the plug. Trace the wires carefully and you will invariably overcome the trouble.

(To be continued.)



HOW THEY DO IT IN INDIANA

Precautions to be Taken in Repairing an Automobile.

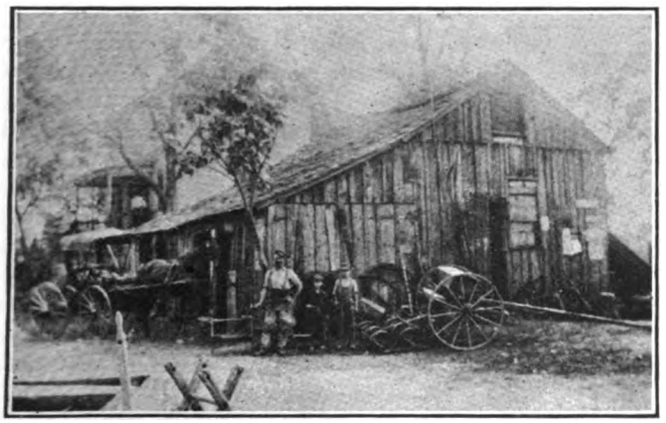
H. W. SLAUSON.

A good practice to follow is first to mark the end of the shaft to which the gear is keyed and then make a corresponding mark on the hub of the gear itself. Each shaft and gear, of course, should have a different mark. After this is done mark one tooth in mesh on one gear and the two teeth between which it lies on the next gear, and so on, making certain that gears which are in mesh with two others have two teeth marked on one side and one on the other. In this way one marked tooth on one gear meshes between two marked teeth on the next gear, three marks being used to designate the relative position of a gear with the one next to it.

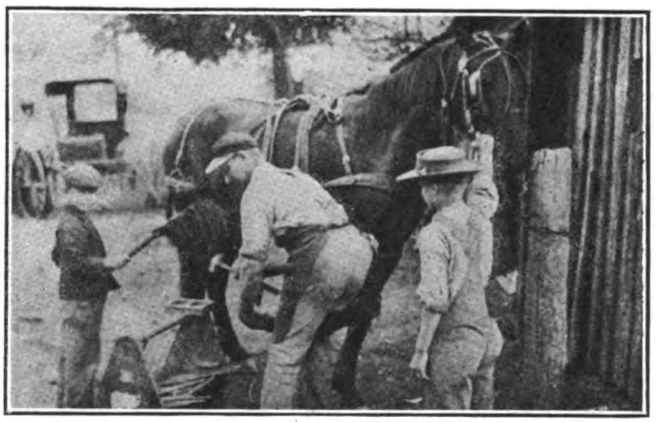
On account of the high speed at which most of the moving parts of an automobile run, lubrication is one of the most important features of motor-car construction and operation. There are various systems in use for the motor, such as the splash, the compression and the mechanical, but in nearly all types the bottom of the crank case is filled with oil. All parts of the transmission and differential run immersed in a heavy oil or grease, and although there is no compression in the cases it is remarkable out of what an infinitesimal opening the oil can find its way. On that account the proper packing of the joints between the motor cylinders and their base, the transmission case and its cover, and the two halves of the differential housing is one of the most important features of motor-car repair and assembly.

In taking down a motor, transmission or differential, the gaskets between the parts are liable to be torn, and it is almost impossible to save them. This is not necessary, however, as new gaskets for these parts may be made very easily, and although many special compositions may be on the market the most effective packing for an oil-tight joint can be obtained by the use of brown paper and shellac. Lay a piece of brown wrapping paper or drawing paper over the joint and follow the edges of the surface to be covered by tapping them with the pene end of a light machinist's hammer. This will break the paper out to the desired shape and size, and if bolt and screw holes have also been tapped they will appear in the proper position on the gasket. Three or four of these should be made for each joint.

Before the application of the gasket the surfaces of the joint should be cleaned thoroughly by liberal applications of gasoline and vigorous scraping with a putty knife or other flat, sharp instrument. All parts of the old gasket should be removed entirely in this manner and the surface then coated with shellac. One of the pieces already cut should then be laid on in the proper position, pressed down smoothly and covered with shellac. This should be continued three or four times, finally forming a sort of shellac



A GENERAL SHOP OF PENNSYLVANIA, RUN BY MR. FRANK TOBIAS



A JOB OF SHOEING DONE WITH THE HELP OF THE BOYS

and paper sandwich. The other half of the joint should be bolted or screwed in place before the shellac has a chance to dry, and if care has been taken an absolutely oil-tight gasket should be formed in a few minutes. The shellac enters all the pores of the iron and paper, and as the pressure is applied before it dries one-half of the joint is practically cemented to the other half.

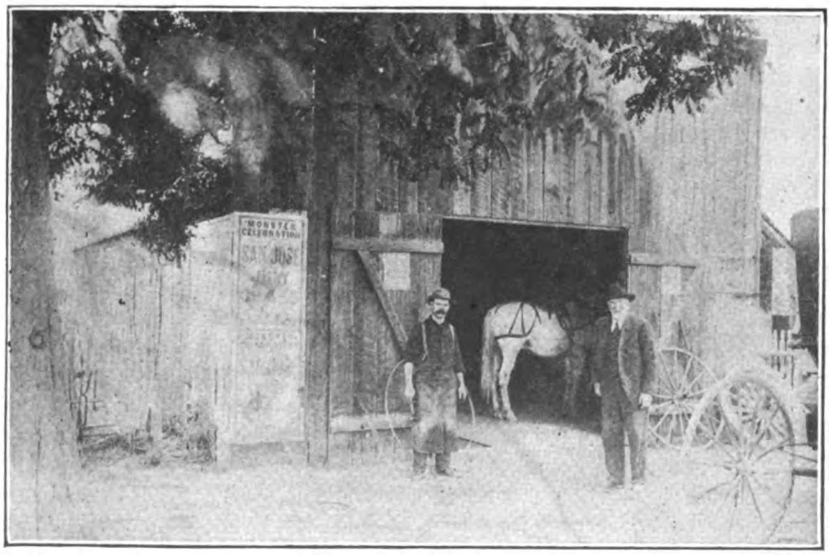
This form of gasket will also serve for the cooling water system and, in fact, for any part of the motor where a high degree of heat is not encountered. For the exhaust pipes, however, where the temperature is high, asbestos makes about the only suitable packing. This can be cut out in the same manner as the paper gasket.

The man who has many repairs to make around the motor or transmission of automobiles will find a complete set of socket wrenches almost a necessity. Many of the nuts, particularly those which hold the engine cylinders to their base, can be reached only with this kind of a tool, and the number of nuts of the same size found on four and six-cylinder motors make the socket wrench a great time saver. One automobile may have a dozen nuts of one size at the exhaust manifold, and an additional dozen holding the cover on the transmission case, and to remove these with the ordinary end wrench would require double the time in which it could be done with one or two socket wrenches.

One of the most valuable tools the automobile repair man can have is a special set of these wrenches, of varying sizes, any one of which fits into the end of a long handle. This handle is in the form of two shanks connected by a universal joint. The end of the upper shank terminates in a cross handle and reversible ratchet arrangement, by means of which rotation in either direction may be communicated to the socket wrench by whole or partial turns of the handle. The universal joint arrangement allows the nut to be approached from almost any angle, and the various sizes of socket heads make this a tool which any bolt or nut in any position cannot long resist—unless badly rusted on.

When a car is first brought into the shop, the first thing to do is to clean thoroughly all parts in the locality of the repair. This is something which many men are inclined to overlook, but no good repair job can be made on a dirty or greasy part. Even the dirtiest motor may be cleaned easily and quickly by the vigorous application of a brush dipped frequently in gasoline. Brush and scrub the parts thoroughly, beginning at the top and working down, and don't spare the gasoline—it will soon evaporate and it is the worst enemy of grease and dirt to be found.

After the parts have been cleaned thoroughly, take down everything that can possibly be in the way when getting at the part to be repaired. If a mud guard interferes, take it off; if the apron under the car doesn't give enough head room, remove it; if the tools get tangled in a wire of the ignition system, disconnect it, and if the motor is not easily accessible, dismount it entirely. Accessibility of parts is a feature over which many manufacturers make a great fuss, but there is not a car made in which no part will interfere with another, and the repair man might much better spend a little extra time in removing such parts than to work under the additional handicap.



A WELL-EQUIPPED POWER SHOP OF CALIFORNIA, RUN BY MR. K. G. PETERSON

Trade and Technical Education in Other Countries—5.

WILLIAM H. DOOLEY.

(*Continued from page* 117.)

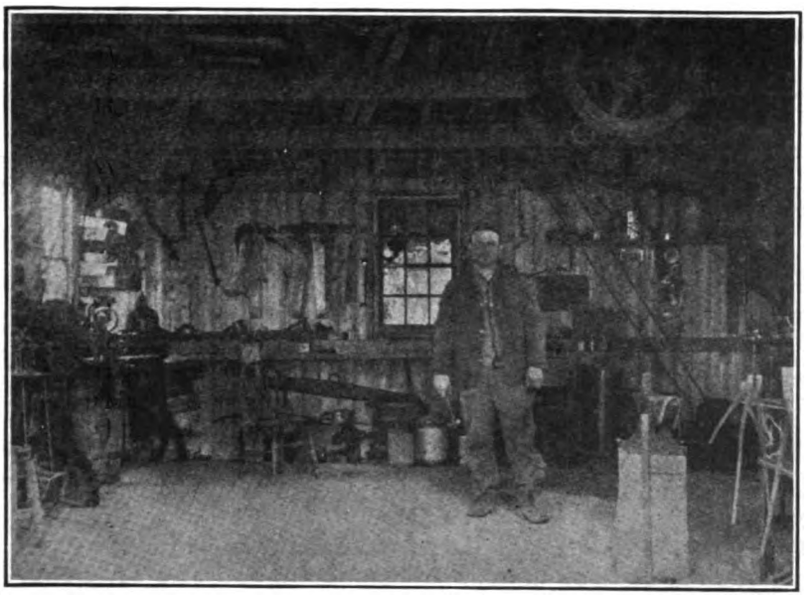
being courses of either 3 or 4 years; (4) Architecture, with a course of 4 years; (5) Road and waterway construction, with equal courses of 4 years' duration. The course of instruction during the first year is the same for all ordinary pupils, but afterwards the studies are directed according to the division intended to be pursued.

The students at the high school are divided into three classes: (1) Ordinary, who attend till they have acquired the amount of skill requisite to the obtaining, after a complete course, of a full certificate, (2) Special, who, when they show themselves possessed of the skill required by the board of examiners, enjoy instruction in a small number of subjects and may obtain certificates of their attainments in those branches, and (3) Extra pupils, who need not give any previous proofs of their ability by passing an entrance examination and who may enjoy the instruction, but are not entitled to receive any testimonial from the college as to these attainments. For ordinary students the instruction is free. Special and extra pupils pay a fee fixed by the governors' board of examiners and varying from $2.68 to $13.40 per term. The management of the high school is under the direction of the governors appointed by the King.

The aim of this school is to give a clear and practical training in the knowledge which is requisite for an intelligent and accurate execution of industrial work and to further the home industries of Sweden. In addition to the above day classes there are technical evening and Sunday classes for those already engaged in the trades. The pupils are free in their choice of subjects and the scheme of study is so arranged that the students have a selection from 18 branches of industrial education.

The technical school for women endeavors to impart to women that artistic insight and skill that will enable them to secure profitable technical employment.

The course in machine work gives that instruction required for the extremely accurate knowledge demanded by mechanical technical work and (as in every department) receives pupils who are above sixteen years of age. The first section is for the training of



A CORNER OF MR. FREDERICK MCDONALD'S YORK STATE SHOP

chief engineers, machinists and draftsmen in mechanical workshops; in the second foremen of mills receive instruction, the third deals with assistant engineers and machinists, workers of metal plate for steam boilers, smiths, makers of mechanical instruments, makers of clocks and watches.

Chalmer's Technical Institute, in Gothenberg, is for the training of such young students as are intended for those industrial professions whose pursuits demand a knowledge of natural science, and especially an acquaintance with technical chemistry. This institute gives instruction in two departments—the elementary and advanced; the elementary consists of a general comprehensive course of the practical application side of the subjects and consists of two 1-year classes. The advanced course, which has a scientific technical direction, embraces 3 classes of a 1-year course and then divides after the first year's training into 4 different sections—mechanical, technical, shipbuilding, and construction of roads and waterways.

In every manufacturing town of Sweden one will find lower technical schools, erected by the town, and intended to give young people engaged in handicrafts and manufactures a necessary instruction in their native language, writing, arithmetic, machine and building drawing.

Norway.

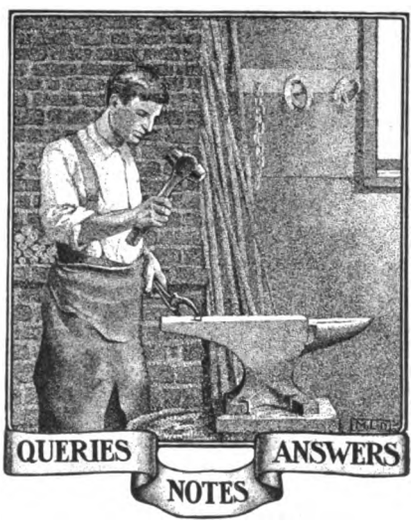
In Norway there are technical schools in all the large cities established upon the same principles as the technical schools in Sweden, which are supported partly by the government and partly by the communities.

Russia.

The only provision for technical education in Russia is at the St. Petersburg Technical Institute. The aim of this school is to give to its students the highest technical education.

The course is five years and is divided into five sections, one for each year. Instruction is given in religion, higher mathematics, descriptive geometry, theoretical mechanics, physics, chemistry, natural sciences, construction of machines, mechanical and chemical technology and metallurgy. Besides these subjects the technical course includes practical studies in physics, chemistry, mechanics, natural history and sciences. Such studies are pursued at the laboratories and workshops of the institute, as well as outside in factories and construction works.

(To be continued.)



Wants to Temper Springs and Tools.—Will some brother smith tell me how to temper tools, such as chisels, axes, dies, pins and plain bits, also how to temper springs. W. H. TEDFORD, Tennessee.

A Question on Steel.—I would like to ask some of your readers what causes cast or tool steel to crumble or break away when it is being welded. What is to be done in such a case.

W. R. FITZPATRICK, South Africa.

Wants a Water Tester.—I would like very much to know the name and address of a company that manufactures a machine for testing for water. The machine to cost somewhere in the neighborhood of $100.00 and one which will test to the depth of from forty to eighty feet. Can some brother smith give me this information?

MR. G. F. MICHELS, Colorado.

A Question on Magnetism.—Is there any reader of THE AMERICAN BLACKSMITH who can tell me through its columns how my center punch, a common piece of ⅝-inch steel rod, became magnetized to such a degree as to be able to pick up a horse-shoe nail? I know positively that it has never come in contact with any magnet.

FRANK J. CASEY, Nebraska.

An Australian Note.—We find your journal very useful, and read with interest the literature contributed by brother craftsmen in different parts of the states. There is not much difference in the methods from our own. The prices, especially for horseshoeing, seem good. From what we have gleaned, power seems to be recognized as a necessary part of shop equipment. You can install it much cheaper than we can. Blacksmiths over on your side seem to be made of similar stuff to the Australian article. CUSACK & PALMER, Australia.

Does Auto Repairing.—We do all kinds of smithing and auto repairing. We get fifty cents for new shoes, twenty-five for resetting, fifty cents for sharpening and hardening plow lays, one dollar for pointing lays, one dollar each for setting tires, and good prices all around. We work two men and have all the work that we can handle. Our shop is 24 by 50 feet. We have a band saw, a circle saw, an emery wheel, a trip hammer and two gas engines—one International 3½ H. P., and one McVicter 6 H. P. A. V. KILDOW, North Dakota.

Making Knives from Files.—Referring to Brother J. G.'s article in the November issue of THE AMERICAN BLACKSMITH about taking the cuts or teeth off of common flat mill files: He says he can grind all day and the teeth won't be off. I have from $1.00 to $100.00 that says I will treat a common 1-inch flat mill file in a common solution and forge the cuts off. The cuts will come off just like scaling fish. And after I get the cuts forged off I will make as fine a butcher knife out of the file as anybody ever saw. I will temper it so it will cut a hair just like a razor.

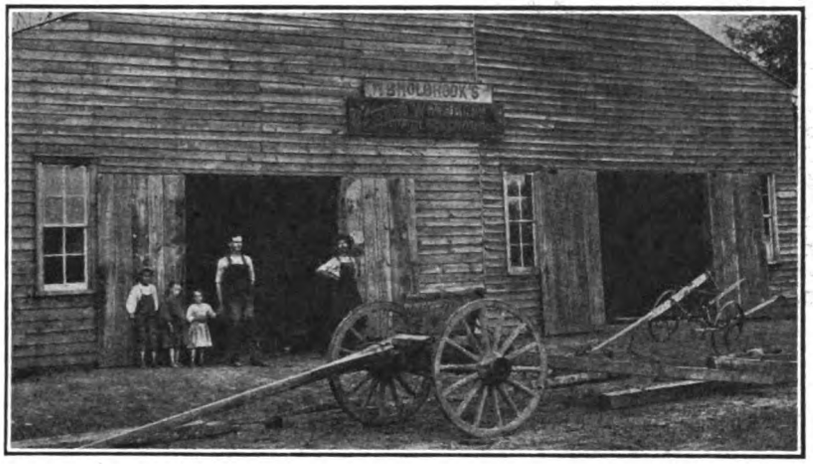
C. A. MCBRIDE, California.

Wants to Make Ice Racing Shoes.—I would like to hear from some of the boys through your valuable paper. What is the best way to make ice shoes for trotting horses? For instance, bar shoes with five calks on each shoe, calks forged on (not welded on), or bar shoes weighing only five or six ounces. I think there is only one right way to make them and that is to forge the calks on out of the solid steel. I have taken THE AMERICAN BLACKSMITH for a good many years and I have learned

a great deal out of it and I hope to learn more. J. J. R., Canada.

Shop-Made Power Hammers.—Since writing you I have made two trip hammers after the pattern of Walter McKoy, which I received through your paper. I made a few changes on his pattern, but I may tell you that it is the best one I have seen for all-around work. It can be built for about $50.00. Any blacksmith can make it and if there is any brother in this section who wants to get a hammer I would advise him to see it before he bought and make his own. Then, also, I have installed electric power. I have a five-horsepower electric motor and a Marvel electric blower.

WALTER J. MAIN, California.



A GENERAL SHOP OF ARKANSAS, RUN BY MR. W. B. HOLBROOK

A Letter from Old Kentucky.—I think a great deal of "Our Journal"—it is a great helper. I have been working at the trade for over 25 years and I do nearly every kind of work in wood and iron. Most of my work is buggy work. I have a ten-horse power and also a two-horsepower engine, both of International make. I run the saws, the emery stand and lathes with the little engine and the corn mill with the larger one. I am now building a shop 40 by 20 feet and 18 feet high and expect to build new buggies and wagons. At present I am agent for the Webber wagon, made by the I. H. C., and have a carload on the way now. B. F. JACKSON, Kentucky.



INTERIOR VIEW OF MR. HOLBROOK'S WELL-EQUIPPED SHOP

A Question on Buggy Wheels.—I have been a reader of THE AMERICAN BLACKSMITH for some time and like it very much. I also like the dear old blacksmiths, too, for they earn what they get, especially in this section of the country. For shoeing with toes we get $1.25; for plain, $1.00; old shoes, 15 cents each; with other work in proportion.

Can some reader tell me how to fix a patent buggy wheel that is entirely good except that it "cries" in the hub? The owner says the tires have never been loose on the wheels. The wheels have been run about eighteen months. They are not dished too much and the tires are not loose now. E. O. M., Tennessee.

From a Kentucky Veteran.—As I have not been writing about anything I will write you a few lines. I am an old smith and work at all kinds of smithing. I find that THE AMERICAN BLACKSMITH is a good journal for a smith to read. I am fifty-eight years old and can learn something every day I live in the shop. I haven't anything to write on now, but will read THE AMERICAN BLACKSMITH and learn all I can and help my brother smith who has not learned all yet. I worked for another man last year but I will run my own shop now. JOHN F. TAYLOR, Kentucky.

A Letter from Arkansas. — I have been a reader of THE AMERICAN BLACKSMITH for several years and I do not want to be without it. I find it a great help and if I would refer to it more I would be better off. And if we would write more for the paper we would be of more use. I must say a few words to the smith who cuts prices, don't do it. You are not honest to yourself, to your brother smiths nor to your family. My way is to give a customer good, honest work at a living price. The farmer cannot sell corn at $ .50 per bushel when it costs him $ .75, neither can you do a $ .75 job for $ .50 and do good, honest work. There has got to be a loophole somewhere, so let us stay together and hold prices up. If we can't work at the trade and be of some use to it let's get down and try something else nearer our calling. With best wishes to the paper and its many readers I will close. E. W., Arkansas.

A Letter from Mississippi.—I don't want to miss a copy as long as I am able to get the wherewith to obtain it. I am an all-around mechanic and go all the gaits, so far as repairing or building anything is concerned, yet while I am all this, I enjoy reading THE AMERICAN BLACKSMITH and gain a great many wrinkles along my lines of business that I have not studied out myself. During the coming year I will write some articles along the lines of some of the trades for the benefit of those who do not know the why and wherefore as I do, and I will also ask some questions for my own benefit which I hope some of our twenty-five thousand readers will be able to answer to my satisfaction. I know that it is impossible for one small cranium to hold the best of all methods of all things, however well learned and skilled in the trades. F. P. TRIPLETT, Mississippi.

A General Shop of Arkansas.—The accompanying engravings show an exterior and also an interior view of my shop. I recently built a residence and did the actual work myself. I dressed all the lumber used in the house, made all the mouldings and casings and turned all the columns. I sawed all the brackets used and matched my flooring. Then I rigged a small carriage on my rip saw and made my shingles out of cypress, and I made better shingles than I could have purchased anywhere. I built the house at odd times, constructed the chimneys and then painted it.

I can turn out any kind of timber stock that I want with my equipment. I have rip and cut-off saws, a band saw, a jointer with an assortment of special bits for making all kinds of mouldings and casings. I made the bits myself. I also have a boring machine, an emery stand, a turning lathe, a cold tire setter and a grindstone. I also have a rotary pump for supplying water to the house. I have just ordered a power hammer and would be very glad of any information on power-hammer work. My work is mostly plow sharpening and making coulters. As a side line I have a photographer's studio. I make exposures at any time and do finishing after supper.

W. B. HOLBROOK, Arkansas.

A Letter from the South.—I am a reader of THE AMERICAN BLACKSMITH and am always glad to get my paper. I love to read the good letters from the brothers. My shop burned the 24th day of July and I have just finished my new shop. It is 34 by 38, of two stories. I want to get

me some new machinery—a band saw, a pony planer and a rip saw. Will some brother smith that has machinery give me some advice as to them? I have an eight-horsepower engine and a grist mill. I do all kinds of wood work, build wagons and shoe horses. I have several side lines; do shoe repairing for one and do tin work and harness repairing. I work two men and myself. There have been two other shops here until now. I am the only one here now. Some of my prices are as follows:

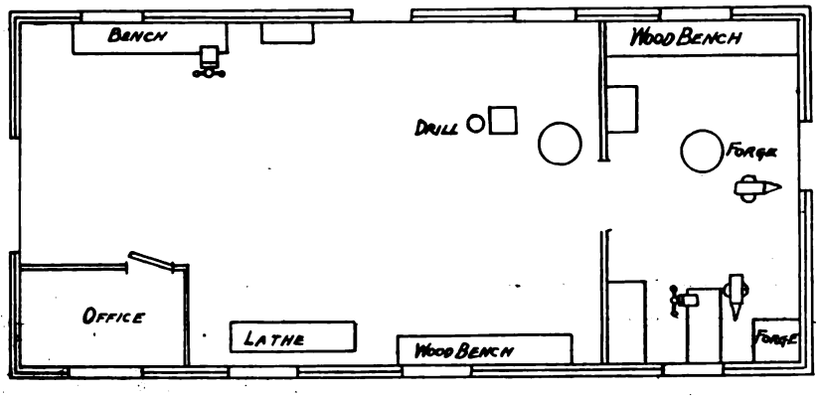
Four new shoes.....$1.00
Resetting four shoes ..... .50
Filling wheels.....from $2.50 to 3.50
and all other work in proportion.

W. H. TEDFORD, Tennessee.



THE FAMILY OF MR. ERNEST WILLIAMS BEFORE HIS GENERAL SHOP

A Word from Canada.—I like "Our Journal" very much and I am interested in every page of it. I have been at the trade for thirteen years, but I can always see some new methods for doing things in "Our Journal." I take great interest in horseshoeing and as far as I have gone I have been very successful. For interfering, I use side-weight shoes. I do not believe in dressing the foot down lower on the outside as I have seen some shoers do. My idea is to get the foot as level as possible, then fit a side-weight shoe. I keep it as full as possible to the outside, so that there is no rasping to be done when clinching, except on the inside I take as much as possible without injury to the foot. I use bar shoes on all horses that have no natural frog pressure and find they are just the right thing. Some of our neighbor shoers detest bar shoes and will do anything rather than put them on. I think they are losing something, as a bar shoe needs skill and good taste to get it nicely made and to fit just exactly as you want it. I will close with best wishes for "Our Journal." A. G. MCINTOSH, Ontario.



THE FLOOR PLAN OF MR. H. L. HUTSON'S TEXAS SHOP

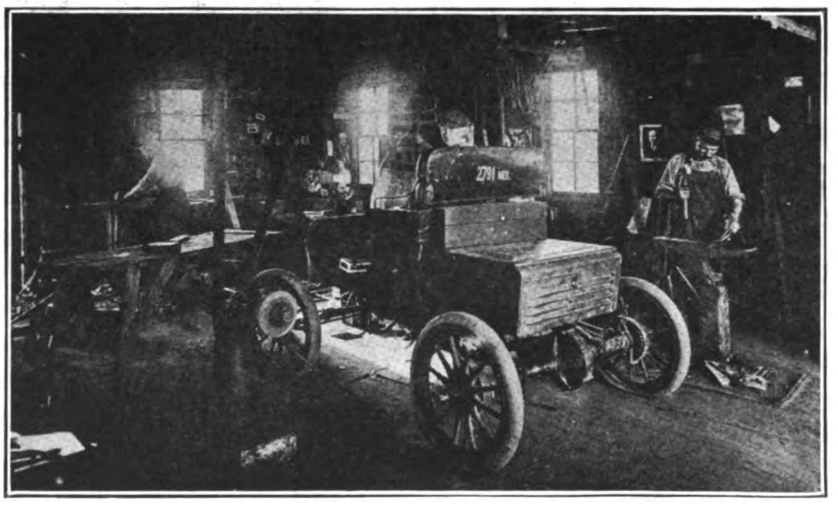
A Credit to the Craft.—I enjoy your journal very much. I have read several articles in my paper about the grand old trade. I think the trade is what a man makes of it. The trouble every time is in the man. My father before me was a smith, is now 75 years old and in good health. The father of twelve children—four of them boys, and all blacksmiths. I am 46 years old and have been working at the trade 32 years. I have raised a family of seven—two boys and five girls. I have put four girls through the high school and three of them are teachers. My oldest son is in the high school. I tell this to show what can be done when a man attends to business and lets drink alone. I find it hard to hire smiths that do not drink. Business has been extra good in this city this season, have all I can do at good prices. This is a city of about 25,000 people. On the north one of the largest forts in the United States; the Federal and Military prisons; on the south the National Soldiers' Home and Kansas State Prison. There is not an open saloon in the city—some few joints. Some thought it would kill the city to close the saloons, but it has not. The city has increased 2,800 in one year and new factories and houses going up every day. W. F. BEDWELL, Kansas.

A Texas Shop.—I have just finished reading a copy of THE AMERICAN BLACKSMITH and it makes me feel good to know there is such a journal devoted to the trade. I have a good trade but expect some trouble from inexperienced men just going into business. I have been running a hand-power shop of my own for fifteen years and now I expect to put in a gasoline engine, a large forge, a trip hammer, a band saw, a rounding and also a boring machine. I want to arrange my fire so I can do heavy well-drill work.

Some of the brothers are complaining about being thirty miles from the railroad and have to keep such a large stock of material on hand. They have no kick coming; I am ninety miles from the railroad and then it is eighty miles to where I can get stock, and then it is very high. I pay on an average of 8 cents for spokes, 12½ cents for felloes, 4 cents a pound for iron and have to pay freight of $1.00 per 100 on top of the high prices, and don't get very good prices for work, either. Here are some prices: New shoes from $1.00 to $1.25 per set; resetting $ .40; buggy and wagon spokes $ .25; wagon felloes $ .25 to $ .35; half rims $ .75 to $ 1.00; tire setting from $2.50 to $3.00. Well, there is no use of complaining, we will have to grin and bear it. The engraving is a floor plan of my shop.

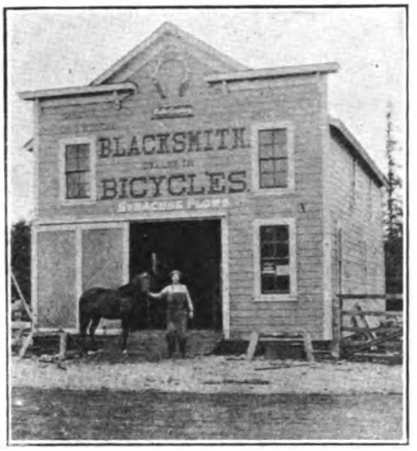
I would like to hear from someone about regulating the Ford and Jackson's automobiles. H. L. HUTSON, Texas.

A Letter from the Blue Grass State.—I am doing blacksmithing, horseshoeing and general repair work. I have a small power equipment consisting of an emery grinder,



MR. H. P. HAUSEN'S GENERAL SHOP IN NEBRASKA

a turning lathe, rip and cut-off saws, a jointer and a 41-inch grist mill, all of which are operated with a six-horsepower Geiser gasoline engine. Someone might wonder how I can do any grinding. I can tell you in a few words: I can grind nine bushels of family meal per hour. I grind every



AN OREGON SHOP RUN BY MR. WALKER QUESINBERRY

day and I get the custom of the surrounding country. The way I get the power from the six-horsepower engine is this: The first pulley on the engine is 16 inches and the pulley on the line shaft is 18 inches. The second belt runs around a 10-inch pulley on line shaft, and a 26-inch on the countershaft. The second pulley on countershaft is 14 inches, the same as the pulley on mill burrs. The engine speed is 3.24 revolutions, calculating by rules for finding the speed of shafting and pulleys, and it gives the burrs 1.11 rev., by gearing it down in this manner. It gives engine power enough to run all machinery. I also have put in larger burrs, if anyone wishes them. They use less power, make better meal and do not pull your engine as hard as small burrs. Small burrs have to run so fast they heat the meal and they also pull the engine harder.

C. C. COMER, Kentucky.

A Large Kansas Shop.—As I stated in a previous letter I am building a new shop. I have two buildings in one, the large building which I use for getting out the wagon wood from the rough lumber is 40 by 80 and the blacksmith shop adjoining is 24 by 45, but I will have to put up another building, 40 by 50. I run my machinery with a 25-horsepower gas engine. Of course, I sell lots of finished wood stock, such as tongues, hounds, etc., in fact, everything used in a wagon. I sold three carloads this week. I am now figuring on a $350.00 wagon. I employ five men besides myself—I still continue behind the anvil. I somehow can't leave that place, as I have stood there now for 29 years out of 50. I have copies of THE AMERICAN BLACKSMITH Journal laying on the desk for from six years back up to date. I think the world and all of "Our Journal," as I find many an article, that some brother smith has sent, to be good. If I only had more time I would like to write a few articles, but my time is so taken up that I find myself away behind when night comes. I could do still more work by investing in some more modern machinery, but the investment would foot up to over $4,000.00. I have one of my own hammers at my anvil, with a 45-pound head. I can take a 1⅛ or 1¼ long-arm axle and weld it with one heat all by myself with such ease that it makes them wonder. A. H. WERTZ, Kansas.

Of Sound Practical Help.—I think it our duty to help one another as much as possible. I have been in business now for thirteen years and it seems as if I couldn't keep house without your paper. The only fault that I can find is that it doesn't come often enough. The more I read it the more I want to read. I think that anyone in the business, young or old, couldn't invest a dollar to better advantage than to invest it in THE AMERICAN BLACKSMITH for one year. He will be so much pleased with it that he will invest another dollar, and so on from year to year. There is no one man knows it all, but by reading we get the ideas of a good many smiths. There is one case in particular I will mention. A man came in the shop the other day with a shot gun and asked me if I could fix it. I looked at it and said "Yes." Well, there was a spring broke. I took an old leaf from a buggy spring and forged out one and fit it. Well, the next thing to do was to temper it and it flashed to my mind in a second that THE AMERICAN BLACKSMITH had told me some time ago to heat slow to a cherry red and plunge into oil, and when cold to draw it back and forward through the fire until the oil was burnt off and I would have a good spring. I did so with the result that I had as good a spring for the business as one could ask for. This is just one of a good many cases. Will close, saying that I am in favor of the publishing of your paper twice a month.

WILL CUMMINGS, Pennsylvania.

More on Cold Setting.—I notice in a recent issue of "Our Journal" that a brother smith in Iowa answers my letter about cold tire setting and says that the best workman in the world can not set some tires on a cold set.

That's just the idea. A man must be a judge of a wheel. I never said a cold setter would do wood work, but it sets tires.

Now, I answer him about the spokes sticking through the rim up against the tire. That is the easiest thing you ever saw. You draw the tire down tight on these spokes with the machine and then take your hammer and hit the tire right over the end of spoke, and you can batter the end of the spoke down in the hole and fill up the hole and it's a better job than if you took off the tire and sawed off the ends.

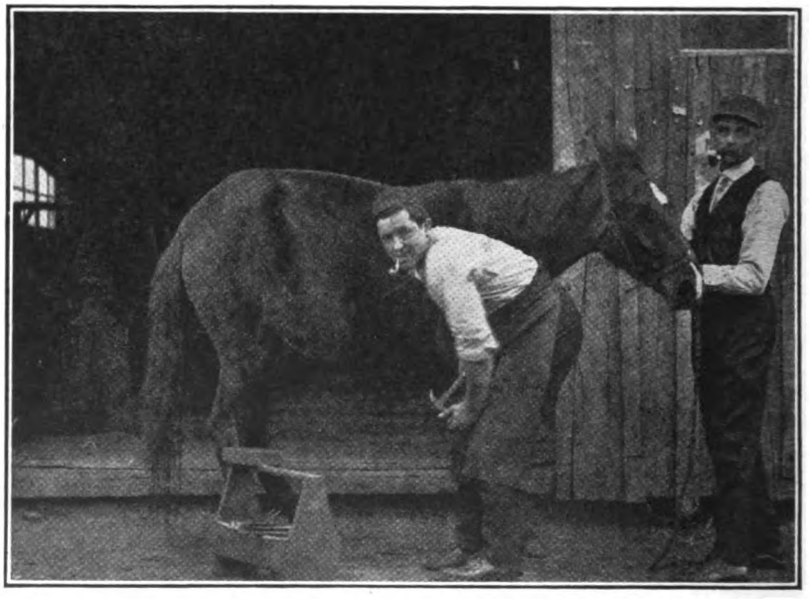
You can also stop all "rattle" of the spokes this way, too. It settles the shoulder of the spoke on rim and batters the end of spoke down in the hole.

As to sand and rust being under the tire, that's just as easy to remedy. Hit the tire all around with hammer and all the dust and dirt and rust that ought to come out will come out.

Now, this rust has worn out a groove in the felloe, and if you knock it all out then when you put the tire back on, the tire rests on the edges of the felloe and if you leave this rust in there and pull the tire down tight on it the tire has a solid face to lay on.

If the rust and sand does not come out when you tap the tire, it shows it's in this groove and let it stay there.

The facts are, it's the man who must use judgment with any kind of machinery, and there is no machine that ever went into a shop that will do as much real good as a cold tire setter, if a man will not expect it to do miracles and just pitch a wheel at the machine and expect it to just naturally set itself.



MR. CARL KRIEBLE, OF INDIANA, IN ACTION

While writing about cold setters I see that one concern now has a setter that sets tires cold or hot on the wheel, and a customer can take his choice.

Well, that's another new one on me, but I am here to learn, and I am sure going to get the gasoline torch and set them hot or cold, and maybe I will have something more to say about this. I am never too old to learn if I am an

OLD TIMER, from Missouri.



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POLES AND SHAFTS

THE QUALITY MAKE

Recognized as best by experienced vehicle men everywhere.

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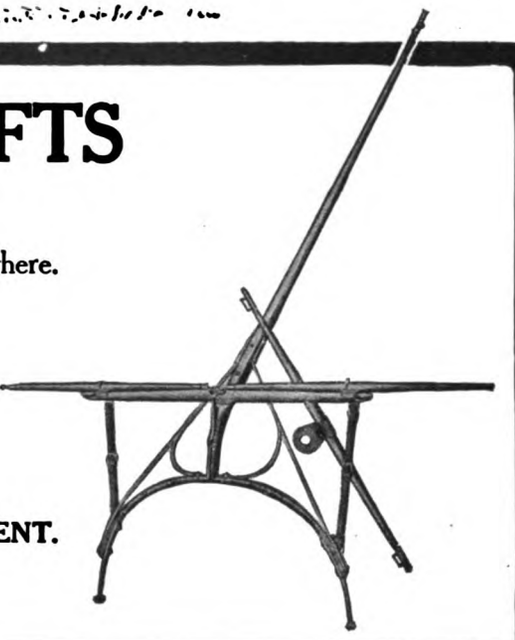
The Pioneer Pole & Shaft Co.

Headquarters and Sales Offices,

PIQUA, - OHIO.

Manufacturers of all styles and sizes of poles and shafts.
A complete line that will SUPPLY EVERY REQUIREMENT.
Have you our catalog and price list?
If not, we want to send you both.





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Best High-grade Steel,
Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

EVERY RASP PERFECT AND WARRANTED

Made in all regular sizes, and in the new 18-inch Slim, which gives the user the advantage of a long stroke, and at the same time a rasp of medium weight.

ASK YOUR DEALER FOR THEM

Current Heavy Hardware Prices.

The following quotations are the prices generally quoted at Chicago, Jan. 29, 1909, and are subject to fluctuations. Corrected for **The American Blacksmith** by the National Heavy Hardware Reporter, Chicago.

No changes are reported in quotations as announced last month.

Light trading in wood stock is usual at this season, while horseshoers' items are generally in strong demand.

The seasonable weather has naturally made business brisk for the shoer, and all sections report trade as exceedingly good.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—
$2.00 rates, full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$2.00 rates, full extras.

Toe Calks—

	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—

6 x ½ and smaller	60–10%
Larger and longer	50%

Machine Bolts—

4 x ½ and smaller	60–10%
Larger and longer	50%

Nuts—

Less than 10 lbs. of a size	$2.50 off
From 10 to 50 lbs.	3.00 off

Washers— Same price as nuts.

Skeins—
Cast 65%

Malleables—
Common $ .09

Half Patent Axles— 65%

Springs—

Single Spring, each	$1.25
Springs, black and half bright	.06

Hickory Lumber—Per Foot—

1 to 2½	$.09½
2½ to 4½	.11

Ash and Oak Lumber—Per Foot—

1–1½	$ .07½	2½–3	$.08½
1½–2	.08	3½–4	.09½

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
¾"	$65.00	$65.00	$75.00
1"	65.00	68.00	80.00
1¼"	68.00	75.00	85.00
1½" 1¾" 2"	72.00	80.00	104.00

Rough Hickory Axles—

			Each.
3	x 4	6 ft	$ .60
3½	x 4½	6 ft	1.00
4	x 5	6 ft	1.20
5	x 6	6 ft	2.20
4	x 5	6½ ft	1.30
4½	x 5½	6½ and 7 ft	2.00
5	x 6	6½ and 7 ft	3.00
5½	x 6½	7 ft	3.50

Finished Hickory Axles—

For 2½ and 2¾ Skeins	$1.00
For 3 Skeins	1.20
For 3¼ Skeins	1.45
For 3½ Skeins	1.60
For 3¾ Skeins	1.95
For 4 Skeins	2.25

Rough Oak Bolsters—

Short	$ .08
12–14–16 ft.	.09

Finished Oak Bolsters—

2¾ x 3¾ and under	$ .65
3 x 4	.70
3¾ x 4¾	.90

Rough Oak Wagon Tongues—

4 x 4 x 2 x 4 x 12 and smaller	$1.00

Finished Oak Wagon Tongues—

3¾ and smaller	$1.25
3¾	1.30
4	1.40

Two Inch Sawed Hounds — Per Pair.

Tongues	$ .40
Front	.45
Hind	.55

Patent Wheels—

A. B. No. 13 and under	45 %
D. No. 13 and under	35–5 %
All Grades, No. 17 to 33	35–5 %
All Grades, No. 39 and Larger	25–5 %
C. No. 13 and under	40–2½ %

Cupped Oak Hubs— Set.

7 x 8 x 9	$1.40
7 x 9 x 10	1.60
8 x 9 x 10	1.65
8 x 10 x 11	1.90
9 x 10 x 12	2.05
9 x 11 x 12	2.10
10 x 12 x 13	3.20
11 x 13 x 14	4.45
12 x 14 x 15	5.35

Plain End Oak Hubs-Set.

10 x 14	$3.45
11 x 14	4.50
11 x 15	4.75
11 x 16	5.35
12 x 16	6.00
12 x 17	6.55
13 x 18	7.50

Rough Sawed Felloes—

1½ x 2"	$1.55	2 x 2½"	2.00
1½ x 2½"	1.75	2½ x 2"	4.75
1¾ x 2½"	1.85	3 x 3"	5.75
		3 x 3½"	6.00

Ironed Poles, White, XXX—

1¾ x 2½" No. 2	$4.00
2 x 2½" No. 3	4.00

Ironed Shafts, White, XXX—

1¾" x 2" and smaller	$2.15
1½ x 2"	2.35
1½ x 2½"	2.90

Farm Wagon Bows—

Round Top, ½ x 2"	$ .65
Flat Top, ½ x 2"	.80
Round Top, ½ x 2½"	1.40

Standard size Piano Bodies with Seats—

Each	$4.25

Plow Beams—

1 Horse	$ .70
2 Horse	.85
3 Horse	1.00

All Hickory and Oak Spokes and Patent Spokes—
Discount from Weis & Lesh List No. 5.. 5%

Wagon Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2½ x 38"	$2.15	$2.95	$4.25
2½ x 42"	2.90	4.05	5.50
2½ x 46"	4.40		
3 x 44"	4.70	6.95	8.90
3 x 48"	5.50	7.85	10.50

Single Trees—Oval—

	Mixed Forest Second Growth	White Second Growth
2"	$1.60	$2.90	$3.50
2½"	1.70	2.95	3.60
2½"	1.80	3.05	3.80
3 x 36"	2.45	3.55	4.20
3 x 38"	2.50		
3 x 40"	2.65	4.00	4.85

Single Trees—Round—

	Forest Second Growth	
2½"	$2.10	$3.60
2½"	2.10	3.65
2½"	2.15	3.75
2½"	2.85	4.25
3"	3.45	4.80

Oval Plow Doubletrees—

2½ x 36"	$1.75
3 x 40"	2.55

Flat Plow Doubletrees—

1¼ x 3½ x 42"	$3.00

Wagon Doubletrees—

2 x 4 x 48"	$3.60
2½ x 48"	4.80
2½ x 4½ x 50"	5.20
2½ x 4½ x 52"	5.60
2½ x 5 x 52"	6.40
2½ x 5 x 54"	7.20
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—

	Forest
2½ x 30" and under	$1.00
2½ x 30" and under	1.25

Buggy Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½" and smaller	$2.65	$3.65	$4.65

Express Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.95	$3.65	$5.00
2½"	3.55	4.15	5.50
3"	3.55	4.30	5.75

Express Singletrees, Turned—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.50	$2.65	$3.75
2½"	2.90	3.65	4.00
2½"	3.50	4.00	4.75

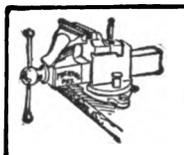
Express Singletrees, Square Center—

	Mixed Forest Second Growth	White Second Growth
2½"	$3.00	$4.15	$5.25
2½"	3.50	5.45	6.00

Buggy Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2 x 42"	$2.75	$3.50	$4.50
2½ x 2½ x 42"	3.15	3.75	5.45

CUMMINGS & EMERSON
Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.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Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material.
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EVERYTHING NEEDED FOR IGNITION

Apple Ignition Dynamo
Complete Electric Lighting Outfits From $150 00 Up
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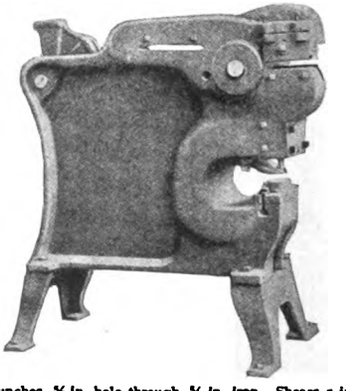
152 St. Clair St.
DAYTON, - OHIO.

No. 5 Combined Punch and Shear

Punches ⅝ in. hole through ⅝ in. iron. Shears 5 in. x ½ in. flat iron bars. Shears 1¼ in. round iron bars. Shears 8 in. x ¼ in. band iron.
Our Large Descriptive Circular will interest you. So will our price.
BADGER STATE MACHINERY CO.
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KALUX STEEL HARDENING SOLUTION

INCREASE the EFFICIENCY *OF ALL YOUR TOOLS*

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It will harden all your carbon steel tools and increase their efficiency from 50 to 150 per cent. **"Kalux"** means a ***Saving of Money*** to those who use it. It costs but a postage stamp to investigate. Tell us the nature of your steel hardening work and who your supply dealer is. ***Write Now.***

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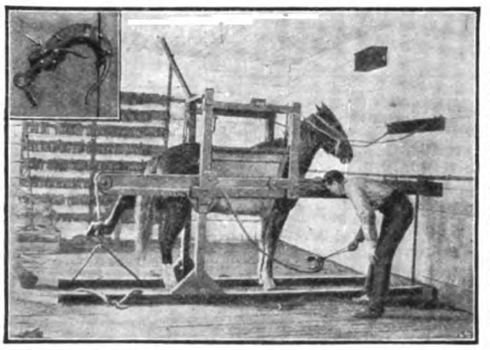
HEMPHILL'S NEW HORSE SHOEING STOCKS



The strongest stocks constructed, and consequently require no repairs and will last a lifetime. Our machine automatically adjusts itself to any size horse, ranging from the smallest to one that will weigh 2,400 lbs. Notice the only strictly automatic spring cuff. There is no time lost in securing the feet in preparation for shoeing.

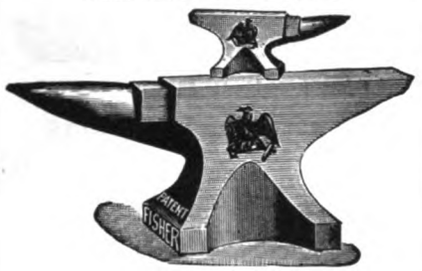
Sold on 30 days' trial use and warranted to hold any horse and to give entire satisfaction.

Write for descriptive circular, giving detailed description and price.

The Hemphill Horse Stocks Company :: Rensselaer, Indiana, U. S. A.

"EAGLE" ANVIL WORKS ESTABLISHED 1843

200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



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OVER 300,000 IN USE

THE ANVIL OF MANY MEDALS.

The "EAGLE ANVIL" has taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always says: "Nothing but an Eagle for me." Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few years' use.

VISES OF MERIT

The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last a lifetime.

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base.

Write for our descriptive Anvil and Vise Catalog.

Our goods are handled by reliable dealers everywhere.



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FISHER & NORRIS, 33-47 Fair St., TRENTON, N. J.

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MANUFACTURE A FULL LINE OF

Vehicle and Automobile Wheels, All Sizes, Styles and Grades, also Gears, Axles, Poles, Shafts, Finished Rims, Finished Spokes, Etc.

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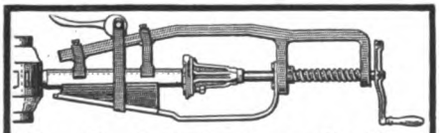
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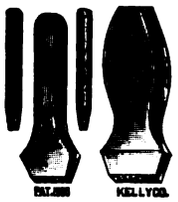
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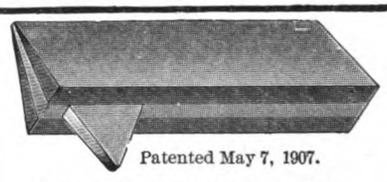
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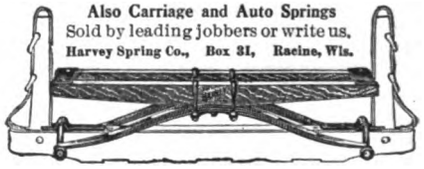

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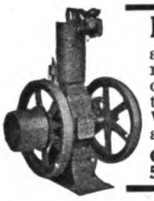

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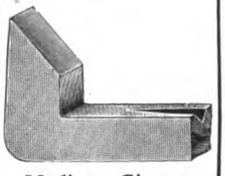

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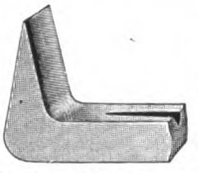

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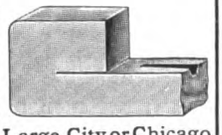

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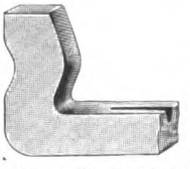

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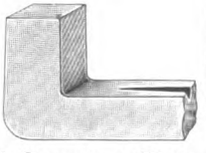

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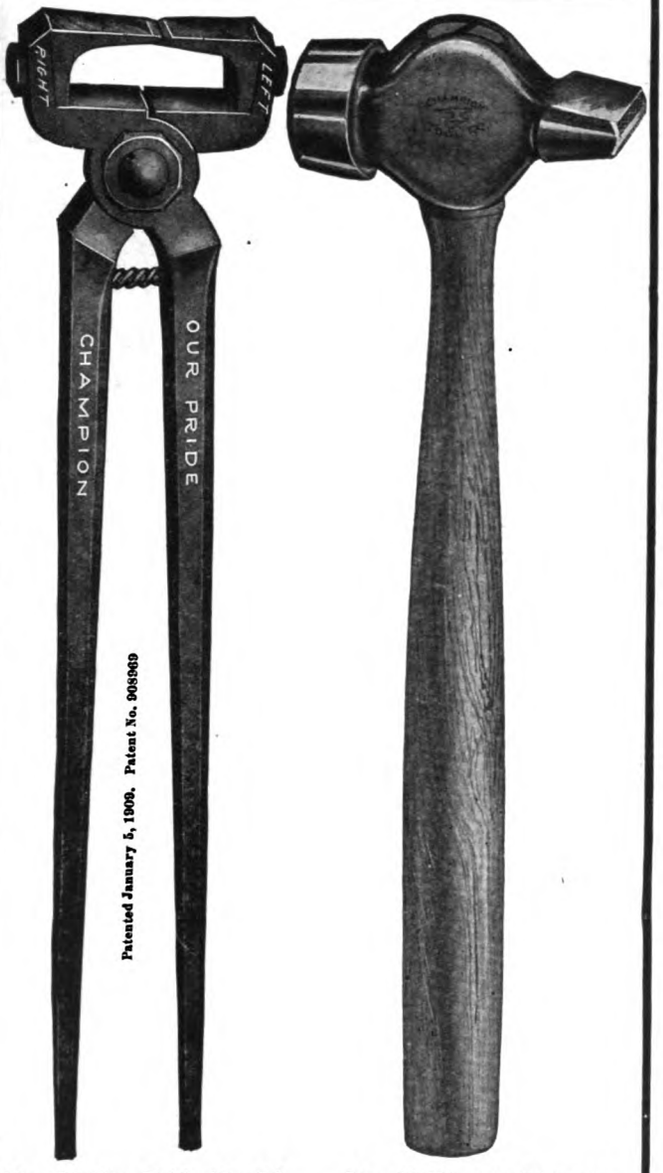

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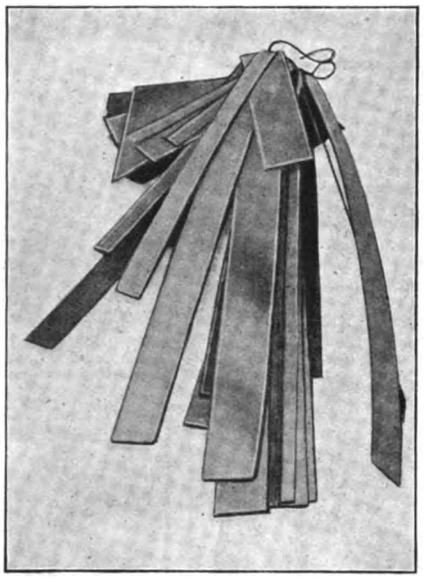

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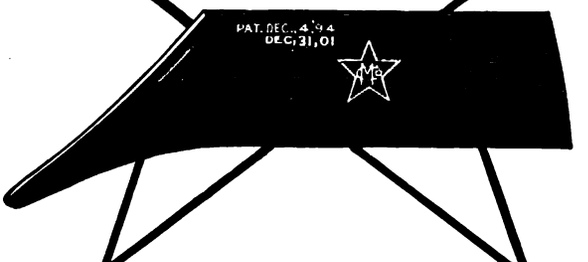

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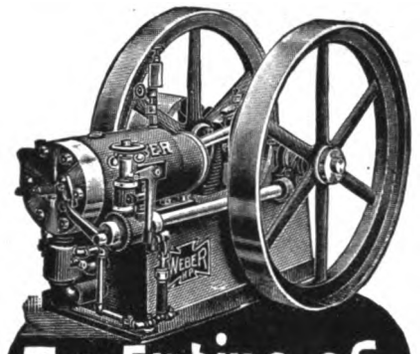

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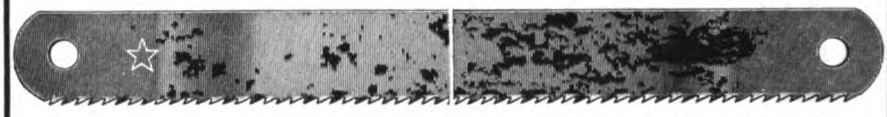

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This is the seventh edition of what is now considered a standard book on the theory, construction, operation, care and management of automobiles. It covers the subject very thoroughly from the history of the self-propelled vehicle to descriptions and explanations of the latest practices in automobile construction. The forty-five chapters are devoted to explaining not only the theory but also the construction of the various parts making up the complete vehicle. The four and also the two cycle engines are explained thoroughly, while the steam and also the electrical vehicles receive due consideration. There is also a chapter on the operation, care and repair of the automobile, and the value of the book is further increased by the appending of a ready reference index.

IGNITION, TIMING AND VALVE SETTING, by Thomas H. Russell, 225 pages, illustrated, flexible leather, $1.50.

Automobile repairmen and others will find in this book just the information they require for the correction of ignition and timing troubles, and it will assist them to the thorough understanding of what to the majority is a very complex problem. The various systems of ignition are carefully explained, and the proper method of setting valves is also thoroughly covered. Among the chapter headings are the following: electrical ignition, the magneto system, ignition faults and hints, induction coils, valves and their functions, valve setting, etc. The automobile repairman will find much helpful and practical information in this book.

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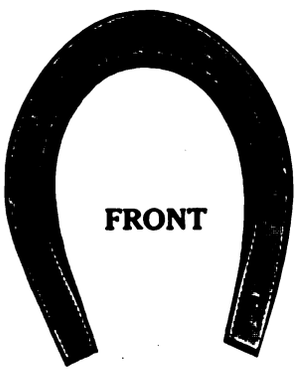

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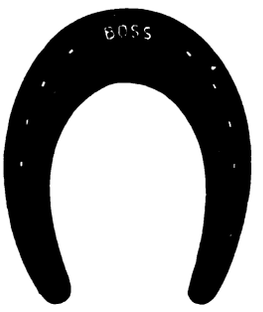

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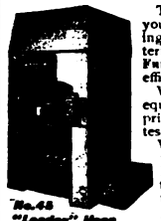
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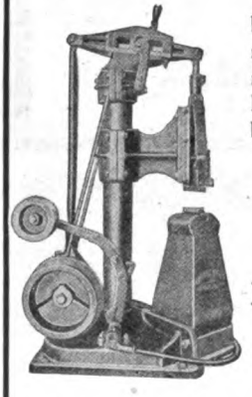
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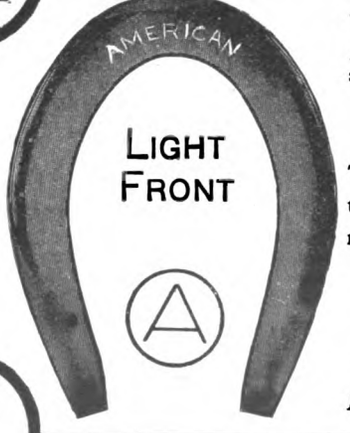

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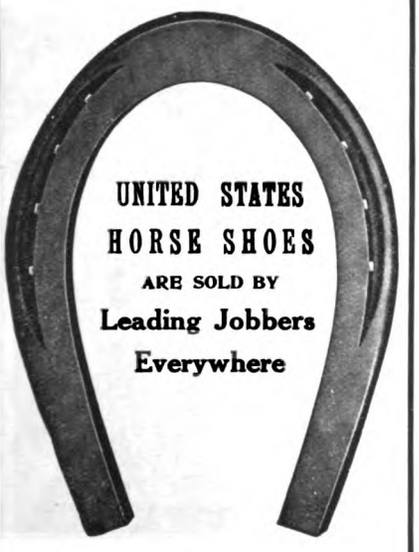

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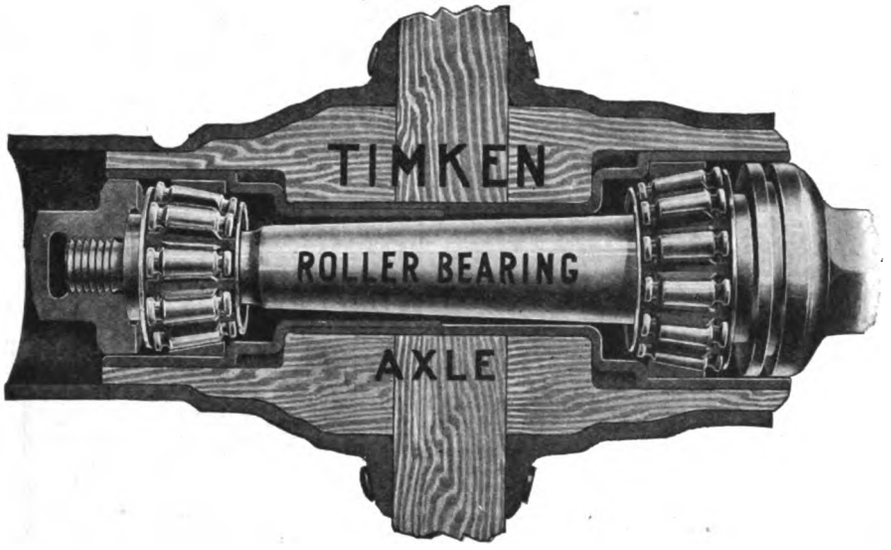

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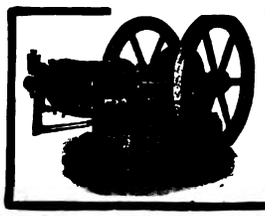

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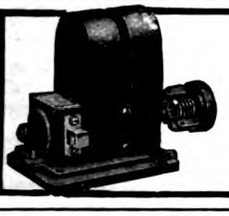

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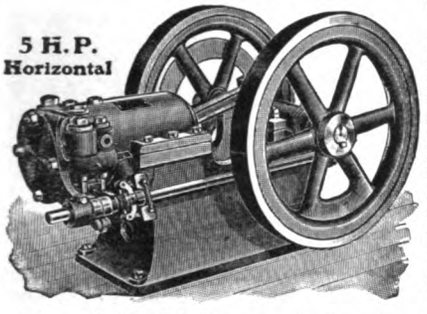

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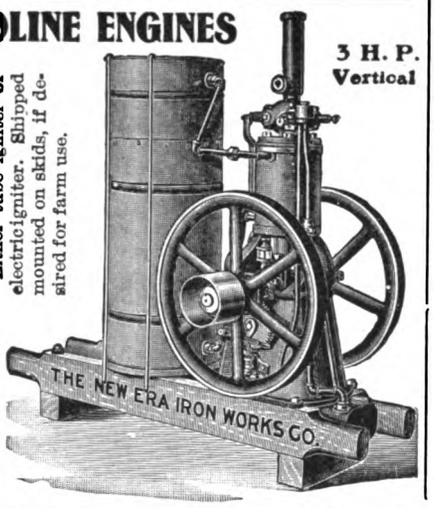

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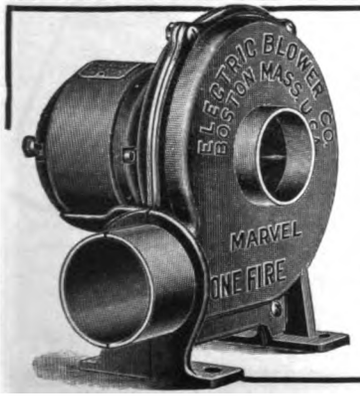

"MARVEL" ELECTRIC BLOWERS

"ONE FIRE" Marvel, -	$28.00
For 4 Light Fires, - -	55.00
For 4 Medium Heavy Fires,	70.00
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For 8 Heavy Fires, - -	120.00

Ask your Dealer, the Electric Light Co., or write to

ELECTRIC BLOWER CO.,
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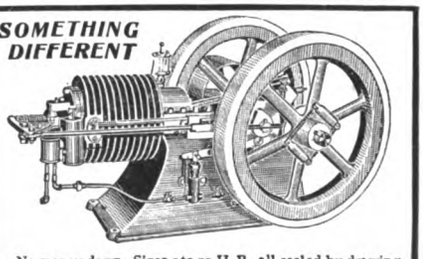

No money down. Sizes 2 to 12 H. P., all cooled by drawing the air directly inside the cylinder—no water used nor fans. ALL water coolers will "freeze up." You can't afford to run the risk. Guaranteed for Five Years. By special arrangement of valves we use one third less gasoline than other makes. Get our proposition to Blacksmiths. Do it now, before we place an agent in your town.

GADE BROS. MFG. CO., 18 North Street, Iowa Falls, Iowa



Clip Horses For Profit

This splendid machine only $7.50. It is the **Stewart No. 1.** Send $2 and we will ship it C. O. D. for the balance. If you are not pleased, return at our expense and get your money.

CHICAGO FLEXIBLE SHAFT CO.
186 Ontario Street Chicago



STEEL STAMPS
Steel Letters and Figures
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Stencil Dies, Stencils, Etc.
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Price List sent upon application.





BUGGY TOPS, $4.60
TOP BUGGIES, $35.00
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Cushion Backs, Storm Fronts, Poles & Shafts.
Write for 100-page Catalog.
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"TOOLS THAT WEAR" **HELLER'S** CELEBRATED AMERICAN HORSE RASPS, FILES AND FARRIER'S TOOLS

will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and Tempered by a Secret Process.



HORSE RASP.

New Catalogue Mailed Free on Application.

HELLER BROTHERS CO., Newark, N. J., U. S. A.

BORAX-ETTE FOR STEEL TRADE MARK
A PERFECT WELDING FLUX.
PREPARED ESPECIALLY FOR WELDING
FAR SUPERIOR TO COMMON BORAX.

Try Borax-ette for Welding Toe-Calks

THEY WON'T KNOCK OFF

It makes steel weld like iron. It has no equal for welding tires, axles and springs

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SAMPLES FREE

CORTLAND WELDING COMPOUND CO., Cortland, N. Y.

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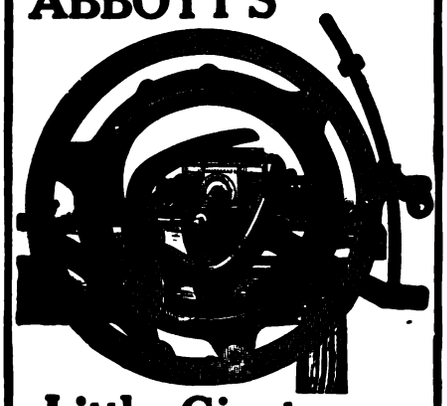


Little Giant Hub Borers

AND Abbott's Box Puller

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

PHINEAS JONES & CO., Newark, N.J.

General Agents for the Eastern States

We make the following sizes:
No. 1, 3 in. wide, 14 in. high
" 2, 3¼ " 14 "
" 3, 3¼ " 10 "
Weight per set of 4, 16 pounds.



The Bruce Malleable Wagon Standard

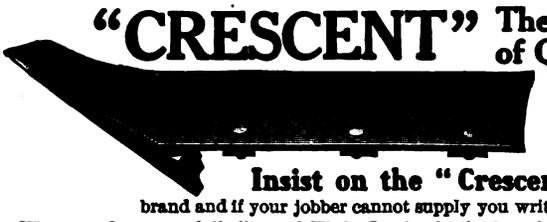
Tested thoroughly and guaranteed strictly as represented. Note its great advantages over the old style.

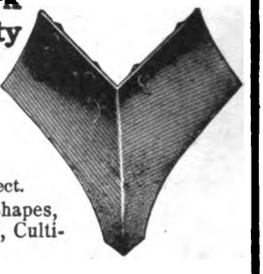
1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.
2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.
3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only a ⅜-in. face.
4. Great time saver. Can be attached to bolster in one fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, write today and ask for prices.

A. H. HARSHBARGER, Danville, Ill.

"CRESCENT" The Mark of Quality





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brand and if your jobber cannot supply you write us direct.

We manufacture a full line of High Grade Agricultural Steel Shapes, Fitted and Bolted Plow and Lister Shares, Merchant Plow Shares, Cultivator Blades, Subsoiler Blades, Landsides, etc., etc.

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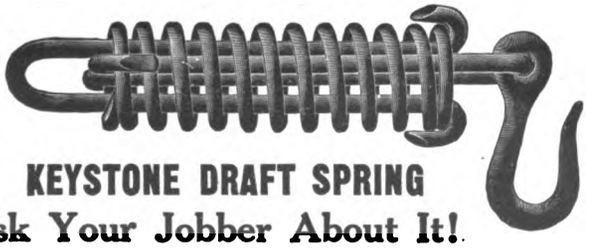

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Ask Your Jobber About It!

MANUFACTURED BY

RAYMOND MANUFACTURING CO., Ltd.
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THE KEYSTONE TRACE OR DRAFT SPRING RELIEVES THE HORSE OF ALL THOSE JARS CAUSED BY THE UNEVENNESS OF THE ROAD AND WHEN TAXED TO ITS FULLEST CAPACITY SIMPLY CLOSES, THUS FURNISHING A SOLID CONNECTING LINK AND AVOIDING ALL POSSIBILITY OF BREAKAGE.

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NATIONAL TIRE BENDING MACHINE

for rolling steel and iron tire for wheels to a circle of any desired diameter. It will bend tire from the lightest to 10" wide by 1" thick. Is heavy and well proportioned. Furnished with tight and loose pulleys, with friction clutch pulley, or direct connected motor, if desired at an additional charge. We also manufacture solid steel loose collar axles and the National self-oiling tubular axles and steel stock and hog troughs.

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NATIONAL TUBULAR AXLE COMPANY, EMIGSVILLE, PA.

FOR STRENGTH, SAFETY, AND QUALITY OF MATERIAL

NORTHWESTERN HORSE NAILS

ARE THE BEST ALL AROUND

Perfection in form and finish. Made of the best Swedish iron

Union Horse Nail Co., Chicago, Ill.

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See That Cushion?

It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



Heavy Leather Back

NO LAMENESS NO SLIPPING CHEAPEST AND BEST



Medium Canvas Back

REVERE RUBBER CO.

Sole Manufacturers BOSTON, MASS.



The New Little Giant Trip Hammer

Made in 3 sizes

25 lbs. 50 lbs. 100 lbs.

Over 2,000 Now Sold

The Best Power Hammer on the market. Works material up to 5 in. round.

FULLY GUARANTEED

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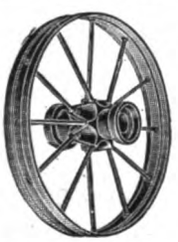

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Plain or Grooved Tire

Farmer's Handy Wagons
All Standard Types

Special Inducements to Blacksmiths

Write Today for Agency

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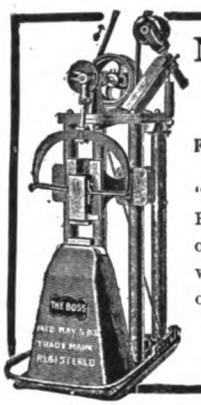

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For Plow Work, Wagon Work, Heavy Work, Any Work.

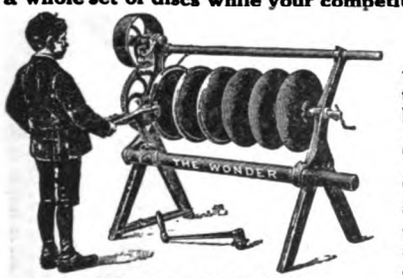
"Will strike as you like." Heavy or light at full speed or less. A broken anvil will cripple no other part of the hammer.

G. E. DAVIS, Mgr.
DUBUQUE, IOWA.

WONDER DISC SHARPENERS

SAVE ½ THE TIME AND ALL THE LABOR.

The Wonder Disc Sharpeners save over one-half the time and labor. Every wide-awake and up-to-date shop owner who has sharpening of disc harrows and disc plows should have one of my Wonder Disc Sharpeners. With these machines youcansharpen a whole set of discs while your competitor is taking off the shaft in the old fashioned way.



THE LITTLE WONDER.

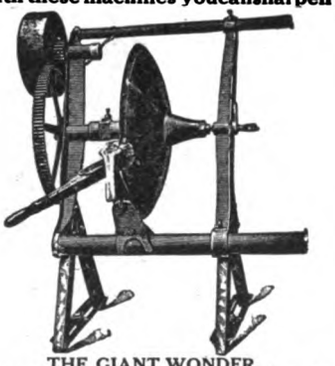
The LITTLE WONDER will sharpen any size disc up to 22 inches in diameter. The accompanying cut shows the LITTLE WONDER at work on a whole section of discs. This machine is especially adapted for sharpening Disc Harrows.

You Can Increase Your Earnings.

when you have one of my machines as you can turn out more work and please your customers better than by sharpening in the old way.

Operated either by hand or power.

Can shear any part of edge to any bevel. Also shear back from edge as far as required. The tool can be used on either side of the disc and can be shifted from one disc to the other. All these things can be done without the turn of a set screw or nut. Is a positive feed; *automatically adjusts itself to wobbling or bent discs.* Knives made of best grade self-tempering steel and will last a lifetime for hand or power.



THE GIANT WONDER.

The GIANT WONDER is a larger and heavier machine; has hoider attachments for rolling coulters and **DISC PLOWS**; will take in discs up to 32 inches in diameter; is a geared machine and will also take in disc harrow sections same as the Little Wonder and do the work equally as well. The only machine on the market with these advantages.

ALL OUR MACHINES GUARANTEED.

We will take back and pay the freight both ways on any machine which does not prove to be exactly as represented and satisfactory in every way. You cannot lose in buying a machine with this liberal guarantee. Most all dealers sell Wonder Machines, but if yours does not, write us direct and please send us his name. Be sure to write at once for descriptive circulars. Don't let another season go by without making money by installing a Wonder Machine in your shop. Address all communications to

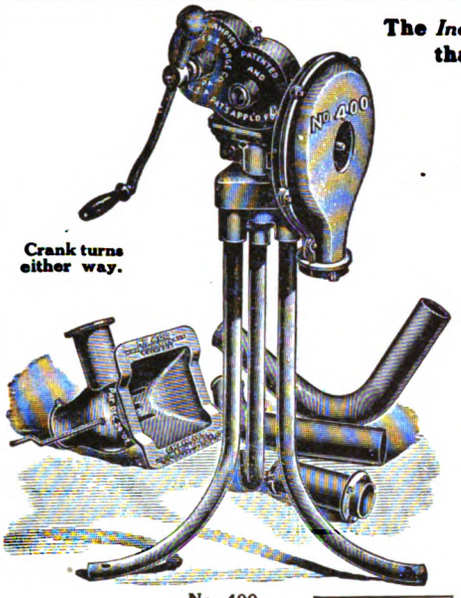
A. E. DURNER, Sole Manufacturer, Main Office, **Evansville, Wis.** CANADIAN BRANCH: London, Ontario, Canada

The *Incomparable* 400 Blower, the one great *Heirloom* that will be handed down *from one generation to the other. Ask what the owners say*

MADE WITH BALL BEARINGS ONLY

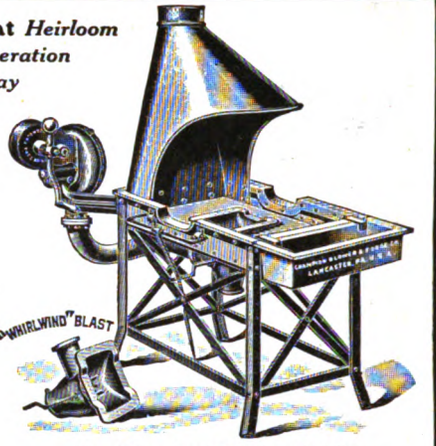
Nearly Half A Million in Use

The No. 400 is the Blower that has REVOLUTIONIZED the World in Making Hand Blast



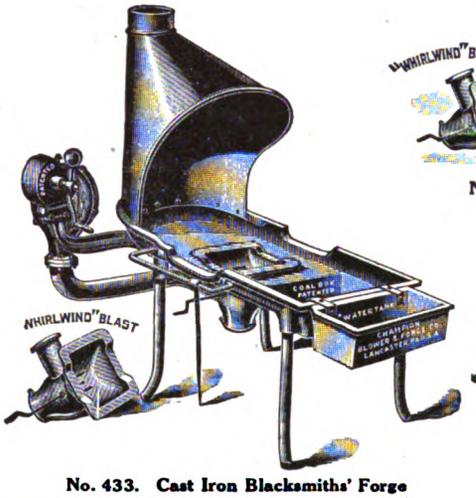
Crank turns either way.

No. 400

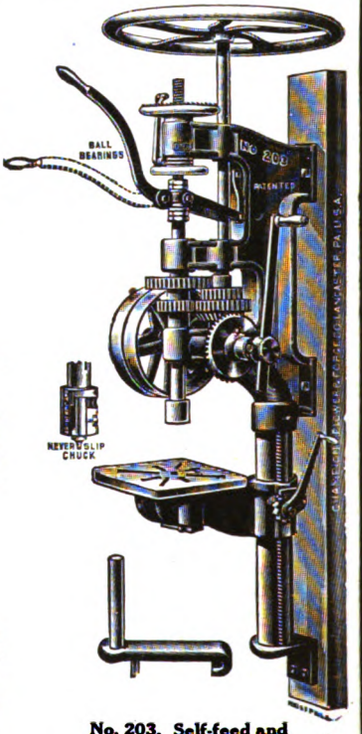


No. 408. Steel Blacksmiths' Forge

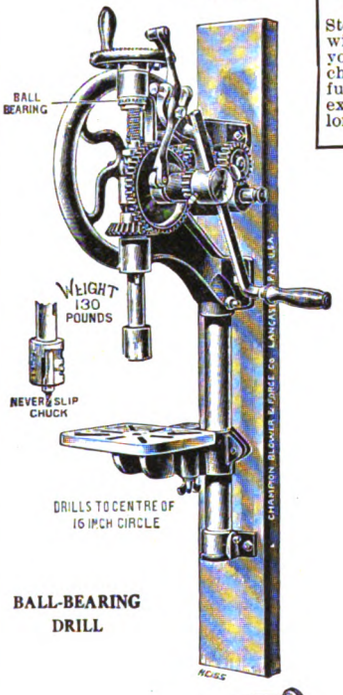
The No. 400 Steel Blower will serve the youngest mechanic faithfully without expense for a long lifetime.



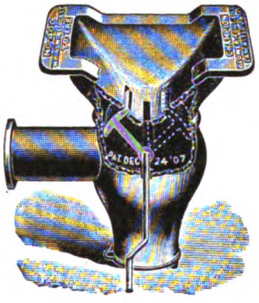
No. 433. Cast Iron Blacksmiths' Forge



No. 203. Self-feed and Lever-feed Drill



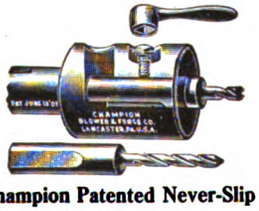
BALL-BEARING DRILL



A Tuyere Iron That Makes A Whirlwind Blast.

The No. 400 Champion "Whirlwind" Blast Anti-Clinker, Heavy Nest Tuyere Iron is furnished with all No. 400 Blowers WITHOUT EXTRA COST.

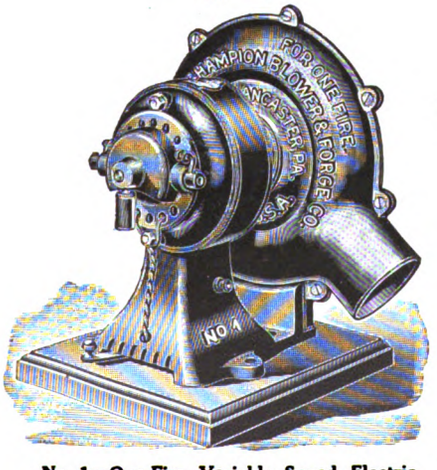
The "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron produces a circular, rotary whirlwind blast and concentrates the heat in the tuyere nest, not permitting it to blow up and out of the chimney, therefore, makes a hotter fire and heats the iron one third quicker, saving much coal.



The Champion Patented Never-Slip Chuck is applied to all CHAMPION DRILL SPINDLES without extra charge

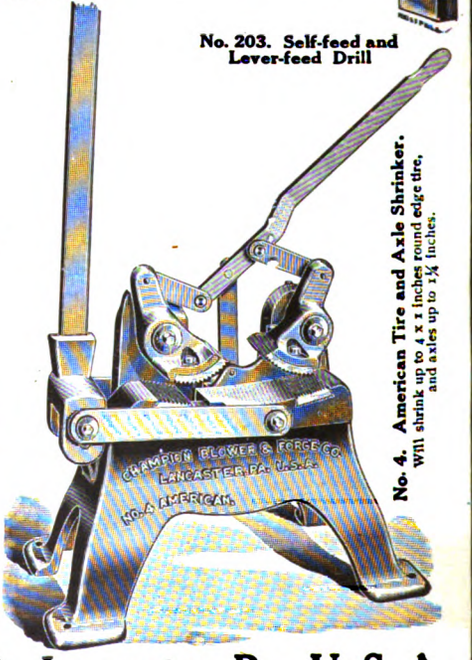


Screw Plates in four styles, cutting up to 1½ in.



No. 1—One-Fire Variable Speed Electric Blacksmiths' Blower, with five speeds for LIGHT, MEDIUM and HEAVY fires.

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power Blower, or Electric Blower, write for our free catalogue, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4 x 1 inches round edge tire, and axles up to 1¼ inches.

THE CHAMPION BLOWER & FORGE CO., Lancaster, Pa., U. S. A.

"Little Giant"
PUNCHES AND SHEARS

Better than a Blacksmith Helper.

Over 3,000 in use. Good the world over.

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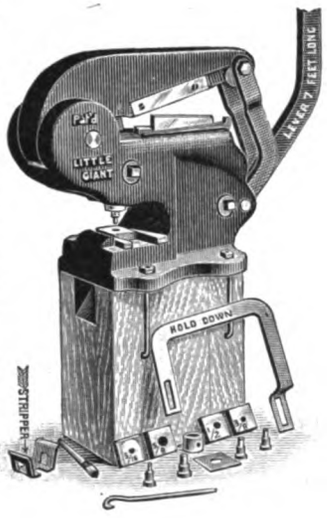
Kei Road, Cape Colony,
S. A., Aug. 12, 1909.
Little Giant Punch
& Shear Co.,
Sparta, Ill., U. S. A.

Dear Sirs: — Enclosed please find Money Order to the value of £1-11-0 in settlement of your acct, The Punch and Shear came safely to hand last Monday and I am very pleased with it indeed. If I can at any time sell one I will do so and will try to do all I can to forward the sale in the Cape Colony. The machine cost me landed here £13-10-0, and I consider it worth twice as much. I find it only takes one man to work the lever and I thought it could not be worked with less than two. I consider every blacksmith should have one, as they save a lot of labor and money.

Yours faithfully,
(Signed) pp
R. G. RISTROW.



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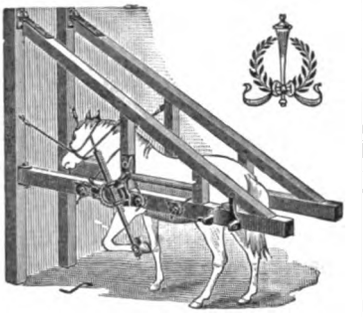
Barcus Horse Stocks

are an ornament to your shop and will **attract** customers.



You would not hammer dynamite!
Why trust every horse? Some day—

As a time-saver; you will do twice your former amount of work. Will last a lifetime. Figure how much you gain. **Illustrated catalog sent free.**

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1895 STANDARD TOE CALKS 1909
HOT FORGED NIB
HIGH GRADE STEEL
DRIVES PERFECTLY
WELDS EASILY
GIVE SATISFACTION



FRANKLIN STEEL WORKS

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New Catalog will be ready this spring, sent on receipt of $1.00, which will be rebated on first order for more than this amount, or sent gratis with first order for $1.00 or more. Plaid designs for automobile panels. Cane work effects. Basket work effects.

For the auto painter who has exhausted his ideas on distinctive color combinations.

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DON'T FAIL TO INVESTIGATE THE

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OF WROUGHT IRON ANVILS

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The Columbus Anvil & Forging Co.

Office, Wyandotte Building
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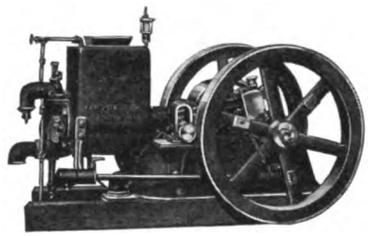
K. C. Junior Gasoline Engines

STEAM COOLED **SINGLE PISTON**



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Power Guaranteed

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ECONOMICAL
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You need an engine to get the most out of your efforts. Hundreds of times one of these simple, reliable powers will give you a more valuable service in a few minutes than you would get from a hired helper in a whole day.

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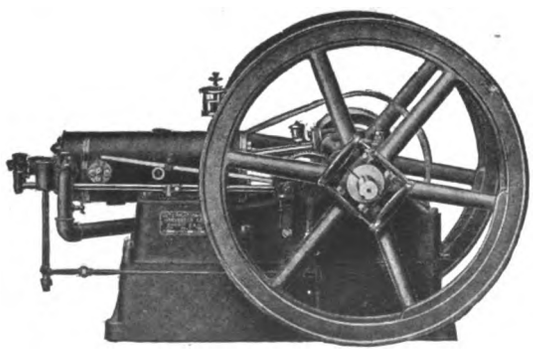
If you let it remain idle, its wages are nothing, its board is nothing, but it will be ready the next day to go right back on the job at your command.



Dependability, readiness, simplicity, economy, ease of operation—these are qualities that make I. H. C. gasoline engines appeal to all classes of mechanics. To no mechanic or shop worker is it more valuable than to the blacksmith.

You have your choice of many sizes and styles.

Verticals—2, 3, and 25-horsepower.

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It will pay you to investigate these engines. It will interest you to look into their superior materials and the superior way in which they are constructed. Write for catalogues of the style in which you are interested.

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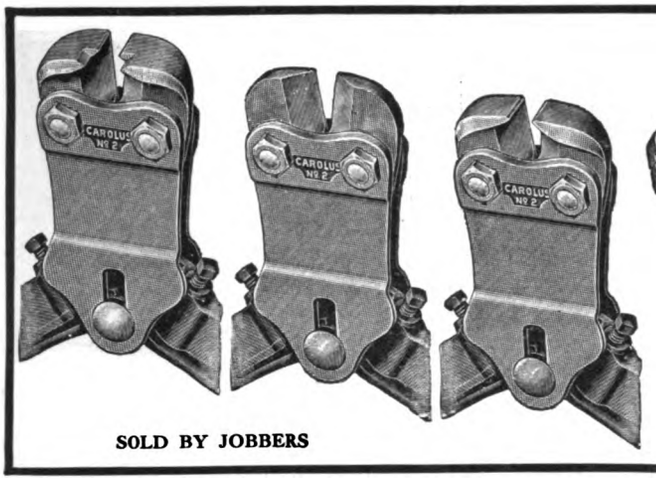
CAROLUS





Nut Splitters and Bolt Clippers

Most Complete, Practical and Durable Manufactured.

MADE IN THREE STYLES

Enlarged views of cutting blades at left. Write for Circulars and Prices.

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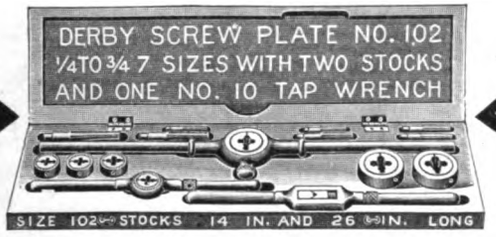

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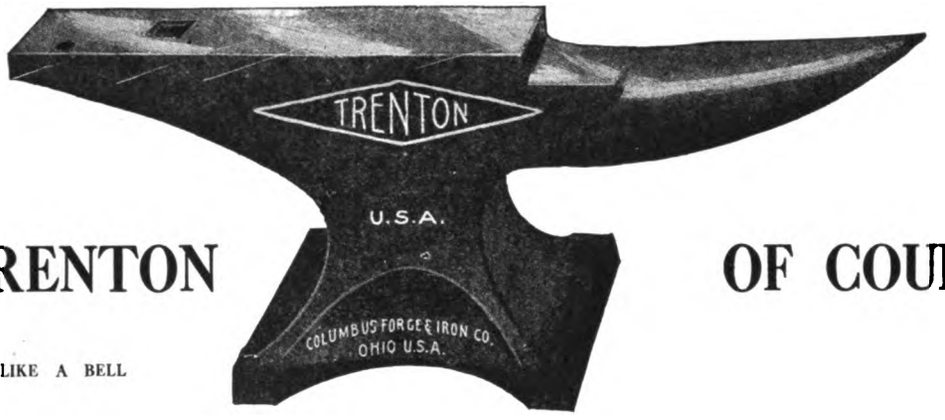
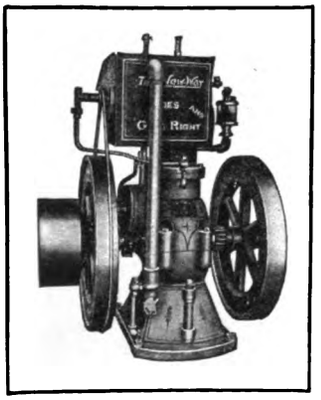
Never Accept Imitations

When a dealer or jobber tries to impose substitutes for the *good advertised articles,* write us or the manufacturer. We will see that you get the genuine—what you want.



THE TRENTON OF COURSE

IT RINGS LIKE A BELL



THE "New-Way" AIR COOLED ENGINES

For Blacksmith Shop Use

No Water to Freeze—No Tank to Fill

ORIGINAL AIR COOLED — QUALITY COUNTS — "NEW-WAY" ENGINE — QUALITY COUNTS — GOES AND GOES RIGHT

You ought to know what Blacksmiths who are using The "NEW WAY" Engines say about them. A post card will bring our catalog and a book of letters from users, that may save you buying two engines to get one you can use.

WRITE FOR CATALOG K.

THE "New-Way" MOTOR COMPANY
LANSING, MICHIGAN, U.S.A.

60 Sheridan Street



"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

THE BEST MECHANICS USE
COLUMBIA CALIPERS
THERE'S A LITTLE BOOK - TELLS WHY
E.G. SMITH, COLUMBIA, PA.

WHEN WRITING TO ADVERTISERS MENTION THE AMERICAN BLACKSMITH

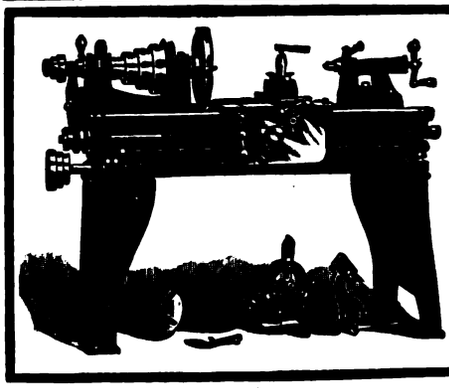
HORSE SHOE BAR IRON

—MADE BY—

The Milton Mfg. Company,

MILTON, PENN'A.

Is of Superior Strength and Quality. We can prove it. Write us.



Built For Business

Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high-grade lathe, is the best for your shop.

It's a SEBASTIAN—a good lathe

Investigate its merits—Write for Catalog.

Foot and Power Lathes, 9 to 15 in. Swing
Tools and Supplies.

SEBASTIAN LATHE CO.
124-126 Culvert St., CINCINNATI, OHIO



Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.

McKEESPORT, PA.

Selling Agencies

NEW YORK CHICAGO
BOSTON PHILADELPHIA

"CHICAGO"
EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



"CHICAGO"
WHEELS SAVE TIME

They're made of stuff that cuts

Emery Wheels, Glue, Emery, Polishing Wheels, Grinding Machinery

136 Page Catalogue for the Asking

Chicago Wheel & Mfg. Co.
108 SO. ABERDEEN ST.
CHICAGO, U. S. A.

SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades
Fully guaranteed
All sizes in stock

THE
BOURNE-FULLER CO.
IRON STEEL
PIG IRON
COKE

Cleveland, Ohio.

DEALERS I WILL PUT DOLLARS IN YOUR POCKET

I'll give you a bigger gasoline engine business for 1910 than you believe possible. I'll furnish you with the best engines built, bring customers into your store and help you sell them.

It Makes Me Smile.
In Fact, I Can Hardly Keep From Laughing

Why do I smile? Because we have added to our family a one-horsepower engine, the Waterloo Boy, Jr., who is just like his big brother, the Waterloo Boy, and for all the world like his dad.

Because it is the best gasoline engine the world has ever known.

Because we have had such a pleasant and profitable business year, having sold over 9,000 gasoline engines in 1909.

These engines were sold in all parts of the United States, in Canada, Cuba, Australia, Sweden, Spain and other foreign countries.

Because these Waterloo Boy gasoline engines have given such universal satisfaction that they sell and stay sold.

Because we have established such a reputation and demand for our engines that we will build and sell 30,000 engines in 1910.

Because we have equipped our factory with the most modern machinery and designed our engines so that we can build and sell these engines for less money than anyone else in the world.

Because the price at which we can sell these engines will bring us the orders with little effort.

30,000 gasoline engines a year are a good many engines. 100 engines each working day, but we know from the past that we can do just as we plan. We have two large factory buildings, 90 by 300′ and 140 by 300′, with numerous smaller buildings, all occupied building gasoline engines, night and day. We will never turn the key from January to January, but will WORK, WORK, WORK, building gasoline engines for the implement dealers all over the world.

WATERLOO BOY GASOLINE ENGINES

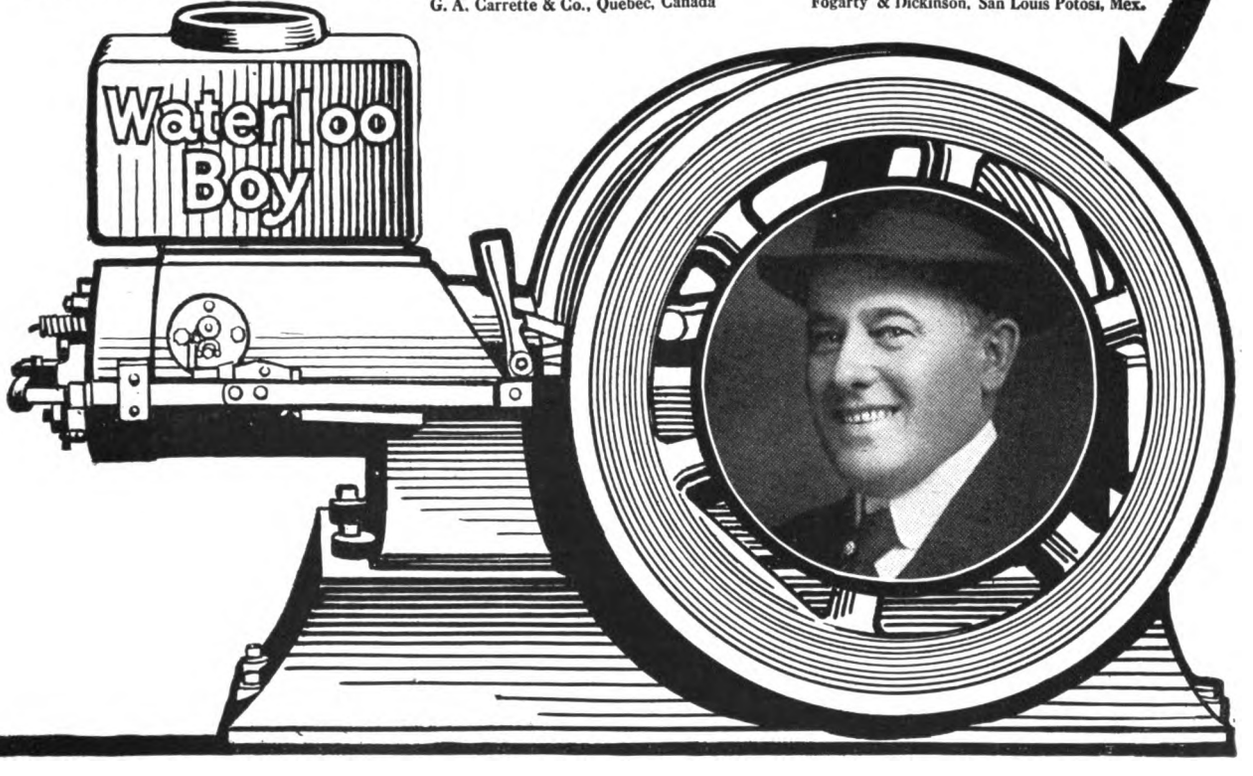
We sell these engines only through dealers. We do not furnish them to any mail-order or catalogue houses. Orders received direct are filled through nearest jobber. Write me for our catalogue and terms to dealers.

GEO. B. MILLER, President, **WATERLOO GASOLINE ENGINE CO.,** Department 198, WATERLOO, IA.

New York Office, 16 East 42d Street. Philadelphia Office, 126 South 34th Street.

DISTRIBUTING JOBBERS:

P. J. Downes & Co., Minneapolis, Minn.
Reierson Machinery Co., Portland, Ore.
P. J. Downes & Co., Winnipeg, Canada
Horter & Fair, Havana, Cuba
Andrew Hollingworth & Co., Christiana, Norway
Donald & Sons, Ltd., Masterton, New Zealand
Donald & Sons, Ltd., Sydney, Australia
Weaver Hardware Co., Rochester, N. Y.
G. A. Carrette & Co., Quebec, Canada
David Bradley & Co., Council Bluffs, Iowa
Horace L. Smith, Petersburg, Va.
Hollingworth & Co., Stockholm, Sweden
Bendix Bros., Copenhagen, Denmark
Fogarty & Dickinson, San Louis Potosi, Mex.



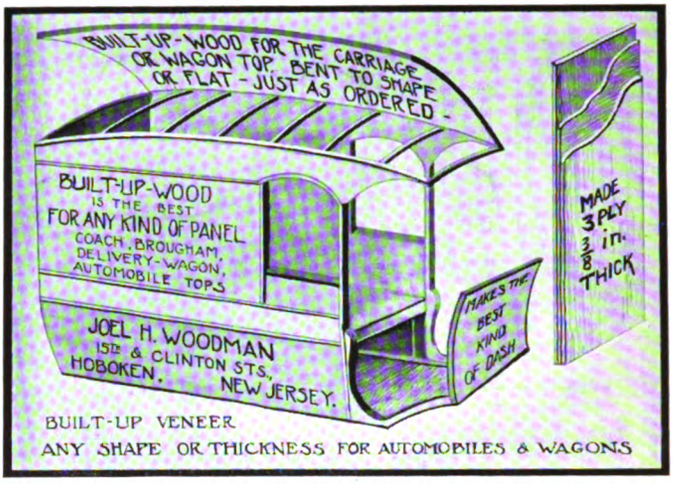
ADJUSTABLE DIES

In "Duplex" Die Stocks are instantly set by hand to exactly the size wanted, standard or over.



The dies also open when thread is cut and so avoid turning-back.

THE HART MANUFACTURING CO.,
50 Wood Street, :: Cleveland, O, U. S. A.



Beats All Others.

SHAW & PARKER
BLACKSMITHS.

Grover Hill, December 29, 1909.

BUFFALO FORGE COMPANY,
Buffalo, N. Y.

Gentlemen:—We have one of your Buffalo 200 Silent Blowers. It is far beyond recommendation to us.

There have been other 'smiths in our shop who have other makes. They all say the No. 200 beats any they have ever seen. Yours respectfully,

SHAW & PARKER.



Say! Mr. Blacksmith,

have you heard about the new tire setter called

THE SCIENTIFIC HYDRAULIC?

Blacksmiths are just wild about it where it is used, and the manufacturers are either **crazy** or **dead sure** they have a "cinch" on the other fellows for they actually **warrant** it to be **better** than any other and will let you be the judge.

GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

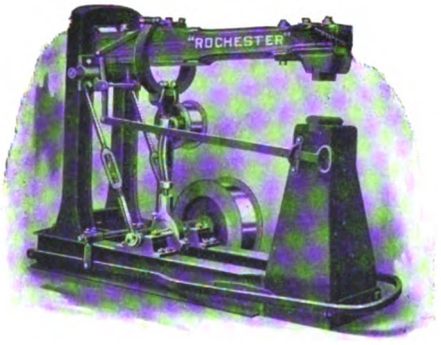
Write for information at once to

National Hydraulic Tire Setter Co.

KEOKUK, IOWA.



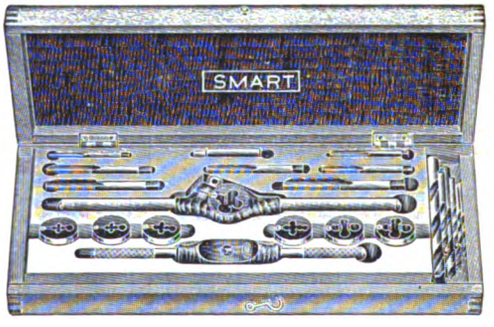
ROCHESTER HELVE HAMMER



(The Hardest Hitter)

Not only does general and special forging, but is a first class **tire welder also.** Made in six sizes.

THE WEST TIRE SETTER CO., Rochester, N. Y.



Strong, Easy Cutting Durable Screw Plates

FULL LINE OF HIGH QUALITY SCREW CUTTING TOOLS

Send for Free Catalog

A. J. SMART MANUFACTURING CO., Greenfield, Mass.

FIRST MADE IN AMERICA

HAY-BUDDEN SOLID FORGED ANVILS

A LONG STEP FORWARD

SOLID FORGED STEEL TOP
Welded to a
SOLID FORGED BASE
Making a
SOLID FORGED ANVIL

The Gold Medal Anvil

HIGHEST AWARD
Omaha 1898 Pan-American 1901



OVER 150,000 IN USE

The **ENTIRE TOP** being one piece of high grade **FORGED STEEL** makes a **LOOSE FACE IMPOSSIBLE.**

TEMPERED "JUST RIGHT".

By our own process, the weld at the waist is a **LASTING UNION.**

Experience has proved their worth and demonstrated that **"HAY-BUDDEN" Anvils** are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., 254 NORTH HENRY ST. BROOKLYN, N. Y.

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VOLUME 9

THE AMERICAN BLACKSMITH

NUMBER 6

BUFFALO
N.Y. U.S.A.

A Practical Journal of Blacksmithing and Wagonmaking

MARCH, 1910

$1.00 A YEAR
10c A COPY

3 Famous Clippers

Horses Should Be Clipped

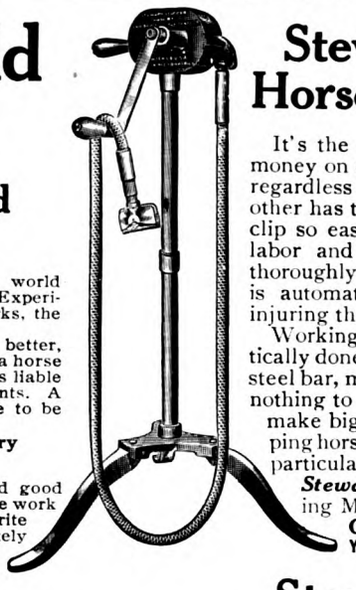
—and Blacksmiths Should Clip Them

Prominent veterinary surgeons throughout the world recommend clipping as an aid to a horse's health. Experience has proven the fact. The harder a horse works, the more need for clipping him.

A clipped horse keeps in better condition, rests better, and food does him more good. Hard work makes a horse perspire and the moisture, held by the long hair, is liable to bring about colds, pneumonia and other complaints. A clipped horse dries out quicker and is less liable to be taken ill.

Horse Clipping is a Logical Part of Every Blacksmith's Business

Horses are being clipped more every year and good prices can be obtained. With a Stewart machine the work is done quickly, and good profits are certain. Write for full particulars of the business which is legitimately the blacksmiths'.



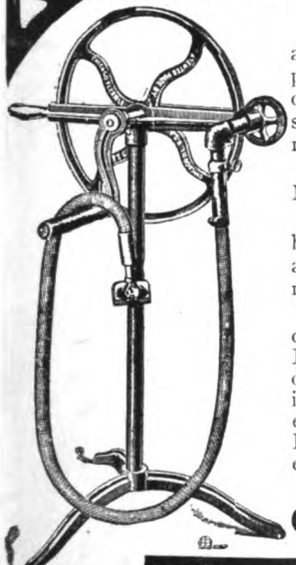
Stewart Ball Bearing Horse Clipping Machine

It's the greatest little clipping machine for the money on earth. No other machine in the world, regardless of price, is as good value as this. No other has the features that enable the ***Stewart*** to clip so easily and so smoothly, yet at such little labor and expense. Anybody can clip horses thoroughly with this machine, because the action is automatic and there is no fear of cutting or injuring the horse.

Working parts are enclosed so that wear is practically done away with. Gears are cut from the solid steel bar, made file hard, and run in oil. Absolutely nothing to wear out or give trouble. Blacksmiths make big money clipping horses. Send for particulars. Price of ***Stewart*** Ball Bearing Machine is . . **$7.50**

Order one TODAY
Your Supply House has it.

1902 Chicago Horse Clipping Machine



The blacksmith's favorite. This is a big, strong machine and is the most practical ever made for the man who does much clipping. Every blacksmith who makes a business of doing much clipping should have one of these.

It operates easily and without power. No retarded motion, no belt to slip.

Gears are cut from the solid metal bar. All parts are carefully balanced, all shock is absorbed and a uniform motion is assured.

The knife is the ***Stewart,*** one nut, dust proof, balance-pressure type. Each machine is fitted with 6½ feet of the highest grade flexible shaft, and is complete in every respect. Price for complete equipment **$10.75**

Stewart Electric Horse Clipping Machine

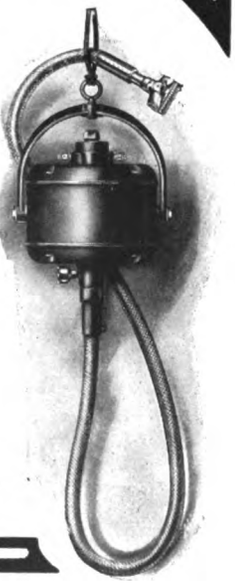
Where electric current is available this machine is very practicable. Each machine is equipped with a high grade motor suspended in a truman yoke.

The flexible shaft connects directly with the motor and gives the utmost freedom of motion. The motors are self-oiling and thoroughly dependable. The machine operates and is stopped on the turn of a switch.

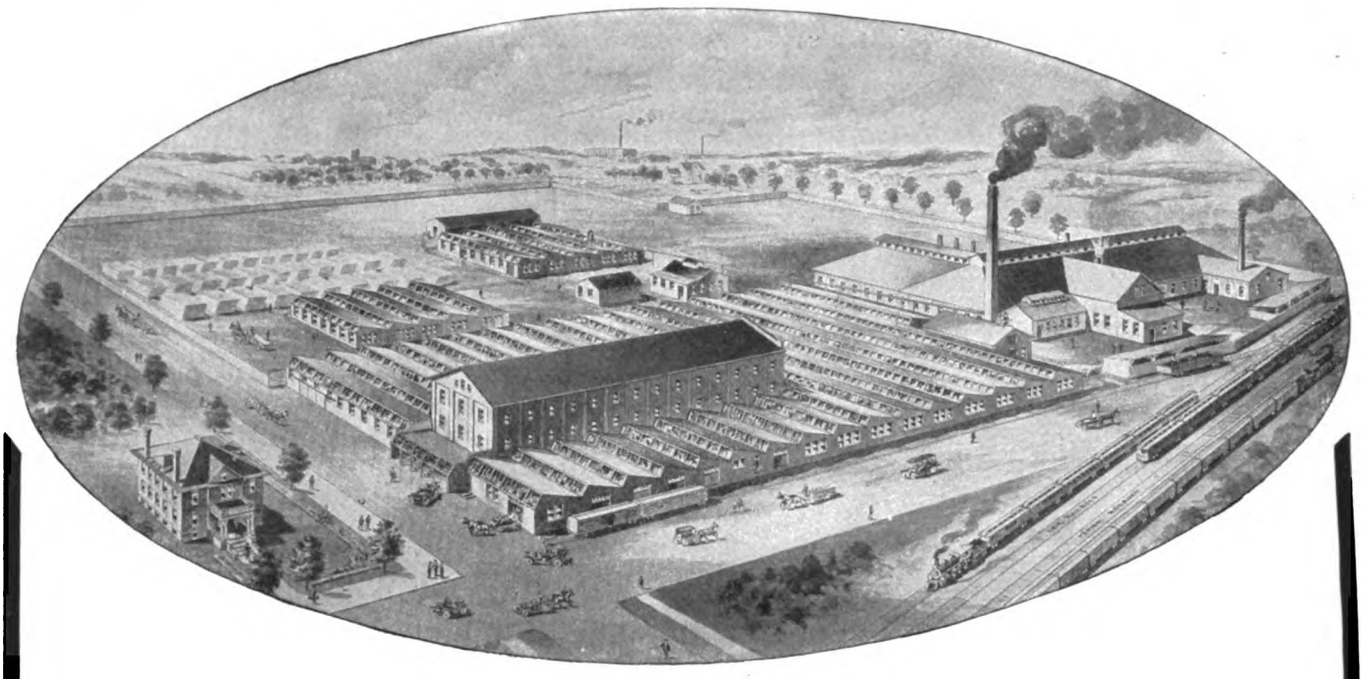
Before ordering our electric clipping machine, be sure to find out from your electric light company about the current they supply and order your machine accordingly.

Price, complete,

Direct current, (110 volts) . $40.00
Direct current, (220 volts) . 60.00
Alternating current 85.00



CHICAGO FLEXIBLE SHAFT COMPANY, 186 Ontario St., CHICAGO



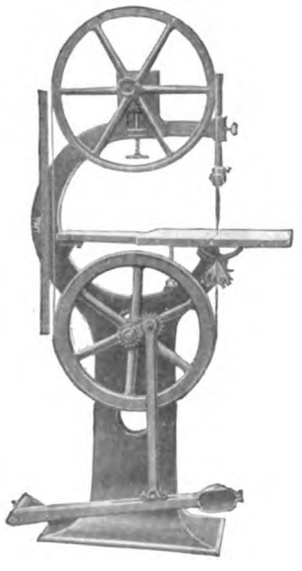
Head Office and Works of

The Silver Mfg. Company

365 Broadway ***Salem, Ohio***

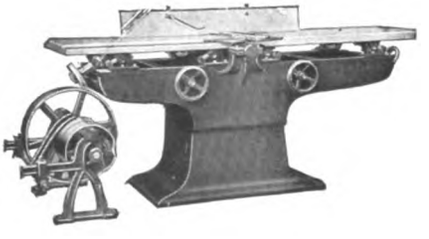
The plant is new and modern in every particular, having been thoroughly remodeled and greatly enlarged during the past year. The machine shop and erecting room alone have a ground floor space of approximately one acre. Unequaled facilities for manufacturing high grade Blacksmiths' Tools at the lowest prices consistent with quality.

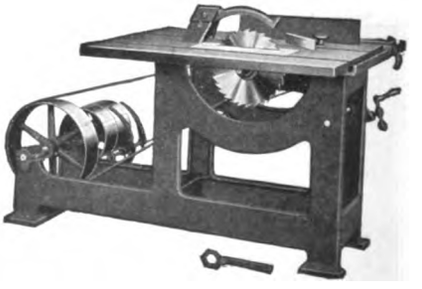
Big 1910 Machinery Catalog Now Ready



The catalog—printed on the finest enameled paper made—fully illustrates and describes our complete lines of Band Saws, Jointers, Saw Tables, Swing Cut-off Saws, Hub Boring and Spoke Tenon Machines, Portable Forges, Blacksmiths' Hand and Power Drills, and 20-inch Power Base Drills.

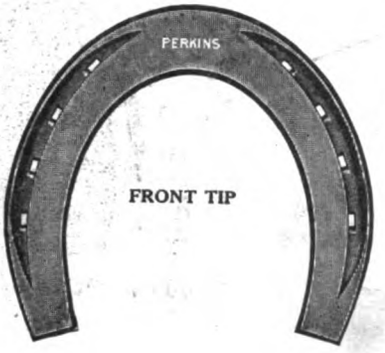
Send for it today. Don't delay!







Look for this Trade Mark ★ The Star brand beats all others





★ PERKINS ★

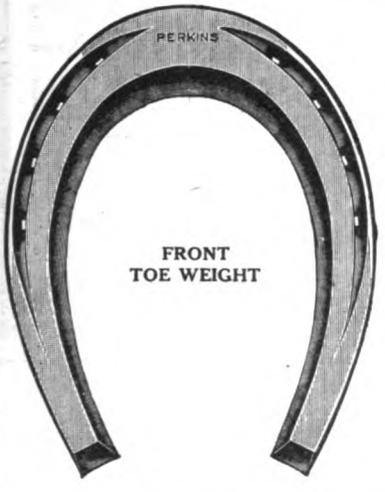
HORSE SHOES

AND

TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



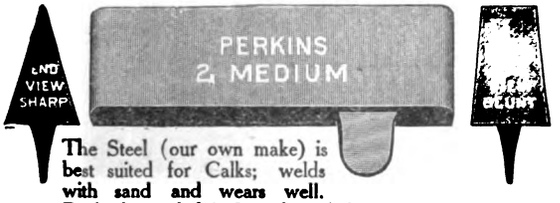


Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

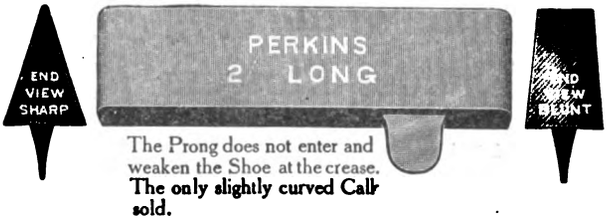


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



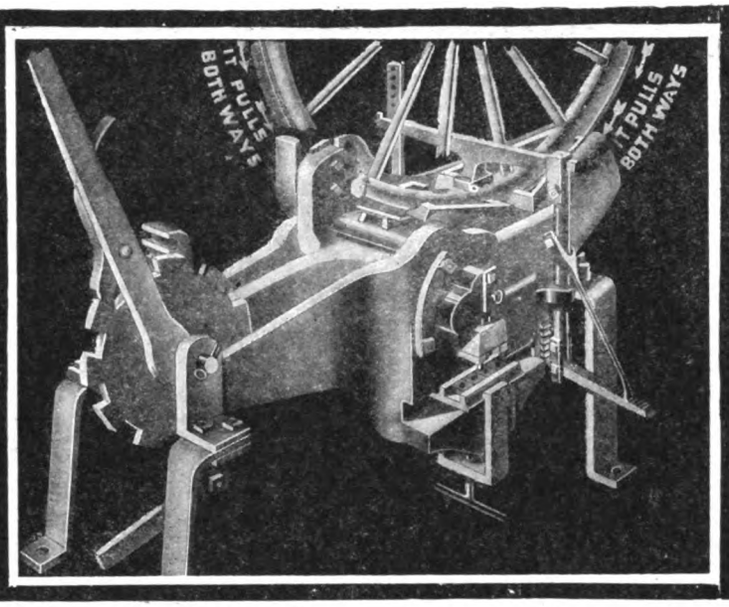
The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

THE HOUSE COLD TIRE SETTER



WILL MAKE MORE MONEY FOR YOU

NOT ONLY THE BEST

BUT ALSO THE CHEAPEST

TAKE NOTICE We have cut prices to suit the times

If you just want a machine without shear and punch, we will sell you a No. 1 guaranteed to set tires up to 2 inches for $90.00, or a No. 2 to set iron tires up to 4 inches or set steel tires up to 3 1-4 inches for $190.00. One man to do the work, and tires will not have to be heated, either. **We also make good prices and terms on all our other machines.** And now please notice our claims for accuracy, simplicity and great durability, for they work just like the old hot setters and are operated by plain direct leverage, and all bearings are tempered so can't wear out. No big screws to get full of sand and cut and stick. No oil pump valves to cut and leak the oil out. **And please notice also our heads move with the curve of the wheels, and therefore set tires perfectly.**

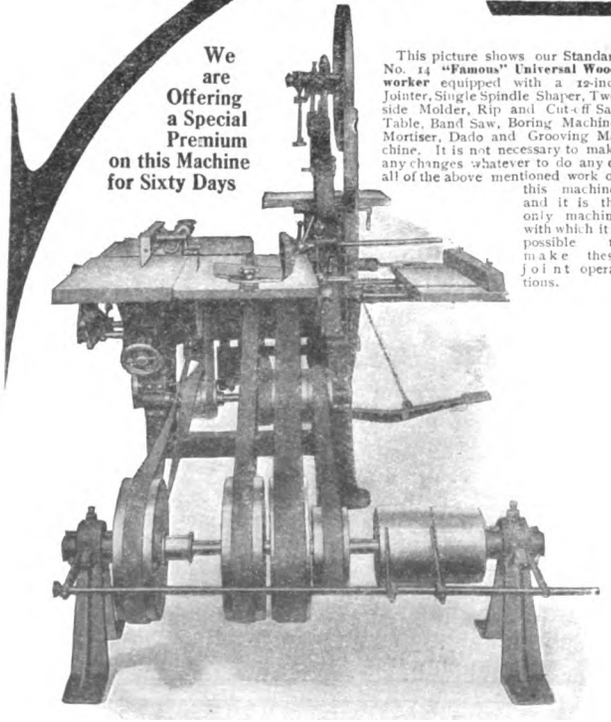
Now is the time to buy. Write us today, and get it advertised in time for the season's work.

HOUSE COLD TIRE SETTER CO., 216-218 S. Third Street, St. Louis, Mo. J. F. HOUSE, 201 Church St. Toronto, Ont., Canada.

Don't Buy 12 Machines—one's enough

The "Universal Woodworker" Does the Work of the Following Twelve Machines

We are Offering a Special Premium on this Machine for Sixty Days



This picture shows our Standard No. 14 **"Famous" Universal Woodworker** equipped with a 12-inch Jointer, Single Spindle Shaper, Two-side Molder, Rip and Cut-off Saw Table, Band Saw, Boring Machine, Mortiser, Dado and Grooving Machine. It is not necessary to make any changes whatever to do any or all of the above mentioned work on this machine, and it is the only machine with which it is possible to make these joint operations.

1—A 12-inch Jointer
2—Saw Table with Saw Arbor that may be raised and lowered
3—Two-side Power-Feed Molder and Edger
4—Band Saw
5—Complete Single Spindle Shaper
6—Pony Planer
7—Power-Feed Sander
8—Boring Machine
9—Hollow Chisel Mortiser
10—Standard Single End Tenoner
11—Emery Grinder
12—Felloe Rounder

Only Weighs 1,500 to 2,000 Pounds (According to Equipment)

Don't think this is like other so-called Universal Woodworkers. No other machine made is like the Famous Universal shown here. It's a very durable machine, built for hard usage and heavy service. Read the specifications—see what the machine will DO. Then consider that a positive guarantee is behind every claim that we make. It's a Fact—A PROVEN FACT—that when you purchase this machine you begin saving time and money.

Two Special Features

FIRST—The Saw Table has raising and lowering Arbor and carries a 14-inch blade, which can be lowered entirely out of the way of the operator when the saw is not in use or wanted. The saw table is arranged with a wooden throat, which can be taken out when you wish to use wide dado or grooving heads. Cut-off gauge on the saw table is adjustable for cutting all the different mitres. The ripping gauge is also arranged for doing mitre ripping and can be swung entirely out of the way when you wish to use the saw table for cutting off. Please understand that it is not necessary to remove the saw table when using any of the other attachments on the machine.

SECOND—The Special Boring Spindle that we furnish on this woodworker enables the operator to do all kinds of boring, routing and hollow chisel work without running the complete machine, as this spindle is driven separately from any other attachment.

Write Now--Today—for Special Premium

The Sidney Tool Co., Sidney, O.



DO YOU WANT TO INCREASE YOUR BUSINESS?

If so, you are the man we want to talk to. Are you satisfied with the amount of your shop trade? How is your shop equipment? Got a Brooks cold tire setter? No? Then you are not fully equipped. Let us send you

A BROOKS

which will set tires by hand while customers wait, and do it better than can be done by the old hot process, or by any other kind of machine. The Brooks is positively the best cold tire setter made. Ask any smith. Look at the other makes of cold tire setters in this magazine—then look at the Brooks here. Notice how substantial and powerful the Brooks is. Nothing to get out of order or break. Don't get a weak, frail machine. Buy the Brooks and you get the best. It is built for business and will last a lifetime. It is guaranteed.

Thousands of smiths have Brooks Cold Tire Setters and are increasing their business. A Brooks will increase not only your tire setting trade, but bring other new work to your shop also.

GET READY NOW FOR NEXT SUMMER

Write us today about our Spring terms. They will interest you. Illustrated catalog sent free on request.

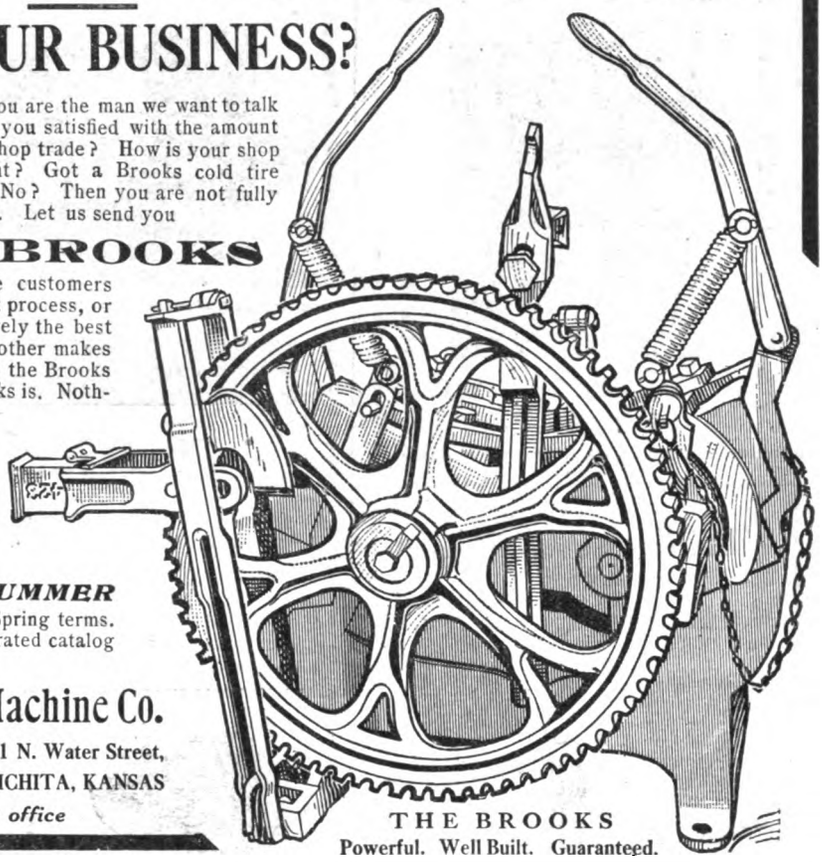
The Brooks endorsed and used by the United States Gov't

The Brooks Tire Machine Co.

857-859 Ellicott Square, BUFFALO, N. Y.

121 N. Water Street, WICHITA, KANSAS

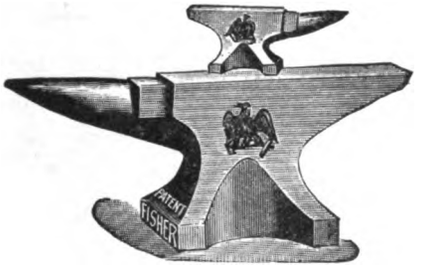
Write to nearest office



THE BROOKS
Powerful. Well Built. Guaranteed.

"EAGLE" ANVIL WORKS ESTABLISHED 1843

200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



NONE BETTER MADE OVER 300,000 IN USE

THE ANVIL OF MANY MEDALS.

The "EAGLE ANVIL" has taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always says: "Nothing but an Eagle for me." Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few years' use.

VISES OF MERIT

The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last a lifetime.

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base.

Write for our descriptive Anvil and Vise Catalog.

Our goods are handled by reliable dealers everywhere.



PARALLEL STRONG AND DURABLE.

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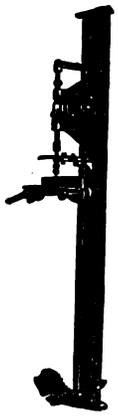

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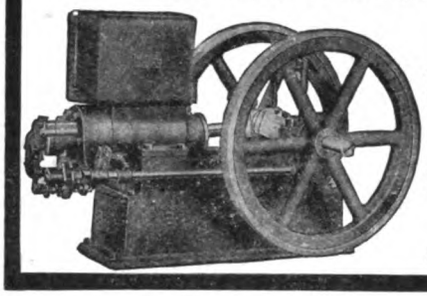

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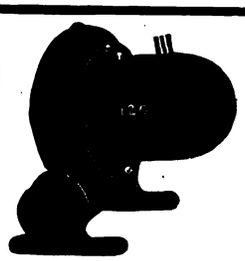

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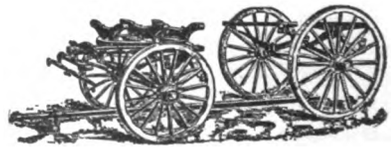

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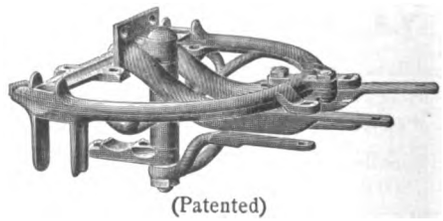

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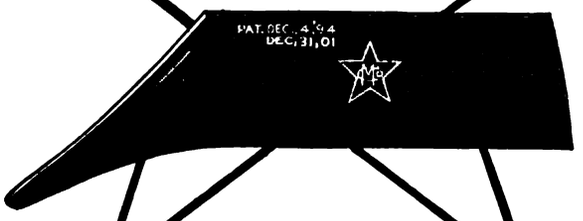

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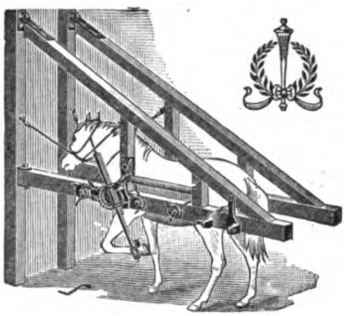

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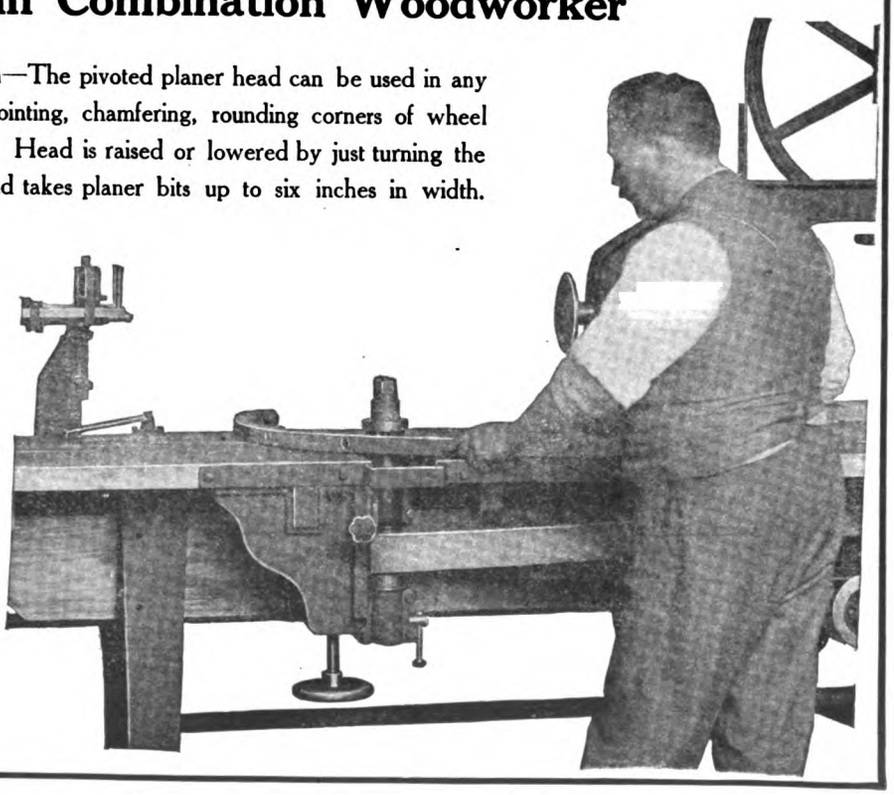

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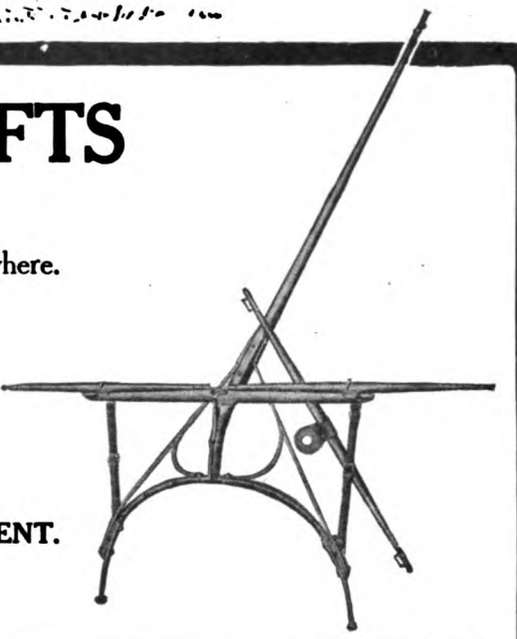

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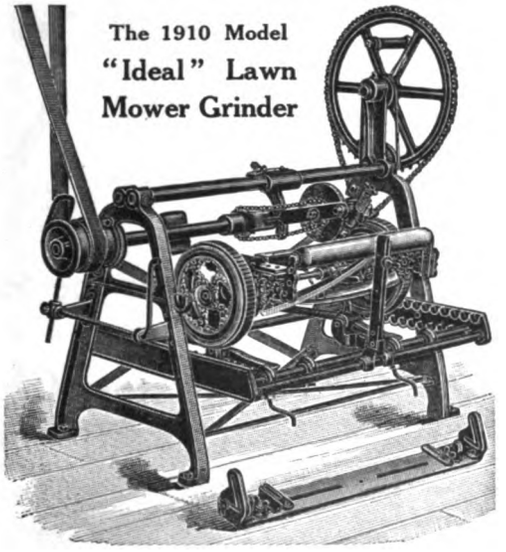

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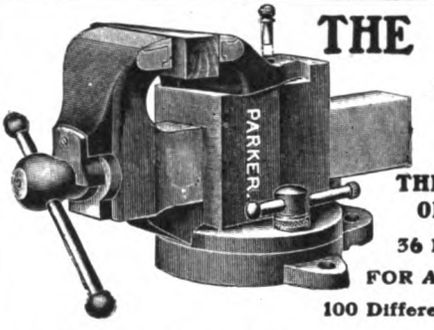

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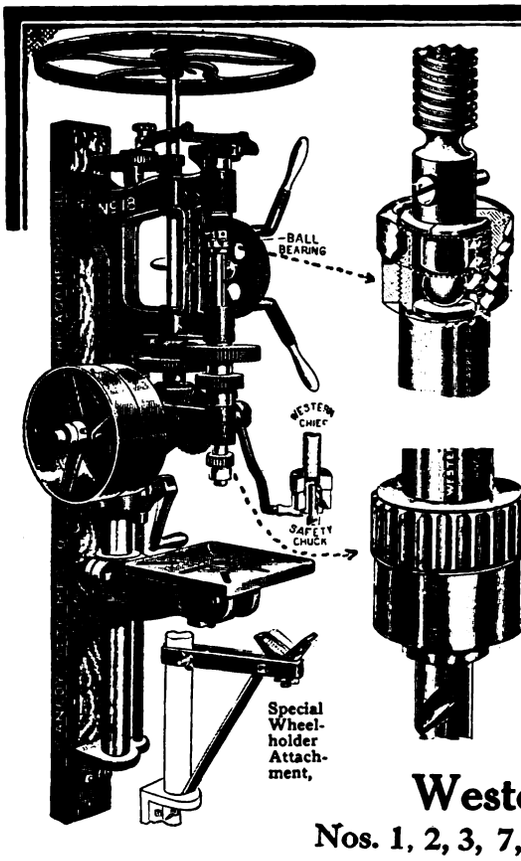

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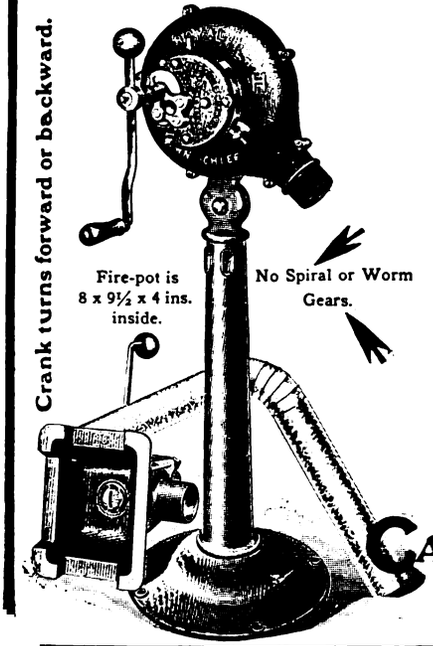

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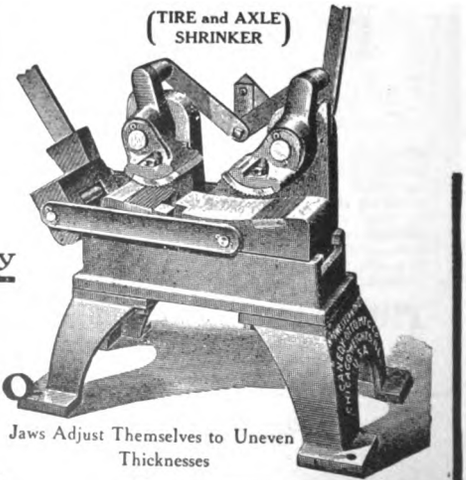

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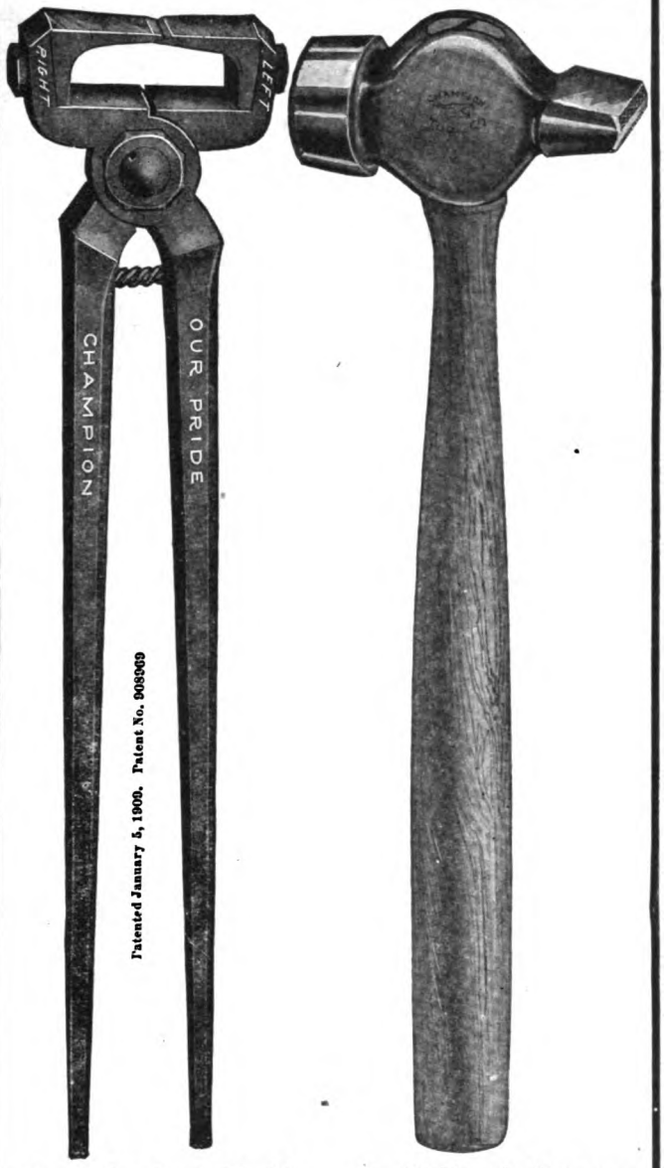

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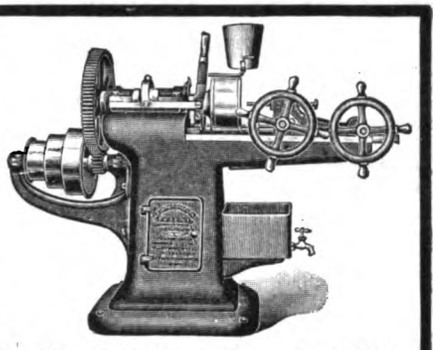

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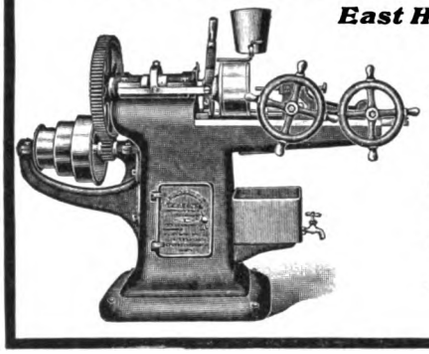

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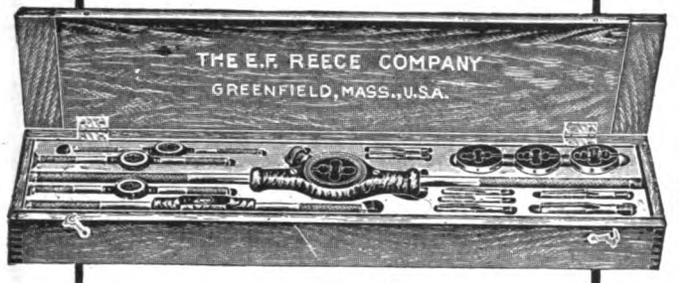

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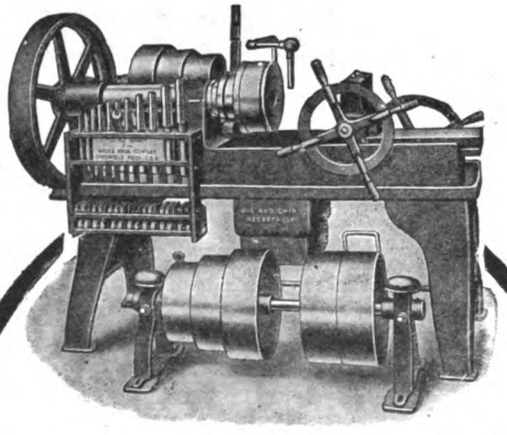

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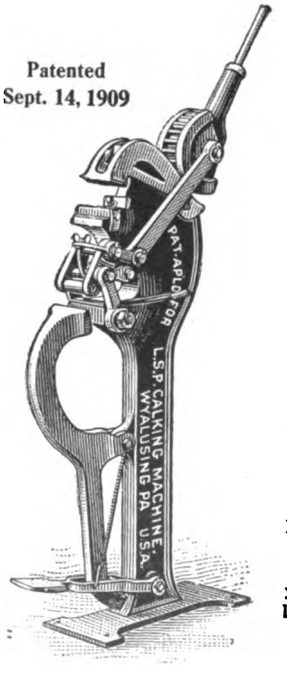

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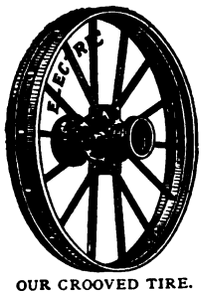

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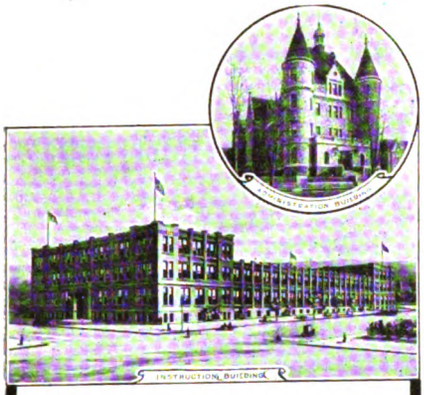

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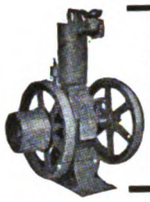

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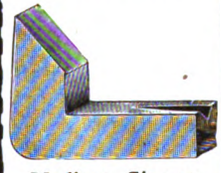

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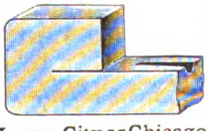

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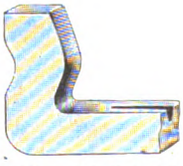
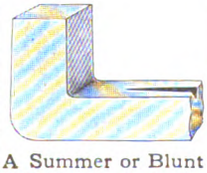


A Blunt Philadelphia Kink



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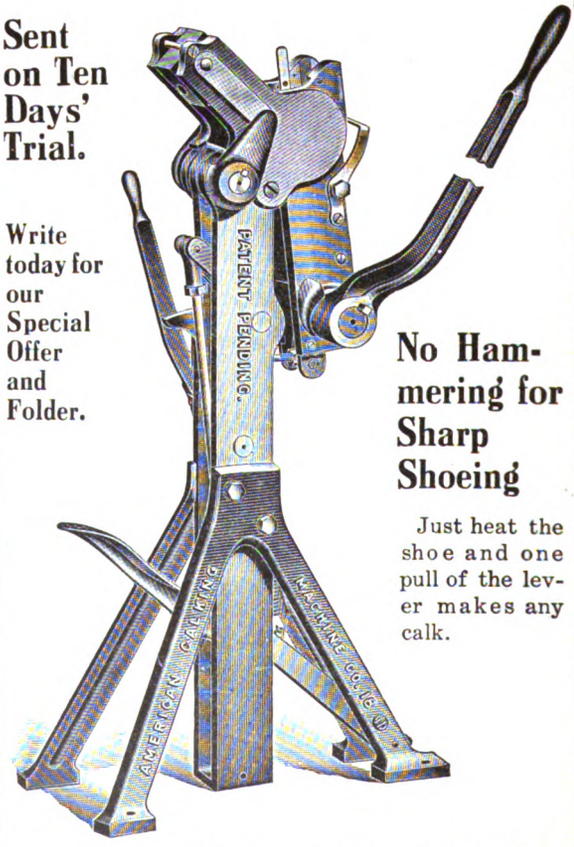

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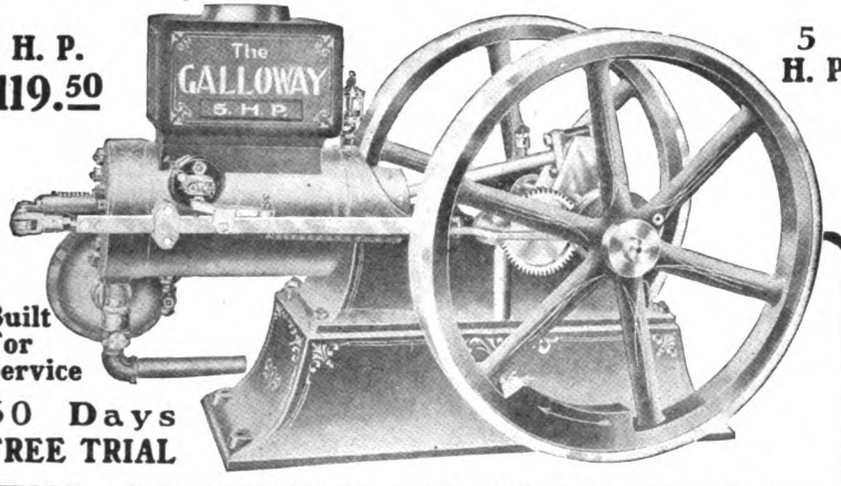

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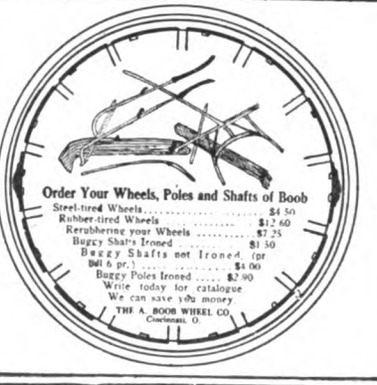

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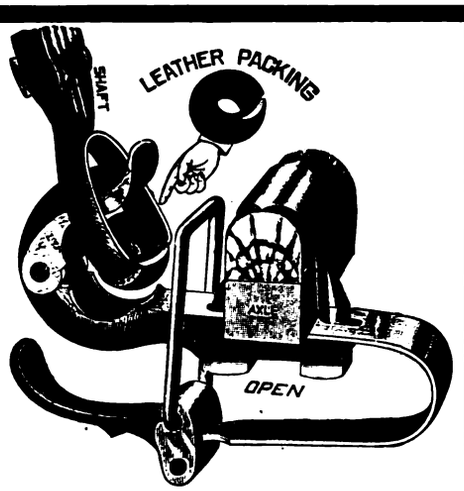

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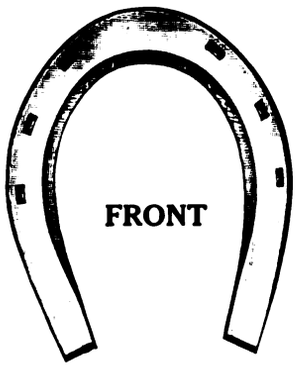

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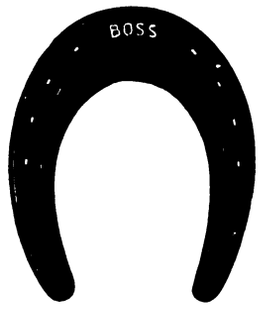

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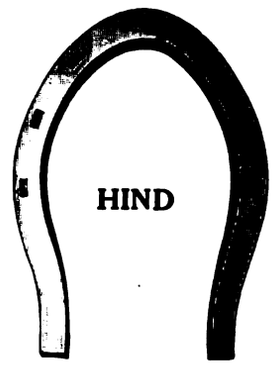

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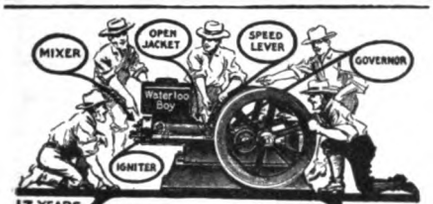

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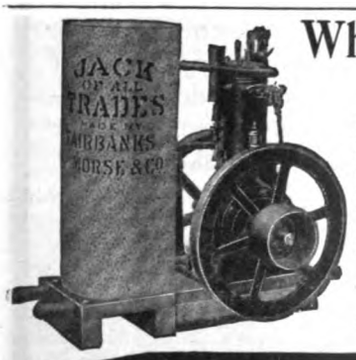

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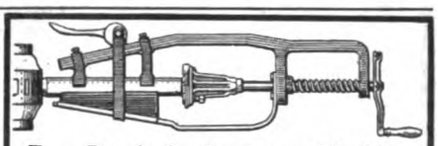

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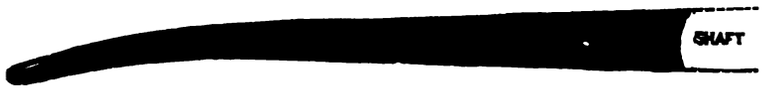

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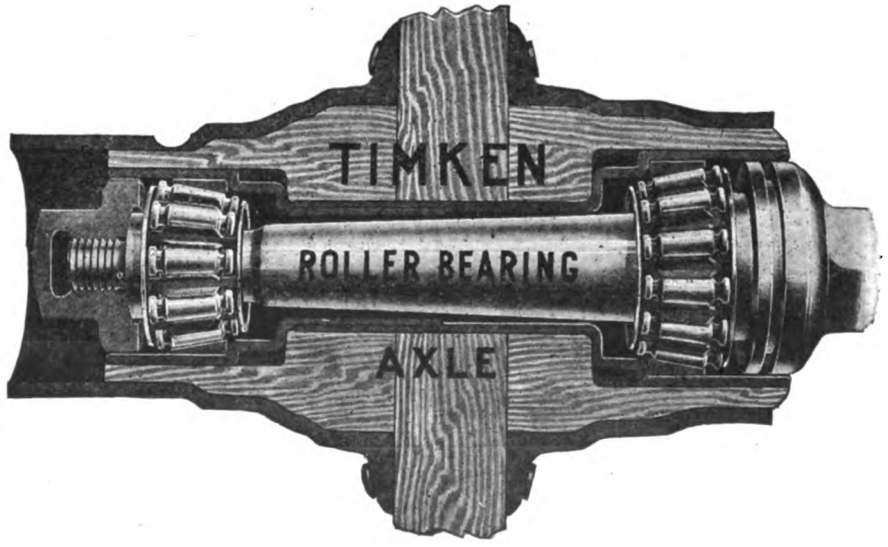

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Here's what a North Dakota subscriber said about "Our Journal" the other day: "Renew my subscription to that monthly helper that is always on time and only gets paid once a year, and small pay at that." THE AMERICAN BLACKSMITH is truly a monthly helper, and the wage it asks is so small as to be almost nothing compared with its value. You can not get anything else that would be as valuable and of as much practical worth as this same "monthly helper." And the price is so small to each subscriber that some forget about it sometimes. But, nevertheless, the price we ask is necessary—you don't expect your men to work for nothing—you can't expect to get a paper like THE AMERICAN BLACKSMITH for nothing. Let us have the staunch support of every reader, not only in a spiritual way, but materially as well. We cannot succeed without your material aid, and all we ask is that you send in your money when it's due. That's all we ask. Not a cent that doesn't belong to us; nor do we ask for charity—just our honest dues. Will you do your part?

The Information Department.

During the past year we have been asked and have answered a great many questions relating to one or another department of smithing. Some of these questions and the answers have been published in the "Queries, Answers, Notes" department, but a great many of them have been answered by mail direct, and the mail department of our information bureau has grown considerably in the past year. And we expect and want it to continue to grow larger each day. The correspondents, contributors and editors are at your service. Ask questions on any topic connected with smithing, shoeing or vehicle work, and our information staff will do their best to help you. This service is free of cost to our subscribers—all we ask is that you enclose a stamp if you want a reply by mail. If you can await the publication of your reply you need not enclose a stamp. You can assist us very materially in our replies by stating your queries clearly and fully.

Remember, we have nothing to base our investigation upon except your letter. Therefore, let it tell everything.

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The Pink Stamps.

During the past two months thousands of the little Pink Buffaloes have been sent scurrying across the country. If you didn't get a new lot let us know. We've got lots of them and we don't want you to be without them for a second. The little squares continue to do their work in an excellent manner and are upholding the principles of protection and fair play. We want you to use them freely and to get the full benefit of what they stand for.

We Want Your Candid Opinion.

We want you to answer these questions candidly. We want your honest ideas on the subjects. If in answering these questions you cannot express your ideas of what the paper should be, write a separate letter telling us just what you like and don't like about the paper. We want to know what changes you would make if you were the managing editor of "Our Journal." We want you to be the managing editor:

1.—Someone has suggested a monthly sermon or religious lecture—do you want it?

2.—Are you interested in the automobile department? If so, is it of practical help to you?

3.—Do you want us to publish a timely cartoon in place of the frontispieces we have been publishing?

4.—Are you pleased with "Around Our Forge Fire" talks?

5.—Suggest some new features and subjects for that department.

6.—Would a monthly short story interest you? Do you want us to publish one every month?

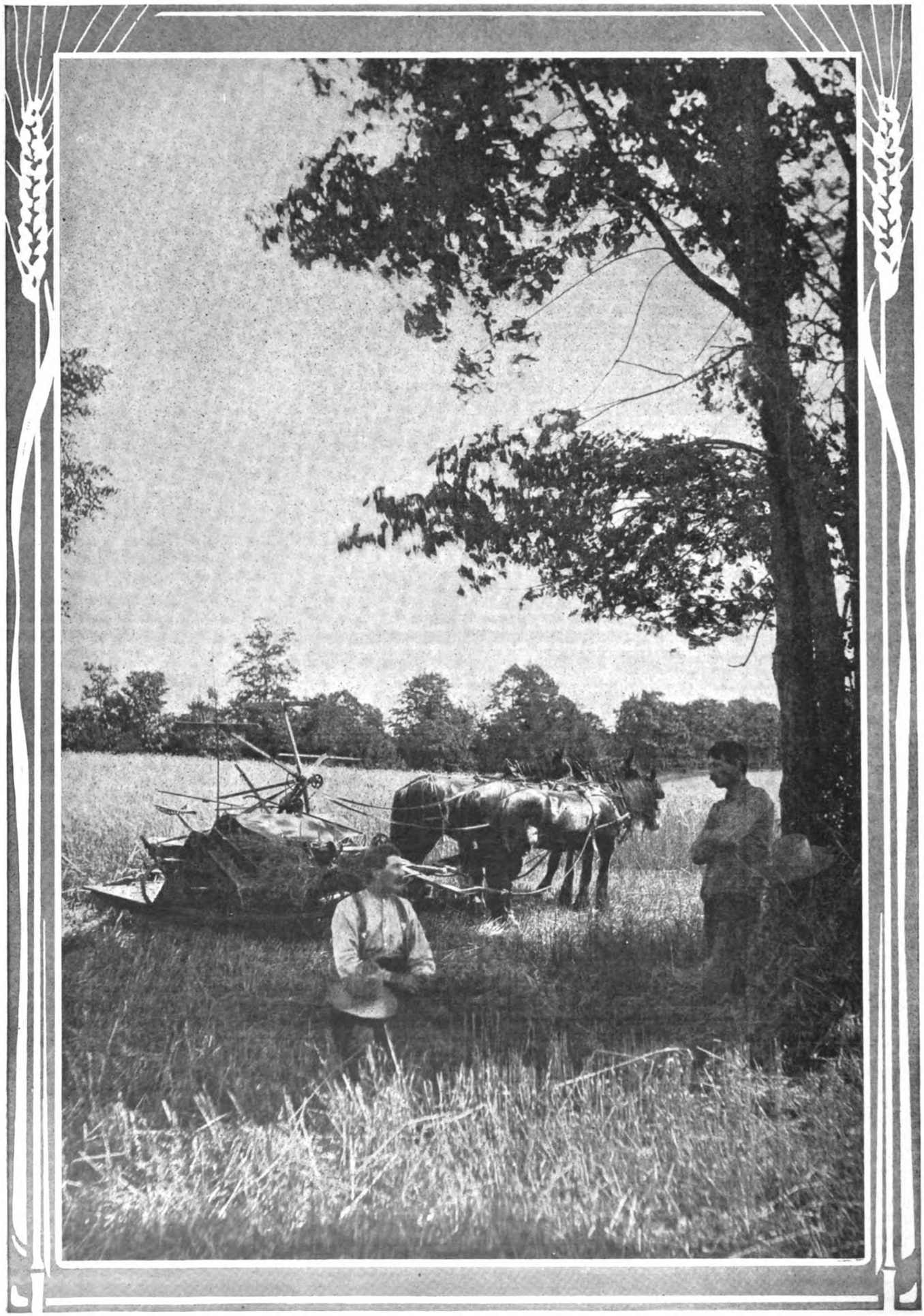
7.—Is the general plan and make-up of the paper pleasing to you?

8.—Do you prefer short articles complete in each issue, or do you prefer long continued articles, running through from six to twelve numbers?

9.—Do the pictures of shops interest you?

10.—Suggest two or more subjects upon which you would like to see articles published.

Let us have your ideas on the above right now. Speak right out—don't be backward in telling us just what you think. We want candid, honest talk—not flattery. The sooner we hear from you the better we'll like it.



Keeping Track of Business

C. H. HENNING

IN order to know what profits you are making it is necessary to know what business you are doing. And you cannot know what you are doing unless you keep track of your business. It is not necessary in order to keep track of business to install a complicated system of bookkeeping. The simpler a business system, other things being equal, the better. Don't try to get your system to tell you too much; don't forget the important matters and, above all, see that every job is accounted for, either on the books or in the cash drawer.

A simple method, convenient and covering all necessary points, is shown by the several forms herewith. In Fig. 1 is shown the job tag. This is attached to every job that is brought to the shop. Instructions as to work to be done are itemized on the back. The face side is filled out by the workman, or workmen, giving their initials, the material used and the work done, their time and remarks, if any. The columns headed "C" and "S" are for prices; "C" for cost and "S" for selling price. One of these tags is attached to each job. When the job is finished, the tag is taken to the office, the end clipped off and the job entered in the ledger if for a charge account, or in the cash book if a cash account. The card is then filed with others. All these cards are numbered, and they are naturally filed numerically, the number being entered in the ledger or cash book, as the case may be, so that the job may be traced to the job tag if necessary.

The entry in the ledger is shown in Fig. 2. Here under the customer's name are his address, rating or references or both, his business and the number of horses and vehicles. The entry in the ledger consists of the date, the kind of work done, the tag or order number and the amount of the charge.

Shoeing jobs are entered on another slip originally and then entered from these into the ledger. A shoeing job slip is shown in Fig. 3. These slips are supplied in pads to the shoeing department, all the firemen using the same desk and pad in a shop of two or three fires. This will enable the bookkeeper to file these slips in numerical order, which would be impossible if each shoer were supplied with a separate pad. On the shoeing job slip the name and address of the customer is given, the date of the job, the name of the animal, name of driver, the work done and the charge for the work. This slip also bears the initials of the fireman and floorman who did the work. This latter is sometimes very useful in tracing and correcting any difficulty or misunderstanding that may arise after the job is done.

The time sheet in Fig. 4 is kept by each workman. A sheet is given each workman each day when he starts to work. At night upon leaving he delivers his time slip to the office. This slip bears the time of the workman, the date, the numbers of the jobs worked upon, whom they were for, the time spent on the jobs and a column left for any special matters that it may be necessary to bring to the attention of the office. This enables the office to know just how each man spends his time.

The advantage of having all slips and cards numbered is so that any cards may be easily detected if missing. If one is missing it must be accounted for. In this way every job is either charged in the ledger or accounted for in the cash book. If a card is destroyed, a card or slip marked with the number of the destroyed card must be placed in the file in its proper place, and upon it should be written the reason for destroying the original job card. The same method should be followed with the shoeing job slips. In this way a slip or card is not likely to be lost, thus insuring every job being charged or accounted for.

The individual time sheets enable you to know just what time a man spends on his work, how he spends his time and whether or not he is worth his wage. If he attempts to fake his time

MR. W. H. Bolton
291 Charter Ave.

№ 1143 DATE: 11/21/09
ARTICLE: Wagon

WORKMAN	MATERIAL USED AND WORK PERFORMED	TIME FROM	TIME TO	DON'T MARK HERE C.	DON'T MARK HERE S.	REMARKS
H. J. M.	Weld spring leaf	10 45	12 -		.50	
	2 spring clips				.70	
	wld. step Rd	1 00	2 30		.30	
	New Gate put in				1.25	
					1.25	
F. L. L.	New end Gate				4.00	

THIS TAG MUST FOLLOW THIS JOB THROUGH THE SHOPS AND MUST BEAR A NOTATION FOR ALL TIME AND MATERIAL IF NECESSARY USE OTHER SIDE

FIG. 1.—THE JOB TAG IS ATTACHED TO EVERY PIECE OF WORK THAT GOES THROUGH THE SHOP

NAME W. H. Bolton Grocer

ADDRESS 291 Charter Ave.

Rating — Pays promptly 4 horses

Refer.— Jones Wholesale House 3 Wagons.

1909				
11/21	Repairing	1143	4	00
11/21	Shoeing	341	2	00

FIG. 2.—A SAMPLE LEDGER PAGE SHOWING ENTRIES

it may easily be detected by a practical man.

The small smith will perhaps desire a still simpler system for keeping track of his work. For the man who has but one or two helpers a very simple system may be arranged which will serve every purpose that the one for the larger shop does. It is, of course, understood that in the smaller shop the owner is in constant touch with the business. He greets all customers personally, sees after the jobs himself, and it is, therefore, not necessary to take up time by noting small details on all the jobs. A very simple yet serviceable system may consist of a number of cards, one for each customer, kept in the pigeonholes or pockets of a wall desk, especially built for the purpose. The desk should have a cover which may be locked at night and which will serve as a writing board when let down. The desk proper may contain as many compartments as may be necessary, allowing one for each charge customer, with a number of extra ones to allow for some growth and expansion. There should also be a card and a corresponding compartment for cash business. At the week's end the charges on the cards should be entered in the ledger under the proper accounts. Then your ledger will tell you just what every man owes up to the beginning of the week, while a glance at his card in the desk will tell you what he owes to date. On the cash card should also be kept a memorandum of the cash paid out for shop supplies and incidentals. After posting accounts in the ledger the cards should be filed in correct order for a reasonable period, so as to guard against complaints and errors.

MR. W. H. Bolton No. 341

291 Charter Ave.

DATE	HORSE	DRIVER	WORK	PRICE	
11/21/09	Bill	Jenks	4 new	2	—

WORK DONE BY: J. H. C. + L. C. McK.

FIG. 3.—EVERY SHOEING JOB IS RECORDED ON A SLIP LIKE THIS

Soliciting Business and Collecting Accounts by Mail.

A Series of Straight-to-the-Point Articles Illustrated with Letters that have "Turned the Trick."

BY THORNTON.

In this series of articles we are going to stick to facts as a porous plaster to the small of a man's back. We will endeavor to take actual examples as illustrations and to reason out just how to hit a man to get him to act. Not a single word will be said about undesirable customers, unwise credits or mistakes. Neither are we going to devote all of this first article to an introduction, but we are going to begin right here.

While it is not absolutely necessary, you will find it of considerable advantage to have a typewriter if you intend doing any great amount of business through the mails. A typewritten letter presents a better appearance, is more easily read and is in every way better than one written in long hand. Let the letters you send out be just as neat, just as readable, just as perfect as it is possible to make them. If it fail in these respects, it may be worded as cleverly as possible and yet be a failure. Therefore, first and above all else should come the appearance of the letter.

The object of a dunning letter is to get money; the object of a letter of solicitation is to get customers. When you write the letter keep its object always in mind. Your letter must be polite. Be just as courteous as you can, whether your letter is a request for money or for patronage. Also be firm in your request. Don't whine, don't attempt to bulldoze—let your letter be straight to the point.

Naturally, some will not reply to the first letter, nor to the second, nor the

TIME SHEET DATE: 11/21/09

WORKMAN Henry G. Miller

JOB No.	FOR	TIME FROM	TIME TO	REMARKS
1143	W. H. Bolton	10 45	12 —	
"	"	1 00	2 30	

FIG. 4.—THE TIME SHEET IS MARKED BY THE WORKMAN

third; therefore, a series of letters is necessary. In the case of letters of solicitation make your letters of personal interest—that is, talk about things that will interest the man you are writing to. If you are asking the village grocer for trade, don't tell him what a cracker-jack you are at repairing plows and farm implements. Tell him what a corking good smith you are, emphasizing especially the excellent success you have at shoeing horses, at repairing wagons, and don't overlook the fact that he'll be interested in prompt service, too.

In the case of dunning letters let your first letter be simply a polite request for payment, and then make each succeeding letter stronger until, if the account is sufficiently large, legal proceedings may be instituted.

Before giving examples of any letters it may be well to point out that a letter is by no means better or more effective than a personal call upon the debtor or upon the man you want as a customer. There are advantages in correspondence schools, but you cannot say that they are better than a college, where the student comes into personal touch with the teacher. A personal application for the settlement of an account or for a man's patronage is more effective in every way. The advantage, however, is with the letter when cost is considered. You can talk to a debtor or a prospective customer much cheaper through the medium of a letter than you can personally, unless you consider your time worth little or nothing.

A Few Examples.

A letter to farmers soliciting their work on the basis of prompt delivery:

MR. HENRY BROWN,
Browns Corners, O.

Dear Sir:—Do you know that some factories lose more than ten dollars a minute for every minute they are delayed by accident.

Every time the clock ticks during an accidental delay one sixth of a dollar flies out of the window.

Delays are expensive.

When your plows need repairing you don't want to wait a week for them. You want them so you can plow when it's plowing weather.

You'll not need to wait long if you bring your work to Thornton's. The size of my shop, the system, the organization, enable me to take care of your work inside of the time you want it done. Just tell me when you want it and I'll do the rest. Let me have a try on your next smith-shop job.

Yours very truly,
THORNTON.

P. S.—Remember this—Thornton's shop and quality mean the same thing.

This one was sent to teamsters, grocers, carting companies and others having need of competent shoeing service:

KENNEDY TRANSFER CO.,
City.

Gentlemen:—Just call up any of these people on the phone:

Barton Bros.—Grocers—3797,
C. W. Jones Co.—Carting—4879,
Brown Dray Co.—Carting— 407,
The Williams Co.—Dept. Store—2356
Jones & Carter—Tea Store—709.

Just ask these people about our horseshoeing service. We make a specialty of prompt work, and when you send your horses to Thornton's you know the animal's well shod—right.

You'll find none but real shoers of horses at Thornton's. My men must treat your animals right, shoe them right and work right, or get out.

Just send a horse or two to Thornton's and then ask your superintendent of horses what he thinks about the job. We'll charge it to profit and loss if you're not satisfied.

Yours very truly,
THORNTON.

The next one was sent out to some slow payers. The majority of them were good pay—they just needed a firm reminder:

WM. H. JONES,
Joneshurst, O.

Dear Sir:—If a man handed you a bushel of oats you would treat the oats as oats, wouldn't you? Of course you would.

Now, I'm not handing you a bushel of oats, but I am handing you a little memorandum of your account. Won't you treat it as a bill should be treated?

It requires considerable money to run a general smithing business these days—a neat little sum going for wages every week. Then, there are bills for supplies becoming due, and I don't know when your money would come in any handier than right now.

Won't you kindly send me your check for the enclosed amount so I can meet several heavy obligations coming due next week? I will appreciate it more than I can say if you'll do it.

Yours very truly,
THORNTON.

Here's another one along similar lines:

MR. JOHN WILLIAMS,
Wilbur, O.

Dear Sir:—When a man is in trouble he usually turns to his friends. I send you the enclosed bill in the same spirit which the shoemaker showed toward a friend of mine. When my friend asked the shoemaker: "Why do you charge me $1.00 for simply putting on one small patch?" the shoer answered, "Well, the fact is, I need the money." Now, that is just my excuse for troubling you.



AN ORNAMENTAL IRON GATE FORGED BY MR. JAMES MORRISON OF BRITISH COLUMBIA

To meet some of my obligations I am simply forced to ask you for money. I turn to you as a friend; won't you kindly help me to meet a big bill which must be paid next week? I'll appreciate your check very much.

Very truly yours,
THORNTON.

Building Business—3.

W. O. B.

Prices.

Prices have a considerable bearing upon the building up of a business, not alone from the profit and loss standpoint, but from the standpoint of custom and patronage. In other words, if a smith's prices are not right, if they are too high or too low, customers are not likely to come easily or quickly. In the one case they are apt to think you are attempting to get rich quickly, and in the case of low prices they are likely to suspect the quality of your work or the materials you use. For



THE FINISHED TABLE

example: a smith starts in business, announces his desire for patronage and begins work. If his would-be customers find him overcharging or undercharging they will become suspicious.

Your prices must be fair. You cannot afford to lower the price and raise the quality. Neither can you afford to raise the price and lower the quality. Let the price be an indication of the quality and the quality an indication of the price.

When costs advance charge more for your work and tell customers why it is necessary for you to raise your prices. Don't hesitate to raise your prices when necessary to do so to get your profit. If customers complain that they can get their work done cheaper elsewhere, your best argument is that poorer work may be done cheaper but not high-grade work such as you do.

How to Make an Ornamental Table.

THOMAS F. GOOGERTY.

A very simple table and one that may be easily worked out in iron is shown in Fig. 1. A piece of white marble is used for the top and also for the bottom shelf. The elevation with dimensions is shown in Fig. 2. For the legs use 1 by 1 by ⅛-inch angles, cutting them 2 feet and 8 inches long; one end is heated and an inch square piece cut out of the top of one wing and formed as shown in Fig. 3. This is to be the top of the leg and is to be riveted under the metal top of table. A full-sized drawing of the leg is now made with chalk on a surface plate, the angle is heated and bent to fit this drawing, care being taken not to have kinks and twists in it and also making all legs exactly alike.

The top is made from No. 16 soft steel. A piece 11½ inches square is used, cutting an inch square out of each corner of the plate. The edges are now bent up at right angles to the bottom, forming a box 9½ inches square, with sides 1 inch high. A good way to bend the sides is to have a square iron block to fit the square hole in the anvil. The size of this block may be 2½ inches square by 1¼ high. The sheet is set on the block and the sides hammered over it; this may be done while the metal is cold. After they are bent over, the corners of sides are caught in a vise and hammered to give them a very sharp and square corner. The open corners are brazed by heating them slowly to a red heat; a little borax is then put on and the heat raised; some spelter or brass filings is placed in the corner, and when the brass begins to melt and flow freely the piece is lifted out and allowed to cool. When all of the corners are brazed, a piece 3x3 inches is cut out of the center of bottom. The reason for this is to help straighten the top, as it has become twisted, due to heating the corners. This twist must all be taken out before the legs are put on or the table will not stand square. In doing this it is hammered on a surface plate until it is true and straight. When finished the sides may be cut out and filed as shown in Fig. 2 at A. Around the bottom outside edge of the top piece, a piece of ½-inch half round stock is riveted with

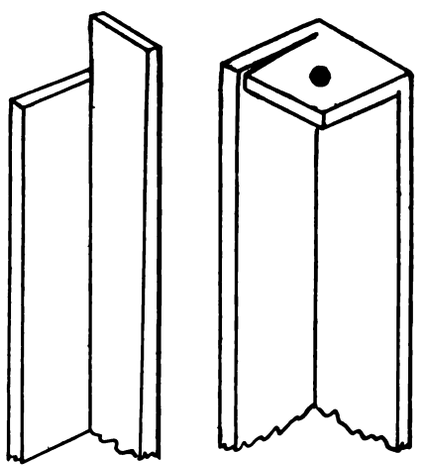


FIG. 3—HOW THE TOPS OF THE LEGS ARE TREATED

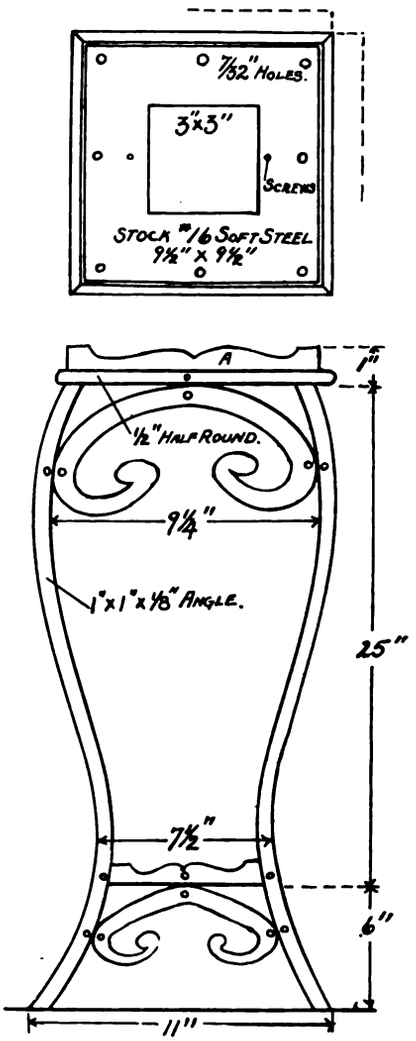


FIG. 2—PLAN OF TOP AND A SIDE ELEVATION

number 12 rivets. This forms a molding, and also gives the corner at the bottom the appearance of having a square turn; the molding is also mitered on the corners by filing them to an angle of 45 degrees. The rivets are filed flush on the out and inside. The bottom shelf is next made, the sides are turned up and the corners brazed in just the same manner as explained for the top.

The next pieces made are the angles shown in Fig. 4. There are 16 of these pieces—eight short and eight long ones—the short pieces to fasten the curved brace to the metal top and shelf; the long ones to fasten the curved brace to the legs of table. These angles are made from flat stock, ¾ by ⅛ inch, and are bent cold in the vice. The ends are then ground round, and all the holes drilled. The curved braces are shown in Fig. 5 and are made from ⅞ by ⅛ inch stock, they are formed in two parts and welded at the center of the top. In doing this a piece of stock is heated and the eye at the end made, the stock is

also drawn a little narrow at the eye: and hammered over the horn of anvil to give it the proper curve at the end. It is then cut long enough so that two pieces may be welded together at the top to form the brace as shown.

The table may now be assembled. All of the holes are drilled for 5/16-inch rivets and all of the angles are riveted to the legs, top and shelf. The top and shelf are now bolted to the legs, and the table made to stand straight and square. The curved braces are then held in place, the holes marked and drilled; the braces are then riveted in position and the rivets filed flush on the outside. The bolts are now taken out of the top and shelf and rivets put in. The whole table is now smoothed with a file and

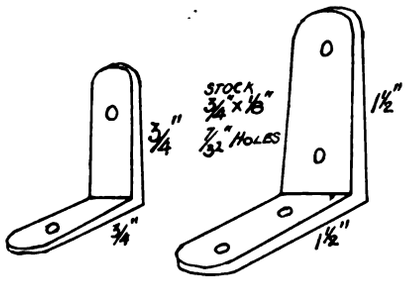


FIG. 4—THERE ARE SIXTEEN ANGLES

emery cloth and the bottom of the legs are filed so there will be no sharp corners. A ½-inch board is dropped into the shelf and also the top and a couple of small screws run in from underneath to hold them. This is done so as not to let the marble slab drop down too low—as it will be about 1 inch thick—this will let the marble project ½ inch above the edge of top. The table should be painted with drop black.

Another Side to the Apprentice Problem.

E. Z. MARK.

I like THE AMERICAN BLACKSMITH, as it is "Our Journal," and where we all, even the little fellows, can get a square deal, and should any brother wander off his course and get lost or explode any ideas, he may find someone to start him on his course and give him his bearings. I see a number of our blacksmiths are lamenting the loss of the apprentice. I presume they are all shop-owners. They want cheap labor—someone to help them get rich quick, work cheap and divide up with them. I don't think they have the good of the profession at heart. They don't advocate a government trade school where one could go and learn a trade and have his choice of occupations, instead of being forced into some occupation for the sake of making a living and for which he is totally unfitted. The Indians have trade schools, why not the white boys? Is it because the Indians get in and sometimes fight for their rights? You must remember, Mr. Shop-owner, that you cannot rise superior to the fellow away down below. Don't try to climb to fame and fortune on his shoulders. A few years ago an apprentice was willing to take your kicks, cuffs, hard knocks and "Hurry up! There! This customer is in a hurry." People will be in a hurry perhaps in one hundred years from now—we can't do it all in our lifetime. Mr. Shop-owner, you have driven the apprentice out with your hard knocks, hurry-up work and small wages and now you are bewailing your lot. You had him only to work money out of him. How often have I heard smiths boast that "the boy can do as much work as that man whom I am paying three fifty per day."

As it is today an apprentice cannot learn a trade in one place. He may be considered a good mechanic in one locality and go to some other place and he knows almost nothing. One has to squander a number of years traveling from place to place and to spend his earnings in hotel bills and railroad fares in order to learn a trade. I served three years, at scarcely enough to hold body and soul together, driving on shoes and striking with a sixteen-pound hammer and then traveled for ten years; an easy mark as my name implies. I now own the tools and the job. You fellows that have the good of the trade at heart had better advocate free government trade schools instead of trying to rope in some poor country boys to slave around for you, do your hard work.

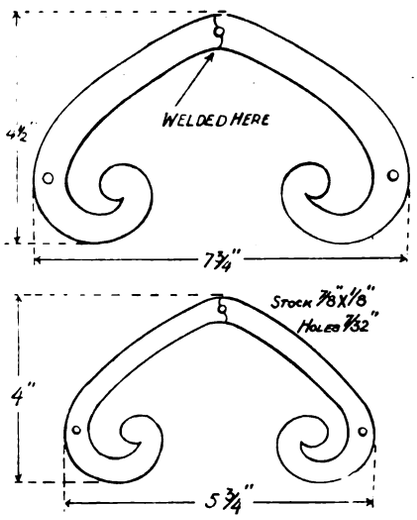
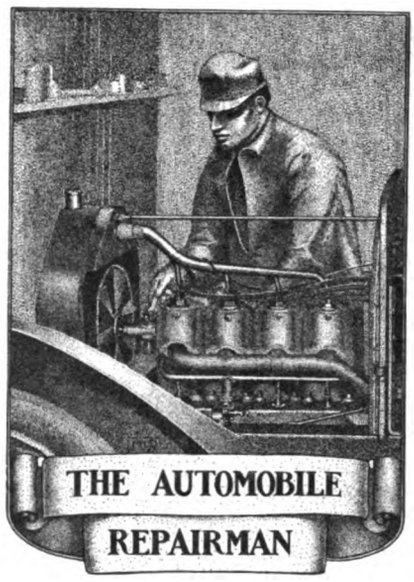


FIG. 5—THE CURVED BRACES ARE MADE IN TWO PIECES



The Automobile, the Farmer and the Smith.

G. H. WILLIAMS.

A man, who ought to know, says: "It is safe to predict that within a short time farmers will be the heaviest users of automobiles of those kinds suitable for country use. The automobile promises to solve several great problems with which the farmers have now got to contend. The hired help question is partly solved, for the tendency of the young men and women to migrate to cities will not be so strong. The shortening of the crop seasons requires quicker handling of the crops, and the waste of time and of animals in going to town is done away with. Then also the expense of keeping two classes of horses—work and driving horses—is eliminated. It would seem that from these standpoints alone there is little question as to the future of the automobile on the farm and in rural districts. With the elements of pleasure, recreation and enjoyment a car affords the whole family, added to its practical benefits, the outlook to the makers of a suitable car for country use is very interesting."

So much for the farmer and the automobile, now where does the smith come in? The blacksmith has for years been shoeing the farmer's horses, repairing his plows and fixing his wagons, buggies, implements and practically everything that needed repairing. Of course the smith will continue to repair these things and to shoe horses, BUT he will also be called upon to repair the farmer's automobile, and the smith will need to know how. And getting into this work at the beginning will naturally enable the

smith to have a good hold on the work as the automobile becomes more and more popular. And finally, if the motor vehicle and tractor does supplant the horse (one cannot tell in these days of progress) the smith will have the business right under his thumb.

The automobile repair business belongs to the blacksmith, and there is no reason why he cannot get it and hold it. Naturally, there are many so-called garages and professional motor repairmen in all sections, but the smith because of his natural mechanical ability can successfully compete with these men. Automobile knowledge is the essential, and backed by natural ability and good, common mechanical sense the practical smith cannot help but make good on automobile work. Practically every new case of breakdown—and by this I do not mean the common road accidents—presents a new problem. Therefore, a good commonsense understanding of automobile construction and principles is the essential, rather than how to repair every one of the long list of accidents likely to happen to a motor vehicle.

Don't get the idea that you cannot repair automobiles. You don't know until you try. And then the most important reason of all is profit.

Adjusting, Repairing and Caring for an Automobile—2.

With Special Reference to the Stevens-Duryea.

Setting of Magneto.

Position of No. 1 Cylinder.—Bring piston to top of compression stroke, which is determined by rotating motor with crank until inlet valve closes, and then one half turn of fly wheel will bring piston to top center. Mark "C" on fly wheel.

Test.—Exhaust valves on No. 4 cylinder will just be closing when No. 1 cylinder is at its highest point on compression stroke. Also insert wire in pet cock No. 534.

Position of Armature and Carbon Brush.—Release cap screws No. 1807, remove connecting bridge No. 1957, dust cover No. 1971, which will give view of armature. Release top screw No. 1993 which holds triangular clamp No. 1973 to allow the removal of cover on distributing disc No. 1964.

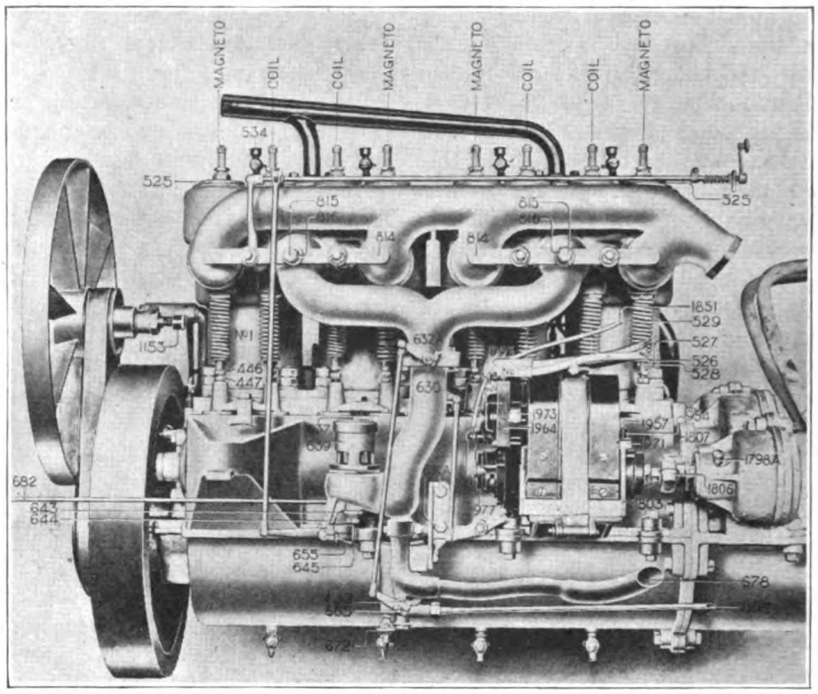
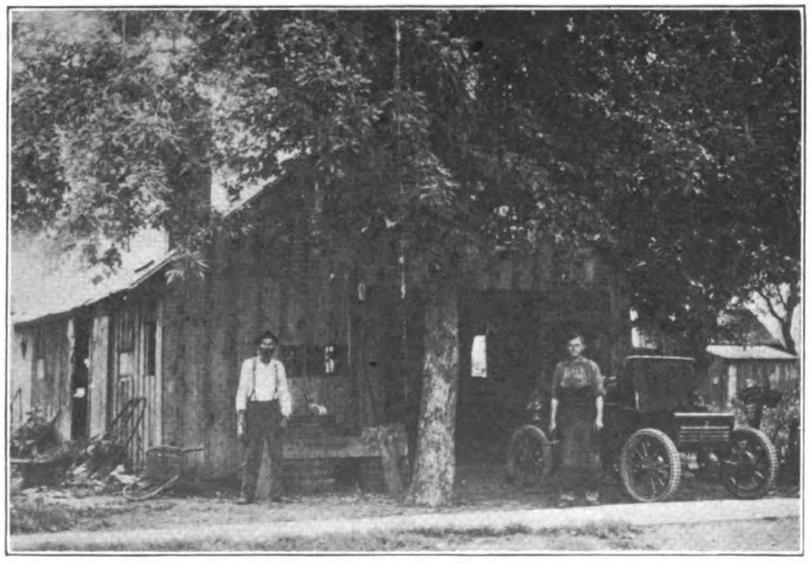


FIG. 1—THE CARBURETOR SIDE OF THE MOTOR



A NEBRASKA GENERAL SHOP, RUN BY MR. BEN MILOW

Distributor.—Turn extension shaft sleeve No. 1803 until carbon brush in distributor is on contact block of No. 1 cylinder. Rotate armature in direction magneto runs (when viewed from rear end of magneto) until armature has $\frac{1}{8}$ of an inch gap from motor side of magneto. Lock coupling No. 1806 to sleeve No. 1803 with cap screws No. 1807.

Test.—If magneto is correctly set, carbon brush in distributor No. 1964 will be just starting to leave contact block of No. 1 cylinder.

Stopping Magneto.—If motor continues to run after lever has been placed in OFF position in switch on coil, stop motor by closing gasoline supply valve at tank or opening automatic air valve No. 637. When motor has stopped, examine carbon brushes No. 1954 and 1977. If glazed, clean with sandpaper; also examine connections of ground wire No. 1851 and wires in switch at coil.

To Remove Carburetor.—Disconnect gasoline pipe No. 806, air pipe No. 678 and remove small pins from lever connections. Release nuts No. 816, unscrew hexagon bolts No. 815 in exhaust pipe strap No. 814 and remove cap screws No. 624A. Complete carburetor can then be taken off.

To Remove Valve.—Remove spark plug and valve cap No. 525, compress spring No. 529 and withdraw valve spring washer key No. 528. In replacing key No. 528 make sure that short offset section is in upper part of

slot in valve stem. That allows washer No. 526 to cover one half of key, which locks it in position.

The gasoline supply from tank under front seat is fed by gravity to carburetor by pipe No. 806. The hot air is taken in at the bottom of the carburetor through a small pipe, No. 678, connecting from outside of the exhaust pipe. (It does not need adjustment.) The float is adjusted at the factory, and we would recommend that you do not disturb adjustment .

The automatic air valve No. 637 and dash pot No. 639 are to the left of the carburetor and towards front of car. It is used to maintain an even quality of mixture at varying motor speeds. The spring No. 646 (located inside and above adjusting screw No. 644) holds No. 637 (automatic air valve) in a closed position when engine is running slow without a load. The spring No. 646 is adjusted by screw No. 644 and locked by nut No. 643. (If spring is too weak the engine will pop at all speeds of the motor.)

Priming.—Small rod No. 682 is used to flush carburetor before starting motor. It is operated by pressing button No. 680 located on cross frame under radiator and to the right of the starting handle. Small hand adjustment No. 687, at left of coil on dash, operates on automatic valve pin No. 645 to hold automatic valve No. 637 closed for starting.

Lever on Dash.—Running position of the lever No. 687 is to the extreme right of the quadrant. If trouble is experienced in starting motor, adjust No. 687 to a central position on quadrant. After starting motor always return handle No. 687 to right near coil. Pet cock No. 672, at bottom of float chamber, should be opened to let out any water or sediment which may collect.

Before making adjustments to carburetor, inspect gasoline supply pipe, drain carburetor float chamber and then flood for a few seconds. See that automatic valve No. 637 is seated and working freely. Leaky joints and connections between carburetor and engine will cause a popping. To locate leaks, put oil around crevices and joints when motor is running.

To Determine if Automatic Valve No. 637 is Working Freely.—Remove casing No. 639 (right-hand thread). Turn casing up and then down, noting if valve will fall to its extreme positions without a pressure other than its own weight. This is a condition that is necessary to have carburetor work properly.

To Adjust Throttle Valve No. 630.—Start motor and close throttle and spark lever on steering post. Release binder screw No. 632A and close valve No. 630 until engine idles slowly. Tighten on binder screw No. 632A.

To Adjust Needle Valve No. 665.—Close throttle lever on steering post, release binder screw No. 632 and close needle valve by turning to the right until valve No. 665 is seated.

Then open valve No. 665 from $\frac{3}{16}$ to $\frac{1}{4}$ (of a complete turn), tighten on binder screw No. 632.

Start motor, and with engine at slow speed release binder screw No. 632 and turn needle valve to the right (closing) until engine runs unevenly. Turn back until engine fires on all cylinders. Do not turn too far to the left (opening) as it gives too rich or heavy mixture at slow speed, causing black smoke to escape from muffler.

A rich mixture can also be noted if exhaust gases cause a binding effect when one is at the rear of the muffler, or if the spark plugs become sooted.

Adjustment if Mixture is Too Rich.—Have engine running slowly with throttle lever closed. and pull up on automatic valve No. 637. If motor slows noticeably and almost to the point of stopping, that indicates the mixture is too rich. To remedy, adjust automatic valve springs (when motor is idling) with enough tension to hold valve No. 637 seated. Release binder screw No. 632 and close needle valve No. 665 just enough to bring engine firing regularly and idling slowly. Lock needle valve with screw No. 632.

Test.—A slight pressure on automatic valve No. 637 will indicate as follows: If mixture is rich, motor will speed up; if mixture is correct, motor will miss badly and stop.

Popping in carburetor is almost always caused by a lack of gasoline, so that the mixture is not rich enough to properly explode. If carburetor pops at high speed or under a load it can be overcome by opening needle valve No. 665 or tightening automatic valve spring No. 646. If mixture is rich when car is under a load or on hills it can be adjusted by closing needle valve No. 665 or releasing tension on automatic valve spring No. 646.

Flooding of Carburetor.—See that bell crank of priming device is not in contact with valve stem in float chamber. Drain carburetor by opening valve No. 672, close, and allow carburetor to refill. Turn valve stem a number of revolutions to remove any particles of dirt that may have lodged on valve seat. Then, if carburetor continues to flood, remove cover of float chamber and note if annular metal float is submerged. That condition being found it will be necessary

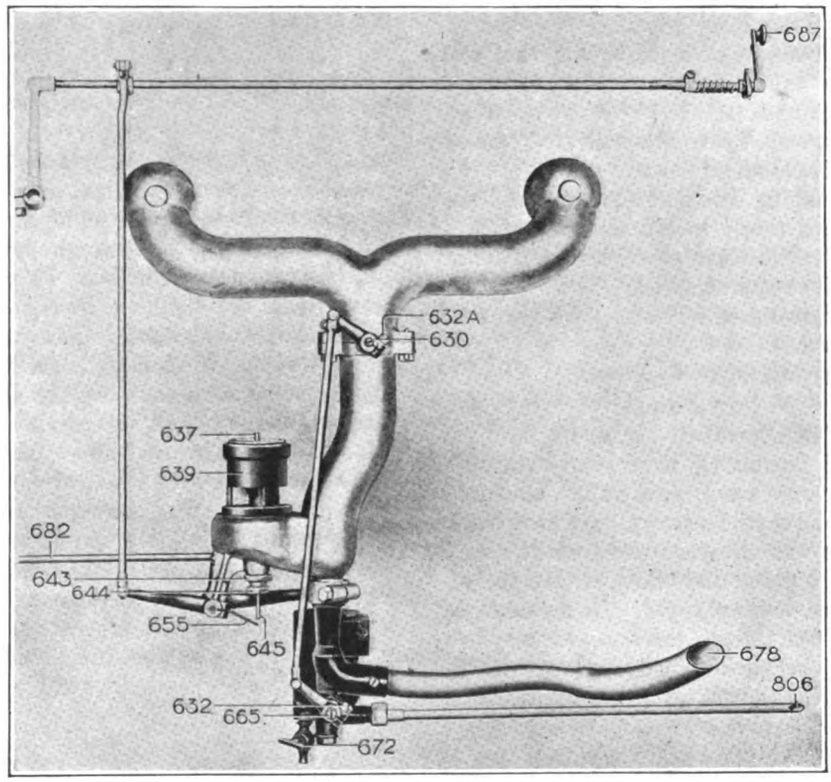


FIG. 2—FUEL SUPPLY SYSTEM IN DETAIL

to take out upper cotter pin in valve stem and remove float. If gasoline is found in float, drill a very small hole and allow it to drain, then solder both the original leak and the drain hole. Replace float, making sure that cotter pin is returned to the same hole that it was withdrawn from. Do not have over $\frac{1}{32}$ of an inch up or down play of the float on the stem.

Operation of Levers on Steering Post.

Starting Position.—Advance spark lever about two inches and throttle lever three inches on quadrant.

Slow Speed.—Spark lever about one half advanced on quadrant.

Throttle lever retarded, release pressure on foot accelerator.

Hill Climbing.—Spark lever advanced on quadrant to highest point that will allow motor to run smoothly without knocking.

Throttle lever or accelerator opened to give required power.

Running Position.—Spark lever advanced nearly to top of quadrant.

Throttle lever or accelerator opened to give required speed.

High Speed.—Spark lever extreme advanced.

Throttle lever wide open.

Caution.

When operating car under ordinary road conditions never carry throttle lever or have accelerator advanced beyond spark lever. Always have spark lever well advanced and throttle closed to the point that will just give the required power of speed. Do not advance spark or throttle lever to extreme open until car is at good road speed. In shutting down, always close throttle first.

(To be continued.)

Accidents to the Forward Part of the Car and How to Repair Them.

HAROLD WHITING SLAUSON.

It is but natural that the forward part of a motor car should meet with more accidents than the rear half and, although this section of the frame is made especially strong and substantial, a telegraph pole, stone fence or other solid obstruction can bring the steering gear, radiator, front axle and wheels to grief very quickly. The blacksmith will probably be called upon to make repairs to these parts of the car more than to any other, and the majority of jobs of this character to be done are right along his line and would require the services of a blacksmith, even though a large and well-equipped garage and repair shop was at hand.

Wood frames reinforced with steel are seldom found on cars nowadays, the tendency being to make this part of pressed steel of channel section.



OLD-STYLE ENGLISH MOTOR TRICYCLE

Some are built of I-beam steel, while others are of the tubular construction, but whatever style is used the end sought is to produce as strong a frame as possible consistent with light weight. The majority of heavy cars employ an I-beam front axle with the center dropped to furnish room for the base of the motor, while the lighter automobiles use a straight tubular axle. Few cars can go through a roadside smashup without having some part bent or distorted, and in the majority of cases it will be the front axle which suffers most. When once removed from the car, however, a good blacksmith can repair this in short order, the only implements necessary being a good forge fire and a sledge hammer. Some of these axles are composed of special process steel, but nearly all kinds can be straightened, when hot, by a few well-directed blows



OLD-STYLE ENGLISH MOTOR CARRIAGE

of the sledge hammer, and if allowed to cool slowly they will not be injured in the least.

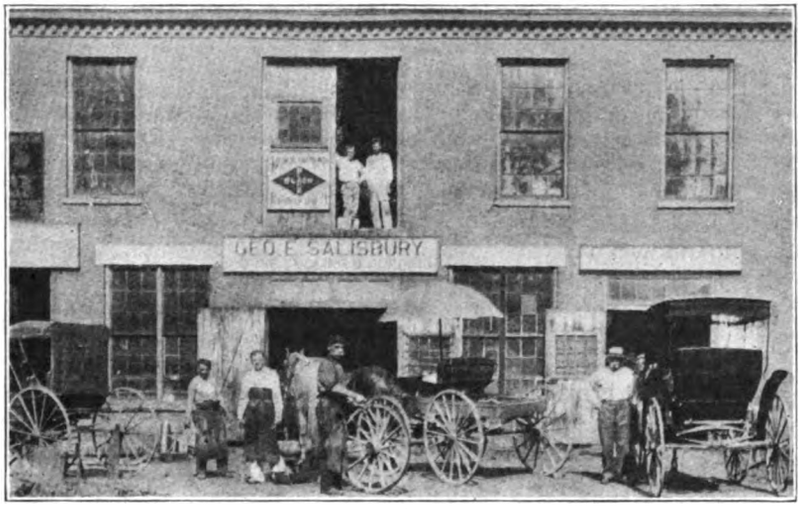
The buggy kind of automobile is about the only kind that uses the ordinary fifth wheel for steering. All of the others employ a stationary front axle with an independent knuckle on each end on which the wheel is mounted. The knuckles upon which the wheels are mounted turn horizontally in a vertical yoke in which each end of the axle terminates and are kept in place by a pin passing through the two holes in the yoke and in the knuckle. The wheels are kept parallel, no matter in which direction they are turned, by means of a rod fastened to an arm forged with each of the knuckles. A bend in the end of the axle will throw one or the other of the wheels out of the proper vertical line and will interfere seriously with the steering of the car. The best way to straighten this is to heat the axle near the yoke and to insert a heavy bar of iron in the holes of the yoke. If the axle is held rigidly in place and sufficient pull is exerted upon the rod acting as a lever, the yoke may be brought to the proper position with regard to the axle. It will probably be necessary to hold the axle level, with the yokes in their ordinary position, and to then drop a plumb line through the holes to make certain that they line up properly.

The front wheels of every properly designed car do not lie in absolutely vertical planes which are parallel to each other, but incline in, or are closer together at the bottom than they are at the top. This is very noticeable in some cars and appears to the uninitiated to be a defect which ought to be repaired, but a better bearing and more steady steering can be obtained with the wheels in this position and, as stated above, it is a common practice with the majority of automobile designers. With the average motor car the bottom of each front wheel should slant in about three inches from a vertical line made by dropping a plum-bob from the upper rim. It will be observed that the way to obtain this proper slant to each wheel is to use the bar in the yoke as mentioned in the preceding paragraph.

The removal of the axle from the car should be a simple matter, since it involves but the loosening of some dozen nuts from the spring clips. If these nuts have been riveted on, however, the ends of the spring clips must be ground off with a file or small electric emery wheel. Anyone who has worked for several hours in the endeavor to remove nuts so fastened on will be hard-hearted, indeed, if he replaces them in the same manner. Of course, it is well to take every precaution against any of these nuts becoming loose and jarring off, but a lock washer or extra nut on each clip will serve the purpose equally well. The extra nuts probably hold the others in place better than anything else and

will greatly help to save the repair man's temper, and it is strange that all cars are not equipped with them when they first leave the factory.

If power for electric lighting is obtainable, a small, portable electric motor weighing but a few pounds is one of the most valuable tools available for loosening spring clips and the like on the under side of the car. The plug, to which is attached the flexible electric wire, may be screwed in any lamp socket, and by means of various kinds of emery wheels attached directly to the spindle of the motor a variety of filing and grinding jobs may be performed easily. The motor may be held in one hand and the emery wheel directed against the bolt end or other projection which is to be ground.



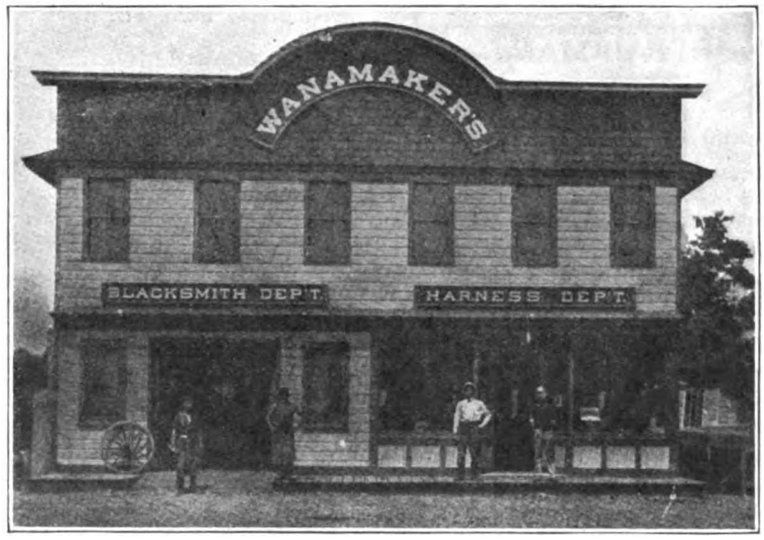
A GENERAL SHOP OF MASSACHUSETTS, RUN BY MR. G. E. SALISBURY

One of the parts of a car most liable to suffer damage in case of a smashup is the radiator. This is so delicate that several cells or tubes may be fractured by even a small stone thrown up from the road. If the fracture is small it may be repaired temporarily by means of soap or putty applied on the outside and allowed to harden. This is but a makeshift repair, however, and the radiator should be soldered as soon as possible in every leaking joint or opening.

If a car from which all the cooling water has leaked is brought into the shop under its own power the motor should be allowed to cool thoroughly before the radiator is again filled. If this precaution is not heeded the cool water coming in contact with the hot cylinder may crack the walls and absolutely ruin the motor. If it is desired to find the leak immediately, thin oil may be poured into the radiator with no attendant danger of cracking the cylinder walls, but in this case great care should be taken to make certain that the engine is not sufficiently hot to set fire to the oil. This is almost certain to happen if the motor has been running for a time after the circulating water has entirely leaked from the radiator.

Sometimes a car may be ditched, or even overturned, with no damage whatsoever to any part of the frame or mechanism. Again, to all appearances, the car may be unharmed, but the frame may have been distorted or twisted sufficiently to throw the motor out of line with the transmission or clutch shaft, thus causing a lateral strain on the crank shaft which will soon heat the bearings. Whether the frame has been twisted or not may be determined easily by uncoupling the joint between the rear end of the crank shaft and the clutch—if these parts are separate—or between the clutch and transmission shaft if part of the clutch is integral with the crank shaft of the motor. Universal joints will probably be found at all of these places, but even when using these the main shaft of the transmission and the crank shaft of the motor should lie in the same straight line—unless the car is of the type having its transmission located near the rear axle. The motor should also be lined up if it has been removed from the frame. It is true that the universal joints will allow power to be transmitted from an angle, but when used in the places in question they are to take care of any flexibility of the main or sub-frame caused by the car moving rapidly over rough roads and should be called into service as little as possible. If the crank shaft and transmission shaft are aligned perfectly there will be no power lost in the universal joints, and these will only serve to make the whole frame of the car more flexible and better adapted for all kinds of running.

If the forward half of the main frame or the sub-frame—which is sometimes used to support the motor—should be found to be twisted or warped only enough to throw the crank and transmission shafts out of alignment by but a fraction of an inch it will not be necessary to straighten the frame itself. In this case the motor may be brought to its proper position in relation to the transmission by the use of a few thin washers between the lugs of the motor and the sides of the frame on which the engine rests. By properly placing these thin washers under the front or rear lugs the end of the crank shaft may be raised or lowered a slight amount.



MR. SETH WANAMAKER'S GENERAL SHOP OF NEW JERSEY

A few washers placed under a couple of lugs diagonally across from each other will properly distribute the weight of the motor on a frame which has been bent more on one side than on the other.

The most accurate method for determining whether two shafts line up or not is to make a sleeve which slides easily over the ends of the two shafts which are to be connected. If a sliding collar is used as a coupling for the two shafts, this will serve the purpose of testing the alignment well, but otherwise a sleeve should be made out of sheet iron or brass, or turned or bored from a metal block. If this is placed over the end of one shaft before the motor is secured in position and then slid toward the end of the other shaft it is certain that the two are in perfect alignment when the sleeve can move freely over the ends of both. This, of course, applies only to a solid coupling, or to one from which the universal joints have been removed.



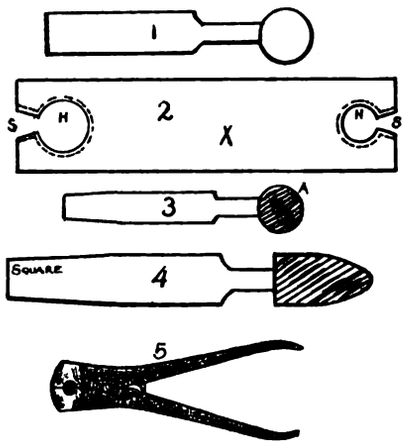
Gun and Novelty Repairing—12.

W. G. MUMMA.

Molds and Cherries.

An assortment of cherries can be used on a variety of work besides the making of molds. They can be made by the mechanic or they can be bought ready-made. So a description of the best method of making them will be given here. They should be made from the best of tool steel. Take a piece of round steel about the size that they have to be when finished, rough out (see Fig 1.) a block to about the right size and shape in a lathe held in a chuck. They can be finished accurately enough by the file, revolving quite fast in the lathe, using a template; or make a tool by taking a piece of steel about ¼ inch thick and one inch wide and six or seven inches long—an old file will do. Drill a hole at H, Fig. 2, the size of a cherry or bullet that may be required; then ream from one side at a taper, so as to make a cutting edge on the other side; then cut a slot at S, the size of the stem of the cherry. Level it the same as the hole on the cherry, while rotating in the lathe with the slot coming over the stem. This will make the cherry perfectly round. Or they can be turned in the lathe, by having the attachments for ball turning.

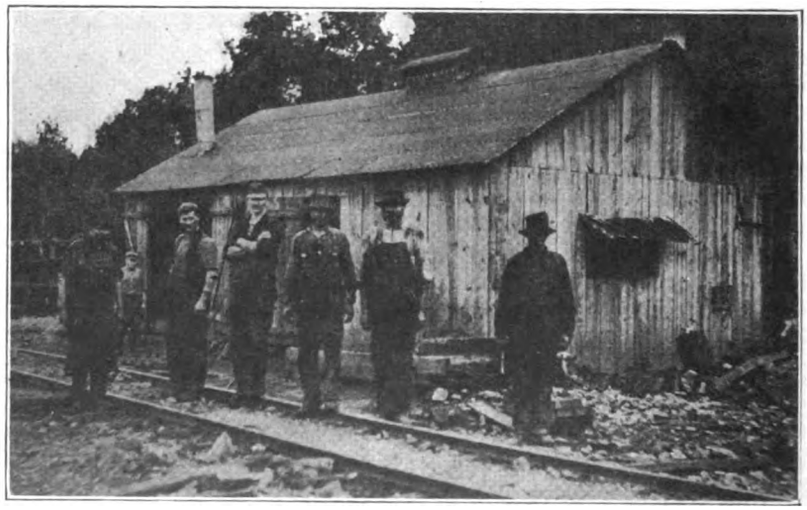
Make the cherry just large enough to fit the bore of the barrel, allowing a little for the patching, if any is used. If it is for a breech loader, make one cherry so it will just go in tight. It is now ready for cutting the teeth, which can be done with a fine file by grinding off one side of the file so it will have a sharp cutting edge and so it will cut only on one side. Make the cutting edges so they will terminate on one side, as shown at A, Fig. 3. This will make a cutting side, cutting at the bottom of hole, thereby making a more perfect sphere. To make these cutting edges by hand requires practice and care, so that the blank will not be spoiled. The cherry should be stained a dark color; blazing off in oil will do. Then lay out, or first space them off from stem to termination A, at about $\frac{3}{32}$ inch apart, as shown; then cut them by the file as described above. By having them stained dark the file cuts will show plainly, so that the cutting edges can be finished up sharply and correctly after they are completed. The ball of the cherry should be tempered pretty hard, but leave the stem soft. The cherries for conical bullets should be made in the same way as for round (see Fig. 4). They should be



MOLDS AND CHERRIES

marked with the number of the bullets or size of caliber. The cherries are to be used in a brace, and the extreme end of shank needs to be filed up square.

Molds can be bought ready-made, or they can be made by the mechanic, himself. They are made of iron or brass. Those used for muzzle loaders or round bullets are generally made of iron. For long, conical bullets, brass is generally used. The iron ones are forged out, and the brass ones are generally cast. They are hinged together like a pair of pliers, each half working on the other as shown in Fig. 5. In order to start the cherry at the right place, drill out some on each part, thereby making it easier for the cherry to do the work. This is for round balls. Conical balls are started in about the same way. If it is desired to have a bullet of a certain size, weight and shape, a bullet is made to correspond to the above of the certain mixture of lead that will be used in the manufacture of



THE SMITH SHOP ON THE D., L. & W. CUT-OFF, FROM PORTLAND TO PORT MORRIS, N. J., RUN BY MR. H. G. KURTZHALS

the bullets. This will serve as a model. A gauge or template of steel is now filed up to the exact size and shape of the profile of the model. A cherry will now be made of the best of tool steel to correspond exactly to the gauge or template, making it a little longer for finishing and shrinkage of the lead. The teeth are then cut lengthwise upon its diameter. These teeth will have to be filed up properly. It is now hardened and tempered, so it will do the work in the proper manner. Now it may be ground to the exact size required, and to put on it as keen an edge as possible it must be honed up on a fine oilstone. Then take the halves of the mold and clamp them together and drill a straight, plain hole, one half on each side of the mold.

(To be continued.)

What One Smith Has Done.

H. M. CRONK.

The accompanying engraving shows what my little shop has grown to. I started, five years ago, in the little shop to the right doing general blacksmith work and worked alone. I thought it would be a good idea to manufacture something that would sell good, so I took up farm bobs. I made about ten sets the first year with my other work. I found out I could sell all I could make, so I built an addition and installed some machinery, and my business increased every year, so I make and sell two hundred to two hundred and fifty sets of bobs a year at the present time. I sell them all to dealers. During the month of March I travel and take contracts for fall shipments, so I know what I have to manufacture through the summer. I also do all kinds of repairing and build some new heavy farm wagons. I run a foundry in connection with my shop, make my own castings and fill lots of outside orders. I have just installed a 12-horsepower gasoline engine to take the place of a steam engine. My force is now six men the year 'round, besides extra day help. For a sideline I handle buggies, buckboards, plows and harrows, and a man can make a few dollars at that, if it is handled right.



The Editor was chatting with Benton on the subject of paying men according to the piece-work system.

"It is generally acknowledged that few, if any, shops or factories are operated up to the limit of their capacity, even though the men are paid according to the work they turn out. Investigations have shown that the especially well-skilled hands will hold back, even though these same workers could earn more, at least for a time."

"How do you account for that?" questioned Benton.

"It's just this way," began the Editor. "A certain group of workers is paid a given piece-work rate. This rate has been determined by the superintendent, or other official, as fair, or at least it is supposed to be fair. One or two of the men are especially proficient in turning out the work in question and make big salaries the first week or two—the other hands making good money. About the third week the rate is cut—'men are pulling out too much money,' says the company. So the men work to a new rate, the best men again speeding up until the rate is cut probably two or three times, when they tumble to the fact that it is better for every one concerned to hold an average rate of output—the best hands slacking up to the slower worker's rate, thus enabling the slow worker to make a fair wage."

"Looks to me like injustice," put in Benton.

"It is injustice," returned the Editor. "Now, let us take machines as an example. Men working under the piece-rate system aren't treated as well as machines, as far as money goes. For instance, in a certain factory, right here in town, they have two machines for doing certain work. One of these machines, while in perfect order and condition, is somewhat of a back number and does but half as much work as a later model which stands beside it. The newer machine takes up considerably more floor space, requires more oil, more power and more attention; yet the company considers it well worth the difference because it turns out more work. Can you draw the same comparison between two of the working men in that factory? And this illustration is all in favor of the worker, for, while the machine of bigger capacity takes up more room, uses more power and requires more oil and attention, the better workman, on the contrary, uses no more room, needs no more light and requires no more material per job. One would naturally suppose that a firm would be very glad to pay a man for his labor when he turns out so much more work at no extra cost.

"It appears to me that the company would win out in the end if they gave the worker what looks like nothing but a square deal," said Benton, lighting a fresh cigar, "it doesn't seem fair to the skilled worker to—"

But Jim Barstow came in at this point. "Hello, Benton, old man! Hello, Mr. Editor! Want some information on case-hardening—got anything on the subject in your book, Benton?"

"I think we have, Jim. In fact, if you will explain a bit about your work I'm pretty sure I can give you just what you want," and Benton took out his receipt book.

"I want some simple preparation that will do good work, but one that does not necessitate the use of a box—the thing I want is for the little occasional casehardening jobs that I have to do."

"Well, here's one," replied Benton, after turning the leaves of his book, "that I think will just fit your needs. Make a careful and thorough mixture of the following, according to weight: seven parts of yellow prussiate of potash; eight parts of common salt and one part of bichromate of potash. After thoroughly mixing these, heat the piece to be casehardened to a dark red and sprinkle the mixture on the piece. Now, replace in the fire to soak, and repeat until the desired depth. Finally, quench in water or oil. This is good for either iron, soft steel or tool steel."

"I think that is just the thing for me, Benton," and, with a nod, Barstow went out.



WHAT ONE SMALL SHOP HAS GROWN TO

Tearin' Down the Shop.

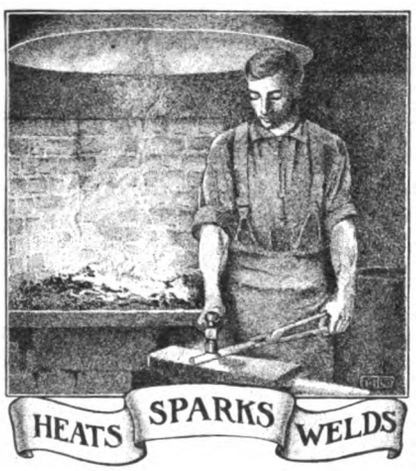
W. O. B.

"I hev spent my best years''—
Said the smith through his tears,
"In thet shop thet they're now tearin' down,
I hev made a small pile,
'Spect ter rest fer a while,
'Fore I'm called on to wear a gold crown.''

"Why, it seems like ter me—
But o' course it kan't be—
Thet each brick in thet ole forge wall
Hez a string ter my heart
Like they hated ter part,
An' I feel a big tug when they fall.

"An' the bench, an' the drill,
The ole bellows, anvil,
It jes' seems thet they're callin' t' me,
An' I see in my mind
The ole days far behind—
Then the tears come, an' I can not see.

"Oh, you young chaps won't know—
Till y' much older grow—
What it means t' see yer ole shop
Bein' ripped all apart—
Seems t' grip on yer heart,
An' the tears in yer eyes will not stop.''



They will be somebody's customers—why not yours?

Don't allow the roof to go too long without repairing. These new roofings are excellent and easily applied. Do it now.

Somebody said: "A cheap-skate is a fellow who tries to prove that every man has his price by cutting his own."

The quickest way to get rid of the chap who knows how to run your business is to tell him how to attend to his own, first.

Uncle Billy Martin Says:—"If these here whinin' folks had what they deserved they wouldn't be here to whine.''

Which would you rather do—turn out ten jobs hurriedly for a total of twenty dollars, or five perfect jobs for fifteen dollars?

It may be the man's fault if he never deals with you; but if he does not become a steady customer after dealing with you once, then you may well blame yourself.

If you keep your finger on the pulse of your business you'll never need to say, "Slow collections was the cause of my failure.'' Keep at the heels of your debtors.

You wouldn't expect to do all forms of lathe work with one tool—then why expect one kind of grinding wheel to do all kinds of grinding? The grinding wheel is a cutting tool.

Put something by for the rainy day. No matter how little, put something aside every day or week. Surprising how quickly money grows when once started. Try it with a small weekly sum.

Are your prices an indication of the quality of your work? You'll not stay in business long if you cut the price and raise the quality, nor can you afford to raise the price and cut the quality.

Have you a file for your catalogues? Put the catalogues where you can find them when you want them. They are just crammed full of trade information. Do you save your catalogues?

Your grandfather no doubt used the most approved methods and tools of his time. No reason on earth why you shouldn't use the best methods and tools of your time. There's no sense in hanging on to old-time methods just for old times' sake.

Automobile work is work that rightly belongs to the smith. Lots of smiths are getting their share of it, but there are more who are allowing this opportunity for bigger profits to get away from them. Read our automobile department and learn how.

Gasoline traction engines are now being manufactured by a number of concerns, and the coming season will find a number of these machines at the doors of the general smith. Better "brush up'' on your knowledge of gas engines, so you can take advantage of this opportunity.

Remember?—Tom fixed the big hole in the shop roof several weeks ago—well, at the time it thawed somebody advised Tom to remove the heavy, wet snow from the shop roof. So Friend Tardy got to work—was shoveling for dear life when he stepped right through the tar paper patch. He landed on the shop floor, 'mid a shower of tar paper, broken slats, dirty, wet snow and portions of the roof. Poor Tom's been laid up for a week now—the shop's closed and the hole is bigger than ever.

Would you patronize a firm that continued to use the same old fixtures, methods and appliances of years ago? especially if some important changes had taken place in their branch of industry? Yet you continue to use that old bellows, that smoky old forge and goodness only knows what other old equipment, and expect people to patrohize you. If it pays a big firm to throw out old equipment the minute better machines appear, wouldn't it pay you as well to replace your old tools with modern equipment?

Little Business Stories—No. 4. Paying three thousand dollars for the loan of one thousand is a high rate of interest, yet that is what a Brooklyn man paid to the "loan sharks'' before finally being driven to suicide. The interest rates that this man was required to pay were far beyond what he would ever be able to pay, and he finally got so he would borrow from one to pay another. Finally he could get no more money and his salary was being drawn by the money lenders. 'Tis always better to go to your friends, or at least to some reputable business man, for financial help.

A big story about some small work is the following from a York State paper:

"Mark Scallot, a blacksmith, in 1578 in the twentieth year of Queen Elizabeth's reign, made a lock consisting of eighteen pieces of steel, iron and brass, with a hollow key to it, that altogether weighed but one grain of gold. He also made a gold chain, composed of forty-three links, which he fastened to the lock and key. In the presence of the queen he put the chain about the neck of a flea, which drew it with ease, after which he put the lock and key, flea and chain into a pair of scales, and they together weighed but one grain and a half. This is vouched for by an old writer.''

As there are but 5,760 grains in a pound, one can easily imagine the size of the lock, key, flea and chain. They must also have had trained fleas in those days, besides exceptionally trained smiths.

A yearly rent of sixty-one nails and six horseshoes seems to be little in these days of machine-made shoes and nails, but in the days of Edward III it meant considerable work. Here's the story: Centuries ago there lived a farrier, Walter le Brun by name, whose dexterity at the anvil on the occasion of a great tilting meeting on the banks of the Thames was noticed by the then reigning monarch, Edward III, who rewarded the blacksmith by granting him sufficient land adjoining the tilting green for the erection thereon of a forge. As quit rent he had to present annually to the King six horseshoes and sixty-one horseshoe nails.

To the modern mind the number of nails would appear to be superfluous, but when it is remembered that the horseshoes of that period required ten nails apiece it will be seen that the calculations of Edward III merely allowed one "over'' in case of accident. Furthermore, the shoes were all to be for the horses' forefeet, from which fact some historians draw the inference that the animals ridden in the knights' tournaments were encouraged to injure one another with their front hoofs.

A German school for blacksmiths is described by Vice-Consul James L. A. Burrell. The school is located at Halberstadt, in the Magdeburg district:

"Young smiths receive instruction in shoeing oxen and horses and preparation for the examination in shoeing, which was made compulsory in the German Empire by the imperial act of July 1, 1883, and is held in the various provinces by state examining commissions. The school is supported by appropriations from the city, the province, and from the two agricultural associations in Halberstadt. The courses of instruction last three months, and four of them are given during the year, beginning each quarter. The theoretical instruction is in charge of a retired military veterinary surgeon. The charge for the practical and theoretical instruction, including the use of iron, etc., is only 25 marks ($5.95) for the course. Board and lodging can be had in the school very cheaply. For young blacksmiths without means four free courses, with board and lodging, are provided each year. Candidates who pass excellent examinations receive premiums. Only six persons may take part in each course of instruction.''

American Association of Blacksmiths and Horseshoers.

The prices that some of you are getting are outrageously low. How you can expect to pay for supplies and other costs and make even a shadow of profit I cannot understand. There is certainly something wrong somewhere. But there is no excuse for such a condition. If competition is the fault, then organize. Get your neighbor smiths to form an association with you. Then you can raise prices to where they should be—to where you can make an honest profit—to what will enable you to support your family as you should support it, as you want to support it. You owe it not alone to yourself, the trade and your business, to get a fair price, but you owe it to your family as well. You can't live on the money that your customers owe you any more than you can build a house on your neighbor's foundation. Get a fair and just price for your family's sake. You are entitled to a fair and honest reward for your labors. No man is expected to work for nothing—but if you do so of your own free will no one will object. If you are working for the profit and good will of your customers there is no better way than to do work at cost or less. But if you are working for your own profit, for an honest living, for the support of your family, you must ask a fair price for your labors.

It is not intended that the prices asked by an association should be exorbitant. The smiths have difficulty enough to get a fair price without boosting prices in trust fashion. It is simply asked that you get a fair price—a square deal. No one on earth can deny you that right. You are entitled to fair compensation for your labors. If you don't get it it's your own fault. If you don't get it here's your opportunity to not only raise prices to where they should be, but to abolish the numerous other trade troubles. Just ask me for my easy plans for forming branch associations. And I don't expect you to do it all alone. I'll help you, and gladly, too. And when we get started together there's nothing on earth can prevent us from building up a strong, growing association in your vicinity. Will you drop me a postal NOW? Just address it to me at P. O. Box 974, Buffalo, N. Y., and I'll send you full particulars and directions by return mail. If you'll do your part I'll do mine, and more.

Now don't put this off until you forget all about it. Sit right down and address that postal. It will take you about one minute and cost but one cent. And that cent may mean dollars in your pocket. Will you do it NOW?

THE SECRETARY.

Annual Meeting of the Nebraska Association at Lincoln.

The third annual meeting of the Nebraska Blacksmith, Horseshoer and Wheelwright Association was called to order by President J. W. Edwards. After the reading of the minutes of the last meeting considerable time was spent during the first session in the giving of short talks on the good of the Association, the speakers consisting of members present at the meeting. Many traveling salesmen for the different wholesale firms met with us and were put on committees. A committee of three on resolutions of condolence in the matter of the death of our late Brother Pat Savage was appointed by the Chair.

Mr. W. I. Wolverton, president of the Kansas Association, met with us and gave us some very interesting points on the working of the Kansas Association. Through their representative, Mr. James Fawthrop, the Burges-Fraser Iron Company of St. Joseph, Mo., presented the meeting with two boxes of cigars which were well received. On a motion F. L. Fay and M. N. Barnes, salesmen, were added to the Press or Publicity Committee.

On a motion all the traveling salesmen for Nebraska territory were added to the Membership Committee.

Hon. Geo. W. Libbelts explained the Legislation bills. It was moved and unanimously carried that the next annual meeting be held in Grand Island, Neb., on the first Wednesday after the first Monday in November, 1910.

Next order of business was the election of officers, with the following results:

President, M. R. Fogarty; Vice-President, W. A. Lloyd; Secretary, Geo. E. Loder; Treasurer, J. W. Edwards; Executive Committee, J. I. Depew, W. M. Goden and G. S. Fisher.

On motion June 21st was chosen as the date for the annual picnic of the Association. A vote of thanks was tendered W. I. Wolverton for meeting with and addressing the Association and a vote of thanks was tendered the wholesale houses and the Lincoln Hotel management for the courteous way in which they treated the Association during their stay in the city.

Many good short talks were given on the good to be derived from these meetings. On a whole, it has been, in my estimation, the best meeting we have held. GEO. E. LODER, *Sec'y*,

Wahoo, Neb.

A Letter from New Zealand.

In traveling over New Zealand I find that your paper has a wide circulation among the shoeing smiths; therefore, I send you a short note re the Master Farriers' & Blacksmiths' Association of Taranaki. I believe that it will interest your New Zealand readers, as association after association has been formed in many parts of the colony. They did good for a time, but, having no power behind them, they have nearly all died a lingering death. If an association has to depend entirely upon the honor of its members there is no use in horseshoers combining. The general feeling throughout this province is that the association has got its foundations upon a rock and that it is here to stay. But it cost the committee a tremendous effort to inaugurate and establish the association. There is so much apathy and jealousy and so many men who wont do anything but point out to others how they should do this and that.

J. W. BRAYSHAW, New Zealand.

The Master Farriers' & Blacksmiths' Association of Taranaki, New Zealand.

The inaugural meeting to establish the above association was held in Stratford, on June 3d, 1908. Thirty-three Master Smiths attended and twenty sent apologies, accompanied by best wishes for a successful issue. It was unanimously decided to form the association for the purpose of discussing matters connected with the trade, to render mutual assistance to each other, and so far as possible to protect the interests of the trade generally. The association to consist of Master Farriers and General Blacksmiths, or, in case of companies, their representatives.

Each tradesman present became a member, and afterwards, with two exceptions, every Master in the whole of Taranaki and north of the Wellington Province enrolled.

A constitution and set of rules was considered and agreed upon, also a price list for shoeing horses, to be enforced throughout the whole district for the ensuing twelve months. How was this association to enforce obedience to its mandates? This question was the rock upon which several previous horseshoeing associations had come to grief—The provisional committee met this difficulty by interviewing every wholesale merchant doing business in the Province, obtaining their sympathy and the promise of their active support. The merchants were fully alive to the fact that it was in their interests to suppress cut-throat competition and reckless trading.

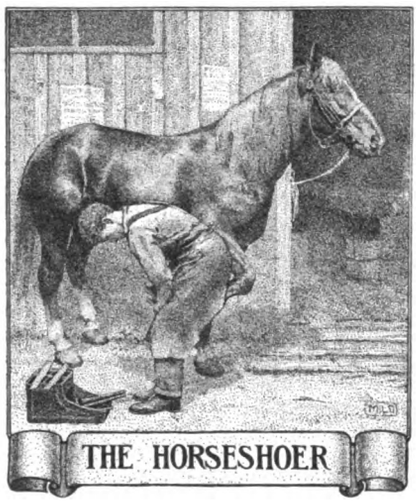
It was realized that the support of the wholesale merchants would be the backbone of the association. One of the rules adopted was that no tradesman would be forced to become a member of the association, but every tradesman in the Province, irrespective of membership, should be prevented from cut-throat competition or reckless trading. Several members who failed to grasp the complete position have had a "cut at their competitors," but immediately they realized the value of the merchants' support of the association they fell into line again. One member who is also running

a large coach-building concern tested the power of the association and the reliance that could be placed upon the promised support of the merchants. He found that the merchants were not slow about deciding as to whether they would support one cut-throat tradesman or others who were honestly trying to pay 20s. on the pound and place their trade upon a more businesslike basis. This incident brought the Taranaki Coachbuilders' and Wheelwrights' Association into the firing line and they decided to offer moral and pecuniary aid to their kindred association.

The Association has overcome many difficulties; others have yet to be faced. The fundamental principle has been firmly demonstrated—"That the Association, backed by the wholesale suppliers, has the power to protect the craft." The complete success of the Association is now assured.

At the next annual meeting it is intended to grapple with the "Credit" system.

The registered office of the Association is at No. 1 Railway Reserve, Stratford, Taranaki, N. Z.



Shoeing the Horse.

P. Y. MILLER.

It is unnecessary to say that the shoe and not the foot should be made to fit. This principle is well understood by all horseshoers. Certainly, this rule does not apply in every case, for frequently a horse must be shod having deformed feet, wherein a correction must be made with the shoe, and in such cases it is permissible to shape the foot to the shoe, using judgment as well as oftentimes a special shoe. The foot should always have all superfluous horn taken from the bottom, except in such cases as I have already mentioned. The shoe after being shaped should be brought to a level on its bearing surface, then the foot leveled in accordance and this with a cold and not a hot shoe. This takes time, but gives more satisfactory service to the horse owner as well, as a favor to the brute and better for the shoer in way of reputation—this alone being his most valuable asset. Just think of the absurdity of a cobbler proposing to save time in fitting the shoes he is making for you by trimming your feet a little here and a little there. Many smiths do not think of this and, to be sure, the horse cannot use words of complaint. Still, actions speak louder than words. To me it is a distressing thing to see a noble animal lamed, perhaps for life, by incorrect shoeing caused by ignorance or carelessness. I would like to see a law placed in the statute books of every state compelling all horseshoers to undergo a rigid examination before being allowed to follow the profession and then enforce a uniform tax, good in all states and costing $100 per year.

The engraving shows a shod foot. The shoe and fitting to my mind reaches more nearly perfection than does any other I have ever used on normal feet. In forming this shoe commence at end of crease and forge with gradual taper thence to end of calk or heels. This should be done edgeways, in order to make the shoe heels more rigid from last nail to end of heel or calk of shoe, thereby rendering the shoe heels less liable to spring or bend. Now, level the foot and then take rasp and lower the heels ⅛ or ¼ inch by cutting a notch in hoof. This should be commenced half way between last nail and end of heels. The object in lowering the heels is to relieve the softer parts from that constant pounding attained by all-around level fitting, thus obviating all possibility of tender, sore or bruised heels. When a barefoot boy, did you ever have bruised heels? This same reasoning applied to the hoof works just the same as when applied to your own feet.

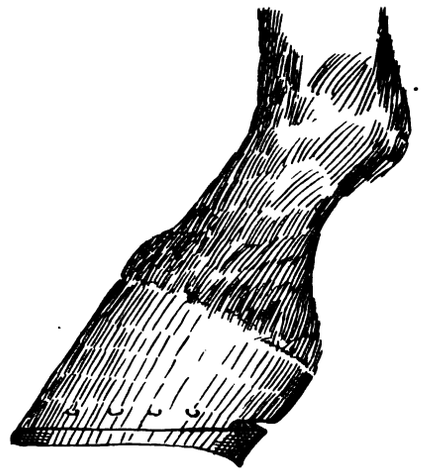
Corns and Shoeing in General.

J. F. ROSE.

If you will get a horse's foot, put it in a kettle and boil the meat off the bones, you will find it of great advantage in understanding the anatomy of the foot and the cure of corns. All that is necessary to cure a corn is to remove the cause, and nature will do the rest. There are many smiths who spring the heel of a shoe to ease the corn. That is all wrong. If the smith will cook the meat out of a foot he will see that there is a small hole at the heel about the size of a small marble and one at the toe about one and a half inches long. These are the only connections the wall of the foot has with the canon bone. You will notice, if a horse steps on a shoe and springs it, when you straighten the shoe the foot is as crooked as the shoe or nearly so. Now, rest a shoe on the heel and toe and leave an opening at the quarter and it will be there till the shoe is taken off. Is that not good evidence that there is no support to the canon bone and the quarter.

Now, find the hole to be at the heel, place the end of your finger in the hole and the other finger on the corn seat and you find that the hole is about one inch back of the corn seat. When you spring the heel you are putting more bearing on the corn. In the first place, the shoe never springs, but the foot springs to the shoe. There are a great many smiths and horse owners who think that the shoe should be filed wide at the heel, but there is more danger to get them too wide than too narrow. If the shoe is so wide that the heel parts or canon bone support will go between the shoe, the foot will break down at the quarter and can't act at the heel and make the foot bulge.

There were lots of lame horses here and I never failed to make them travel, and now I am getting shoeing from other towns. When I came here we only got 20 and 40 for shoeing, and a little over a year ago I raised the price to 25 and 50. There were a few who got mad but they all came back except one man. His horses were very lame when I started to shoe them. When I raised the price he quit me and did lots of talking so when he came back I told him he had better turn his horses into



SHOEING THE HORSE

the pasture and save that extra nickel. I hope that they will pass a license law here. I think it would put a stop to the man who sweeps out the shop twice and then starts a shop of his own. I often hear of men picking up the trade. Well, I think they can pick up a small portion of it, but I think that the bulk

of it is entirely too heavy for them to pick up. Brother C. W. Phelps likes to have things explained well; I don't see that Brother Phelps has explained why a toe clip ever hurt a horse's foot. Now, I have filed shoes for the last 25 years and I have never seen any bad results from a toe clip, but I have seen some awful shortened toes when the shoe was not clipped. I can show Brother Phelps horses that I have shod for 12 years and that there never was a shoe put on without a toe clip and never had corns in their feet. Now, if Brother Phelps can do better than that he is doing nicely. I hope that Brother Phelps will explain how a clip injures the hoof.

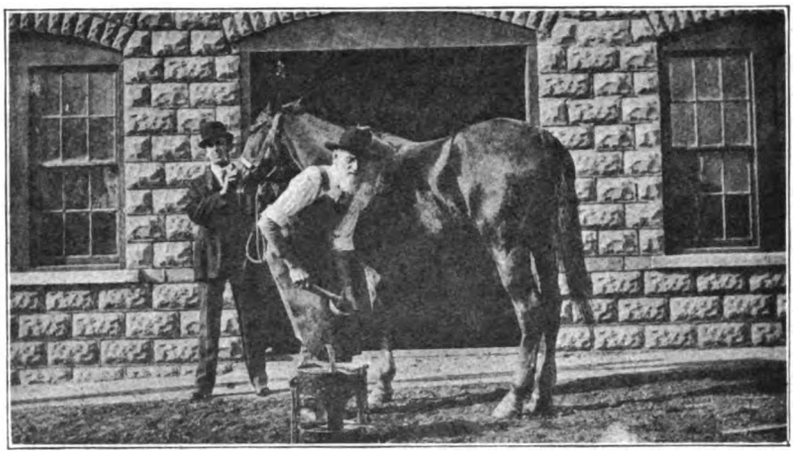
Shoeing According to Nature.

E. H. MALOON.

Something that has especially claimed my attention in "Our Journal" is the different shoes shown. These I divide into two classes; first, there are shoes designed to make the horse carry his feet in a different direction than nature designed. To me these are useless, as after using them for twenty years or more with very poor success, I came to the conclusion that the feet would go as nature designed. The principle I work on is to put on as little iron as I can, leave the feet as nearly as the horse wants them, and I have my shoe of success. The second class is made up of shoes with obstacles on them to hinder the horse from doing certain things. These I find to be partly successful, but at a fearful strain on the horse's muscles and tendons. It is simply creating one evil to counteract another, and I do what my common-sense tells me is best for the horse. Take, for instance, the low heel and long, high toe behind for the horse that overreaches: the strain on the back tendon is great and the effort to get over his toe must tire him unduly. Take the high heel and short toe on the front feet and see the position you have put the horse in. Yet the very best men say this is the only practical way to stop a horse from overreaching. I have found it to be the way to stop most horses, but I deplore the means used. As I look at it the horse is muscled and his joints are all formed as nature made them and his leg and foot must go forward in just the manner that nature says they shall. It does not lay in the power of man to change them very much, if any, and still maintain the stride of the horse and allow him to go along in comfort.

I could cite case after case where a very *little* change would allow the horse to go clear from overreaching, but I don't now remember a single case where I ever met with any success in changing the gait. This calls to mind one instance in particular where a man owned a valuable horse that overreached. He brought him to me to be shod, giving me free rein to do as I pleased. I tried every device then known to the trade to stop him, and caused him untold misery (I have no doubt), but the result was always the same. This was the last horse I ever put weighted shoes on, except at the special request of the owner.

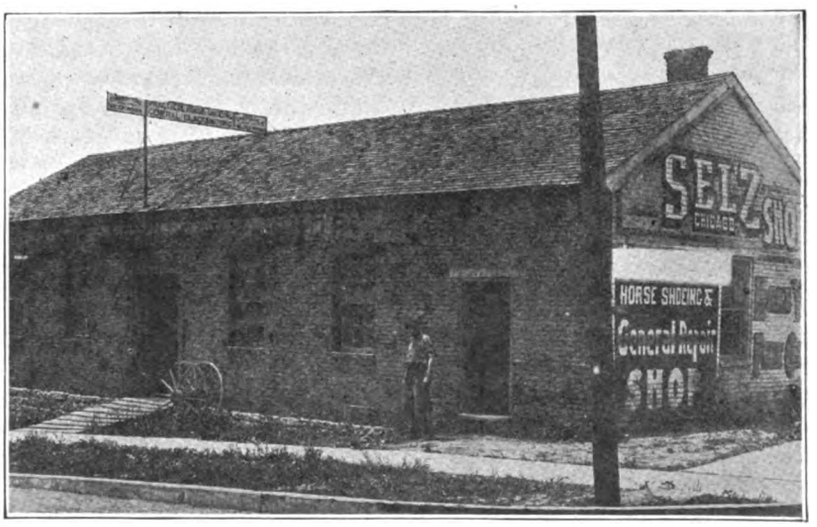
The whole scheme of horseshoeing can be simmered down to this one point. How much protection from undue wear does this horse need? Solve this problem and you have the whole deed done. To prove this point I will say in all my long life I never saw but a very few horses that went wrong before they were shod, but as soon as man tried to improve him then came trouble. This doctrine no doubt seems foolish to some readers of THE AMERICAN BLACKSMITH, but let me tell you right here that I have great success in shoeing this way. The fact is, I have more than my share of interfering and lame horses to shoe. Perhaps I have said enough in one article about the fallacy of changing a horse's gait. In pursuance of this article we have in the June number of THE AMERICAN BLACKSMITH some cuts of shoes by Mr. A. F. Libby that are designed to help a horse do as he wants to. Some of these shoes I have found to be very valuable on overreaching horses and the roll toe shoe is a great help to the horse that stubs his toe, but I have yet to find a shoe that will stop a livery horse from hitting his shins and knees, and I have tried almost everything that anyone has ever written, and a good many shoes of my own design. To my mind, a horse must be in good condition and not overtired for a man to do much for him except to make him go natural and as easy as possible.



MR. CROFT SHOEING A HORSE ON HIS EIGHTIETH BIRTHDAY

Another Veteran Craftsman.

David Croft was born on a farm near Chambersburg, Pa., November 25, 1829; worked on his father's farm until



THE OLD SHOP ON THE SANTA FE TRAIL

the year 1850, when he secured employment in the blacksmith shop of D. M. Leisher, in Chambersburg. Here he served a three-years apprenticeship, after which he worked about a year in Lexington, Va. His old boss, Mr. Leisher, then induced him to return to Chambersburg, and he remained in Mr. Leisher's employ until 1856, when he opened a shop of his own in Chambersburg. This business he conducted until 1879, when he moved to Abilene, Kan., and opened a shop with H. G. Fisher, under the name of Fisher & Croft. This business was conducted until 1895, when they sold out and Mr. Croft retired from active life, since which time he has made his home with his youngest daughter, Mrs. M. L. Pierce, at Superior, Neb.

Mr. Croft is very active and well preserved for one of his years. He visits the blacksmith shops of the town 'most every day, and when the boys get a particularly hard job, it is to him they go for advice.

That he is still able to shoe a horse the picture (page 147) is ample proof. The young man holding the horse is Mr. John Eyre, of the firm of Reilly & Eyre, Superior, Neb.

An Old Shop on the Sante Fe Trail.

H. F. WILLE.

In the October issue Mr. P. V. Burgess, of Missouri, referred to old shops. Complying with his wishes I am enclosing a photograph of the shop (page 147) in which I am at present doing business. This shop was built in 1835 and has been a smith-shop ever since. As you will notice it has four one-inch rods through it to keep it from collapsing. In pioneer days, when men had the gold fever and were striking



A MISSOURI SHOP RUN BY MR. A. L. LONGFIELD

out west to California, many an outfit found birth in this old shop and started west over the Sante Fe trail. Such pioneers as Kit Carson, Buffalo Bill and many others had their horses shod in this old shop. One man there was who learned his trade here and worked as a journeyman in this structure for some forty-five years, standing at one forge throughout that length of time. One evening, after accomplishing his daily routine of shoeing horses and other labor, he sat down to a good supper, but never rose again—he died of heart failure.

About a year ago the Historical Society of Kansas City came and obtained part of a window-sill from which a gable was made for the Society.

The article, "Those Fifty Lister Lays," certainly gave me occasion for a hearty laugh. I find myself much like Mr. C. W. Metcalf, of Iowa—I would like to see the man or his right arm. However, I have an idea; most western shops now possess a gasoline engine and a small power hammer, and I doubt it not in the least that one man can sharpen fifty lister lays if he has the patronage of enough farmers to supply him with the lays to sharpen.



Plain Machine Work for the Blacksmith—5.

GEORGE CORMACK, JR.

The Drill Press.

The first thing for the man at the drill press to know, and the importance of which cannot be overestimated, is the speed at which different sized drills should be run. The correct speed for a drill is that at which it will produce the most work in a given time with fewest re-grindings and breaking of the drill. From careful observation and experiment the speed best suited for drilling wrought iron and steel is a speed of 30 ft. per minute. This means that the outer corners of the cutting edges should revolve at a speed of 30 ft. per minute. In other words, it is the number of revolutions the drill would make if rolled over a flat surface 30 ft. long. This speed can be got at easiest by multiplying the diameter of the drill by $3\frac{1}{7}$ or 3.1416 and then dividing 30 ft., or 360 inches, by the product thus obtained. Cast iron can be drilled at a slightly higher speed, usually about 35 ft. per minute, whilst the speed used in drilling brass is usually about 60 ft. per minute.

In order to be able to readily know the correct speed of drills of different sizes I am including in this article a tabulation of drill speeds at 30, 35 and 60 ft. cutting speeds. Before the workman can use this table it is necessary for him to know the speed of the drill spindle at each speed change. If the power is always supplied at a uniform speed, as with a steam or gas engine or by an electric motor, all that is necessary is to count the revolutions of the drill spindle at each cone speed, if the drill press is not back geared; if it is back geared it will be necessary to also take the speed at every cone speed with the back gear in. If the drill press is constantly used it is an easy matter to memorize these speeds, otherwise it is better to tabulate them and keep the table near the drill press for ready reference. This is a method which should be adopted with all machine tools having speed changes, enabling the workman to definitely know that when he has the belt on a certain step of the cone the cutter, drill or work is revolving at a certain number of revolutions per minute. Why this is not done more extensively is a mystery which in my many years' experience in the machine shop I have been unable to solve.

Of course, it is doubtless true that men who have worked for years as machinists come to know almost instinctively when the metal is being cut at the most efficient speed, but it is also true that a much greater production could be obtained on certain classes of work where really skilled machinists are not necessary, such as drilling, especially when drilling jigs are employed, if the workmen could be induced or compelled to acquire even a primary knowledge of cutting speeds and feeds. In machine shops, even if the foreman does not give the inexperienced workman the right speed at which to run his machine on certain work, he soon begins, if of ordinary intelligence, to set his speeds comparatively with the speeds used by those around him who have had more experience. The isolated man in the blacksmith or repair shop has not this comparative study ever before his eyes, and in order to attain the best result he must resort to figuring the speeds or taking them from a tabulation of speeds for different diameters. As he gains in experience he will find that he also

will gradually be able to tell by intuition when a drill or a piece of work in the lathe is running at the right speed. Another thing of importance in drilling is the feed given to the drill—that is, the speed at which it is forced into the metal. This is usually given as so many thousandths of an inch for every revolution of the drill. For small drills below ¼-inch a feed of from .002 inch to .007 inch is commonly used; for larger drills, from .007 inch to .020 inch, depending largely on the power of the drill press. These feed speeds are only necessary of application when the drill press is equipped with power feed. With hand feed the workman soon gets to know just how much he can pull on the feed lever without breaking the drill. This knowledge is usually acquired by breaking quite a few drills. If, however, the drill press has power feed then it is necessary to know what these feeds are on each feed change. To find out the ratio of the feed to the speed of the drill spindle, place a drill in the drill chuck and lay a flat piece of steel on the drill table. Bring the point of the drill to a position exactly 1 inch above the steel plate, start up the drill press, throw in the feed, at the same time starting to count the revolutions of the drill spindle. Keep on counting until the point of the drill comes down upon the steel plate. Divide 1000 by the number of revolutions the drill spindle made and the result will be the amount of the feed in thousandths of an inch for each revolution of the drill spindle. Do this with every feed change and either mark it down on some convenient place or memorize the figures.

Diam. of drill.	Speed of drill at 30 ft.	Speed of drill at 35 ft.	Speed of drill at 60 ft.
1/16	1834	2140	3668
1/8	917	1070	1834
3/16	611	713	1222
1/4	458	535	917
5/16	367	428	733
3/8	306	357	611
7/16	262	306	524
1/2	229	268	459
9/16	184	214	367
5/8	153	178	306
3/4	131	153	262
1	115	134	229
1 1/8	102	119	204
1 1/4	91	107	183
1 3/8	83	97	167
1 1/2	76	89	153
1 5/8	70	82	141
1 3/4	65	76	131
1 7/8	61	71	122
2	57	66	115

THE SPEED OF DRILLS UP TO TWO INCHES IN DIAMETER

The following table gives the speed of drills up to 2-inch diameter, and is the standard practice for ordinary carbon tool steel twist drills. If high speed drills are used the speeds may be doubled and the feeds given above may be increased about 25%. These figures, however, the same as all others relating to the operation of machine tools, must be often modified to conform to circumstances. Differences in the hardness of the metals drilled allowing modifications in either direction. Good judgment and experience gathered from close observation being always the final judge as to the proper feed and speed to use. If the material to be drilled is harder than the average, the speed must be reduced and, correspondingly, if it is softer than the average the speed can be relatively increased. The Table can only be accepted as applying to average conditions.

In drilling steel or wrought iron the best lubricant for the drill is lard oil, for brass or cast iron no lubricant is necessary. Tool steel and harder metals can often be drilled better without a lubricant, running the drill at a slower speed. Turpentine is often recommended as a good lubricant for hardened steel, such as spring steel, etc., but my experience has been that running the drill slowly without any lubricating medium will give equally as good if not better results. If it is desired to drill very hard steel or chilled metal of any kind which cannot be touched with an ordinary drill good results can be obtained by hardening the very point of the drill in sulphuric, hydrochloric, or nitric acid. Take just enough acid in a saucer



A WELL-BUILT GENERAL SHOP OF TEXAS, RUN BY MR. C. N. ANDERSON

to reach up about $\frac{1}{16}$ of an inch above the cutting edges of the drill, when the drill is stood up on its point in the saucer. Heat the drill to the ordinary heat for hardening, being careful to heat as short a portion of it as possible, and stand it up on its point in the acid in the saucer, holding it there until it cools. No drawing of the temper is necessary. This method gives the lips of the drill an extreme degree of hardness. If too much acid is used this hardness will extend too far up the drill, and it will break very easily In using such a drill it must be run very slowly and carefully, the moment it becomes the least little bit dull it must be re-ground, but if carefully handled it will drill material which an ordinary drill will not even mark. Ordinary twist drills will stand more strain in proportion to their size and weight than almost any other tool, and when a good drill gives trouble it is pretty safe to say some of the conditions are wrong. If it chips on the edges, the lip clearance is too great and fails to support the cutting edge, or the feed is too heavy. Ease off the feed first and then watch the grinding. If it splits in the web, it is either ground wrong, that is, does not have the center lip at the angle of 45 degrees, or the feed is altogether too heavy. If the outer corners wear, it shows that the speed is too great. This is particularly noticeable on cast iron. In most cases it is better to use high speeds almost to the point where the drill corners commence to wear with a light feed than to use slower speeds and heavier feeds. This must be modified in drilling deep holes, the fine chips are harder to work out of the hole than coarse chips and, consequently, as the drill goes down in the hole the speed ought to be reduced and the feed increased. This, of course, although correct theoretically is impractical, as no one is going to change the speed and feed of the drill during the drilling of each hole. Where deep holes are to be drilled, and by deep holes is meant any hole deeper than three diameters of the drill, the usual practice is to adopt a slower speed of the drill and a coarser feed from start to finish.

(To be continued.)

How to Make Turn Buckles.

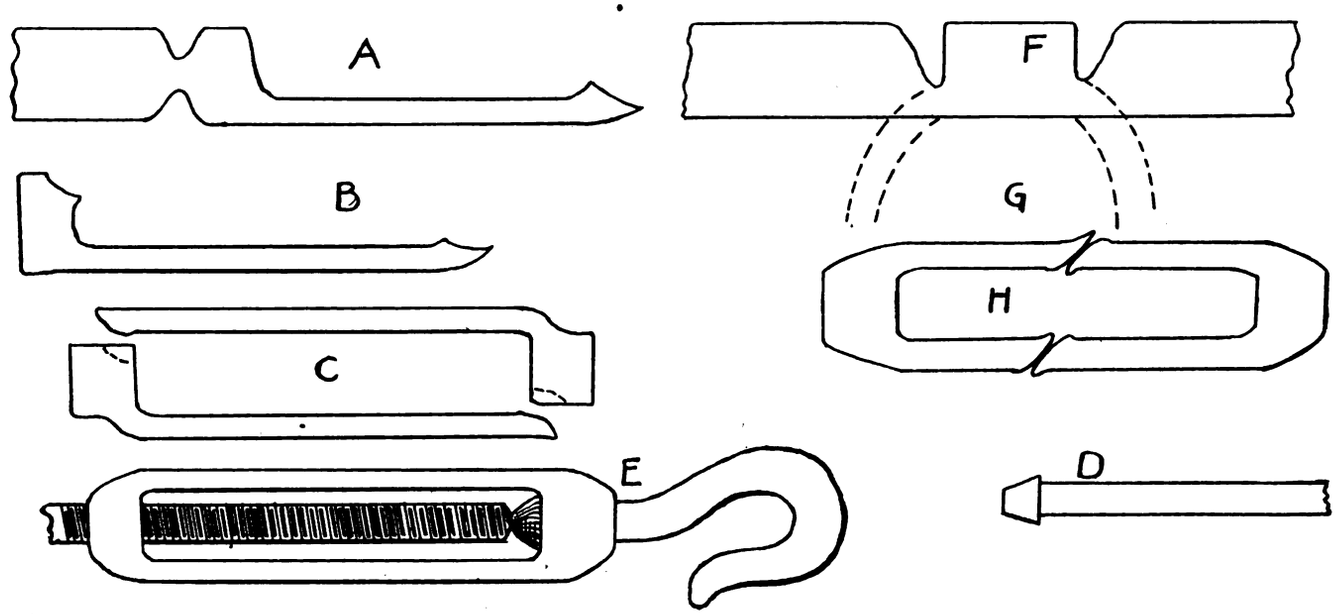
BERT HILLYER.

Although turn buckles may be obtained cheaper from the factories it is sometimes necessary to make them in the shop. When we possess only right-handed taps and dies we make them with a swivel in one end and thread in the other. One way in which to construct them is to take a piece of round stock and forge two pieces, as shown at A. Then take a small bob and break down a lip, as shown at B; weld together C, and finish to your satisfaction. After it is drilled and tapped, make a rod with a head similar to D and bend the turn buckle in order to get the rod through the hole. Then bend back and screw in thread end tight against head of rod in the opposite end, see E. This will hold it securely should you want to turn an eye on it or weld it onto another piece.

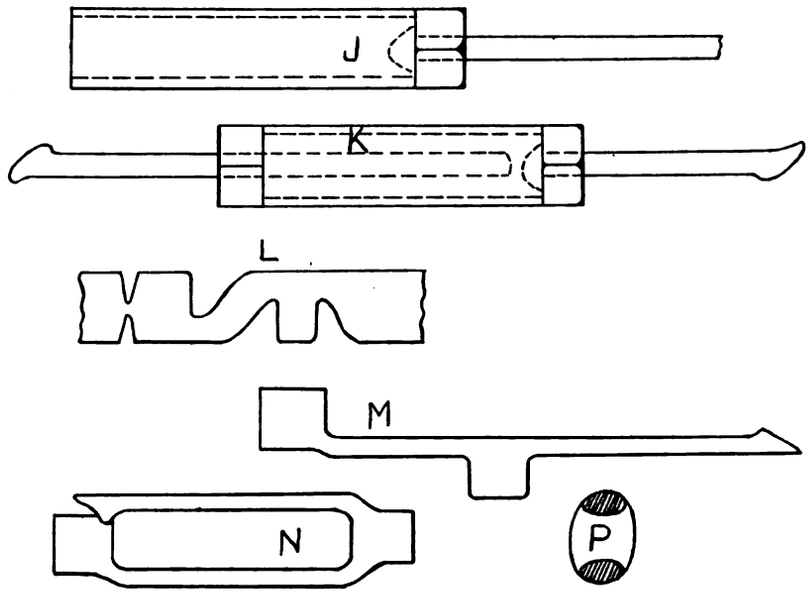
Another process is to take a piece of square stock and fuller in like at F; draw the ends down, round and bend, as at G. Make two pieces this shape and weld together in the middle, as at H.

Still another way, and one which I consider the easiest, cheapest and best way of all, is to take a piece of pipe $1\frac{1}{2}$ sizes larger than the holes that are to be drilled in the ends of the turn buckles. (If a one-inch hole is to be drilled for the swivel end, use $1\frac{1}{2}$-inch pipe.) Take the piece of pipe and cut it the length desired and then take a short heat on the ends. Now upset them a little, which will swell and thus enlarge them, and then cut a short piece of round iron for a plug to fit in the end of the pipe. The plug should be hot when driven in the pipe and should be an exact, tight fit. Then, with a good heat, weld it up, making the end octagonal in shape. Do not hammer the end down too small, but leave it as large as it will come. Then drill a hole in the end for the swivel rod, making it the same as the one at D, Fig. 1, and put the rod in the pipe. Be sure that the head turns freely before you weld in the other end, see J, Fig. 2. Then weld in the other plug, drill and tap thread and you have a good turn buckle. One excellent advantage is that the thread end which is screwed in the pipe will not rust so quickly, as it is not exposed to the weather. The ends may be made round and a hole may be drilled in the side of the pipe to be screwed up with a rod, but I think a wrench used on the octagonal end gives about the best results.

Still another process is to take a piece of rectangular stock very nearly square and fuller in, as shown at L, Fig. 2. Draw down, as at M, and then bend, as at N., and weld. When constructed from square or rectangular stock the



THERE ARE A NUMBER OF METHODS OF FORGING GOOD TURN BUCKLES



VERY GOOD TURN BUCKLES MAY BE MADE FROM THE PROPER SIZED PIPING

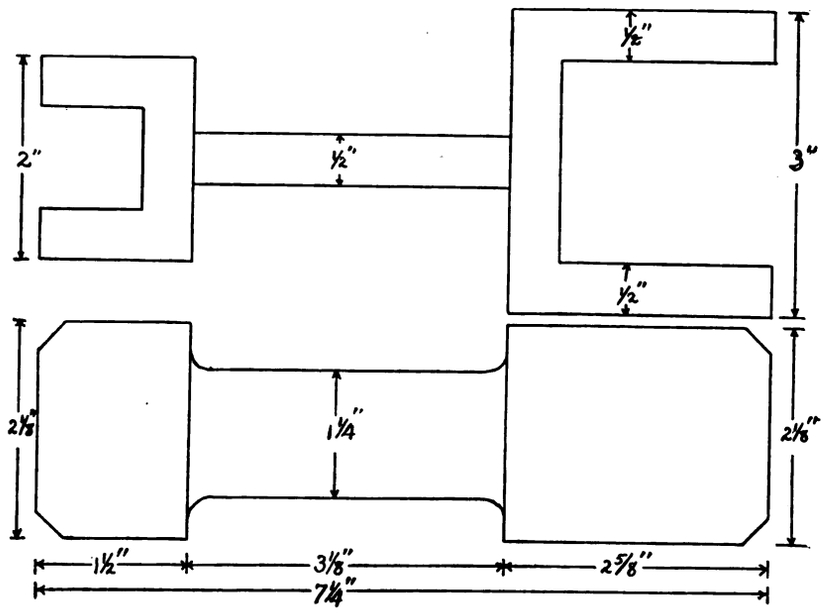
corners must be rounded and the ends should resemble P, Fig. 2. There are two other good processes, but space forbids at this time.

A Special Forging.

C. W. METCALF.

In reply to E. A., Ohio, please let me say a few words before I go into the details of this forging. There are many of "Our Readers" who would laugh at the idea of a blacksmith asking how to forge as simple a thing as this seems to be. The forging I refer to appears on page 74 in the December issue of 1909. But, let me say, have your laugh and then try your luck in making this piece. You will find you have a job on your hands that you weren't looking for. I know what I am talking about, for I had some of the same forgings to make a short time ago, and I found a very difficult job. I forged it in one piece, although my forgings were of heavier dimensions, but about the same length and width.

Now, as to the size of the stock; as his finished forging is ½-inch thick all around, and he must allow for a little waste and some to work on, I would take stock at least 2¼ by 1¼ inch or 1⅜-inch thick is still better. Cut the desired length and with a hot chisel split one end about 5 inches; then about ¾ inch back from the cut take a fuller and fuller in about ⅓ the depth as you want the stock when finished. Then heat to a good bright heat and bend each side at right angles to the main piece, and then with a good soft heat place it against the tail of the anvil, with the opposite prong down and bend your upright prong down to the anvil; then treat the other in the same manner. Now heat and work out the corners. If they are required to be square corners it would be best to bend them to about 45 degrees and then work out the corners to prevent a coldshut in the inside corner. When you have this end finished treat the other end in the same manner. Be careful to measure your stock so you will have enough to draw the desired length of the center piece when both ends are finished. Some would prefer to forge the ends separately and then weld them together. This is somewhat easier. In both cases you will need to make a tool to fit your anvil and of the right height and width to work out the center piece. If this isn't satisfactory let me know and I will go deeper into detail. The above, however, I think will explain the making of the piece in a simple manner, and from the directions a practical smith should be able to proceed without difficulty.



A SPECIAL FORGING EASILY TURNED WHEN YOU KNOW HOW

Trade and Technical Education in Other Countries—6.

WILLIAM H. DOOLEY.

Switzerland.

Switzerland is famous for its educational advantages in general. Few countries, if any, have so many schools in proportion to the population. This is especially true in regard to industrial and technical schools. These schools receive patronage, encouragement and private support from all classes of the people and the cities, cantons, communes and the federal government each add important money contributions. The general government gives subsidies to not less than 157 of these institutions for the advancement of trade and industrial education. Over 17,000 young Swiss are attending these industrial schools.

More than $330,000 has been paid out by the government for the support of trade schools during the last few years, while the amounts added by cantons, communes and private subscription raised the total to above $1,500.000. Let it be remembered that Switzerland contains a population of only 3,000,000.

The opinion has been general for many years that in Switzerland, as in the United States, the so-called learned professions have been overcrowded. Thinking people look with alarm at the vast number of professional men turned out by colleges of every grade and rank all over the world. How are these tens of thousands to make a living in the inevitable struggle that is before them?

Switzerland is solving the problem for herself. She is doing it by ennobling labor; by teaching the young that a trade well followed is as honorable as a profession; that by labor of the hands, as with labor of the intellect, there are honorable heights to be reached; and she emphasizes her teaching by opening schools of every kind for the advancement of industrial education. Young men now learn trades in Switzerland with zeal, looking for the same honor and the same reward that is anticipated from the adoption of professions. The basis, however, on which they build is more solid, the aim more elevated than ever before.

In Switzerland a master carpenter or a foreman of stonecutters, trimmers, weavers, spinners, watchmakers or what is not supposed to be, in a sense, an educated man; that is, educated in every detail pertaining to his calling, need not know astronomy or the dead languages, but he must know the science that pertains to the thing he is doing. He must bear in his pocket

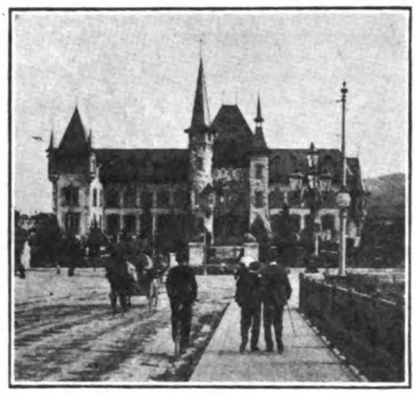


THE TOWN HALL AT ZURICH, SWITZERLAND

a certificate that he knows his trade and all about it—that he has learned its elements from practical masters and its sciences from men of knowledge.

The Swiss special training ennobles labor; it raises the mechanic in the eyes of the world, as well as in his own eyes. A Swiss who has attended the full time understands his calling perfectly, and has no trouble in securing employment at the highest wages. These are the facts shown by the record. Most of these industrial and technical schools know what becomes of the young men who have studied with them, and they follow them into life with parental solicitude.

The industrial schools of Switzerland had their beginning a century and a half ago, when a school of drawing



STYLE OF EDUCATIONAL BUILDING IN SWITZERLAND

was established at Geneva. Since then there has been established an industrial drawing school in all the smaller towns. The important basis of all these schools is drawing and designing. The Swiss theory is that no man can properly make a thing that he can not first sketch on paper. It is, therefore, no wonder that Swiss school boys go around with pencils and drawing books somewhat as American boys go about with penknives and marbles. Every schoolboy in Switzerland must learn the primary rules of sketching and drawing, and the extent to which this artistic preparation for every calling in life is carried is astonishing to foreigners. Boys on leaving even the secondary school can draw excellent maps and sketch off-hand almost any object in still life. It is a part of their common daily-school work; they must all do it, and the exercise is only preliminary to the more perfect lessons they are to receive in the trade and technical schools, toward which so many of them are turning their eyes.

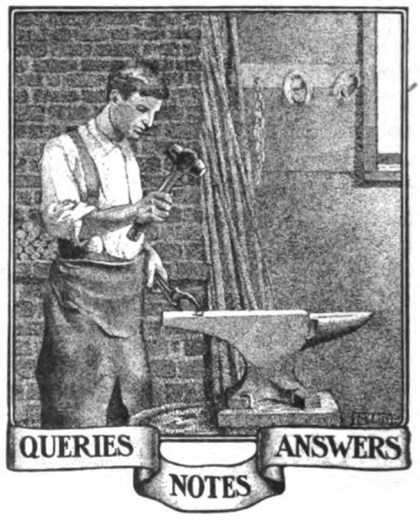
In addition to industrial art schools there are industrial museums, industrial continuation schools, the handicraft and trade schools, the housekeeping and domestic science schools, trade schools and apprentice shops, secondary technical schools and the higher technical schools. Industrial museums contain collections of materials, fruits and products, and are expected to be "up-to-date" in representing the different industries. Such museums are found in Geneva, Berne and Zurich. The industrial continuation schools form the largest class, and number upward of two hundred. These include industrial continuation schools for young men and young women, the handicraft schools and trade courses.

At first this instruction was given mainly in the evening and on Sundays and was compulsory in some districts. In others it was left with each commune whether it should be compulsory or not; and in still other cantons it was voluntary. But there has all along been a feeling against youths having to attend schools regularly in the evening, and the new law for apprentices, requiring day attendance on their part, covers most cases, so that the industrial schools have chiefly resolved themselves into part-time courses.

The handicraft schools and trade courses are for the purpose of enlarging the knowledge of those engaged in the trades, and comprise courses for both men and women. The instruction covers over two or three years. Such schools are the School of Arts and Crafts, at Geneva, and the school for painters, tailors and shoemakers, at Zurich.

The housekeeping and domestic science schools offer training to those women who wish to obtain a knowledge of housework, so that they may become good home-makers and home-helpers.

(*To be continued.*)



Painting Automobiles.—Please publish in your next paper how to paint an automobile. Also, what paint is used on the hood, as the hood gets very warm and blisters the paint. The car is not in very bad shape.
CHARLES W. NORTH, New Jersey.

Wants Information on Stone Tools.—I would like to know the best and most serviceable way to temper stone tools, such as tooth chisels, tooth axes, picks and points. As I am a young blacksmith, I would be very glad to have some information on these subjects. WITTMER BROS., Oklahoma.

Metal for Sparking Points.—Can any of our many readers give me some light on the subject of sparking points? I should like to know what metal is used on them in the make and break system (supposed to be platinum, but it is not), and also the mode of attaching same to parts.
A. T. HENWOOD, Ontario.

Cure for Crippled Foot Wanted.—Just a word to say I could not get along in my shop without THE AMERICAN BLACKSMITH, as it is as necessary as a good tool in a shop. Will some brother smith please tell me how to cure a crippled foot that has been crippled from a nail stuck in the toe, causing the hoof to become narrow (contracted), and also causing a sore in the front of toe near the wall? I shall be very grateful for any information on this subject.

J. E. MARTIN, Texas.

How to Remove Broken Stud Bolt.—In reply to Mr. H. Kellogg's request, if he will take a drill bit and grind it the reverse of the way they are, it will be left hand instead of right. Then put it in a chain drill so he can use a brace and turn just as if he was going to drill it out that way. If the steel isn't too tight when the drill takes hold and gets to cutting it, it will turn the stud out, and if it is anything he can get to the press drill it is an easy job.

I. E. D., Oregon.

Wants to Brass-Plate a Bell.—Can any of my co-readers tell me how to cover a steel cow bell with brass? S. A. HURT, Kansas.

In Reply.—First finish up the bell just as perfectly as possible, smoothing it and getting all kinks, cuts and file marks out of the surface. Now prepare a soda bath of common sal soda and hot water and place the bell in it to remove all grease and dirt. Then plunge it into melted brass. If the bell has been perfectly cleaned and has been kept so, a thin coat of brass will have adhered to the bell and it may then be polished or burnished. H.T.F.,New York.

The American Association.—I believe that the blacksmiths of the United States should belong to an American organization of blacksmiths, and every state and county should have its organization for the betterment of their condition. Also, there should be a law compelling every man to pass a rigid examination by a board of scientific and practical blacksmiths before they be allowed to open shops. The average customer might have to pay a little more for his smithing, but he would get better work and more value for his money than he does now. TOM C. BRENEMAN, Kansas.

A Letter from Texas.—As I am a new reader of THE BLACKSMITH I thought I would write something. I am from the East, served four years at my trade in a cab and hearse shop and then went into a locomotive shop and served four years. I have traveled around a little, and must say I have learned more in three years' travel than the eight years in two shops. I have only been eighteen years at the business and am learning every day. I will give you some of the prices here:

New shoes	$1.50
Resetting	.75
Plow lays	$ .20 to .35
Wagon tongue, old iron	3.85
Bolster, hind or front	2.00
Axle, maple, $3.00—hickory	3.50
Spokes, each	.25
Felloes	1.00
4 tires reset and bolted	3.00
1 set new tires	8.00

Other prices in proportion—this is the benefit of a union. There are two shops here. JAS. SODEN, Texas.

Can You Tell Him.—I should very much appreciate information relating to tools to be used with the ordinary power hammer, not only those that the manufacturers of hammers furnish, but also what blacksmiths have invented for themselves, to do work single-handed or in a cheap and efficient manner. Obviously, the tools that are used with steam hammers are not always suitable, and need one or more men as helpers. I should also like information on the appliances to do welding with gases of various kinds, with detailed description of apparatus and cost of work done.

G. C. JEPSEN, Panama.

A Word of Praise.—You know that this state went for the Lord this November (Democratic). We have the majority in both houses and I am going to have a law passed prohibiting any blacksmith from following the trade unless he can show a receipt that he has paid up for THE AMERICAN BLACKSMITH at the first of each year. I am also going to have a binding clause in the law compelling his wife or mother, or some female person to see that they do read and study it. Now, if I do this and more, I know you will say that I have done some. Now, Boys, all together—Three Cheers for THE AMERICAN BLACKSMITH!

R. B. GAMBILL, Kentucky.

He Has Every Number.—I have every number of "Our Journal" on file, even to the sample copy of Number 1 of Volume I, and would feel very much lost without the paper. I consider it is the best publication of its kind I have ever come across in the sixty-five years of my life. Although I am sixty-five years old and have been on one side or the other of the anvil for a few months over fifty years and have had about as varied an experience as usually falls to the lot of men in our business, yet in nearly every paper I learn something new. The facts are I picked up a back number of the paper (some two years old) today and ran onto an article that sent me to my desk to renew my subscription.

ISAAC CORNELL, New York.

Horseshoeing and Two Questions.—I find some things in the Journal that help, but lots that does not. The article on horseshoeing, where the picture shows the cause in the conformation, is of great value, but for one smith to try to tell another how to shoe a horse without shoeing the horse he professes to shoe is misleading, and in my opinion does more harm than good.

I would like to obtain information on Huther's Patent Groove Head and where it can be obtained; also how to make sand belts. What is used for the belt?

I would like to ask the brothers who use band saws if a 22-inch swing band saw that will cut 6½ inches deep is practical for a carriagemaker. C. B. STAPLES, Maine.

A Shoeing Shop of Vermont.—I consider your paper the best of its kind that I have ever had. I have worked at the blacksmith trade for twenty-two years and possess a shop 22 feet in width and 48 in length. I keep two fires going and have all the tools necessary in a country shop. My business consists chiefly of horseshoeing, but in the winter when the snow is deep I do other things, such as repairing sleds and wagons, and I find so much in THE AMERICAN BLACKSMITH to help me that I want to advise any brother blacksmith who does not subscribe to it to do so without delay. I wish the paper came twice a month instead of but once, and I hope it will have a prosperous and a happy New Year.

FRED. W. CLARK, Vermont.

For the Slow Payers.—These verses are just the thing to hang up in the shop where those who are indebted to you can see and read them. They might stir these people to action.

Lives of great men oft' remind us
Honest men stand no chance;
The more we work there grows behind us
Bigger patches on our pants.

On our pants, once new and nobby,
Now are stripes of different hue,
All because our debtors linger,
And don't pay us what is due.



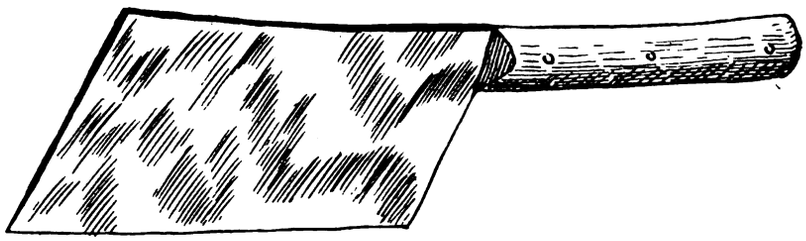
MR. W. E. GRISWOLD'S MISSOURI SHOEING SHOP

Then let us be up and doing,
Get the debt, however small,
For when snows of winter strike us
We may have no pants at all.

H. B. GOODWIN, Missouri.

A Letter from Indiana.—Since I first became a subscriber to your very valuable magazine I have equipped my shop with power, viz., three-horsepower "Olds" gas engine, with which we—I now have a partner—run one Root's Blower, an emery wheel, a band saw and a boring machine. The engine has been running twelve months with entire satisfaction,

although I would advise anyone to buy a four or six-horsepower engine. Our prices, like the majority of smiths', are too low. Shoeing, plain, $ .90 cash, $1.00 credit;



DO YOU MAKE BUTCHERS' CLEAVERS?

toed, $1.00 cash, $1.10 credit; resetting, $ .50 and $ .60. The majority of our work is on credit. Our collections, along with all others, is very slow. We consider your magazine so valuable that we cannot get along without it. W. W. GROSE, Indiana.

A Word from Nevada.—THE AMERICAN BLACKSMITH is a most excellent periodical. I apply its teachings every day, and find them so practical and helpful that I wonder how I ever did without it. I am just a beginner in the craft, having worked but fifteen years at the trade, nine of these having been spent at this place. In my shop are installed a good three-horsepower gasoline engine, an emery wheel stand, a lathe, a large power grindstone, a pumping plant, and I will put in a band saw this spring. Here are some of my prices: Shoeing, plain, $2.00; rough, $2.50; setting light tire, per set, $4.00; welding and setting axles, $4.00; wooden axles, put in, each, $8.00; new buggy tires, per set, $10.00; setting heavy tires, each, $1.50; front bolster, each, $6.00; tongues, complete, $8.00. All other work at the same rate.

A. L. LONGFIELD, Nevada.

On Butchers' Cleavers.—Could any of our many readers give me some advice concerning the making of a butcher's chopper? A customer brought me one with a large gap in it and asked me to reshape it for him. He also wants me to make him one, the shape of which is to be like the engraving. What steel should you advise me to use, and how would you temper them? Would it do to heat them to a blood red all over and then immerse in rainwater? Then, shall I hold over a low fire and lower to a straw color? I would be most grateful for an early reply.

WILLIAM A. PEARSON, England.

Those Fifty Lister Lays.—I see that our Mr. Metcalf, of Iowa, is making light of the article of Mr. J. D. Couch, from Kansas, and, as he has not answered, will say for him that he has put it too low. Now, fifty lister lays is not a day's work with me, and I can sharpen that many and not have my arm bare, and do some other work besides. Surely, Mr. Metcalf is a back number or he would not think much of such a stunt. You must remember that we out here in Kansas and Nebraska do work while they wait. If Mr. Metcalf will come out some time I will put him next, but will say the way it is done is to have an engine, power blower and trip hammer, a fire in which you can heat a lister lay in two heats and with only two heats to each lay and two listers in the fire at a time—it is easy. It is so common out here in this country that we never give it a second thought. Put in power and nothing like a little speed will surprise you and you may be able to start a little cyclone in your own shop.

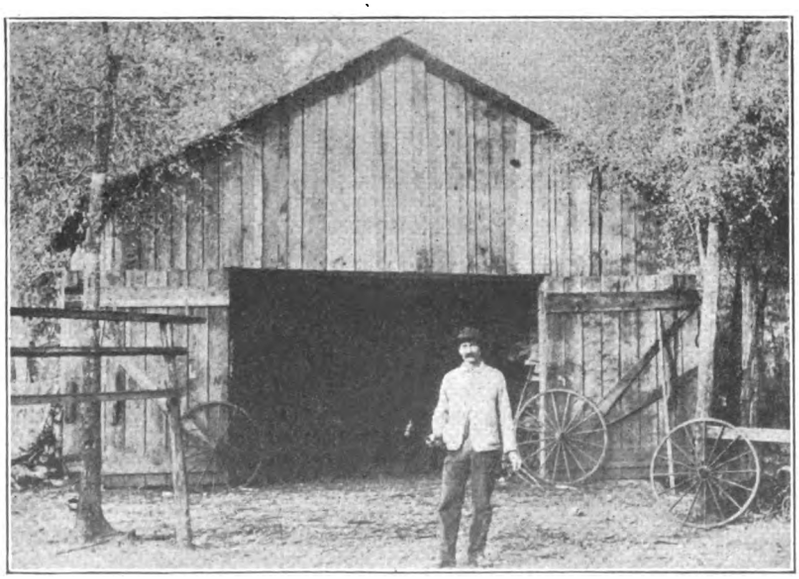
G. B. JEWETT, Nebraska.

That Engine Foundation.—Perhaps this will be too late to be of any use, but if Mr. Tedford wishes to build a concrete foundation for his engine he wants to get a board large enough to put under his engine upon which to mark and bore the holes for his bolts. Then take four pieces of old cart tires, about 3 or 4 feet long, and bore holes in them to correspond to the holes in the board marked from the face of the engine. Then make the bolts according to the size of the engine. If it is 6 or 8 H. P., they will have to be 3 feet long and the base will have to be 6 feet square up to the floor level. He can then make a form ½ inch larger than the base of his engine each way and level it so it will be larger at the base than at the engine. He need not be afraid of getting his base too large. I mix cement three to one, and the last inch clear cement. I like your paper very much as I get a lot of information from it. I have been at the business for eleven years and am learning yet. Although I do not shoe horses I enjoy reading what the brothers have to say to each other, for I think some of them know what they are talking about.

L. LAURENCE, New Hampshire.

Low and High Prices.—I wish to express my appreciation of your paper. I love to read the contributions, etc., and, in fact, I read advertisements and all. There is much to be learned from its pages. I desire to say in regard to prices I shall continue to keep up prices or lay aside my hammer. This part of Mississippi is run on long credit as a rule, and there are many Tom Tardys and Cheap John blacksmiths who gobble up all the cash jobs at too low a price upon which a skilled workman can live. When I came here, in the spring of 1902, I built a 14 by 20-foot shop on another man's property and possessed only a few tools. Nevertheless, I continued holding up prices and, by adding new tools from time to time, I finally won a fairly good run of work and am now well known in town, although I am located five miles from it. I raised plow sharpening here from 5 cents each for 7 inches to 10 cents for 7 inches, and 25 cents for larger ones; cotton sweeps, 10 cents to 20 cents each; 1⅛ wagon wheels, filled, $3.50; buggy wheels, filled, $3.50; buggy stubs, $6.00 a set, and this year I will go higher. A. L. POWELL, Mississippi.

On Plows and Plow Lays.—Seeing an item from Brother Andrew Peters, of Minnesota, on plow work, I would like a little more information on the hardening of plow lays. I looked in our dictionary for the dust he uses in the way of sprinkling just before plunging, and the word "cyanide" does not seem to be a powder or dust. I know there is a certain kind of powder or dust that will harden steel if applied when hot, but have never used it, nor do I know what it is. Let Brother Peters, if he will, explain this hardening a little more clearly, if he pleases. Is there not an acid that will temper, too, if applied? With the powder, do you plunge in water or in ashes? I have worked on plows, making lays and repairing for some thirty years, and have worked a great deal in other shops, but never tried to harden except with water, though I know that a smith cannot temper a plow lay all along the edge evenly with water or in oil by heating in a common forge. I think Brother Peters' way of putting on a point very good for common, but in this country a share will wear in the throat as well as the point; so I put on most all points double and all with the same heat. The under side of the point being in the shape of a V, one part lying on under side



AN ALABAMA SHOP DOING GENERAL WORK, AND RUN BY MR. R. A. MC GILL

of bar point, and the other side of the V lying along the throat; then turn so as to cover top. Clasp with crooked tongs and weld all at once. This is solid and good.

W. R. GARMAN, Kansas.

A Criticism on Forging.—I was just reading the article on "Forging and Its Cure," by W. O. Julius, in my December issue on page 62. I think he must have had fresh pork for dinner, or else he has a bad cold and had taken a rather large dose of quinine before he wrote this article. He first goes on to explain the cause of a horse's forging and a cure. His explanation is good, and I do believe, according to my theory, to be correct in every point. Then he gives a sketch of a front shoe which is an A No. 1 shoe. He says the toe of the front shoe should be fitted with a toe weight and beveled at the heels as shown at A. All that bevel amounts to, it prevents from cutting the hind foot in case he should strike.

Now, he says that the hind shoe should be formed as shown at B on the same page, the toe shortened and fitted, with two clips if necessary; but we don't use the clips only in rare cases, as he admits the clips do more damage than good. Now here is the point I wish to bring before our brother readers: When a horse forges, the first thing we are to do is to increase the action of the front feet and to decrease the action of the hind feet. Well now, if we put a toe weight on in front and shorten the toe of the hind foot, what have we gained? The proper thing to do is to lengthen the toe of the hind foot so as to decrease the action there, and then we have accomplished something, and I sincerely think that Mr. Julius will agree with me on that point, too, for I don't really believe that he meant his article to read as it does. But, if he did, I am real sorry, because I believe it incorrect, and I think others will agree with me that his theory is absolutely wrong.

C. W. METCALF, Iowa.

Prices in Oklahoma.—I have thought for a long time about writing a letter to my brother craftsmen. I have been taking THE AMERICAN BLACKSMITH for nearly a year and it is a great help to me. I have been doing general repair work and shoeing for nineteen years, and of that nineteen years I followed practical horseshoeing for seven years. I did track work in half of the states, and horseshoeing was about to break me down when I took up repair work. I learned my trade way back in old Indiana, at Indianapolis, and served a three-years apprenticeship. Probably some of the people back East think there aren't very good workmen in our new state, Oklahoma, but I will tell you we have good ones and lots of poor ones, too, and if my name even appears in the journal I think there will be lots of brother craftsmen recognize it, as I have done lots of journey work. I have been in business six years here in Oklahoma for myself. My shop is 20 by 30 feet. My principal work is plow and carriage work and some shoeing, and my prices don't tally with the Arkansas brother. If I were he I would get up a price system to suit myself, as he has a big territory to work on. Here are some of my prices:

4 shoes toed	$1.35 to $1.50
Resetting	$ .80 and 1.00
Tire setting, per set	2.00
Axle set	1.00
Making new plow lays	$2.75 and 3.50
Sharpening plows	.20 to .30
Listers	.25 to .35
Wood axle	2.50
Spokes	.25
Buggy tires	3.00
Big wagon tires	2.50
Painting plow lays	.75
Cutting down wide gauge wagon	8.50
Stubbing buggies	6.50
Stubs, 1¼	7.00
New tires, per set	$10.00 to 16.00
Welding cotton gin shaft	.50
Small weld	.10 to .15
Welding cycles	.75

MORGAN KEITH, Oklahoma.

A Practical Talk on Plow Work.—I have been working at the trade for but three years, and am, consequently, comparatively a new man. The little 14 by 16-foot shop in which I started was within half a mile of another, and naturally I found out what the word competition means. When I got fairly started I told an old craftsman friend of mine about my troubles. He quoted the old rule about competition being the life of trade and added that "A silent tongue, good work, kindness and always at your post" was the best advertisement that a man could display.

The way I true a plow is to place it on a broad plank and find just where it is out; then I commence at the ground and go up. If the plow goes too deep I look for suction, and if it is there I see that the shank that holds the point has not bent down. If it has, I heat the plow at that place and bring the point to the proper place. Then I place the plow on the board again and measure the point of the beam. The beam should measure 14 inches from the bottom of the beam to the board. If the beam stands too high, don't trim the beam. I take the handles and the beam off the plow and place them upright over the fire till a good, red heat is obtained; then I bring the upright forward till the beam is in the right position. I set the plow out to cool, so it will not warp. Care must be exercised so as not to take the land from the plow, or give it any more than it ought to have. I then place the plow together and try this rule: For a two-horse plow there should be ¼ inch suction at the point 14 inches under the beam and gather to suit the size of the plow. I have followed this rule and I have not had a single complaint.

To reset a tire on a new rig and not mar the paint I cut the tire at the felloe joint, in one of the tire holes and then cut away the rim until the felloe is snug on the spokes on the same side that I cut the tire. Then I weld the tire and bore the hole for the felloe joint and place the tire in the way that it was, put tire bolts in three or four places around the wheel and let the tire cool.

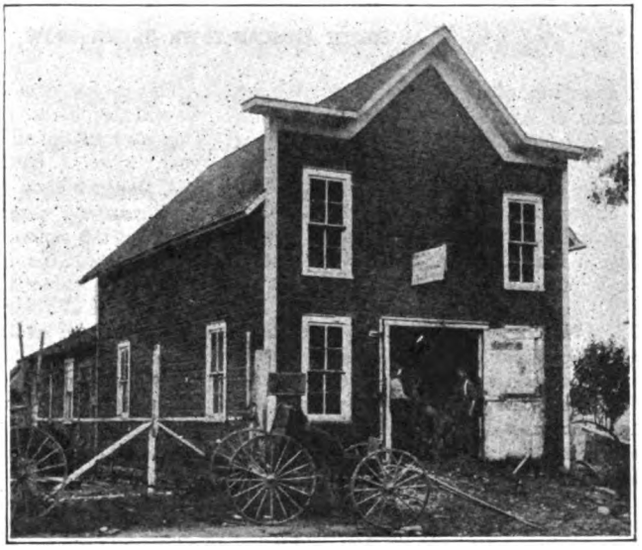
J. C. SUTTLE, Illinois.

An Interesting Letter from Kansas.—Someone has said that "the pen is mightier than the hammer," but we doubt it; at least, it hasn't proven so in our case. We think that we have been fairly successful, considering that we are both young and had not a great deal of experience, except such as is gained in a small place.

Our location is in Central Kansas in a little town of some 2,500 inhabitants and we have been in business about two years.



THE HOME OF MR. CHARLES KASTEN, OF WISCONSIN



THE GENERAL SHOP, RUN BY MR. CHARLES KASTEN

The firm was formerly known as Buckley & Son, but as our father wished to retire from business we bought him out and are now at the old stand. Our shop is built of concrete blocks and is 25 by 80 feet. We have it equipped with an I. H. C. Gas Engine, drill press, trip hammer, power blowers and emery stand, also a cold-rolled disc sharpener of the latest model. We are thinking of installing a blower to furnish a breeze for the interior of the shop during the still, hot days of summer.

During the last few weeks we have had the largest run of horseshoeing in the history of the shop. We have made a specialty of horseshoeing and plow work and have found out that it pays to "try to do every job just a little better than the last one." We have heard some complaint about papers containing one third instructive matter and two thirds advertisements, but we have this much to say—we consider THE AMERICAN BLACKSMITH, without the reading matter, the best up-to-date catalogue of all, and as a whole we consider "Our Journal" the best magazine and one that can't be beat.

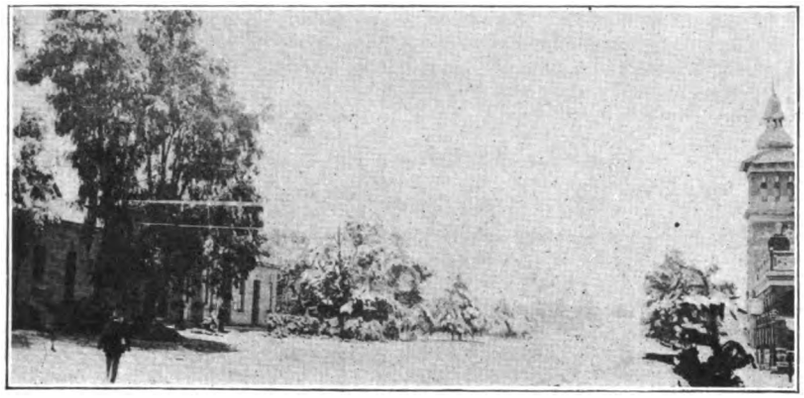
Another of our ideas is that good work justifies good prices, and we take pride in stating that we, that is all the shops in this town, receive better prices for our work than even the surrounding towns do. To substantiate our statement we quote a few of our prices:

HORSESHOEING:

Plates	$1.50
Rough	1.75
Over 5's	2.00
Stallions	4.00
Resetting plain	1.00
" with new toe calks	1.25

REPAIRING:

New wagon tires, per set	$ 9.00 and up
New buggy tires, per set	6.00
New buggy rims and set tire	6.00
New wagon rims and set tire	10.00
Tire setting, per set (4)	2.00
Discs up to 18 in., sharpened	.40
" 18 to 24 in., sharpened	.50
" 30 in. and over, sharp'nd	1.00

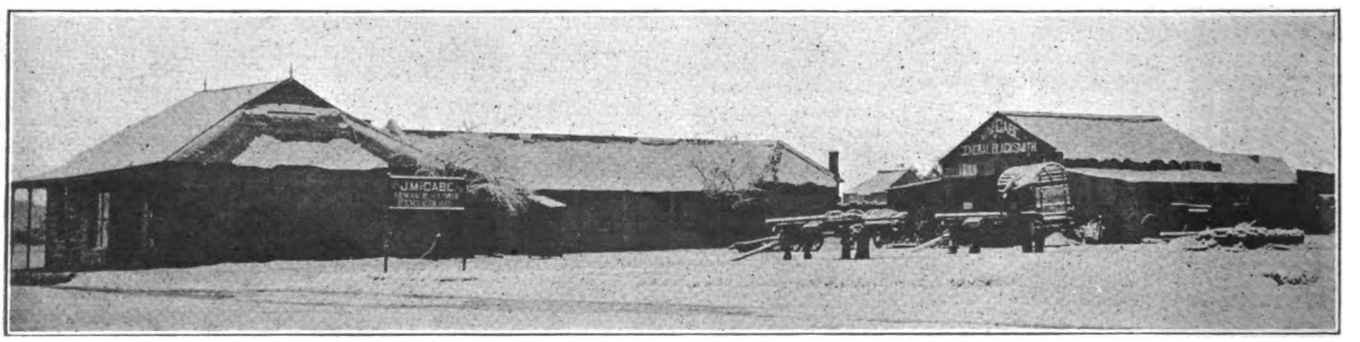


A SOUTH AFRICAN TOWN UNDER SNOW

This is our first appearance in print, so we will stop here. We wish THE AMERICAN BLACKSMITH and all her patrons a prosperous year. BUCKLEY BROS., Kansas.

A General Shop in the Transvaal.—The accompanying engravings show my shop and also the center of the town. You will observe that the ground is covered with snow—something that doesn't occur except at intervals of about five years.

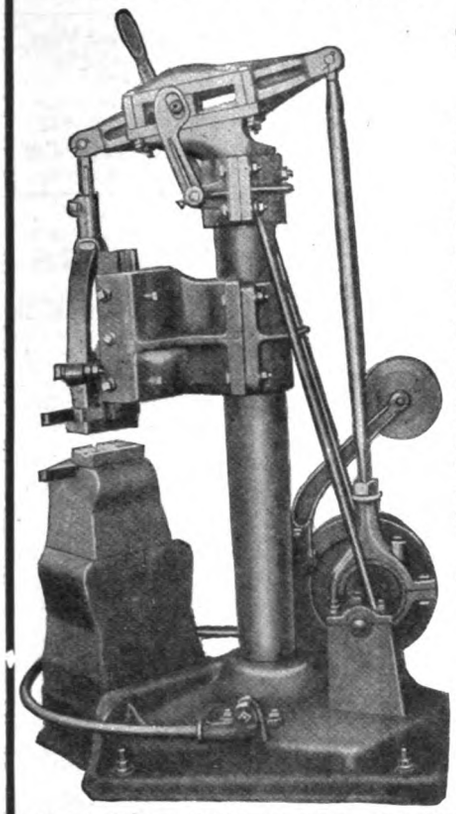
I have been established here some thirty years—have had to struggle through bad times and the late war has almost completely ruined myself and everybody else. Up to the beginning of the war there were three blacksmith shops here—although for years I was the only one and had to do everything from smithing to tinkering and clockmaking. At present there are no less than seven shops competing, but my work, through its merit, holds its own, and my business on the whole is progressing favorably, despite the competition. JOHN MCCABE, South Africa.



THE SHOPS OF MR. J. M'CABE IN THE TRANSVAAL, SOUTH AFRICA

More About Blacksmiths and Gentlemen.—I noticed the clipping from the Denver Post in the October issue of THE AMERICAN BLACKSMITH. I presume the writer of it who signs himself "A Gentleman" belongs to the white slavers, or Governor Peabody, or Senator Borah, or Teddy R., of Chicago & Alton fame. It is high time the workers of Colorado began to put their class in office when one trial cost the people three hundred thousand that we know about and Lord knows how much more that we don't know about; all on account of having gentlemen looters in office. It appears that they have one of those big black-fisted blacksmiths in the office of State Auditor, Roady Kenehan by name—a man with a mind and one who cannot be hoodwinked by those slippery gentlemen that have been looting the public domain and treasury. You ask the question, Mr. Gentleman, "Where would the poor get their Christmas dinners and soup tickets if it were not for the upper classes?" If it were not for such people as you gentlemen highwaymen there would be no poor. You do nothing but absorb the product of their labor and dodge the tax collector. The system that produced you likewise produced the hobo and the prostitute. What would you do for your Christmas dinner if it were not for the blacksmiths and all other working classes? Look at all the inventions and machinery in this vast country, all belong to the working class. Not one thing did you contribute. Then, after making this country what it is, you have the gall to tell us we are not fit for office, cannot be trusted to govern ourselves or hold our destiny in our own hands. This property that you are dodging the tax collector on is only yours so long as the blacksmiths and other workers permit you to have it. I am glad to hear of a blacksmith in office and some of these days the workers of this country are going to quit voting for your class and elect their own kind. We will outnumber your class a thousand to one. We have the votes and the power. Then you will have to do your share of the work and not shirk when the tax collector comes around. We will even go a step farther and reduce the hours of those that toil to about three per day, and put all gentlemen to work. We will own the tools and the job. Then there will be leisure for everybody and all be gentlemen, instead of working three times as long as we should, and allowing you to absorb our products and hold us down to brutish levels. We will establish government factories and shops, farms and commissaries, pension our old, worn-out blacksmiths and workers instead of leaving them to starve, and die in a poorhouse while others live in luxury. How can you become rich except on the product of other men's labor; and your boasted prudence and economy—what is it but the most skilful availing yourself of their necessities and the most resolute closing of your heart against their cries to you for help. E. Z. MARK, California.

Modern Means Power Profitable Hammer Help



The No. 1 Modern is a durable, light weight, quick-acting hammer, covering a wide range of work, from extreme light up to the full capacity of the machine.

Our No. 2 Modern Heavy Basis Power Hammer, with a lever making possible a light or heavy blow at full speed, is designed for use in repair shops and manufactories.

Write us today for our book, entitled:

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It is a pleasure to use . . . **Derby Screw Plates**

Uniform strength and accuracy make them—out of the ordinary. Write now for our complete illustrated catalog, sent free. : : : : :

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When a dealer or jobber tries to impose substitutes for the *good advertised articles,* write us or the manufacturer. We will see that you get the genuine—what you want.



SUPERIOR
HORSE RASPS

THE BEST YET

Best High-grade Steel,
Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

EVERY RASP PERFECT AND WARRANTED

Made in all regular sizes, and in the new 18-inch Slim, which gives the user the advantage of a long stroke, and at the same time a rasp of medium weight.

ASK YOUR DEALER FOR THEM

Current Heavy Hardware Prices.

The following quotations are lowest prices generally quoted at Chicago, Feb. 16, 1910, and are subject to fluctuations. Corrected for The American Blacksmith by the National Heavy Hardware Reporter, Chicago.

A great many changes will be noted in wood stock quotations. It is the opinion of large handlers that prices will be much higher soon. The mills have cut little or nothing this winter and are not cutting now; the large manufacturers have picked up everything in sight and the spring demand will send prices soaring.

Business in the sections visited by heavy snow fall, has been dull, while those few sections that have had but little snow report business as excellent. The shoers in some sections have been very busy.

Iron and steel remain firm.

Collections generally are reported slow.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—

$2.00 rates, full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—

$2.00 rates, full extras.

Toe Calks—	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—	
6 x ⅞ and smaller	60–10%
Larger and longer	50%

Machine Bolts—	
4 x ⅞ and smaller	60–10%
Larger and longer	50%

Nuts—	
Less than 10 lbs. of a size	$2.50 off
From 10 to 50 lbs.	3.00 off

Washers—	**Skeins—**	
Same price as nuts.	Cast	65%

Malleables—	**Half Patent Axles—**	
Common	$ .09	65%

Springs—	
Single Spring, each	$1.25
Springs, black and half bright	.06

Hickory Lumber—Per Foot—	
1 to 2½	$.09
2½ to 4½	.10

Ash and Oak Lumber—Per Foot—			
1–1½	$ .07	2½–3	$.08
1½–2	.07½	3½–4	.09

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
⅜"	$70.00	$70.00	$80.00
½"	70.00	73.00	85.00
⅝"	73.00	80.00	90.00
¾" to 1"	77.00	85.00	109.00

Rough Hickory Axles—		Each.
3 x 4	6 ft.	$ .55
3½ x 4½	6 ft.	.90
4 x 5	6 ft.	1.10
5 x 6	6 ft.	2.00
4 x 5	6½ ft.	1.20
4½ x 5½	6½ and 7 ft.	1.80
5 x 6	6½ and 7 ft.	2.50
5½ x 6½	7 ft.	3.00

Finished Hickory Axles—	
For 2½ and 2⅝ Skeins	$ .95
For 3 Skeins	1.10
For 3¼ Skeins	1.35
For 3½ Skeins	1.50
For 3⅝ Skeins	1.80
For 4 Skeins	2.10

Rough Oak Bolsters—	
Short	$.07½
12–14–16 ft.	.08½

Finished Oak Bolsters—	
2½ x 3¼ and under	$ .60
3 x 4	.65
3½ x 4½	.80

Rough Oak Wagon Tongues—	
4 x 4 x 2 x 4 x 12 and smaller	$ .95

Finished Oak Wagon Tongues—	
3½ and smaller	$1.20
3⅝	1.25
4	1.30

Two Inch Sawed Hounds	Per Pair.
Tongues	$ .35
Front	.40
Hind	.50

Patent Wheels—	
A. B. No. 13 and under	45 %
D. No. 13 and under	35–5 %
All Grades, No. 17 to 33	35–5 %
All Grades, No. 39 and Larger	25–5 %
C. No. 13 and under	40–2½ %

Cupped Oak Hubs—	Set.	**Plain End Oak Hubs—**	Set.
7 x 8 x 9	$1.40	10 x 14	$3.30
7 x 9 x 10	1.50	11 x 14	4.20
8 x 9 x 10	1.55	11 x 15	4.50
8 x 10 x 11	1.80	11 x 16	5.10
9 x 10 x 11	1.95	12 x 16	5.75
9 x 11 x 12	2.00	12 x 17	6.30
10 x 12 x 13	3.00	13 x 18	7.00
11 x 13 x 14	4.20		
12 x 14 x 15	5.10		

Rough Sawed Felloes—			
1½ x 2 "	$1.45	2 x 2½"	1.85
1½ x 2½"	1.65	2½ x 2 "	4.35
1½ x 2⅝"	1.75	3 x 3 "	5.25
3 x 3½"	5.50		

Ironed Poles, White, XXX—	
1⅞ x 2½" No. 2	$3.80
2 x 2½" No. 3	3.80

Ironed Shafts, White, XXX—	
1⅜" x 2 " and smaller	$1.95
1½ x 2 "	2.20
1½ x 2½"	2.70

Farm Wagon Bows—	
Round Top, ½ x 2 "	$ .60
Flat Top, ½ x 2 "	.75
Round Top, ⅝ x 2½"	1.35

Standard size Piano Bodies with Seats—	
Each	$4.25

Plow Beams—	
1 Horse	$ .60
2 Horse	.75
3 Horse	.90

All Hickory and Oak Spokes and Patent Spokes—
Discount from Weis & Lesh List No. 5 .. 5%

Wagon Neck Yokes—

	Mixed Forest	Second Growth	White Second Growth
2½ x 38"	$2.05	$2.80	$4.00
2½ x 42"	2.70	3.90	5.25
2½ x 46"	4.15		
3 x 44"	4.35	6.70	8.38
3 x 48"	5.25	7.50	10.00

Single Trees—Oval—

	Mixed Forest	Second Growth	White Second Growth
2½"	$1.50	$2.70	$3.35
2½"	1.60	2.75	3.50
2½"	1.65	2.80	3.65
3 x 36"	2.30	3.30	4.10
3 x 38"	2.35		
3 x 40"	2.50	3.85	4.65

Single Trees—Round—

	Forest	Second Growth
2½"	$1.90	$3.45
2½"	1.90	3.50
2½"	2.00	3.60
2½"	2.65	4.10
3 "	3.20	4.65

Oval Plow Doubletrees—		**Flat Plow Doubletrees—**	
2½ x 36"	$1.60	1¼ x 3½ x 42"	$2.75
3 x 40"	2.40		

Wagon Doubletrees—	
2 x 4 x 48"	$3.40
2½ x 48"	4.50
2½ x 4½ x 50"	4.90
2½ x 4½ x 52"	5.25
2½ x 5 x 52"	6.00
2½ x 5 x 54"	6.75
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—	Forest
2½ x 30" and under	$ .90
2½ x 30" and under	1.15

Buggy Doubletrees—

	Mixed Forest	Second Growth	White Second Growth
2½" and smaller	$2.50	$3.50	$4.50

Express Doubletrees—

	Mixed Forest	Second Growth	White Second Growth
2½"	$2.80	$3.55	$4.80
2½"	3.40	4.50	5.25
3 "	3.40	4.15	5.50

Express Singletrees, Turned—

	Mixed Forest	Second Growth	White Second Growth
2½"	$2.25	$2.50	$3.50
2½"	2.75	3.50	3.75
2½"	3.25	3.75	4.50

Express Singletrees, Square Center—

	Mixed Forest	Second Growth	White Second Growth
2½"	$2.75	$4.00	$5.00
2½"	3.25	5.20	5.75

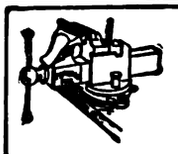
Buggy Neck Yokes—

	Mixed Forest	Second Growth	White Second Growth
2 x 42"	$2.60	$3.25	$4.25
2½ x 2½ x 42"	3.00	3.50	5.00

CUMMINGS & EMERSON

Blacksmith and Wagon Makers' Supplies,

PEORIA, ILL.



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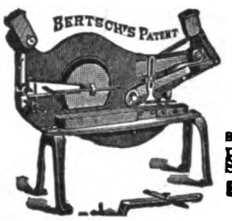

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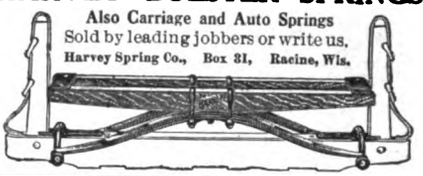

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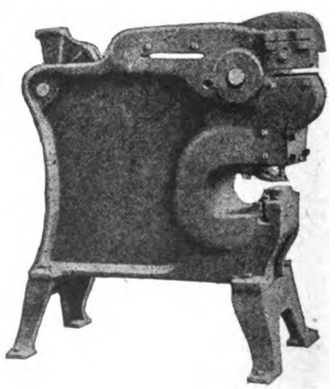

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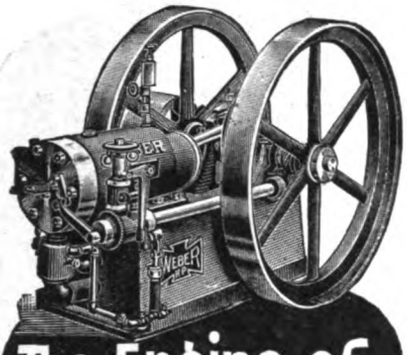

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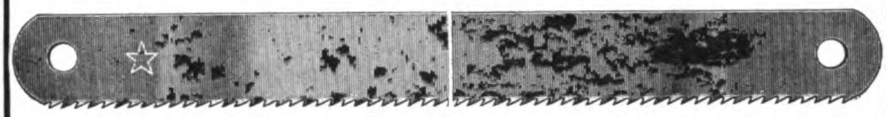

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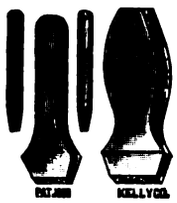
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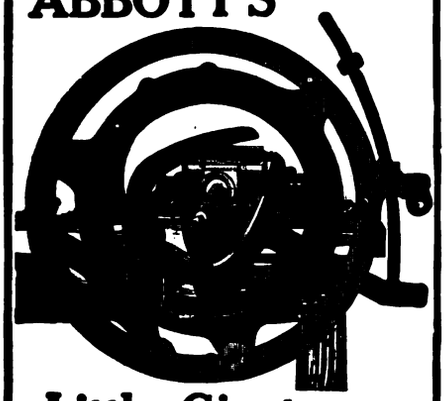

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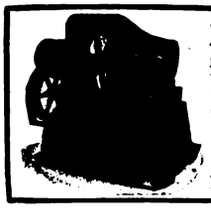

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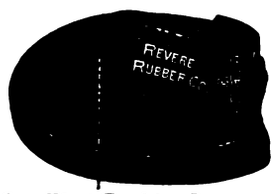

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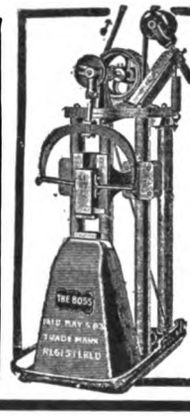

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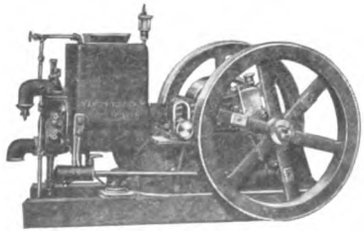

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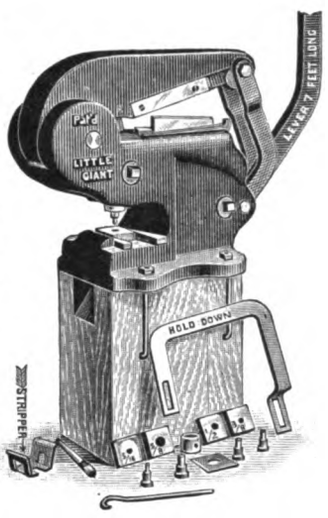

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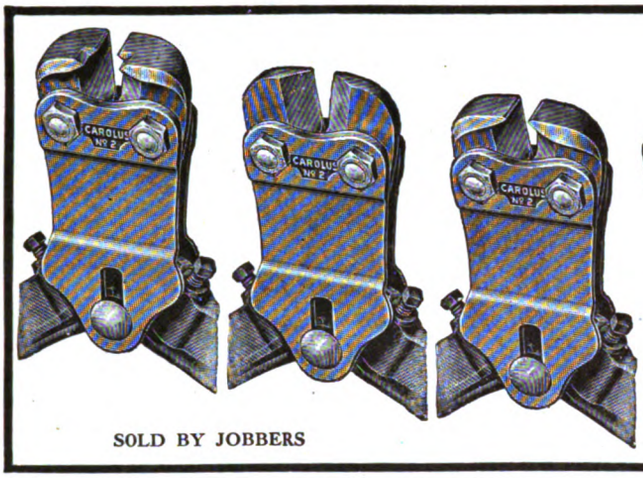

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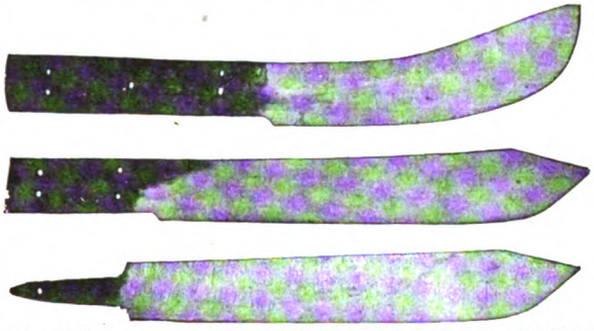

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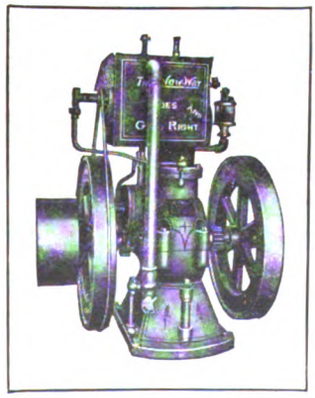

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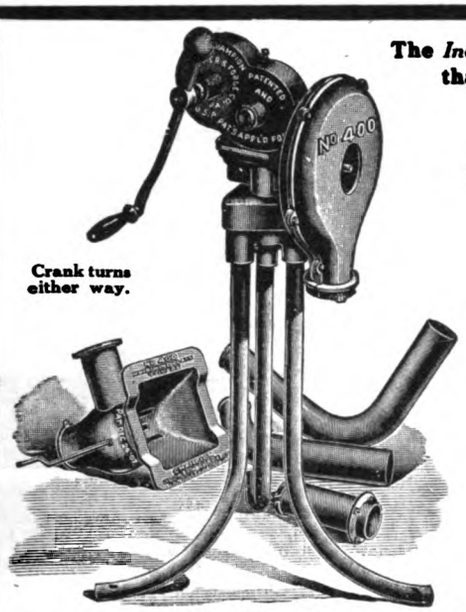

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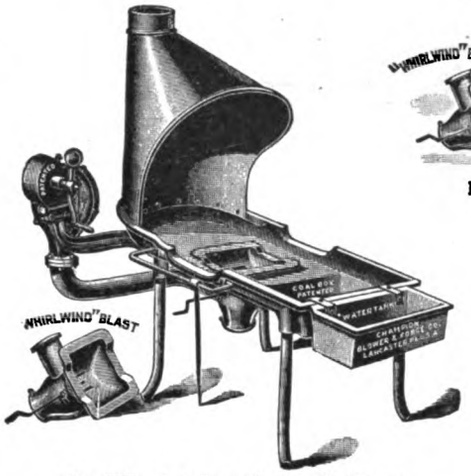
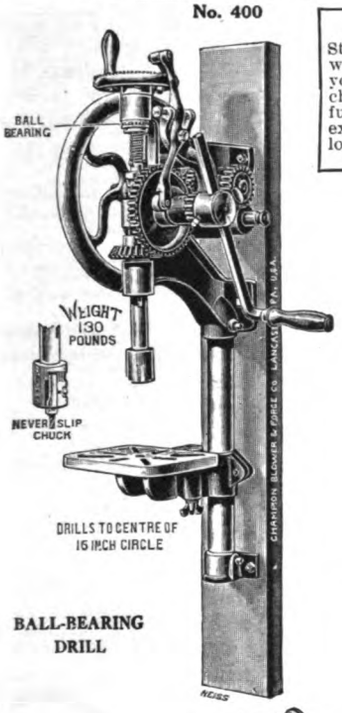


No. 433. Cast Iron Blacksmiths' Forge



No. 408. Steel Blacksmiths' Forge



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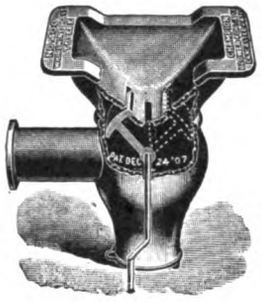

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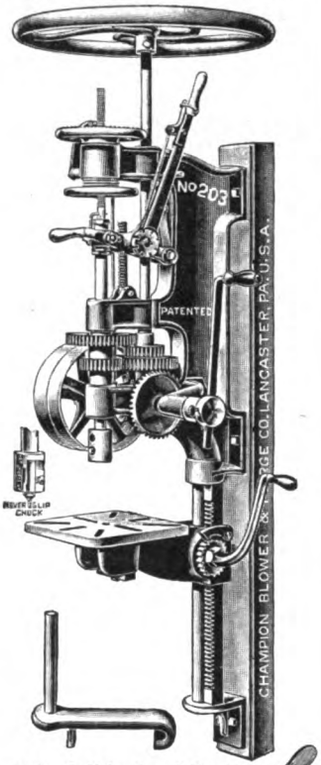
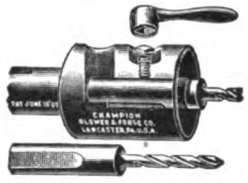


No. 203. Self-feed and Double Compound Lever-feed Drill.



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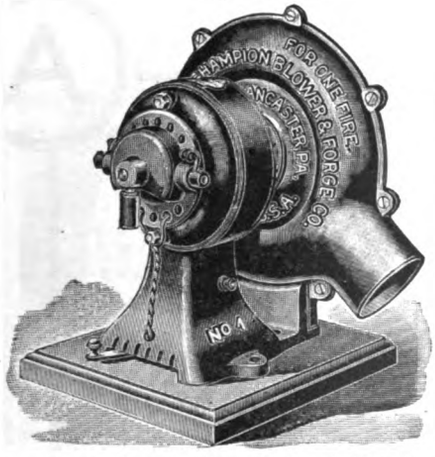

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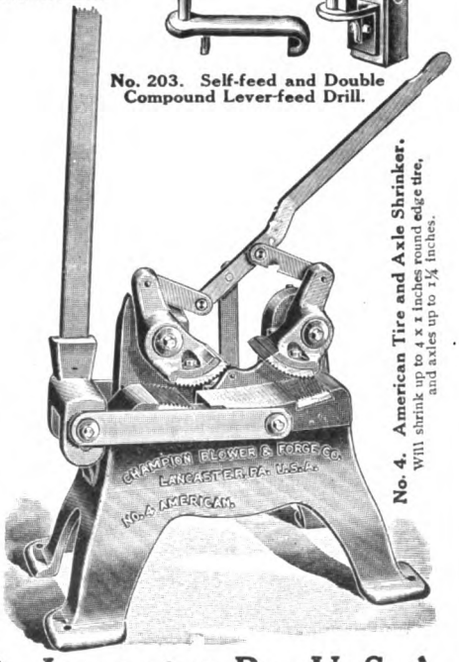

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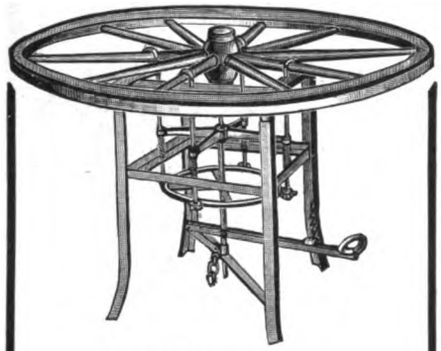

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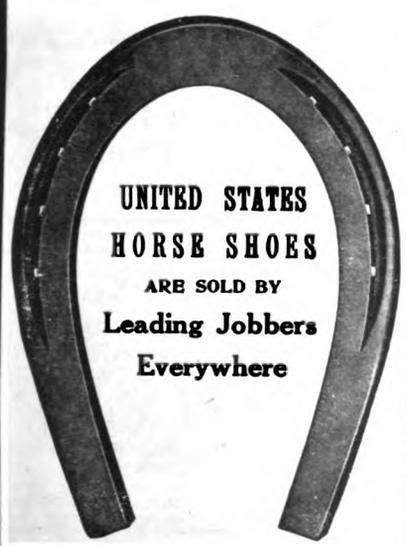

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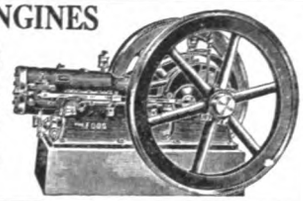

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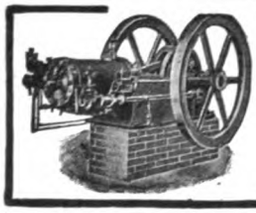

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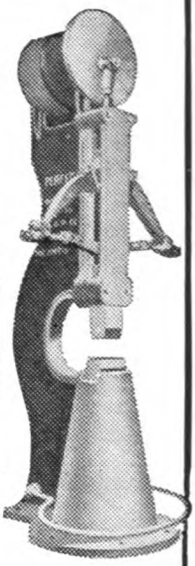

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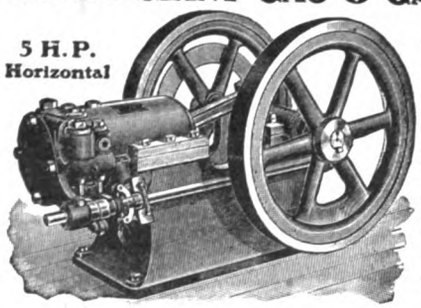
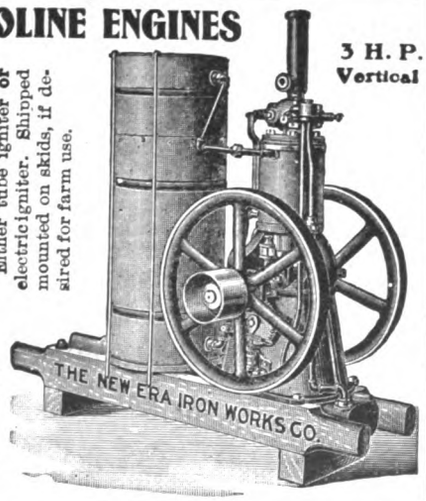


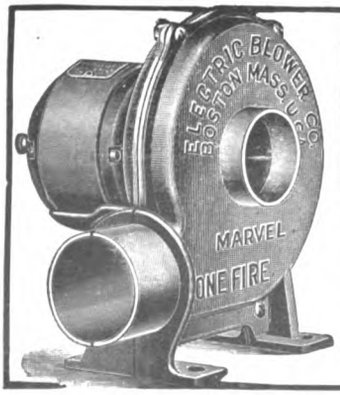
Sizes, 1½, 3, 4½ H. P. Vertical, 5 to 25 H. P. Horizontal. **Either tube igniter or electric igniter.** Shipped mounted on skids, if desired for farm use.

3 H. P. Vertical



Also equipped with pumping attachments. Write for booklet describing full line New Era Gas Engines from 4 to 100 H. P. Special inducements to dealers as agents.

THE NEW ERA GAS ENGINE CO.
No. 63 Dale Ave., DAYTON, OHIO.





MARVEL

"One Fire" Variable Speed Electric Forge Blower

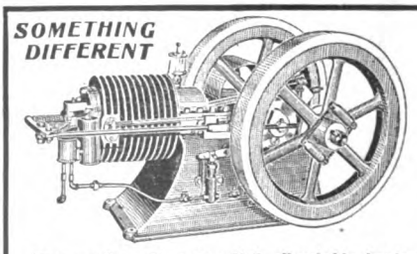
$28.00 Net

Gives 100 per cent greater air pressure than any other "one fire" outfit.

30 days' Free Trial, through your dealer.

ELECTRIC BLOWER COMPANY
BOSTON, MASS.

SOMETHING DIFFERENT



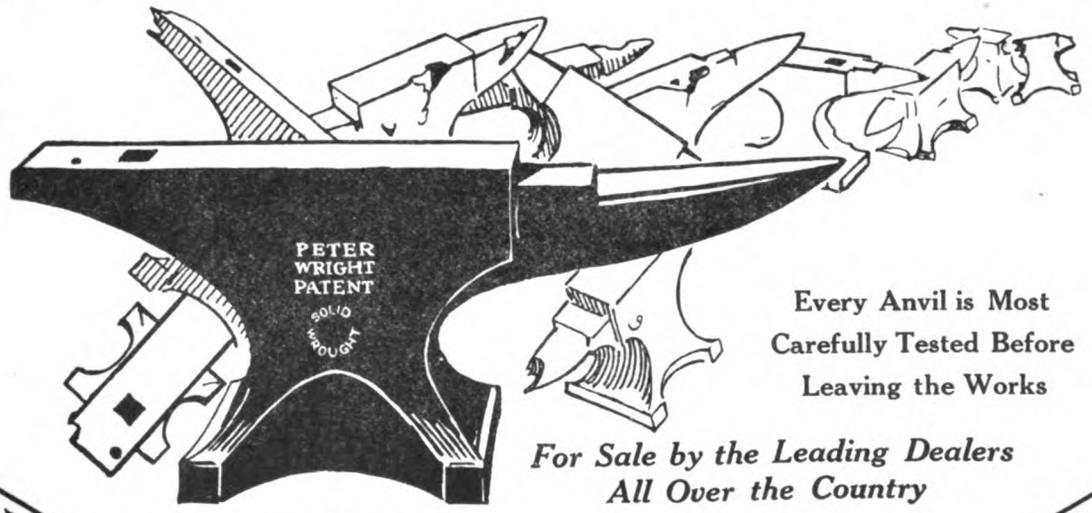
No money down. Sizes 2 to 12 H. P., all cooled by drawing the air directly inside the cylinder—no water used nor fans. ALL water coolers will "freeze up." You can't afford to run the risk. Guaranteed for Five Years. By special arrangement of valves we use one third less gasoline than other makes. Get our proposition to Blacksmiths. Do it now, before we place an agent in your town.

GADE BROS. MFG. CO., 18 North Street, Iowa Falls, Iowa

Watch this Space for a Complete Line of Light Drop-forged Steel Horse Shoes and Tips : : :

WRIGHT'S ANVILS

"WRIGHT'S ANVILS OUTLAST ALL OTHERS"



Every Anvil is Most Carefully Tested Before Leaving the Works

For Sale by the Leading Dealers All Over the Country

QUALITY COUNTS

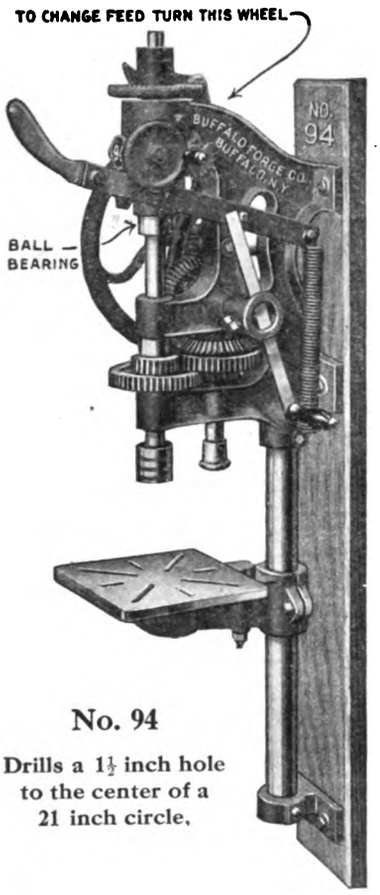
Agents for the Manufacturers

WIEBUSCH & HILGER, Ltd.,

106-110 Lafayette St., NEW YORK, N. Y.

Buffalo Ball-Bearing Drills

With Full and Instant Return of Drill Spindle



No. 94

Drills a 1½ inch hole to the center of a 21 inch circle.

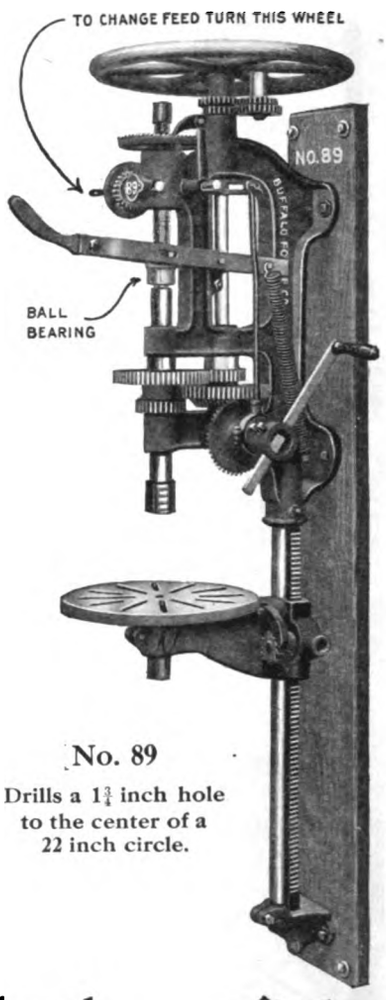
The only drills with ball bearings practically applied at the points of high speed friction, greatly increasing the efficiency.

Long journal bearings bored and reamed in the solid frame, machine-cut gears in perfect mesh, accurately fitted parts, insure easy operation without noise, loose motion or back lash.

A half turn of the little wheel at the left of feed screw head gives lever control with instant return of spindle.

Drill a Hole, Let Go.
You Are Ready for the Next.

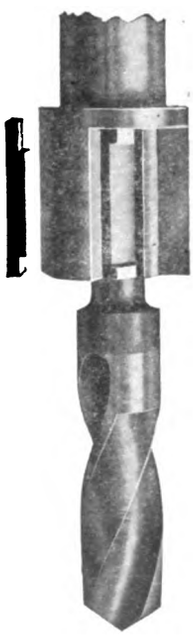
Send for Drill Catalog
178 A. B.



No. 89

Drills a 1¾ inch hole to the center of a 22 inch circle.

Buffalo "Suregrip" Drill Chuck



Sectional View

Consists of only two parts, the key and the collar. The key rests in a slot in the drill spindle, around which the collar revolves. The outer side of the key rests against the collar. A half turn of the collar either way forces the key against the flat side of the drill and

Locks the Drill Securely

until a half turn back releases it.

When in line the Os on drill spindle and chuck indicate the chuck is open.

No Screws or Projecting Parts

to injure the hands or tear the clothing.

Buffalo "Suregrip" Drill Chuck is regularly furnished on Buffalo Drills 89, 90, 94, 96, 98 and 99.

List Price, Separately, $2.00



The Chuck

Buffalo Forge Company
Buffalo, N.Y.

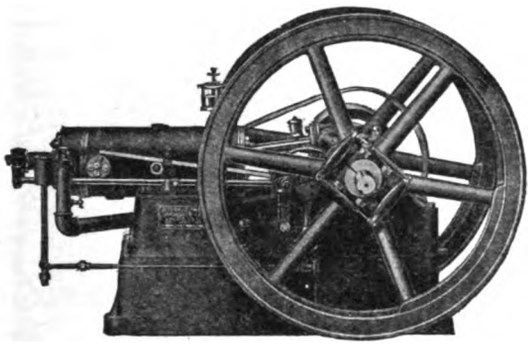
Ask your dealer for and insist upon "Buffalo" Tools. Look for the name, it's cast on every tool. If he does not supply you, write us. We will see that you get the right goods at the right price.

EVERY BLACKSMITH NEEDS AN I. H. C. GASOLINE ENGINE

You need an engine to get the most out of your efforts. Hundreds of times one of these simple, reliable powers will give you a more valuable service in a few minutes than you would get from a hired helper in a whole day.

Why not make an I. H. C. engine your handy man? You can call upon it whenever you need its service. You will find it ever ready. If it works for you steadily all day, its wages will be only a few cents expended for gasoline.

If you let it remain idle, its wages are nothing, its board is nothing, but it will be ready the next day to go right back on the job at your command.



Dependability, readiness, simplicity, economy, ease of operation—these are qualities that make I. H. C. gasoline engines appeal to all classes of mechanics. To no mechanic or shop worker is it more valuable than to the blacksmith.

You have your choice of many sizes and styles.

Verticals—2, 3, and 25-horsepower.

Horizontals (portable and stationary)—in 4, 6, 8, 10, 12, 15, 20 and 25-horsepower.

Air Cooled Engines—in 1, 2 and 3-horsepower.

It will pay you to investigate these engines. It will interest you to look into their superior materials and the superior way in which they are constructed. Write for catalogues of the style in which you are interested.

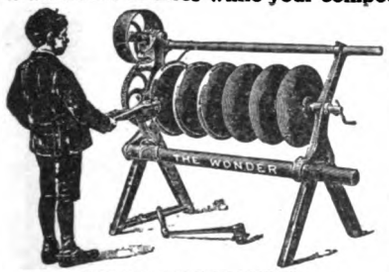
INTERNATIONAL HARVESTER COMPANY OF AMERICA
(INCORPORATED)

13 Harvester Building *CHICAGO, U. S. A.*

WONDER DISC SHARPENERS

SAVE ½ THE TIME AND ALL THE LABOR.

The Wonder Disc Sharpeners save over one-half the time and labor. Every wide-awake and up-to-date shop owner who has sharpening of disc harrows and disc plows should have one of my Wonder Disc Sharpeners. With these machines you can sharpen a whole set of discs while your competitor is taking off the shaft in the old fashioned way.



THE LITTLE WONDER.

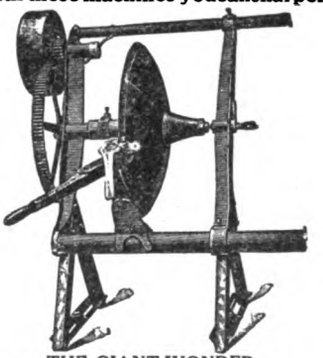
The LITTLE WONDER will sharpen any size disc up to 22 inches in diameter. The accompanying cut shows the LITTLE WONDER at work on a whole section of discs. This machine is especially adapted for sharpening Disc Harrows.

You Can Increase Your Earnings.

when you have one of my machines as you can turn out more work and please your customers better than by sharpening in the old way.

Operated either by hand or power.

Can shear any part of edge to any bevel. Also shear back from edge as far as required. The tool can be used on either side of the disc and can be shifted from one disc to the other. All these things can be done without the turn of a set screw or nut. Is a positive feed; *automatically adjusts itself to wobbling or bent discs.* Knives made of best grade self-tempering steel and will last a lifetime for hand or power.



THE GIANT WONDER.

The GIANT WONDER is a larger and heavier machine; has holder attachments for rolling coulters and **DISC PLOWS**; will take in discs up to 32 inches in diameter; is a geared machine and will also take in disc harrow sections same as the Little Wonder and do the work equally as well. The only machine on the market with these advantages.

ALL OUR MACHINES GUARANTEED.

We will take back and pay the freight both ways on any machine which does not prove to be exactly as represented and satisfactory in every way. You cannot lose in buying a machine with this liberal guarantee. Most all dealers sell Wonder Machines, but if yours does not, write us direct and please send us his name. Be sure to write at once for descriptive circulars. Don't let another season go by without making money by installing a Wonder Machine in your shop. Address all communications to

A. E. DURNER, Sole Manufacturer, Main Office, **Evansville, Wis.** CANADIAN BRANCH: London, Ontario, Canada

KERRIHARD'S POWER HAMMER



does the work—while you smile on in contentment and satisfaction. There are no delays, starting and stopping by simple pressure of the toe of your shoe. Turns out three times the work in same length of time by hand. Never asks for more pay. Expects nothing.

Adds prestige to your shop and spells success for you.

You save $25.00 to $50.00 and get the only world's famous Hammer. Write today for full particulars and souvenir.



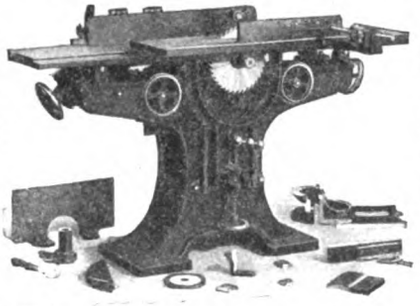
Hammer and Grinder Dept. **THE KERRIHARD COMPANY,** **RED OAK, IOWA, U.S.A.**

THE CRESCENT VARIETY WOOD WORKER

Is a Time and Money Saver for any Blacksmith who does Wood Work

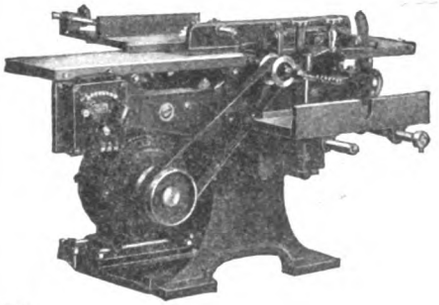
CRESCENT

Because it is a durable machine, easily operated, which, without making a single adjustment, will do the work of a Jointer, Saw Table, Pole Rounder and Shaper.



Send for our descriptive catalogue, giving complete information about the Crescent line of Band Saws, Saw Tables, Jointers, Shapers, Borers, Swing Cut-off Saws, Disc Grinders, Planers, Planer and Matcher, and Variety Wood Workers.

CRESCENT





THE CRESCENT MACHINE COMPANY
245 MAIN STREET,
LEETONIA, OHIO, U.S.A.

GET YOUR SHARE!!

of these Bargains for Blacksmiths and Wagon Makers by sending your order today before stock is all sold. Save 20 to 50 per cent real money, "not stage money."

Receivers', Sheriffs' and Manufacturers' Sales

Items on this page are fair specimens of bargains you can get from us, and for complete list of over 50,000 articles, send for our Mammoth Catalog. : : :

Premier Wrought Anvils 5c. Lb.

Lot No. 4-A-115.

Best in quality, form and finish. Steel face is a solid piece planed smooth after welded.



Absolutely Guaranteed

Weight.	Price lb.	Weight.	Price lb.
150 to 200 lbs.	5c.	70 to 79 lbs.	10½c.
120 to 145 lbs.	9c.	60 to 69 lbs.	11c.
80 to 119 lbs.	9½c.	50 to 59 lbs.	12½c.

Horseshoe Nails 5c. Lb.



Lot No. 4-A. B.-96.

2,000 boxes of Bay State cold rolled Horseshoe Nails, made of best Norway Iron, sizes, 7, 8, 9 and 10.

Price in bulk, 25 lbs. to box, 5½c. lb.

Or in 5 lb. cartons ..... 7½c. lb.

Queen City Special, cold rolled Horseshoe Nails, sizes, 7, 8, 9, put up 25 lbs. bulk in a box, price per lb ..... 5c.

"Bonanza," forged and pointed, warranted Horseshoe Nails, made of best Swedish stock, sizes, 7, 8, 9, put up in bulk, 25 lbs. to box, price per lb ..... 6c.

Ball Bearing Grindstones, $2.95



Lot No. 4-A-1266.

Strongest and easiest running grindstone on the market.

Frame made of angle steel. Ball bearings on journals and cups.

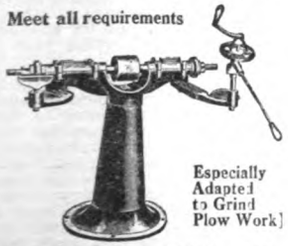
60 lb. stone, 22x2½.

Weight, complete, 85 lbs.

Price $2.95

$25 Emery Grinder, $14.25

Meet all requirements



Especially Adapted to Grind Plow Work

Made for general shop work and grinding plows. Note Disc Grinding Attachment shown on right hand.

Dimensions—Height, 30 in. Base, 18 in. Arbor, 36 in. Shaft, 1¼ in. Collar, 3¾ in. Bearings, 1¼x8 in. Pulley, 4x4½ in. Weight, 190 lbs. Will carry wheels 14x3 in.

Lot No. 4-A-591.

Price with two rests $14.25

Extra for Disc Grinder Attachment, add .. 3.00

Horseshoes $3.00



Brand New Horseshoes made by the Eagle Horseshoe Company. Absolutely new and in first class order. Stock consists of

25 kegs ..... No. 0
22 kegs ..... No. 1

Lot No. B-2560.

Price per 100 lb. kegs $3.00

Structural Steel 1½c. Lb.

Over 10,000 tons of Angles, Channels, Tees, "I" Beams, round, square and flat Bars, all first class stock, standard sizes and lengths, at 1½c per lb. and up.

You must send us a list of your wants in merchant or structural steel, for prices that will mean a big saving to you. **We can also furnish pipe,** cut to specifications, at less than mill prices.

Mail orders accepted for any item quoted on this page

Green River Screw Plates, $7.96



Quality of Green River Plates is unquestioned. Make a perfect thread with a single cut; dies are adjustable.

Our Lot No. 4-A-346. 5 each, Taps, Dies, and Guides, complete with tap wrench and stock, in hardwood case. Cuts ¼x20, ⅜x16, ½x12, ⅝x11 and ¾x10 threads.

Our price, complete $7.95

Advance Self Feed Drill, $15



For Belt or Hand Power. Will drill 1 1-4 in. hole to center of 18 in. circle. Has special **automatic feed device,** located back of spindle. Has cam arrangement so as to **give continuous feed.** Stands heaviest service, yet is simple in construction, with a very few parts.

Dimensions—Height, 50 in. **Table,** 11 in. diameter. **Gear Wheels,** 8 in. **Spindle,** 1⅝ in. **Run of Spindle,** 3 in. **Size Column,** 2 in. **Greatest Spread** of spindle to table, 16½ in. Spindle bored for ½ in. rounk shank drills.

Lot No. 4-A-34.

Weight, 190 lbs.

Usually retail at $25. Our Price, ... $15.00

Bolts 2¼c lb.



About 10 tons **brand new Machine and Carriage Bolts,** all in first class condition, various sizes mixed together, ranging from ⅜ to 1 inch diameter and from 2 to 10 inches long.

Price in lots of 25 to 100 lbs ..... 3c per lb.
Price in lots of 100 to 500 lbs ..... 2½c per lb.
Price in lots of 500 lbs. or more ..... 2¼c per lb.

Plow and Tire Bolts

All brand new Bolts from a jobber's stock, mixed together in various sizes, diameter from 3-16 to 5-16 inch and lengths from 1¼ to 2½ inches. Absolutely brand new and in first-class order.

Special prices, while they last, as follows:

Mixed Plow Bolts, 25 lbs. or more ..... 2c per lb.
Mixed Tire Bolts, 25 lbs. or more ..... 2½c per lb.



Double Geared Tire Bender

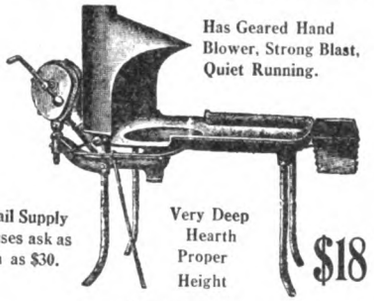
First Class Tool in every detail.

Lot No. 4-A-110.

Will bend 5 in. tire or smaller to circle 24 in. in diameter or larger.

Price $6.75

Your Favorite Forge, $18.00



Has Geared Hand Blower, Strong Blast, Quiet Running.

Retail Supply Houses ask as high as $30.

Very Deep Hearth Proper Height

$18

Dimensions

Height, 30 in.; size of hearth, 31x53 in.; diameter of fan, 12 in.; weight about 290 lbs.

Lot No. 4-A-459. Price, with Water Tank, as shown $18.00

Send Us This Coupon

Chicago House Wrecking Co., Chicago.

I saw this ad in AMERICAN BLACKSMITH.

Send me your Mammoth Catalog free of **any** expense.

I am interested in .....

Name .....

920 Town .....

Co. ..... State .....

Am. Blk. Mch. 1910.

CHICAGO HOUSE WRECKING CO.

35th and IRON STREETS, CHICAGO, ILL.

"E-Z" WELDING COMPOUND will make Perfect

welds at 250 degrees lower heat than any other.

TRADE E-Z MARK — FOR ALL GRADES OF STEEL — WELDING COMPOUND

PAT. MAY 27, 1902

"E-Z" WILL STICK to the metal when metal is at low heat and is EXCELLENT for Spring Steel, Tool Steel, Tire or Axle Welding.

For sale by all leading Jobbers. Send to us for FREE PREPAID SAMPLE. Manufactured only by

ANTI-BORAX COMPOUND COMPANY

MANUFACTURERS OF

WELDING, BRAZING AND TEMPERING COMPOUNDS

FORT WAYNE *INDIANA* *U. S. A.*

TRADE MARK MADISON

REMEMBER

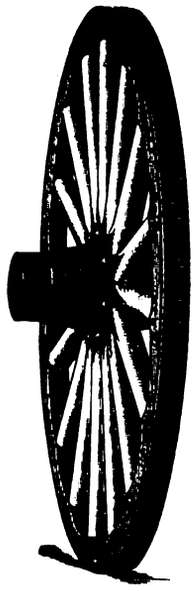
"MADISON"

We manufacture a full line of Vehicle and Automobile Wheels, all sizes, styles and grades. Also Gears, Axles, Poles, Shafts, Finished Rims, Spokes, Etc.

Prompt Shipments

TRADE MARK MADISON

THE MADISON WHEEL COMPANY



OUR TRADE MARK

Means Quality

TRADE MARK MADISON

ALL OUR GOODS are GUARANTEED. This means the use of the BEST MATERIAL and WORKMANSHIP.

Write today for our Catalog and Net Prices

MADISON, OHIO

TRADE MARK MADISON

Trade Literature and Notes.

WE ARE IN RECEIPT of a neat folder from the North Star Iron Works, setting forth the merits of their Plow Polishing Stand No. 3, Bench Emery Wheel Stand No. 4 and Sensative Post Drill. The No. 3 is intended for all heavy grinding and plow polishing. The No. 4 is best adapted to light work for carpenter or machine shops or farm work; as gumming saws, grinding and polishing cultivator shovels and grinding sickles. This neat little folder will be furnished to anyone applying to the North Star Iron Works, Owatonna, Minn., and mentioning THE AMERICAN BLACKSMITH.

FAIRBANKS, MORSE & CO. have a new catalog of wood and steel windmills. The theory and details of constructions are analyzed and published in this book.

Pumping Systems and the new "Femco Underground Force Pump" are described in detail. The technical information and practical suggestions contained in this book ought to be read by all of those interested in windmill pumping.

Send to Fairbanks, Morse & Co., Chicago, Ill., for a copy of this catalog, mentioning THE AMERICAN BLACKSMITH.

WILEY & RUSSELL MFG. CO., Greenfield, Mass., have issued a very complete and attractive catalogue which carefully describes their line of tools and machines. This catalogue, which is No. 34D, is referred to in their announcement on page 47 of this issue, and will be sent to anyone who requests same and mentions that he is a reader or subscriber of THE AMERICAN BLACKSMITH.

MR. O. G. KLEIN, of Barron, Wis., manufactures a very useful device known as the Handy Wheel Holder. This Holder, by reason of its practicability, will find a welcome in every shop which does wheel repairing. The Holder is being offered to the blacksmith trade through the columns of this paper; a cut of same will be found on Page 36 of this issue.

A VERY ATTRACTIVE GENERAL CATALOGUE has just been issued by William Galloway Company, of Waterloo, Iowa. In this piece of printed matter, Mr. Galloway explains his system and policy of doing business. Our subscribers and friends will find advertised in this catalogue many articles of interest. The gas engine line, for instance, is very complete. A copy of this catalogue will be sent to anyone who requests same and mentions THE AMERICAN BLACKSMITH.

CRAY BROTHERS, the large manufacturers and jobbers of Carriage and Wagon Hardware, of Cleveland, Ohio, have prepared in the interest of their line a special catalogue and work of reference. The book is much larger and more complete than any they have ever heretofore published. Any one of our subscribers and readers who will write to Cray Brothers, Cleveland, Ohio, requesting same will receive a copy of this edition.

AFTER THREE YEARS OF CAREFUL STUDY by a practical horseshoer, The American Calking Machine Co. have perfected a time and labor saver in the nature of a calking machine. By the means of this machine, which is equipped with a shear for trimming the calks after they are formed, sharp calks, blunt calks, long calks, medium calks, block calks, kink calks, any shape calk, any length calk, on any size shoe, can be made in a second's time after the iron is hot. The many superior points which this device possesses are enumerated in a circular in which appear proofs in the nature of testimonials from the users of these machines of its utility and practicability.

The American Calking Machine Company, First National Bank Building, Chicago, will be only too glad to have our readers communicate with them regarding this machine. The circular matter which was forwarded to THE AMERICAN BLACKSMITH would certainly be of interest to the subscribers of this publication and may be had for the asking.

THE SILVER MANUFACTURING COMPANY of Salem, Ohio, a company of fifty-six years' standing, have just issued a general catalogue of their complete line, for the purpose of keeping their customers in touch with their latest improvements and additions. The articles they manufacture are in the carriage-making, wood-working and blacksmith lines. This book has a very artistic cover and contains 82 pages. The articles are rather minutely described, and illustrated with beautiful half tones. It contains not only price lists of new tools, but a complete repair list. This piece of printed matter shows progressiveness and is certainly a credit to any firm. The manufacturing plant of this company is new and modern in every particular. During the past year it has been thoroughly remodeled and greatly enlarged, so that today this company is in a position to give its customers complete satisfaction.

RECENTLY THERE CAME TO OUR HANDS a very attractive catalog issued by Wells Bros. Co., Greenfield, Mass., containing a full description of their Little Giant tools. They will be very glad to send this catalog to anyone mentioning THE AMERICAN BLACKSMITH.

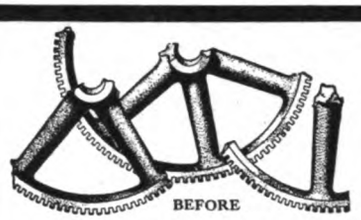
Trade Literature and Notes.

MR. H. L. CHAPMAN, Marcellus, Mich., the manufacturer of the Economizer Gas and Gasoline Engines, has issued a very attractive little booklet in which he endeavors to explain why the "Economizer" engines give higher economy, better durability and less trouble than other small engines on the market. Each important part of his engine is taken under consideration and convincing reasons given why he believes the "Economizers" are the best. Inasmuch as Mr. Chapman manufactures an engine which is especially adapted to the use of the blacksmith and shop owner, we believe it would be to the advantage of our subscribers and readers to send for this booklet.

WE HAVE JUST RECEIVED fresh from the press a neat folder from E. G. Smith & Co., of Columbia, Pa., telling of the advantages of the "Columbian" calipers and of their extensive use. They are money savers and indispensable on many kinds of work. Catalogues will be gladly sent to any interested persons who apply for them.

WE CALL THE ATTENTION OF OUR READERS to the advertisement of the Bradley Patent Horseshoe Company on page 17 of this issue. The Bradley people claim that much time can be saved by the blacksmith through the use of their eshoe and that it is practical for all kinds of horses under all conditions of winter and summer. The shoe is steel forged and non-slipping and can be bent or shaped to fit any hoof. The manufacturers tell us that these shoes are having a great run in the southeastern section of Pennsylvania where their factory is located and they are just now beginning to introduce them in other sections of the country. Horseshoers everywhere, it is said, are beginning to appreciate the advantages of the Bradley shoe and their plant is kept running night and day to supply the largely increasing demand for this new shoe. For further particulars, we would suggest addressing the makers. The Bradley Patent Horse Shoe Company, Chester, Pa.

THE HOUSE COLD TIRE SETTER COMPANY have for the past nine years been planning and perfecting a spoke auger, and are now manufacturing what they consider a very successful implement. They appreciate that to suit the needs of wagon builders it should be reasonable in price; heretofore, machines, to do the work required, had been so costly as not to come within reach of the men by whom they were needed, but the House people believe they have overcome this objection. The new machine will bore spoke tenons, and, mechanically, they say it is practically perfect. We would suggest that any of our friends who are interested in such a device write to the manufacturers, House Cold Tire Company, 216 South 3rd St., St. Louis, Mo.


BEFORE

TRADE WELDARINE MARK.

REGISTERED
United States Patent, March 24, 1908.
Canadian Patent, April 6, 1909.
Other Patents Pending.

Weldarine is the only compound that will braze cast iron.
Weldarine will braze any form of iron or steel.
Weldarine is, or ought to be, in every up-to-date shop.
Weldarine is sold by the leading Heavy Hardware houses in America, and is used in every civilized country in the world.

WHAT THEY SAY—Copy of Testimonial, dated 11th September, 1907, from WILLIAM JAMES, Engineer of Kameruka Estate, via Bega, N. S. W.

Dear Sirs:—Referring to yours of the 9th instant, it gives me great pleasure to say that the WELDARINE set supplied by you last month has given entire satisfaction on the jobs we have had occasion to use it. We welded a rocker arm bracket on a steam pump which had broken across the middle. This was repaired about three weeks ago and now is stronger than ever. We also put two new cogs in a cog wheel of a corn and cob mill. The great tenacity of WELDARINE in repairing broken castings has surprised me. Yours faithfully, WILLIAM JAMES.

Concord, Illinois.

I ordered a sample package of your WELDARINE with but little faith in it. Am happy to say I have made a success of every job I have undertaken, and believe anyone can do the same by following the simple instructions sent with it. I am satisfied it will do all you claim for it.
JOHN N. ERIXON.

EVERY SET GUARANTEED **PUT UP IN THREE SIZES**

Small set $ 2.00, weighs 2 lbs., will do from $ 30 to $ 40 worth of work.
Large " 3.00, " 4 " " " 75 to 90 " " "
Jumbo " 10.00, " 25 " " " 400 to 500 " " "

If your dealer cannot supply you, fill out the attached coupon and mail today. Order now. Prices liable to advance.

The Weldarine Mfg. Co., Topeka, Kansas, U. S. A.

COUPON

The Weldarine Mfg. Co., 700 Kans. Ave., Topeka, Kans.

Please find enclosed $....., for which send one set of Weldarine.

Name.....

Address.....

Date.....


AFTER

Have You Seen It?

The New Improved

BLACK GIANT

COMBINED UPSET, PUNCH AND SHEARS

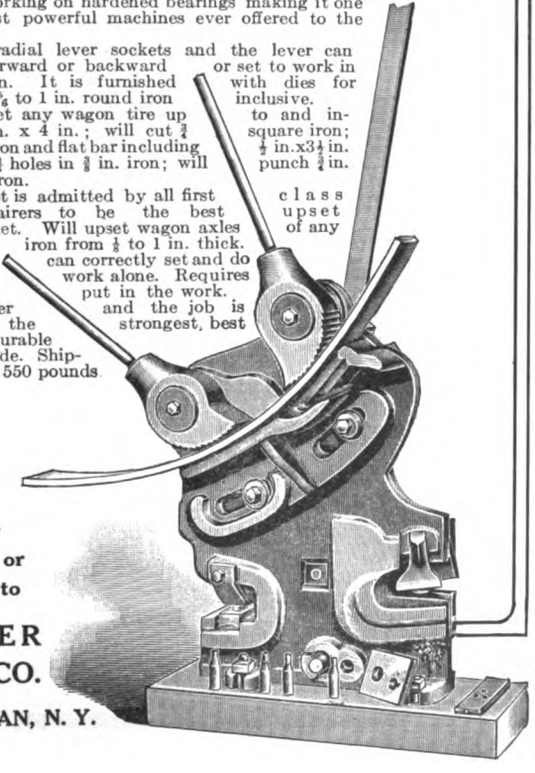
Has compound lever action and in connection with an eccentric working on hardened bearings making it one of the most powerful machines ever offered to the trade.

It has radial lever sockets and the lever can be pulled forward or backward or set to work in any position. It is furnished with dies for cutting off $\frac{5}{16}$ to 1 in. round iron inclusive.

Will upset any wagon tire up to and including 1 in. x 4 in.; will cut $\frac{3}{4}$ in. square iron; 1 in. round iron and flat bar including $\frac{1}{2}$ in.x3$\frac{1}{2}$ in. Will punch $\frac{3}{8}$ holes in $\frac{3}{8}$ in. iron; will punch $\frac{3}{4}$ in. holes in $\frac{5}{16}$ iron.

The upset is admitted by all first class wagon repairers to be the best upset on the market. Will upset wagon axles of any kind of iron from $\frac{1}{2}$ to 1 in. thick.

One man can correctly set and do all ordinary work alone. Requires no change put in the work. Pull the lever and the job is done. It is the strongest, best and most durable machine made. Shipping weight 550 pounds.



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LUTHER MFG. CO.

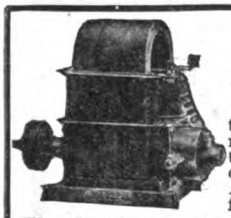
OLEAN, N. Y.

Burlington Rubber Tire Machine



Our big No. 4 is the only machine made that will apply all kinds of solid and cushion rubber tires, both internal and outside wires, and close the joint on the same machine. One man can operate the machine easily without help. Put an end to your troubles in applying tires by investing in this machine. Write for descriptive circulars and price.

Enterprise Foundry Harvey, Ill., U.S.A.



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IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

THE BEST MECHANICS USE
COLUMBIA CALIPERS
THERE'S A LITTLE BOOK—TELLS WHY
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WHEN WRITING TO ADVERTISERS MENTION THE AMERICAN BLACKSMITH

Dissatisfied with Iron you are now using?

TRY "MILTON" BARS

FOR BOTH QUALITY AND SIZE.

Many Blacksmiths using them with very best results.
Write for Prices.

THE MILTON MANFG. CO.,

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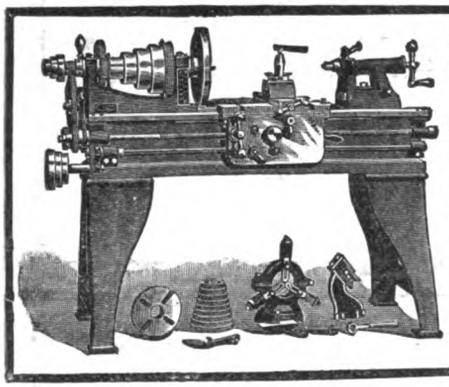

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Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high-grade lathe, is the best for your shop.

It's a SEBASTIAN—a good lathe

Investigate its merits—Write for Catalog.

Foot and Power Lathes, 9 to 15 in. Swing
Tools and Supplies.

SEBASTIAN LATHE CO.

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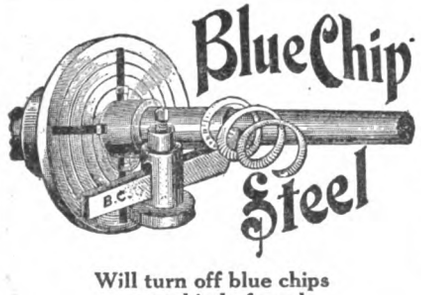

Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.

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"CHICAGO"
EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



"CHICAGO"
WHEELS SAVE TIME

They're made of stuff that cuts

Emery Wheels, Glue, Emery, Polishing Wheels, Grinding Machinery

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SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades
Fully guaranteed
All sizes in stock

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IRON STEEL
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IT'S WHAT IT SAVES

that other engines waste that makes the

Economizer Engines cheap

just as reliable, durable and will carry same load as engines costing $25 to $75 more. Better investigate. Also power and foot-power Emery Grinders, Trip-Hammers, Band Saws, Saw Tables, etc.

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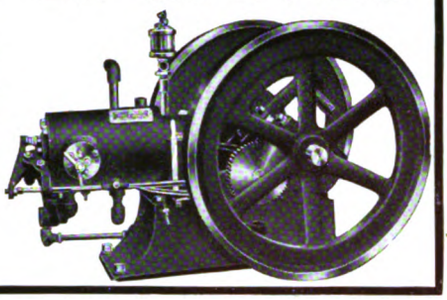
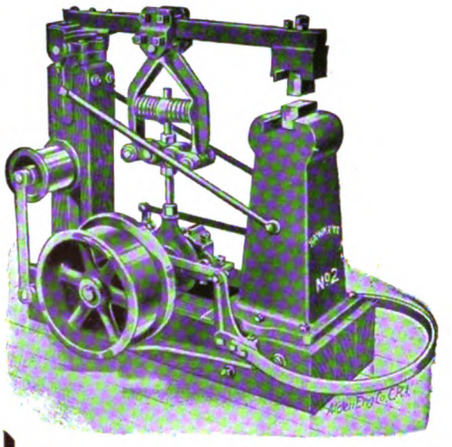
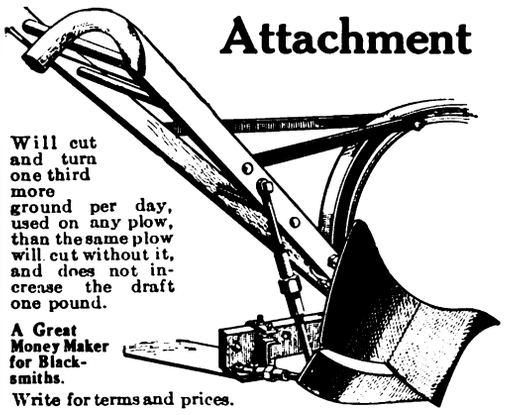




The COVEY Plow Attachment

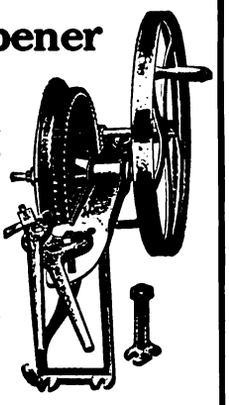


Will cut and turn one third more ground per day, used on any plow, than the same plow will cut without it, and does not increase the draft one pound.

A Great Money Maker for Blacksmiths.

Write for terms and prices.

Novelty Disc Sharpener



Will sharpen any size disc, from 10 inches to 36 inches, and is especially designed to sharpen large plow discs.

Every blacksmith should have one.

WALKER MANUFACTURING CO., :-: COUNCIL BLUFFS, IOWA

The Hawkeye Power Hammers

Now Built in Three Sizes

Buy a Guaranteed Hawkeye Helve Hammer,—you will then be fixed to handle both light and heavy forging, also long work and tire welding. They have double the capacity of any upright hammer of the same weight and price. Why not have the best?

Hawkeye Manufacturing Company,
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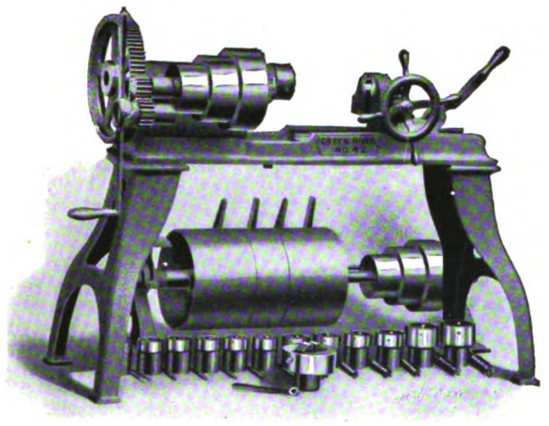
No. 42 GREEN RIVER BOLT CUTTER AND NUT TAPPER

Read One of Many Testimonials



FOR POWER OR HAND USE.

Capacity, ¼ to 1½ in. bolts and nuts, and ⅛ to 2 in. pipe.

ESTABLISHED 1872

H. LANGE WAGON CO.
MANUFACTURERS OF
FINE BUSINESS WAGONS

PITTSBURGH, PA. Jan. 21st, 1910.

Wiley & Russell Mfg. Co.,
Greenfield, Mass.

Gentlemen:-

In reply to your inquiry of Jan. 15th. We are pleased to state that the four No. 42 bolt cutters bought from your concern, have been giving us very good satisfaction. Two of these machines have been in constant use in our city factory for over fifteen years.

Any prospective purchasers that you may refer to us we will be pleased to reply to as we think a great deal of your machine.

Very truly yours,

EH/EL

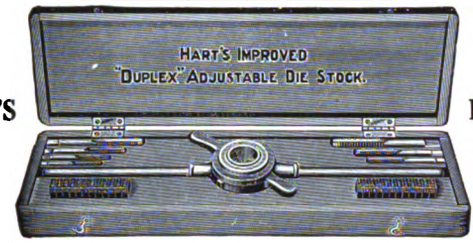
H. LANGE WAGON CO.

Send for Catalogue 34 D and Prices

SOLE MAKERS

WILEY & RUSSELL MFG. CO., GREENFIELD, MASS., U. S. A.

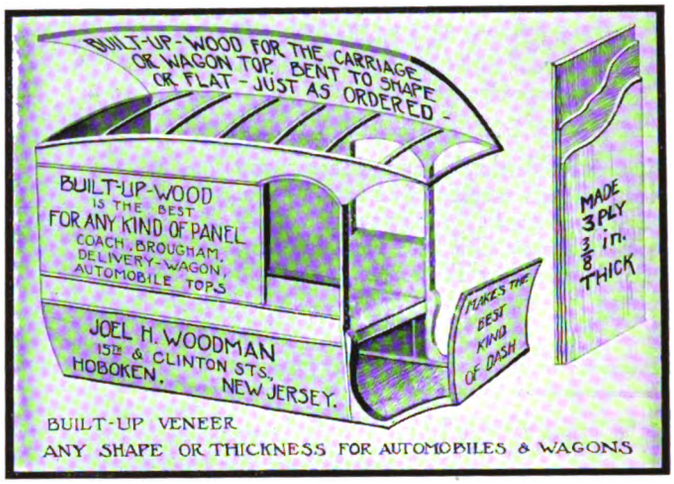
HART'S HART'S



A Threading Outfit that is suitable for general shop use—the **"DUPLEX" Bolt Die Stock Set "A"**, range ¼ to ¾ in. It contains dies that adjust without a wrench and require no reversing when cut is finished. A variety of sets with desirable ranges.

THE HART MFG. CO.

50 Wood Street **CLEVELAND, O., U. S. A.**



Beats All Others.

SHAW & PARKER
BLACKSMITHS.

Grover Hill, December 29, 1909.

BUFFALO FORGE COMPANY,
Buffalo, N. Y.

Gentlemen:—We have one of your Buffalo 200 Silent Blowers. It is far beyond recommendation to us.

There have been other 'smiths in our shop who have other makes. They all say the No. 200 beats any they have ever seen. Yours respectfully,

SHAW & PARKER.

Hercules Hydraulic Tire Setters



For Factories or Repair Shops

ARE NOT EQUALED

by any other

Write for catalog and prices

NATIONAL HYDRAULIC TIRE SETTER CO.
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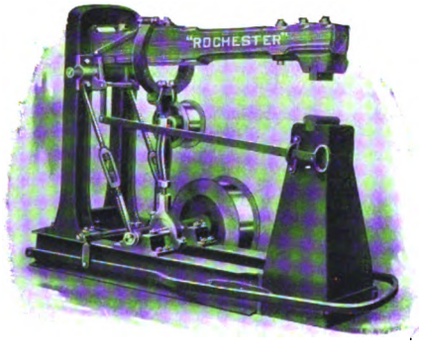


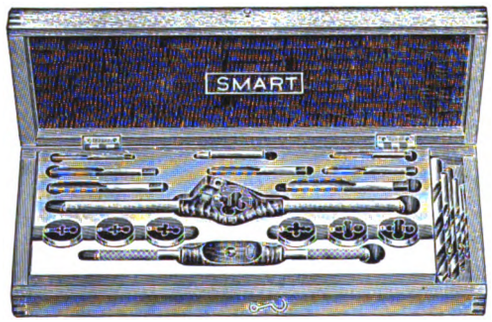
(The Hardest Hitter)

Forging dies set crossways of helve. Welding dies set lengthways.

The best hammer made for general work, and a dandy Tire Welder.

MADE IN SIX SIZES

THE WEST TIRE SETTER CO., Rochester, N. Y.



Strong, Easy Cutting Durable Screw Plates

FULL LINE OF HIGH QUALITY SCREW CUTTING TOOLS
Send for Free Catalog
A. J. SMART MANUFACTURING CO., Greenfield, Mass.

FIRST MADE IN AMERICA

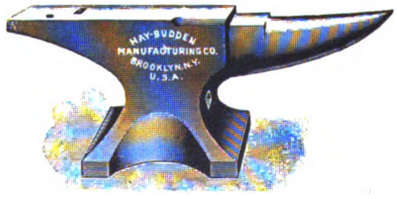
HAY-BUDDEN SOLID FORGED ANVILS

A LONG STEP FORWARD

SOLID FORGED STEEL TOP
Welded to a
SOLID FORGED BASE
Making a
SOLID FORGED ANVIL

The Gold Medal Anvil

HIGHEST AWARD
Omaha 1898 Pan-American 1901



OVER 150,000 IN USE

The **ENTIRE TOP** being one piece of high grade **FORGED STEEL** makes a **LOOSE FACE IMPOSSIBLE.**

TEMPERED "JUST RIGHT".

By our own process, the weld at the waist is a **LASTING UNION.**

Experience has proved their worth and demonstrated that **"HAY-BUDDEN"** Anvils are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., 254 NORTH HENRY ST. BROOKLYN, N. Y.

VOLUME 9

NUMBER 7

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO
N.Y. U.S.A.

APRIL, 1910

$1.00 A YEAR
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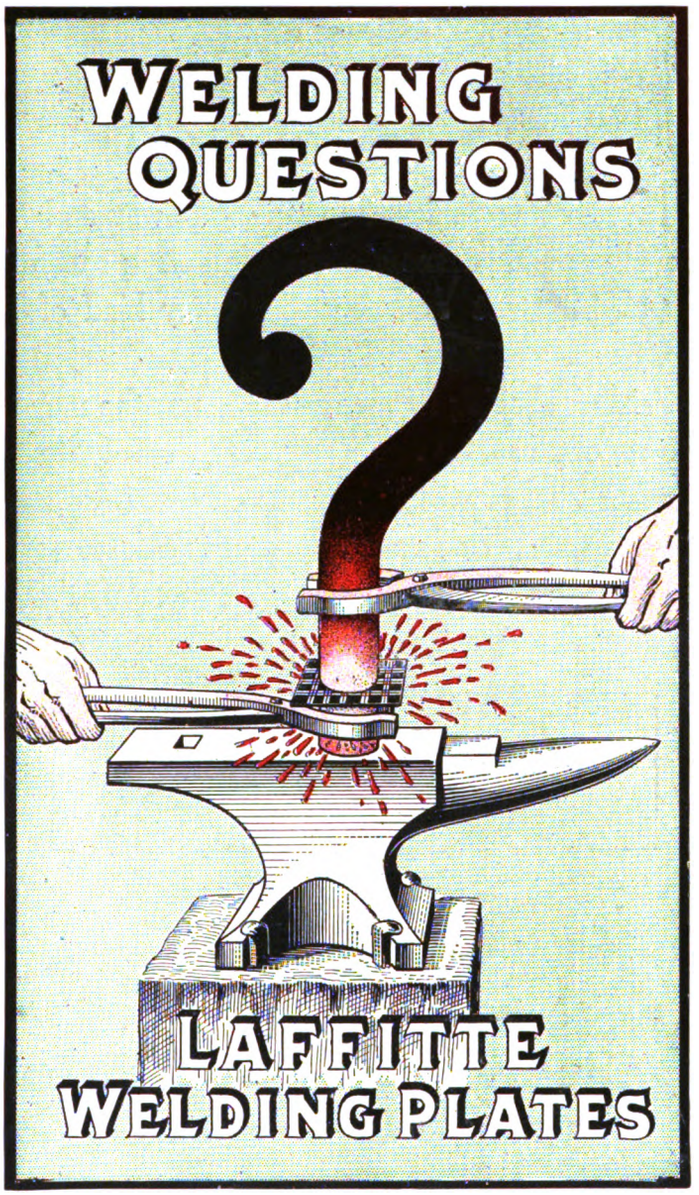
WELDING QUESTIONS



Welds at a Low Heat

Chemical Action
Increases the Strength
at Point of Weld

Welds Hard Steel
Tool Steel
Spring Steel
Steel Castings
Malleable Iron

There Is No Loss
in Strength of Steel
Due to Burning

Welds in a Single Heat

No Special Equipment
Is Necessary

Saving of One Third
in Time
Fuel and Labor

One to One Hundred
Welds From a Plate

No Waste with the
Plate as with Powder

Lowers Your Costs
Improves Your Work

Does What You
Cannot Do Now

FOR SALE BY ALL ACTIVE DEALERS

THE PHILLIPS-LAFFITTE CO.
Pennsylvania Building PHILADELPHIA, PA.

SEND FOR SAMPLES AND CIRCULARS

Laffitte has had many imitators but never a competitor

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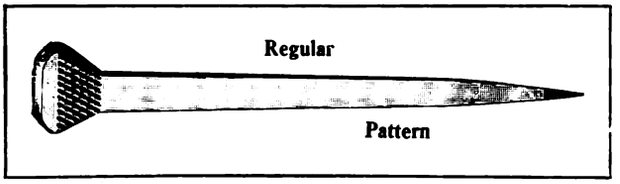
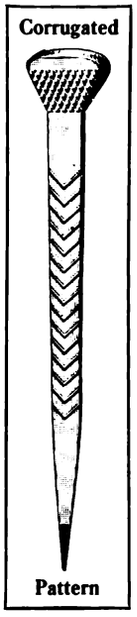
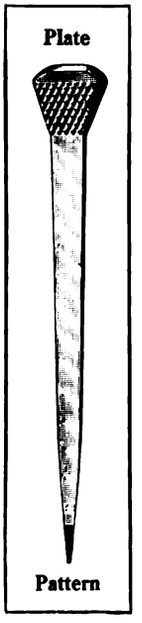
The Best to Drive



The Safest to Use

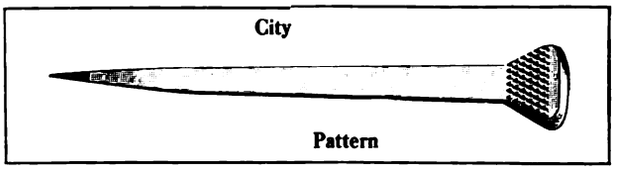
"The Capewell" Horse Nail





remarkable for its wonderful **Holding** power and **Driving** qualities—is acknowledged in all parts of the country to be **best adapted** for every kind of horseshoeing.

Whether shoeing horses for the farm, the race track, the city streets, cavalry and artillery service of the army, or any other kind of work, the nail which **drives easiest** and proves most **economical** and **satisfactory** is "The Capewell." This is the verdict of thousands upon thousands of horseshoers.



There is no other nail to compare with "The Capewell"

The Surest to Hold

The Most Perfect in Form and Finish

Made by

The Capewell Horse Nail Company

Hartford, Conn., U. S. A.

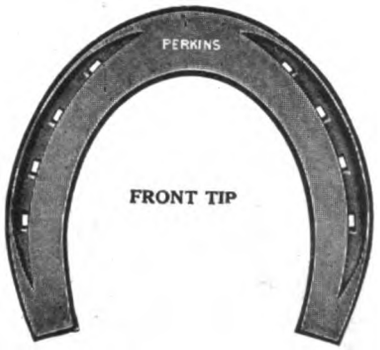
BRANCHES:

New York Buffalo Portland, Ore. Baltimore Chicago St. Louis
Detroit Boston Philadelphia Denver Cincinnati
San Francisco New Orleans Toronto, Canada Mexico City, Mexico Yokohama, Japan

The Largest Manufacturers of Horseshoe Nails in the World



Look for this Trade Mark ★ The Star brand beats all others





★ PERKINS ★

HORSE SHOES

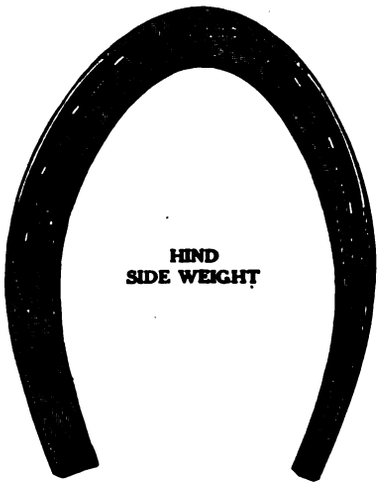
AND

TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



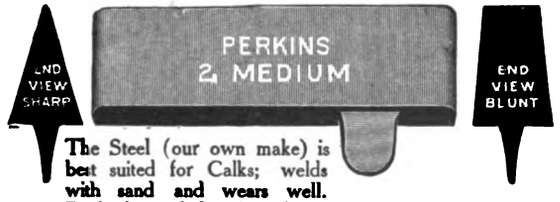


Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

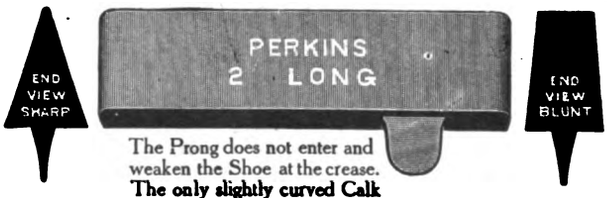


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

LOOK! This is the New Hand or POWER Machine for Wide, Thin Tires

Sets Tires COLD or HOT on the Wheel

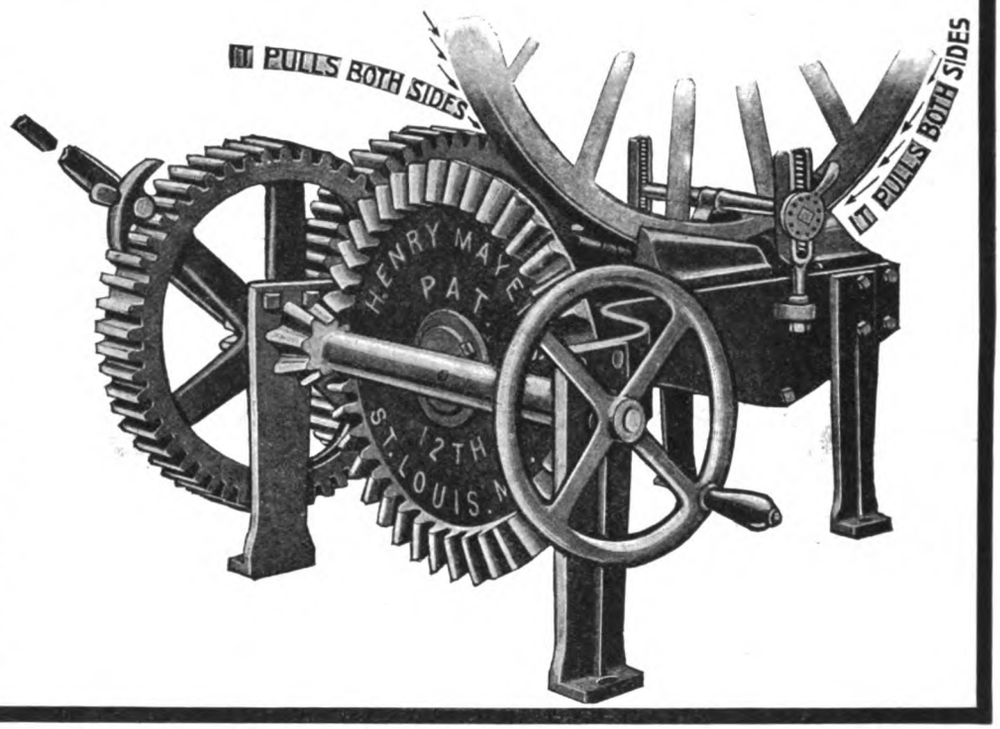
IT'S A NEW IDEA. It will interest YOU. IT GETS THE MONEY FOR YOU.

MAYERS TIRE SETTER MFG. CO., 4028-30 Forest Park Boulevard, **ST. LOUIS, MO.**

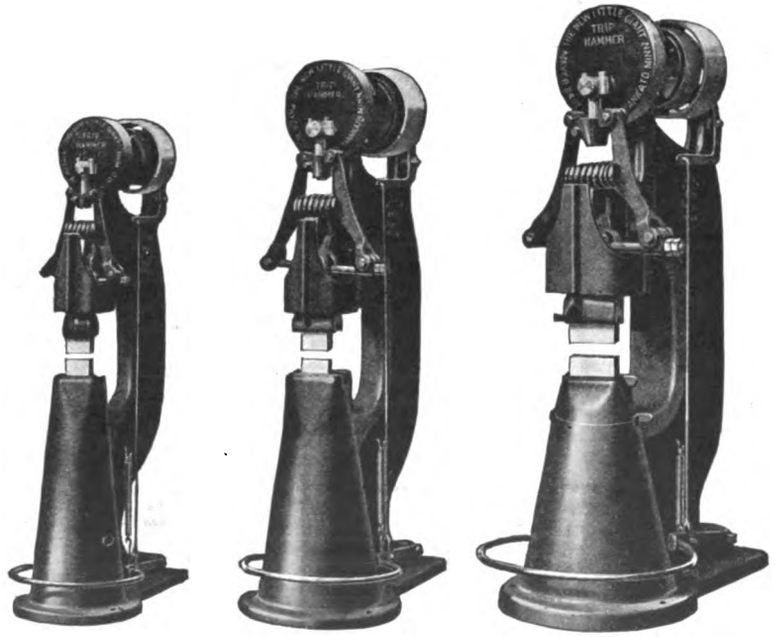
Write today for full particulars



AND A FREE WATCH CHARM



The New Little Giant Power Hammer



Stands for what is best in design, material and construction. It does THE WORK efficiently and quickly and is always under perfect control.

This high degree of perfection in Power Hammers is the result of fifteen years' experience.

Made in three sizes:

25 lb. 50 lb. 100 lb.

Suitable for forging material up to 5 in. in diameter.

Will do anything and everything that can be done on Power Hammer.

Recommended by over 3,000 satisfied users.

Manufactured by

MAYER BROTHERS COMPANY :: MANKATO, MINN.

AGENTS: United States—All Jobbers; New Zealand—Alex Storrie, Ltd., Invercargill; Manitoba, Saskatchewan and Alberta—Melotte Cream Separator Co., Winnipeg

WRITE NOW FOR FULL INFORMATION

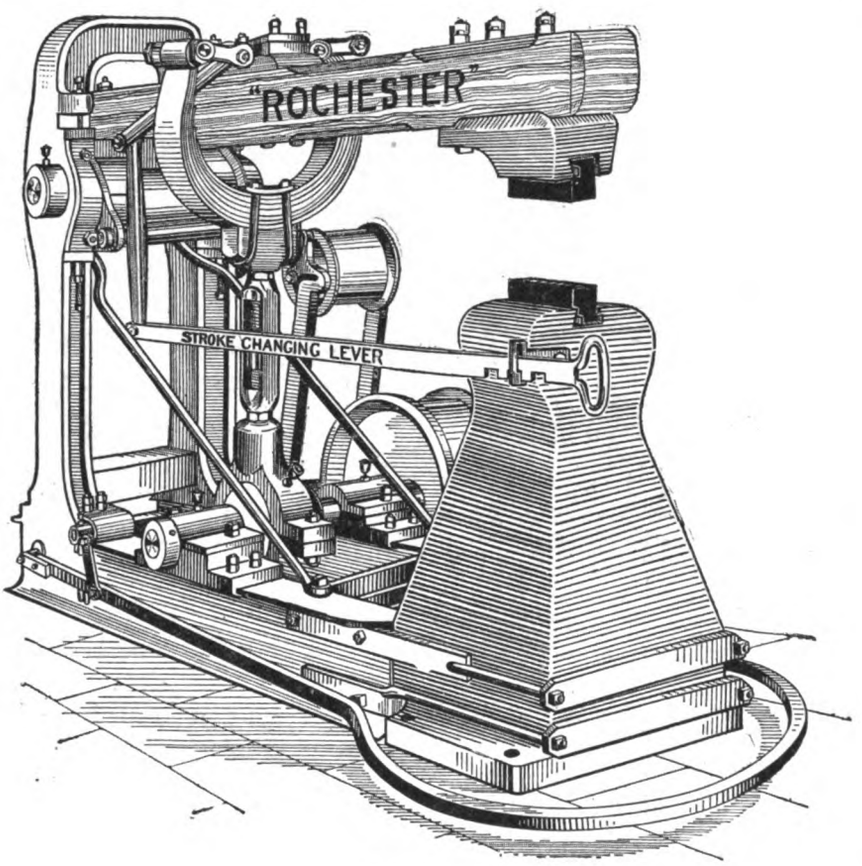
Phoenix Horse Shoes

Are the best. More uniform. Better material. Easier to fit. Try them. Be convinced.

Phoenix Horse Shoe Company

Rolling Mills and Factories: Joliet, Ill., Poughkeepsie, N. Y.
General Offices: Rookery Building, Chicago, Illinois

ROCHESTER HELVE HAMMER



ROCHESTER HELVE HAMMER

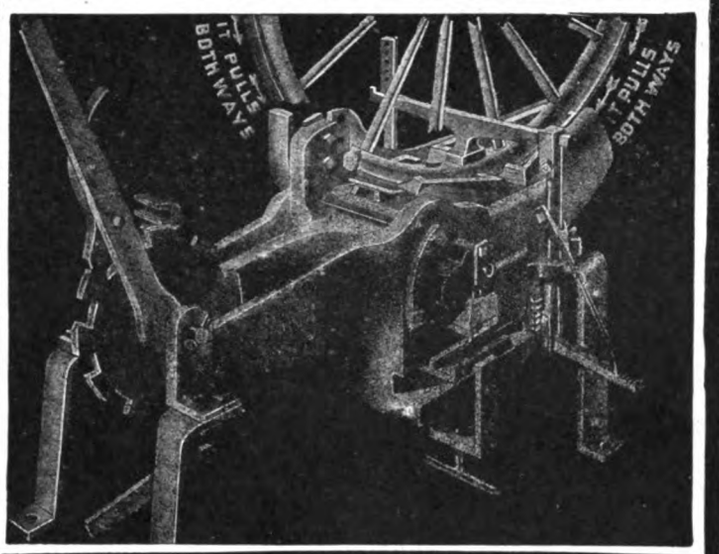
strikes the highest, hardest blow of any hammer made. Designed especially for use by wagon makers and general blacksmiths.

A first class hammer for welding tires, axles and general forging, including special die work. A high grade hammer at reasonable price. Send for our booklet.

THE WEST TIRE SETTER COMPANY

ROCHESTER, N. Y.

THE HOUSE COLD TIRE SETTER



WILL MAKE MORE MONEY FOR YOU

NOT ONLY THE BEST

BUT ALSO THE CHEAPEST

TAKE NOTICE—You Can Have Our Machine in Your Shop

and see for yourself that it does the work just right before you are required to pay a cent on it. We don't ask our customers to take any risk, we take it all. You have no cause to hesitate, even if you know nothing about cold tire setters, or have heard bad reports on them, for we give you a chance to see for yourself. ***Do You Want to Build Up Your Business and Make Money?*** It saves you full time of one man and three quarters of another and you don't keep your customers waiting. So don't try to get along without it, and don't buy any other until you have tried ours, as it costs you nothing.

Write for our reduced prices and terms.

Now is the time to buy and get it advertised in time for the season's work

HOUSE COLD TIRE SETTER CO., 216-218 S. Third Street, St. Louis, Mo. J. F. HOUSE, 201 Church St. Toronto, Ont., Canada.

A Felloe Rounder

Is One of the "Twelve Machines In One"



The Famous "Universal Woodworker"

It's not business policy to buy a Felloe Rounder that is **only** a Felloe Rounder when, by installing a Famous "Universal Woodworker" in your shop, you get a **good** Felloe Rounder and eleven other machines besides—all in ONE.

The illustration shows how easy it is to operate the Famous "Universal Woodworker" as a Felloe Rounder, for rounding all kinds of wagon and buggy felloes, also for making different kinds of curve mouldings. And for rounding wagon and buggy shafts it's ideal. It is adjustable up and down, for the different thicknesses of cut, also in and out, for the different widths of felloes.

This felloe attachment can be put on or taken off the machine in the minimum of time, and with no trouble whatever. It operates just as good as a machine made especially for felloe work, and is very reasonable in cost.

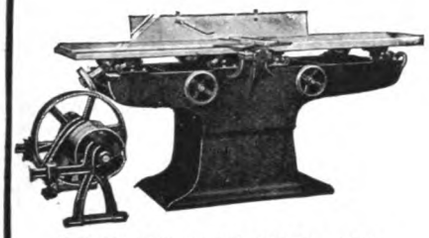
Every Blacksmith Needs One

Every blacksmith who uses a Felloe Rounder should send for particulars of this wonderful machine. Its adaptability to do many kinds of work, enormous durability, simplicity of construction and operation, and the low cost, are features which you ought to know about. Literature mailed upon request.

The Sidney Tool Co., Sidney, Ohio

THE SILVER MFG. CO.

365 BROADWAY SALEM, OHIO.



SILVER'S NEW JOINTERS

Five Sizes—8, 12, 16, 20 and 24 inch. New "patent applied for" features.



SILVER'S SAW TABLES

Send for circular of Saw Tables and Swing Saws.

Let the Silver Line of Tools Work for You



Silver's New Swing Saw. Four Lengths.

Tools for all kinds of work—drilling, boring carriage and wagon hubs, forging, tenoning spokes, buzz planing, sawing.

Tools as strong, as simple, as well built as skill and experience can make them.

Tools that are reliable, that you can depend on, that have only the best of iron, steel and wood; we've been making them right here since long before the Civil War.

Tools that will outwear your own sturdy muscle. You pay one price, and the price stops when you buy—there are practically no repairs. Silver tools are built right in the first place.

It will pay you in dollars and cents to

SEND FOR OUR 1910 MACHINERY CATALOG

or for any of the following booklets:

BAND SAWS AND JOINTERS—describing 20" Band Saws for foot or belt power or combination; also 26, 32, 36-inch Power Band Saws with new features; also five sizes of Jointers.

HUB BORING AND SPOKE TENONING MACHINES—illustrating and describing several sizes of each.

PORTABLE FORGES—illustrating and describing 14 styles.

DRILLING MACHINES—covering our line of some 22 distinct machines.

POWER DRILLS—illustrating our line of 20" machines with lever feed, lever and wheel feed, power feed with automatic stop, power feed with back gears and automatic stop.

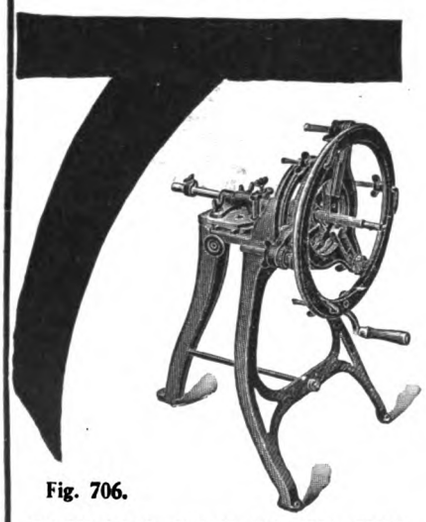
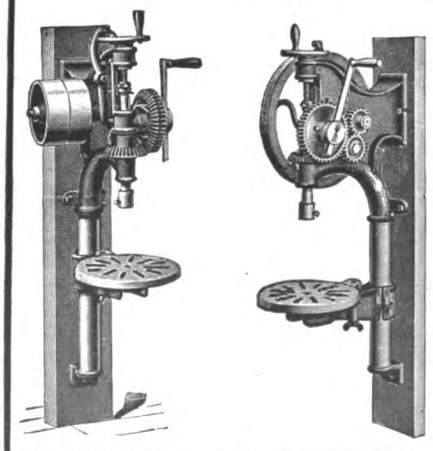


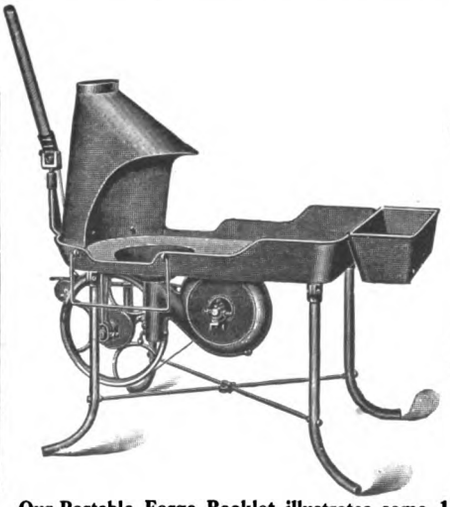
Fig. 706.

TAYLOR'S NEW TAPER HUB BORING MACHINE.

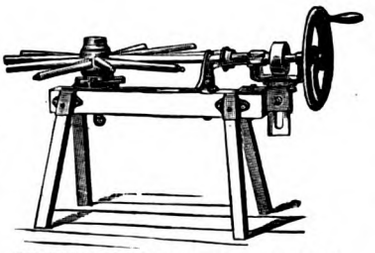
Hand wheel regulates cut. Bores any size hole or taper without changing bit.



Our Booklet, "Drilling Machines", illustrates 22 kinds we make.



Our Portable Forge Booklet illustrates some 14 kinds. We have a size to suit your needs. Strong and durable. Attractive designs.



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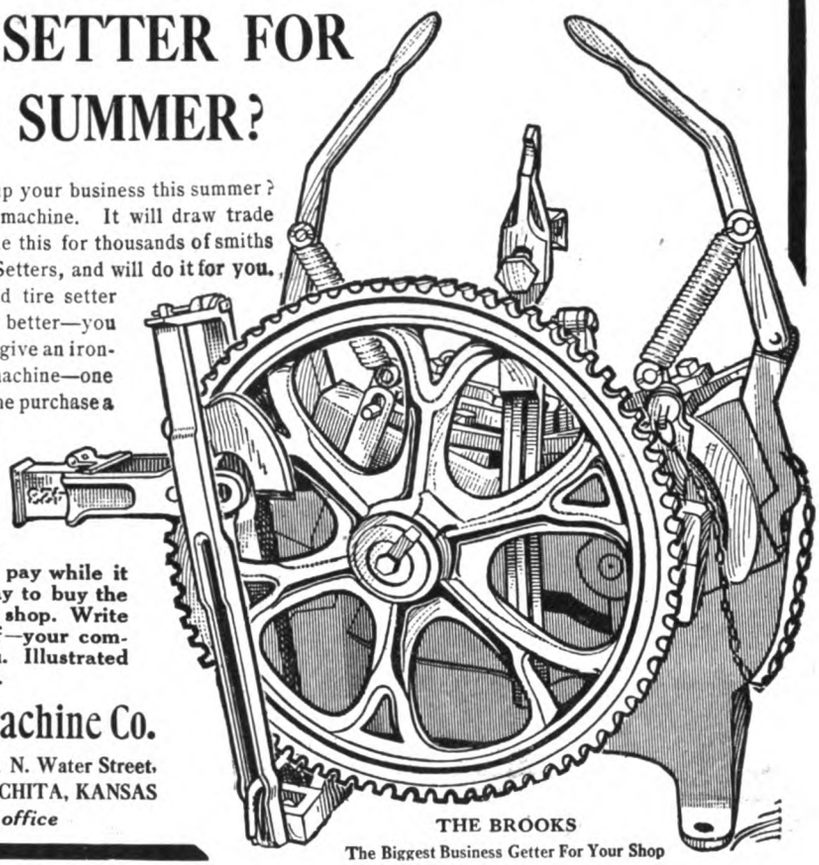
in Seven Sizes. Fitted with Star Hollow Auger.



DO YOU WANT A BROOKS COLD TIRE SETTER FOR THIS SUMMER?

Do you want to build up your business this summer? You can do it with a Brooks machine. It will draw trade for miles around. It has done this for thousands of smiths who have Brooks Cold Tire Setters, and will do it for you. The Brooks is the best cold tire setter made. You cannot buy one better—you cannot buy one as good. We give an iron-clad guarantee with each machine—one that protects you and makes the purchase a safe, reliable investment. Reputation, experience and prestige are back of every Brooks Cold Tire Setter.



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We will ship you a Brooks Cold Tire Setter now, before you send us any money. You can pay while it earns money in your shop. Here is an easy way to buy the best business getter for your shop. Write us today. Don't put it off—your competitor may get ahead of you. Illustrated catalog sent free on request.

The Brooks endorsed and used by the United States Gov't

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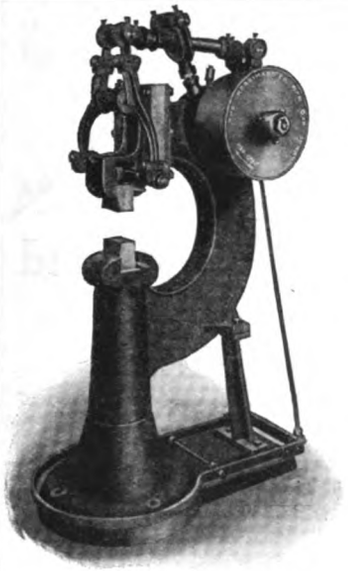
121 N. Water Street, WICHITA, KANSAS

Write to nearest office

THE BROOKS
The Biggest Business Getter For Your Shop

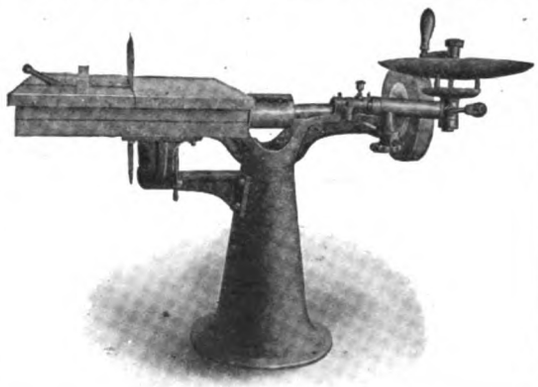


10 DAYS' FREE TRIAL OFFER

applies to our selling proposition below. You have nothing to lose—and will see that the **KERRIHARD POWER HAMMER *simply must be as is claimed for it,*** or we could not take so long a chance. You have 10 days in which to prove our guarantee and claims. Could any fairer, more utterly reasonable offer be made by any one?

THE PROPOSITION

Send us $60 (***which will be held in trust by us for the trial period of 10 days***), for which we will ship you, via shortest possible route, one of our 1909 Models, which is the standard of the world. You test out the hammer in any way you wish; do all your plow, shovel, drag-tooth work and welding—abuse it if you wish—then, when you are satisfied, either keep it or send it to us and receive by return mail the full purchase price.

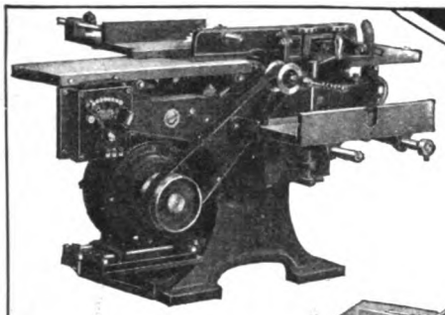


You lose money to wait. Now is the time to get ready for the Spring business, which will increase from the day you install one of our clever Hammers. **Order today.**

Hammer and Grinder Department

THE KERRIHARD COMPANY

RED OAK IOWA U. S. A.



FOR THE WOOD WORKER

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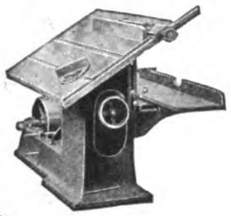
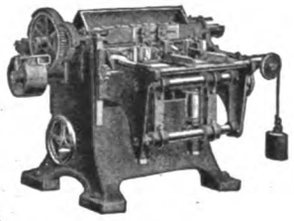
Crescent machines give such absolute satisfaction that we have difficulty in getting the machines out fast enough to supply the demand. The machines are saving money for the owners of just such shops as yours, and they will enable you to do a lot of work that now goes to your competitor.

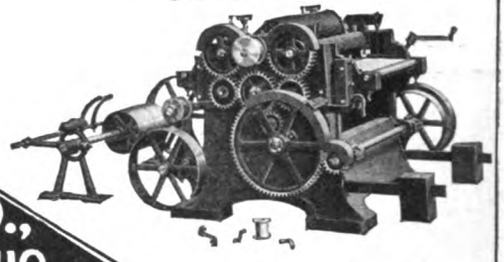




Send for a catalog today, giving complete description and telling about our fine line of Band Saws, Saw Tables, Shapers, Planers, Planer and Matchers, Borers, Disk Grinders, Pole Rounders, Variety Wood Workers.







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245 MAIN ST., LEETONIA, OHIO.

Handy Lamp

Gasoline Lighting System

Draws Trade to Your Shop





Gives a 300 Candle Power Shadowless Light the instant you move the lever. Turns up or down, like gas, burns dim when not in use, or can be turned up instantly when more light is needed. It floods a 30 foot space with a brilliancy like daylight. Far cheaper than gas, kerosene or electricity, and so simple that anyone can use it. You can depend on it for years for any purpose demanding a big, strong light. Catalogue A.B. tells why. Send for it now.

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When a dealer or jobber tries to impose substitutes for the *good advertised articles,* write us or the manufacturer. We will see that you get the genuine—what you want.

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TRADE E-Z MARK
WELDING COMPOUND
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"E-Z" Welding Compound

MAKES

PERFECT WELDS

at 250 degrees LOWER HEAT than any other

"E-Z" Will Stick

when metal is at LOW HEAT and it is EXCELLENT for Spring Steel, Tool Steel, Tire or Axle Welding

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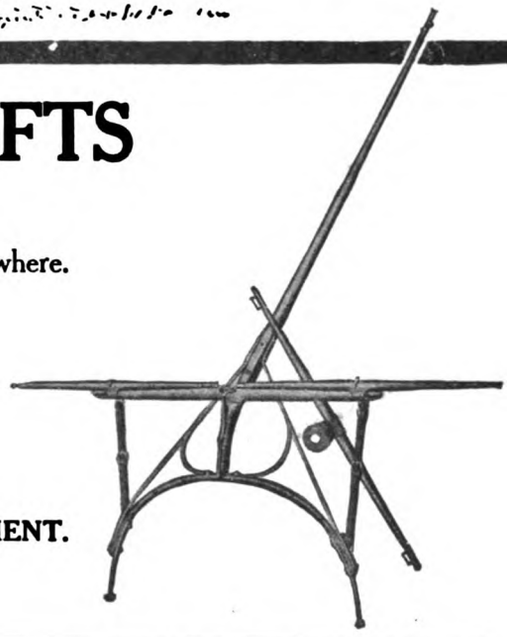
POLES AND SHAFTS

THE QUALITY MAKE

Recognized as best by experienced vehicle men everywhere.



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The Pioneer Pole & Shaft Co.

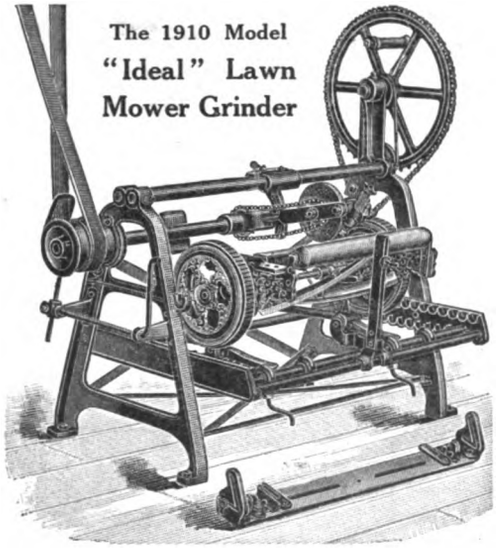
Headquarters and Sales Offices,

PIQUA, - OHIO.

Manufacturers of all styles and sizes of poles and shafts.
A complete line that will SUPPLY EVERY REQUIREMENT.
Have you our catalog and price list?
If not, we want to send you both.

"You Grind It As You Find It"

THE 1910 MODEL OF THE "Ideal" Lawn Mower Grinder



grinds the Reel Knives to fit the straight blade, even if the latter is bent and out of shape—something never done before, and the most important feature of Lawnmower sharpening. Has 5 in. ball-bearing grinding wheel, ground and polished shaft, babbited bearings, twice as easy running as any other. Grinds either right or left hand Mowers perfectly in 15 minutes, without removing ratchets or wheels. We are the originators, and seven years' experience has shown us how to make them perfect.

Send for circular giving full information and prices. **Write Today.**

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Successors to The Root Brothers Co.

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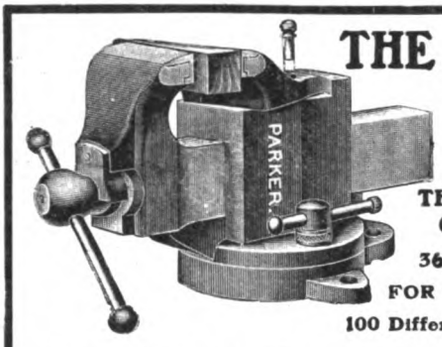

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THE MOST RELIABLE ON THE MARKET

36 Different Styles.

FOR ALL PURPOSES.

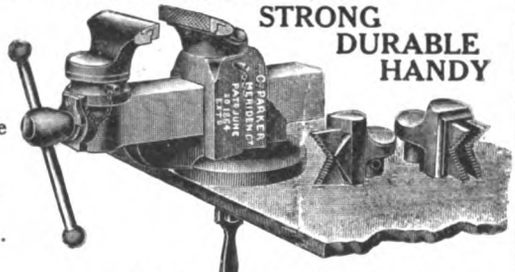
100 Different Sizes.

Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings.

The steel faces on these vises are milled and fitted to the jaws and are removable. Have self-adjusting back jaws which automatically adapt themselves for holding wedge-shaped pieces.

STRONG
DURABLE
HANDY



Our complete illustrated catalogue is free. Write today for price list also.

A tool of many uses. Both round and pipe jaws interchangeable. Weight, 76 lbs.

THE CHAS. PARKER CO.,

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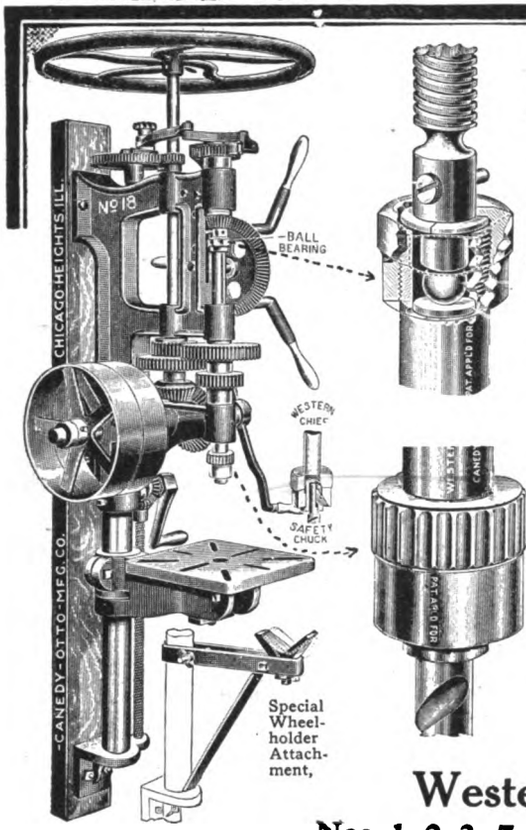


Special Wheel-holder Attachment,

Ball-Bearing and Safety Chuck

Ball-Bearing

A single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate.

Safety Chuck

It is opened and closed with the hand.

No more set-screws to mar and bruise the shanks of bits.

No more wrenches to tighten and loosen set-screws.

No more twisting of bits in the chuck.

No more trouble in inserting and removing bits from chuck.

Western Chief Drills

Nos. 1, 2, 3, 7, 12, 14, 15, 16, 17 and 18

A Feature of TO-DAY

Wrench? NO!

FORGES—BLOWERS—DRILLS—



No. 100 Royal Forge

Fan, 12 inches. Hearth, 31½ x 45½ in

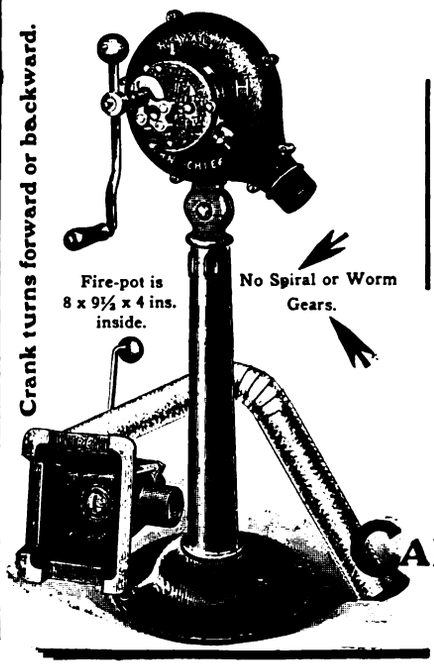
The Names — "ROYAL and WESTERN CHIEF"

When found on a Forge, Blower, Drill, or other Blacksmith Tool—mean that that article is better than the ordinary. They mean that in its construction the best materials and the highest skill obtainable have been employed. They mean that years of experience have served to perfect it. They mean the tool is a success, and quality alone has made it so. Dealers and Blacksmiths in general will procure what they like best. We must deserve before we can obtain trade. There is no doubt about our deserving, because our production grows rapidly.

There is a reason—Quality

They are all the Best!

Royal Blower



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Jaws Adjust Themselves to Uneven Thicknesses

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CANEDY OTTO MFG. CO

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ONE CENT

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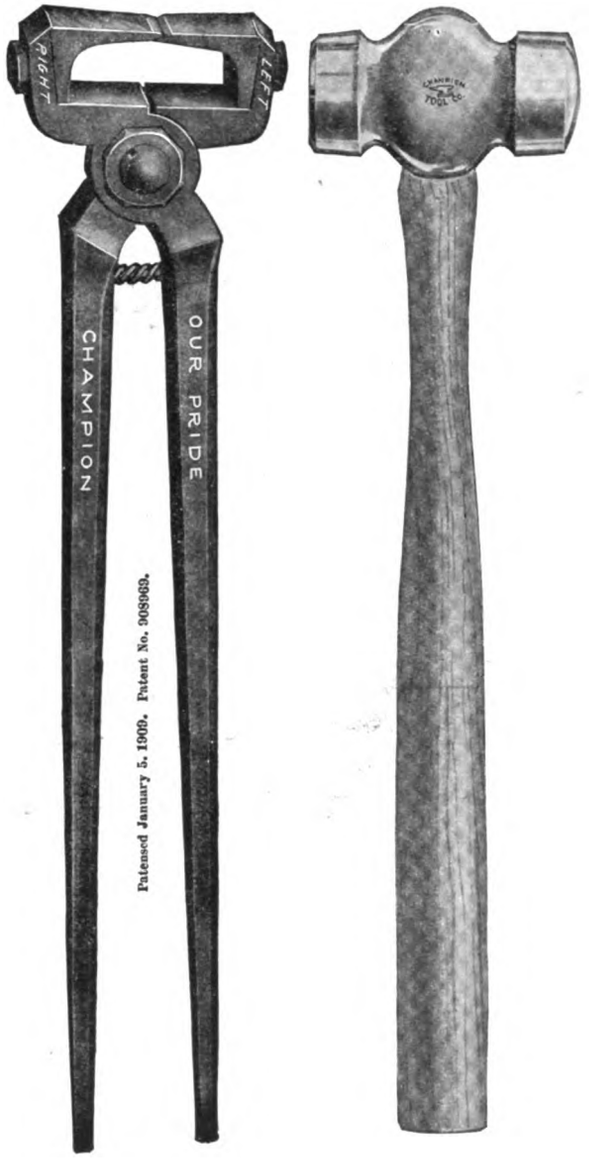
82 Labor-Saving Tools



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Ball Bearing Hoof Shear
12 inch 14 inch
BALL BEARING JOINT
Interchangeable Blades
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No. 4 Weighs 1½ to 3 lbs.
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ROUNDING HAMMER
Swings Just Right
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Our Tools are tempered in PLAIN COLD WATER and can be redressed and retempered by any practical man.

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THE
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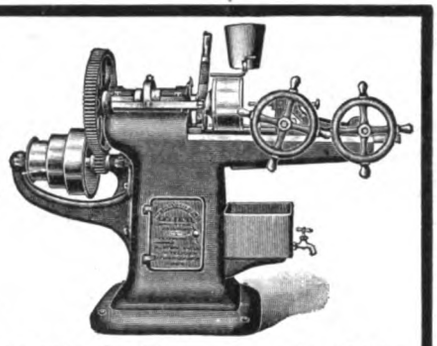
Bolt Threader
Best on Earth



A Bolt Cutter is Much Like a Man in This
THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly.

THE H. B. BROWN CO.,
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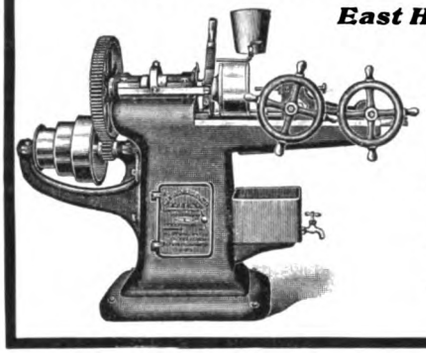

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Catalog No. 11
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"MORSE" TOOLS



Prominent among them are

"MORSE" DRILLS

fitting the different presses made especially for blacksmiths' use. Shanks are furnished round or flattened for set screw, as desired.

None Better. A Trial Is Proof.

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Morse Twist Drill & Machine Co.

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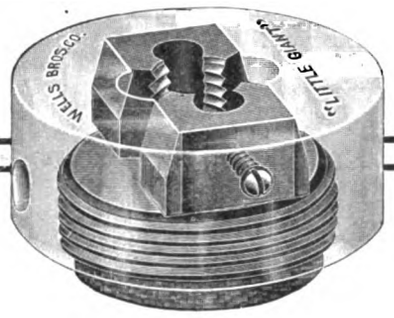

Little Giant

THAT BEVEL ON "LITTLE GIANT" DIES and in the collets makes them always fit solidly and they never wear loose. This feature is found in "Little Giant" dies only.

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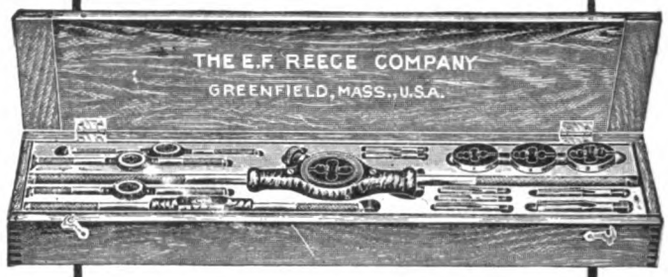
Wells Brothers Company

Greenfield, Mass., U. S. A.

NEW YORK CHICAGO LONDON

Reece Combination Screw Plate No. 103

$8.25 NET WILL BUY ONE



The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16 — 18, 3-8 — 16, 7-16 — 14, 1-2 — 12, 5-8 — 11, 3-4 — 10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustable, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only $8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

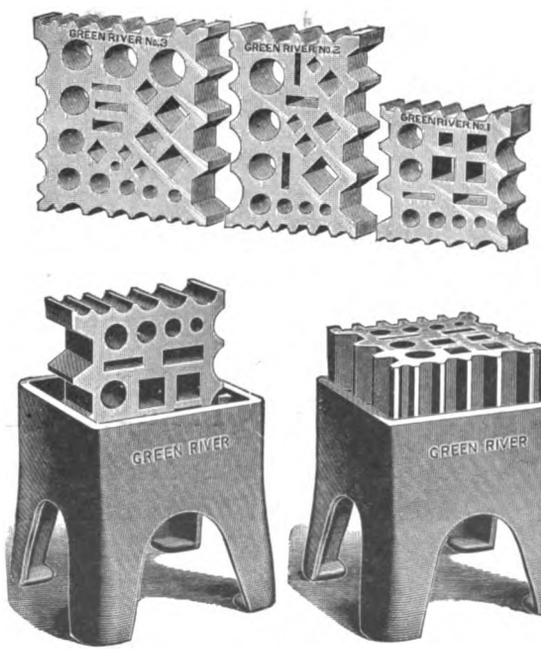
Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

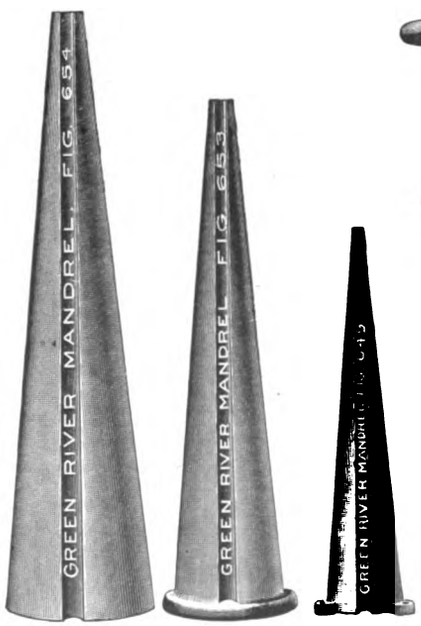
THE E. F. REECE CO., Greenfield, Mass., U. S. A.

GREEN RIVER SWAGE BLOCKS AND STANDS

Specially Strong, Hard Iron, Carefully Moulded

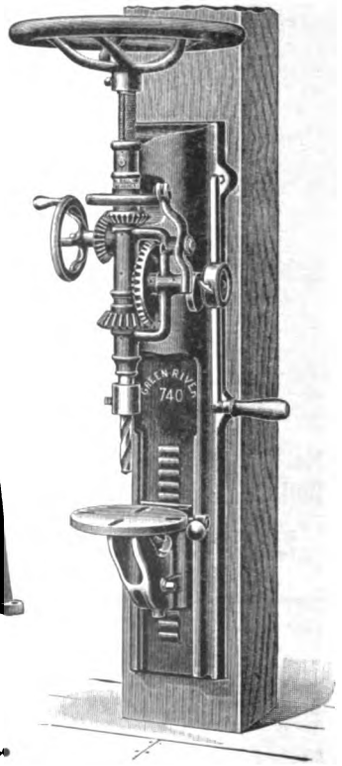


GREEN RIVER BLACKSMITHS' MANDRELS



GREEN RIVER DRILLING MACHINE

No. 740



Send for Catalog 34 D and Prices

SOLE MAKERS

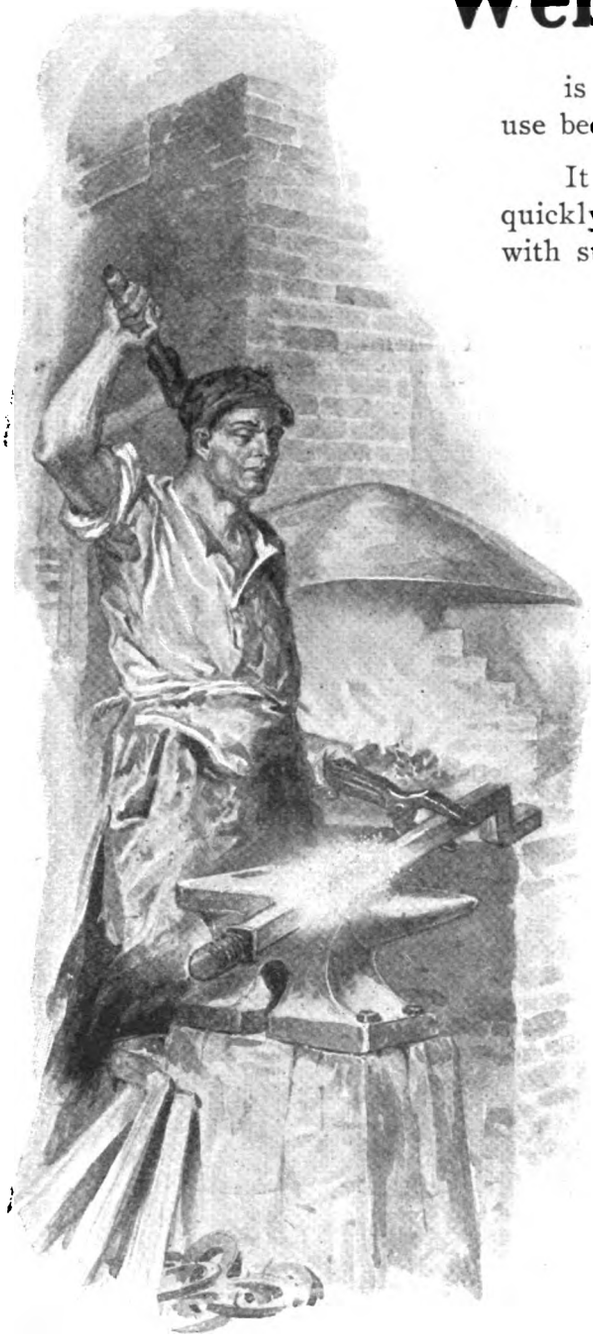
Wiley & Russell Mfg. Co., Greenfield, Mass., U. S. A.

The iron on your anvil tells the story of the coal on your forge

PERHAPS you haven't realized how much quick work and a good job depend on the quality of coal you use. But you do appreciate a good, hot, steady fire.

Blacksmiths who have looked into the question and experimented have found that a high-grade coal especially adapted for smithing purposes is a wonderful saver of time, and remarkably increases the quality of work. They have found that

Webster Smithing Coal



is distinctly superior to ordinary smithing coal for forge use because:

It is practically free from sulphur, fuses iron or steel quickly and insures a firm weld. Welding is impossible with sulphurous coal.

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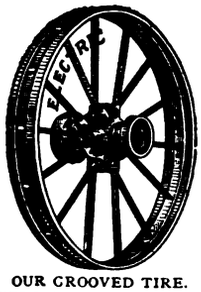

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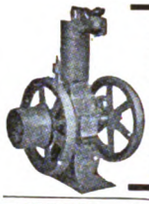

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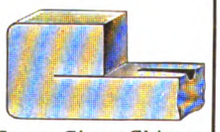

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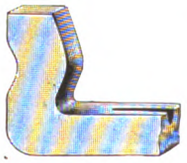

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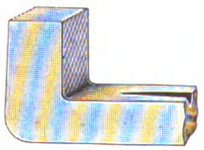

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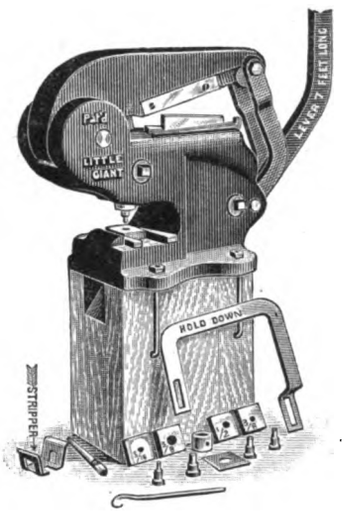

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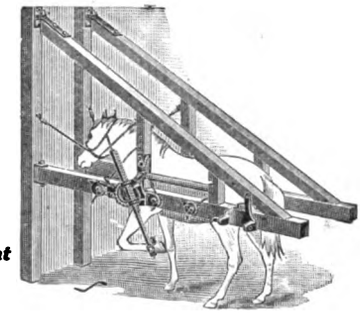

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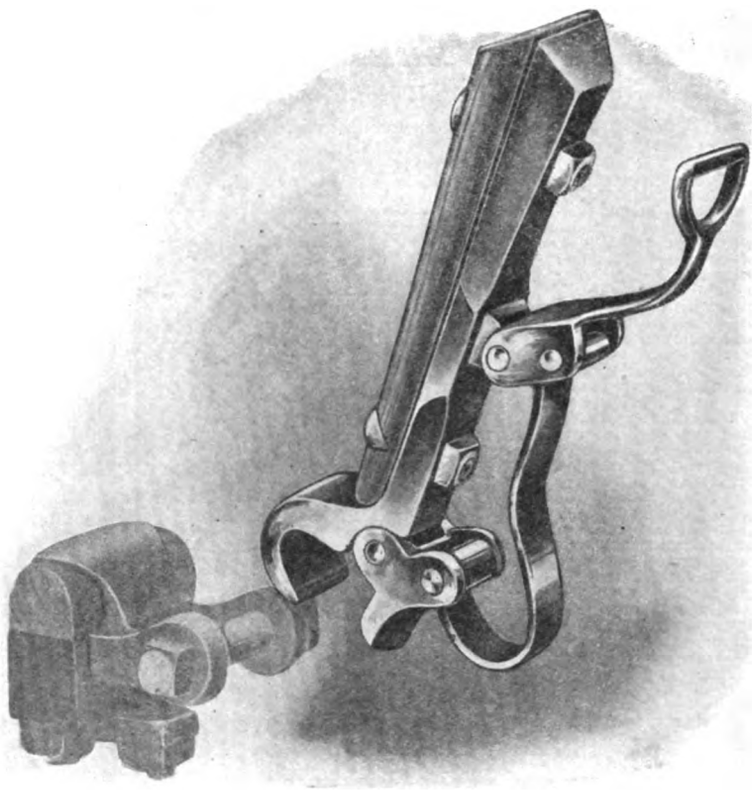

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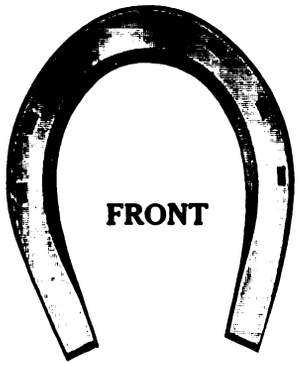

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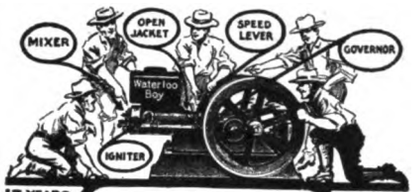

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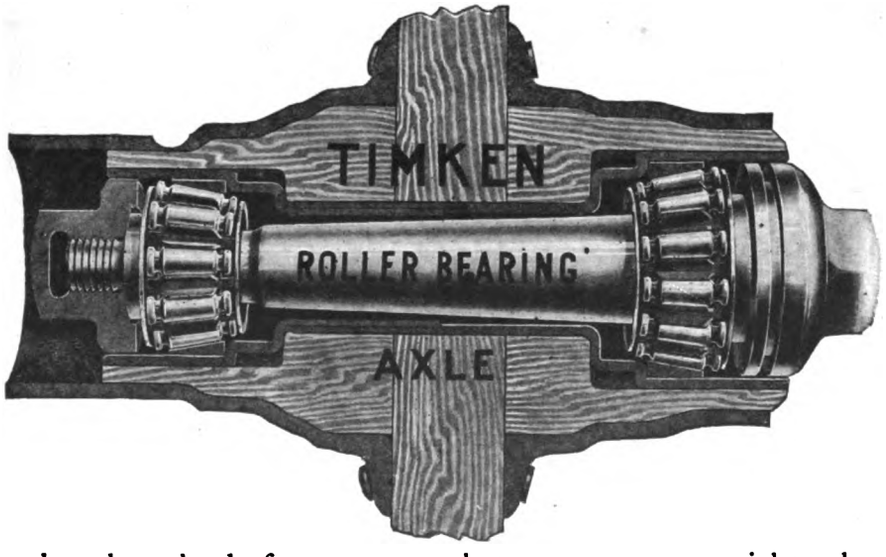

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The Season's Program.

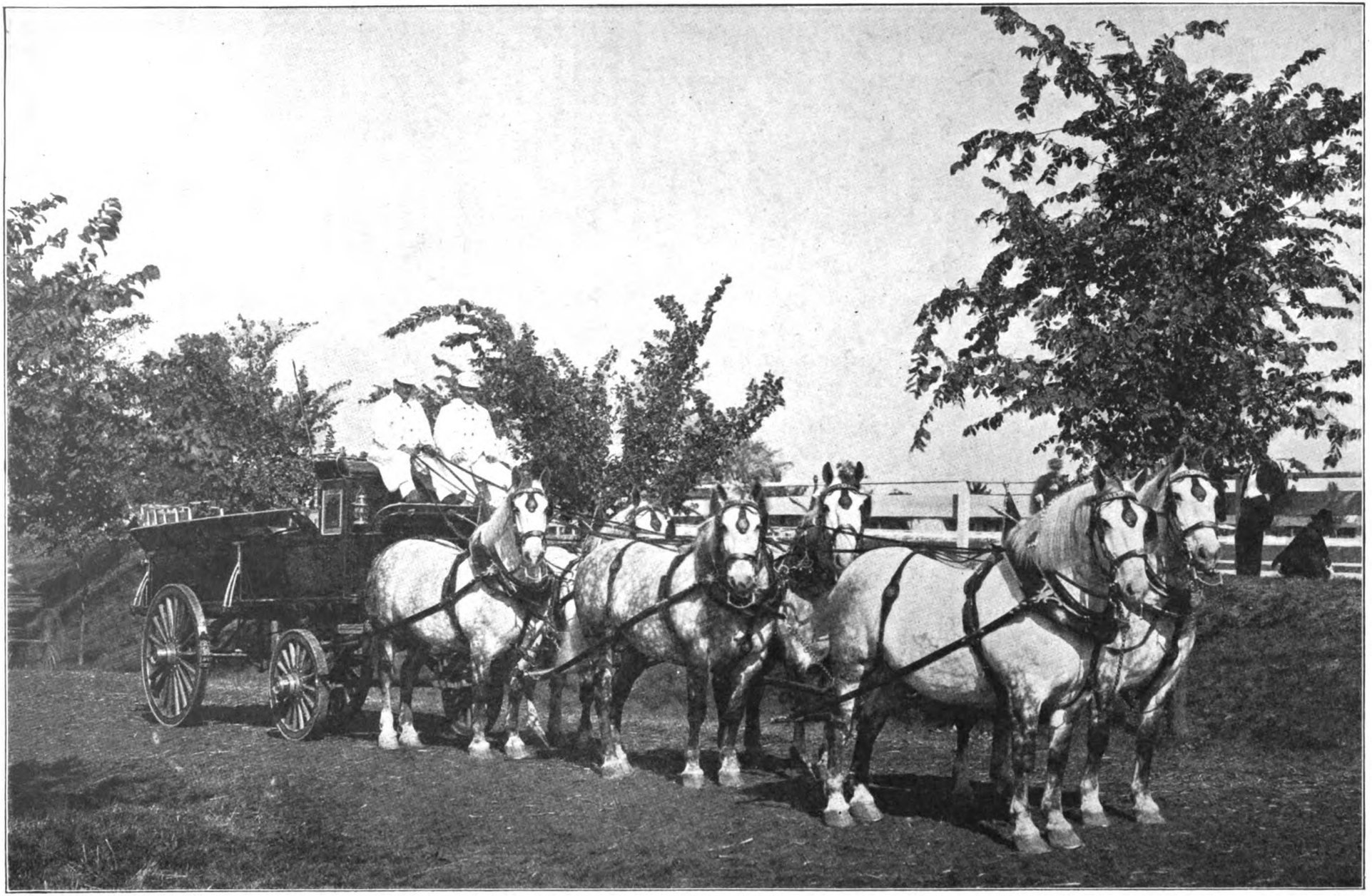
The coming season will see THE AMERICAN BLACKSMITH still better, bigger and more valuable than ever before. The January number, we are sure you will admit, was the best issue of any smithing paper that has ever been published. Lots of our friends have asked us how we can expect to do better. We admit, it's going to be somewhat difficult to improve on that January issue, but we're going to do it; and we expect that the entire year of 1910 will be a succession of surprises for "Our Folks."

Of course, the regular departments and subjects will receive full attention. There will be the regular yearly "Shop Number" in the summer, an automobile issue next month and then other feature numbers as the time for their appearance arrives. There will be several new names among our contributors and a number of articles on entirely new subjects will appear.

But to make these issues of 1910 the success we want them to be we must have your coöperation. We want you to send in items of interest for publication. Let us have a photograph of your shop, a description of it, a sketch of any tools or machines you may have made, with a description of how you made them. Let us know what you are doing in the line of advertising, send us your association news. In short, keep us posted on any and all matters connected with the good old craft.

Save Money.

Our long-time rates will save you considerable money, to say nothing of the time and bother saved in taking care of your subscription for a period of years. Two dollars would make a welcome gift to anybody, and that is the amount you save on a domestic subscription for a period of five years. Thus, you pay but three dollars instead of the five you would pay by subscribing for single year each time. And there are proportionate savings for other periods.



THE FAMOUS SIX-HORSE TEAM OF SWIFT AND COMPANY, CHICAGO

Treating Diseases and Injuries of the Foot

W. O. JULIUS

THE great problem in successfully treating diseases and injuries of the foot is the protection of the wound and the dressing. To prevent the irritating acids of stable dirt from working into the wound is the difficulty. This difficulty is not so great when the disease or injury affects that part of the limb above the hoof wall, but when the injury is in the ground surface of the foot the problem is especially difficult of solution. Coupled with the difficulty of keeping the wound and dressing clean is the problem of so protecting the part as to make it as easy as possible to change the dressing. In other words, the wound must be properly protected and still at the same time be accessible for frequent treatment. For in many cases it is the continuous cleanliness rather than the application of the medicine or drug that does the work. Then again there are cases in which a simple device will be sufficient, provided it keeps the dressing intact and clean. It is unnecessary, and time and money wasted, to provide an elaborate protective device for cases of this kind.

The several engravings show how both the serious and the slight injury may be successfully treated. The cover-plate shoe is made in several forms, as shown in the accompanying engravings. In Fig. 1 the shoe is an ordinary four-calk shoe with a cover plate to fit with holes corresponding. The calks should have square, blunt heads, and if necessary the plate may be slightly concaved to allow plenty of room for the bandage or dressing. In Fig. 2 is shown a similar shoe, but with a little spur or projection at the toe end to hold it in place. Fig 3 shows a plate fitted with a spring to hold it in place. Recesses at each side of the shoe will allow the spring to catch and remain immovable.

For the treatment of slight injuries the practical farrier is already acquainted with the leather put on under the shoe. This is a very effective means of keeping a curative packing in the hoof, but as the shoe must be removed in order to remove the leather it is not practical for injuries or diseases requiring continuous treatment. In Fig. 4 is shown another simple means of retaining a dressing in the foot. In this case thin splints of tough wood are placed between the hoof and shoe.

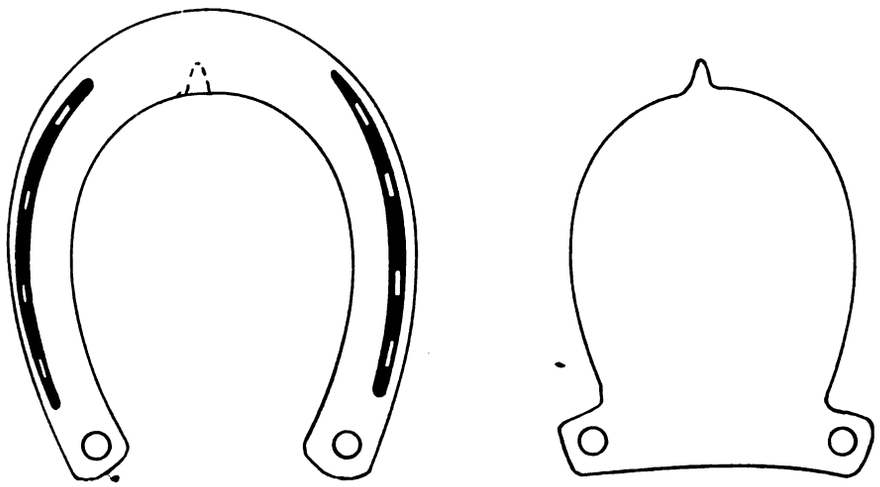


FIG. 2—A PROJECTION HOLDS THE PLATE AT THE TOE

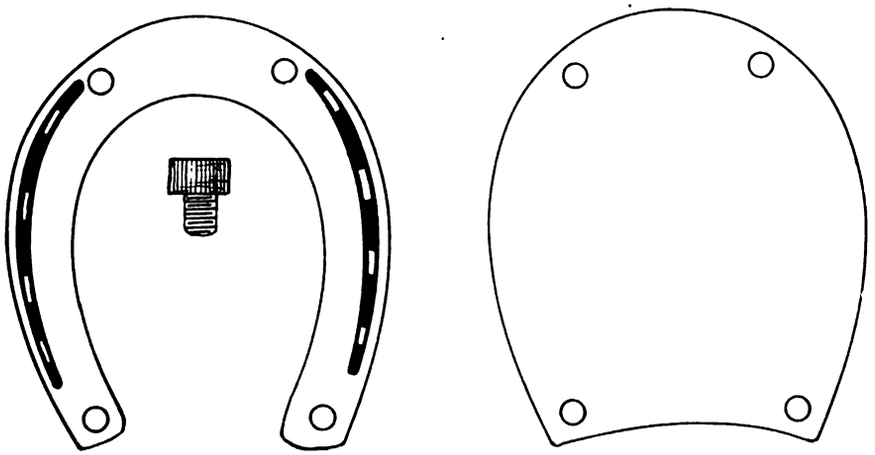


FIG. 1—THE COVER IS HELD BY FOUR SCREW CALKS

The advantage of the splints over the leather is the fact that the wood does not give quite as readily under the pressure as the leather. This is sometimes an advantage to be sought.

In the treatment of diseases of the foot it is almost unnecessary to repeat that old saw: "First remove the cause." It is of the utmost importance in treating diseased feet, and the owner must be warned repeatedly, if necessary. In thrush, for instance, no amount of drugging and treatment will arrest the disease if the filthy condition of the stable, which is the most common cause of the trouble, is allowed to remain. The cover-plate shoe is an especially effective aid in the treatment of thrush, as cleanliness is the very first requisite to the successful treatment of this trouble. If the disease has progressed for any period the diseased and ragged portions of the horn should be pared away and the foot poulticed for two days with boiled turnips. Just previous to applying the turnip poultice sprinkle a handful of powdered charcoal in the hoof to destroy

the offensive odor. After this treatment the hoof is carefully cleaned out and well filled with dry calomel, and then a packing of oakum and the cover replaced. Should the discharge be heavy the foot had best be dressed every day. Otherwise every two or three days will be sufficient.

Canker will usually succumb to the same general treatment. First clean the foot well in a warm bath and then apply a poultice containing powdered charcoal. After poulticing for one or two days carefully remove all diseased portions of the horn, cleaning the foot out carefully and as neatly as possible. Then compound the following mixture:

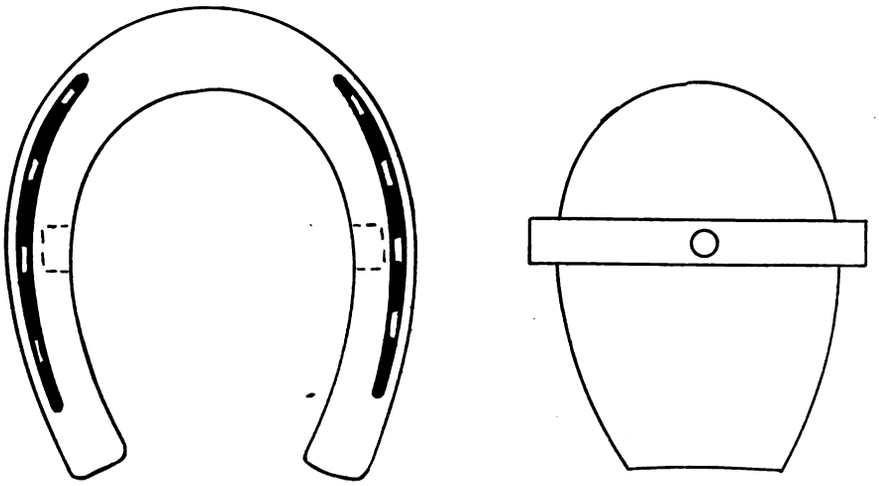


FIG. 3—A SPRING HOLDS THIS PLATE IN POSITION

One part Barbados tar, eight parts of turpentine, two parts of sulphuric acid. Mix the tar and turpentine, and then add the acid slowly, stirring and mixing well until cooled. Now dip a wad of oakum into the mixture and spread carefully in the hoof, so as to cover every part of the hoof well. Then apply dry oakum sufficient to produce considerable pressure on the foot and replace the cover of the shoe. In some cases it is best to dress the foot quite frequently—even twice a day at first. When changing the dressing the foot should be cleaned carefully of any loose horn, and when the secretion diminishes dry calomel should be applied to the foot. The curative treatment should not be discontinued too early, or the disease may re-occur.

In the treatment of contracted heels on animals that cannot be taken from their work, bar shoes with cover plates are most effective. The main point to bear in mind in this connection is to use care in the application of the bar. Don't let the bar bear too heavily on the shrunken frog at first. Keep a moist packing under the cover continually, and after the hoof and frog have been returned to some semblance of health continue the use of the bar shoe without the cover.

In treating punctured wounds of the foot the cover-plate shoe is a most valuable aid. Naturally, the treatment depends upon the extent of the injury. The puncture may or may not be of a serious nature, according to whether or not it involves the more important organs of the hoof. In all cases the treatment should be such as to keep the wound open and free from pus, poultices applied for the reduction of inflammation, and then a healing, antiseptic dressing applied and renewed from time to time—if necessary as frequently as once each day. An easily procured remedy and one that is perfectly safe to handle is common every-day salt. It will keep a wound clean and healthy and will work its way into the remotest corners of the wound. It is not necessary to handle it with the extreme care necessary in handling the poisons often recommended and used, and the results are in every way as satisfactory.

Bruises of the frog may also be very successfully treated in connection with the cover plate. If the bruise is detected immediately, the foot should be bathed in cold water, and the frog examined frequently to arrest further developments. However, if the bruise is severe and not of recent occurrence, the frog and bars should be pared carefully to remove all possible pressure, and a poultice applied. Change the poultice frequently and continue treatment for several days, carefully removing all dead portions of the foot as they slough off. When the sloughing has diminished, treat the foot with stimulating dressings—the tar mixture

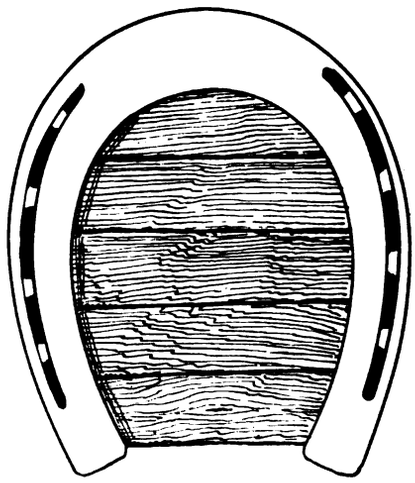
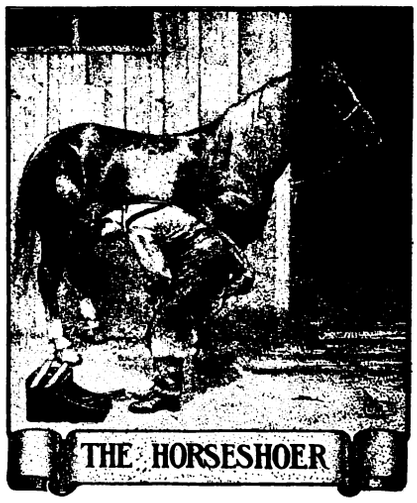


FIG. 4—THIN PIECES OF WOOD MAY ALSO BE USED

mentioned is excellent. As the new horn forms gradually apply pressure by means of oakum pads until the horn is sufficiently thick to take the full weight of the animal. Continue with the bar shoe at least until the foot is in perfect health.

The important points, then, in the treatment of foot diseases and injuries are: First, removal of the cause; second, cleanliness; third, frequent change of the dressing. The importance of removing the cause has already been emphasized. Cleanliness is a very close second, and the nearer we can come to absolute cleanliness, not only of the wound and foot, but of surrounding stable conditions as well, the quicker the cure.



When the Horse Goes Barefoot.

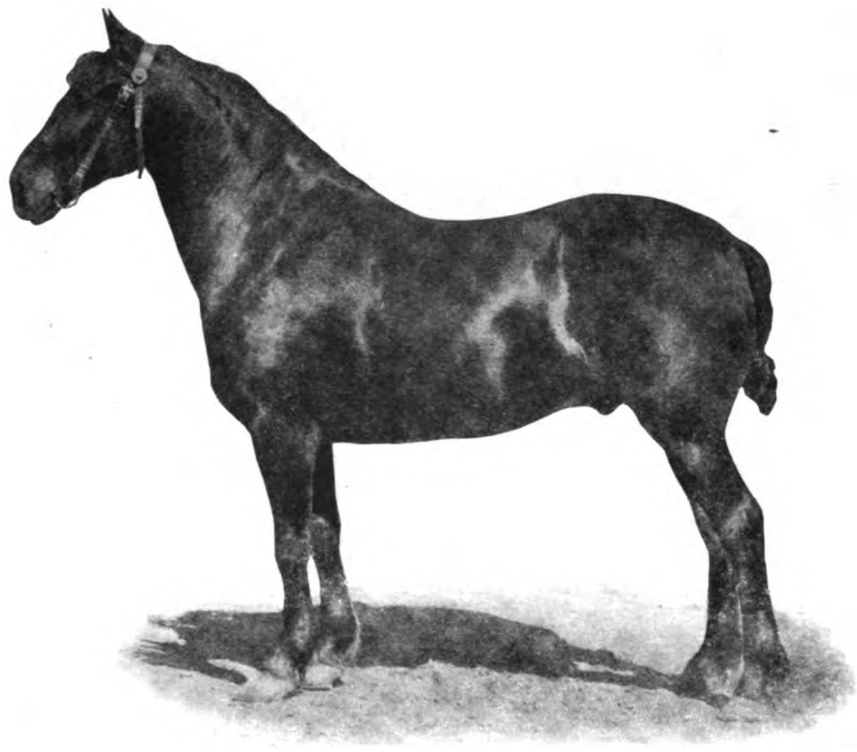
H. F. STEVENS.

When the shoes are removed preparatory to allowing the animal to go barefoot, either in the pasture or to work on ground the nature of which renders shoeing unnecessary, the hoof must necessarily have proper preparation to

prevent undue wear, cracking and breaking. The advantages of occasionally allowing an animal to go barefoot are generally well known. It strengthens the hoof, promotes its growth and will improve the health of the foot, generally.

Before removing the shoes, preparatory to allowing the animal to go barefoot, be certain that the foot has plenty of horn. It is but natural that the horn will wear away considerably at first, owing to the fact that it is not accustomed to coming into direct contact with the ground. To stand this wear and grinding away, the amount of horn on the hoof must be considerably longer than usual. After making certain that the hoof carries plenty of horn, remove the shoe carefully, being especially painstaking so as not to break the edges of the hoof. When the shoe has been removed pare the frog carefully, if it extends beyond the level of the wall. The frog having had but little pressure compared with what it will receive when the shoe is off is likely to be forced up into the foot and to do very serious injury. It is, therefore, necessary to pare it down almost to the level of the hoof wall. This will insure the frog getting the proper pressure gradually and performing its proper functions.

The wall of the foot, after the shoe has been removed, is now rounded off with the rasp on its outer edge, i. e., the edge made by the juncture of the slanting wall and the ground surface. This rounding is necessary on account of the readiness with which large pieces of the wall will break away. This rounding is sometimes necessary as far back as the white line, especially in hoofs having a long slanting wall.



AN EXCELLENT TYPE OF ANIMAL FOR FARM USE



AN ANIMAL WELL SUITED FOR BOTH RIDING AND DRIVING

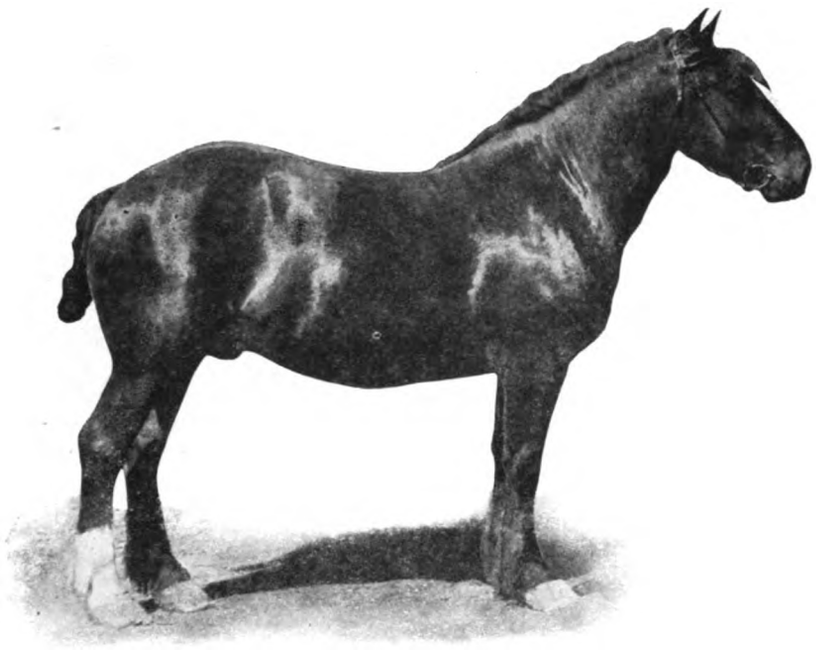
It is also necessary to examine the shoeless hoofs occasionally to see that they are growing properly. If the horn is growing improperly such growth should be corrected with knife or rasp. Also, if the heels get unduly long they should be pared, as they do not, as a general thing, wear down as much as the toe. If necessary, the edge of the hoof should be rounded from time to time to prevent it from breaking. Frequent inspection of the animal's feet and an occasional rasping when necessary will keep his feet in good shape and even allow him to do light work on soft ground.

A Discussion on Shoeing.

RAY VOLLMER.

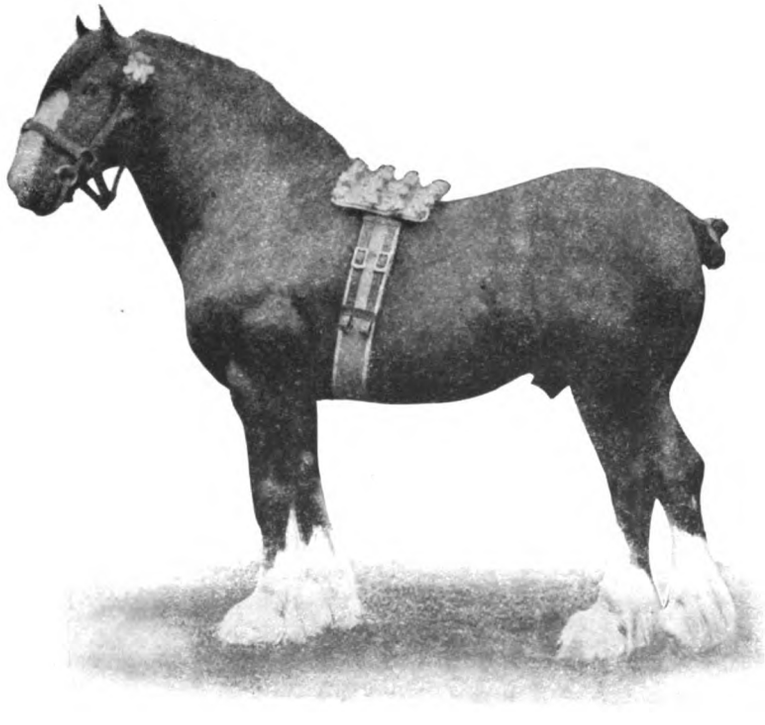
I should like to discuss the old rehashed topic of horseshoeing,—not because I claim to know any more about it than anyone else, but because there is such a great diversity of opinions regarding it. Each shoer claims he has the only way or a better way than his brother competitor.

One writer says one should use light shoes without calks for a horse that has corns. Now, I cannot see why the shoes should be light. I think a shoe should be heavy enough so that when it is sprung, in order to relieve the pressure on the seat of corn, it will stay sprung. Besides, why do people (in the winter when most of



FINE TYPE OF FARM HORSE—THE EASTERN CHUNK

the shoeing is done) have horses shod, if it is not to keep them from slipping, and how would a shoe without calks do the work? Some shoers seem to be of the opinion that a corn on a horse's foot is similar to one on a human foot, that it has roots, and needs a great deal of trimming and burning and a dose of nitric acid to cure it, when it is nothing more than an inflamed place in the sole of the foot, caused—and caused only—by under pressure. Some claim that a horse's foot should have frog pressure, if properly shod. If that be true, how many horses in the city could you find properly shod? Most of my customers in the summer have their horses shod to relieve the frog pressure. Of course, there are exceptions when a bar shoe is needed and needed badly; especially where the wall is in such a condition that it cannot support the shoe. But to make a practice of using bar shoes would hardly be practicable.



THE SHIRE STALLION IS AN EXCELLENT ANIMAL FOR HEAVY DRAFT

I should like to give my views on just another phase of shoeing before I close, and that is the holding of a hot shoe to a horse's foot. Some shoers claim that it simply ruins a horse's foot; that it dries it up; that it contracts it and makes it brittle, and many other things. Some time ago I read a book issued by the Government, and in it was an article describing the method of shoeing in Cuba. It said that the shoes had to be fitted hot, in order to make a close, tight fit, because the climate was such that a shoe would become loose in a short time if done otherwise. How much headway could a man make leveling feet if he did not use a hot shoe? Remember, I do not want you to think that a person should go to extremes in burning a foot, but merely enough to color it, so that one may know where to trim. If burning feet is such a harmful practice, why is it not abolished in the cities where it is practiced the most?

Using salt in punctures and wounds as a disinfectant, by Brother Craig, is a new one to me. I believe I would hate to be the horse. I have read where salt was sprinkled in open sores with the idea of inflicting pain, but never with the object of relieving it. I believe a little diluted carbolic acid would answer better—that is, on an old sore. Never use turpentine on an old wound, although it is hard to beat, on a new one.

Clips and Clipping.

W. O. JULIUS.

The writer has, in several papers on horseshoeing which have appeared in "Our Journal," mentioned the fact that he is adverse to the use of clips, except in certain cases. Several readers have brought up the matter and expressed their willingness to know the why and the wherefore.

In the first place let us consider what the true office of the clip really is. Is the clip intended to help hold the shoe to the foot? Some I have seen would appear to do so without the aid of nails. This, however, I am glad to say, is not the rule, and these days one does not often see big, clumsy clips that make a shoe appear as though it were of the nail-less variety. The true office of a properly forged, properly fitted clip is to prevent the shoe from shifting from side to side. Therefore, it should be low and wide rather than high and narrow. So much for the shape of the clip. In fitting it, some shoers, and they are by no means

exceptions, carve a piece out of the hoof, thus making a hole in which to imbed the clip. This is certainly not correct practice. All that is necessary is to simply rasp a small flat surface at the toe—the clip if properly made is flat—for the clip to rest on. Then, in fitting, many smiths hammer the clip down on the wall in a manner that reminds one of a man burring rivets. This is certainly not right. The foot was never intended to be held in a vise, but that is practically what is done when the clip is hammered down upon the toe of the hoof.

Then again, suppose the shoe becomes loosened and that it bears a high, narrow clip, is there anything to prevent a rapidly-traveling animal or even one moving at a moderate pace from injuring himself badly?

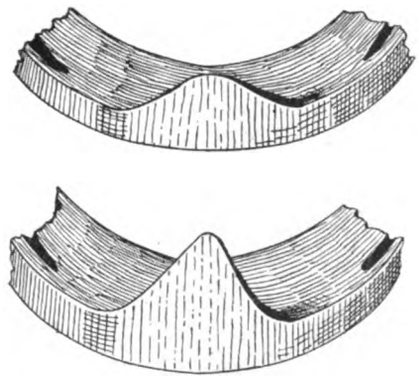
Now, suppose the shoe to be fastened correctly with nails. In such case the clip has no chance of being of assistance. The nails themselves keep it from slipping sideways. If the shoe is loose the clip becomes a menace and a possible means of inflicting serious injury. Therefore, why use the clip at all? Can anyone tell of what advantage a clip is on a shoe that is properly fitted and properly nailed? The clip may be of some assistance in steadying the shoe on the foot when driving the nails, but a good shoer should not require this aid and should not depend on it.

It is, of course, understood that the writer refers to the shoeing of healthy hoofs in the foregoing. In the shoeing of diseased feet clips properly made and fitted are of advantage.

Anatomy, Physiology and Trimming the Foot.

FRANZ WENKE,
U. S. Army Shoer.

I have observed in many articles the constant admonition. "The horseshoer must know anatomy," but very seldom do we hear that he must also know physiology. Now, in my humble opinion, a horseshoer who knows how many bones, ligaments, blood vessels and nerves make up a horse's foot, but does not know what those bones, ligaments, etc., have to perform, will make but a very indifferent horseshoer. In fact, he is like a machinist or engineer who knows the different parts of a machine, but does not know what those parts have to do. Such a machinist is only part of a machine or engine himself; he is not the finished mechanic. So with the horseshoer—anatomy alone will never give him the opportunity resulting from a little knowledge of physiology. Both must travel together in order to afford a good knowledge of horseshoeing. The young horseshoer, therefore, cannot do better than to study anatomy and then to pursue the study of physiology.



CLIPS AND CLIPPING

If such a young man will then read a journal like THE AMERICAN BLACKSMITH, it will whet his appetite for more and diligent study, and he will surely make a success if his name be not Tom Tardy.

In your latest issue of THE AMERICAN BLACKSMITH, I notice Mr. L. E. Phifer refers to cutting out the old scale of the sole of the foot. I beg to differ with him there. Nature provided the horse with the power of reproducing the hoof, but it also provided for the removal of the surplus. The old scale in the sole of horses' feet will invariably exfoliate, through exigencies of weather and climate, except in very exceptional cases.

I have shod many horses, taken from the ranch, which never had shoes on their feet, but I never found it necessary to pare the sole or frog. On the contrary, I believe in leaving the old sole and frog alone; rather fit my shoe accordingly, in order to have no pressure on either one of them.

If we look at those old scales in the right light we will find them to be a wise institution of nature. In the first place, the old, dry scale is hard, as a rule, and will in most cases prevent the penetration of street nails, glass and other foreign substances into the foot. In the second instance, these old scales will act as a sponge, or packing, in taking up the moisture from the ground, or otherwise, and communicate it to the new underlying sole. In the third case, the old scales prevent the new sole, especially in the "good old summertime," from drying out on our hard and also, in some instances, dry and hot, sandy roads.

I would like to ask Brother Phifer a question. Did he ever shoe one of those original bronchos from the plains of Wyoming or Arizona for the first time? If he has, was it without a rope or sling? If so, please let us hear how it was done. I am not a mean



A PRIZE-WINNING MULE OF COLOMBIA, SOUTH AMERICA

man, and need no club, rope, twitch or sling on every unruly horse or mule, but I have shod many an animal which was absolutely dangerous to shoe without some means of securing it. I have been at the trade thirty-five years, doing mostly horseshoeing, and I have handled many a dangerous horse.

A Short, Early History of the Horse in North America.

W. O. B.

Previous to 1519 the ground of the North American continent had never felt the weight of a horse's foot. In that year, however, the first horses came with Cortez. There were twenty-one animals in the party, sixteen horses and five mares.

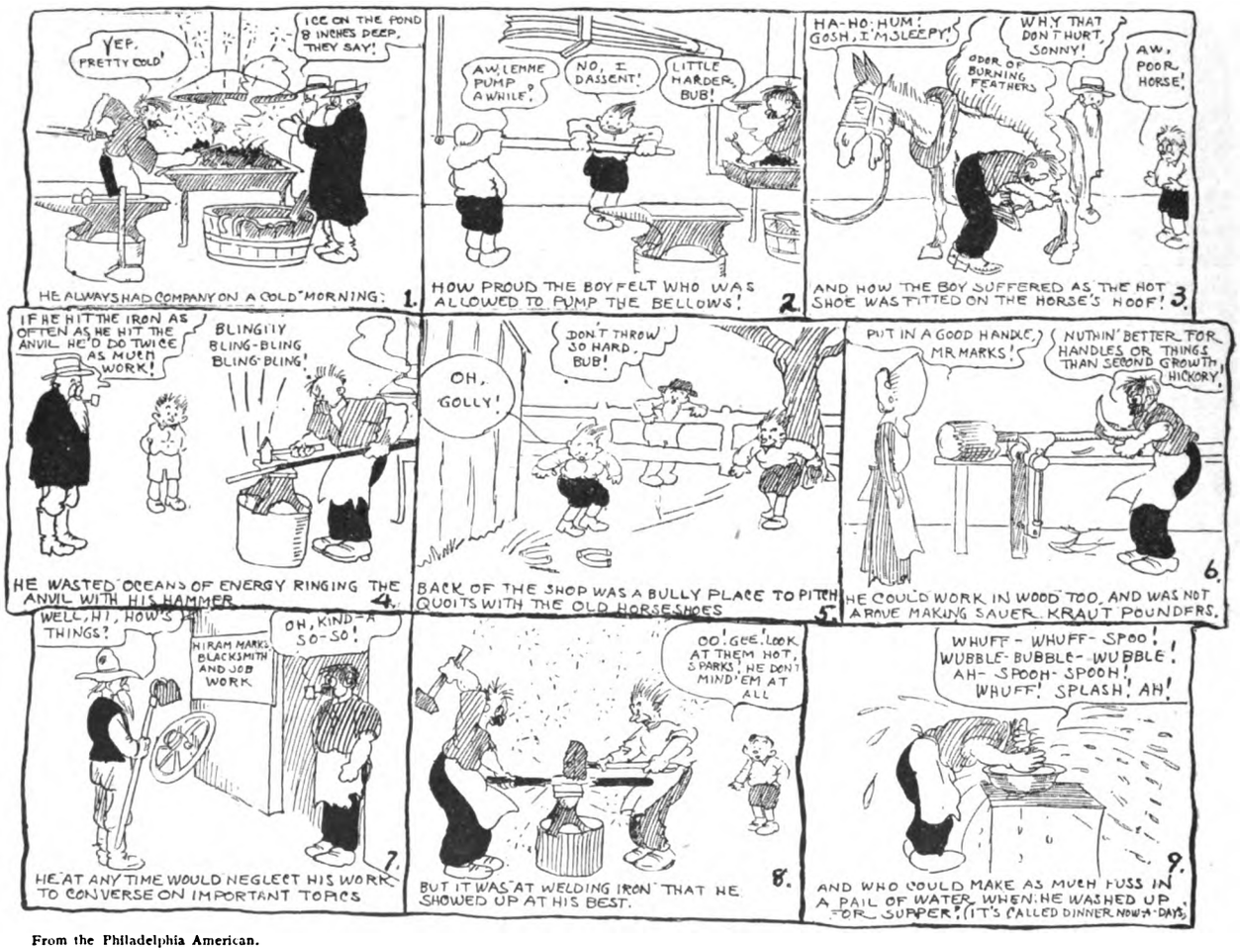
At this time every thing was high except money—gold and silver were the cheapest things procurable. One Hernando Pizarro could not afford iron, so he shod his horses with silver and a few of them with gold.

And while silver was the cheapest thing, horses were the most expensive. In fact, they were not for sale. In the early years of the conquest of Mexico horses fetched from four to six thousand dollars and that only upon the death of their owner. And in one of the many wars of the time a cavalier seeing a negro slave leading a horse down the street and taking an especial fancy to the animal offered the owner ten thousand dollars for the two (horse and slave). The offer, however, was promptly, but politely refused.

The first sight of the horse is said to have filled the natives of Mexico first with astonishment and terror and then with admiration. One can readily imagine their utter surprise and bewilderment when one realizes that they had never before beheld anything of the kind.

After the introduction of the horse by the Spaniards the increase of the animal was nothing short of marvelous, and while single horses brought thousands during the days of the Conquest in a comparatively short time mules and horses were sold in lots of ten and fifteen thousand at from five to ten dollars a head. In 1700 a ranch owner offered an admiral one thousand saddled horses and promised some fifty thousand more if needed. The prices to which this marvelous increase in numbers caused the animals to fall is even more significant. In 1780 horses and mules could be had for two and three dollars a head, while it was not uncommon to purchase a stud of twenty-four mares and their stallion for as low as twenty-five dollars. And in Chile one could purchase a good trotter for a dollar. It is almost unnecessary to state, in view of the foregoing, that many gentlemen at that time owned fifty thousand and more head of cattle and horses. In this connection it is also interesting to note that one ranch owner, about 1650, had in one year thirty-six thousand calves born on his hacienda.

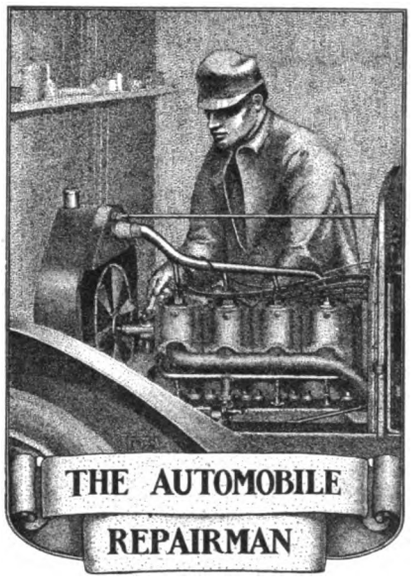
Naturally, from the foregoing, horses must have been unloaded into the country in great numbers, and they were also used in great numbers. As an illustration of the latter fact it is recorded that in the palmy days of the Vera Cruz trail seventy thousand mules a year were used. This trail was a shod path from Vera Cruz to the city of Mexico, over which the pack trains traveled. It was stone paved for a great portion of its length, and for three and one half centuries its



From the Philadelphia American.

WAS THERE EVER A MORE FASCINATING PLACE FOR BOY OR MAN?

surface was marked with the footprints of a commerce so vast as to seem almost incredible. Down this mere thread of roadway poured the wealth of the most famous Mexican silver mines, to say nothing of the indigo, sugar; cochineal and similar products of Mexico; the cacao of Equador and the copper of Coquimbo. At the height of its activity the Vera Cruz trail enjoyed a travel of fifty thousand tons a year. As for value, it may be noted that one pack train of a thousand mules averaged two thousand dollars per animal, the cargo being silver.



Adjusting, Repairing and Caring for an Automobile—3.

With Special Reference to the Stevens-Duryea.

Oiler—Commutator—Clutch Lever.

DRIVE.—The oiler is driven by bevel gear No. 483 on lay shaft meshing with driven bevel gear No. 745 on oiler. Oiler is placed under the hood to insure an even temperature, allowing a very accurate and economical feed to bearings.

The mechanical oiler feeds the oil only when motor is running. After adjustment to the oil which is used (and the oil feed pipes do not leak at unions), the refilling of tank will be all that is required.

PIPING.—The four feed pipes carry oil directly to the main bearings under pressure. Pipe No. 747 to the forward main bearing, No. 748 to the forward end and No. 749 to rear of middle main bearing. The rear main bearing is fed by pipe No. 750.

CRANK CASE.—Motor crank case is divided into two compartments which are in turn divided into two connecting compartments.

PET COCKS.—Pet cocks No. 413 (four in number) are screwed into base at lowest point. These pet cocks screw into base to a pre-determined height, and upon opening should be allowed to drain.

Too much drainage is an excess of oil, while a few drops indicates oil only in standpipes of pet cocks.

With the car on the level and upon opening the pet cocks No. 413, it is found that one or more show an excess of oil. It will be readily overcome by turning shells No. 712 to the left, decreasing supply to that compartment. The shells when turned to the right increase the supply, but only to the feed pipe, which corresponds to the shell which is being adjusted.

The bleeder valves No. 736 (four in number) are used to test the quantity of oil delivered. The pressing on bleeder valve caps allows the oil to drop in glass sight feed.

AMOUNT OF OIL.—It is not possible to tell the exact number of drops per revolution of pump, as the various oils require different adjustments. The breathers No. 586 (two in number) are for filling compartments.

The cylinders, piston and all moving parts (directly below cylinders) are lubricated by splash from supply of oil in the bottom of crank case. Except main bearings which receive oil direct from oiler.

CLEANING MOTOR.—If one wants to thoroughly clean the motor it can be accomplished by removing pet cocks No. 413, and allowing base to drain. Replace pet cocks and pour about a quart of kerosene in at each breather No. 586. Run motor about a minute remove pet cocks and allow base to thoroughly drain. Replace pet cocks (have them opened). Pour cylinder oil into breathers until flow from pet cocks is noticed. Allow all excess to drain and close pet cocks. Make all oil adjustments when motor is warm.

SUPPLY TANK.—Stuffing box No. 721 on motor side of oiler tank can be repacked by releasing hexagon nut No. 438, disconnecting oiler feed pipes (four in number) and removing hexagon cap screws No. 702 that hold oiler tank to motor.

Remove oiler and release stuffing box nut No. 722 which will allow recess in stuffing box No. 721 to be packed.

COMMUTATOR.—To adjust ball bearings, have cover on tight, loosen set screw in adjusting cap No. 577 and turn down until all play is removed, then lock adjusting cap by tightening small set screw. Lubricate commutator with light oil every day.

CLUTCH FOOT LEVER.—Lever can be adjusted to any desired position by releasing cap screw No. 898.

In removing lever No. 895 it will be necessary to withdraw cap screw No. 898, as recess in sleeve to which it is clamped does not allow lever to be taken off with the cap screw in lever.

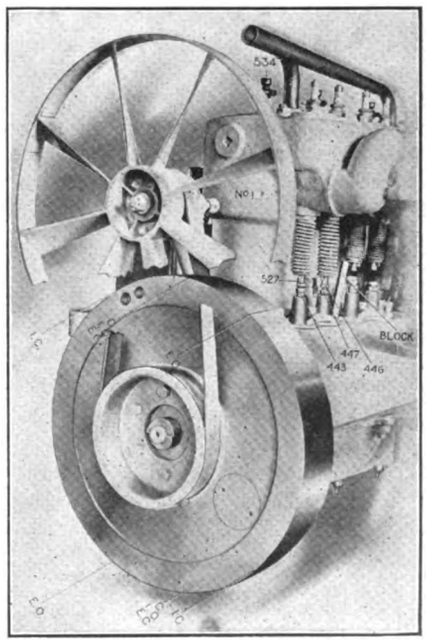
Timing the Valves.

The inspection or adjustment can be very easily accomplished by opening pet cocks No. 534 and rotating the flywheel by hand in the direction in which the motor runs. If timing gears are replaced it will be necessary to re-time the valves as the gears are not marked until after the motor is timed at the factory.

Begin with No. 1 cylinder, turn the flywheel until exhaust valve lifter No. 443 comes in contact with valve stem No. 527. The mark on highest point in travel of flywheel should read E. O. (exhaust valve opens). If mark has passed or has not reached highest point bring back to proper position and adjust tappet stud No. 446 until it just contacts with valve stem No. 527. Lock with nut No. 447, then turn motor four and a half inches more than one half revolution of flywheel until mark "C" (center), I. O. (inlet opens) and E. C. (exhaust closes) are at the highest point in travel of flywheel. Valve lifter No. 443 should just be free from exhaust valve stem No. 527.

Intake Valve.

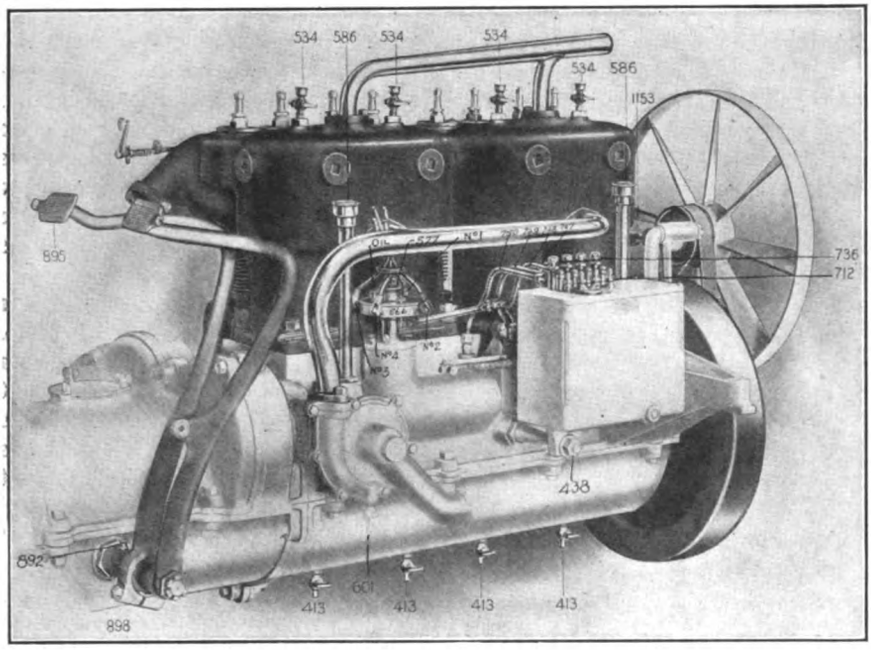
Leave flywheel in same position and examine valve lifter of intake valve of same cylinder. The lifter should be in contact with intake valve stem,



HOW THE FLYWHEEL IS MARKED

then turn flywheel four and a half inches more than a half revolution which will bring I. C. (inlet closes) to the highest point. Valve lifter should then be just free from inlet stem.

Cylinders Nos. 2, 3 and 4 are timed in exactly the same manner as No. 1.



THE MOTOR FROM THE OILER SIDE

Simply turn flywheel until exhaust valve starts to open (of the cylinder you are inspecting), then proceed as with No. 1 cylinder. The valves of No. 2 cylinder are blocked up. This is to show what is to be done to the valves if cam shafts are to be removed. The blocking of the valves relieves the strain on the cam shaft, and it will be found much easier to block them up than to remove the entire line of tappets.

The Power Plant.

Give occasional attention to all bolts, nuts and screws used on the motor, clutch and transmission case, particularly the ones holding the power plant to the chassis.

If any of the cylinders do not show sufficient compression, pour oil around valve caps, plugs and pet cocks, noting, as motor is turned slowly, if any leakage appears.

If that is not found, inject kerosene at pet cocks No. 534 (with motor warm), and rotate the motor with the crank. If this is repeated for a few days compression in all cylinders will be equalized.

To reseat the valves, scrape all carbon from valve, valve seat and chamber. Clean all parts thoroughly with gasoline before starting to reseat the valve. Use ground glass or very fine emery, taking every precaution not to have any particles of the grinding materials come in contact with the cylinder walls. Clean all parts very thoroughly with gasoline before replacing.

Valve covers should be replaced with care, making sure that each is replaced over the valve from which it is removed. If valve stems become enlarged from an excessive use of cylinder oil, causing the valve to remain open, resulting in a loss of compression and a skipping of the motor, it can be remedied by removing the spark plug and using plenty of gasoline or kerosene. Rotate motor with crank, also rotate valve with screwdriver.

Carbon deposits are caused by an excessive supply of cylinder oil, low test gasoline, rich mixture or a skipping of the motor. If the motor acts or gives every symptom as would be noted with an extreme advance of spark, such as back firing and a knocking in the motor, undoubtedly the cylinders, pistons or plugs are covered with a deposit of carbon. It may be removed by cleaning the plugs and valve chambers thoroughly, and by taking out the pistons and cleaning the cylinders if necessary.

Grinding the Valves of the Automobile Motor.

HAROLD WHITING SLAUSON.

To keep a gasoline engine in the best of condition the valves should be ground occasionally. No definite statement can be given as to just how often this should be done, for no two motors will be affected in the same manner and to the same degree, but the average automobile, receiving ordinary service, should have the exhaust and intake valves of the engine ground at least once a season. Under some conditions it is necessary to attend to the "lungs" of the motor every month, but this is an extreme case, and will not be met with by the average repairman.

The valves of the ordinary engine are of the "poppet" type, and are lifted from their seats by the action of a cam. Under normal conditions a stiff spring holds the valve in place in its seat. Since both valves in each cylinder are operated every two revolutions of the flywheel, a few hundred or a thousand miles' running of the car will mean a considerable wear for these parts of the motor, and in consequence the valves and their stems are made of the very best quality of steel procurable. The object of valve grinding is to form a more perfect joint of the valve with its seat so that no gas can escape on the compression stroke or at the time of the powerful explosion in the cylinder. Should any of the valves leak and allow the compression or the expansive force of the ignited charge to escape, the power of the motor would be greatly reduced and the expense of operation would increase.

It is not the wear alone which makes valve grinding necessary, however, for the simple motion of the valve on its seat will not tend to destroy the fit of the joint at this point; it is rather the intense degree of heat to which the valves, their stems and seats are subjected. The exhaust gases of combustion often attain a temperature of from twelve to fifteen hundred degrees Fahrenheit, and the continued application of this heat will have a tendency to warp the valve and its stem. It is this heat which also makes the valves "pitted," or filled with minute holes, which will prevent a perfectly tight contact with the seat. It is impossible to obtain steel of absolutely uniform grain and molecular construction, and consequently certain portions of the surface of the valve and its seat will not be able to resist the heat as well as will others, and these parts will melt out, leaving the above-mentioned "pits."

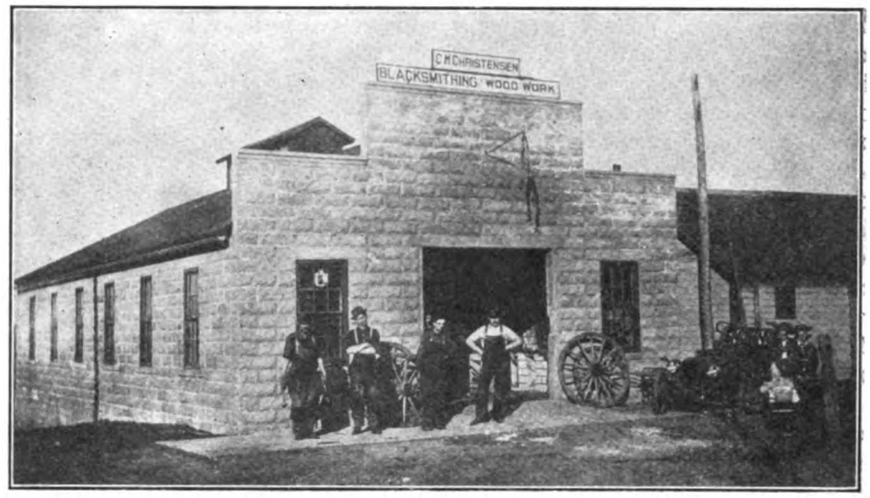
A hard carbon deposit may also be formed between the valve and its seat, due to the condition of the exhaust gas as it leaves the cylinder. A poor

quality of lubricating oil in the cylinder or an imperfect mixture of gasoline and air may cause this carbon deposit, and while grinding the valves may not be necessary in this case the deposit should be removed and the surfaces cleaned thoroughly before efficient running of the motor can be obtained. Kerosene has always been considered the best liquid for softening a carbon deposit, but I have found a certain popular make of varnish remover to be far superior, and quicker in its action as well. In general it may be said that conditions which leave a sooty deposit in the engine cylinder will have the same effect on the exhaust valves and will render cleaning or grinding necessary.

The intake valve is not subjected to as high a degree of heat as the exhaust valve, nor is it left free to receive the carbon and soot deposit from the burned gases, and in consequence it will not become so pitted nor stand in as urgent need of grinding as will the latter. The intake valves should be ground, however, as frequently as the exhaust valves, although the time and trouble required to obtain a perfect seat will not be as great.

Valve grinding at the factory is done before the motor is installed in the chassis, and by the use of a special machine all of the valves may be attended to at once. Unless the motor is to be taken apart entirely, however, it will not pay to remove it from the chassis in order to grind the valves, for the whole operation can be done by hand. In the motors having their valves located in side pockets and operated by a straight push on the stem from the cam the seats are a part of the cylinder casting, and the grinding must be done on the motor. This is the style of motor in use in the majority of automobiles today, and valve grinding of this kind will probably be encountered by most of the repairmen.

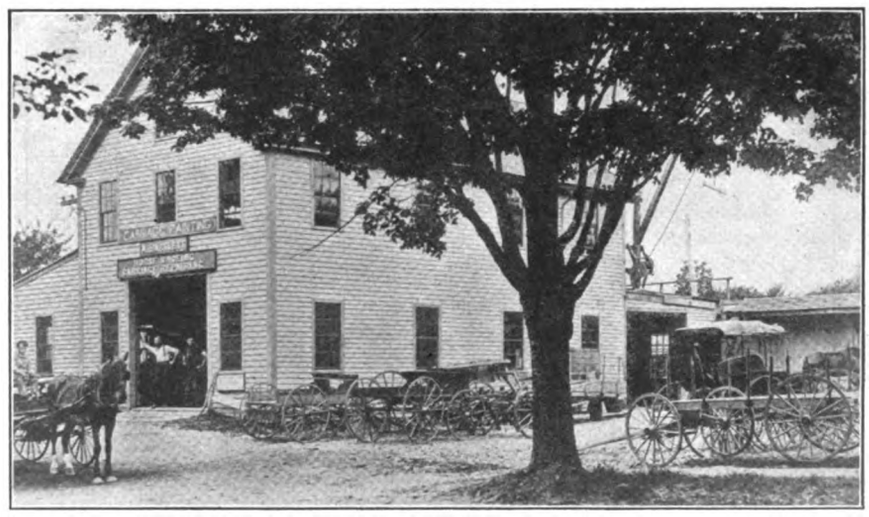
The valve is reached by unscrewing the large plug nut directly over the valve pocket. The heavy spring holding the valve on its seat should then be removed by depressing it with an iron bar and pulling out the pin or other device which acts as a stop. The valve and its stem can then be removed from the pocket and cleaned with kerosene or some good carbon remover. The valve seat should also be cleaned thoroughly. After the valve has been returned to its pocket, the heavy spring which has been removed should be replaced by a light spiral spring of only sufficient strength to hold the valve an inch or so above its seat when there is no pressure exerted upon it. Such a spring can be made in a few minutes in any shop by coiling a good quality of wire around a bar of the proper size.



MR. C. H. CHRISTENSEN, OF IOWA, LIKES OUR AUTO TALKS

With the temporary spring and valve in place, the grinding mixture should be applied to the valve surface and its seat. This grinding compound may be purchased at any atuomobile supply store, or it may be "home made," by mixing cylinder oil with fine emery powder until it is about the consistency of thick molasses. This makes a very satisfactory and inexpensive grinding material. When this mixture has been applied to the valve and its seat, a screwdriver should be inserted in the slot in the top of the valve. This screwdriver should have a round handle. By placing the handle of the screwdriver between the palms of the hands, pressing down slightly and moving the hands back and forth—rubbing them, as it were—a rotary motion in alternately opposite directions will be imparted to the valve. The downward pressure on the handle of the screwdriver should be sufficient so that you can feel the particles of emery "bite" into the surface of the valve and its seat. After half a minute, say, of grinding in this position the valve should be released so that the spring will push it from its seat, and a short turn given to it, so that when grinding is again resumed the same portions of the valve and its seat will not be in contact. This is necessary in order to give equal wear to all parts of the surfaces. For the same reason the alternating rotary motion, first in one direction and then in the other, is better for valve grinding than if the screwdriver were turned the same way continuously.

The grinding material on the valve and its seat should be renewed after every few turns, and it should be so distributed that all parts are being ground



MR. A. J. BARTLET'S MASSACHUSETTS SHOP IS LIGHTED BY ELECTRICITY

at the same time. When this grinding has been continued until it is thought that all parts of the valve and seat will form a perfectly tight joint, a finer grinding material should be used for a few minutes to give the finishing polish to the surfaces and remove any scratches that the emery may have left. Glass powdered to the fineness of flour makes one of the best finishing compounds when mixed with the proper amount of oil, and this is used in the same manner as was the coarser material.

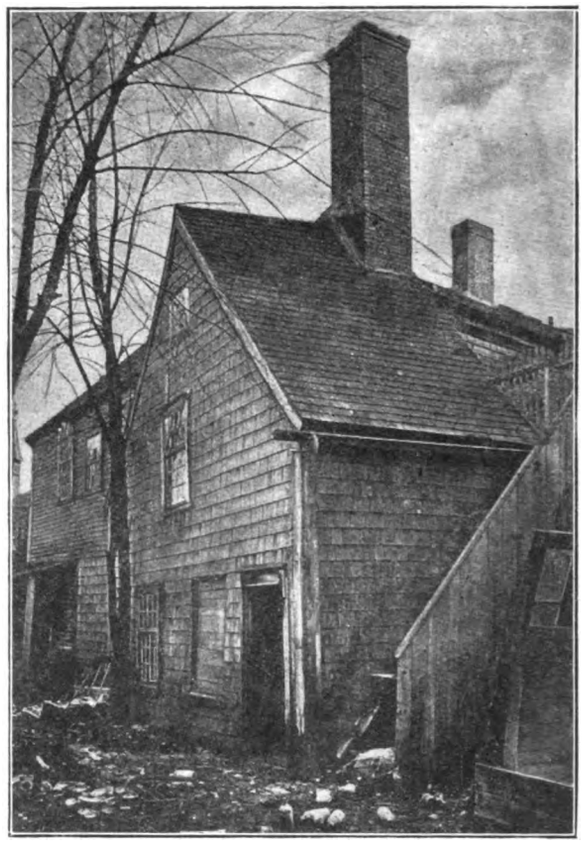
Before a valve can be considered to be ground properly and sufficiently it must undergo a severe test—that of holding gasoline. Gasoline, being of less specific gravity than water, can find its way through joints which would be considered practically water and air tight, and a gasoline-tight valve will be pretty certain not to "leak compression." The gasoline should be poured into the valve pocket to a depth sufficient to cover all parts of the valve and seat. Then, by forcing down on the screwdriver and turning the valve, all parts of the rim of the valve will be brought into contact with every point on the seat, and if at the end of this time there has been no "sweating" or dripping of gasoline on the underside of the valve the grinding has been well done. If even so much as one drop comes through, however, the grinding operations described above must be performed again, and continued until the proper seating of the valve is attained.

If the valve and seat are badly pitted or warped the screwdriver and hand method of grinding will be very slow and tedious, and in this case it may be better to use a breast drill in the end of which has been inserted a screwdriver blade. A greater pressure upon the valve can be obtained in this way, but this increased pressure should not be continued for the finish grinding.

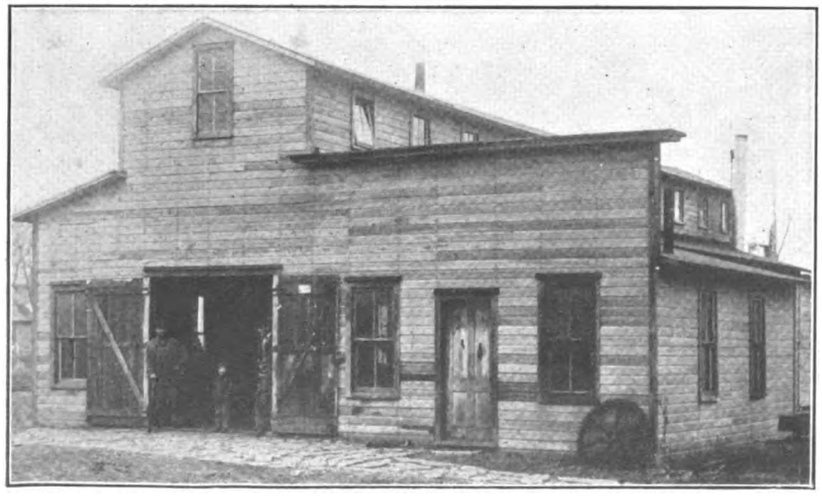
Many motors are constructed now which have the valves located in the head and operated either by a cam shaft extending across the tops of the cylinders or by means of long push rods and rocker arms actuated by a cam shaft in the crank case. In many of these, the valve seats, instead of being cast in the head, are located in separate cages which may be removed by loosening a couple of nuts. This arrangement allows the valve and its seat to be carried to a vise and secured in any position which is the most convenient for grinding. Notwithstanding the desirability of obtaining rotary motion in alternating directions when grinding valves, many repair shops use an ordinary drill press for this purpose, and while the results are not as satisfactory the job can certainly be done much more quickly than by the hand method.

Of course, the drill press can be used for grinding only those valves which are located, with their seats, in removable cages. The light spring is placed around the valve stem in the cage in the same manner as for the hand grinding, and the two methods are much the same—except that the direction of rotation cannot be changed with the drill press. The best way in using the drill press is to hold the cage containing the valve and seat firmly against the flat-ended tool in the drill chuck, and then the pressure may be relieved occasionally without the necessity of stopping the machine. When this is done the tool will still retain its position in the valve on account of the pressure of the spring.

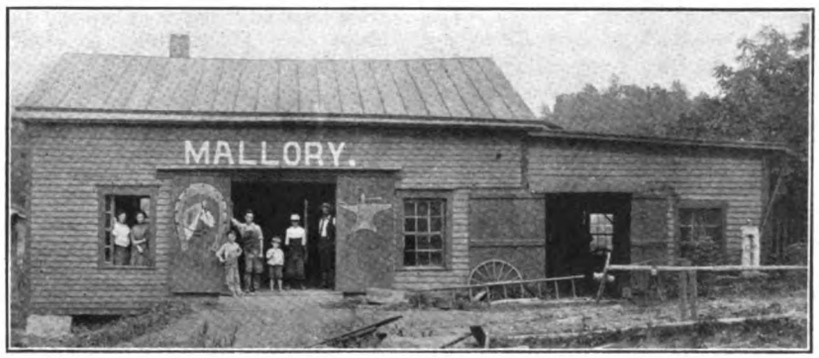
In order to form a perfectly tight joint between the valve and its seat there must be as large an area of contact as possible. In order to have each point on the valve edge in contact with some part of the seat, the angle of the two must be exactly the same. For instance, if the valve should be beveled at an angle of forty-eight degrees and the seat at forty-five degrees there would be but one line around the circumference of the valve which was in actual contact, and an absolutely tight valve would be impossible until the angle was made the same in each. If there is a difference between the angle of the valve and its seat it is almost impossible to grind the two to a perfect fit. The best way to do is to take the valve to the lathe and turn the edge down to an angle which



COLE'S BLACKSMITH SHOP, 1684, AT PILGRIM, PLYMOUTH. SAID TO BE THE OLDEST IN THIS COUNTRY
Photograph sent in by Mr. M. K. Huntley, Massachusetts.



A KANSAS SHOP, RUN BY MR. S. J. PEMBERTON



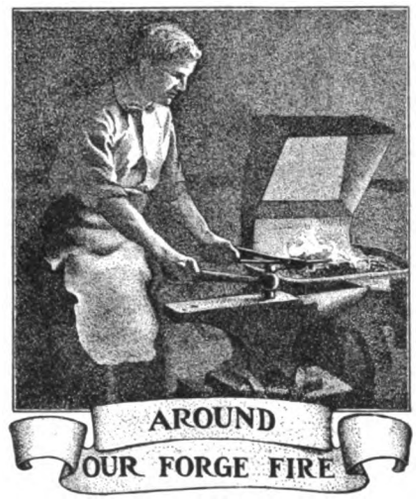
MR. MILTON MALLORY RUNS THIS WEST VIRGINIA SHOP

will coincide with that of the seat. In fact, with any valve which is in bad condition and would require a great amount of grinding, this is the best thing to do in order to save time, and then the finish can be given by grinding in the ordinary way.

A good way of determining at what points of the valve and seat the contact is imperfect is to mark several lines across the face of the valve with a pencil. Then, by placing the valve in position and turning it alternately in opposite directions through a small arc it can be observed which marks are rubbed out and which are untouched. If the face of the valve and its seat are not of the same angle the pencil marks will only be rubbed at one point near the top or bottom of the bevel face.

If several valves in detachable cages are ground at the same time, great care should be taken to make certain that each valve is returned to the seat from which is was originally removed. The valve, the seat and the cylinder from which the cage was removed should all be marked with corresponding pricks made by a punch. The usual manner is to mark the forward cylinder "1," and to number each consecutively toward the rear of the car.

If the valve seats are not removable, so that the grinding must be done in the cylinders, the repair man should make certain that none of the powdered emery or other non-combustible grinding material finds its way into the interior where it is liable to get between the piston and cylinder and score the walls.



"Say, Benton," exclaimed the Editor as the man of receipts entered, "I want some good receipts for the horseshoer."

"All right," returned Benton removing his coat and making himself comfortable in his favorite chair, "now what will you have?"

"Better light a torch first or you'll get uneasy," and the Editor handed Benton the cigars. "Now, we'll begin at the beginning. Here's a man in Iowa wants a receipt for a good hoof ointment."

"I think I've got just the thing he wants," and Benton turned to his book of receipts. "Here is one that is recommended very highly: Take two pounds of lard, six ounces of bees wax and four ounces of rosin, and melt all together. Then add three ounces of turpentine, enough powdered verdigris to color mixture green and one pound of tallow. Stir the mixture until cool. It is excellent for the hoof. It is used on sore or tender feet, cracks, cuts and bruises of the feet. It is applied every third day for tender feet and every day for cracks."

"What kind of an ointment have you got for chapped hands? Here's a smith up in Wisconsin who says his hands are in terrible shape from chapping during the winter."

"I just got a receipt from Jack Mills the other day that he said is the finest man and beast remedy he ever saw. He said 'it's fine for rheumatism, sprains, burns, bruises, inflammation and chapped hands.' It is made by thoroughly mixing two pounds of fresh butter, two ounces of oil of organum and one half ounce of tincture of iodine. When thoroughly mixed rub it well into the skin with the hand. It is perhaps most convenient to apply it at night."

"That will probably suit our Wisconsin friend," returned the Editor. "Now, can you help a Pennsylvania smith with a —"

But just at this point Will Andrews appeared at the door with a piece of flat steel about a foot square. He handed it to Benton and said: "I want to give that a good black finish to match a row of paneling, how can I do it?"

Benton took the plate and after examining it said: "Well, I don't think you can match the black paneling very closely, Will, but I can tell you how to get a nice black finish on the plate."

"I didn't think it possible to match the paneling exact," returned Andrews, "I simply want it to fit into the general color scheme."

"Then this little kink will do the trick," and Benton turned to his book of receipts. "You've already polished the plate, so that I won't say anything about that. But clean it thoroughly of any grease or finger marks and then heat it over a clean fire until it comes evenly to a second blue. Then plunge it into lard oil and shake off all superfluous oil. Now take a piece of old rubber hose or shoe, allow it to burn in the forge and hold the plate over the flame and in the black smoke until it is covered with a thick coat of soot. Then allow the plate to cool slowly and then rub it with an oily cloth. The result will be a beautiful black finish."

"That's simple, and if it results in a black finish that's all I want. I'm very grateful to you, Benton," and with a nod Andrews went out.



THE MISSOURI SHOP OF MR. THEODORE CHEWNING

The Builders.

LONGFELLOW.

All are architects of Fate
Working in these walls of time;
Some with massive deeds and great
Some with ornaments of ryme.

Nothing useless is or low,
Each thing in its place is best,
And what seems but idle show
Strengthens and supports the rest.

For the structure that we raise
Time is with materials filled.
Our todays and yesterdays
Are the blocks with which we build.

Truly shape and fashion these
Leave no yawning gaps between;
Think not, because no man sees
Such things will remain unseen.

In the elder days of art
Builders wrought with greatest care
Each minute and unseen part
For the gods see everywhere.

Let us do our work as well
Both the unseen and the seen
Make the house, where gods may dwell
Beautiful, entire and clean.

Else our lives are incomplete
Standing in these walls of time,
Broken stairways where the feet
Stumble as they seek to climb.

Build today, then, strong and sure,
With a firm and ample base:
And ascending and secure
Shall tomorrow find its place.

Thus alone can we attain
To those turrets where the eye
Sees the world as one vast plain
And one boundless reach of sky.



Laziness is its own reward and its only reward.

"The 'sharp' man generally cuts his own fingers."

"Better late than never, but better never late."

Things that are free are usually worth what they cost.

The chap who lives on hope need seldom take any anti-fat remedies.

Strike the nail on the head—but first be sure the nail is where it should be.

Insist upon giving the money's worth to the customer that gives you the money.

Kill the dead beat by organizing. It's a case of your crushing him before he crushes you.

Resign when you find your employer cheating a customer—he may try it on you.

Don't worry so much about things you ought to do that you can't find time to do what you might.

Business does not grow like a wild flower. It's a hot-house plant—it needs careful watching and tending.

A fine tool and a fine man are alike in one respect—neither is worth a whoop if they lose their temper.

We all learn by experience—is some one profiting by yours? Let us have something practical from you.

Tell us when you move, where you move, whence you move, if you move, for surely we cannot see you move.

"A penny saved is a penny earned," and an extra penny earned is an extra penny saved. What do you do during spare time?

Uncle Billy Martin says: "It peers ter me thet the reason some folks pray is so thay can blame the Almighty ef enything goes wrong."

The easiest way is to send for the Secretary's Easy Association Plans. It is also the best way and, therefore, the right way. Write for them right away.

A thunder storm is always refreshing. It clears the air and makes things grow. Don't be afraid to thunder and storm if you are not satisfied with "Our Journal."

When you order a grinding wheel don't forget to tell the diameter, width and style of face, arbor hole, description of work, speed of spindle and the letter and number telling the grain and grade.

A giant among rotary pump plants is the one at Beaumont, Texas. This plant discharges 140,000 gallons of water per minute. The impellers are 58½ inches in diameter and displace 2,512 gallons at each revolution.

Don't wait until the last minute to repair the forge, tongs, hammers and things. When there's work to be done do it right away—don't spend valuable time repairing your tools so you can do it. Keep your tools in constant repair.

The biggest carpet in the world is said to cover the floor of the London Olympia. It measures 63,000 square feet, and it took four months to complete it. It required 37 vans to transport it, and if cut up it would cover 437 floors, 12 feet square.

A very effective scheme is used by Norfolk, Nebraska, smiths to bring dead beats to time. The smiths are organized and refuse to do work for anyone who owes a bill to a brother craftsman. A man cannot get a bit of smith work done unless he pays up. Try this in your town.

A Manitoba smith says: "Until recently Manitoba smiths were getting the same as they did thirty-five years ago—and one dollar then went as far as two do now." Isn't it about time to wake up? Isn't it about time to get together with your brother smiths to get what you deserve?

Despite the increased use of the automobile it has not been able to decrease either the value or the number of horses. For example, in 1908 the average price of horses was $95.64, while in 1909 it rose to $108.19. In numbers, the horses in the United States have increased from 20,640,000 to 21,040,000.

Don't forget we must have your cooperation in making the annual shop number a success. It is due in July, and we want a picture of every good shop in the country. Let us hear from you by way of a photograph, a shop plan or something of interest along shop lines. You know what we have done—will you help us to do still better?

And now comes a man with a device for filing horses' hoofs. The machine is described as a low framework, to the front of which is an upright that moves up and down when the crank is turned. This upright holds the filing plate. In front of the file is a concaved block for supporting the hoof when being filed. The newspapers say: "The advantage of this process over the old method of burning the excess portion of the hoof off until it is clean and ready for shoeing is apparent."

Tom has just discovered another new scheme for getting rich quickly. Last Wednesday a stranger sauntered into the shop and after passing the time of day and remarking about the weather he asked Tom to have a drink. Now, it's a very rare day when Friend Tardy refuses a drink, so the two went down to the corner. They had a "round or two," shook hands and said good bye. As Tom neared the shop he saw another stranger come out of the shop and walk rapidly down the street. Upon investigation our friend found that the drinks cost him just $150 which he had tucked under the old box that serves him as a desk, safe and what-not cabinet. Tom will soon know all the flim-flam schemes.

Little Business Stories: A young smith—we'll call him Jack Smith, because that isn't his name—started up for himself in a Middle Western town, and tried to win trade against three competitors, all older and more experienced. The newcomer was a good smith, had a fair equipment and the locality was one of the best—a prosperous farming section. He had picked his locality deliberately, because of the prosperity that was evident. At first he advertised in the regular way—a card in the local weekly, and hand bills. These, however, did not bring him the trade he wanted. After analyzing the situation he discontinued all advertising and, with a saw, a paint brush, and a pot of paint, he made a number of signs reading as follows: "Shake hands with Jack Smith." These he nailed on fences for miles around. Painted an immense sign with the same line on it and placed it over his shop door. The same slogan appeared in about a dozen places in every issue of the local weekly, and it also appeared on his bill and letter heads. And the people came, too, not only to shake hands, but to do business.

American Association of Blacksmiths and Horseshoers.

You are probably well into your spring rush. Nevertheless, it is not too late to get busy with a branch association in your county. The past season has been an unusually busy one in the American Association circles. If you cannot boast of a protective association in your county, make this spring a busy one in your vicinity.

Suppose you drop into the other shops in the neighborhood and ask the smiths to meet at your home some convenient evening. Talk to them on association topics: get their ideas. You will find them every bit as willing as you are yourself to form a protective association, in order to raise prices and to overcome the many abuses found in unprotected blacksmithing circles.

Thinking about these things in the shop, without doing, will never bring results. You must get out and talk to your brother craftsmen in order to start the ball a-rolling. Get busy on this matter right away. If you can possibly spare fifteen minutes or half an hour right now just call on the other shops in your neighborhood. Make a start—that is the important thing.

Forming a county and branch association is a good deal like coasting down a steep hill; all you require is a start, and the rest is easy. Write to me for my easy plans for forming associations. You will be surprised how very easily an association can be formed in your county and, furthermore, the American Association is always ready to help you and assist you in building up a strong and growing organization.

You know that you should have better prices—you know that you should have proper protection—you know that better harmony among craftsmen would be better for all concerned. You can secure these advantages and many others through an organization. Will you let me hear from you today? Address me P. O. Box No. 974, Buffalo, N. Y., and by return mail will come full directions on how to form a blacksmith association.

THE SECRETARY.

An Association Price List from Manitoba.

Good Bros.

After reading some of the letters and a few of the price lists submitted by the different smiths I have noticed what a great difference there is in prices in the different places, and have realized that many of them would mean starvation to the smith and woodworker out here in Manitoba. We have been in business here for nearly six years, and during that time stock and material have been steadily advancing in price, so that, about a year ago, on figuring everything up to date we decided that something was seriously out of order. Upon investigation we discovered that we were giving too much work for a shilling, and so we called a halt. We interviewed the craftsmen in the entire district, and called a meeting at which few were present. But it was a starter. We then called another, with better results; and still another. Finally we agreed upon a scale of prices (see page 182) to correspond with the advance in the cost of material and wages, and at last secured the fee of two dollars and the signatures of all but four smiths in the district. Thus, we have rescued our craft from poverty, and have established it on a paying basis. A price list was first printed on large cards to be placed in each shop, and then printed on four thousand folders for distribution among customers. Our staff consists of my brother, myself and a man whom we pay two dollars and seventy-cents per day from March to November, and twenty-five cents per hour for work done in winter. We have a six-horsepower Sylvester gasoline engine, a Hawkeye hammer, an emery grinder and polisher, and we purpose erecting another building next spring for a wood shop alone.

A Talk on Organization.

G. W. LANCASTER.

Organize, if you must quit work for a month to do it, as it will pay anybody. In a late number of THE AMERICAN BLACKSMITH one man says that he has done enough work to kill four good mules, and has gotten nothing as yet. For heaven's sake, who is he waiting for—some farmer to do it for him? I am proud to say that Kansas has had an organization for three years, and is doing well. We have good prices and are getting out a new price list which is better than before. If they do not like it, let them hunt for a cheap smith, if they can find one. It does not take the entire state to organize. The one formed in our state started in Holton, Kansas, with about five or six men of the craft as members. I think the brother that "killed four good mules" is like a good many of the rest of them—when they do a job and the customer comes after it and asks how much it is worth they will whine around and tell him that they used so many bolts and so much iron, and a little paint and a few screws, and what time it took them to do the job, and then they will say, "I think it ought to be worth about thirty-five cents, don't you think so?" Now, here is the way I go about it. When my customers want to know what a job costs, I keep a stiff upper lip and say, "fifty cents, sir." There are too many smiths at loggerheads with their competitors. Now, this is money out of your pockets. Get together and talk better prices. Go and visit your opponent. Have a social, and invite him to come. Get together; lock arms; go down the middle of the street together. He can tell you a lot of things, and you can tell him some in return. Borrow from and loan to each other. Your opponent has just as good a right in the town as you have. You can't do a man by condemning his work. Try my plans, and if you do not profit by them you may wallop me.



Gun and Novelty Repairing—13.

W. G. MUMMA.

Pistols and Revolvers.

The different parts will be taken up in succession. The component parts of the leading makes can be bought ready made, which is the best way to repair, for it is sometimes very difficult for one to make an exact duplicate of any part that becomes worn out or broken, and some of the parts are so hidden from view that one cannot see what he is doing, so as to properly adjust them. For instance, if a new dog has to be made that moves the cylinder when it is put in its place, it is so hidden from view that it cannot be seen how it works. It may be a fraction too short or too long, or not the right shape or something else is the matter,

so it is difficult to determine just what is required so that it will work properly.

Sometimes frames become broken. They can be brazed with hard solder, but soft solder will not do. They can be blued or browned by using the methods heretofore described. Sometimes they will have to be nickel plated; in that case the old plate should be removed and the frame cleaned properly.

About all that will be required on barrels is to clean them, which can be done the same as a rifle, only a cleaning rod will be needed. Sometimes the barrels will have to be blued or nickel plated, which can be done as heretofore described.

Handles sometimes become broken. A new part can be bought ready made and an exact duplicate. They are generally made of hard rubber, but some of the very cheap ones can be replaced with wood (walnut).

Triggers can be easily made or replaced with a duplicate ready made. The trigger guards can be brazed with hard solder if they become broken.

Springs can either be made or bought ready made. Sometimes it is quite a task to get them to fit, especially in some revolvers, as they are hidden from view, one cannot see just how they are to work so as to get the right size or shape. The best way is to make them an exact duplicate of the one that is to be replaced.

Extractors are not difficult to repair. A new one can be made by using the old one as a pattern, and for some work they can be had ready made.

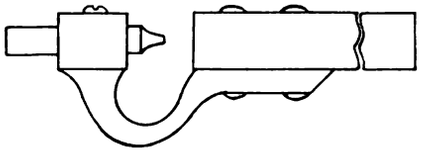
If the cylinder dogs become so worn that they fail to actuate the cylinder they will have to be renewed. They can be made by using the old one as a pattern. Sometimes the old one can be repaired so it will do good service by hammering out and filing over until it will work properly.

If the hammer should become broken, it can be brazed with hard solder, or if any part should be broken out a new piece can be brazed in, or if they become so badly worn or broken a new one can be bought ready made.

The plunger or firing pin can easily be made and replaced, using the old one as a pattern.

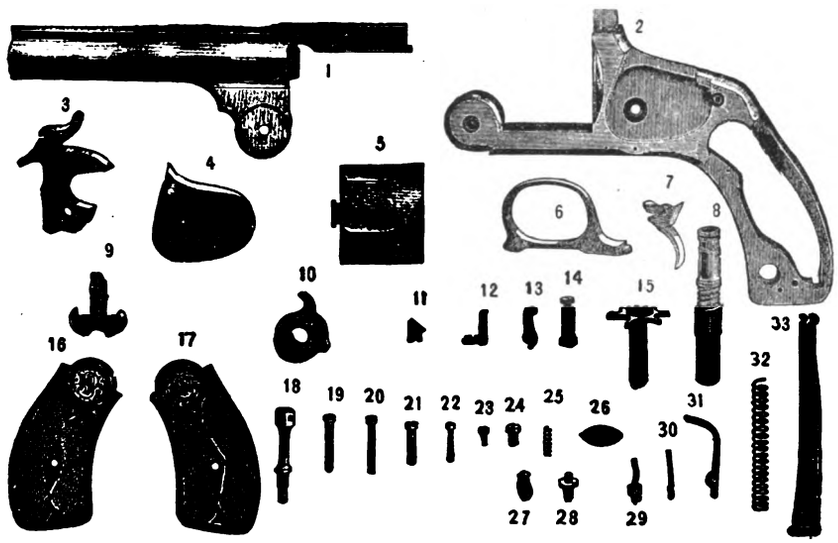
The pin that supports the cylinder can be easily repaired or a new one made, using the old one as a pattern. If the chambers of the cylinder should become worn by becoming powder burnt or rusty and so get holes in the walls of the chamber through which the fire may pass one to the other it then becomes dangerous and should be thrown away and replaced with a new one. If the notches should become worn out, drill them out to about one half inch deep, then fit a plug in rather loosely and braze with hard solder. Then drill through from the back end for the pin. The notches can be cut in with a file, and should be equally spaced as to the number that may be required. For some revolvers duplicates can be had ready made.

Sometimes old pistols and revolvers will come into the shop to be fixed. They are so old they are relics—old flint locks and of many curious models. One will have to use his best judgment.



FOR REMOVING BOW RIVETS

Some are not worth repairing, only to serve as relics. There are many old kinds that have long since ceased to be manufactured and sold. There are also many old style guns, such as old muskets, old flint locks, old style breech loaders and shot guns, also a lot of old cheap guns. They are not worth repairing, and they can only serve as relics and as an interesting study of mechanical ingenuity.



COMPONENT PARTS OF A SMITH AND WESSON SINGLE-ACTION REVOLVER

1–Barrel.
2–Frame.
3–Hammer.
4–Side Plate.
5–Cylinder.
6–Guard.
7–Trigger.
8–Base Pin.
9–Barrel Catch.
10–Extractor Cam.
11–Barrel Catch Cam.
12–Hand.
13–Cylinder Stop.
14–Joint Pivot and Screw.
15–Extractor.
16–Right-Hand Stock.
17–Left-Hand Stock.
18–Extractor Post.
19–Strain Screw.
20–Stock Screw.
21–Barrel Catch Screw.
22–Long Plate Screw.
23–Short Plate Screw.
24–Guard Screw.
25–Barrel Catch Cam Spring.
26–Sight.
27–Stirrup.
28–Hammer Stud.
29–Cylinder Stop Spring.
30–Haad Spring.
31–Trigger Spring.
32–Extractor Spring.
33–Main Spring.

A Buggy Bow Rivet Shooter.

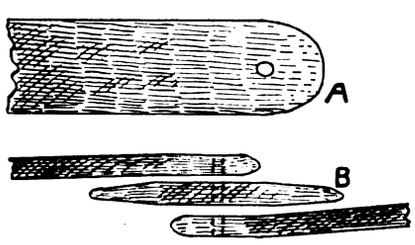
H. E. REES.

The accompanying engraving shows a practical tool that we think is a great labor saver. It is for taking the rivets out of buggy bows easily and quickly. A bar of steel may be used for the main part of the tool, but an old rifle barrel is excellent. Having procured the barrel, plug one end of it and countersink for use as a holder to place against a rivet head when burring the opposite end. Now ream a $\frac{7}{16}$-inch hole in the other end of barrel. Then secure an old pole coupling, make a $\frac{1}{2}$-inch hole in one end of this to hold the punch, and then rivet the coupling to the reamed end of the barrel. Now bend coupling to guide point of punch to center of reamed hole. The punch is a broken $\frac{3}{16}$-inch drill bit, and a set screw in the holder keeps it from dropping out. Thirty minutes' work, and you have a tool that you won't let anyone carry away for a considerable amount.

Welding Broken Spring Plates.

J. L. H. MOSIER.

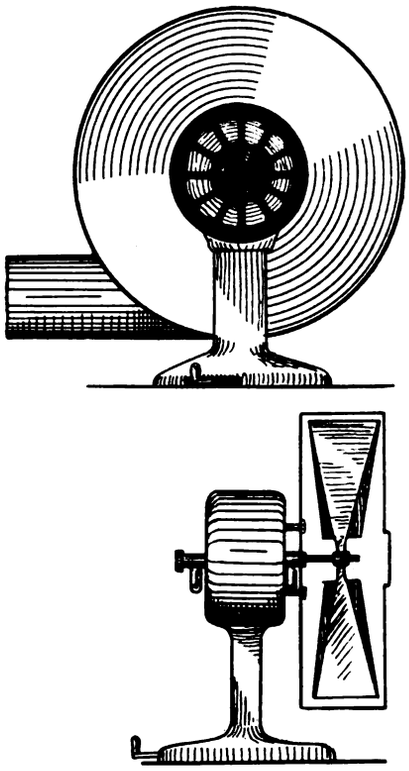
To weld a spring plate perfectly is easy when one knows how,—but when



WELDING SPRING PLATES

one does not know how, a perfect job will not result. The writer has tried many ways of welding springs since 1850, but with no real success until he tried and used the method herein explained. Experience with the split method of welding was unsatisfactory.

To weld a spring perfectly begin by upsetting the ends and scarfing as shown at A in the engraving. After preparing both ends in this manner cut a piece of spring steel about 1½ or 2 inches long by as wide as the spring leaf, and shape it as shown at B. Now punch a rivet hole through the center of the piece and corresponding holes in the ends of the broken spring. Then place the pieces together,



AN ELECTRIC BLOWER EASILY MADE

as shown, and fasten with a rivet made of steel. Now heat carefully to a soft red and rivet firmly. Then apply the flux and replace in the fire. At the same time heat up a flat piece of iron with which to warm the face of the anvil before placing the spring upon it for welding. Hammer only upon the flat sides of the spring—don't turn on its edge. After thorough hammering and welding reheat the spring and trim the "flash" off on each side with the hot chisel. Now dress up with a mill file and then the emery wheel.

A Shop-Made Electric Blower.

HERBERT BINGHAM.

The first thing required is a motor. I secured a common, ordinary motor fan and removed the fan guard from it. In its place I attached a fan case made of two pieces of sheet iron thirteen inches in diameter for the front and back. These are held in place by a band of sheet iron four inches wide and forty-two inches long. The leaves of the fan were now bent straight and their tips cut square across. Then I bolted the fan case to the frame by means of the same bolts that held the wire fan guard. Then I soldered a piece of three-inch pipe to the bottom part of the fan case for a blast pipe. The front of the fan case must have a hole in the center—I made mine three inches in diameter. It may be covered or guarded with a piece of wire mesh, for fear some curious person may poke an inquisitive finger into the hole.

This blower cost me but little, saves lots of hard labor and makes an excellent blast.

A Shop-Made Drilling Machine.

C. C. HOLLINGER.

This drill is easily made and does good work at boring and drilling either in iron or wood. For cutting tenons and boring holes in rims it is a time and labor saver. The machine was built as follows: The piece A is a 4 by 4 into which B is framed which consists of two pieces 2 by 8 inches and 14 inches long, beside the tenon. Between these two pieces is a babbit boxing for the shaft to run in. The pulley C fits into a recess made in the pieces at B. The pulley is 3 by 7 inches, with a key to fit the key seat in the drill shaft and allow it to slide up and down.

At a distance of 2½ feet below B another piece is framed in. This piece, D, is 4 by 4 by 4 and receives the lower end of 1¼-inch pipe which holds the work rest or table. This rest E is made of two pieces 2 by 6 inches and 14 inches long, with a hole bored through them so as to make each piece fit half way around the pipe. These pieces are held in place on the pipe by means of two bolts with tail nuts, and can thus be easily adjusted to suit the size of the work. Extending through D and then through the pipe and out through B at the top is a ½-inch rod operated by the crank at F, for the purpose of regulating the feed by means of the screw G and the lever H. The construction of the handle and its connection with the drill spindle is so apparent and simple as to require no explanation. The swivel in the drill spindle is located at J.

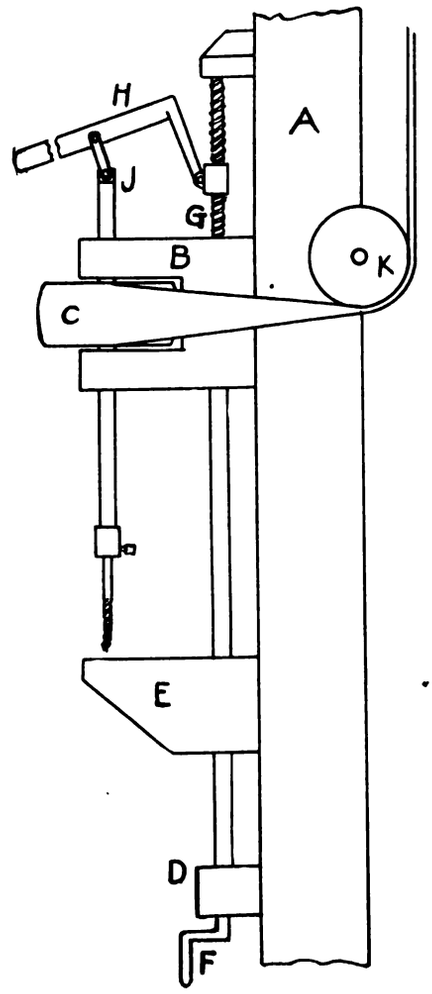
Any wear in the drill shaft boxing can be adjusted by tightening the bolts holding the two pieces comprising B. The pulley at K is 4 inches in diameter, and naturally there is one on each side of the 4 by 4.

Trade and Technical Education in Other Countries—7.

W. H. DOOLEY.

Switzerland.

The trade schools and apprentice shops are for the purpose of teaching the trades thoroughly and to give a higher training to ambitious workers



A SERVICEABLE DRILLING MACHINE

in the trade. Such schools are the School of Horology, at Geneva; the Pupils' Workshops, at Berne, and the School for Silk Weaving, at Zurich. The secondary technical schools occupy an intermediate position between ordinary trade schools and the higher technical schools. There are a number of such schools scattered around Switzerland. They are modeled after the German secondary industrial schools. The higher technical schools are few in number, and correspond to

the highest technical schools in Germany, France and America.

The Swiss people take the greatest personal interest in industrial education and all that pertains thereto. One of the most far-reaching legislative acts relating to the education of the workman was that of the apprentice school law, which was passed by an overwhelming majority of the people on a referendum vote in 1906. This law compels every employer of labor who seeks to teach a trade, or accepts boys or girls as apprentices, to allow a certain number of hours a week during the day for the attendance of such learners upon industrial schools.

Educators, employers, graduates of trade and technical schools and labor unions are in favor of technical education in Switzerland.

The director of a machinery manufacturing company near Zurich, employing 46 foremen and 1,700 workmen and apprentices, stated that only in rare instances do the regular workmen attend a technical school after entering on the practice of their work (trade). The apprentices, numbering about 130, attend a continuation school one half day per week. The term of apprenticeship is four years, and during this period the apprentices are trained in a number of different occupations represented in the industry. The policy is to shorten the apprenticeship for those who adopt a special occupation. The apprentices are remunerated, and their attendance of the continuation school is strictly enforced. This company is of the opinion that the workmen trained in technical schools obtain employment more easily, that they command better positions and higher wages and can more quickly rise to a high class of labor.

A shoe cutter, graduate of the shoemaking section of the apprenticeship shops in the City of Berne, obtained a position on graduation. He believes the school training has been advantageous to him, in proof of which he cites the grade of employment and wages he has been able to obtain. He thinks attendance on a technical trade school is the best way to learn a trade.

A foreman in the employ of a machine manufacturing company near Zurich attended an industrial school one year, and states that on graduation he found immediate employment. He says this technical learning has been, in his opinion, of advantage to him. Besides enabling him readily to obtain employment, it has enabled him to obtain a better position and higher wages than he would otherwise have secured. He believes, however, that a practical apprenticeship in a machine shop is to be preferred as a method of learning the trade.

The Secretary of the Central Labor Body of Switzerland said that the unions considered trade and technical schools of the several types as valuable to workingmen. The trade unions have always given such schools their moral support. At times they have organized and maintained small practical courses for workingmen (continuation schools) in localities not provided with State trade schools.

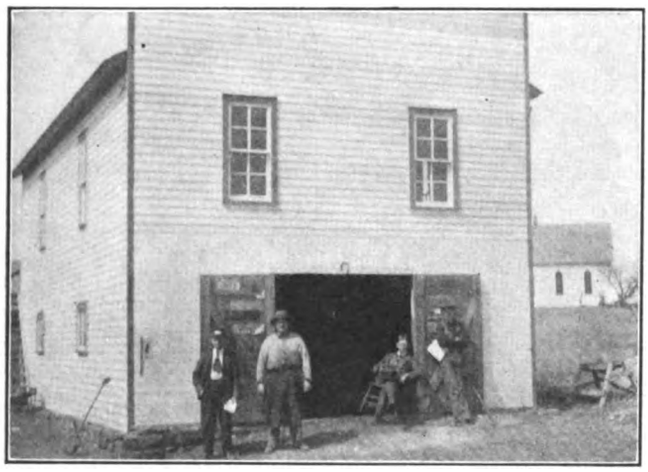
There are over 250 industrial and technical schools costing upwards of half a million dollars per year in Switzerland. These schools are supported by municipalities and the State. The State gives not over one half the cost of maintenance. They employ experts to make inspection of the schools.

To show how the Swiss are educated along the line of different trades it might be of interest to know that a few years ago when the phonographs were placed on the market the Swiss at the time were making thousands of music boxes. When the phonograph was placed on the market the music-box business was a failure. Hundreds of workmen skilled in this line immediately went into the watchmaking and other mechanical lines. This shows how versatile they are along mechanical trades, due to industrial education.

Geneva is noted throughout the world for its watchmaking, and its School of Horology is thoroughly in keeping with the reputation of the city in this industry. It was founded in 1824 by the Association for the Advancement of Arts and Crafts. The school was transferred to the present building in the Rue Necher in 1879, the building being of ample proportions, well equipped and well lighted. Of the eighty pupils who are in attendance, on an average, the majority when they enter upon their trade prove themselves the very best workmen in the city, as indifferent work is not allowed to pass by in the school. At present the watch business of Geneva is brisk, and accordingly the school is well patronized.

Pupils are admitted at the age of fourteen and remain from three to five years. Applicants for admission must have completed the first year's course at the Geneva Professional School, or pass an examination in subjects equivalent to those taken in the school. Swiss pupils pay one dollar a month and foreign pupils pay five dollars a month. Pupils are provided with tools which cost about thirty dollars, and the tools are the property of the pupil when he has completed the course.

In the next paper on Trade and



A GENERAL SHOP, RUN BY MR. J. O. FLEMING



MR. J. O. FLEMING'S RESIDENCE IN KANSAS

Technical Education in Other Countries, the system and method of teaching trades and professions in Italy will be taken up.

(To be continued.)



Plain Machine Work for the Blacksmith—6.

GEORGE CORMACK, JR.

Drilling.

In doing plain drilling on the common drill press the tools necessary besides the drill press itself and the drills are few and simple, and can nearly all be made by the blacksmith himself. The first of these tools is the well known center or prick punch, and although not absolutely necessary it is always better to have two of these, a large one and a small one. These can be very easily made from a worn-out round file. The file should be annealed and the teeth ground or filed off; if this is not done the sharp cut at the bottom of the teeth will always set up flaws in the steel and cause it to water-crack in hardening. Many small tools can be forged from old files, but in order to obtain good results the teeth should always be ground off first, before the tools are forged. It is impossible to hammer the teeth out of a file, you may get a flat and smooth surface by drawing the file down, but the teeth are always there, although they are not visible to the naked eye, yet they will usually show up in hardening, the little flaw in the steel being just the right thing to start a water crack.

In making tools from files, remember that the steel is not really tool steel, it is a crucible steel, but of a lower grade than tool steel. Some of the very best grades of files are really made from tool steel, but none of the ordinary files are. If small tools are made from files the steel can be greatly improved by careful handling and hammering, but where really good tools are wanted it is always best to get a grade of tool steel suitable for such tools. The large center punch should be made from a $\frac{5}{8}$ or $\frac{3}{4}$-inch file and the smaller one from a file about $\frac{3}{8}$ inch in diameter. Fig. 1 shows a method of making a neat and attractive looking center punch from an old round file. The file is first annealed and a piece 5 or 6 inches long cut off. The teeth are filed off the end parts A and C but are left on the middle part B. The ends are then forged down to the size and shape desired. The point of the center punch should be hardened about the same as a cold chisel, ground to an angle of about 60° and always kept sharp. Another necessary tool for the drill press is the drawing chisel. This is a small chisel similiar to a narrow cape chisel with the cutting edge rounded instead of flat. An ordinary round punch ground off at the end as shown in Fig. 2 is very often used for a drawing chisel. The use of the drawing chisel will be shown and illustrated further along. The next tool is the scratch awl shown in Fig. 3. This should be forged from good tool steel, the points drawn down fine and hardened, one of the points being bent as shown. After hardening, the points should be ground to a needle point and kept in that condition. A number of bolts of varying lengths and of a diameter which will go through the slots in the drill press table, together with plenty of washers, should be kept convenient to the drill press. Besides these a number of V-clamps as shown in Fig. 4 should be forged and kept with the bolts and washers. These clamps should be forged from square stock, and of different lengths and weights. The slot, B, should be wide enough to allow the bolts to slide easily in it, and it is a good plan to draw down the ends as shown at A. Two or three common malleable iron clamps are also handy. These the blacksmith can either buy—or make steel forged ones in his spare moments. Some parallels, either steel or cast iron, are often necessary in blocking up work on the drill press table. The easiest way to get these is to buy a piece of cold rolled steel bar of, say, 1 by $\frac{1}{2}$ inch, and cut it up into 8, 10 or 12 inch lengths. This cold rolled flat stock is very handy around any shop where machine work is done. It is very nearly accurate in size, and a good grade of cold rolled steel will seldom vary over two thousandths of an inch from standard size, in consequence, when a piece of work is set up on two pieces of this steel for drilling, the lower face of the work may be assumed to be parallel with the drill press table and at right angles with the drill press spindle.



FIG. 1.

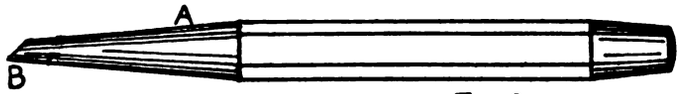


FIG. 2.

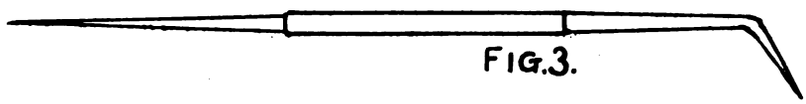


FIG. 3.

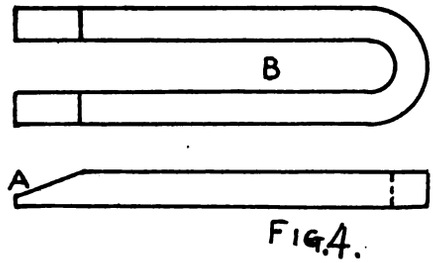


FIG. 4.

SOME SIMPLE MACHINISTS' TOOLS

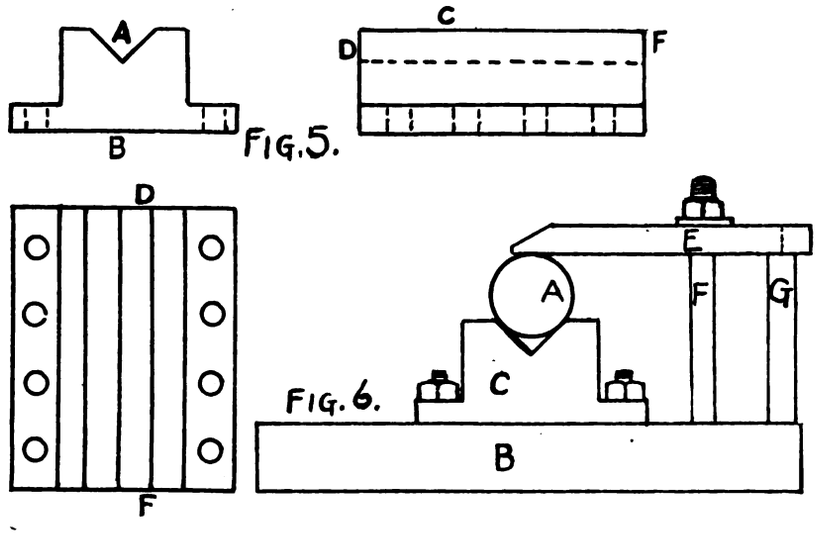


FIG. 5.

FIG. 6.

THE V-BLOCK AND HOW IT IS USED

One of the jobs which the blacksmith-machinist is often called upon to do is the drilling of a hole through a round bar or a piece of shafting. This is by no means an easy job, if there are no facilities at hand to hold the shaft or bar. If it is attempted by simply laying the bar on the drill press table the chances are that the shaft will twist around when the pressure of the drill is brought upon it, often breaking the drill, or if this does not occur the hole has about a hundred chances to one to be off towards one side of the bar. The drilling of all such holes can be easily and accurately accomplished by means of a V-block. Fig. 5 shows such a block. They are usually made from cast-iron, and if the blacksmith cannot make the pattern for this he can usually get a casting from nearly any machine shop. The bottom B, the slot A and the top C should all be planed parallel to each other and the ends D and F planed at right angles to the slot. Bolt holes are drilled in the bottom flange, enough holes being drilled so as to facilitate bolting the V-block to the drill press table in almost any position. In using the V-block it is bolted to the drill press table, the table is rotated in the arm and the arm rotated around the column of the drill press until the apex of the V is brought directly under the center of the drill spindle. The table and the arm are then clamped tight and the shaft or round bar laid in the V-block, the location of the hole to be drilled having previously been marked with a center punch. The center punch mark is brought directly under the point of the drill, and the shaft clamped down to the V-block as shown in Fig. 6. A is the shaft or rod, B the drill press table, C the V-block, E a V-clamp, F a bolt, and G a wooden block supporting the outer end of the clamp strap.

Another job which the blacksmith is often called upon to do, where the V-block comes in extremely handy, is illustrated in Fig. 7. This represents a piece of a shaft with a lever fastened to it by a pin through the hub of the lever and the shaft, as shown by the dotted lines at B. The breaking of such a lever as shown by the crack A is a very common occurrence, and in many cases where the original lever was of cast iron the blacksmith gets the job of making a new one of wrought iron or steel. The forging of the lever is an easy job, but when it comes to drilling a hole in it so that the pin will go in the old hole in the shaft it is a horse of a different color. If the right method is employed, however, the job becomes exceedingly simple, and can be done accurately without any laying out whatever. Fig. 8 shows how this is done with the aid of the V-block. First, wire or clamp the broken lever together as best you can and put it on the shaft with the pin in the hole; in order to facilitate things the pin should be filed down a little so that it will be an easy fit in the hole. Next, bolt the V-block on the drill press table with one end projecting a little over the edge of the table as shown in Fig. 8. Lay the shaft in the V-block with the end of the hub of the lever against the end of the V-block, as shown by line F, and clamp the shaft down by means of a strap and bolt. Do not tighten the clamp, but leave it loose enough so that you can turn the shaft by hand. Now, turn the shaft until the pin seems to stand straight up and down, put a drill

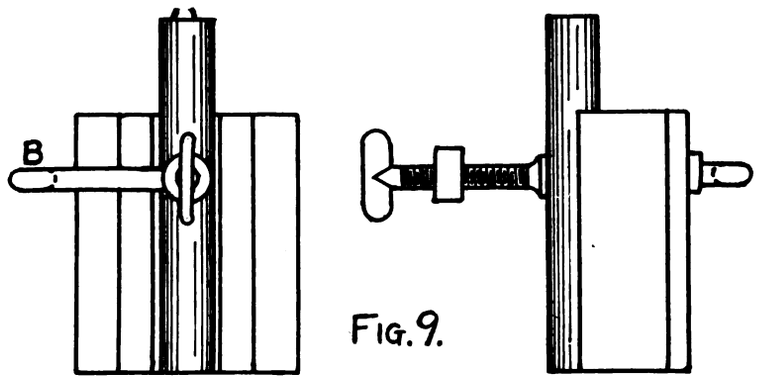


FIG. 9.

ANOTHER EXAMPLE OF THE V-BLOCK IN USE

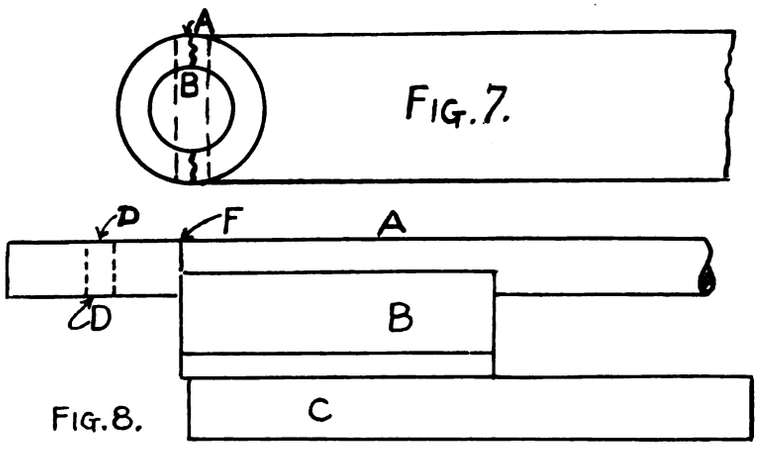


FIG. 7.

FIG. 8.

THE V-BLOCK AS USED ON A RATHER DIFFICULT JOB

the size of the pin in the drill chuck, and bring the pin, by rotating the table and swinging the arm, directly under the point of the drill. Locate it as nearly central with the drill as you can, and then take out the pin and by lowering the drill spindle see if the hole is directly in line with the drill. A little manipulation may be necessary in order to get the hole perfectly in line,



THE SHOP OF MR. W. STEPHENS IN QUEENSLAND, AUSTRALIA

but keep at it until, when the spindle is lowered by means of the feed lever, the drill slips through the hole without bending. If the lever has to be located in relation to some other member on the shaft leave the drill in the hole and block up the outer end of the lever. When the blocking is fixed, tighten down the clamp on the shaft and try raising and lowering the drill spindle to see that if in tightening down the clamp you haven't moved anything. Now, tighten up the clamps on the table and arm of the drill and remove the old lever from the shaft. Now, slip the new lever on the shaft with the end of the hub up against the end of the V-block and with the outer end resting on the blocking, in fact, just in the same position as the old lever occupied, a piece of wood can be clamped on the outer end of the shaft with its end up against the lever to keep it from moving endways on the shaft. Start the drill press up and bring the drill down on the work, feeding very carefully until the drill gets a good start. It is a good plan to file a little flat spot on the lever where the hole is to be, allowing the drill a good place to start on. The holes in the lever will be perfectly in line with the hole in the shaft; no matter how much out of center the original hole may have been.

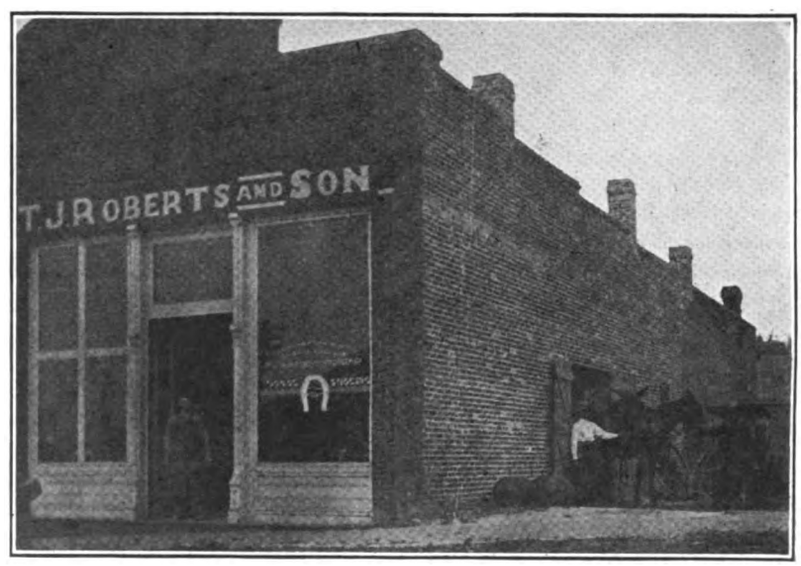
Another use of the V-block is illustrated in Fig. 9. This is a method used in holding round or square pieces when drilling a hole in the end of the piece, and is often resorted to when drilling and reaming the centers in the ends of pieces to be turned between the centers of the lathe. The piece to be drilled, A, is held in the V-block by means of the clamp B, the V-block standing on end on the drill press table. Many uses for the V-block will readily suggest themselves to the man who has to exercise his ingenuity in the repair of machinery. In fact, it is a fixture which he cannot very well get along without. Repair work usually requires far more ingenuity than any work in a machine shop where new machinery is built. In small repair shops the workman must usually make up for lack of tools and special fixtures by his own ingenuity, and his success and reputation as a repair man depend largely on the amount of ingenuity he displays in overcoming difficulties. The main thing in all machine work is to so arrange the different operations as to insure the greatest accuracy in the final result with the least amount of labor, and to eliminate chance as far as possible. In any piece of machine work requiring several different operations for its completion the first thing to be considered is the exact number and character of these operations. Secondly, these operations should be so arranged in a proper sequence as to insure the proper relation of surfaces, holes and dimensions of parts. Every part of a machine has a definite relation and connection to other parts—this must always be clearly in the mind of the man who attempts to do anything in machine building or repairing. For instance, if a piece has to be turned up to fit snugly in a hole it is necessary to know the exact size of the hole. The hole may be nominally one inch in diameter, but, before the piece can be turned to fit snug, the hole will have to be measured, and may be found to vary quite a little from being exactly one inch, and if the piece has been turned just an inch in diameter it would not have fitted the hole at all. Absolute accuracy is something practically unknown in mechanical work of the ordinary type, and nearly all work on machines for commercial purposes is made to some limited approximation. For instance, in a certain machine a shaft has to be a running fit in a 2-inch hole, on the drawing the shaft will be marked 2 inches and 1.998 inches, showing that the shaft must not exceed 2 inches in diameter and must not be smaller than two thousandths under 2 inches. The hole would be marked 2 inches and 2.002 inches, showing that at the smallest it must be 2 inches and at the largest two thousandths over two inches. It is evident that the largest shaft will go in the smallest hole, and the character of the work must be such that the smallest shaft will not be too loose in the largest hole. From the above it is evident that the only safe assumption for the mechanic is that nothing is exactly right, and such an assumption will often save much trouble in dealing with machines and their parts.

(To be continued.)

A Special Forging.

BERT HILLYER.

I should like to tell E. A. how to make a forging as shown in the sketch in the December number. There are two or three different ways of doing the work. One way would be to take a piece of soft steel, 2⅛ by 1½-inch stock. The least stock out of which you can work it makes it quicker and less work, but it is best to be sure to have enough. The only difficult part that I can see is the short distance between

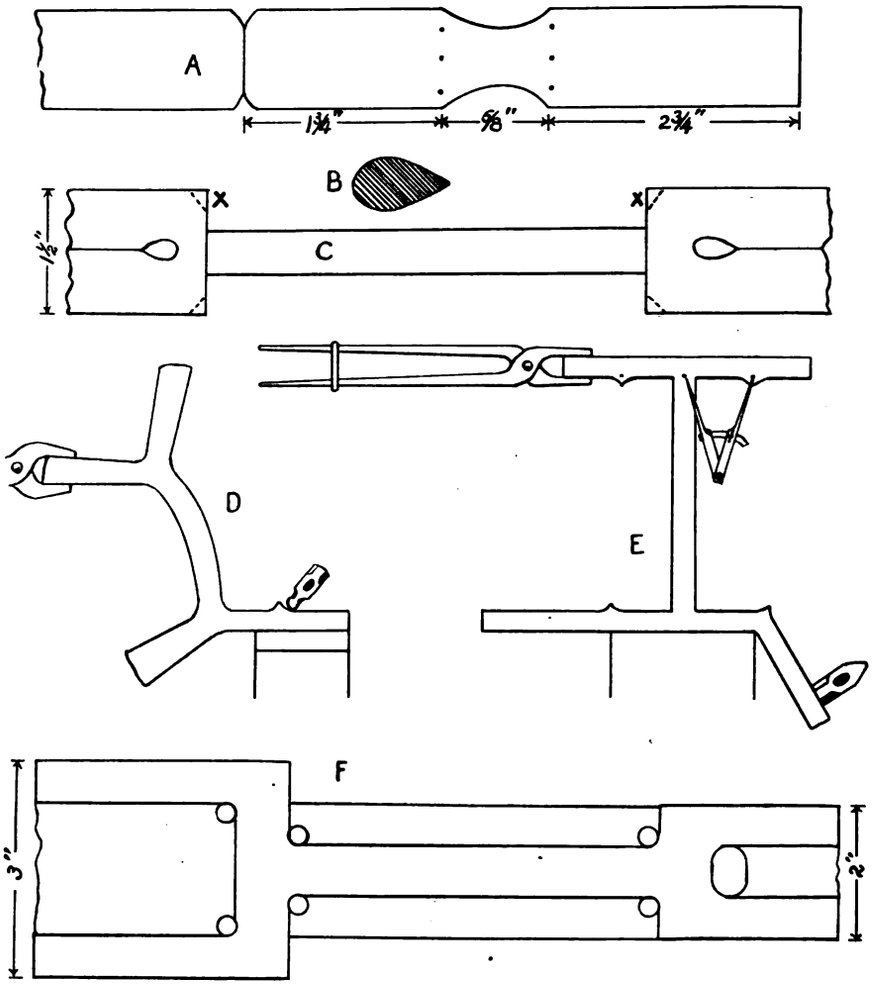


A WELL-BUILT SHOP OF MISSOURI

the jaws in beginning to draw it out. First, it would take ½ by 1¼ by 3⅛, equal to 1⅜¼—that is, in the finished piece between the jaws—adding in the small amount for the fillet, or, I would say, two cubic inches. Then, in reckoning on the stock as 2⅛ by 1½, it would take 2⅛ by 1½ by ⅝, equal to 1 17/32, or, we will say, two cubic inches. We will now take the stock and center punch a place ⅝ inch wide, leaving about 2¾ inches on the end for the jaw. Then fuller in with narrow fuller between marks, following it up with larger fuller as it widens out. See engraving at A, Fig. 1.

Next, take side tools if you have them and, if not, take a sharp-edged set hammer and break down over center punch marks, being careful not to get any lap-over parts in it. Draw down—but not quite to size—and then take a punch, with the end shaped as at B, and punch holes. Now, trim off sharp corners at XX and split the ends in two with hot cutter (C in engraving), and spread the ends out, bending in the middle so that you will have a good show to forge out end as shown at D. Make a center punch mark in the center of the pad and set dividers one inch apart for the small end (see E in engraving), and 1½ inches for the big end, so that in finishing up it will measure that distance from the center to outside of jaw, and will not be lop-sided as in some forgings which I doubt not you have seen. After the jaws are bent and turned off, take a light heat and brush off all scales with a file, then finish up with flatter. Using plenty of water on face of anvil when finishing will make the forging clean and glossy. Also keep the anvil face free from scales as much as possible when forging, for, if left there, they will imprint themselves in the iron when it is being hammered hot and it will appear rough.

Another plan would be to take a piece of 3 by 2½-inch stock and punch holes and cut it out as at F. But I would not call this forging—I would say it was chopped out or "butchered."



SEVERAL METHODS OF TURNING A SPECIAL FORGING

Some Experience with Burnt Steel.

DAYTON O. SHAW.

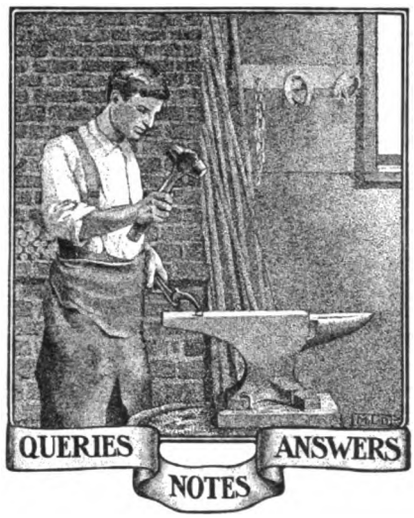
Sometimes the tool-smith is instructed to lay aside all forging when a tool is needed. This is very well when the smith has nothing special to do; but when he is hurrying on some particular or difficult forging it is a different matter. It may be that he is making a forging to take the place of a broken casting, and finds he has just stock enough to work it out, provided he is careful not to make a slip, which would spoil the work. Under such circumstances he becomes anxious and perhaps nervous. Just then, a man comes out of the machine shop and wants a special tool on a hurry-up job. The smith, of course, must throw the forging aside and proceed to make the tool. He has a very large and extremely hot fire. He is thinking of the forging and the tool at the same time, and does not make allowances for his hot fire. Consequently, his steel does not show hot until it becomes equal in heat with the fire, and oftentimes is burnt. When using a fire of this kind I occasionally draw the steel from the fire and watch the progress of heating in that way. Another danger in overheating is a well-lighted shop on a bright, sunshiny day. Nevertheless, I prefer a shop of this kind, for then I can gauge the light to suit my work. For instance, on a dark, cloudy day the shop would not be too light for hardening, but on a bright day it could be darkened by curtains. Thus, I could have the light nearly equal, fair or foul. I never had a shop too light for forging.

Since the smith tries so hard to keep from overheating his steel, it sounds strange for a man to say, as some do, that burnt steel is the best. Once, when I was working at the second tool-smith's fire, a man stepped into the shop exclaiming, "Burnt steel is the best!" The boss tool-smith let him take his fire, and the agent proceeded to prove his statement. He took a piece of ⅝-octagon steel and heated the end until it sparkled. Then he cooled the steel in a compound which he was selling. After this he heated it again to a forging heat and drew out a cold chisel. The steel worked fine. It flowed like wax under the hammer, and when finished had no indication of being burnt. The chisel was then tempered, but was not drawn so low as we usually drew our chisels. After this came the test. They chipped iron and steel, and it stood the test all right and did not

break or bend. The recipe for this marvelous compound was only five dollars. It was the agent's plan to have two blacksmiths buy the recipe together, but the boss could get no one to buy with him. Finally he got the recipe for two dollars. Then he began to have a swelled head. He could neither think nor talk of anything else but his marvelous compound for restoring burnt steel. The patternmaker, however, was something of a chemist, and he tried to reason with the smith, —but no, had he not proved it himself? "Very well," said the patternmaker, "don't you put my tools into that stuff." Consequently, his work came to me ever after. Now, this smith went on the principle that if the compound was good for burnt steel it would be good for steel that was not burnt. Let me ask the reader if it does not look reasonable from this man's point of view. To test his opinion he began to heat his tools a little hotter than he was wont to heat them and then go through his operation with the compound. The first time the tools were dressed in this manner they worked finely, but the second time they did not stand the test so well, and the third time they were practically useless. This practice was so unsatisfactory that it was in a short time abandoned.

The Shop Number.

Don't forget to send in a picture of your shop for the shop number. We want to show good, up-to-date shops from every section of the country. If you haven't a photograph of your shop send in a floor plan and description, but let us have something.



Polishing Wheel.—I have found in "Our Journal" advice on how to make everything but a polishing wheel, and I wish somebody would give me that valuable information. CHARLES POTTER, Penn.

He Asks Two Questions.—Could you please inform me how to temper plowlays and also how to make a foot-power emery wheel frame? Any light on the subject would be greatly appreciated.

C. F. RICE, Iowa.

Vulcanizing Tires.—Can anyone tell us what apparatus is necessary in vulcanizing tires—that is, sand holes, etc.? We would also appreciate information concerning the way in which to do the work.

H. J., AND D. H. C., Minn.

Can You Tell Him?—I would like to know through our paper if any of our readers know anything about or have had any experience with a water tuyere iron or fire pot for a forge. Any information would be greatly appreciated. J. WEBER, N. Y.

A Puzzling Case.—We have a problem that we cannot solve. Would some brother smith help us out? We have a customer with a horse that we cannot shoe properly, for the reason that the bottom of the foot grows faster than the shell, and we cannot trim it down far enough to get the shoe on solidly without striking the quick. If any of the brothers have ever been up against a case of this kind we would like to hear from them. BYARS BROS., Kansas.

Desires Information.—Can any of my co-readers tell me how to make a three-horse evener work on a John Deere walking cultivator? I would be most grateful for any light on this subject.

W. A. HERR, Iowa.

Brick Press.—Will some brother craftsman give me through "Our Journal" plans or instructions for the building of a brick press, to press brick by horsepower? I desire to start a small brick business as a side line, and want to know how to build a press.

WM. O. HEARNE, Arkansas.

Wants to Know How to Paint.—Can anyone suggest a good body filler for buggies and tell me how it may be mixed; or, if it be already mixed, where it may be obtained? Also, I would appreciate his kindness if some brother would give me some pointers on painting, from the start to the finish.

ED. BRAND, Georgia.

Cold Tire Setter Question.—I herewith ask advice concerning the best and most durable cold tire setter. It must easily shrink cold a 3 by $\frac{3}{4}$-inch tire. I know the old way of doing it is the best, but we must keep up with the times. I hope I shall receive well-explained answers to the above question from my brother craftsmen of the new world.

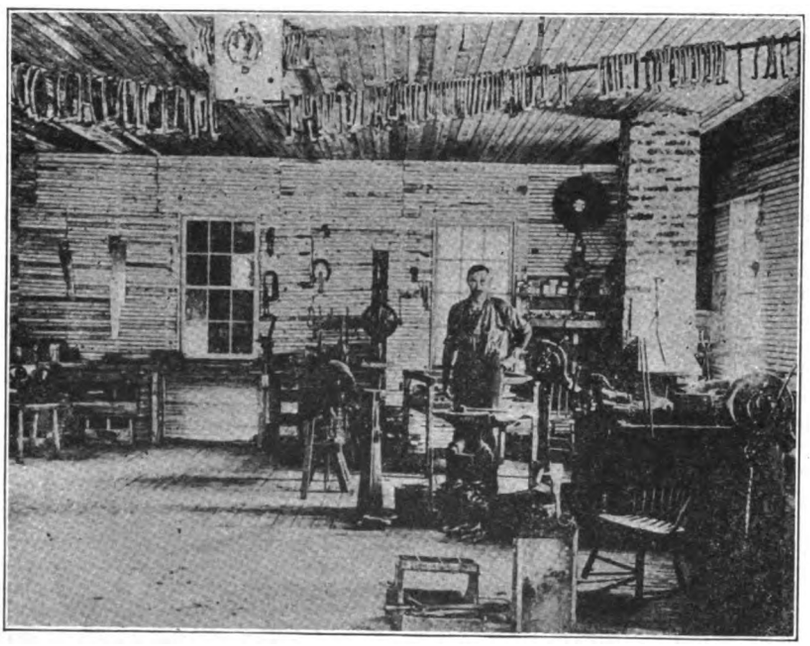
W. H. E. NIEMEYER, South Africa.

Concerning A Contracted Foot.—While reading the experiments of horseshoers, I noticed, on page 90, an account by Mr. L. E. Phifer of the manner in which to shoe a contracted foot. He claims he makes the shoe a trifle larger than the foot and begins at the toe to nail. I should like to know whether he springs the shoe in to fit the foot, as he nails back along the foot, or whether he leaves the shoe larger than the foot. Information along this line would be gratefully received. J. E. TRUMP, Iowa.

Magnetized Tools.—Frank J. Casey, of Nebraska, in the February number wants to know how his center punch became magnetized. My experience is that some steels magnetize more easily than others, and the same applies to bars of iron. Such steel, if laid for some time pointing north and south, becomes charged with magnetism, as also do bars of iron laid in the same direction. The proximity of electrical apparatus may have been the means of charging the punch.

Years ago, magnetized iron or steel was a curiosity; today it is of such common occurrence that but small notice is given to magnetized tools. It is a common thing for drilling tools to become magnetized. L. R. SWARTZ, Pennsylvania.

Wants to Build a Brick Forge.—I wish to build a brick forge for a general shop, and I wish some of "Our Folks" would tell me how. I would like to know what size to make it, how big the base should be and the size of the chimney. I intend to pipe a portable forge and also a heating



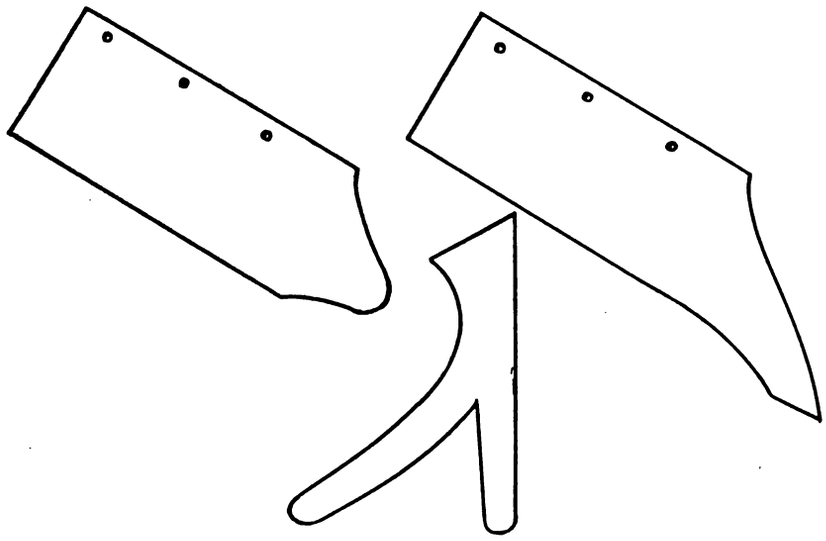
A CORNER OF MR. F. W. CLARK'S VERMONT SHOP

stove into the same chimney. Another thing I would like to know is whether any reader is using a Buffalo down draft forge, and his opinion of same. Any information on these subjects will be gratefully received.

FRANK SCHMITZ, Ohio.

From A Young Smith.—I am a reader of THE AMERICAN BLACKSMITH and like to read it from the first page to the last. I am a young smith, but twenty-five years of age and, after working four years under a first-class blacksmith in order to acquire experience, I am now starting out for myself. I am proud to state that I like the trade. My shop, fifty feet by thirty feet, is located in a good-sized town in a farming district where the soil is rich. I employ three men all the year round, and am glad to say that the credit here is very small.

LAURENT THIBODEAUX, Louisiana.



CONCERNING PLOW-LAYS AND THEIR REPAIR

A Labor-Saving Kink.—I would like to give a small item to my brother craftsmen. I know it will be new to some of them. It is not original with me, but has been a labor-saver to me. In removing stubs of old spokes from hub, use a lag screw with a good thread. Bore hole in spoke one size smaller than screw. Turn screw in with wrench until point of screw hits box, and, unless the spoke is rotten, the screw will shove the stub out. Try it, brothers. Would say I have just built a new shop, all of corrugated galvanized iron, and am very much pleased with the result. L. D. HIGLEY, Washington.

Lubricating Dies.—Worms in Hickory.—Can anyone give me a receipt or formula for making a good screw cutting fluid that is not so expensive as lard oil, and that will run freely in cold weather? I have a machine for cutting threads, which is fixed to feed the oil onto the dies by means of a small pipe from a tank above, but in cold weather the oil will not run freely, and thus causes trouble. I will be very grateful for any information on this subject, and also for a remedy for keeping worms out of hickory timber, spokes, etc., should anyone be aware of any.

EDWARD DEITRICH, Indiana.

Youngest Animal Shod.—In the September issue of "Our Journal," Mr. W. H. Smith, of Tennessee, claims to have shod the youngest animal on record, (a mule three weeks old). I shall claim that honor, until some more worthy brother can "show me." I shod a mule colt six days old with good results, and, no doubt, saved its life. The owner had been advised to kill it. It had never been able to walk: the back tendons were so contracted it could not get its foot to the ground. After shoeing, however, it stood upright, and in a few days came all right. I enclose a nail made for this shoeing.

JOSEPH CREGAR, Virginia.

NOTE—The nail is but one and three-sixteenths inches long, with a thickness of one sixteenth of an inch at the head and is one eighth of an inch in its widest part.

EDITOR.

Forty-Four Years in One Shop.—I am a blacksmith, sixty-six years of age, and have been a blacksmith forty-four years. I am now working in the shop that my grandfather and my father after him worked in. In January, 1825, my grandfather came to this town and put up a blacksmith shop. He worked in it as long as he lived. After his death my father worked in the same shop all his days, and I have been at work in it for forty-four years. There has been some one of my grandfather's family at work on this same lot continuously since 1825—in all eighty-four years. Pretty soon, I too will go, and somebody will take my place; there will be horses to shoe and wagons to repair and other things to do, just as it is today. We all but prepare for somebody else to take our places, and we must all try to do better than the last one did, in order to make the next one do even better. JNO. V. COROWAY, Georgia.

Concerning Plow-Lays.—I should like to inform my co-readers of the way in which I point a plow-lay. In the first place I have never had a plow-lay come to my shop with a point as good as Mr. C. W. Metcalf's. I will endeavor to give a rough drawing of the way they arrive and the kind of point I use. I find it gives the best of wear and satisfaction. Remember, a plow must be kept full in the throat, if you want a good-running plow, and it must be neither too high nor too low. If it be too high the plow will buck along, and if too low the heel will crowd the land side. About the thickness of your rule, and single, is quite right. Too long a point will make the plow kick up at the heel, and too short a beam will do the same. Now, if Brother C. W. Metcalf will use this kind of a point he will cease using those turn-back points. Let the bar of the point run back on the share and you will have a good-running plow.

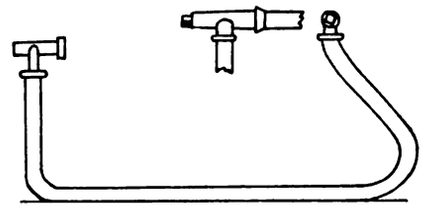
O. R. MANVILLE, Missouri.

An Interesting Missouri Letter.—Here are two items that will probably interest my co-readers. One of my customers brought in a grindstone that had been a 2½-inch face by 24-inch diameter when new. It was badly out of shape, and he wanted me to true it up. Here is how I did it. I have a Giant Wonder Disc Sharpener, and I placed the stone in this, just as I would a disc, and put a box filled with water beneath it, in order to keep the stone wet. Then I took an old 14-inch file and, using the tang end, commenced on the side of the stone and cut each way, or from each side as it revolved. When finished I smoothed it up with an old rasp, and had an 18-inch stone; you can readily see how untrue it was when it came to me.

If you desire to make a cutter or sleigh out of your buggy the following method is very serviceable and also inexpensive. Take a piece of one-inch gas pipe, two T-couplings and two nipples about three inches long for each side. Bend to the shape you desire for your runner and place the couplings so that the spindle will pass through, as through the box in a wheel. The nipple keeps it tight and prevents slipping.

Here are some of my prices:

Horseshoeing, new shoes, each	$ .45
Horseshoeing, old shoes, reset, each	.30
Setting tires, per set of four	$2.00 to 3.00
Plow sharpening, from	.30 to .35
Plow pointing	1.00
Lister sharpening	$ .40 and .50
Lister pointing	$1.25 and up
Grinding mower sickle, per foot	.05
Wagon tongues	4.00
Buggy tongues	4.00
Buggy tongue circles	1.25
Wagon and buggy spokes, each	.25
Bolsters, hind or front	2.00
Front hounds	3.50
Hind hounds	3.00



AN EASILY MADE SLEIGH RUNNER

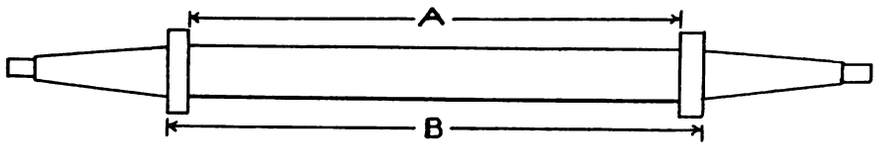
Reaches, wagon	$1.15 to $1.75
Reaches, buggy	1.25
Wagon axles	3.50 and 4.00

Other prices in proportion. Odd work, fifty cents per hour.

T. E. WILSON, Missouri.

Reboring Cylinders.—I have a particular job to do on a cylinder of an engine, and I should like to know the best way to do the job. This cylinder has no compression, because the wrist pin of the piston is loose

and goes each side of the cylinder, making two grooves, one-half inch wide and one sixteenth of an inch deep. I desire to rebore this cylinder, but some of my friends discourage me, saying it is very difficult to rebore them. Others say that reboring makes them as good as new, if rings are made to fit the rebored cylinders. Can somebody tell me which of my friends is correct? L. P. LACOSTE, Quebec.



DOES HE MEAN INSIDE OR OUTSIDE OF COLLARS?

In Reply.—We would not suggest your reboring the cylinder, unless you have the proper facilities for doing this work. Reboring the cylinder, unless the work is done perfectly, often leaves the cylinder worse than before the reboring was done. Of course, if you have a lathe large enough to handle the cylinder, you should have no trouble in doing a very good job. If a reboring job is done properly it will put the engine into practically as good a condition as when new. After reboring, it is also good practice to fit the cylinder with new rings, so as to get the best possible compression. L. F. R., New York.

Die For Cutting Cold Steel.—I would like to describe a die for cutting cold steel. It was hardened in a furnace three feet square, with a hard coal bed four inches thick, with the gas all burned out, and well tamped with a piece of 1¼-inch casting laid on it. The casting is the size of the die and the die was placed on it and well covered with charcoal. It required five hours for heating. The bath was of brine in a tank fifty inches deep and thirty-six inches in diameter, with brine at a temperature of fifty. To draw it, I used a hot iron two inches thick, the same size as the die. This die did not spring a hundredth part of an inch. It is used in one of the largest fork factories in the states, and cuts 10,000 ferrules without grinding. FRED YOUNG, Vermont.

Willing To Be Convinced.—In the January number of "Our Journal" Mr. L. Van Dorin has an article on "How to Set Axles," and I enjoyed reading his method of setting them and the clear and logical manner in which it was explained. But allow me to ask Mr. Van Dorin two questions through the Journal, as I should very much like to give his method a trial. When he says "between the collars of axle" as in the first part of his article, does he mean between the collars as per engraving, A, or from outside edge of collar as at B? Now, again, Mr. Van Dorin says to give no gather. To my mind, a job is not practical without a little gather, but most probably I am slow, as the fellow says. So, would you mind answering these two questions for me, Mr. Dorin. I wish all success to THE AMERICAN BLACKSMITH, as it is invaluable to the craft.

C. CRAIG, Canada.

About Fire Clay.—I should like to know a bit concerning fire clay, what the difference is between it and common red clay, and where it can be obtained. Any information will be gratefully received.

W. G. LAMBERT, South Dakota.

In Reply.—True fire clay is a variety of clay entriely free from lime, iron or alkali and, therefore, infusible. There is, however, little clay which is entirely free from all three elements. By analyzing it, is probably the only way in which fire clay can be distinguished from the ordinary clay. However, for the fire pot in the forge, the ordinary river clay will be found entirely satisfactory. The main point is to get good clay and then to pound it well into place. The clay should be entirely free from pebbles and used just as it comes from the river bank. Don't be afraid to pound it. Use your heavy hand hammer and hammer the clay into place, just where you want it.

As to cement, I have heard of it being used and with success, though I cannot boast of having had any experience with it.

If you want to get good fire clay you can possibly secure it from a brick or sewer-pipe manufacturer, though I think it unnecessary, if good river clay can be secured. I. J. KRAMER, (In June, 1909.)

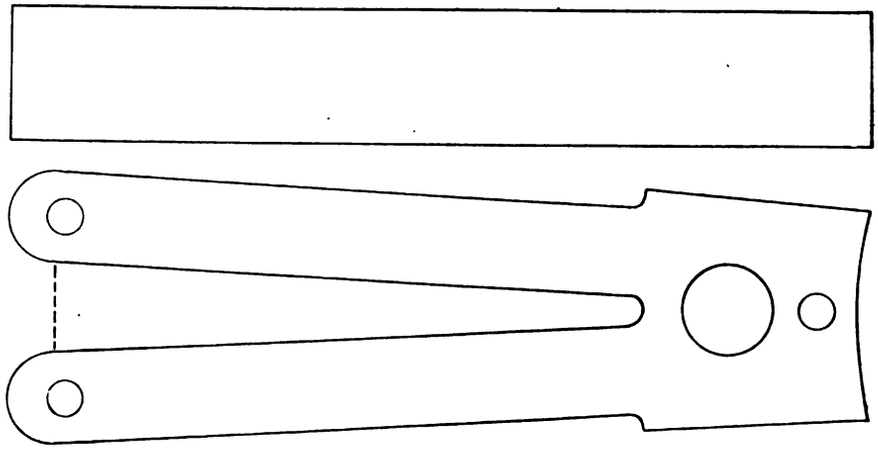
Two and Four-Cycle Engines.—Will somebody be kind enough to explain to me concerning the two and four-cycle engines? Does the two-cycle make two explosions while the fly wheel goes around once, and does a four-cycle make four explosions while the fly wheel goes around once? Will someone kindly throw a little light on this subject for me? I. H. B., Oklahoma.

In Reply.—In explaining the operations of the two-cycle and four-cycle gas engines it is necessary to understand what "cycle" means. A cycle is a time or a round of events necessary to produce a certain result. When applied to a gas engine it means the round of movements or events to get one explosion or one impulse. Therefore, in the two-cycle engine there are two distinct movements or events to get one explosion, while in the four-cycle engine there are four distinct movements or events to get one explosion.

These movements occur as follows: first, a charge is drawn into the engine cylinder. It is compressed, fired, and then the burned gases are exhausted. But this is all done in two strokes or movements in the two-cycle engine, and naturally it differs very materially in construction and quite a little in operation from the four-cycle engine.

In the four-cycle engine the piston starts on the first stroke, drawing in by suction the charge of air and fuel. Then, at the end of this stroke, the inlet valve is closed by its spring and the piston returns and compresses the charge. At the end of the return stroke or compression stroke the electric spark occurs, firing or exploding the charge and forcing the piston outward on its power stroke. The next stroke of the piston forces the burned gases out of the engine cylinder, thus completing the round of events in the four-cycle engine. You, of course, understand that these movements or events follow one another very quickly; the fly wheels enabling the engine to continue without hesitation. W. O. B., New York.

Questions and Kinks on Drill Jars.—We have only recently taken up Artesian Drilling, so we are a bit new at some of the most up-to-date methods, and find it necessary to ask for advice. Drill jars are one of our puzzlers. We bought jars from a firm who make jars for their own drills, and they have several holes to their credit well over the five thousand foot mark, so we concluded they knew about jars all through the piece, including post-script; but we found their jars broke, while the jars imported with the Star drills still did business. So we began casting about for a cause, and fortunately ran across the article in your July, 1909, issue showing how a separate piece of steel was welded into each pair of reins to take the blow and prevent the weld opening or splitting. We understand this piece of steel is intended to be put in with longitudinal grain of steel opposite to the grain in the jars, and we have obtained good results thus far by putting them in this way. However, we need more time to test these jars before thinking we have solved the jar problem. In the meantime, any experience others have



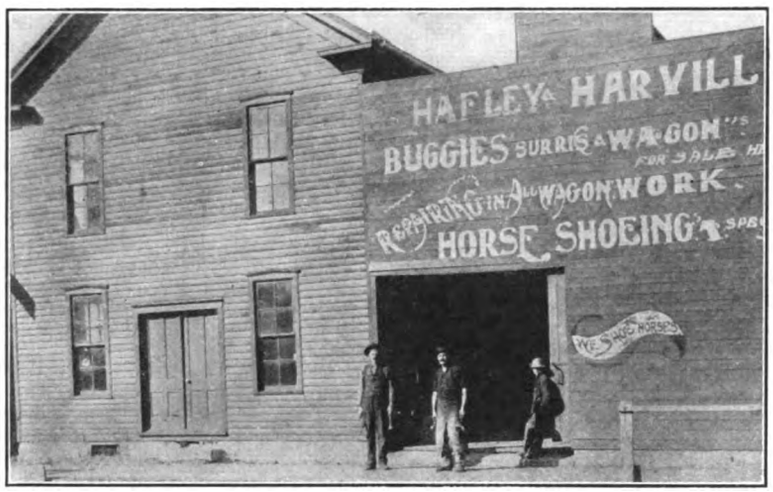
A DIE FOR CUTTING COLD STEEL

had with jars will be gratefully heard by us.

We have tried making our jars out of what is known here as Carnegie steel, made by the Carnegie Steel Company, of New York. Judging by the tough manner in which it resisted the hammer in the making these jars ought to be very good.

During one of the writer's trips to our drills he ran across a very good method for annealing hard steel quickly. This method is one used by a mine smith in the back blocks of North Queensland. He takes any high-speed steel, heats it the same heat used if annealing in lime, and plunges it into a tin of ordinary soft soap, leaving it there about three minutes. He then plunges it in water, and he can work the hardest steel within five minutes after taking it out of the fire. This little trick proves new to so many out here that it may prove the same to a few at your end, so you are welcome to use it if you wish to do so.

C. J. WINSTON, The Goldfields Diamond Drilling Company, Australia.



A GENERAL SHOP OF MISSOURI

Some Prices.—The accompanying picture shows a two-fire shop, where I have three men working all the year round. In the room at the side I keep buggies and wagons. Here are a few prices that may interest some brother blacksmiths:

Four new shoes	$1.00 to $1.50
Buggy tires, set	2.00
New rim on buggy	5.00
Wagon tongue	3.00
Buggy pole	6.00

All else in proportion.

J. N. HARVILL, Missouri.

The Price List agreed upon by the Blacksmith's and Wheelwright's Association of Northwestern Manitoba.

Horse Shoeing.

New shoes (10% off for cash), each	$ .50
Bar shoes (10% off for cash), each	1.00
Setting (10% off for cash), each	.25
New shoes on stallion (factory), net	.75
New shoes (hand made), net	1.25
Setting, net	.50
Running plates, net	.75
Running plates calked, net	1.00
Rubber pads and tips, each, net	1.50
Neverslip, net	.80
Neverslip calks, net	.05
Hand-turned shoes, net	$ .75 to 1.00
Paring feet, each, net	.05
Shoeing fractious horses extra, net	$1.00
Leather and oakum, extra, each, net.	.25

Plow Work.

	Cash	Credit
New shares 12x14 in., each	$4.00	$4.50
New shares 16x18 in., each	4.50	5.00
Extra for soft center steel	.50	.50
Sharpening, 12x14 in., each	.25	.30
Sharpening, 16x18 in., each	.35	.40
Laying, extra	.40	.50
Laying on heel, extra	.40	.40
Polishing	.10	.10
Plow beam set, each	1.50	and up
New fin, each	.75	.80
Fin sharpened, each	.15	.15
Sharpening scrub share	$.50	$ .50
Sharpening colter	.25	.30
Laying colter	.75	and up
Colter clasps, each	.50	.60
Sharpening drill shoes	.20	22½
Polishing, extra	.05	.05
Laying, extra	.50	.55
Polishing, extra	.15	.15
Harrow teeth, removed and sharpened, each	.03½	.03½
Harrow teeth, sharpened only	.02	.02
New teeth, put in, each	.12½	.12½
New teeth, not put in, each	.10	.10

Wagon Work.

	Cash	Credit
Tire setting, per set up to 2 inch	$3.00 to	$3.25
Tire setting, per set up to 2½ inch	3.25 to	3.50
Tire setting, per set, larger	3.50 to	4.00
One tire any size	1.00 to	1.00
New tire up to 2 in., each	3.00 to	3.25
New tire up to 2½ in., each	3.25 to	3.50
New tire up to 3 in., each	3.50 to	4.00
Rims, new, per set 2 inch	10.00 to	11.00
Rims, new, per set, 2½ and 3 inch	11.00 to	13.00
Half rim, extra	.25	
Sawed felloes, each	.30 to	.50
Spokes, single	.50 to	.50
Spokes, 2 or more, each	.25 to	.30
Tongues, each	3.50 to	4.00
Hounds, straight	1.25	
Hounds, bent	3.50 to	4.00
Pole hounds	1.00 to	1.10
Sway bar	1.00 to	1.40
Wagon reach, 10 ft	1.75 to	2.00
Wagon reach, 12 ft	2.00 to	2.25
Wagon reach, 14 ft	2.25 to	2.50
Axles, front or rear	4.50 to	5.00
Bolster without stakes		2.50
Bolster with stakes		3.50
Sandboard	2.25 to	2.50
Bolster plates, per pair	1.00 to	1.25
Pole cap		.75

	Cash	Credit
Hammer strap		$ .50
Tongue bolts	$.35 to	.50
King bolt		.75
Box rods		.25
New neckyoke in old irons		1.00
New neckyoke complete	1.75 to	2.00
Single tree wood, old irons	.60 to	.75
Single tree wood, complete	1.00 to	1.25
Whiffletrees and neckyoke, complete	5.50 to	6.00
End gate for wagon box, complete		2.00

Carriage Work.

	Cash	Credit
Axle stubs up to 1 inch, per set	$8.00 to	$10.00
Axle stubs up to 1¼ inch, per set	11.00 to	13.00
Setting axle	1.00 to	1.25
Welding	1.50 to	2.00
Setting tires, per set	3.50 to	4.00
New tires, per set	10.00 to	11.00
Welding spring, 1 leaf	.75 to	1.00
Welding spring, each additional	.50	
End spring, new, each	3.25 to	4.00
Repairing shaft, iron, each	.50	
Repairing pole, each	.50	
Clip king bolt	.75	
Shaft shackles	.40 to	.50
Bolts		.10
Singletree clasp and bolt		.25
New set buggy eveners, complete	2.40 to	3.50
Double tree	1.00 to	1.25
Singletree, old irons	.75	.75
Buggy neckyokes, wood only	.75	.75
Buggy neckyokes, complete	1.75 to	2.00
Axle clips, each		.25
Top bow socket, each	1.00 to	1.25
Nuts, each		.15
Rivet in bow socket		.10
Steel shaft splice	.75 to	1.00
Buggy shaft, each	2.00 to	2.25
Cross bar	1.00 to	1.25
Buggy pole	3.50 to	4.00
Pole circle	1.50 to	1.75
Reach		1.00
Spokes		.25
Rim	1.50 to	2.00
Spring bars	1.00 to	1.25
Axle beds	1.50 to	2.00
New dash	2.50 to	3.00
Piano body without seats	10.00 to	11.00
Seat	2.50 to	3.00

Cutter Work.

	Cash	Credit
Runners, each	$2.50 to	$3.50
Knees	.75 to	1.00
Beams	1.25 to	1.50
Draw bars	.75 to	1.00
Cutter shoes	1.75 to	2.00
Pole coupling irons, pr pair		1.25

Sleigh Work.

	Cash	Credit
Runners, each	$2.75 to	$3.25
Benches, straight	2.00 to	2.25
Benches sawed	2.50 to	2.75
Bolsters		2.00
Roller	1.75 to	2.00
Shoes, each	1.75 to	2.00
Sleigh rods, each		.50
Start pins	.50 2 for	.75
Short tongues		1.00

Miscellaneous.

	Cash	Credit
Chain hooks, round, each	$ .40 to	$ .50
Chain hooks, grab	.35 to	.50
Chain links		.10
Welding binder sickle bar	.75 to	1.00
Welding mower	.50 to	.75
Four-horse evener, 2x6 or 7, 6 ft. oak	2.00 to	2.50
Four-horse evener, 2x6 or 7, 6 ft. hickory	2.50 to	3.00
Labor, per hour	.60 to	.75



It is a pleasure to use . . . **Derby Screw Plates**

Uniform strength and accuracy make them—out of the ordinary. Write now for our complete illustrated catalog, sent free. : : : : :

BUTTERFIELD & CO., Derby Line, Vt., U. S. A.

TRADE KALUX MARK

STEEL HARDENING SOLUTION

Steel Hardening and Tempering Solution is endorsed by craftsmen everywhere as being the "Last Word" in the treatment of all water-hardening steels.

$1.00 per Pt. 16 oz. for 16 gallons of water
$2.00 per Qt. 32 oz. for 32 gallons of water

If your dealer will not get it for you, send us your order for 1 quart or over and we will add sufficient "Kalux" to cover express charges to any point within 1,000 miles, beyond that, half the express charges.

Metal Hardening Solution Co., Granite Building, **Rochester, N. Y.**

Beals & Co. Buffalo, N. Y. Faeth Iron Co., Kansas City, Mo. L. K. Kingsley & Co., Binghamton, N. Y.
H. W. Petrie, Ltd., Toronto, Montreal, Cobalt, Vancouver



The Bradley Patent NON-SLIPPING HORSESHOE

Mr. Horseshoer:

If you are satisfied with the old conditions of horseshoeing—making a Rolling Mill of yourself—you will **not** want the Bradley Shoe; but if you are looking for a shoe whereby your profits will be just as large with one half of the labor you **will** want the Bradley Shoe.

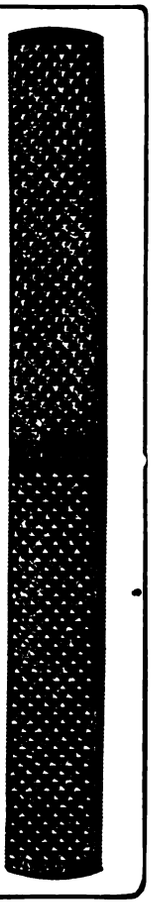
It is the man who keeps abreast of the Times who is successful in every business.

The Bradley is the only practical shoe today that contains all the merits of all other shoes combined and merits that no other shoe has.

The shoe that is practical for all kinds of horses under all kinds of conditions—Summer and Winter—can be bent or shaped to fit any horse under the sun, and yet this shoe does not cost any more than ordinary shoes.

We will send prepaid to any address in the United States for $1.00 one set of either of the four sizes 3, 4, 5 and 6. If your jobber does not handle these shoes send to us for wholesale prices and further particulars at once. **— Agents Wanted —**

THE BRADLEY PATENT HORSESHOE CO.
CHESTER, DELAWARE COUNTY, PA.



SUPERIOR
HORSE RASPS

THE BEST YET

Best High-grade Steel,
Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

EVERY RASP PERFECT AND WARRANTED

Made in all regular sizes, and in the new 18-inch Slim, which gives the user the advantage of a long stroke, and at the same time a rasp of medium weight.

ASK YOUR DEALER FOR THEM

Current Heavy Hardware Prices.

The following quotations are lowest prices generally quoted at Chicago, March 10, 1910, and are subject to fluctuations. Corrected for The American Blacksmith by the National Heavy Hardware Reporter, Chicago.

There are no changes in market quotations for this month.

Iron and steel remain firm and the mills are still behind their orders.

Already evidence is showing for higher rates on wood stock items. Trade is not heavy, however, and the Spring rush is not yet apparent. It is certain, however, that the first Spring flurry will push wood stock items up.

Collections are still reported as being slow.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—
$2.00 rates, full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$2.00 rates, full extras.

Toe Calks—	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—	
6 x ½ and smaller	60–10%
Larger and longer	50%

Machine Bolts—	
4 x ½ and smaller	60–10%
Larger and longer	50%

Nuts—	
Less than 10 lbs. of a size	$2.50 off
From 10 to 50 lbs.	3.00 off

Washers—	**Skeins—**
Same price as nuts.	Cast 65%

Malleables—	**Half Patent Axles—**
Common $ .09	65%

Springs—	
Single Spring, each	$1.25
Springs, black and half bright	.06

Hickory Lumber—Per Foot—	
1 to 2½	$.09
2½ to 4½	.10

Ash and Oak Lumber—Per Foot—			
1–1½	$ .07	2½–3	$.08
1½–2	.07½	3½–4	.09

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
½"	$70.00	$70.00	$80.00
⅝"	70.00	73.00	85.00
¾"	73.00	80.00	90.00
⅞" } 1" }	77.00	85.00	109.00

Rough Hickory Axles—		Each.
3 x 4	6 ft.	$ .55
3½ x 4½	6 ft.	.90
4 x 5	6 ft.	1.10
5 x 6	6 ft.	2.00
4 x 5	6½ ft.	1.20
4½ x 5½	6½ and 7 ft.	1.80
5 x 6	6½ and 7 ft.	2.50
5½ x 6½	7 ft.	3.00

Finished Hickory Axles—	
For 2½ and 2¾ Skeins	$ .95
For 3 Skeins	1.10
For 3¼ Skeins	1.35
For 3½ Skeins	1.50
For 3¾ Skeins	1.80
For 4 Skeins	2.10

Rough Oak Bolsters—	
Short	$.07½
12–14–16 ft.	.08½

Finished Oak Bolsters—	
2¾ x 3¾ and under	$ .60
3 x 4	.65
3¾ x 4¾	.80

Rough Oak Wagon Tongues—	
4 x 4 x 2 x 4 x 12 and smaller	$ .95

Finished Oak Wagon Tongues—	
3½ and smaller	$1.20
3¾	1.25
4	1.30

Two Inch Sawed Hounds	Per Pair.
Tongues	$ .35
Front	.40
Hind	.50

Patent Wheels—	
A. B. No. 13 and under	45 %
D. No. 13 and under	35–5 %
All Grades, No. 17 to 33	35–5 %
All Grades, No. 39 and Larger	25–5 %
C. No. 13 and under	40–2½ %

Cupped Oak Hubs— Set.		**Plain End Oak Hubs—** Set.	
7 x 8 x 9	$1.40	10 x 14	$3.30
7 x 9 x 10	1.50	11 x 14	4.20
8 x 9 x 10	1.55	11 x 15	4.50
8 x 10 x 11	1.80	11 x 16	5.10
9 x 10 x 11	1.95	12 x 16	5.75
9 x 11 x 12	2.00	12 x 17	6.30
10 x 12 x 13	3.00	13 x 18	7.00
11 x 13 x 14	4.20		
12 x 14 x 15	5.10		

Rough Sawed Felloes—			
1½ x 2 "	$1.45	2 x 2½"	1.85
1½ x 2½"	1.65	2½ x 2 "	4.35
1¼ x 2¼"	1.75	3 x 3 "	5.25
3 x 3½"	5.50		

Ironed Poles, White, XXX—	
1¾ x 2½" No. 2	$3.80
2 x 2½" No. 3	3.80

Ironed Shafts, White, XXX—	
1¼" x 2 " and smaller	$1.95
1½ x 2 "	2.20
1½ x 2½"	2.70

Farm Wagon Bows—	
Round Top, ½ x 2 "	$ .60
Flat Top, ½ x 2 "	.75
Round Top, ⅝ x 2½"	1.35

Standard size Piano Bodies with Seats—	
Each	$4.25

Plow Beams—	
1 Horse	$ .60
2 Horse	.75
3 Horse	.90

All Hickory and Oak Spokes and Patent Spokes— Discount from Weis & Lesh List No. 5.. 5%

Wagon Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2½ x 38"	$2.05	$2.80	$4.00
2½ x 42"	2.70	3.90	5.25
2½ x 46"	4.15		
3 x 44"	4.35	6.70	8.38
3 x 48"	5.25	7.50	10.00

Single Trees—Oval—

	Mixed Forest Second Growth	White Second Growth
2½"	$1.50	$2.70	$3.35
2⅝"	1.60	2.75	3.50
2¾"	1.65	2.80	3.65
3 x 36"	2.30	3.30	4.10
3 x 38"	2.35		
3 x 40"	2.50	3.85	4.65

Single Trees—Round—

	Forest Second Growth	
2½"	$1.90	$3.45
2⅝"	1.90	3.50
2¾"	2.00	3.60
2¾"	2.65	4.10
3 "	3.20	4.65

Oval Plow Doubletrees—		**Flat Plow Doubletrees—**	
2½ x 36"	$1.60	1½ x 3½ x 42"	$2.75
3 x 40"	2.40		

Wagon Doubletrees—	
2 x 4 x 48"	$3.40
2½ x 48"	4.50
2½ x 4½ x 50"	4.90
2½ x 4½ x 52"	5.25
2½ x 5 x 52"	6.00
2½ x 5 x 54"	6.75
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—	Forest
2½ x 30" and under	$ .90
2½ x 30" and under	1.15

Buggy Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½" and smaller	$2.50	$3.50	$4.50

Express Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.80	$3.55	$4.80
2⅝"	3.40	4.50	5.25
3 "	3.40	4.15	5.50

Express Singletrees, Turned—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.25	$2.50	$3.50
2⅝"	2.75	3.50	3.75
2¾"	3.25	3.75	4.50

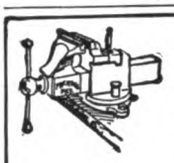
Express Singletrees, Square Center—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.75	$4.00	$5.00
2⅝"	3.25	5.20	5.75

Buggy Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2 x 42"	$2.60	$3.25	$4.25
2½ x 2½ x 42"	3.00	3.50	5.00

CUMMINGS & EMERSON
Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.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ALL STYLES AND SIZES
FOR ALL USES
LARGEST LINE IN THE WORLD
ILLUSTRATED CATALOGUE FREE
PRENTISS VISE CO
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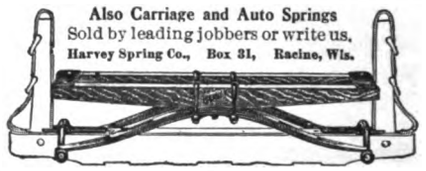
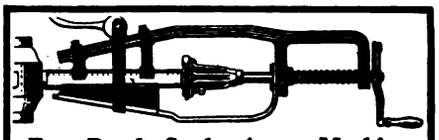
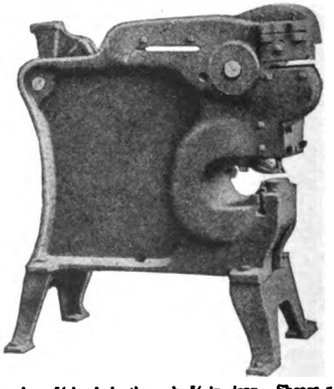
We Manufacture
SHEARS AND PUNCHES
Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.
BERTSCH & CO.
Cambridge City, Ind.

The Campbell Iron Co.
ST. LOUIS, MO.
Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material.
WESTERN AGT. FOR DITZLER COLORS IN JAPAN.
Write Dept. B. your requirements.

HARVEY BOLSTER SPRINGS

Also Carriage and Auto Springs
Sold by leading jobbers or write us.
Harvey Spring Co., Box 31, Racine, Wis.


Ever-Ready Spoke Auger Machine
Something New
Self-feeding, easy running, very light and handy.
Uses any spoke auger. Clamps the spoke accurately and bores tenons just as desired, and sold very cheap, less than $5.00. It is a "Gem" and fills a long-felt want. Write us today. Good percent to jobbers.
HOUSE COLD TIRE SETTER CO.
215 South Third St. : St. Louis, Mo.

No. 5 Combined Punch and Shear

Punches ⅝ in. hole through ⅝ in. iron. Shears 5 in. x ⅞ in. flat iron bars. Shears 1¼ in. round iron bars. Shears 8 in. x ¼ in. band iron.
Our Large Descriptive Circular will interest you. So will our price.
BADGER STATE MACHINERY CO.
19-25 Trinity Street Janesville, Wis.

Have You Seen It?

The New Improved

BLACK GIANT

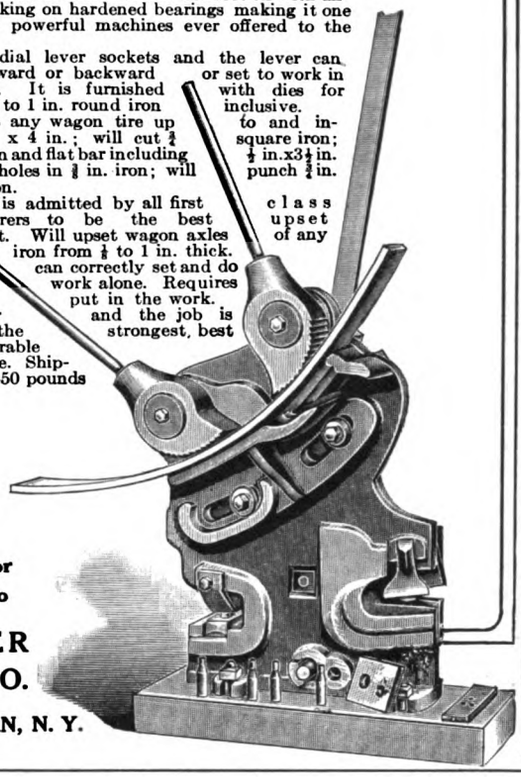
COMBINED UPSET, PUNCH AND SHEARS

Has compound lever action and in connection with an eccentric working on hardened bearings making it one of the most powerful machines ever offered to the trade.

It has radial lever sockets and the lever can be pulled forward or backward or set to work in any position. It is furnished with dies for cutting off ¼ to 1 in. round iron inclusive.

Will upset any wagon tire up to and including 1 in. x 4 in.; will cut ¾ in. square iron; 1 in. round iron and flat bar including ½ in.x3½ in. Will punch ⅜ holes in ⅜ in. iron; will punch ⅞ in. holes in ⅝ iron.

The upset is admitted by all first class wagon repairers to be the best upset on the market. Will upset wagon axles of any kind of iron from ½ to 1 in. thick. One man can correctly set and do all ordinary work alone. Requires no change put in the work. Pull the lever and the job is done. It is the strongest, best and most durable machine made. Shipping weight 550 pounds



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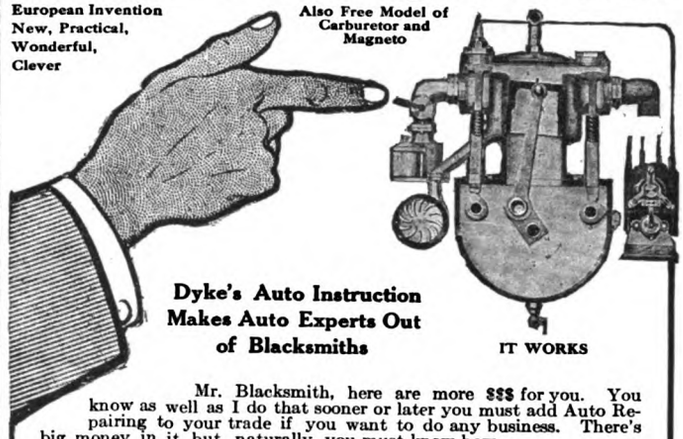
LUTHER MFG. CO.

OLEAN, N. Y.

FREE—Gas Engine Model

European Invention New, Practical, Wonderful, Clever

Also Free Model of Carburetor and Magneto



Dyke's Auto Instruction Makes Auto Experts Out of Blacksmiths

IT WORKS

Mr. Blacksmith, here are more $$$ for you. You know as well as I do that sooner or later you must add Auto Repairing to your trade if you want to do any business. There's big money in it, but, naturally, you must know how.

Experience is the old way, but that is expensive, and you cannot afford to go to work as a helper, especially when you don't need to.

The Modern Way—the inexpensive, easy, most thorough way—is with Dyke's Auto Instruction.

You learn the how and why—all about every part of the Auto—from my 24 Instruction Books, so simple a boy of ten years can understand, yet of great value even to an expert. Then you get the practice—actual experience—in valve setting, timing the ignition, setting the magneto, wiring and general repairing on my wonderful models that actually work. I give the three models free to every student.

I GUARANTEE to make an expert Auto Repairman out of you. If I don't, it will not cost you a cent.

There is nothing else in existence like my system. I made a special trip to Europe and spent thousands of dollars to make my Course the only practical and most thorough way to learn the Auto business.

SPECIAL LIMITED PRICE TRIAL OFFER

The price of this course is only $10.00 and you get the models free. We have a special offer which we are making to those who do not wish to pay the full ten dollars down: You may send us $5 cash and $6 in 30 days. You will have two days'time to inspect the course carefully. If you are satisfied (and I am sure you will be), then send me the other six dollars, or if you send the full ten dollars, then you save one dollar. CUT OUT THIS AD AND MAIL IT TO ME TODAY WITH YOUR ORDER, OR SEND FOR OUR FREE CATALOGUE, and we will show you testimonial after testimonial, and explain our system fully. DO IT NOW.

DYKE'S CORRESPONDENCE SCHOOL OF MOTORING

3910 Washington Avenue ST. LOUIS, MO.

The First Auto Supply Man in America.

Special Offer
To American Blacksmith Readers



We want to make it easy for you to test Delmas Plates, because we know you will use them right along after you give them a trial and learn the wide range of work they will do and how they will help you out on difficult welds when a strong job is required immediately.

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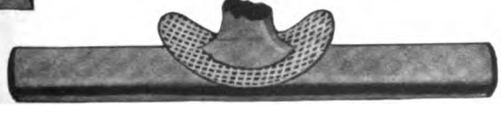



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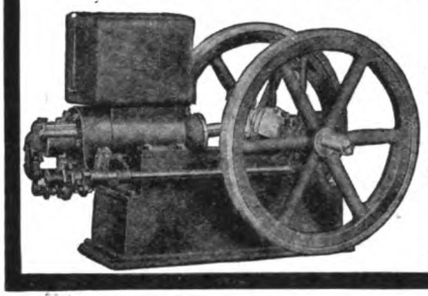

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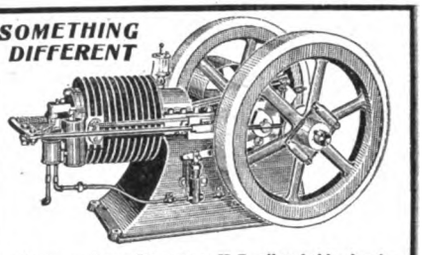

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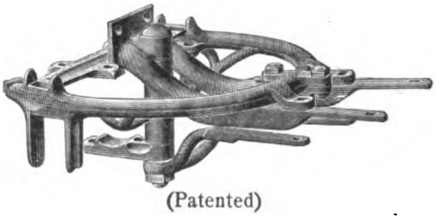

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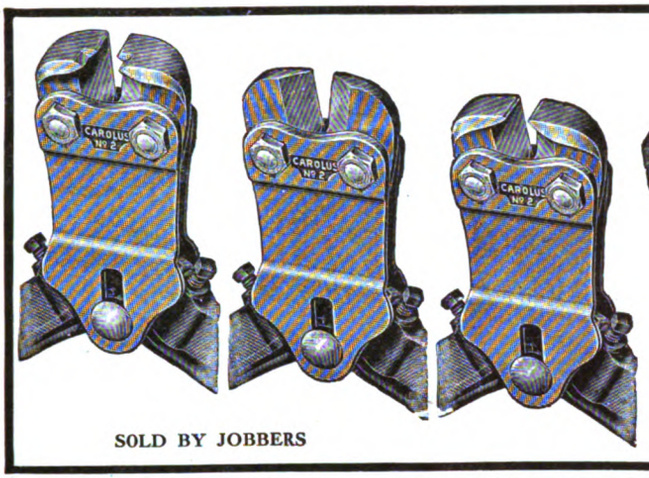

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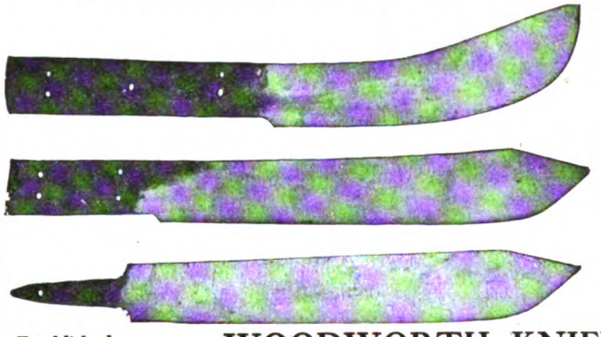

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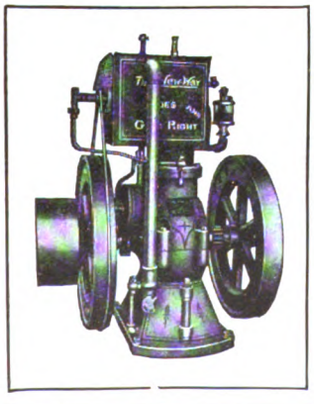

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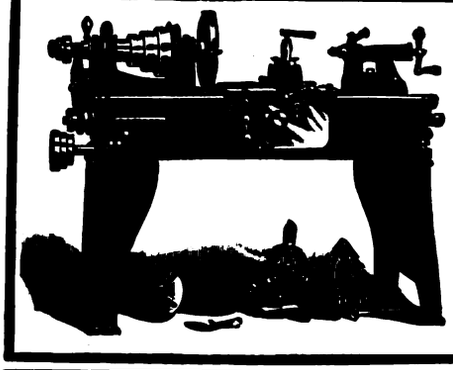

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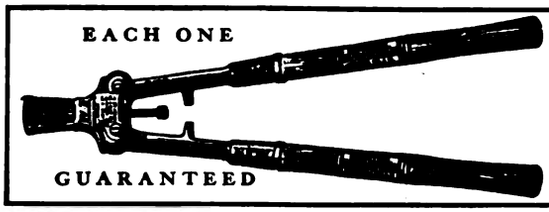

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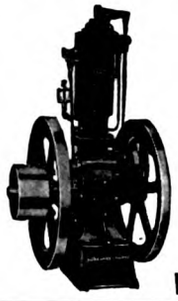

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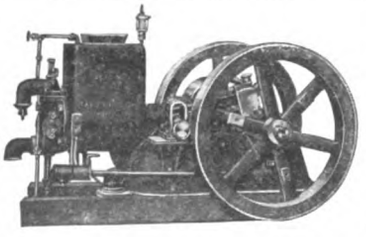

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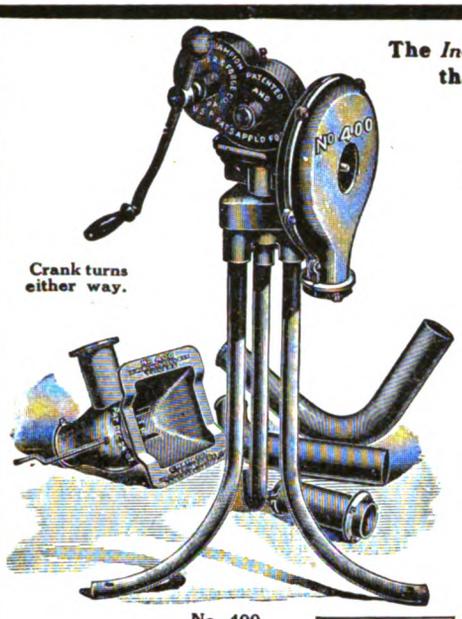

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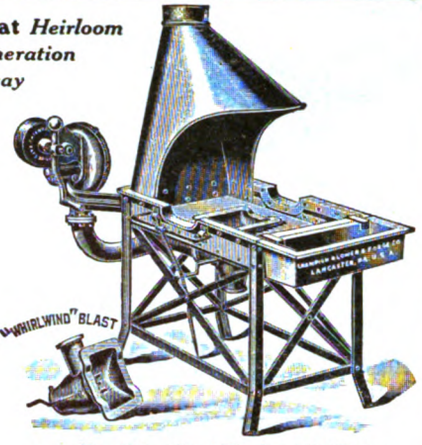
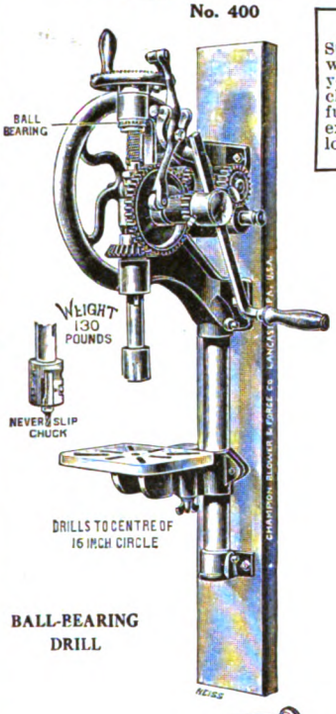


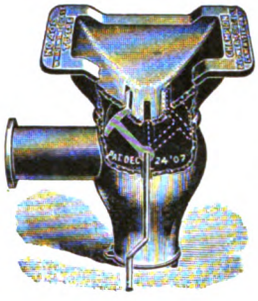
No. 408. Steel Blacksmiths' Forge



No. 433. Cast Iron Blacksmiths' Forge



BALL-BEARING DRILL



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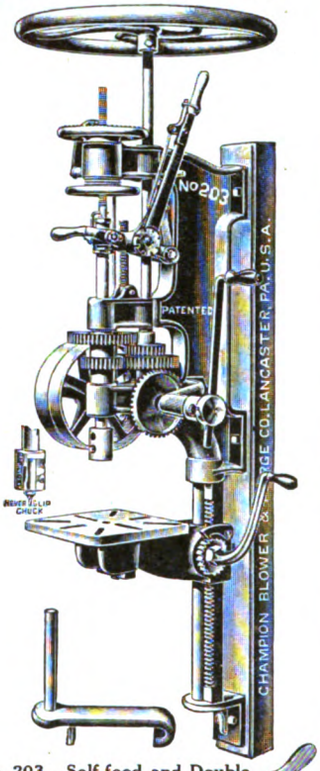
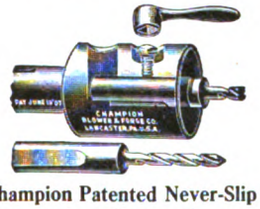


No. 203. Self-feed and Double Compound Lever-feed Drill.



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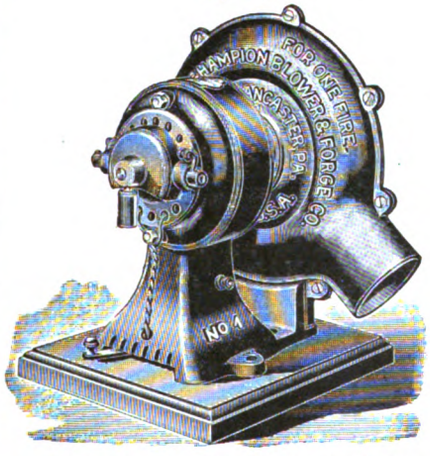

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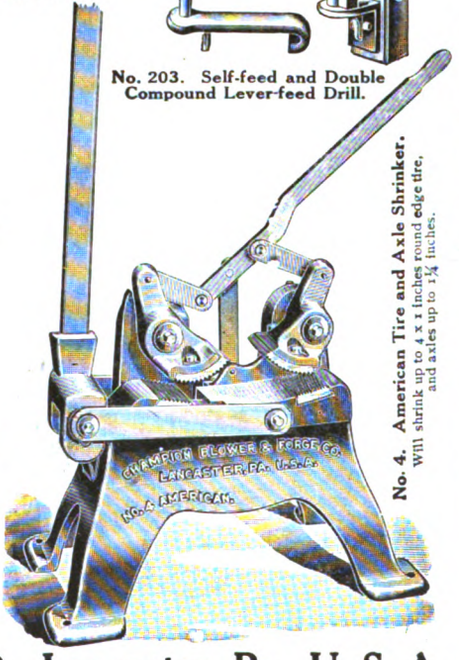

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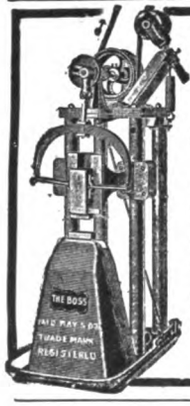
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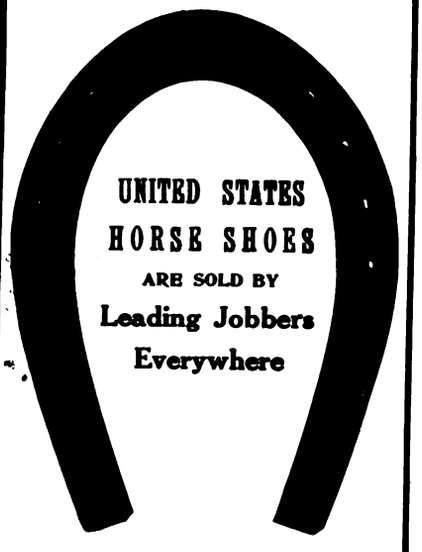

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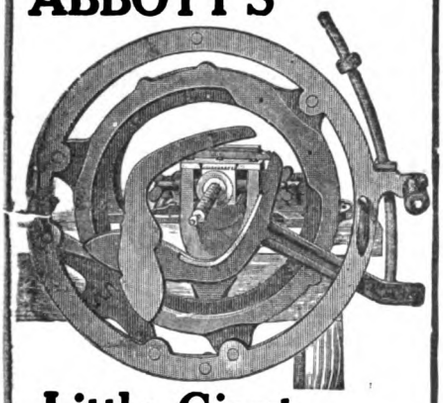

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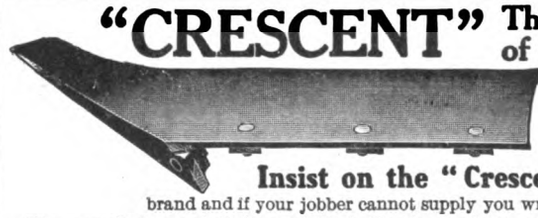



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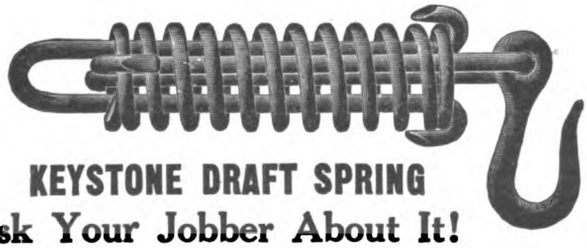

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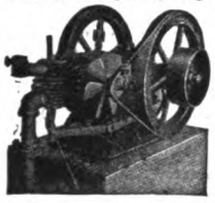

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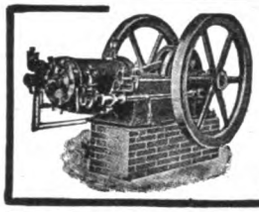
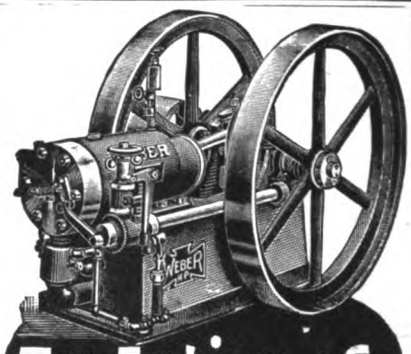
Send for Catalogue No. 49, which gives details, and tells in an argumentative way about many superior gas engine points. 2 and 5 H. P.
THE FOOS GAS ENGINE CO., Springfield, Ohio



THE AJAX GAS AND GASOLINE ENGINES
4 Cycle
5 to 10 H. P.
For the small power user there are no better engines made. Their construction combines strength, simplicity and economy. Backed by the most accurate workmanship, made of the highest grade of material, every part interchangeable, our engines give years of satisfactory service. Learn more about them. Our big illustrated catalog mailed **free** on request,
AJAX IRON WORKS, CORRY, PA.



The Engine of Reliable Records

Getting the most engine for your money does not mean buying the cheapest—it is a matter of securing an engine that will give reliable results year in, year out—the speed must be steady and uniform—absolute interchangeability of parts assured—actual power must equal rating. Every requirement of the blacksmith who wants a simple, reliable, powerful engine for all light work—running drills, emery wheels, blowers, etc.—is met by the

Weber
Gas or Gasoline Engine

Some of its special features are—underground gasoline reservoir for main gasoline supply—gasoline pump, pumping supply to engine; surplus returning to reservoir—electric igniter—heavy and rigid construction (see cut)—a perfect control governor by which the operator can change speed instantly—all parts easy of access and guaranteed interchangeable—small number of moving parts. It takes but little room, adds to capacity of shop and costs little to operate,

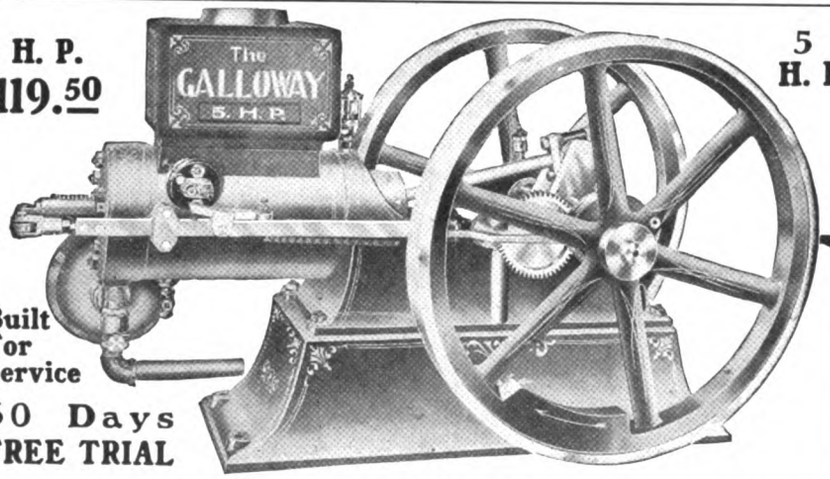
Sold Under Our Absolute Guarantee

Write today, telling us for what you need power and we will send you our new handsomely illustrated catalog fully describing the Weber Engine best suited to your requirements.

Sheffield Gas Power Co.
121 Winchester Place Kansas City, Mo.

Let it Furnish Power for You

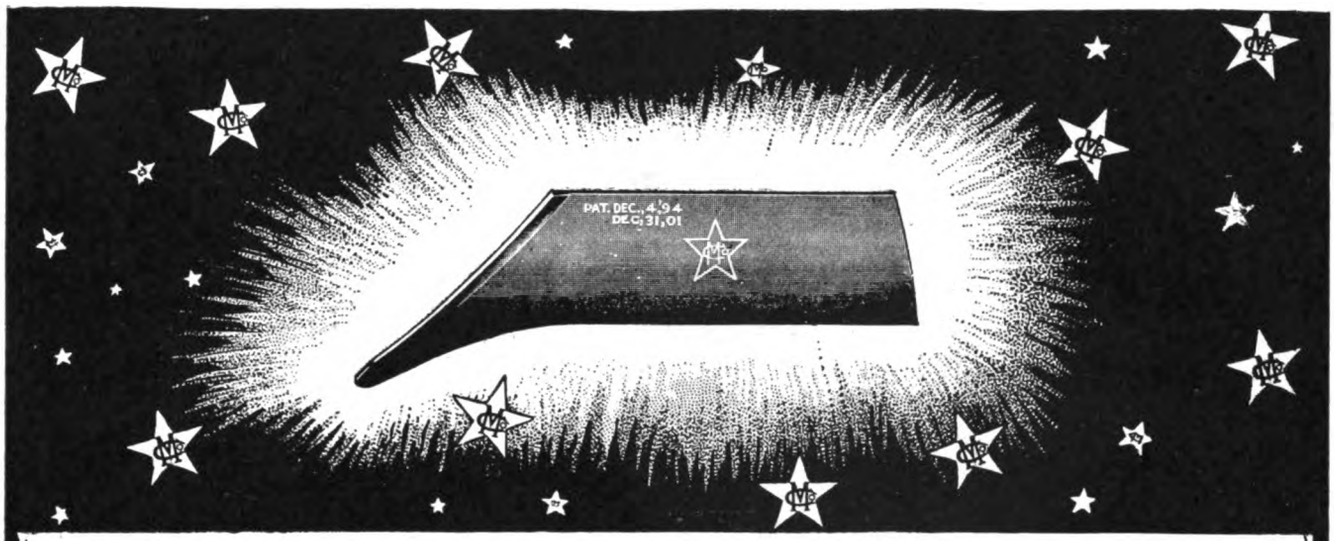
5 H. P. $119.50



5 H. P.

Built For Service
30 Days FREE TRIAL

THE GALLOWAY GASOLINE ENGINE
Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa
will run your shop at several times its present capacity and enable you to take lots of jobs that you have to turn down now because you have not the capacity.
Only four things to do: **Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start,** and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.
The Galloway has been classed as a standard, high-grade engine for 15 years. Over 2,500 in use in Iowa alone. Thousands in every other State and Territory.
If you try the Galloway engine, you will find that it is not overspeeded. Remember the bore and stroke counts and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests.
On the larger sizes, if it is not entirely convenient for you to pay all cash, I will take your note for the balance at the regular rate of interest for 6 months.
The price given is for the 5-horse power only, but we make these engines in seven sizes.
Note my special proposition to blacksmiths.
I have a plan by which every blacksmith can partly or entirely pay for his own machine. It's good; it's away out of the ordinary; and you will be overlooking a big chance if you don't write for my proposition.
Ask for my free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure.
WRITE TODAY. **WILLIAM GALLOWAY, President.**
THE WILLIAM GALLOWAY COMPANY, 577 Jefferson St., Waterloo, Iowa.



STAR



Plowshares
Quick Repair Shares
Cultivator Shovels
Landside Plates
Moldboards
Landside Points
Plow Points
Shovel Points
Subsoilers



STAR MANUFACTURING COMPANY
CARPENTERSVILLE, ILL.

Depend On This Engine To Do All Your Hard Work

LET an I. H. C. engine be your right hand man. Let it do the hard work for you. Let it run the air blower, trip hammer, lathe, grindstone, emery wheel, etc.

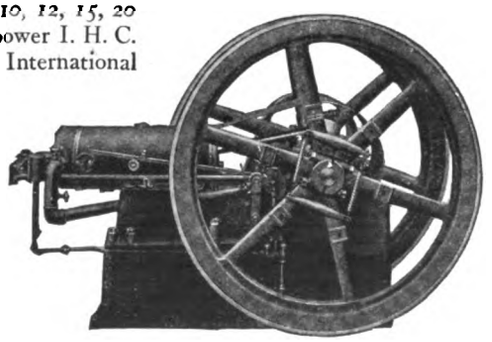
A week's use of an I. H. C. engine will make you wonder how you ever got along without it. For its uses are many. And it works cheaper than the cheapest hired hand—cheaper than any other engine.

The I. H. C. means power when you want it. It costs you nothing when not in actual use. And it is most dependable when working. Whatever else an engine is—it must be dependable. But reliability is not the only advantage of

I. H. C. Gasoline Engines

It is just as superior in simplicity, economy, construction and strength. You will find no better than the I. H. C.

The I. H. C. line offers you a wide range of selection. There is a size and style to meet your requirements. In Horizontal (portable and stationary) you will find 4, 6, 8, 10, 12, 15, 20 and 25 horsepower I. H. C. engines. In Vertical style there are 2, 3 and 25 horsepower I. H. C. engines. And I. H. C. air-cooled engines are made in 1, 2 and 3 horsepower. International Tractors made in 12, 15 and 20 horsepower sizes are very successful as plowing and general purpose engines.



No matter which I. H. C. engine you choose it will do your work better than any other make. It will pay you to investigate the I. H. C. line. You will be surprised at the superior materials and workmanship, the variety of work they do, and the low first price and running expense. Write for catalogues of the style in which you are most interested.

International Harvester Company of America
(Incorporated)
13 Harvester Building Chicago, U. S. A.

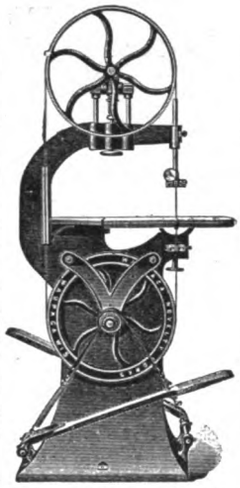
DON'T BUY GASOLINE ENGINES UNTIL YOU INVESTIGATE "THE MASTER WORKMAN," a two-cylinder gasoline, kerosene or alcohol engine, superior to any one-cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE. THE TEMPLE ENGINE MFG. CO., 492 West 15th St., Chicago. THIS IS OUR FIFTY SIXTH YEAR.

Band Saws and Grinding Machines
You Need in Your Shop

Whether or not you have power in your shop you can use our new No. 2 20-inch foot or combination Band Saw Machine, shown in the accompanying picture. This machine is designed especially for your needs and will enable you to do more and better work, paying for itself in a short time.

The simplicity and strength of this machine are two important features. Built of the best materials, to withstand the hardest possible wear and usage. The machine has no gears of any kind to get out of order and add to the friction. The finest ball-bearings are used throughout, making the easiest running bearings possible, and many other distinctive features which are described in our circulars.

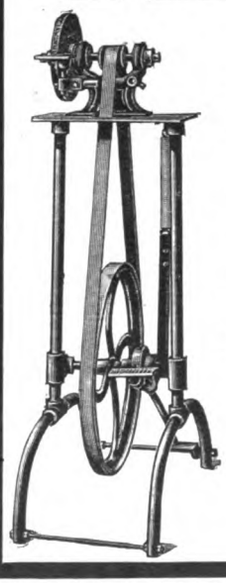
The machine is equipped with a single treadle for one person or two treadles for two persons. When desired to be run by power, we furnish tight and loose pulleys in place of the back treadle.



The upper saw pulley can be tilted by means of a hand wheel, also can be raised and lowered to change the tension of the saw. The table tilts both sides, which you will find very handy for bevel sawing. This feature found only in our machines.

Stop and think of the many advantages of this machine. Just what you have been looking for—and that your shop is not complete without one, and then send for our prices and descriptive circulars.

Foot Power Emery Wheel Grinding Machines

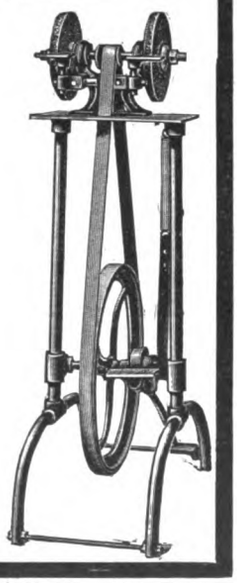


The machines are made especially for you—The Blacksmith—to save time, labor and, consequently, money. To save a large number of files, as these grinders will do three fourths of all the work you usually do with a file.

These Grinding Machines are light in weight and can be moved from place to place in your shop easily. Ball-bearings throughout, making them easy running.

Every Blacksmith should investigate the advantages of our machines, both Band Saws and Grinders, by writing for our circulars, containing prices, which are sent free on request.

Write Now—Today



WAUPACA NOVELTY WORKS

Waupaca, Wis.

Make Big Money Training Horses!

Prof. Beery, King of Horse Tamers and Trainers, has retired from the Arena and will teach his wonderful system to a limited number, by mail.

$1200 to $3000 a Year
At Home or Traveling



Prof. Jesse Beery is acknowledged to be the world's master horseman. His exhibitions of taming man-killing horses, and conquering horses of all dispositions, have thrilled vast audiences everywhere.

He is now teaching his marvelously successful methods to others. His system of Horse Training and Colt Breaking opens up a most attractive money-making field to the man who masters its simple principles.

Competent Horse Trainers are in demand everywhere. People gladly pay $15 to $25 a head to have horses tamed, trained, cured of habits—to have colts broken to harness. A good trainer can always keep his stable full of horses.

If you love travel, here is a chance to see the world, giving exhibitions and making large profits. You will be surprised to learn how little it costs to get into the Horse-Training profession.

Write and Prof. Beery will send you full particulars and handsome book about horses—FREE. Address

Prof. Jesse Beery, Box 25, Pleasant Hill, Ohio

Electric Lights
For Every Home and Factory

We manufacture isolated lighting plants, suitable for farm house, cottage, and small factory use, ranging in price from $250.00 up to $375.00. In addition to furnishing current for the lights, the outfit furnishes power for pumping water, sawing wood, churning butter, etc. . . . . Write for information today.

The Dayton Electrical Mfg. Co.

151 St. Clair Street Dayton, Ohio

The Perfection Disc Sharpener

is the standard of America. It will sharpen any size disc perfectly. Thousands in use. It will be shipped on trial anywhere.

Write today to

R. M. HAMMOND CO., Dellvale, Kansas

Blacksmiths Can Set the Self-Setting PLANE



right the first time trying. Just drop the plane iron and cap back in the plane and turn a thumb screw and it is set **exactly right.** Five seconds does it. They are sent on trial. Ask any Carpenter. We will send you a hard, tough Carpenter's Pencil if you will send us ten addresses of plane users and mention this paper.

GAGE TOOL COMPANY, VINELAND, N. J.

Trade Literature and Notes.

SOMETHING THAT WILL APPEAR as decidedly new to readers of THE AMERICAN BLACKSMITH is the "Revelation" water-blast blowpipe advertised on page 30 of this issue. This device is based and constructed on scientific principles and consists of a Bunsen burner to which is attached a steam generator, consisting of two tubes running parallel with the Bunsen tube. Two smaller tubes attached to the top of the generator serve to carry the superheated steam to an injector, which again is provided with a needle valve to regulate the blast. Small perforations in the Bunsen tube keep the generator under a continuous heat sufficient to convert a fine film of water into superheated steam which is forced out of the nozzle of the injector under high pressure, thereby taking up air by suction of the steam pressure. The gas, steam and air are thus mixed and converted into a highly inflammable fuel and issue from the burner nozzle as an intensely hot flame.

The appliances, contrary to natural supposition, are not unduly complicated, and are not easily put out of order.

The small bench forge is operated by means of a gallon of water which is placed in the tank and suspended about eight feet above the base of the burner. This supplies sufficient pressure to furnish a good blast for a day or two without renewing.

Owing to the simplicity of the process this system can be utilized for all purposes where quick and steady heat is required. It can be used in soldering irons, melting, annealing and hardening furnaces, water heaters and the like. Any one interested in this system of producing blast can get full information regarding other appliances, equipment, prices, etc., by communicating with the National Economic Gas Blast Co., 20 Gold Street, New York City.

THE HANNA-BRECKENRIDGE CO., Fort Wayne, Ind., whose specialty is rebuilding woodworking machinery, have, we believe, one of the largest plants of its kind in the world. It has about forty-two thousand square feet of floor space and occupies two and one half acres of ground. The shipping facilities are excellent, as they have direct connections with seven trunk line railroads leading to all parts of the country.

It may be of interest to our subscribers and readers to know that this company have issued a new and up-to-date Guaranteed Machinery List which they will gladly send for the asking to any subscriber of this publication.

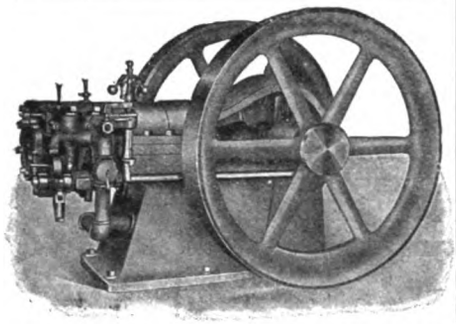
FROM DYKES CORRESPONDENCE SCHOOL OF MOTORING, St. Louis, Mo., comes a new catalog describing their practical system of teaching automobile engineering and operation by mail. The book is well illustrated, and explains the course in a very thorough manner. There are illustrations of the various working models supplied with this course, and the center pages are taken up with an illustration showing the twenty-four instruction books. To anyone contemplating the installation of an automobile garage and the repair of motor vehicles, this book will be of extreme interest. If you are at all interested in automobiles, write to Dykes Correspondence School of Motoring, 3949 Washington St., St. Louis, Mo., and ask for their catalog, mentioning THE AMERICAN BLACKSMITH.

A PATENTED COLLAPSIBLE STEEL HORSE OR TRESTLE suitable for nearly every conceivable use has recently been placed on the market by the S. M. Hildredth Co., 2 Rector St., New York City. These horses are manufactured from angle iron which makes them light, but very strong and durable. The collapsible feature is especially commendable as the legs fold up when the trestles are not in use thus making them easy to handle and convenient to store.

Description and cuts will be gladly sent to any one requesting same and mentioning THE AMERICAN BLACKSMITH.

A VERY NEAT AND ATTRACTIVE BOOKLET, which is of great interest to the craftsmen because it describes a new system of lighting, has just been issued by a very progressive company in Chicago. This new system is not only practical for lighting the shop, but also for residential use. It is contended that it is more economical than either gas, kerosene or electricity as a three hundred candle power lamp will illuminate a thirty-foot room at about one half cent per hour. All who are interested in receiving more information about this lighting system and apply to the Brilliant Gas Lamp Company, 42 State St., Chicago, Ill., mentioning THE AMERICAN BLACKSMITH will be favored with one of these booklets.

THE PRENTISS VISE CO., 44 Barclay St., New York City, the manufacturers of the "Prentiss Patent Vises," after twenty years' location at the above address are compelled to move their office and sales room to The Hardware Building, 106–110 Lafayette St., New York City, and will be settled in these new quarters after April 15th.

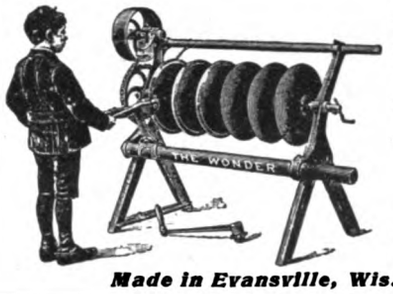


Write for booklet describing full line of Gas and Gasoline engines, from 3 to 100 H. P. Special inducements to dealers as agents.

Sold Under A Positive Guarantee.

The New Era Gas Engine Co.
No. 63 Dale Ave. Dayton, Ohio.

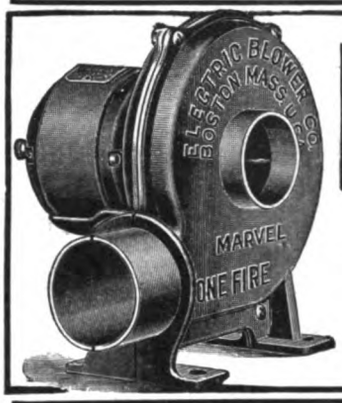
Buy the Wonder Disc Sharpeners Because



THE WONDERS are the only machines adjusted to all conditions.
Can shear any part of edge to any bevel.
Can shear back from edge as far as required.
Can use tool on either side of disc.
Can shift from one disc to another.
Can do all this without the turn of a set screw or nut, is a positive feed, automatically adjusts itself to wobbling or bent discs; knives made of best grade, self-tempered steel, will last a lifetime; for hand and power. For prices write to your jobber, or

A. E. DURNER, Manufacturer
Main Office: Evansville, Wisconsin, U. S. A.

Made in Evansville, Wis., and London, Ont., Canada





MARVEL

"One Fire" Variable Speed Electric Forge Blower

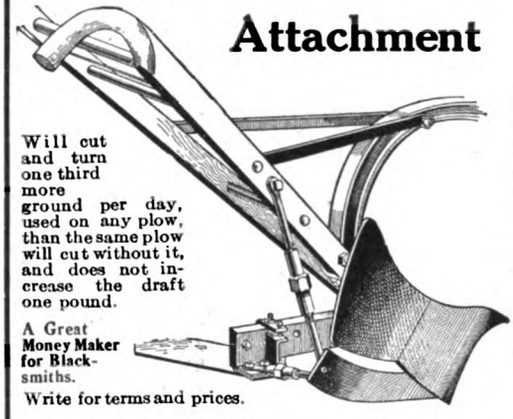
$28.00 Net

Gives 100 per cent greater air pressure than any other "one fire" outfit.

30 days' Free Trial, through your dealer.

ELECTRIC BLOWER COMPANY
BOSTON, MASS.

The COVEY Plow Attachment

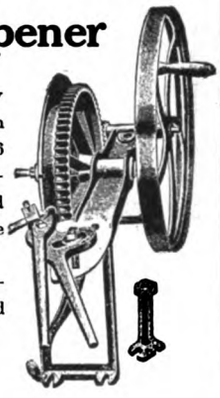


Will cut and turn one third more ground per day, used on any plow, than the same plow will cut without it, and does not increase the draft one pound.

A Great **Money Maker for Blacksmiths.**

Write for terms and prices.

Novelty Disc Sharpener



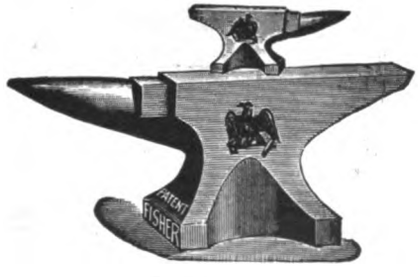
Will sharpen any size disc, from 10 inches to 36 inches, and is especially designed to sharpen large plow discs.

Every blacksmith should have one.

WALKER MANUFACTURING CO., :-: COUNCIL BLUFFS, IOWA

"EAGLE" ANVIL WORKS ESTABLISHED 1843

200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



NONE BETTER MADE
OVER 300,000 IN USE

THE ANVIL OF MANY MEDALS.

The "EAGLE ANVIL" has taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always says: "Nothing but an Eagle for me." Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few years' use.

VISES OF MERIT

The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last a lifetime.

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base.

Write for our descriptive Anvil and Vise Catalog.

Our goods are handled by reliable dealers everywhere.



PARALLEL STRONG AND DURABLE.

FISHER & NORRIS, 33-47 Fair St., TRENTON, N. J.

Carriage Makers and Repairers **Attention** Auto Repairers and Builders

L. J. Kingsley Co.

BINGHAMTON, N. Y.

have issued a catalogue each Spring until this year. There being so few changes in prices, we will delay issue until Fall, and then give you another, which will be worthy your attention. :: :: :: ::

Write for 1909 Book
The Prices Hold for 1910

MENTION THE AMERICAN BLACKSMITH



To counter the destructive influence of the sun, heat, cold, water, steam and chemicals, use "F-S" products liberally.

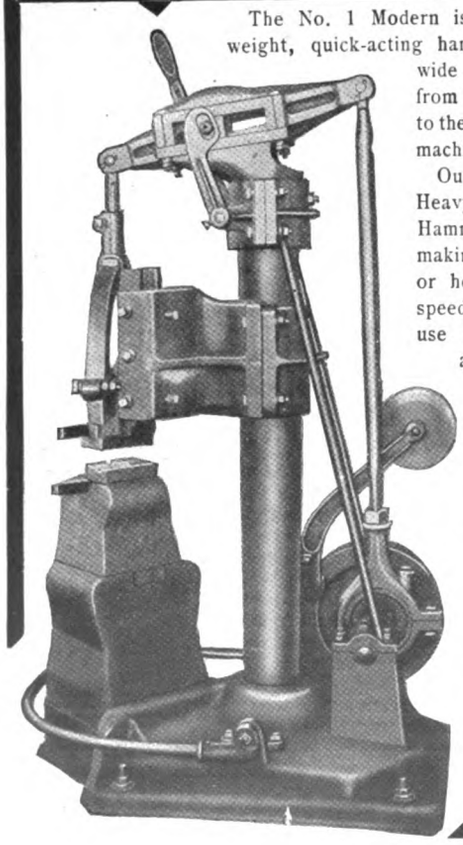
Try "F-S" Enamel Top Dressing on that particular job and note the improvement.

FELTON, SIBLEY & CO.

Manufacturers of Paints, Colors and Varnishes

136-140 N. 4th St., PHILADELPHIA

MODERN POWER HAMMERS



The No. 1 Modern is a durable, light weight, quick-acting hammer, covering a wide range of work, from extreme light up to the full capacity of the machine.

Our No. 2 Modern Heavy Basis Power Hammer, with a lever making possible a light or heavy blow at full speed, is designed for use in repair shops and manufactories.

Write us today for our book, entitled:

"Smithing Made Easy."

For Sale by All Jobbers

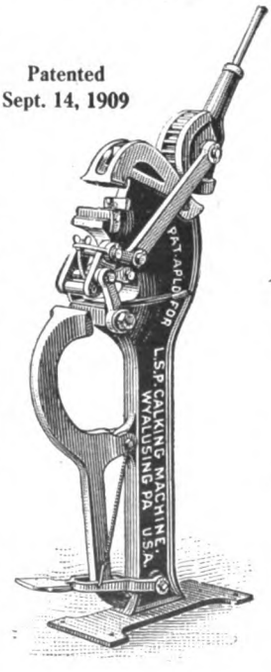
D. Ackland & Sons, Limited, Winnipeg, Canada
Agents for Canada

MODERN SALES COMPANY
Grinnell, Iowa

THE ONLY CALKING MACHINE THAT CALKS A HORSESHOE COMPLETE

Makes 25 Different Styles Heel Calks

Patented Sept. 14, 1909



The only Calking Machine that with one pull of lever makes a heel calk complete, blunt or sharp, also makes double kink for the famous block calk, or sharpens side calk, with one pull of lever, welds blunt or sharp toe calks and forms toe clip with one pull of lever, also, has a shear to cut off either end of shoe.

Works equally as well on old shoes. The machine takes up but 8 x 16 inches floor space, and stands 3 feet 3 inches high, and weighs 131 lbs. All the working parts made of a special grade of steel. Fully warranted. Write now for circulars and prices.

The L. S. P. Calking Machine is in use by the United States Government, and they use nothing but the "Best." Read what one of their men has to say about the machine:

Arlington, Va., Feb. 17, 1910.
L. S. P. CALKING MACHINE CO.
Gentlemen:—Your calking machine is all that could be desired of a machine, to calk shoes either sharp or blunt. I am using one of your machines every day, for the U. S. Government, in the Quartermaster's shop at Fort Myer, Va. It is a great labor saving machine.
Respectfully yours,
SEYMORE H. HENSON.

L. S. P. CALKING MACHINE COMPANY
WYALUSING, PA., U. S. A.

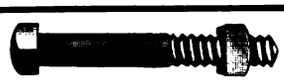
Bargains for April, 1910

Never before have we been able to offer greater inducements in brand new Tools and Supplies for Blacksmiths, Iron Workers or Wagon Makers than at the present time, and if you are now ready to buy, here is an opportunity to save 30 to 50 per cent on clean, fresh, new stocks. We buy these goods from

Receivers', Sheriffs' and Manufacturers' Sales

We guarantee absolute satisfaction on any of the following items. Will ship same C. O. D. upon receipt of a 25 per cent deposit. You can pay the balance when the goods arrive at your railroad station. If not found satisfactory we will return your deposit and pay freight both ways. Certainly this is a fair offer. Send us at least a trial order and be convinced. If you buy from us once, you will trade with us often.

Bolts 2¼c lb.



About 10 tons brand new Machine and Carriage Bolts, all in first class condition, various sizes mixed together, ranging from ¾ to 1 inch diameter and from 2 to 10 inches long.

Price in lots of 25 to 100 lbs..... 3c per lb.
Price in lots of 100 to 500 lbs.....2½c per lb.
Price in lots of 500 lbs. or more .....2¼c per lb.

Plow and Tire Bolts

All brand new Bolts from a jobber's stock, mixed together in various sizes, diameter from 3-16 to 5-16 inch and lengths from 1¼ to 2½ inches. Absolutely brand new and in first-class order.

Special prices, while they last, as follows:

Mixed Plow Bolts, 25 lbs. or more..... 2c per lb.
Mixed Tire Bolts, 25 lbs. or more ..... 2½c per lb.



Double Geared Tire Bender

First Class Tool in every detail.

Lot No. 4-A-110.

Will bend 5 in. tire or smaller to circle 24 in. in diameter or larger.

Price.....$6.75

Ball Bearing Grindstones, $2.95



Lot No. 4-A-1266.

Strongest and easiest running grindstone on the market.

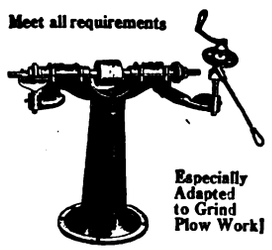
Frame made of angle steel. Ball bearings on journals and cups.

60 lb. stone, 22x2½.

Weight, complete, 85 lbs.

Price $2.95

$25 Emery Grinder, $14.25



Made for general shop work and grinding plows. Note Disc Grinding Attachment shown on right hand.

Dimensions—Height, 30 in. Base, 18 in. Arbor, 36 in. Shaft, 1¼ in. Collar, 3½ in. Bearings, 1½x8 in. Pulley, 4x4½ in. Weight, 190 lbs. Will carry wheels 14x3 in.

Lot No. 4-A-591.

Price with two rests $14.25
Extra for Disc Grinder Attachment, add.. 3.00

Horseshoes $3.00



Brand New Horseshoes made by the Eagle Horseshoe Company. Absolutely new and in first class order. Stock consists of

25 kegs.....No. 0
22 kegs.....No. 1
Lot No. B-2580.

Price per 100 lb. kegs.....$3.00

Structural Steel 1½c. Lb.

Over 10,000 tons of Angles, Channels, Tees, "I" Beams, round, square and flat Bars, all first class stock, standard sizes and lengths, at 1½c per lb. and up.

You must send us a list of your wants in merchant or structural steel, for prices that will mean a big saving to you. We can also furnish pipe, cut to specifications, at less than mill prices.

Mail orders accepted for any item quoted on this page

Green River Screw Plates, $7.96



Quality of Green River Plates is unquestioned. Make a perfect thread with a single cut; dies are adjustable.

Our Lot No. 4-A-346. 5 each, Taps, Dies, and Guides, complete with tap wrench and stock, in hardwood case. Cuts ¼x20, ⅜x16, ½x12, ⅝x11 and ¾x10 threads.

Our price, complete.....$7.96

Advance Self Feed Drill, $15



For Belt or Hand Power. Will drill 1 1-4 in. hole to center of 18 in. circle. Has special automatic feed device, located back of spindle. Has cam arrangement so as to give continuous feed. Stands heaviest service, yet is simple in construction, with a very few parts.

Dimensions—Height, 50 in. Table, 11 in. diameter. Gear Wheels, 8 in. Spindle, 1¼ in. Run of Spindle, 3 in. Size Column, 2 in. Greatest Spread of spindle to table, 16½ in. Spindle bored for ½ in. rounk shank drills.

Lot No. 4-A-34.

Weight, 190 lbs.

Usually retail at $25. Our Price, ...$15.00

Premier Wrought Anvils 5c. Lb.

Lot No. 4-A-115.

Best in quality, form and finish. Steel face is a solid piece planed smooth after welded.



Absolutely Guaranteed

Weight.	Price lb.	Weight.	Price lb.
150 to 200 lbs.	5c.	70 to 79 lbs.	10½c.
120 to 145 lbs.	9c.	60 to 69 lbs.	11c.
80 to 119 lbs.	9½c.	50 to 59 lbs.	12½c.

Horseshoe Nails 5c. Lb.



Lot No. 4-A. B.-96.

2,000 boxes of Bay State cold rolled Horseshoe Nails, made of best Norway Iron, sizes, 7, 8, 9 and 10.

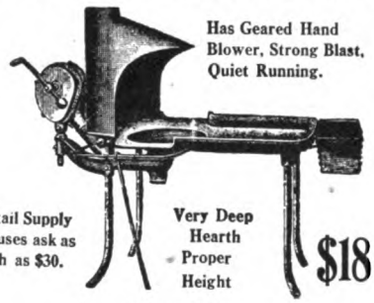
Price in bulk, 25 lbs. to box, 5½c. lb.

Or in 5 lb. cartons..... 7½c. lb.

Queen City Special, cold rolled Horseshoe Nails, sizes, 7, 8, 9, put up 25 lbs. bulk in a box, price per lb..... 5c.

"Bonanza," forged and pointed, warranted Horseshoe Nails, made of best Swedish stock, sizes, 7, 8, 9, put up in bulk, 25 lbs. to box, price per lb..... 6c

Your Favorite Forge, $18.00



Dimensions

Height, 30 in.; size of hearth, 31x53 in.; diameter of fan, 18 in.; weight about 290 lbs.

Lot No. 4-A-459. Price, with Water Tank, as shown $18.00

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Chicago House Wrecking Co., Chicago.

I saw this ad in AMERICAN BLACKSMITH.

Send me your Mammoth Catalog free of any expense.

I am interested in.....

Name .....

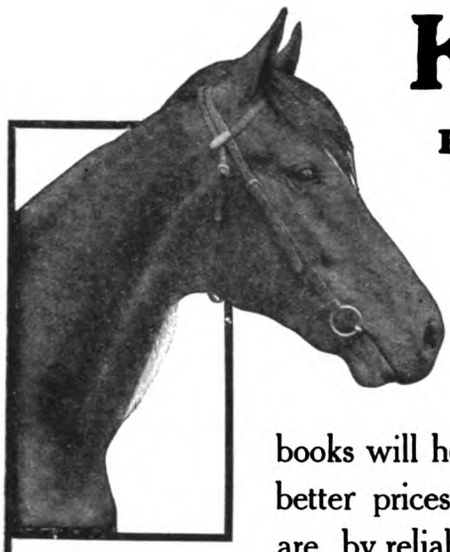
920 Town .....

Co..... State .....

Am. Blk. April, 1910.

CHICAGO HOUSE WRECKING CO.

35th and IRON STREETS, CHICAGO, ILL.



Know Your Trade

FROM

Head to Foot



IN these days of competition it's the man who knows that gets the "plums"—the big prices. These books will help you to know your trade better, to get better prices and to branch out into other fields. All of these books are by reliable authorities and are offered at such reasonable prices that you cannot afford to do without them.

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American Blacksmith Company

BOOK DEPARTMENT

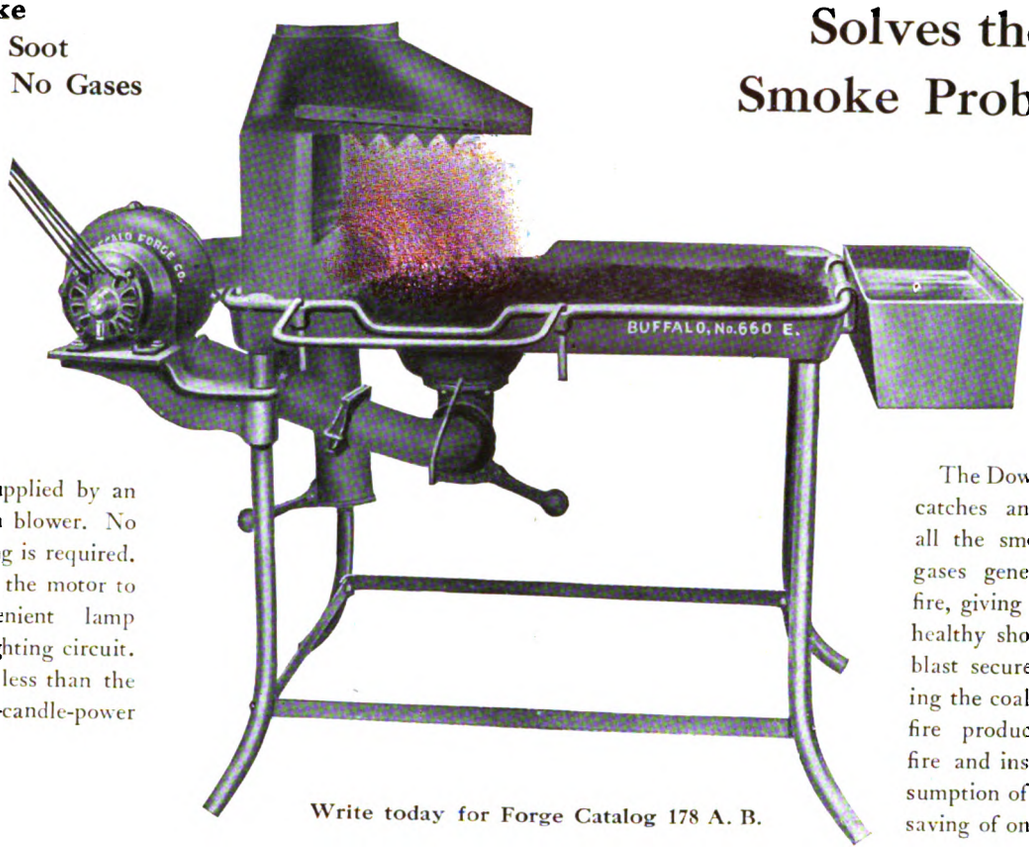
P. O. Box 974 **Buffalo** **N. Y., U. S. A.**

Buffalo Down Draft Forge

660 E

No Smoke
No Soot
No Gases

Solves the Smoke Problem



The blast is supplied by an electrically driven blower. No complicated wiring is required. You just connect the motor to the most convenient lamp socket on the lighting circuit. Cost of power is less than the cost of a 16-candle-power lamp.

The Down Draft Hood catches and carries off all the smoke, soot and gases generated by the fire, giving you a clean, healthy shop. The hot blast secured by returning the coal gases to the fire produces a hotter fire and insures full consumption of fuel, with a saving of one third.

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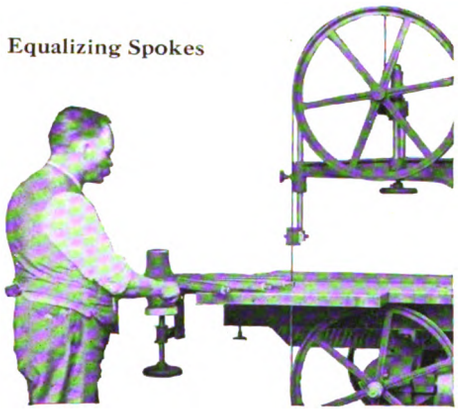
Crain Combination Woodworker

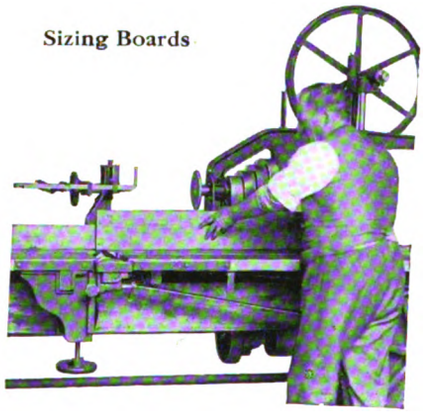
Twelve Machines in One

Equalizing Spokes



This machine combines in one compact machine the operations possible on the following individual machines: Lathe, Boring Machine, Drill, Band Saw, Rip Saw, Cross Cut Saw, Planer, Sander, Sizer, Equalizer, Shaper, Tenoner. This is done without removing a part—all that is necessary is the insertion of the proper tool, as on any individual machine.

Sizing Boards



Write for Special Woodworker Catalog 178 A. B.

Buffalo Forge Company
Buffalo, N.Y.

—BOTH—

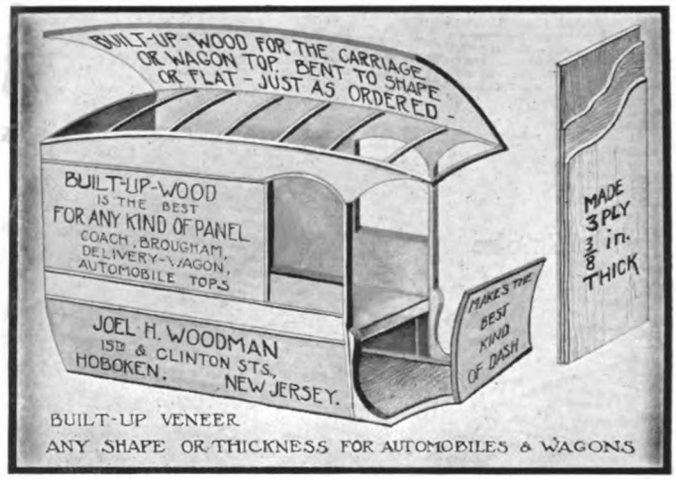
EVEN AND OVER-SIZE THREADS

cut with each  set of dies

That is one thing that can be done with a "Duplex" Die Stock. Learn of the further points of difference between it and others.

THE HART MFG. CO.

50 Wood Street CLEVELAND, O., U. S. A.



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BUGGIES, TRUCKS AND WAGONS

118 and 120 S. Eighth Street.

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BUFFALO FORGE CO., Buffalo, N. Y.

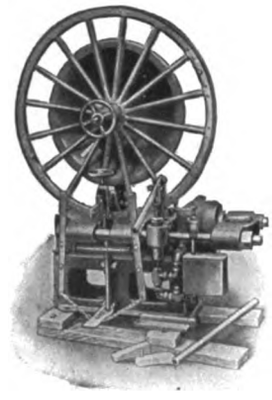
Gentlemen:—The Crain Combination Woodworking Machine which we purchased from R. W. Norris & Sons, Baltimore, Md., last September, has proven very satisfactory.

We have put this machine to very severe tests, and it has always done the work. It is a wonderful addition to our shop, being of such great help to us upon heavy work.

Yours very truly,

A. MEYER'S SONS.

See page 47.



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for a blacksmith is a

Scientific Hydraulic Tire Setter

Write for catalog and prices to

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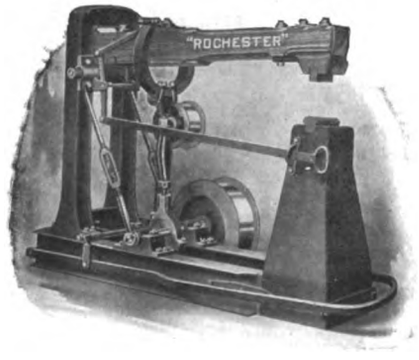

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Forging dies set crossways of helve. Welding dies set lengthways.

The best hammer made for general work, and a dandy Tire Welder.

MADE IN SIX SIZES

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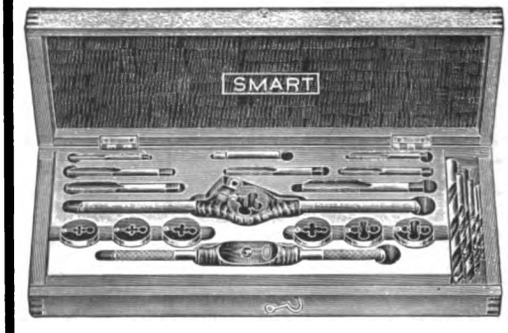

Strong, Easy Cutting Durable Screw Plates

FULL LINE OF HIGH QUALITY SCREW CUTTING TOOLS

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FIRST MADE IN AMERICA

HAY-BUDDEN SOLID FORGED ANVILS

A LONG STEP FORWARD

SOLID FORGED STEEL TOP
Welded to a
SOLID FORGED BASE
Making a
SOLID FORGED ANVIL

The Gold Medal Anvil

HIGHEST AWARD
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OVER 150,000 IN USE

The ENTIRE TOP being one piece of high grade FORGED STEEL makes a LOOSE FACE IMPOSSIBLE.

TEMPERED "JUST RIGHT".

By our own process, the weld at the waist is a LASTING UNION.

Experience has proved their worth and demonstrated that "HAY-BUDDEN" Anvils are Superior in Quality, Form and Finish to any others on the Market.

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VOLUME 9

NUMBER 8

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO
N.Y. U.S.A.

MAY, 1910

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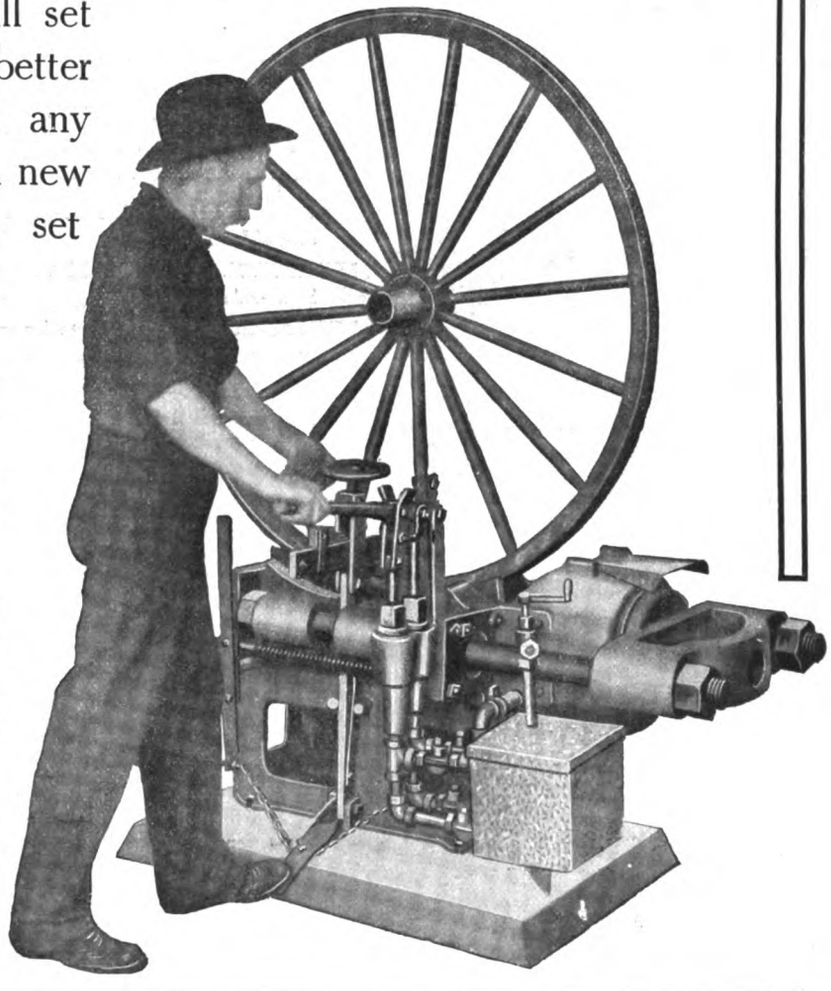
Can be Done Quicker and Easier With a Scientific Hydraulic Tire Setter

You should investigate this machine before you buy a tire setter, because the Scientific will set tires in less time, is built of better material, and will outlast any other machine made. A new attachment enables you to set perfectly wide, thin tires, tires worn oval or to a thin edge, channel tires, or thin buggy tires on painted wheels without marring the tires or felloes in the least. **No other Grip Machine will do this work.**



Write for our circulars and our **warranty that the Scientific will** do all we claim, or you do not have to pay for it. Sold by **leading jobbers everywhere.**

National Hydraulic Tire Setter Company

Keokuk Iowa

THE SILVER MFG. CO.

365 BROADWAY SALEM, OHIO.



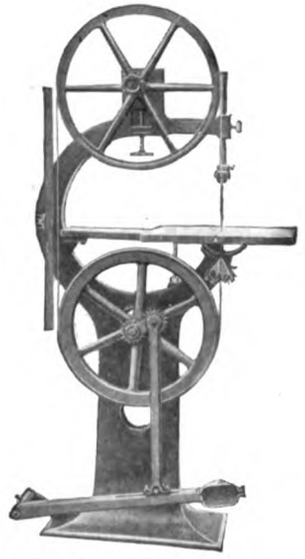
SILVER'S NEW JOINTERS

Five Sizes—8, 12, 16, 20 and 24 inch. New "patent applied for" features.



SILVER'S SAW TABLES

Send for circular of Saw Tables and Swing Saws.



NEW PLANETARY BAND SAW

20-inch Foot or Combination.

Silver's High Quality Money Making Tools for the Blacksmith.



Silver's New Swing Saw. Four Lengths.

Did you see the illustration of our large new Plant in the March issue? Housed in that ample structure we have tens of thousands of dollars invested in the very latest and most improved machinery in the market. Machinery that cuts down the manufacturing cost of our tools in every department from the pattern room to the shipping room. It enables us to produce the best tools at less money and—you get the benefit.

While you are thinking of installing that new machinery that will cut down **Your** labor and **Your** expense, drop a card for our beautiful, illustrated "1910 Machinery Catalog," and investigate for yourself.

Don't put this off. Send today for our

1910 MACHINERY CATALOG.

or for any of the following booklets:

BAND SAWS AND JOINTERS—describing 20" Band Saws for foot or belt power or combination; also 26, 32, 36-inch Power Band Saws with new features; also five sizes of Jointers.

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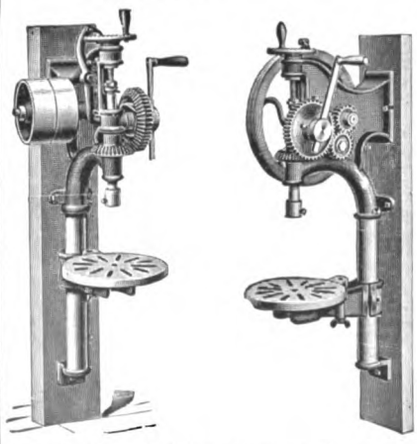
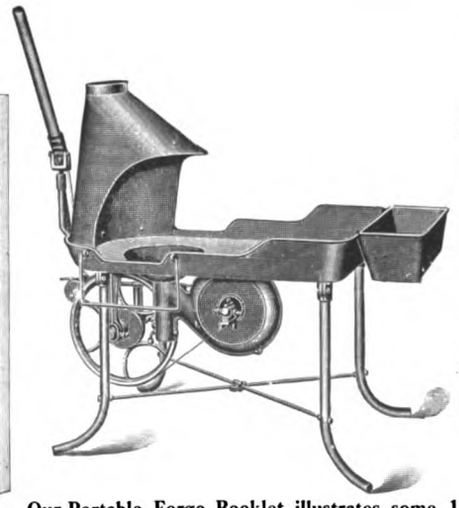
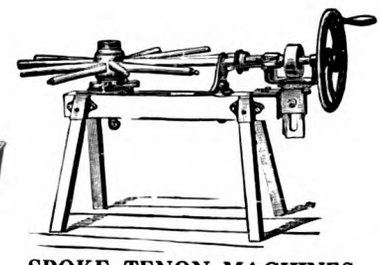


Our Booklet, "Drilling Machines", illustrates 22 kinds we make.



Our Portable Forge Booklet illustrates some 14 kinds. We have a size to suit your needs. Strong and durable. Attractive designs.



SPOKE TENON MACHINES

in Seven Sizes. Fitted with Star Hollow Auger.



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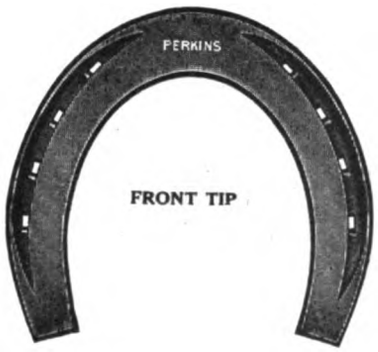
Look for this Trade Mark ★ The Star brand beats all others



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FRONT STEEL COUNTERSUNK

★ PERKINS ★

HORSE SHOES

AND

TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



FRONT TOE WEIGHT



HIND SIDE WEIGHT

Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

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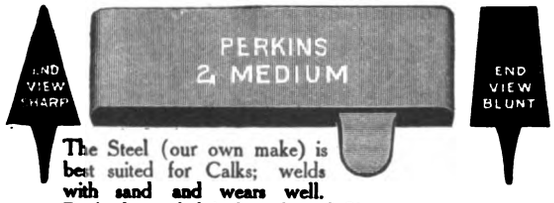
PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

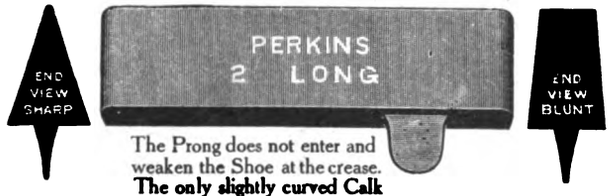


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

Why Do You Send Your Children to School?

It's because **YOU** want them to be ABLE to meet COMPETITION and **WIN** in the struggle of LIFE—and be a **SUCCESS.**

Perhaps YOU and I only learned "reading 'riteing and 'rithmatic." You and I realize THIS is the day of PROGRESS. The three "R's" are not enough for the CHILDREN.

You and I KNOW the children must be well EDUCATED so as to be READY for any OPPORTUNITY. Perhaps YOU and I KNOW from EXPERIENCE what the LACK of an education means, and think WHAT we MIGHT have done if we had had it.

Therefore, YOU and I are giving OUR children every advantage we can in the way of EDUCATION, which is but another name for LIFE EQUIPMENT, or **MENTAL MACHINERY,** if you please. Are these not FACTS?

It's nothing but right, THEIR RIGHT to ask it, and OUR DUTY to do it! And, after awhile, it will prove the BEST and HAPPIEST investment we ever made.

THEIR success will richly repay US for all the sacrifices their EDUCATION cost us.

But I am not trying to PREACH, nor am I "drumming" for a school.

I am after that "almighty dollar" and sweating for it—just like YOU are.

YOU need more of them. So do I. BOTH of us can get them IF YOU WILL STUDY THIS PICTURE



While it's too late for YOU to go to school and get the **MENTAL MACHINERY** your child will get, YOU can get the **MACHINERY** I "dug" out of the school of "HARD KNOCKS and EXPERIENCE" and BOTH of us will be profited!

You know that EVERYTHING is high?

Prices "out of sight and still a-climbing."

But YOU have "GOT TO REACH THE APPLES."

YOU know that YOUR prices are TOO LOW COMPARED WITH THE "APPLES" YOU ARE **"COMPELLED"** TO BUY!

YOUR pole is simply too short and YOU know it! What are YOU going to do about it?

YOU say you cannot RAISE your prices on account of the "other fellow" and his COMPETITION. YES, THERE IS A WAY!

Get AHEAD of your competitor by putting in MY **MACHINE** and **INCREASING YOUR EARNING POWER TEN TIMES AT THE SAME PRICES.**

YOU can do TEN times the work, get ten times the PAY, do it TEN TIMES easier and do **BETTER** work than by hand.

YOUR prices are the SAME, but YOUR EARNINGS ARE INCREASED TEN TIMES!

YOU equip YOURSELF to meet the **CONDITIONS that confront YOU,** the same as you see YOU must equip **YOUR** children to meet the CONDITIONS WHICH WILL CONFRONT THEM!

YOU and I love our children, but should we not love OURSELVES just a little bit?

Don't YOU and I owe OURSELVES anything; not to mention the good MOTHER who SURE has done more than her part?

YOU SEE WHAT YOU NEED!

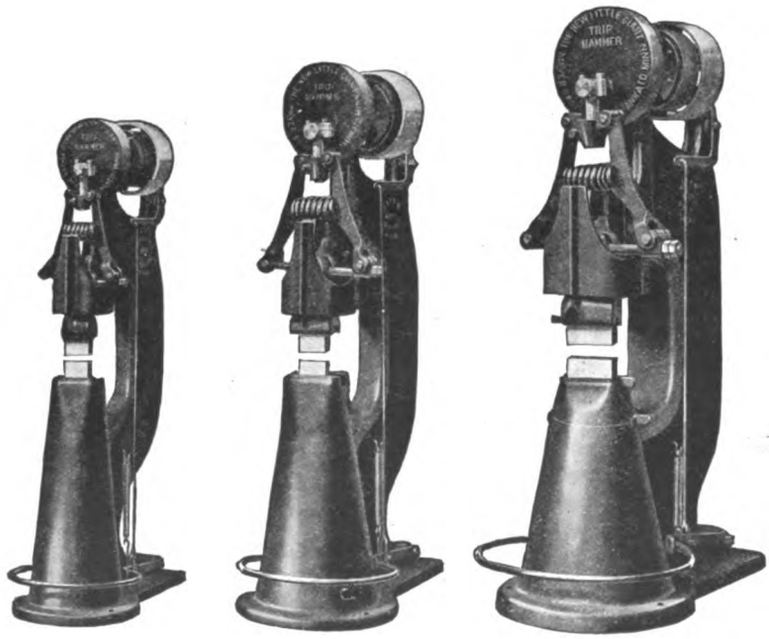
BEST of all, it will require no sacrifice or denial on your part. All you need is the "FAITH" to put the machine in your shop and it will not only pay for itself by its "WORK," but help YOU foot the bills for the children.

Just reach out and get the "machinery pole" behind the apple tree.

MAYERS TIRE SETTER MANUFACTURING CO.
4028-30 Forest Park Boulevard, St. Louis, Mo.

Henry Mayers

The New Little Giant Power Hammer



Stands for what is best in design, material and construction. It does THE WORK efficiently and quickly and is always under perfect control.

This high degree of perfection in Power Hammers is the result of fifteen years' experience.

Made in three sizes:

25 lb. 50 lb. 100 lb.

Suitable for forging material up to 5 in. in diameter.

Will do anything and everything that can be done on Power Hammer.

Recommended by over 3,000 satisfied users.

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Are the best. More uniform. Better material. Easier to fit. Try them. Be convinced.

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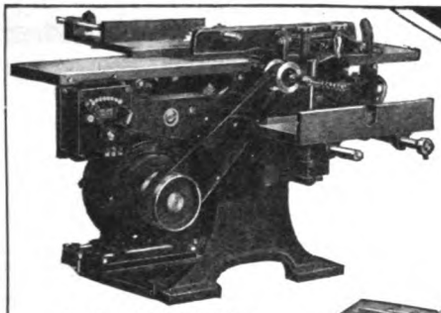
FOR THE WOOD WORKER

CRESCENT



Variety Wood Worker.

Crescent machines give such absolute satisfaction that we have difficulty in getting the machines out fast enough to supply the demand. The machines are saving money for the owners of just such shops as yours, and they will enable you to do a lot of work that now goes to your competitor.

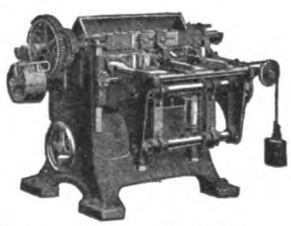


Five Sizes Band Saws.



Five Styles Saw Tables.

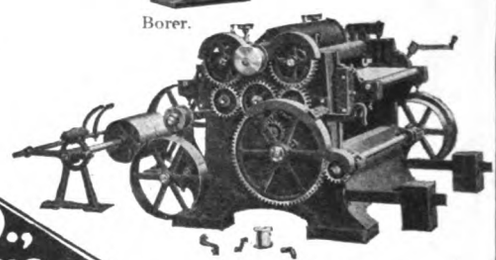
Send for a catalog today, giving complete description and telling about our fine line of Band Saws, Saw Tables, Shapers, Planers, Planer and Matchers, Borers, Disk Grinders, Pole Rounders, Variety Wood Workers.



Planer and Matcher.



Borer.



Three Sizes Planers.

CRESCENT

THE CRESCENT MACHINE CO.,
245 MAIN ST., LEETONIA, OHIO.

A Pole, Tongue and Shaft Rounder for Wagon Makers and Blacksmiths

The "FAMOUS" Universal Woodworker does the work of twelve machines. Do you fully realize what this means? Besides being a Pole, Tongue and Shaft Rounder, it can be converted into a Felloe Rounder—or ten other machines—at will.

Every wagon maker needs a "FAMOUS" Universal Woodworker—as a duty to his business. For every wagon maker has need of more than one machine; we offer him twelve—at the price of one. He simply changes the machine to do either of the twelve varieties of work.

Consider that, in this case, you have only one machine and one investment. There's no wasted factory space, no wasted power, no capital tied up in idle machines, no need of a great quantity of shafting, pulleys and power transmitting equipment.

The "FAMOUS" Universal Woodworker

Here's a proposition that every wagon maker and blacksmith should be interested in. The illustration shows the No. 14 "FAMOUS" Universal Woodworker being operated as a Pole, Tongue and Shaft Rounder. This attachment sets right on the table, cut being made off the main jointer head. You pull the tables back far enough to allow the attachment to drop in between them, push them up tight, adjust the tables up and down for the depth of cut you desire. That's all. The machine is then ready for operation. The attachment can be placed on and taken off the machine in a remarkably short space of time, without any trouble whatever.

You ought to have the catalog. It explains the construction of this wonderful machine in detail and is free upon request. Send for it today.

THE SIDNEY TOOL CO.,

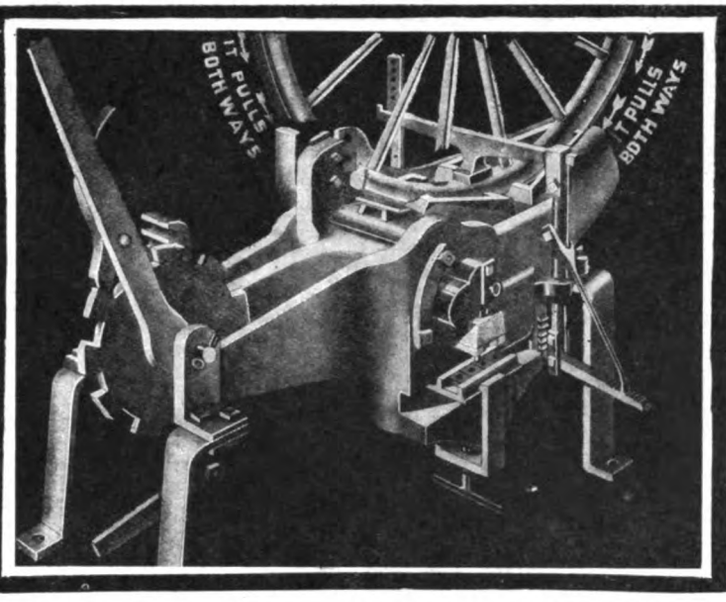
SIDNEY, OHIO.



Send for Catalog and Details of Special Offer

Ask us about our special "30 day" proposition. It's a good offer and you ought to be posted.

THE HOUSE COLD TIRE SETTER



WILL MAKE MORE MONEY FOR YOU

NOT ONLY THE BEST

BUT ALSO THE CHEAPEST

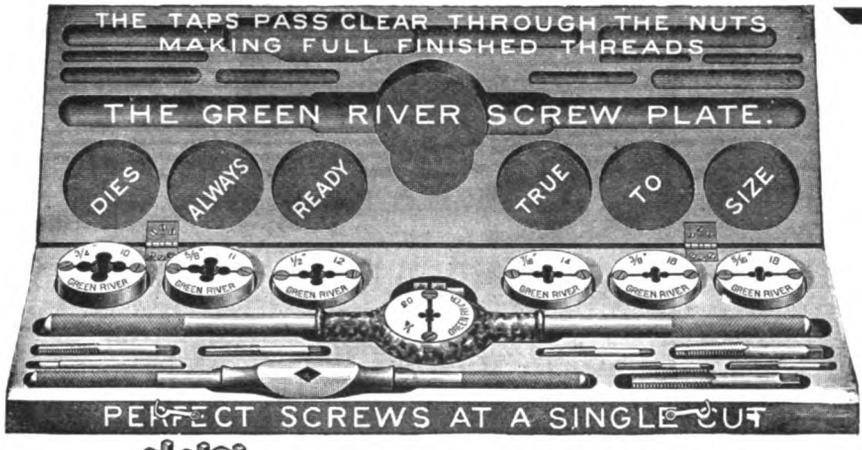
TAKE NOTICE—You Can Have Our Machine in Your Shop

and see for yourself that it does the work just right before you are required to pay a cent on it. We don't ask our customers to take any risk, we take it all. You have no cause to hesitate, even if you know nothing about cold tire setters, or have heard bad reports on them, for we give you a chance to see for yourself. ***Do You Want to Build Up Your Business and Make Money?*** It saves you full time of one man and three quarters of another and you don't keep your customers waiting. So don't try to get along without it, and don't buy any other until you have tried ours, as it costs you nothing.

Write for our reduced prices and terms.

Now is the time to buy and get it advertised in time for the season's work

HOUSE COLD TIRE SETTER CO., 216-218 S. Third Street, St. Louis, Mo. J. F. HOUSE, 201 Church St. Toronto, Ont., Canada.





Green River Taper-Pin Reamers



Set for Automobile Kits.
Case has Screw Cover.

GREEN RIVER AND LIGHTNING Screw Plates, Taps and Reamers

FOR

Automobile Repairers

Taps and Dies conform to the A. L. A. M. standard.

Standard Taper Pin Reamers.

Send for Catalog 34D and prices.

Sole Makers

WILEY & RUSSELL MFG. CO.

Greenfield, Mass., U. S. A.



Sterling Hoof Pads

These pads are about as much better than the old style leather backed pads as those are better than none. Our pad is one smooth, solid piece of rubber. The calk is vulcanized onto the back and stays there. The entire pad is perfectly impervious to water, and will keep horses' feet in better condition than is possible with wet and soggy leather, which contracts and expands with varying conditions of moisture and temperature.

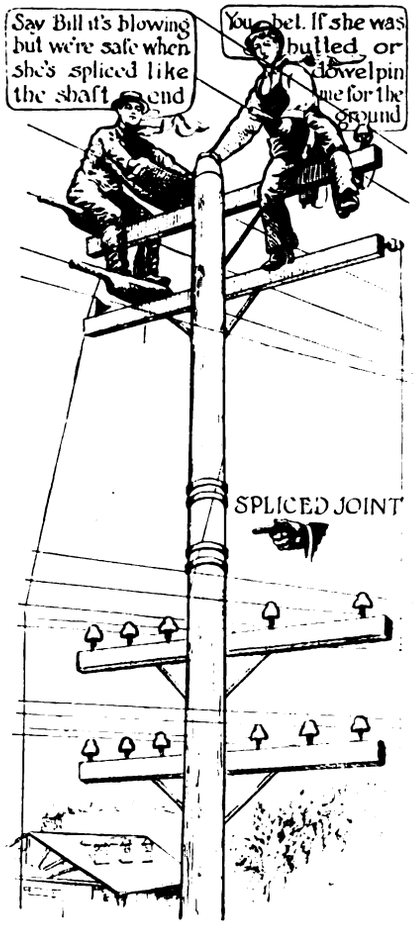
The construction of these pads is our own device and invention and is fully protected. There is and can be no adequate substitute.

Prices about the same as for leather backed pads. Dealers are requested to write for discounts and open territory.

Trade Mark

Manufactured by

Rutherford Rubber Co. :: Rutherford, N. J.



The Original and Reliable

Spliced Joint Shaft Ends

Give Perfect Satisfaction

They are the only kind that do, for these reasons:

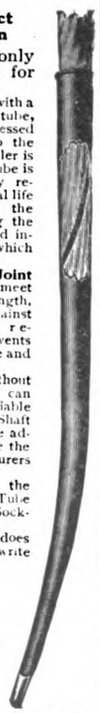
They are made with a double reinforced tube, the inner being pressed and crimped into the outer; the wood filler is inserted after the tube is enameled, thereby retaining the natural life and strength of the wood and allowing the tube to be enameled inside and out, which avoids rusting.

The Splice Joint where the wools meet adds great strength, guarantees them against breaking where repaired, and prevents them working loose and rattling.

No Shaft End without this construction can possibly give reliable service. No other Shaft End can have these advantages, as we are the original manufacturers and patentees.

Insist on having the original Double Tube Splice Joint Steel Socket Shaft Ends.

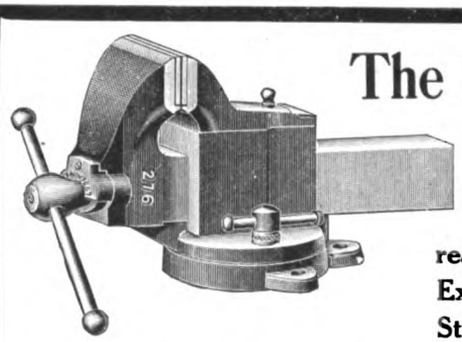
If your jobber does not have them, write us.



Cut showing Splice Joint.

STEEL SOCKET SHAFT END COMPANY

Cleveland, Ohio, U. S. A.



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Always ready for use. Excel in Strength, Durability, Finish

38 Styles, for all purposes and in size to suit

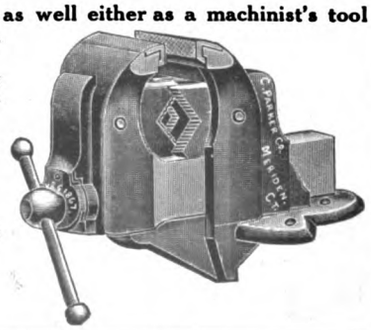
Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings

This is our Best Combination Vise

Can be used equally as well either as a machinist's tool or for holding pipe. A very satisfactory tool.

Our latest catalog mailed free on application.



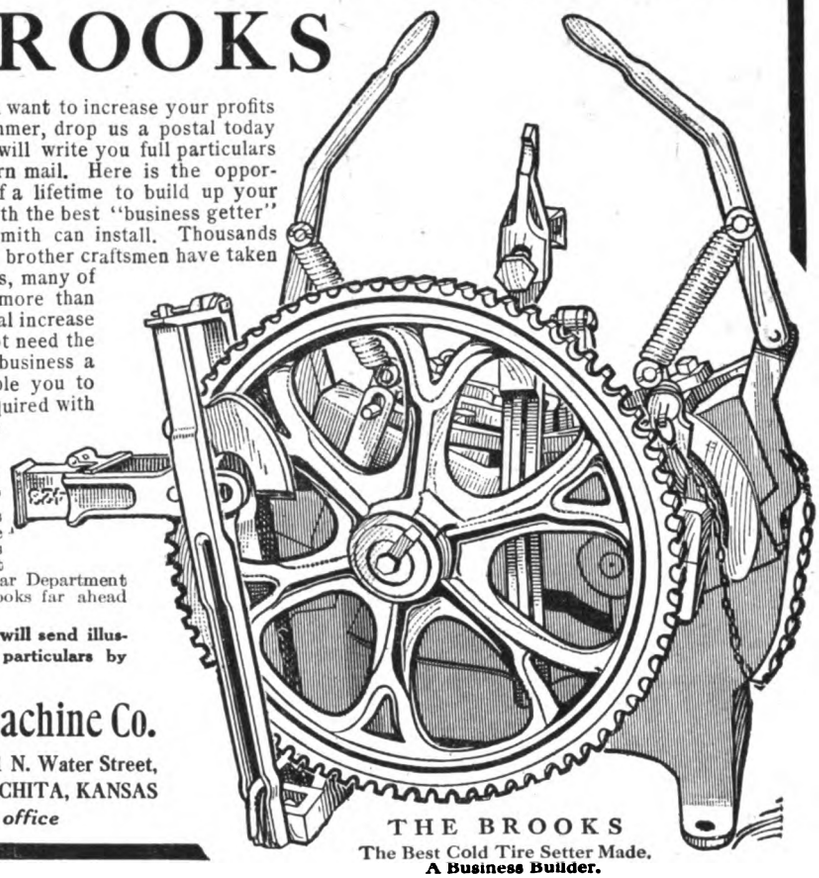
The Chas. Parker Co.

Meriden, Conn.



Your Credit Is Good For A BROOKS

If you want to increase your profits this Summer, drop us a postal today and we will write you full particulars by return mail. Here is the opportunity of a lifetime to build up your trade with the best "business getter" a blacksmith can install. Thousands of your brother craftsmen have taken our advice and they are now getting excellent results, many of whom have written us that their tire setting business more than doubled during the first sixty days, and that a substantial increase was noticeable in all other lines of work. You do not need the ready cash to make this purchase, as the increased business a BROOKS will bring to your shop will more than enable you to meet the monthly payments we require. No money required with your order; simply write us that you want a machine and we will help you to get it.



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The Best Cold Tire Setter Made.
A Business Builder.

OUR IRON-CLAD GUARANTEE

The Brooks is backed by an iron-clad guarantee—just as strong as we can make it—so you are assured of getting the best cold tire setter made. The Brooks is built for business and will last a lifetime. The United States Government has adopted the Brooks and uses a large number in the War Department and Agricultural Schools. Our Government finds the Brooks far ahead of the old hot process.

Drop us a postal today. We will send illustrated Catalog and write full particulars by return mail.

The Brooks endorsed and used by the United States Gov't

The Brooks Tire Machine Co.

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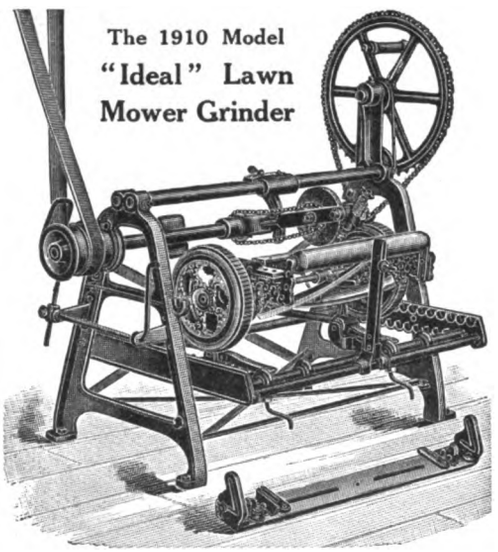
Write to nearest office

"You Grind It As You Find It"

THE 1910 MODEL OF THE "Ideal" Lawn Mower Grinder



grinds the Reel Knives to fit the straight blade, even if the latter is bent and out of shape—something never done before, and the most important feature of Lawnmower sharpening. Has 5 in. ball-bearing grinding wheel, ground and polished shaft, babbited bearings, twice as easy running as any other. Grinds either right or left hand Mowers perfectly in 15 minutes, without removing ratchets or wheels. We are the originators, and seven years' experience has shown us how to make them perfect.

Send for circular giving full information and prices. **Write Today.**

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Successors to The Root Brothers Co.
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FOR OUR NEW

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Please send me a copy of your new 1910 NET PRICE CATALOG.

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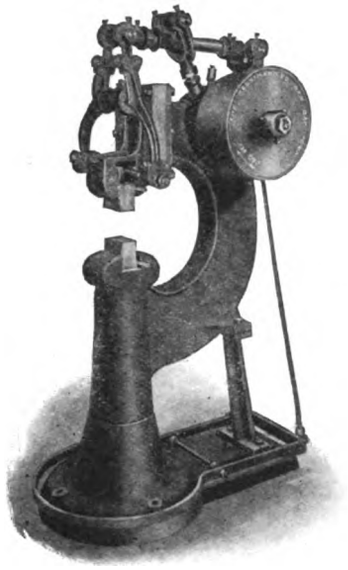
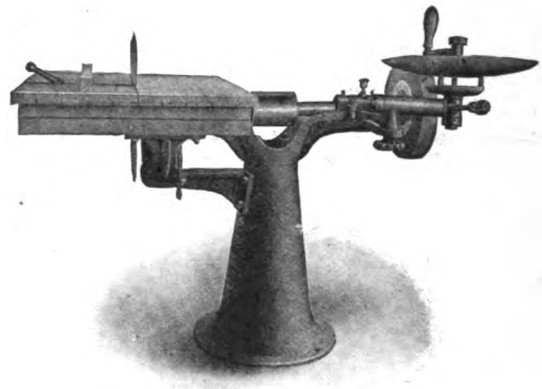


10 DAYS' FREE TRIAL OFFER

applies to our selling proposition below. You have nothing to lose—and will see that the **KERRIHARD POWER HAMMER *simply must be as is claimed for it,*** or we could not take so long a chance. You have 10 days in which to prove our guarantee and claims. Could any fairer, more utterly reasonable offer be made by any one?

THE PROPOSITION

Send us $60 (***which will be held in trust by us for the trial period of 10 days***), for which we will ship you, via shortest possible route, one of our 1909 Models, which is the standard of the world. You test out the hammer in any way you wish; do all your plow, shovel, drag-tooth work and welding—abuse it if you wish—then, when you are satisfied, either keep it or send it to us and receive by return mail the full purchase price.



You lose money to wait. Now is the time to get ready for the Spring business, which will increase from the day you install one of our clever Hammers. **Order today.**

Hammer and Grinder Department

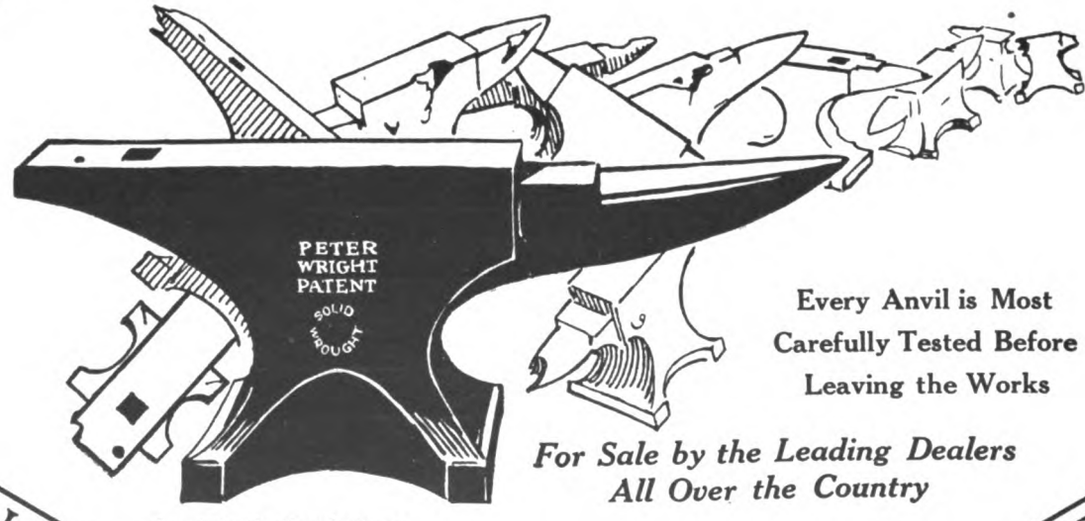
THE KERRIHARD COMPANY

RED OAK **IOWA** **U. S. A.**

PETER WRIGHT PATENT SOLID WROUGHT

WRIGHT'S ANVILS

"WRIGHT'S ANVILS OUTLAST ALL OTHERS"



Every Anvil is Most Carefully Tested Before Leaving the Works

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86 Labor-Saving Tools



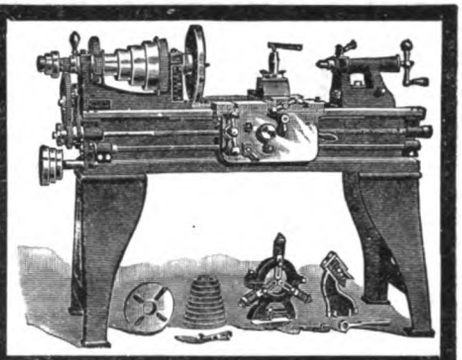
No. 81 Our Pride No. 81 Ball Bearing Hoof Shear
12 inch 14 inch
BALL BEARING JOINT
Interchangeable Blades
Drop Forged

No. 4 Weights 1¼ to 3 lbs.
MAUD S
ROUNDING HAMMER
Swings Just Right
Drop Forged

Our Tools are tempered in PLAIN COLD WATER and can be redressed and retempered by any practical man.

CHAMPION TOOL CO.
Dept. A. MEADVILLE, PENNA.

Built for Business



Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high grade, low priced lathe for Automobile builders, repair shops, and general jobbing shops.

Investigate its Merits

WRITE FOR

Catalogue of Lathes, Tools and Supplies.

The Sebastian Lathe Company,
124-126 Culvert St., Cincinnati, Ohio.

"MORSE" TOOLS



Prominent among them are

"MORSE" DRILLS

fitting the different presses made especially for blacksmiths' use. Shanks are furnished round or flattened for set screw, as desired.

None Better. A Trial Is Proof.

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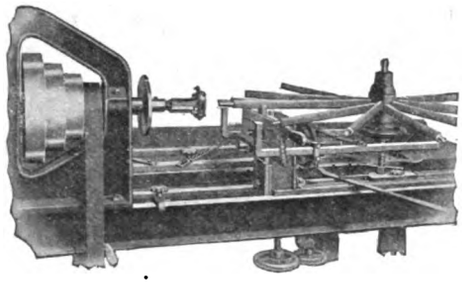
Morse Twist Drill & Machine Co.
NEW BEDFORD, MASS., U.S.A.

Crain Combination Woodworker

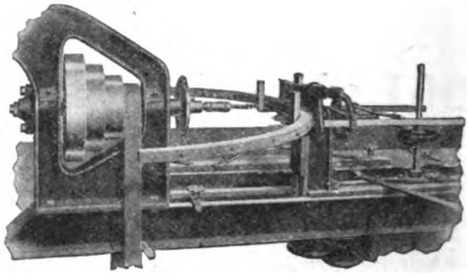
Twelve Machines in One



Tenoning Spokes

You will readily see from the four operations here illustrated that this is just the machine for the smith.

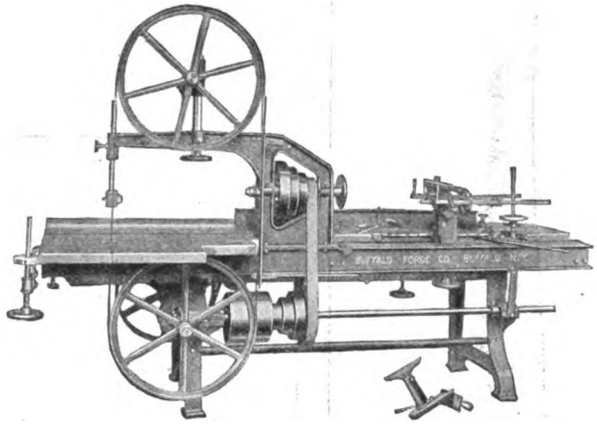
It confines in one machine all the woodworking tools he requires.



Boring Rim

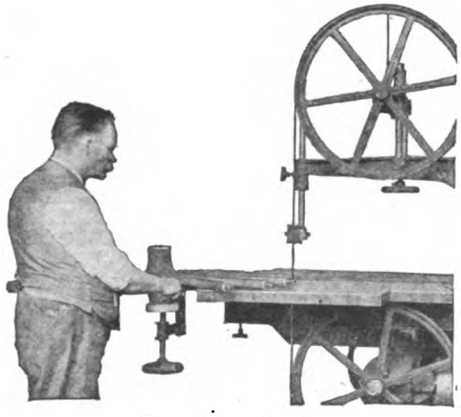
Tenoning Spokes—The wheel post on the boring table is adjustable to any angle or height required to give the wheel the right dish. An adjustable stop halts the carriage at the right point, so that the spokes are tenoned equally and a true wheel insured.

Equalizing Spokes—The band saw table is provided with a wheel post, adjustable to the diameter of any wheel. The spokes are thus uniformly equalized after they are mounted on the hub.



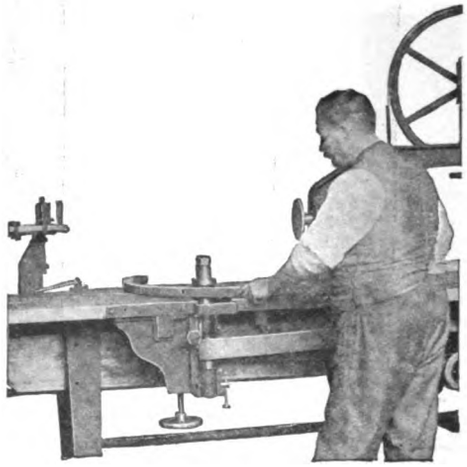
Boring Rims—The boring table can be raised or lowered to bring the work to the desired height for boring. This table is equipped with clamps to hold the work firmly in place; so rims are always bored on the true radial line to the center of the wheel.

Rounding Rims—The planer head is adjustable to any position from horizontal to vertical. This arrangement provides a quick and easy way to uniformly round the rims of wheels or do any other irregular work.



Equalizing Spokes

This machine combines in one compact machine the operations possible on the following individual machines: Lathe, Boring Machine, Drill, Band Saw, Rip Saw, Cross Cut Saw, Planer, Sander, Sizer, Equalizer, Shaper, Tenoner. This is done without removing a part—all that is necessary is the insertion of the proper tool, as on any individual machine.



Rounding Rims

Write for Special Woodworker Catalog 178 A. B., Sec. H.

Buffalo Forge Company
Buffalo, N.Y.

Four-fifths of a Blacksmith's Troubles



come from a faulty fire. How does ***your*** fire burn? Is it sometimes hot and sometimes not? Does it come up very fast and then lose its heat? Is the red flame edged with blue? Is the coke formed dark-colored and crumbling? Do you have trouble making good solid welds? Then-

You're Using the Wrong Coal

Try these simple tests on the coal you are now using:

1—Take several pieces the size of your fist and crack them open. If little white scales or brown deposits appear between the layers, they are sulphur. It is bad for any iron or steel, and absolutely prevents making good welds. Webster Smithing Coal contains no such white scales or brown deposits, because it is practically free from sulphur.

2—Look at the coke formed around the edge of the fire. If it is not solid and of a clear gray color, the coal contains a large quantity of dirt. Webster Smithing Coal forms a clear gray coke, of even grain, which when burned over, makes a hot, steady fire.

3—A blue edge around the flame indicates a large amount of the injurious sulphur. Webster Smithing coal, being practically free from sulphur, makes a pure red and yellow flame.

4—Look closely at your coal-pile and see how many pieces of dull gray slate you can pick out, ***just from the surface of the pile.*** Slate is not coal. It will not burn itself, and it keeps even the coal with which it is mixed from burning freely. Webster Smithing Coal is not slate. It is pure Coal.

5—If your fire is hot in spots, or for a short time, and then "drops out"—the coal is low in heat efficiency—is not adapted to smithing. Webster Smithing Coal maintains a high, clear heat for a remarkably long time, because it is all pure heat-giving coal, specially selected and specially prepared for smithing.

It pays a blacksmith to use Webster Smithing Coal. Pays him in dollars saved on his coal bills. Pays by avoiding all those fire troubles and welding troubles which commonly spoil his work and ruffle his temper. Pays him in the quality and quickness of his work.

Webster Smithing Coal is mined in Cambria County, Pennsylvania, right in the heart of the region noted for high grade smithing coal. It is especially adapted for forge use, and its superiority for this purpose is easily shown by comparing it with any other coal. Webster Smithing Coal may be obtained from local coal dealers at points in the United States and Canada in bags, in bulk or car load lots. Write for prices and further particulars, and remember—

It pays every Blacksmith wherever located to use Webster Smithing Coal

PENNSYLVANIA COAL & COKE COMPANY

T. H. WATKINS, Receiver

Boston, 141 Milk Street. Whitehall Building, New York. Philadelphia, Land Title Bldg.

"CHICAGO"
EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



"CHICAGO"
WHEELS SAVE TIME

They're made of stuff that cuts

Emery Wheels, Glue, Emery, Polishing Wheels, Grinding Machinery

136 Page Catalogue for the Asking

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"QUICK ACTION"
IGNITING DYNAMOS
Excel all others!

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co.,
SOUTH BEND, IND.

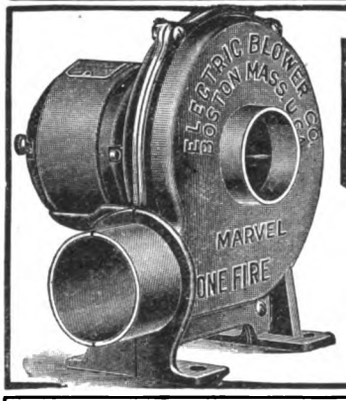
THE BEST MECHANICS USE
COLUMBIA CALIPERS
THERE'S A LITTLE BOOK—TELLS WHY
E. G. SMITH, COLUMBIA, PA.

WHEN WRITING TO ADVERTISERS MENTION THE AMERICAN BLACKSMITH

"MILTON" TIRE IRON
ROLLED TO SIZE—LOOKS WELL.

Our Rounds and Squares are accurately rolled. All uniform in quality. Try them.

THE MILTON MANUFACTURING CO.
MILTON, PENNSYLVANIA.





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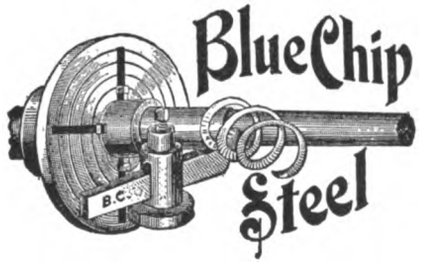
"One Fire" Variable Speed Electric Forge Blower

$28.00 Net

Gives 100 per cent greater air pressure than any other "one fire" outfit.
30 days' Free Trial, through your dealer.

ELECTRIC BLOWER COMPANY
BOSTON, MASS.



Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.
McKEESPORT, PA.

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BOSTON PHILADELPHIA

SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades
Fully guaranteed
All sizes in stock

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BOURNE-FULLER CO.
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PIG IRON
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Cleveland, Ohio.

"Little Giant"

PUNCHES AND SHEARS

Better than a Blacksmith Helper.

Over 3,000 in use. Good the world over.

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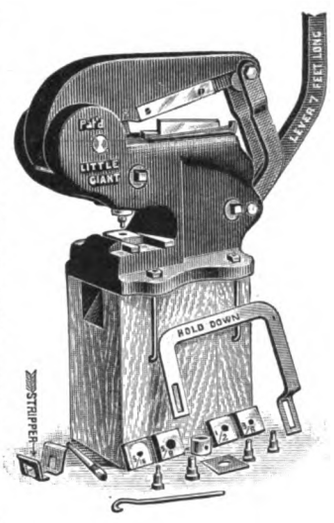

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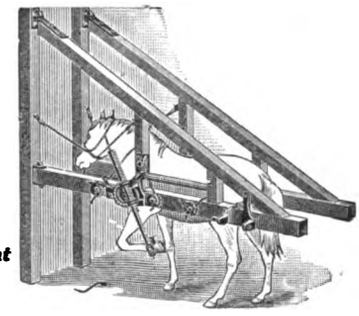

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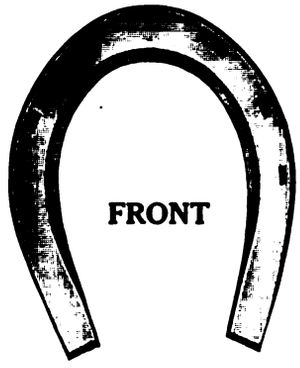

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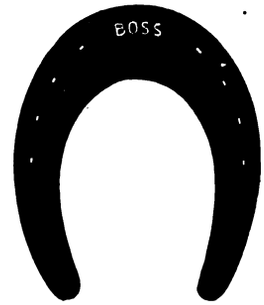

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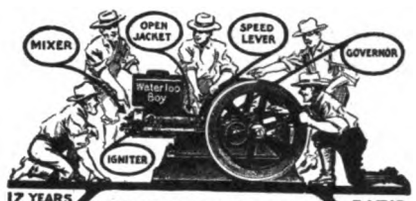

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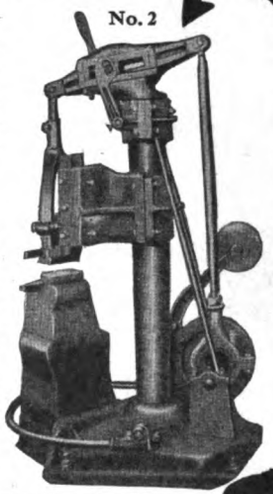

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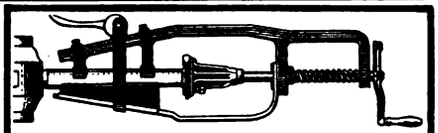

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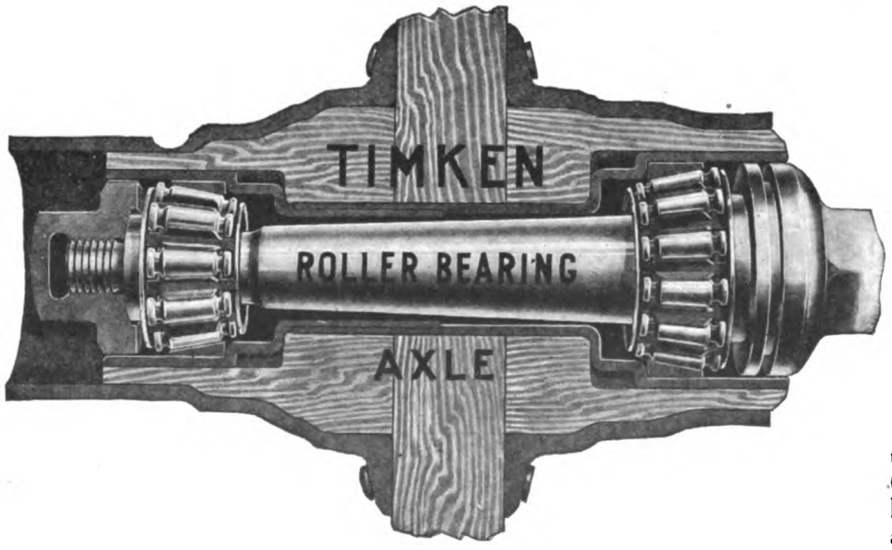

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Here's a letter received from a subscriber in England; "It gives me great pleasure to express my warmest thanks to you. I received the first two numbers of the journal (January and February), and am highly pleased. I should just like to say how I was induced to take it. I have received invitations from you the last few years, but thought it a 'catch penny.' But when the last invitation came I took it up and when the January number came I was most agreeably surprised to find the paper far beyond my anticipation. I had no idea there was such a book published—so closely allied to the trade . . . . . I was at a loss to know the right angle at which to grind my drills, but your valuable article on grinding put me right."

This letter came after he had received but two issues. It comes from a man who has spent thirty years in the trade—a man who ought to know a good book when he sees it. Tell your neighbor about this. Tell him what "Our Journal" is doing for you and for the craft. Show him a copy of the paper—or better still tell him to ask for a sample copy. But get him interested—and then get his subscription order.

This Number.

That the popularity and use of motor vehicles has increased most wonderfully cannot be denied; that this increasing use and demand must naturally make inroads upon the horse vehicle industry must also be admitted; and in view of these facts it is but natural that those interested in horse vehicle construction and repair should turn their attention to automobiles. This is not more true than in the field of blacksmithing. Numbers of "Our Folks" have included the motor-car in their vehicle repair business. It is a branch of the business that rightfully belongs to them.

This number will tell you something about the how of automobile repairing. It has been made a special automobile issue because "Our Folks" will, this season have more need for automobile information than ever before. More automobiles will be sold this season and more repaired, and the blacksmith should get some of this business.

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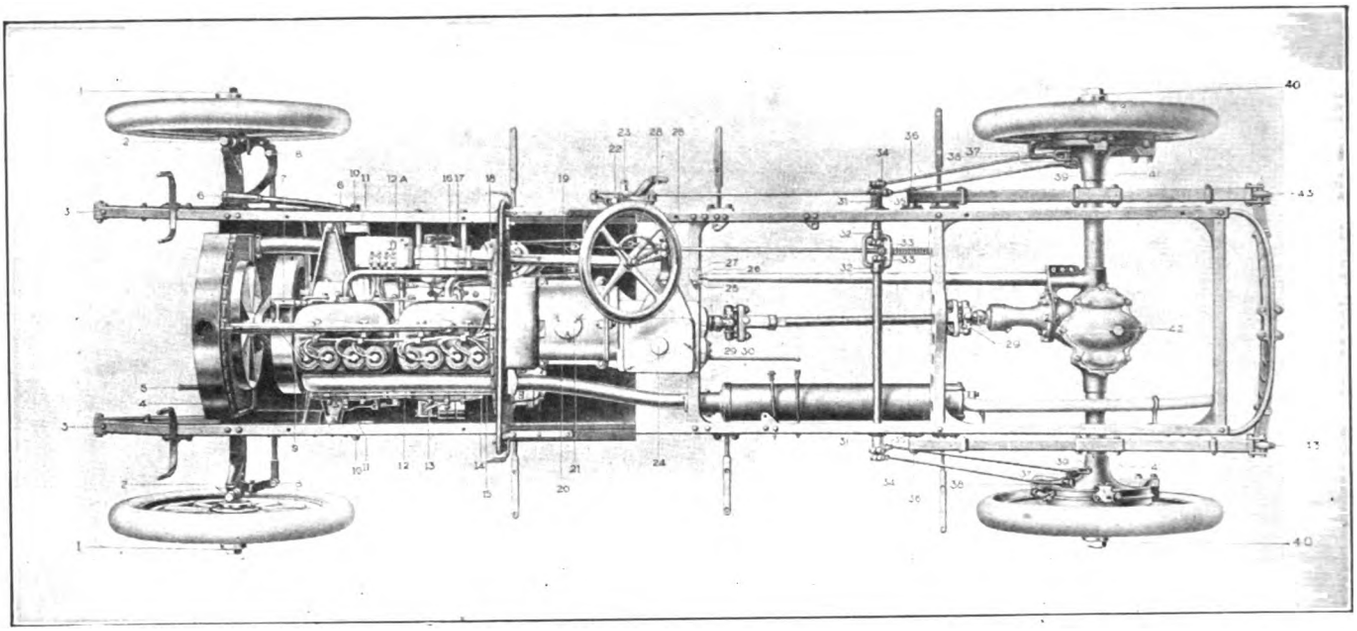
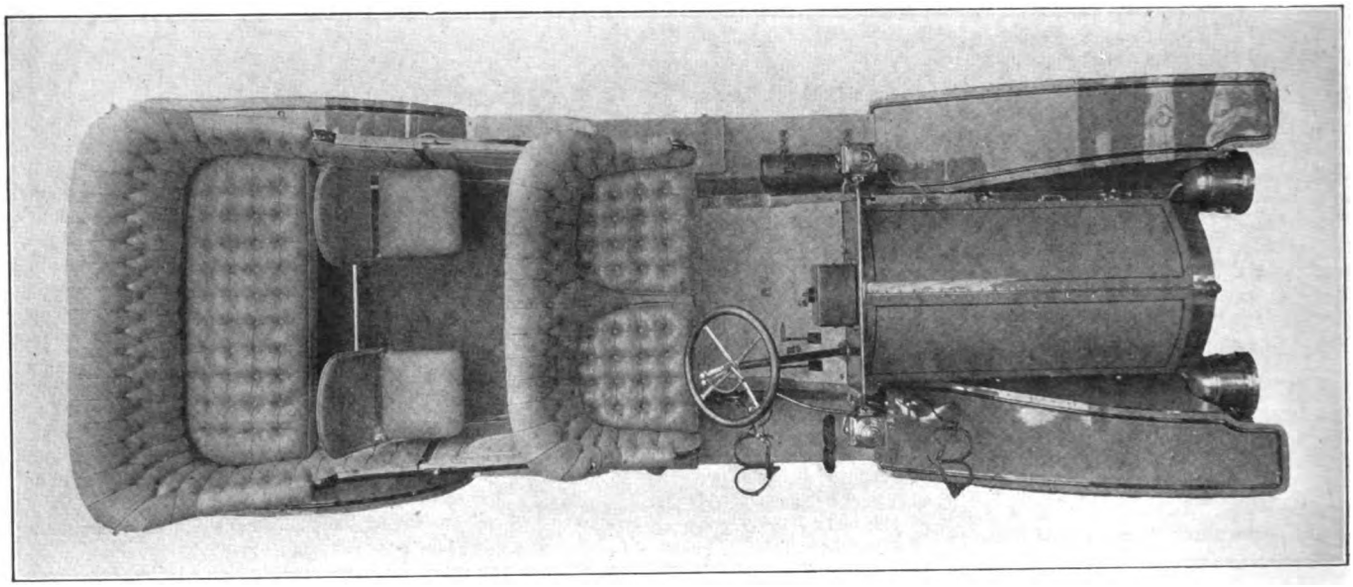
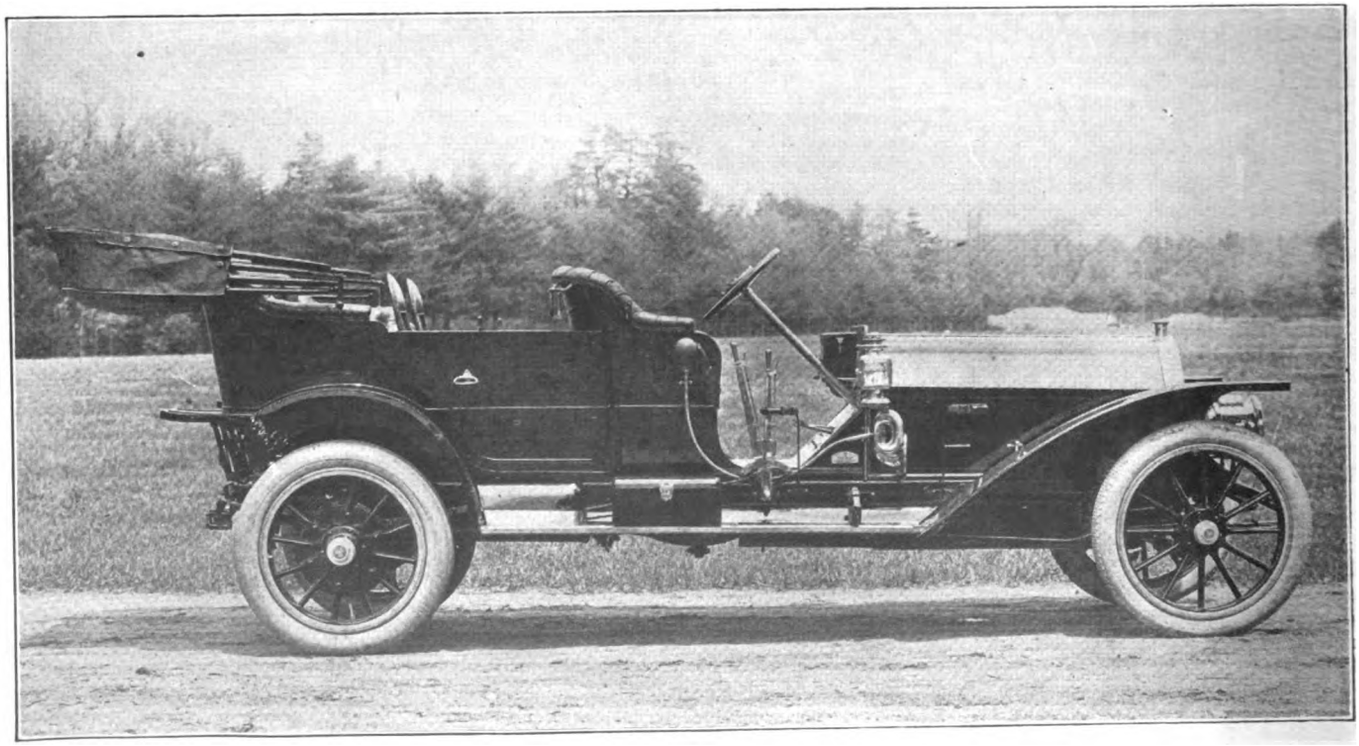




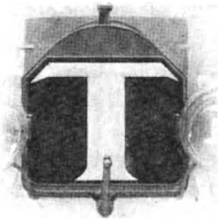


A STEVENS-DURYEA FROM ALL ANGLES

A Plain Talk on Motor-Car Troubles

E. B. FINCH

Head of Technical Department Chalmers-Detroit Motor Co.



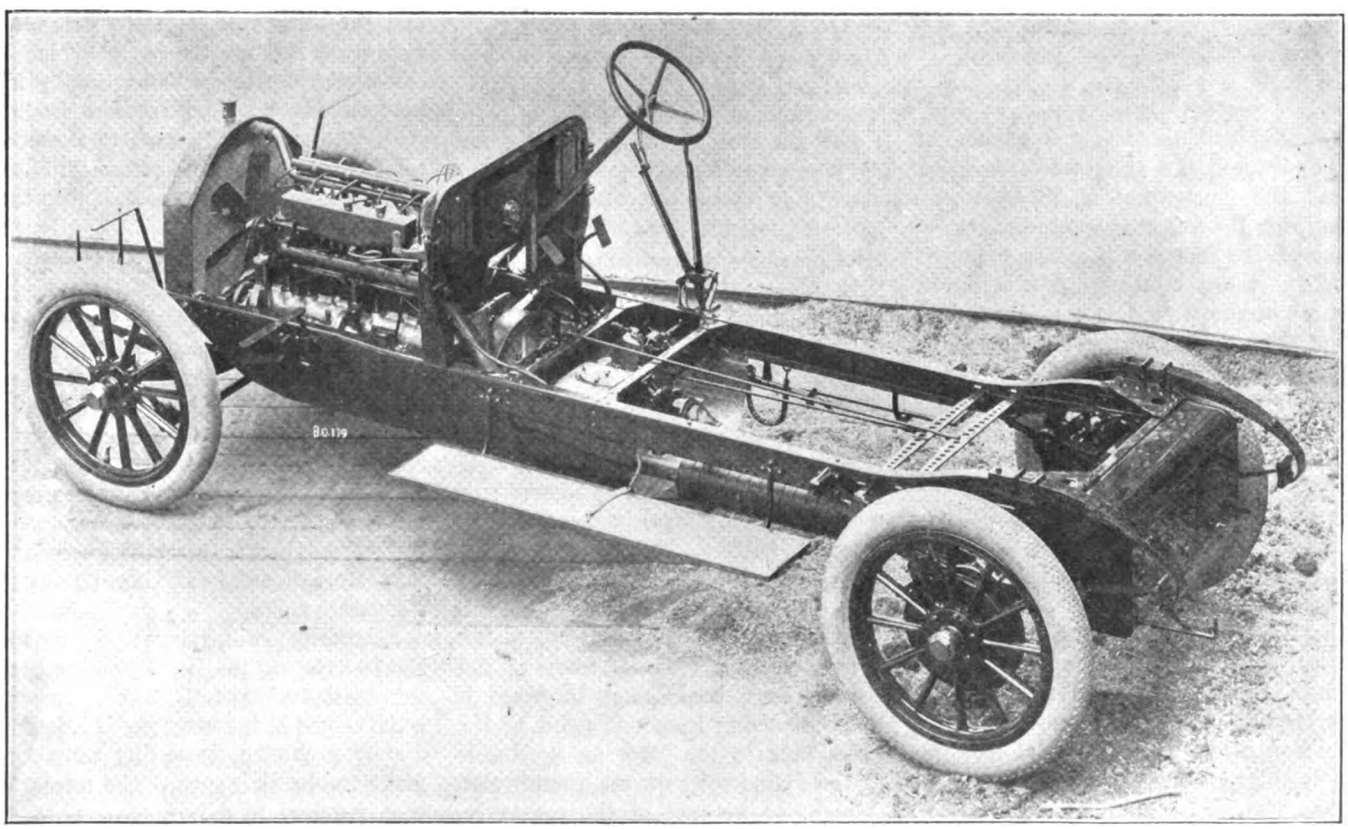
The writer does not intend to go into technical details, and to avoid confusing my readers I will handle matters in a plain and general manner, and hope to offer a few suggestions which will be interesting and perhaps helpful to men called upon to repair motor cars. I trust I may be pardoned if, in an effort to make my explanations clear and simple, I make a few statements slightly at the expense of technical accuracy.

My experience has been that very often a good level-headed blacksmith has more good common-sense ideas about repairing motor cars than many so called "expert repair men." I have personally gained much excellent information by discussing methods of making repairs with blacksmiths with whom I have had the opportunity to come in contact.

In order that the action of a gasoline motor may be perfectly clear, an explanation may not be out of place. There are two kinds of gasoline motors used in motor cars, viz., two-cycle and four-cycle, the latter being more commonly used. The electrical systems of each are practically the same. The four-cycle has inlet and exhaust valves, the two-cycle has not. The two cycle gives an explosion every revolution of the flywheel, while the four cycle gives one every second revolution.

The action of a two-cycle motor is as follows: the upward travel of the piston sucks a charge of gasoline and air through a check valve into the crank case (which as the valve closes is air tight). As the piston reaches the top of its travel a spark occurs, exploding the charge on top of the piston, driving it downward. As the piston nears the bottom of its travel it uncovers two ports in the sides of the cylinder. It also compresses the charge which has been sucked into the crank case, and as soon as the ports are uncovered this charge in the base is forced through a passage around the side of the piston and into the top of the cylinder through one of these ports. In doing this it pushes the old burnt charge left from the explosion out the port on the opposite side of the cylinder. The momentum of the flywheel carries the piston upwards, which compresses the charge and sucks a fresh one into the crank case.

The action of a four-cycle motor is as follows: Starting with an explosion,

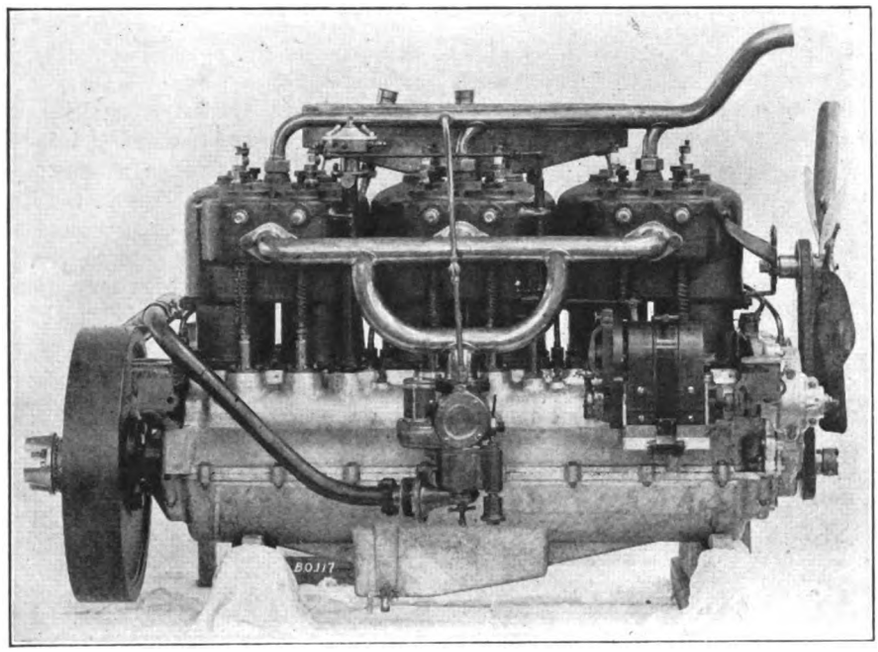


CHASSIS OF A SIX-CYLINDER 48 HORSEPOWER PIERCE-ARROW CAR

the piston is driven downward. As it gets near the bottom of its stroke an exhaust valve is opened by a cam on the cam shaft, which is operated by gears from the crank shaft. As the piston is carried upward by the momentum, the old burnt gases are pushed out past the exhaust valve, which remains open until the piston reaches the top of its travel, when it closes. Just after the exhaust valve closes, the inlet valve opens and remains open while the piston is traveling downward, allowing a charge of gas to be sucked into the cylinder. At the bottom of the piston stroke, the inlet valve closes and the momentum of the flywheel, carrying the piston upward, compresses the charge in the top of the cylinder. When the piston reaches the top a spark occurs, exploding the charge and the operation is repeated. It will be noted that the exhaust and inlet valves are only opened every second revolution of the flywheel. This is accomplished by having the gear on the cam shaft twice as large as the gear on the crank shaft, which operates it.

Perhaps one of the most common things a repair man is called upon to locate is a miss in the motor, and as the trouble is often found in the electrical system we will take that up first. I have known of men looking for trouble in the rear axle and transmission, when as a matter of fact the only thing wrong was simply a miss in the motor. The intermittent jerks leading the owner to believe that a tooth has been broken out of the gear.

Opinions of owners sometimes differ as to what a miss in the motor really is. I heard of a case the other day: An owner called up his repair man and asked how the repairs on his car were getting along. The repair man said they were nearly done, except that the motor was missing. The owner said, "Well, don't that beat the dickens! I went out to get my car the other morning and found the lap robe and one of the lamps gone, and now it's the motor. I think I'll have to keep everything locked up after this."



MOTOR OF THE PIERCE-ARROW FROM THE INLET SIDE

For the benefit of those who are not familiar with just the part electricity plays in a motor car, and the way it performs its duty, we will cover in a brief manner the electrical system.

In order that electricity may be used, that is, that it may flow, the circuit must be complete; i. e., each pole must be directly or indirectly grounded. In a motor car, two kinds of current are used; one is known as a "primary current" and one is known as the "secondary current." The primary current is of low voltage, just as it comes from the battery. The secondary current is an induced current of much higher voltage. The primary current, as it comes from the battery, is not strong enough; that is, there is not enough force back of it to cause it to jump across from one point of the spark plug to the other on the inside of the cylinder where the compression is high, on account of the resistance. Therefore the current as it comes from the battery or from the magneto (in a low tension magneto) must be transformed into a secondary current. For illustration, we will consider the common battery and vibrator coil outfit in connection with that commonly known as a "commutator" or "contact box."

One of the poles or sides of the battery is grounded either directly or through the switch on the coil box. The other side or pole of the battery is carried by means of rubber-covered insulated wires to the coil through which it passes, and from there to an insulated binding post on the commutator or contact box.

The circuit is not complete; that is, the pole of the battery is not grounded until the roller or contact finger inside of the commutator, which revolves as the motor turns over, touches the block to which the wire running from the coil is attached. Every time this roller passes over one of these contact boxes it completes the circuit; because this roller or contact finger is grounded through the shaft to which it is attached to the motor, and a current of electricity passes through the coil, thus producing in the coils a secondary current (which, as we explained above, is necessary in order to jump across the points of the spark plugs against the compression in the cylinders). One end of this secondary current is grounded direct to some metal portion of the car, and the other runs to the spark plug and down through the center which is insulated from the outside, usually by porcelain or mica. It cannot ground itself until it jumps across to the outside of the plug inside of the cylinder, thus causing a spark which ignites the charge. The outer shell of the spark plug being screwed to the cylinder, grounds this end of the current.

With a magneto system the process is much the same. The current is generated as soon as the armature in the magneto begins to revolve, and in case of a low tension magneto the current is passed through a coil to produce a secondary current. In case of a high tension magneto the transformation of the current takes place right in the magneto, instead of carrying it through a separate coil.

Electricity will always take the shortest course; that is, the course with the least resistance. As the current is developed in the magneto it is immediately grounded, excepting when the make-and-break is open. The current is then required to take another path to the ground, which is longer and which is through a coil and thence back to

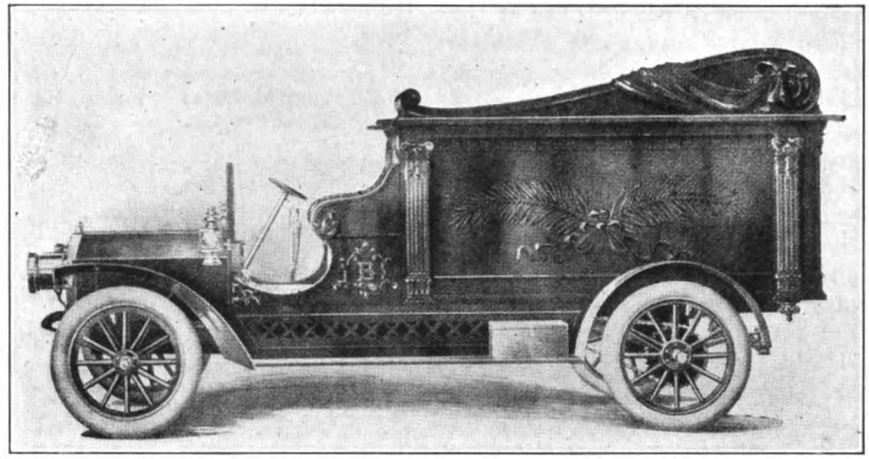
the distributing plate, usually located on the upper shaft of the magneto, and from there to the spark plugs in each cylinder. Or in case of a high tension magneto—instead of going through an extra coil it is carried through the secondary winding of the magneto, where a secondary current is induced, and is distributed to the plugs in the different cylinders with the help of the distributing plate.

All connections must be well made, and especially in the low tension circuit where the current is not as strong as the secondary current and more liable to be hampered or retarded by dirt or grease or improper contact.

Some of the most common places to look for trouble are:—loose wire connections, either between the cells of the battery, or connections to the ground or on the coil. Sometimes a motor will run perfectly when the car is standing idle and miss when the car is moving, on account of the vibration of the moving car causing a loose wire to make a poor contact. If a spark plug is dirty, the current may be short circuited or carried to the ground without being obliged to jump across the gaps between the points. If the points on a spark plug are too far apart, the current may not be able to jump across, and hence will take some other course. The proper distance for these points should be about one thirty-second of an inch. Sometimes the current leaks to a ground before it reaches the spark plug, on account of the insulation of the wire having become worn through or by becoming saturated with oil.

A simple way to locate which cylinder is giving trouble is to place the point of a wooden-handle screwdriver (being careful to hold by the handle) against the cylinder, and let the shank lay against the spark plug terminal. If current is found at this point, and by making contact at the upper end of the plug, and thus cutting out that cylinder, it makes no difference with the running of the motor, you can conclude that the trouble is in this cylinder, and that the cause is probably in the plug.

Other things which may cause a miss in the electrical system are: weak battery, broken wire, corroded terminals where they are attached to the storage battery (thoroughly cleaning the terminals and greasing them will usually prevent corrosion), coil vibrator out of adjustment, contact roller in the contact box not making a good contact with the binding post block (sometimes the vibrator swells slightly, causing the roller to jump over the contact block). Oil or dirt on the carbon brush at the end of the lower shaft through the magneto will also cause trouble. If the make-and-break on the magneto is not properly adjusted it will prevent the motor from running properly. The correct setting is about one sixty-fourth of an inch apart when the break is made. Good magnetos give very little trouble, and I would advise leaving them alone and look elsewhere for trouble, looking to them as a last resort.



AN AUTO HEARSE BUILT BY CRANE & BREED OF CINCINNATI

Other things which may cause a miss are:—improper adjustment of valve push rods, so that the valves are held open all of the time and do not properly seat, leaks in some of the inlet pipe connections (weak compression in one cylinder indicating a leakage of air, thus giving that cylinder too thin a mixture, sometimes due to valves needing regrinding or valve bonnets not properly screwed down or gaskets broken, or too poor piston rings).

Improper carburetor adjustment—too rich a mixture will show black smoke from the muffler causing the eyes to smart and the motor to be logy. Too thin a mixture will usually cause popping back in the carburetor. Water in the gasoline may also cause a miss in the motor and sometimes even cause the motor to stop. There is usually an outlet pocket or sediment cup in the bottom of the gasoline tank for the purpose of collecting dirt and water almost invariably found to a greater or less extent in all gasoline. This outlet pocket should be drained frequently enough to keep the water out of the gasoline system. It is always a good precaution to strain all gasoline through a chamois when the tank is being filled.

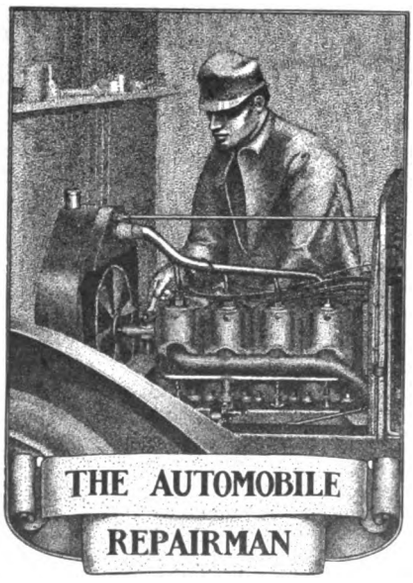
A miss in the motor will naturally cause a lack of power. It may also cause the motor to overheat. Lack of power in a motor may also be caused by some of the following things, although they may not be pronounced enough to cause the motor to actually miss. For instance, weak compression in a motor may cause it to lose power; mis-adjustment of the carburetor; weak batteries, improper timing of the spark; carbon in the cylinder; improper valve timing and the motor overheating would all cause loss of power. Complaint is often made that a motor lacks power, when investigation shows that the real trouble is due to the brakes dragging and binding.

Among other things which a repair man is called upon to locate are: "knocks in the motor." A knock may be caused by one or more of the following things: loose connecting rod bearings, which, of course, are easily examined by dropping the oil pan or removing the hand hole plate from the crank case. If a bearing has been burned out, so that it is impossible to make a proper adjustment of what remains of the bearing, a temporary repair can be made by removing the old bearing, if it is in very bad shape, and centering the crank shaft in the lower end of the connecting rod. This can be done with very small pieces of wood to hold it in position. Then pack clay around the bearing, leaving opening at the top for pouring. It is a good plan first to warm up the crank shaft with a blow torch, so that it will not chill the metal too quickly, then by pouring a good grade of babbit metal around the crank shaft the temporary repair should carry the customer to where

there are facilities and time for a permanent repair to be made. Care should be taken to provide oil openings at the top and on the sides of the bearing, so that it will get proper lubrication.

A connecting-rod knock or a loose piston is usually noticeable when the motor is under a hard pull. A loose flywheel is usually noticeable when the motor is speeded up, sometimes located more easily when the car is idle than when in motion. If the cylinders are badly carbonized, the compression is usually not good. The presence of carbon can be determined by removing one of the valve bonnets, and if the opening is large enough and accessible much of the carbon can be scraped off the tops of the pistons with a tool of the right shape. An application of kerosene also helps to soften up the carbon and clean out the cylinders. About two tablespoonfuls to each cylinder is the right quantity.

I have endeavored to touch in a plain, general way a few common things which a repair man may be called upon to locate. In the next article we will cover a few motor car troubles and also attempt to offer some suggestions for making temporary and general repairs to the different parts of the motor car.



Punctures.

First a tack hole. "Aw, thet's nuthin'," Said young John O'Let-it go,
And he ran his auto wagon,—
We all know how punctures grow.

Large and larger! "It won't burst yet—
Purty soon I'll vulkernize."
John still ran his auto wagon:
Hole enlarged before his eyes.

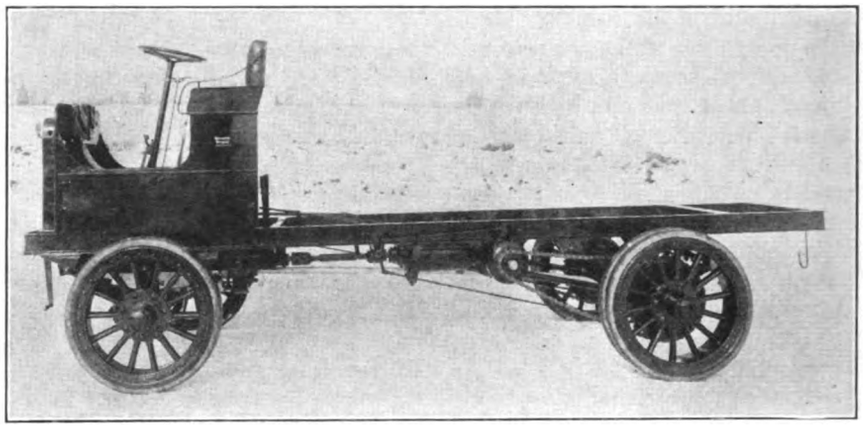
Then one busy, fine May morning,
Miles from home, and with a load
More than usually important,
John was stranded in the road.

Tire useless: no help near him,
Mill some seven miles away,—
John regretted, fumed and swore, then,
At the cause of his delay.

But 'twas vain,—he was quite helpless,
Johnny learned to his dismay.
"Arter this, w'en tires punchur,
Y'bet I'll fix 'em rite erway!"

Take ye heed, o blacksmiths many,—
Watch for John O'Let-it-go.
Note his little punctures for him:
And to you he'll always go.

R. G.



CHASSIS OF THE GRAMM THREE-TON TRUCK

A simple means of detecting air leaks, either in tires or fuel feed pipes, is to dust a piece of fine wire gauge or netting with some powdered chalk, talcum or even road dust, and pass this about in the vicinity of where the leak is suspected. Where air is leaking, the dust will be blown from the gauge. F. G. L., Illinois.

Rusty rims do not lengthen the life of the tires, to say the least, and a preventive coating after the rust has been discovered and thoroughly removed is necessary. Make a mixture by stirring a quantity of fine flake graphite into some shellac varnish which is fairly thick. This will form a smooth, hard surface on the rims and will effectively prevent rust and consequent rotting of the tire.

AUTO, Connecticut.

When fitting gaskets be sure to fit them correctly. We had trouble a few days ago in locating a trouble right after the motor had been overhauled. After much time, trouble and work we discovered that one of the rubber gaskets had not been cut out so the passage would be free. One of the men had failed to cut out the center portion of the disk of rubber which he had inserted to make the joint. Be careful of this, and you'll save much time, trouble and cussing. L. G. H., Kansas.

The Gramm Motor Truck.

Motor trucks are becoming more and more common every day, not only in the big cities but in the towns, and some have appeared on the farm. Naturally, the smith will be called upon to repair these heavy vehicles as well as the pleasure cars, and he should know something about their construction.

The frame of the Gramm truck, shown in the engraving, is of channel steel. The corners are held by means of steel castings and riveted. The wheels are the regulation wood artillery type and the tires are solid. The front axle is of high-carbon steel yoked at the ends for the steering knuckles. The rear axle is of round machine steel. The motor is of the four-cylinder, four-cycle type, water-cooled, and cylinders cast in pairs. The valves are mechanically operated and all on one side. The gasoline or fuel tank is located directly under the seat. The clutch is of the multiple disc type and the drive is by means of a shaft and two "Diamond" chains to the large sprockets of the rear wheels. As shown in the engraving of the chassis the power plant is compactly located under the seat and footboard, and no part of the mechanism interferes with the load platform.

Some Practical Hints on Repairing Automobiles.

H. T. MARTIN.

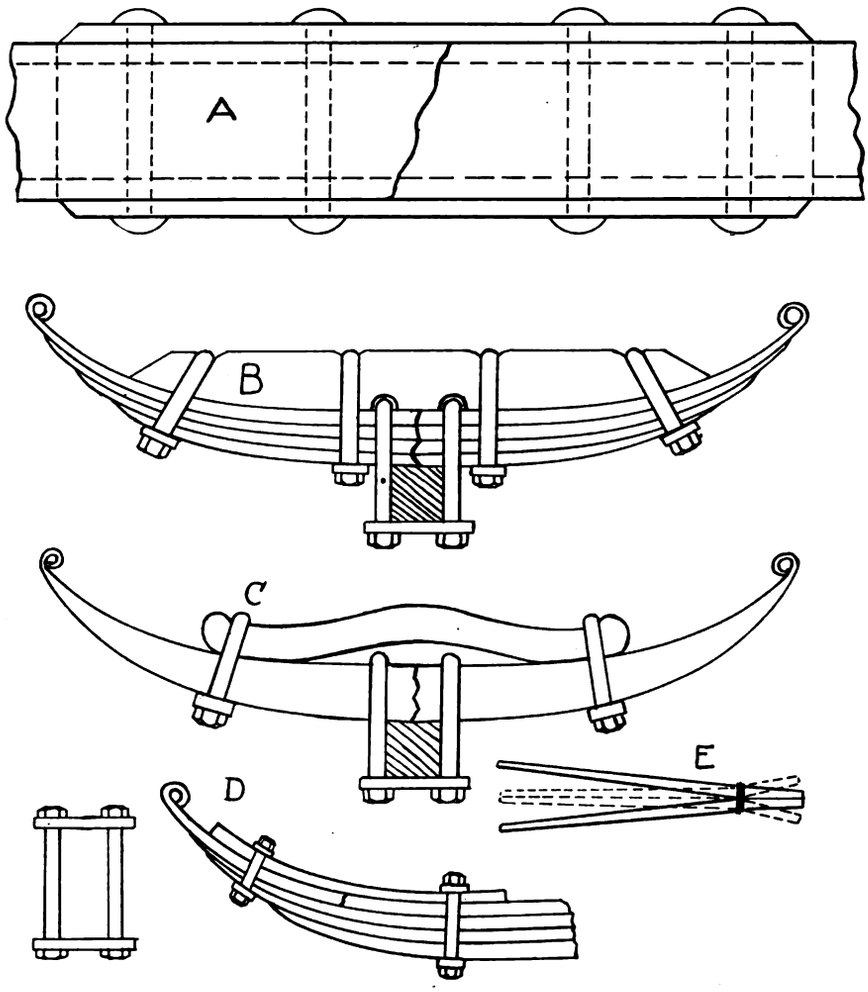
In automobile work, as in everything else, good, common horse sense goes a long way toward effecting a practical repair. Of course, one could fill page after page on what to do in this, that and the other event, and yet the next machine that is towed to your door may have something wrong which was possibly not even hinted at in these pages. There is perhaps no greater room anywhere for the thoroughly practical man than in the field of automobile repairing. Good, common sense mixed with a liberal portion of mechanical ability will, therefore, need to be applied liberally if one is to successfully cope with the autoists' troubles.

BROKEN FRAMES.—The breaking of a frame is of rare occurrence now. In the early days of motor vehicles frames

broke more frequently. But when a frame does break it is imperative that it be repaired as quickly as possible. If the frame is the regulation angle iron style a repair made as follows will suffice for some time, or at least until a new part can be put in: Fit a piece of stock into the channel of the frame, making as close a fit as possible and extending for a reasonable distance each side of the break. If you happen to have a piece of good channel steel on hand that will fit into the channel of the frame so much the better, as your repair will then be lighter and about as strong. After fitting the piece inside the channel, take two pieces of good, flat steel and clamp one piece above and one piece below the frame, as shown in the engraving at A. Now, having all pieces solidly clamped in position, drill four holes through the supports and frame, as shown at A, for pins or bolts. This repair if properly made and with good stock will put the frame in practically as strong shape as when new.

Should the frame be of tubular construction, practically the same method of repair can be followed, using a turned piece of steel for the inside and a sleeve for the outside.

Most any part of the frame can be repaired in this manner. If desired, the pinning or bolting of the supporting parts may be further fixed by brazing.

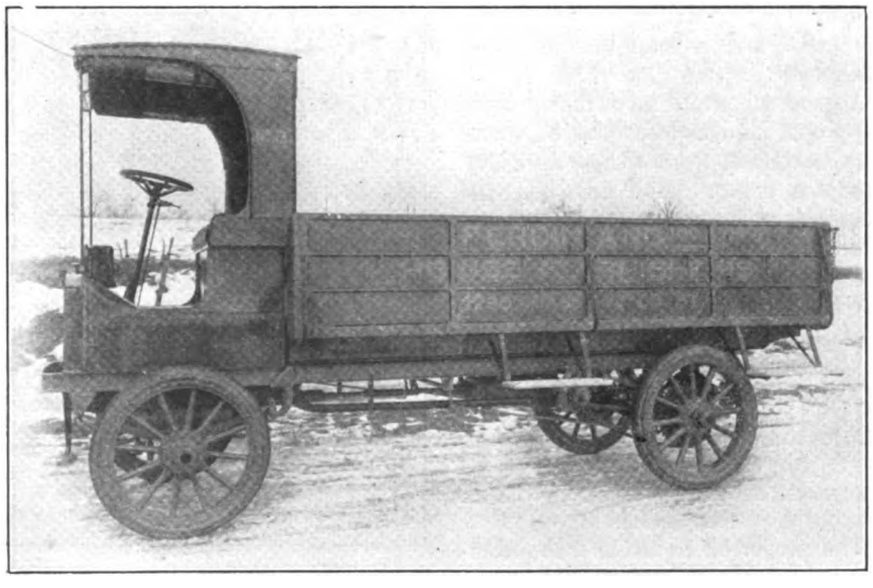


SEVERAL HINTS ON THE PRACTICAL REPAIR OF AUTOMOBILES

BROKEN SPRINGS.—A break of one or more of the spring leaves is not so uncommon as frame breakage. A temporary repair can, however, be effected with little trouble. The method of repairing depends, of course, in a large measure upon the location of the break. If the break is in the center of the spring and directly over the axle all the leaves will generally show a fracture, and in such event a temporary repair may be made with a piece of good, stout wood stock, as shown at B. The piece of wood should be shaped on one side to conform to the normal shape of the spring and recesses made for the reception of the clips. If time permits and materials are at hand a steel brace may be made and attached as at C.

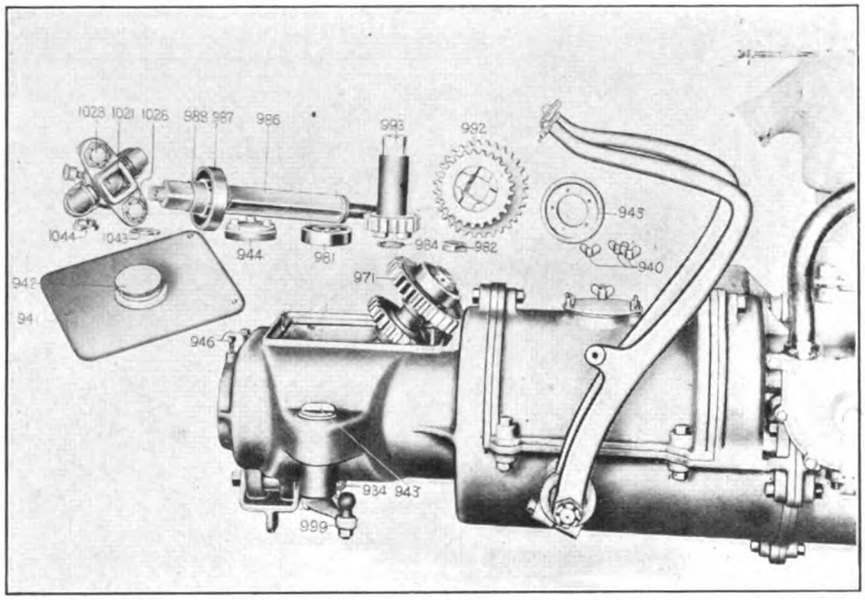
If the break is in one leaf only, it will generally be found near the end. To repair a fracture of this kind, use a steel splint and fasten it by means of clips as shown at D. The splint may be a piece of another spring, if of suitable weight and strength, while the clips may be very easily made in the shop by drilling suitable holes through short pieces of flat stock and holding these pieces by means of strong bolts and nuts.

BENT AXLE.—This defect is usually best remedied by the fitting of a new axle. However, if the bend is not too great it may be straightened with the hammer. Extreme care must be exercised, however, so as not to start a crack in the metal. But in any event the motorist should be warned that the straightening of an automobile axle is not to be recommended and that a new axle should be fitted as soon as it can be procured.



THE GRAMM ONE AND ONE-HALF-TON TRUCK

If the axle is of tubular construction it may be cut in two at the dent or bend and the depression swedged out. The axle may then be repaired by inserting a solid liner and either pinning or brazing this piece into place.



THE TRANSMISSION CASE OF THE STEVENS-DURYEA, SHOWING PARTS

PISTON RINGS.—Unless one is experienced, the removal and refitting of piston rings is somewhat difficult, and the job is liable to be accompanied by pinched and cut fingers and a distorted, if not a broken ring or two. To remove the rings from a piston easily and with a minimum amount of work, time and trouble, secure three or four strips of tin about three eighths of an inch wide and about as long as the piston. Also get two pieces of stock about ten or twelve inches long and about one fourth of an inch in section. Now bend each piece about two inches from the end and wire the pieces together as at E. You now have a pair of tongs that will work just opposite to the regular style tongs. Now fit the ends of the jaws into the slot of the ring to be removed and press the handles of the tongs together. This will open the ring so that one of the tin strips can be inserted between the ring and the piston. Insert the other strips in the same way until the ring rests entirely on the strips, when the ring may be slipped off with comparative ease. The operation of replacing rings is very easy with the tin strips.

MISCELLANEOUS HINTS.—A nut, bolt or spark plug when over-tightened or rusted in is often very difficult to remove, and if undue force is used serious damage may result. If reasonable pressure on the wrench fails to turn it, apply kerosene liberally to the joint and allow it to soak. If this is not effective, heating may loosen the joint sufficiently to allow the nut to be screwed off.

To prevent a re-occurrence of a rusted thread joint, soak the threads liberally with kerosene until the rust is entirely removed. Then wipe dry and apply a thin coat of vaseline to each thread before screwing together.

To make an oil-tight joint between the two halves of a gear box, crank chamber or similar auto part, use soft lead wire. This flattens out under pressure and makes an excellent joint.

When necessary to fit a piece of copper piping to any part of the motor, heat the pipe to a cherry and plunge quickly into water. This will soften the metal and it may then be more easily bent.

A good substitute for a funnel when the proper implement cannot be found may be turned from a sheet of heavy wrapping paper. Roll this into the shape of a cornucopia, tearing a small piece off the smaller end and it is ready for use.

When the water-circulating pump needs repacking use plenty of graphite, as the spindle of the pump can hardly be over-lubricated.

Adjusting, Repairing and Caring for an Automobile—4.

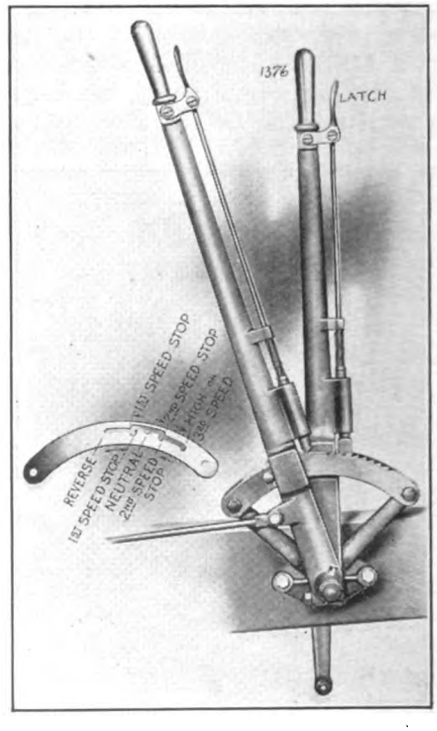
With Special Reference to the Stevens-Duryea.

Lubrication.

The proper oil to use is that recommended by the makers of the car. It is best to get the same oil which they use in testing. Do not use cheap oils; though the most expensive oil is not necessarily the best for the particular part to be lubricated. And never under any circumstance use steam engine cylinder oil.

The transmission case should be flooded with oil to a depth of not less than one inch. The level of the oil should be inspected occasionally, so as to assure yourself that the transmission has the proper amount. This can be determined by unscrewing cap in transmission cover and inserting wire or rule. As the transmission rotates on annular bearings it will be found necessary to be sure to use a non-acid lubricant which will not affect the bearing. Do not use grease under any condition, as the forward bearing for square shaft, together with main drive gear, require oil. The rear axle should be lubricated with the proper oil, and should be filled to overflow plug in rear axle housing.

About every five thousand miles all the used oil should be drained by removing pet cocks under motor and the pet cock together with drain plug under reverse gear in transmission case, also drain plug at rear axle under the differential. Replace them and fill to the usual level with kerosene, start motor, run car for about a minute (no longer), remove pet cocks together with plugs, and thoroughly drain. Replace pet cock in motor base, having them open, and



GEAR CHANGE LEVERS ON THE STEVENS-DURYEA

supply oil through breather pipes until overflow is noted, then close. When returning pet cock under transmission make sure that it is closed, and about two quarts of oil will be found sufficient. The rear axle will require about one and one half quarts of oil.

Steering Post.

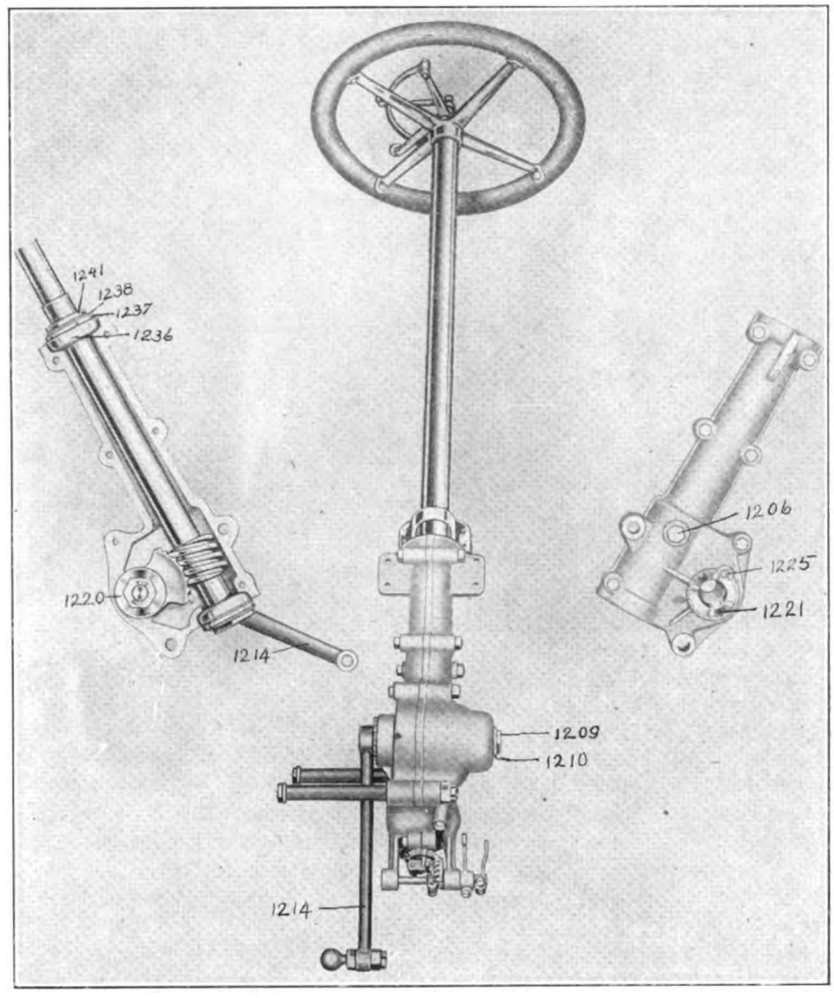
For adjusting, jack up the front wheels, and if any up and down play is found in post it can be taken up by loosening lock nut No. 1241 and turning cone No. 1237 down. Be sure and have lock nut No. 1241 tight and the vertical play removed before adjusting steering worm gear No. 1220. To adjust steering worm gear No. 1220, remove lock screw No. 1225 and turn eccentric bushing No. 1221 until you have an even tension in steering post at all positions of the front wheels. The end thrust of the steering shaft No. 1214 may be taken up by thrust screw No. 1209 and locked by nut No. 1210.

To lubricate, remove plug No. 1206 and fill with grease every seven hundred and fifty miles. Also lubricate upper ball bearings No. 1236 with light oil every two hundred miles.

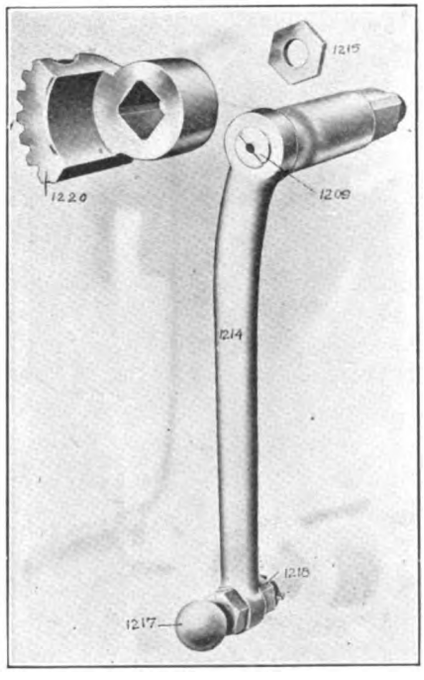
Operating Gear Change Levers.

Gear shift lever in neutral position. Start motor and release emergency brake.

STARTING 1ST SPEED.—Push spark lever forward on quadrant about half way up, press the left foot against the clutch pedal, and the first forward gear is engaged by compressing latch and bringing handle back (with latch compressed) to first speed stop, release latch, accelerate motor and engage clutch slowly.



THE STEERING POST AND PARTS ON THE STEVENS-DURYEA



THIS SHOWS THE TAPER SQUARE CONNECTION IN STEERING POST

2D SPEED.—As car gains headway, and second speed is desired, compress latch, release clutch, and a forward movement of handle (with latch compressed) as far as second speed stop will have engaged the gears, release latch, accelerate motor and engage clutch slowly.

3D OR HIGH SPEED.—The third speed forward only requires the releasing of the clutch and a forward movement of handle No. 1376. (The latch is not touched for the third speed.)

FROM 3D TO 2D SPEED.—To engage second speed when running in third, release clutch, and pull handle back to second speed stop (without touching the latch).

When making this exchange, if car is running on level road, slow the car before making the shift.

FROM 2D TO 1ST SPEED.—First speed from second is positively meshed by compressing latch, releasing clutch and pulling handle (with latch compressed) to the rear stop first speed, release latch and allow clutch to engage slowly.

REVERSE.—To reverse, release clutch, bring car to standstill and push handle to the rear as far as possible, without touching latch. It does not require the operating of latch either from first speed forward to reverse or from reverse to first speed.

NEUTRAL.—With gear in first or second speed if neutral point is desired, compress latch, release clutch and move handle toward neutral point from first speed (forward) from second speed (to the rear) release latch immediately upon starting movement of handle, which will allow locking stud to engage at neutral.

GEAR CHANGE ON GRADES.

Any ordinary hill can be climbed on high gear by accelerating motor.

UP HILLS.—If the hill is very steep or blocked with traffic it is best to drop to a lower gear so as not to have the motor labor excessively.

It is the simplest of all operations to drop to second speed. Just release the clutch and pull handle back to second

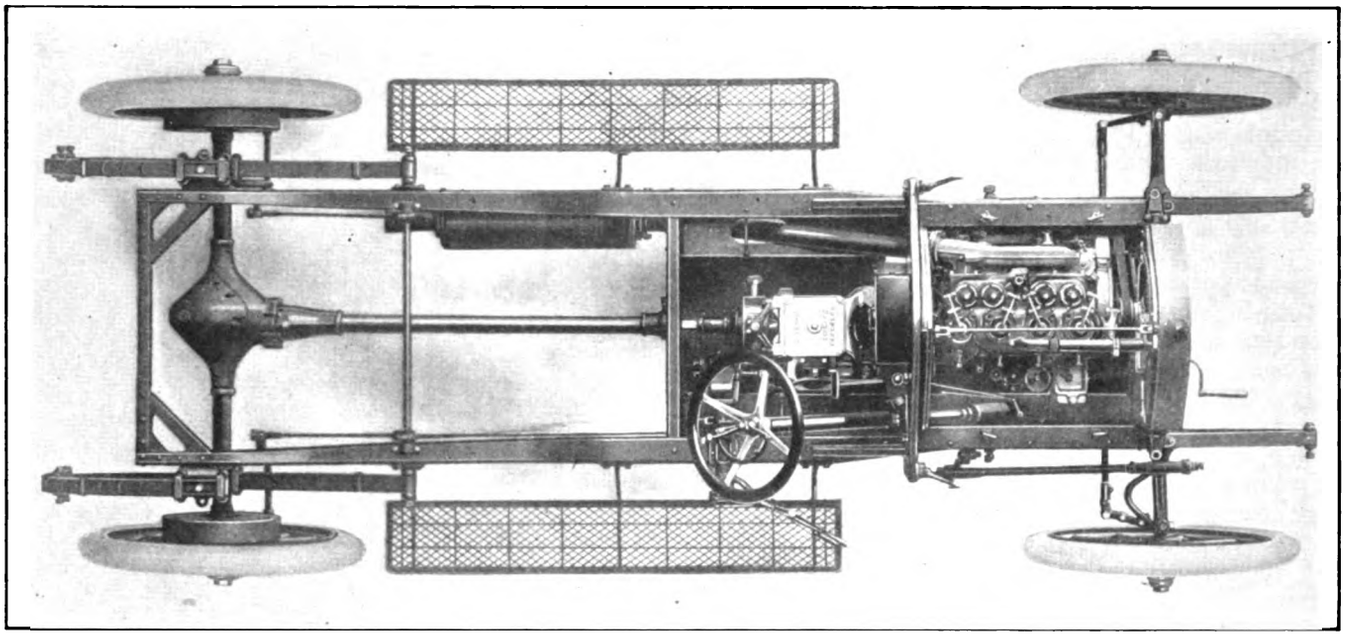


FIG. 1.—SHOWING A TOP VIEW OF THE CHASSIS OF A CHALMER'S CAR

speed stop. (Do not operate the latch.)

We would advise making shifts quickly from one to another gear before the car has entirely lost its headway, as the exchange will be very much smoother, and strain on driving parts as well as tires will be greatly relieved.

DOWN HILLS.—In descending hills and when running in high do not attempt to make speed. Always close throttle and retard spark. On gradual grade use foot brake, but never apply it suddenly, except in an emergency case, then apply both systems of brakes. Always have car under perfect control in descending any grade, and if the view of the descent is obstructed, or grade very steep, drop back to a lower gear. Do this before car gains too fast headway. Do not attempt to exchange gears on down grade with car moving rapidly.

It is good practice to coast with clutch engaged, but if car is to be slowed suddenly push forward on both clutch and brake pedals.

In going through gears in the reverse direction, on level roads and the car running over 25 miles per hour, it will be necessary to slow the car to make a smooth exchange.

CAR RUNNING ON THE LEVEL.—Do not exchange gears too slowly or too gently. A positive release of the clutch and a firm, smooth motion of the gear shifting handle without the loss of car speed will result in a noiseless, jarless and positive gear shift.

Let the clutch in gradually, but at the same time quick enough so as not to lose the momentum of the car.

SKIDDING.—Drive with care on wet pavements or muddy roads; driving as closely as conditions will allow in a straight line.

Use extreme caution in regard to the applying of brakes, as when wheels are locked and car starts to skid, the results are entirely out of the operator's control.

SLOWING CAR.—In slowing car or driving around corners do not disengage clutch or apply brakes. Check the speed of the car by retarding the throttle and spark.

Always operate on the safe side in regard to the speed of the car, as fast driving at corners or on curves tends to greatly decrease the total mileage of your tires.

Transmission.

COUNTERSHAFT.—Cover No. 941 can be removed by detaching wing nuts No. 940 (three in number).

In removing countershaft No. 971, release hexagon cap screw No. 946 and remove aluminum cap No. 944. Withdraw countershaft for about an inch, which will allow spring washer No. 984, together with pin and nut No. 982, to be taken off, allowing removal of bearing No. 981.

Then countershaft can be withdrawn from cover hole as shown.

MAIN SHAFT.—Disconnect universal joint by removing nuts No. 1028 and withdrawing studs. Yoke No. 1021 is

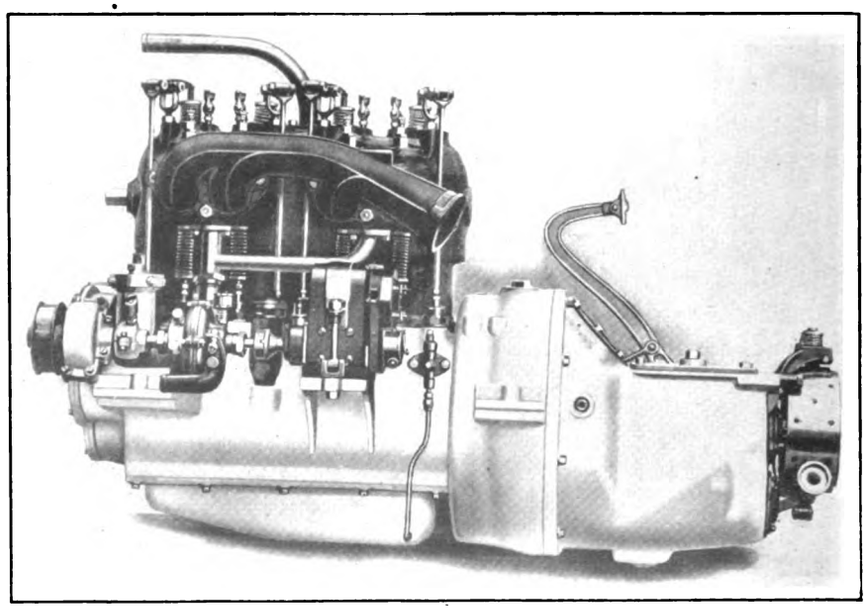


FIG. 2.—THE EXHAUST SIDE OF THE CHALMER'S MOTOR

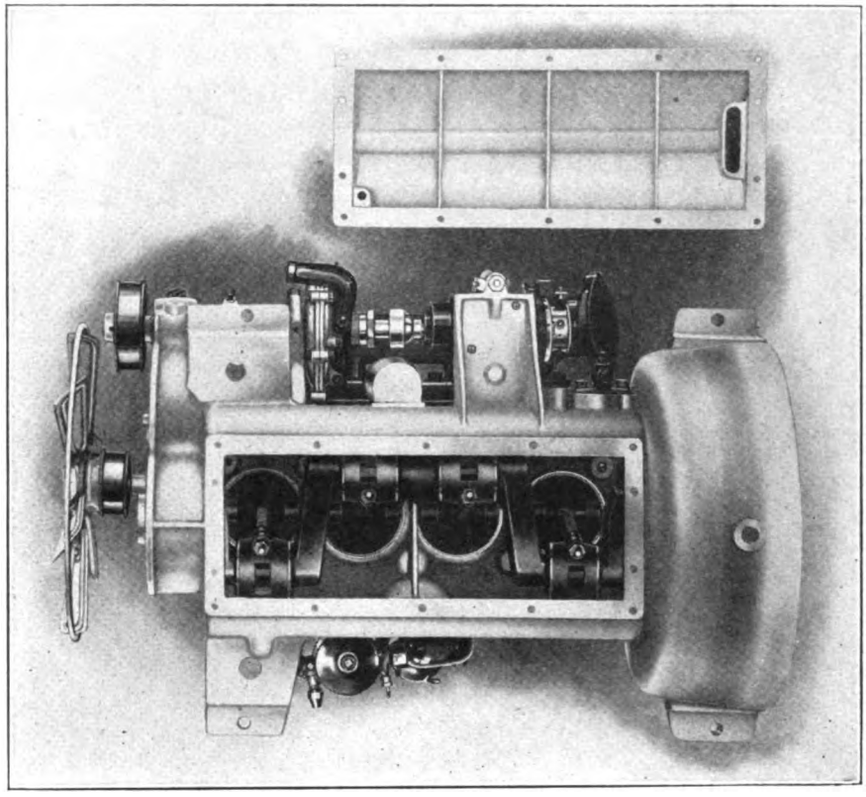


FIG. 3.—THE CHALMER'S MOTOR FROM BELOW

held on square by nut No. 1044 and washer No. 1043.

Release cap screw No. 946 and take out aluminum cap No. 945, that will allow main shaft No. 986 with bearing No. 987 to be withdrawn from case.

After removing main shaft, sliding gear No. 992 and driving gear No. 993 are taken out through cover hole.

Gear shifting lever No. 999 is withdrawn by taking off aluminum cap No. 943 and unscrewing taper hexagon head binding screw No. 1000.

LUBRICATION.—The entire transmission with bearings are lubricated by the splash system. We recommend a heavy (non-acid) oil not less than one inch deep in case.

To drain, open pet cock No. 934 and remove drain plug No. 936 under reverse gear.

Driving gear No. 993 has a cork plug near square end to prevent oil from leaking into clutch case.

Cranking the Motor.

POSITION OF LEVERS.—Set gear shifting lever in neutral. Put on emergency brake, insert switch plug and throw lever of coil on battery. Set hand throttle about three inches and spark lever about two inches advanced on quadrant. Prime the carburetor by pressing the flooding device in front just below radiator. You are now ready to crank the motor. Grasp the starting handle and push in against the spring, turning the handle to the right until it engages in notched sleeve at end of crank shaft; having found compression, pull up quickly. Do not push down, only when spinning motor (with the spark off). If the motor is difficult to start make sure that everything has been made ready properly.

MAKE SURE.—Gasoline in tank, gasoline at carburetor. That you have a spark at each cylinder. Try advancing the spark, but not over three inches on quadrant. We do not recommend spinning motor with any more advance of spark. If motor is cold or has been left standing for a long time you will find that by putting the lever on dash in the central position that a few spins of the motor (with the spark off) will charge the cylinders with the proper firing mixture.

The Chalmers-Detroit "30."

The accompanying engravings show the Chalmers chassis, motor and parts. This car has a 115-inch wheel base, making it longer than the big Chalmers-Detroit "40" of last year. The power plant is of unit construction, placing the motor, clutch and transmission in compact and simple form. The working parts are all enclosed in a single case and flooded with oil. The transmission case and clutch are attached directly to the flywheel casing. The entire power plant may be removed by simply removing six bolts. The cylinders are one single casting. The crank shaft has but two bearings instead of the regulation three, thus enabling the makers to place the cylinders closer together.

In the engravings Fig. 1 is a top view of the Chalmers chassis, showing the position and arrangement of the power plant. As shown the drive is by means of a shaft to the rear axle. A near view of the entire power plant from the exhaust side is shown in Fig. 2. The engraving shows the arrangement

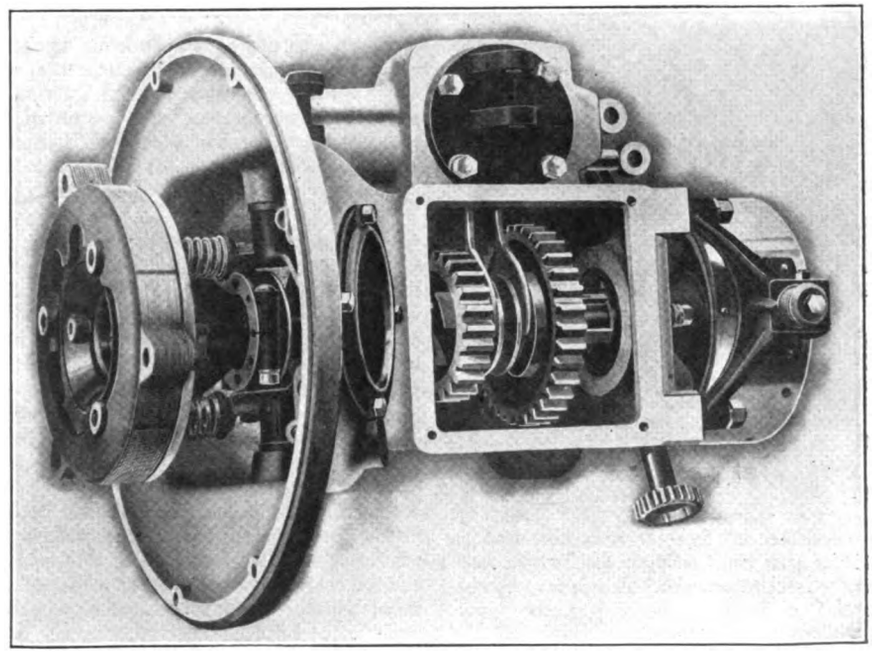


FIG. 4.—THE DISC CLUTCH AND TRANSMISSION OF THE CHALMER'S CAR

of the exhaust valves, timer, water pump, magneto, the oil reservoir at bottom of motor and the plunger oil pump operated by inlet cam on fourth cylinder. The Chalmers motor is seen from below in Fig. 3. Here is shown the crank shaft, large connecting rod bearings and the pistons. The oil reservoir has been detached and is shown above. As can readily be seen the oil reservoir is divided into four compartments, into which the ends of the connecting rods dip for oil. The oblong hole on the right is for the overflow into the well below. The clutch and transmission are shown in Fig. 4. The clutch of the Chalmers car is of the multiple disc type. It consists of alternate discs of hard bronze and steel—the bronze discs being connected with the flywheel, while the steel ones are keyed on the main driving shaft of the transmission. They all run in a bath of oil. In operation they work as follows: when the clutch is thrown out the discs separate and the bronze plates rotate with the flywheel while the steel discs remain quiet. When the clutch is "thrown in" the springs jam both sets of discs together, gradually squeezing the oil out between them until the plates are in contact and the whole combination rotates. In Fig. 4 the sliding gear transmission is shown in the center, while the drive shaft brake is seen at the right.

The right side of the Chalmers "30" motor is shown in Fig. 5. Here is shown the carburetor and the gas or fuel intake, the wiring arrangement, the fan and radiator.

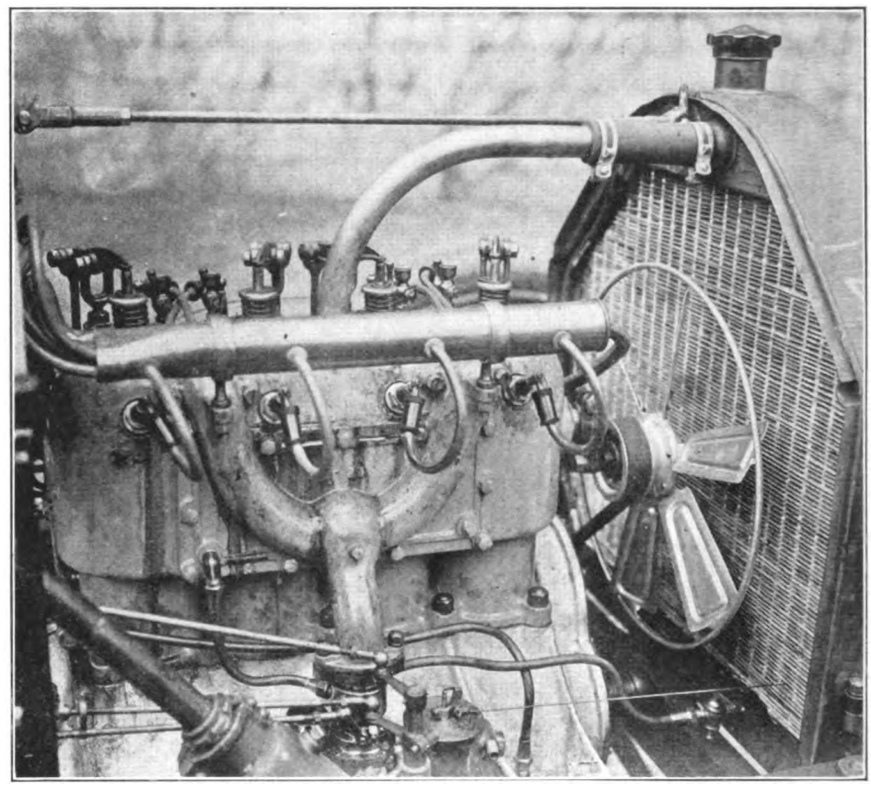
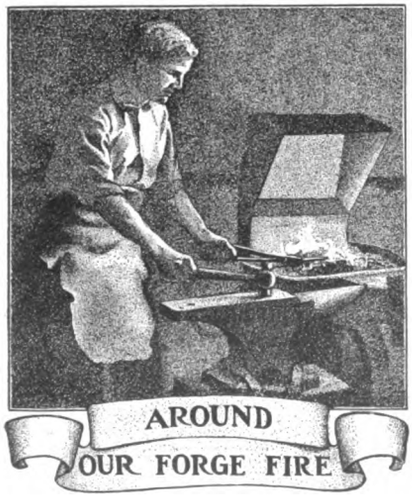


FIG. 5.—THE RIGHT SIDE OF THE CHALMER'S MOTOR



The Editor had shown his visitors through the printing plant and was discussing several topics with them in his "Forge-room."

"What do you candidly think of side lines for blacksmiths? asked one of the men.

For reply the Editor told the following story;

"In the central part of a middle western state an ambitious young chap started a small blacksmith shop. His tools and equipment were no better than the average beginner's, in fact, they leaned toward the poorer side rather than the better. But what this fellow's tools lacked, he himself made up in ambition and ability—He worked hard,—when he got a job—to please people, and did the very best he knew how. But he found himself making headway extremely slow. In fact there were times when he was 'pretty close to the cushion.'

"Then one day a farmer drove up, had a couple of shoes reset, and after the job was finished he asked the smith if he happened to have a wagon jack he wanted to sell. The smith said; 'No, but I'll make you one.' The farmer said he'd call for it on his return.

"Well, he made a wagon jack for that farmer and then he made others. And he kept them in view, with a neat card giving the price. From wagon jacks he went to other things—put in a small stock of whips, axle-grease and harness oil, until he had quite a line of sundries.

"Then one day a farmer friend spoke to him about carrying a line of agricultural implements. He sent for catalogs, interviewed his customers on the subject, and thus got an idea of what line to handle. After that he talked agricultural implements instead of politics or gossip, to a customer while blowing the fire, and by the time the local hardware man woke up to the possibilities of business in plow parts and farm implements this smith had things just about his own way.

"It's hardly necessary to say that this man had to enlarge his shop several times and that now he has one of the best-paying shops in his section of the country. He has a large shop now, where any kind of work from shoeing a horse to overhauling an auto is done. His implement business has been turned into a company, and he himself has a good slice of stock. Of course, he is not as active in the business as he was years ago, but he still keeps his hand on the reins.

"Now the point is just this—would that business have grown so, would he have even made a living, if he hadn't taken up side lines?

"I don't by any means wish to say that a smith can't make a success, can't make a good living, at smithing alone. But I do say and very emphatically, too, that there are many cases where a smith is not busy all the time and then he can turn unprofitable spare time into money."

One of the visitors then asked how to apply rubber covers to the iron wheels of a band saw.

"First, thoroughly clean the surface to be covered" replied the editor "Then apply a wash of muriatic acid and let the wheel stand over night. The next day give the iron and rubber a good coat of heavy yellow shellac varnish and press the rubber tightly upon the wheel and clamp. Now allow the wheel to stand until thoroughly dry and until the varnish has set. The wheel may then be used."

"What sort of a joint would you make in your rubber—lap or butt?" asked the other.

"You'll have to butt the two ends together," replied the editor, "unless you can make a lap without making a hump in the surface of the rubber covering."

The visitors then thanked the Editor for a very interesting hour and departed.

Smoke Pictures.

W. O. B.

Jes' a smokin' an' a dreamin',
Jes' a pullin' at my clay,
Lookin' at the smoke arisin'
An' at places far away.
Jes' a smokin' an' a dreamin'
O' the olden days an' folk.
Jes' a sittin' in the gloamin'
Seein' pictures in the smoke.

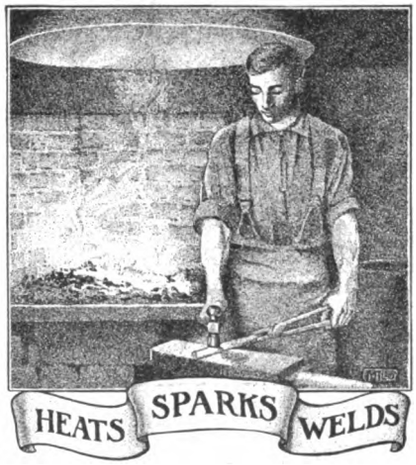
Jes' a floatin' back t' boyhood,
Back t' days o' long ago,
Back t' places long forgotten—
As the seeds o' mem'ry grow.
Jes' a smokin' an' a dreamin'
O' the shop beside the oak,
Where I pounded on the anvil—
I can see it in the smoke.

Jes' a dreamin' o' the smith shop,
With its forge an' ole anvil—
Nestlin' down thur in the hollow
Rite nex' to the ole saw mill.
Jes' a thinkin' I'm a hammerin'
An' a blowin' up the coke.
Jes' a dreamin' that I'm part of
Thet thur picture in the smoke.

Jes' a lookin' at a picture
At a picture in the smoke,
One thet brings back sweet ole mem'ries
Jes' as if the picture spoke.
It's a picture of a woman
Standin' thur beside the oak
Jes' outside the smithy doorway
In the picture in the smoke.

Jes' a lookin' at her picture
Brings the tears into my eyes
Still I love t' see her face there
As the smoke begins t' rise.
Jes' a dreamin' o' her picture
Makes my throat a kind o' choke—
Then Son Jim says; "Dad stop smokin' "-
It's the picture—not the smoke.

Jes' a smokin' an' a dreamin'
Since I've laid my hammer down.
Jes' a restin' from my labors
'Fore I'm called to wear a crown.
I don't need no picture gallery
For t' see old scenes an' folk.
I can see heart masterpieces
In the pictures in the smoke.



'Tis a poor job that brings not another.

Procrastination is also the thief of profits.

Better too much than too little light and ventilation.

You can't stop a wagon's screeching by removing its tongue.

What do you think of automobile work for blacksmiths now?

Troubles seldom trouble those who are larger than their troubles.

You can lead a horse to water, but you cannot make him eat a bit.

Does the amount of your work increase with the length of the days?

The mortgage-covered shop is not usually the one with the tightest roof.

There's a difference between keeping a smith shop and having a shop keep you.

A timely explanation often saves a load of trouble—tell it to us, before you judge.

Say what you will about dumb animals, but just the same the horse knows a good bit.

Sense in business usually means cents in business—but it never results in price cutting.

Uncle Billy Martin says; "The folks that expect pay for doing right are the worst sinners."

There'll be lots of room for shoo pictures in the coming shop number. Better send yours now.

No man can forge his way to success with a stone hammer in these days. Be a modern smith.

First, read helpful hints; second, learn helpful hints; third, apply helpful hints, and then be helpful to your neighbor.

It's not the price so much as it is the quality that is the deciding point on whether the customer will or will not come again.

Interest the children in a garden. You'll find them glad of the chance to help beautify things. And then, too, everybody likes flowers—even a blacksmith.

Accounts will over run if you don't run over them occasionally. Keep at the heels of your debtors—they'll get behind if you don't, and then you'll be behind.

A young horseshoer desiring to work in a country shop about a mile from town is requested to communicate with Mr. A. Burns, Jr., at Coburg, Ontario.

The difference between the money you take in and the money you pay out shows whether or not you are making a profit. Cutting expenses increases profits.

If your end of the selling price is too big, cut prices, of course. But when you do cut remember that it's the profit and not the cost end of the selling price that you shave.

Are you getting some of the money spent on automobiles? It's your own fault if you're not. Follow up the articles in our "Horseless Department," and get some of this money.

A man may write from now until the end of time, about what he thinks he knows about horseshoeing, but two minutes spent watching him at work on a foot will tell whether he actually knows, or just thinks he knows.

With higher prices and fewer customers you make the same as with low prices and many customers. Do good work and get good prices. Good work brings customers. Good work means better prices and more customers.

Get the helper's opinion—he must know something or you wouldn't have hired him. Talk things over with him. You can both get help from such a discussion. And you'll find him a better helper for having shown an interest in his opinions.

Farmers are buying more automobiles every year. Manufacturers prepared for bigger business than ever this season—dealers are also stocked to take care of big business. Are you prepared to care for these machines when they break down?

If a man lived alone, away from mankind, heard no voice but his own and read no books, how much would he know? What chances would he have as a blacksmith? Discussion and reading develops the mind, and a blacksmith must use brain as well as brawn.

At the close of last year, of 89 vehicle manufacturers, 41 reported a satisfactory outlook, 18 unsatisfactory and 30 noncommittal; 38 said they were building automobiles, 7 had discontinued building horse-drawn vehicles, 6 were building autobodies and 4 were either in or were going into the electric carriage field.

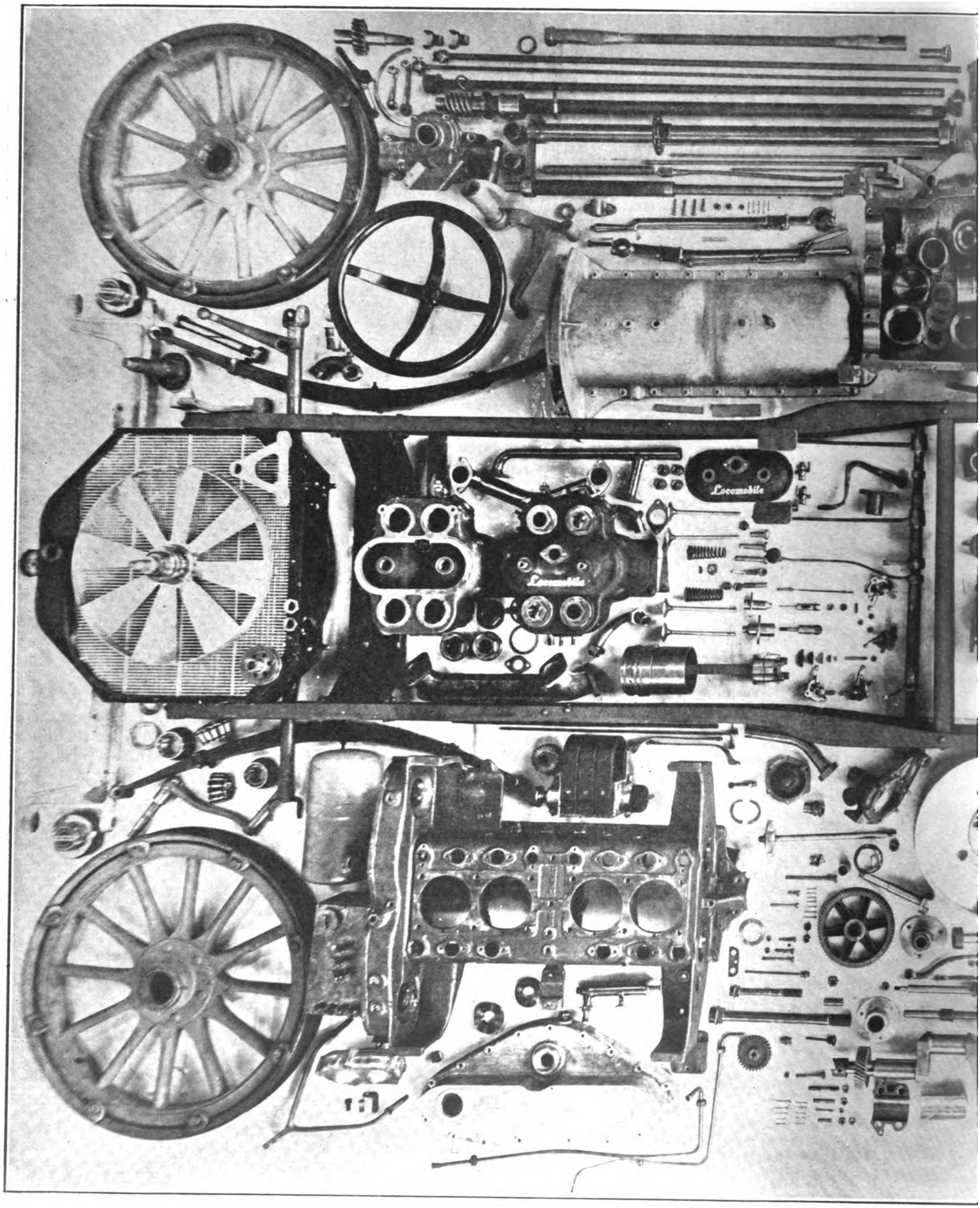
When asked to tell the secret of his success, a man whose name is known to every smoker of good cigars in central Indiana said; "I don't sell any cigars that I myself would not willingly smoke, and I don't try to make all my profit in one transaction." The same principle can be applied to the smithing business, with profit.

How much salary do you pay yourself? If you are the proprietor see that you get your pay every pay-day. You are worth more to the business than any of the men. See that you get more. If you cannot pay yourself a salary at present prices, raise your prices so you can. If you're afraid to raise prices, organize—send for the Secretary's plans.

Oklahoma Meeting.—A meeting of the smiths of Oklahoma is to take place at Guthrie on May 23, 1910. We would advise every smith who can possibly do so to attend and become a member of the Oklahoma Association. There is no reason why a good big delegation should not meet at Guthrie on the 23d. For further particulars write to Juenger and Huston, Stillwater, Oklahoma.

Now is the time to act—the roads will be right for visiting other shops, and if you are not getting as much money as you should for your work an Association will enable you to get what you deserve. Don't be content to work for little or nothing. Kick and kick hard for good prices. Get your neighbors kicking and then kick up an Association. Keep at it, kicking persistently, everlastingly, until you get what you deserve.

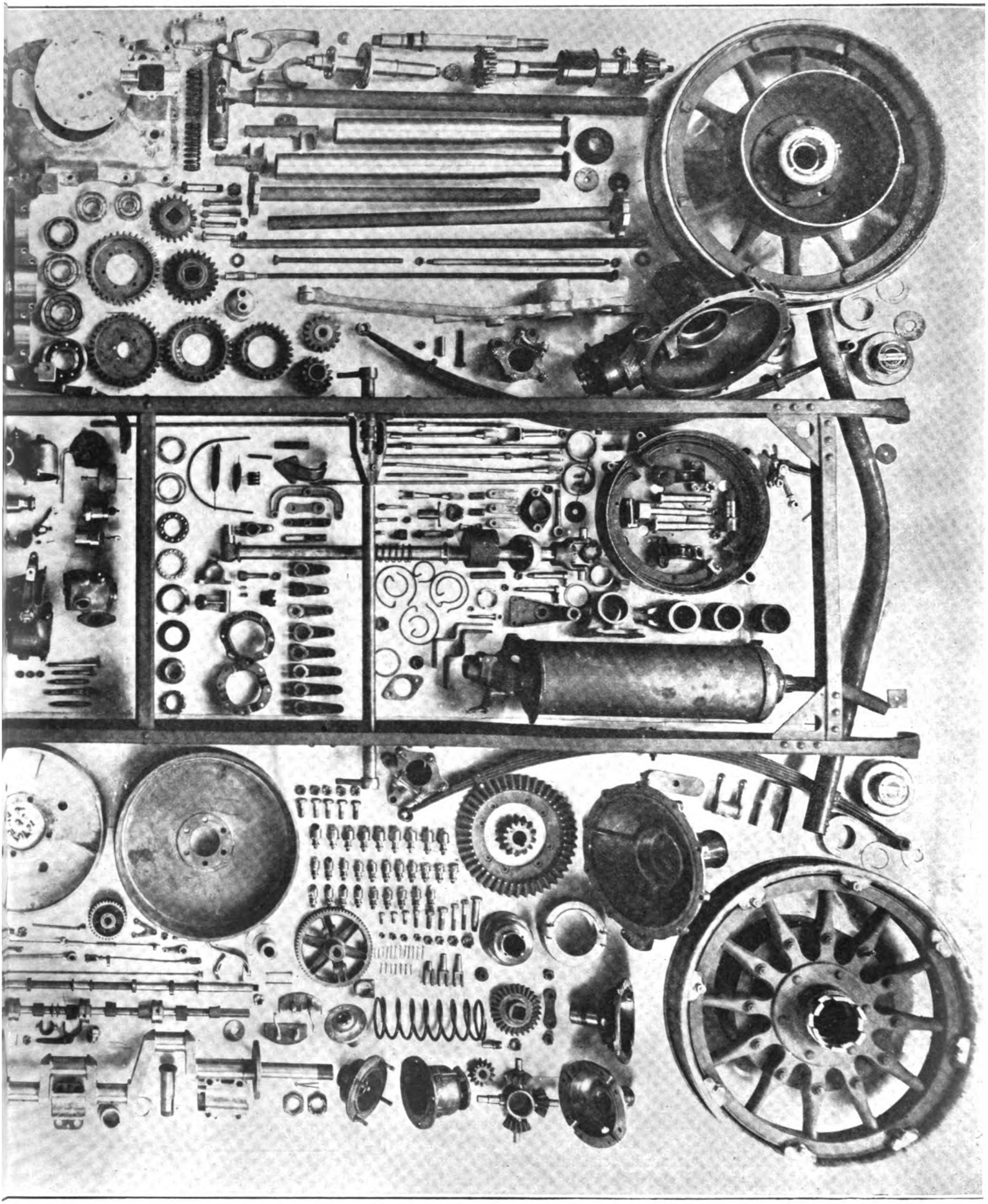
Tom turned over a new leaf the first of April, said he was "goin' t' fule thet Editer." So he started by getting his sign ready. He hauled it out from beneath a pile of old odds and ends and got it into fair shape with the aid of a pot of paint. He then attempted to replace it over the shop door, but before he had finished nailing it the sign came down bringing a portion of the rotten old doorway with it. Luckily, Tom wasn't hurt, but the sign is still lying just where it fell two weeks ago. Tom says he's going to have a new shop front put in—some day.



The modern motor car is a combination of many different machines, and when we consider and realize the great number and variety of the parts and what a car can do and does do day after day, we cannot help but marvel at the skill and ingenuity displayed by the engineers and mechanics interested in its construction.

The Parts to a Mode

To an extent, the motor car is becoming more complex. Engineers are striving for better performance, increased ability and reliability, and many parts have been added to obtain these



ern Motor Car Chassis

greatly desired qualifications. Simplicity does not necessarily mean reliability—in fact, the requirements of a motor car are so complex that the mechanism must of a necessity become complex to fill its requirements. In the chassis shown above, which is a Locomobile, there are: In the engine with magneto and carburetor, 1,508 pieces; in the transmission, 126; the rear axle, 166; the steering column complete, 158; in the hand lever group, 66, and a total of 4,983 pieces in all.

We are indebted to The Locomobile Co. for the photograph.

American Association of Blacksmiths and Horseshoers.

How are things in your county, Mr. Reader? Pretty near time you got a fair return, a full price for your labor, isn't it? The only way you can get what you deserve, what rightly belongs to you, is through organization. Get busy now—right this very minute. There is no time better than the present to start an organization. The roads are good, weather is fine and times are generally prosperous. Don't wait until next season. An association that will benefit you next year will benefit you now, and the sooner it is formed the sooner it will begin to benefit you. Why not get all the benefit you can.

Never before was the need of organization in the smithing field more apparent. Prices continue to soar and, while costs are going up, the smiths' selling prices are at a standstill, because of misunderstanding in the ranks. Why not speak to your brother smiths about the matter. You'll find them just as anxious as you are to organize.

But reading this letter every month won't help you. You've got to start something. You've got to talk to the other boys in the neighborhood, and get them to meet some evening and talk over the matter. Get my easy plans—they will tell you just how to go about the whole matter.

Action and push are needed to start an association. You can't do anything toward bettering prices by smoking in the shop doorway all day. You must *do*, not *dream*. A copy of my plans will help you *do*. And a request mailed now, today, will bring you full directions by return mail. Don't delay your request another minute. A penny postal will do, and anything worth doing is worth doing *now*. And if anything is worth doing it is certainly worth while to form a branch association to enable you to get better prices, to protect your family and business, and to enable you to work under better conditions. Address that postal this very minute to THE SECRETARY.
P. O. Box 974, Buffalo, N. Y.

Some Straight Talk on Prices.

"TOM PRONTO."

I have noticed the prices charged by blacksmiths generally all over the United States, and think the system wrong in a great measure. For instance, one charges $ .25 for a buggy spoke, another $4.00 for a wagon pole, $ .50 for felloe, and so on. In straight blacksmithing, it is the same—sharpening share, $ .25; setting four buggy tires, $2.50; four wagon tires, set, $2.50; etc. The sooner this is changed the better, as I think I can prove that a plan I have tried is better. It is as follows:

I charge a very reasonable price for bolts, spokes, poles and tires and all stock, and then charge for work, fitting, etc., and have found it pays much better than a straight price. Of course, it cannot be done in all work, but I manage to come close to it. In justice to yourself and your customer, my plan evens things up, as shown in the following bills:

March 4, 1910,

MR. TWELVEMONTHS
To TOM PRONTO, DR.,
Blacksmith and Woodworker.

Four laths in brake	$ .12
Eight screws in seat 10 by 1½	.05
Two bolts in buggy 5-inch wheel, ¼ by 2¼	.05
One oak spoke, 2½	.18
One oak reach rough, 2 by 4 by 10 feet	1.20
One man, 3 hours' time fitting, @ $ .50	1.50
Two countersunk head bolts in panel board plate	.20
Two men and fire, 3½ hours, @ $ .75	2.60
Four shoes (sorrel)	1.50
Four shoes (brown), bad wild horse, three hours	2.25
	$9.65

Any wagon repair man knows he cannot put one or two spokes or felloes in different wheels in the same time. He will have to re-mortise the hub, which takes longer than fitting three spokes in another wheel. The wheel may be dished and all the felloes loose. Then they have to be wedged, and he cannot fit a felloe as easily as on a straight wheel. He cannot put two bolts, in a sand board plate without taking the bed off, and he cannot put two bolts, ¼ by 2¼ inches, buggy fifth wheel, for the price of the bolts. I have often seen a good man work over an hour to take out two or three old bolts from a fifth wheel and fit new ones.

My attention has been drawn to the inequality of straight prices for work by charges for plumbing (which I do as a side line) as follows:

MR. PAY-NOW, CALIFORNIA, Mar. 4, 1910
To TOM PRONTO, Plumber.

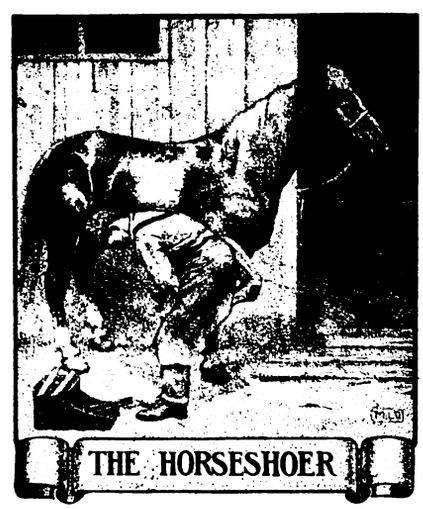
3¾-inch Elbows black	$ .30
2¾-inch Tees, black	.30
1 Lead Strap, 1½	.95
1¼-inch Union, black	$ .25
2 Sheets Tin, 14 by 20 inches	.20
½ bar Solder, $ .30, Gasoline, $ .20, Acid, $ .10	.60
1 man and helper, 4 hours @ $ .90	3.60
	$6.20

The men get full pay from the time they leave the shop until they are back.

It is time blacksmiths altered the system that has kept them poor in the past. A trade that has done more for the real good of this now prosperous land than any other—what does it give you? Not even a compensation in old age, but work, work, work, and die with your hammer in hand and the apron on. I know many smiths who have worked the better part of their lives in the shops as owners or journeymen, and *not one* who has stuck to the trade has put by enough to allow him to rest in independence the few remaining years of his life. We have to carry an expensive stock, and some goods are not wanted in six months, but we must have them on hand when wanted, or quit the business.

Our tools are expensive and cost time and trouble to keep up, and after once used one can only get little better than junk price for them.

Now, if all the blacksmiths in this country refused to work, within three months everything would be at a standstill. We are the men, and they cannot do without us. Have some backbone. Do not stand still while all the others are passing on to prosperity.

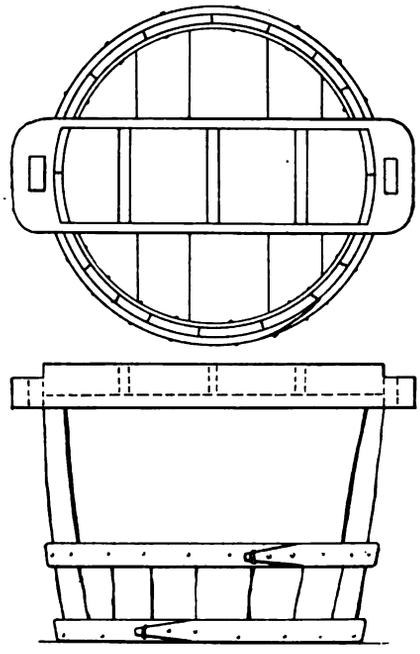


Treating Foundered Horses.

E. H. MALOON.

I notice that quite a little has been said about a drop sole in a horse's foot. As I understand it a drop sole is only present in a foundered horse. When a horse is foundered, the laminae of his

foot is destroyed, and the whole inside structure of his foot is allowed to settle. The sole, not being strong enough to hold the horse up, becomes convexed, and we have what we call a drop sole. As I look at it this sole must have artificial support, as the laminae has been destroyed and can never be replaced, as a tissue once destroyed will never grow again. Now, to give the sole artificial support is



A SHOEING BOX MADE FROM A SHOE KEG

just where the skill of the horseshoer comes in, for often the sole is very thin and tender. Oftentimes I put on quite a thick, narrow web, flat shoe. This divides up the weight of the horse, part on the shell and part on the frog and sole, and a great many times the horse will go sound, except when he steps on a stone and the sole gets the whole weight.

But if the sole is thin, it must be covered by leather, cotton and iron. My way of doing it is to find out the tender spot. I then make my shoe with a thin steel plate over the tender part. I never use tar on a horse of this description. After the shoe is fitted, I take cotton and pack the foot, all but the sore place. This I leave open. I now cut a good stiff pad from belting and proceed to set my shoe. I trim the foot but little as I like lots of shell to put my shoe on and plenty of shell to get my nails into. If the toe gets long and turns up I take a sharp rasp and rasp it back, and I rasp on top until I get the foot to look as well as I can. I can generally find some way to make the horse go sound.

But if men only knew how there is a way to stop a horse from being completely foundered. One thing is always safe to do—that is to remove his shoes and pare the shell until the sole gets pressure, and give him four ounces of saltpeter in a pint of water every six hours for a week. If you want to, apply cold water to his feet and, if fever arises and the heart beats strongly and he is greatly excited, ten drop doses of aconite and niter can be given every two hours for twenty-four hours. There may be newer, and perhaps better, remedies (I am no veterinary), but I get good results from this treatment.

A Shoeing Box from a Keg.

JOHN A. THORNE.

I have a shoeing box that I consider the best I ever saw. Its advantages lie in its strength combined with light weight, and in the fact that it is balanced from the center. To make it, take a horseshoe keg that is good and with two wide staves as nearly opposite as possible. On these are built the nail boxes. Take off the top hoops and put one of them inside the keg at the second hoop from the bottom. Nail all the staves through both hoops and then cut off all of them except the two wide ones at this double hoop. Cut the two wide ones as long as you wish the height of the box to be and build in the nail boxes. To make the knife holders, I take a piece of soft pine about one by two and a half inches, cut it to fit the staves and cut out a notch to fit the knife blade. I like this better than leather, as it does not cut through, and it does not dull the knife like band iron would. I have found out by experience that a wooden-hooped keg with wide hoops is the best. A nail keg is a little wider than a shoe keg and gives more room for the nail boxes. This idea of making a box is not mine, but I have improved on it, and the box I make is stronger than the one I first saw. I have made several of them in different places and have seen them get very hard usage from bad horses and have never seen one broken. The thing that I like about them is their light weight. One of them full of tools is not any heavier than another box of the same strength and empty.

A License Not Necessary (?)

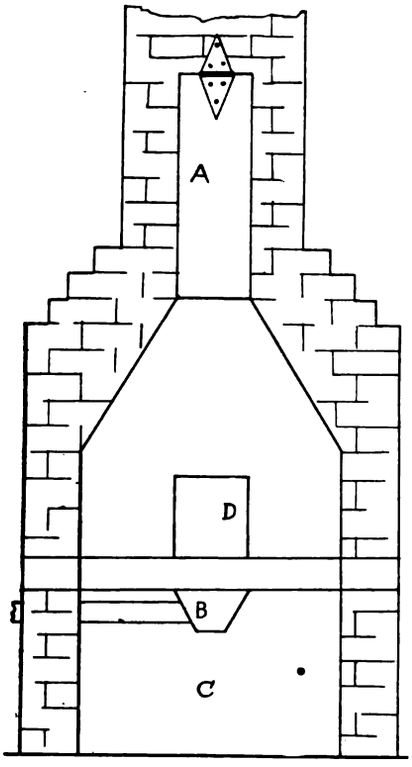
FRANZ WENKE.

"No blacksmith needs a license to shoe horses: one might just as well license a cobbler, who shoes people." This is a decision by a judge in Denver, Colorado.

I will not pass on the legality of the decision of that Denver judge—it might be "contempt of court" or "Les Majesty" or something of that sort. But I would like to find out where that judge got his judicial learning, his business sense, and whether that judge has his horses shod by a cobbler who shoes people. This famous decision was given by a judge who claims that the law to license horseshoers is "unconstitutional." The judge, clothed in purple and ermine, says that the trade of horseshoeing has been practiced since the days of antiquity, and is an ordinary calling. True it has been practiced ever so long. We all know that Alexander the Great, when he went to war with the Persians, became stuck in the desert with his ten thousand horsemen, and had to use leather and



THE NEAT APPEARING SHOP OF MR. H. E. BERGER OF NEW JERSEY



A NOVEL IDEA IN FORGES

wooden and iron horseshoes in order to continue. We also have heard that Alexander had his own horse shod with silver shoes. An old adage says, "For want of a nail a shoe was lost, for want of the shoe a horse was lost, for want of the horse a rider was lost, and for want of the rider the battle was lost."

"In the days of antiquity," to use the honorable judge's own words, the ancients found out that for want of horseshoes the armies came to a standstill, but we have not heard that Alexander's foot legions, for want of cobblers, could go no further. In the days of antiquity there was a lack of the great breeding of blooded horses or racers, to our knowledge, but we know that when horses were wanted they were wanted badly. Now, since the days of antiquity, the art (not only the trade) has advanced until today it is a science. Not every Tom Tardy can make a success at the art of horseshoeing on the same principles as a cobbler gives us corns and bunions.

In every state we find humane societies who protect the poor, dumb animals. There, in Denver, we see, each day during winter, the blue-coated policeman stopping drivers whose horses are slipping on the icy streets. Why do not these humane societies and societies for the Prevention of Cruelty to Animals see to it that not every Tom Tardy will cripple horses? Heaven knows we men have to suffer enough at the hands of unsophisticated cobblers, but we can kick as well as explain about our wants, but the poor abused horse can only kick, if he has life enough left in him. I think the honorable judge has another think coming to him.

A Novel Idea in Forges.

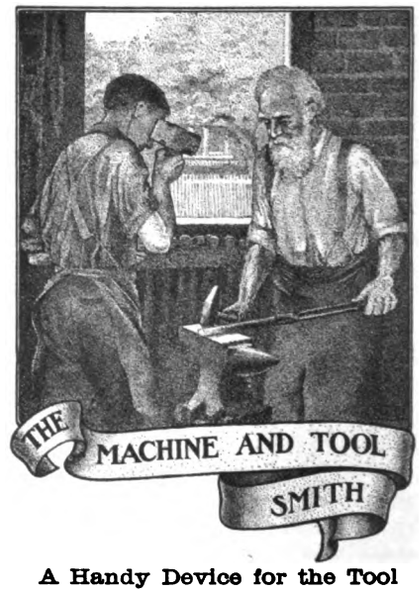
ELMER BUTZ

I have noticed so many photographs of blacksmith shops in THE AMERICAN BLACKSMITH, that I thought I would send in mine. It is a two-story shop, forty-four by thirty-eight feet, and in it I have all the latest tools and machinery. I possess a six-horsepower engine, a band saw, a circle saw, a power grindstone, a Wonder disc sharpener, a Champion hand or power drill, an emery stand, a Little Giant trip hammer, a power blower and an Ideal lawn-mower sharpener. I have room for sixteen horses in my shop, and the wagon shop is twenty-two by thirty-eight feet.

I think I have the finest thing in the way of forges that ever was built—you can see them on the right-hand side of my shop. They are built on the outside of the shop, giving full shop space within, and another advantage is that there is no dirt or smoke inside the shop. In it, I can do any kind of work that can be done in any other forge, and some work which cannot be gotten within other forges. I can put a wagon tire in it, too. The engraving shows how it looks viewed from within the shop. A board, A, is used to close hole when it is not being used for tire setting, and is high enough to put in any sized tire; B is firebox right in the center of the forge which is four feet square and C is the ash box. The space for the forge is cut out of the side of the shop, and the inside of the boards are lined with asbestos paper. In the back of the forge is a small door, D, through which to put long irons.



THE FORGES ARE BUILT AGAINST THE SHOP BUILDING PROPER

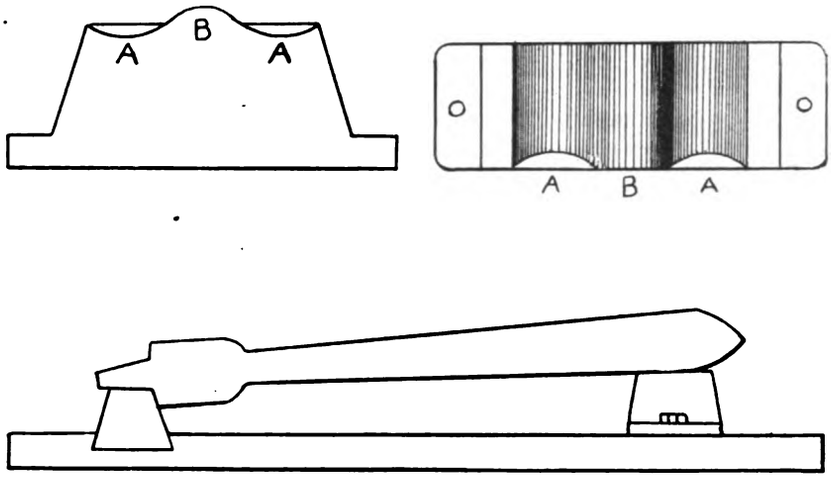


A Handy Device for the Tool Dresser.

L. R. SWARTZ.

Most tool dressers know the difficulty of keeping the flute of a bit in proper shape near the edge. Several years ago I got up the form of anvil billet shown in the engraving, and I found it to be a great improvement over the old style flat topped billet, both in the way of keeping the flute clear and in forming a support to the thin part of the bit while dressing. The raised part, B, is of such shape as to fit the flute. The slight depressions worked out at the front are for the purpose of preventing injury to the cutting corners

of the bit when bringing the wings in to gauge. The billet is made of cast iron. The body of pattern is made of four by four inch white pine



THE DRESSER OF DRILL BITS WILL FIND THIS DEVICE VERY HANDY

board tacked to under side of pattern and the top or fuller part shaped up and bradded on afterward. The curved depressions are worked out at each side of fuller. They begin about 1½ inches from the front and are only about ¼ inch deep at front; thus the shape is ¼ inch in 1½ inches. As indicated at C, bolt holes are made to permit the billet to be bolted to the rack, which is a piece of 2½-inch or 3-inch plank with a heel block dovetailed crosswise into the plank. This heel block has a V-cut in the top for the pin to lie in so that the bit will not jostle off the rack in dressing or in turning the bit on the billet. The engraving of rack and anvil billet shows the position of bit billet and heel block on the rack.

The billet for 5⅛-inch or 6-inch bit weighs forty-five to fifty pounds and can be made at any foundry. In connection with the billet I use a top fuller with a handle. This top fuller is made of a piece of 1½-inch square tool steel, the face shaped to a 2-inch circle. Whenever the steel shows a tendency to drive back into the flute to form a feather I use the top fuller to put it into shape. This may also be pened in with the pene of the sledge, if the pene is nice and round, and is more easily done if one has no helper, but where one has a helper the fuller does the job the quicker.

How to Forge Eye Bolts.

BERT HILLYER.

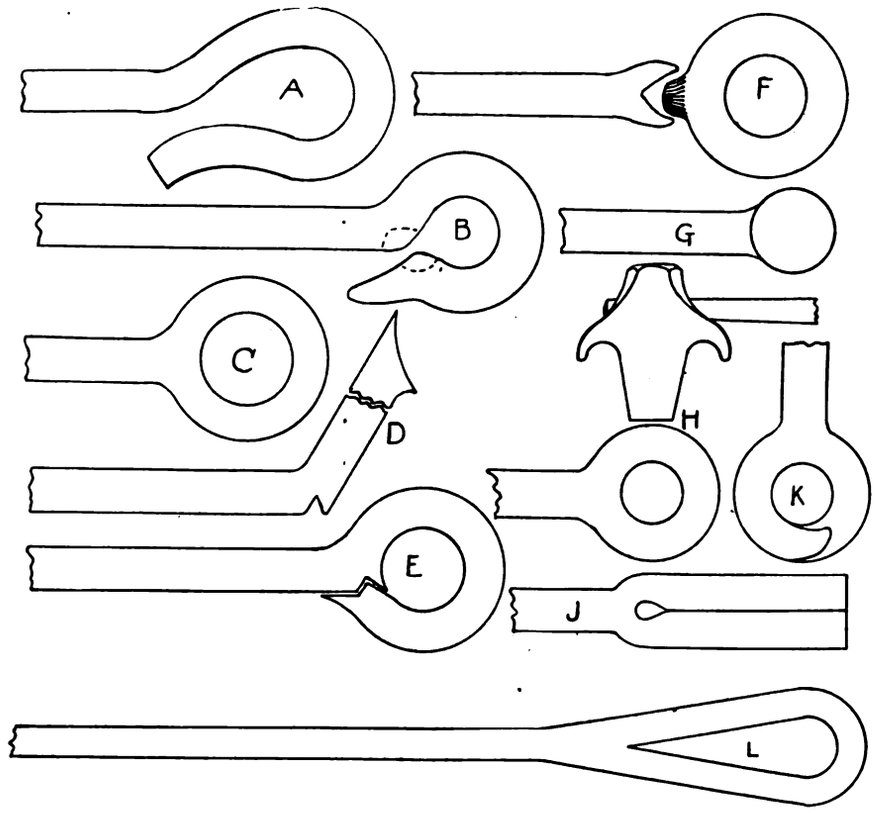
The forging of eye bolts is of frequent occurrence in all smith shops. There are many methods of making them, some of which I will endeavor to explain. The most common form is to bend the stock around a pin to shape the eye, and then weld. Some draw the end down to a point first before bending around and some bend around first and cut the end tapering where it is to be welded.

Another way is to put a bob punch in the iron where the weld is to be and make a lip on the side of the iron and another near the end of the piece, so that when the two scarfs are crossed and welded it resembles a solid eye, see B and C.

Still another way is to upset a scarf on the end of a piece, making the end of the piece look as at D. Then bend back the right distance to make the eye and cut as shown. When bent around and welded this also looks like a solid eye.

Another process, mostly used in making large eye bolts, is to make a ring first, and then scarf wedge shaped where the ring has been welded. Next take stem upset and split on end; then take separate heats. To weld, put ring over horn of anvil and split piece over that with three or four sharp blows on end to drive it into place. Weld sides, and use fuller to weld in neck. If good heats have been used you have a good eye bolt. See F in the engraving.

The process that I consider best of all is to make them out of the solid. When possible the best way to make them out of the solid is to take a piece of round iron, and draw down the stem to the size desired, leaving enough stock on the end to make a round ball. The ball can be made very easily by constructing a blank spring swedge. Then make the ball as near round as possible, by using top and bottom swedges, holding it at different angles as the helper strikes it. Heat up the blank swedges and put ball in between them. Take firm grip on the stem so that you can turn the ball after each blow of the hammer, until you have a perfect print of the stem and ball. In this way almost any rough lump will turn



THERE ARE SEVERAL WAYS OF FORGING AN EYE BOLT

out (if it has enough stock in it) to be a nice smooth ball after being hammered in the swedge. Then flatten ball to very nearly the size you desire it and punch the hole. Another spring tool can be made to round the eye if desired or a handle punch with a circular collar around one half of it will do it. When made this way a good, safe eye bolt is the result. See G and H.

Yet another way is to take a piece of flat stock, shoulder in as at J, draw stem to size wanted and split down with hot cutter to punch mark. Throw ends out in T-shape after rounding up nicely, bend top part in a ring, and weld as at K.

To make the long wire eye (see L) that is used on bridges, and which is supposed to be the strongest welded eye made, the rule is to take seven times the diameter of the pin for the length and three times the diameter of the iron for the width to make it the right proportion.

Solid Forgings.

JAMES CRAN.

The term "solid forging" when used without qualification applies to forgings made from one solid piece of iron or steel in short forgings without welds.

To a great extent steel has displaced wrought iron as material for machine forgings and in consequence the methods of forging have also changed, for the reason that steel even in the mildest form is much more difficult to weld than wrought iron. Up to comparatively recent years nearly all forgings used in the construction of machinery were of wrought iron made in sections and assembled into one piece by welding, which as far as blacksmithing goes was comparatively easy compared with making the solid steel forgings that are almost invariably used in the construction of high efficiency machinery of today. When welding was the rule, blacksmiths with comparatively little education could hold down good jobs as long as they knew about how much to allow for a weld, were skilled in the use of tools and able to do good heating; as they did not necessarily have to calculate the amount of stock required for a whole forging, but made it piece by piece from various sizes of stock, the amount of which was guessed at and a little bit allowed for paring off the ends of pieces to be welded together. In the kind of blacksmithing referred to, proficiency and skill came by practice and native ability, alone. Theory tables and handbooks were at a discount, and the men who could guess the closest were the ones who got the plums.

The general use of steel, however, has changed all this, and the old-time crackerjack with his cut and try methods is not in it with the up-to-date machine blacksmith of today who must be able to read drawings, calculate the amount of stock necessary to make forgings, know how much to allow for waste in forging, how much to allow for finish and above all be skilled enough to reproduce in solid steel, with accuracy, the pieces shown on paper, if he expects to command top-notch wages.

There is no forging in this line that has come into more general use in the last few years than the weldless steel ring, which is used for a wide variety of purposes in modern machine building in sizes from a few inches to several feet in diameter. One of the many purposes they are used for is rims for gears which are shrunk upon cast-iron centers and have the teeth cut in the solid steel. For such purposes the advantage of solid rings over welded ones is obvious—no welds to show up in machining, no extra stock to be removed from the edges near the inside, which is caused by the inside of the ring upsetting and the outside drawing as it is bent to shape. And the time used in making them is less than half what is necessary to scarf, bend, weld and true up welded ones.

The first thing to do in making rings from the solid is to calculate the amount of material necessary for a ring of any given size. This may either be done by weight or cubic capacity. The

DIAM.	WEIGHT		DIAM.	WEIGHT		DIAM.	WEIGHT		DIAM.	WEIGHT		DIAM.	WEIGHT		DIAM.	WEIGHT		DIAM.	WEIGHT	
INCH	LBS.	OZ.	INCH	LBS.	OZ.	INCH	LBS.	OZ.	INCH	LBS.	OZ.	INCH	LBS.	OZ.	INCH	LBS.	OZ.	INCH	LBS.	OZ.
1	0	3 1/2	6 5/8	8	4	11 1/4	27	13 1/2	16 3/8	58	15 5/8	21 1/2	101	12 1/2	26 5/8	155	13 11/16	31 3/4	221	13 5/8
1 1/8	0	4 1/2	6 3/4	8	9 1/2	11 3/8	28	7 15/16	16 1/2	59	14 1/2	21 5/8	102	14 1/16	26 3/4	157	6 3/8	31 7/8	223	8 1/2
1 1/4	0	5 1/2	6 3/8	8	15	11 1/2	29	1 1/2	16 5/8	60	12 11/16	21 3/4	104	1/3	26 7/8	158	4 1/2	32	225	4 1/2
1 3/8	0	6 3/8	6 1/2	9	4	11 5/8	29	11 3/8	16 3/4	61	11 3/8	21 7/8	105	4 1/3	27	160	6 1/8	32 1/8	226	3 1/8
1 1/2	0	7 1/8	6 5/8	9	10 1/2	11 3/4	30	6	16 7/8	62	10 1/8	22	106	7 3/8	27 1/8	161	13 1/2	32 1/4	228	12 1/8
1 5/8	0	8 1/2	6 3/4	10	1/2	11 7/8	31	5/16	17	63	9 1/2	22 1/8	107	11 11/16	27 1/4	163	5 5/8	32 3/8	230	9 15/16
1 3/4	0	10 1/2	6 7/8	10	6 1/2	12	31	10 5/8	17 1/8	64	8 1/2	22 1/4	108	14 1/3	27 3/8	164	13 5/8	32 1/2	232	6
1 7/8	0	12 1/2	7	10	12 5/16	12 1/8	32	5 1/4	17 1/4	65	7 1/2	22 3/8	110	1/4	27 1/2	166	6	32 5/8	234	2 3/4
2	0	14 1/2	7 1/8	11	2 3/8	12 1/4	33	1/4	17 3/8	66	6 1/4	22 1/2	111	6	27 5/8	167	14 1/4	32 3/4	235	15 1/3
2 1/8	1	0	7 1/4	11	9	12 3/8	33	10 3/8	17 1/2	67	6	22 5/8	112	9 5/16	27 3/4	169	6 1/4	32 5/8	237	12 1/3
2 1/4	1	2 3/8	7 3/8	11	15 5/16	12 1/2	34	6	17 5/8	68	5 1/4	22 3/4	113	13 5/16	27 7/8	170	13 1/2	33	239	9 1/3
2 3/8	1	3 5/8	7 1/2	12	6	12 5/8	35	0	17 3/4	69	5	22 7/8	114	4 7/16	28	172	7 1/2	33 1/8	241	6 1/3
2 1/2	1	6	7 5/8	12	12 3/16	12 3/4	35	12 1/8	17 7/8	70	4 1/3	23	116	3 1/3	28 1/8	174	8 1/3	33 1/4	243	3 11/16
2 5/8	1	8 1/4	7 3/4	13	3 1/3	12 7/8	36	6 1/3	18	71	4 1/2	23 1/8	117	10 1/3	28 1/4	175	9 1/16	33 3/8	245	11/12
2 3/4	1	10 1/2	7 7/8	13	10 1/4	13	37	2 11/16	18 1/8	72	4 1/3	23 1/4	118	14 3/8	28 3/8	177	2	33 1/2	246	14 1/3
2 7/8	1	13 1/2	8	14	1 1/3	13 1/8	37	14 5/16	18 1/4	73	4 1/3	23 3/8	120	3 1/4	28 1/2	178	11 1/16	33 5/8	248	10 5/16
3	1	15 1/2	8 1/8	14	8 1/3	13 1/4	38	10	18 3/8	74	4 5/16	23 1/2	121	8	28 5/8	180	12 5/16	33 3/4	250	9 1/2
3 1/8	2	2 3/8	8 1/4	14	14 1/3	13 3/8	39	6	18 1/2	75	4 1/3	23 5/8	122	12 5/16	28 3/4	181	13 1/4	33 7/8	252	7 1/4
3 1/4	2	5 1/8	8 3/8	15	6 1/3	13 1/2	40	1/16	18 5/8	76	5	23 3/4	124	1 1/16	28 7/8	183	6 5/8	34	254	5 1/16
3 3/8	2	8 1/16	8 1/2	15	14 1/3	13 5/8	40	13 1/2	18 3/4	77	5 1/4	23 7/8	125	6 5/16	29	185	1/3	34 1/8	256	4 15/16
3 1/2	2	11 1/16	8 5/8	16	5 5/16	13 3/4	41	9 1/2	18 7/8	78	6	24	126	11 1/16	29 1/8	186	9 11/16	34 1/4	258	1 1/8
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3 7/8	3	4 3/16	9	17	13 1/16	14 1/8	43	14	19 1/4	81	8 1/16	24 3/8	130	11 1/3	29 1/2	191	7 1/16	34 5/8	263	12 1/8
4	3	8 1/3	9 1/8	18	5 1/16	14 1/4	44	10 5/16	19 3/8	82	9 1/16	24 1/2	132	11/12	29 5/8	193	1/3	34 3/4	265	10 1/16
4 1/8	3	12	9 1/4	18	13 1/16	14 3/8	45	6 1/16	19 1/2	83	10 1/16	24 5/8	133	6 1/16	29 3/4	194	1 1/16	34 7/8	267	9 1/16
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4 1/2	4	7 1/16	9 5/8	20	3/16	14 3/4	47	13 1/16	19 7/8	86	14 1/16	25	137	8	30 1/8	199	10 1/16	35 1/4	273	5 5/16
4 5/8	4	11 1/16	9 3/16	20	14 3/16	14 7/8	48	11 1/16	20	88	0	25 1/8	138	15 1/16	30 1/4	201	5	35 3/8	275	4 11/16
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4 7/8	5	3 1/16	10	22	0	15 1/8	50	5 1/16	20 1/4	90	3 1/16	25 3/8	141	10 1/16	30 1/2	204	9 1/16	35 5/8	279	3 1/16
5	5	8	10 1/8	22	8 5/16	15 1/4	51	3 1/16	20 3/8	91	6 1/16	25 1/2	143	1 1/16	30 5/8	206	5 1/16	35 3/4	281	2 1/16
5 1/8	5	12 5/16	10 1/4	23	1 5/16	15 3/8	52	0	20 1/2	92	7 1/16	25 5/8	144	4 1/16	30 3/4	208	1 1/16	35 7/8	283	2 1/16
5 1/4	6	1/16	10 3/8	23	10 1/16	15 1/2	52	13 1/16	20 5/8	93	9 1/16	25 3/4	145	14 1/16	30 7/8	209	11 1/16	36	285	1 1/16
5 3/8	6	3 1/16	10 1/2	24	4 1/16	15 5/8	53	11 1/16	20 3/4	94	11 1/16	25 7/8	147	4 1/16	31	211	6 1/16			
5 1/2	6	10 1/16	10 5/8	24	13 1/16	15 3/4	54	8 1/16	20 7/8	95	13 1/16	26	148	11 1/16	31 1/8	213	2			
5 5/8	6	15 1/16	10 3/4	25	6 1/16	15 7/8	55	5 1/16	21	97	1/3	26 1/8	150	2 1/16	31 1/4	214	12			
5 3/4	7	4 1/3	10 7/8	26	1/3	16	56	5 1/3	21 1/8	98	1 1/3	26 1/4	151	9 1/16	31 3/8	216	9			
5 7/8	7	9 1/16	11	26	10	16 1/8	57	2 1/3	21 1/4	98	5 1/16	26 3/8	153	3/16	31 1/2	218	4 1/3			
6	7	14 1/3	11 1/8	27	3 1/3	16 1/4	58	1 1/3	21 1/8	100	8 1/16	26 1/2	154	8	31 5/8	220	1/16			

FIG. 1.—THE WEIGHT OF ROUND STEEL ONE INCH IN LENGTH AND FROM ONE INCH UP TO 36 INCHES IN DIAMETER

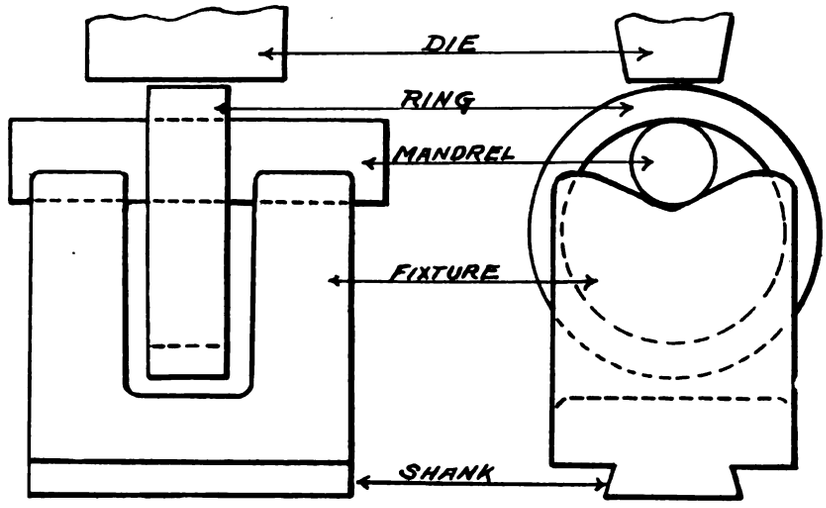


FIG. 2.—SHOWING FIXTURE FOR HEAVY RINGS

weight of one cubic inch of steel is a little over twenty-eight hundredths of a pound. But in calculating stock for forgings it is much easier and always leaves one on the safe side to figure upon four cubic inches to a pound, as a certain amount must be allowed for compression and waste in forging. What the writer considers the easiest method of arriving at the correct amount of material to use for a solid ring of any given size is to calculate the amount of stock necessary for a solid piece the same size as the outside of the ring is to be when machined, deduct from that the amount equal to the inside and add twenty-five per cent to the neat amount of stock required, as that much is necessary for waste, compression and allowance for machining.

The writer fully appreciates the fact that a great many skilful blacksmiths are heavily handicapped in arriving at any definite conclusion as to the correct amount of stock to use, even after consulting tables of weights or handbooks as the weights in them are almost invariably given in pounds and decimal fractions thereof, with which a great many are unfamiliar. Therefore, a table in plain pounds, ounces and fractions thereof, of round steel one inch in length, from one inch up to thirty-six inches diameter is given in Fig. 1. The weights in this table are not guaranteed to be absolutely correct, but are near enough for all practical purposes. And it can be used to advantage in arriving at a close approximation of the amount of stock necessary for rings or any cylindrical forging.

Before proceeding further it is necessary to say that weldless rings can only be made to advantage by the use of a steam hammer.

When the correct amount of stock has been ascertained the piece is forged circular shape and a little thinner than the depth of the face of the ring is to be. A hole is then punched in the center and drifted out until it is large

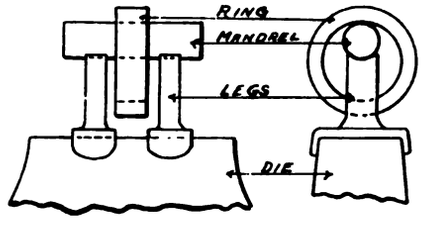


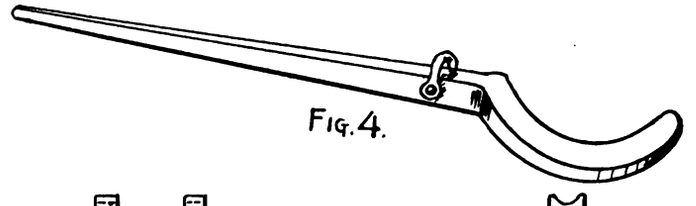
FIG. 3.—SHOWING A LIGHTER FIXTURE

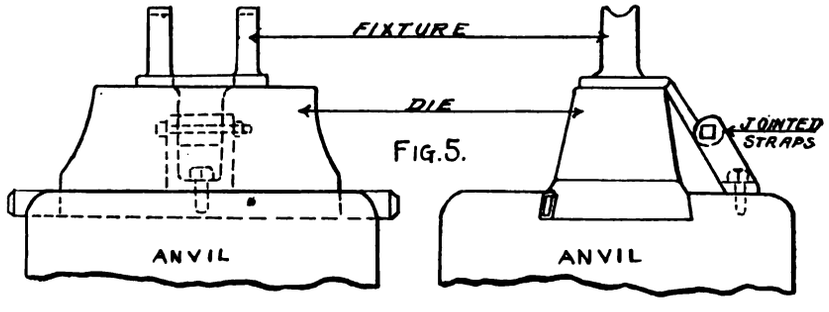
enough to admit a mandrel, upon which it is drawn to size by being placed in a fixture similar to a double V block, as shown in Fig. 2,—the mandrel resting in the V's, and the ring being turned just enough at each stroke of the hammer to bring the portion of its surface next to the spot where the last blow was struck directly under the die. As the ring increases in size larger mandrels are used until the correct dimensions are reached. Should the face spread wider than it is meant to be it is easily reduced to size by a few blows with plain dies. Rings of small size and light section can be made by using two short upright legs, the lower ends of which are made to fit on the lower die of the hammer as shown in Fig. 3,—the tops being V-shaped for the mandrel to rest upon.

Larger rings of heavier section are made by removing the lower die from the hammer and using a fixture, as shown in Fig. 2. And larger sizes up to the full capacity of the hammer can be made by removing the anvil from the base and keying a larger fixture of the same type in its place. In shops equipped with only one steam hammer an auxiliary lower die to fit in the V's of the larger fixtures is necessary for the working in of the edges of rings when they become wide. This can be made from a piece of round steel of large diameter and proper length by heating it all over and placing it in the V. A few blows of the hammer will fit the lower side to the fixture and also flatten the upper side so as that it can be used for the purpose referred to.

When rings exceed a certain size and weight more or less difficulty is experienced in raising them in the fixture for inserting or removing mandrels, as they are awkward to handle either by a crane or chain hoist, and they can only be handled with any degree of speed or comfort by using a lever, as shown in Fig. 4. This is suspended from above by a chain attached to the clevis, the circular end slipped under the ring, which is raised by bearing down on the handle.

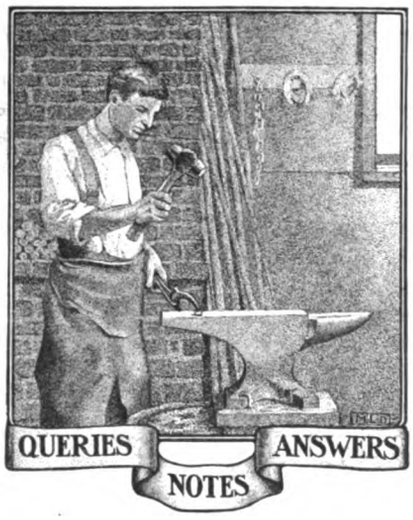
Where large quantities of small and medium-sized rings are to be made in a shop equipped with only one





FIGS. 4 AND 5.—SHOWING A HANDLING BAR AND A HINGED FIXTURE

steam hammer, other work may be stopped or retarded while the hammer is tied up with the ring fixture. This can be overcome by using a fixture, as shown in Fig. 5, which is constructed so that when its base is resting upon the lower die of the hammer it is held in position by a strap that is jointed to lugs secured to the anvil and can be folded back in the open space between the lower die and the frame of the hammer. Here it is out of the way of other work and can be placed in position at any time, allowing of all the operations of ring forging or any other kind of work being carried out without breaking up the hammer in the least.



Copper Welding.—Can anyone give me some information on the subject of copper welding? I would be very grateful for same. W. B. TERRY, Oklahoma.

A Question on Tempering.—Will some brother smith tell me how to temper a nail cutter that has been made from a buggy spring: also how to temper a buggy spring? G. P. NORMAN, Ohio.

A Pointer on Drilling.—If you will run your $\frac{3}{16}$-inch and $\frac{1}{4}$-inch drill bits through a block of wood and let just enough of the bit extend or stick out as the depth of the hole you want you will find they will not break so easily. J. VESTAL, Louisiana.

Crumbling Steel.—I would say to the brother smith who inquires concerning the cause of the crumbling of his steel, that he undoubtedly burns it, as that is the only thing to cause it to crumble.

HOMER N. POPE, Connecticut.

Soldering Query.—Could anyone advise me how to solder the bit on a cylinder saw? Telling what kind of acid to use, if any: what kind of solder, and whether or not it could be done with a blow torch? Any information would be gratefully received.

T. R. JAMES, Virginia.

Concerning Crumbling Steel.—In answer to Brother Fitzpatrick's inquiry in the February number, about steel crumbling when being welded, it is my belief that if he used plenty of borax and not quite as much heat he would have no trouble in doing a good job. R. N. KELSO, Illinois.

A Wheel Kink.—The way to treat a wheel that will not stay dished the right way is to remove the felloe, turn it over, i. e., put what was originally front side of rim on back side of wheel, reset tire, screwing it down to proper dish, and the wheel will usually be O. K.

E. S. WORTHINGTON, New York.

Good Aluminum Solder.—I would like to learn, through the columns of your paper, of a good aluminum solder.

A. C. COSSEBOOM, Massachusetts.

In Reply.—A solder for aluminum that has best stood practical tests consists of: tin, 29 ounces; zinc, 11 ounces; aluminum, 1 ounce; 5 per cent phosphor tin, 1 ounce. It can be applied with the soldering iron or blow pipe. EDITOR.

A Question on Trimming Feet.—I do a general blacksmithing business and have good success in shoeing, but would like to have a brother explain why it is necessary to cut the heel of a healthy foot $1\frac{1}{8}$ or $\frac{1}{4}$ of an inch lower. It is all right for corns or defective heels, but I cannot believe it is best for a healthy foot.

L. D. SMITH, Colorado.

Tempering Stone Tools.—In answer to Wittmer Brothers, Oklahoma, in the March issue: in order to temper tools to cut granite, dress your tools to shape required and let them cool. Now heat to a cherry red, dip in clean, cold water, allow temper to run to a copper color, and then stop and cool off. To cut marble, temper to a pigeon blue.

L. B. KENT & SON., New York.

Wants to Charge Storage Batteries.—I am operating an auto livery business, and find some good pointers in our paper in the way of making repairs, but would like a few pointers on charging storage batteries. What kind of a dynamo is it best to install? I have only three batteries to charge and will be interested in a small outfit. There is no electric power here—and please tell me about the acid, as this is quite important. C. S. WOLFSEN, Washington.

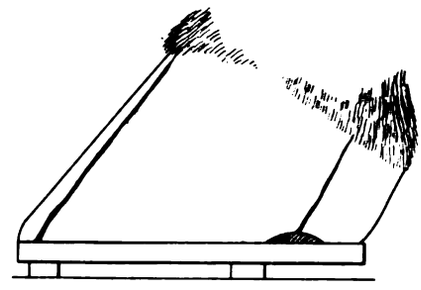
Crying in the Hub.—I notice, in the February number, that E. O. M., of Tennessee, asks for information concerning patent buggy wheels that are entirely good, except that they cry in the hub. My treatment for that is to take the tire off and saw a piece out of the felloe and then shrink the tire on again. If it is not very loose in the hub, take out about one eighth inch; otherwise in proportion.

CHARLES DUCHANOIS, Pennsylvania.

Concerning Buggy Cushions.—We should like to receive some information on carriage trimming. Can anyone supply us with a pattern of, and tell us how to lay off a buggy cushion in the biscuit or diamond fashion, explaining how to lay the leather and the back canvas, and how much difference there is in the two, in order to turn the diamond style into the biscuit? Any information would be greatly appreciated.

JUENGER & HUSTON, Oklahoma.

Old Files for Knives.—I note Mr. C. A. McBride, of California, is willing to wager his pile on old files for knives. Now, with steel as cheap and as good as we can get it these days, I think it time wasted to grind or forge the teeth off, as I have seen it tried many times. Just when you think you have a good job finished, a cut a little deeper than the rest will show up and your labor is lost. So for one I shall



A HORSESHOEING PROBLEM

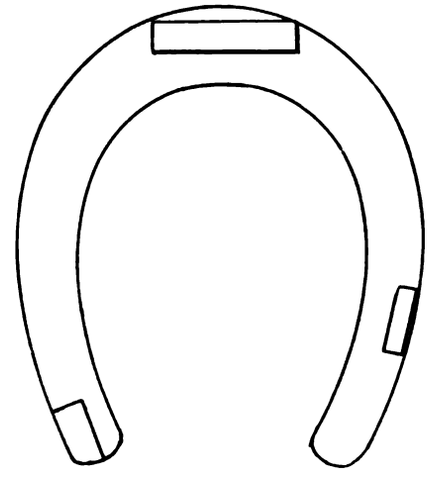
stick to new stock, and think my wagering friend had better do the same.

HOMER N. POPE, Connecticut.

A Horseshoeing Problem.—The accompanying engraving shows a foot of a horse that came to me lately to be shod. I have put shoes on him but once, and then it was a bar shoe with a copper plate on the toe crack. He has a toe crack in each front foot and a quarter crack in all his feet from coronet to bottom. They open nd close at each step, and some of thema have blood running from them at the heel. The owner has the name of being a very good veterinary surgeon, and he said that the horse's feet have never been diseased, but I think he must be mistaken. I would be thankful if someone would tell me how to cure him or shoe him, for it would be a great help to me. The owner has something like two hundred dollars' worth of work done a year, and I would like to keep him as a customer.

G. E. HENDERSON, Kentucky.

Burnt-Sand Query.—Will some brother smith please tell me if there is any solution made that will remove burnt sand from steel castings? If not is there a composition that will temper a tool that will



A HORSESHOEING PROBLEM

cut that sand? Any information will be greatly appreciated.

ROBERT SQUIBB, Pennsylvania.

In Reply.—A solution of sulphuric acid and water will cut scale on castings and will no doubt remove the burnt sand on your steel castings. Begin with a solution composed of about one part acid to

ten parts water, and then weaken or strengthen it as may seem necessary.

F. W. H., Ohio.

Cure for Thrush Wanted.—I would be very thankful if somebody would tell me through these columns a sure cure for thrush. I have a horse that has it in all four feet, and two veterinary surgeons have doctored him all winter with no results whatever,—in fact, the horse is getting worse. As he is a valuable horse I would like to do something for him.

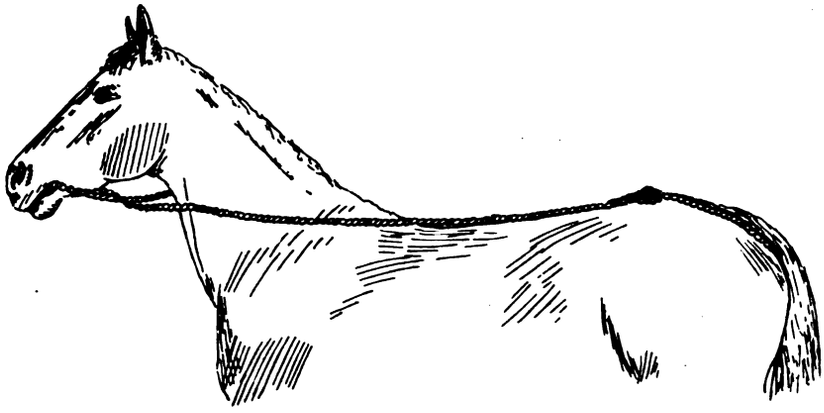
E. R. WILNER, New York.

In Reply.—The April issue contained an article on the treatment of thrush. Perhaps our readers can tell of other methods of treatment that have been used successfully.

EDITOR.

Wants to Treat Hoof.—Will some brother smith tell me how to treat a mare's hoof that is narrow at the bottom and does not spread at all? The mare stands cocked in the ankle and walks on toe and side of hoof. It is said this was caused by the animal being kicked, but I believe it has been strained. The only way we can shoe this hoof, in order to get any service, is to put on a flat toe about one inch long and a side plate on the shoe. Is this correct, and is there any remedy that will cause the hoof to spread or be cured? I would be most grateful if some smith would kindly inform me concerning this.

JOHN HAYES, Missouri.



ONE WAY TO CURE A KICKING ANIMAL

Roping a Kicking Horse.—I should like to ask our fellow smiths, through these columns, for the best and most effectual way of roping a kicking horse, when there is no room for stocks, and when coaxing and thrashing are of no avail and something needs to be done. I have no doubt, someone has a better method of using the rope than we (my son and I) have.

J. TUDGE, England.

In Reply.—There are a number of ways of roping a horse about the head to subdue him, also ways to tie his head to his body. The querist does not say which method he desires explained, so I will illustrate one of each. The first engraving shows a head rig. Here the rope,—a strong, light cord, preferably smooth, about eight feet long—is passed around the animal's neck, and tied, allowing plenty of play. Then the cord is passed through the mouth and back through the loop about the neck and then upward over the head just back of the ears. It is then passed down the side of the head and again through the mouth, but this time above the upper teeth and thence back of the rope as it passes to the ears. A few pulls on the free end of a rope arranged in this manner will usually suffice.

The other rig is self acting. Take a good, strong rope of a good length and double it, passing the loop of the doubled end under the tail, similar to a crupper. Now bring the two ends forward and cross them over the back, knotting them just above the hips. Now continue with one end each side of the neck and cross the ropes just under the head. Now measure the position of the mouth on the ropes when the latter are drawn fairly taut and make a knot. Now cut the remaining ends off and force the knot into the animal's mouth. Any tendency toward kicking or pitching will stop after one or two trials.

J. H. FULTON, Pennsylvania.

Thread Standards and Wood Axles.—I would like to ask the following questions through "Our Journal." If you were thinking of buying a set of screw plates and consulted your catalog, it would read something like this; "Unless otherwise ordered, will send screw plates with V-thread and $\frac{1}{32}$ or $\frac{1}{64}$ oversize. Can furnish screw plates with exact sizes V: U. S. Standard or Franklin Institute and Whitworth form of thread," etc., What is the difference between these different kinds of threads, and which is the proper kind to buy and why?

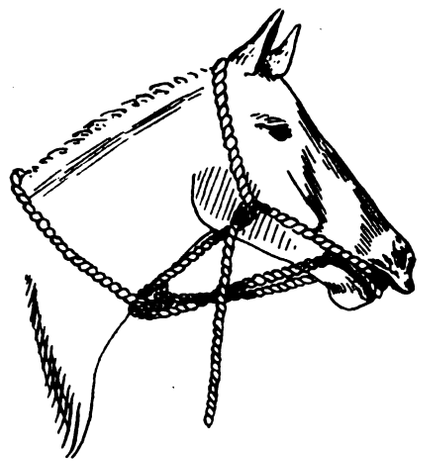
Also, I would like simple rule for making wood axle. You can get length from old axle, but after getting center of axle wood, how far down and far front do you mark for center of point when complete, to give correct pitch and gather, supposing you have proper dish in wheels. I see rules sometimes, but it would take a college graduate to understand. Please give simple rule.

G. W. SIDDERS, Ohio.

In Reply.—The accompanying engravings show the various forms of screw threads mentioned. At A is shown the V-thread which has the form of an equilateral triangle with an angle of sixty degrees. It is sharp at both top and bottom and is rather difficult to cut because of the trouble in keeping the point of the tool sharp. At B is shown the United States standard or Franklin Institute standard. This thread has the same angle of sixty degrees, but is flattened at top and bottom for one eighth of its depth. This thread is stronger than the V-thread and permits greater accuracy in cutting. The Whitworth standard at C is similar to the U. S. standard, except that the sides of the thread form an angle of fifty-five degrees and the top and bottom are rounded.

As for the best of these standards, opinions differ; however, preference has recently tended stoward the use of the United States standard, which has been generally adopted by the leading technical societies.

A. G. K., New York.



FOR THE VICIOUS HORSE

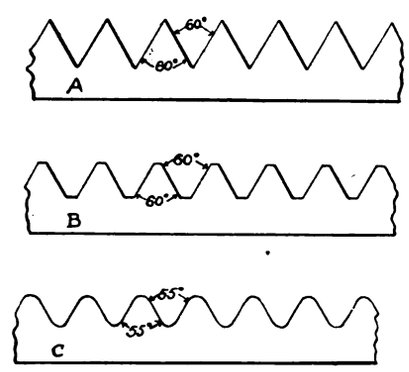
Tire Furnace and Paint-Mixing Questions.—Would some one of the craft kindly explain the best tire furnace for my purpose? as I would like to build one. We have a great quantity of light wood, such as old boxes, lumber, etc., and if I could build a tire furnace that would burn such stuff it would be a money maker, as at the present time this wood is given away. We have from light buggy tires to large tires, 3 or $3\frac{1}{2}$ inches by $\frac{3}{8}$ inches.

Also would someone tell me, through THE AMERICAN BLACKSMITH, the proper way to go about mixing paints for the repair shop. Sometimes there is a priming coat needed; then, again, a finishing coat, etc. Or there may be a buggy to repaint or a wagon or something else, and I would be glad to hear from someone concerning this.

C. CRAIG, Canada.

Several Good Hints.—Replying to Frank J. Casey, will say that he struck the right temper in the steel he used. If he used the right steel for a center punch he has a good punch.

If our brothers use hand-made drill bits, forge them from a small coil spring from a railroad box-car, and temper to hold cast drill dust, and they have good ones.

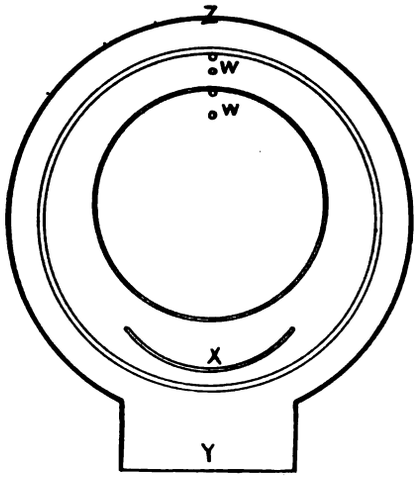


SECTIONS OF VARIOUS THREADS

I save time and borax by using old talcum powder boxes for applying borax on iron for welding: and the borax will not lose its strength in the box, as when kept loose and in the open.

I use a three-legged bench while shoeing. I can trim better and drive nails better, as the hoof has a support, and the horse likes this way, as he can steady himself on the bench, especially if he is sore.

H. F. BOOKER, North Carolina.



A SIMPLE TIRE HEATER

A Challenge:—In looking over my January AMERICAN BLACKSMITH I noticed the article wherein the assertion is made that in Newark there is a statue erected to Seth Boyden which is the only statue in the world erected in honor of a blacksmith. I would like to dispute this. In Guelph, Quebec, Canada, I saw a magnificent statue erected in 1882 in honor of J. B. Armstrong, the inventor of the celebrated spring that still bears his name throughout the world, which fact seems to me a more fitting memorial than one in bronze or in marble.

I would like to make this challenge to all the blacksmiths in the world that they cannot and never did make a weld that I cannot take apart without leaving a particle of one piece adhering to the other and do it without the aid of a chisel or acid. There, now!—don't all jump on me at once. G. W. KINSMAN, Georgia.

An Excellent Sand Belt.—In reply to C. B. Staples, I would advise him to make his sand belt of very heavy canvas or duck. Cut strips the width and length wanted, lap ends as much as once the width of belt and glue together. Common carpenter's glue will do, but common sand will not do.

In putting the sand on sand belts have the belt around two pulleys or rollers that turn easily. Have the glue hot and rather thin. Apply glue with a wide brush and sprinkle sand on quickly before glue has time to set.

A 22-inch band saw is one of the most useful machines a carriage maker can put in his shops. Of course, a larger size is better—say about a 26-inch. I consider a band saw and jointer (hand planer) two of the most useful wood-working tools in our shop. J. L. EAKIN, Arkansas.

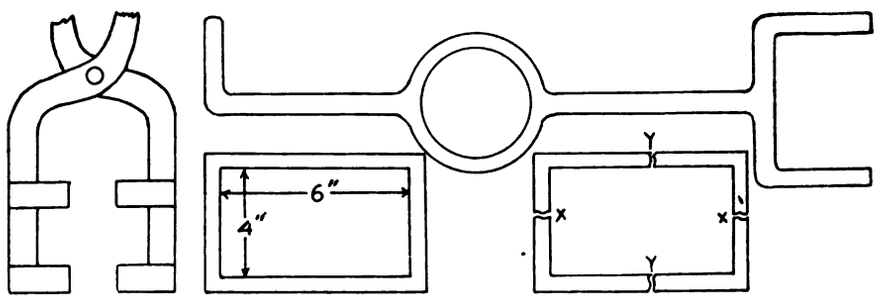
Trip Hammer Question.—I would like to ask some brother to kindly give me some information about trip hammers. I have just installed a Star trip hammer, and have met with some difficulty in using it successfully. I want to sharpen plows with it, and fail to do it properly, while I can do heavy forging with it very well. I would be very glad, indeed, if some brother would tell me whether it can be made to sharpen plows well, also how to shape my dies for different work, and whether or not my hammer is a good one. If it is not a good one I will dispose of it and get another, if there is a hammer that will sharpen plows with success, as most of my work is plow sharpening. I possess all kinds of machines necessary in a blacksmith shop, and have found every one, except the hammer, entirely satisfactory.

W. B. HOLBROOK, Arkansas.

Wants to Start in America.—Could anyone inform me through our valuable paper, THE AMERICAN BLACKSMITH, concerning the price for which I could buy a good business with a guarantee of a good living for two experienced men and one assistant blacksmith, with or without wood shop? I have here a blacksmith shop with plenty of work for two men and one assistant, a wood shop for one man and as a side line a general iron-mongery shop. I would very much like to sell this and buy a business in America, and I should be pleased if some brother blacksmith could assist me by telling me in what part of the country it would be best for a stranger to try his luck. I am a smith and wheelwright, coach, cart and van builder, repair lawnmowers, garden shears and all kinds of horticultural and agricultural implements and machinery, supply these implements and machinery, rubber tires and fencing.

Any aid or advice would be gratefully received. W. SANDS, England.

A Few Questions.—Can anyone answer these questions for me? How shall I forge a pair of tongs and shank for handling crucibles in a brass foundry? In telling me this, please state what kind of stock to take and describe each step of the process. How shall I set tongs to fit the pot? How is a printer's chase made? Which is the best method of making bands for a derrick, the stock being five by three-sixteenths inches. They must be welded and my main trouble in welding them is on account of width. In hardening an engraved die, how can I keep face bright and keep it from oxidizing? EDWARD ADAM, Ohio.



HOW WOULD YOU FORGE THESE ARTICLES?

In Reply.—To make a printer's chase it is necessary to make the rectangle absolutely true; that is, have each corner a true right angle. To do this make each corner separately as in the engraving and after they are an absolute fit on the try square weld the two ends together at XX, and then weld on the long sides at YY. It is, of course, understood that the distance from one corner to another must be the same on the opposite side. After welding, measure and true up again with the try square. J. O. B., Pennsylvania.

Wants a Tire Furnace.—Could any one give me information concerning an upright tire furnace for heating tires? Same would be much appreciated.

G. H. TRAVERS, Tasmania.

In Reply.—A very serviceable tire furnace or heater may be made of sheet metal in the shape as shown in the engraving, and hung right over the forge. The box is naturally shallow and should be of a size to take the largest tire likely to be brought to the shop. To make the heater, cut two pieces out of sheet metal in the shape, as shown; i. e., one circular piece with a square projection and one without the projection. Now rivet a flange all around the first piece, so that when the cover piece is put on the box will be deep enough to take your widest tire. Now make a box of the projection, and hinge the large circular piece at the top at Z. Hang the heater on the chimney over the forge and arrange so your fire will come just under the opening, Y, when the heater is pulled out a little from the chimney, and so the heat from the fire will go into it. At W, W, W, are pegs for hanging the tires on, and at X is a crescent-shaped piece of sheet metal to spread the flame and heat.

F. G. K., Ohio.

On Making Angle Rings.—Could someone inform me through these columns how to figure on stock for making angle iron rings? My employer was going to figure it out. One day I made two rings, but I thought I had them short, so I allowed six inches longer than he told me, and it came right on the mark.

C. E. GRONLUND, Massachusetts.

In Reply.—When the flange is on the outside of the ring take the inside diameter and add twice the thickness of the corner of the angle. This will give you the mean diameter. Now add to this mean diameter sufficient to allow for the weld. Then multiply that by twenty-two and divide by seven. The result will be the length of stock to cut.

When the flange is on the outside and the diameter is outside to outside, multiply the thickness of the corner of the anvil by two and deduct it from the diameter. Then proceed same as before.

H. G. W., New York.

A Lame Mare.—I am a reader of THE AMERICAN BLACKSMITH, and am always

glad to get my paper, as I love to read the letters written by the craft in other parts of the world. I do more shoeing than other work, and I prefer it to the other, although I run a repair shop and do much new work, ordered and otherwise.

I have a fine mare to shoe, but she is lame, and I cannot find the cause of her lameness. At first I thought her feet caused the trouble, but now I am in the dark as to the cause. Her feet look to be in excellent condition, but she cannot go, and if someone will kindly give me some help on this subject I will be grateful, indeed. J. D. FERRELL, Florida.

In Reply.—Look at the feet carefully for punctures. It may be that a nail or other sharp-pointed piece of metal has penetrated to the sensitive portion of the foot. Have you felt carefully for inflammation of the limb and fetlock joint? Are you sure it is not the shoulder that is affected? The lameness is certainly caused by something, and it can only be cured by determining the cause.

W. O. JULIUS, New York.

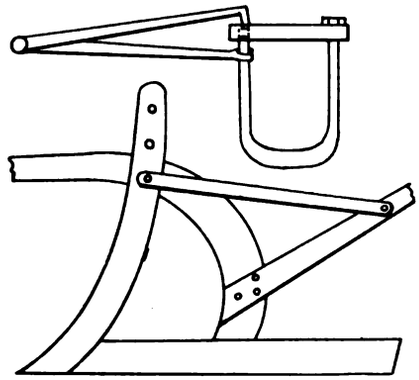
Discussion Desired.—We would like to see in these columns a discussion on the building of wagon wheels, i. e., wooden wheels, beginning with the hub, telling how to prepare it, how to fit and drive the spokes, whether to use glue or not, how much dish, and whether spokes should be driven with dish or drawn with the tire, etc. This information would be gratefully received. DOBSON BROTHERS, Wisconsin.

In Reply.—Spokes should be driven with the dish and not drawn with the tire. It is the wheelwright's business to build the wheel correctly and not leave it to the blacksmith to draw the dish in with the tire. Spokes should be set in the best glue and the glue should be hot. The amount of dish depends upon the size and kind of wheel. To detail all the steps and operations in building a wheel would require considerable space, but I will attempt to explain the work from beginning to end in the near future or as soon as time permits. WHEELWRIGHT, Illinois.

Advice on Shoeing.—I fail to agree with Brother P. Y. Miller, who writes in the March number. I do not think it necessary to pay one hundred dollars a year to shoe horses, if the man knows his business. I believe that every smith ought to stand an examination before fitting or nailing shoes. I consider bar shoes well made and well fitted as very good shoes for quarter cracks, wire cuts and corns. When I learned the trade my first duty was to turn a very good shoe and the next was to thoroughly examine a horse's foot, and find all the parts of it. The manner in which I happened to secure the foot and leg to examine is as follows: one mile from our burg a farmer friend had the bad luck of having a horse break a leg, so that the horse had to be killed. I was ordered by my employer to get one foot and leg up to the knee, and thus I had an excellent opportunity to study it and get familiar with its structure. I believe every young smith should learn to turn shoes and should thoroughly understand feet before attempting to nail. JOHN STITZER, Wisconsin.

To Make a Sand Belt.—In answer to Brother Staples' inquiry, concerning a 22-inch band saw cutting six and a half inches, I would advise him by all means to get a 36-inch saw for such work.

In order to make a sand belt, he should get a piece of heavy canvas as wide as his work requires, six or eight inches wide and twelve or fourteen feet long. He should

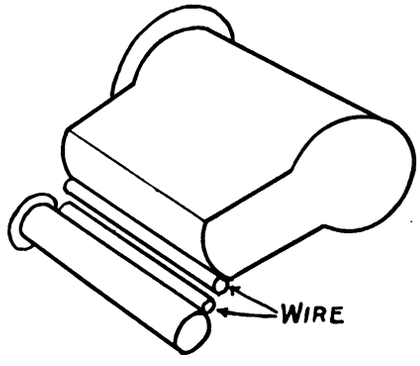


PLOWS AND AXLE CLIPS

then sew the ends together, leaving no lap. The next thing to do is to make a sliding frame that will hold two pulleys as wide as his belt, the pulleys to be twelve inches in diameter, one of them tight on a shaft on which is a drive pulley. A box one inch wider than his belt and about six feet long should be made, and the box should be filled one half full of sharp, white sand. The glue should be heated and applied with a wide brush, four feet at a time. Then he should lay the belt in the sand, glue side down and press down hard in the sand with a roller. This process should be continued until one side of the belt is covered, when it should be hung up to dry. When dry, it should be put onto the pulleys, and the frame should be let out until the belt is very tight. Then it should be fastened through the belt from the extra pulley to the main shaft, when he may go ahead and sand any kind of wood. If he desires to polish iron he should use loose emery No. 30 in place of sand.

J. L. SNELL, Illinois.

Metal Used on Sparking Points.—In reply to A. T. Henwood, Ontario, we would suggest that he try "Meteor Wire" furnished by Herman Boker & Company, Duane St., near Broadway, New York City,



METAL FOR SPARKING POINTS

for the sparking or contact points for make-and-break ignition. It is attached by brazing in the ordinary way, using borax or soldering fluid. We have a pair of points on our engine over eighteen months, and find them still serviceable, running ten hours a day. We use $\frac{3}{16}$-inch wire, although it can be had from $\frac{1}{8}$ inch up. H. Boker & Company sell this wire only by the rod of about three feet at $7.00 per rod, but the Fairbanks Company, of Broome and Lafayette streets, New York City, sell it for $ .25 per inch.

D. SYLVESTER & SON, New York.

On Plows and Axle Clips.—Since it is a very bad day and work is dull, since it is too stormy for anyone to come to the shop or for a man to do anything well, I thought I would visit with the boys and have a chat about the craft. I am operating a shop one half mile from a new town on the M. O. & G. R. R., but I expect to build in the town in spring. I have a seven-horsepower gasoline engine, a Kerrihard hammer, an emery grinder, a 26-inch band saw, a power drill, a Royal blower, a shear and a Mayer's cold tire setter. In fact, I have everything I need, except a corn mill, which I expect to order at once.

Brother smith, do you have much plow work and do the farmers use middle busters? If so, let me give you a model for a middle buster stock that will give satisfaction. Just use a steel beam from an old turning plow, take a piece of bar iron, one half by two inches to make bar, drill holes to fit bar plate on beam and let bar extend about eight inches forward—plate with hole in front end. Then use two bars, three eighths by two inches for upright, drill holes at end to bolt to bar and then bind to fit plow with two holes, one below and one above beam, and fasten handles on beam where wing of plow fastens. Then you have made one of the highest running plows that can be used for any kind of a single plow. A few kept on hand make an excellent side line. They cost about one dollar apiece in the making, with about two hours' work, and the farmer thinks he has a bargain at three dollars and fifty cents.

Do you have any trouble getting yokes back on axle clips? Just take a piece of a lift arm of a buggy top, cut one end one inch longer than the other, forge to a point, and butt angle to other piece when closed. Then flatten other piece and cut notch in end. T. N. MOORE, Oklahoma.

Quarter Cracks.—It does not seem reasonable that, after reading in the October number of THE AMERICAN BLACKSMITH on horseshoeing and quarter cracks, one would desire any further information on the subject, but I am at present up against something in the shape of a quarter crack that is different from anything with which I have ever had to contend.

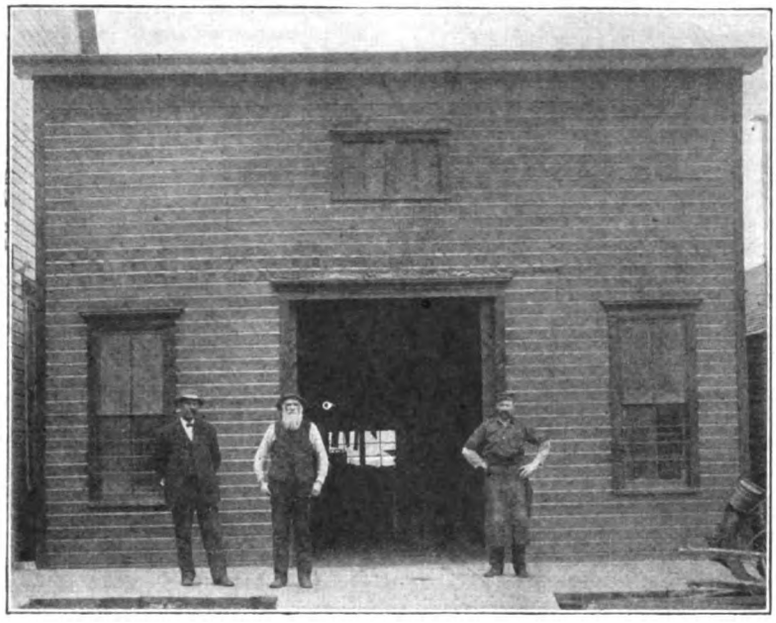
I cured a horse of the worst case I ever saw of quarter cracks on both front feet. The horse was traded, and his present owner sent him to another shop to be shod and, after being shod at the other shop awhile, he brought him back with a crack starting at or just below the hair, about one inch long. It is too near the hair to draw the crack together with a nail, because of the thinness of the wall. Will some brother kindly help me out of my extremity by telling me how to treat this case? S. A. FLYNT, Georgia.

In Reply.—The best thing you can do in this case is to keep the feet in as healthy a condition as possible. Apply hoof oint-

ment liberally and allow the horse to use the pasture, if possible. You, of course, understand that the shoes are to be removed before turning the horse into the field.

If it is impossible to take the horse from his work apply a bar shoe after fitting carefully and relieving the pressure immediately below the crack. Also apply a good hoof remedy, using a leather pad to keep the dressing in the hoof. The April issue of THE AMERICAN BLACKSMITH shows several styles of cover shoes which you will find very handy in a case of this kind where the dressing should be renewed from time to time. It is almost impossible to keep the edges of the crack immovable, but a stout strap buckled around the upper end of the hoof wall will at least prevent the crack from growing longer.

Any more information from "Our Journal" readers would, I am sure, be greatly appreciated. W. O. JULIUS, New York.



A NEAT SHOP OF NEBRASKA, RUN BY A. L. BARNUM

A Letter from Nebraska.—The accompanying picture is of my shop, which is situated on the main street. The shop is twenty-five by forty-five feet and in it I have one Champion blower and one Royal blower, one Peter Wright and one Burden anvil, a Champion drill, an Edwards shear, a Barcus shoeing stock and a brick tire oven in the rear of the shop. The sign on the front of the shop does not show plainly, but it reads "A L. Barnum, Blacksmith and Wagon Shop." The men in front are myself (with apron on), my father in the center, and the other man is the owner of the hotel next door to the shop.

A. L. BARNUM, Nebraska.

Two Paint Queries and a Wheel Kink.—I have a bike wagon to paint. It has wire wheels, the spokes of which were painted with aluminum paint, and the owner wants it painted as before. I have never used this paint and wish someone would tell me how to use it. Does it want a lead coat first? Does it want varnishing? What is best to mix it with?

I also have a light wood job to do over,—a varnish job. Can anyone tell me what is best to use for staining? Please tell me the best way to handle the job. My trade was horseshoeing and wagon work, but I had to give up shoeing on account of rheumatism, so have taken up carriage painting. I have a book on painting, but it does not say anything about this kind of work.

Here is a little kink that I have long intended sending. It concerns setting tires on wheels that are dished the wrong way. When I get a wheel in that condition I measure both edges of the rim and both edges of the tire and most always find that the back side of the tire is the tightest. I saw out the rim a little if it needs it, then I get the tire upset and ready to put on, take it on the anvil and draw it on the back side as I would hammer a hoop to flare it, only not quite so much, and am careful to draw the tire even, in order not to get it out of true. Then I measure the tire again as I want the tire to be as large as the wheel or a trifle larger on the back side, bringing all the draught on the front side. Then it will draw the wheel the right way. If the wheel is heavy or the tire very light I put the tire on and then I have a place where I can draw the wheel the right way with a screw bolt in order to help the tire. W. S. NEELY, Connecticut.

In Reply.—Aluminum paint may be purchased ready mixed from any paint or supply dealer, and for the occasional job of this kind it is best to purchase the paint in that way, getting a small can of the paint sufficient to cover the wheels in this instance. You will find full directions on the can for applying.

If you prefer to mix your own paint, purchase some aluminum bronze and banana oil at any paint house and mix the two as needed. If the wheels have already been painted no lead coat is required—nor is it necessary to varnish.

A more thorough explanation of the other job is necessary before definite instructions can be given. PAINTMAN, New York.

Galvanizing Work.—I wish someone would tell me a little about galvanizing, something about the cost of rigging up for it on a small scale and about the process. If I had a tank two and a half feet by four and a half feet, it would open the way to a big trade for me, whereas I get none now. There is plenty of motor-boat work in this place, but I get very little of it to do because they want it galvanized. I hope somebody will be able to help me out. A. N. TORREY, Maine.

In Reply.—The cost of rigging up a small plant for galvanizing depends upon how much you yourself care to make and erect. If you make and erect the plant entirely, a small equipment such as you have in mind should not cost you very much. In the first place a special kettle is necessary. Do not make one smaller than three feet long or less than twenty inches in depth and width. The tank or kettle such as you have in mind is of a good size. The kettle should be made of refined iron or the best fire-box steel. In setting the kettle or tank build a special furnace into which the kettle will fit and, if possible, build the furnace in a building by itself, as the fumes of the chemicals used are very destructive to tools and machines. The building should be well ventilated.

To load the kettle place the zinc pigs around the sides so that the kettle is not so likely to be injured by the heat. In starting up with a kettle of cold zinc do not allow your fire to burn too freely—heat up the kettle gradually and as the heat begins to affect the metal allow your fire to come up stronger.

After having your zinc in readiness clean the articles to be galvanized in a pickle bath, composed of one part of sulphuric acid to twenty parts of water, heated to a temperature of about one hundred and fifty degrees. This bath will remove the scale and all impurities on the surface of the work, as it is very necessary that the work be absolutely clean. After immersing in the sulphuric acid bath until all scale is removed, place it in a solution of muriatic acid and water. This acts as a flux and also removes any rust that has formed on the work and which the sulphuric acid pickle failed to remove. The muriatic acid solution is made by diluting the acid about one half and adding one pound of sal ammoniac to the gallon. If rust has not formed on the article to be galvanized an immersion of two or three minutes in the muriatic acid mixture will suffice.

From the latter bath the article is dipped directly into the kettle of hot zinc until the desired coating is effected. The pieces may be dipped repeatedly if necessary. Extreme care and caution is necessary in handling the articles in the baths and in the zinc. Do not inhale any of the fumes, wear a pair of old leather gloves and use tongs or wire hooks in handling the pieces. Perhaps the best floor in a plant of this kind is well tamped dirt or cinders. Any other floor would soon rot and crumble on account of the drippings from the pieces when removed from the baths. Do not allow any of the materials used to come into contact with any part of the body or clothes. SPELTER, New York.



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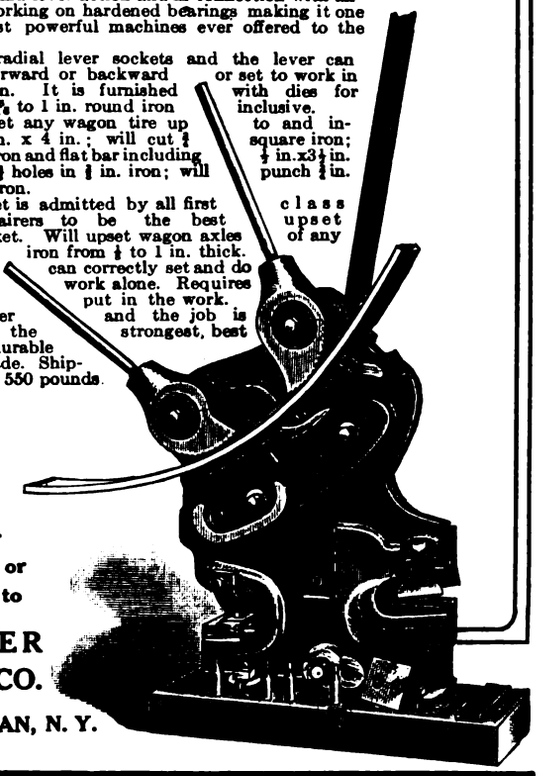
It has radial lever sockets and the lever can be pulled forward or backward or set to work in any position. It is furnished with dies for cutting off ⅛ to 1 in. round iron inclusive.

Will upset any wagon tire up to and including 1 in. x 4 in.; will cut ¾ in. square iron; 1 in. round iron and flat bar including ½ in. x 3½ in. Will punch ¾ holes in ¾ in. iron; will punch ¾ in. holes in ⅛ iron.

The upset is admitted by all first class wagon repairers to be the best upset on the market. Will upset wagon axles of any kind of iron from ¼ to 1 in. thick. One man can correctly set and do all ordinary work alone. Requires no change put in the work. Pull the lever and the job is done. It is the strongest, best and most durable machine made. Shipping weight 550 pounds.



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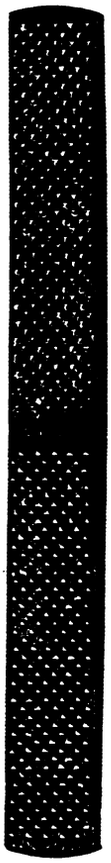

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Hard, Thorough Temper. Sharp Cutting Edge.
Sharp, Strong Teeth, Well Backed.

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Made in all regular sizes, and in the new 18-inch Slim, which gives the user the advantage of a long stroke, and at the same time a rasp of medium weight.

ASK YOUR DEALER FOR THEM

Current Heavy Hardware Prices.

The following quotations are lowest prices generally quoted at Chicago, April 11, 1910, and are subject to fluctuations. Corrected for The American Blacksmith by the National Heavy Hardware Reporter, Chicago.

No changes are reported in Chicago prices this month. Iron and steel continue firm and there seems to be more difficulty to get mill deliveries at all than about the price.

Spring trade continues to develop, naturally causing prices to steady.

Trade generally is reported very good and collections are better.

First class wood stock is getting very scarce, and when found commands much higher prices.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—
$2.00 rates, full extras and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$2.00 rates, full extras.

Toe Calks—

	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—

6 x ⅜ and smaller	60–10%
Larger and longer	50%

Machine Bolts—

¼ x ⅜ and smaller	60–10%
Larger and longer	50%

Nuts—

Less than 10 lbs. of a size	$2.50 off
From 10 to 50 lbs.	3.00 off

Washers— Same price as nuts.

Skeins— Cast 65%

Malleables— Common $ .09

Half Patent Axles— 65%

Springs—

Single Spring, each	$1.25
Springs, black and half bright	.06

Hickory Lumber—Per Foot—

1 to 2½	$.09
2½ to 4½	.10

Ash and Oak Lumber—Per Foot—

1–1½	$ .07	2½–3	$.08
1½–2	.07½	3½–4	.09

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
¼"	$70.00	$70.00	$80.00
⅜"	70.00	73.00	85.00
½"	73.00	80.00	90.00
⅝" } ¾" }	77.00	85.00	109.00

Rough Hickory Axles—

	Each.
3 x 4 6 ft	$ .55
3½ x 4½ 6 ft	.90
4 x 5 6 ft	1.10
5 x 6 6 ft	2.00
4 x 5 6½ ft	1.20
4½ x 5½ 6½ and 7 ft	1.80
5 x 6 6½ and 7 ft	2.50
5½ x 6½ 7 ft	3.00

Finished Hickory Axles—

For 2½ and 2¾ Skeins	$ .95
For 3 Skeins	1.10
For 3¼ Skeins	1.35
For 3½ Skeins	1.50
For 3¾ Skeins	1.80
For 4 Skeins	2.10

Rough Oak Bolsters—

Short	$.07½
12–14–16 ft.	.08½

Finished Oak Bolsters—

2¾ x 3¾ and under	$ .60
3 x 4	.65
3¾ x 4¾	.80

Rough Oak Wagon Tongues—
4 x 4 x 2 x 4 x 12 and smaller $ .95

Finished Oak Wagon Tongues—

3½ and smaller	$1.20
3¾	1.25
4	1.30

Two Inch Sawed Hounds

	Per Pair.
Tongues	$ .35
Front	.40
Hind	.50

Patent Wheels—

A. B. No. 13 and under	45 %
D. No. 13 and under	35–5 %
All Grades, No. 17 to 33	35–5 %
All Grades, No. 39 and Larger	25–5 %
C. No. 13 and under	40–2½ %

Cupped Oak Hubs—

	Set.
7 x 8 x 9	$1.40
7 x 9 x 10	1.50
8 x 9 x 10	1.55
8 x 10 x 11	1.80
9 x 10 x 11	1.95
9 x 11 x 12	2.00
10 x 12 x 13	3.00
11 x 13 x 14	4.20
12 x 14 x 15	5.10

Plain End Oak Hubs—

	Set.
10 x 14	$3.30
11 x 14	4.20
11 x 15	4.50
11 x 16	5.10
12 x 16	5.75
12 x 17	6.30
13 x 18	7.00

Rough Sawed Felloes—

1½ x 2 "	$1.45	2 x 2½"	1.85
1½ x 2½"	1.65	2½ x 2 "	4.35
1½ x 2½"	1.75	3 x 3 "	5.25
		3 x 3½"	5.50

Ironed Poles, White, XXX—

1¾ x 2½" No. 2	$3.80
2 x 2½" No. 3	3.80

Ironed Shafts, White, XXX—

1¾" x 2 " and smaller	$1.95
1½ x 2 "	2.20
1½ x 2½"	2.70

Farm Wagon Bows—

Round Top, ½ x 2 "	$ .60
Flat Top, ½ x 2 "	.75
Round Top, ⅝ x 2½"	1.35

Standard size Piano Bodies with Seats—
Each $4.25

Plow Beams—

1 Horse	$ .60
2 Horse	.75
3 Horse	.90

All Hickory and Oak Spokes and Patent Spokes—
Discount from Weis & Lesh List No. 5.. 5%

Wagon Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2½ x 38"	$2.05	$2.80 $4.00
2½ x 42"	2.70	3.90 5.25
2¾ x 46"	4.15	
3 x 44"	4.35	6.70 8.38
3 x 48"	5.25	7.50 10.00

Single Trees—Oval—

	Mixed Forest Second Growth	White Second Growth
2½"	$1.50	$2.70 $3.35
2¾"	1.60	2.75 3.50
2½"	1.65	2.80 3.65
3 x 36"	2.30	3.30 4.10
3 x 38"	2.35	
3 x 40"	2.50	3.85 4.65

Single Trees—Round—

	Forest Second Growth	
2½"	$1.90	$3.45
2½"	1.90	3.50
2¾"	2.00	3.60
2½"	2.65	4.10
3 "	3.20	4.65

Oval Plow Doubletrees—

2¾ x 36"	$1.60
3 x 40"	2.40

Flat Plow Doubletrees— 1¾ x 3½ x 42" $2.75

Wagon Doubletrees—

2 x 4 x 48"	$3.40
2½ x 48"	4.50
2½ x 4½ x 50"	4.90
2½ x 4½ x 52"	5.25
2½ x 5 x 52"	6.00
2½ x 5 x 54"	6.75
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—

	Forest
2½ x 30" and under	$ .90
2½ x 30" and under	1.15

Buggy Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½" and smaller	$2.50	$3.50 $4.50

Express Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.80	$3.55 $4.80
2¾"	3.40	4.50 5.25
3 "	3.40	4.15 5.50

Express Singletrees, Turned—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.25	$2.50 $3.50
2¾"	2.75	3.50 3.75
2½"	3.25	3.75 4.50

Express Singletrees, Square Center—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.75	$4.00 $5.00
2¾"	3.25	5.20 5.75

Buggy Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2 x 42"	$2.60	$3.25 $4.25
2½ x 2¾ x 42"	3.00	3.50 5.00

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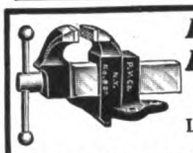
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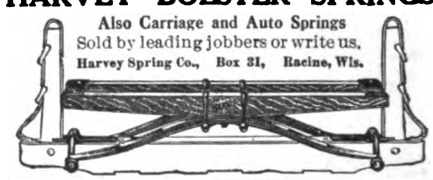
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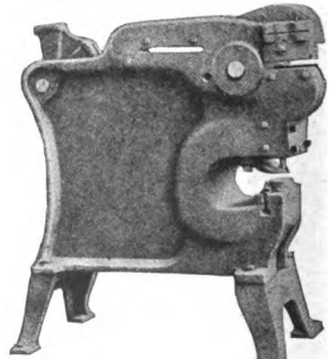
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Our business has been built up on the reputation of making the best there is in our line, and we are very choice of this reputation, for we are not in business for today or tomorrow only.

The new list on Star Blades is:

$3.50	$3.75	$4.00	$4.50	$5.00	$5.50	$6.00	per gross
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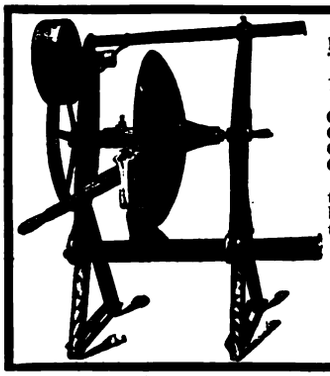

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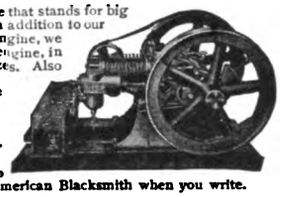

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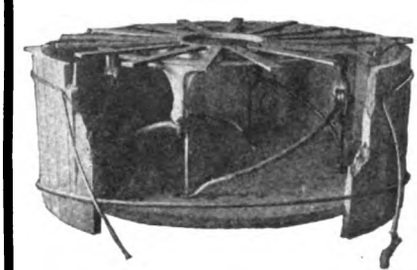

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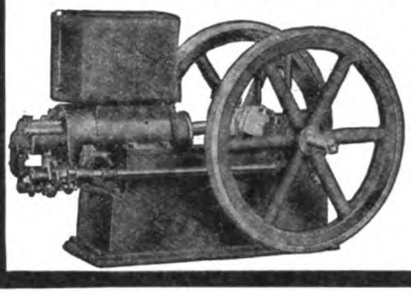

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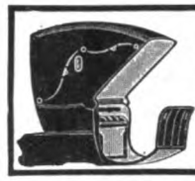

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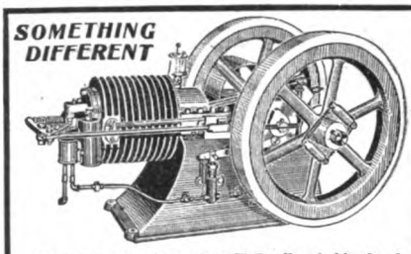

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Note the difference in construction over other makes:

EXTRA LONG GUIDES, insuring a direct movement of the ram without any side motion, which causes guides and springs to break on other hammers.

THE ONLY HAMMER MADE with a disk attachment with special anvil for sharpening harrow and plow disks.

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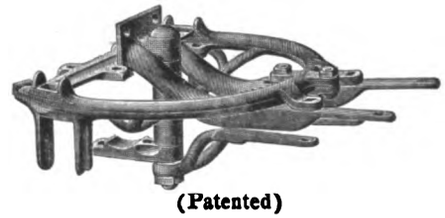

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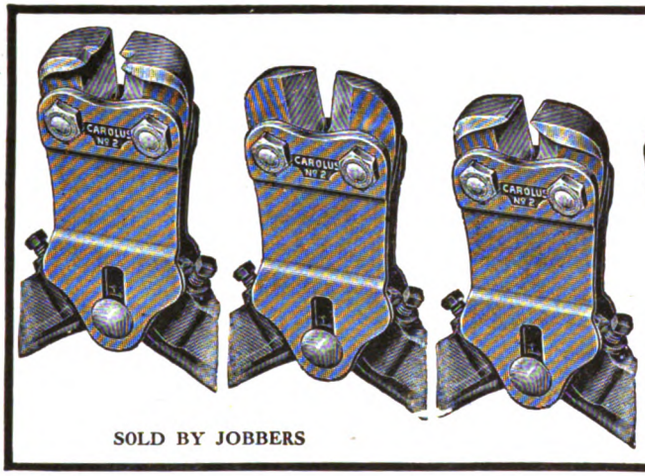

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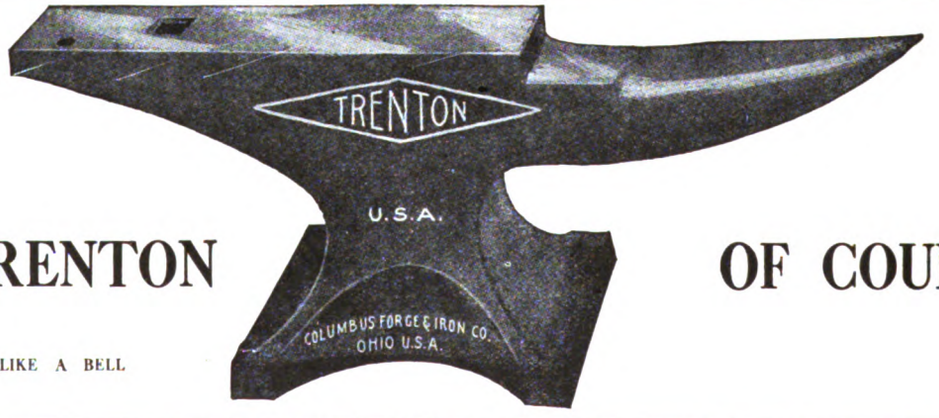

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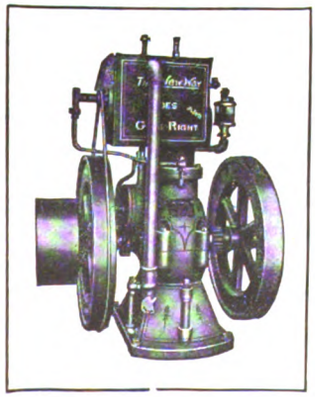

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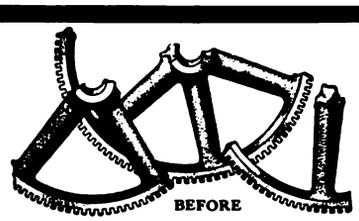
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Weldarine is, or ought to be, in every up-to-date shop.
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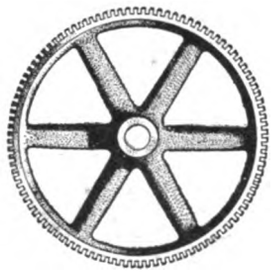
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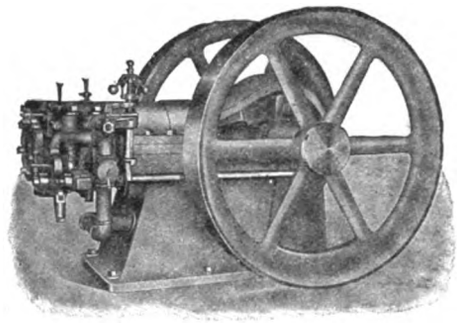

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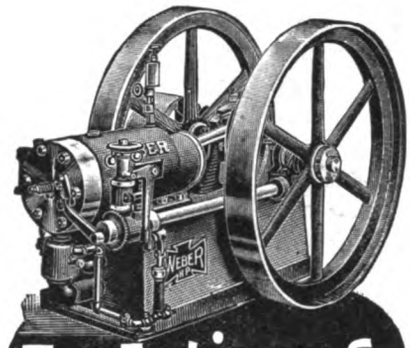

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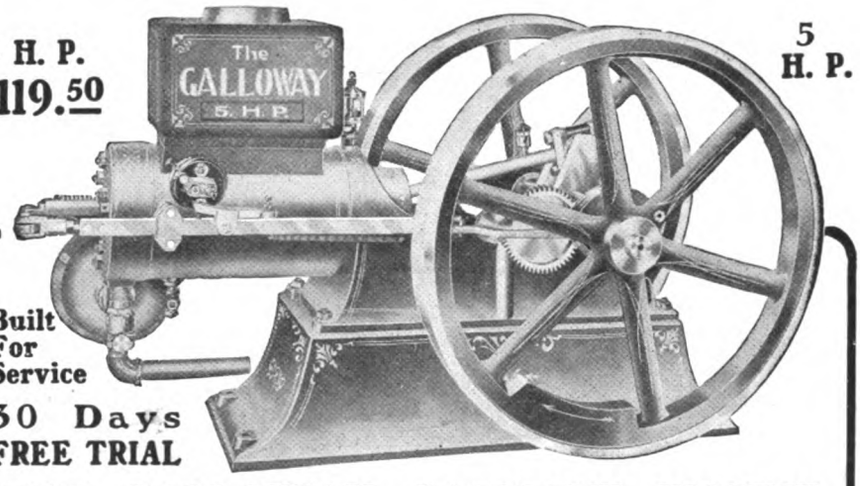

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will run your shop at several times its present capacity and enable you to take lots of jobs that you have to turn down now because you have not the capacity.

Only four things to do: **Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start,** and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high-grade engine for 15 years. Over 2,500 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember the bore and stroke counts and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests.

On the larger sizes, if it is not entirely convenient for you to pay all cash, I will take your note for the balance at the regular rate of interest for 6 months.

The price given is for the 5-horse power only, but we make these engines in seven sizes.

Note my special proposition to blacksmiths.

I have a plan by which every blacksmith can partly or entirely pay for his own machine. It's good; it's away out of the ordinary; and you will be overlooking a big chance if you don't write for my proposition.

Ask for my free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure.

WRITE TODAY. **WILLIAM GALLOWAY, President.**

THE WILLIAM GALLOWAY COMPANY, 577 Jefferson St., Waterloo, Iowa.

TRIMMINGS FOR EVERYTHING ON WHEELS



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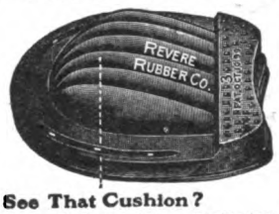

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Heavy Leather Back

NO LAMENESS NO SLIPPING CHEAPEST AND BEST



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See That Cushion?

It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

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THE REVELATION GAS BLAST





Furnace for Hardening, Tempering, Annealing, Melting, $20.00

Blow Pipe $12.50.

Use Gas and Water only—no bellows, no air compressor. The process is simple and produces a strong and steady blast. Invaluable where no kind of power is obtainable. For brazing, soldering, hardening, tempering, annealing, melting, etc. Save labor and money.

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Every farmer who comes into your shop is a live prospect for a FAIRBANKS-MORSE Gasoline Engine, and selling is easy when they can see one of these reliable engines running your machinery and relieving you of the hard work. Then, by becoming an agent, you get your own engine at the agent's price.

Mention this publication and write now for agency proposition No. 487 A. N.

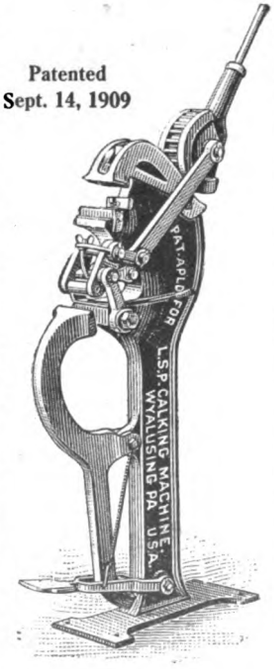
FAIRBANKS, MORSE & CO.

481 WABASH AVENUE CHICAGO, ILL.

THE ONLY CALKING MACHINE THAT CALKS A HORSESHOE COMPLETE

Makes 25 Different Styles Heel Calks

Patented Sept. 14, 1909



The only Calking Machine that with one pull of lever makes a heel calk complete, blunt or sharp, also makes double kink for the famous block calk, or sharpens side calk, with one pull of lever, welds blunt or sharp toe calks and forms toe clip with one pull of lever, also, has a shear to cut off either end of shoe.

Works equally as well on old shoes. The machine takes up but 8 x 16 inches floor space, and stands 3 feet 3 inches high, and weighs 131 lbs. All the working parts made of a special grade of steel. Fully warranted. Write now for circulars and prices.

The L. S. P. Calking Machine is in use by the United States Government, and they use nothing but the "Best." Read what one of their men has to say about the machine:

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Gentlemen:—Your calking machine is all that could be desired of a machine, to calk shoes either sharp or blunt. I am using one of your machines every day, for the U. S. Government, in the Quartermaster's shop at Fort Myer, Va. It is a great labor saving machine.
Respectfully yours,
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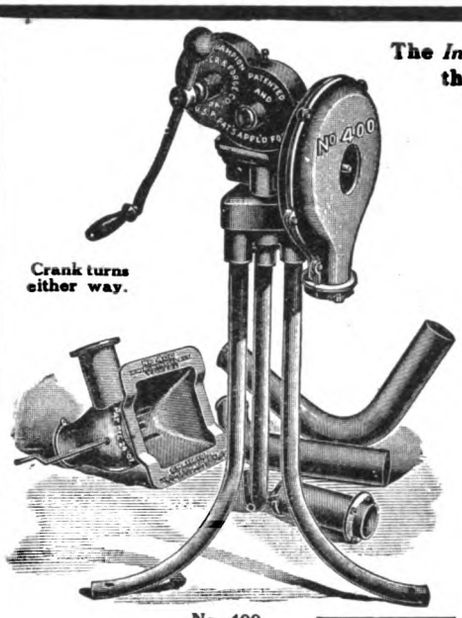

Crank turns either way.

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The No. 400 Steel Blower will serve the youngest mechanic faithfully without expense for a long lifetime.



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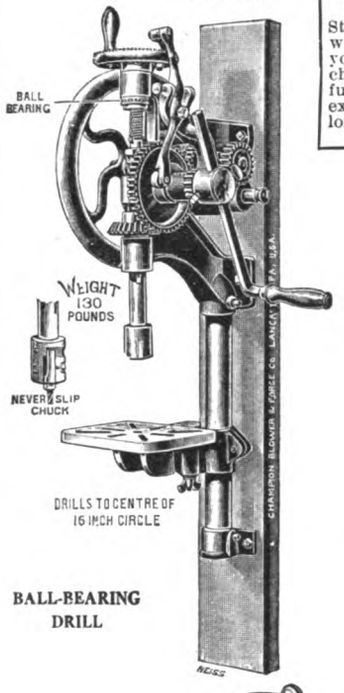

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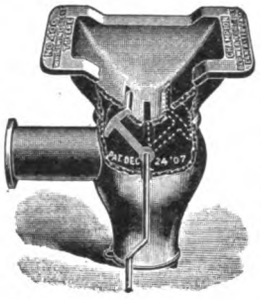

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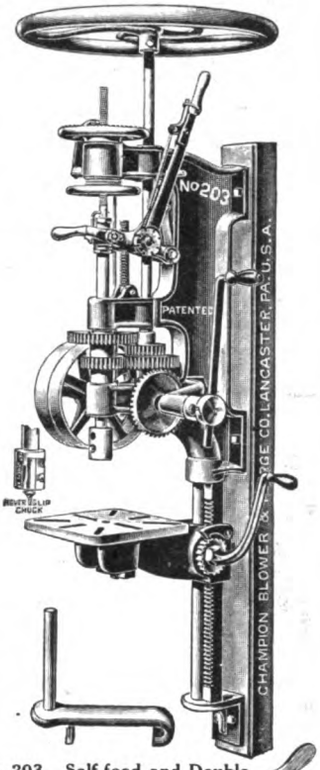
The "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron produces a circular, rotary whirlwind blast and concentrates the heat in the tuyere nest, not permitting it to blow up and out of the chimney, therefore, makes a hotter fire and heats the iron one third quicker, saving much coal.



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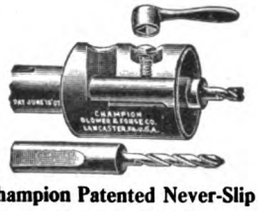

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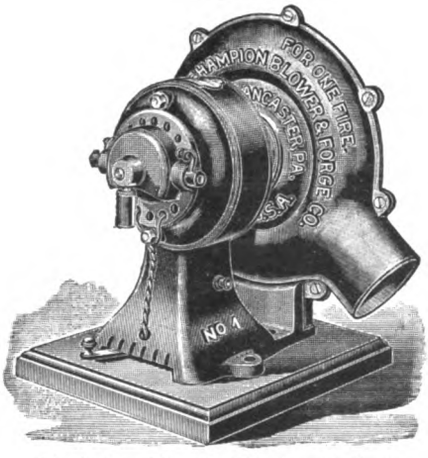

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Screw Plates in four styles, cutting up to 1½ in.

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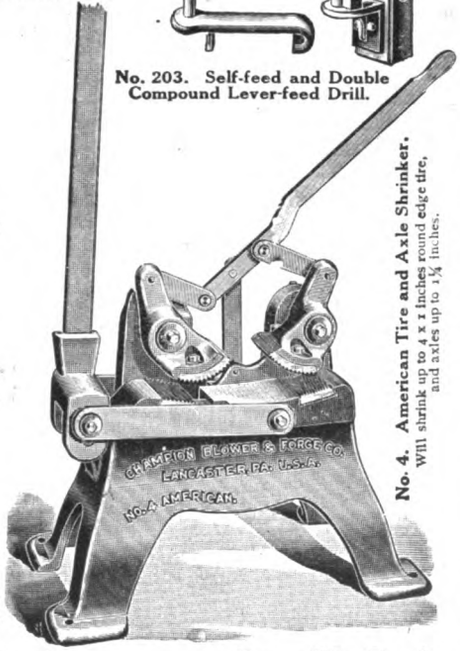

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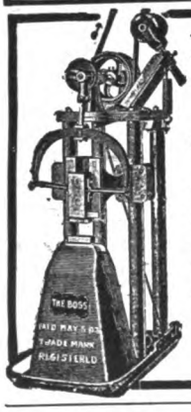

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For its location in this issue, see Index on Page 19.

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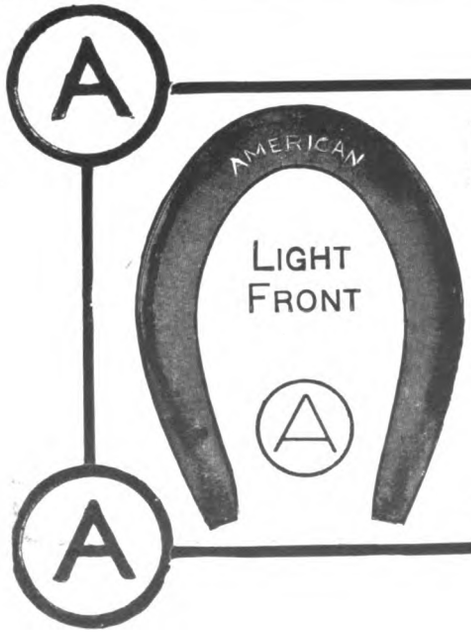

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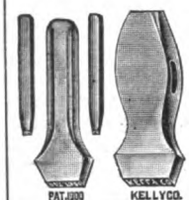

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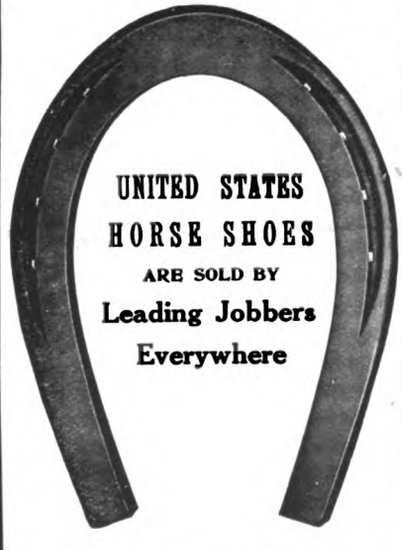

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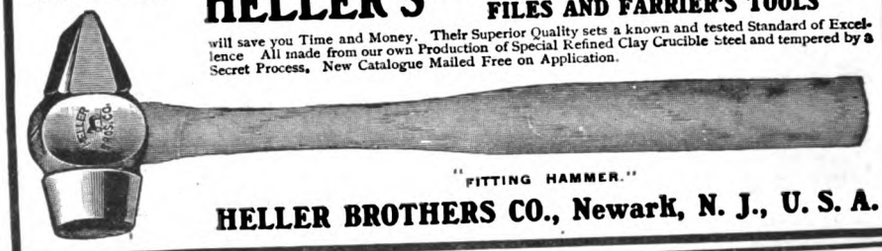

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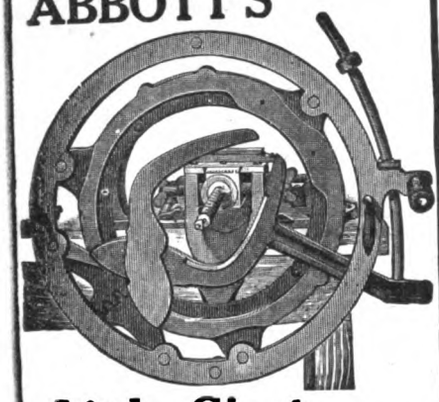

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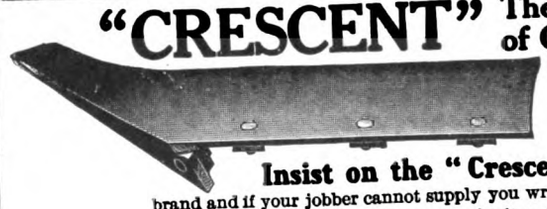



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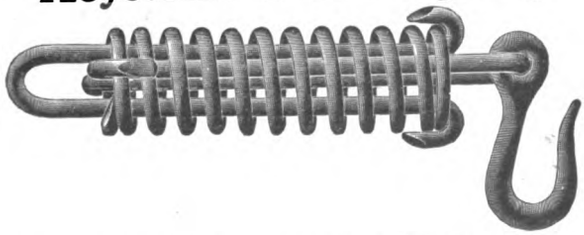

makes the load lighter for the HORSE and the road smoother for the DRIVER.

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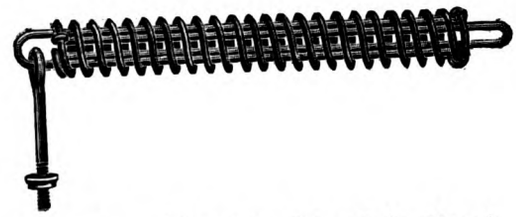

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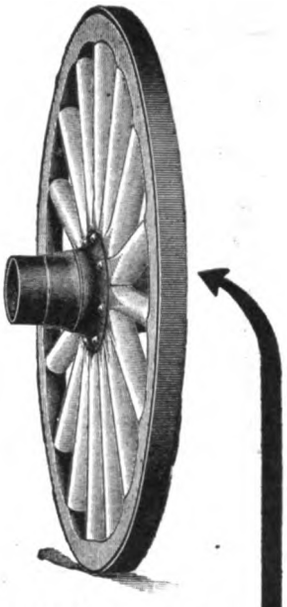

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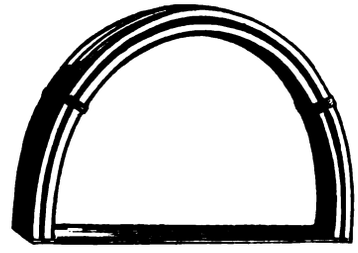

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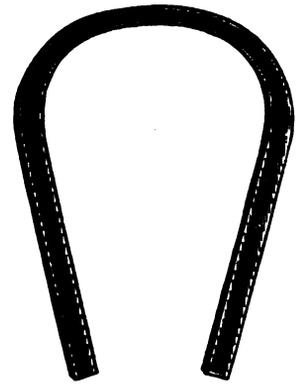

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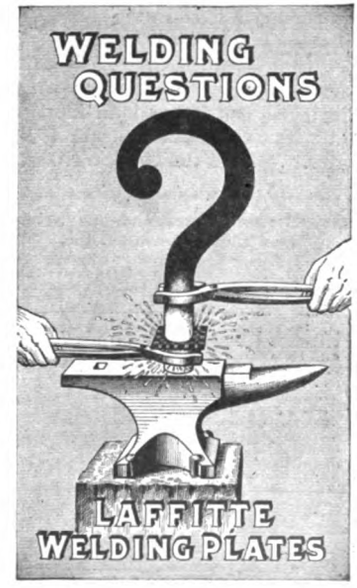



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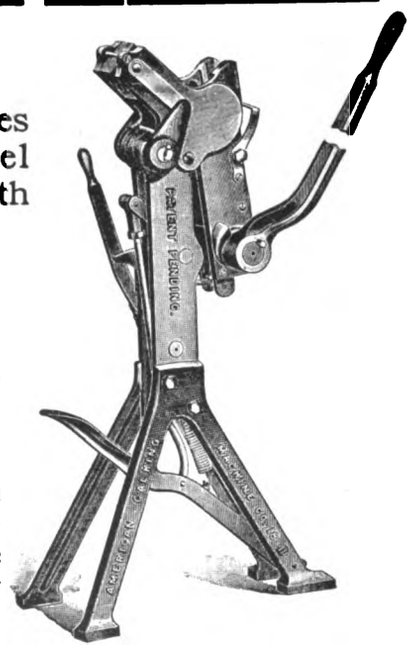

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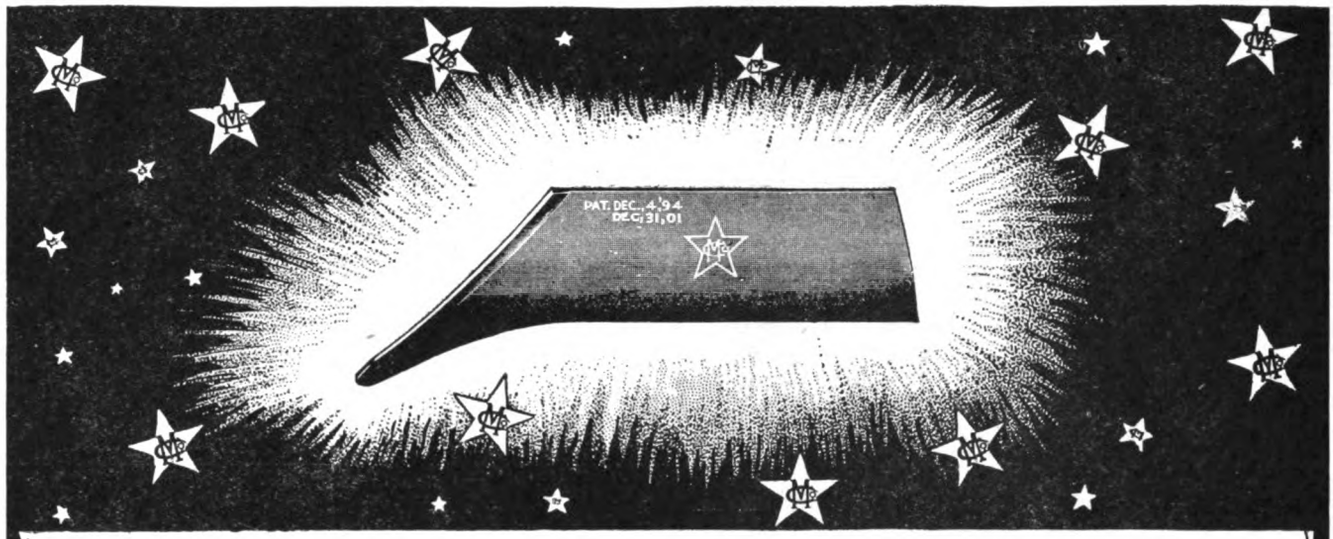

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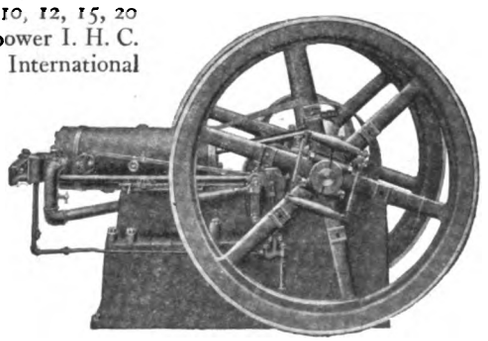

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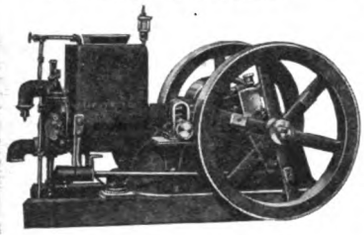

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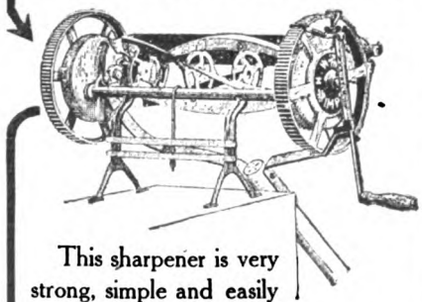

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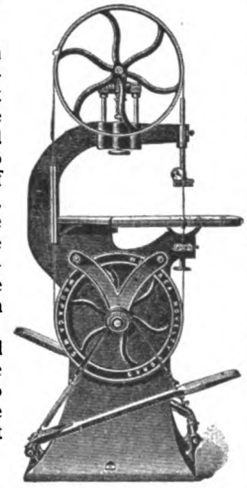

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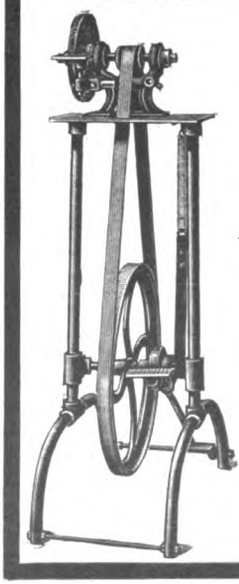

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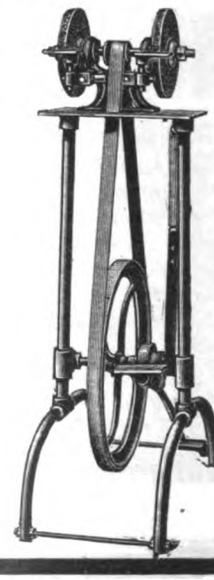

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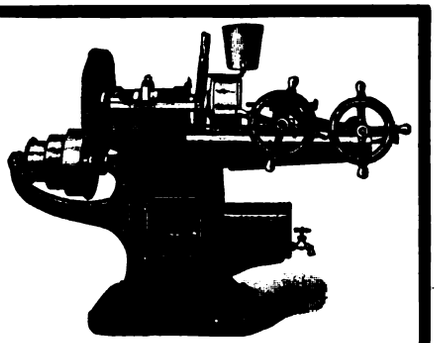

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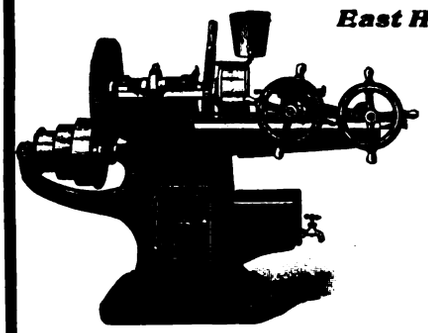

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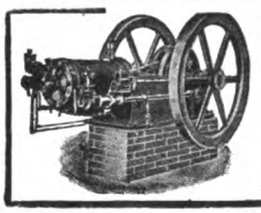

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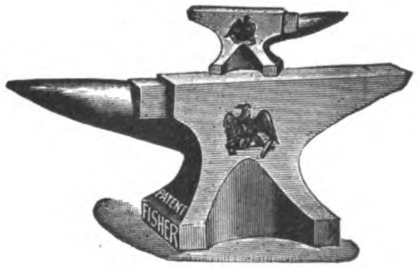

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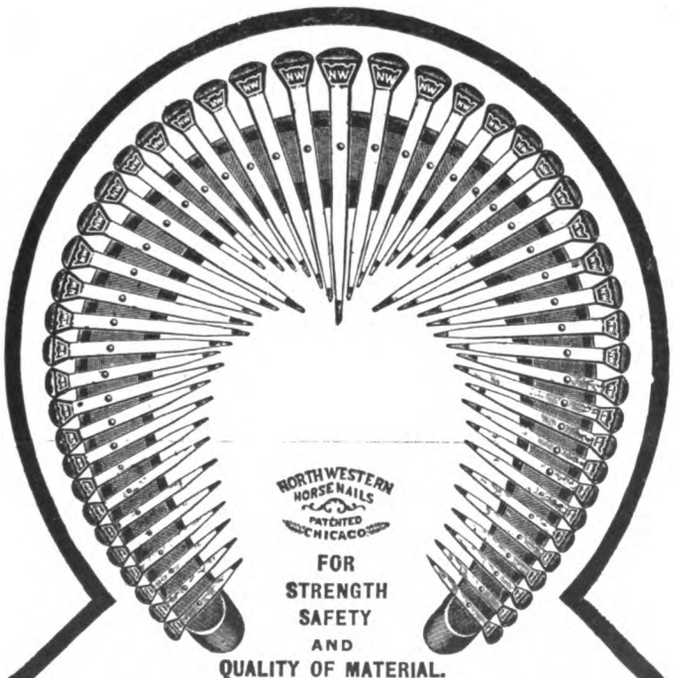

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$8.25 NET WILL BUY ONE



The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16 — 18, 3-8 — 16, 7-16 — 14, 1-2 — 12, 5-8 — 11, 3-4 — 10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustable, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only $8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

THE E. F. REECE CO., Greenfield, Mass., U. S. A.

Great Price Wrecking Sale!

From Sheriffs', Receivers' and Manufacturers' Stocks

All goods sold on a binding guarantee. Your money back if you're not satisfied.

Every article in this advertisement is guaranteed brand new and first class.

CHICAGO HOUSE WRECKING CO.

Our plant covers 40 acres of ground and is one of the most wonderful mercantile institutions in the land. Our capital is one million dollars. Our responsibility is unquestioned.

Our stock includes practically everything under the sun. Millions of dollars' worth of brand new, high grade merchandise **bought by us at various sales**, is offered to the public **at prices usually less than the original cost of production.** We offer an exceptional opportunity to those who buy now, so send us a trial order. This will convince you.

Read every word of our greatest sale. **Never before** have prices been cut deeper than those quoted in this advertisement. **Every item** means a **big saving for you. Make your selection at once.**

SPECIAL SPRING 1910 OFFER

Send us your order today. Bargains such as these may never again be advertised.

Mixed Bolts, 2½c. per lb.



10 tons brand new mixed **Machine** and **Carriage Bolts,** first class condition, **various sizes mixed** together, from ⅜ to 1 inch diameter and from 2 to 10 inches long.

Price F. O. B. Chicago:
In lots of 25 to 100 lbs.....3c. lb.
In lots of 100 to 500 lbs.....2½c. lb.
In lots of 500 lbs. and up.....2¼c. lb.

Horseshoe Nails, 5c. lb.



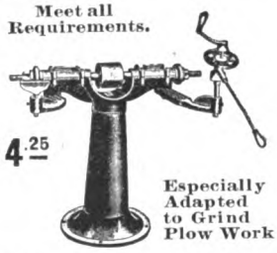
Lot No. 4-A-B-96.
Queen City Special, cold rolled Horseshoe Nails, sizes 7, 8, 9, put up 25 lbs. bulk in a box.
Price, per lb..... **5c.**

"Bonanza" forged and pointed, warranted Horseshoe Nails, made of best Swedish stock, sizes 7, 8, 9, put up in bulk, 25 lbs. to box.
Price, per lb..... **6c.**

2,000 boxes of **"Bay State"** cold rolled Horseshoe Nails, made of best Norway Iron, sizes 7, 8, 9 and 10.
Price in bulk, 25 lbs. to box..... **5½c. lb.**
Or in 5 lb. cartons..... **7½c. lb.**

$25 Emery Grinder $14.25

Meet all Requirements.



$14.25=

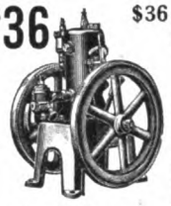
Especially Adapted to Grind Plow Work

Made for general shop work and grinding plows. Note Disc Grinding Attachment shown on right hand.

DIMENSIONS—Height 30 inch; Base 18 in.; Arbor 36 in.; Shaft 1¼ in.; Collar 3¾ in.; Bearings 1¼x8 in.; Pulley 4x4½ in.; Weight 190 lbs. Will carry wheels 14x3 in.

Price..... **$14.25=**

$36 Buys 2 H. P. New Gasoline Engine.



$36

A brand new 2 H.P. electrical ignited Gasoline engine, complete in every detail. Ready to run when you receive it, for..... **$36.00**

This is the greatest offer ever made on Gasoline Engines. This engine is strictly brand new, first class and covered by a binding guarantee. It is the **well known "Superior" make.**

4 H. P. Gasoline Engine for..... $64.00=

Larger sizes at equally low prices.

Our five-year guarantee on these engines protects you. Shipped with the understanding that if not entirely satisfactory, may be returned at our expense. No fairer offer could be expected. Every blacksmith or iron worker should have power in his shop, and here is your opportunity.

☞ Write for our great Gasoline Engine Catalog. Tells you how to buy these high grade engines at lowest prices.

Green River Screw Plates, $7.95



Quality of Green River Plates is unquestioned. Make a perfect thread with a single cut; dies are adjustable.

Our Lot No. 4-A-346.
5 each, Taps, Dies and Guides, complete with tap wrench and stock, in hardwood case. Cuts ¼x20, ⅜x16, ½x12, ⅝x11 and ¾x10 threads. Our price, complete..... **$7.95=**

New Wrought Anvils 5c. per lb.



5c.

Best quality, form and finish. Steel face is a solid piece planed smooth after welded.

Lot No. 4-A-115.
Absolutely guaranteed.
Weight 150 to 200 lbs.
Price per lb..... **5c.**

Ball Bearing Grindstones.

$2.95=



Lot No. 4-A-1266.
Strongest and **easiest** running Grindstone on the market.
Angle steel frame. Ball bearing journals.
60 lb. 2½ in. stone, weight 85 lbs.
Price..... **$2.95=**

Double Geared Tire Bender.

$6.75=



Lot No. 4-A-110.
First class tool in every detail. Bends up to 5 in. tire to circle 24 in. or larger.
Price... **$6.75=**

New Horse Shoes $3.00 per 100 lb. Kegs.



Brand new Horseshoes, made by Eagle Horseshoe Co. First class order.
Lot No. B-2500.
25 kegs No. 0
22 kegs No. 1
Price per 100 lb. kegs.... **$3.00=**

Rawhide Rubber Roofing.



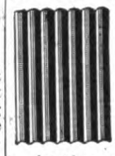
The greatest bargain in the world. Fire, hail and weather-proof. Not affected by heat or cold. Used in any climate. Made from pure asphalt. A strictly high grade, lasting covering. **Recommended** by fire underwriters. **108 sq. ft. to a roll,** with large headed nails and cement for laps. Requires no coating. Samples free.

Send for Roofing Booklet.

1 ply Guar. 6 yrs. $1.22 per roll
2 ply " 9 " 1.49 per roll
3 ply " 12 " 1.71 per roll

At above prices freight prepaid to Ill., Ind., Ia., Ohio, Wis. and Mich. Write for prices prepaid to other States.

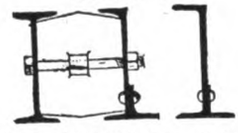
Steel Roofing, per 100 feet, $1.60



100,000 Squares of new Steel Roofing, which we are selling at the following prices, freight prepaid,
Flat..... $1.60
Corrugated, V-Crimped or Standing seam, 1.85

At these prices we prepay freight to all points **east of Colorado,** except Oklahoma and Texas. Quotations to these points on application. Our high grade **Galvanized Rust Proof Roofing** at prices ranging from **$3.00** per square up. Write today for free sample and Great Book on Roofing.

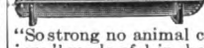
Structural Steel 1½c. per lb.



Over 10,000 tons of Angles, Channels, Tees, "I" Beams, round, square and flat Bars, all first class stock, standard size and lengths, at..... **1½c. per lb.** and up.

You must send us a list of your wants in merchant or structural steel, for prices that will mean a big saving to you.

5 ft. Boiler Steel Hog Troughs $1.80



Lasts forever.

"So strong no animal can break or injure," made of ¼ in. boiler steel. Size 10 in. x 5 in. by 5 ft., at **$1.80,** worth **$4.** Over 150 other styles and sizes for Poultry, Hogs, Sheep, Horses and Cattle. Write for circular.

☞FILL OUT THIS COUPON

Chicago House Wrecking Co., Chicago:

I saw your advertisement in **American Blacksmith.** Am interested in the following items:

_____

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Do you want Free Mammoth Catalog ? Do you want Free Gasoline Engine Bk ?

Dou you want Free Roofing Book ? Do you want Free Structural Steel Bk ?

My Name_____

Town_____

R.F.D._____ P.O. Box_____

County_____ State_____

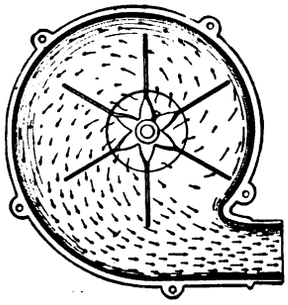
May, 1910, Am. Blk.

Chicago House Wrecking Co. 35th & Iron Sts. CHICAGO

Buy a Buffalo "200" Silent Blower

Guaranteed against repairs for ten (10 years)

The Buffalo Way



Compare

Our Guarantee.

For and in consideration of the purchase price of this machine, *we hereby guarantee to replace*, free of charge, f. o. b. cars Buffalo, N. Y., any parts of the "*Buffalo 200 Silent Blower*" wearing out within ten (10) years.

We also guarantee this Blower to produce a stronger blast with the same number of turns of the crank than any other blower built.

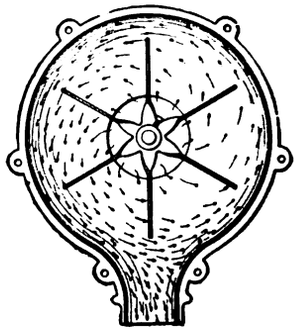
Run this Blower 24 hours per day and the guarantee still holds good.

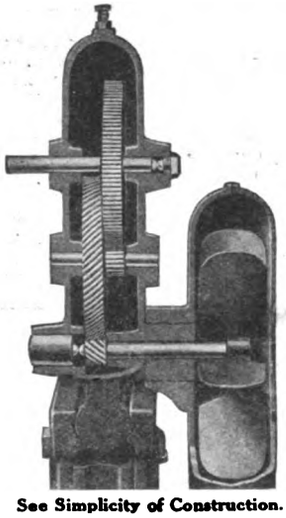
BUFFALO FORGE COMPANY,

W. A. Mudt

President.

The Other Way





See Simplicity of Construction.

The construction of the fan case gives delivery of air along the line of least resistance, without any loss. Nature's law observed. It therefore

Delivers More Air per Turn of Crank

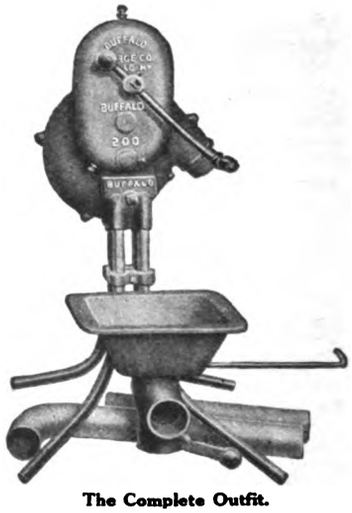
than any other blower.

Machine cut gears—spur drive—helical speed—mesh perfectly. Gears run in extra long journal bearings, bored and reamed in the solid metal of the case. Perfect alignment always retained. End thrust balanced on ball bearings. No appreciable friction.

Improves with Use

All is enclosed in an oil and dust proof case.

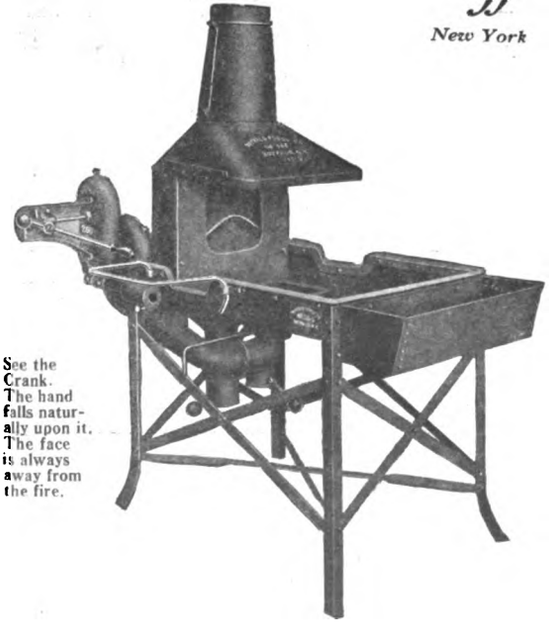
Write today for Catalog 178 A. C.



The Complete Outfit.

Buffalo Forge Company

New York *Buffalo, N.Y.* *U.S.A. Chicago*



See the Crank. The hand falls naturally upon it. The face is always away from the fire.

Buffalo Down Draft Forge, 666

No Smoke No Soot No Gases

The air of your shop always pure and clear. The down draft hood catches and removes all the smoke and gases generated by the fire.

This forge is built of heavy rolled steel plate, with a heavy cast iron hood and stack.

Equipped with the powerful Buffalo "200" Silent Blower.

Buffalo Blacksmiths' Drill, 89

The planetary geared fly-wheel increases the energy applied.

Ball Bearings at points of highest speed reduce friction to the smallest possible point.

A half turn of the small wheel at the left of feed screw head gives hand lever feed, with

Full and Instant Return

of drill spindle the full length of feed. A half turn back instantly and reliably locks the power feed.



Write today for your copy of Catalog 178 A. C.

describing Buffalo Blacksmiths' Tools, Blowers, Forges, Drills, Armor Plate Punches and Shears



The Complete Kit

No matter how fine the car you own, or drive, or manufacture; no matter how thoroughly it is equipped, your outfit is not *complete* unless you own the new

Cyclopedia of Automobile Engineering

Four large, handsome volumes, bound in half morocco, 1200 illustrations, full page plates, diagrams, etc., 1500 pages, 7 x 10 inches, crammed with interesting and very necessary information concerning automobiles, aeroplanes and motor boats; knowledge that you've got to get some way or other before you can thoroughly understand or enjoy the automobile "game."

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VOL. I.—GASOLINE AUTOMOBILES: Running Gear, Power, Operation, Repair. *Automobile Mechanisms:* Carburetors, Starting Devices, Clutches, Gears, Brakes.

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READ THIS FREE EXAMINATION OFFER

You can examine these books for five days in your own home or office, free of all cost. Don't risk missing this offer by stopping to think it over now. Order now and do your careful thinking with the books before you. That costs nothing. Here's the coupon.

HERE'S OUR LIBERAL SELLING PLAN

If you like the books after examination, send us $2.00; then $2.00 a month until the special price of $12.80 is paid. If they are not satisfactory, advise us and we will have the books returned at our expense.

Order promptly and we will include for one year, as a monthly supplement, the TECHNICAL WORLD MAGAZINE, a regular $1.50 monthly, full of interesting scientific topics written in popular form.

American School of Correspondence

CHICAGO, U. S. A.

FREE EXAMINATION COUPON

American School of Correspondence:

Please send set Cyclopedia of Automobile Engineering for 5 days' free examination; also Technical World for 1 year. I will send $2.00 within 5 days and $2.00 a month until I have paid $12.80; or notify you and hold the books subject to your order. Title not to pass until fully paid.

Amer. Blacksmith-5-'10.

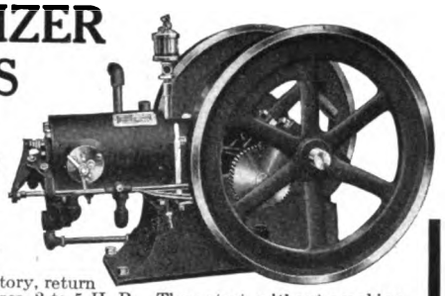
NAME .....

ADDRESS .....

OCCUPATION .....

EMPLOYER .....

ECONOMIZER ENGINES CHEAP



THIRTY DAYS' FREE TRIAL

and if it is not satisfactory, return it at our expense. Sizes, 2 to 5 H. P. They start without cranking, one motion of lever shuts off gasoline, locks up governor and cuts out the battery, so there is absolutely no waste. Just the engine for the blacksmith and automobile repairman. Drives lathe, blower, trip hammer and band saw all at once, with power to spare. Buy the first engine in your vicinity at a reduced price and SECURE AGENCY. Write at once or you may be too late. Address,

H. L. CHAPMAN, Box A, Marcellus, Mich.

Is Your Anvil Worn Out?

But it's NOT beyond repair for we can REPAIR old wrought anvils no matter how badly they are broken.



Before buying a new anvil write for our prices—it will pay you.

The Columbus Anvil & Forging Co.

Office, Wyandotte Building
Factory, West Frankfort St.
COLUMBUS, OHIO



ASSORTMENT No. 1.

Cutting Sizes—$\frac{1}{4}$—$\frac{5}{16}$—$\frac{3}{8}$—$\frac{7}{16}$—$\frac{1}{2}$

Little Giant

Every smith who uses a "LITTLE GIANT" screw plate takes pride in the threaded work he sends out of his shop.

There's good reason for his pride—he knows that work done by "LITTLE GIANT" tools can be ***backed up*** and ***guaranteed.***

Catalog 22 is sent on request.

WELLS BROTHERS COMPANY

GREENFIELD MASS. U. S. A.
NEW YORK CHICAGO LONDON

SHARP DIES

are what are needed in order to cut good threads, and you can always have them if you use a

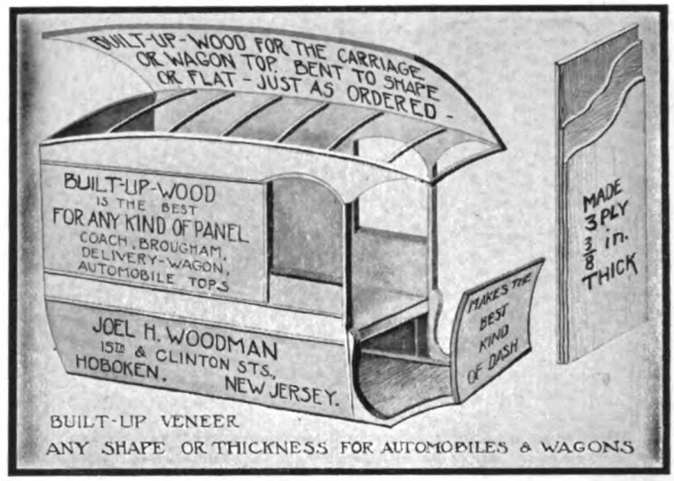


"DUPLEX" DIE STOCK SET

The dies in these sets are easier to sharpen than a knife; this fact enables you to get the full wear out of them. *Write us.*

THE HART MANUFACTURING CO.,

50 Wood Street, :: :: Cleveland, O., U. S. A.



Of Great Help.

Established 1870. New Repository, 731 E. Cary St. Phone 765.

BUILDERS OF HIGH GRADE WAGONS.

A. MEYER'S SONS

BUGGIES, TRUCKS AND WAGONS

118 and 120 S. Eighth Street.

Richmond, Va., March 10th, 1910.

BUFFALO FORGE CO., Buffalo, N. Y.

Gentlemen:—The Crain Combination Woodworking Machine which we purchased from R. W. Norris & Sons, Baltimore, Md., last September, has proven very satisfactory.

We have put this machine to very severe tests, and it has always done the work. It is a wonderful addition to our shop, being of such great help to us upon heavy work.

Yours very truly,

A. MEYER'S SONS.

See page 47.



Say! Mr. Blacksmith,

have you heard about the new tire setter called

THE SCIENTIFIC HYDRAULIC?

Blacksmiths are just wild about it where it is used, and the manufacturers are either **crazy** or **dead sure** they have a "cinch" on the other fellows for they actually **warrant** it to be **better** than any other and will let you be the judge.

GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

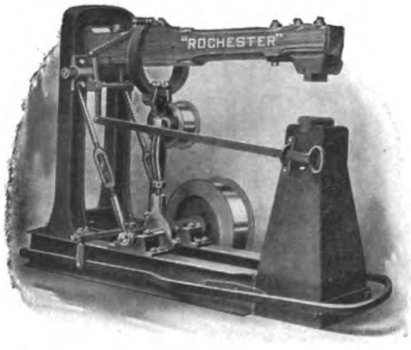
Write for information at once to



National Hydraulic Tire Setter Co.

KEOKUK, IOWA.

ROCHESTER HELVE HAMMER



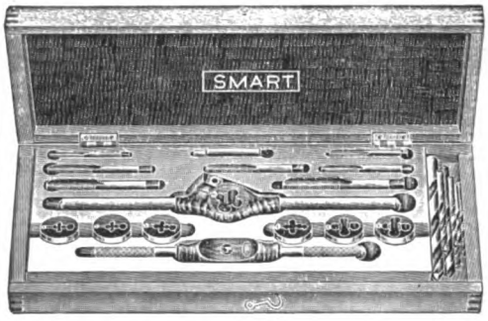
(The Hardest Hitter)

Forging dies set crossways of helve. Welding dies set lengthways.

The best hammer made for general work, and a dandy Tire Welder.

MADE IN SIX SIZES

THE WEST TIRE SETTER CO., Rochester, N. Y.



Strong,
Easy
Cutting
Durable
Screw
Plates

FULL LINE OF HIGH QUALITY SCREW CUTTING TOOLS

Send for Free Catalog

A. J. SMART MANUFACTURING CO., Greenfield, Mass.

FIRST MADE IN AMERICA

HAY-BUDDEN SOLID FORGED ANVILS

A LONG STEP FORWARD

SOLID FORGED STEEL TOP
Welded to a
SOLID FORGED BASE
Making a
SOLID FORGED ANVIL

The Gold Medal Anvil

HIGHEST AWARD
Omaha 1898 Pan-American 1901



OVER 150,000 IN USE

The **ENTIRE TOP** being one piece of high grade **FORGED STEEL** makes a **LOOSE FACE IMPOSSIBLE.**

TEMPERED "JUST RIGHT".

By our own process, the weld at the waist is a **LASTING UNION.**

Experience has proved their worth and demonstrated that **"HAY-BUDDEN" Anvils** are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., 254 NORTH HENRY ST. BROOKLYN, N. Y.

VOLUME 9

THE AMERICAN BLACKSMITH

NUMBER 9

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JUN 17 1910

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO
N.Y. U.S.A.

JUNE, 1910

$1.00 A YEAR
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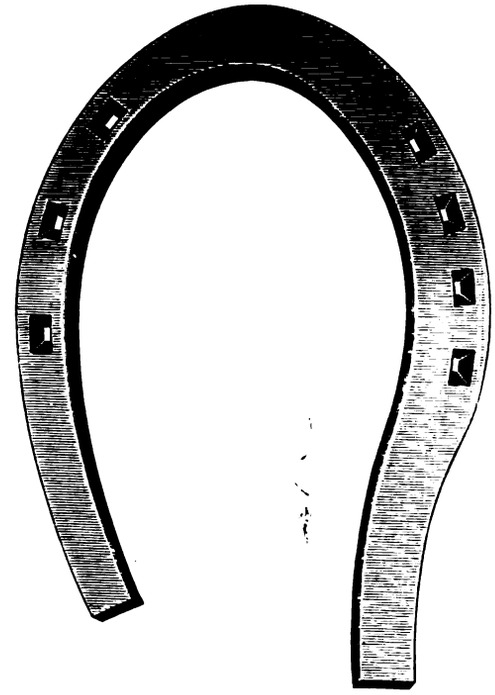
Boss Steel Countersunk Side Weight Shoes

A Drop Forged Shoe of Exceptional Merit



45 per cent more weight on the heavy side



No. 1	Light	weighs	9	ounces	No. 1	Medium weighs	10¼ ounces
No. 2	"	"	10½	"	No. 2	" "	12 "
No. 3	"	"	11¾	"	No. 3	" "	13¾ "
No. 4	"	"	14	"	No. 4	" "	16 "

These are packed in wooden boxes, each containing 10 pairs

Price per pair, all sizes, 18 cents

Manufactured by

BRYDEN HORSE SHOE CO.

Catasauqua, Pa.

THE SILVER MFG. CO.

365 BROADWAY SALEM, OHIO.



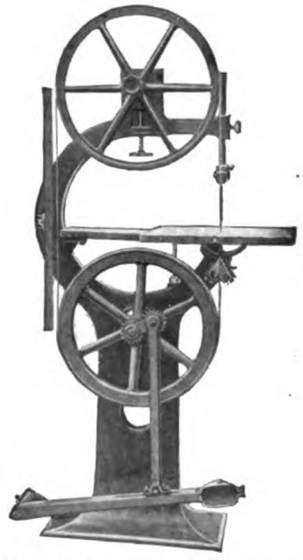
SILVER'S NEW JOINTERS

Five Sizes—8, 12, 16, 20 and 24 inch. New "patent applied for" features.



SILVER'S SAW TABLES

Send for circular of Saw Tables and Swing Saws.



NEW PLANETARY BAND SAW

20-inch Foot or Combination.

Silver's High Quality Money Making Tools for the Blacksmith.



Silver's New Swing Saw. Four Lengths.

Did you see the illustration of our large new Plant in the March issue? Housed in that ample structure we have tens of thousands of dollars invested in the very latest and most improved machinery in the market. Machinery that cuts down the manufacturing cost of our tools in every department from the pattern room to the shipping room. It enables us to produce the best tools at less money and—you get the benefit.

While you are thinking of installing that new machinery that will cut down **Your** labor and **Your** expense, drop a card for our beautiful, illustrated "1910 Machinery Catalog," and investigate for yourself.

Don't put this off. Send today for our

1910 MACHINERY CATALOG.

or for any of the following booklets:

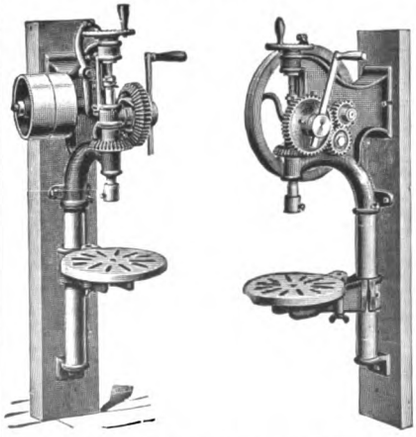
BAND SAWS AND JOINTERS—describing 20" Band Saws for foot or belt power or combination; also 26, 32, 36-inch Power Band Saws with new features; also five sizes of Jointers.

HUB BORING AND SPOKE TENONING MACHINES—illustrating and describing several sizes of each.

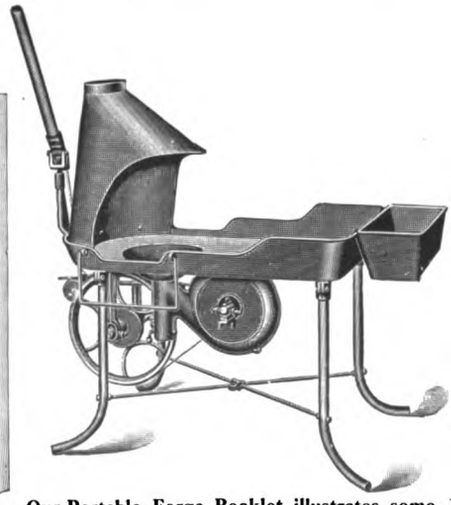
PORTABLE FORGES—illustrating and describing 14 styles.

DRILLING MACHINES—covering our line of some 22 distinct machines.

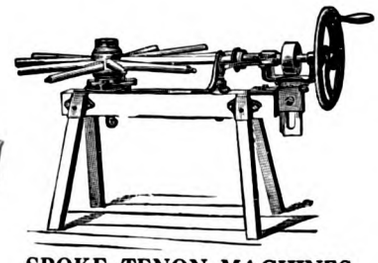
POWER DRILLS—illustrating our line of 20" machines with lever feed, lever and wheel feed, power feed with automatic stop, power feed with back gears and automatic stop.



Our Booklet, "Drilling Machines", illustrates 22 kinds we make.



Our Portable Forge Booklet illustrates some 14 kinds. We have a size to suit your needs. Strong and durable. Attractive designs.

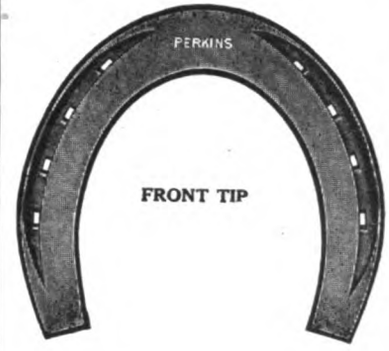


SPOKE TENON MACHINES

in Seven Sizes. Fitted with Star Hollow Auger.



Look for this Trade Mark ★ The Star brand beats all others





★ PERKINS ★

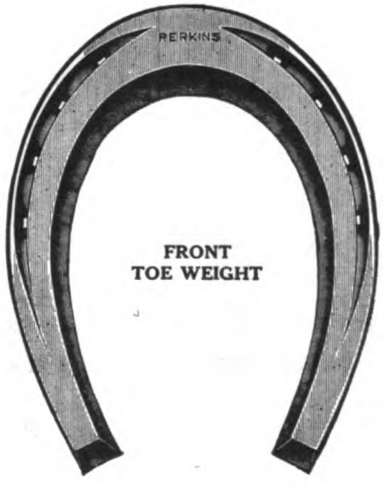
HORSE SHOES

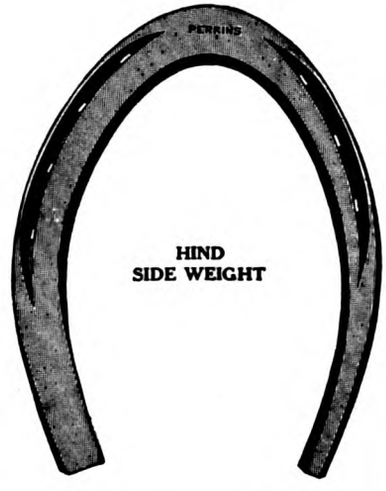
AND

TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



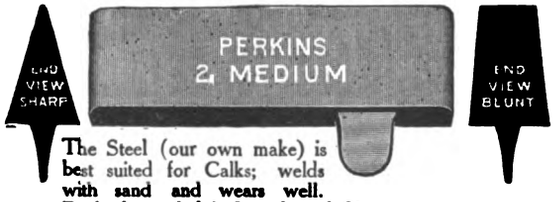


Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

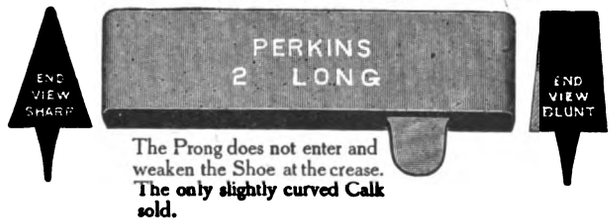


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

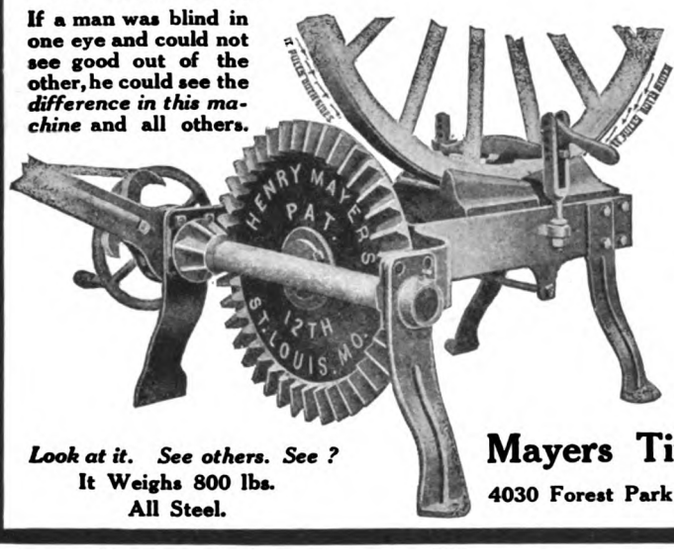
Because You Have Set 'Em 40 Years One Way

Is the best reason you should CHANGE THAT WAY. You have tried the old way long enough! Once you made horseshoe nails, long, long ago. Why DON'T YOU MAKE THEM NOW? THERE IS A REASON.

WHY KEEP ON SETTING TIRES THE OLD WAY? Opportunity and these $$$$$$$$$$$$$$$$$ are rolling right past YOU. Don't just "reach out"—but GRAB HER AND HOLD HER. THE MAN WHO SAYS "IT CAN'T BE DONE" is usually run over by some one DOING IT.



If a man was blind in one eye and could not see good out of the other, he could see the *difference in this machine* and all others.



Grab opportunity today by writing for the

NEW IDEA

Setting Tires

COLD OR HOT ON THE WHEEL.

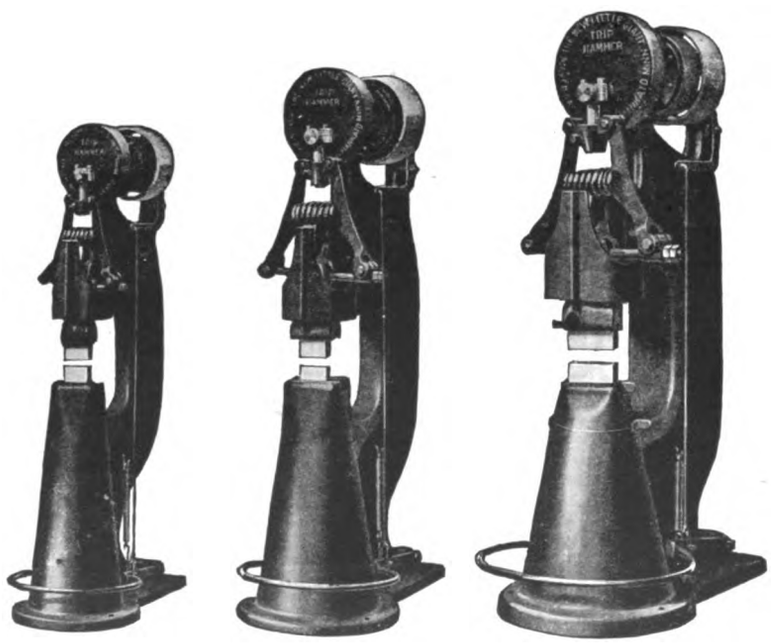
—

Hand or Power

Look at it. See others. See ?
It Weighs 800 lbs.
All Steel.

Mayers Tire Setter Mfg. Co.
4030 Forest Park Boulevard ST. LOUIS, MO.

The New Little Giant Power Hammer



Stands for what is best in design, material and construction. It does THE WORK efficiently and quickly and is always under perfect control.

This high degree of perfection in Power Hammers is the result of fifteen years' experience.

Made in three sizes:

25 lb. 50 lb. 100 lb.

Suitable for forging material up to 5 in. in diameter.

Will do anything and everything that can be done on Power Hammer.

Recommended by over 3,000 satisfied users.

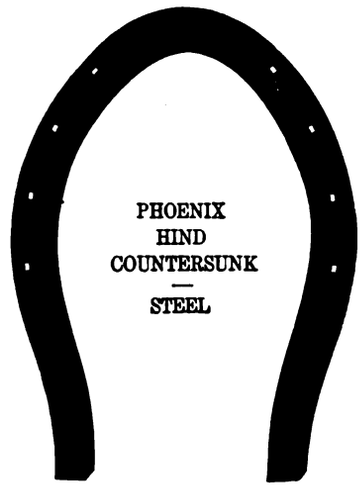
Manufactured by

MAYER BROTHERS COMPANY :: MANKATO, MINN.

AGENTS: United States— All Jobbers
New Zealand— Alex Storrie, Ltd., Invercargill
Manitoba, Saskatchewan and Alberta— Melotte Cream Separator Co., Winnipeg

WRITE NOW FOR FULL INFORMATION







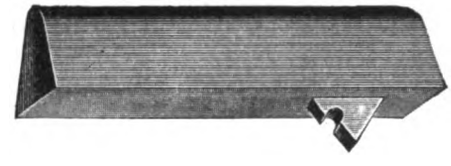
Phoenix Horse Shoes

Are the best. More uniform. Better material. Easier to fit. Try them. Be convinced.

Phoenix Horse Shoe Company

Rolling Mills and Factories: Joliet, Ill., Poughkeepsie, N. Y.
General Offices: Rookery Building, Chicago, Illinois

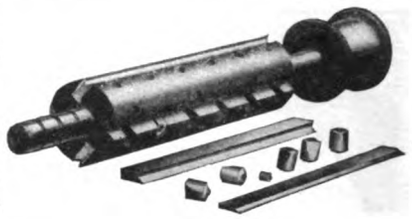




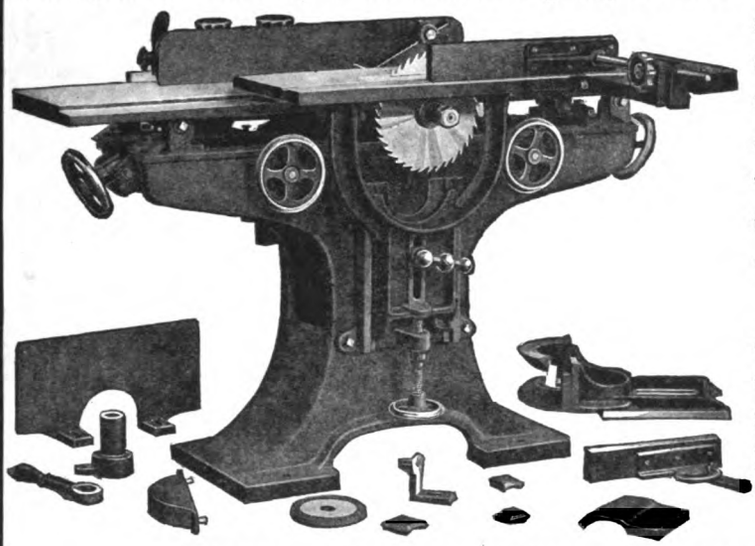
Have You Tried Bull Dog Toe Calks—They Have Many Advantages Over the Old Style Calks—Your Dealer Has Them.

Save Time, Money and Fingers

by using a Crescent Jointer with Safety Head



The knives are made of high speed steel and will hold an edge longer than the ordinary steel, consequently less time is required to dress the knives, and the efficiency of the machine is greatly increased. In case of an accident the worst that could happen to the operator would be a flesh wound, as the round head would not allow the hand to be drawn into the knives, as is the case on jointers with square heads. As a further protection to the operator all Crescent Jointers are provided with safety guards.



Send today for catalog, giving complete description and telling all about our substantial line of Band Saws, Saw Tables, Jointers, Shapers, Borers, Planers, Planer and Matchers, Pole Rounders, Disk Grinders, Variety Wood Workers.

THE CRESCENT MACHINE COMPANY

245 Main Street **Leetonia, Ohio, U. S. A.**

"FAMOUS" UNIVERSAL WOODWORKER

A Complete Machine Shop In Itself

The "FAMOUS" Universal Woodworker is really **fourteen** woodworkers—each doing a different line of work—combined on one base because of the low cost of purchase and economy of maintenance. It is **the only** woodworker for Blacksmiths, because of the wonderful adaptability to so many kinds of work. Blacksmiths have long waited for this wonderful proposition. At last they can obtain a machine that's a felloe rounder, or a reversible shaper, or a dozen other machines, by making a few simple adjustments. Ordinary, everyday business sense is against buying fourteen expensive machines when a small investment buys one which does the work of fourteen. It's not business economy to waste all that extra floor space. Next to having our Woodworker installed in your shop is sending for our catalog. Kindly write for particulars **today.** :: :: :: :: :: :: ::

The Friction Reversible Shaper Spindle

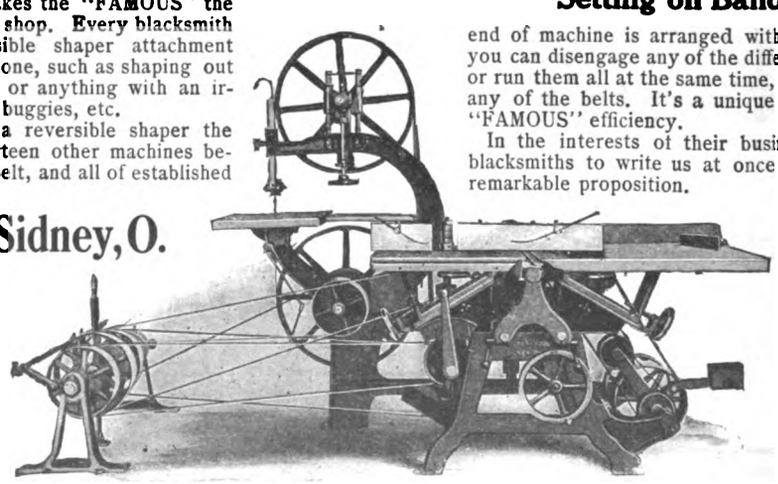
is our latest great feature, and one that makes the "FAMOUS" the perfect Woodworker for the blacksmith's shop. Every blacksmith needs a reversible shaper. The reversible shaper attachment enables various extra kinds of work to be done, such as shaping out all kinds of wagon hounds, wagon felloes, or anything with an irregular curve necessary to use on wagons, buggies, etc.

But don't forget that besides being a reversible shaper the "FAMOUS" Universal Woodworker is thirteen other machines besides, all driven by one motor, or by one belt, and all of established merit.

The New Friction Counter-Shaft Setting on Band Saw

end of machine is arranged with friction so that you can disengage any of the different attachments, or run them all at the same time, without changing any of the belts. It's a unique device, typical of "FAMOUS" efficiency.

In the interests of their business, we ask all blacksmiths to write us at once for details of a remarkable proposition.



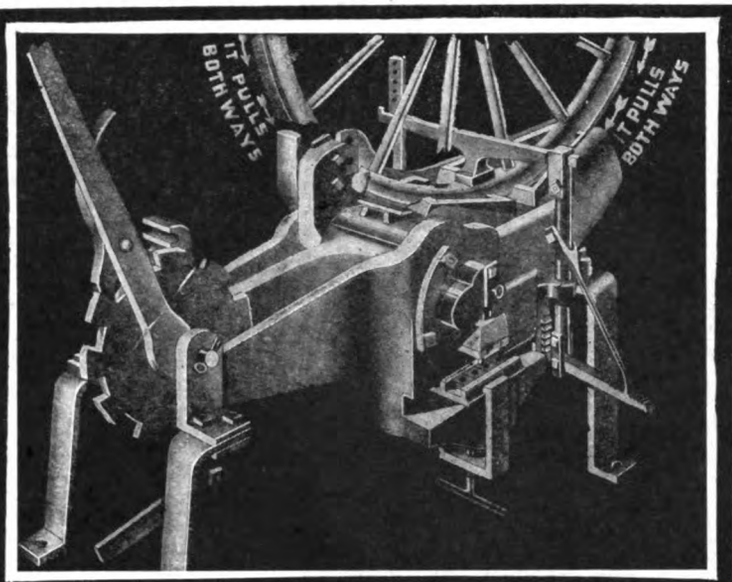
The Sidney Tool Co., Sidney, O.

14

Machines in ONE

Every Blacksmith Needs One

THE HOUSE COLD TIRE SETTER



WILL MAKE MORE MONEY FOR YOU

NOT ONLY THE BEST

BUT ALSO THE CHEAPEST

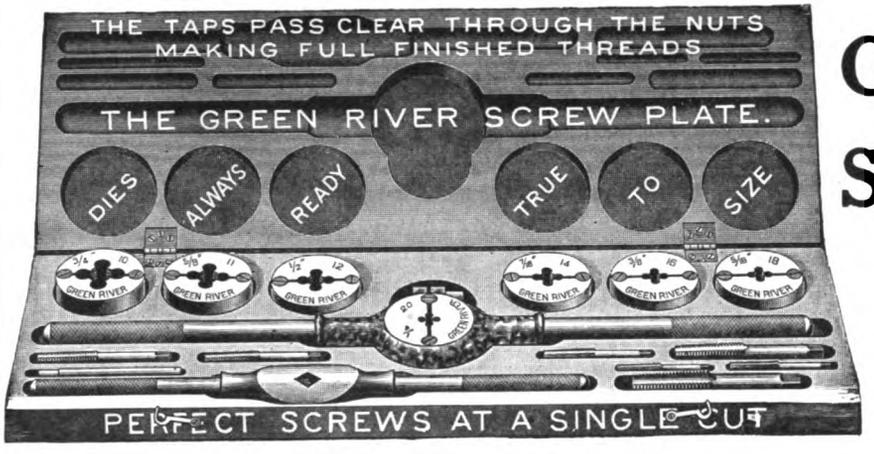
TAKE NOTICE—You Can Have Our Machine in Your Shop

and see for yourself that it does the work just right before you are required to pay a cent on it. We don't ask our customers to take any risk, we take it all. You have no cause to hesitate, even if you know nothing about cold tire setters, or have heard bad reports on them, for we give you a chance to see for yourself. ***Do You Want to Build Up Your Business and Make Money?*** It saves you full time of one man and three quarters of another and you don't keep your customers waiting. So don't try to get along without it, and don't buy any other until you have tried ours, as it costs you nothing.

Write for our reduced prices and terms.

Now is the time to buy and get it advertised in time for the season's work

HOUSE COLD TIRE SETTER CO., 216-218 S. Third Street, St. Louis, Mo. J. F. HOUSE, 201 Church St. Toronto, Ont., Canada.



Green River Screw Plates for Blacksmiths

Simple adjustment—one taper screw does the work. Can be adjusted without removing dies from stock. The best sets of taps and dies for the least money. Send for Catalog 34 D.

Sole Makers

Wiley & Russell Mfg. Company Greenfield, Mass., U. S. A.



Sterling Hoof Pads

These pads are about as much better than the old style leather backed pads as those are better than none. Our pad is one smooth, solid piece of rubber. The calk is vulcanized onto the back and stays there. The entire pad is perfectly impervious to water, and will keep horses' feet in better condition than is possible with wet and soggy leather, which contracts and expands with varying conditions of moisture and temperature.

The construction of these pads is our own device and invention and is fully protected. There is and can be no adequate substitute.

Prices about the same as for leather backed pads. Dealers are requested to write for discounts and open territory.

Trade Mark

Manufactured by

Rutherford Rubber Co. :: Rutherford, N. J.

Equipped with the

Buffalo "200" Silent Blower

Guaranteed to produce a stronger blast than any other blower made; also against repairs for ten years.



Buffalo Down Draft Forge

No. 660

Cast iron hood, tile stack, indestructible from heat, rust and gases

No Soot, No Smoke, No Gases

Your forge shop atmosphere always pure and clear. The down draft hood catches and removes all smoke and gases generated by the fire. It also supplies the fire with a hot blast of returned coal gases, which effects full consumption of, and

Saves 1-3 in Fuel

Notice the position of the crank on the blower. It is just where you want it. The hand falls naturally upon it, and you do not face the fire. The up-to-date forge for the modern shop.

Write today for our new Catalog No. 178 A. B., describing

Forges
Blowers
Drills
Punches
Shears
Blacksmiths' Tools

Always ask your Dealer for "Buffalo" Tools. If he does not supply you, write us, we will see that you get the right goods, at the right price. The name "Buffalo" is on every Tool—look for it.

Cast Iron Hearth, Deep Fire, Anti-Clinker, H. H. Tuyere.

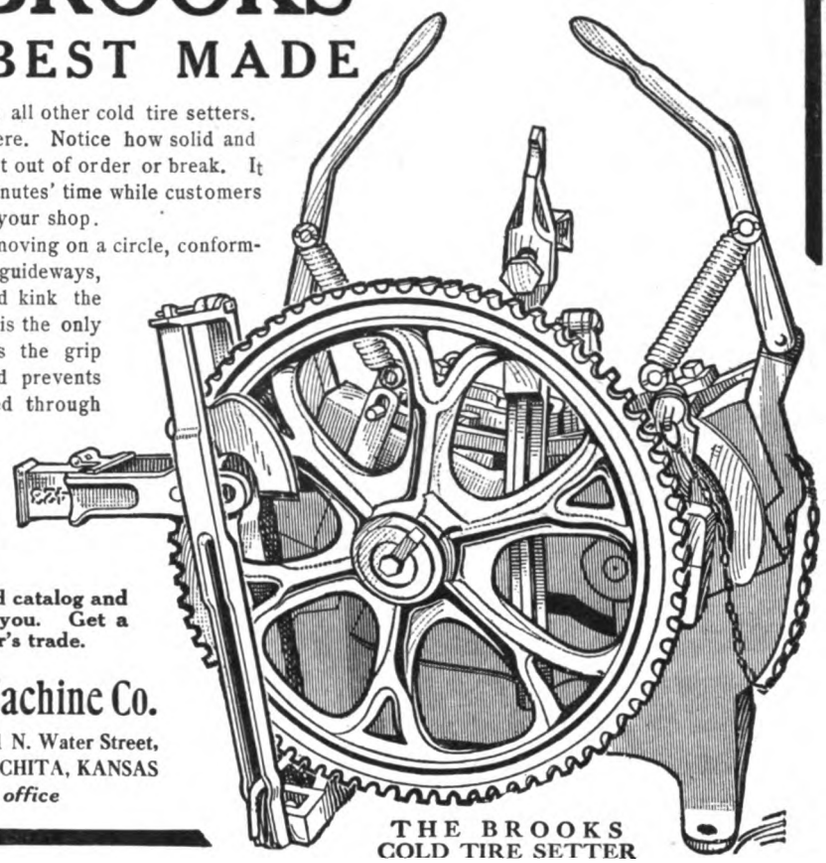
BUFFALO FORGE CO.
BUFFALO, N. Y.

The Brooks makes the Smith rich

THE BROOKS
IS THE BEST MADE

Compare the Brooks with all other cold tire setters. Study the Brooks shown here. Notice how solid and powerful it is constructed. Absolutely nothing to get out of order or break. It sets tires perfectly and does the work in a few minutes' time while customers wait. It's the biggest money maker you can put in your shop.

The Brooks is the only machine with draw-heads moving on a circle, conforming to the circle of the tire. Has machine finished guideways, making it impossible for the draw-heads to raise and kink the tire, which other tire setters often do. The Brooks is the only machine with a key-adjusting device which forces the grip keys against the tire, making them work evenly, and prevents their slipping on the tire. The power is applied through eccentrics. One man can operate the Brooks, whereas two or three men are often required to operate other tire setters. These and many other improvements not found on any other machines make the Brooks the simplest, strongest and best Cold Tire Setter made.



THE BROOKS COLD TIRE SETTER

The Brooks endorsed and used by the United States Gov't

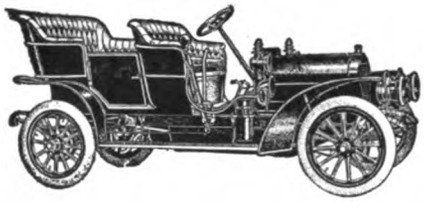
Write today for illustrated catalog and prices. They will interest you. Get a Brooks now for this Summer's trade.

The Brooks Tire Machine Co.

857-859 Ellicott Square, BUFFALO, N. Y.
121 N. Water Street, WICHITA, KANSAS

Write to nearest office

DO YOU DO AUTOMOBILE REPAIRING?



THESE BOOKS WILL TELL YOU HOW

Self-Propelled Vehicles—Homans, 7th and latest edition. 650 pages, 500 illustrations, cloth binding. A practical treatise on the theory, construction, operation, care and management of all forms of automobiles.
Price, postpaid.....**$2.00**

Automobile Troubles and How to Remedy Them.—Root, 225 pages, illustrated. Leather or cloth. It tells how to locate troubles and make repairs. The practical repairman's practical book. **Price, postpaid, leather, $1.50; cloth, $1.00**

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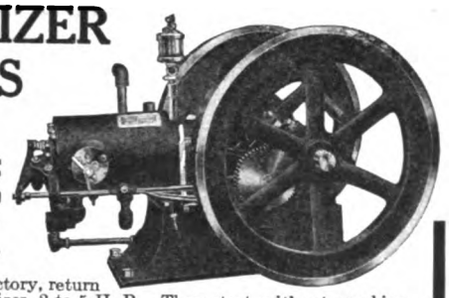
Price, postpaid.....**leather, $1.50; cloth, $1.00**

These books will be sent postpaid to any address on earth. **Our Guarantee:** Money back if not satisfactory.

The American Blacksmith Company

Book Department **P. O. Box 974** **Buffalo, N. Y.**

ECONOMIZER ENGINES CHEAP



THIRTY DAYS' FREE TRIAL

and if it is not satisfactory, return it at our expense. Sizes, 2 to 5 H. P. They start without cranking, one motion of lever shuts off gasoline, locks up governor and cuts out the battery, so there is absolutely no waste. Just the engine for the blacksmith and automobile repairman. Drives lathe, blower, trip hammer and band saw all at once, with power to spare. Buy the first engine in your vicinity at a reduced price and SECURE AGENCY. Write at once or you may be too late. Address,

H. L. CHAPMAN, Box A, Marcellus, Mich.

Never Accept Imitations

When a dealer or jobber tries to impose substitutes for the *good advertised articles,* write us or the manufacturer. We will see that you get the genuine—what you want.

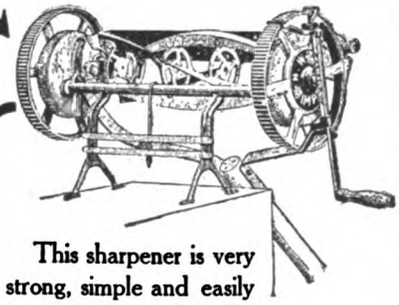
A Money Maker In Every Shop

In your neighborhood there are many lawn mowers to be sharpened, and you can make money sharpening these mowers.

The Little Giant Lawn Mower Sharpener

will enable you to do this in your spare time. Every shop should have one of these sharpeners as the ***cost is low*** and the ***profits*** that can be made ***are large.***

It pays for itself by sharpening ***two lawn mowers;*** the price for the complete sharpener being only $1.50.



This sharpener is very strong, simple and easily handled by anybody. Will sharpen a lawn mower in 3 minutes.

Be the first one in your section to get one of these outfits by sending ***$1.50*** today and we will forward promptly, prepaid, the complete outfit.

Circulars will be gladly sent if you want further information. Write today.

VULCAN IRON WORKS

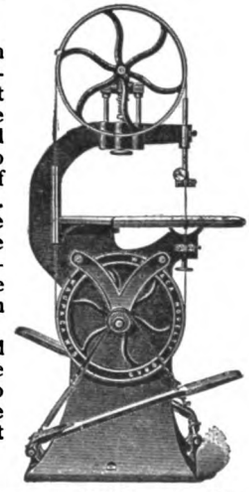
MASON CITY, IOWA.

Band Saws and Grinding Machines *You Need in Your Shop*

Whether or not you have power in your shop you can use our new No. 2 20-inch foot or combination Band Saw Machine, shown in the accompanying picture. This machine is designed especially for your needs and will enable you to do more and better work, paying for itself in a short time.

The simplicity and strength of this machine are two important features. Built of the best materials, to withstand the hardest possible wear and usage. The machine has no gears of any kind to get out of order and add to the friction. The finest ball-bearings are used throughout, making the easiest running bearings possible, and many other distinctive features which are described in our circulars.

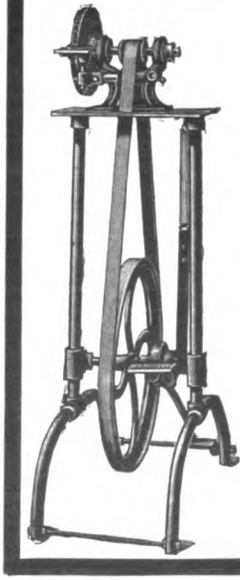
The machine is equipped with a single treadle for one person or two treadles for two persons. When desired to be run by power, we furnish tight and loose pulleys in place of the back treadle.



The upper saw pulley can be tilted by means of a hand wheel, also can be raised and lowered to change the tension of the saw. The table tilts both sides, which you will find very handy for bevel sawing. This feature found only in our machines.

Stop and think of the many advantages of this machine. Just what you have been looking for—and that your shop is not complete without one, and then send for our prices and descriptive circulars.

Foot Power Emery Wheel Grinding Machines



The machines are made especially for you—The Blacksmith—to save time, labor and, consequently, money. To save a large number of files, as these grinders will do three fourths of all the work you usually do with a file.

These Grinding Machines are light in weight and can be moved from place to place in your shop easily. Ball-bearings throughout, making them easy running.

Every Blacksmith should investigate the advantages of our machines, both Band Saws and Grinders, by writing for our circulars, containing prices, which are sent free on request.

Write Now—Today



WAUPACA NOVELTY WORKS

Waupaca, Wis.

United States Horse and Mule Shoes

ARE SUPERIOR

IN

QUALITY, SHAPE AND FINISH

MANUFACTURED IN THE MOST MODERN AND SPLENDIDLY EQUIPPED PLANT IN THE WORLD, OF THE BEST MATERIAL POSSIBLE TO OBTAIN, BY MEN "WHO KNOW HOW." THEY ARE TO-DAY



THE MOST POPULAR SHOES ON THE MARKET

ORDER "U. S." AND GET THE BEST

MADE IN

ALL SIZES AND PATTERNS

SOLD BY

LEADING JOBBERS EVERYWHERE

HANDSOME SOUVENIR STICK PIN SENT FREE TO EVERY SMITH SENDING HIS NAME AND ADDRESS

CATALOG UPON REQUEST



Copyright 1908, by
United States Horse Shoe Co.

THE

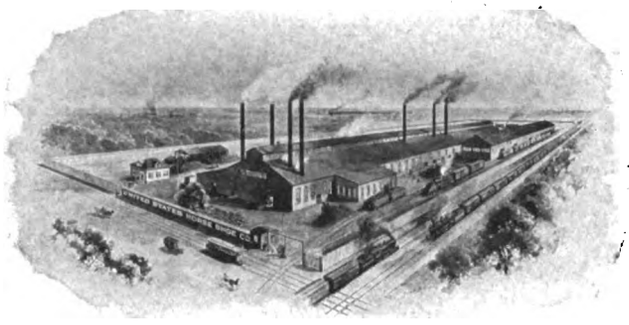
UNITED STATES

HORSE SHOE COMPANY

ERIE, PENNSYLVANIA, U. S. A.

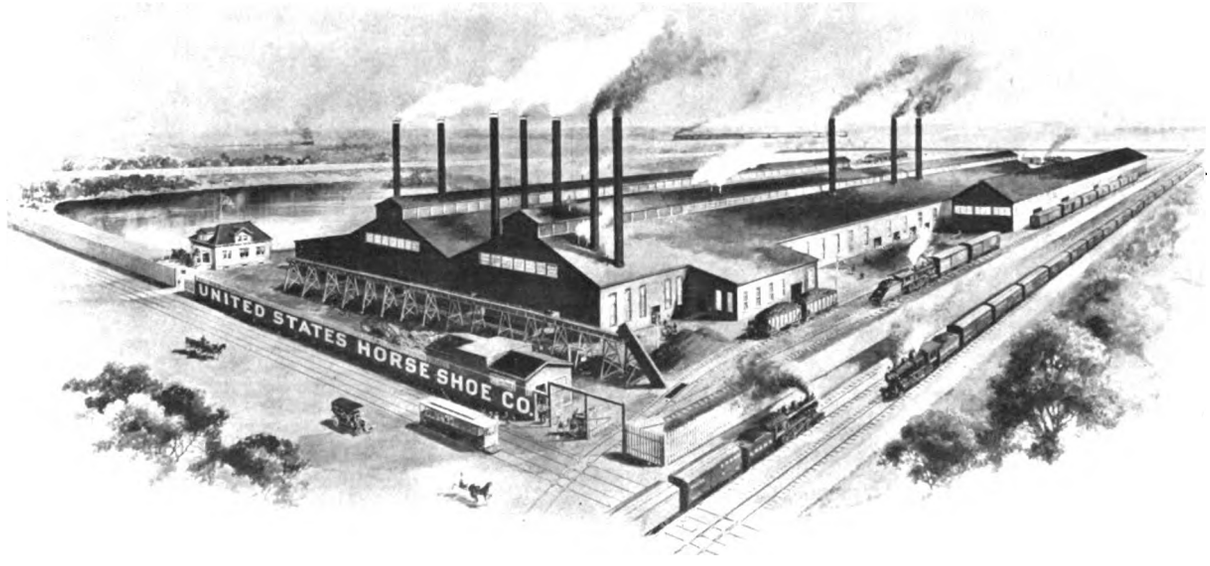
THE UNITED STATES HORSE SHOE CO., ERIE, PA.

can justly lay claim to having exhibited the most rapid and successful growth ever known in the history of horse-shoe manufacturers.



Original plant of United States Horse Shoe Company.

Most manufacturers are proud when they can point to a doubling of capacity in fifteen to twenty years. What does it indicate then to point out that here is a company which, though but five years old, has doubled its capacity and output in three years time? It indicates that THE UNITED STATES HORSE SHOE COMPANY, ERIE, PA., is manufacturing a line of horse and mule shoes for which there is a big demand. This demand is simply because users find these shoes to be the very best that can be bought for the money.



Present enlarged factory of the United States Horse Shoe Company, at Erie, Pa.

The remarkable growth of this factory shown by the illustrations on this page is therefore a tangible proof that horseshoers can get more satisfaction and more for their money by using UNITED STATES SHOES.

UNITED STATES HORSE SHOE COMPANY

ERIE, PENNSYLVANIA.

Drives the Best



Holds the Best

Convincing Evidence

is not wanting that "The Capewell" nail will **best prove** its superiority over all other nails **where the strains are greatest and the service most severe.**

Probably there is **no service more trying** for a horse nail than that of a Fire Department. The horses used in this work are heavy, powerful animals which **must dash at full speed** over all kinds and conditions of roads.

That "Capewell" nails are well adapted for such service—as well as all other classes of horseshoeing—is **convincingly shown** in many letters received here from shoers of "Fire Horses" in the great cities of the United States, of which the following is a specimen:

San Francisco, Cal., Feb. 15, 1910.

The Capewell Horse Nail Co., Hartford, Conn.

Gentlemen:—In 1894, when you opened your office in San Francisco, I was shoeing the Fire Department horses and continued this work until July, 1909. Since then the City has done its own shoeing. During all those years I **used nothing but "Capewell" nails,** having found them to be the only ones that would stand the terrible strains they were subjected to in this service.

The uniformity and tensile strength of this brand made it **possible to use a smaller size** than of other brands. This enabled me to keep the horses' hoofs in much better shape than would have been possible otherwise. I had **little tightening to do**—a very important matter in the case of Fire Department horses.

I can recommend this nail to all shoers as the **best, cheapest** and **safest** nail to use. I shall never use any other.

I also used your nails on many horses belonging to the largest firms in this city, including Wells-Fargo Express Co., Standard Oil Co., and the Telephone Co. At times I have had twenty-five men working in my different shops, and they were all driving your nails.

Sincerely, E. M. GRANEY.

Made by

The Capewell Horse Nail Company

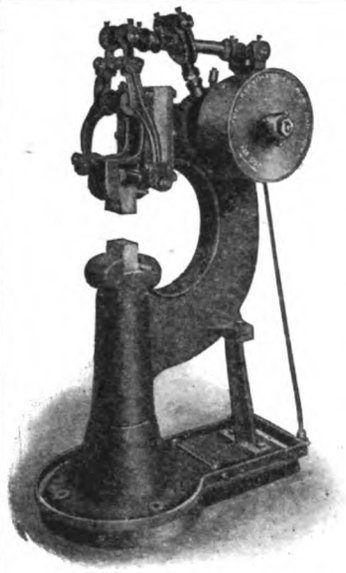
Hartford, Conn., U. S. A.

The Largest Manufacturers of Horseshoe Nails in the World

The Safest to Use



Most Perfect in Form and Finish

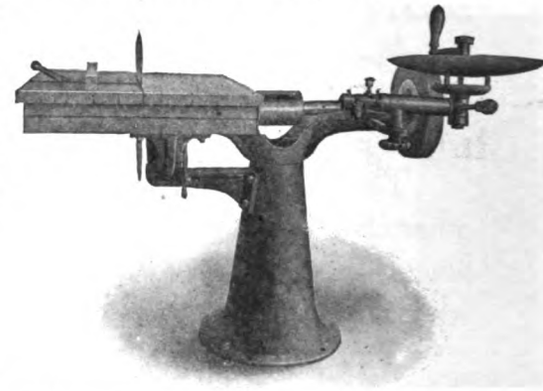


10 DAYS' FREE TRIAL OFFER

applies to our selling proposition below. You have nothing to lose—and will see that the **KERRIHARD POWER HAMMER** ***simply must be as is claimed for it,*** or we could not take so long a chance. You have 10 days in which to prove our guarantee and claims. Could any fairer, more utterly reasonable offer be made by any one?

THE PROPOSITION

Send us $60 (***which will be held in trust by us for the trial period of 10 days***), for which we will ship you, via shortest possible route, one of our 1909 Models, which is the standard of the world. You test out the hammer in any way you wish; do all your plow, shovel, drag-tooth work and welding—abuse it if you wish—then, when you are satisfied, either keep it or send it to us and receive by return mail the full purchase price.



You lose money to wait. Now is the time to get ready for the Spring business, which will increase from the day you install one of our clever Hammers. **Order today.**

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THE KERRIHARD COMPANY

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Prominent among them are

"MORSE" DRILLS

fitting the different presses made especially for blacksmiths' use. Shanks are furnished round or flattened for set screw, as desired.

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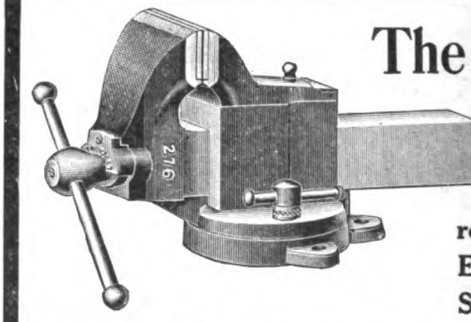
Morse Twist Drill & Machine Co.

NEW BEDFORD, MASS., U.S.A.



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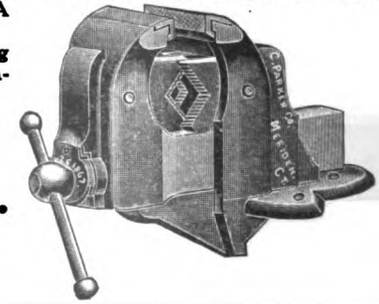

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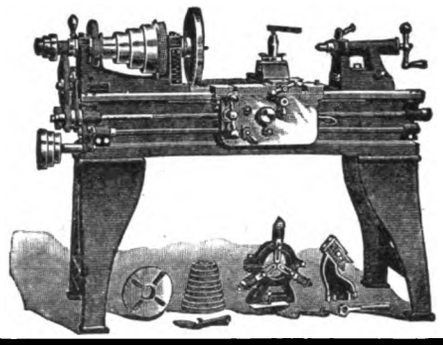

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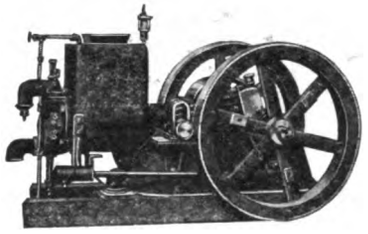

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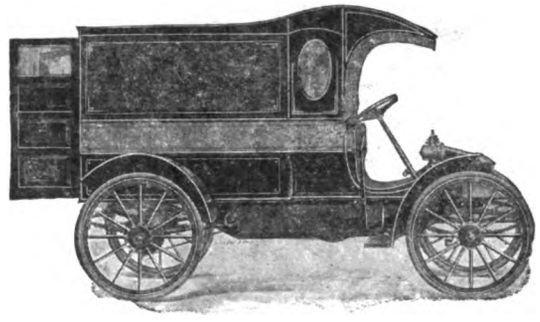

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What It Means to the Blacksmith and Carriage Man

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You can make your screw cutting work known for its **excellence** if you use Little Giant tools. They'll give you all the service you can ask for, and a couple of screw plate assortments will pay for themselves many times over.

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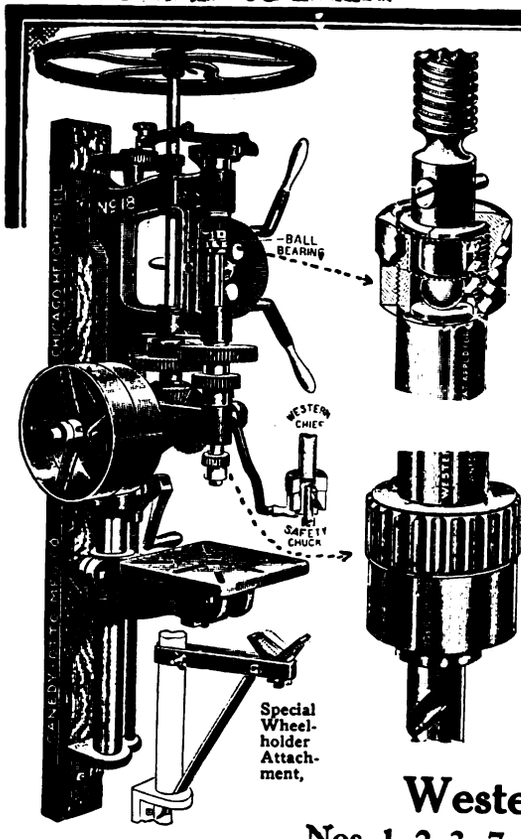

Ball-Bearing and Safety Chuck

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A single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate.

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It is opened and closed with the hand.

No more set-screws to mar and bruise the shanks of bits.

No more wrenches to tighten and loosen set-screws.

No more twisting of bits in the chuck.

No more trouble in inserting and removing bits from chuck.

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Western Chief Drills

Nos. 1, 2, 3, 7, 12, 14, 15, 16, 17 and 18

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No. 100 Royal Forge

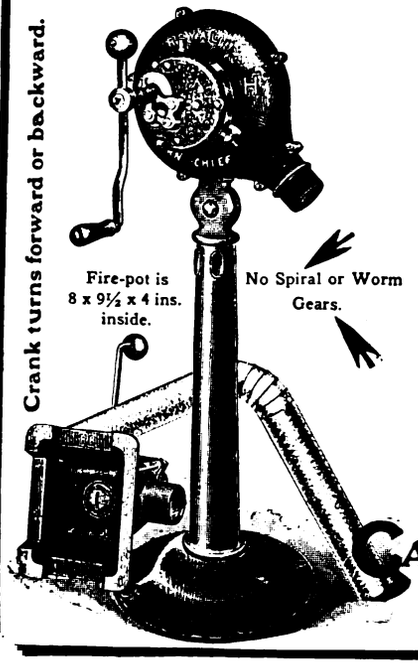
Fan, 12 inches. Hearth, 31½ x 45½ in

The Names — "ROYAL and WESTERN CHIEF"

When found on a Forge, Blower, Drill, or other Blacksmith Tool—mean that that article is better than the ordinary. They mean that in its construction the best materials and the highest skill obtainable have been employed. They mean that years of experience have served to perfect it. They mean the tool is a success, and quality alone has made it so. Dealers and Blacksmiths in general will procure what they like best. We must deserve before we can obtain trade. There is no doubt about our deserving, because our production grows rapidly.

There is a reason—Quality

Royal Blower



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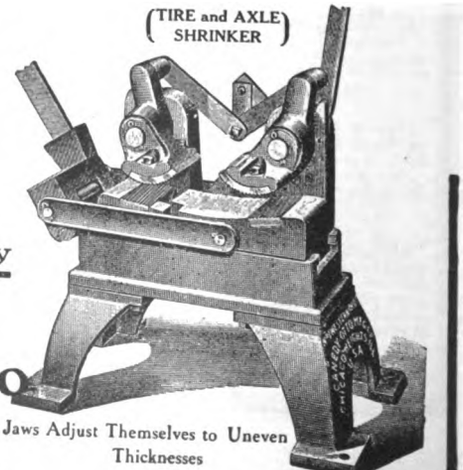

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Better than a Blacksmith Helper.

Over 3,000 in use. Good the world over.

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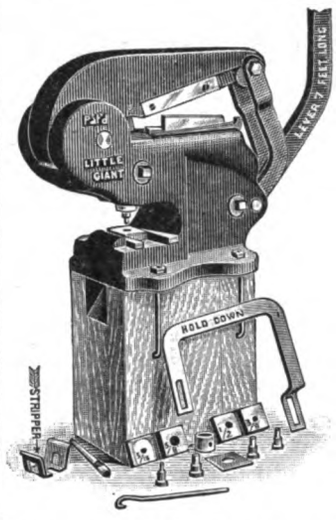

Kei Road, Cape Colony,
S. A., Aug. 12, 1909.
Little Giant Punch
& Shear Co.,
Sparta, Ill., U. S. A.

Dear Sirs: — Enclosed please find Money Order to the value of £1-11-0 in settlement of your acct, The Punch and Shear came safely to hand last Monday and I am very pleased with it indeed. If I can at any time sell one I will do so and will try to do all I can to forward the sale in the Cape Colony. The machine cost me landed here £13-10-0, and I consider it worth twice as much. I find it only takes one man to work the lever and I thought it could not be worked with less than two. I consider every blacksmith should have one, as they save a lot of labor and money.

Yours faithfully,
(Signed) pp
R. G. RISTROW.

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COMBINED UPSET, PUNCH AND SHEARS

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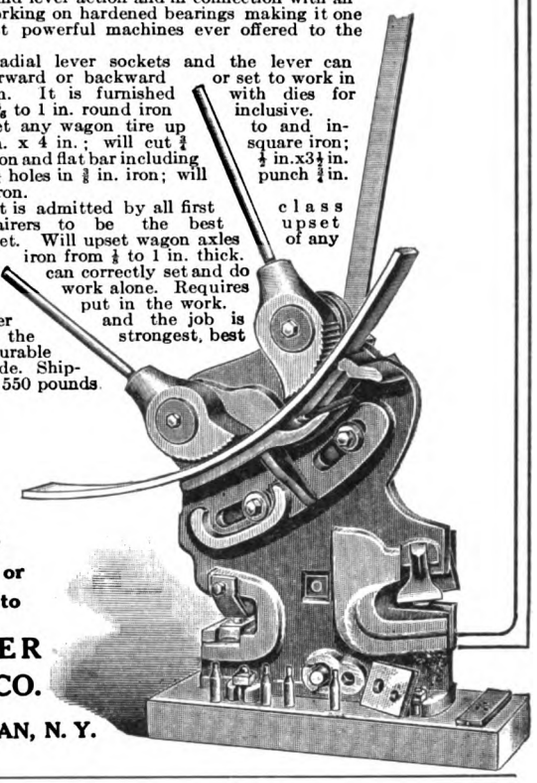
It has radial lever sockets and the lever can be pulled forward or backward or set to work in any position. It is furnished with dies for cutting off ⅝ to 1 in. round iron inclusive.

Will upset any wagon tire up to and including 1 in. x 4 in.; will cut ¾ in. square iron; 1 in. round iron and flat bar ½ in.x3½ in. Will punch ⅞ holes in ⅜ in. iron; will punch ¾ in. holes in ⅝ iron.

The upset is admitted by all first class wagon repairers to be the best upset on the market. Will upset wagon axles of any kind of iron from ¼ to 1 in. thick.

One man can correctly set and do all ordinary work alone. Requires no change put in the work. Pull the lever and the job is done. It is the strongest, best and most durable machine made. Shipping weight 550 pounds.



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No. 30

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The **HOLD-FAST** is made in buggy size only. Shaft ends and pole ends.

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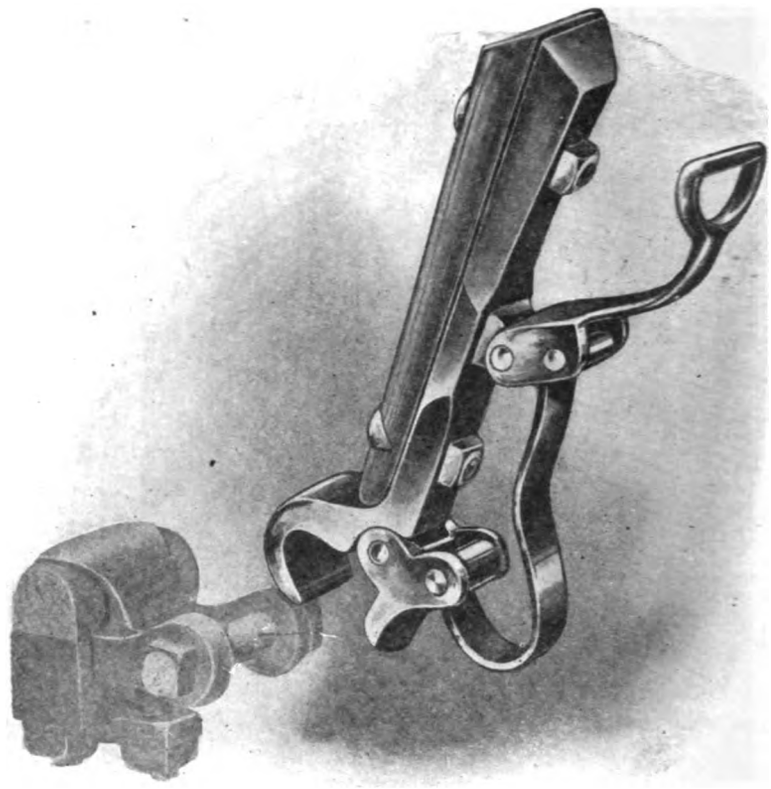

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Forged from ONE SOLID PIECE



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PARAGON ***Swedish SOLID STEEL Anvil***

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Perfect Shape and Finish *Write for Descriptive Booklet*

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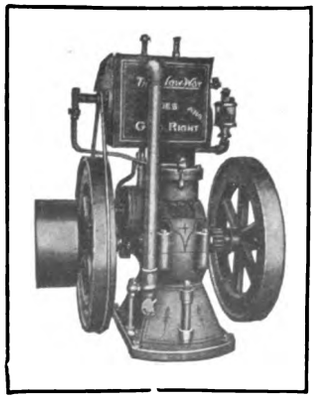

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No Water to Freeze—No Tank to Fill

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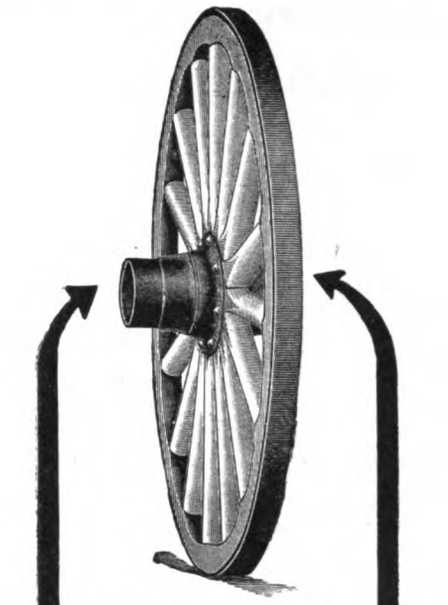

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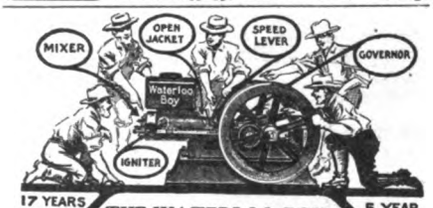

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Blacksmiths can make money by handling these knives.

Write for further particulars, prices, and plan by which this business can be made profitable as a **side line** by every shop in the country. Address

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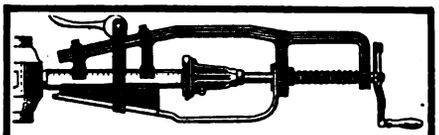

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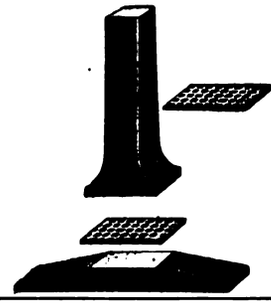

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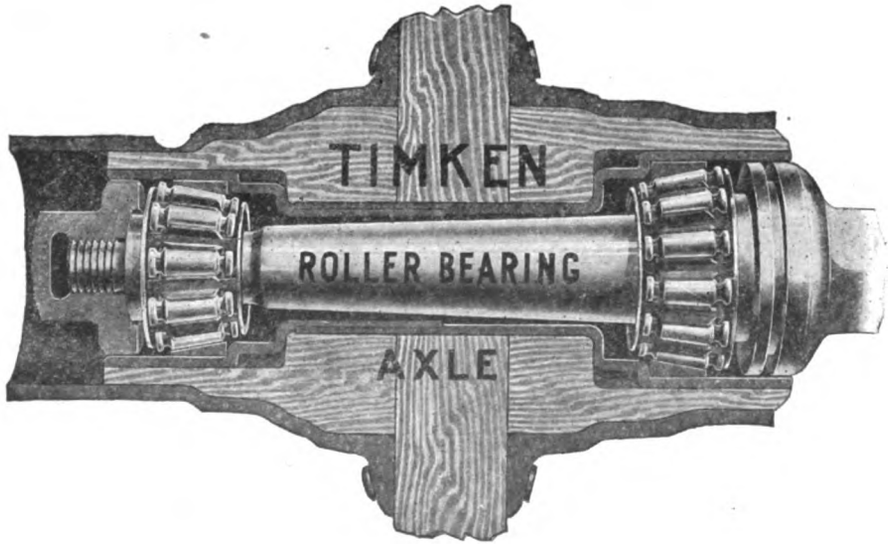

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More Readers.

Are you taking advantage of every opportunity to make "Our Journal" better known to the smithing craft? Are you telling any brother smiths who may be unacquainted with our paper, just what we are doing for you and the rest of "Our Folks?" Is your neighbor smith a subscriber to "Our Journal?" If not, is there any reason why he should not be? If the paper is helping you, it will certainly help him. Just show the brotherly feeling by calling on him and leaving a copy of "Our Journal." Tell him what the paper is doing for you and for the thousands of other smiths in all parts of the world. If you will do this, and every one of "Our Folks" will do the same, we will soon double the number of our readers.

What "Our Folks" Say.

If the following quotations from a few of the letters recently received at our offices were a rarity, we would hesitate to mention them at all, but the frequency with which letters of this kind are received makes it impossible for us to let them go unnoticed. Of course, we are always glad to receive letters of praise and commendation, especially when they are worded so strongly as Mr. F. S. Fuller's letter. He writes to say that he gets bigger value for his money from the dollar which he sends to THE AMERICAN BLACKSMITH Company than from any other dollar that he invests during the year.

Mr. J. T. Wilson, of South Carolina, refers especially to the automobile and horseshoeing departments. He says, "I am always glad when the paper arrives. I and all of my helpers read it and I cannot say too much for it. I am very much interested in the auto work, and, as for the horseshoeing, we enjoy that very much."

Here is another letter from a York State smith—Mr. C. F. Yates. He says, "Any man who has any mechanical ideas knows the worth and the need of THE AMERICAN BLACKSMITH."

Mr. Geo. Busscher, of Illinois, is more explicit in his appreciation of the worth of THE AMERICAN BLACKSMITH. He says, "I would not be without the paper for ten times its cost."

Do these letters speak strongly enough? Tell your neighbor.

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Queries and Answers.

In the "Queries, Answers, Notes" department we are answering questions immediately upon publication whenever possible, and when we can secure the information immediately. Naturally, of course, there are a goodly number of questions which the querist desires placed before his brother readers and we must then await the pleasure of those before whom the question is placed.

We contemplate making the "Queries, Answers, Notes" department a still more important feature of "Our Journal," and we shall, whenever possible, answer questions by return mail, also publishing the questions and answers for the benefit of all readers.

"Our Folks" can assist us very materially in the improvement and betterment of our question and answer department, by thoroughly explaining and describing the matters in question. It has often been said that a question carefully and fully described is half answered. We trust that "Our Folks" will bear this in mind when requesting information on any topics or matters connected with the smithing craft and its branches.

Business Talks.

"Our Folks" have, no doubt, noticed the number of articles on the subject of business and the methods of caring for a smith-shop business, that have been recently appearing in the pages of "Our Journal," and we wish to say that it is our intention to have one or two, perhaps more, articles on business subjects appear regularly each month. We believe that our readers will admit that there is plenty of room for improvement in smith-shop business methods. It is not enough, these days, to know how to shoe a horse properly or how to repair a wagon or buggy; but, after the actual work is done, the smith must know how to keep track of these transactions. What would it profit a smith to carry on a business amounting to several thousands a year, if he did not know how to keep track of his accounts, how to figure costs, how to collect bills, etc.? The business and bookkeeping end of smithing is just as important to the profit end of the trade as a knowledge of how to do the work correctly.



How to Build a Milk Wagon

Plans and Specifications for an Easily Built Wagon of the Regulation Style

L. G. HILL

This is a very simple wagon to build. The sides and ends are perpendicular and the corners are all right angles. The sills, A, Figs. 1, 3 and 4, are 5½ by 1½ good, hard wood. They are dressed up square and cut out for the doorway, as shown in the half bottom plan. B, Figs. 3 and 4, is a 1½ by ¼-inch iron very securely screwed to the inside of A. It must be borne in mind in constructing milk wagons, that they are used hard in all kinds of weather. There is also a great deal of moisture around the cans and bottles, a large portion of which finds its way to the floor of the wagon. So it is imperative that great care be taken to fit all joints tightly, especially on the bottom, and to use, between joints, plenty of keg white lead, thinned very slightly with two parts japan and one part varnish bottoms. The life of the wagon and incidentally the reputation of the builder will be greatly increased by a little attention to the above facts. The front and back bars are connected with the sills by a mortise and tenon, this making a stronger job than a lap, providing the tenons fit the mortises. The standards and corner pillars are checked into the sills and bars, as shown in the half bottom plan. The side rails, D, are checked into the standards and pillars, F, from the outside, as shown in the side section in Fig. 3. These pieces are 1½ by ⅝, and with the exception of the top rail, G, the entire framework is even on the outside. The three panels on each side are glued and bradded to this frame, a moulding covering the joints, as shown in Fig. 3.

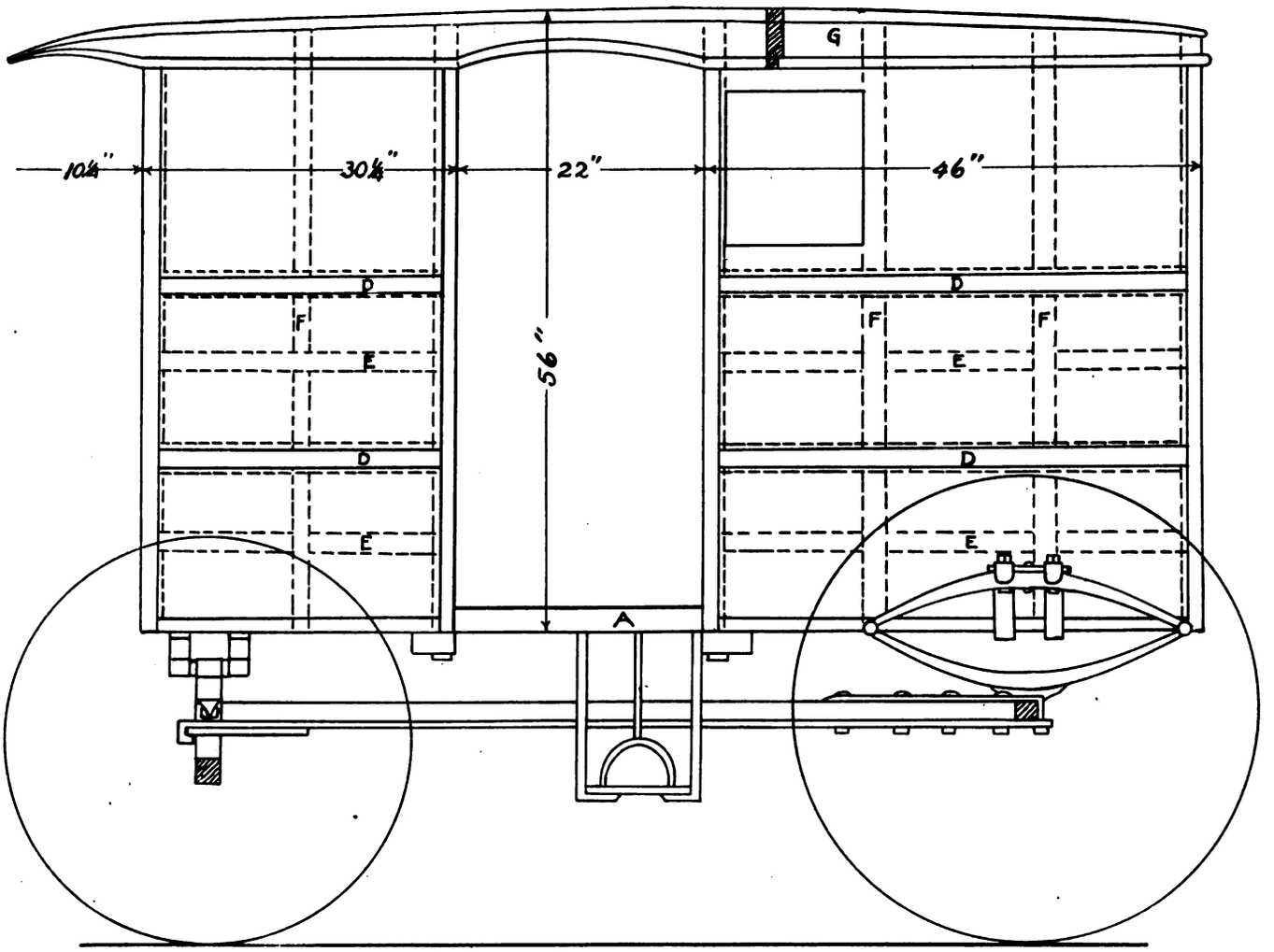


FIG. 1.—A SIDE VIEW OF THE MILK WAGON SHOWING GENERAL LINES

In Figs. 1, 2 and 3, with the exception of E, the full lines represent the mouldings and the dotted lines the frame. E is a one-inch, half-round iron screwed

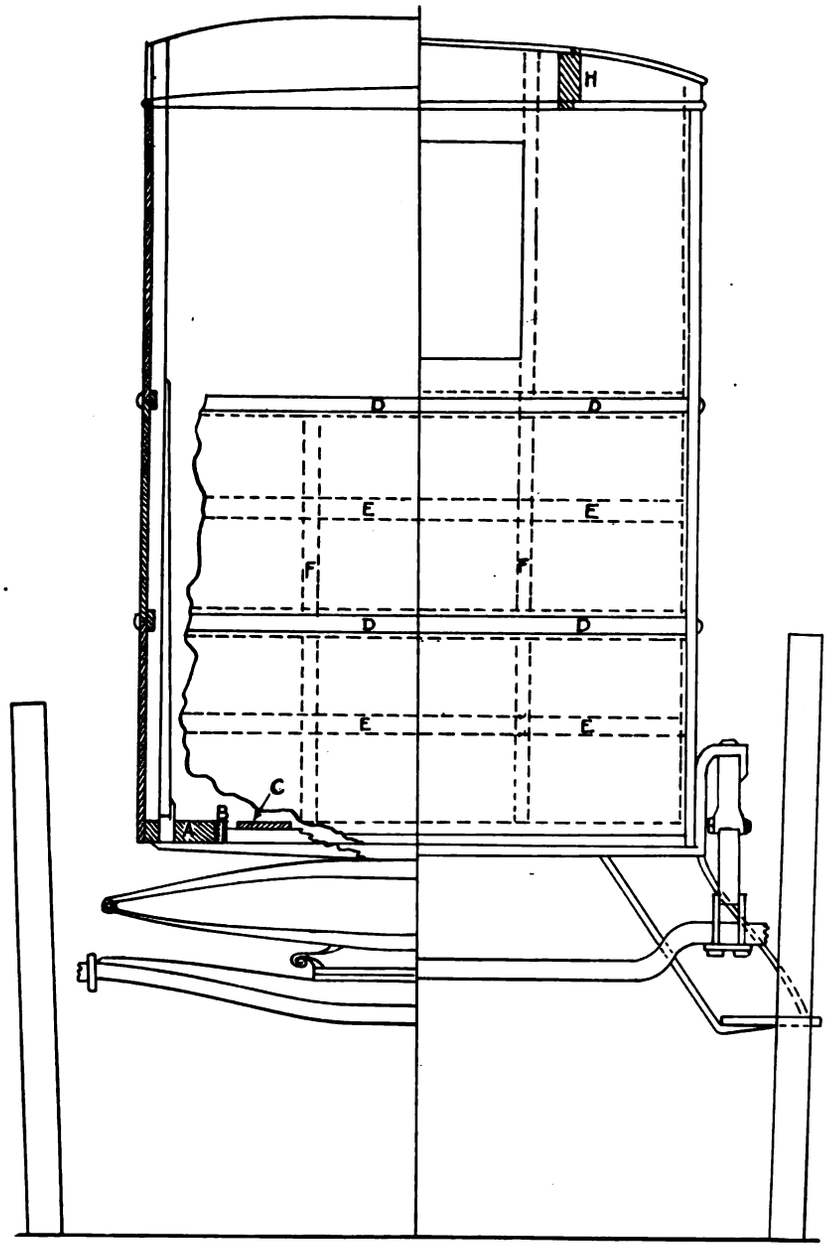


FIG. 2.—HALF OF FRONT ELEVATION

FIG. 3.—HALF OF REAR ELEVATION

inside to protect the sides from the cans. The mouldings on the corners, both front, back and doors are of angle iron. This makes a very strong job and covers up the ends of the panels. This is especially necessary on the door pillars where the cans are very apt to tear wood to pieces. On the sill between the door posts also put angle iron. This not only makes a strong job, but the corners do not wear thin and curl up as with flat iron.

The top rail, G, is 4 by $\frac{7}{8}$. The section in Fig. 1 shows how this will look from the ends. The rabbet on the lower outside edge is for the panel. The half top plan illustrates how the rail is fastened to the pillars. The top back-bar, H, projects three eighths of an inch above the top rails, G, to allow for the roof slats, J, one of which is placed on top of G and the back end of each slat is let into H. This is shown more clearly in the section in Fig. 2. The top inside rabbet does not run the full length of the bar, as does the rabbet on the lower outside edge, which is for the back panel, but is only the width of each slat, J. This is made clear in the half top plan, Fig. 4. It will be seen that the top slats run over the inside edge of H. By this method no hole is left between the slats on the top of H. There are seven bows, $\frac{3}{4}$ by $\frac{7}{8}$, in the roof, a bar across the front of the body, one, $1\frac{1}{2}$ by $\frac{7}{8}$, in the overhang of the roof and H. Across these are placed eleven slats, $2\frac{1}{4}$ by $\frac{3}{8}$, having a $\frac{1}{4}$-inch brad on the under edge. Over this is stretched a covering of canvas, rubber duck or some other suitable material.

This style of wagon is very frequently made without any doors or front window, such as the drawings indicate.

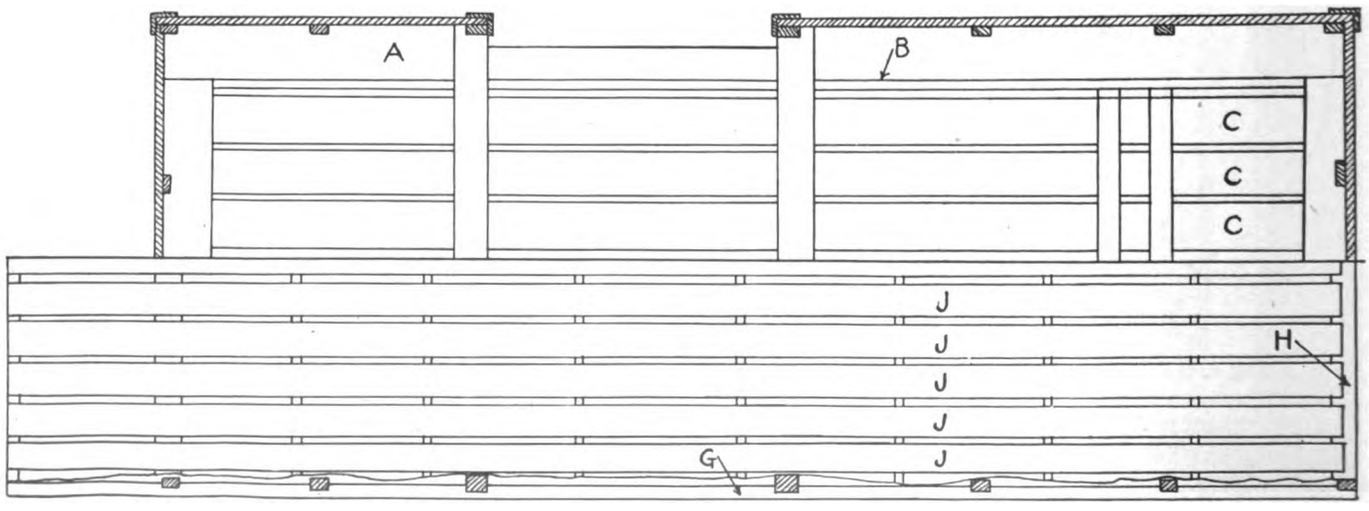


FIG. 4.—SHOWING HALF PLANS OF BOTH BOTTOM AND TOP OF MILK WAGON

The addition of these, however, is a simple matter and to the writer seems a very necessary one. The front windows can be made in two sections to slide from one side to the other. For

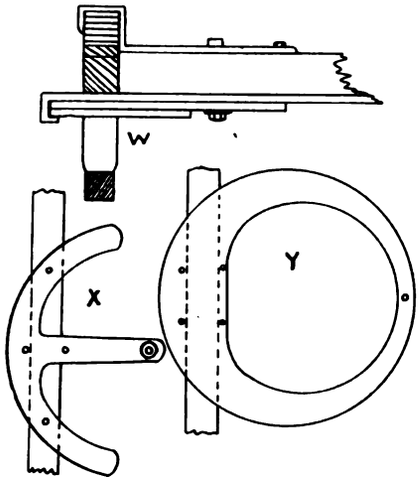


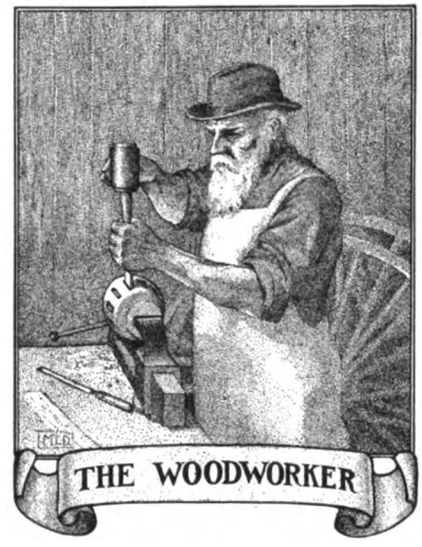
FIG. 5.—DETAILS OF FIFTH WHEEL CONSTRUCTION

this purpose bars made as shown by 1, Fig. 6, will be required. The thin strip in the center is called a "fence" and is made of very light iron. The width of the bar is determined by the thickness of the window frames, which are usually five eighths of an inch. The outside and inside guards are each five sixteenths of an inch thick. Allowing sufficient room for the two frames and the thickness of the fence is in all about two and one eighth inches. The kind of bars required for a drop window is shown at 2, Fig. 6. This can be made for one or two frames. If two are used there must be a center post to divide them. The top bar of 2 is much lighter than 1. Also note that the middle bar is made in two pieces, as the frame must slide between them into the pocket. The frames, when down in the pocket, must be protected. To do so, put a ½-inch panel across the frame that slides on the inside and bore three or four ⅜-inch holes in the bottom of the pocket to let out what little water may get in. The doors are made to slide similar to barn doors. If you have four small grooved wheels you can soon make all the fixtures required. Fasten a track to the inside of the top rail over the doorway and the width of the door back. To hang the doors, bend a piece of iron 1 by ⅛ inch in the form of a hook, put an axle through the wheel, rivet in the hook and fasten the other end of the iron to the door. A brass half-round track fastened on the sill with a corresponding groove in the bottom of the door will always keep the door in position up against the side of the body.

The greatest drawback to vehicles of this kind is the space taken up in turning. That is when constructed in the regular way with the king-bolt through the axle. In order to obviate this, the king-bolt is put as far back of the axle as practical. At Y, Fig. 5, will be found the top half of the fifth wheel. The four bolts shown run up, two on either side of the head block, to fasten down the spring. The bottom half is shown at X and is attached to the axle bed. It will be noticed that the king-bolt is at the end of the center shank. The center of the bolt being six and a half inches back of the center of the axle, the bolt going through the reach instead of through the head block as is usual. On the front end of the reach plate is a hook which holds both the top and bottom parts of the fifth wheel together. An idea of how these parts look when they are assembled is shown at W, in Fig. 5. The half plan of the gear, Fig. 6, shows how the axle brace is made. This is an improvement over the narrow clip, for they are continually working loose, due very largely to the small bearing they have on the axle.

There are three springs in front. The front view makes them appear like an ordinary elliptic, but the side view, Fig. 1, shows that there are two half elliptics on top, i. e., one on each side of the bottom half. A washer about ½-inch thick is placed between each spring head, then the bolt, which should be one half inch, goes through the three spring heads and the two washers. The length of the front spring is 47 inches center to center of bolts, 1¾ inches wide, seven plates in the bottom and five in each top spring, with an opening of seven inches, outside to outside of the springs. The rear springs are 35 by 1¾ by 6 plates with a 7¾ inside opening. They are 42½ inches apart on the axle. The center of the front wheels is six inches back of the front of the body and the center of the rear wheels is 19 inches forward of the back of the body. The wheels are 38 and 44 inches high, 1½-inch spokes, seven-inch hubs, Sarven patent; 2¼ by ⅜ steel tires; 1½-inch steel half patent axles with a track of 4 feet 8 inches. The body is hung 29 inches from the ground. The bottom boards, C, Figs. 3 and 4, are 4 by ¾ hard wood, with a space between each to prevent water laying on them. The length of the body outside is 8 feet 2¼ inches by 3 feet 3½ inches wide. The depth of the front axle bed is 2½ inches by 1¾ inches wide, depth of head block, 2 by 1¾ wide and the reach is 1½ by 1⅝.

For painting, a very rich cream color, bordering on a yellow, is most suitable, though any color may be used.



When removing an old rim from a wheel that is otherwise good, don't try to drive the rim off the ends of the spokes—you may injure the joint where the spokes set into the hub. Split the old rim off by driving a sharp wedge into the center of the face of the rim. If carefully done, the spokes will not be disturbed in the hub.

W. H. HUNT, Iowa.

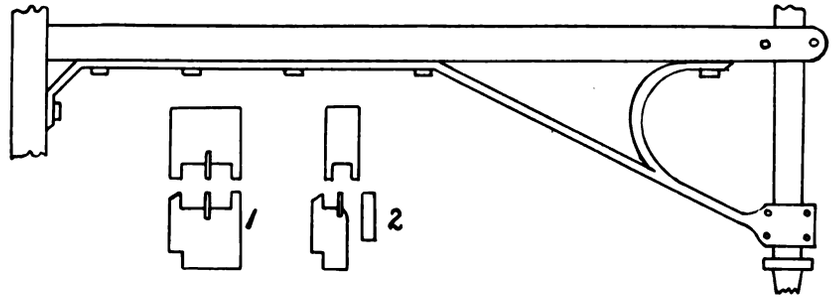


FIG. 6—SHOWING PART OF REACH AND FITTINGS FOR WINDOWS

A simple dowel maker that will turn out doweling for any purpose and of practically any size may be made by any woodworker. Get a piece of half-inch stock six inches long and about two inches wide. Now make center punch marks on this piece at reasonable distances and drill holes of different sizes to correspond to the doweling

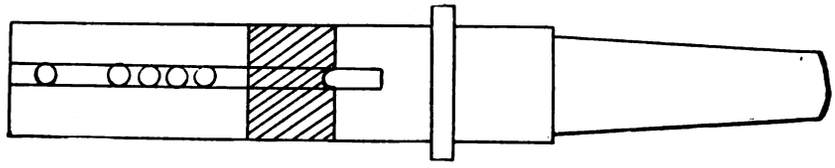
generally used. When you want doweling of a certain size trim your wood down almost to size leaving some stock for rounding up and then drive your pieces through the hole corresponding to the size of the doweling wanted. This simple little device will be found very handy.

L. F. F., Pennsylvania.

A Handy Tool for the Vehicle Worker.

E. C. FAY.

This is a very handy tool for making spring and axle clips. A practical smith can make it in a very short time and it will save him many heats, and much time and trouble when making clips for springs and axles.



A HANDY TOOL FOR THE VEHICLE WORKER

Get an old axle stub and heat one side of the square part and fuller as shown, making a straight groove of equal depth for a reasonable distance. Now drill a number of holes through the axle from the groove side. These holes should be so spaced as to accommodate several sizes of springs and axle clips. By using this tool a smith can easily forge a clip in one heat.

Some Pointers for Vehicle Workers.

W. H. GUNN.

How to Set Axles.

An axle is not properly set unless the wheels have a perfectly plumb bearing. That is, the bottom surface of the tire must bear level on a level floor, so that the wear of the tire will be uniform on the wearing surface. Therefore, the only rule we can adopt is to set an axle according to the dish of the wheel.

In building heavy wagons, I set the axles as follows: Heat axle in center, twelve inches or so; curve a little; put on wheels; turn axle bottom-side up; put straight edge across wheels; then, if both wheels square with the line, and the boxes are wedged truly, the axle is correct. All axles should be gathered slightly to the front.

I have found by actual experience that axles should be set so that the wheel will not run hard on the collar or nut, and so that it will bear plumb on the bottom. It saves the wheel, the axle and the team.

The principle of setting axles by a fixed rule is that the bottom and the front should be at right angles, as shown in the engraving. The parallel lines AA represent the track. The straight edge B is laid across the wheel rims at CC, while the dish is shown from the center of the track DD to the rims at EE. Therefore, we have a perfectly plumb bearing on bottom and the wheels make a parallel track as is clearly shown in the engraving.

How to Weld Springs.

Mending springs to vehicles has been a fine art in blacksmithing; but since springs of all kinds are so cheaply manufactured, it has become customary in large factories to replace a broken spring with a new one. But all cannot do that.

The purpose of the writer is to offer an experimental test of long and successful experience in welding springs.

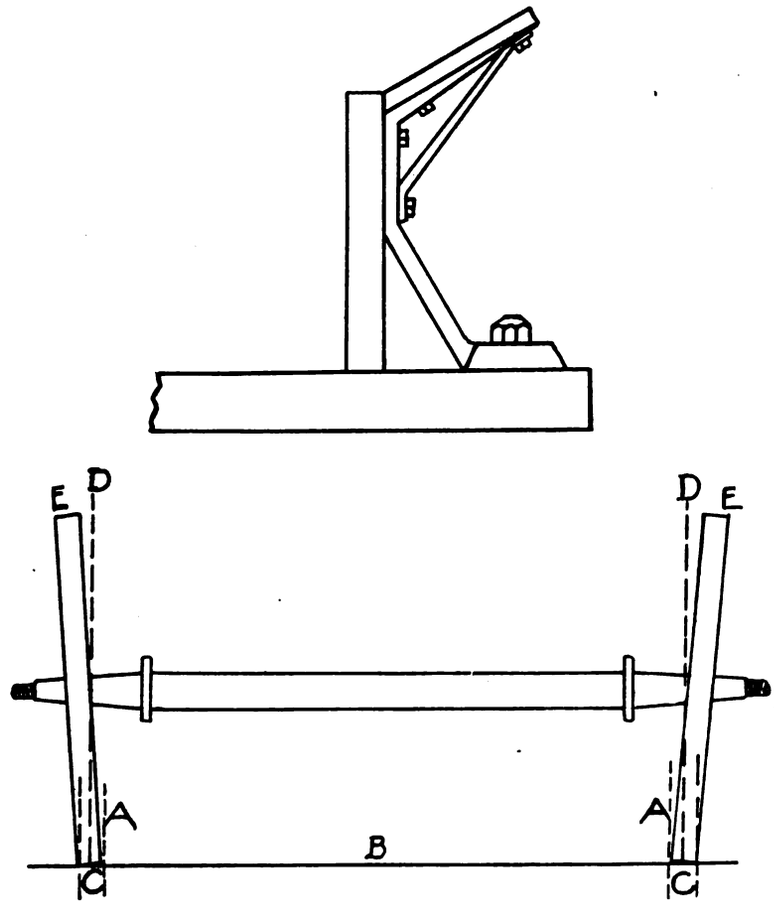
To prepare the spring plate, upset the ends, punch a small hole with a sharp-pointed tool, (to save stock), one quarter inch from end. Cut out with sharp chisel and bend the two parts down in opposite angles a little. Then fuller the scarf, leaving outer edge thick and forging a thin lip on inside of both ends. When thus prepared, heat and lock the four scarfs in together and hammer on flat surface first, and then on edge. Now pin the thick outside edge which will stretch around and lock the four parts tightly together.

The fire should be clean, with small sides, and covered with a thin plate of iron, while catching heat. Use a small quantity of borax, and never overheat. Let no coal touch the spring. A round edge flatter will make a better weld than the hammer. Fit spring plates with clamp tongues; holding a few seconds and bearing on ends over horn of anvil will give proper set.

Temper with oil and have spring just hot enough to make oil blaze. Lay down in the air, or heat to a very dark red and dip whole plate in oil vat ten seconds. In either case, the spring will stand usage better where it is mended than anywhere else. This is the result of thirty years' experience.

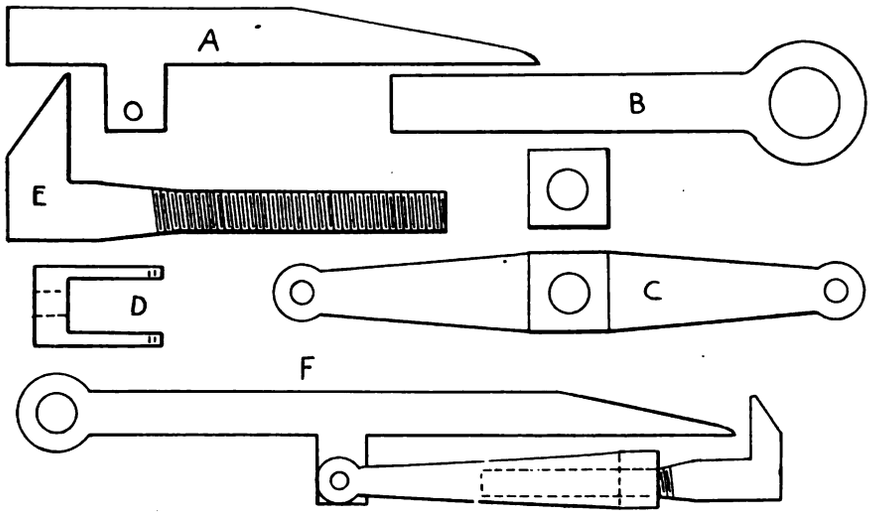
Flare Board Stays.

The diagram is for flare board stays to truck wagons. The $\frac{5}{8}$-inch



SOME POINTERS FOR VEHICLE WORKERS

round iron brace prevents the main iron from bending. It is the strongest brace I ever used. It keeps clear of the back wheels. Very much lighter iron may be used with the small stay.



AN ADJUSTABLE BOLT-HOLDER EASILY MADE

Keep Shop in Order.

Have a place for everything and everything in its place, is one of the best schemes for a successful mechanic or business man yet. The mechanic who keeps his tools in good order and in their proper place can do more work and better work with fifty per cent less energy than he who keeps a disorderly or badly-arranged place of business. He worries out a poorly paid life hunting tools and falling over debris.

An Adjustable Bolt-Holder.

IRVIN R. VANARSDALL.

Here is a bolt holder that I planned and made, and that will hold a bolt in any place or shape, for the holder can be adjusted to catch it. There is no bolt holder on the market that can beat it for holding bolts, for they can be held so tight that you can twist them in two. And this tool is so simple to make and adjust that any smith can easily make one for himself. It will be found especially useful in plow time.

Take a piece of old wagon tire, 8-inches long, 1¾-inches wide and ½-inch thick, commence six inches from one end and fuller it down to ½-inch square, leaving it in the shape of a screwdriver, as at A. Then lay the end, X, with a piece of steel—or an old rasp will do just as well—and temper it to a cold chisel temper. This makes it cut in the bolt to hold it. Then measure one inch from the other end and fuller it down to a ¾-inch square, leaving one inch space for shoulder which is not touched. Bore a ¼-inch hole in shoulder close to the end to which the clevis is bolted with a quarter-inch bolt. Now take a ¾-inch round rod one foot four inches long, upset it at one end and then flatten it out and punch a ½-inch hole in it, with which to hang it up when finished, as at B. Now weld the ¾-inch rod to the square end of A. This serves as a handle. The shoulder on the piece at A is one inch by 1¾-inches wide.

Next take a piece of new buggy tire, 1 foot 1 inch long, ⅞-inches wide and ⅜-inches thick, fuller it down to three-eighths inches at each end, leaving a space for a ¼-inch hole, as at C, then weld a ½-inch nut in the center of the piece. This nut should be threaded. Then bend this piece in the form of a clevis, as at D. Next take a ½-inch round rod and upset it to five-eighths of an inch for one and a half inches from the end. This rod should be eight inches long before you commence working with it. The upsetting is to give it more strength in the bend. Then bend up one and a half inches as at E, sloping the outer end a little, as shown. Thread the other end of rod down, up to the upset part. Now fasten the clevis to the shoulder of the main piece, A, with a ¼-inch bolt. Then screw the ½-inch threaded rod with a hook on the end into the clevis, and you have the holder complete, as at F.

The First Blacksmith Shop in American History.

W. O. B.

The city of Vera Cruz on the gulf coast of Mexico marks the landing place of Hernando Cortez, The Conqueror. From this point to the city of Mexico the valiant conquistador, in 1522, laid out a road, paved for part of its three hundred miles, and known as the Vera Cruz road or trail. In its day famous for the immense traffic which it bore it was but natural that it should contribute in goodly part to the making of cities on its route. One of these towns, practically owing its existence to the immense commerce of the Vera Cruz road, was Puebla—a city about midway on the journey down the trail. This town, from a beginning in 1531 with thirty-three settlers, had in 1675 a larger population than New York City had one hundred and twenty-five years later.

But while Vera Cruz was large and of extraordinary growth there grew up on its outskirts a town which, as is often the case, holds more of interest for you and me. The town was not large, few travelers stopped there and there is little trace of its existence in print, yet in this town of Amozoc were forged blades of such temper and articles of such beauty and fineness as would put the modern smith to shame. Here in 1527 Pedro Jaime, a Spaniard, was the first to set up anvil and forge in the New World. With this humble beginning, he and his descendants built up a business requiring a corps of smiths, who not only shod the multitude of pack beasts used on the trail but did such other work in iron as was required. The best swords, machetes, knives, shears, bits and spurs, sometimes inlaid with silver and gold, came from these forges. The temper of the Amozoc blades became famous in the New World, like unto the fame of the Toledo blades in the Old Hemisphere. The handicraft of the Amozoc smiths was beautiful, and their inlaying of precious metals on steel was incomparable with anything produced on this side of the ocean and rarely equaled in the Old World. And to this day, it is said, the descendants of those old Spanish and Indian smiths are producing work that is a reproach to our modern iron workers.

Advertising the Smith Shop.

There are all kinds of ways to advertise a smith shop—some good ways, some bad, some indifferent. But among the better methods of advertising is a sixteen-page booklet gotten out by Mr. Louis Petersen of California. This little booklet with its brown cover and title in black and red presents an excellent appearance, and must certainly be responsible for a goodly amount of patronage at the Petersen shop. The title of

the booklet is "The Horse is King," and after an opening greeting Mr. Petersen gives a little talk on the subject of horseshoeing and its importance. There are several pages of "Don'ts that apply especially to horse owners, and also a time table showing the time trains leave for various towns. The balance of the booklet is taken up with some very convincing testimonials. This feature of the booklet we think excellent, as there is little that is more convincing than the testimony of other persons, especially when those persons live in your own town and may be questioned if one is interested. Other progressive smiths may well copy after Mr. Petersen's plan of advertising.



Gun and Novelty Repairing—14.

W. G. MUMMA.

Bicycles.

Such work as repairing bicycles, sewing machines, gasoline stoves, keys and locks, cutlery, type-writers, pays quite well, will bring considerable work into the shop and is not difficult to do. No attempt will be given here as to details of manufacturing these goods, but will take up the repairing of each component part separately.

Should the frame of a bicycle become broken it can be repaired by first cleaning each part thoroughly of all dirt, enamel, etc., then fit a piece of tubing quite tight inside of the frame at the break. Have it about three inches long. File it clean and fasten it with pins on each side of the break as marked at C, Fig. 1. Then braze it with hard solder, using borax as a flux. Use the torch as per directions already given. Before the brazing is done see that the frame has no twist in it or is otherwise out of line and that it has the same shape as before it was broken. After the brazing is done dip the parts while hot into water, this will loosen the borax and scale, then finish up smooth and apply enamel. You will have a solid joint that can scarcely be detected. If the fork is broken near the axle of the wheel saw it off above the broken part and file out the inside to a feather edge and then forge out a piece of steel to fit so it can be driven up tight into the tube. Now braze and then drill a hole or make a slot for the axle as the case may be. Now clean up and finish as heretofore described. The hard solder will sweat into the joints. Should any of the joints of the frame become broken they can be brazed. The rear-frame brace that is attached to the rear part of frame when broken is repaired in the same manner as the other parts are.

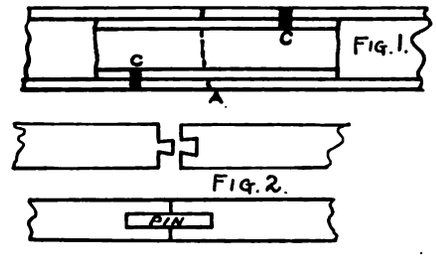
Wheels require the most work and attention to keep in order, and they are also the most difficult and particular part of a bicycle to repair. If a crank should become broken it can be replaced with a new one or can be brazed by taking the broken parts and making a dovetailed joint or drill out in each end and put a pin in, as shown in Fig. 2, and then braze with hard solder.

If a spoke becomes broken it is best to replace it with a new one. To put a new one in a wheel proceed first by turning the wheel so the end of the broken spoke is up, then crowd the tire from the rim where the broken spoke is and take out the nipple belonging to the broken spoke. Use a nipple wrench to unscrew the nipple. The new spokes must now be taken through the holes in the hub to the proper holes in the rim, then screw down the nipples with the screwdriver, using the slot cut in the nipples for that purpose. After the nipple and spokes are in place put a little rim cement on the rim, then crowd the tire back. The wheel is now ready to be trued by tightening the nipples slightly. The nuts holding the axle are loosened a little. Then make sure the wheel is in place with axle tight against the forks as it should be with the weight of the rider on it. The nuts of the axle are then tightened and the wheel turned slowly, at the same time observing the distance between the rim and forks and adjusting and tightening the spokes and nipples in accordance to the distance of rim from the forks. Now go over the wheel with the hand, and any spokes that spring more than they should are tightened so as to equalize the tension of the spokes on the rim, for they are liable to break at the hub if not properly tightened. If it is a rear wheel the sprocket will have to be taken off in order to get the spokes into place. Be sure to turn the lock nut that holds it to the proper way, as some of them have left-hand threads on them. A spoke tightener can be used in the place of a nipple wrench to tighten the spokes in the hubs. It will be seldom that any repairing will have to be done on the hubs. They can be brazed if any parts are broken.

If any rims are broken or otherwise damaged they can be replaced with new. About the only repairing that can be done on the rims will be some slight damage or breakage either with cement or otherwise as the case may be.

Tires require the most attention of any part of the wheel. They are made single and double tube. The double tubes are best when the tire is cemented to the rim. Should one become broken or punctured it can be repaired by using plugs or the punctures can be stopped by using a cement made especially for the purpose. Should the inner tube need repairing use the patching rubber made especially for the purpose. The outside tires wil have to be cemented to the rims. There are several kinds of cement or makes used. Some wheels have good guards and lacings for the protection of the clothes; these can be had ready made and are not difficult to string on the frame.

There are several varieties of chains and sprockets used on the different makes of bicycles. About all the attention that chains will need is that they will have to be cleaned by using a cleaning brush and some benzine or gasoline or even kerosene oil with plenty of rubbing until clean. Finally use a dry rag and wipe off. Should any links of the chain become broken take them out and insert new ones. If the



REPAIRING BICYCLE TUBING

sprocket wheels are broken they can be brazed. The sprocket fastenings should be looked after to see that they are in proper shape.

Handle bars can be replaced with new ones or they can be repaired should any part become broken or otherwise damaged. The grips can be replaced

with ready-made ones at small cost, and are easily attached. They are made of several kinds of materials, such as cork, fiber, leather compositions, etc.

Screws can be replaced with new ones or they can be made. One should have a set of taps and dies that is made especially for the purpose as the threads on bicycles are different from the machine-screw sizes.

Enamel finish can be had ready made. Apply as per directions furnished with it. All oils, grease and lubricants can be bought ready made from the dealers. This will apply also to the tire cements and patching. There are also a blue-metal finish, a rust remover and nickel polish to be had ready made and they can be applied according to instructions. All such parts as saddles, cyclometers, bells, whistles, lamps, tourist cases, toe clips and trousers guards, etc., will never need much repairing, for they will last longer than the main parts of a wheel. Only in case of accidents will they ever need much attention, as they can be renewed with ready-made parts or in case of slight damage can be easily repaired.

Sewing Machines.

These will not require much repairing, but sometimes they will need adjusting; the needle and shuttle will have to be so adjusted that they will be timed with each other. The bearings will sometimes need to be bushed and tightened up. New springs will have to replace the old, broken or weak ones; sometimes the screws will have to be replaced with new ones. Occasionally the cases will come apart and will have to be glued together, and sometimes they will need varnishing.

Gasoline Stoves.

These will seldom become broken in any of the parts, but they will have to be cleaned and the wicks or burners will have to be adjusted and leaks stopped. In cleaning, use a stiff brush and plenty of rubbing and finally wipe off with dry rags. Some of the parts will have to be taken off so that they can be cleaned inside.

Door Locks and Keys.

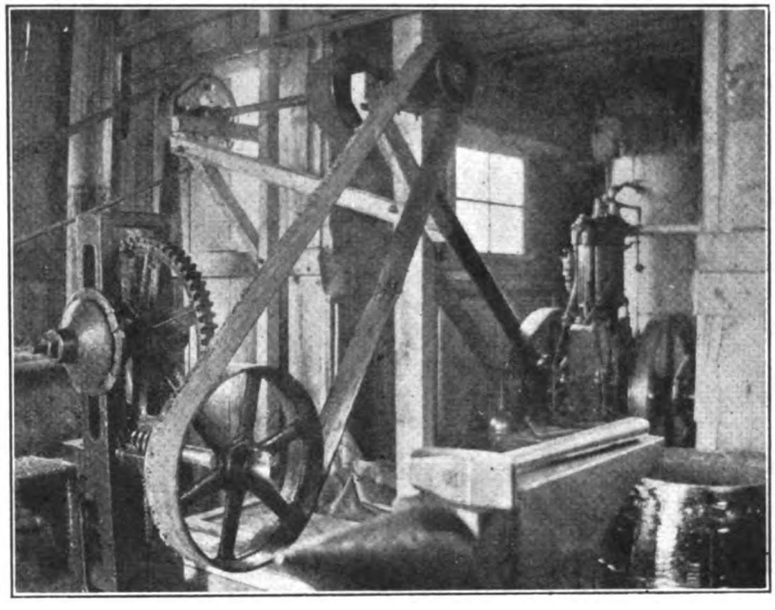
These need to be repaired, new keys made and fitted, and new springs will have to be made. The material for the springs can be had ready made either in the flat or round wire all ready tempered, so that all that will have to be done is to cut off and fit them to their places. Blank keys can be had ready made, so the fitting will be all that is necessary to be done. Flat keys can be forged out of flat steel, and then filed up to shape.

Typewriters.

The first to be done on these machines is to clean them. Take a hand bellows and blow all of the loose dirt and dust out thoroughly; wipe off with clean, soft rags, using benzine. Take off some of the parts so that the inside can be gotten at more conveniently. After all the parts are cleaned and dried put them together. Then see that each part is properly adjusted. See that the type letters are properly aligned so that the types will strike at their proper places. The spring that carries the platen back and forward sometimes causes the most trouble, and it is the most difficult to repair. It sometimes breaks or becomes weak or worn out, when it will have to be replaced with a new one. It is similar to a clock spring and is wound up in about the same way. If it is not wound up on the mandrel in the right manner it will break and cause trouble. It should be wound tight on the mandrel so as to protect and support the end where it is fastened on the mandrel. It is fastened with a small screw, and if it is wound tight the coils being tight on each other will keep the spring from breaking at the screw, while if the coils are loose and open, the action of the spring will cause it to break at the screw. To clean the type when it becomes clogged up with dirt or carbon use a little gasoline or benzine and a toothbrush.

Cutlery.

If the gun and novelty mechanic is prepared to do plating, some work can be done in replating tableware, but no attempt will be given here in going into the details of plating, as it is mentioned elsewhere in this work. Some work can be had at grinding knives, scissors, razors, etc. The main point in grinding scissors is to get a square, sharp edge (not rounding), ground at a slight bevel from the front side. It will take some practice to get a good edge on a pair of scissors. A moderate coarse-grain emery wheel run dry is suitable for this work. There are a great many razors that need grinding, and it is quite an art to become expert at. Wet emery wheels, with a face of about one and a half inches with a diameter of from two to three inches so as to get the concave of the razor, are the best to use for razor grinding.



THE POWER CORNER OF F. W. PECKHAM'S SHOP, OF IOWA

The wheel should be run at a moderate speed and the razor held on the wheel so as to get a smooth, even cut from end to end. It takes considerable practice to get a nice, even job of grinding so that it will just come right down even with the edge. After the grinding is finished the razor should be polished on a polishing wheel of the same diameter as the grinding wheel. Care should be used to avoid the heating of the razor.

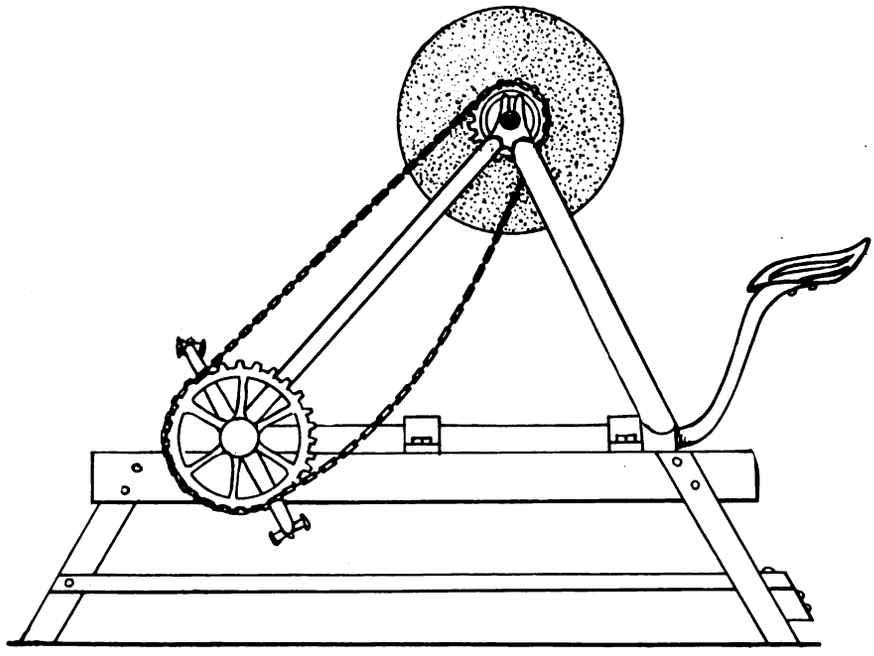
Some mechanics make butcher knives, and several receipts will be given in another chapter on the tempering of the blades. They can be forged out of some flat steel of about the right size that the blade is to be. Then they are finished by grinding and polishing on emery wheels. They are then ready for tempering. They should have some spring, and have handles nicely made and fitted on the blades.

In some towns quite a number of lawnmowers have to be ground or sharpened. Some use a machine especially for the purpose so it will give the knives a correct bevel edge. Also the knives will not have to be taken off the frame so that they can be got at more conveniently. The knives will all be ground to a true circle so that one knife will not be shorter than the next one to it.

A Shop-Made Grinder.

J. T. MONCLA.

The engraving shows a grinder that I made in the shop and I am so pleased with it that I want others to get the benefit of my experience. First, I made a three-legged stand or trestle, using a piece of two by four for the top. This is two feet long. The legs of this stand are two by four inches in section and sixteen inches long. Then I secured an old bicycle and, after removing the front fork and wheel, I cut the front part of the frame away, just ahead of the seat above and just ahead of the large sprocket wheel below. Then I mounted the remainder of the frame on the trestle or stand, that part of the frame which ran from the seat to the large sprocket being placed on the bottom. Then I cut and removed all the spokes from the back wheel, leaving nothing but the hub and the sprocket wheel. Now, I mounted the grindstone on the rear hub, took an old seat from a binder, bolted it in proper position on the stand and all was ready for use. The stone runs on ball bearings, as does also the crank and pedals, thus naturally making a very easy-running machine. The cost of this device was five cents for the bolts used. It may perhaps be well to emphasize the fact that the frame must be bolted solidly and strongly to the wooden stand or trestle.



A HANDY SHOP-MADE GRINDER FROM SCRAP

An Improved Forge.

S. L. HESS.

The accompanying engraving shows a plan for a forge that makes blacksmithing a pleasure. The pleasure of working a forge in hot weather that does away with all smoke and dirt and protects you from all unnecessary heat is something that should be sought by all blacksmiths. Doing heavy work in the fire on hot days, all the while pondering the fact that we must do three days' work for the wages earned by one, should induce any blacksmith to build a forge that will stop its share of these troubles.

This forge is the only one of its kind of which I am aware, and, after using it five or six years, I pronounce it the best one that I have ever seen. It is not necessary to give full dimensions, as it can be built to suit the conditions under which it is to be used, with practically the same results. The lower part, the hearth, should be built so that the fire pot can be put in far enough from the back or side wall to allow the largest tires to go in. Also leave an opening under the fire bed to clean out dirt. There should also be a hole one foot square in the back wall, opposite the fire, so that long iron may be worked in the fire; there should also be a door on this hole so it may be closed when not in use.

This forge has a double chimney. One starts fifteen inches from the hearth, should have an opening eight inches by two and a half feet at the lower end, and should continue this size up to second floor. Here it can be drawn into half this size, and then carried out to full size again. The second chimney starts on top of the overhead wall just under the second floor, and is the same size as the first one. It should be built in with the first one in order to make one chimney with a partition in it. The particular kink in the construction of this forge is to get these chimneys large enough to carry all smoke out when a fire is first made. Do not make them any smaller than the above dimensions, but make them larger, if possible, building the stack three feet higher than any part of the shop roof, so that high winds will not give a down draught. A sheet-iron door should be made for the front and hung to the side wall. It should extend from the overhead wall to within two feet of hearth, making the upper chimney draw harder and keeping the heat out of your face. This door is opened when a tire is to be heated.

This forge, if properly built, carries off all dirt that ordinarily goes up into the air and comes down on the smith's back. What the lower chimney misses is caught by the upper one.

A Shop-Made Gasket Cutter.

JOHN, THE BLACKSMITH.

For cutting leather and rubber washers for vehicle axles, pump valves, hose connections and the like, this tool will be found both labor and time saving. The first step in the making of this tool is to take a bar of machine steel one inch square and about nine inches long and drift out a slot one half by one inch long, about two inches from one end. Now after making certain that your lathe centers are absolutely correct turn the bar as shown at B, after which drill and tap the holes for the two thumb screws. If no set or thumb screws are at hand they may be turned in the lathe as shown at F.

Now take two pieces of tool steel of the required size to make the cutters shown at E. These are six and seven inches long respectively from blunt end to bent corner, while from the bend to the cutting end they are one

and three quarters and two inches respectively. The cutters are sharpened on both sides and the temper is drawn to a purple.

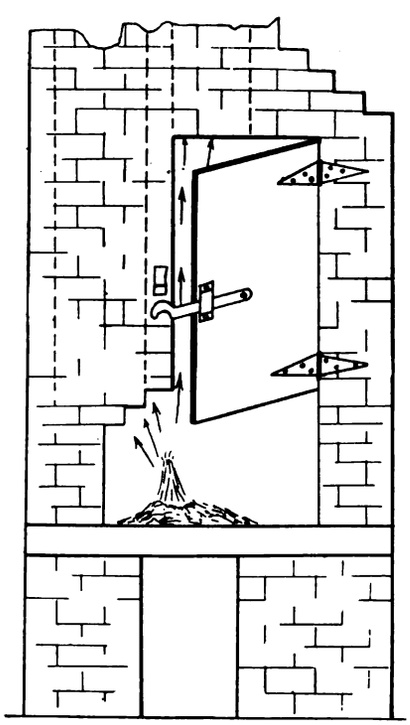
In use always place a soft pine board under the stock you desire to cut. This allows the point of the tool to remain central and the knives or cutters have a solid bottom to cut on. If no iron lathe is at hand the stock can be swedged down with swedge blocks and then ground on the emery stone. This tool would, however, be suitable for use with a hand brace only. If it is desired to make one for use in the drill press it must be turned in the lathe and made exactly true. This would not be possible with swedge blocks.

Tempering Plow Points.

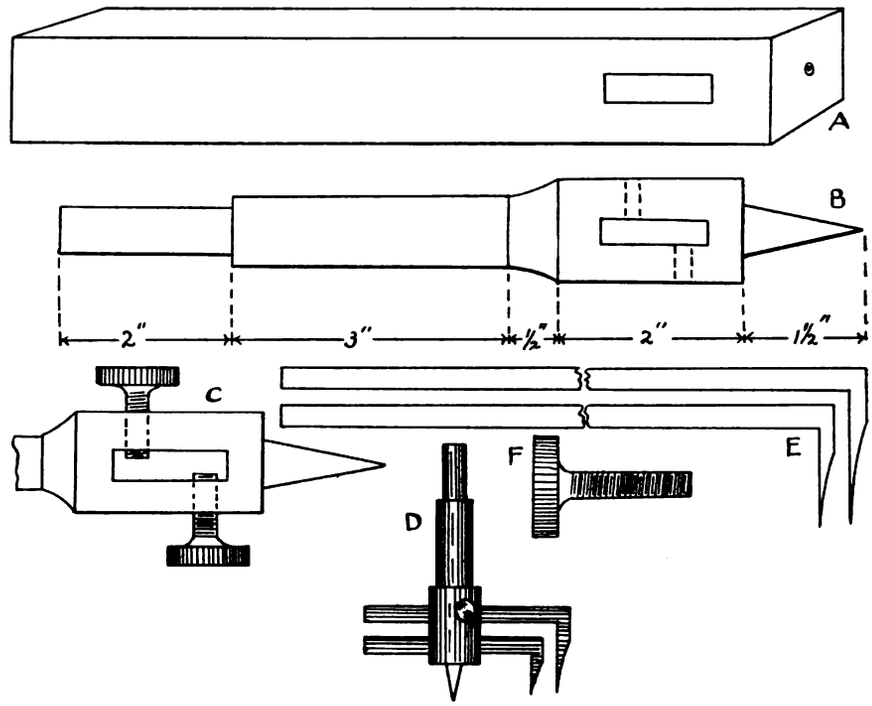
J. E. McNEELEY.

Noting Mr. W. R. Garman's request, in the March issue, for more information concerning the tempering of plow points, I will endeavor to tell him how I acquired success. First, I learn what kind of metal I am hammering. In sharpening a point I find that some steel is much harder than others, and the softer a piece of steel hammers, the higher it can be heated to temper. A good, soft piece of plow steel can be heated a gray-red heat, then plunged into the water and allowed to remain until cool. The harder the point hammers, the lower the heat must be, in order to obtain the desired color of temper. I believe, if Mr. Garman will study the nature of his metal while working on it and try plunge tempering, the desired information will come to him and crown his work with success. I take care not to draw my points too thinly on the edge, in order to have a good body of steel to hold the temper. Then, the color of the heat in the fire—when it makes a sky-blue by plunging the steel it gives excellent satisfaction. I have been hammering plow points for twenty years, and I learned it by using the plow myself. When I tried to temper it by drawing it and dipping, cooling a little and dipping again, my points would wear in notches, but when I learned how to plunge temper, the edge wore off evenly and my plows lasted twice as long. I temper everything by plunging it when I can get to hammering on it, thus finding out the kind of metal on which I am working.

My shop is close to a planing mill and I make all the small bits that they use. I made about fifty bits for them last year and I have never tempered but one the second time. The beauty about the plunge temper is that one can temper the thick portion of the bit or plow part as hard as the edge, and the bit will hold it until it is worn out, and that is long enough. By draw-tempering, bits need to be re-tempered often.



AN IMPROVED FORGE



A SERVICEABLE GASKET-CUTTER THAT ANY SMITH CAN MAKE

Trade and Technical Education in Other Countries—8.

W. H. DOOLEY.

Italy.

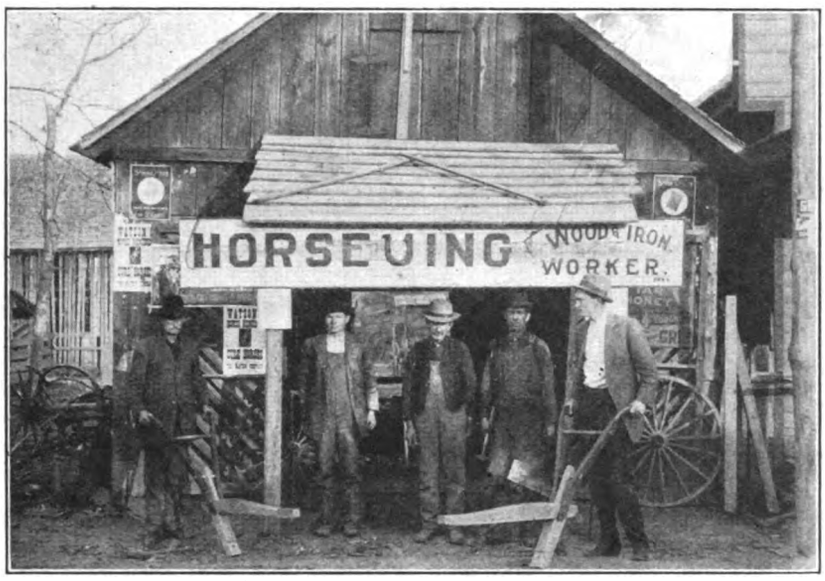
As early as the fifteenth and sixteenth centuries several efforts were made in the direction of industrial education in Italy, but these were not important and were lost in the general neglect of education. But early in this century there was established at Naples schools of arts and trades for workingmen, which marked the commencement of the union of the school and the workshop. Since then schools have sprung up here and there, according to the necessities and means of the localities, without a pre-established plan, almost without the intervention of the state. They are of widely different types and vary greatly in their objects and programmes.

One is greatly surprised to find that these schools are without co-ordination—because in all the Latin countries there is a tendency toward strong administration regulations. The elementary and secondary schools have almost identical programmes and character throughout the whole kingdom. The only explanation that was offered the writer was that it was necessary that the industrial and technical schools should have a liberty of action that permits adjustment to surrounding conditions.

These trade and technical schools might be divided into two distinct types—industrial schools and schools of art applied to industry. There are, of course, several grades representing each of these types.

At the head of the industrial schools are institutions having the rank of universities. They are the Italian Royal Industrial Museum at Turin, the

Politermio at Milan and the School for Engineers at Naples. These schools train the captains of industry and superintendents of industrial enterprises. Next there are the industrial and trade schools of medium grade intended to train foremen of workshops, and, lastly, the schools of arts and trades for training workmen.



A GENERAL SHOP, RUN BY JAMES F. WALKER

Notwithstanding the defects in the organization of these schools they have exercised a beneficent influence upon the social life of the nation. Italy is afflicted with a scourge which sadly prevails in the Latin nations and which is almost unknown in America, namely, the intellectual proletariat. In Italy, for the last thirty years, there has been an excess of young persons who devoted themselves to study and especially to classical study, a phenomenon which had its origin partly in various social circumstances of the epoch. It follows that when there is a superabundance of doctors, lawyers, etc., who cannot find work in the professions for which they have been educated, they will devote themselves particularly to seeking public employment. This is what happened in Italy. Whenever there are vacancies in the civil service there is a host of competitors, even when the places offer the most niggardly salaries. The unfortunate class of proletarians weigh heavily upon the social balance of the nation, because it is a truly unproductive class.

If, on the contrary, the industrial and trade schools had been developed to the extent institutions for classical learning had, they would become useful to the nation, not alone on account of the progress that they will bring about in the industries and in making more skilled workers and foremen, but also because they may divert from classical studies and toward more useful occupations a class of young people who are crowding the ranks of the intellectual proletariat.

One of the best organized industrial schools is "Alexandro Rossi Industrial School" at Vicinza. This school was founded in 1878 by Senator Alexandro Rossi, who made a donation of sixty-seven thousand dollars for the establishment and one half the running expenses for the first six years. The school is located in a city of about 35,000 inhabitants, which is not a great industrial or commercial city, but which is surrounded by smaller districts containing important industrial establishments. The purpose of the school is to prepare intelligent and skillful foremen for the mechanical industries, and to qualify for advanced technical pursuits such of its pupils as are especially qualified for the study of higher mechanical technology. It is, therefore, divided into two sections; a section for mechanical construction work, electro-technics and the textile industries (the object of which is to train foremen for the electrical, mechanical, weaving and spinning industries) and a section for higher studies, which prepares the best students for the superior schools for engineers.

All pupils serve an apprenticeship in the six workshops attached to the school and remain longest in those where they show the greatest aptitude. These workshops are for patternmakers and carpenters, molders, blacksmiths, machinists, turners and machine tenders and electricians. The shops are very well provided with materials, models, tools and machinery. A part of the material is manufactured in the workshops by the pupils. Orders are also taken from private establishments, and considerable business is done by furnishing castings and other products made by machines or with tools, from which source the school receives considerable revenue. The school is in constant receipt of requests from industrial establishments, so that there is no difficulty in finding positions for the pupils who are graduated each year.

The schools of art applied to industry, and schools of industrial drawing, are of great importance in a country like Italy, where the artistic temperament is so well developed. This innate artistic character which one observes among the people in many parts of Italy makes it possible to give the most ample development to the artistic industries.

These schools are numerous, more numerous even than the industrial schools and they abound in the villages. Some of the schools have an income of one hundred dollars and exist by what might be termed heroic effort of the teachers, who are content with small compensation.



"The mind of the physically lazy man has done more for this world than you think, Benton," said the Editor.

"I can't see how you figure that, Mr. Editor," returned Benton.

"In fact, I think I can safely say that the mind of the physically lazy man has done more for humanity than has the mind of your hustling, bustling, fussy chap." And the Editor waited for Benton's exclamation at this apparently illogical reasoning.

"Do you mean to say that the lazy man is worth more to this world than the

hustler?" questioned Benton, in surprise.

"No, I didn't say exactly that," returned the Editor, smilingly, "I said that the mind of the physically lazy man is worth more than the mind of the hustler."

"Well, if you'll explain, perhaps I'll understand what to me sounds like Hindoo," and Benton lit his pipe, settled back in his chair and prepared to listen to a talk on the "Justification of the Lazy Man."

"To begin with," stated the Editor, "you must understand the difference between the kind of lazy man I mean and the kind that a person usually pictures in their mind when 'lazy man' is mentioned. The lazy man as usually thought of by the majority of persons is not only physically lazy, but mentally lazy, also. The mentally lazy have never done very much except to waste time and they take plenty of time doing that.

"But your lazy man who is only physically lazy has used and is using his mind for the good of humanity.

"To illustrate: Centuries ago when men wore skins for clothes, carried clubs for weapons and lived in stone houses, a certain lazy chap was building a new stone domicile. He used big stones because they meant a less number of trips to the stone pile. In this connection an old German proverb applies very appropriately. It goes something like this: 'The lazy kill themselves carrying big loads, while the thrifty kill themselves hustling.'

"And this chap was lazy. For he was soon complaining about the difficulty of pulling and hauling the big stones over the ground. And in one instance, after bringing a particularly large and heavy stone from the quarry, he wondered why it wouldn't be possible to place a stone on one of those logs which roll so easily, and in this way roll it home. He put the idea into action and found it worked perfectly. And that lazy chap told his neighbors about his little stunt and, as year followed year and century followed century, improvements were made on that simple log-rolling stunt, until wheeled vehicles evolved.

"Now take some lazy men of more recent years. There is the chap who got tired of dipping his pen into the ink, so he put the ink into his pen. Then there's the lazy chap who got tired of lifting a heavy hammer all day long so he fixed up a hammer that would lift up when he stepped on a lever. Then there's the fellow who got tired of pushing a saw all day long—he rigged up a device whereby his horse worked the saw. All the man had to do was to see that the saw had something to saw.

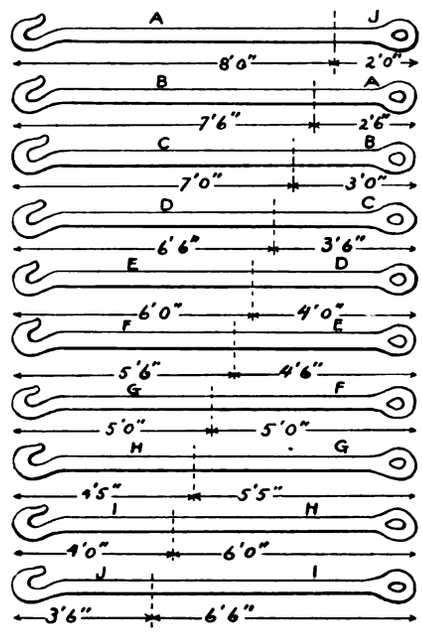
"And cases without number may be cited where the lazy man with a thinking brain has helped, not only his own lazy self, but humanity in general. It's simply the labor-saving mind asserting itself."

Jim Robertson came in at this point. Robertson, it must be explained, is the smith over at the Charter-Grant Works. They are putting up some additions over there and, as both the Editor and Benton soon learned, Jim is sometimes called upon to assist the building contractors.

"I want you to help me" began Robertson, turning to Benton and unrolling a sheet of paper. "You see these rods? Well, they're too short. There are ten of them that need lengthening by six inches. The rods have an eye on one end and a hook on the other end. If I cut them and weld a six-inch piece in each rod, I'll have to make ten cuts for the rods, ten cuts for the stock and then make twenty welds. Now, isn't there some other way of doing it?" And Jim handed the paper of rod specifications to Benton. The latter looked at the sizes and dimensions carefully.

"Well, Jim, you can straighten that hook, weld your piece onto that end and then bend up a new hook." Ventured Benton.

"Straightening the hook and then bending up a new one will take longer than the



HOW THE JOB WAS SIMPLIFIED

weld which it would save," returned Robertson.

"Well, then I don't see how you can do it any different than to weld a six-inch piece into each rod." And Benton continued to look at the specifications in an endeavor to find a way out of the difficulty.

"Let me see your specifications," put in the Editor, quietly. He looked over the dimensions carefully, then took a pad from his desk and began to figure. After several minutes he turned to the two others and said:

"I can lengthen those ten bars by making eleven cuts, eleven welds and using one piece of extra stock a little over five feet long," and the Editor waited for Benton's laugh of ridicule which he knew would follow this announcement. And he wasn't disappointed.

"Are you a wizard?" asked Benton after composing himself, "or perhaps you think Robertson wants these rods welded into one long piece." Then Benton added sarcastically, for he disliked having anyone get the better of him: "Would you mind explaining your wonderful feat?"

"Of course not," returned the Editor. "I intended to explain, and if you will simply hold your horses, or sarcasm rather, I will gladly show you." The Editor then drew some lines on a piece of paper and then continued.

"To make the matter entirely clear to you, here are the ten rods. Now, I take the first one and cut it two feet from the eye end. That will give me two pieces of rod; an eye end two feet long and a hook end eight feet long. Then I take the next rod and cut it two feet six inches from the eye end. Now, I take the eye end here marked A and which is two feet six inches long and the hook end marked A which is eight feet long and weld them together, and I have one rod ten feet six inches long. Of course, in actual practice, something must be allowed for the weld, so that you will need to cut your rods a little longer according to the amount you require for welding. Now the other rods are cut each six inches farther from the eye end just as I've marked them here. In welding, you use the hook end of one rod and the eye end of the next rod."

"That's fine as far as you go, Mr. Editor, but how about the eye end J which I believe is two feet long and the hook end at J which you have marked three feet six inches long? Welding them will give you only five feet six inches, without even allowing anything for the weld." And Benton smiled as he thought how easily he had caught the Editor.

"If you will shake up that brain of yours," replied the Editor, "you will remember that I said I would use one piece of stock a little longer than five feet. That piece is welded between the shortest eye end and the shortest hook end. Before cutting it from stock both the ends to be joined are measured to see just exactly how much is needed to join them so that the rod will measure ten feet six inches."

"Well, that lets me off in a very easy way," said Robertson when the Editor finished his explanation. "I thought I was in for a good long job of welding and cutting, but you cut the entire job just about in half. Now, how can I tell how to cut the ends so as to have plenty of stock for welding?"

"Go at it in this way," began the Editor. "Cutting the first end will be very simple; then just cut the eye end A enough longer than two feet six inches to allow for the weld. Of course, that will leave your hook end B a little shorter than seven feet six inches as I have marked it. But you will measure just exactly how long that end is and cut the eye end B accordingly,—proceeding in this way, measuring the hook end first and then cutting the eye end of the next rod accordingly. Of course, here on the paper I've just worked the job out theoretically to illustrate the method." The Editor then made a copy of his sketch and handed it to Robertson, who, after many "thank yous" went back to his job.

"Why didn't you give him your sketch?" asked Benton, still feeling somewhat irritated.

"'Our Folks' will be interested in that job and I want to put it in 'Our Journal,'" returned the other. "And after that is done, I think I'll have it framed and present it to you. You know we were talking about the labor-saving mind when Robertson came in. This is a practical example." And the Editor turned to the big pile of photographs for the shop number.

Jes' A Blacksmith.

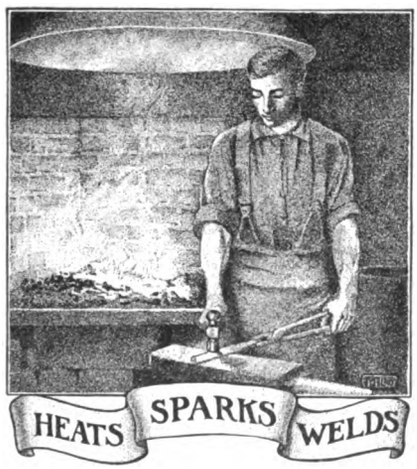
W. O. B.

When the farmer's crop's a failure,
When his hay, an' grain, an' truck,
And his peaches, pears an' apples
Aren't worth a whoopin' shuck.
When his great big barns are empty,
And his land is kind o' dead,
Then I'm glad I'm jes' a blacksmith,
Not a farmer man, instead.

When the oil king's been indited,
When he's tried by twelve true men,
When they've found him mighty guilty
Of discriminatin'—then
The judge he fines him roundly—
The amount would stagger you.
Then I'm glad I'm jes' a smithin'
An' am not an oil king, too.

When the President has spoken
To the people in the land—
And magazines and newspapers
Find fault t' beat the band.
When "Billyum" tries explainin' things
But makes 'em worse than bad
Then I think I'm jes' a smithy,
An' I feel almighty glad.

When the Speaker's lost his power,
When the smoke o' battle's cleared,
When the long expected happens
Jes' the thing he has long feared.
When insurgents leave him battered—
Shorn of all 'cept his cigar,
Then it's time to be right thankful
That I'm jes' a smith, by gar!



Keep too busy at your own job to want the other fellow's.

If life is as we make it, why growl when it doesn't suit us?

Opportunities are like fish, the biggest ones always get away.

How often our greatest worries are over things that never happen!

Does it make a thirteen-cent man a better workman to hand him a fifty-dollar kit of tools?

The "Mauretania"—biggest of ocean greyhounds—has an electric light equipment of 6,300 lamps.

Any old jack can cut prices and go into bankruptcy, but it takes good horse sense to make a profit and stick.

Don't pay your help good money for what they know and then disregard their advice. Talk it over with your help.

A dead sure thing is generally just what its name indicates—a thing dead sure to make money for the promoter.

He who believes in advertising but does not advertise is more foolish than he who advertises but doesn't believe in it.

The careful gas engineer lets no week go by without examining every nut and bolt on his engine. And his engine looks it, too.

Uncle Billy Martin says: "I notis thet some people are purty religious—at times."

You are not expected to get all the business all of the time, but are you sure you are getting all you might if you went out after it?

Don't put it in the safe. When you come across a good craft idea, send it in to the Editor for publication and for the good of the craft.

Irons seems a somewhat peculiar name for a smith, but Mr. James A. Irons, blacksmith, died at Monaca, Pa., the other day. He was 74 years old.

Investigate. There must be a cause. There is a remedy. And if there's something wrong with your business a thorough investigation will bring it out.

When your customer is the only one who profits on a transaction it is time to get out of business. Are you in business for your customer's profit only?

Forging the shoe and nailing it on the foot is not all there is to horseshoeing. It's the know-how that counts—knowing that you are doing it correctly.

If you own a horse you may not think this is true, but 'tis said that the horse has a smaller stomach in proportion to the size of the animal than any other quadruped.

There's no better time than right now to form that Association. Don't do another thing or read another line until you ask the Secretary for his easy Association plans.

If one man can teach you new hints, methods, receipts, how much more can the hundreds of writers teach you through the medium of "Our Journal." Tell your neighbor.

It's not so much the man who knows as the one who is willing to try with all his might. He's the chap who finds out that lots of things can be done that were thought impossible before.

Economy is not the doing without tools when they're needed. It's the purchasing of good goods and the saving of that which you get for the money you spend. It's not alone the saving of money.

Keep everlastingly at it—you must certainly excel your competitors at some point. Keep everlastingly harping on that point. And if you keep at it long enough and loud enough you'll win out.

The original village blacksmith, Mr. Thaddeus W. Tyler, is dead at Lynn, Mass. He was the hero of Longfellow's well-known poem "The Village Blacksmith." Mr. Tyler and Mr. Longfellow were warm friends until the famous poet died.

If you cannot do business on a strictly cash basis, extend credit, but in a business-like manner. When a man asks for credit, don't say "yes" or "no" as the mood strikes you. Ask him where he's been trading. Look up his record with other business men and then answer accordingly.

For all-'round use nothing has ever been brought out that is of such material benefit to the farmer as the automobile. So thoroughly is it becoming understood and used that, 'tis said, it is not uncommon for a motor-car to be used to run a threshing machine in the morning, carry a load of produce to the city in the afternoon, and for a pleasure run in the evening.

In Kansas alone it has been reported that 600 sales for one car have been made. And a man who should know says that farmers all over the State have been withdrawing cash from the banks to purchase automobiles.

"How's business, Tom?" we questioned as we espied our friend dozing in his chair before the shop. Tom yawned and stretched, knocked his pipe on his heel and said: "Business is bum. I've been sittin' here all mornin' an' ain't seen a customer. Guess I'll close up an' go fishin'." And Friend Tardy yawned again, stretched, kicked a hammer, a rasp and a pair of tongs into the corner, put on his hat and after pulling the door shut walked down the street toward the free lunch dispensary.

One hundred years ago Elihu Burritt, "the learned blacksmith," was born in New Britain, Ct., and the event was celebrated in connection with the peace congress in that city. This celebration was most appropriate, as Burritt's other title was "apostle of peace." Burritt, at an early age, was apprenticed to a blacksmith and while laboring at the anvil would keep his mind busy on grammatical and mathematical problems. He died in 1879. He was a man of great industry, honesty and genuineness; thoroughly devoted to all good causes, fearless in his advocacy of them and was as healthy a representative of the self-made man as ever breathed.

Fifty-two years is quite a record, these days, for a man to continue with one business house, and yet Phineas Jones & Co., of Newark, N. J., have two men still in their employ who began with them in 1858. This well-known firm of wheel makers began business in 1855, 55 years ago, and their service record shows that 33 men have been in their employ for periods of 25 years and more. Of three men, S. D. Aspinwall, Edward Whalen and Ira J. Smith, who began in 1858, Mr. Smith died in 1909, making his record 51 years, while the other two men are still working. Another noteworthy fact in this connection is that this concern has been in its present location for 46 years.

These quotations on labor and work seem to apply particularly to the blacksmith.

Labor is discovered to be the grand conqueror, enriching and building up nations more surely than the proudest battles.—*Channing.*

No man is born into the world whose work
Is work is not born with him; there is always work
And tools to work withal for those who will;
And blessed are the hoary hands of toil.—*Lowell.*

Taste the joy that springs from labor.—*Longfellow.*

All true work is sacred; in all true work were it but true hand-labor, there is something of divineness.—*Carlyle.*

American Association of Blacksmiths and Horseshoers.

How much longer are you going to sit idly by and allow the present conditions in the craft to continue? Surely you will agree with me that you deserve better treatment, better prices, better harmony in the craft. You cannot give me one single reason why organization will not benefit the craft in your county.

Why not get started along association channels this month? Blacksmiths generally have a little time to spare during the summer months, and you should have no trouble at all to get them to attend meetings and organize into a strong branch association by the time the fall rush sets in.

Smiths everywhere realize the many advantages of organization and if you will but start the ball a-rolling you will have little or no difficulty in getting your brother craftsmen thoroughly and strongly organized.

But it requires action, Mr. Reader, good, prompt, vigorous action. Sitting in the shop and blowing smoke pictures of ideal shop conditions will not secure better prices for you or form an association in your county. You must work—coöperate with your brother craftsmen, send for my easy plans, and then, almost before you know it, you will have a strong, healthy association formed in your county. Just send me a postal-card, request my easy association plans and I'll send them by return mail. When you get them, read them carefully, and then, with strong, vigorous action on your part, and assistance from me, a good healthy association will be the result—and the cost to you is but the penny for the postcard. Isn't the result worth it? Surely, you would pay that for better prices, harmony and improved craft conditions.

And there is no better time in the year than right now. Smiths are better able to go to a meeting at this time than they are when the roads are buried under snow drifts. Address your postcard to P. O. Box 974, Buffalo, N. Y. It will take but a minute, cost but a penny and may mean hundreds of dollars to you. Don't turn the page until you have written that postcard to

THE SECRETARY.

Straws in the Wind.

Straws show which way the wind blows. In asking those questions in our March issue we wanted candid opinions—not flattery, not a jolly slap on the back and a long-winded talk on what good fellows we are. We wanted straight-from-the-shoulder talk on just what readers wanted. And we got it, too. We got so many replies—and they're still coming—that we have been unable to present the result of that little question box until now. The table accompanying shows by percentages just what "Our Folks" want. Some of the replies surprised us, but it is gratifying to know that not one of our readers replied "no" to either question 4 or 7. In the case of question 8 it will be noted that the replies are divided according to the preference as to long or short articles.

QUESTIONS.	YES.	NO.
1.—Someone has suggested a monthly sermon or religious lecture—do you want it?	16%	84%
2.—Are you interested in the automobile department? If so, is it of practical help to you?	76%	24%
3.—Do you want us to publish a timely cartoon in place of the frontispieces we have been publishing?	16%	84%
4.—Are you pleased with "Around Our Forge Fire" talks?	100%	
6.—Would a monthly short story interest you? Do you want us to publish one every month?	20%	80%
7.—Is the general plan and make-up of the paper pleasing to you	100%	
9.—Do the pictures of shops interest you?	88%	12%
8.—Do you prefer short articles complete in each issue, or do you prefer long continued articles, running through from six to twelve numbers?	short	long
	92%	08%

THE REPLIES TO OUR MARCH QUESTIONS IN TABLE FORM

In this connection it is perhaps necessary to explain that while all letters and replies to our questions did and will receive due consideration, none but those answering *all* the questions enumerated in the table were considered in figuring the percentages shown. For example, if a letter referred to but two or three of the questions asked, no part of the letter was considered in compiling the table of percentages.

It will also be noted that requests 5 and 10 are not included in the table of results. These, as you will no doubt remember, were requests for suggestions for future articles, items and subjects of articles. Oh yes, we received a goodly number of suggestions—suggestions of all kinds—but it was impossible to include them in the table which we were desirous of making as simple as possible.

Advertising the Smith Shop.

WM. H. SPONHOLTZ.

I read your AMERICAN BLACKSMITH and also other trade papers, and I read many good things in them. And from the tone of the papers I gather that they all want to help us bring out the blacksmith business on a higher plane. Now, to my mind, they come short of one thing. After we work all day we don't feel very much like writing advertisements for the local papers. If the trade papers had two or more advertisements in them appropriate for the time of the year we could soon get our advertisement ready for our local paper. Something that will cover from four to six inches would be just about right. I am sending a few that I put in my advertising space, and they made quite a hit. Everybody read them. If there is something in these that would help my brother blacksmiths so much the better.

Smile a Few and Boost a Bit.

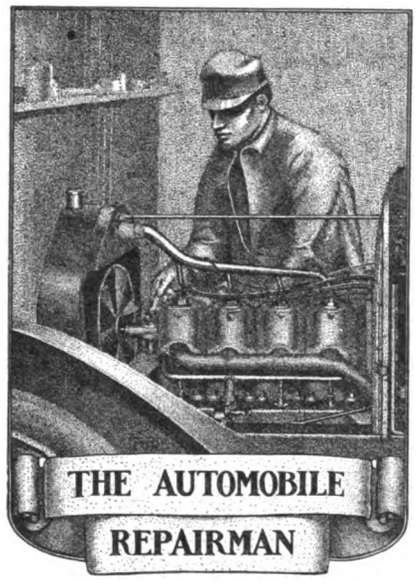
"A five-dollar whip won't take you to town if your horse is lame and your wagon broken." I can fix both of them, and am doing a big business in that line, and I am prepared to do yours.

Then smile a few an' boost a bit,
An' you discontented knocker,
Growlin' 'bout the country's ills,
Chloroform your dismal talker.
Take a course of liver pills,

Stop yer durn ki-o-tee howlin';
Chaw some sand an' git some grit;
Don't sit in the dumps a-growlin';
Smile a few an' boost a bit,
For the wagon maker an' the smit'.

Fall in while the band's a-playin',
Ketch the step an' march along;
'Stead of pessimistic brayin'
Jine the halleluja song.

Drop yer hammer—do some rootin',
Grab a horn, you cuss, an' split
Every echo with your tootin',
Smile a few an' boost a bit,
For the horseshoer an' the smit'.



Adjusting, Repairing and Caring for an Automobile—5.

With Special Reference to the Stevens-Duryea.

Cam Shaft and Lay Shaft.

CAM SHAFT.—Remove lower half of engine case No. 412. Lift off clutch cover No. 947. Cam shaft gear No. 473 can be taken off by removing cotter pin and nut No. 461, that will allow hexagon cap screws No. 467 to be taken out and end bearing No. 466 withdrawn.

To withdraw cam shaft release hexagon bolt No. 464 in upper engine case (above center bearing No. 463) that will allow cam shaft No. 453 to be removed as shown.

LAY SHAFT.—Remove lower half of engine case No. 412 and lift off clutch cover No. 947. Remove nut No. 495 and gear No. 505. The end bearing No. 498 can be taken off by removing hexagon bolts No. 499. Unscrew lay shaft center bearing lock screw No. 492 in upper engine case (below center bearing No. 497). Release lock bolts in pinch collars No. 481, timer driving gear No. 486, oiler driving gear No. 483 and pump driving gear No. 489. This will allow them to slide on shaft No. 480 as it is withdrawn as shown.

Muffler and Muffler Cut-Out Valve.

CLEANING.—Remove four nuts No. 849 from straps No. 847 and withdraw shells from outside casing No. 855.

In replacing a separate cone, disconnect rear muffler head No. 845 from support shafts No. 853 by unscrewing six nuts No. 854.

Muffler cut-out casing No. 839, valve No. 841, are removed by unscrewing cap screws No. 840.

CONES.—Cone No. 857 (closed end) and No. 858 (opened end cone) are alternately placed on shafts No. 853 and spaced by tubes No. 851.

MUFFLER CUT-OUT.—Valve No. 841 is placed in exhaust pipe just in front of the muffler and is operated by foot pad No. 873 in the center of the front seat floor. The muffler design is such as to offer a minimum of back pressure. Use cut-out valve only to test the regularity of the explosions.

Racing the Engine.

Never allow an engine to race. If the car is traveling on third or high gear at a fast road clip, and it becomes necessary to disengage the clutch, thus removing a load from the engine, or you desire the car to coast, the throttle should be closed. You cannot abuse an engine worse than by allowing it to race or run idle at high-engine speed.

Piston Removed.

REMOVING AND REPLACING PISTON.—To remove any piston for examination or cleaning of cylinder it is only necessary to remove lower half of crank case No. 412, which is attached to upper section by hexagon bolts and nuts No. 414.

In replacing piston No. 546 care should be used not to force it too far up in cylinder, as upper ring would expand in recess at top.

It is a good plan just as soon as piston has been started to turn crank shaft to lowest point; connecting rod will then swing over crank shaft without any danger of ring expanding.

BEARING ADJUSTMENTS.—In making bearing adjustments on crank do not set caps up so tight that the connecting rods cannot be snapped forward and back with a slight pressure of the hand.

Main bearings should not be tightened so that but a light pressure on flywheel would allow it to rotate.

Care should be used in removing wrist pin No. 549 so as not to distort piston—small end of wrist pin is on set screw side of piston. In removing, apply pressure to set screw side only.

LAY SHAFT.—In removing lay shaft, release nut and unscrew lock stud No. 492 about three quarters of an inch; that will allow center bearing to be withdrawn with lay shaft.

Clutch.

The clutch is of (unit) multiple disc type—six discs double faced with quarter sections of woven wire and asbestos are united with seven driven discs (of steel) by spring pressure.

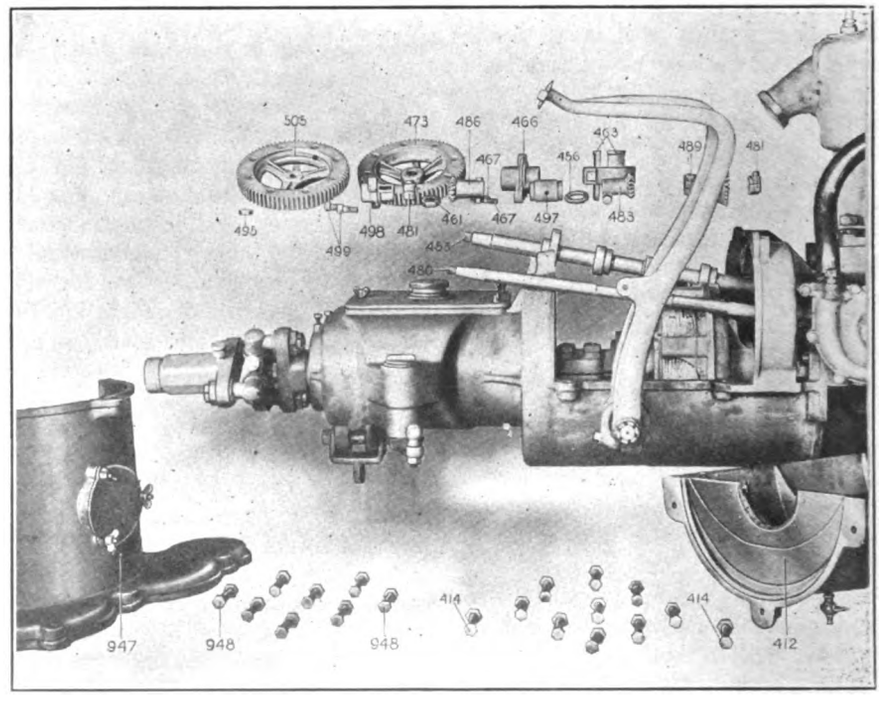


FIG. 1.—ILLUSTRATING HOW THE CAM AND LAY SHAFTS ARE REMOVED

Take off hexagon nuts No. 542; that will allow the removing of connecting rod cap No. 539 and studs No. 541.

By setting crank shaft at a slight angle, piston can be withdrawn.

A forward movement of clutch lever at left of steering post compresses spring in clutch and allows discs in driving member No. 903 to separate from disc on driven member No. 906.

THE ADJUSTMENT FOR WEAR is taken up by the spring and is entirely automatic.

In an emergency case, adjusting ring No. 908 can be tightened to overcome any slipping (that is caused by abuse). After adjusting No. 908 and before locking in position be sure that discs separate freely.

When making adjustment to No. 908 have pressure on foot lever, to relieve pressure on disc and adjusting ring.

CLUTCH REMOVED.—In removing the clutch, raise foot boards and remove aluminum cover No. 947 by taking out bolts No. 948; square clamp No. 925 can then be removed.

On taking out hexagon bolts No. 904, that unite driving clutch extension No. 903 with clutch member No. 902, it will allow the removal of the complete clutch.

IN REPLACING CLUTCH, projecting arms on No. 919 should be engaged with adjusting fork lever No. 887, having oil hole in No. 919 on upper side.

OIL.—Clutch has only three points at which oil should be used. Cups marked No. 890 and No. 892 on case every 200 miles and mark "A" on clutch every 500 miles. To oil "A" when cover is on remove cap No. 950.

Clutch discs do not run in oil and any oil in clutch case will cause clutch to slip. If discs should become oiled, start engine, release clutch and pour gasoline on clutch discs through hole at No. 950.

Keep oil holes marked "open" at bottom of case clear from dirt.

Body.

REMOVAL OF BODY.—Remove the brass plates at sides of front seat floor together with six nuts holding the body to the chassis, disconnect the horn tube and make sure as the body is lifted from the chassis that it is elevated to a height sufficient to clear gasoline tank under front seats.

The upholstering and body should be cleaned only with the best grade of soap with a liberal use of water. Gasoline deteriorates the luster of the finish and should only be used in extreme cases, and then only on the chassis.

Tires.

PRESSURE.—Give careful attention to the pressure carried in the tires; the following will be found to be ample for all touring conditions: 34 by 4 Front 70 pounds. 34 by 4 Rear 80 pounds. 36 by 3½ Front 60 pounds. 36 by 4 Front 70 pounds. 36 by 4 Rear 80 pounds.

CHAINS.—Tire chains should be used for safety and greatly add to the traction when driving on muddy, slippery or snow-covered roads. Always use chains on both rear wheels, as when only one chain is used undue strain is placed on the differential of the rear axle. When carrying extra shoes or inner tubes make sure that they are well protected from oil, heat, water and gasoline, as each affects the rubber and fabric, causing noticeable loss in wearing qualities.

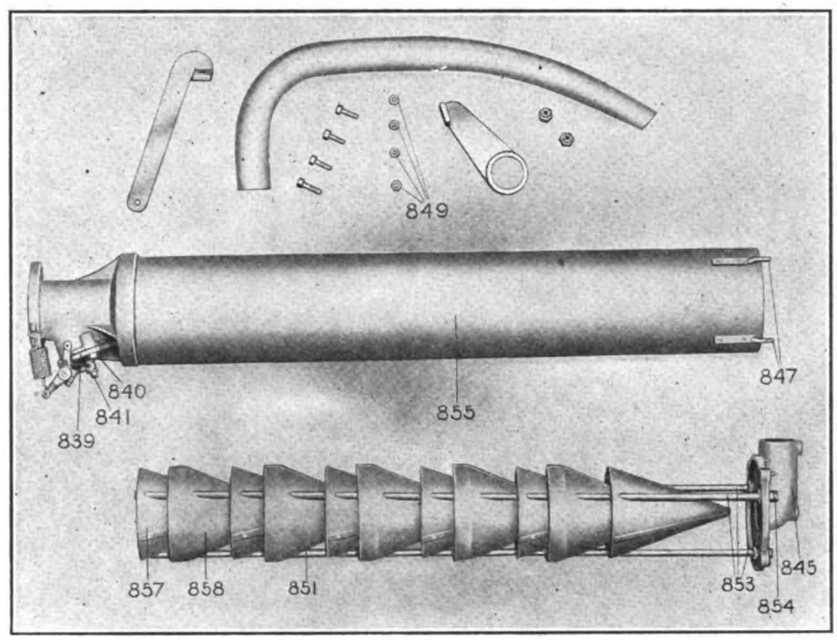


FIG. 2.—THE MUFFLER AND HOW IT IS DISSEMBLED

Clutch Adjustment.

CLUTCH TOOL.—Remove the square clamps and press forward on clutch pedal, which will allow clutch opening tool to be inserted in square on driven clutch member No. 906.

Remove taper head screws No. 904 and lift clutch from case.

Withdraw cotter pin No. 910 and lock pin No. 909 from clutch discs adjusting nut No. 908.

PLATES.—If plates are to be removed unscrew adjusting nut No. 908 from driven member No. 906, which will allow the removal of as many discs as desired.

ADJUSTMENT.—If only an adjustment is required it will not be necessary to remove clutch, just turn adjusting nut in the direction required. To the right tightens and to the left loosens the tension on discs.

In turning adjusting nut No. 908 it

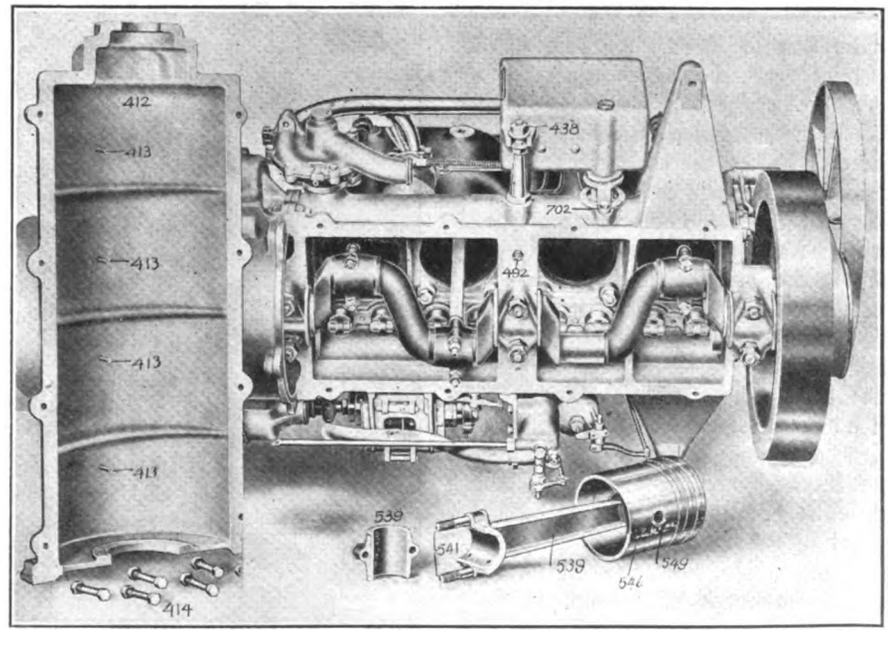


FIG. 3.—THE CYLINDERS AND CRANK SHAFT FROM BELOW

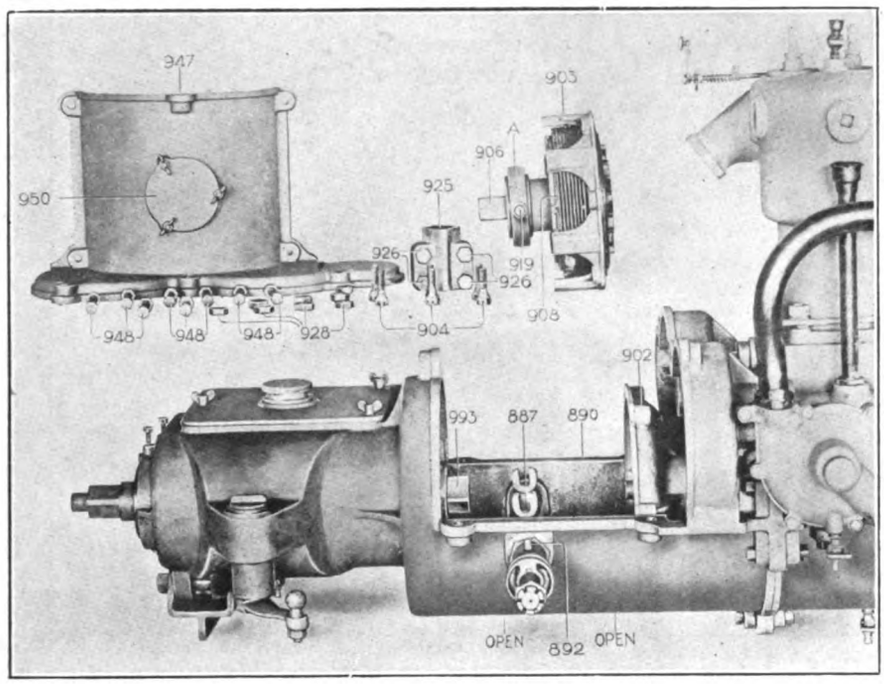


FIG. 4.—HOW THE CLUTCH IS REMOVED FROM ITS CASE

will be necessary to make one and one sixth revolutions each time so that the hole in adjusting nut No. 908 will coincide with the holes drilled in driven member No. 906.

CAUTION.—After making adjustment and before replacing clutch cover make sure (with clutch pedal forward) that discs have good clearance between them.

Also note in shifting gears that the clutch releases perfectly free, so as not to rotate countershaft in transmission.

(To be continued.)

Recent Tendencies in Gasoline Car Design.

WALTER C. WHITE,
Second Vice-President of the White Company.

Rapid as has been the growth of the gasoline car industry, measured in terms of production, still more rapid has been the development of gasoline car design. In the early days of the industry, designers centered their energies on the development of a car which could be depended upon to keep going with reasonable regularity. In more recent years, other considerations, such as comfort of passengers, quietness and flexibility, have received increasing attention. These qualities having been in a measure secured, the leading foreign designers and those American makers who are acting in accordance with foreign practice have very recently taken up such qualities as simplification of design, low fuel-consumption and minimum cost of up-keep.

To maintain that perfection in design was reached three, two or even one year ago, or that only minor refinements have since been necessary, is to confess ignorance of, or indifference to, the advance which has meantime taken place. The discriminating buyer will appreciate that a car of the latest design will be the most satisfactory; provided, of course, that workmanship and material are in keeping with the design.

One of the modern tendencies in design is toward the "long-stroke" engine. The development of the "long-stroke" engine is due largely to the fact that a year or two ago the rules of the great International races held abroad imposed limits on the diameter of cylinders and also limited the fuel consumption. The principal European makers, who were at the time all interested in racing, thereupon proceeded to develop higher powered engines of limited bore, by the simple expedient of increasing the stroke. It was also found that by increasing the stroke the desired economy in the use of fuel was secured. As the new construction was in every respect advantageous it was but a short step to develop the principles acquired in the construction of racing cars, so that they might be applied to cars built for general touring purposes. It is significant of the wide-spread adherence to old ideas that the standard formula used in this country for computing horse power does not take into consideration the length of the stroke and it is, therefore, to that extent, defective and unreliable. The most important of the new developments, however, is the recent tendency to simplify the design by the reduction of the number of parts. The block construction; that is, the casting of all four cylinders in a single piece, results in many advantages. It has made possible the development of a design wherein all external manifolds are eliminated, and the intake passages and exhaust passages are a part of the sengine casting. By such a contruction it is possible both to heat the intake gases and to cool the exhaust gases.

In the modern engine, a single intake pipe leads from the carburetor to the

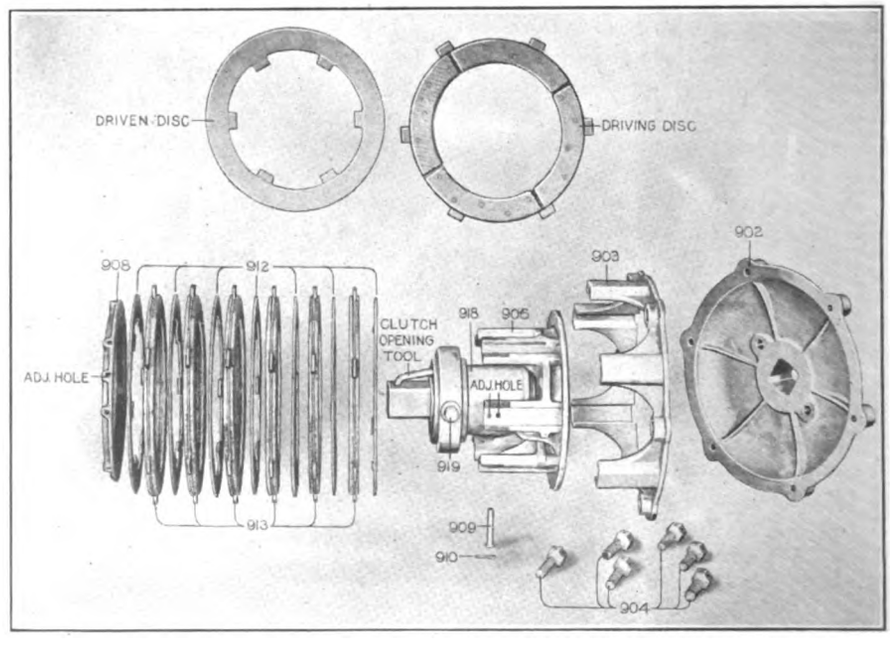


FIG. 5.—THE CLUTCH DISSEMBLED, SHOWING DISCS AND OTHER PARTS

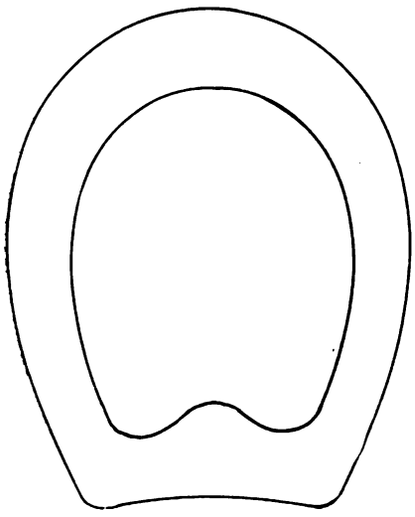


FIG. 1.—THE ORDINARY BAR SHOE

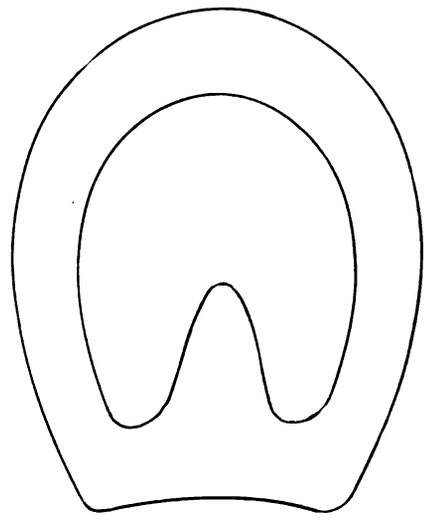


FIG. 2.—THE IMPROVED BAR SHOE

engine. Forming an integral part of the engine casting are intake passages communicating with each of the cylinders. The charge of gas from the carburetor is heated in these passages, with the result that there is no condensation of the gasoline vapor, and the cylinders receive a uniform mixture of the proper richness, thus giving the highest possible economy and efficiency.

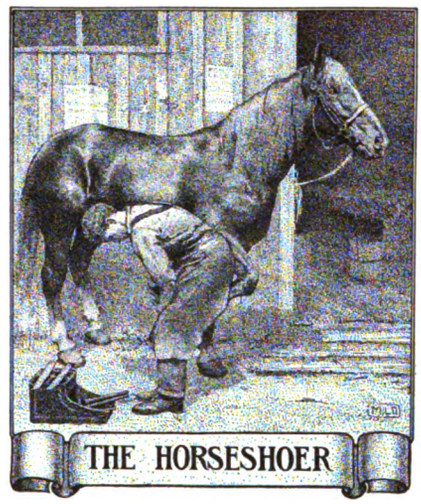
The advantage gained by heating the intake gases will be appreciated if we consider the composition of gasoline. The ordinary gasoline of commerce is a mixture of a number of hydro-carbons, each of which vaporizes at a certain definite temperature. The more volatile of these hydro-carbons turns into vapor at ordinary temperatures, but the other constituents will not vaporize at ordinary temperatures, and therefore if the intake gases are not properly heated are carried into the cylinders in a more or less inert form—that is, they are not completely converted into gas.

The exhaust gases, on leaving the cylinders, are conducted through passages which, like the intake passages, are a part of the engine casting. These passages are water jacketed; with the result that the exhaust gases are at once cooled, thereby reducing their pressure and, incidentally, reducing the noise.

Each of the three features above enumerated—the "long-stroke" engine, the heated intake and the water-cooled exhaust—tend toward economy and efficiency.

Another advantage of the block system of engine construction is that it is possible to surround all of the cylinders with a single water jacket, thus preventing unequal cooling of the cylinders, which often happens where there are two or three independent water jackets.

Another pronounced tendency in the latest design is toward the substitution of the four-speed transmission for the three-speed transmission, even in cars of moderate size and power. Every one recognizes how much more efficient is a car with three-speed transmission as compared with a car with a two-speed transmission. In almost the same degree a car with four-speed transmission is superior to a car with a three-speed transmission, and for the same reason the speed of the car can be adapted to road conditions more economically and with less wear and tear on the engine.



The Bar Shoe and Its Use.

L. G. MILLER.

There has been considerable talk and discussion concerning the bar shoe and its use, but to my mind the most important point has not been touched upon. The bar shoe, as practically all agree, is excellent for promoting frog pressure and for restoring the general health of the foot. As generally applied, the bar consists simply of a narrow piece of iron extending from one heel to the other heel branch, somewhat as shown in Fig. 1. Now this frog bearing is good as far as it goes, but why not get a bearing on the entire frog, if it is not diseased?

For some time we have been using a bar shoe shaped as shown in Fig. 2. This puts a bearing on the entire frog, and if experience counts for anything it restores the foot to normal much more quickly than the bar as ordinarily applied.

In making this shoe, simply have a little more stock in the bar and then draw it out to a point to cover the frog from point to cleft.

In applying this shoe to a foot in which the frog has partly shrunken or disappeared, take extreme care not to apply the pressure too much at first. For, in the case of a shrunken frog, the sudden pressure will tend to force the hard, dry frog into the foot. Apply the pressure gradually at each succeeding shoeing until the health of the frog has been restored, when full pressure may be applied.

Why shoers generally have been using the smaller bar, I cannot understand. To my mind, if the small bar is good for the frog and the frog in its natural state comes in contact with the ground for its entire length from point to cleft why isn't the full-pressure bar so much better? I figure that the more natural pressure we are able to give, the better for the health of the foot. And experience has proven that this is about correct.

Another important matter in connection with the fitting of the bar shoe, is the placing of the nail holes. Keep the nails away from the heels as much as possible. This will allow the foot to expand at the heels without interference, while if the nails are placed too near the heels that part of the foot is held as in a vise.

Anatomy of the Horse's Foot and a Talk on Corns.

E. H. MALOON.

There is but little written on horseshoeing in THE AMERICAN BLACKSMITH with which I am not familiar, but in the March number I found in the article on corns and general shoeing, by J. F. Ross, information that was entirely new to me; that was, that the shell of

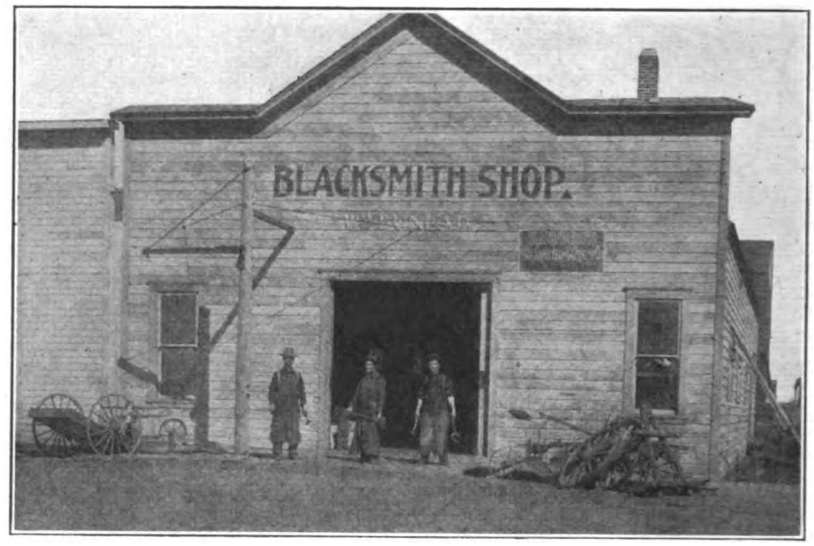
a horse's foot was fastened to the canon bone by two holes in the heel and one in the toe. I have the bones from a two-year-old colt's foot and I immediately got them and set them up, but could not find the holes, so concluded that perhaps the bones being from a young horse the holes had not grown; it would be quite a stretch of imagination to bring the shell up onto the canon bones. The facts are, the wall is connected to the coffin bone by the laminae, which is a thin, strong, elastic fiber that is firmly attached to the coffin bone and the wall of the foot (here is where the horse founders). I have given the anatomy of the foot several times, but will repeat.

Beginning at the knee, going down, we have the large canon bone, small canon bone, coronary bone, coffin bone and the navicular bone which is back and under the joint of the coffin and coronary joint. These bones are held in place partly by three tendons, one in front, fastening to the coffin bone. This tendon holds the toe up and causes the foot to come to the ground nearly flat. Now, trouble with this cord is one of the greatest reasons why horses stumble. One cord at rear of leg runs down next to bone and holds the sesamoid bones in place near the ankle joint, then going on down and fastening to either side of ankle near the middle. This tendon moves the ankle joint. Another tendon runs down the rear of the leg and fastens to the bottom of the coffin bone. That causes the coffin joint to move as the horse rolls up on his toe as he starts to take a step.

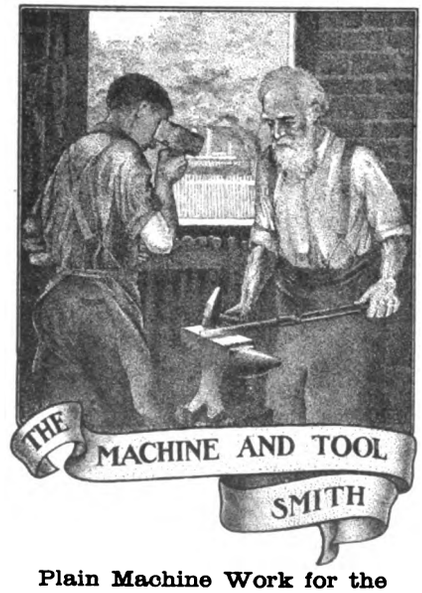
Speaking of corns, my experience has been that they are hard things to cure, except by long and careful treatment, beginning at the coronary band and blistering and growing new hoof from the tissues that are situated there.

There are three kinds of corns, the dry, the moist and the suppurative. The corn is caused by a number of different conditions; failure to keep the heels cut down being first. High heels cause contracted heels, and from this you may continue counting numberless troubles that would not have existed had the heels been kept cut down as they should have been. Here the old adage proves true again that "An ounce of prevention is better than a pound of cure."

The direct cause of lameness from corns is the shoe causing undue pressure. For this pressure there are several reasons. First, the preparation of the foot for the shoe; second, a long heel calk and, third, a calk on a light shoe that possesses no bar. My way of shoeing for corns is to first cut out the corn, fill the hole with cotton, and over the cotton melt rosin. I use a bar shoe flat, and make the outside of hoof and frog carry the load and relieve the concussion of the inside quarter. Now, blister the coronary band, soften up the outside shell and, soon, the corn will cease to trouble.



MR. WM. DUNLOP RUNS THIS OREGON GENERAL SHOP



Plain Machine Work for the Blacksmith—6.

GEORGE CORMACK, JR.

The larger part of the work done on the drill press is the drilling of holes in the parts of machines so that they can be fastened together by means of bolts, studs, cap screws or machine screws. By many who have never had the advantages of a thorough practical mechanical training these different methods of fastening are usually grouped under the general term of bolts, and as we are now to take up the drilling of holes in machine parts it might not be amiss to give a brief description of these. Fig. 1 shows the different fasteners in common use. At A is shown what is known as a machine bolt; such bolts are made with either square or hexagon heads and fitted with square or hexagon nuts. They are made in sizes varying by sixteenths up to $\frac{5}{8}$-inch diameter, and then upwards by eighths. B is a carriage bolt; the head is rounded and smooth, whilst under the head for a short distance the section of the bolt is square. As these bolts are usually intended for fastening wooden parts together, the square shoulder cuts into the wood and keeps the bolt from turning whilst the nut is being tightened up. These carriage bolts are made in the same sizes as the machine bolts and are fitted with either square or hexagon nuts. Both machine and carriage bolts are threaded with standard thread pitch, but the diameter of rough bolts is slightly over the standard size, and what are known as bolt taps and dies cut threads from $\frac{1}{64}$ to $\frac{1}{32}$ over size. At C is shown a stove bolt; these are made only in small sizes, from $\frac{1}{8}$ to $\frac{3}{8}$-inch diameter. The heads are either flat, countersunk heads, as at C, or round heads, as at D; in either case a screwdriver slot is provided in the head. The pitch of the thread on stove bolts is slightly coarser than standard pitch, and is never a full thread. The nuts are thin and are not chamfered on on either side, and are a very loose fit on the thread of the bolt. E and F are square and hexagon-headed cap screws. G is a flat head cap screw, and H a fillister-head cap screw. All cap screws are turned to standard size and the threads cut standard pitch. E and F are

commonly used where the projection of the head is permissible, but where the head has to be sunk below the level of the surface either G or H is used. In sinking in the head of G an ordinary countersink is used, whilst H is sunk in with what is known as a counterbore. Cap screws are not intended to be used as bolts. Where two pieces are fastened together with cap screws the hole in one piece is drilled large enough to allow the screw to pass through freely, whilst the other piece is drilled and tapped to fit the threaded part of the screw. I, J, and K are what are known as machine screws; they are really small cap screws, but are never made with square or hexagon head, the heads being either flat, round or fillister, and all are intended for use with a screwdriver. They are used in the same manner as cap screws. Whilst cap screws are made to the fractional parts of an inch in diameter, the same as bolts, and are so designated, machine screws are known by number, every number indicating a certain diameter, the numbers running from 0 to 30 and the larger numbers being the larger screws. Each number has, however, several different pitches of thread, and usually when machine screws are mentioned both the number indicating the diameter and the number of threads per inch are given. For instance, a 10 by 32-inch machine screw means that the diameter of the screw is the size indicated by 10, whilst the pitch is 32 threads to the inch. L, M, N are what are known as set screws. They

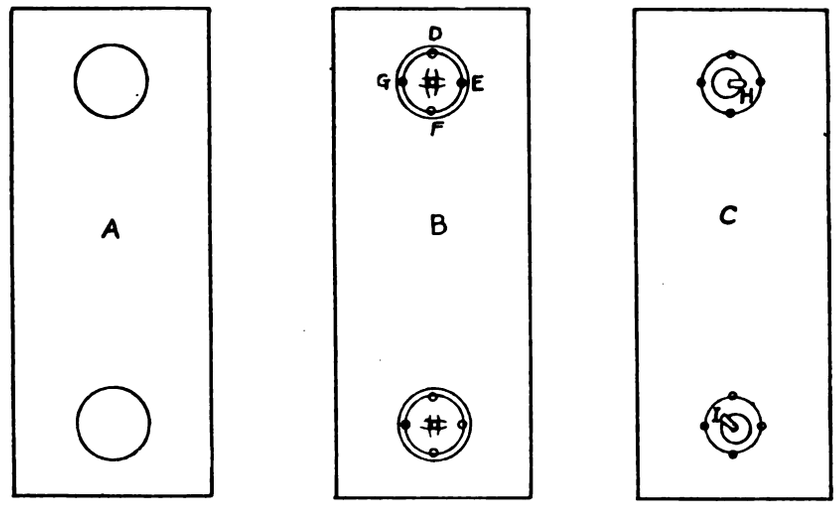


FIG. 2.—HOW HOLES ARE DRILLED FOR SCREWS

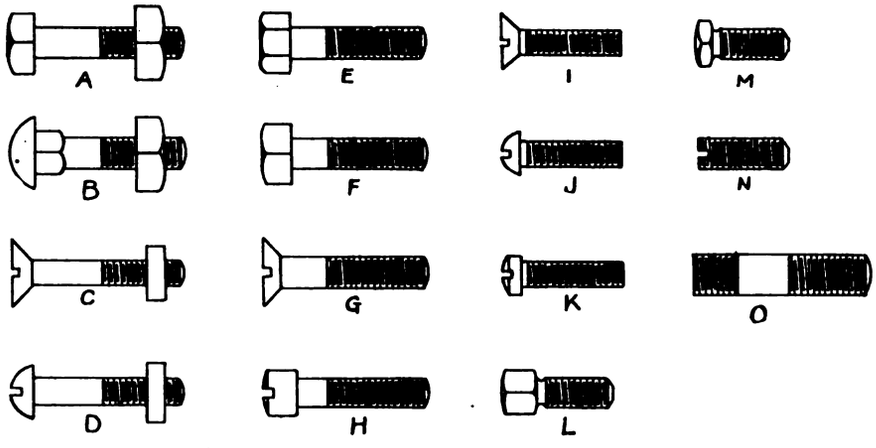


FIG. 1.—ILLUSTRATING THE VARIOUS STYLES OF SCREWS

are used practically as clamping screws, chiefly for fastening pulleys and other machine elements to round, smooth, cylindrical parts, such as shafts, etc. L is the common set screw with full-length head, M shows what is known as a half head set screw, whilst N is called a blind set screw, having no head, only a screwdriver slot. The blind set screw is intended for use where the projection of the head is objectionable. All set screws are casehardened, and as their holding qualities usually depend on the pressure of the point against a surface the point is generally made of a cup-shape, and the sharp edges of this cupped point cut into the surface against which it is pressed. At O is shown a common stud and is the best and most mechanical method of fastening the different parts of a machine together, if it is possible to use it. Where two pieces are to be fastened together by studs one of the pieces is drilled and tapped to fit the shorter threaded end of the stud, whilst the other piece is drilled large enough for the body of the stud to slip through, and a nut, or a nut and lock nut, is used on the outer or longer threaded end of the stud. The shorter threaded end of the stud is usually threaded slightly over size, so that it fits the tapped hole snugly, and in studs this is known as a "steam fit," whilst the outer end is threaded standard size, or slightly under, and is called a "nut fit." Studs are made in all standard sizes the same as bolts, only the diameter of the threaded parts is standard size in diameter instead of being over size, as is the case with bolts.

In drilling holes for holding the pieces of a machine together, where cap screws, studs or machine screws are used, it is evident from what has been said that the holes in one of the pieces must be larger than the holes in the other and that two different drills must be used. Of these two drills the larger is known as the "body size drill," and the smaller as the "tap drill." The body size drill must be at least the same diameter as the body of the screw or stud, and in most cases a drill slightly larger is used, depending on the character of the work. In rough work when screws or studs over $\frac{1}{2}$ inch are used it is not uncommon to find that a body size drill $\frac{1}{16}$ inch larger than the screw or stud is used, but usually where a good job is desired a $\frac{1}{64}$ or at most a $\frac{1}{32}$ is all that will be allowed over size in the body drill. Where a body size drill the exact diameter of the screw or stud is used it is not such an easy job as it looks to get a number of holes to line up so that the screws will go in, and it requires considerable skill to make a good job. The tap drills for the different standard sizes of cap screws, studs and set screws are given below.

Size of cap screw.	Size of tap drill.	No. of threads per inch.
$\frac{3}{16}$	$\frac{5}{32}$	24
$\frac{1}{4}$	$\frac{13}{64}$	20
$\frac{5}{16}$	$\frac{1}{4}$	18
$\frac{3}{8}$	$\frac{5}{16}$	16
$\frac{7}{16}$	$\frac{23}{64}$	14
$\frac{1}{2}$	$\frac{13}{32}$	13 & 12
$\frac{9}{16}$	$\frac{15}{32}$	12
$\frac{5}{8}$	$\frac{17}{32}$	11
$\frac{3}{4}$	$\frac{41}{64}$	10
$\frac{7}{8}$	$\frac{3}{4}$	9
1	$\frac{27}{32}$	8

It is impossible to give the tap drills for the legion of machine screws; these are, usually given in drill and tap catalogues.

We will now take up the different methods used in drilling the holes in two pieces of metal intended to be fastened together by means of bolts, cap screws, studs or machine screws. In Fig. 2 we will assume in the first place that the two plates A and B are to be fastened together with bolts. In such a case the easiest way to proceed is to lay the holes out on plate A, marking the center of each hole heavily with a large center punch; clamp the two plates together and drill through both plates with a drill slightly larger than the bolt. If, however, it is intended to fasten them together by either of the other fasteners a different method will have to be pursued. We have seen that where pieces are fastened together with studs, cap screws or machine screws, two drills of different diameters have to be used. In drilling the two plates A and B so that they can be fastened together with cap screws the simplest method, providing the circumstances will permit of its being done, is to clamp the pieces together the same as before and drill right through both pieces with the smaller or tap drill; then unclamp the pieces and redrill plate A with the body size drill. Plate B can then be tapped and the screws inserted. In many cases such a method of drilling is impossible, and very often the holes may be already drilled in plate A. In such cases clamp the two plates together and, using the body size drill and the holes in plate A as a guide for the drill, drill into plate B a little way. The drill should be run into B a little less than the depth of the drill point. Then the body size drill should be replaced by the tap drill and plate B drilled clear through. It is a good plan in tapping such holes to have the plate clamped together whilst the tapping is being done, the body size hole in the upper plate acting as a guide to keep the tap straight and square with the work. Very often when doing work of this kind where there are quite a few holes in the pieces to be fastened together one hole is drilled and tapped first, and the two parts fastened together with a cap screw instead of a clamp, and then all the rest of the holes are drilled and tapped.

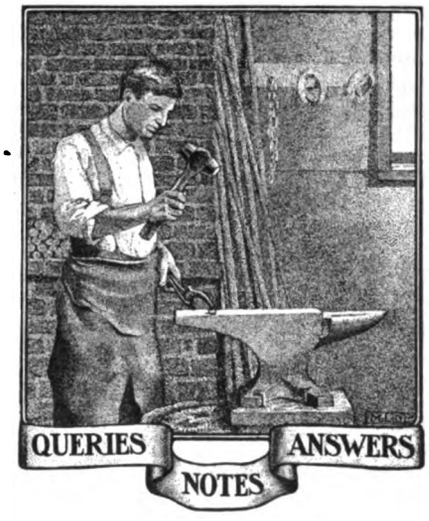
Another class of this kind of work, and one which doubtless the repair man often runs up against, is where two pieces have to be fastened together by means of studs, cap screws or machine screws, and where the shape of the pieces and the surrounding elements of the machine prohibit the clamping of the two pieces together and the holes have to be scratched and laid out. In the other methods I have already described it was almost impossible to get the holes out of line, but when the holes have to be scratched and laid out, the alignment of the holes will depend on the skill of the workman. We will take the two plates A and B and imagine that they are of some shape which prohibits the clamping of them together, and that they require to be fastened together with cap screws. In the first place the holes in A are laid out and drilled with the body-size drill. The surface of B where A is to be attached is rubbed over with a piece of chalk. A is applied to B and located in the right position, and whilst firmly held in this position a sharp scratch awl is used to scratch the location of the holes in A on the chalked surface on B. This is done by putting the scratch awl point into the holes in A and working it around the circumference of the holes. When A is removed from B the location of the two holes will be represented by two circles of the same diameter as the body drill. As the holes in B are to be tapped, the holes have to be smaller than those at A. The first thing to do after scratching the holes is to take a compass or dividers, set a little larger than the radius of the scratched circle, to describe four short arcs around the center of the scratched circle, as shown at both holes of plate B. This is done by using points D, E, F, G in the scratched circle as centers. The object of this is to approximate the center of the scratched circle. It is far easier to guess at the center inside the little square made by the intersecting arcs than it is to guess at the center of the circle without them. A very light center punch mark should be made at what is supposed to be the center of the scratched circle; tested by setting the dividers to the radius of the scratched circle and swinging it around from the supposed center. If the center is not quite central, move it with the center punch until it is central. It must always be remembered to make the first center punch mark very light, because every time you move it it will get deeper. When you have located the center of the scratched circle, set the divider to half the diameter of the tap drill and describe circles of this diameter inside the scratched circles. With a small center punch make four or more light center punch marks on the circumference of this circle, as shown on B and C, and with a large center punch drive in a larger center punch mark in the center of the circle. B is now placed on the drill press table, and the center of a hole located under the drill point, the drill used being, of course, the tap drill. The drill is just started into the work and is then withdrawn and the work examined to see if it is really starting central with the scratched circle. Very often it will be found that the drill is running off to one side, as shown by plate C. In such cases the drawing chisel described in a former article is used to cut a small groove in the side of the hole made by the drill point, as shown at H and I. The effect of this groove is to make the drill crowd towards the side where the groove is cut when the drill is again applied to the work. These corrections by means of the drawing chisel may have to be made more than once, but they must be all made before the point of the drill gets below the surface of the metal. The small center punch marks in the inner circle are to indicate the position of this circle after the chips have obliterated it, and when the drill has entered the metal past the point these center punch marks should be cut in



A GENERAL SMITHY IN THE ORANGE RIVER COLONY, SOUTH AFRICA

two if the hole is central, and should be so apparent around the edge of the hole. This method of scratching out holes should never be resorted to if the holes can be transferred by the other methods. It is a method which requires skill and experience for its successful accomplishment, and where there are even three or four holes in the pieces and it is necessary that the bodies of the screws fit the holes exactly it is a job which only a skilled workman who realizes the difficulties involved can expect to accomplish.

(To be continued.)



Welding Instruction Desired.—I would be grateful if someone would instruct me how to weld a buggy axle, as one of the best blacksmiths in this vicinity has tried to weld one, but failed, and I would like to try my hand at it after having received instructions on welding.

P. G. BIBLE, Georgia.

Mending and Welding Questions.—I would like to ask, through these columns, for information concerning the best way to mend a cracked bell. I would also like to know how to weld copper. I have much of it to do, but I braze it and I would like to get a good recipe for welding it.

W. C. HARRIS, Australia.

Who Has Used Them?—I would like to ask in these columns whether any brother has the Famous Universal Woodworker, made by the Sidney Tool Co., Sidney, Ohio, or the Crain Combination Woodworker, made by the Buffalo Forge Co., Buffalo, N. Y., and how he likes the same.

FRANK A. HARRIS, New Jersey.

Paper Horseshoes.—Having heard that compressed paper horseshoes are in use in the United States by the cavalry and civic mounted police corps, I wish someone who is well acquainted with this subject would kindly inform me through these columns, or otherwise, where they are to be had, their cost, etc.

D. O. SULLIVAN, Quebec.

Tempering Method Desired.—I would like to see an article on the best method for tempering wagon springs. I know a few ways, but would like to hear others' opinions. I would also like to see something on coach building, if my brothers would be so kind as to give me the benefit of their experiences.

W. H. STEVENS, New Zealand.

Price List for Lathe Work Wanted.—Will some reader of "Our Journal" kindly submit a price list of lathe work? Some brother can, no doubt, give me an idea as to prices of different work done on a metal-working lathe. I have just put in a new lathe with a twenty-inch swing and a fourteen-foot bed. I am absolutely in the dark in regard to prices.

L. D. SANDERS, Missouri.

Painting Information Desired.—Will some brother kindly give me, through these columns, some good hints on painting carriages and vehicles, the finest make of paint, the method of mixing for best results and the best way to rub down to cause a smoothness and glossiness, as I am a new beginner in the painting line and would like to get full particulars for best work.

G. Q. MORRIS, Georgia.

Rifle Query.—Could anyone tell me the best way to fix a rifle in which the shell sticks? S. HOLDEN, New Mexico.

In Reply.—If the breach is a little narrow for the regulation shell ream it lightly, being careful not to make it too large. Perhaps the part into which the shell fits is a bit rusty. If so, a thorough cleaning will fix it. J. F. V., Illinois.

More Concerning Magnetized Punch.—In answer to Frank J. Casey, of Nebraska, on the subject of the magnetized punch, will say that any punch will become magnetized if held at a slant of ninety-five degrees to the north. Grasp the punch on the end, slant to the north on an anvil and hammer fast, and it will become magnetized. I tried it and it picked up a number of horseshoes easily. THOS. ASHLUND, Michigan.

Wants Information on Power Hammers.—I would like to see dies for hammers shown and explained in these columns—dies such as are used in railway works under the power hammer; also explanations of drop forgings, stampings, and how this work is done generally under the hammer. I should like someone to explain the forging of axles, both cranked and straight for carriages and auto cars, and, in fact, any kind of work done under the power hammer.

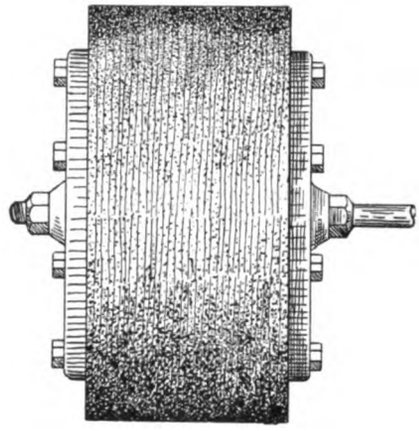
BERT. BAKER, England.

Horseshoeing Remedies Wanted.—I would be glad if some brother would favor me with their remedies for shoeing horses and mules that strike with their hind feet. The hind shoe will strike under the bottom of the front shoe. Also, tell me how to prevent a horse from stumbling in his front feet. I have a horse that stumbles in one front foot and I have tried several ways to prevent it with no success. Will someone kindly help me? G. Q. MORRIS, Georgia.

Horseshoeing Inquiry.—I have a lame mare that appears to be "sore footed," and I cannot do her any good shoeing her. When standing, she constantly changes her feet. In trimming the foot, the sole appears to be too soft. This is the third case of this kind I have had; one of which every horseshoer in this community failed on. The feet appear to be in first-class shape. If any one can offer any information on this subject it will be highly appreciated.

J. T. COMPTON, Alabama.

Filling Automobile Wheels.—I would appreciate it if some good brother would inform me of the best method of filling automobile wheels for best results, as I have to make spokes by hand, and find it a difficult matter to make spokes remain in hub until I get the tire on. The flange will not hold spokes tight enough until I can get the tire on. The spokes attempt to draw out when I begin putting on the rim. I will be grateful for any information on this subject. G. Q. MORRIS, Georgia.



HOME-MADE POLISHING WHEELS

Letter from New Mexico.—I have been a reader of "Our Journal" for about three years, but have been working at the blacksmith trade for thirteen years. I have machinery and tools consisting of: one three-horsepower Fairbanks-Morse gasoline engine, which gives excellent satisfaction: one Perfect power hammer: two forges, one Champion No. 400, the other Royal H. Western Chief: two anvils, one American, 157 pounds, the other Hay-Budden, 153 pounds: one Moie tire setter: one emery stand of my own make: one drill stand: two vises, one 100 pounds, the other, 35 pounds. OTIS DUKE, New Mexico.

Home-Made Polishing Wheels.—Answering the question of Mr. Charles Potter, in the April issue of "Our Journal," in regard to home-made polishing wheels, would say that he can make very good wheels by getting a lot of discarded cardboard boxes from some clothing store, then cutting two circular plates out of No. 16 or 18 sheet iron, about two inches smaller than the wheel desired. Drill about eight ¼-inch holes near the edges to correspond in both plates. Pile the cardboards together; then lay one plate on top. Bore the holes through the paper and insert the bolts, turn wheel over and place the other plate opposite and bolt together. Then drill center hole to fit spindle. The surplus paper can be cut off with the sharpened point of a file, and wheel turned smooth while in motion. By using a grade of good glue, this makes a good cutting wheel when faced with from No. 18 to No. 24 emery. For very fine polishing, the wheels should be filled with canvas and fine emery used.

A. H., Minnesota.

Steam Automobiles.—I would like to see in these columns information on the steam automobile, concerning its construction and running principle. J. C. ROSEN, Colorado.

In Reply.—A description of the White Steam Car will appear in our automobile department in the near future. If any

readers desire descriptions of any other special makes of cars we will endeavor to publish such descriptions as soon as possible after they make their wants known.

THE EDITORS.

Prices Desired.—I would like to see, in these columns, a list of New York State prices, i. e., the prices of horseshoeing, wagon work and sleigh work charged by the horseshoers' and wagon-workers' union.

P. H. BROWN, New York.

In Reply.—Prices on shoeing and vehicle work in New York State differ in the various sections, and one price list would not give a fair idea of what smiths in all sections are getting. Perhaps some New York State smiths will send in their lists for Mr. Brown. TRAVELLER, New York.

The Oldest Horse.—I would like to say a few words to the boys in regard to old horses. We shod, today, a horse that is,—or will be,—thirty-three (33) years old this spring. Can any one of the boys beat that? If so, let us know, as we would like to know where the oldest horse is that is doing service for his owner.

The horse mentioned is a well-bred driving horse, gray in color, weighs about 1,050 or 1,100 pounds and is now used at light ranch work at times, to fill in as an extra for a few hours at a time. He is in good flesh and may live quite a while yet.

BECK AND COLE, California.

More Co-operation Needed.—I am well pleased with THE AMERICAN BLACKSMITH and would say that I like it the best of any paper of the kind that I have ever seen. The plan of the stamp label is a most excellent plan to get the hardware men and the poor laboring blacksmiths together on business principles. This co-operation is needed badly here, as the blacksmiths are so distant towards one another, and I would delight in seeing them co-operate and become as one man. Our little town has something like twenty-five hundred inhabitants, four shops and a good country surrounding. The shops are all good ones for repair work.

J. E. MCNEELY, Arkansas.

A Few Words from Texas.—I am a new man in the shop work—have been at work five years—and I get a great deal of help from "Our Paper" every time I look it over. I have a good trade, and, although I have a man to help me, we get more than we can do at times.

I find that some work done by other smiths would not do in Texas and I suppose my work would not satisfy them. I wish the brothers would write on this subject. We could do each other so much good through "Our Paper" if we only would. I very much like the plan of coming together on the matter of prices. Organization is what is greatly needed in Texas.

S. H. CALDWELL, Texas.

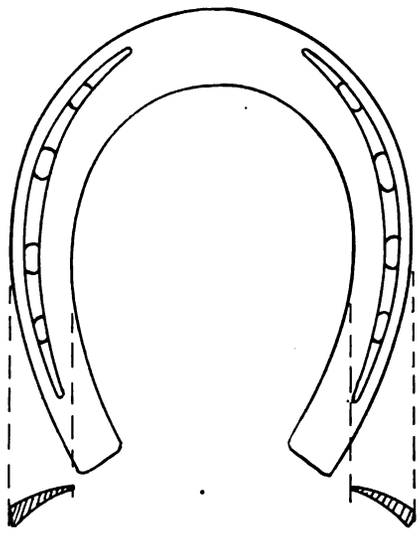
Concerning Dry Cells.—What is the weight of sal-ammoniac per gallon of water used for soaking batteries? I have renewed many dry cells with salt, but sal-ammoniac is better and runs longer.

L. P. LACOSTE, Quebec.

In Reply.—The sal-ammoniac solution should be made by dissolving all the sal-ammoniac that the water will take up. In other words, make the solution just as strong as possible. You will find that after a certain amount of the sal-ammoniac is dissolved, any more added to the water will remain as crystals.

H. J., New York.

Concerning Sparking Points.—In answer to A. T. Henwood, Ontario, in the March issue, just drill a $\frac{3}{16}$-inch hole where the point should be, then take a twenty-penny spike and make points and braze them in. They are a little soft and will wear out in six months or a year, but when they do, put them in the fire and melt the brazing, push them out with a scratch awl or wire and put in new ones. We have used fork



SHOEING FOR DROPPED SOLE

prongs to make points, but they get so hard after they are used about a year that they do not make good sparks, and making them of files yields about the same results. So we think spikes are best and use them altogether. D. M. LOVE & SONS, Iowa.

Shoeing for Dropped Sole.—In reply to Byars Bros., regarding how to shoe the foot with the sole lower than the wall, I would say that if they will take a shoe that is quite wide and concave it on the bottom side enough to let the wall take most of the bearing, I believe they will not have any trouble, providing the owner will have the horse shod often. I had a case some time ago very much like this and by shoeing this way the horse was able to travel without going lame. I will try and give you an idea of the shoe in the diagram.

The shoe may be used either with or without calks and if this does not give entire satisfaction, try a bar shoe and concave it the same way. If the horse is worth shoeing keep trying and you'll succeed. "Don't give up the ship."

J. I. R., Virginia.

A Letter from New Mexico.—I have never written to "Our Journal," but have been a reader of it for about a year and like it immensely. I never spent a dollar I enjoyed any better than I have enjoyed this dollar's worth,—reading the Journal at night. We do a great deal of work. We are two brothers in business together, and run a country shop sixty miles from the railroad in a little farming belt in the mountains. Our shop is forty-two feet long by fourteen feet wide, and we run a grist mill and are going to put in a flour mill this fall. Our blacksmith business runs from $100.00 to $150.00 a month, and there is no other shop within forty miles of us. NOLEY POWELL, New Mexico.

Another Word About Trade Schools.—Just another word to the boys, this month, about trade schools. When you get THE AMERICAN BLACKSMITH and your supply of pink stamps, do not forget to write your representative in Congress; and be sure to put one of those stamps in the corner of the envelope or letter. Keep hammering away at them until we get what we want.

They cannot get along without us blacksmiths and iron workers. We have to forge the tools for all the others, so I suppose we will need to lead the fight for better conditions. See the boys in the other trades and get them to subscribe and write their congressmen. Be sure to tell them to use those pink stamps.

E. Z. MARK, California.

Wants a Soldering Solution.—I have a good shop and a good trade, and possess a small stock of dry goods and groceries as a side line which my wife looks after. I would like to ask some of my brethren for a little information on how to make a good soldering fluid, one that can be used when soldering tin, iron, galvanized and enamel ware, also what may be used to clean soldering irons? L. B. PARNELL, Arkansas.

In Reply.—A good soldering acid or solution may be made by placing an ounce of muriatic acid in a two-ounce bottle and add to it one teaspoonful of sal ammoniac. Now drop thin pieces of zinc into the bottle slowly until the acid will dissolve no more zinc and allow to stand. To use, wind a bit of cloth about a stick and swab the acid on the parts to be soldered.

To clean a soldering iron rub it with a common brick that is free from dirt or grease. Or a medium file may also be used. C. A. C., Ohio.

Tempering Screwdriver Bits.—I have been taking your paper for about two years and would not think of doing without it. I would like to have some information concerning the tempering of screwdriver bits. I always have trouble; they are either too soft or too hard. I hope some reader of THE AMERICAN BLACKSMITH will help me out on this.

ERNEST FAILLE, Michigan.

In Reply.—We would suggest that, in hardening your screwdrivers, instead of attempting to harden them in water, as you have undoubtedly been doing, you try oil or, if it is impossible for you to use this, try heating the water. The main point desired in hardening and tempering screwdrivers is to make them tough. Exceptional hardness is not required, as they will not be called upon to do any cutting. The water bath as generally used tends to harden the metal rather than to toughen it; therefore, we suggest that you use oil or use water heated nearly to the boiling point for small bits. We hope our readers will express their opinions on this subject. W. O. B., New York.

Setting the Tire Correctly.—I feel obliged to say, referring to Brother Bain's article on cold-tire setting in the January issue of "Our Journal," that he who is so poor a workman and dishonest enough as a man to attempt to set a tire cold in the condition Brother Bain describes is a poor enough workman and dishonest

enough to try to set the tire hot without doing the necessary work on the wheel to be enabled to fix it properly. Therefore, the criticism would be more just if it were directed against the man rather than the method of doing the work, especially when the method condemned has been tried for some years now, and has been found, when used intelligently, to give results as good and often better than the hot process. Poor and careless workmen have spoiled more patent wheels shrinking tires hot around them than have ever been hurt by practical use in hauling loads beyond their estimated limit of capacity. There is more in the man than in the method. J. T. LAVEIGNE, Florida.

Use of Old Files.—I am situated in the rolling backwoods of Kentucky. I have a five-horsepower gasoline engine, a fourteen-inch grist mill, a band saw, an emery stand, a circle saw and a Brooks cold tire setter, and I do any kind of work that comes along.

Lately, I have noticed several articles touching on the use of old files. I wish to say that I have never found anything better than old files for making small springs, such as main springs for guns, etc. I use a receipt for tempering that I found in THE AMERICAN BLACKSMITH several years ago, and it never fails. Heat the spring to a good red and drop in linseed oil; then pour off all the oil except about half enough to cover the spring. Set oil cup on the fire and let burn until the oil is burnt out; then lay out spring and let cool. I guarantee these springs for all time to come, and I have never as yet had any returned to me. If any brother who thinks an old file will not make a knife or anything of the sort will come over here I will let him shave with a razor made out of a file—then he may look in the glass and see how he looks with a clean shave. E. E. SMITH, Kentucky.

About Raising Prices.—I notice in THE AMERICAN BLACKSMITH that much is said concerning the raising and bettering of prices. It is my honest opinion that if anybody is entitled to good prices it is the horseshoer. But the trouble is, how is he to get them, when the men with whom he deals will not make prices with him? I came to this place two years ago, built a shop and went to work. There were two blacksmiths in the vicinity, and they shod a horse around for eighty cents and removed for eight cents. Well, I shod at the same rate for a few months, and then raised to one dollar around and ten cents for removal. One of the blacksmiths has closed his shop; the other has raised his price to one dollar. And now I get three times as much shoeing as I did last winter. So you see the trouble is that there are people who profess to be horseshoers but cannot do work good enough to demand good prices. They find themselves compelled to work for almost anything, and thus ruin the prices for better mechanics. I should like to see the time when prices will be uniform, for then, blacksmiths will have to be capable or they will be compelled to close up their shops.

JOHN E. MOWERY, Pennsylvania.

A General Shop of Pennsylvania.—We would like to tell you about our new shop. It is a three-story building, except the front. As you can see from the accompanying photograph we are on a steep bank. The first floor is where we keep the engine and the woodworking machinery, and on it, also, are the iron room and the rubber-tire room; the second story is composed of the blacksmith shop, wood room and office, and on the third floor are the paint and trim shop and repository. We possess all the latest up-to-date machinery, and run three forges with a blower. Our old shop, one end of which may be seen in the photograph, is also in use. On the first floor we keep lumber, rims, spokes and shafts; the second floor is for new delivery wagons and second-hand work after they have been painted and need to be stacked up until ready to be set up and run out. We have plans prepared now for an addition to our new shop which we intend to build in the rear this coming summer, if times pick up. It will be a two-story structure, forty-five by sixty feet.

FRY & SON, Pennsylvania.

An Odd State of Affairs.—I would like to cite a rather strange state of affairs. Here in Pfeifer, Kansas, there have been no blacksmiths—why I do not know. And now a blacksmith could not make a living, because nearly every farmer for miles around has bought himself a blacksmith outfit and they do the work themselves.

Several years ago a man could have made good pay had he started a shop in this neighborhood. We tried all kinds of ways to induce a man to start one, but never succeeded. When one came it was always some fellow who had never done blacksmithing or, if he had, was so poor that he had to lean up against a barn to think.

I know one of them landed here and saw that a blacksmith would have a fine location, so he sent his loose change to a "job-lot house," and received a cast-iron anvil, a "rigagig" blower, some "kill-me-quick" thread cutters, a "Jim Dandy" vise, a few cabbage-head hammers and other small articles too numerous to mention. Well, he knew about as much of blacksmithing as Lydia E. Pinkham does. When he got through with this neck of the woods he had ruined most of the farmers' implements and crippled all the horses that he had shod. One night he read about a dope they call tar and feathers, and he thought he had better make tracks. And that was the end of our blacksmiths.

C. A. KRUGER, JR., Kansas.

A Question of Speed.—We are putting up in our shop a two-horsepower International engine which has a speed of 400 R. P. M., and has a pulley wheel of eight inches in diameter by five inches face. We put on our main shaft a 12-inch pulley, which gives the main shaft a speed of 266⅔ R. P. M. Now, we were told by several parties that this was too fast for the main shaft to travel, as it would be liable to stop the engine by heavy pulling. Could some one give us information as to how many revolutions would be the correct number for same to travel? We intend to run at present only an emery wheel, a drill press and a grindstone, but later on we intend to put in a power hammer, saw, and all else that may be needed.

HENRY BOCK'S SONS, Illinois.

In Reply.—According to our ideas a speed of 266 R. P. M. for the main shaft is very much too high. A line shaft for a machine shop is generally operated at about 120 to 150 R. P. M., and for a general smith shop we believe that 175 R. P. M. would be about as high as you should go. To change the speed of your main shaft you may proceed by either one of two methods: place an 18-inch pulley on the shaft, thus bringing its speed down to about 175 revolutions or, if this pulley is too large for the main shaft, use a 16-inch pulley on the shaft and a 7-inch pulley on the engine. This will give you about the same shaft speed.

W. O. B., New York.

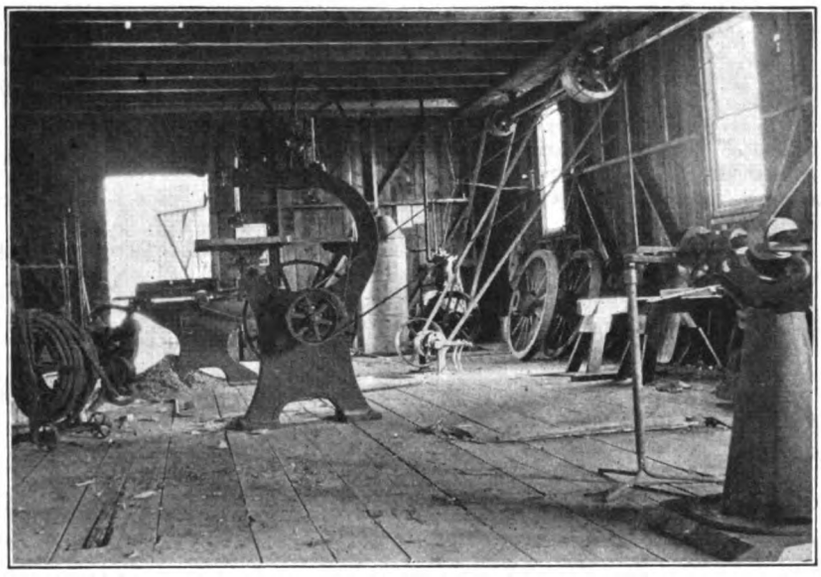
More Concerning the Apprentice Problem.—After reading Mr. E. Z. Mark's article on the apprentice problem I feel compelled to say that Mr. Mark hit the nail on the head. In most cases the boss wants a boy for a slave. I learned my trade with a man in New Jersey. The first year that I hired with him I received one dollar and a half a week, and board, up to Saturday night. Then I had to go home to Paterson, N. J., and get my washing done at home, and my car fare was thirty-five cents out of that one dollar and a half. That left me one dollar and fifteen cents with which to buy my clothes. Then, also, my boss kept a horse and I had to take care of his



THEY ARE PLANNING FOR STILL MORE ROOM

horse and wash his wagons and clean his harness, cut and gather his hay, cut all the wood for the house, go to the store for his wife and help her clean house in the spring and the fall, take care of their plot in the cemetery and, when the boss went fishing for two or three days in the summer and hunting two or three days in the fall, I would be left all alone in the shop. Then there were times when we would go to work in the shop at five in the morning and work until eight and nine in the evening. When my first year was up he would not pay me any more, so I stayed another year. Then I went to Paterson to work in a horseshoeing shop at two dollars a day. Later, I left that place and went West. I have been in business for myself for eleven years and six months, and have been here for ten years.

Now,—as to the apprentice,—he is only a slave. My boss never gave me five cents extra, and if anything went wrong in the shop he would lay it to me. I do not blame any young man for not wanting to learn the blacksmith or horseshoeing trade. It is very hard and dirty work, and it is a trade about which everyone else thinks he knows more than the blacksmith himself does. ERWIN W. SMITH, New Jersey.



POWER MACHINES HELP THIS SMITH TO EASE HIS LABORS

An Arkansas Power Shop.—The accompanying picture shows the power corner of my new shop. I just moved into it, and have not yet straightened it out. There are three other shops here, but I am gaining ground, and do not cut prices to do it. I just do my work and forget the others. What takes, these days, is to do quick work and not keep a customer waiting. Prices are quite reasonable here—not very high, but enough to enable a smith to make a fair living and to save a few dollars for that "rainy day," if he be careful and industrious. I charge $1.00 for four new shoes and $1.25 for toe shoes, other work in proportion.

W. A. ROBERTS, Arkansas.

Those Fifty Lister Lays.—Mr. G. B. Jewett, in the March issue of "Our Journal," page 154, in referring to our Kansas brother, Mr. J. D. Couch, says: "Will say for him he has put it too low at fifty lays in a day." He also says that if I will come out there he will "put me next." I would like to say to Brother Jewett that I have not run a peanut roaster all my life and that I have worked against the best plow man in the State of Nebraska, and that I have the name of being the fastest, the finest and the best workman. Please sound on that a while. I find that Nebraska is a kind of a hot-air state, with occasionally a cold wave like Kansas. Now, to be plain about the matter, I would like to know what manner of shape a lister lay would be in after being heated hot enough to draw out in two heats. Mr. Jewett must have a form to fit them on after they are drawn so he can get them back on the lister. The trouble with Mr. J. D. Couch is that, in his article, he did not state how he drew his lays, whether with a hand hammer or with a power hammer. If he had, it would probably have made some difference with the appearance of his article; but, judging from the way in which he wrote it, anyone who had a particle of knowledge of sharpening lister lays would make light of it. I am not the only one of the back numbers as Mr. Jewett calls it. I would like to call his attention to the article by Mr. H. F. Wills, on page 148, of March, 1910, in which he says, "Certainly gave me occasion for a hearty laugh. I find myself much like Mr. C. W. Metcalf, of Iowa," also, I would like to say before I close that I had a customer for whom I worked for several years; when I sold out and moved a distance of seventy-two miles he would bring his plow lays to me every spring to get them sharpened. He was a good deal like an old brindle cow we once had,—she would swim a lake forty rods wide to get a drink. C. W. METCALF, Iowa.

On Figuring Costs.—I would not be without THE AMERICAN BLACKSMITH for ten times its cost, especially now, when it seems to take up the question of the cost of doing business. Kindly allow me to say that this is a subject that has not received enough attention. In the March number was an article on "Keeping Track of Business," which is the first and most important in figuring the cost of doing business.

I think the blacksmith ought to keep a cost accounting system, for they need it as badly as all other forms of business that require it. This system of guessing at prices must be stopped. This is the only cause of the failure to make money of most of our blacksmiths.

I would like to give you my little experience concerning the cost of doing business, and I hope that this subject will be pursued for some time by the publication of the ideas of our Editor and others more experienced than he or I. I began to look into this matter but a few months ago and, therefore, can still learn a great deal from others.

First, a blacksmith must consider himself a manufacturer, and should keep his records from a manufacturer's point of view. He has to figure chiefly with raw material and labor. Raw material must not be figured at cost It cannot be handled at less than twenty-five per cent above cost. Labor should carry fifty per cent in addition to wages paid: for example, if you pay a man twenty cents an hour, you should charge thirty cents against the work in hand.

Next, you must ascertain what per cent the interest on investment, rent, taxes, insurance, light, heat, power, depreciation on tools and machinery and salary of proprietor carry to the productive account. It can be safely stated that a carefully conducted shop carries an unproductive expense burden of about forty per cent. In other words, if the wages of the shop amount to fifty dollars per week, there should be added twenty dollars for unproductive shop expense.

After all cost has been distributed, there should be added ten per cent to cover all other things that might be omitted or overlooked, and bring the owner out at the end of the year without loss.

I herewith quote you an example of how to figure a repair job.

LABOR.

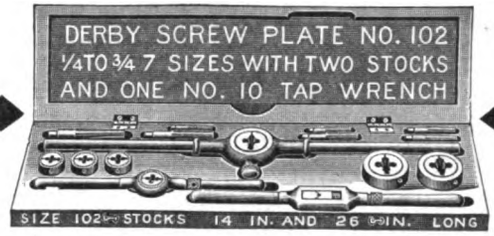
Blacksmithing,	10 hours,	$ .30	$3.00
Woodworking,	14 "	.25	3.50
Finishing,	5 "	.30	1.50
Total			$8.00

MATERIAL.

Oak Lumber	$1.65
Pine "	.35
Poplar "	2.70
Varnish	.75
Hardware	.60
Total	$6.05
Labor	$8.00
Shop expense, 40%	3.20
Total	$11.20
Material	$6.05
Profit, 25%	1.50
Total	$7.55
Labor	$11.20
Total	$18.75
Profit, 10%	1.88
For the job	$20.63

I trust that this will be the means of beginning this most important subject.

GEO. BUSSCHER, JR., Illinois.



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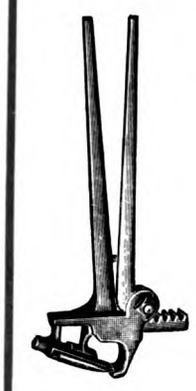

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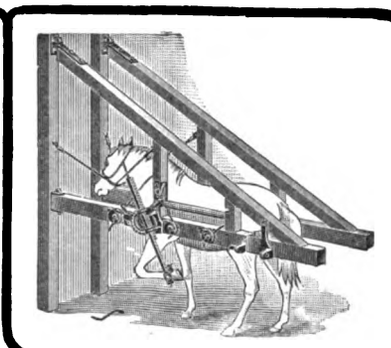

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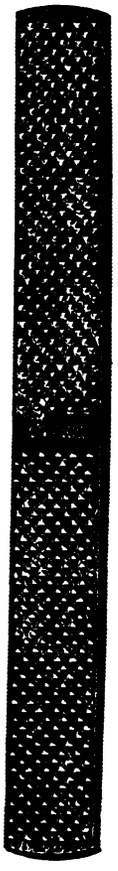

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FOR SALE—Best all around blacksmith shop in county. Very little opposition. Will sell shop, entire tool and machine equipment for $1,300. Write today for further particulars to
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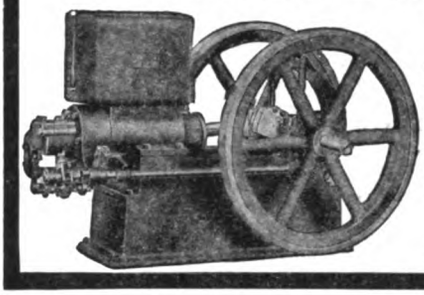

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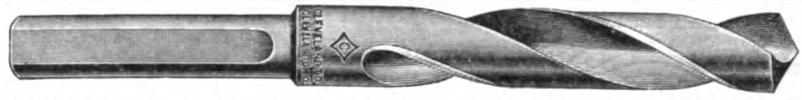

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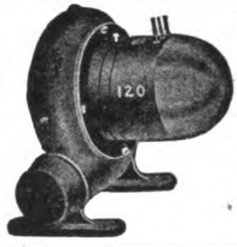

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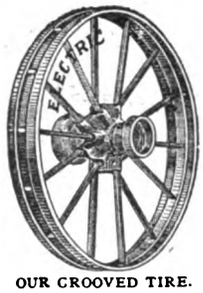

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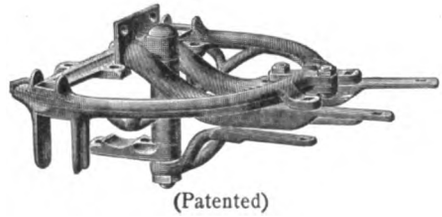

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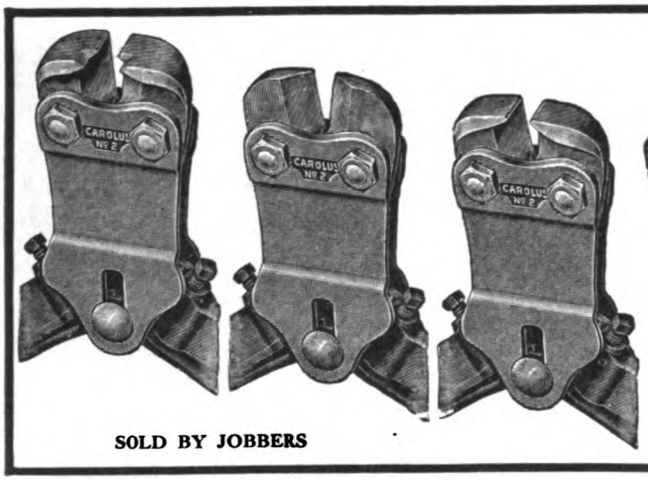



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It has the shape
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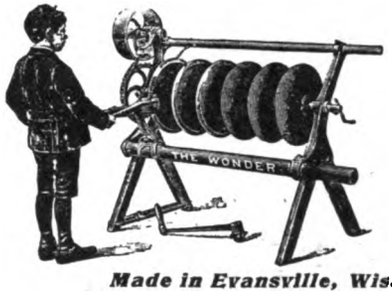

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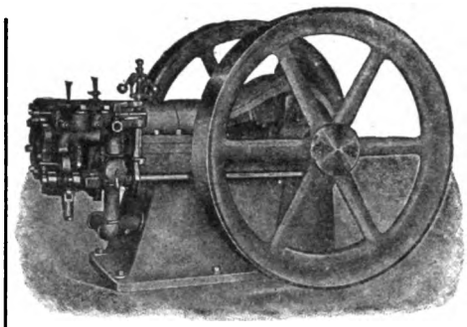

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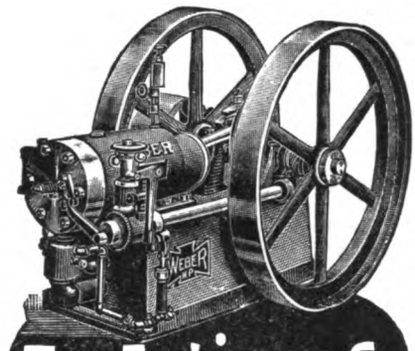

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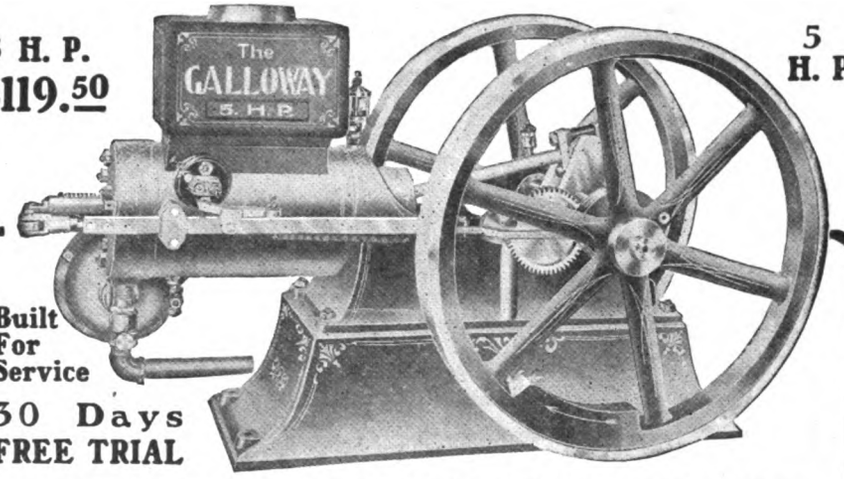

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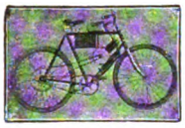

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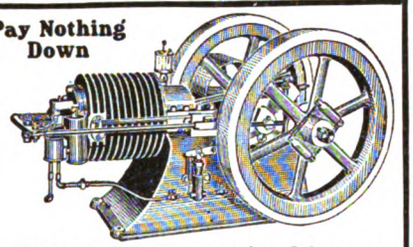

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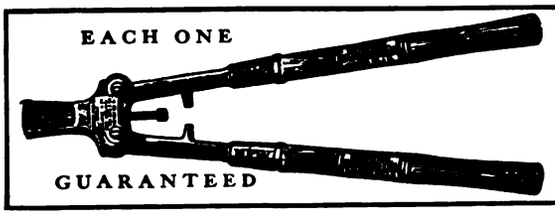

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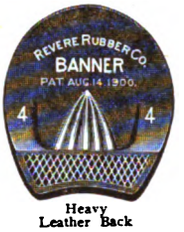

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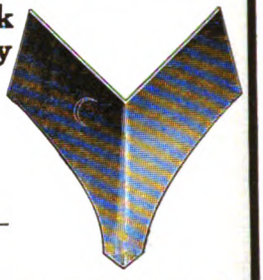

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Makes 25 Different Styles Heel Calks

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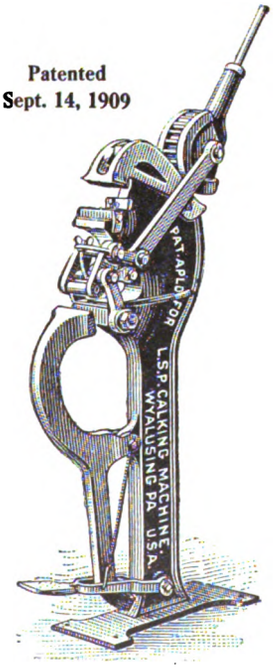

The only Calking Machine that with one pull of lever makes a heel calk complete, blunt or sharp, also makes double kink for the famous block calk, or sharpens side calk, with one pull of lever, welds blunt or sharp toe calks and forms toe clip with one pull of lever, also, has a shear to cut off either end of shoe.

Works equally as well on old shoes. The machine takes up but 8 x 16 inches floor space, and stands 3 feet 3 inches high, and weighs 131 lbs. All the working parts made of a special grade of steel. Fully warranted. Write now for circulars and prices.

If you have any doubt about the machine doing the work, if you will send us 25 cents we will send you a shoe by mail, postpaid, that was calked on the machine, without a hammer or rasp touching it, just as the machine leaves it, and the work of the machine on it will be done in less time than you can think about it (three pulls of the lever), with one sharp heel and one blunt heel calk and toe calk welded and clip formed. That will give you some idea of the work the machine does, and if you order a machine your 25 cents will be taken out of the price of the machine.

L. S. P. CALKING MACHINE COMPANY

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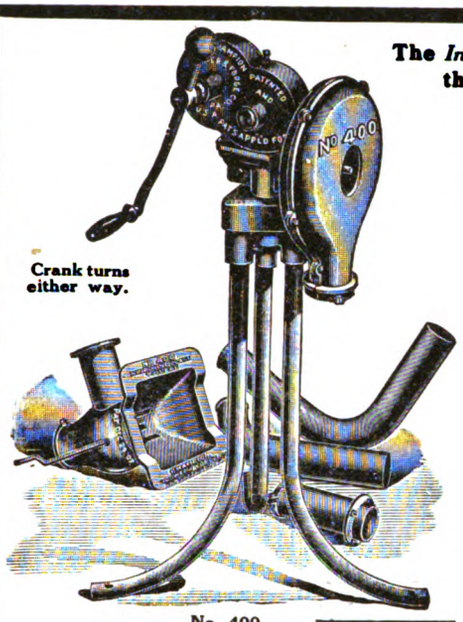

Crank turns either way.

No. 400

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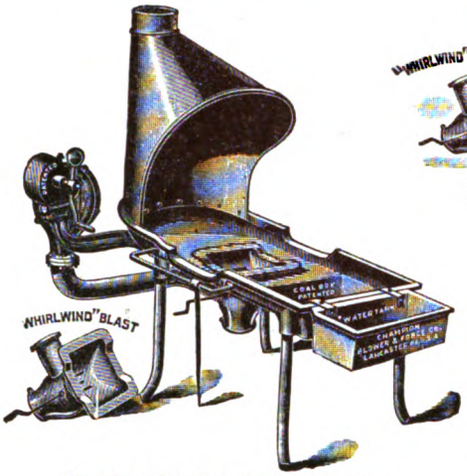
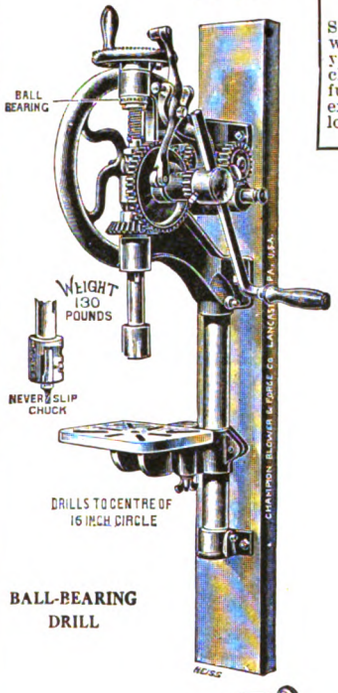


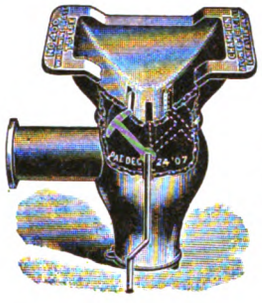
No. 433. Cast Iron Blacksmiths' Forge



No. 408. Steel Blacksmiths' Forge



BALL-BEARING DRILL



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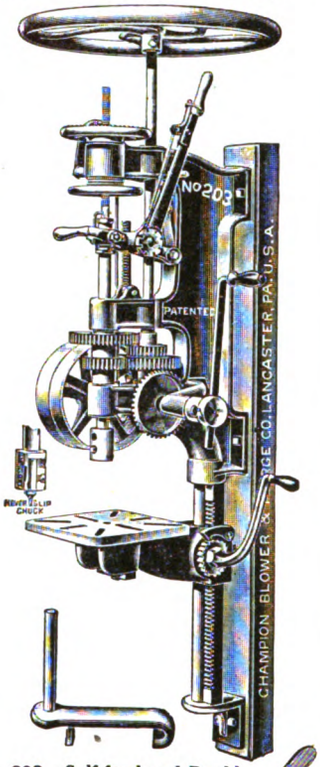
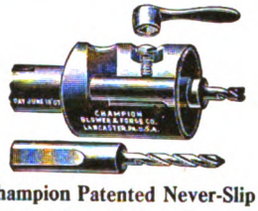
The "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron produces a circular, rotary whirlwind blast and concentrates the heat in the tuyere nest, not permitting it to blow up and out of the chimney, therefore, makes a hotter fire and heats the iron one third quicker, saving much coal.



No. 203. Self-feed and Double Compound Lever-feed Drill.



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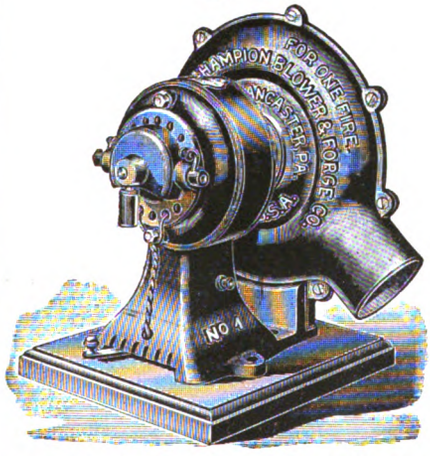

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Screw Plates in four styles, cutting up to 1½ in.

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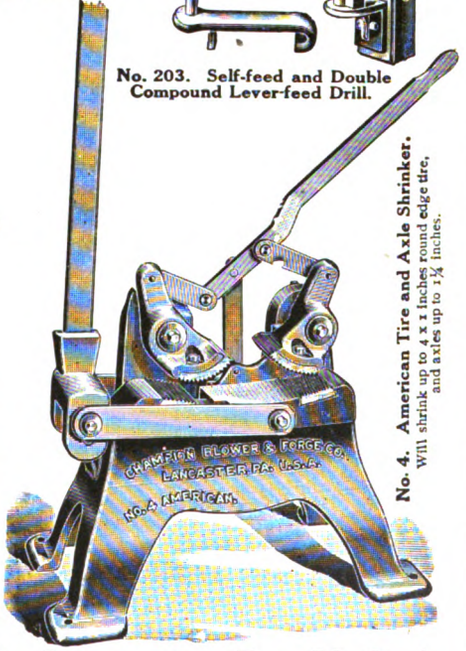

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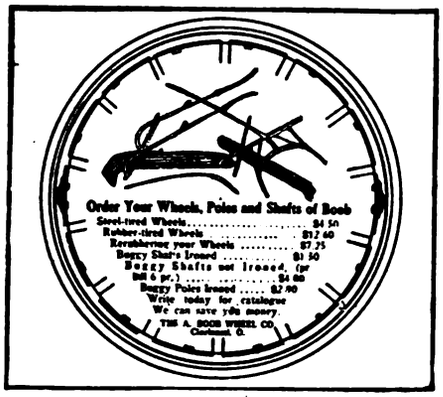



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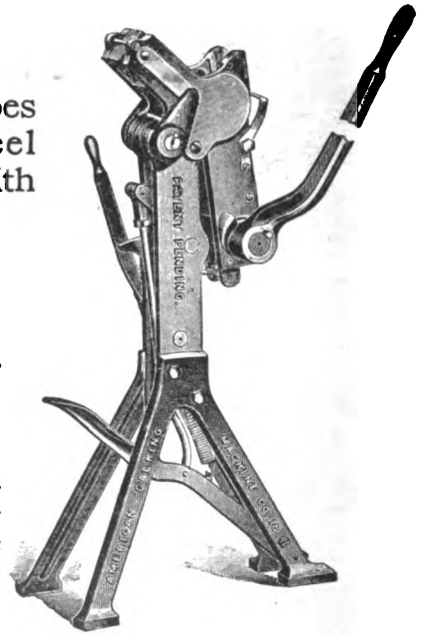

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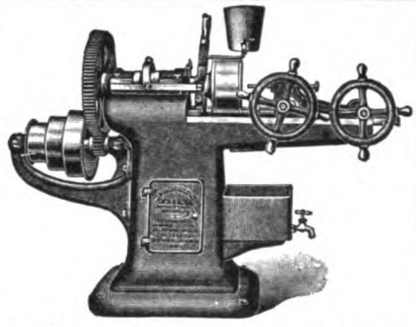

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THE HEAD IS NEARLY EVERYTHING

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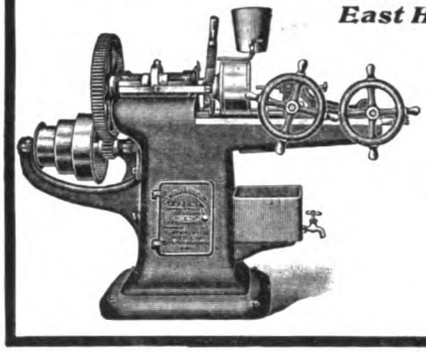

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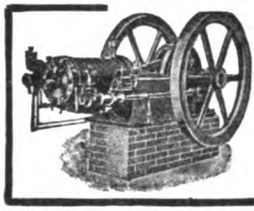

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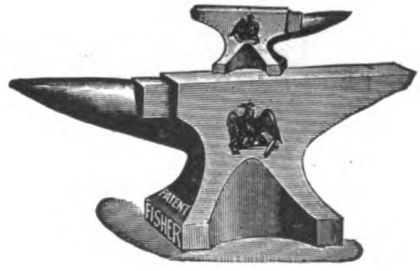

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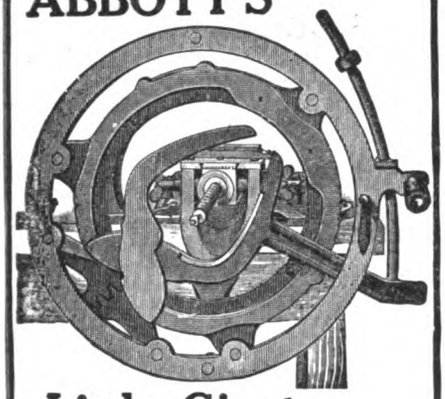

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" 2, 3¼ " 14 "
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Weight per set of 4, 16 pounds.



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Tested thoroughly and guaranteed strictly as represented. Note its great advantages over the old style.

1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.
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3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only a ⅞-in. face.
4. Great time saver. Can be attached to bolster in one fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, write today and ask for prices.

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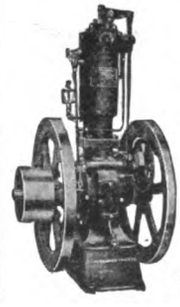

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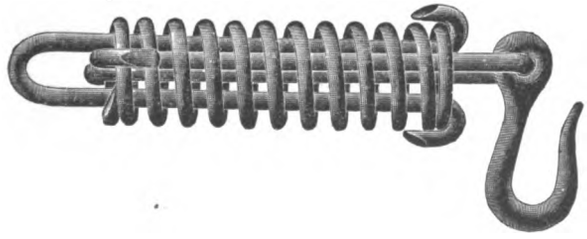

makes the load lighter for the HORSE and the road smoother for the DRIVER.

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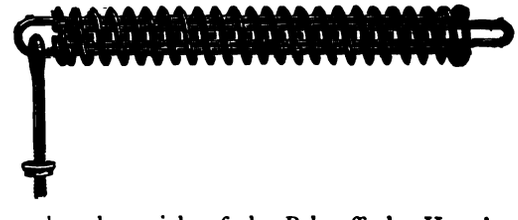

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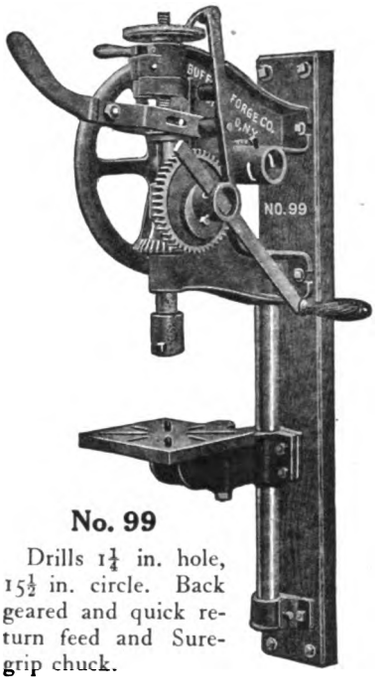
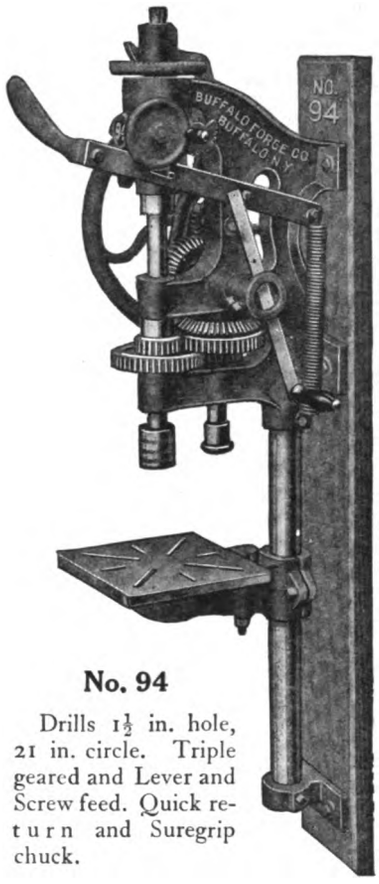
The Only Drills with Ball Bearings at the point of High Speed Friction



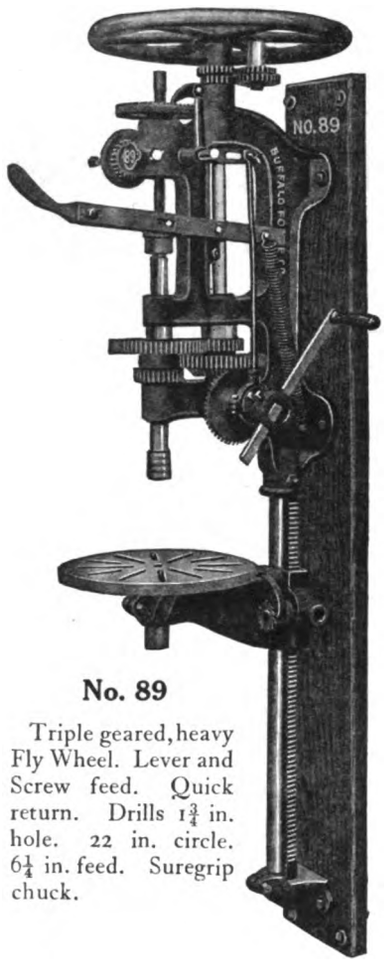
No. 99

Drills 1¼ in. hole, 15½ in. circle. Back geared and quick return feed and Suregrip chuck.



No. 94

Drills 1½ in. hole, 21 in. circle. Triple geared and Lever and Screw feed. Quick return and Suregrip chuck.



No. 89

Triple geared, heavy Fly Wheel. Lever and Screw feed. Quick return. Drills 1¾ in. hole. 22 in. circle. 6¼ in. feed. Suregrip chuck.

You will find these drills easy to operate at their full capacity. The end thrust of the swiftly revolving drill spindle is balanced upon ball bearings. All journal bearings are extra long, bored and reamed in the solid metal of the frame. The gears mesh perfectly. All parts are accurately fitted, and operate without lost motion, back lash, or noise.

A half turn of the small lever at the feed screw head gives hand lever control with

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You do not have to turn back the feed screw or even lift the drill from the work. Think of the time and labor you save. A half turn back instantly and reliably locks the power feed.

Each of these Drills is equipped with

Buffalo Suregrip Chuck

which has no projecting parts to injure your hands or tear your clothing. The chuck positively locks the drill with a half turn of the collar, and without the use of a tool.

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Buffalo, N.Y.



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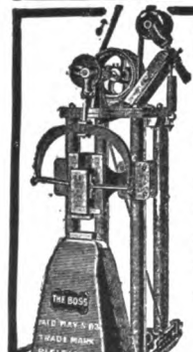

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For Plow Work, Wagon Work, Heavy Work, Any Work.
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DUBUQUE, IOWA.

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To Find Address of any Firm given here, consult their advertisement.

For its location in this issue, see Index on Page 17.

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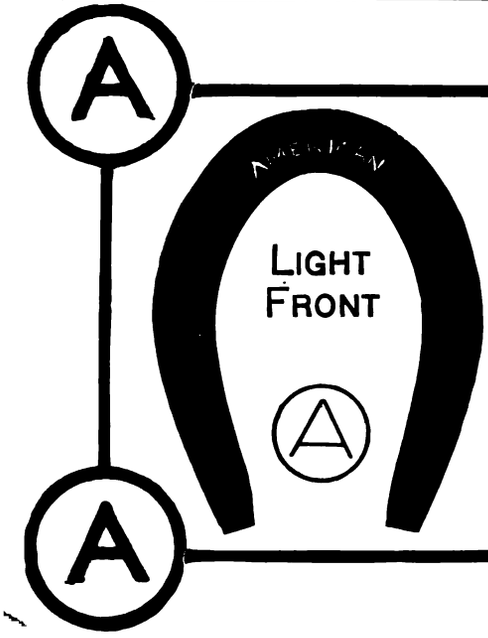

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The most complete line for you to select from. Material and workmanship guaranteed to be the best. Our shoes always give satisfaction.

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Showing all Styles of our Shoes

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International Correspondence School.
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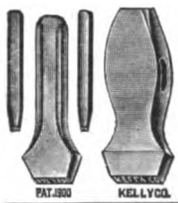
ONLY 60 CENTS Did you ever try to shoe a horse that would not stand still? By the use of my great **Pulley Breaking Bridle** you can make the most restless horse stand as quiet as a lamb—even ugly horses, stallions, etc., completely subdued while being shod. Price, **Only 60c postpaid.** You should own one.



Will bring business to you. Send for circular telling all about it.

PROF. J. W. BEERY, PLEASANT HILL, OHIO.



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BLUE GRASS HOOF OIL

Made in Kentucky

Used by all prominent horsemen and liverymen.

Best Remedy On Earth for Horses' Feet

Cures wire cuts, nail pricks, saddle and harness gall, etc. Best money maker for blacksmiths.
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THE REVELATION GAS BLAST



Blow Pipe, $12.50.

Furnace for Hardening, Tempering, Annealing, Melting, $30.00.



Use Gas and Water only—no bellows, no air compressor. The process is simple and produces a strong and steady blast. Invaluable where no kind of power is obtainable. For brazing, soldering, hardening, tempering, annealing, melting, etc. Save labor and money.

National Economic Gas Blast Co., 88 John St., N. Y.

'BETTER PROTECTION FOR JOINTER OPERATORS. So many expensive damage suits result from improperly guarded wood-working machines that shop-owners are constantly looking for every efficient means of protecting their workmen.

Many wood-workers of the older school would have more fingers today had the jointers on which they worked been provided with the modern round safety head. The most serviceable device of this kind that has yet been placed on the market is shown in connection with this article. The construction of the head is such that the knives are securely wedged in place and the centrifugal force only tends to hold them all the tighter. The knives are made of high-speed steel, so that jointers equipped with this head are more efficient and will turn out greater quantities of accurate work with less attention to the knives. The knives have a bearing the full length and are gripped tightly the full width to the very cutting edge. A very convenient and effective means is provided for adjusting the knives. On most round heads it is not possible to use moulding cutters, but with this one special throat pieces are furnished, so that moulding cutters or special knives of any kind may be used. The head is manufactured by the Crescent Machine Co., No. 245 Main Street, Leetonia, Ohio, and they will be glad to give additional information.

THE WILEY & RUSSELL MANUFACTURING COMPANY, Greenfield, Mass., at present are manufacturing some screw-cutting and tapping machinery which deserve mention; such as special fluted band chucking and taper pin reamers, screw plates, stocks and dies, machine relieve taps and bolt cutters. They also turn out special sets of automobile reamers, tap and screw plates (illustration). The taps are furnished in plug style with the A L A M standard pitch; also the plates. These are warranted to do the work at a single cut. We would suggest that AMERICAN BLACKSMITH readers who are interested in automobile repair work correspond with this company concerning the above-mentioned tools. Write for catalog No. 34 and other circular matter. Mention THE AMERICAN BLACKSMITH.

THE NEW ERA GAS ENGINE CO., of Dayton, Ohio, has recently sold out its *Auto-Cycle* business, and with it the entire plant and equipment, except such tools and appliances, patterns, etc., that were only adapted to the Gas Engine business. They have interested a large amount of new capital, and are now planning to equip a new factory for the exclusive manufacture of their well-known "New Era" Gas & Gasoline Engines. Catalogs and prices are wanted on all sorts of small tools and appliances.

"NEW EASY" 4 Sizes **BOLT CLIPPERS** "EASY" 2 Sizes

THE GENUINE TOOL



KNOWN AND PREFERRED EVERYWHERE

H. K. PORTER EVERETT, MASS. U. S. A.

DURYEA BUGGYAUT, $675



Several styles. Air cooled, 2-cyc., 15 H. P., 2 cylinder. No chains, belts, gears nor clutches. Simple roller drive. These rigs will please your trade.

CHAS. X. DURYEA, READING, PA.

DON'T BUY GASOLINE ENGINES UNTIL YOU INVESTIGATE "THE MASTER WORKMAN," a two-cylinder gasoline, kerosene or alcohol engine, superior to any one-cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE. THE TEMPLE ENGINE MFG. CO., 498 West 15th St., Chicago. THIS IS OUR FIFTY SIXTH YEAR.

Current Heavy Hardware Prices.

The following quotations are lowest prices generally quoted at Chicago, May 20, 1910, and are subject to fluctuations. Corrected for The American Blacksmith by the National Heavy Hardware Reporter, Chicago.

No changes are reported in Chicago prices this month. Iron and steel continue firm and there seems to be more difficulty to get mill deliveries at all than about the price.

Trade still continues to develop, naturally causing prices to steady.

Trade generally is reported very good and collections are fair.

First class wood stock is getting very scarce, and when found commands much higher prices.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X, L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—
$2.00 rates, full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$2.00 rates, full extras.

Toe Calks—

	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—

6 x ½ and smaller	60–10%
Larger and longer	50%

Machine Bolts—

4 x ½ and smaller	60–10%
Larger and longer	50%

Nuts—

Less than 10 lbs. of a size	$2.50 off
From 10 to 50 lbs.	3.00 off

Washers— Same price as nuts.

Skeins—

Cast	65%

Malleables— Common $ .09

Half Patent Axles— 65%

Springs—

Single Spring, each	$1.25
Springs, black and half bright	.06

Hickory Lumber—Per Foot—

1 to 2½	$.09
2½ to 4½	.10

Ash and Oak Lumber—Per Foot—

1–1½	$ .07	2½–3	$.08
1½–2	.07½	3½–4	.09

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
1"	$70.00	$70.00	$80.00
1¼"	70.00	73.00	85.00
1½"	73.00	80.00	90.00
1¾" 2"	77.00	85.00	109.00

Rough Hickory Axles—

		Each.
3 x 4	6 ft	$ .55
3½ x 4½	6 ft	.90
4 x 5	6 ft	1.10
5 x 6	6 ft	2.00
4 x 5	6½ ft	1.20
4½ x 5½	6½ and 7 ft	1.80
5 x 6	6½ and 7 ft	2.50
5½ x 6½	7 ft	3.00

Finished Hickory Axles—

For 2½ and 2¾ Skeins	$ .95
For 3 Skeins	1.10
For 3¼ Skeins	1.35
For 3½ Skeins	1.50
For 3¾ Skeins	1.80
For 4 Skeins	2.10

Rough Oak Bolsters—

Short	$.07½
12–14–16 ft.	.08½

Finished Oak Bolsters—

2¾ x 3¾ and under	$ .60
3 x 4	.65
3¾ x 4¾	.80

Rough Oak Wagon Tongues—
4 x 4 x 2 x 4 x 12 and smaller $ .95

Finished Oak Wagon Tongues—

3½ and smaller	$1.20
3¾	1.25
4	1.30

Two Inch Sawed Hounds

	Per Pair.
Tongues	$ .35
Front	.40
Hind	.50

Patent Wheels—

A. B. No. 13 and under	45 %
D. No. 13 and under	35–5 %
All Grades, No. 17 to 33	35–5 %
All Grades, No. 39 and Larger	25–5 %
C. No. 13 and under	40–2½ %

Cupped Oak Hubs— Set.

7 x 8 x 9	$1.40	10 x 14	$3.30
7 x 9 x 10	1.50	11 x 14	4.20
8 x 9 x 10	1.55	11 x 15	4.50
8 x 10 x 11	1.80	11 x 16	5.10
9 x 10 x 11	1.95	12 x 16	5.75
9 x 11 x 12	2.00	12 x 17	6.30
10 x 12 x 13	3.00	13 x 18	7.00
11 x 13 x 14	4.20		
12 x 14 x 15	5.10		

Plain End Oak Hubs Set.

Rough Sawed Felloes—

1½ x 2 "	$1.45	2 x 2½"	1.85
1¾ x 2½"	1.65	2½ x 2 "	4.35
1¾ x 2¾"	1.75	3 x 3 "	5.25
3 x 3½"	5.50		

Ironed Poles, White, XXX—

1¾ x 2½" No. 2	$3.80
2 x 2½" No. 3	3.80

Ironed Shafts, White, XXX—

1¾" x 2 " and smaller	$1.95
1½ x 2 "	2.20
1½ x 2½"	2.70

Farm Wagon Bows—

Round Top, ½ x 2 "	$ .60
Flat Top, ½ x 2 "	.75
Round Top, ¾ x 2½"	1.35

Standard size Piano Bodies with Seats—
Each $4.25

Plow Beams—

1 Horse	$ .60
2 Horse	.75
3 Horse	.90

All Hickory and Oak Spokes and Patent Spokes—
Discount from Weis & Lesh List No. 5.. 5%

Wagon Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2½ x 38"	$2.05	$2.80	$4.00
2½ x 42"	2.70	3.90	5.25
2¾ x 46"	4.15		
3 x 44"	4.35	6.70	8.38
3 x 48"	5.25	7.50	10.00

Single Trees—Oval—

	Mixed Forest Second Growth	White Second Growth
2½".....	$1.50	$2.70	$3.35
2¾".....	1.60	2.75	3.50
2¾".....	1.65	2.80	3.65
3 x 36"	2.30	3.30	4.10
3 x 38"	2.35		
3 x 40"	2.50	3.85	4.65

Single Trees—Round—

	Forest Second Growth	
2½"	$1.90	$3.45
2¾"	1.90	3.50
2¾"	2.00	3.60
2¾"	2.65	4.10
3 "	3.20	4.65

Oval Plow Doubletrees—

2¾ x 36"	$1.60
3 x 40"	2.40

Flat Plow Doubletrees—

1¼ x 3½ x 42"	$2.75

Wagon Doubletrees—

2 x 4 x 48"	$3.40
2½ x 48"	4.50
2½ x 4½ x 50"	4.90
2½ x 4½ x 52"	5.25
2½ x 5 x 52"	6.00
2½ x 5 x 5¼"	6.75
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—

	Forest
2½ x 30" and under	$ .90
2½ x 30" and under	1.15

Buggy Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½" and smaller	$2.50	$3.50	$4.50

Express Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½".....	$2.80	$3.55	$4.80
2¾".....	3.40	4.50	5.25
3 ".....	3.40	4.15	5.50

Express Singletrees, Turned—

	Mixed Forest Second Growth	White Second Growth
2½".....	$2.25	$2.50	$3.50
2¾".....	2.75	3.50	3.75
2½".....	3.25	3.75	4.50

Express Singletrees, Square Center—

	Mixed Forest Second Growth	White Second Growth
2½".....	$2.75	$4.00	$5.00
2¾".....	3.25	5.20	5.75

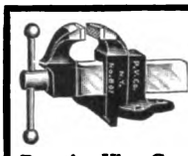
Buggy Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2 x 42"	$2.60	$3.25	$4.25
2½ x 2½ x 42"	3.00	3.50	5.00

CUMMINGS & EMERSON
Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.

Trade
TEMPERTOUGH
Mark

We have spent two years trying out TEMPERTOUGH in one of the largest machine shops in the west.
No more chipping or breaking of edge tools. The object has been to produce a temper so tough in old carbon tool steel, as well as high grade steel, that there would be no chipping or breaking.
SIMPLICITY OF HARDENING not alone in comparison with the customary treatment for standard qualities of High Speed Steel, but also compared with the more delicate process of hardening and tempering the old carbon tool steel. Can be adapted to low grades of tool steel. SAVE the cost of redressing, say nothing about the satisfaction of using tools tempered with TEMPERTOUGH. No machine, blacksmith or automobile shop can afford to be without TEMPERTOUGH, or anyone using edge tools.
Put up in two sizes:
1 Gallon Tin Buckets, $5.00; 1-2 Gallon Tin Buckets, $2.60
For sale by all Wholesale Hardware Houses. Order NOW. Guaranteed and manufactured by
The Weldarine Mfg. Co., Topeka, Kas., U.S.A.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SHEARS AND PUNCHES
Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue O.
BERTSCH & CO.
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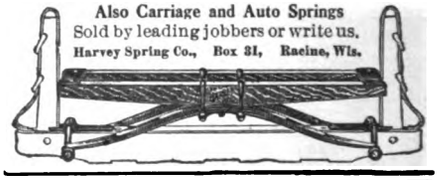
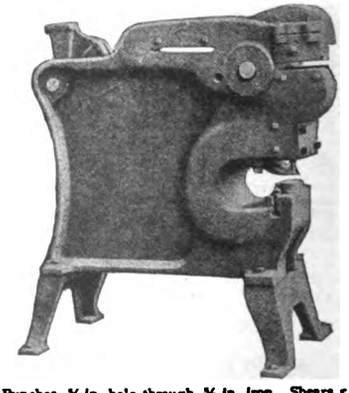
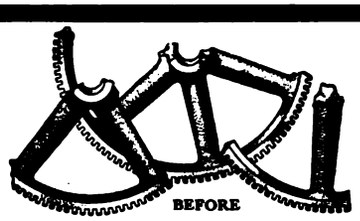
The Campbell Iron Co.
ST. LOUIS, MO.
Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material.
WESTERN AGT. FOR DITZLER COLORS IN JAPAN.
Write Dept. B. your requirements.

HARVEY BOLSTER SPRINGS
Also Carriage and Auto Springs
Sold by leading jobbers or write us.
Harvey Spring Co., Box 31, Racine, Wis.


No. 5 Combined Punch and Shear

Punches ⅝ in. hole through ⅝ in. iron. Shears 5 in. x ½ in. flat iron bars. Shears 1¼ in. round iron bars. Shears 8 in. x ¼ in. band iron.
Our Large Descriptive Circular will interest you. So will our price.
BADGER STATE MACHINERY CO.
19-25 Trinity Street Janesville, Wis.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REGISTERED
United States Patent, March 24, 1908.
Canadian Patent, April 6, 1909.
Other Patents Pending.

Weldarine is the only compound that will braze cast iron.
Weldarine will braze any form of iron or steel.
Weldarine is, or ought to be, in every up-to-date shop.
Weldarine is sold by the leading Heavy Hardware houses in America, and is used in every civilized country in the world.

WHAT THEY SAY—Copy of Testimonial, dated 11th September, 1907, from WILLIAM JAMES, Engineer of Kameruka Estate, via Bega, N. S. W.

Dear Sirs:—Referring to yours of the 9th instant, it gives me great pleasure to say that the WELDARINE set supplied by you last month has given entire satisfaction on the jobs we have had occasion to use it. We welded a rocker arm bracket on a steam pump which had broken across the middle. This was repaired about three weeks ago and now is stronger than ever. We also put two new cogs in a cog wheel of a corn and cob mill. The great tenacity of WELDARINE in repairing broken castings has surprised me. Yours faithfully, WILLIAM JAMES.

Concord, Illinois.

I ordered a sample package of your WELDARINE with but little faith in it. Am happy to say I have made a success of every job I have undertaken, and believe anyone can do the same by following the simple instructions sent with it. I am satisfied it will do all you claim for it.
JOHN N. ERIXON.

EVERY SET GUARANTEED **PUT UP IN THREE SIZES**

Small set	**$ 2.00,**	**weighs**	**2**	**lbs.,**	**will do from**	**$ 30**	**to**	**$ 40**	**worth of work.**
Large "	3.00,	"	4	"	"	75	to	90	" " "
Jumbo "	10.00,	"	25	"	"	400	to	500	" " "

If your dealer cannot supply you, fill out the attached coupon and mail today. Order now. Prices liable to advance.

The Weldarine Mfg. Co., Topeka, Kansas, U. S. A.


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The Weldarine Mfg. Co., 700 Kans. Ave., Topeka, Kans.

Please find enclosed $....., for which send one set of Weldarine.

Name.....

Address.....

Date.....



10 DAYS FREE TRIAL We will ship you a **"RANGER" BICYCLE** on approval, freight **prepaid** to any place in the United States *without a cent deposit in advance*, and allow ten days free trial from the day you receive it. If it does not suit you in every way and is not all or more than we claim for it and a better bicycle than you can get anywhere else regardless of price, or if for any reason whatever you do not wish to keep it, ship it back to us at our expense for freight and you will *not be out one cent.*

LOW FACTORY PRICES We sell the highest grade bicycles direct from factory to rider at **lower prices** than any other house. We save you $10 to $25 middlemen's profit on every bicycle—highest grade models with Puncture-Proof tires, Imported Roller chains, pedals, etc., at prices no higher than cheap mail order bicycles; also reliable medium grade models at **unheard of low prices.**

RIDER AGENTS WANTED in each town and district to ride and exhibit a sample 1910 Ranger Bicycle furnished by us. **You will be astonished** at the *wonderfully low prices* and the liberal propositions and special offers we will give on the first 1910 sample going to your town. **Write at once** for our *special offer.*

DO NOT BUY a bicycle or a pair of tires from *anyone* at *any price* until you receive our catalogue and learn our low prices and liberal terms. **BICYCLE DEALERS:** you can sell our bicycles under your own name plate at double our prices. Orders filled the day received.

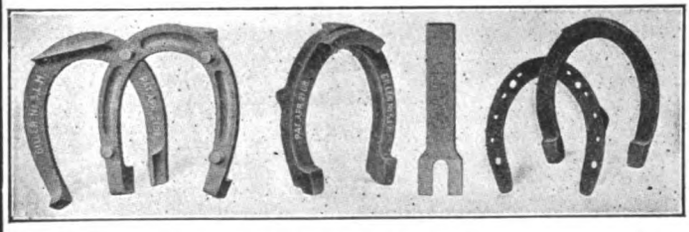
SECOND HAND BICYCLES—a limited number taken in trade by our Chicago retail stores will be closed out at once, at **$3 to $8 each.** Descriptive bargain list mailed free.

TIRES, COASTER BRAKES, single wheels, inner tubes, lamps, cyclometers, parts, repairs and everything in the bicycle line at **half the usual prices.**

DO NOT WAIT but write today for our *Large Catalog* beautifully illustrated and containing a great fund of interesting matter and useful information. It only costs a postal to get everything. **Write it now.**

MEAD CYCLE COMPANY, Dept. M.196, CHICAGO, ILL.

THE CUSHION INTERCHANGEABLE HORSESHOE



The Best, Most Practical Shoe Ever Put On The Market.

Outlasts three of the common kind, and price is the same. Old shoes easily and quickly detached and new ones substituted.

Write today for particulars and prices

THE GILLER ACME HORSESHOE CO., 3513 Hamilton Ave., BROOKLYN, N. Y.

Saves Figuring You will not have to stop to figure out this or that dimension on a piece of work. Just refer to **FODEN'S MECHANICAL TABLES.** This book gives Circumferences of Circles by eighth inches up to twenty feet, weight of Rectangular Iron, Round and Square Bar Iron, Angle and Sheet Iron, and other miscellaneous tables. Cloth Bound. Price, 50 Cents. Sent to any part of the world postage prepaid.
AMERICAN BLACKSMITH COMPANY, P. O. Box 974. Buffalo, N. Y., U. S. A.

HANDY LAMP
GASOLINE LIGHTING SYSTEM

Gives a 300 Candle Power Shadowless Light the instant you move the lever. Turns up or down, like gas, burns when not in use, or can be turned up instantly when more light is needed. It floods a 30-foot space with a brilliancy like daylight. Far cheaper than gas, kerosene or electricity, and so simple that anyone can use it. Catalog A. B. tells why. **Send for it now.**



BRILLIANT GAS LAMP CO.
DEPT. 12, 42 STATE ST. CHICAGO, ILL.

CORPORATIONS ORGANIZED

Incorporate your business under liberal **Delaware Laws** and avoid **personal or partnership liability.** Fraternal insurance and business companies organize at minimum cost. Different kinds of business may be transacted under the same charter. Law fully adjudicated by our courts. Write for information.

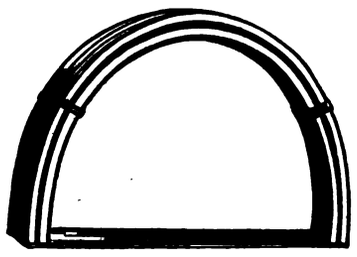
LAWYERS' CORPORATION TRUST CO.
WILMINGTON, DEL.

International Tractors

Prize winners in all world's greatest contests. Let us send you proof. If interested in gasoline engines of any style or size, ask for our Gasoline Engine Catalogue. Write today, anyway, for Tractor Book, Free. Address,

International Harvester Co. of America (Incor.)
13 Harvester Building **Chicago, U. S. A.**

Oak Rims



Low prices on all sizes, especially rims 2 inches and under in depth, any size tread.

3x2 all heights, up to and including 4' 4", $3.35, delivered, freight prepaid to your nearest railroad station, cash with order. All other sizes in proportion.

We guarantee that our rims are equal to the best made, and we sell from factory to consumer, saving you all the extra profits.

Send us your inquiries.

Illustrated catalog on your request.

May Bending Works

Steubenville, Ohio

"CHICAGO"
EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



"CHICAGO"
WHEELS SAVE TIME

They're made of stuff that cuts

Emery Wheels, Glue, Emery, Polishing Wheels, Grinding Machinery

136 Page Catalogue for the Asking

Chicago Wheel & Mfg. Co.

108 90. ABERDEEN ST.

CHICAGO, U. S. A.



"Quick Action"

Igniting Dynamos

Excel all others.

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co., South Bend, Ind.

FOR STRENGTH, SAFETY, AND QUALITY OF MATERIAL

NORTHWESTERN HORSE NAILS

ARE THE BEST ALL AROUND

Perfection in form and finish. Made of the best Swedish iron

Union Horse Nail Co., Chicago, Ill.

WHEN WRITING TO ADVERTISERS MENTION THE AMERICAN BLACKSMITH

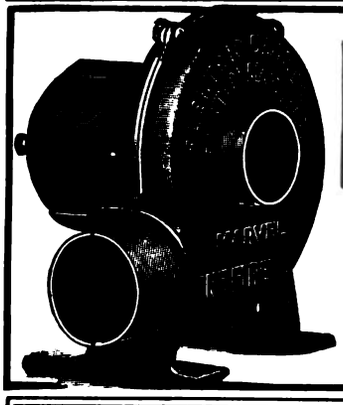
HORSE SHOE BAR IRON

—MADE BY—

The Milton Mfg. Company,

MILTON, PENN'A.

Is of Superior Strength and Quality. We can prove it. Write us.





MARVEL

"One Fire" Variable Speed Electric Forge Blower

$28.00 Net

Gives 100 per cent greater air pressure than any other "one fire" outfit.

30 days' Free Trial, through your dealer.

ELECTRIC BLOWER COMPANY

BOSTON, MASS.



Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.

McKEESPORT, PA.

Selling Agencies

NEW YORK CHICAGO

BOSTON PHILADELPHIA

SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades
Fully guaranteed
All sizes in stock

THE
BOURNE-FULLER CO.
IRON STEEL
PIG IRON
COKE

Cleveland, Ohio.

Bargains for Blacksmiths and Iron Workers

From Sheriffs', Receivers' and Manufacturers' Stocks

All goods sold on a binding guarantee. Your money back if you're not satisfied.

Every article in this advertisement is guaranteed brand new and first class.

CHICAGO HOUSE WRECKING CO.

Our plant covers 40 acres of ground and is one of the most wonderful mercantile institutions in the land. Our capital is one million dollars. Our responsibility is unquestioned.

Our stock includes practically everything under the sun. Millions of dollars' worth of brand new, high grade merchandise **bought by us at various sales**, is offered to the public **at prices usually less than the original cost of production.** We offer an exceptional opportunity to those who buy now, so send us a trial order. This will convince you.

Read every word of our greatest sale. **Never before** have prices been cut deeper than those quoted in this advertisement. **Every item means a big saving for you. Make your selection at once.**

SPECIAL SUMMER 1910 OFFER

Send us your order today. Bargains such as these may never again be advertised.

New Wrought Anvils 5c. per lb.



5c.

Best quality, form and finish. Steel face is a solid piece planed smooth after welded.

Lot No. 4 A-115.

Absolutely guaranteed. Weight 150 to 200 lbs. Price per lb..... **5c.**

Horseshoe Nails, 5c. lb.



Lot No. 4-A-B-96.

Queen City Special, cold rolled Horseshoe Nails, sizes 7, 8, 9, put up 25 lbs. bulk in a box.

Price, per lb.... **5c.**

"Bonanza" forged and pointed, warr nted Horseshoe Nails, made of best Swedish stock, sizes 7, 8, 9, put up in bulk, 25 lbs. to box.

Price, per lb..... **6c.**

2,000 boxes of **"Bay State"** cold rolled Horseshoe Nails, made of best Norway Iron, sizes 7, 8, 9 and 10.

Price in bulk. 25 lbs. to box..... **5½c. lb.**

Or in 5 lb. cartons ..... **7½c. lb.**

Merchant Steel Bargains.

WE BOUGHT THE ENTIRE CARGO of the Steamer Wisshackon which recently foundered on Duck Island, near Detroit, Michigan. The largest part of the cargo was never touched by water, and is in strictly first class condition.

We propose to sell it without any attempt to get market prices.

Following are a few items of interest to all readers of The American Blacksmith:

Lot ABW-1.

150 tons of Merchant bar steel, ranging from 3-16 to 2" **Rounds, Flats** from ¼ to ½" thick by 1" to 6" wide, **Squares** from ¼" to 1½".

Lot ABW-2.

970 bars of Canton drill steel, 1" octagon in mill lengths.

Lot ABW-3.

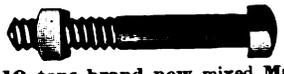
3,000 Steel Plates, ranging from 3 ft. to 6 ft. wide up to 27 ft. long; in thickness, 12 to ¼ in.

☞ Memo.—**Write for stock list or send a memorandum** of the quantity and size of the above steel that you can use and **we will name you prices lower than ever quoted before.**

Lot ABW-4.

NECKYOKE FERRULE AND RING 150 Oliver Mfg. Co.'s neckyoke ferrule and ring No. 80½, 1⅛" ferrule with 3¼ x 7-16" ring. Price, each, 6c

Mixed Bolts, 2½c. per lb.



10 tons brand new mixed Machine and Carriage Bolts, first class condition, **various sizes mixed** together, from ¾ to 1 inch diameter and from 2 to 10 inches long.

Price F. O. B. Chicago:

In lots of 25 to 100 lbs..... 3c. lb.
In lots of 100 to 500 lbs..... 2½c. lb.
In lots of 500 lbs. and up..... 2½c. lb.

$36 Buys 2 H. P. New Gasoline Engine.



A brand new 2 H.P. electrical ignited Gasoline engine, complete in evrey detail. Ready to run when you receive it, for..... **$36.00**

This is the greatest offer ever made on Gasoline Engines. This engine is strictly brand new, first class and covered by a binding guarantee. It is **the well known "Superior" make.**

4 H. P. Gasoline Engine for..... $64.00

Larger sizes at equally low prices.

Our five-year guarantee on these engines protects you. Shipped with the understanding that if not entirely satisfactory, may be returned at our expense. No fairer offer could be expected. Every blacksmith or iron worker should have power in his shop, and here is your opportunity.

☞ Write for our great Gasoline Engine Catalog. Tells you how to buy these high grade engines at lowest prices.

Green River Screw Plates, $7.95



Quality of Green River Plates is unquestioned. Make a perfect thread with a single cut; dies are adjustable.

Our Lot No. 4-A-346.

5 each, Taps, Dies and Guides, complete with tap wrench and stock, in hardwood case. Cuts ¼x20, ¼x16, ⅜x12, ⅜x11 and ⅜x10 threads. Our price, complete..... **$7.95**

$2.95 Ball Bearing Grindstones.



Lot No. 4-A-1266. **Strongest** and **easiest** running Grindstone on the market.

Angle steel frame. Ball bearing journals. 60 lb. 2½ in. stone, weight 85 lbs.

Price..... **$2.95**

Plumbing Material.

90c buys our special flat rim, cast iron, white enamel Kitchen Sinks, new, but slightly defective. Price includes strainer and coupling.

$5.50 buys an Enamel Bath Tub.



$10 is our price for a cast iron, roll rim, white enamel **Bath Tub. $9.50** for our white enamel, low down tank Water Closet, complete outfit. You can buy Wash Stands from us at **$3.25.** Iron pipe at mill prices.

Bargains in Ornamental Fence.



Brand new, perfect Galvanized Steel, **Ornamental Lawn Fence. 10c** 35 inches high, per lineal ft.... **10c**

Write for special wire circular. Shows over 100 sizes and designs of beautiful fence.

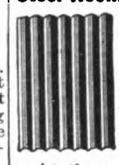
New Porch at 50% Saving.

Improve your home with this **spacious and handsome Colonial Porch.** All the material to build this Colonial Porch, 16 ft. long and 7 ft. wide, for.... **$44.50**



☞ Larger sizes at proportionate price. Blue print plans free. Send us sketch with dimensions for delivered prices.

Steel Roofing, per 100 feet, $1.60

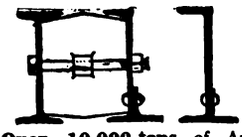


100,000 Squares of new Steel Roofing, which we are selling at the following prices, freight prepaid,

Flat..... $1.60
Corrugated, V-Crimped or Standing seam, 1.85

At these prices we prepay freight to all points **east of Colorado,** except Oklahoma and Texas. Quotations to these points on application. Our high grade **Galvanized Rust Proof Roofing** at prices ranging from **$3.00** per square up. Write today for free sample and Great Book on Roofing.

Structural Steel 1½c. Lb.



Over 10,000 tons of Angles, Channels, Tees, "I" Beams, round, square and flat Bars, all first class stock, standard size and lengths, at..... **1½c. per lb. and up,**

You must send us a list of your wants in merchant or structural steel. for prices that will mean a big saving to you.

Horse Shoes $3.00 per Keg.

Brand new Horseshoes, made by Eagle Horseshoe Co. First class order.

Lot No. B-2500
25 kegs No. 0
22 kegs No. 1

Price per 100 lb. kegs.... **$3.00**



☞FILL OUT THIS COUPON

Chicago House Wrecking Co., Chicago:

I saw your advertisement in **American Blacksmith.** Am interested in the following items:

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_____

Do you want Free Mammoth Catalog ? Do you want Free Gasoline Engine Bk ?

Dou you want Free Roofing Book ? Do you want Free Structural Steel Bk ?

My Name _____

Town _____

R.F.D. _____ P.O. Box _____

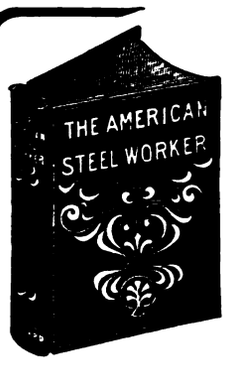
County _____ State _____

June, 1910, Am. Blk.

Chicago House Wrecking Co. 35th & Iron Sts. CHICAGO



STAR MFG. CO., Carpentersville, Ill.



BIGGER AND BETTER THAN EVER

IS THE NEW EDITION OF

THE AMERICAN STEEL WORKER

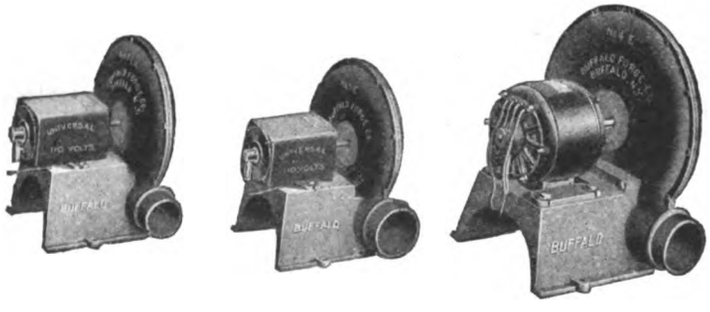
New binding, new paper, new everything, and a big chapter on High Speed Steels added. It's written in good plain English and tells you just what you want to know, whether it is buying, working, tempering, hardening, welding or selling steel. Tells you how to build furnaces, make baths and the hundred and one other important features in steel working. Markham has had over 27 years' experience at this sort of thing, and he knows. We'll send the book on approval if you desire. It contains over 350 pages, well filled with good illustrations, and is neatly and substantially bound in green and gold.

PRICE, $2.50

—money back if not satisfactory.

AMERICAN BLACKSMITH CO.

P. O. Box 974 BUFFALO N. Y., U. S. A.



2 E 2 EH 4 E

Buffalo Electric Forge Blowers

with Universal Motors.

You cannot afford to pump a bellows when a Buffalo Electric Forge Blower will supply the blast at a cost of 2 to 3 cents per day.

When purchasing a 2 E or 2 EH Blower you do not have to consider the character of the current as long as it is 100 to 120 volts. These blowers are regularly equipped with **universal motors,** which work equally well on either direct or alternating current of 100 to 120 volts.

When placed close to the forge, with a connection leading straight to the forge, 2 E will supply blast sufficient for one horseshoer's fire; the 2 EH, for one large blacksmith's fire or two horseshoers' fires; 4 E, three large blacksmiths' fires or five horseshoers' fires.

Write for particulars

Buffalo Forge Company

Buffalo, N. Y., U. S. A.

The success of your blacksmithing work depends on the quality of coal you use—

When wrong coal may mean a job spoiled or time wasted—isn't it wise to use coal that is specially adapted for smithing and forging?

Coal that contains too much sulphur may ruin a piece of iron or steel and prevent welding. Coal that is dirty with slate or dust will cake and burn fitfully with insufficient and uneven heat.

You are only laying the foundation for quick, satisfactory work when you insist on getting a special smithing coal of guaranteed quality on which you can always depend. Such a coal is

WEBSTER SMITHING COAL

Its superiority for smithing purposes is proven by both scientific analyses and practical tests.

Compare the coal you are using now with these qualities.

WEBSTER SMITHING COAL is practically free from sulphur, that bane of ordinary smithing coal. Its clear, high heat insures quick fusibility of iron or steel, insuring a good solid weld.

WEBSTER SMITHING COAL forms a clear gray coke that, when burned over, makes a hot, steady fire. It is free from dirt and does not cake.

WEBSTER SMITHING COAL contains no slate. It is pure coal of a high efficiency. It gives an intense, steady heat for a long period.

WEBSTER SMITHING COAL is all mined in Cambria County, Pennsylvania, in the heart of a region noted for high grade smithing coal. It is subjected to special processes and exacting tests which insure uniform quality.

We want you to try Webster Smithing Coal. We'll ship it anywhere in carload lots—if your local dealer doesn't have it. But nearly all dealers are glad to supply Webster Smithing Coal. Speak to yours about it. Or write to us for prices, mentioning the quantity you use and the name of your dealer.

PENNSYLVANIA COAL & COKE COMPANY

T. H. WATKINS, Receiver

Boston, 141 Milk Street. **Whitehall Building, New York.** Philadelphia, Land Title Bldg.

Syracuse, Union Building.

YOUR HANDS

are the only tools needed for adjusting and working this die stock on any diameter for which it is made.

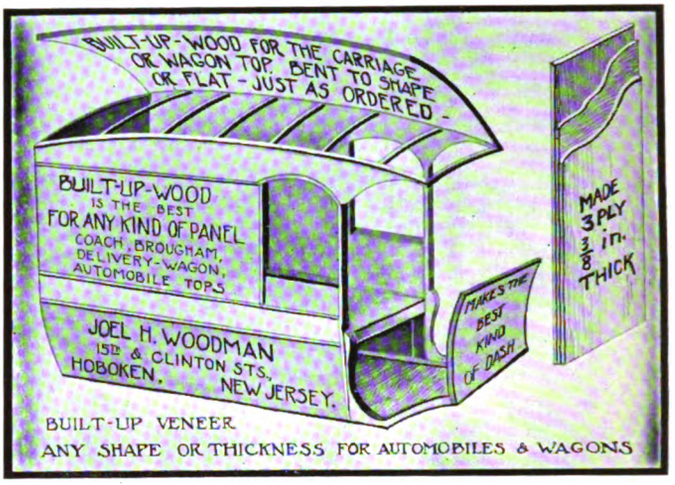


THE "DUPLEX."

It has a wide adjustment, too, and a range adapting it to a large amount of work. Put up in a case with taps.

THE HART MFG. CO.

50 Wood Street **CLEVELAND, O., U. S. A.**



Of Great Help.

Established 1870. New Repository, 731 E. Cary St. Phone 765.

BUILDERS OF HIGH GRADE WAGONS.

A. MEYER'S SONS

BUGGIES, TRUCKS AND WAGONS

118 and 120 S. Eighth Street.

Richmond, Va., March 10th, 1910.

BUFFALO FORGE CO., Buffalo, N. Y.

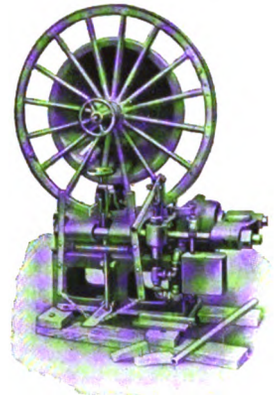
Gentlemen:—The Crain Combination Woodworking Machine which we purchased from R. W. Norris & Sons, Baltimore, Md., last September, has proven very satisfactory.

We have put this machine to very severe tests, and it has always done the work. It is a wonderful addition to our shop, being of such great help to us upon heavy work.

Yours very truly,

A. MEYER'S SONS.

See page 47.



THE GREATEST

MONEY MAKER

for a blacksmith is a

Scientific Hydraulic Tire Setter

Write for catalog and prices to

National Hydraulic Tire Setter Company

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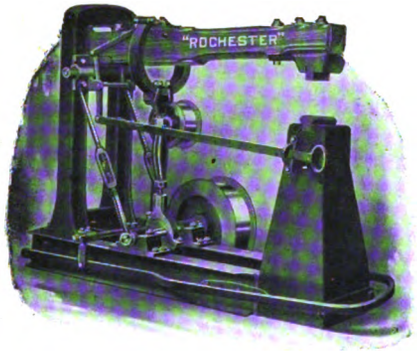
ROCHESTER HELVE HAMMER



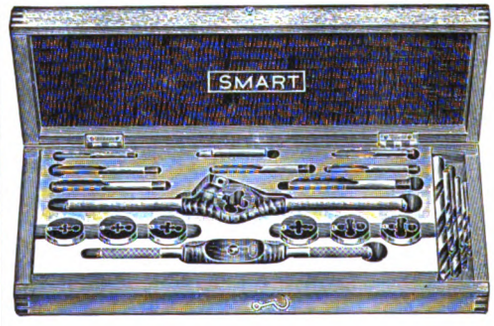
(The Hardest Hitter)

Forging dies set crossways of helve. Welding dies set lengthways.

The best hammer made for general work, and a dandy Tire Welder.

MADE IN SIX SIZES

THE WEST TIRE SETTER CO., Rochester, N. Y.



Strong, Easy Cutting Durable Screw Plates

FULL LINE OF HIGH QUALITY SCREW CUTTING TOOLS

Send for Free Catalog

A. J. SMART MANUFACTURING CO., Greenfield, Mass.

FIRST MADE IN AMERICA

HAY-BUDDEN SOLID FORGED ANVILS

A LONG STEP FORWARD

SOLID FORGED STEEL TOP Welded to a SOLID FORGED BASE Making a SOLID FORGED ANVIL

The Gold Medal Anvil

HIGHEST AWARD

Omaha 1898 Pan-American 1901



OVER 150,000 IN USE

The **ENTIRE TOP** being one piece of high grade **FORGED STEEL** makes a **LOOSE FACE IMPOSSIBLE.**

TEMPERED "JUST RIGHT".

By our own process, the weld at the waist is a **LASTING UNION.**

Experience has proved their worth and demonstrated that **"HAY-BUDDEN" Anvils** are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., 254 NORTH HENRY ST. BROOKLYN, N. Y.

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JUL 16 1910

VOLUME 9 NUMBER 10

THE AMERICAN BLACKSMITH

A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO
N.Y. U.S.A.

JULY, 1910

$1.00 A YEAR
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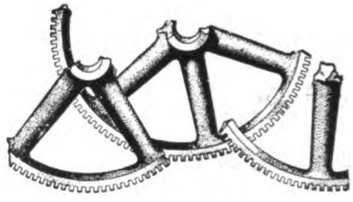
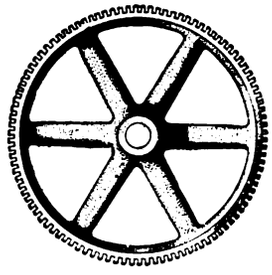
A PROBLEM

EASILY SOLVED



+ TRADE WELDARINE MARK =



A broken wheel plus Weldarine always equals a new wheel, and,
Any broken tool or machine part plus Weldarine always means a new part.
Weldarine is the only compound that will braze cast iron.
Weldarine will braze any form of iron or steel.
Weldarine is or ought to be in every up-to-date shop.
Weldarine is sold by the leading Heavy Hardware Houses in America.
Weldarine is used by every civilized country in the world.

Every Set (3 sizes) Guaranteed.

Small set, $ 2.00.	Weight, 2 lbs.	Will do $ 30 to $ 40 worth of work.
Large " 3.00.	" 4 lbs.	" 75 to 90 " " "
Jumbo " 10.00.	" 25 lbs.	" 400 to 500 " " "

Order now. Money refunded if not satisfactory.

Multiply Your Profits

Trade
TEMPERTOUGH
Mark

No more chipping or breaking of tools with TEMPERTOUGH. Produces so tough a temper in old carbon tool steel, as well as in high grade steels, that there cannot be any more chipping or breaking. Simplicity of hardening, not alone in comparison with the customary treatment for standard qualities of high-speed steel, but also with the more delicate process of hardening and tempering old carbon tool steel. The grade of steel does not make any difference. It acts just as efficiently with low as with high grades.

No machine, blacksmith, automobile repair shop, or anyone using edge tools ought to be without it. We have spent two years trying it out in the largest machine shops in the West. The results were SUCCESS.

1 gallon tin buckets, $5.00 **1-2 gallon tin buckets, $3.00**

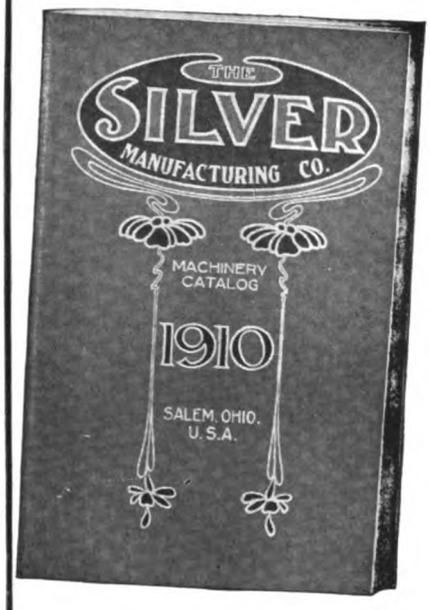
Order Now—IT'S GUARANTEED.

Weldarine Manufacturing Co., Topeka, Kansas, U. S. A.

READY!

THE SILVER MFG. CO.

365 BROADWAY SALEM, OHIO.



This 84-Page Book FREE—Send Today



Silver's New Swing Saw. Four Lengths.

It's a winner! The heavy demand for our first edition exhausted it before the year was half over. We've just received a new lot—revised. Your copy is here, waiting, for the asking.

Don't hesitate to write for it today. That's what we printed it for. Even if you feel that you don't need better tools, it will pay you to examine this illustrated book and get our prices.

SEND TODAY FOR THIS CATALOG

or for any of the following booklets:

BAND SAWS AND JOINTERS—describing 20" Band Saws for foot or belt power or combination; also 26, 32, 36-inch Power Band Saws with new features; also five sizes of Jointers.

HUB BORING AND SPOKE TENONING MACHINES—illustrating and describing several sizes of each.

PORTABLE FORGES—illustrating and describing 14 styles.

DRILLING MACHINES—covering our line of some 22 distinct machines.

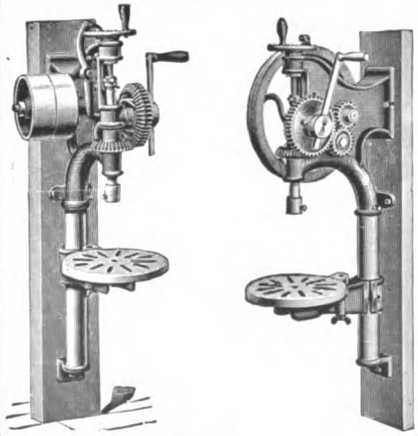
POWER DRILLS—illustrating our line of 20" machines with lever feed, lever and wheel feed, power feed with automatic stop, power feed with back gears and automatic stop.



Fig. 706.

TAYLOR'S NEW TAPER HUB BORING MACHINE

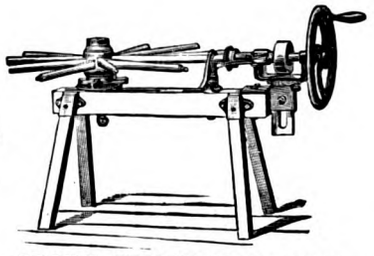
Hand wheel regulates cut. Bores any size hole or taper without changing bit.



Our Booklet, "Drilling Machines", illustrates 22 kinds we make.



Our Portable Forge Booklet illustrates some 14 kinds. We have a size to suit your needs. Strong and durable. Attractive designs.

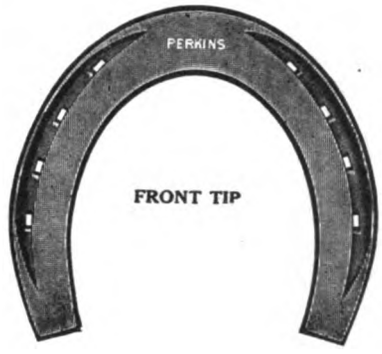


SPOKE TENON MACHINES

in Seven Sizes. Fitted with Star Hollow Auger.



Look for this Trade Mark ★ The Star brand beats all others





★ PERKINS ★

HORSE SHOES

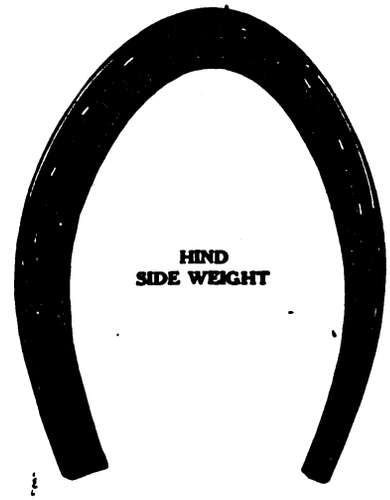
AND

TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



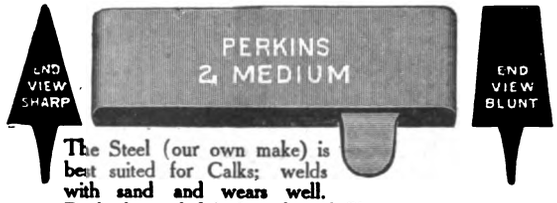


Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

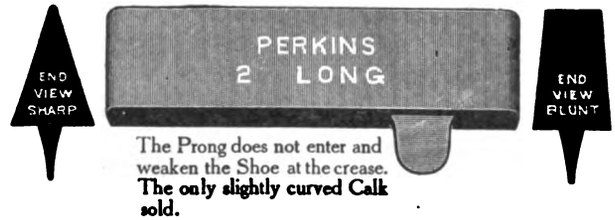


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

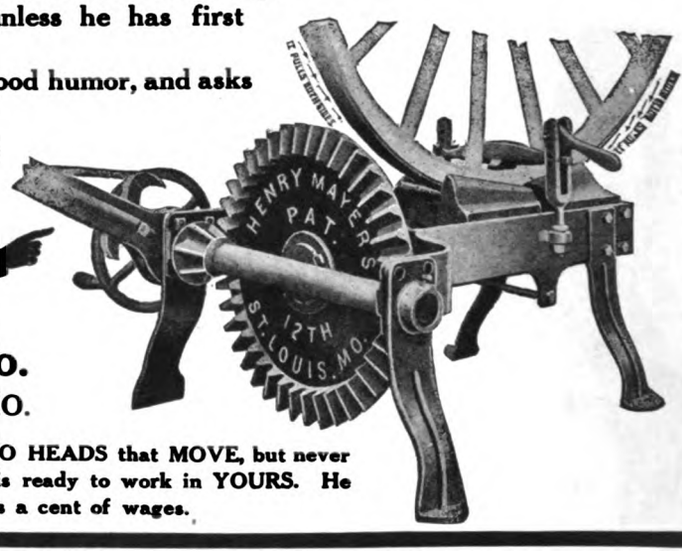
RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.

These Dog Days While You Are Sweating

How would you like to have a HELPER

Who would do TWICE as much work as you can do?
Who would bring in enough EXTRA WORK to more than pay his wages?
Who would never KICK for a raise?
Who never has the backache, nor whose muscles ever tire?
Who never "talks back," or "sasses," gets drunk, fights, or "cusses"?
Who never kills time, or listens for the "dinner horn to blow"?
Who does the work as YOU say, and EXACTLY as YOU say?
Who never asks for his little wages unless he has first EARNED them?
Who is always "onto the job," and in a good humor, and asks for MORE?
Who never "comes up missing" when most needed and work is heaviest?



Yes, there is such a HELPER!
Here is his PICTURE ——→

and his full name and address is:

Mayers Tire Setter Mfg. Co.

4030 Forest Park Boulevard ST. LOUIS, MO.

He is made out of STEEL, weighs 800 lbs. Has TWO HEADS that MOVE, but never TALKS. Already has a JOB in thousands of shops, but is ready to work in YOURS. He asks the PRIVILEGE of proving his value bofore he asks a cent of wages.

Equipped with the
Buffalo "200" Silent Blower
Guaranteed to produce a stronger blast than any other blower made; also against repairs for ten years.



Buffalo Down Draft Forge

No. 660

Cast iron hood, tile stack, indestructible from heat, rust and gases

No Soot, No Smoke, No Gases

Your forge shop atmosphere always pure and clear. The down draft hood catches and removes all smoke and gases generated by the fire. It also supplies the fire with a hot blast of returned coal gases, which effects full consumption of, and

Saves 1-3 in Fuel

Notice the position of the crank on the blower. It is just where you want it. The hand falls naturally upon it, and you do not face the fire. The up-to-date forge for the modern shop.

Write today for our new Catalog No. 178 A. B., describing
Forges
Blowers
Drills
Punches
Shears
Blacksmiths' Tools

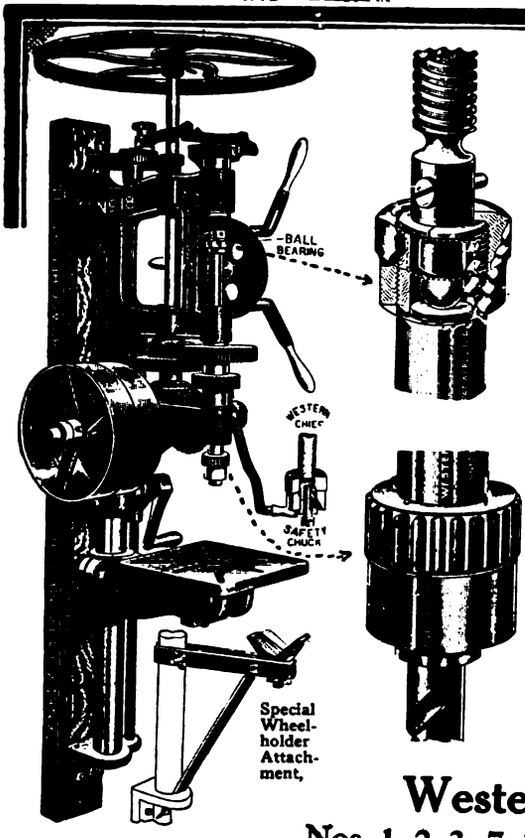
Always ask your Dealer for "Buffalo" Tools. If he does not supply you, write us, we will see that you get the right goods, at the right price. The name "Buffalo" is on every Tool—look for it.

Cast Iron Hearth, Deep Fire, Anti-Clinker, H H. Tuyere.

BUFFALO FORGE CO.

BUFFALO, N. Y.

Phoenix Horse and Mule Shoes and Bull Dog Toe Calks



Special Wheel-holder Attachment,

Ball-Bearing and Safety Chuck

Ball-Bearing

A single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate.

Safety Chuck

It is opened and closed with the hand.

No more set-screws to mar and bruise the shanks of bits.

No more wrenches to tighten and loosen set-screws.

No more twisting of bits in the chuck.

No more trouble in inserting and removing bits from chuck.

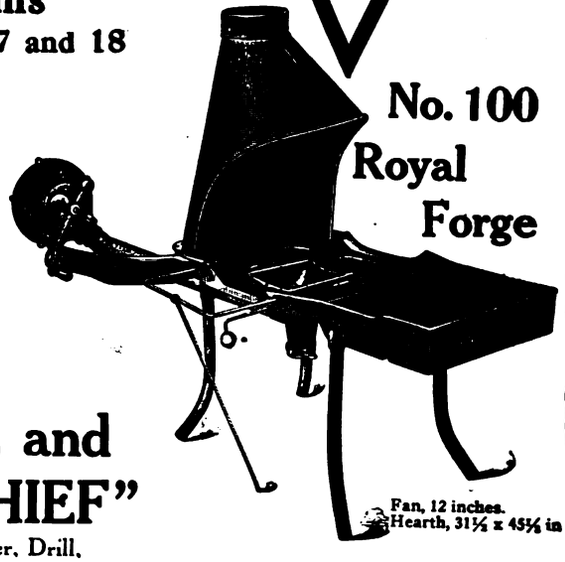
A Feature of TO-DAY

Wrench? NO!

Western Chief Drills

Nos. 1, 2, 3, 7, 12, 14, 15, 16, 17 and 18

FORGES—BLOWERS—DRILLS—



No. 100 Royal Forge

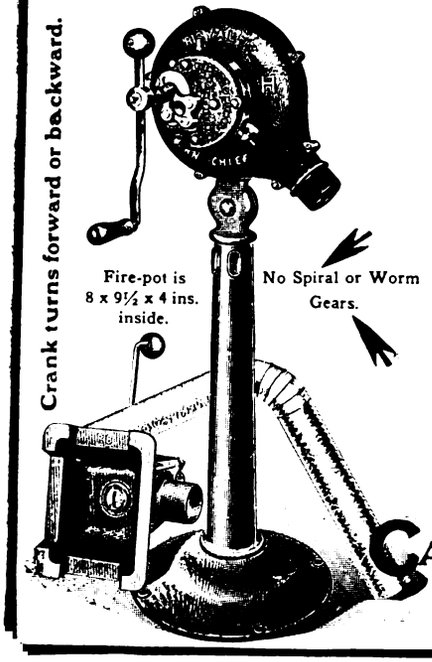
Fan, 12 inches. Hearth, 31½ x 45½ in

The Names — "ROYAL and WESTERN CHIEF"

When found on a Forge, Blower, Drill, or other Blacksmith Tool—mean that that article is better than the ordinary. They mean that in its construction the best materials and the highest skill obtainable have been employed. They mean that years of experience have served to perfect it. They mean the tool is a success, and quality alone has made it so. Dealers and Blacksmiths in general will procure what they like best. We must deserve before we can obtain trade. There is no doubt about our deserving, because our production grows rapidly.

There is a reason—Quality

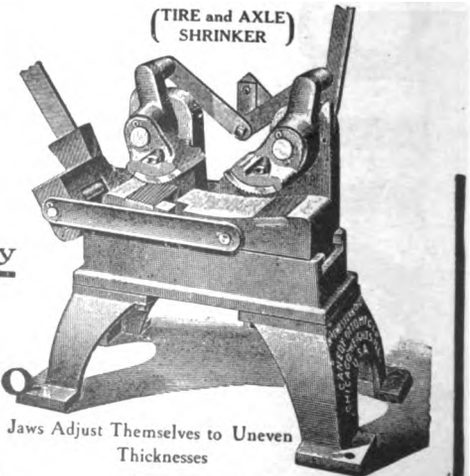
Royal Blower



They are all the Best!

No. 1 Western Chief

(TIRE and AXLE SHRINKER)



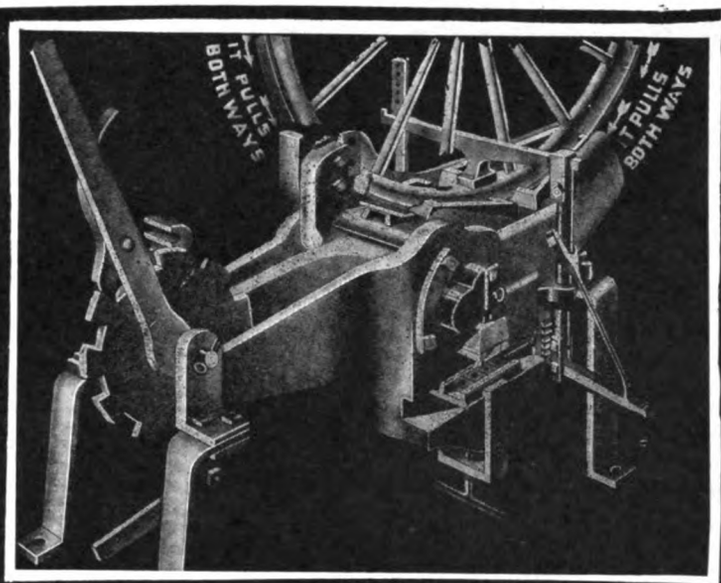
Jaws Adjust Themselves to Uneven Thicknesses

MADE BY

CANEDY OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

THE HOUSE COLD TIRE SETTER



WILL MAKE MORE MONEY FOR YOU

NOT ONLY THE BEST

BUT ALSO THE CHEAPEST

TAKE NOTICE—You Can Have Our Machine in Your Shop

and see for yourself that it does the work just right before you are required to pay a cent on it. We don't ask our customers to take any risk, we take it all. You have no cause to hesitate, even if you know nothing about cold tire setters, or have heard bad reports on them, for we give you a chance to see for yourself. ***Do You Want to Build Up Your Business and Make Money?*** It saves you full time of one man and three quarters of another and you don't keep your customers waiting. So don't try to get along without it, and don't buy any other until you have tried ours, as it costs you nothing.

Write for our reduced prices and terms.

Now is the time to buy and get it advertised in time for the season's work

HOUSE COLD TIRE SETTER CO., 216-218 S. Third Street, St. Louis, Mo. J. F. HOUSE, 201 Church St. Toronto, Ont., Canada.

LIGHTNING FULL MOUNTED SCREW PLATES

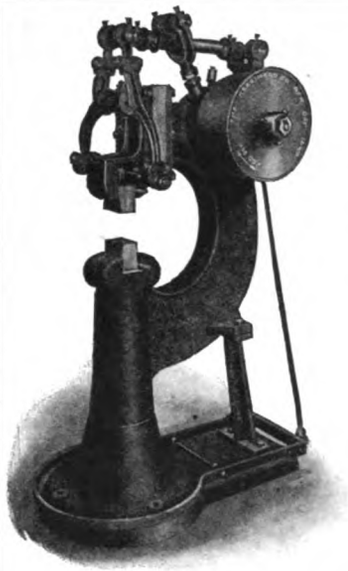


Handiest and Most Substantial Set Made

The stocks are nicely made and fitted. They are carefully graded so as to have each stock of proper length and weight to suit dies. The ¼ inch stock is 11 inches long and weighs, with die, ½ lb., and they increase in length and weight up to the 1-inch size, which is 28 inches long and weighs, with die, 3 lbs. Gunlock finished. Steel tube handles. Handsome cases. Send for catalog 34D and prices.

Sole Makers

Wiley & Russell Mfg. Co. :: Greenfield, Mass., U. S. A.

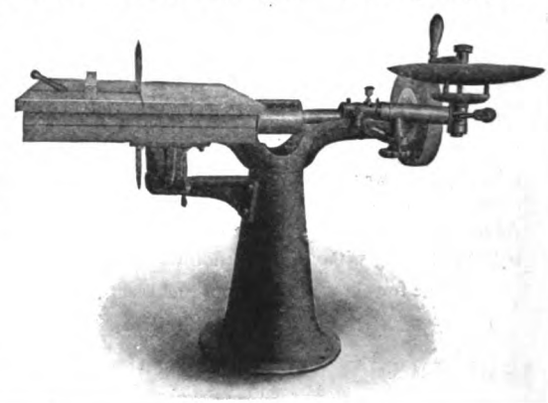


10 DAYS' FREE TRIAL OFFER

applies to our selling proposition below. You have nothing to lose—and will see that the **KERRIHARD POWER HAMMER *simply must be as is claimed for it,*** or we could not take so long a chance. You have 10 days in which to prove our guarantee and claims. Could any fairer, more utterly reasonable offer be made by any one?

THE PROPOSITION

Send us $60 (***which will be held in trust by us for the trial period of 10 days***), for which we will ship you, via shortest possible route, one of our 1909 Models, which is the standard of the world. You test out the hammer in any way you wish; do all your plow, shovel, drag-tooth work and welding—abuse it if you wish—then, when you are satisfied, either keep it or send it to us and receive by return mail the full purchase price.



You lose money to wait. Now is the time to get ready for the Spring business, which will increase from the day you install one of our clever Hammers. **Order today.**

Hammer and Grinder Department

THE KERRIHARD COMPANY

RED OAK IOWA U. S. A.

"MORSE" TOOLS



Prominent among them are

"MORSE" DRILLS

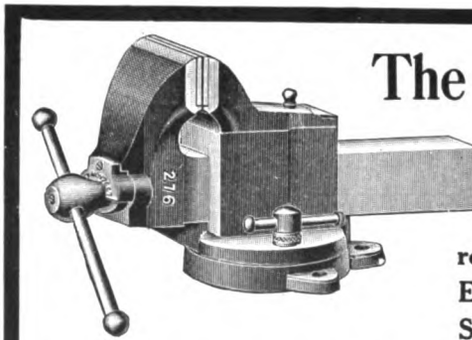
fitting the different presses made especially for blacksmiths' use. Shanks are furnished round or flattened for set screw, as desired.

None Better. A Trial Is Proof.

Send for an illustrated catalogue and a Young Machinist's Practical Guide. Free to all.

Morse Twist Drill & Machine Co.

NEW BEDFORD, MASS., U.S.A.



The Parker Vises

Always ready for use. Excel in Strength, Durability, Finish

38 Styles, for all purposes and in size to suit

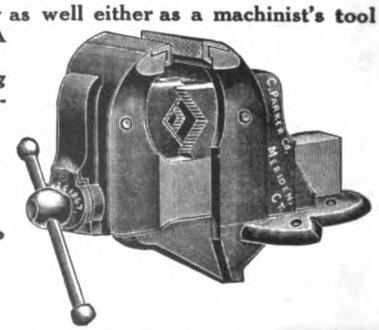
Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings

This is our Best Combination Vise

Can be used equally as well either as a machinist's tool or for holding pipe. A very satisfactory tool.

Our latest catalog mailed free on application.



The Chas. Parker Co.

Meriden, Conn.

The Brooks makes the Smith rich

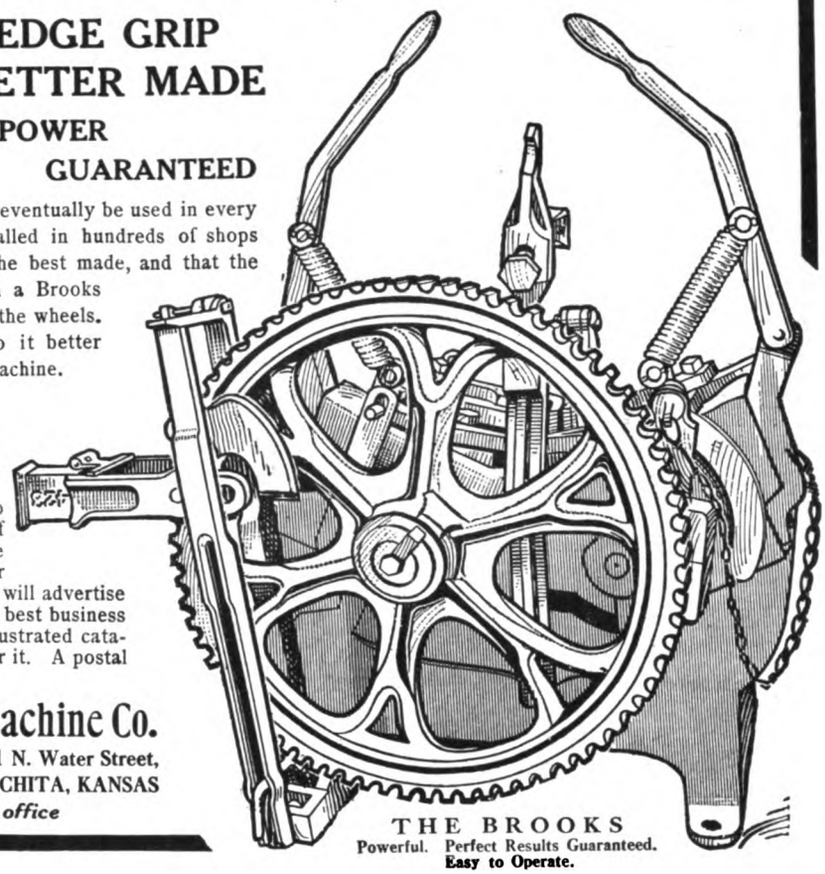
THE BROOKS COLD TIRE SETTER

THE BEST EDGE GRIP COLD TIRE SETTER MADE

HAND POWER

OPERATES BY ONE MAN GUARANTEED

The Brooks is the only Cold Tire Setter that will eventually be used in every blacksmith shop. Brooks machines are being installed in hundreds of shops daily, because the smiths are beginning to find it is the best made, and that the old hot way is too slow and unsatisfactory. With a Brooks you can set tires cold and without taking the tires off the wheels. You can do the work while customers wait, and do it better than by the old hot process or by any other kind of machine.



THE BROOKS
Powerful. Perfect Results Guaranteed.
Easy to Operate.

The Brooks Will Build Up Your Business

The Brooks will bring new customers to your shop for miles around. It has done this for thousands of smiths and will do the same for you. Write us at once about this. How the Brooks will greatly increase your trade in one season. How it will advertise your shop and help you do the best business of any smith in your town. Illustrated catalog sent to you free Write for it. A postal will do.

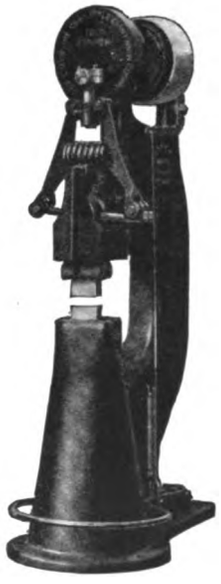
The Brooks endorsed and used by the United States Gov't

The Brooks Tire Machine Co.

857-859 Ellicott Square, BUFFALO, N. Y.
121 N. Water Street, WICHITA, KANSAS

Write to nearest office

The New Little Giant Power Hammer



Stands for what is best in design, material and construction. It does THE WORK efficiently and quickly and is always under perfect control.

This high degree of perfection in Power Hammers is the result of fifteen years' experience.

Made in three sizes:

25 lb. 50 lb. 100 lb.

Suitable for forging material up tc 5 in. in diameter.

Will do anything and everything that can be done on Power Hammer.

Recommended by over 3,000 satisfied users.

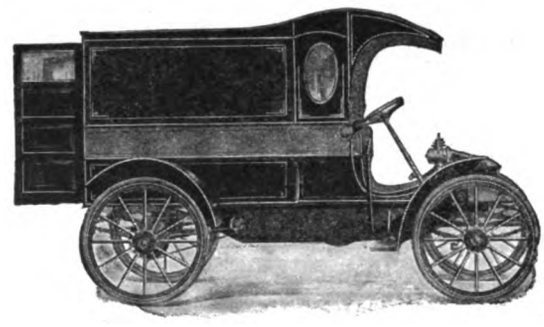
Manufactured by

MAYER BROTHERS COMPANY

MANKATO, MINN.

AGENTS: United States—All Jobbers
New Zealand—Alex Storrie, Ltd., Invercargill
Manitoba, Saskatchewan and Alberta—Melotte Cream Separator Co., Winnipeg

WRITE NOW FOR FULL INFORMATION



The Motor Delivery Wagon

and

What It Means to the Blacksmith and Carriage Man

Hundreds of merchants in all parts of the country are replacing horse-drawn vehicles with up-to-date auto delivery wagons, because they are more satisfactory and less expensive, to say nothing of their value from an advertising standpoint.

Blacksmiths and carriage dealers are the logical people to supply these vehicles, and we have just what they want in our

Motor Delivery Chassis, with Running Gear

We furnish everything all ready to run except body; you build open or closed body, as desired, and paint job. Takes body 40x60 to 72" back of seat. Capacity 1500. 22-24 H. P. Speed, 20 miles.

We have an extraordinary proposition for prompt acceptance. Write immediately for complete description and wholesale price.

ASK FOR THIS BOOK

Our 448 page Net Price Catalog for 1910 quotes lowest wholesale prices on a complete line of Carriage Hardware, Blacksmith Tools and Motor Car Supplies. Tells how to build and repair Autos. Its use will save you money on everything you buy, no matter where you live. It is free to the trade. You should have a copy. You need it. Write for it today.

CRAY BROTHERS, 1113 W. 11th St., Cleveland, O.

Forged from ONE SOLID PIECE



If you want the BEST order a

PARAGON *Swedish SOLID STEEL Anvil*

Newest Process *Absolute Guarantee* *Finest Material*

Perfect Shape and Finish *Write for Descriptive Booklet*

Manufactured by

SÖDERFORS BRUKS AKTIEBOLAG

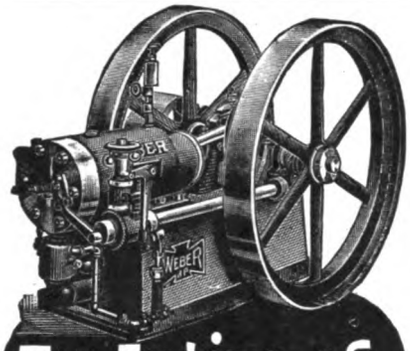
FALUN, SWEDEN

For sale by All Leading Dealers

General Sales Agents for the United States

HORACE T. POTTS & COMPANY

PHILADELPHIA, U. S. A.



The Engine of Reliable Records

Getting the most engine for your money does not mean buying the cheapest—it is a matter of securing an engine that will give reliable results year in, year out—the speed must be steady and uniform—absolute interchangeability of parts assured—actual power must equal rating. Every requirement of the blacksmith who wants a simple, reliable, powerful engine for all light work—running drills, emery wheels, blowers, etc.—is met by the

Weber
Gas or Gasoline Engine

Some of its special features are—underground gasoline reservoir for main gasoline supply—gasoline pump, pumping supply to engine; surplus returning to reservoir—electric igniter—heavy and rigid construction (see cut)—a perfect control governor by which the operator can change speed instantly—all parts easy of access and guaranteed interchangeable—small number of moving parts. It takes but little room, adds to capacity of shop and costs little to operate,

Sold Under Our Absolute Guarantee

Write today, telling us for what you need power and we will send you our new handsomely illustrated catalog fully describing the Weber Engine best suited to your requirements.

Sheffield Gas Power Co.
121 Winchester Place Kansas City, Mo.

Let it Furnish Power for You

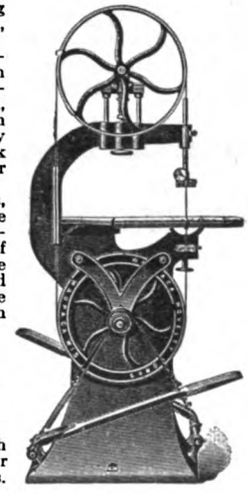
In Every Shop

Our Band Saws and Grinders

Our band saws and grinding machines will save much time, labor and money.

Whether or not you have power, you can use our No. 2 20-inch band saw shown in the accompanying picture. A powerful, strong and simple machine, which is suited to your needs, and by enabling you to do your work quicker and better, will pay for itself in a short time.

Built of the very best materials, our machines will withstand the hardest usage without any repairing. There are no gears of any kind to get out of order—the finest ball bearings being used throughout, which make this the easiest running machine you can buy.



Some Other Distinctive Features.

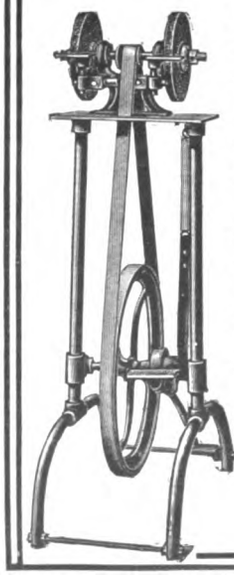
The machine is equipped with a single treadle for one person or two treadles for two persons. Each treadle is independent of the other—one can be worked while the other stands still. When desired to run by power, we furnish tight and loose pulleys in place of the back treadle.

The **Upper Saw Pulley** can be tilted by means of a hand wheel, also can be raised and lowered, to change the tension of the saw. The table tilts both sides, which you will find very handy for bevel sawing. **This** feature is only found in **our machines.**

Stop and Think

of the many advantages of this machine—the time you will save by having one in your shop and how much better work you can do. Then, send for our prices and descriptive **circulars.**

Our Foot Power Emery Wheel Grinding Machines



Especially designed for the blacksmith to save time and also many files. One of these grinders will do three fourths of all the work you usually do with the file in a much shorter time.

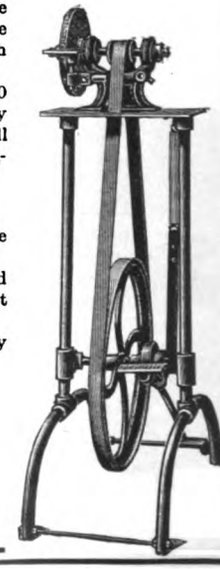
The speed of these grinders is 2,600 to 2,800 revolutions per minute, with a comparatively small effort on the part of the operator. Ball Bearings throughout make them very easy running.

Are Handy Machines

because they are light in weight and can be moved from place to place in your shop easily.

Your jobber will supply you with our band saws or grinding machines. If he does not carry them, write us and we will supply you.

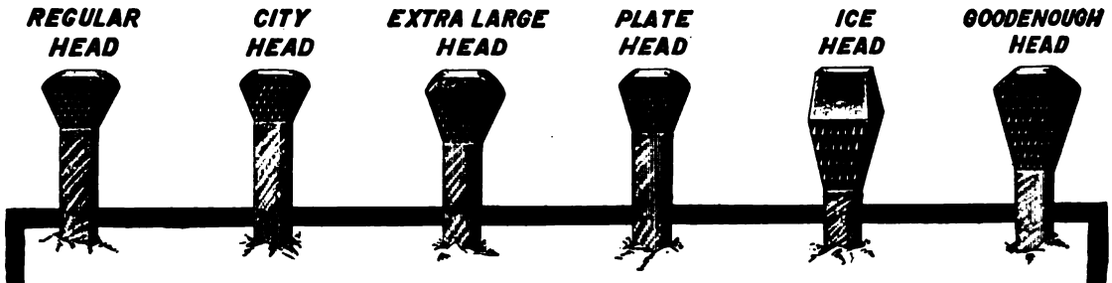
Our circulars are sent free if you desire any further information.



Waupaca Novelty Works
Waupaca, Wis.

Capewell Horse Nails

Ahead of them all!



In other words, the Leading Horse Nail of the world is "The Capewell"—made in **all** styles of head, as illustrated above.

"Capewell" Nails are best adapted to all kinds of horseshoeing, designed to meet every requirement of the Shoer and certain to give perfect satisfaction to Horse Owners.

Easiest to Drive. These nails are made from specially selected stock which, when worked by "The Capewell" process, makes nails **stiff enough to drive into the hardest hoof without crimping, yet ductile enough to be easily clinched.**

No nail is a "Capewell" unless it has the Check Mark on the head, as shown in the picture above.

For ease in driving, economy and general satisfaction there is no horse nail in the world which equals "The Capewell."

Made by

The Capewell Horse Nail Company

Hartford, Conn., U. S. A.

The Largest Manufacturers of Horseshoe Nails in the World

STERLING HOOF PADS



These pads are about as much better than the old style leather backed pads as those are better than none. Our pad is one smooth, solid piece of rubber. The calk is vulcanized onto the back and stays there. The entire pad is perfectly impervious to water, and will keep horses' feet in better condition than is possible with wet and soggy leather, which contracts and expands with varying conditions of moisture and temperature.

The construction of these pads is our own device and invention, and is fully protected. There is and can be no adequate substitute.

Prices about the same as for leather backed pads. Dealers are requested to write for discounts and open territory.

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MANUFACTURED BY

Rutherford Rubber Co. :: Rutherford, N. J.

Distributors of Our Pads:

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Syracuse, N. Y.,—Central City Rubber Co., 129 E. Water St.
Philadelphia, Pa.,—Philadelphia Rubber Tire Company.
Jacksonville, Fla.,—McGraw Bros. & Vogt.
New Orleans, La.,—F. H. Bayley, 407 Hennen Building.
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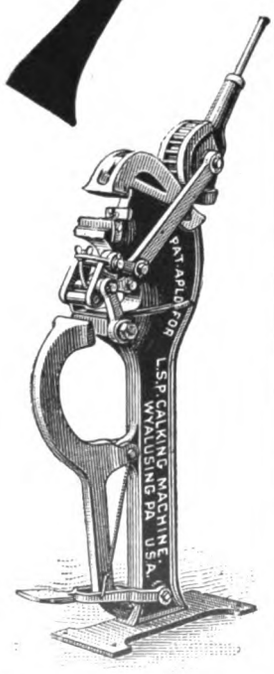
7 REASONS WHY

You Should Have The L. S. P. Calking Machine



The Only Calking Machine

1. It is the only calking machine advertised in a trade paper to which a patent has been granted, running no risk of litigation.
2. The only calking machine used by the United States Government.
3. The only machine that makes every possible kind of a heel calk.
4. It is not a foot vise, nor a heel bending device, but a CALKING MACHINE.
5. One pull of lever makes either sharp or blunt heel calk, another pull welds sharp or blunt toe calk, and forms clip, if so desired.
6. All working parts made of a special grade of steel.
7. Holds the record, 41 shoes heel-calked sharp in 25 minutes and 33 shoes calked complete in 45 minutes.

This machine works equally as well on old shoes. Takes up only 8 x 16 inches floor space, stands three feet, three inches high, and weighs 131 pounds. Write now for particulars and prices.

United States Office, L. S. P. Calking Machine Co., Wyalusing, Pa., U.S.A.
Canadian Office, National Machine Co., Brighton, Ont.

The Greatest Labor Saver

EVER PLACED IN THE HORSESHOER'S SHOP IS THE VERDICT OF THE USERS OF THE

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"FOR THE MAKING OF GOOD HEEL CALKS"



The only machine on earth that makes perfect, ready-for-use heel calks, on any size shoe, without the use of a hammer.

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Perfect in execution.

Saves Money, Time, Muscle, Labor.

Makes more than 200 different shapes and sizes of heel calks.

Ask your dealer or us for testimonials, and see what your fellow craftsmen say about it.

ONE PULL OF THE LEVER MAKES THE CALK

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ONE CENT

invested in a postal asking for our New Catalog No. 60, showing 87 labor saving tools, will mean dollars to you.

12 inch  14 inch

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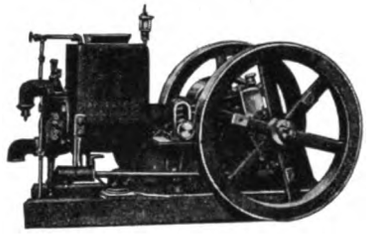

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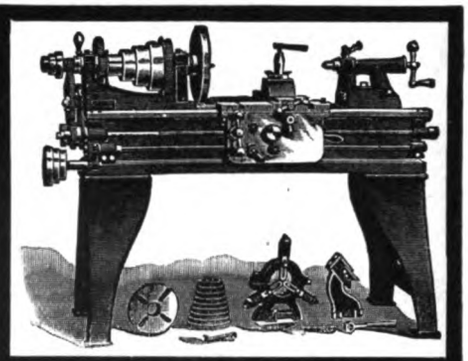

Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high grade, low priced lathe for Automobile builders, repair shops, and general jobbing shops.

Investigate its Merits

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Catalogue of Lathes, Tools and Supplies.

The Sebastian Lathe Company,
124-126 Culvert St., Cincinnati, Ohio.



FOR STRENGTH SAFETY AND QUALITY OF MATERIAL.

Northwestern Horse Nails

ARE THE BEST ALL AROUND

The most perfect in form and finish. Made of the best Swedish Iron. Will hold a shoe longer than any other nail made. Note the re-enforced point—makes it easiest to drive and the safest to use.

UNION HORSE NAIL CO., CHICAGO, ILL.



Did you ever want to tighten or loosen a nut that you couldn't reach with an ordinary wrench? That's the time you need LITTLE GIANT Bit Brace Nut Wrenches. They get into all sorts of corners, and every smith and carriage maker ought to have a set. May we have YOUR order?

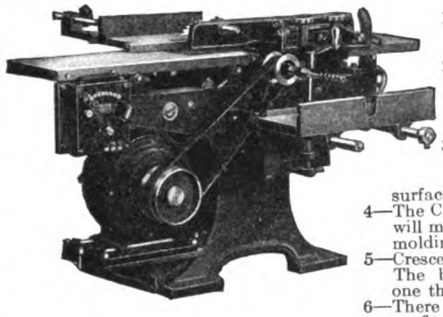
"Their Use Becomes A Habit"

WELLS BROTHERS COMPANY

GREENFIELD MASS. U. S. A.

NEW YORK CHICAGO LONDON

CRESCENT MACHINES



1—Are best for your use because they are convenient, strong and durable.
2—One customer says the Crescent Variety Wood Worker paid for itself in less than one year. It will do the same for you.
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6—There are five sizes of Crescent Band Saws, and one of them will help make more profit for you.
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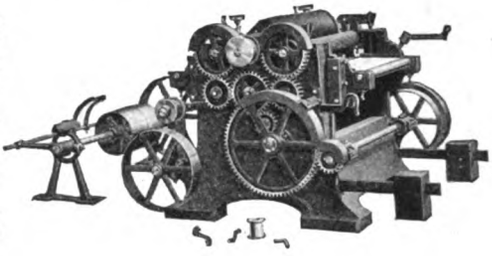
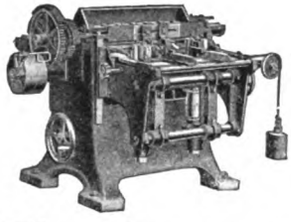
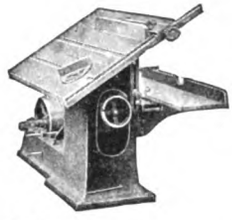
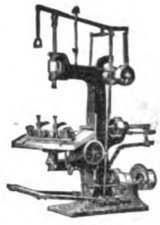










The Crescent Machine Co., 245 Main St., Leetonia, Ohio

"FAMOUS" UNIVERSAL WOODWORKER

A Complete Machine Shop In Itself

The "FAMOUS" Universal Woodworker is really **fourteen** woodworkers—each doing a different line of work—combined on one base because of the low cost of purchase and economy of maintenance. It is **the only** woodworker for Blacksmiths, because of the wonderful adaptability to so many kinds of work. Blacksmiths have long waited for this wonderful proposition. At last they can obtain a machine that's a felloe rounder, or a reversible shaper, or a dozen other machines, by making a few simple adjustments. Ordinary, everyday business sense is against buying fourteen expensive machines when a small investment buys one which does the work of fourteen. It's not business economy to waste all that extra floor space. Next to having our Woodworker installed in your shop is sending for our catalog. Kindly write for particulars **today.** :: :: :: :: :: :: ::

The Friction Reversible Shaper Spindle

is our latest great feature, and one that makes the "FAMOUS" the perfect Woodworker for the blacksmith's shop. Every blacksmith needs a reversible shaper. The reversible shaper attachment enables various extra kinds of work to be done, such as shaping out all kinds of wagon hounds, wagon felloes, or anything with an irregular curve necessary to use on wagons, buggies, etc.

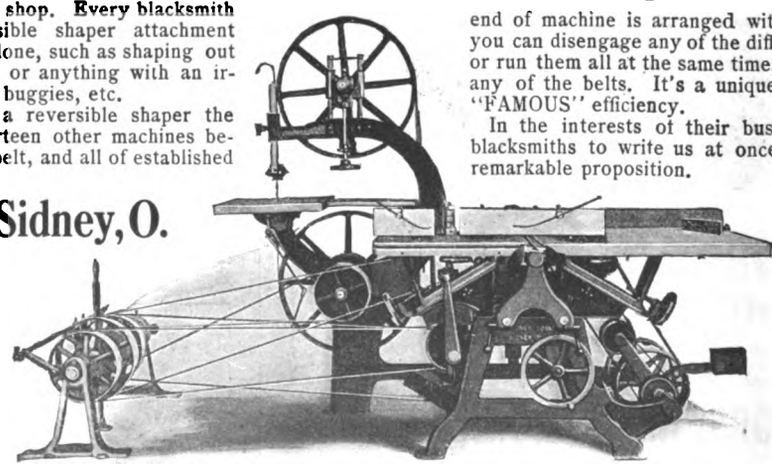
But don't forget that besides being a reversible shaper the "FAMOUS" Universal Woodworker is thirteen other machines besides, all driven by one motor, or by one belt, and all of established merit.

The New Friction Counter-Shaft Setting on Band Saw

end of machine is arranged with friction so that you can disengage any of the different attachments, or run them all at the same time, without changing any of the belts. It's a unique device, typical of "FAMOUS" efficiency.

In the interests of their business, we ask all blacksmiths to write us at once for details of a remarkable proposition.

The Sidney Tool Co., Sidney, O.



14

Machines in ONE

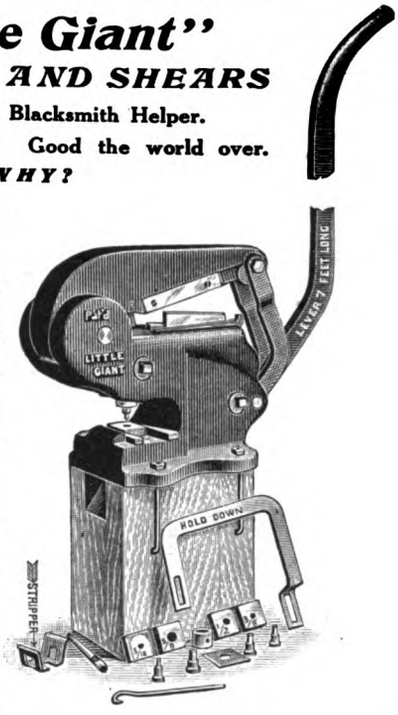
Every Blacksmith Needs One

"Little Giant"
PUNCHES AND SHEARS

Better than a Blacksmith Helper.

Over 3,000 in use. Good the world over.

WHY?



Kei Road, Cape Colony, S. A., Aug. 12, 1909.
Little Giant Punch & Shear Co.,
Sparta, Ill., U. S. A.

Dear Sirs: — Enclosed please find Money Order to the value of £1-11-0 in settlement of your acct, The Punch and Shear came safely to hand last Monday and I am very pleased with it indeed. If I can at any time sell one I will do so and will try to do all I can to forward the sale in the Cape Colony. The machine cost me landed here £13-10-0, and I consider it worth twice as much. I find it only takes one man to work the lever and I thought it could not be worked with less than two. I consider every blacksmith should have one, as they save a lot of labor and money.

Yours faithfully,
(Signed) pp
R. G. RISTROW.

You don't have to take our word for it, but get our booklet of Testimonials.

WRITE FOR NEW CATALOGUE

Little Giant Punch & Shear Co.
210 S. Market St. SPARTA, ILLINOIS

Have You Seen It?

The New Improved

BLACK GIANT

COMBINED UPSET, PUNCH AND SHEARS

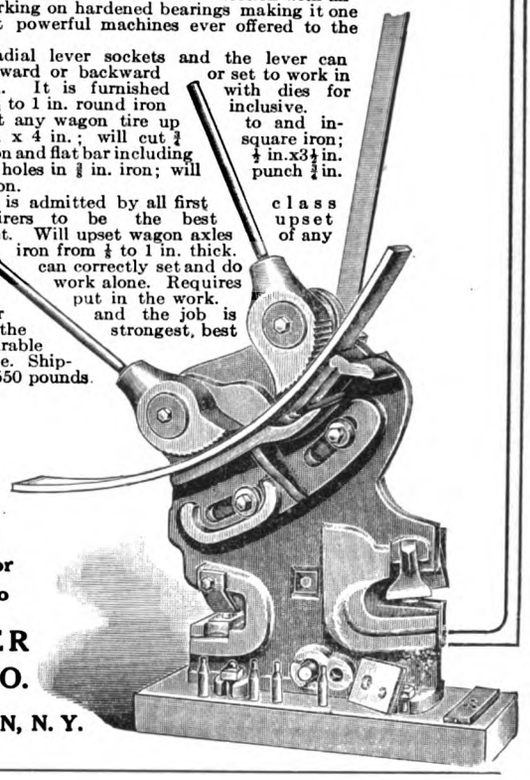
Has compound lever action and in connection with an eccentric working on hardened bearings making it one of the most powerful machines ever offered to the trade.

It has radial lever sockets and the lever can be pulled forward or backward or set to work in any position. It is furnished with dies for cutting off ⅛ to 1 in. round iron inclusive.

Will upset any wagon tire up to and including 1 in. x 4 in.; will cut ¾ in.x3½ in. square iron; 1 in. round iron and flat bar including ½ in. Will punch ⅝ holes in ⅜ in. iron; will punch ¾ in. holes in ⅛ iron.

The upset is admitted by all first class wagon repairers to be the best upset on the market. Will upset wagon axles of any kind of iron from ¼ to 1 in. thick.

One man can correctly set and do all ordinary work alone. Requires no change put in the work. Pull the lever and the job is done. It is the strongest, best and most durable machine made. Shipping weight 550 pounds.



Ask Your Jobber or Write to

LUTHER MFG. CO.

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INSIST ON "STANDARD" CALKS

BUY FROM YOUR DEALER

1895- STANDARD TOE CALKS -1910-
HIGH GRADE STEEL HOT FORGED NIB DRIVES PERFECTLY
WELDS EASILY GIVE SATISFACTION



FRANKLIN STEEL WORKS

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Placing the loop over the end of the cap and drawing the thumb lever back until it rests against the flat spring closes the coupler, keeps it closed, and takes up the wear of the leather packing.

Unless a Carriage Coupler is furnished with a moulded leather bushing and steel spring just like this it is not a Bradley.





THE

BRADLEY Carriage Coupler

All Steel, Noiseless, Quick Shifting, Ball Bearing.

The ONLY Carriage Shaft Coupler that is furnished with a

One-Piece Moulded Leather Packing

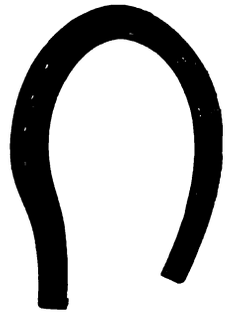
A packing that will outwear any other packing ever made. It fits the ball and socket. It is held in place by a spring steel retaining ring. It may be put on and taken off in a jiffy, and it stays where it is put.

C. C. BRADLEY & SON

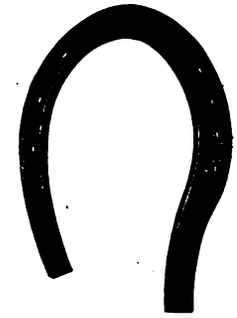
SYRACUSE, N. Y.

Boss Steel Countersunk Side Weight Shoes

A DROP FORGED SHOE OF EXCEPTIONAL MERIT



45 per cent more weight on the heavy side

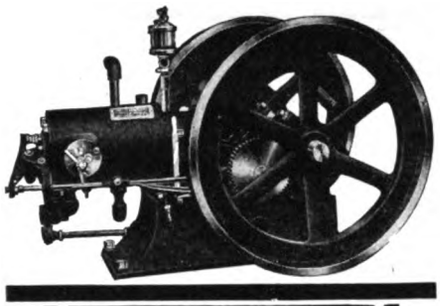


No. 1	Light	weighs	9	ounces	No. 1	Medium weighs	10½ ounces
No. 2	"	"	10½	"	No. 2	" "	12 "
No. 3	"	"	11½	"	No. 3	" "	13½ "
No. 4	"	"	14	"	No. 4	" "	16 "

These are packed in wooden boxes, each containing 10 pairs

Manufactured by

Bryden Horse Shoe Co., Catasauqua, Pa.



Some Engines Are Cheap

others are expensive at half the price. Some engines are easy to sell, stay sold, and sell others in the same locality. Of others, one in a locality is enough.

High quality ECONOMIZERS win.

Want to know more? Ask

H. L. CHAPMAN
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OUR ROTARY WELL DRILL

turns its own rope and cuts fast. One man and one team does the work. Increase your savings by reducing cost of operation. Address,

FORT SMITH WELL DRILL MFG. CO.
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Leading Blacksmiths
USE
STAR STEEL SHAPES
Solid Cast Crucible
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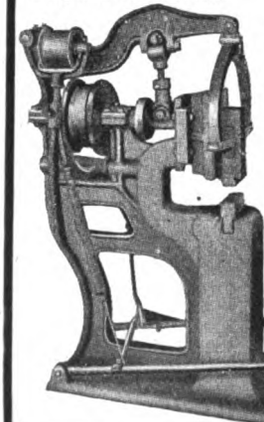
Write Your Jobber Today. Made by
Star Manufacturing Company
CARPENTERSVILLE, ILL.

The Sterling Hammer

The Sterling Hammer is built for business It is exceptionally strong, durable and simple in construction.



It has the weight and has the strength just where it is most needed.
It has the necessary adjustments for a wide range of work.
It is at all times under perfect control of the operator.
It has fewer parts than any other Hammer of equal capacity.
FULLY GUARANTEED.
Write for price—it will surprise you.

STERLING MACHINE WORKS
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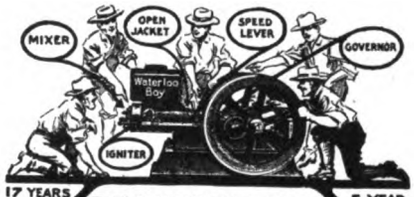

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THE WATERLOO BOY

has all of the good points that go into any gasoline engine besides many exclusive patented features. A few days' trial will enable you to point out the superior points that make the

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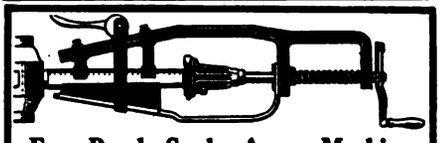

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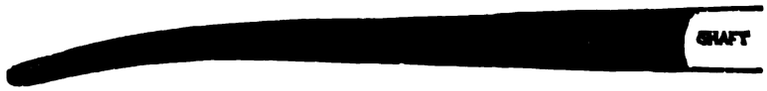

Don't let yourself become side-tracked with the idea that any old thing will do on a repair job. Many a shop is hung up and out of the running because the blacksmith stays in the old cheap rut, while the other fellow with his eyes open booms along to prosperity.

"PIONEER" SHAFT ENDS are the Standard Repair Socket on the market today. Representative shops use them because they're THE BEST. Specify "PIONEER" next time you order and note the difference.

Made in three sizes—Buggy, Light Buggy and Surrey, by

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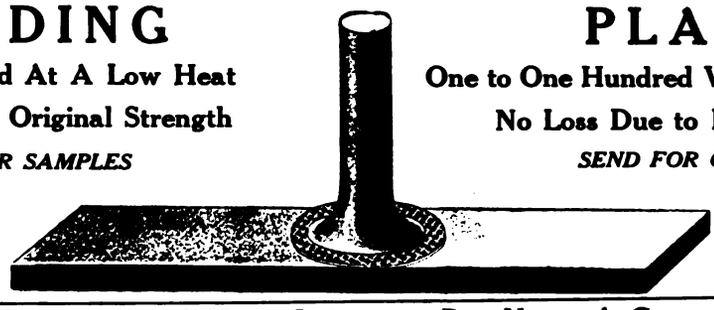

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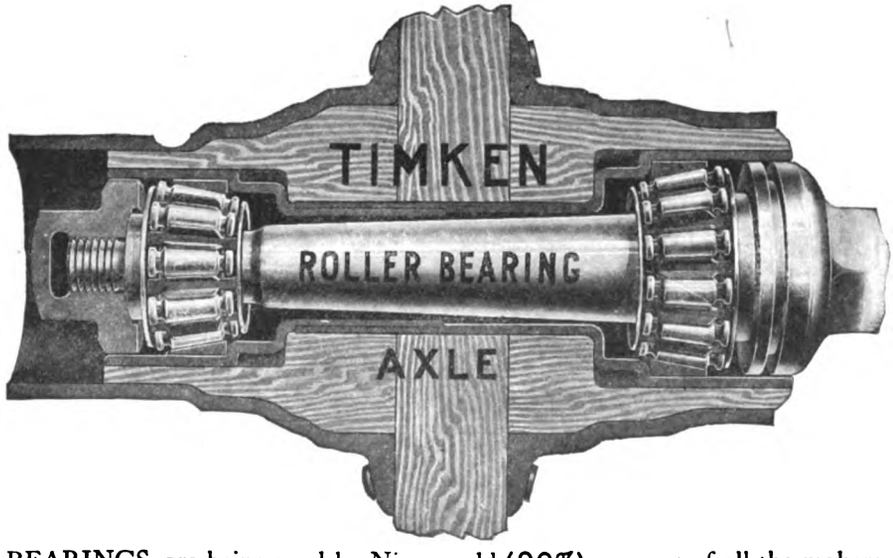

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They can be fitted to all classes and styles of carriages and wagons, adding a selling value to them. And this live dealers know.

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require little or no adjustment—are easily gotten at—are simple and fool-proof, requiring oiling but once a month, and are sold under a two years' guarantee.

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The Annual Shop Number.

The annual shop number of "Our Journal," of which this is the fourth, has always proven very popular with "Our Folks," and, while the shop number of last year was a very excellent one, we believe there are many reasons for calling this one the best one yet published. We say this, not because we like to pat ourselves on the back, but because of the loyal coöperation of our readers, which makes this number possible. We desire to heartily thank every one of "Our Folks" who has had a part in the production of this issue. If you do not think this number right up to the mark kindly tell us so. If you have a criticism to offer, a suggestion to make, kindly write us fully concerning it. A suggestion or two may possibly help us in making the next shop number still better and more to your liking. We are always desirous of improving the paper with each issue, and when you have a suggestion or improvement in mind just write us about it.

From Alaska to Australia.

From Alaska to Australia have the best of the world's craftsmen placed the stamp of approval on THE AMERICAN BLACKSMITH.

Alaska says: "THE AMERICAN BLACKSMITH is A No. 1. I wish it would come every week."—W. H. Connors.

Australia says: "I like THE AMERICAN BLACKSMITH—I never read so good or cheap a paper before. The Australian paper is nothing compared to yours, and it costs over twice as much as yours."—P. Witt. And here are just a few—a very few—words from other members of the good old craft.

Robert Woods, of Liverpool, England, says: "Your Journal is a household word with our family."

William H. Miller, from the "Show Me" State (Missouri), says: "THE AMERICAN BLACKSMITH is one of the best tools in the shop—I could not dispense with it."

And from Texas, Mr. J. H. Reddell says: "I like the paper fine, though I have received but two copies of it. I can hardly wait for the next issue."

Does this testimony mean anything to you? Tell your neighbor. Just drop in on him some day with this copy of "Our Journal." Show him what we are doing for you and the craft, and when you come away bring his subscription order with you.

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Books on the Auto.

Just a word to those of "Our Folks" who are taking up or have taken up automobile repairing. There have been very few good books written on the subject of automobile repairing, yet there is, perhaps, no subject just at present upon which good information is more in demand. Our book department has hunted for good books on automobile topics ever since we began the automobile department, but not until recently have we been satisfied. Now we believe we have an excellent library on automobile work. We have sold a considerable number of the automobile books that we are now advertising, and have yet to hear of one displeased purchaser. And every book that is sold is sold on the same guarantee of money back if you are not satisfied.

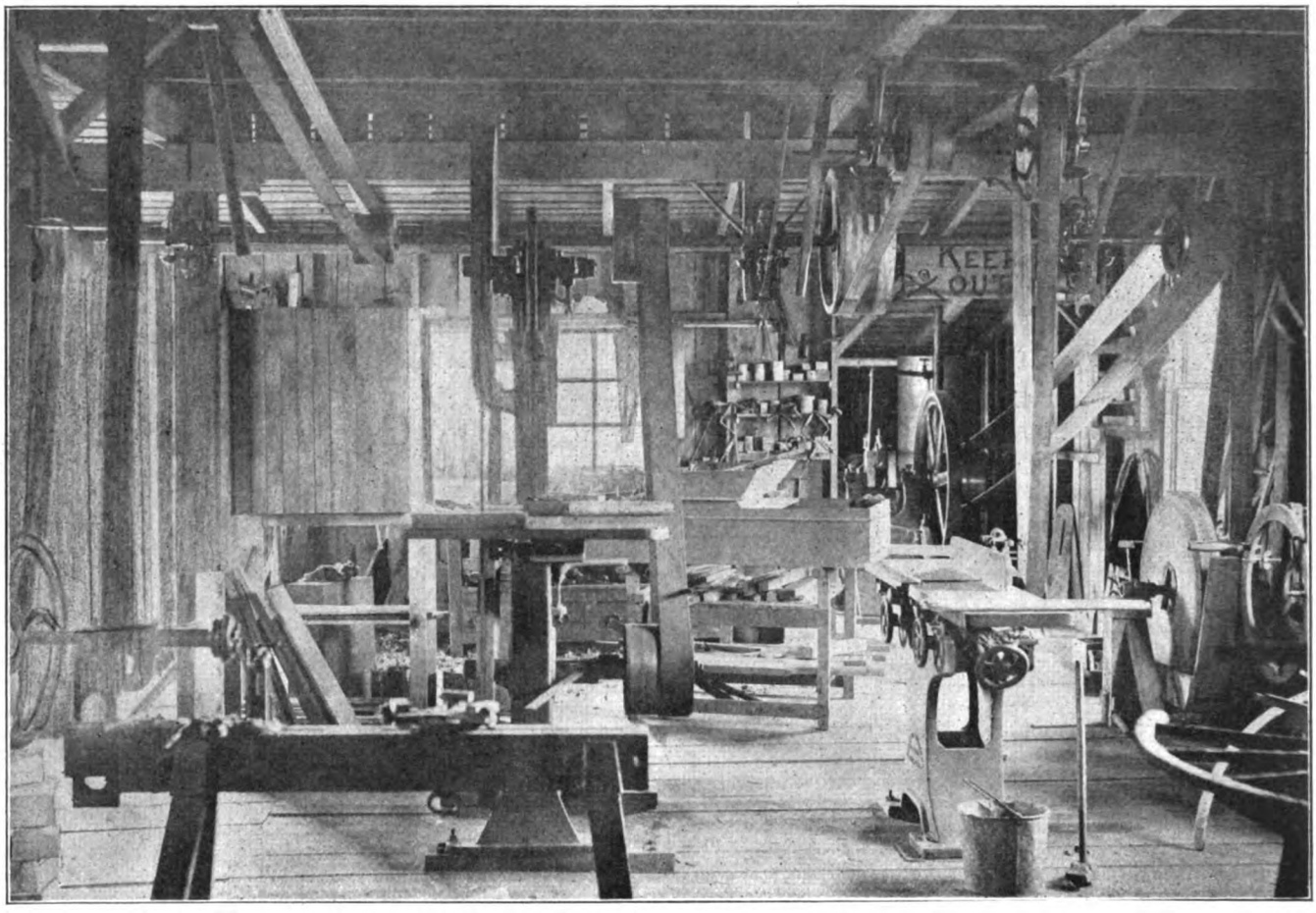
If you want a book on automobiles, or any other subject, just write our book department. We can give you valuable help in selecting just the book you want.

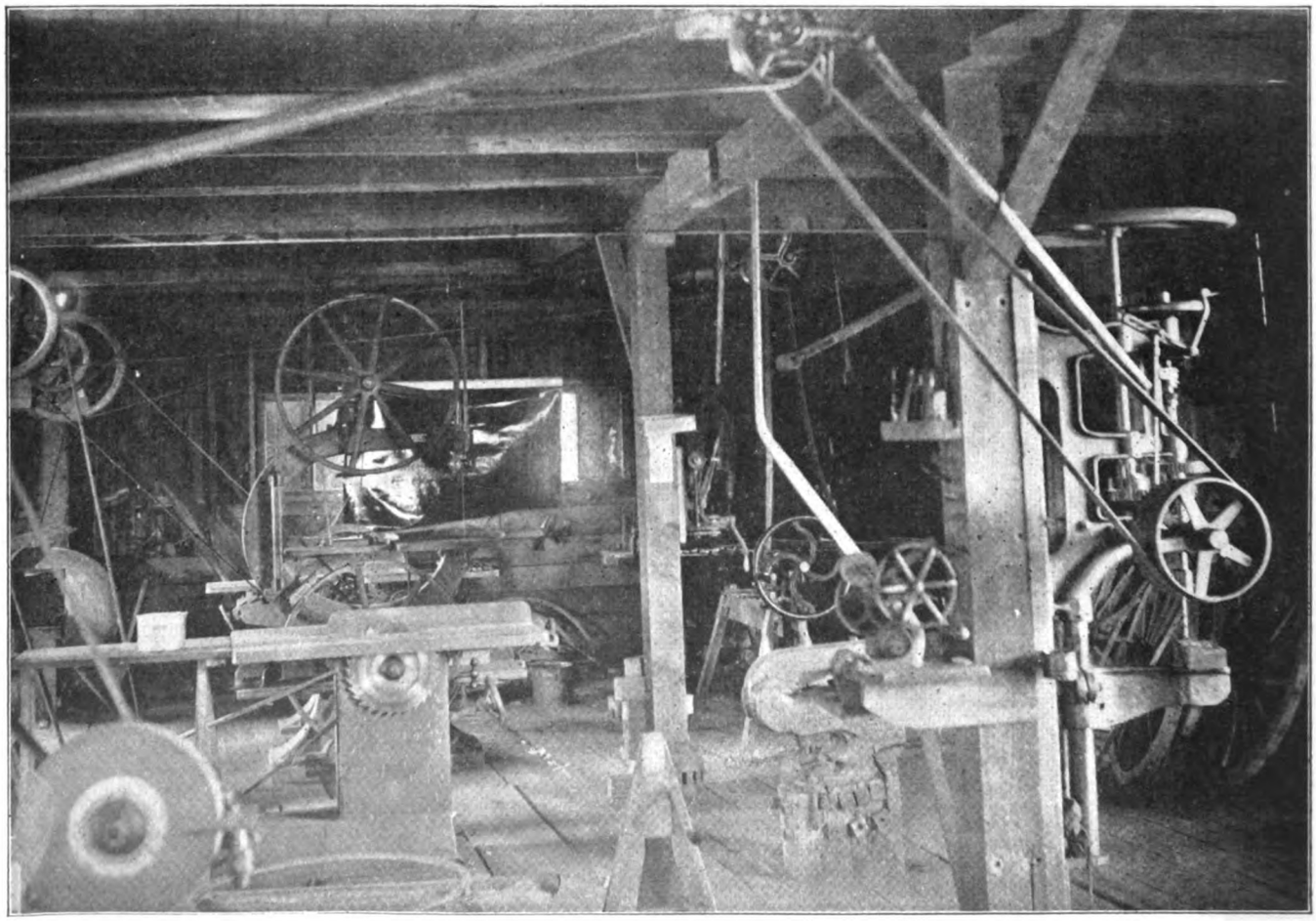
Your Pink Buffaloes.

How is your stock? Don't ever allow yourself to run out of them. When your stock gets low, ask for more and use them freely. We've got a big batch of them here at Buffalo. Don't ever allow a letter to go into the mail without a pink buffalo on it. Remember "Our Pink Buffaloes" protect you—they insure you against loss. So, use them freely on your letters to jobbers, manufacturers and brother craftsmen.

Are You In Need.

Are you in need of any items of shop equipment? Do you want any tools, machines or supplies? If you do, just let us know what you want and about when you will want it. Whether or not the material is advertised in "Our Journal," we can put you in touch with reliable manufacturers or dealers. If you want special information, descriptions of machines, catalog prices, or want anything else connected with blacksmith shop equipment, let us know, and we will put you in touch with the right firm. This will save you considerable trouble and expense, and this service is, of course, without charge to "Our Folks"—simply one of the links in our chain of satisfactory service to subscribers.





THE WOOD-WORKING DEPARTMENT OF R. C. KISTLER AND BROTHERS' TENNESSEE SHOP IS WELL EQUIPPED WITH POWER MACHINES

The Ideal Shop

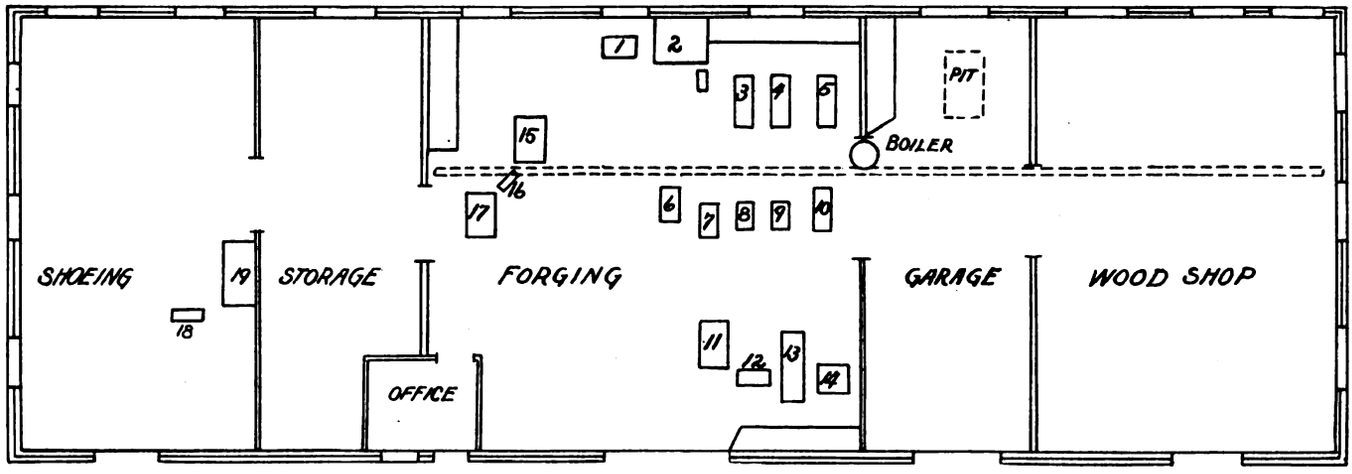
The Location, Power Used and Equipment

DAYTON O. SHAW

THE first important thing for an ideal shop is the location. I would choose a smart manufacturing town, one that is increasing in growth and where business seems to center. Having found the town, I would endeavor to get my shop as near the center of trade as possible and have it face the street. Then I would have a sign on each department, so large that those who run may read. Having found the location, the next question is, "What shall we have for power?" I would choose steam for several reasons. It is handy for the woodworker, for sweating or drying lumber; it is handy for the blacksmith to remove strains from steel or to warm his baths; it can be used to heat the shop below and aloft. For the shop I have in mind, I think a 15-horsepower boiler and a 10-horsepower engine would answer the purpose. In the ground plan the reader will see that I have placed the boiler and engine between the machine room and the garage, with a main shaft running through the center of all departments, except the store room and the shoeing shop. The power can be taken from the main shaft for machines in the center, and from counter shafts on the side.

Now, let us visit the different departments. First, we come to the shoeing room. The forge is placed near the center of the back side, facing the door, with bench and tools necessary for that work near by. Next, the store room. Here are racks for iron and steel, cupboards and tills for nuts, washers, bolts and pipe fittings; also pipe racks. I would carry a small line of hardware, such as cable chains, picks, bars, and so forth. Next comes the forge shop. The office opens into this part and also has an outside entrance. The floor of the forge shop should be cement. Here we find the power hammer, the anvil, the big forge, a furnace and necessary baths; also swedge blocks and mandrels. Then there is a space left for machines, wagons and repair work of any kind. It is handy for either the blacksmith or machinist. On the back side of the shop is the emery wheel and a forge for babbitting or brazing. Then there are the tool lathes. One of these should be a large, heavy machine for handling heavy work. These lathes should be set in line right and left hand, and far enough apart to take a 16-foot shaft. This is done by taking the tail stock off the No. 1 lathe and turning the tail stock on No. 2 lathe around, so that the center will point toward the head of No. 1. You will need to do this very often in truing up shafting. Beyond these is the planer. In the center is the speed lathe, upright drill, tire turner, tire upset and punch and shear. Down the other side is the pipe and bolt cutter, the hack saw and a first-class screw cutting lathe. This lathe is used for tool making and no green-horn should be allowed to fool with it. Then comes the miller machine, engine and boiler, coal bin and the garage, with the pit inside and oil-tank outside. We now come to the wood shop. I intend to have such machinery here, that one can take stock from rough lumber and finish it complete for wagons, carts, wheelbarrows, sleighs, etc. As I am not much of a woodworker myself, I think I would consult my wheelwright before buying this machinery. Over the woodshop is the paint shop; over the garage is a room for finished work; over the blacksmith's rooms is a place to store second-hand articles for repairs.

Now the reader may ask, "What is the advantage of this combination?" It is simply this: You get all the side lines you want in your own shop. In other words, one department gets work for the other. To illustrate, take a sign board. The board is made by the



THE IDEAL SHOP

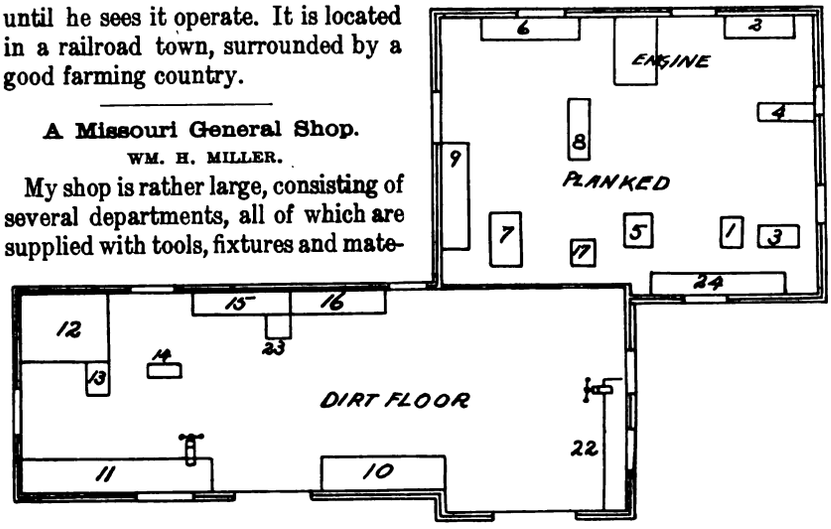
1. Represents Emery Grinder
2. Forge
3. Lathe.
4. Lathe
5. Planer
6. Punch and Shear
7. Tire Upsetter
8. Tire Rolls
9. Drill
10. Speed Lathe
11. Thread Cutter
12. Hack Saw
13. Lathe
14. Milling Machine
15. Forge and Furnace
16. Anvil
17. Power Hammer
18. Anvil
19. Forge

until he sees it operate. It is located in a railroad town, surrounded by a good farming country.

A Missouri General Shop.

WM. H. MILLER.

My shop is rather large, consisting of several departments, all of which are supplied with tools, fixtures and material. The engine room is complete with modern gasoline engine, etc., and I have emery wheels, drill, two forges, band saw, planing machine, Brooks cold tire setter, hot tire shrinker, wood saw, power blowers, tire bender, etc. The horseshoeing and woodworking departments are complete and convenient. The main building (page 239) is 20 feet by 55 feet and an "L," 14 feet by 18 feet.



THE FLOOR PLAN OF A WELL EQUIPPED SHOP OF TENNESSEE

The Floor Plan of a General Shop of Tennessee.

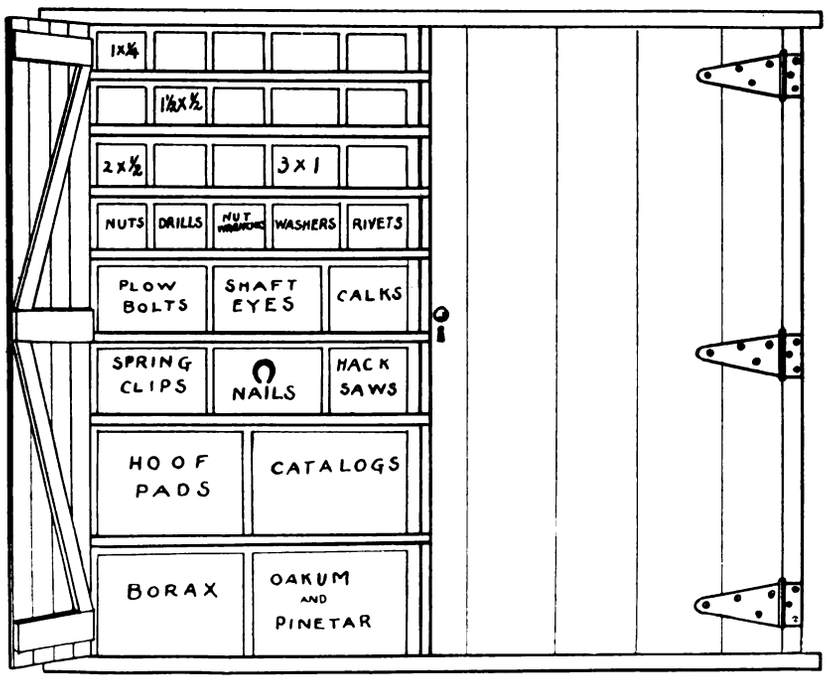
MACK C. HARNED.

The accompanying engraving shows a floor plan of my blacksmith and wood shops. No. 1 represents the drill press; 2, the iron lathe; 3, the emery wheels; 4, spoke tenoning and boring machine; 5, band saw; 6, cut-off saw; 7, shaper; 8, sanding machine; 9, jointer; 10, iron rack; 11, vise bench; 12, forge; 13, blower; 14, anvil; 15, bolt case; 16, bench for bender; 17, wheel bench; 18, spoke rack; 19, planer and moulder; 20, 8-horsepower portable engine; 21, rip saw; 22, woodwork bench; 23, tire setter; 24, wood lathe.

I do all kinds of work in the blacksmith line, except horseshoeing, and get out all kinds of building material in the woodwork line. I now have a horseshoer hired who will begin work as soon as I can complete a house for him to live in.

I have worked this business up myself, having never worked a day in any shop other than my own. When I happened to be in the shop of another I watched all operations closely, and almost always caught on to some of the tricks.

I live in a rural district and have always, with the exception of a few months, worked alone. Prices are very low here as compared with some of the prices listed in "Our Journal;" still, I dig out about $1,000 per year. With my planing mill I can easily make $12 to $15 per day. Each of these machines being portable, I move out in the country to good-sized jobs and make good money.

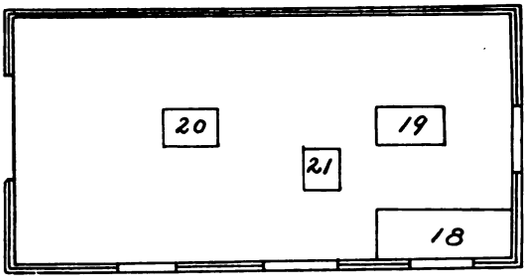


A VALUABLE SPACE AND TIME SAVER FOR THE MODERN SHOP

A Cabinet for Small Parts.

H. E. ANDREWS.

The engraving shows a very handy cabinet for bolts, nuts, nails, calks, etc.



It saves valuable space in the shop and keeps these stocks where you can find them when you want them, and it also prevents loss through carelessness.

The cabinet may be made any size, using lumber of a size that is suitable. The shelves should be well supported, so as not to sag, and, if well made this cabinet will last a good, long time.

It can be made practically any size to take care of simply the very small parts, or you can make it large enough to include pads and even some tools. The average smith will find it best to make the cabinet so as to include all the parts he possibly can; for it is equally convenient for very small as well as the larger parts.

Some may think the doors a nuisance, but I find that it keeps the material cleaner, and that is a great convenience at times.

Of course, if a smith is content to pick his supplies out of a general box, from amongst hoof shavings, anvil dust, cinders, and the like, he can't use one of these cabinets.

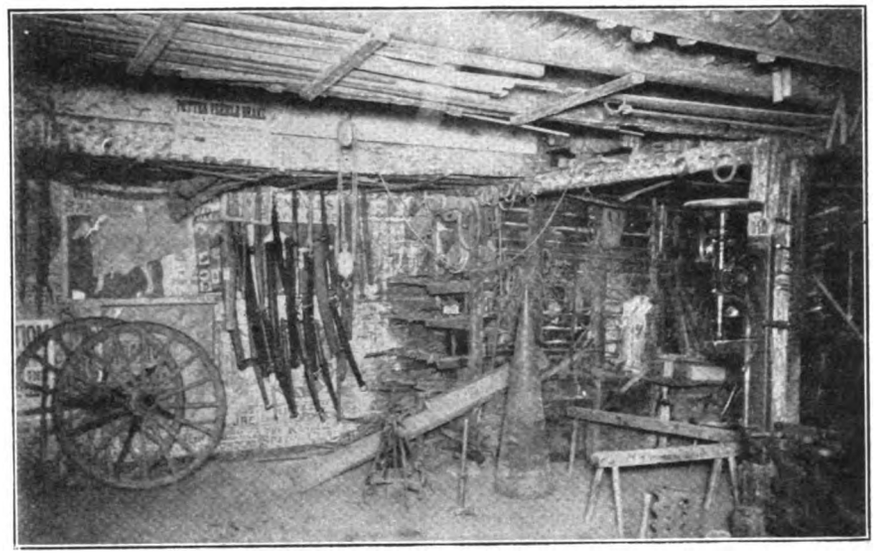
An Old Smith Shop of New York State.

J. HARVEY HANFORD.

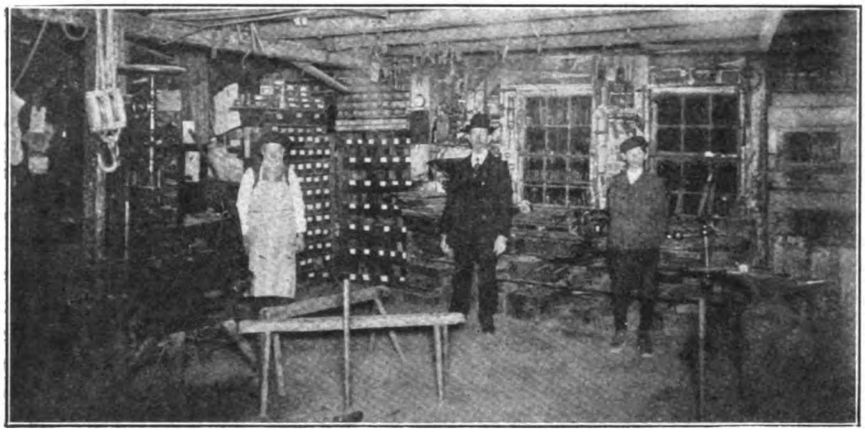
The accompanying engravings show two interior views of my shop. In the first picture at the left is a tackle block suspended from an iron rod that runs from end to end of the room, so the blocks can be slipped along and used at any point for very many purposes.

Near one block is my drill press and underneath that, a combined shear, punch, bender and tire upsetter. A pressure of 100 lbs. on lever gives 50,000 lbs. on shear and 72,000 on punch, and I can with ease cut 1⅝-inch by ⅝-inch iron and punch ⅞-inch hole in 7/16-inch iron. Back of these, but not visible are my desk and office room. Next to the shear is myself, seventy-two years old, and I work every day. I have been in this shop, at one anvil and forge, for forty-eight years. The next person is my son, forty-one years old, who learned the painter's trade in this building and has never worked elsewhere. He runs his part on his own hook, with plenty of work to do. Next to him is his son Clinton, fourteen years old.

My father established the business here in 1839, the year in which I was born, and I have been here ever since, except three years spent in the Civil War. Two brothers of mine were, one a woodworker and the other a painter, and I am a blacksmith. We all learned our trades in father's shop and were in the Civil War. Another young man began when we did, learned his trade and continued working with us forty-five years. All are now dead but myself.



SOME OLD SHOPS PRESENT A NEATER INTERIOR THAN DO MANY NEW ONES



A 72-YEAR OLD SMITH RUNNING A BUSINESS ESTABLISHED 72 YEARS AGO

Back of me is a cabinet with drawers and pockets for bolts, etc. This cabinet is arranged so as to close one half upon the other, like a suitcase set on end, the left side of which closes on the right side. On the back of this hinged left side are drawers holding all sizes of rivets, felloe clips, nails, etc., etc. The closet is 6 feet high, 3 feet wide and 2 feet deep, and contains 345 drawers—very much in a little space. Behind my son and grandson is my work bench with tools hanging up in the racks in windows. Over these windows is a large skylight. Under the bench are boxes for various things and to the right of the bench is the anvil, with a door back of it. Still farther to the right, is the forge, with a window right over it, so that the shop is well lighted.

The other picture shows another corner with shelves and hooks for keeping things off the floor. One of my hobbies has always been "to have a place for everything and everything in its place," and a clean shop as far as possible. Often men and women come in, and, failing to find everything scattered around and the floor covered with dirt, as is the case in most shops, ask, "Will you please tell me where Hanford's blacksmith shop is"? Adjoining this room is a large room for wood work, containing four work benches, jig saw and turning lathe, run by horsepower. Adjoining this are lumber sheds—with from five to ten thousand feet of lumber being seasoned—barn, wagon sheds, storage rooms, etc. Over the wood shop and sheds are four large, well lighted rooms for painting.

An Oklahoma Power Shop.

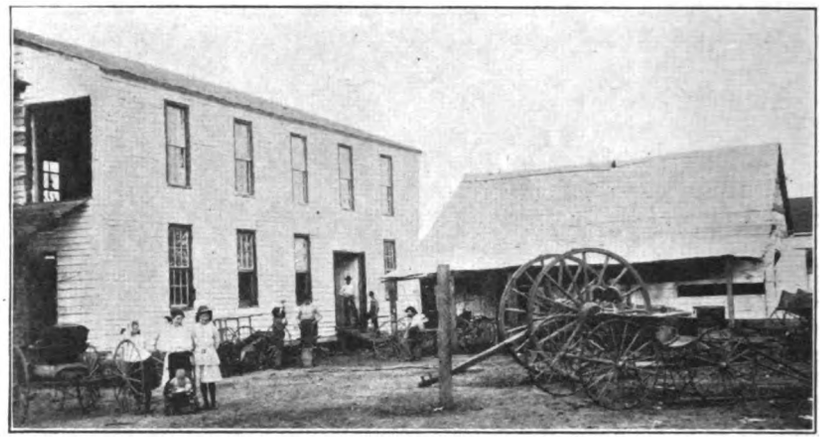
GILBERT & ENDAILY.

The accompanying photograph is an inside view of the front portion of our shop. We do all kinds of blacksmith work and new work also. Engine repairs and flue welding is one of our specialties. Our shop is 22 feet by 70 feet. A



A POWER SHOP OF OKLAHOMA WHERE GENERAL SMITHING IS DONE

4-horsepower gas engine produces our power, and we possess a power hammer of our own make, an emery stand, a drill lathe, a circle saw and a spoke tenoning machine. In fact, we do almost everything by power. In the photograph I am shoeing the horse; my partner, Mr. Endaily, is standing by the anvil. The other parties are customers.



A GENERAL SHOP OF ILLINOIS RUN BY GAS ENGINE POWER

A Business System in a Well-Equipped Shop.

J. T. WILSON.

My shop equipment consists of two emery wheels, a band saw, rip saw, planer, wood lathe, drill and grindstone, all run by a 3-horsepower I. H. C. engine.

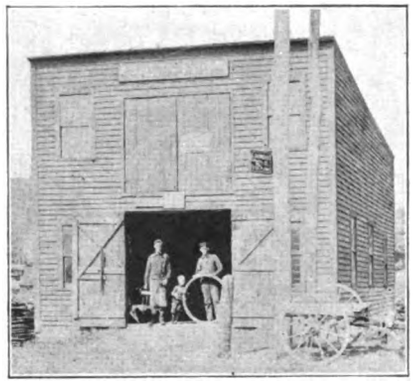
In my iron department I have two No. 400 forges; one hot tire shrinker and a cold tire shrinker, but it does not pay me down here, as we have so much sand and tires get too thin for it. It is perfectly O. K. for thick tires. I also have a bolting machine for taking off and putting on tires. With my force I can take off and shrink a set of buggy tires in forty minutes, and we can put on a set of spindles in eighty minutes from the time we start until the buggy is ready to go again.

I get $.25 a foot for shoeing, $.50 apiece for shrunk tires, $.25 for trimming a horse's feet all around, and $2.00 for clipping. I possess a Steward Clipper and it works excellently. My men are paid from $2.50 to $3.00 per day.

I keep a day-book in order to know each day what I have made, and I do not enter a job until it goes out. For instance, this is the plan of my book:

	work	material
A-wheel filled,16 spokes	$2.50	$.80
B-one set spokes.....	5.00	1.25
C-one tongue.....	$1.50	$ .40
D-shoeing horse.....	1.00	.25
E-straighten buggy axle	.50	
F-one plow beam.....	.75	.20

and so on. When night comes I set down all my labor, add up the work and deduct the expense of material and labor and find out what profit I have made.



H. A. LANGWORTHY DOES A GENERAL BUSINESS IN HIS YORK STATE SHOP



MR. J. T. WILSON'S ILLINOIS SHOP IS WELL EQUIPPED

When the end of the month comes I add up the totals and put it on my ledger. When the year is out I add up all the months, then deduct, and thus find out what I have done for the year. For instance, for 1909 my books told me my labor amounted to $870.20; material, $646.25; work, $3,601.72; and profit, $2,101.12. I am getting very good prices, but I wish they could grow a trifle better.

Soliciting Business and Collecting Accounts by Mail.

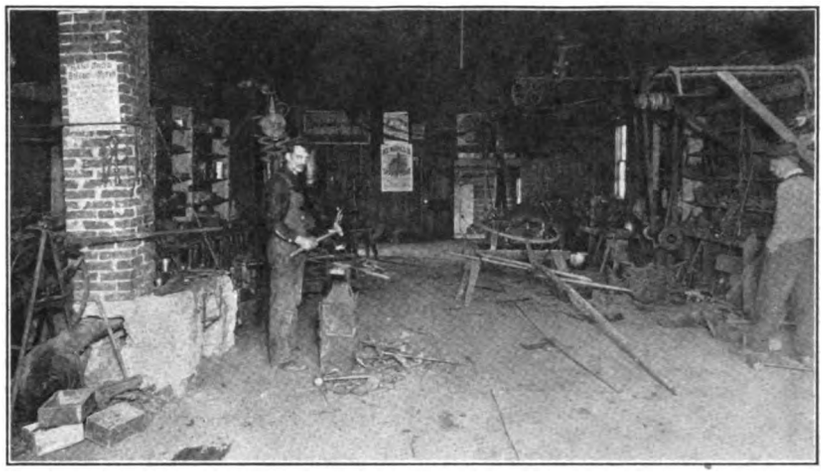
A Series of Straight-to-the-Point Articles Illustrated with Letters that have "Turned the Trick."

BY THORNTON.

Letters may be divided into two classes, viz.: those that are simply sheets of paper bearing collections of words and those that seem to be living, talking things. Needless to say, it's the latter class that gets the business and that's the kind you want to write. The days are past when you "beg to state" or "have the honor to inform," etc. Those expressions don't mean anything. They have gone the route of the bellows and other out-of-date equipment. When you write a letter to a man asking either for money or patronage you write to get his attention. And to get his attention your letter must be attention-compelling.

If you discovered a neighbor's house on fire you would not walk leisurely up to his front door, ring the bell and then ask for Mr. Jones. And when he appeared you wouldn't say: "Mr. Jones, I have the honor to inform you that your roof is afire." No, of course, you would not—it sounds ridiculous. You would turn in an alarm and tell Neighbor Jones in the quickest and best way.

Now that's just the way to write a letter. Think about what you want to say until you are just afire with enthusiasm for your proposition. Then yell



MR. DAVIS ALSO TAKES CARE OF DISABLED AUTOMOBILES

Fire!—not in so many words, but in that spirit, and tell your story as though you were talking face to face with your man.

For instance, how often have you read, and perhaps written, a letter somewhat along these lines:

DEAR SIR:—I have the honor to inform you that I have just located in the shop formerly occupied by Bill Taft. I have taken over Mr. Taft's business and you will find me always ready to do expert shoeing, general repairing and vehicle work. I will deem it an honor to serve you to the best of my ability at all times, etc., etc.

Nice and dignified isn't it? But where is the reason for the would-be customer to come to you? Why should he trade at your shop? That letter certainly hasn't said a word why a man should come to you. Contrast it with this appeal:

DEAR SIR:—My ideas on how a horse should be shod didn't grow over night. They are the result of seventeen years of study—study beside the forge, under the animal and beside the reading lamp. And now that I have secured the shop opposite the Post Office I want to shoe your horses.

If I couldn't shoe horses right do you think Dr. J. L. Adams, of Wilbur, where I was formerly located, would say what he does about my work?

You want your horses shod right and you want them shod when you want them shod. Send your next shoeing job to me—if you are not satisfied I'll stand the cost.

Yours very truly,

Which of these letters do you think will bring the man to your shop? "But," you say, "you make a bid for shoeing business only." Yes, of course. That's the advantage the second letter has over the first. Don't try to talk up every line you carry in every letter you write. Take up one line at a time. Clinch each argument so that it stays clinched. You can't fasten a shoe to a horse's foot by attempting to drive all the nails home at one and the same time. Then don't try the same thing in your letter-writing. Talk on horseshoeing in one letter, then in the next one tell how well equipped you are for taking care of vehicle repairs. After that you may talk about the good buggies you can build. And in this connection I am reminded of a letter I came across the other day. It read about as follows:



EXTERIOR OF E. W. DAVIS'S SHOP OF KANSAS

DEAR SIR:—I wonder how your ideas and mine would agree on the matter of buggies. I wonder if a buggy that I built for myself would suit you.

I built a new buggy for my own use and finished it about two weeks ago. The first Sunday the Mrs. and I drove up to her folks at Dayton and while there Mr. Brown, the grocer, offered me five dollars more than the regular price and I let him have it.

When I got home on Monday I immediately got the boys started on a few buggies of exactly the same description. One of them I am going to use myself—do you want one of the others?

These jobs are now nearing the finished state and I want you to see just what kind of stock is going into them, whether you buy or not. I know that after you see what I am putting into these vehicles you will call on me when you want a good buggy.

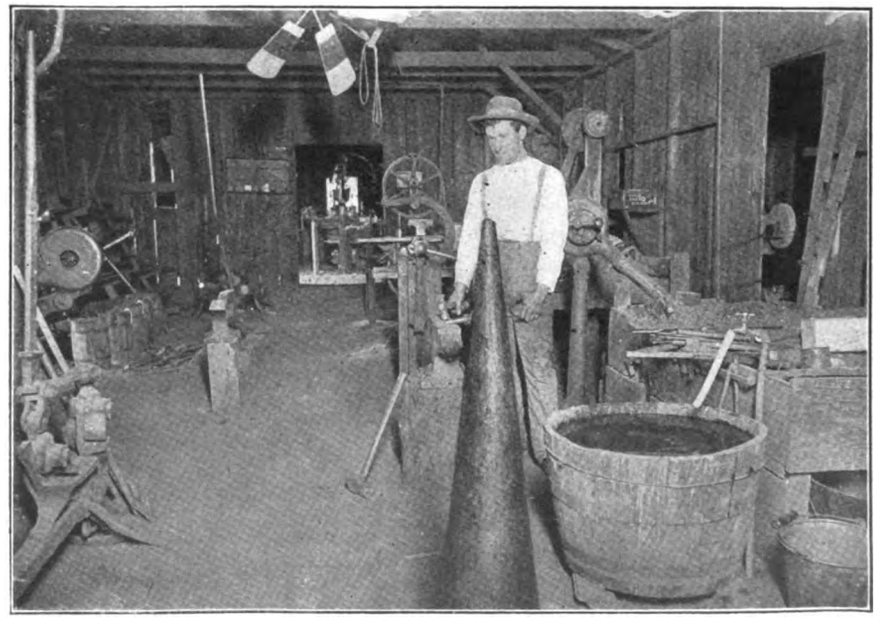
Just drop into the wood-working department in the next day or two. I'll be in the shop to explain anything you may want to know.

Yours very truly,

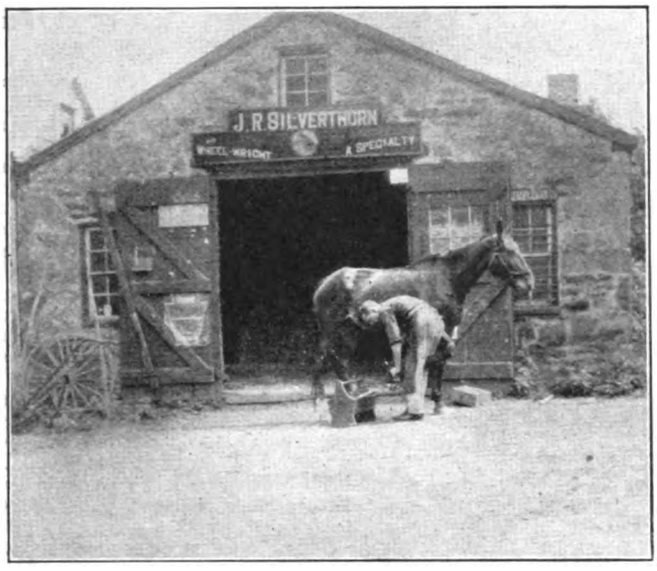
This letter is commendable because of its personal nature. A letter of this kind interests a man because it speaks to him just as you would speak to him in your shop. And, generally speaking, if you will write your letter just exactly as you would talk to the man you will usually write a good letter. For instance, suppose you were going to announce that you had recently added an expert horseshoer to your force. You wouldn't say:

"I take great pleasure in announcing that I have recently been very fortunate in securing the services of Mr. Charles Trimmer, who has had several years' experience in some of the best shoeing shops in the country. He is a graduate of the Farriery Department of Sumpter Veterinary College and for two seasons was instructor at that institution," etc.

You wouldn't be very likely to talk



A MISSISSIPPI POWER SHOP RUN BY MR. W. W. CRAIN



A GENERAL SHOP OF NEW JERSEY RUN BY MR. J. R. SILVERTHORN



A FINE APPEARING INDIANA SHOP WHERE TRADE IS GOOD

that way.—Then why write it? If you met your man face to face you would say something like this:

"I've got a new horseshoer at the shop. He is the best man I've ever seen at the profession. Charley Trimmer's his name, and Charley has had more experience in his seven years than most shoers get in a lifetime.

"He's a graduate of Hampton Veterinary College where he stayed as instructor for two years after graduating. Then he took care of some of Uncle Sam's horses for several years, shoeing animals in about all sections of the country.

"He has made a special study of diseased feet," etc.



A WELL BUILT SHOP OF PENNSYLVANIA RUN BY W. H. ALT AND SON



THE AUTOMOBILE IS KEEPING THE GENERAL SMITH BUSY IN KANSAS

Doesn't that sound more natural? There's no reason why you cannot and should not write just as you talk. Don't start your letter as though you were trying to hide something from the man. Some letters I have read seem to be written with the idea of slipping something into a man's brain without his knowing about it. The letters start out in a stiff, formal way, talking generalities and mentioning the main point simply incidentally—in a kind of apologetic manner so as not to offend the would-be customer.

When you write a business letter it is generally admitted that the man to whom you are writing is interested in what you are trying to sell—be that services or tangible articles. Then why try to slip the main point to him as though you were afraid of hurting his feelings? Suppose you were going to tell a man about the fine line of buggies you have just put out. You wouldn't straighten your tie, hitch up your trousers, brush an imaginary speck off your coat and then clear your throat and begin with your shop history in the buggy business. No-sir-ee—you'd start right off the bat with buggies. You'd tell him about the one in the stock that will just suit him. You would talk buggies and your buggies in particular.

Just one more comparison before closing this talk. When I was planning to enlarge my shop several years ago I received a good many letters and catalogs from manufacturers and dealers,—I saved those letters—in fact, I save

every letter I get, good and poor alike. The good one tells me how to write my letters and the poor ones tell me how *not* to write. How do I tell the good from the poor ones?—by their effect on me, the impression they leave in my mind.

Now, to resume, I just want to quote from two of these letters. One begins like this:

"We have been informed that you are planning to enlarge your shop, and if so, you will without doubt need some articles of new equipment.

"We wish to say that we carry a full line of blacksmith supplies and machines and can furnish complete equipments as well as any single machines or items," etc.

The other letter reads:

"You will soon be wanting supplies for your enlarged shop. And you know how trying it is to order equipment from five or six different houses. Some parts or machines are sure to be delayed and altogether it is generally a very bothersome and unsatisfactory way.

"You have perhaps thought that how much more convenient it would be to order everything from one place and have it taken care of correctly.

"That is just what we are ready to do," etc.

Which letter do *you* think gets the business?



MR. T. E. BIRCHMORE'S ESTABLISHMENT OF GEORGIA

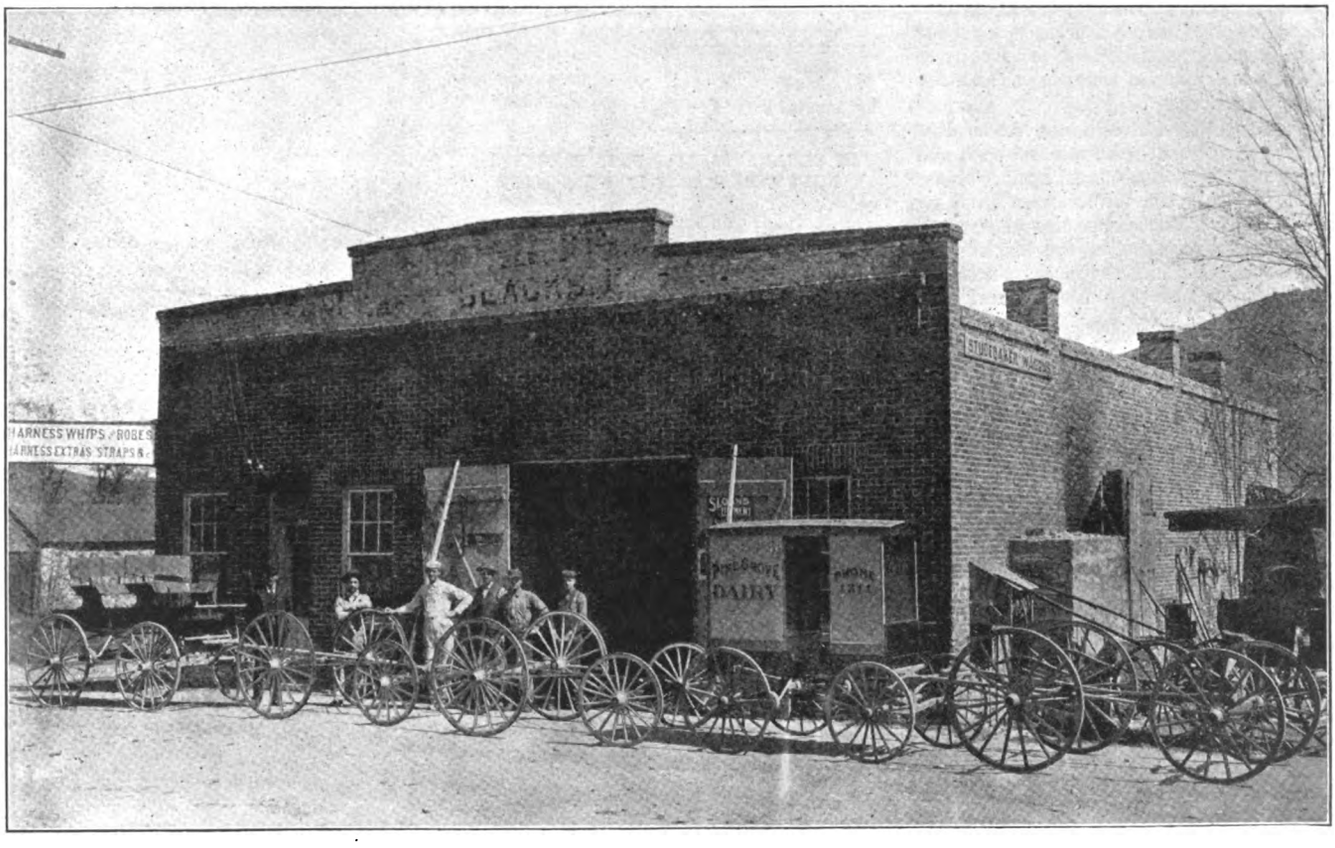


MR. H. N. MULLIN RUNS A MODERN GENERAL SHOP

Is This Fair Treatment?

A. A. ROSS.

I enclose a copy of a letter which I sent to my insurance agent. In reading it you will see that I feel we smiths are not getting fair treatment from the insurance companies. I think this matter should be agitated. The rates referred



MODERN EQUIPMENT IN A WELL BUILT SHOP IS NECESSARY THESE DAYS



A MISSOURI SHOP RUN BY MR. C. W. ARMBRUSTER AS A GENERAL SMITHY



A GENERAL SHOP IN A GOOD FARMING SECTION OF YORK STATE

to in the letter were $3.00 on $100.00 for one year, and when the adjuster raised it 25 cents I kicked. Do you blame me? Kindly publish this letter in THE AMERICAN BLACKSMITH.

DEAR SIR—I see that the policy on my shop expires the 23d of this month. You need not renew it, as I have decided not to be robbed any longer by insurance companies. When the adjuster was here he said he thought my rating was pretty high, yet he raised it twenty-five cents on each $100.

I have no fault to find with you; the rates are fixed by the companies, and you have to abide by them. The injustice is done to the blacksmiths at large. There was a time when a blacksmith's shop was a very hazardous risk to insure. Probably the time when the rates were fixed. About fifty years ago our coal was made from wood and the dust in handling it and breaking it up would fly all over the shop and lodge on the beams of the shop, and it would take fire as easily as tinder. And we would need to go into the shop at night before retiring to see if the sparks from our iron had set fire to any of the dust, and many a time we saved a fire by so doing.

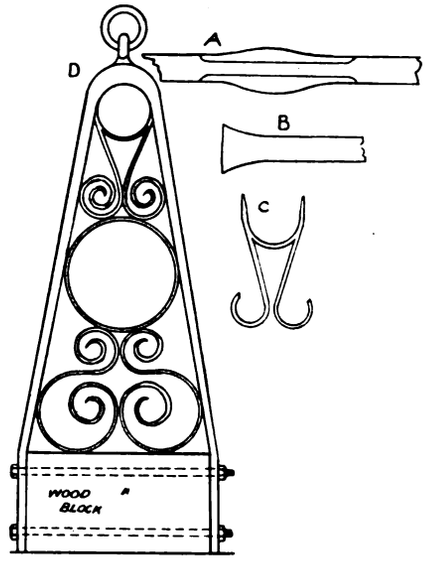
It is altogether different now. The dust flies after it is burnt from mineral coal, and is fire-proof and will not burn again. Therefore, it protects the timber from catching fire. I think if the companies understood the facts they could give the blacksmiths better rates. I think the rates on a blacksmith shop where they use mineral coal ought to be as low as they are on a barn. You never heard of a blacksmith shop taking fire by spontaneous combustion, but lots of barns are burned in that way.

This matter has not been agitated much by the blacksmiths, as a great many of them do not own their shops, but the parties owning them charge enough rent to make it up, so it comes out of the blacksmith in the end.

I should like to have you send this letter to your company and see what they think of it.

I remain as ever, yours truly,

A. A. Ross.



AN ORNAMENTAL TIE POST PRESENTS A NEAT APPEARANCE IF WELL MADE

An Ornamental Tie Post.

BERT HILLYER.

A tie post like this will be found more attractive than a cast-iron post. There is something about iron or steel, with its clean, sharp corners, connected with the fact that the article had been made with the hammer and tongs, that gives to a hand-forged post a certain fascination that a casting fails to possess. Cast iron will never take the place of wrought iron or steel where these can be used and a first-class article is required. Another advantage in a wrought post is that a horse will not eat as much off the top as they would were the post wooden. It always seemed to me that some horses, when tied to a wooden post, thought they were put there purposely to destroy it and were working at it on the piece-work plan.

The post in the accompanying drawing was made of ½-inch by 2½-inch soft steel. For the frame, cut off a piece 8 feet 6 inches long, center punch in the middle, heat it, draw out each side of mark (see A in engraving), and put in

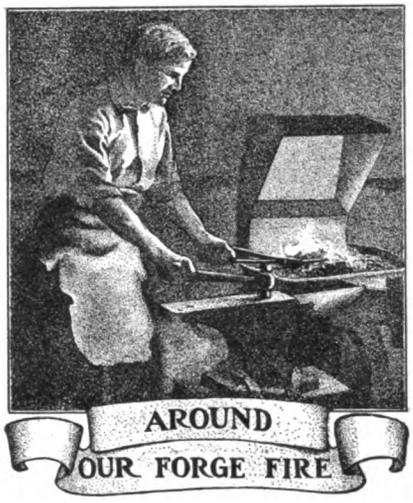


THIS YORK STATE SMITH DOES A GENERAL BUSINESS AND DEALS IN AGRICULTURAL IMPLEMENTS



MR. D. FRENYA IS LOCATED IN A PROSPEROUS SECTION OF NEW YORK STATE

swedge, hollowing inside slightly. Next, heat and bend to the radius which you desire for top of post. Now flange the part that was spread in to a rounding shape, driving it in from the outside with the hammer and making the top look heavier, as in finished sketch. The bottom is then fitted to go over piece of timber or a short post, or the ends can be turned in so as to be imbedded in concrete. Then forge a bolt with a ball on it, drill a hole through center and weld in ring to be riveted in top of post. The scrolls and ring are made from ¼-inch by 1¼-inch stock, flattened on ends similar to B in the engraving. Cut off straight across the end and bend. When bending, do not get any kinks but make the curves as gracefully as possible. The top scroll is made like C. Then set up in top so that it resembles a ring. The remainder is so easily made and bent no explanation is required. It is then riveted together with countersunk rivets, painted black, and a good, serviceable tie post has been made.



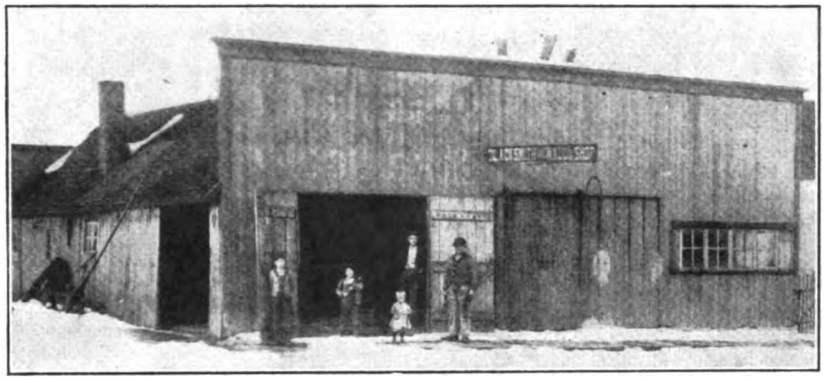
"Well, Benton, where have you been for the past week? Trying that new auto of yours?" asked the Editor, as the man of receipts settled into his favorite chair.

"I've been down through the country, looking for some new material," and Benton helped himself to a cigar.

"It isn't necessary to ask whether or not you got what you went for—so let us have some of the new stuff."

"Well, about the first stunt I ran across was down in a shop near Lawton. I just happened to drop into the shop one afternoon and found the smith working on a window—he was dabbing the glass with putty. I asked him what he was doing that for, and he said that he was going to place his desk under the window, and desired the lower panes of glass to present a frosted appearance. And the job certainly looked O. K. That is only a little kink, but it may help out some day."

"That's a very simple way to imitate frosted glass," said the Editor, "and it will no doubt help some readers who are bothered by inquisitive persons looking into the shop or office. What's your next kink?"



A KANSAS GENERAL SHOP RUN BY MR. GEORGE W. LANCASTER

"While I was down in the neighborhood of the steel plant I dropped into the smith-shop—they generally have something down there of interest, and I wasn't disappointed, either. I found one of the boys pounding up something with a hammer. He told me it was furnace slag and that the men used it for welding. Well, I thought the kid was stringing me, so I spoke to one of the men at the forge, and he told me the same thing. They take the slag that is formed in the furnace, pulverize it with a hammer and use it the same as borax or ordinary flux."

"That's a good one, Benton," returned the Editor, "and it will no doubt be new to some of "Our Folks."

"Then, I also got a new ointment for slipping belts. Tom Short, down at Radway, was mixing up something as I came into the shop, and he told me it was a cure for slipping belts. He said he took about nineteen parts of rosin to one part of machine oil and melted both together. After stirring thoroughly he applied it warm, while the belt was running."

"Well, Benton, you certainly got some good material for your receipt book on this last trip. Almost time to get another book, isn't it?" Then the Editor asked Benton if he had any more hints, but before Benton could reply Jim Williams came in.

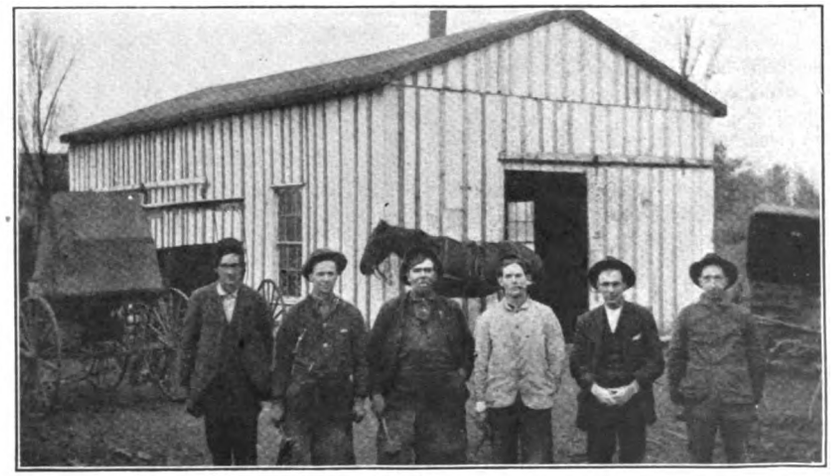
"Hello, Jim," exclaimed Benton. "How's that trotter of yours getting on?" Jim Williams owns what he thinks will some day be a "marvel of the turf"—others, however, think differently, and Benton is one of the others.

"Never mind that trotter, Benton. One of these fine days I'm going to have the laugh on you, and then it won't be such a joke." Then, turning to the Editor, Williams asked if he could get a good receipt for a hand-cleaner. "I've simply got to get something for the boys in the shop. I've tried pumice soaps and other things, but they don't seem to get the dirt off."

"I think Benton can give you something along that line, Jim,' and the Editor turned to Benton.

"I just came across a good hand-cleaner the other day," replied Benton. "Get a cake of some scouring soap at the grocery, and pound it up with the hammer until you have it pretty well pulverized. Then take about a cupful of lard, heat it in a pan and, while stirring the heated lard, pour the powdered scouring soap into it slowly. Keep stirring until thoroughly mixed; then pour it into a convenient tin, so that it can be gotten out easily when you want to clean your hands. Use it just as it is on dry hands, rubbing the hands thoroughly with it and then wash off with soap and water. You see the lard dissolves the soft oil and grease while the pulverized scouring soap scrapes the grime off. Then, when you use a good white soap and clear water, the grease, grime and all is removed, leaving the hands clean and smooth."

"I'll give that a trial, Benton, and if it is as good as your hints that I've used, it will work like magic," and with that compliment to Benton, Williams went out.



MR. T. H. THOMPSON OF KENTUCKY DOES A GENERAL SMITHING BUSINESS

Tom Tardy's Dream.

W. O. B.

T' other nite Fren' Tardy dreamed 'bout some o' the tools an' machines that he's allus talkin' agin' an' these here verses are writ in an attempt to tell what happened to our fren.

He dreamed he met a tire set,
A-goin' down the street.
It grabbed his hand and sed: "I bet
You're sorryful t' meet
A chap like me," an' then, by gee,
It set upon his toes,
Upon his ear, and on his knee,
Then set upon his nose.

And nex' in line a band saw fine—
It ran about like mad.
It slammed him with a piece o' pine,
Then cut his cheek right bad.
It ripped his coat and marred his throat—
Tom thought his time had come;
It butted him jes' like a goat,
An' kep' him on the run.

A punch then came to join the game.
It shook Tom's hand an' sed:
"I'm not jes' well, I'm kind o' lame,"
An' then it punched Tom's hed.
It made Tom's face look jes' like lace;
It punched holes in his ears,
An' then it set a punchin' pace
He'll not forget for years.

A blower now made a low bow,
An' then it blowed a blast.
It blowed Tom up, he don't know how—
He went so awful fast.
It blowed him round an' round an' round,
A-spinnin' like a top,
An' when he tried t' grab the ground,
He found he couldn't stop.

An' then there 'peared behind a beard
Some two yards long or more,
A little man, to'ard Tom he steer'd,—
How he did laugh an' roar,
"You're kind o' jar'd, a little mar'd,
But never fear," said he.
"I'll patch you up where you are scar'd,
As good as new—you'll see."

He called his men, they numbered ten,
They patched with tin and glue,
An' used such things es Tom used when
He had repairs t' do.
Old boards an' nails, hoops from ole pails,
A slat, an' ole tin can—
They fix'd his face with ole fence rails,
An' then away they ran.

Tom 'woke from scare, an' 'gin t' sware—
He swared he'd make things hum.
He said: "I'll do my work with care
An' read our jurnal some.
An' then I'll get a tire set,
A drill an' blower, too."
A punch an' shear—an' y' kin bet
I'll learn to use 'em, too."

But up t' date—an' t's gettin' late—
Tom ain't bo't nothin' yet.
He's travellin' at his reg'lar gate—
A keepin' his throte wet.



Say "I will" often and soon you will.

Busy tools go hand in hand with a growing salary.

Doing when doubting never brought success—know first, then do.

Deliver a square deal to yourself by dealing squarely with others.

"They say"—but your anvil is making so much noise you can't hear it.

How would that contract or agreement read if you were the other fellow?

Divorce is the thing for the smith who is married to Tom Tardy methods.

Characters are killed in many ways. Some men kill their's by killing time.

The only way, sometimes, is to place the bad accounts right in a lawyer's hands.

There's lots more to horseshoeing than shaping the shoe and driving the nail.

Tom Tardy's shop interior reminds one of an "Institution for Worn-Out Tools."

Now is sometime—remember that when postponing something until "sometime."

Wonder if any of "Our Folks" have started repairing airships? Tell us if you have.

We've waited three years for one smith to send in an item for publication—are you that smith?

All of us have weak points, and people generally find out about them in proportion to the talking we do.

Be a first-class doer of first-class work—it's the best kind of advertising to be known as a first-class workman.

Cheerfulness—the best medicine in the world, easiest to take and pays the biggest dividends to the business man.

Now is a good time to lop off unnecessary expenses. Find the leaks, bad accounts, and tighten up on expenses and losses.

It's all very well to let tomorrow take care of itself, but the man who is beforehand today is usually behind-hand tomorrow.

Don't pay for a bill of goods until you have checked it up and made certain that you have what you ordered and in good condition.

Uncle Billy Martin says: "Most peepul are virtuous 'cause they're afraid o' being found out—the others don't care a whoop."

Don't allow yourself to get caught unprepared by a rush. Get things into ship-shape during the slack times. Then you'll not be unprepared.

Some men seem to succeed admirably filling the place of loose pulleys—they do a mighty lot of hustling around, but accomplish nothing.

Did you get one of those safety razors? We will send one free if you will secure a new subscriber to "Our Journal." Ask your neighbor.

The shrewd smith never allows first cost to be the deciding factor in the purchase of tools. The cheapest at first may be the dearest in the end.

Success is won only by hard work. There are no short cuts on the road to success—it is one long, up-hill, stone-strewed, bramble-covered road.

Call attention to your competitor's poor jobs by putting the best possible into your own work. Don't forget that old saying about actions speaking louder than words.

Does your business grow? A live, up-to-date shop in a live, up-to-date community ought to do more business each year. How does June of this year compare with June a year ago?

Investigate when buying new tools or machines. Write to all the firms making or handling the machine you want and then pick out that one best suited to your needs and requirements.

Appearances count. See your shop as others see it. Walk into your shop and look about as if you were a customer—look critically at the outside. Room for improvement? Then improve it.

Do you save your catalogs? They're important pieces of trade literature. How often you have wondered where to secure a certain make of tool or machine. Catalogs are for that purpose—if you keep them on file you'll know about machines and tools.

Open to readers also are our advertising columns. Any of "Our Folks" can purchase space just as cheaply as the biggest manufacturer. If you have a tool or machine to sell ask for rates and help. Our advertising department will gladly help you in every way.

The good old days—would you wish yourself back to them if you could? The days of few tools and poor and everything done by hand. There are smiths today who are little better equipped than their grandfathers were. Modern times require modern tools.

In the drama of progress the role played by the smith is hardly more apparent than when viewing the erection of a modern sky-scraper. The thinking man is strongly impressed with the thought of how impossible the modern structure of steel and cement without the smith's help.

What have you done to raise prices in your vicinity? You admit, don't you, that prices need raising? You know supplies of all kinds have gone up. Then how can you make a fair profit by sticking to your same old price list? Write the secretary today—ask for his plans—start something on the road to better returns for your labor.

Last year the great Krupp Works at Essen, Germany, increased their working force by the addition of nearly 4,000 men, making an army of about 67,000 in the employ of this company. The Essen Works uses over 73,000 horsepower, which operates over 7,000 machine tools, 900 cranes, 187 trip hammers and 81 hydraulic presses.

American Association of Blacksmiths and Horseshoers.

Did you ever think, brother, that the chap who digs a ditch, the fellow who lays bricks, the chap who carries the mortar and that hundreds of other trades not nearly as important as blacksmithing, are today enjoying more and better protection than the smith? Do you know that lots and lots of laborers, knowing a considerable amount less about their business than any smith, are getting more for their work than many smiths who own their own shops?

Why is it, Mr. Reader?

Simply because you will not organize—simply because you won't shake hands with your brother craftsmen for your own good and protection.

Organization will give you the power to get better prices, to insist upon payment after the work is done, to place your business and the trade in general, in a better position in the world of business.

Organization will enable you and your neighbor smiths to do many things that you want to do, but are now unable to do, because you cannot cöoperate.

Don't think your neighbor won't join with you in an organization movement. He is human, and is looking for better prices the same as you are. And when you are organized you'll find that your competitor is a pretty good chap, after all.

Just drop a postal card, asking about an Association in your county. I'll help you—and you'll find it so easy, you'll wonder why you didn't ask for my easy plans before. Every day you delay puts organization so much further away. So, address that card to THE SECRETARY P. O. Box 974, Buffalo, N. Y.

How to Paint Buggies.

C. W. METCALF.

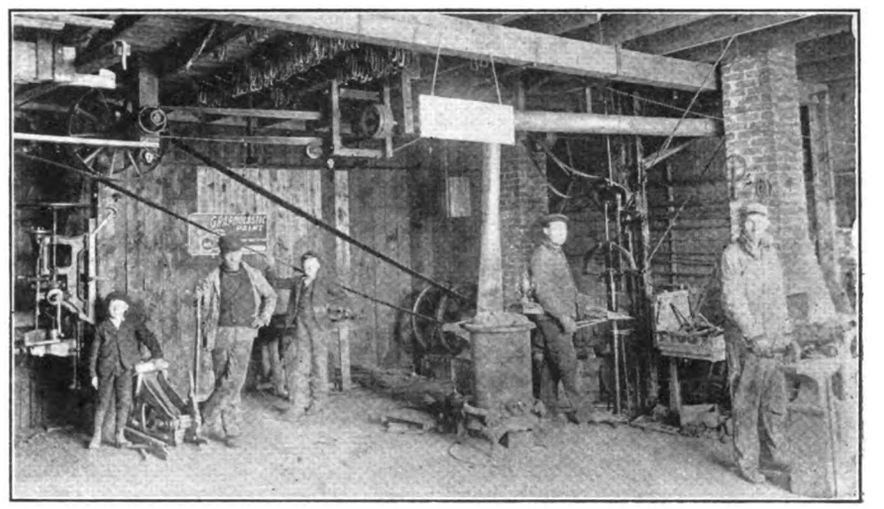
Some use yellow ocher for a filler, but I, for one, do not advise anyone to use it. I do not think it a good filler at all. I have had twenty-nine years of experience in general repair blacksmithing and carriage work, and the best filler that I have found is white lead and oil—not quite as thick as that generally used for paint—with a little lampblack added to it to give a dark shade. Give it about three or four days to dry and then go over it with fine sandpaper, rubbing it down well. Let it dry about two days longer, or, better, a week, and then give it another coat of the same, a little thicker than the first coat and let it stand for a week. Use the fine sandpaper again, but use it lightly this time—just enough to remove all specks and pimples which may appear on the surface. Then, using a piece of cotton cloth, rub it lightly, and it is ready for your colors which you buy already mixed, as drop black or Bruester green. The latter is my choice for a fine rig. If this black or green is too thick add a little turpentine to thin it. I almost always add a little, for I think it spreads better. In mixing the white lead and oil at first put a small quantity of oil in the lead and with a small paddle stir it a while. Then add a little more oil until you have it well mixed, so that there are no lumps in it. Then stir and add oil until you have it thin enough to suit. Use boiled oil, as the raw oil is not good for painting buggies. Another important thing—be sure that you have the pure linseed oil, as much cottonseed oil is sold and used for paint, but it is not good for this work.



How to Make Hooks.

BERT HILLYER.

Hooks are made in almost all shops and in various ways, some of which I will endeavor to describe. When I was an apprentice I was given a rule for making a hook. In this rule I was to observe three things: First, I was to make a hook in proportion and to know what length to cut the iron to take, 1 inch in length for every ⅛ of an inch in the diameter of the iron to be used. For instance, if a hook were to be made of 1-inch iron there would be 8 eighths of an inch in it, and, therefore, you would cut off a piece 8 inches long, which would make it nicely. If it were to be made of 1½-inch iron there would be 12 eighths of an inch and, therefore, you would cut off a piece 12 inches long, and so on—an inch in length for every eighth inch in diameter. Second, the hook must pull central—the center of the eye must be on a line with the center of the hook where the load comes. And, third, notice whether or not there are any flaws in it. If there were, it was to be thrown away and another one was to be made, as a defective hook is liable to break and injure someone. Sometimes a smith will not take time to take another heat to weld up a small crack or flaw, but will take the hammer and pene the crack so that it will not be seen. But it is there just the same and makes a weak spot that will break at the first opportunity. It were better to leave it open, so that it might be seen in order to warn those working near it to be cautious; otherwise, they may think it perfectly safe because it appeared so from the outside.



MR. H. M. HOUCK OF ILLINOIS HAS A WELL-EQUIPPED SHOP AND REPORTS GOOD PRICES

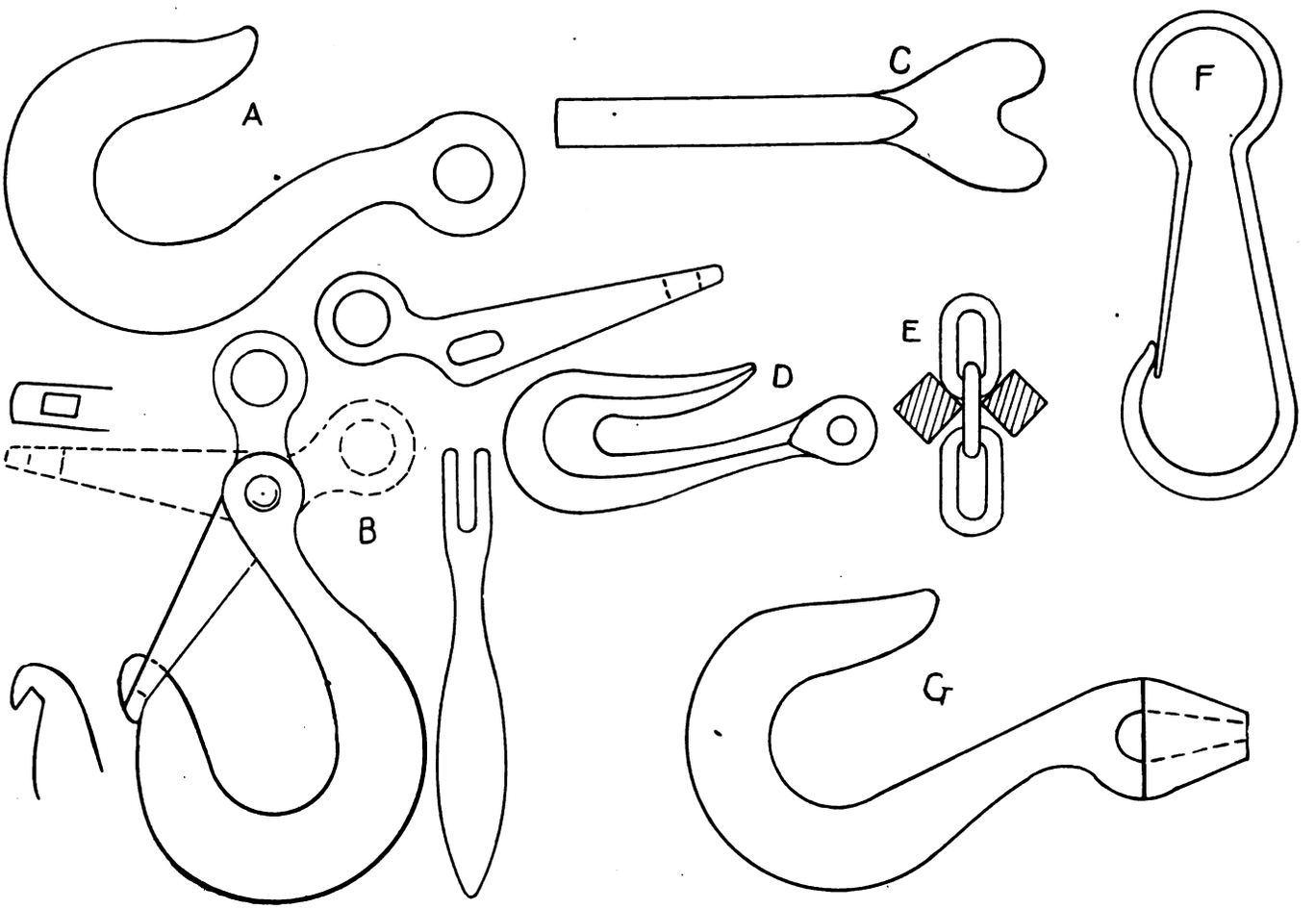
A hook that I designed may interest some readers. It is made as shown at B. In order to make the jaw, take a piece of iron, upset the end large enough to make jaw, and flatten it down so that

it appears as at C. Then bend the flat part into a U-shape. This will make a jaw with a solid back to strengthen it. The other parts are so easily made that it is unnecessary to explain them. The oblong slot in the top piece is to allow that part to slip down over the nib on the hook; it locks itself when pull is applied. This makes the hook stronger, because the strain is on both ends of the hook, thus making it impossible for the hook to straighten out. Another advantage is that, should the hook be raised up amongst any obstructions, the point will not catch, but will slide off. Also, anything that is hooked on must remain there until it is set down and the strain released on the top part of the hook.

A very handy hook is made of square iron, the bend being on the corner of the iron. This hook is made long and narrow on the inside, and a little wider than the diameter of the iron in the chain. The hook is made to slip over one link, while the links adjoining keep it from slipping, see D and E. Thus, it can be fastened anywhere in the length of the chain.

A small snap hook can be made very quickly by taking a piece of ¼-inch or $\frac{5}{16}$-inch spring steel and drawing one end out in the shape of the spring, then bending around, as shown at F.

Hooks that are to be fastened to a wire cable are sometimes made in the following manner: The socket on the end is made so the cable will slip through it. The ends of the strands are then bent over in the big part of the socket and jambed in tightly. Clay is then put around the small end and hot lead is poured in the large end of the socket until it is full. This makes a wedge-shaped form that will not pull out. To make this hook, take a piece of round iron, as large as the biggest part of socket, fuller in two or three inches from the end, or according to the length of socket you desire, and flatten it so that it comes tapering from center of hook to the neck. Then drill a hole twice as large as the cable down through the end. Then close up end, tapering in swedge block until it is just large enough for the cable to go through. Then finish hook up in the usual way.



A GOOD HOOK MUST BE PROPERLY PROPORTIONED, MUST PULL CENTRALLY AND BE WITHOUT A FLAW

Forging Weather Vanes.

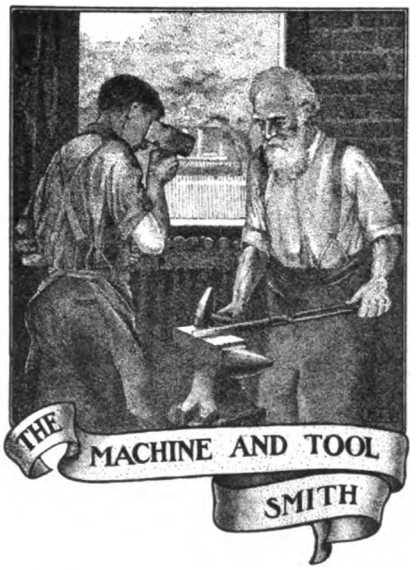
BERT HILLYER.

I will endeavor to explain one method of forging the weather vanes seen on flag poles and buildings. Take a piece of mild steel large enough to forge or cut out a cross, as shown at A. The reason for cutting out the piece in this shape is that the side arms may be drawn out so much longer, and it is unnecessary to use as large stock as would be necessary if it were cut out straight. The two long ends should be drawn out round and the short arms left square, in order that they may be split down the center, spread apart and drawn out to the size desired. This will give a forging with six arms all in one solid piece. Then get a lag screw and weld it on the lower end or cut a coarse thread on it so that you can screw it in the top of the pole. The letters, N., E., S., and W., may be cut out of sheet brass, leaving a piece in the middle to be riveted to the arms, as shown at C.

The arrow should be made light, and should revolve easily, so that it will sway with the lightest wind. In order to make the arrow, forge a piece as at D. After drawing it out, flatten head and tail and cut out, as shown on dotted lines at E. The tail end should be wide and thin, and the hub in the middle should be drilled out to fit over top stem. After the arrow is slipped

on the shaft a collar should be welded on near the top and a thread cut on the end so that a ball may be fastened to it by screwing on a nut. See F for finished vane.

On a flag pole there is generally a double band that connects the staff to the pole. One part is made square and the other round. The handiest way to make them is to take a piece of mild steel large enough to split, as at G. Then throw out the ends so the piece forms an H and then bend and weld as shown by dotted lines.



Plain Machine Work for the Blacksmith—7.

GEORGE CORMACK, JR.

Fortunately the most jobs which come to the blacksmith or repair man are of such a character as will permit of body drills being used of a size considerably larger than the screws or studs, but even then if there are many holes in one piece the scratching and drawing of the holes have to be carefully done. One thing can almost be absolutely figured on in drill press work, and that is, that the drill will not start exactly where the center punch mark is. This can be overcome to some extent by drilling in a little way with a very small drill first; but even then it is never safe to just bring the drill down to the work, locate it by the center punch mark and slam it through, if you want the hole to be in some specific location. Another thing, when redrilling a hole, say drilling a ½-inch hole to one inch, you will often find that the center of the one-inch hole is not where the center of the one-half was, that it has crowded to one side or the other. This effect is often due to the way work is fastened or held to the drill press table whilst being drilled. In drill press work the same as in any of the other branches of the machinist trade the man who makes the best mechanic is the man who is looking for and expecting things to come out wrong. With this idea in your mind you are always scheming to get it as near right as possible, and arrive at a workable, practical approximation.

Special Applications of the Drill Press.

Before leaving the subject of the drill press and drilling, a brief description of some special uses of the drill press will doubtless be of interest to many of the readers of THE AMERICAN BLACKSMITH. In a great many cases the drill press is the only machine tool which the blacksmith possesses, and very often he has to do many things with it besides simply drilling holes. For instance, cases often arise where a cored hole in a casting has to be bored out, the hole being of such a size as to preclude the use of a drill; furthermore, in such cases if a drill were used the hole would be neither sound nor straight, and in all likelihood the exact size would not be attained. The core, as is often the case, may not be in the exact location and may not be straight. In all such cases if a drill were used it would follow the cored hole. Of course, most of these jobs are really legitimate lathe jobs, but if the shop has not a lathe in its equipment they can be handled almost equally as well on the drill press if the proper methods are used. Again, there are many such jobs which have to be done on the drill press because the castings are of such

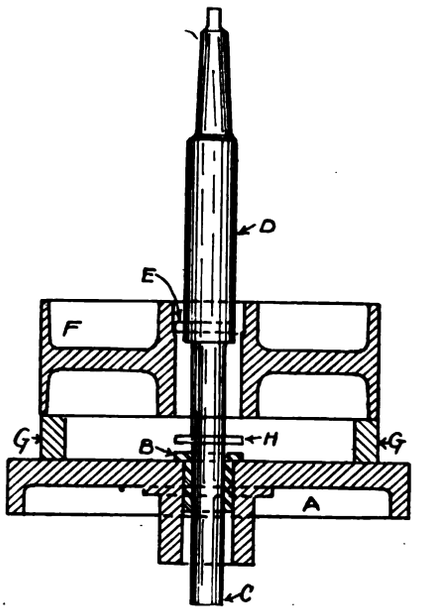
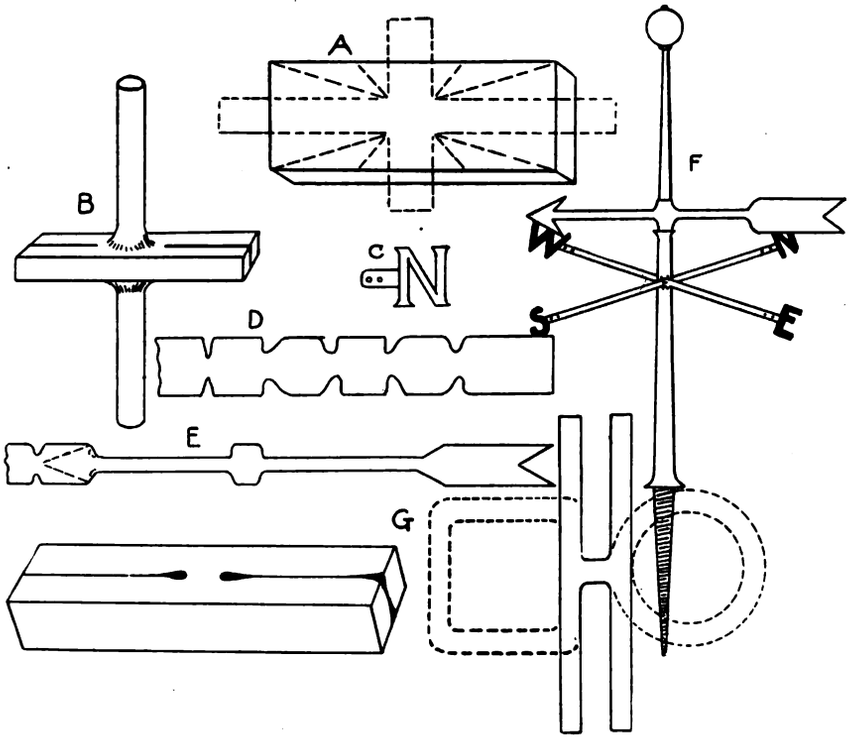


FIG. 1—SPECIAL APPLICATIONS OF THE DRILL PRESS

a size or form as cannot be conveniently swung in a lathe.

Fig. 1 illustrates the method of boring such holes in the ordinary drill press. The illustration shows the boring of a large hole in a cast-iron pulley. For convenience the pulley and drill press table are shown in section. The drill press table is marked A; a steel bushing, B, fits into the center hole of the table. Usually, the bushing is made of tool steel and hardened. It is well where there is considerable of such work to be done, to have several of these bushings with different sized holes in them. The



WEATHER VANES ARE EASILY MADE WHEN YOU KNOW HOW

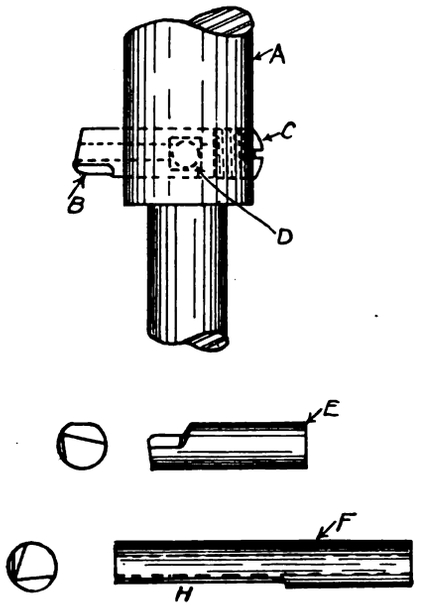


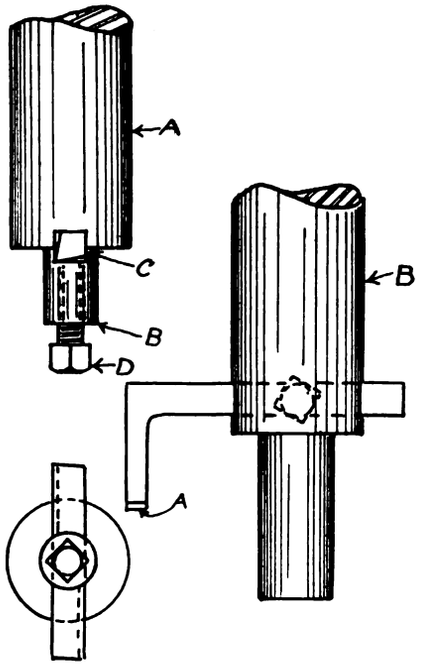
FIG. 2.—SPECIAL APPLICATIONS OF THE DRILL PRESS

bushings must be a snug fit in the hole in the table to prevent them from turning. A boring bar is at C, the lower end of which is a running or easy fit in the bushing B, whilst the upper end D can either be made to fit the tape in the drill spindle, as shown, or turned down straight to go in the drill chuck. The former method is the better, but where the latter method is adopted, the turned-down end should be of the largest diameter that will go in the drill chuck. A leather washer, H, is made from a piece of old belting, the hole in it being a tight fit on the boring bar, and is to prevent the chips from working in around the bar in the bushing, resulting in the cutting of the bar. The tool steel cutter, E, is usually made from a round piece of steel. The pulley, F, is supported on the parallels G and G, and securely clamped to the table by bolts and straps (not shown in the engraving).

A better idea of the cutter and how it is held in the boring bar, and how adjusted to bore any size of hole, is shown in Fig. 2, where an enlarged portion of the boring bar is shown. In Fig. 2, A, is the main body of the bar; a hole, the diameter of the cutter being drilled through it to secure the cutter, B. One end of this hole is tapped with a suitable sized standard tap, the top being run in about half through the bar. Another hole at right angles to the hole for holding the cutter is drilled and tapped for set screw, D, used to clamp the cutter securely in place. The cutter itself is shown removed from the bar at E, and has a flat filed on it for the point of set screw, D, to impinge upon. The cutting or business end of the cutter is ground, as shown.

A headless set screw, C, is used to regulate the depth of cut taken by the cutter and also to prevent its slipping back when under the strain of the cut.

In rigging up such a job the drill table ought first be brought central with the drill spindle; this is easily done by inserting the bushing in the table, the boring bar in the spindle and moving the table until the boring bar slips into the bushing without binding when the spindle is lowered. Next, the pulley should be tightly clamped to the table and trued up, not by the hole, but by the run of the pulley. This can be very easily done by inserting a bar the size of the cutter in the hole in the boring bar, the bar being long enough to reach over the outside of the pulley rim. The outer end of this bar should be bent down at right angles so that when the spindle is lower it will come down outside the pulley rim; then, by turning the drill spindle by hand it will be readily seen whether the pulley is central with the circle described by the end of the bar. The pulley can easily be moved by tapping it lightly with a hammer, and when a central position is attained; the bolts clamping it to the table should be tightened up. It is also well to make sure before starting boring that the table and arm are both securely clamped. If severel pulleys of the same size are to be bored out, after truing up the first one get three wooden blocks, high enough to reach up from the table to



FIGS. 3 & 4—SPECIAL APPLICATIONS OF THE DRILL PRESS

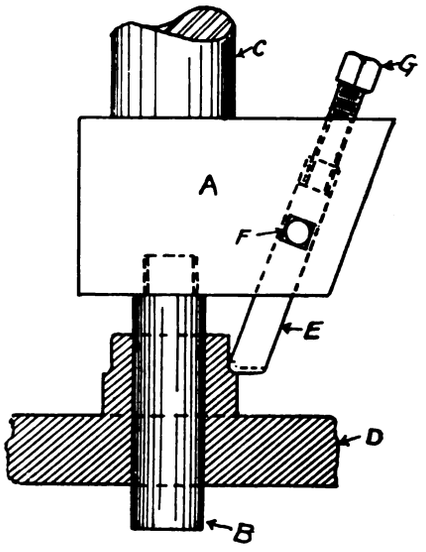


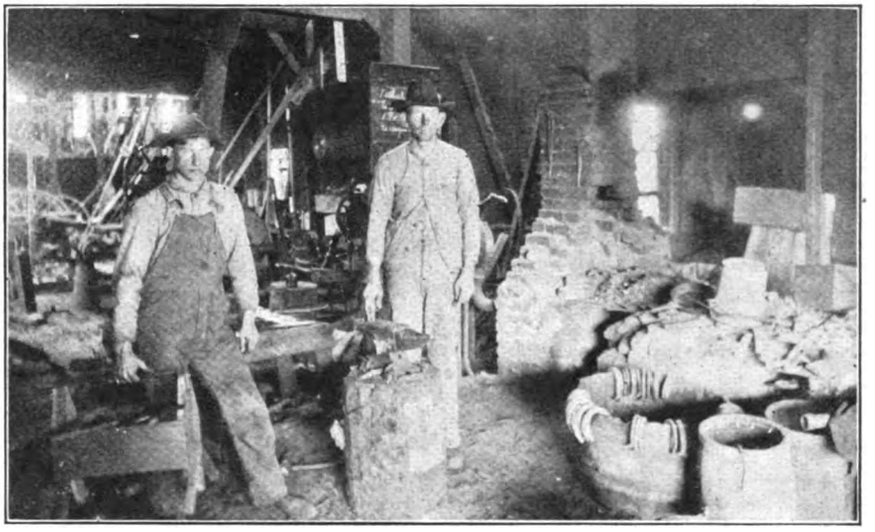
FIG. 5—SPECIAL APPLICATIONS OF THE DRILL PRESS

half an inch up the pulley rim and clamp them to the table at equal distances around the pulley, their inner ends pressing against the rim. These will serve as guides to correctly center the pulleys. When this is done, all that will be necessary after boring the first pulley will be to release the clamps, remove the pulley and drop the next one into place, the wooden blocks insuring its alignment.

In boring, the cutter is set out by means of the blind set screw, C, Fig. 2, until the right depth of cut is arrived at; the cutter being then clamped in place by tightening set screw, D. Always try when taking the first cut to make it deep enough to get the point of the cutter below the scale on the iron all the way around the hole. If the cutter is allowed to scrape on the scale a very few minutes will dull it and wear the point completely off. This fact ought to be remembered in all operations involving the cutting of cast iron.

In boring by the method shown, although not impossible, it is a difficult job to give the bar the right feed by means of a hand-feed lever, and wherever possible either power or worm feed should be used. Subsequent cuts are taken by pushing the cutter a little farther out by means of the blind set screw. Very often the hole is bored with the boring bar $\frac{1}{64}$ smaller than the desired diameter, and then finished by means of a standard reamer, the reamer being driven by the drill press. If it is necessary to face off the hub of the pulley a sweep cutter, as shown at F, Fig. 2, is placed in the boring bar instead of the boring cutter. The cutting edge of this cutter is along its lower edge, at

H, and this is brought down on the end of the pulley hub, sweeping it off at one cut. If the end of the pulley hub is rough the cutter must be lowered very carefully and gradually, else it will catch and break off close to the boring bar. The above serves to show the use of the boring bar in the drill press, and the ingenious blacksmith or repairman will doubtless find many different applications of this method which will help him out in his work.



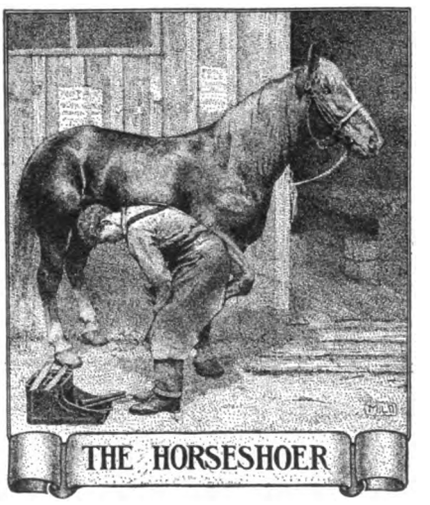
A POWER SHOP OF TEXAS, RUN BY T. J. BEDELL

Many special forms of facing and boring tools are used in the drill press. Fig. 3 illustrates the simplest form of facing or boring off cutter. A is the shank, either tapered to fit the drill spindle or left straight to go in the drill chuck. The turned-down lower end, B, is called the pilot. The cutter, C, is usually made of square tool steel. The set screw, D, is for clamping the cutter in place. An easy way to make such a cutter when wanted in a hurry, is to take a piece of round machinery steel of the size decided on for the main body, A, and drill a hole for the cutter, C, $\frac{1}{64}$ inch smaller than the cutter. Now make a square drift or punch slightly larger than the cutter, heat the stock for the body of the tool in the forge, and then drive the drift through the drilled hole, being careful to keep the drift square with the bar. Now center the bar and turn it down to size required and drill out and tap the hole in the pilot for the set screw, D. Such facing tools are used for facing off the ends of hubs or bosses, and also for surfacing around bolt holes in order to procure a level surface for nuts to tighten down on. The pilot must always be the size of the hole in the work, and several facing tools or counterbores, as they are often called, are made and sold, with interchangeable bushings for the pilots to fit different sizes of holes. These are very handy and are not expensive.

Another tool of somewhat similar character is the pin drill, which is simply a facing tool with a cutter, as shown in Fig. 4. One end of the cutter is bent down, the cutting edge being at A. This form of cutter or drill is used in cutting flue holes in boiler plates and such work where the depth to be drilled is not great. In using the pin drill a hole the size of the pilot is first drilled and then by using this hole as a bearing for the pilot, a circle is cut out concentric with the pilot hole. It is evident that any sized hole can be cut by adjusting the cutter out or in.

Another form of tool often used in the drill press for turning off the outside of bosses or hubs is shown at Fig. 5. The shank of the tool is marked C; a cast-iron block, A, is shrunk or pressed on to the shank, C. A pilot, B, is usually screwed into the block, making it readily interchangeable with pilots of different diameters. The cutter, E, is of square tool steel, made adjustable as shown. In using all tools where pilots are employed to guide the tool and keep it steady the pilots should be frequently cleaned and oiled. Fig. 5 shows the turning off of a boss or hub by means of such a tool and needs no explanation.

This method of turning is being used more and more in some classes of machine work. The writer has in mind an application of this method where the cone pulleys of a small drill press are entirely finished in the drill press by a complete arrangement of this kind. It would be easy enough to illustrate a great many different uses of the drill press, but space does not permit. I have, however, tried to illustrate some of the leading principles involved in drilling and drill press work, and the ingenuity of the workman will suggest many variations to suit his individual needs. Before leaving the subject of the drill press and taking up the engine lathe—"the king of tools"—it were well to summarize the most important points in drilling. These are sharp and properly ground drills and cutters, running the drills at the right speed, avoiding drilling into the drill table, keeping the machine clean, well oiled and the belts tight, and cleaning out the taper hole in the spindle before putting in the chuck or the shanks of drills. Never strike the drill chuck, nor, in fact, any finished part of a machine tool with a hammer, unless the hammer is of lead or rawhide. Any hammer marks on a machine or its accessories stamp the man operating the machine as a "dub" and not a mechanic. Keep the spindle free from end play in the sleeve, use common sense and do not try to hold small pieces by hand whilst drilling holes in them, or you may have nasty scratches and cuts to heal up. Keep your drills in such shape and order that you can lay your hand on any drill you want. Don't lend drills to everybody and, above all, don't let every Tom, Dick and Harry who wants to drill a hole use your drill press and drills.



A Cure for Thrush in Horses' Feet.

FRANZ WENKE,
U. S. Army Shoer.

The best cure I have ever found for thrush is salicylic acid. I have had considerable experience with both thrush and canker in horses' feet in the United States army. I have always used it with



With Apologies to Farm Implement News.

THE WISE BLACKSMITH—"THEY BOTH LOOK GOOD TO ME"

a covered shoe, as described in the April number, and which I also described in THE AMERICAN BLACKSMITH some time ago.

To start a cure I first insist on a dry floor in the stables for the horse to stand on. I then wash the foot thoroughly with warm water and castile soap, about ten per cent carbolic acid being added to the water. Carbolic acid is more adapted to such cures, as it is volatile. After thoroughly cleaning, I cut all diseased parts off, but without drawing blood. I do not believe in poultices on thrush or canker, as they tend to make the foot more sloppy and dirty. In fact, I keep all moisture, beyond one or two washings, out of the foot. After thoroughly cleaning (and I say again *thoroughly*) and cutting out all diseased parts, I drive the shoe and pack with dry salicylic acid, covered with oakum. This is not my own prescription, but that of Dr. Buoby, V. S., San Antonio, Texas.

I renew this packing every day and will invariably have a healthy action in from two to three days. After healthy granulation sets in, I pack with one part of pine tar mixed with one part of sulphuric acid, which packing needs in most cases be repeated only every other day.

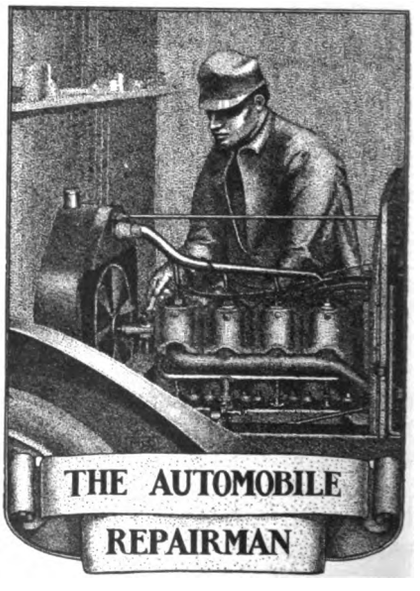
At the same time, while using the tar packing, I allow the horse to do some light work, but only on dry roads and in dry weather. This light work stimulates the frog into action and insures quicker healing.

More About High Calks and Healthy Feet.

ALBERT MEIER.

In reply to Ray Vollmer I should say that in shoeing there should be no matter of opinions, but an absolute condition—not a theory, for when a horse in its condition confronts the smith there is no time to theorize.

In regard to calking let us consider a horse that never was shod. If you will notice, the frog is a natural cushion or buffer that comes in contact with the ground at each step, which prevents collision, makes the step light and breaks the jar. It also is the only and natural spreader of the foot in a soft and healthy condition; therefore, when we put on shoes with high calks we deprive the frog of its functions or health. It then contracts and shrinks from its normal size, and the heels from shoeing to shoeing, draw in. In time, we get what I call cleft-contraction of either inside heel or both sides of each foot. This continues, congestion and inflammation set in, and we get a rupture of the pockets of blood at the clefts of the heels that are contracted. Cutting out, acids, and stiff shoes will do nothing towards a cure, but we must resort to a poultice, extract the fever, soften the foot and frog, pare down the contracted heel, use a bar shoe and put the pressure on the frog. Keep the feet moist and soft and in a few shoeings in this manner we will have the feet back to their normal, natural condition. It must be borne in mind that in winter we have wet, cold weather that aids in keeping the feet moist, while in summer we have hot, dry streets which dry out the feet, causing them to shrink and contract. It must be remembered that a city horse may be made miserable and agonized, all on account of high calks and hot shoes drying the moisture of the feet, leaving them to contract and become feverish. This, in time extends up the legs, causing them to become stiff, years before they should. And young horse after young horse soon gets stiffened and crippled, all for the want of a better knowledge of the anatomy of the foot on the shoer's part. The sole of the foot is the sole foundation of the limb; therefore, it needs but little paring and should be kept with the frog left in its natural, normal condition. Nature will do the rest.



The White Gasoline Car.

The makers of the well-known White steam car are now building gasoline cars and vehicle models of a wide range, including trucks, ambulances and commercial cars, beside both the steam and gasoline pleasure vehicles.

The White gasoline car is fitted with a four-cylinder, four-cycle engine. In this a radical departure from general practice is made in casting the cylinders

in one piece—see engraving showing the magneto side of the engine. This construction does away with the usual external manifolds, as all intake and exhaust passages are a part of the casting. The valves are all on one side of the engine and are operated by a single cam shaft contained in the crank case. The valves are easily removed by unscrewing plugs located in the upper part of the valve chambers. To get at the valve stems and springs, remove the side plate on the intake and exhaust side of the engine. This plate is held in place by two thumbscrews, and its removal brings the valve stems and springs into view and easily accessible. The shaft of thiscrank car is shown in Fig. 2. It shows also the bearings, connecting rods and pistons. The reader will also note the oil pipes for lubricating the connecting-rod bearings. The lubrication of the White car is effected by a combination of the splash and positive feed systems.

In Fig. 3 is shown the transmission case and gears. There are four forward speeds and a reverse, instead of the usual three and reverse. The drive is by means of a shaft from gear case to the rear axle. This shaft is fitted with two universal joints and a telescopic joint. A top view of the chassis of this car is shown in Fig. 4.

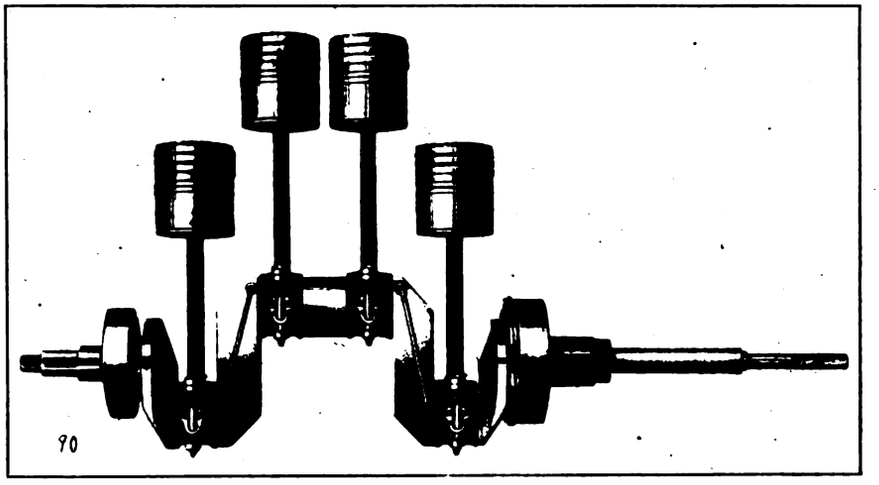


FIG. 2—CRANK SHAFT AND PISTONS OF THE WHITE GASOLINE CAR

The Piston and Its Rings.

HAROLD WHITING SLAUSON, M. E.

When a car is brought into the shop and the owner tells you that the motor runs smoothly without missing, but does not seem to develop its full power, it is almost certain that there is a loss of compression in the cylinders. You may be able to tell for certain that this is the case by turning the starting crank until a resistance of compression is met, and holding it in this position a few moments. If the resistance is gradually reduced so that the crank can be turned more easily the longer it is held, you may be sure that there is a decided loss of compression, due either to the fact that the valves need grinding, or that one or more of the piston rings is stuck or broken. If the valves have been ground recently it is almost certain that the trouble lies with the rings, and in this case the cylinders and pistons must be removed.

In the majority of modern automobile motors the cylinders are cast with solid heads. In this case, the entire cylinder must be removed from the crank case by loosening the nuts at its base and lifting it up from the piston. The rings may then be examined without removing the piston. Should any be found which require attention, the connecting rod bearing may be loosened from the crank shaft and the piston and connecting rod lifted out from the case. If the cylinder is cast with a separate head, the latter may be removed and the piston and connecting rod lifted out after first removing the crank shaft bearing by reaching through the hand holes in the side of the crank case. In this case the cylinder proper will be left in position on its base.

The rings are held in place by grooves cut in the piston, and when in normal position project out beyond its surface. They are springy to a certain extent, and are compressed when placed in the cylinder, thus making a tight fit with the walls. This allows the piston to be made smaller than the bore of the cylinder, to allow for the expansion of the walls under the heat of the motor, and makes a supposedly gas-tight joint between the moving parts. Should the joint thus formed not be sufficiently tight, the compression and force of the explosion would escape, and the power developed by the motor would be reduced to a proportionate extent.

A superficial examination will reveal whether the rings are doing their work or not, for it is evident that each should be intact and fit in its groove so that it can be moved in and out easily. If one is cracked it will have lost its springiness, so that it will not conform in shape to the cylinder walls, or if it is stuck in its groove it will not be able to adapt itself to the proper position when the piston is in place. Either of

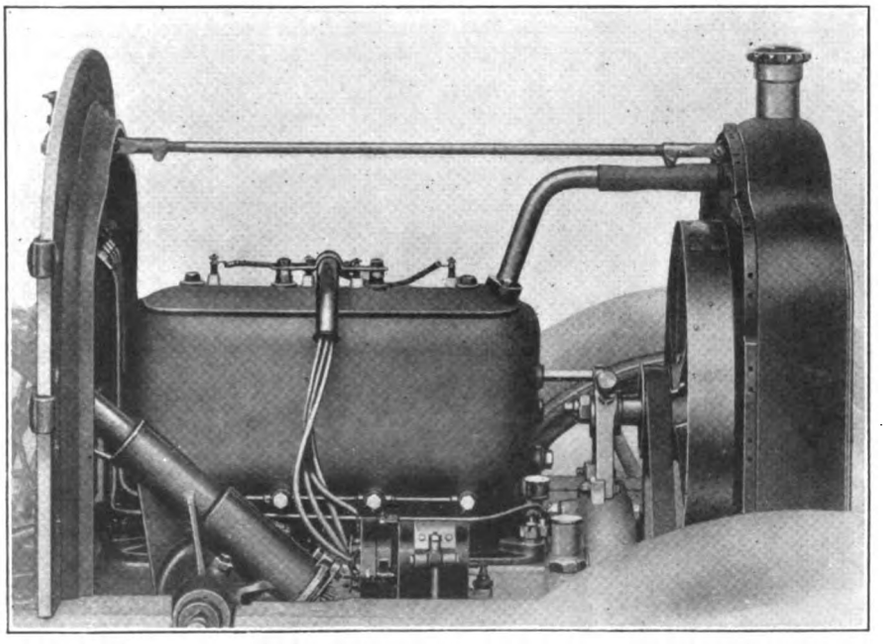


FIG. 1—RIGHT SIDE OF THE WHITE GASOLINE MOTOR

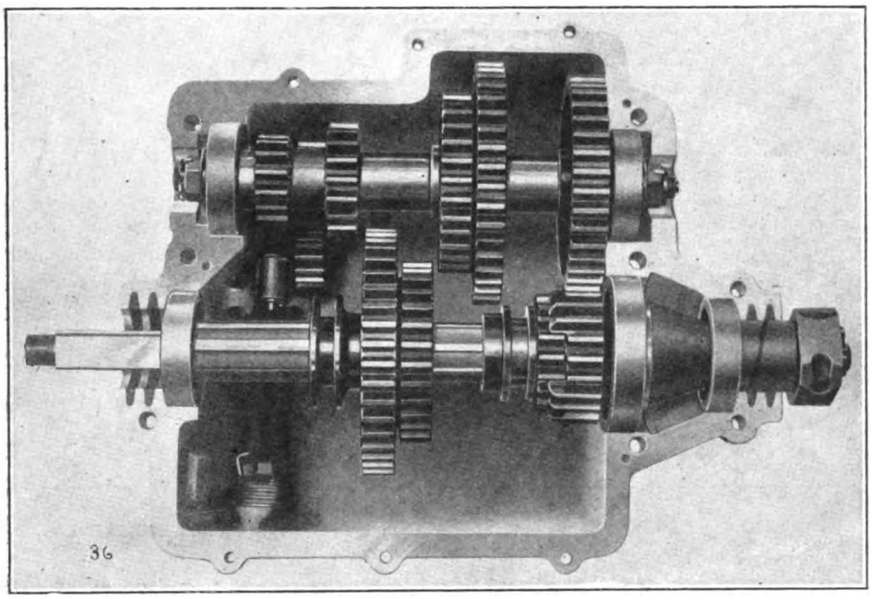


FIG. 3—THE TRANSMISSION CASE OF THE WHITE—COVER REMOVED

these troubles will generally be caused by but one of two things—a poor grade or an insufficient supply of lubricating oil for the cylinders. In the former case an excess of carbon will have formed, which when united with some of the products of combustion of the mixture will form a sticky, gummy substance that finally hardens and holds the ring in one position in its groove. If the supply of oil has been insufficient, the rings and piston will have heated and expanded unduly, and a "siezed" piston and "scored" cylinder walls and rings are liable to be the result.

In either case the rings must be removed. The removal of a broken ring is a simple matter, but to loosen the one that is stuck and take it out intact so that it may be used again requires considerable care and patience. Kerosene should be applied thoroughly to the ring, so that all of the carbon and gummed oil holding it in place will be loosened. If the ring is stuck near either end the point of a screwdriver may be inserted in the groove under it and the ring gradually worked loose in this manner. Care should be taken not to bend too short a section, for while the ring is springy to a certain extent, it is brittle beyond that point and will snap in two if too much force is used. When the ring has been loosened at all points it may be removed by means of the screwdriver and small wedges or short lengths of wire by which the succeeding sections are kept from working back into the groove when they have once been forced out. When the entire ring has been forced out of its groove, and is surrounding the outer wall of the piston, it may be slid off easily.

All parts of the grooves from which the rings have been removed should now be soaked in kerosene and scraped with a sharp-bladed instrument in order to remove every vestige of carbon. Particular attention should be paid to the upper and lower sides, as it is at these points that the rings will be the most liable to bind. The best instrument for this purpose is a putty knife, with its blade cut or ground sufficiently narrow so that it will enter the groove. This knife will have sharp, square edges, which are exceedingly useful for removing the carbon from the groove—much better, in fact, than the more or less blunt end and sides of a screwdriver.

All rings that are to be replaced should be soaked, scraped and cleaned thoroughly in the same manner as were their grooves, and great care should be taken to return each to the groove from which it was removed. This last is important, as each ring is ground to fit its own particular groove and an interchange might cause an imperfect fit in the whole set, thus destroying entirely any good that might have been accomplished by the cleaning. The replacing of rings is much easier than their removal, for each may be forced over the piston and slipped down to its proper groove, into which it will

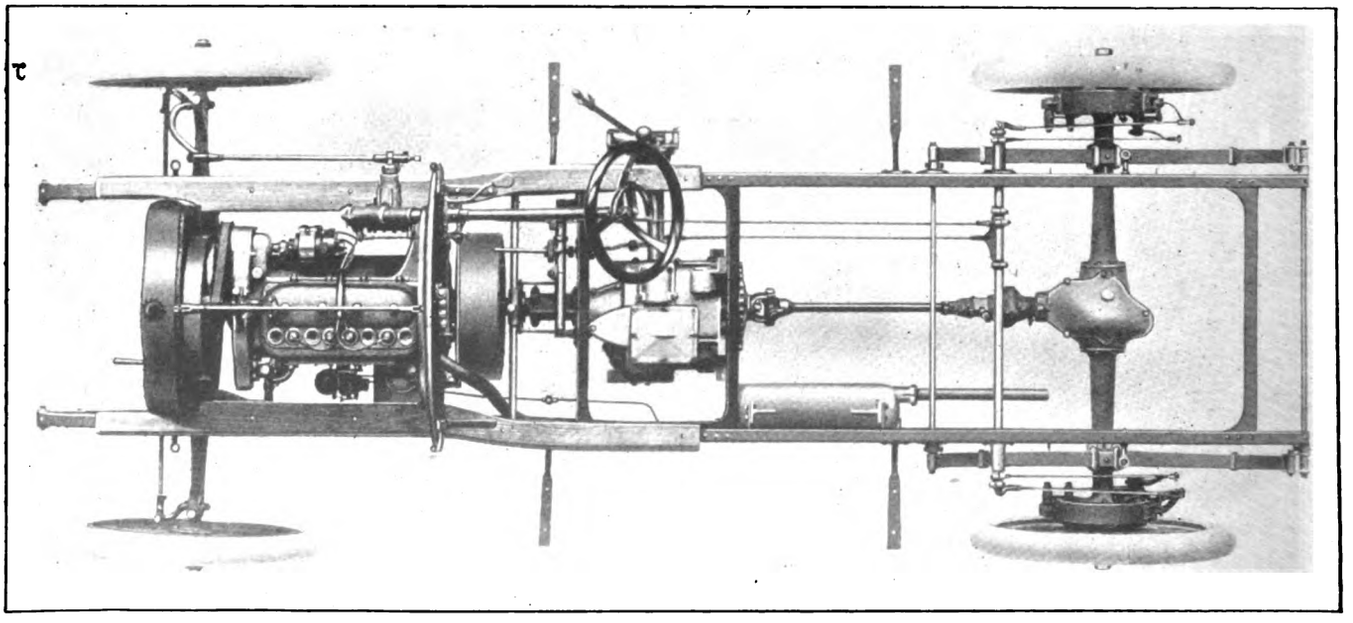
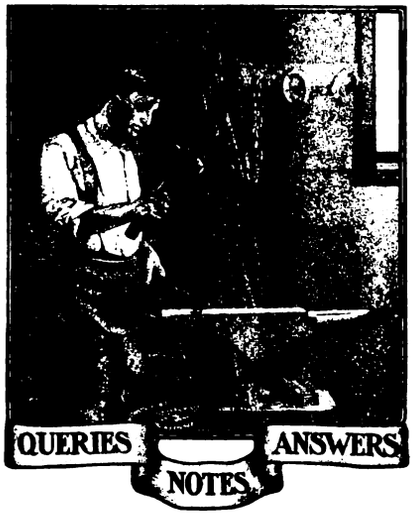


FIG. 4—A TOP VIEW OF THE CHASSIS OF THE WHITE GASOLINE CAR

slide without any trouble. If all rings are to be forced on over the top of the piston, the one fitting the bottom groove should be slipped on first, and then the ring for each groove above should be placed on in succession, as it is almost impossible to slip one ring over another

(To be continued.)



Retempering Question.—I would be most grateful if some brother smith would tell me how to draw out and retemper old axes successfully. IRA BEAL, Utah.

To Temper Mill Picks.—Will some brother please tell me how to temper mill picks for dressing the old-fashioned burrs with? W. R. LANCASTER, Tennessee.

Horseshoeing Stocks Desired.—I would be very grateful if some brother smith would give me through these columns, or through private correspondence, plans for making horseshoeing stocks. Y. F. SMITH, Missouri.

For Worms in Hickory.—In answer to Edward Deitrich, Indiana, who desired a remedy for keeping worms or bugs from working in hickory wood will say that I have used gasoline with much success.

A. E. NICHOLS, Oklahoma.

More About Magnetized Center Punch.—In answer to F. J. Casey, Nebraska, would say that his center punch will become magnetized when he uses it by the jar from his hammer; also by standing vertical for some time. "NEW SUBSCRIBER," Kansas.

Bending Wood.—I would be grateful for any information concerning bending different woods for sleigh runners, the time required for a given size of stick, and whether boiling or steaming is the better. ISAAC BUTTERWORTH, New York.

Shoeing Pumice Sole Foot.—If the horseshoer who desires to shoe a pumice sole foot will make a bar shoe and level all the inside of the shoe that fits on the wall so that the shoe will just rest on the wall, and then will put a strip of leather all around under the shoe just where the shoe rests on the wall, he will find the shoeing satisfactory.

A. A. BARRICK, Iowa.

Cheap Labor Not Cheap.—I believe every journeyman should insist upon selling his labor in the best market, thus improving himself and making himself a better investment for his master. I employ labor, and I find cheap labor is not the cheapest. For instance, I paid one man 36s ($8 75) per week and another 26s ($6.35) per week, each working fifty-four hours in all. The former made the same number of articles in four days that the latter made in six days.

ROBERT WOODS, England.

The Youngest Mule Shod.—In the April issue of "Our Journal" I find that Mr. Joseph Cregar, Virginia, shod a mule colt six days old. I am now going to claim the honor of shoeing the youngest mule colt, for I shod one that was twenty-four hours old. Both front feet were so badly contracted that the animal could not stand. Now the mule is three years old and is at work within sight every day.

J. R. ABEMATHY, Texas.

That Magnetized Punch.—In the February number of "Our Journal" I saw a question on magnetism by Frank J. Casey, of Nebraska. My idea is that it is not the punch that is magnetized, but the polish that is on the nails that caused the punch to pick them up. Let him try to pick up iron or steel, and see if it will draw them as it does the nail. If it will pick up iron, then I will admit that I am wrong.

ALEX FRITZ, Pennsylvania.

Corn Cure Desired.—I have been at the forge for twenty-six years and do all kinds of work, but I am troubled to find something that will positively kill what is known as corns in horses' feet. I would be more than pleased to see published in THE AMERICAN BLACKSMITH, or to hear from some brother personally, some sure cure for these corns. I have found many things to help them, but what I want is something that will kill them entirely, and the proper way to use same.

H. L. BLAISDELL, New York.

Wants to Make Swedges.—I would be very pleased if some of the good smiths who contribute to these columns would describe their method of making rounding swedges. I wish to make a set from ⅜ inch up to one inch. They cost $2.75 a pair here, and I believe one could make one's own cheaper. Would 2-inch square wagon axle steel be suitable material? I have a power drill and emery wheel to help in the making of these swedges, but would like some information on how to go about it.

LUKE BLABEY, Manitoba.

A Shop in a New Town.—My partner and I have a shop 26 by 35 feet, a Kerrihard power hammer, two Royal Western Chief blowers, a power drill, rip saw and grindstone, and plenty of small shop tools for a general repair shop. We are located in a new town, but we have all we can do all the time. This is a farming and fruit country, and most of our work is farm tool repairs and horseshoeing. We are in a fine locality and look for an improvement in shop trade from now on.

BEARD & THOMPSON, Colorado.

Advice on Shoeing.—In reply to the query of Byars Brothers in regard to shoeing a foot that is in the condition he describes, I would advise that he use a very wide web shoe—one that will cover a greater portion of the sole; also that he concave the shoe to fit the sole. It is not necessary that a shoe rest on the wall when the foot is in such a condition. On the other hand, it is far better that it should not. If the state the feet are in was caused by being foundered the feet will never return to their natural shape.

RAY VOLLMER, Illinois.

Several Forging Questions.—Would some brother smith who has had more practice at forging than the majority of us of today please give me proper instructions concerning how to forge out a good socket wrench, or a wrench to put into a brace to put on nuts in quick order. I would also like to know how different kinds of fire tongs are forged out. The tongs I mean are other than the common straight tongs that are easily made—some to hold round or square stock, or to hold some of the jobs that are done around the forge fire of a general repair shop. C. CRAIG, Quebec.

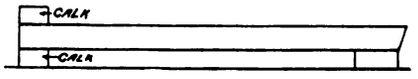
What Say You, Brother?—I would like to make a suggestion which I believe would benefit blacksmiths living in the country so far from a town, and that is, that we be given, through the paper, simple remedies to cure horses of gripes, greasy heels, and other ailments to which they are subject. I am constantly asked to try to do something for horses with these diseases, as the nearest veterinary surgeon is twenty miles from here, and a horse could die before he arrived. There are dozens of blacksmiths whom I know are situated as I am in this respect. H. W. ROSE, Australia.

Wants Other Device for Contraction.—I would like to ask the subscribers of THE AMERICAN BLACKSMITH what they think is the best machanism for a horse with contracted feet. I, myself use a screw shoe that I make, and which has given entire satisfaction. I have some to make and place now.

I have a side line in the form of a window-sash, in which the lights are placed, and do not use any putty. I have them in my house for the last eight years with perfect satisfaction, and would like to get in touch with some large manufacturing company, as I have a small one in Washington, D. C.

H. L. HIGGINS, New Jersey.

Shoeing that Bad Foot.—In answer to Byars Brothers, Kansas, who ask how to properly shoe a horse, the bottom of whose foot grows faster than the shell, would advise that they put two toe calks on the shoe, as in the engraving, having the one next to the foot just high enough to keep



SHOEING THAT BAD FOOT

the shoe from touching the foot. The heel of the shoe will come down all right The calk next to the foot presses against the shell and relieves the bottom or sole. I have shod some bad cases in this way with very good results. If Byars Brothers desire further information they may obtain my address from the Editor.

J. I. B., Pennsylvania.

A Question on Batteries.—I am located way out in Western Texas, in an excellent farming country, but our prices are cut down so there is not much in it for the blacksmith but a lot of hard work. I will give you some of our prices:

Shoeing	$1.00 to $1.25
Plow sharpening	.10 to .25
Tire setting for buggies	3.00
Tire setting for wagons	2.00 to 2.25

and all other work in proportion.

I would like to ask the craft how long one set of good fresh electric batteries will last on a 1-H. P. motor, to run eight hours per day. I am thinking of putting in something of that kind with which to run my forges, but I do not know how expensive it will prove to be. J. H. REDDELL, Texas.

Answers to Questions on Axle Setting.—In answer to C. Craig, of Canada, who wants two questions answered in regard to the article I wrote on axle setting, which appeared in the January number of "Our Journal," would advise that No. 1 means the outside or face of collars; otherwise, the axle set would rest on collars after being adjusted. In answer to No. 2, setting an axle so that the wheel is held in the direction it is intended to run is of vastly more importance than setting it on a plumb spoke, so far as the draft of the vehicle is concerned; hence, my objection to giving an axle gather. The less gather a spindle has the less its wheel will run sideways, which experience has taught me is altogether wrong. Glad to hear from you, Brother Craig—come again. This subject is my hobby.

L. VAN DORIN, California.

From Iowa.—I prize THE AMERICAN BLACKSMITH very highly. I have taken a great interest in the pictures of different shops and am sending you a picture of my shop, showing myself and my son at the forges. I run an up-to-date shop and have the only electric forges in the city. I am always glad to get hold of any new tools or machines that will save labor and increase business, and through your paper saw the L. S. P. Calking Machine advertised and now I have the first one in the city. It does all they claim for it. If more of the craft would read THE AMERICAN BLACKSMITH and properly equip their shops they would make more money, and business would be a pleasure.

R. S. HARSHAW, Iowa.

A Few Prices from Arkansas.—I have been a subscriber of THE AMERICAN BLACKSMITH but a few months, but must say it is lots of help to me. I am not going to do without it any more, I get so much information from its pages. I have tried several plans that I have read and find them successful. I am thirty-two years old and have been at the trade all my life. I was raised in my father's shop. My work here is on wagons, buggies, farm implements and shoeing. I will give you a few prices:

Landsides	$1.25
Laying Plow Points, plain	.50
Laying Listers	1.00
Filling wheels, front	4.00
Filling wheels, hind	5.00
Spokes, each	.25
Fellos	.35
Tires	3.00
Axles	from $3.00 to 5.00
Wagon body	12.00
Shoeing, new	1.00
Resetting	.70

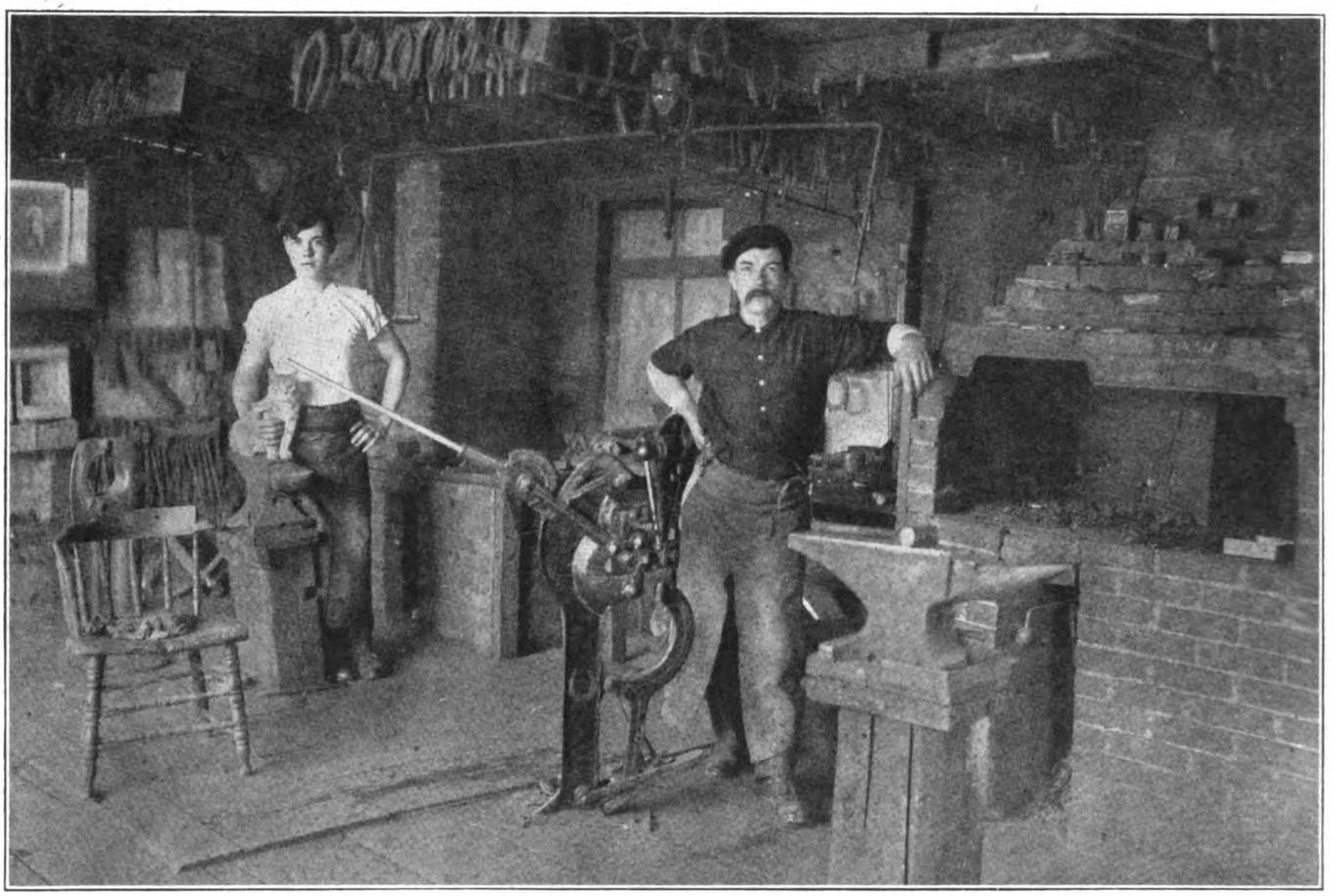
W. A. BOLDIN, Arkansas.

Casehardening Methods Desired.—I would be most grateful if some one of the craft would inform me with what to caseharden thin iron, and how to do it.

LEONARD I. TRIEPP, New York.

In Reply.—Brother Triepp does not say whether he has large or small quantities of work to caseharden. If he desires to caseharden an occasional job, then he had best use the cyanide of potassium method, which consists of heating the article to a good red, and then sprinkling it with granulated cyanide of potassium. After the piece has cooled off, reheat to a red and then plunge in clear, cold water.

If he has considerable casehardening to do, he had best use the pack method, i. e.: pack the articles in some carbonizing material and heating red hot in an iron box until the depth of hardened case is effected. If Brother Triepp will say just how much work he expects to do in this line, the writer will be very glad to explain both methods minutely. H. F. G., New York.



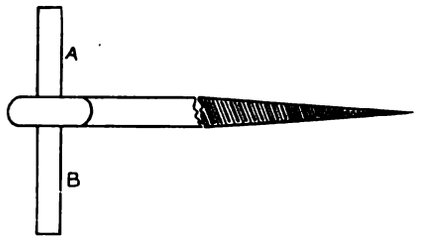
MR. R. S. HARSHAW'S SHOP OF IOWA IS LIGHTED AND OPERATED BY ELECTRICITY

Interesting Letter from South Australia.—I am very well pleased with THE AMERICAN BLACKSMITH, as it always contains useful information and is usually very practical, with illustrations to many of the items. I am much interested in the horseshoeing, making of forge tools and the various helps to the smith. I am situated in a part of the country where wheat growing is the chief occupation of the people. Fairly large areas are cropped and, it being timber country, no set plows are used—all are made to jump when coming into contact with stumps or stones. American-made seed drills and binders are much in demand, and Canada is also supplying us with these implements. Grain crops are always stripped with Australian-made

machinery. In carriage building, we are large importers of American woodwork for wheels; in fact, all bent wood used is imported from the States; so you see we are dependent on our American cousins for many things in far-away Australia.

THOS. BRENNAND, South Australia.

Removing Spoke Stubs.—I would like to tell Brother Higley, of Washington, how I improved on his method of removing spoke stubs from wagon hubs. I learned



FOR REMOVING SPOKE STUBS

his way first, but thought it could be improved. I take a ⅝-inch lag screw, with a good sharp thread, and cut the head off. Then I draw out, turn eye, and then take a piece of ⅝-inch round iron, six inches long, and weld it in the eye. One does not need to use wrench or to screw against box. I bore in with $\frac{9}{16}$-inch bit and screw in the lag screw as an auger. Then I take hold of handle at A and tap with hammer at B. In this manner I can remove three to his one. I hope this information will prove of interest and service to some.

JOE WARRINGTON, Mississippi.

Horse Evener Question.—I would greatly appreciate information concerning the way to put a four-horse evener to a Milwaukee binder, so that four horses may work abreast. Of course, I understand I must contend with a side draft, but I want as little as possible.

CHAS. W. ARMBRUSTER, Missouri.

In Reply.—The accompanying engraving shows a four-horse evener as used for a binder. It will be noticed that the pole passes between the two horses on the cutter side. In other words, the equalizer must be so fitted so that the horses nearest the cutter will be in the same position as though but two horses were used.

L. H. G., Ohio.

On Shoeing Vicious Horses.—In reply to L. E. Phifer, in the January number, will say one cannot compare a human foot with a horse's foot for several reasons, which I shall not try to explain at present. In regard to shoeing unruly horses I do agree with Brother Phifer in being quiet with them; but if good and kind treatment does not work I try something else I have been shoeing horses for almost thirty years, and I have never yet seen a horse or mule on whom I could not get a set of shoes. Perhaps any horse can be shod without a rope, sling, box or switch, providing you will take your time and the chance of being laid up. But, as a general rule, the mean horses come when you are very busy and time amounts to a good deal. I have in use a shoeing rack of my own make, which I have used for over fifteen years, and I can get four shoes on the worst horse or mule in thirty minutes, taking two feet at once. But I do not read a chapter in the Bible when I am at work. I would like to hear from Brother Franz Wenke how long a cavalry horse lasts, on the average, in the army.

JOE BRUNE, Nebraska.

Welding Soft Steel.—For a considerable time we have had a large amount of soft steel axles to weld, and in some cases, although the steel would stand a fairly good heat, the difficulty was to get the weld to hold at first. Even though the scarfs were pretty well backed to prevent slipping, they would slip anyway, and as I had not seen anyone else weld them I needed to discover a plan of my own, which has since helped very much. I gathered as much of the scale as I could, all around my anvil, crushed it in my hand and used that as I would sand on iron, as good welding sand is difficult to get here. I found that this scale was a good welding flux, and the steel would stand a greater heat when using it. I write this with the hope of probably helping someone, and as I have not heard anyone else speak on the subject, others might possess a better plan, although with this one I have had no difficulty, except that I had to use a little more care than customary in welding iron. I have had a great deal of Carnegie soft steel lately, and it welds very easily, even without sand. I appeal to others of the craft to give us all the benefit of their experience.

WM. W. WATT, Natal, South Africa.

What is the Cause of Thrush.—I would be pleased if some brother smith would tell me the real cause of thrush in horses' feet. Some veterinarians say it is caused by using the paring knife from one horse to another by smiths, thus spreading the disease. I claim it is from filthy stables and barnyards mostly, and that it is the same with the rot in the frog in hind feet. Any information would be gratefully accepted.

FRANK J. PIES, Wisconsin.

In Reply.—Several authorities were consulted on the subject. A. A. Holcombe, D. V. S., Inspector, Bureau of Animal Industry, says: "The most common cause of thrush is the filthy condition of the stable in which the animal is kept. Hard work on rough, stony roads may induce the disease, as may a change from dryness to excessive moisture. Muddy streets and roads, especially where mineral substances are plentiful, excite this abnormal condition of the frog. Contracted heels, scratches and navicular disease predispose to thrush, while by some a constitutional tendency is believed to exist among certain animals, which otherwise present a perfect frog.

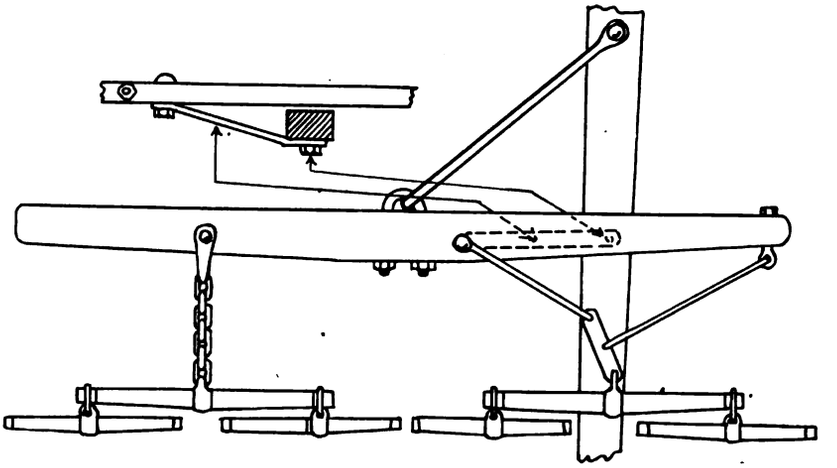
A Lungwitz, Instructor and Director of the Shoeing School of the Royal Veterinary College, in Dresden, Germany, and John W. Adams, A. B., V. M. D., Professor of Surgery and Obstetrics, and lecturer on shoeing in Veterinary Department, University of Pennsylvania, say: "The causes of thrush are uncleanliness, too little exercise in fresh air, excessive paring of the frog, the use of shoes with calks by which the frog is permanently removed from the ground, and the use of frog-pads, which are kept on from month to month."

Neither of the forementioned authorities refer to thrush as being carried from one foot to another by means of the shoer's knife.

EDITORS.

On Shoeing and Handling Horses.—In the January number of THE AMERICAN BLACKSMITH I noticed an article by L. E. Phifer, under the heading "A Talk on Shoeing and Handling Horses." His experience has been quite different to mine. I agree with him that pine tar is an excellent remedy for a contracted foot, but he trims the hoof down close. I leave it reasonably long, to get more leverage. Then I make a light shoe, from a ½-inch rod or an old hay rake tooth flattened down. Make it $\frac{3}{16}$ of an inch wider at the heel than the hoof, and give it a spring temper at the toe, so when you squeeze it together at the heels with your hands and then let go, it will spring back to its former width. Hold it together at the heels in any way that is convenient while you nail it on. Reset it every ten days, keeping it $\frac{1}{16}$ of an inch wider than the hoof each time you set it till you get the desired width, and tell the driver to stand him in a soak-tub of warm water one hour each day. Charge whatever you think it is worth.

When Mr. Phifer said that some men think when they are able to drive a fence nail in a board they are professional horseshoers, I suppose he referred to us fellows who may not be able to mention the names of all the bones and other parts in a horse's leg without consulting a book. I acknowledge that is my fix. I had that knowledge once upon a time, but have since forgotten it. I have been shoeing all the time, too, so I suppose I must consider myself among the fence-nail class. I have shod some pretty fair horses, though, boys; from the fast



A FOUR-HORSE EVENER FOR A BINDER

guideless trotting horse in the world down to dray horses, heavy stallions, kicking mules and broncos. Well, probably we do think we are better than we really are, but I notice there are others who think that when they are able to shoe some gentle, family driving horse without using a rope, they can shoe any horse that ever wore hair, in the same manner. Mr. Phifer said he never shod a horse under a rope or in a swing, and that there is no need for it. Now, I would like to inform him that there are horses in Wyoming and Western Nebraska with whom a man cannot remain in the same corral on foot, let alone shoeing them. I will describe one that he cannot shoe. Of course, we understand that a horse may be chloroformed, or a man might use a cable in place of a rope, or some similar device, but he cannot win a bet that way here.

Two men led a black bronco, weighing about 1,100 pounds, to the shop to be shod. He stopped about ten feet from the door and cleaned out his nostrils thoroughly and refused to enter for about a minute. Then, with one jump, he landed ten or twelve feet in on the floor, and that familiar sound came from his nostrils—at least, it is familiar to most horseshoers in this part of the United States. For those who have never heard it, if there be any, it sounds like a soft plug going out of a steam boiler under high pressure. Well, we tied him to a ring on the wall with a halter rope that proved to be a good one, and let him stand a while to quiet down, while I tightened my apron string a little, rolled my sleeves a trifle higher and took a fresh chew of tobacco. But he did not quiet down a bit. He pawed the floor continually with one foot, then with the other. When I endeavored to get close to him, no matter from which side I came, he would line up along the wall, turn his head straight toward me, his eyes shining like coals of fire, and every little while we would hear that familiar sound. However, I got too close to suit him once, and he pulled back, reared up, then jumped forward, rammed both front feet through the side of the shop, reared again, came down with one foot over the halter rope, slipped with the other, fell on his side, rolled over and onto his feet again, quick as a cat, and again we heard that familiar sound. Then I put a slip loop in a rope, threw it on the floor in front of him, let him paw into it with one foot, jerked it up tight around his ankle, threw the loose end over his back, and the man on the other side threw it back under his belly to me. I pulled on it, raising his foot from the floor. Then I held on at a respectable distance, while he threw himself four or five times and fought the rope until the sweat came out on him all over. Then he landed once more on his feet, or on three feet, and again we heard that familiar sound; then he stood perfectly still. According to Mr. Phifer, now was about the time to say "whoa" once or twice, real sharp. At least, it was the first time I got to his head, and that is where he says he goes before he says it. I then handed the rope to the other man and proceeded to trim the foot. He never made a move until I was about done, when, without warning and quick as lightning, he reared, threw his head around, got me by the back of the neck with his teeth, took one suspender and the whole back out of my shirt, and left a blood blister on the back of my neck about the size of a silver dollar. According to Mr. Phifer, now was about the time to commence to quote from the Bible. Well, I did—good and plenty, too. Again, he states that every shoer who gets hurt, gets injured through neglect. I will admit it. I neglected to put a muzzle on him as soon as he came in. Well, we proceeded in the usual way with ropes until we got him shod.

Now, this is not one horse out of a thousand, but there are any quantity of just such horses worked in harness or under the saddle every day, and they must be shod. But I cannot shoe them without a rope. Yet, when it comes to main strength, or using language found in the Bible, while shoeing a bronco, I think I can do as good a job as Mr. Phifer, although I never met him. And if it really is a fact that he is man enough to shoe any horse without a rope, I do not want to meet him, after saying what I have said, for I am satisfied he can put me, or even Jim Jeffries out in less than two rounds. FRANK J. CASEY, Nebraska.

From Far-off Rhodesia.—I possess a small shanty here and work alone, excepting three natives who help at times. I did have a wood man here, but like Mr. Stoltz, I found he was watching me shoeing or doing other iron work, half his time, so I, myself, am doing what wood work there is. I have a pair of forty-inch pear-shaped bellows, a box of Green River lightning dies, a tire bender, a spoke tenoner and a Buffalo drill press with twist bits. I have made myself a tiring platform out of a large, flat ring in the form of a tire filled with concrete. I was thinking of getting a cold-tire setter, but the transport riders and farmers insist on having the saw run through every joint when shortening the tire. Besides, I do not think they make a good job of heavy wagon wheels. I get tires here up to 3½ inch by 1¼ inch to shorten.



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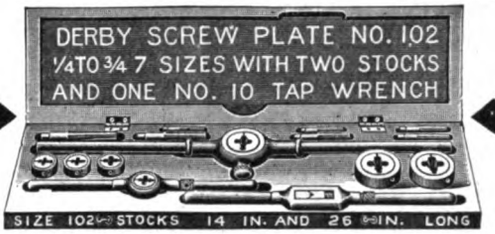
One new light cart spring	3 £	($14.61)
Welding light axle	10s.	($2.43)
Welding wagon axle	2 £	($9.74)

I get a very large assortment of work for which it would be difficult to make or state a fixed price. One thing that is very agreeable is that I am not worried by a rival, as I have the right on these farms. As a side line, I breed a few cattle: I have twenty head of Frieslands.

It would be a great favor to me if any of my brother smiths would tell me how to build a simple tire furnace to heat from four to eight tires at one time. At present, I am heating them on the ground with cow dung or wood, which is far from satisfactory, as they only get hot in places, and a large furnace would be too large for my purpose. I would also like to know how to make a sinking platform for tiring.

HARRY G. BELL, Rhodesia, South Africa.



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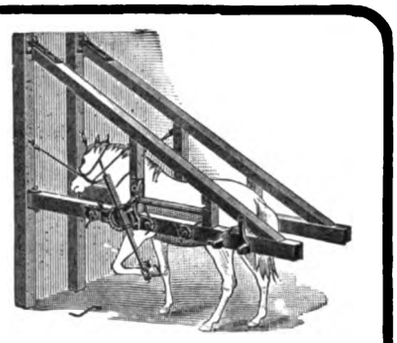

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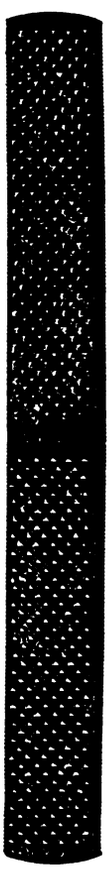

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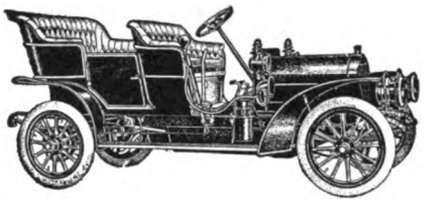

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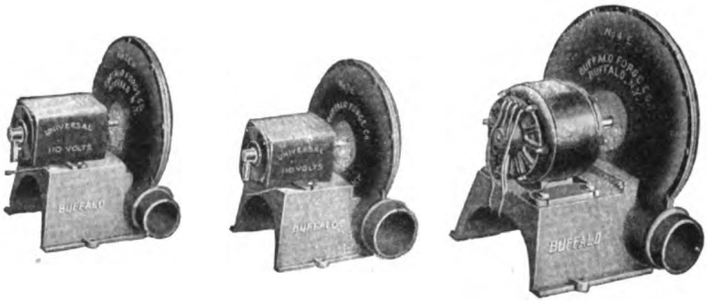

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"METAL SPINNING," No. 57 in "Machinery's" reference series, paper covered, pamphlet style, Industrial Press, New York City, price 25c.

This is made up of three articles which were recently published in "Machinery." They cover the process of metal spinning and the tools and metals used. This art is again coming into prominence because of the very fine work that can be done by the skilled hand-craftsman. There has been very little matter published on this subject, and those interested in the art will find much of interest and value in this pamphlet.

A. B. C. OF THE MOTOR CYCLE, W. J. Jackman, M. E., 250 pages, illustrated. Leather $1.50, cloth $1.00.

This is the latest edition of Thompson's series of books for motorists, and it covers the subject of the motor cycle from its history down to the latest types and practices. This book is written especially for the beginner and the novice, and is practically free from technical and theoretical discussions. The various parts of the vehicle are thoroughly and carefully explained, and many practical hints given on the purchasing of new, as well as second-hand, motor cycles. There are also chapters on horsepower and how to figure it, cost of operation, tires and their proper care, the selection and use of the machine, etc.

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THE "SHOW HOW" SERIES OF BOOKS, published by the Charles C. Thompson Co., Chicago, is a valuable addition to mechanical literature. There are six of these books, covering completely the field of automobile, motor-cycle and motor-boat mechanism and operation. The authors are men of ability who have handled their various subjects in plain, every-day language, so that their writings are readily understandable by those who lack technical training. The entire series may be read with profit by everybody interested in automobile, motor-cycle or motor-boat operation, particularly owners.

IT MAY BE OF INTEREST to our readers to know that an "Indestructible" file and tool handle claiming all of the long sought for merits has recently been placed on the market. These handles which range in size from three and one half to six inches are very simple in construction and correspondingly cheap in price. It is claimed that with ordinary usage one of these handles will outlast twenty to thirty of the old type handles made from common wood. All who are interested in knowing more about this "Indestructible" handle are invited to write to the Advertising Department of THE AMERICAN BLACKSMITH, Buffalo, N. Y.

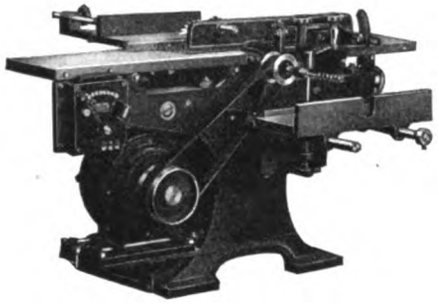
FAIRBANKS, MORSE & CO. have recently issued a very interesting and complete catalogue on Hydraulic, Ball and Roller Bearing and Compound Jacks. This book, from cover to cover of the forty-eight pages, is full of interesting and instructive descriptive matter and illustrations, describing in detail the simplicity as well as durability in construction and operation of Track Jacks, Ball Bearing Screw Jacks, Roller Bearing Jacks, Automobile and Lowering Jacks, Car and Journal Jacks, Geared Ratchet Lever Jacks and Telescopic Jacks, making the catalogue of practical value to all buyers and users of Jacks.

Fairbanks, Morse & Co., Chicago, Ill., will send a copy of this catalogue to interested parties who mention this publication.

J. H. SESSIONS & SON, of Bristol, Conn., manufacture a "Safety Spring" device for whiffletrees and neck yokes which it is claimed was invented by a blacksmith whose experience has been the means of producing a practical spring which can be used with wrought, malleable and forged hooks, and works equally well with all of these; in fact, it is contended that any hook used with the ordinary flat springs will answer for safety springs. Further information concerning this device will be gladly given by the manufacturers if you will in requesting same mention THE AMERICAN BLACKSMITH.

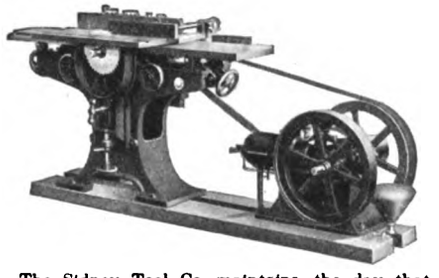
CRAY BROTHERS, CLEVELAND, OHIO, have issued their 1910 Net Price Catalogue, which is claimed to be recognized as a standard book of references and price maker for the carriage, blacksmith, hardware and automobile trade. It is replete in 448 pages and contains about three thousand illustrations. A copy of this excellent publication will gladly be sent to anyone who requests same and mentions THE AMERICAN BLACKSMITH.

THE SIDNEY TOOL CO. have recently brought out what they call their FAMOUS UNIVERSAL WOOD WORKER for the Blacksmith, Wagon Maker and Cabinet Shops where a great variety of work is to be turned out, and where there is not room or requirement for special machines. The FAMOUS WOOD WORKER consists of twelve complete machines, viz.: a twelve-inch JOINTER; a SAW TABLE with raising and lowering saw arbor;



two side power Feed Molder and Edger; a Band Saw; a complete Single Spindle Shaper; a Pony-Planer; a Power Feed Sander; a Boring Machine; a Hollow Chisel Mortiser; a Single End Tenoner; an Emery and Knife Grinder, and a Disc Sander. There are also other special attachments made for this machine, such as the Pole, Tongue and Shaft Rounder, Felloe Rounder, Spoke Tenoner and Hub Borer.

If you watch their advertisement from month to month they will show you the different operations which can be done on this FAMOUS tool.



The Sidney Tool Co. maintains, the day that you install the FAMOUS UNIVERSAL WOOD WORKER you discount competition and will be able to make profits you cannot earn without one. They stand ready to prove any claim and back each sale with a guarantee. All they ask you to do is to mention THE AMERICAN BLACKSMITH and ask for additional information concerning their special premium good for sixty days. Address The Sidney Tool Co., Sidney, Ohio.

CLEVELAND TWIST DRILL COMPANY has moved its Chicago Branch to 9 North Jefferson St. Their new location affords them greatly improved facilities for the prompt handling of their steadily increasing business.

THE ROME GAS ENGINE COMPANY, of Rome, N. Y., are putting on the market an engine especially designed for blacksmith shop use, and are in a position to make AMERICAN BLACKSMITH readers a very attractive proposition. It is the object of this Company to sell their engines direct to the shop-owners, thereby giving him the benefit of the middle man's profit. Readers who are in the market for a gasoline engine will find it to their interest to write for particulars, mentioning THE AMERICAN BLACKSMITH.

THE VULCAN IRON WORKS, Mason City, Iowa, are putting on the market a universal tenon and boring Machine, which they say will cut tenons on a set of wheels in twelve minutes. They will gladly furnish catalogue and prices if you will write for them, mentioning THE AMERICAN BLACKSMITH.

READERS WHO ARE IN THE MARKET for gasoline engines will do well if they correspond with the "New Way" Motor Co., Lansing, Mich., concerning their engine before they buy. This company is putting on the market an Air-Cooled Engine, which they have been experimenting with for the past few years. It has now made good in every climate from Alaska, where the temperature is sixty degrees below zero, down to Australia and New Zealand where the temperature is sometimes higher than one hundred degrees in the shade. Mention THE AMERICAN BLACKSMITH when writing to them.

THE GILLER ACME HORSESHOE COMPANY is introducing a drop forge interchangeable shoe which is in two parts: a plate which is nailed to the hoof, and the shoe proper which is held on the shoe by means of four taper plugs. These shoes can be supplied in all the sharp or blunt calk styles and, among the points of excellence, the manufacturers emphasize the fact that blunt shoes can be changed for sharp ones, or vice versa, in four or five minutes. This change is accomplished by the use of a prier wrench which consists of a flat bar at the end of which are two wedge-shaped prongs. These prongs are driven between the shoe proper and the plate, one prong on each side of the plug, thus driving the shoe and the plate apart. Another point emphasized by the makers is that the upper surface of the shoe proper has depressions which fit directly over the nail heads in the foot plate; thus the nail heads never touch the ground, and consequently, the nails do not work loose in the plate. If you are interested in this shoe, write to the Giller Acme Horseshoe Company, 3513 Fort Hamilton Avenue, Brooklyn, N. Y.

SOMETHING NEW FOR THE AUTOMOBILE KIT. A set of stocks and dies put up in a handsome and convenient leather roll. The manufacturers having had so many requests from parties requiring stocks and dies put up in a small and convenient form, have adopted this style. It is compact, 14 inches by 4 inches, and weighs only 2 pounds. The leather roll is very strong and substantially made. The dies, eight in number, range from ¼ inch to ⅜-inch sizes for threading bolts and nuts with the A. L. A. M. standard threads. They are round with side adjusting screw 1¼-inch outside diameter. The stocks are handsomely finished



with gun-lock centers, the whole making a very convenient set. Illustration shows style of stock. All complete automobile kits include a set of these stocks and dies. Jammed threads can be instantly recut and broken bolts quickly replaced. They should be in the possession of every auto repairman. The set is so small that it can be conveniently carried when out on repair trips.

This set is made by the Wiley & Russel Mfg. Co., Greenfield, Mass. They will be glad to furnish further information in prices. Kindly mention THE AMERICAN BLACKSMITH.

IT MIGHT INTEREST READERS to know that the Franklin Steel Works, who have branches in Joliet, Ill., and Cambridge, Mass., are now manufacturing the famous FEDERAL calks, beside their regular output of STANDARD, CLIMAX and SWEETS toe calks.

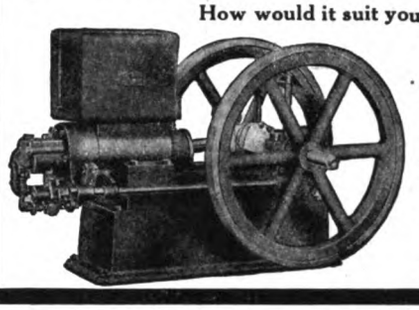
THE SOUTH BEND MACHINE TOOL CO., South Bend, Ind., are at present manufacturing an improved 15" swing lathe (either foot power or countershaft) containing all necessary practical features for general blacksmithing work. All who are interested in the purchase of the machine are invited to write to the Advertising Department, THE AMERICAN BLACKSMITH, Buffalo, N. Y.

DID YOU NOTICE THE FRONT COVER ADVERTISEMENT? The Weldarine Mfg. Co. are now putting on the market a brazing compound which they claim is the best that has ever been made. One blacksmith reports welding a broken arm bracket of a steam pump; another tells how he inserted new cogs in a gear; another tells about how he repaired a broken casting with it. Their "Tempertough" they claim cannot be compared with any other hardening solution. Subscribers who have use for these two products we believe would do well to correspond with this company, mentioning THE AMERICAN BLACKSMITH.

HAVE YOU NOTICED the 2½ pages of advertising The Buffalo Forge Company is carrying in this issue? Their blowers, forges, ball bearing drills and combination woodworking machines have proven a success wherever used, and we believe it would be of interest to the readers using any of the above mentioned machines to correspond with this company.

$ MORE DOLLARS; LESS WORK $

How would it suit you to take the agency for

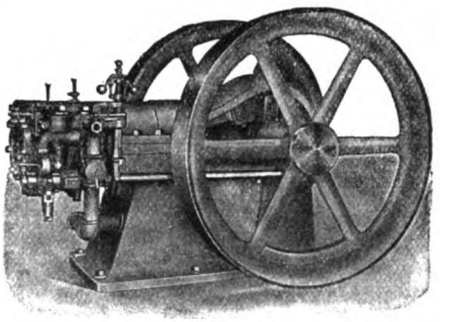


WITTE GASOLINE ENGINES

Your experience is worth something. If you use a "Witte" your customers will want them; **why not sell them and make the profit?** Our engines are **GUARANTEED FIVE YEARS**

Have been on the market 25 years; advertised and sold everywhere. **Lots of good selling points.** Write for introductory proposition, stating size you can use.

WITTE IRON WORKS CO.
1617 Oakland Ave. Kansas City, Mo.



Write for booklet describing full line of Gas and Gasoline engines, from 3 to 100 H. P. Special inducements to dealers as agents.

Sold Under A Positive Guarantee.

The New Era Gas Engine Co.
No. 63 Dale Ave. Dayton, Ohio.

Electric Lights

For Every Home and Factory

We manufacture isolated lighting plants, suitable for farm house, cottage and small factory use, ranging in price from $250.00 up to $375.00. These prices include engine, dynamo, storage battery and switchboard. You can use the engine for pumping water, sawing wood, churning butter, etc.; at the same time you can run the dynamo and charge the storage battery at no extra expense, hence the current used for lighting costs practically nothing.

Write today for interesting information on the lighting subject.

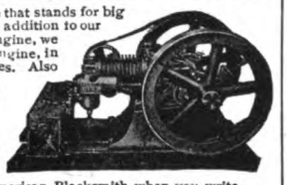
The Dayton Electrical Mfg. Co.

151 St. Clair Street Dayton, Ohio

"STEINER," the name that stands for big power at low cost. In addition to our famous water-cooled engine, we make this air-cooled engine, in 1½, 2½ and 3 h. p. sizes. Also Pumps and Jacks.

When writing state size wanted, etc.

Catalogue free.



M. STEINER & CO.
242 S. Torrence St.
Dayton Ohio

Mention The American Blacksmith when you write.

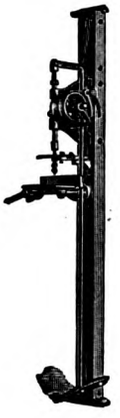
HONEST DEALINGS.

Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in **American Blacksmith** advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

A Time and Labor Saver In Every Shop

In twelve minutes you can cut tenons on a set of wheels with a

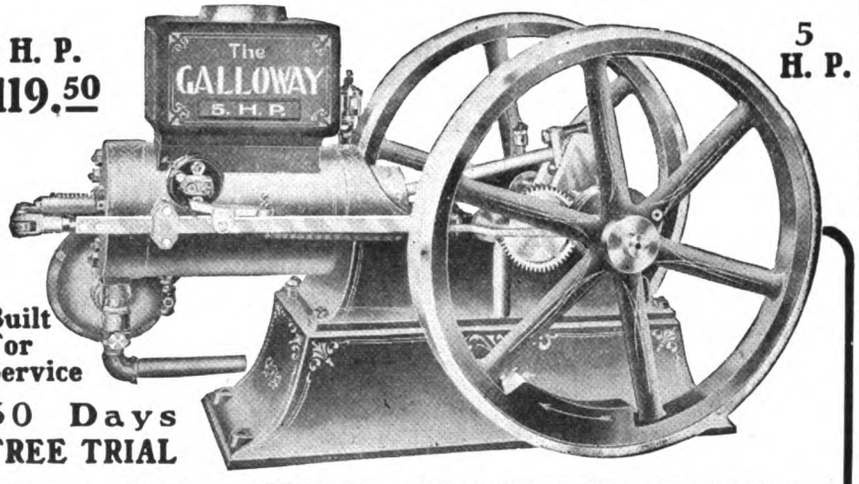
Universal Tenon and Boring Machine



Every shop owner should investigate this simple and powerful machine by writing now—today—for our catalog, which is mailed free to anyone on request to

VULCAN IRON WORKS
MASON CITY, IOWA

5 H. P.
$119.50



5 H. P.

Built For Service

30 Days FREE TRIAL

THE GALLOWAY GASOLINE ENGINE

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa

will run your shop at several times its present capacity and enable you to take lots of jobs that you have to turn down now because you have not the capacity.

Only four things to do: **Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start,** and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high-grade engine for 15 years. Over 2,500 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember the bore and stroke counts and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests.

On the larger sizes, if it is not entirely convenient for you to pay all cash, I will take your note for the balance at the regular rate of interest for 6 months.

The price given is for the 5-horse power only, but we make these engines in seven sizes.

Note my special proposition to blacksmiths.

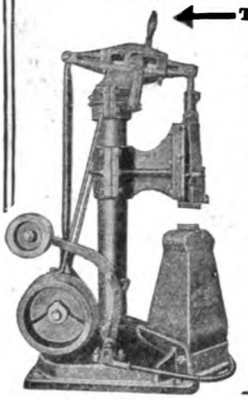
I have a plan by which every blacksmith can partly or entirely pay for his own machine. It's good; it's away out of the ordinary; and you will be overlooking a big chance if you don't write for my proposition.

Ask for my free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure.

WRITE TODAY. **WILLIAM GALLOWAY, President.**

THE WILLIAM GALLOWAY COMPANY, 577 Jefferson St., Waterloo, Iowa.

Modern Power Hammers
Make Profitable Helpers



This Lever is only found in the "Modern" Hammer. It makes possible a light or heavy blow at **high speed.**

Every blacksmith and repair shop owner should investigate this hammer. It

Makes Smithing Easy.

No. 1, shown here, is a light, quick-acting hammer, covering a wide range of work.

No. 2 is designed especially for use in large repair shops and factories. Both of these are completely described in our booklet—sent to anyone on request. Write for one.

Modern Sales Company
GRINNELL, IOWA

D. Ackland & Son, Ltd., Winnipeg, Canada
Agents for Canada
Gibson Battle & Co., Ltd., Melbourne, Australia
Agents for Australia

BLISS HOOF CUTTER

No person who shoes horses can afford to be without it

Most powerful and with the widest range of work, of any tool made



$2.50 each
Extra Knives 25c. each

BLISS MANUFACTURING COMPANY, So. Egremont, Mass.



10 DAYS FREE TRIAL We will ship you a **"RANGER" BICYCLE on approval, freight prepaid** to any place in the United States *without a cent deposit in advance*, and allow ten days free trial from the day you receive it. If it does not suit you in every way and is not all or more than we claim for it and a better bicycle than you can get anywhere else regardless of price, or if for any reason whatever you do not wish to keep it, ship it back to us at our expense for freight and you will *not be out one cent.*

LOW FACTORY PRICES We sell the highest grade bicycles direct from factory to rider at **lower prices** than any other house. We save you $10 to $25 middlemen's profit on every bicycle—highest grade models with Puncture-Proof tires, Imported Roller chains, pedals, etc., at prices no higher than cheap mail order bicycles; also reliable medium grade models at **unheard of low prices.**

RIDER AGENTS WANTED in each town and district to ride and exhibit a sample 1910 Ranger Bicycle furnished by us. **You will be astonished** at the *wonderfully low prices* and the liberal propositions and special offers we will give on the first 1910 sample going to your town. **Write at once** for our *special offer.*

DO NOT BUY a bicycle or a pair of tires from *anyone* at *any price* until you receive our catalogue and learn our low prices and liberal terms. **BICYCLE DEALERS!** you can sell our bicycles under your own name plate at double our prices. Orders filled the day received.

SECOND HAND BICYCLES—a limited number taken in trade by our Chicago retail stores will be closed out at once, at **$3 to $8 each.** Descriptive bargain list mailed free.

TIRES, COASTER BRAKES, single wheels, inner tubes, lamps, cyclometers, parts, repairs and everything in the bicycle line at **half the usual prices.**

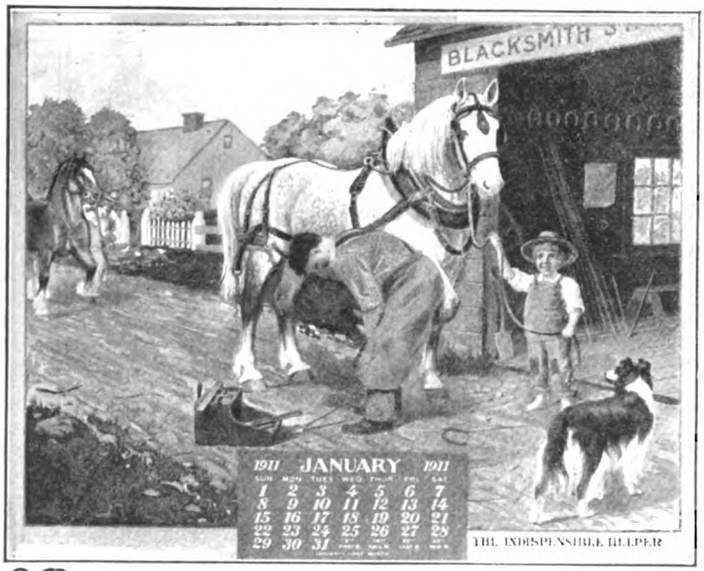
DO NOT WAIT but write today for our *Large Catalog* beautifully illustrated and containing a great fund of interesting matter and useful information. It only costs a postal to get everything. **Write it now.**

MEAD CYCLE COMPANY, Dept. M.196, CHICAGO, ILL.

FOR CURRENT HEAVY HARDWARE PRICES SEE PAGE 38.

Never Accept Imitations

When a dealer or jobber tries to impose substitutes for the *good advertised articles,* write us or the manufacturer. We will see that you get the genuine—what you want.



"The Indispensable Helper"

This extremely beautiful water color we have had reproduced in ten colors as a most appropriate art calendar. The calendar is 8 x 9½ inches and reproduced on good, heavy coated cardboard, with a date pad of convenient size and harmonious tint.

Free to "Our Folks"

We are going to present one of these calendars **free of charge** to every reader whose subscription is paid up to January, 1911. If your subscription expires before that time better get in line for one of these beautiful art subjects.

For Advertising

your own business we have secured a limited number of these fine calendars, which we offer at cost. They will bear no advertising except your own business card of ten words or less. This we will print at the top of the calendar without extra charge. We offer these calendars to subscribers of "Our Journal" only—you must be or become a regular reader before you can get any of these calendars.

If you want calendars order them now. We have made special arrangements this season, and our first calendars will be ready for delivery about November 15th. But don't wait—be sure of getting some.

These prices include printing your business card of ten words or less on each calendar, also packing and carriage charges.

(1) **50 Calendars, postpaid (for subscribers only)**	**$2 00**
(2) **50 Calendars and one year's subscription,**	**2 50**
(3) **50 Calendars and two years' subscription,**	**3 25**
(4) **50 Calendars and four years' subscription,**	**4 00**

Larger lots at rate of $1.75 for each additional 50.

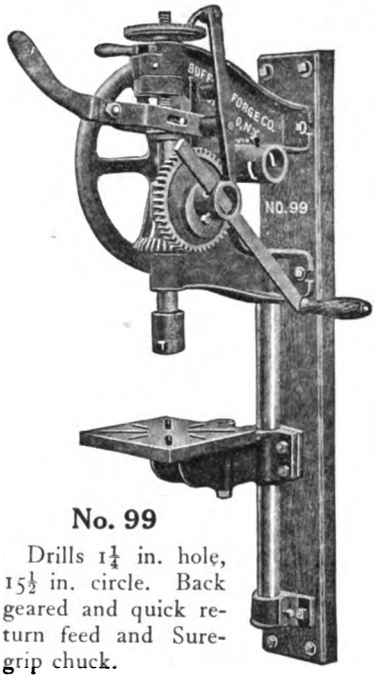
Offer number (4) you can readily see is an exceptional bargain—you get the calendars practically free.

The American Blacksmith Company
P. O. Box 974 **Buffalo, N. Y.**

Buffalo Ball Bearing Drills

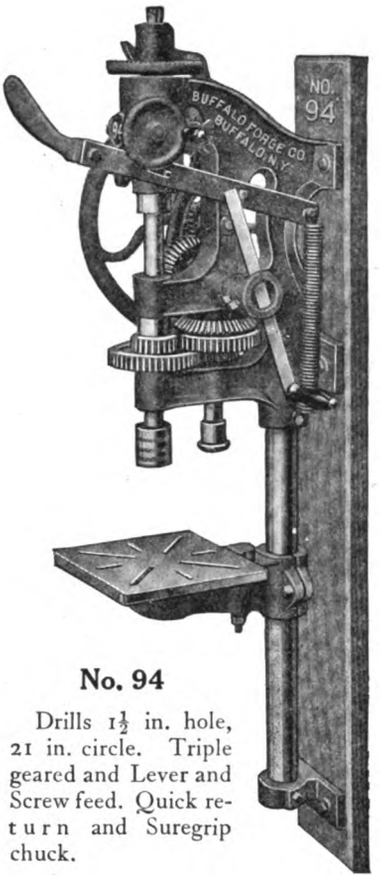
Equipped with All the Latest Time and Labor Saving Devices

The Only Drills with Ball Bearings at the point of High Speed Friction



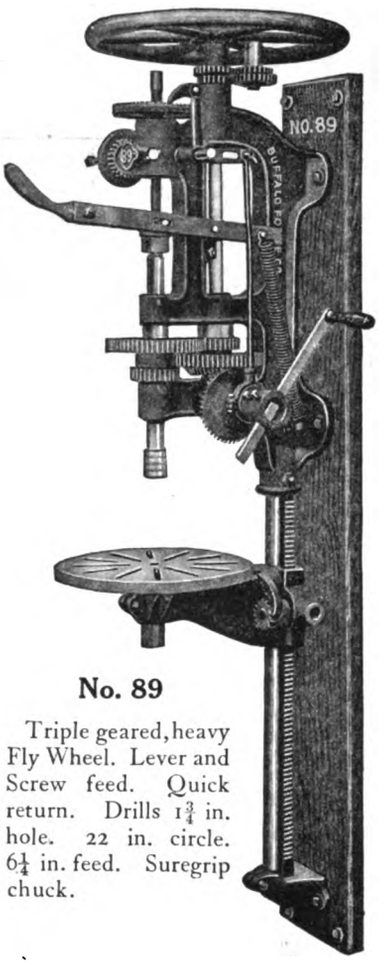
No. 99

Drills 1¼ in. hole, 15½ in. circle. Back geared and quick return feed and Suregrip chuck.



No. 94

Drills 1½ in. hole, 21 in. circle. Triple geared and Lever and Screw feed. Quick return and Suregrip chuck.



No. 89

Triple geared, heavy Fly Wheel. Lever and Screw feed. Quick return. Drills 1¾ in. hole. 22 in. circle. 6¼ in. feed. Suregrip chuck.

You will find these drills easy to operate at their full capacity. The end thrust of the swiftly revolving drill spindle is balanced upon ball bearings. All journal bearings are extra long, bored and reamed in the solid metal of the frame. The gears mesh perfectly. All parts are accurately fitted, and operate without lost motion, back lash, or noise.

A half turn of the small lever at the feed screw head gives hand lever control with

Full and Instant Return of Drill Spindle

You do not have to turn back the feed screw or even lift the drill from the work. Think of the time and labor you save. A half turn back instantly and reliably locks the power feed.

Each of these Drills is equipped with

Buffalo Suregrip Chuck

which has no projecting parts to injure your hands or tear your clothing. The chuck positively locks the drill with a half turn of the collar, and without the use of a tool.

Write now for Catalog 178 A. B.

Buffalo Forge Company
Buffalo, N.Y.



GOES LIKE SIXTY
SELLS LIKE SIXTY
SELLS FOR SIXTY
$60
GILSON
GASOLENE
ENGINE
For Pumping, Cream Separators, Churns, Wash Machines, etc. FREE TRIAL
Ask for catalog—all sizes
GILSON MFG. CO. 39 Park St. Port Washington, Wis.



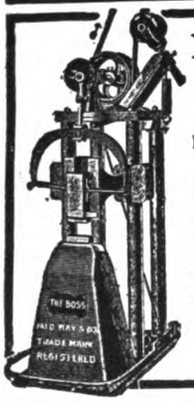
RUBBER TIRED RUNABOUT, $42.00
Top Buggy, $35. Buggy Tops, $4.60
Write for 100-page Catalog.
It's free. Compare our prices.
Established 1883.
BUOB & SCHEU,
500-520 East Court St,
CINCINNATI, OHIO.

MORGAN & WRIGHT PADS
ARE GOOD PADS

STEEL WHEELS



To Fit Any Wagon
Plain or Grooved Tire
Farmer's Handy Wagons
All Standard Types
Special Inducements to Blacksmiths
Write Today for Agency
EMPIRE MFG. CO., P. O. Box 301. Quincy, Ill.



NOVELTY
IRON WORKS
BOSS HAMMER
For Plow Work, Wagon Work, Heavy Work, Any Work.
"Will strike as you like." Heavy or light at full speed or less. A broken anvil will cripple no other part of the hammer.
G. E. DAVIS, Mgr.
DUBUQUE, IOWA.

CLASSIFIED BUYER'S GUIDE.

To Find Address of any Firm given here, consult their advertisement.

For its location in this issue, see Index on Page 17.

Anvils.
Columbus Forge & Iron Co.
Eagle Anvil Works.
Hay-Budden Mfg. Co.
Horace T. Potts Co.
Wiebusch & Hilger.
Peter Wright & Sons.

Annealing Furnaces.
National Economic Gas Blast Co.

Automobile Specialties.
Cray Brothers.

Axles.
Timken Roller Bearing Axle Co.

Axle Gauge.
Cray Bros.

Axle Nuts.
Cray Bros.

Blacksmiths & Wagon Builders Tools & Supplies.
Beals & Co.
Buffalo Forge Co.
Campbell Iron Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Champion Tool Co.
Cray Bros.
Cummings & Emerson.
Heller Bros.
E. F. Reece Co.
Silver Mfg. Co.
Wells Bros.
Wiley & Russell.

Blowers.
Buffalo Forge Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Electric Blower Co.
Roth Bros. & Co.

Bolt Clippers.
Chambers Bros. Co.
Champion Tool Co.
H. K. Porter.

Bolt Cutters.
H. B. Brown & Co.
Wells Bros.

Books.
Chas. C. Thompson Co.

Building Materials.
Chicago Housewrecking Co.

Built Up Wood.
Joel H. Woodman.

Calks.
Franklin Steel Works
Rhode Island Perkins Horseshoe Co.
Phœnix Horseshoe Co.

Calking Machines.
American Calking Mach. Co.
L. S. P. Calking Machine Co.

Carriage Top Dressing.
West Mfg. Co.

Carriage Rims.
May Bending Works.

Carriage Specialties.
C. C. Bradley & Sons.
Crandal, Stone & Co.
Cray Brothers.

Coke.
Bourne Fuller Co.

Corporations.
Lawyer's Corp. Trust Co.

Cycles.
Mead Cycle Co.

Disc Grinders.
A. E. Durner.

Drills.
Buffalo Forge Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Silver Mfg. Co.

Emery Grinders.
Kerrihard Company.
Crescent Machine Co.
Waupaca Novelty Works.

Emery Wheels.
Chicago Wheel & Mfg. Co.

Fifth Wheels.
Dayton Fifth Wheel Co.

Files & Rasps.
Heller Bros. Co.
Nicholson File Co.

Forges.
Buffalo Forge Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Silver Mfg. Co.

Gas & Gasoline Engines.
Air Cooled Motor Co.
Ajax Iron Works.
H. L. Chapman.
Fairbanks-Morse & Co.
Foos Gas Engine Co.
Gade Bros. Mfg. Co.
Wm. Galloway Co.
Gilson Mfg. Co.
International Harvester Co.
Kansas City Hay Press Co.
New Era Gas Engine Co.
New Way Motor Co.
Sheffield Gas Power Co.
Sidney Tool Co.
Steffey Mfg. Co.
M. Steiner & Co.
Temple Pump Co.
Waterloo Gasoline Engine Co.
Witte Iron Works.

Gas Lamps.
Brilliant Gas Lamp Co.

Gears.
Akron Selle Co.

Hammers.
Champion Tool Co.
Heller Bros.

Hardening Solutions.
Anti-Borax Compound Co.

Hoof Cutters.
Bliss Mfg. Co.

Horseshoes.
Bryden Horseshoe Co.
Giller Acme Horseshoe Co.
Phœnix Horseshoe Co.
Rhode Island Perkins Horseshoe Co.
U. S. Horseshoe Co.

Horseshoe Nails.
Capewell Horse Nail Co.
Union Horse Nail Co.

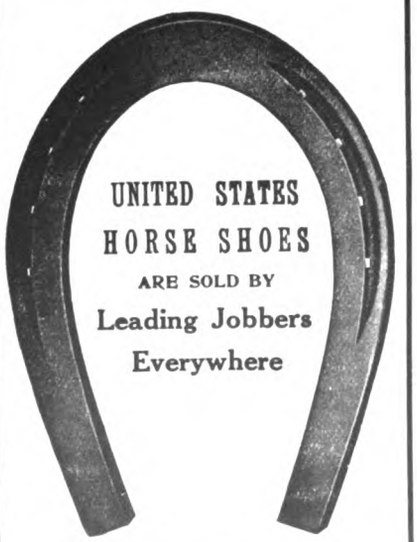
Horseshoe Pads.
Morgan & Wright.
Revere Rubber Co.
Rutherford Rubber Co.

Horse Stocks.
Geo. Barcus & Co.

Horse Training.
Prof. Jesse Beery.

Hub Borers.
Abbott & Co.
Silver Mfg. Co.

Igniters.
Dayton Electrical Mfg. Co.
Knoblock-Heideman Mfg. Co.



When You Buy Horse Shoes

Is it not preferable to make your selection from the most complete line and the best shoes on the market?

United States Horse Shoes

"In a Class by Themselves"

Our Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today.

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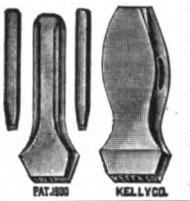

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Current Heavy Hardware Prices.

The following quotations are lowest prices generally quoted at Chicago, June 11, 1910, and are subject to fluctuations. Corrected for The American Blacksmith by the National Heavy Hardware Reporter, Chicago.

Correspondents report absolutely no changes in Chicago prices at this date. Iron and steel from the mill are still difficult to get.

Trade during the past month is reported as about normal. This is, without doubt, due to the very poor weather. Jobbers reported large orders during March, but these very promising conditions have fallen away greatly.

An event of importance in this connection is the organization in Chicago of the American Iron and Steel and Heavy Hardware Association, embracing the United States. The association starts with 134 members.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—
$2.00 rates, full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$2.00 rates, full extras.

Toe Calks—	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—

6 x ½ and smaller	60–10%
Larger and longer	50%

Machine Bolts—

4 x ½ and smaller	60–10%
Larger and longer	50%

Nuts—

Less than 10 lbs. of a size	$2.50 off
From 10 to 50 lbs.	3.00 off

Washers—
Same price as nuts.

Skeins—
Cast 65%

Malleables—
Common $ .09

Half Patent Axles— 65%

Springs—

Single Spring, each	$1.25
Springs, black and half bright	.06

Hickory Lumber—Per Foot—

1 to 2½	$.09
2½ to 4½	.10

Ash and Oak Lumber—Per Foot—

1–1½	$ .07	2½–3	$.08
1½–2	.07½	3½–4	.09

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
½"	$70.00	$70.00	$80.00
⅝"	70.00	73.00	85.00
¾"	73.00	80.00	90.00
⅞"	77.00	85.00	109.00
1"			

Rough Hickory Axles—

	Each.
3 x 4 6 ft	$ .55
3½ x 4½ 6 ft	.90
4 x 5 6 ft	1.10
5 x 6 6 ft	2.00
4 x 5 6½ ft	1.20
4½ x 5½ 6½ and 7 ft	1.80
5 x 6 6½ and 7 ft	2.50
5½ x 6½ 7 ft	3.00

Finished Hickory Axles—

For 2½ and 2¾ Skeins	$ .95
For 3 Skeins	1.10
For 3¼ Skeins	1.35
For 3½ Skeins	1.50
For 3¾ Skeins	1.80
For 4 Skeins	2.10

Rough Oak Bolsters—

Short	$.07½
12–14–16 ft.	.08½

Finished Oak Bolsters—

2¾ x 3¼ and under	$ .60
3 x 4	.65
3¾ x 4¾	.80

Rough Oak Wagon Tongues—

4 x 4 x 2 x 4 x 12 and smaller	$ .95

Finished Oak Wagon Tongues—

3½ and smaller	$1.20
3¾	1.25
4	1.30

Two Inch Sawed Hounds

	Per Pair.
Tongues	$ .35
Front	.40
Hind	.50

Patent Wheels—

A. B. No. 13 and under	45 %
D. No. 13 and under	35–5 %
All Grades, No. 17 to 33	35–5 %
All Grades, No. 39 and Larger	25–5 %
C. No. 13 and under	40–2½ %

Cupped Oak Hubs—	Set.	**Plain End Oak Hubs**	Set.
7 x 8 x 9	$1.40	10 x 14	$3.30
7 x 9 x 10	1.50	11 x 14	4.20
8 x 9 x 10	1.55	11 x 15	4.50
8 x 10 x 11	1.80	11 x 16	5.10
9 x 10 x 11	1.95	12 x 16	5.75
9 x 11 x 12	2.00	12 x 17	6.30
10 x 12 x 13	3.00	13 x 18	7.00
11 x 13 x 14	4.20		
12 x 14 x 15	5.10		

Rough Sawed Felloes—

1¼ x 2"	$1.45	2 x 2½"	1.85
1½ x 2½"	1.65	2½ x 2"	4.35
1¾ x 2½"	1.75	3 x 3"	5.25
3 x 3½"	5.50		

Ironed Poles, White, XXX—

1¾ x 2½" No. 2	$3.80
2 x 2½" No. 3	3.80

Ironed Shafts, White, XXX—

1¾" x 2" and smaller	$1.95
1½ x 2"	2.20
1½ x 2¼"	2.70

Farm Wagon Bows—

Round Top, ½ x 2"	$ .60
Flat Top, ½ x 2"	.75
Round Top, ⅝ x 2½"	1.35

Standard size Piano Bodies with Seats—
Each $4.25

Plow Beams—

1 Horse	$ .60
2 Horse	.75
3 Horse	.90

All Hickory and Oak Spokes and Patent Spokes—
Discount from Weis & Lesh List No. 5.. 5%

Wagon Neck Yokes—

	Mixed Forest Growth	Second Growth	White Second Growth
2½ x 38"	$2.05	$2.80	$4.00
2½ x 42"	2.70	3.90	5.25
2½ x 46"	4.15		
3 x 44"	4.35	6.70	8.38
3 x 48"	5.25	7.50	10.00

Single Trees—Oval—

	Mixed Forest Growth	Second Growth	White Second Growth
2¼"	$1.50	$2.70	$3.35
2½"	1.60	2.75	3.50
2¾"	1.65	2.80	3.65
3 x 36"	2.30	3.30	4.10
3 x 38"	2.35		
3 x 40"	2.50	3.85	4.65

Single Trees—Round—

	Forest Growth	Second Growth
2"	$1.90	$3.45
2¼"	1.90	3.50
2½"	2.00	3.60
2¾"	2.65	4.10
3"	3.20	4.65

Oval Plow Doubletrees—		**Flat Plow Doubletrees—**	
2¾ x 36"	$1.60	1¾ x 3½ x 42"	$2.75
3 x 40"	2.40		

Wagon Doubletrees—

2 x 4 x 48"	$3.40
2½ x 48"	4.50
2½ x 4½ x 50"	4.90
2½ x 4½ x 52"	5.25
2½ x 5 x 52"	6.00
2½ x 5 x 54"	6.75
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—

	Forest
2½ x 30" and under	$ .90
2½ x 30" and under	1.15

Buggy Doubletrees—

	Mixed Forest Growth	Second Growth	White Second Growth
2½" and smaller	$2.50	$3.50	$4.50

Express Doubletrees—

	Mixed Forest Growth	Second Growth	White Second Growth
2½"	$2.80	$3.55	$4.80
2¾"	3.40	4.50	5.25
3"	3.40	4.15	5.50

Express Singletrees, Turned—

	Mixed Forest Growth	Second Growth	White Second Growth
2¼"	$2.25	$2.50	$3.50
2½"	2.75	3.50	3.75
2¾"	3.25	3.75	4.50

Express Singletrees, Square Center—

	Mixed Forest Growth	Second Growth	White Second Growth
2½"	$2.75	$4.00	$5.00
2¾"	3.25	5.20	5.75

Buggy Neck Yokes—

	Mixed Forest Growth	Second Growth	White Second Growth
2 x 42"	$2.60	$3.25	$4.25
2½ x 2¼ x 42"	3.00	3.50	5.00

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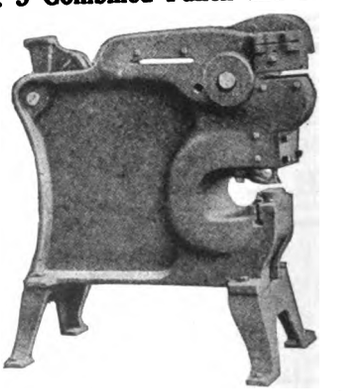
No. 5 Combined Punch and Shear

Punches ⅝ in. hole through ⅝ in. iron. Shears 5 in. x ½ in. flat iron bars. Shears 1½ in. round iron bars. Shears 8 in. x ¼ in. band iron.
Our Large Descriptive Circular will interest you. So will our price.
BADGER STATE MACHINERY CO.
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The *Incomparable* 400 Blower, the one great *Heirloom* that will be handed down *from one generation to the other. Ask what the owners say*

MADE WITH BALL BEARINGS ONLY

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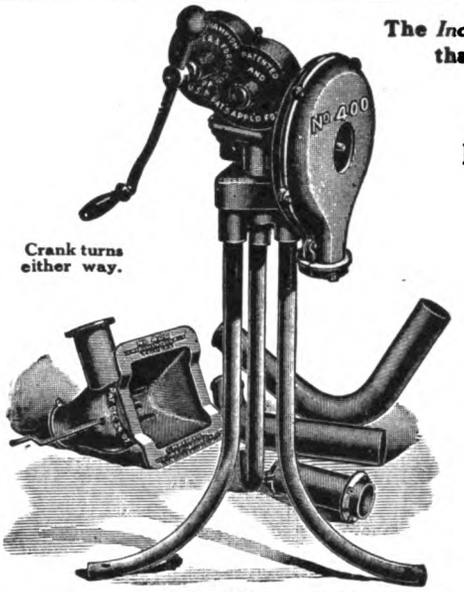
The No. 400 is the Blower that has REVOLUTIONIZED the World in Making Hand Blast



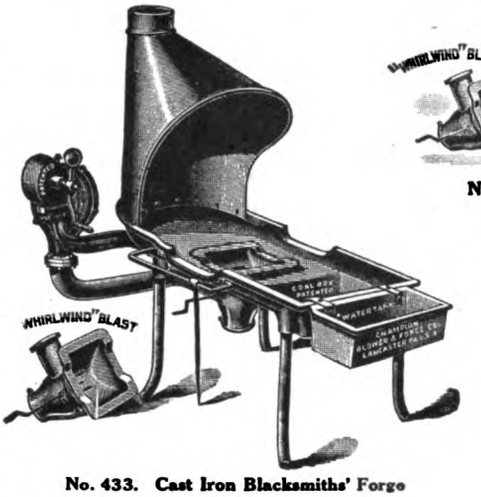
Crank turns either way.

No. 400

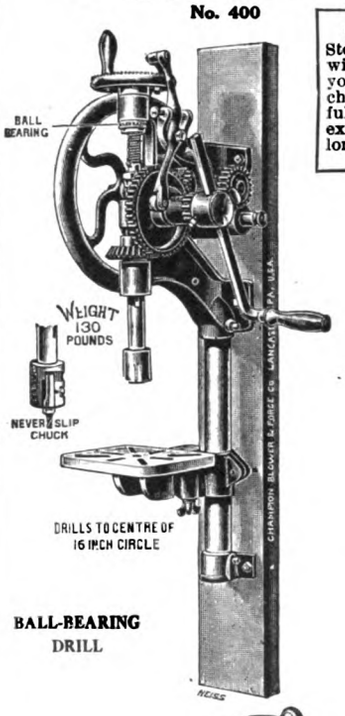
The No. 400 Steel Blower will serve the youngest mechanic faithfully without expense for a long lifetime.



No. 408. Steel Blacksmiths' Forge



No. 433. Cast Iron Blacksmiths' Forge



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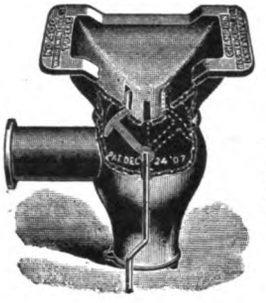

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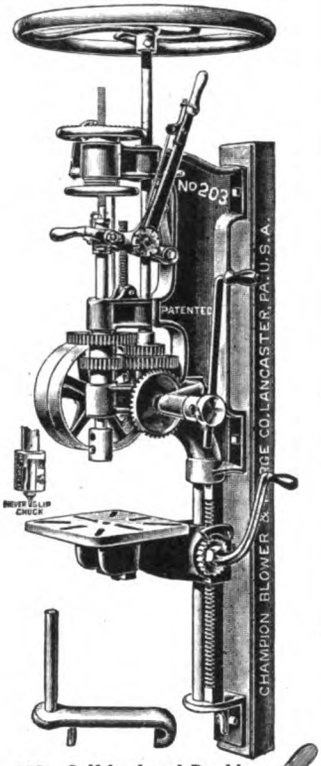
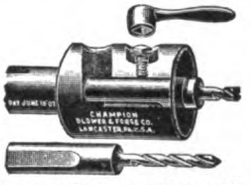
The "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron produces a circular, rotary whirlwind blast and concentrates the heat in the tuyere nest, not permitting it to blow up and out of the chimney, therefore, makes a hotter fire and heats the iron one third quicker, saving much coal.



No. 203. Self-feed and Double Compound Lever-feed Drill.



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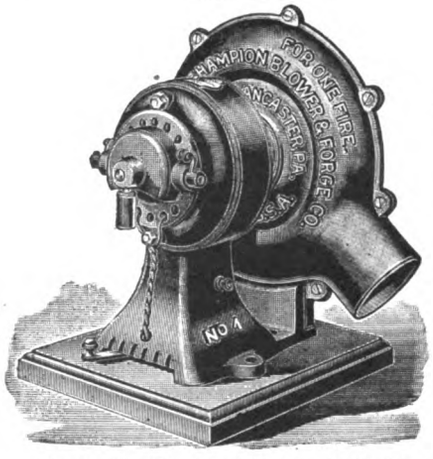

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Screw Plates in four styles, cutting up to 1½ in.

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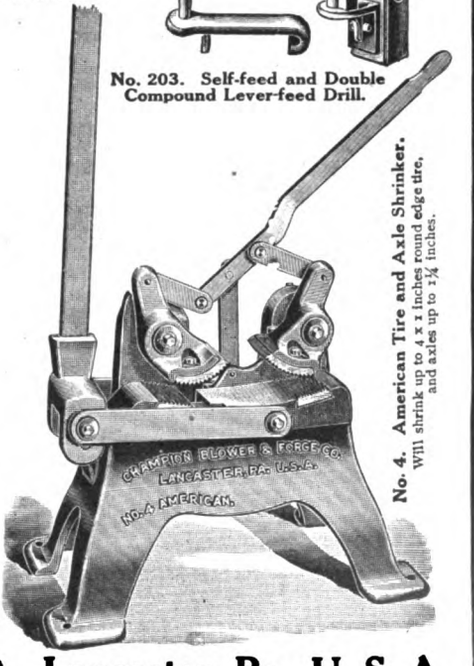

No. 4. American Tire and Axle Shrinker. Will shrink up to 4 x 1 inches round edge tire, and axles up to 1¼ inches.

THE CHAMPION BLOWER & FORGE CO., Lancaster, Pa., U. S. A.

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AT 250 DEGREES LOWER HEAT THAN ANY OTHER

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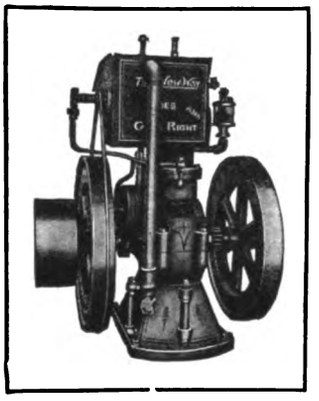

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$8.25 NET WILL BUY ONE



The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16 — 18, 3-8 — 16, 7-16 — 14, 1-2 — 12, 5-8 — 11, 3-4 — 10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustable, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only $8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

THE E. F. REECE CO., Greenfield, Mass., U. S. A.

Ask your dealer to show you the



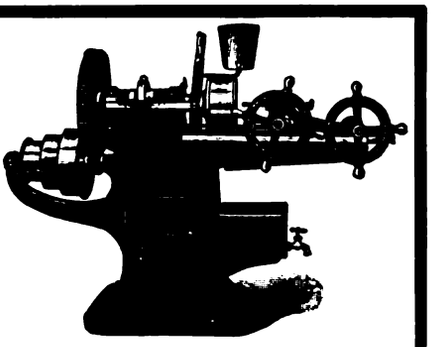
Trenton Anvil

The favorite of blacksmiths and horseshoers everywhere

It has the shape
It rings like a bell
It does the work

Ask for the INDIAN CHIEF Blacksmith Vise.

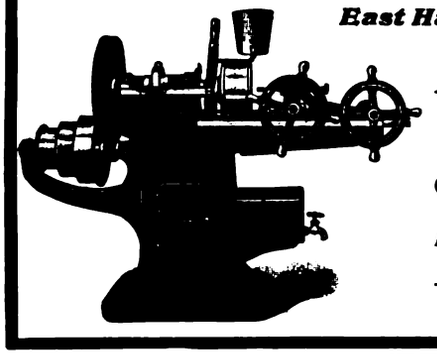
THE
MERRIMAN
Bolt Threader
Best on Earth



A Bolt Cutter is Much Like a Man in This
THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly.

THE H. B. BROWN CO.,
East Hampton, Conn.



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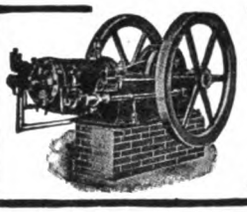
We understand your needs and can help you if you will let us. Write us before you start work on that "particular" job.

FELTON, SIBLEY & CO.
Manufacturers of Paints, Colors and Varnishes
136-140 N. 4th St., PHILADELPHIA



THE AJAX GAS AND GASOLINE 4 Cycle 5 to 10 H. P. ENGINES

For the small power user there are no better engines made. Their construction combines strength, simplicity and economy. Backed by the most accurate workmanship, made of the highest grade of material, every part interchangeable, our engines give years of satisfactory service. Learn more about them. Our big illustrated catalog mailed free on request,

AJAX IRON WORKS, CORRY, PA.

FOOS GAS AND GASOLINE **ENGINES**

FOR THE BUSY BLACKSMITH

The man who wants an engine that is easy to start, simple to operate and cheaply maintained, should write for FREE BOOK No. 49, and learn why the Foos WILL SAVE HIM MONEY.

THE FOOS GAS ENGINE CO., Springfield, Ohio.

Air-Cooled Motors



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THE BEST ON THE MARKET

Agents Wanted Write for Prices

The Air-Cooled Motor Co.
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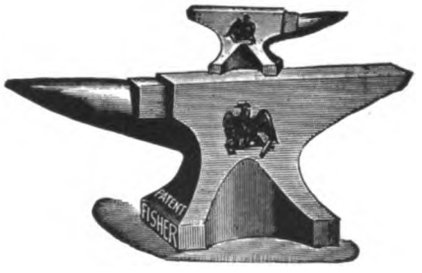
200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



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THE ANVIL OF MANY MEDALS.

The "EAGLE ANVIL" has taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always says: "Nothing but an Eagle for me." Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few years' use.

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The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last a lifetime.

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base.

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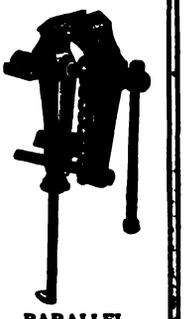

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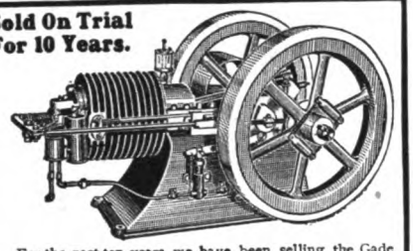

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The cylinder is cooled without the use of water or fans. Find out how we can save you one third on gasoline. Do it now, before we place an agent in your town.

Gade Bros. Mfg. Co., 18 North St., Iowa Falls, Iowa

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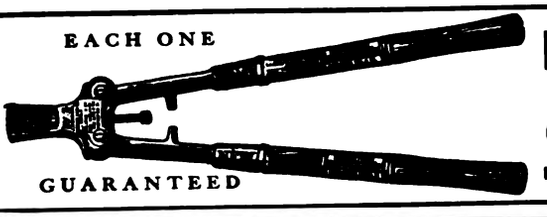

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Twelve Different Styles



Heavy Leather Back

NO LAMENESS

NO SLIPPING

Write us for further information



Exposed Leather Back

SEE THAT CUSHION?

It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

REVERE RUBBER COMPANY

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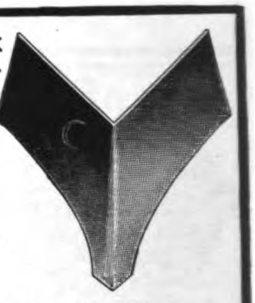
"CRESCENT" The Mark of Quality





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Save labor and increase your profits by using Fitted Shares—we make the best.

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Manufacturers of High Grade Fitted Plow Shares and Agricultural Shapes

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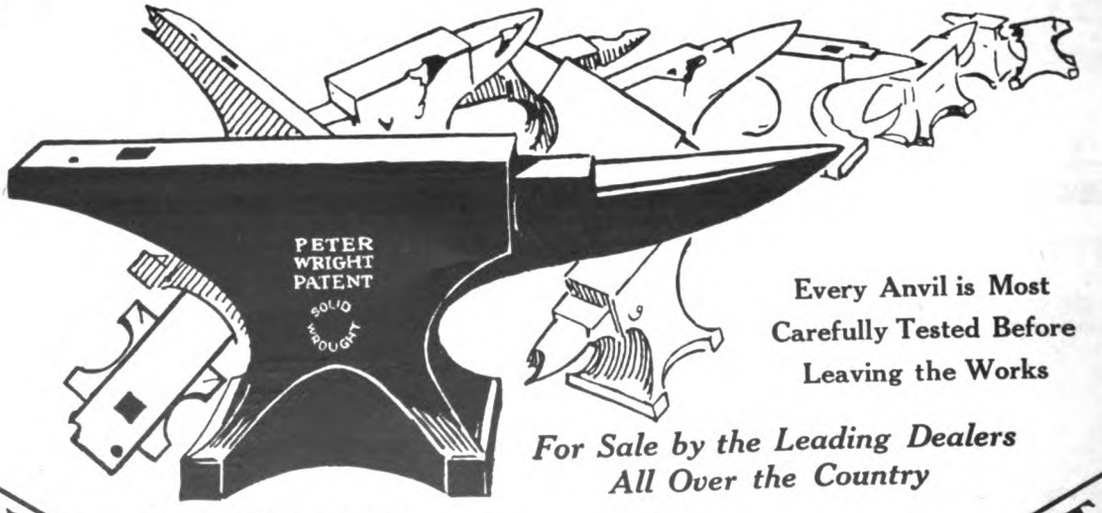
WRIGHT'S ANVILS

"WRIGHT'S ANVILS OUTLAST ALL OTHERS"



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For Sale by the Leading Dealers All Over the Country

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Bargains for Blacksmiths and Iron Workers

From Sheriffs', Receivers' and Manufacturers' Stocks

All goods sold on a binding guarantee. Your money back if you're not satisfied.

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CHICAGO HOUSE WRECKING CO.

Our plant covers 40 acres of ground and is one of the most wonderful mercantile institutions in the land. Our capital is one million dollars. Our responsibility is unquestioned.

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Read every word of our greatest sale. **Never before** have prices been cut deeper than those quoted in this advertisement. **Every item** means a **big saving for you. Make your selection at once.**

SPECIAL SUMMER 1910 OFFER

Send us your order today. Bargains such as these may never again be advertised.

New Wrought Anvils 5c. per lb.



5c.

Best quality, form and finish. Steel face is a solid piece planed smooth after welded.

Lot No. 4 A-115.

Absolutely guaranteed. Weight 150 to 200 lbs.

Price per lb..... **5c.**

Horseshoe Nails, 5c. lb.



Lot No. 4-A-B-96.

Queen City Special, cold rolled Horseshoe **Nails,** sizes 7, 8, 9, put up **25 lbs.** bulk in a box.

Price, per lb... .... **5c.**

"Bonanza" forged and pointed, warr nted Horseshoe Nails, made of best Swedish stock, sizes 7, 8, 9, put up in bulk, 25 lbs. to box.

Price, per lb..... **6c.**

2,000 boxes of **"Bay State"** cold rolled Horseshoe Nails, made of best Norway Iron, sizes 7, 8, 9 and 10.

Price in bulk, 25 lbs. to box..... **5½c. lb.**

Or in 5 lb. cartons ..... **7½c. lb.**

Merchant Steel Bargains.

WE BOUGHT THE ENTIRE CARGO of the Steamer Wisshackon which recently foundered on Duck Island, near Detroit, Michigan. The largest part of the cargo was never touched by water, and is in strictly first class condition.

We propose to sell it without any attempt to get market prices.

Following are a few items of interest to all readers of The American Blacksmith:

Lot ABW-1.

150 tons of Merchant bar steel, ranging from 3-16 to 2" **Rounds, Flats** from ¼ to 1" thick by 1" to 6" wide, **Squares** from ¼" to 1½".

Lot ABW-2.

970 bars of Canton drill steel, 1" octagon in mill lengths.

Lot ABW-3.

3,000 Steel Plates, ranging from 3 ft. to 6 ft. wide up to 27 ft. long; in thickness, 12 to ¼ in.

☞ Memo.—**Write for stock list or send a memorandum** of the quantity and size of the above steel that you can use and **we will name you prices lower than ever quoted before.**

Lot ABW-4.

NECKYOKE FERRULE AND RING 150 Oliver Mfg. Co.'s neckyoke ferrule and ring No. 80½, 1⅛" ferrule with 3½ x 7-16" ring. Price, each, **6c**

Mixed Bolts, 2½c. per lb.



10 tons brand new mixed **Machine** and **Carriage Bolts,** first class condition, **various sizes mixed** together, from ⅜ to 1 inch diameter and from 2 to 10 inches long.

Price F. O. B. Chicago:
In lots of 25 to 100 lbs.....3c. lb.
In lots of 100 to 500 lbs.....2½c. lb.
In lots of 500 lbs. and up.....2½c. lb.

$36 $36 Buys 2 H. P. New Gasoline Engine.



A brand new 2 H.P. electrical ignited Gasoline engine, complete in evrey detail. Ready to run when you receive it, for..... **$36.00**

This is the greatest offer ever made on Gasoline Engines. This engine is strictly brand new, first class and covered by a binding guarantee. It is the **well known "Superior" make.**

4 H. P. Gasoline Engine for..... $64.00

Larger sizes at equally low prices.

Our five-year guarantee on these engines protects you. Shipped with the understanding that if not entirely satisfactory, may be returned at our expense. No fairer offer could be expected. Every blacksmith or iron worker should have power in his shop, and here is your opportunity.

☞ Write for our great Gasoline Engine Catalog. Tells you how to buy these high grade engines at lowest prices.

Green River Screw Plates, $7.95



Quality of Green River Plates is unquestioned. Make a perfect thread with a single cut; dies are adjustable.

Our Lot No. 4-A-346.

5 each, Taps, Dies and Guides, complete with tap wrench and stock, in hardwood case. Cuts ¼x20, ⅜x16, ½x12, ⅝x11 and ¾x10 threads. Our price, complete..... **$7.95**

$2.95 Ball Bearing Grindstones.



Lot No. 4-A-1266. **Strongest** and **easiest** running Grindstone on the market.

Angle steel frame. Ball bearing journals. 60 lb. 2½ in. stone, weight 85 lbs.

Price..... **$2.95**

Plumbing Material.

90c buys our special flat rim, cast iron, white enamel Kitchen Sinks, new, but slightly defective. Price includes strainer and coupling.

$5.50 buys an Enamel Bath Tub.



$10 is our price for a cast iron, roll rim, white enamel **Bath Tub.** $9.50 for our white enamel, low down tank Water Closet, complete outfit. You can buy Wash Stands from us at $3.25. Iron pipe at mill prices.

Bargains in Ornamental Fence.



Brand new, perfect Galvanized Steel, **Ornamental Lawn Fence. 35 inches** high, per lineal ft.... **10c**

Write for special wire circular. Shows over 100 sizes and designs of beautiful fence.

New Porch at 50% Saving.

Improve your home with this spacious and handsome Colonial Porch. All the material to build this Colonial Porch, 16 ft. long and 7 ft. wide, for.... **$44.50**



☞ Larger sizes at proportionate price. Blue print plans **free.** Send us sketch with dimensions for delivered prices.

Steel Roofing, per 100 feet, $1.60



100,000 Squares of new Steel Roofing, which we are selling at the following prices, freight prepaid,
Flat.....$1.60
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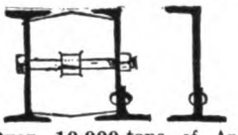
At these prices we prepay freight to all points **east of Colorado,** except Oklahoma and Texas. Quotations to these points on application. Our high grade **Galvanized Rust Proof Roofing** at prices ranging from **$3.00** per square up. Write today for free sample and Great Book on Roofing.

Structural Steel 1½c. Lb.



Over 10,000 tons of Angles, Channels, Tees, "I" Beams, round, square and flat Bars, all first class stock, standard size and lengths, at..... **1½c. per lb.** and up,

You must send us a list of your wants in merchant or structural steel. for prices that will mean a big saving to you.

Horse Shoes $3.00 per Keg.

Brand new Horseshoes, made by Eagle Horseshoe Co. First class order.

Lot No. B-2500
25 kegs No. 0
22 kegs No. 1

Price per 100 lb. kegs.... **$3.00**



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Do you want Free Mammoth Catalog ? Do you want Free Gasoline Engine Bk ?

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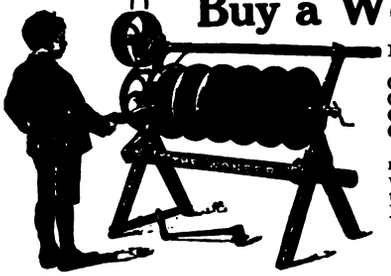
June, 1910, Am. Blk.

Chicago House Wrecking Co. 35th & Iron Sts. CHICAGO



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Because THE WONDER is the only machine adjusted to all conditions.
Can shear any part of edge to any bevel.
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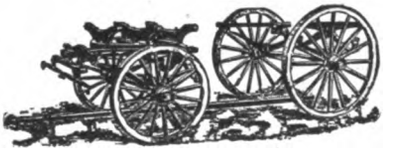

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Send for Sample.

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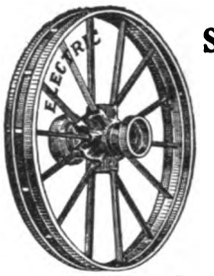

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W. C. NORRIS
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MACGOWAN & FINIGAN FOUNDRY & MACHINE Co., St. Louis, Mo.

Gentlemen:

Your letter asking how I like your Perfect Power Hammer, received. In reply will say that the two I have in use have given me "PERFECT" satisfaction; they are all right. I have two other makes in use, but I have found your Perfect Hammer much the best of the three; it is much better in every way, more convenient and durable. The fact that I have sent you today an order for two more of the Hammers is evidence that I am pleased with them. Yours truly, W. C. NORRIS.

Will ship to any responsible party on approval. If not as represented, no sale. Made in three sizes:

2½ inch square,	30 lb.	ram—shipping weight	1100 lbs.
3 " "	40 " " " "	1150 "
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When you write to an advertiser name The American Blacksmith.

The Dayton Fifth Wheel is sold by nearly every Carriage Hardware Jobber

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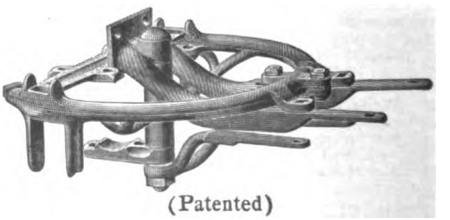
Dayton, Ohio



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Gives a 300 Candle Power Shadowless Light the instant you move the lever. Turns up or down, like gas, burns when not in use, or can be turned up instantly when more light is needed. It floods a 30-foot space with a brilliancy like daylight. Far cheaper than gas, kerosene or electricity, and so simple that anyone can use it. Catalog A. B. tells why. **Send for it now.**



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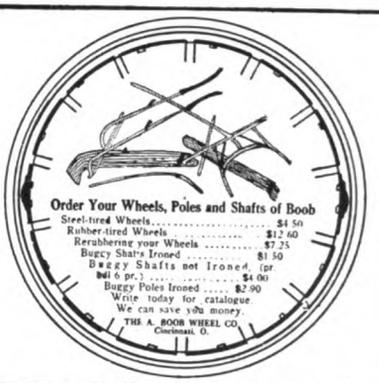

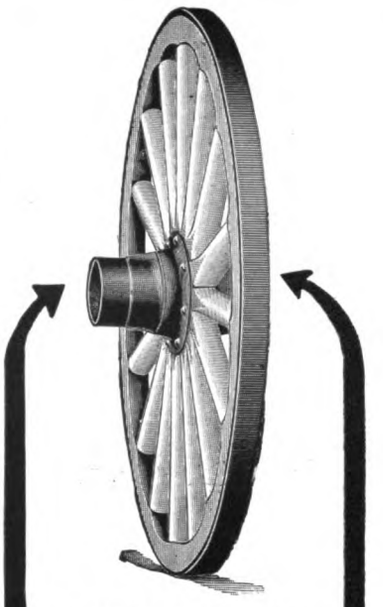

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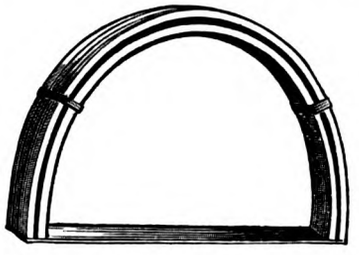

Low prices on all sizes, especially rims 2 inches and under in depth, any size tread.

3x2 all heights, up to and including 4' 4", $3.35, delivered, freight prepaid to your nearest railroad station, cash with order. All other sizes in proportion.

We guarantee that our rims are equal to the best made, and we sell from factory to consumer, saving you all the extra profits.

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WORTH MORE COST LESS
Than Any 50-lb. Steel Head Hammer on the Market.
Hook'er to your Ingin.

Thousands of satisfied customers. Send for letters and Catalogue.

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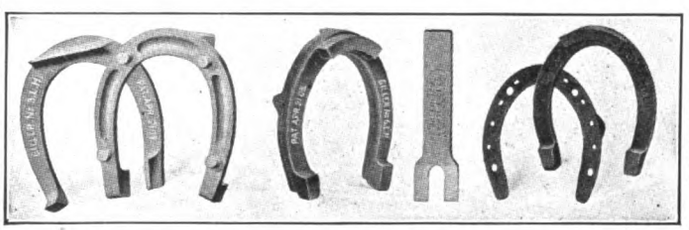

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Outlasts three of the common kind, and price is the same. Old shoes easily and quickly detached and new ones substituted.

Write today for particulars and prices

THE GILLER ACME HORSESHOE CO., 3513 Hamilton Ave., BROOKLYN, N. Y.

HART'S

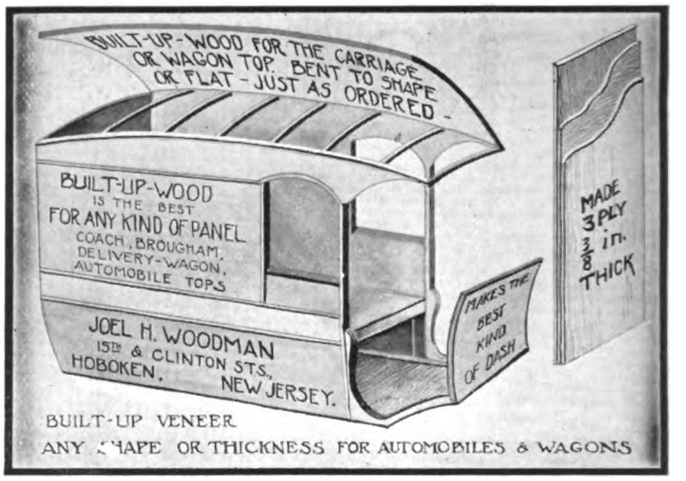


HART'S

A Threading Outfit that is suitable for general shop use—the **"DUPLEX" Bolt Die Stock Set "A"**, range ¼ to ¾ in. It contains dies that adjust without a wrench and require no reversing when cut is finished. A variety of sets with desirable ranges.

THE HART MFG. CO.

50 Wood Street CLEVELAND, O., U. S. A.



Of Great Help.

Established 1870. New Repository, 731 E. Cary St.
Phone 765.

BUILDERS OF HIGH GRADE WAGONS.
A. MEYER'S SONS
BUGGIES, TRUCKS AND WAGONS
118 and 120 S. Eighth Street.
Richmond, Va., March 10th, 1910.

BUFFALO FORGE CO., Buffalo, N. Y.
Gentlemen:—The Crain Combination Woodworking Machine which we purchased from R. W. Norris & Sons, Baltimore, Md., last September, has proven very satisfactory.
We have put this machine to very severe tests, and it has always done the work. It is a wonderful addition to our shop, being of such great help to us upon heavy work.
Yours very truly,
A. MEYER'S SONS.

See page 47.

Hercules Hydraulic Tire Setters



For Factories or Repair Shops

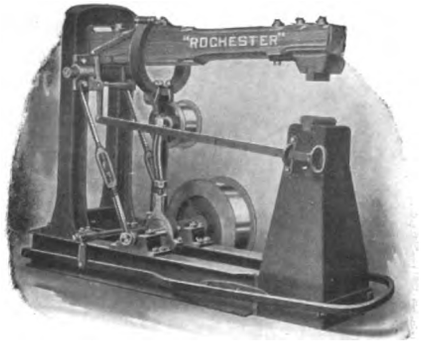
ARE NOT EQUALED

by any other

Write for catalog and prices

NATIONAL HYDRAULIC TIRE SETTER CO.
KEOKUK, IOWA

ROCHESTER HELVE HAMMER



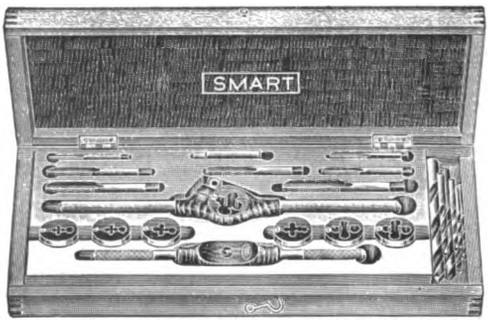
(The Hardest Hitter)

Forging dies set crossways of helve. Welding dies set lengthways.

The best hammer made for general work, and a dandy Tire Welder.

MADE IN SIX SIZES

THE WEST TIRE SETTER CO., Rochester, N. Y.



Strong, Easy Cutting Durable Screw Plates

FULL LINE OF HIGH QUALITY SCREW CUTTING TOOLS
Send for Free Catalog
A. J. SMART MANUFACTURING CO., Greenfield, Mass.

FIRST MADE IN AMERICA

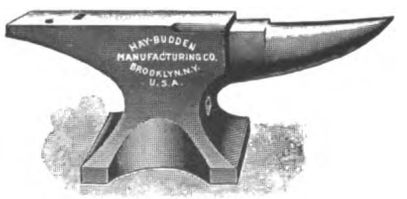
HAY-BUDDEN SOLID FORGED ANVILS

A LONG STEP FORWARD

SOLID FORGED STEEL TOP
Welded to a
SOLID FORGED BASE
Making a
SOLID FORGED ANVIL

The Gold Medal Anvil

HIGHEST AWARD
Omaha 1898 Pan-American 1901



OVER 150,000 IN USE

The **ENTIRE TOP** being one piece of high grade **FORGED STEEL** makes a **LOOSE FACE IMPOSSIBLE.**

TEMPERED "JUST RIGHT".
By our own process, the weld at the waist is a **LASTING UNION.**

Experience has proved their worth and demonstrated that **"HAY-BUDDEN"** Anvils are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., 254 NORTH HENRY ST. BROOKLYN, N. Y.

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AUG 12 1910

VOLUME 9 NUMBER 11

THE AMERICAN BLACKSMITH

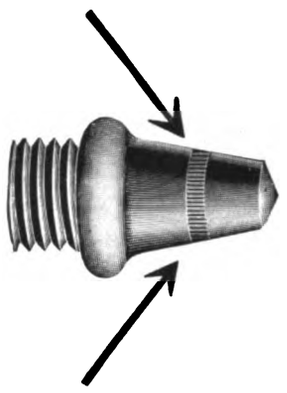
A Practical Journal of Blacksmithing and Wagonmaking

BUFFALO N.Y. U.S.A. AUGUST, 1910 $1.00 A YEAR 10c A COPY

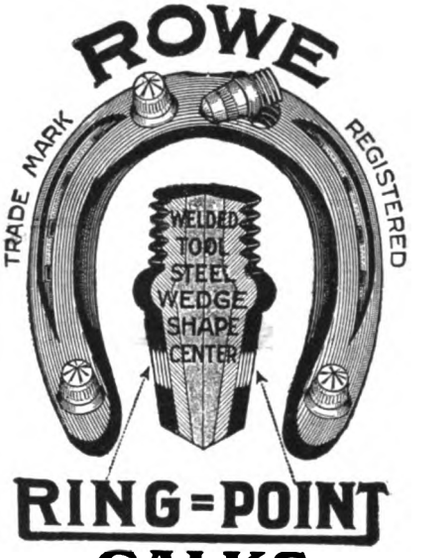
A New and Better Calk

THE "RING-POINT"

Look for the Trade Mark

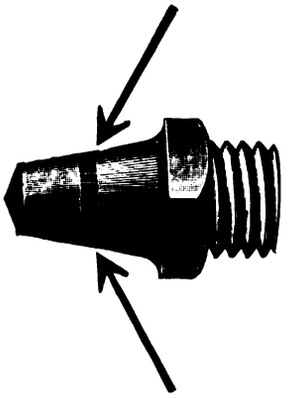


A Milled Ring around the Taper End on every calk



CALKS

Look for the Trade Mark



A Milled Ring around the Taper End on every calk

An Improvement on Last Year's Rowe "Tool Steel Center" Brand— Tremendous Advertising Campaign to Horseowners

Horseshoers, here is more business for you—more profits—better satisfied customers.

Supply your trade with Ring Point Calks—the new brand that has already received the unanimous endorsement of the trade. Nothing like it was ever known since calks were made.

Ring Points succeed our famous tool steel center calks, but they are much improved. In order that you may not get confused we have given them a new name.

Every Ring Point Calk now bears the new trade mark. See illustrations.

Ring Points have the wedge shape welded tool steel centers that made Rowe Calks famous, but they are made of even better material, are more uniform, and in every other way are as superior to our Tool Steel Center Calks as they in turn were to all others.

To satisfy ourselves of this, we have made during the past year elaborate and conclusive tests of Ring Points and competing calks.

These proved beyond our expectation the superiority and lasting qualities of our calks. We have compiled the results of these tests in printed form and a copy will be sent you on request. For your own information you ought to read it.

You can get Ring Points now. Your jobbers have already been supplied and will take care of your needs. Don't wait too long. You may be like several thousand horseshoers who last year were not prepared to take care of the demand we created for them.

We are going to more than repeat this season. Our last year's advertising campaign will be multiplied by four, and our plans for helping you get the business are more complete than ever. We work for your interests as well as our own.

These show how Ring Points are superior to other calks. They alone will convince any doubting customers.

If you are a new customer, we want you to send us a list of horse owners, your customers and others. We will mail them our handsome printed instruction booklets, and refer them to you. Old customers should send us a revised list or write us to repeat on the list they sent us last year.

Our Unqualified Guaranty—You Risk Nothing

Remember that we stand back of Ring Point Calks at all times. You risk absolutely nothing under our guaranty. Never before has a calk received such backings as this. Read this:

The Rowe Patent Calk Company and The Rowe Calk Selling Company hereby guarantee all Ring Points to be made with the finest quality of tool steel center adaptable to hard center calks, with the purest and softest outer shell that will suitably weld to the center, with soft-rolled threads of perfect taper, absolutely identical in size with the threads of other standard brands.

To be perfectly hardened with scientific precision and uniformity.

To give complete satisfaction to the users—in short, to be the best screw calks on the market.

Any Ring Points not measuring up to this guaranty will be replaced free of all transportation and other charges in the hands of anyone, anywhere, at any time.

This extends to jobbers, dealers, horseshoers and horseowners.

Write us today.

Fill out this coupon and send to us.

THE ROWE CALK SELLING COMPANY,
2700 Mechanic Street, Hartford, Conn.

Gentlemen:—I will handle your Ring Point Calks this winter. Please see that I am supplied with advertising Poster and split samples of calks.

Name.....
Address.....
My Jobber's Name is.....
Jobber's Address.....
Bill Poster's Name.....
Bill Poster's Address.....

THE ROWE CALK SELLING CO., 2700 Mechanic Street, HARTFORD, CONN.

Ring-Point Calks are the only brand that will have our advertising help

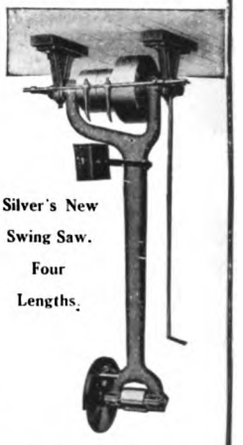
THE SILVER MFG. CO.

365 BROADWAY SALEM, OHIO.



This Large Illustrated Book FREE—Send NOW

84 pages—64 illustrations, covering our full line of Post and Power Drills, Portable Forges, Band Saws, Jointers, Saw Tables, Swing Saws, Hub Boring and Spoke Tenon Machines.



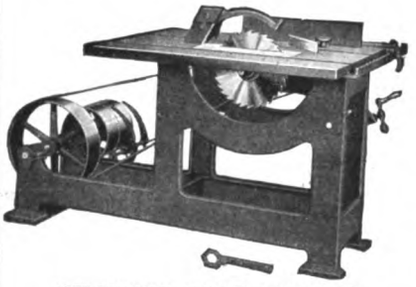
Silver's New Swing Saw. Four Lengths.

Don't hesitate to write for it today. That's what we printed it for. Even if you feel that you don't need better tools, it will pay you to examine this illustrated book and get our prices.



SILVER'S NEW JOINTERS

Five Sizes—8, 12, 16, 20 and 24 inch. New "patent applied for" features.



SILVER'S SAW TABLES

Send for circular of Saw Tables and Swing Saws.

SEND TODAY FOR THIS CATALOG

or for any of the following booklets:

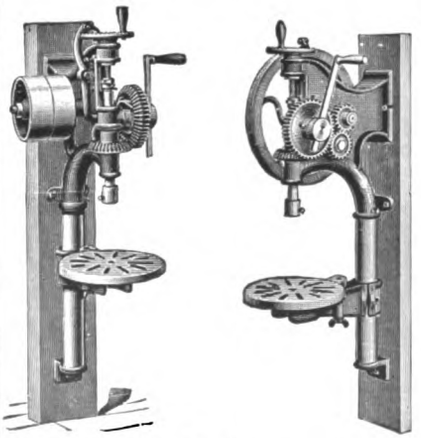
BAND SAWS AND JOINTERS—describing 20" Band Saws for foot or belt power or combination; also 26, 32, 36-inch Power Band Saws with new features; also five sizes of Jointers.

HUB BORING AND SPOKE TENONING MACHINES—illustrating and describing several sizes of each.

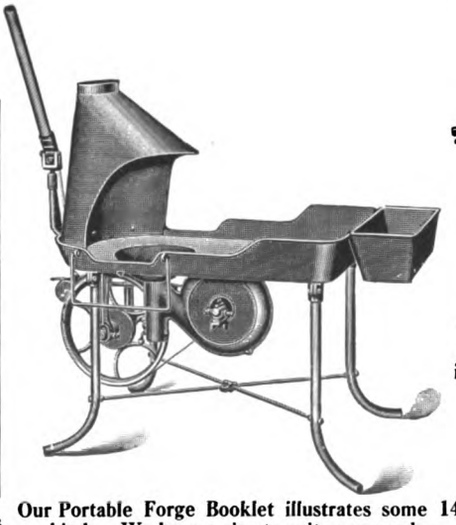
PORTABLE FORGES—illustrating and describing 14 styles.

DRILLING MACHINES—covering our line of some 22 distinct machines.

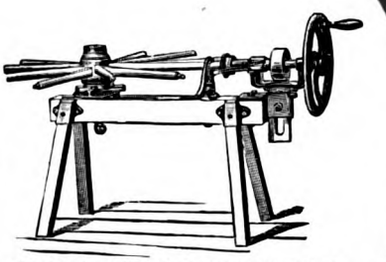
POWER DRILLS—illustrating our line of 20" machines with lever feed, lever and wheel feed, power feed with automatic stop, power feed with back gears and automatic stop.



Our Booklet, "Drilling Machines", illustrates 22 kinds we make.



Our Portable Forge Booklet illustrates some 14 kinds. We have a size to suit your needs. Strong and durable. Attractive designs.



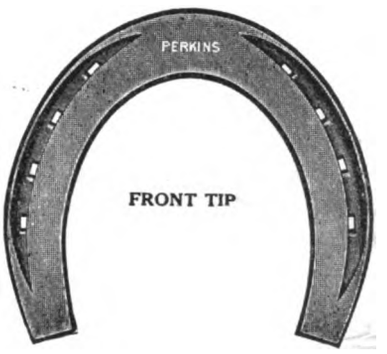
SPOKE TENON MACHINES

in Seven Sizes. Fitted with Star Hollow Auger.



HIND CITY

Look for this Trade Mark ★ The Star brand beats all others



FRONT TIP



FRONT STEEL COUNTERSUNK

★ PERKINS ★

HORSE SHOES

AND

TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



FRONT TOE WEIGHT

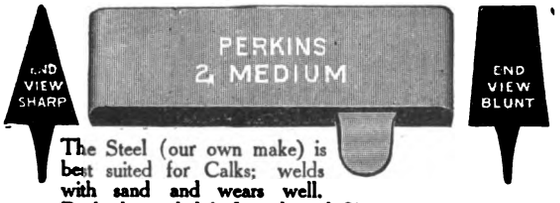

HIND SIDE WEIGHT

Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

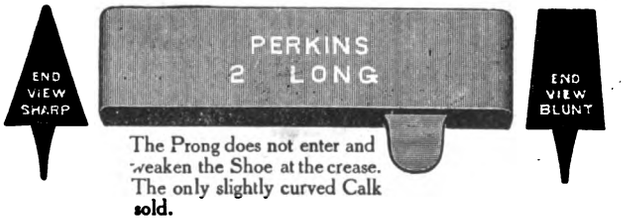


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

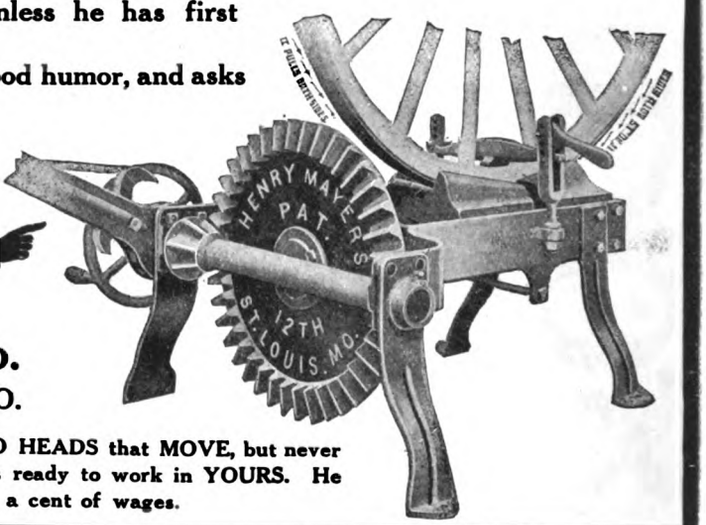
PROVIDENCE, RHODE ISLAND.

These Dog Days While You Are Sweating

How would you like to have a HELPER

Who would do TWICE as much work as you can do?
Who would bring in enough EXTRA WORK to more than pay his wages?
Who would never KICK for a raise?
Who never has the backache, nor whose muscles ever tire?
Who never "talks back," or "sasses," gets drunk, fights, or "cusses"?
Who never kills time, or listens for the "dinner horn to blow"?
Who does the work as YOU say, and EXACTLY as YOU say?
Who never asks for his little wages unless he has first EARNED them?
Who is always "onto the job," and in a good humor, and asks for MORE?
Who never "comes up missing" when most needed and work is heaviest?

Yes, there is such a HELPER!
Here is his PICTURE ——



and his full name and address is:

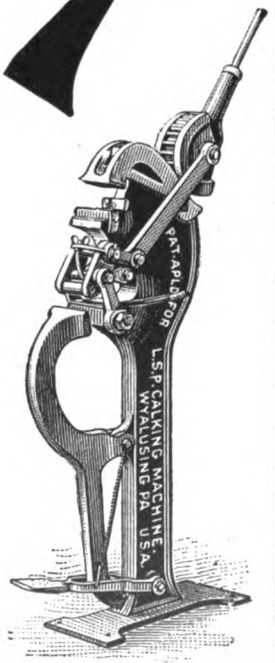
Mayers Tire Setter Mfg. Co.

4030 Forest Park Boulevard ST. LOUIS, MO.

He is made out of STEEL, weighs 800 lbs. Has TWO HEADS that MOVE, but never TALKS. Already has a JOB in thousands of shops, but is ready to work in YOURS. He asks the PRIVILEGE of proving his value bofore he asks a cent of wages.

7 REASONS WHY

You Should Have The L. S. P. Calking Machine



The Only Calking Machine

1. It is the only calking machine advertised in a trade paper to which a patent has been granted, running no risk of litigation.
2. The only calking machine used by the United States Government.
3. The only machine that makes every possible kind of a heel calk.
4. It is not a foot vise, nor a heel bending device, but a CALKING MACHINE.
5. One pull of lever makes either sharp or blunt heel calk, another pull welds sharp or blunt toe calk, and forms clip, if so desired.
6. All working parts made of a special grade of steel.
7. Holds the record, 41 shoes heel-calked sharp in 25 minutes and 33 shoes calked complete in 45 minutes.

This machine works equally as well on old shoes. Takes up only 8 x 16 inches floor space, stands three feet, three inches high, and weighs 131 pounds. Write now for particulars and prices.

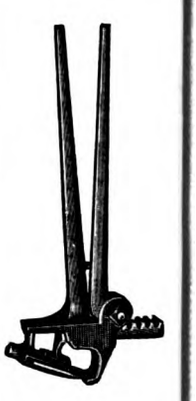
United States Office, L. S. P. Calking Machine Co., Wyalusing, Pa., U.S.A.
Canadian Office, National Machine Co., Brighton, Ont.

Bliss Hoof Cutter

No Person Who Shoes Horses Can Afford To Be Without It

It is the most powerful.
Does the best and widest range of work.
Easiest kept in order.
Makes easier work of hoof cutting than any other tool made.

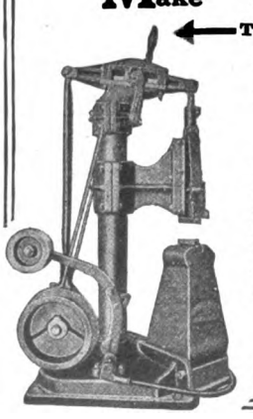
$2.50 each. Extra Knives, 25c each.



BLISS MANUFACTURING CO.

South Egremont, Mass.

Modern Make Power Profitable Hammers Helpers



This Lever is only found in the "Modern" Hammer. It makes possible a light or heavy blow at **high speed.**

Every blacksmith and repair shop owner should investigate this hammer. It

Makes Smithing Easy.

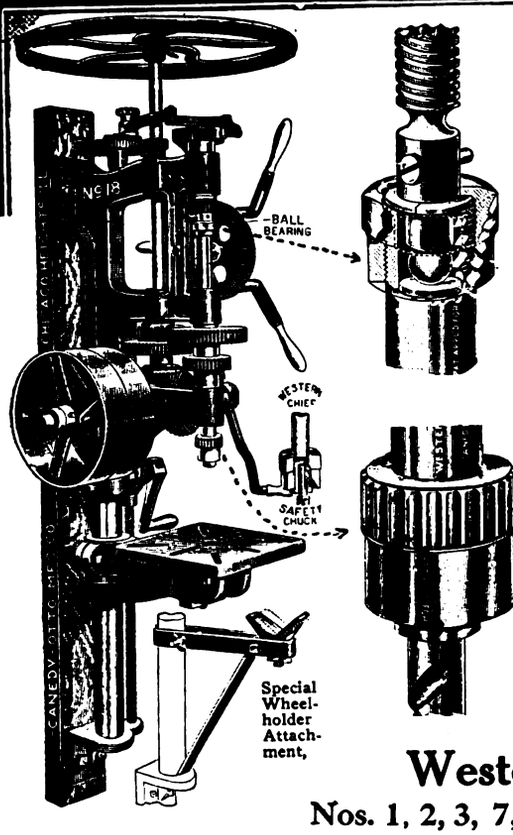
No. 1, shown here, is a light, quick-acting hammer, covering a wide range of work.
No. 2 is designed especially for use in large repair shops and factories. Both of these are completely described in our booklet—sent to anyone on request. Write for one.

Modern Sales Company

GRINNELL, IOWA

D. Ackland & Son, Ltd., Winnipeg, Canada
Agents for Canada
Gibson Battle & Co., Ltd., Melbourne, Australia
Agents for Australia

Phoenix Horse and Mule Shoes and Bull Dog Toe Calks



Special Wheel-holder Attachment,

Ball-Bearing and Safety Chuck

Ball-Bearing

A single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate.

Safety Chuck

It is opened and closed with the hand.

No more set-screws to mar and bruise the shanks of bits.

No more wrenches to tighten and loosen set-screws.

No more twisting of bits in the chuck.

No more trouble in inserting and removing bits from chuck.

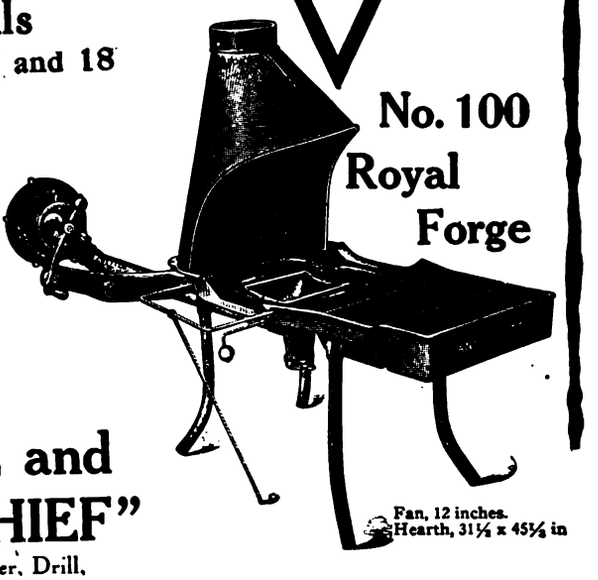
A Feature of TO-DAY

Wrench? NO!

Western Chief Drills

Nos. 1, 2, 3, 7, 12, 14, 15, 16, 17 and 18

FORGES—BLOWERS—DRILLS



No. 100 Royal Forge

Fan, 12 inches. Hearth, 31½ x 45½ in

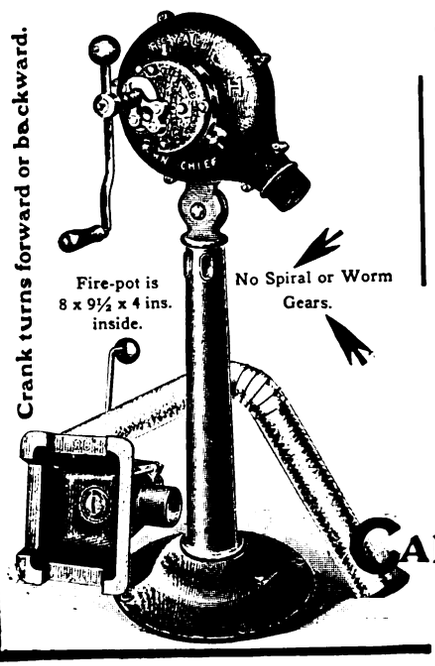
The Names — **"ROYAL and WESTERN CHIEF"**

When found on a Forge, Blower, Drill, or other Blacksmith Tool—mean that that article is better than the ordinary. They mean that in its construction the best materials and the highest skill obtainable have been employed. They mean that years of experience have served to perfect it. They mean the tool is a success, and quality alone has made it so. Dealers and Blacksmiths in general will procure what they like best. We must deserve before we can obtain trade. There is no doubt about our deserving, because our production grows rapidly.

There is a reason—Quality

They are all the Best!

Royal Blower



Crank turns forward or backward.

Fire-pot is 8 x 9½ x 4 ins. inside.

No Spiral or Worm Gears.

No. 1 Western Chief

(TIRE and AXLE SHRINKER)



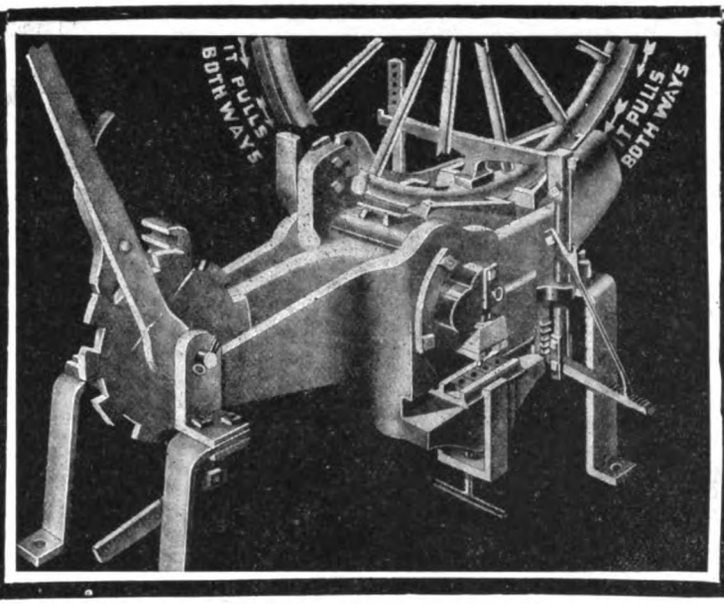
Jaws Adjust Themselves to Uneven Thicknesses

MADE BY

CANEDY OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

THE HOUSE COLD TIRE SETTER



WILL MAKE MORE MONEY FOR YOU

NOT ONLY THE BEST

BUT ALSO THE CHEAPEST

TAKE NOTICE—You Can Have Our Machine in Your Shop

and see for yourself that it does the work just right before you are required to pay a cent on it. We don't ask our customers to take any risk, we take it all. You have no cause to hesitate, even if you know nothing about cold tire setters, or have heard bad reports on them, for we give you a chance to see for yourself. ***Do You Want to Build Up Your Business and Make Money?*** It saves you full time of one man and three quarters of another and you don't keep your customers waiting. So don't try to get along without it, and don't buy any other until you have tried ours, as it costs you nothing.

Write for our reduced prices and terms.

Now is the time to buy and get it advertised in time for the season's work

HOUSE COLD TIRE SETTER CO., 216-218 S. Third Street, St. Louis, Mo. J. F. HOUSE, 201 Church St. Toronto, Ont., Canada.

The New Little Giant Power Hammer



Stands for what is best in design, material and construction. It does THE WORK efficiently and quickly and is always under perfect control.

This high degree of perfection in Power Hammers is the result of fifteen years' experience.

Made in three sizes:

25 lb. 50 lb. 100 lb.

Suitable for forging material up to 5 in. in diameter.

Will do anything and everything that can be done on Power Hammer.

Recommended by over 3,000 satisfied users.

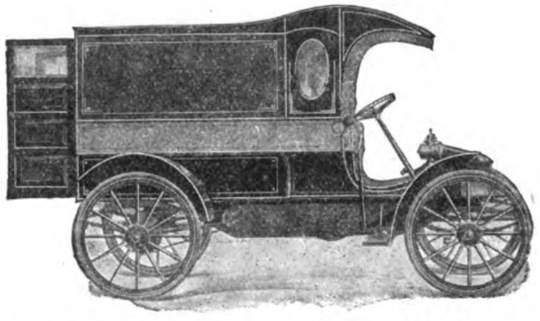
Manufactured by

MAYER BROTHERS COMPANY

MANKATO, MINN.

AGENTS: United States—All Jobbers
New Zealand—Alex Storrie, Ltd., Invercargill
Manitoba, Saskatchewan and Alberta—Melotte Cream Separator Co., Winnipeg

WRITE NOW FOR FULL INFORMATION



The Motor Delivery Wagon

and

What It Means to the Blacksmith and Carriage Man

Hundreds of merchants in all parts of the country are replacing horse-drawn vehicles with up-to-date auto delivery wagons, because they are more satisfactory and less expensive, to say nothing of their value from an advertising standpoint.

Blacksmiths and carriage dealers are the logical people to supply these vehicles, and we have just what they want in our

Motor Delivery Chassis, with Running Gear

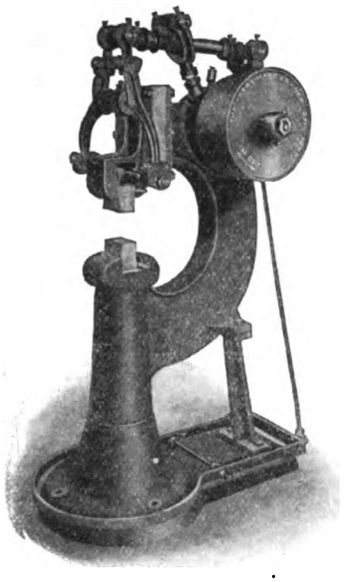
We furnish everything all ready to run except body; you build open or closed body, as desired, and paint job. Takes body 40x60 to 72" back of seat. Capacity 1500. 22–24 H. P. Speed, 20 miles.

We have an extraordinary proposition for prompt acceptance. Write immediately for complete description and wholesale price.

ASK FOR THIS BOOK

Our 448 page Net Price Catalog for 1910 quotes lowest wholesale prices on a complete line of Carriage Hardware, Blacksmith Tools and Motor Car Supplies. Tells how to build and repair Autos. Its use will save you money on everything you buy, no matter where you live. It is free to the trade. You should have a copy. You need it. Write for it today.

CRAY BROTHERS, 1113 W. 11th St., Cleveland, O.

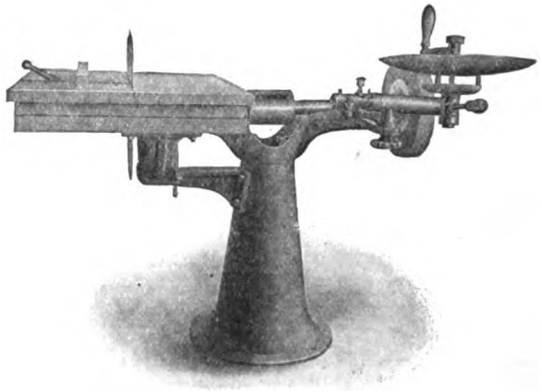


10 DAYS' FREE TRIAL OFFER

applies to our selling proposition below. You have nothing to lose—and will see that the **KERRIHARD POWER HAMMER *simply must be as is claimed for it,*** or we could not take so long a chance. You have 10 days in which to prove our guarantee and claims. Could any fairer, more utterly reasonable offer be made by any one?

THE PROPOSITION

Send us $60 (***which will be held in trust by us for the trial period of 10 days***), for which we will ship you, via shortest possible route, one of our 1909 Models, which is the standard of the world. You test out the hammer in any way you wish; do all your plow, shovel, drag-tooth work and welding—abuse it if you wish—then, when you are satisfied, either keep it or send it to us and receive by return mail the full purchase price.



You lose money to wait. Now is the time to get ready for the Spring business, which will increase from the day you install one of our clever Hammers. **Order today.**

Hammer and Grinder Department

THE KERRIHARD COMPANY

RED OAK IOWA U. S. A.

"MORSE" TOOLS



Prominent among them are

"MORSE" DRILLS

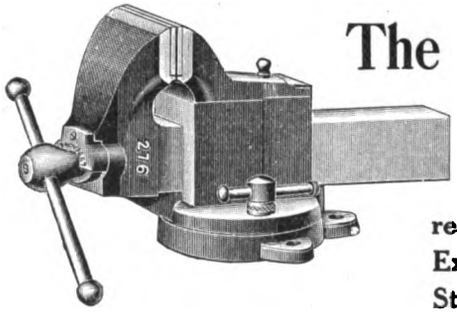
fitting the different presses made especially for blacksmiths' use. Shanks are furnished round or flattened for set screw, as desired.

None Better. A Trial Is Proof.

Send for an illustrated catalogue and a Young Machinist's Practical Guide. Free to all.

Morse Twist Drill & Machine Co.

NEW BEDFORD, MASS., U.S.A.



The Parker Vises

Always ready for use. Excel in Strength, Durability, Finish

38 Styles, for all purposes and in size to suit

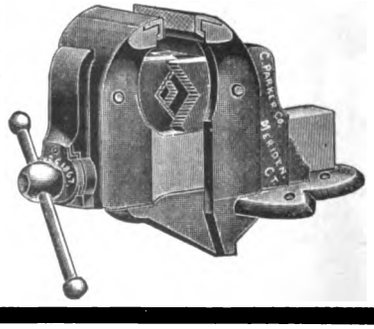
Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings

This is our Best Combination Vise

Can be used equally as well either as a machinist's tool or for holding pipe. A very satisfactory tool.

Our latest catalog mailed free on application.



The Chas. Parker Co.

Meriden, Conn.

The Brooks endorsed and used by the United States Gov't

MAKES $14.00 A DAY WITH HIS BROOKS

is the report received from R. L. Morris, McNeil, Ark. Mr. Morris gets the business, makes a splendid profit and pleases his customers. All because he has a Brooks Cold Tire Setter. Read his letter:

The Brooks Tire Machine Company:

I bought a Brooks Cold Tire Setter about two years ago. I find it the best piece of machinery I ever had in my shop. Don't see how I ever did without it. It will do the work just as I want it done. There is no trouble making $2.00 an hour with it, and have made as high as $14.00 a day just setting tires. When I fill a wheel I just pull the tire on cold and set it in the machine and I can pull the dish just where I want it in every wheel, and there are no loose joints. The machine has brought me more work than any tool I ever bought.

Respectfully, R. L. Morris,
McNeil, Ark.

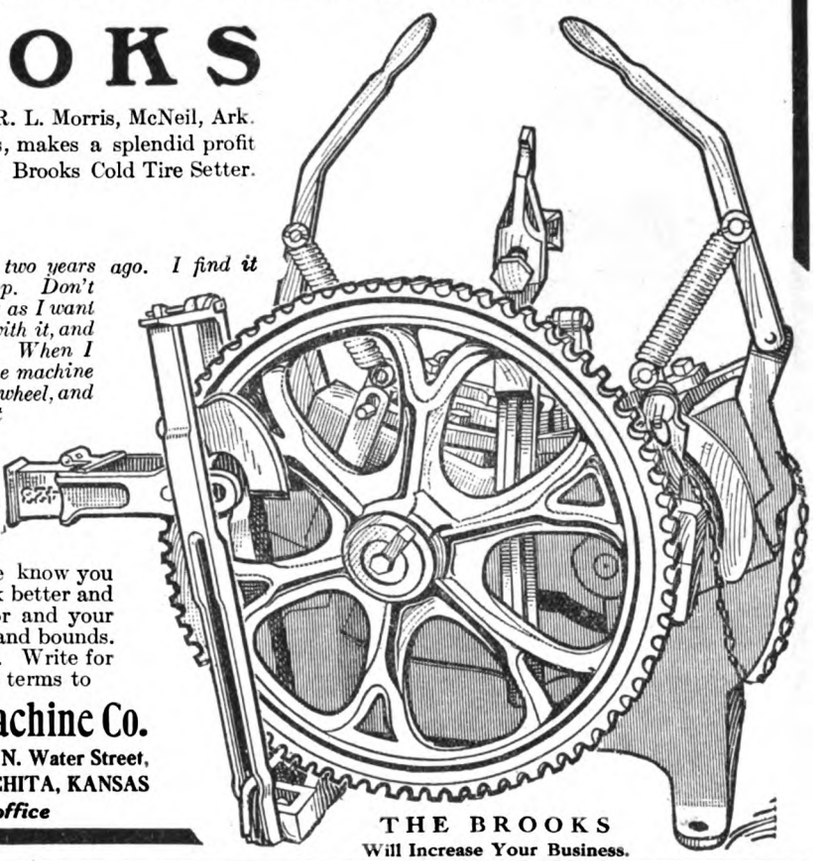
Can YOU afford to be without a Brooks which will set ten times as many tires in a day as you can set by the old hot process? If you are not doing much tire setting, get a Brooks and let the people know you are prepared to do their work better and quicker than your competitor and your business will increase by leaps and bounds. The Brooks is a money maker. Write for illustrated Catalog, prices and terms to

The Brooks makes the Smith rich

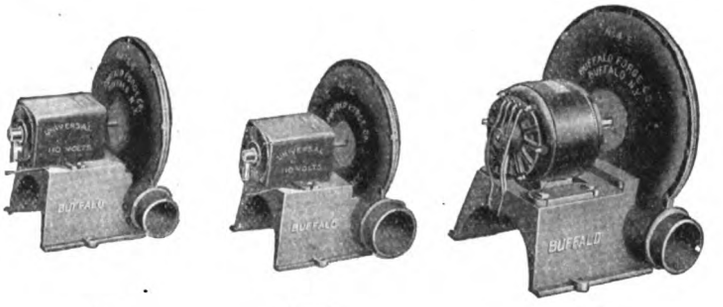
The Brooks Tire Machine Co.

857-859 Ellicott Square, BUFFALO, N. Y.
121 N. Water Street, WICHITA, KANSAS

Write to nearest office



THE BROOKS
Will Increase Your Business.



2 E 2 EH 4 E

Buffalo Electric Forge Blowers

with Universal Motors.

You cannot afford to pump a bellows when a Buffalo Electric Forge Blower will supply the blast at a cost of 2 to 3 cents per day.

When purchasing a 2 E or 2 EH Blower you do not have to consider the character of the current as long as it is 100 to 120 volts. These blowers are regularly equipped with **universal motors,** which work equally well on either direct or alternating current of 100 to 120 volts.

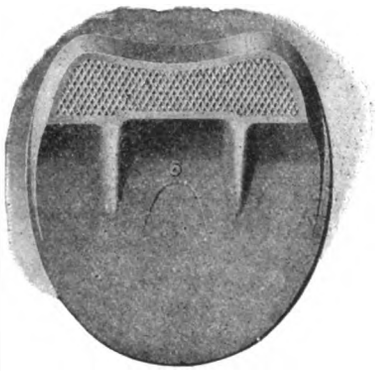
When placed close to the forge, with a connection leading straight to the forge, 2 E will supply blast sufficient for one horseshoer's fire; the 2 EH, for one large blacksmith's fire or two horseshoers' fires; 4 E, three large blacksmiths' fires or five horseshoers' fires.

Write for particulars

Buffalo Forge Company

Buffalo, N. Y., U. S. A.

STERLING HOOF PADS



These pads are about as much better than the old style leather backed pads as those are better than none. Our pad is one smooth, solid piece of rubber. The calk is vulcanized onto the back and stays there. The entire pad is perfectly impervious to water, and will keep horses' feet in better condition than is possible with wet and soggy leather, which contracts and expands with varying conditions of moisture and temperature.

The construction of these pads is our own device and invention, and is fully protected. There is and can be no adequate substitute.

Prices about the same as for leather backed pads. Dealers are requested to write for discounts and open territory.

Trade Mark

MANUFACTURED BY

Rutherford Rubber Co. :: Rutherford, N. J.

Distributors of Our Pads:

Detroit, Mich.,—Rutherford Rubber Company, 870 Woodward Ave.
New York City, —Regal Hoof Pad Company, 201 Fulton St.
Syracuse, N. Y.,—Central City Rubber Co., 129 E. Water St.
Philadelphia, Pa.,—Philadelphia Rubber Tire Company.
Jacksonville, Fla.,—McGraw Bros. & Vogt.
New Orleans, La.,—F. H. Bayley, 407 Hennen Building.
Norfolk, Va.,—Virginia Supply Co., 115 Cove St.
Richmond, Va.,—C. & A. Edgar, 1714 E. Main St.
Atlanta, Ga.,—Beck & Gregg Hardware Co.
Cincinnati, O.—The G. B. Schulte Sons Co., 716 Main St.
St. Paul, Minn.,—C. J. Smith & Co., 16 W. Fourth St.
Winston-Salem, N. C.,—Smoak & McCleary.
Columbus, O.,—The Griswold-Sohl Co., 79 Front St.
Washington, D. C.,—Washington Rubber Co., 10th and F Sts.
Savannah, Ga.,—Jones-Kessler Co.
Wheeling, W. Va.,—Miller & Stein.
Louisville, Ky.,—Fulton, Conway & Co.
St. Louis, Mo.,—Campbell Iron Co., 809-819 Cass Ave.
Boston, Mass.,—Butts & Ordway, 33 Purchase St.
Scranton, Pa.,—The Bittenbender Co., 120 Franklin Ave.
Harrisburg, Pa.,—H. A. Gable, 113 South Second St.
Lancaster, Pa.,—Herr & Co., 7 East King St.
Worcester, Mass.,—Geo. F. Blake, Jr., & Co.
Springfield, Mass.,—Chas. C. Lewis Co.
Danbury, Ct.,—F. A. Hull & Son.
Albany, N. Y.,—Croissant Hardware Co., 204 Washington Ave.
Albany, N. Y.,—Chas. Croissant & Son, 251 Sheridan Ave.
Reading, Pa.,—Bard Hardware Co.

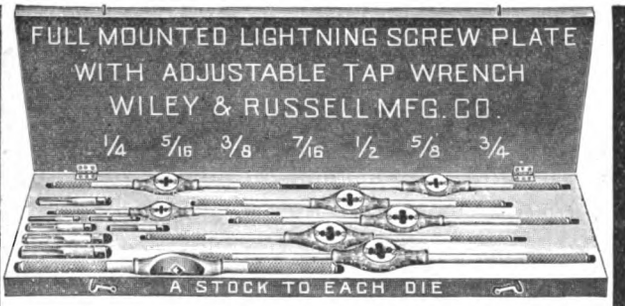
Set No. 1223

Contains 7 sizes.
A stock to each die.
A tap wrench.
Sizes:

$\frac{1}{4}$ $\frac{5}{16}$ $\frac{3}{8}$ $\frac{7}{16}$ $\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{4}$

All complete in handsome case.

Don't you need a set like this?

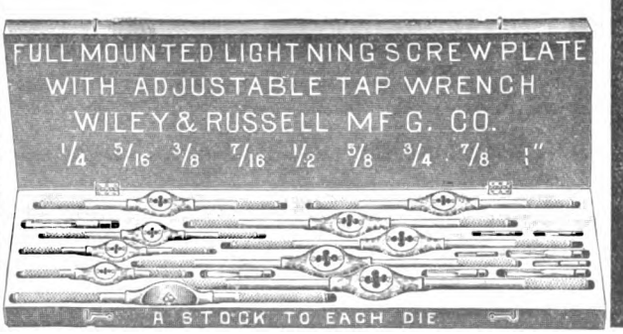


Send for Catalog 34D and prices.

Sole Makers

Wiley & Russell Mfg. Co.

Greenfield, Mass., U. S. A.



Set No. 1229

Contains 9 sizes.
A stock to each die.
A tap wrench.
Sizes:

$\frac{1}{4}$ $\frac{5}{16}$ $\frac{3}{8}$ $\frac{7}{16}$ $\frac{1}{2}$ $\frac{5}{8}$ $\frac{3}{4}$ $\frac{7}{8}$ 1 in.

All complete in handsome case.

Ask your dealer to show you one of these sets.

There Is No Doubt About It!

"The Capewell" Nail Drives the Easiest

Because

First — They are the most perfect in form and the finest in finish, and they are absolutely uniform in length, breadth and thickness.

Second — They have keen and symmetrical points, which penetrate easily the hardest hoof.

Third — They never buckle in driving.

Fourth — They are stiff enough to drive where wanted, while sufficiently ductile to clinch without breaking, and firm enough to hold securely at the clinch.

Fifth — The set of head, neck and blade is faultless, according to the opinion of instructors in training schools for farriers of the United States Army, veterinarians of eminence in this country and abroad, and horseshoers of long experience on the Grand Circuit, as well as masters and journeymen in successful practice of their work throughout the United States.

The Best Nail in the World



No Nail is a "Capewell" unless it has the Check Mark on the face of the head, as shown on the nail pictured above.

Made by

The Capewell Horse Nail Company

Hartford, Conn., U. S. A.

The Largest Manufacturers of Horseshoe Nails in the World

Forged from ONE SOLID PIECE



If you want the BEST order a

PARAGON *Swedish SOLID STEEL Anvil*

Newest Process *Absolute Guarantee* *Finest Material*
Perfect Shape and Finish *Write for Descriptive Booklet*

Manufactured by
SÖDERFORS BRUKS AKTIEBOLAG
FALUN, SWEDEN

For sale by All Leading Dealers

General Sales Agents for the United States
HORACE T. POTTS & COMPANY
PHILADELPHIA, U. S. A.

A Time and Labor Saver In Every Shop

In twelve minutes you can cut tenons on a set of wheels with a

Universal Tenon and Boring Machine



Every shop owner should investigate this simple and powerful machine by writing now—today—for our catalog, which is mailed free to anyone on request to

VULCAN IRON WORKS
MASON CITY, IOWA

The Greatest Labor Saver

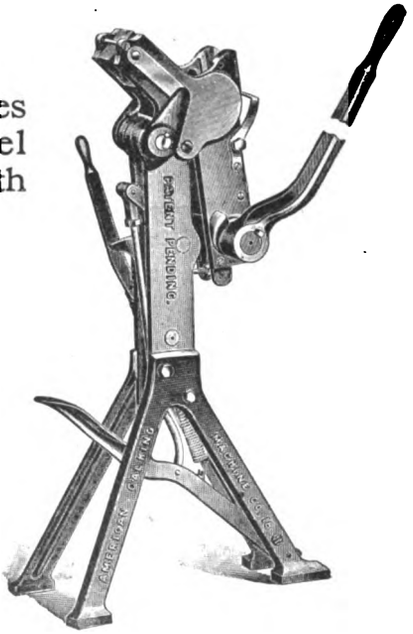
Ever placed in the Horse Shoer's Shop is the Verdict of the Users of the

American Calking Machine

More than
200 different shapes and sizes of heel calks are made with this machine.

Saves—
Time, Money, Muscle and Labor

The Only
Machine on earth that makes perfect, ready-for-use Heel Calks on any size shoe.



One Pull of the Lever Makes the Calk

Ask your dealer for
Descriptive Circular and Testimonials
or Write us.

American Calking Machine Company
Perry, Iowa

ONE CENT

invested in a postal asking for our New Catalog No. 60, showing 87 labor saving tools, will mean dollars to you.

12 inch



14 inch

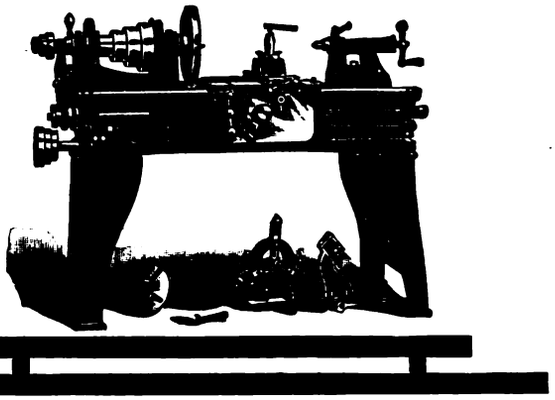
No. 81. OUR PRIDE HOOF SHEAR

BALL BEARING

Patented January 5, 1909. No. 908969.

Champion Tool Co. :-: Meadville, Pa.

DEPT. A U. S. A.



The Sebastian 15 in. Lathe

is the standard low price, high grade machine for automobile builders, repair shops, and general jobbing shops. :: :: ::

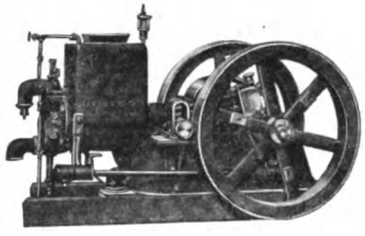
Descriptive Catalog of Lathes and Tools Free

SEBASTIAN LATHE CO.

124 Culvert Street Cincinnati, Ohio

K. C. Junior Gasoline Engines

STEAM COOLED SINGLE PISTON



3-5-8-10 H.P.

Power Guaranteed

SIMPLE
ECONOMICAL
LOW PRICED

Write Us Before Buying

KANSAS CITY HAY PRESS CO.,

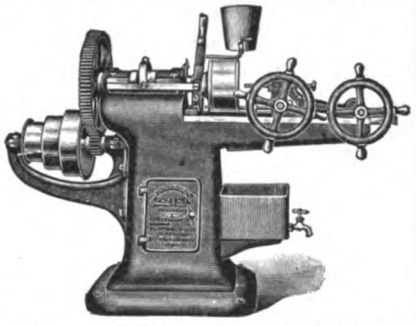
482 Mills Street, :: :: :: Kansas City, Mo.

THE

MERRIMAN

Bolt Threader

Best on Earth

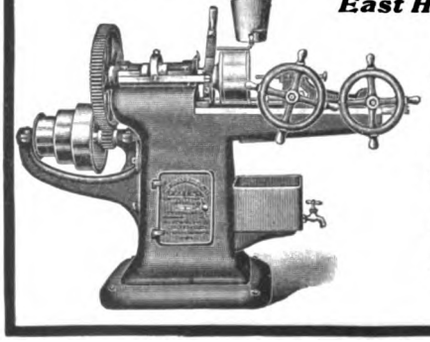


A Bolt Cutter is Much Like a Man in This
THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly.

THE H. B. BROWN CO.,

East Hampton, Conn.



Send for Catalog No. 11

A Postcard will bring it



Little Giant

Did you ever want to tighten or loosen a nut that you couldn't reach with an ordinary wrench? That's the time you need LITTLE GIANT Bit Brace Nut Wrenches. They get into all sorts of corners, and every smith and carriage maker ought to have a set. May we have YOUR order?

"Their Use Becomes A Habit"

WELLS BROTHERS COMPANY

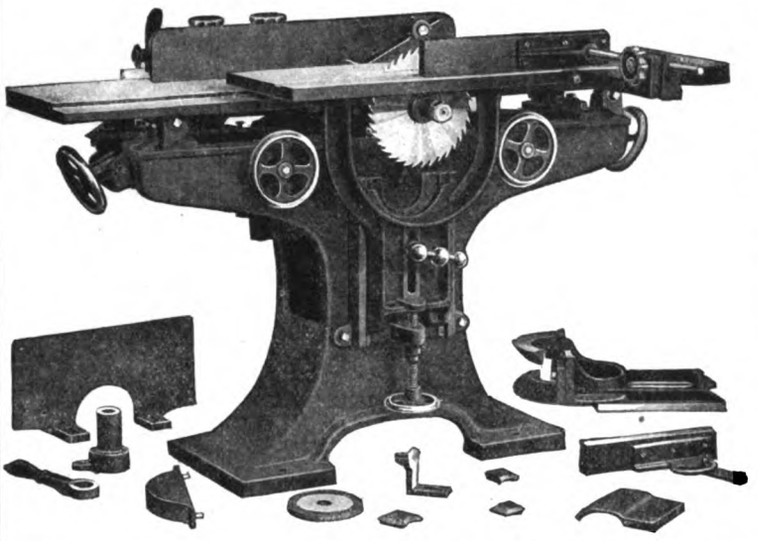
GREENFIELD MASS. U. S. A.

NEW YORK CHICAGO LONDON

Mr. Blacksmith———This Machine Is Built For You

THE CRESCENT Variety Wood Worker will do jointing, make molding, do boring, sawing, dadoing, round poles, tongues and felloes.

Read this letter



Lake Geneva, Wis., May 14, '10.

The Crescent Machine Co.,
Leetonia, Ohio.

Gentlemen:—Yours of recent date to hand. In reply would say that I have used your Variety Wood Worker for the last five months and am more than pleased with it. Don't see how I ever got along without it. The Wood Worker, in connection with the Crescent Band Saw, is worth more to me than a man for repair work. They never get on a spree and are always ready for business.

Yours truly,
J. H. RUSSELL.

This machine in a live blacksmith and repair shop should pay for itself within about six months.

Machine can be driven with electric motor or gasoline engine.

The Crescent Machine Co., 245 Main Street, Leetonia, Ohio

A Spoke Tenoner—Sizer—Rim Borer

Another one of the 14 machines successfully operated on the FAMOUS Universal Woodworker. Adjustable in all directions to accommodate all sizes of wheels and felloes.

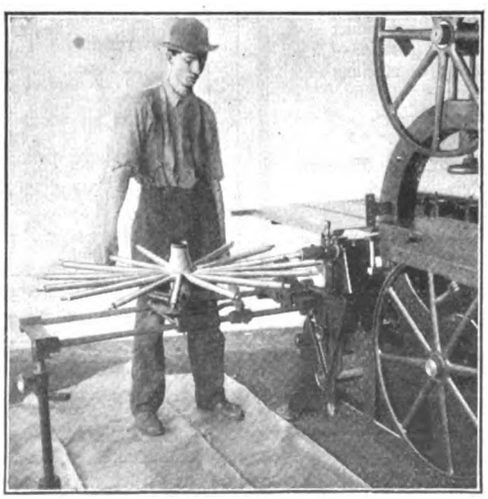
This machine will pay for itself in half the time required by any other woodworker. Because it does twice as much, your profits start twice as soon.

Sidney Tool Company

Sidney, Ohio

The FAMOUS consists of the following complete machines:

1 A twelve inch jointer.
2 A saw table—14 in. saws.
3 Two side power feed molder and edger.
4 SPOKE TENONER, SIZER AND RIM BORER.
5 Complete single spindle shaper.
6 Pony planer.
7 Drum sander.
8 Disc sander.
9 Boring machine.
10 Hollow chisel mortiser.
11 Single end tenoner.
12 Emery grinder.
13 Band saw.
14 Pole, tong, shaft and felloe rounder.



Any operation can be done complete without driving the rest of the machine. This is what makes it FAMOUS. It's the machine for YOUR SHOP. Sent on approval. Why buy 14 different machines and use so much floor space. This machine is a complete woodworking plant in itself, all on one base. Just a few simple adjustments and you have 14 different machines. It is a proven fact that you save money as soon as you purchase this woodworker. Catalogue and circular sent on request. Write today.

"Little Giant"
PUNCHES AND SHEARS

Better than a Blacksmith Helper.

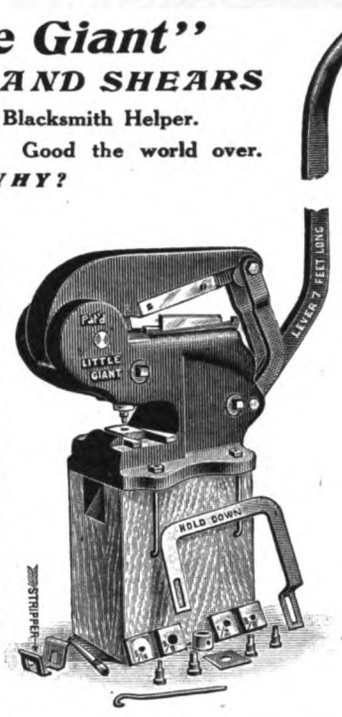
Over 3,000 in use. Good the world over.

WHY?

Kei Road, Cape Colony,
S. A., Aug. 12, 1909.
Little Giant Punch
& Shear Co.,
Sparta, Ill., U. S. A.

Dear Sirs: — Enclosed please find Money Order to the value of £1-11-0 in settlement of your acct, The Punch and Shear came safely to hand last Monday and I am very pleased with it indeed. If I can at any time sell one I will do so and will try to do all I can to forward the sale in the Cape Colony. The machine cost me landed here £13-10-0, and I consider it worth twice as much. I find it only takes one man to work the lever and I thought it could not be worked with less than two. I consider every blacksmith should have one, as they save a lot of labor and money.

Yours faithfully,
(Signed) pp
R. G. RISTROW.



You don't have to take our word for it, but get our booklet of Testimonials.

WRITE FOR NEW CATALOGUE

Little Giant Punch & Shear Co.
210 S. Market St. SPARTA, ILLINOIS

Have You Seen It?

The New Improved

BLACK GIANT

COMBINED UPSET, PUNCH AND SHEARS

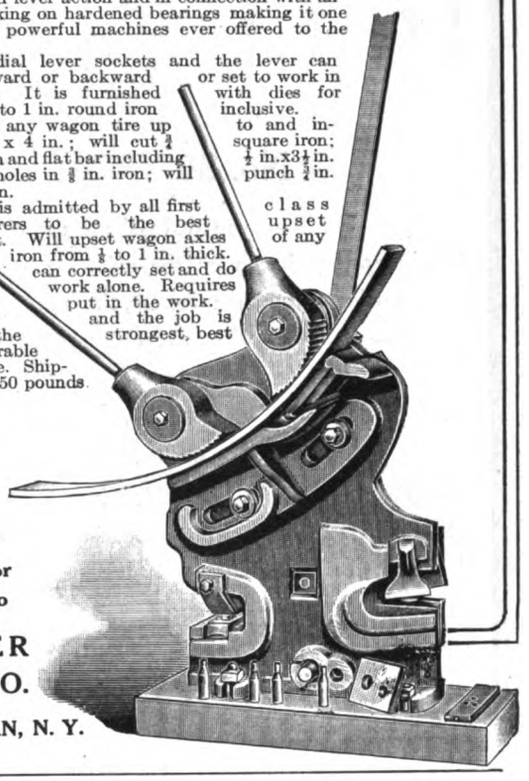
Has compound lever action and in connection with an eccentric working on hardened bearings making it one of the most powerful machines ever offered to the trade.

It has radial lever sockets and the lever can be pulled forward or backward or set to work in any position. It is furnished with dies for cutting off $\frac{1}{16}$ to 1 in. round iron inclusive.

Will upset any wagon tire up to and including 1 in. x 4 in.; will cut $\frac{3}{4}$ in. square iron; 1 in. round iron and flat bar including $\frac{1}{2}$ in. x $3\frac{1}{2}$ in. Will punch $\frac{3}{8}$ holes in $\frac{3}{8}$ in. iron; will punch $\frac{3}{4}$ in. holes in $\frac{5}{16}$ iron.

The upset is admitted by all first class wagon repairers to be the best upset on the market. Will upset wagon axles of any kind of iron from $\frac{1}{4}$ to 1 in. thick.

One man can correctly set and do all ordinary work alone. Requires no change put in the work. Pull the lever and the job is done. It is the strongest, best and most durable machine made. Shipping weight 550 pounds.



Ask Your Jobber or Write to

LUTHER MFG. CO.
OLEAN, N. Y.

INSIST ON "STANDARD" CALKS

BUY FROM YOUR DEALER

-1895- STANDARD TOE CALKS -1910-
HOT FORGED NIB
HIGH GRADE STEEL
DRIVES PERFECTLY
WELDS EASILY
GIVE SATISFACTION



FRANKLIN STEEL WORKS

Joliet, Ill.
Cambridge, Mass.

THE

BRADLEY
Hold-Fast

Carriage Coupler
No. 30

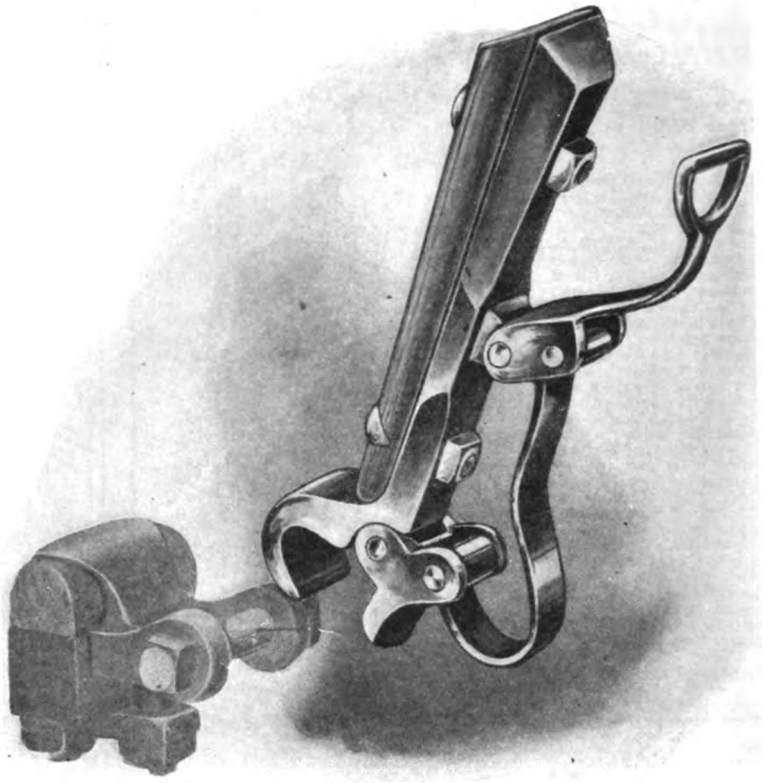
If you feel that you **MUST** use the old style bolt or lug shackle on the axles of some of the carriages you manufacture, the Bradley **Hold-Fast** coupler will meet every requirement.

The **HOLD-FAST** is made in buggy size only. Shaft ends and pole ends.

While the **Bradley Ball Bearing** is the **BEST** carriage coupler ever made, the **Hold-Fast** is the best in its class.

C. C. BRADLEY & SON

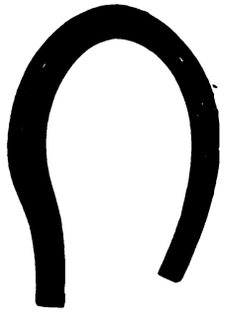
Syracuse, N. Y.



HOLD-FAST, No. 30, SHAFT END

Boss Steel Countersunk Side Weight Shoes

A DROP FORGED SHOE OF EXCEPTIONAL MERIT



45 per cent more weight on the heavy side



No. 1	Light	weighs	9	ounces	No. 1	Medium weighs	10½ ounces
No. 2	"	"	10½	"	No. 2	" "	12 "
No. 3	"	"	11½	"	No. 3	" "	13½ "
No. 4	"	"	14	"	No. 4	" "	16 "

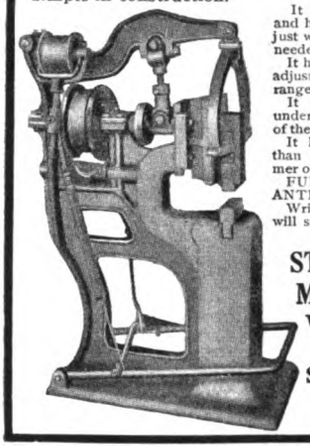
These are packed in wooden boxes, each containing 10 pairs

Manufactured by

Bryden Horse Shoe Co., Catasauqua, Pa.

The Sterling Hammer

The Sterling Hammer is built for business. It is exceptionally strong, durable and simple in construction.



It has the weight and has the strength just where it is most needed.

It has the necessary adjustments for a wide range of work.

It is at all times under perfect control of the operator.

It has fewer parts than any other Hammer of equal capacity.

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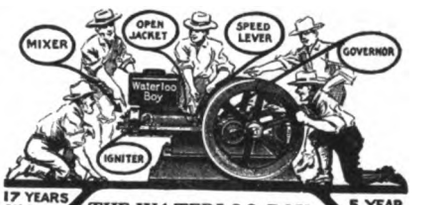

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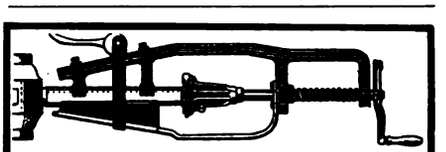

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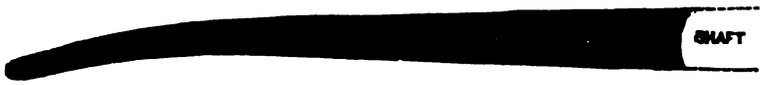

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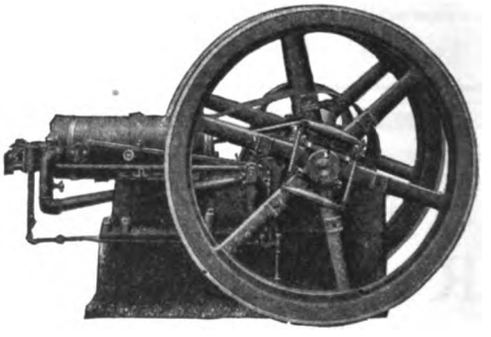

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Bert Hillyer. George Cormack, Jr.

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"Our Journal" and the Auto.

This talk was suggested by a recent letter from a subscriber. This smith says: "Upon reading my May paper I am forced to think that you are running to automobiles too much. What does the smith want with autos, anyway—they are hurting his shoeing and vehicle business and the less he sees of them the better."

Now, a word of explanation: When we decided to open an automobile department in "Our Journal" we did so only after carefully considering the subject from all sides. We didn't jump right in without thinking. We considered and carefully weighed all phases and sides of the matter. Our conclusion was just this: The blacksmith should take up automobile work, and the sooner he is able to handle this business the better for the craft and the more business he will get. And our lead in the automobile field was shortly followed by the other blacksmith publications. This we were very glad to note, for the more information the smith gets on automobile subjects and the quicker he gets it the better able will he be to take care of this new field.

Lots and lots of "Our Folks" have entered the automobile field. As evidence we submit extracts from a few letters recently received:

"Keep up the auto articles—auto work belongs to the smith, and these articles are alone worth the subscription price."

G. E. Bartell, Washington.

"The automobile corner is worth the price of the paper."

H. N. Smith, Kansas.

"Last Sunday I was reading the May number, and I thought you were running toward automobiles a little too strong and was going to tell you so. But the first thing when I opened shop Monday morning what should come along but a 30-horse Buick out of commission. And right there my reading came into use. So I guess the paper is all right, after all."

Fred Littlefield, Montana.

These are but a very few of the many letters we have received from "Our Folks," but they show which way the wind blows.

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Our Associates.

The names announced above as "Associates" are not new to the majority of "Our Folks." These writers have contributed to our columns for some time. The purpose of this talk is simply to tell you something about these men and why their writings are published.

Mr. James Cran has already been introduced to our readers. His specialty is blacksmithing—all kinds of it, from the shaping of a delicate rose petal to the forging of a ponderous shaft under the power hammer. He learned his trade in Scotland, has worked in all kinds of smith shops from the Atlantic to the Pacific, has devoted considerable attention to steel hardening and tempering and does considerable ornamental work of exceptional merit. He is at present employed as foreman in the Pond Machine Tool Works.

Mr. Harold Whiting Slauson, M. E., devotes his attention more especially to automobiles and motor car mechanisms. His writings have been of much interest and value to "Our Folks" who have taken up automobile work and he is telling the how, the why and the wherefore of the auto in a clear, concise manner.

Mr. Bert Hillyer began smithing when but sixteen years of age. He started to learn the trade at Lambertson's shop at South Amboy, N. J. The work here was mostly ship smithing. After four years at this shop he went into the locomotive shops of the Pennsylvania Railroad. Here he started with a light fire and worked himself up to the position of head smith. After remaining here for twelve years he went to the U. S. Metal Refining Company at Chrome, N. J., where he is at present employed as foreman.

Mr. George Cormack, Jr., as a gas engine expert, has traveled considerably about the country, his work taking him into blacksmith shops of all kinds. He knows what the smith lacks along the line of machine shop work, and his articles on that subject are written and directly intended for the general smith. Mr. Cormack is at present Superintendent of the Gas Engine Department of the Independent Harvester Co., at Plano, Illinois.



IN THIS FIELD IS SHOWN IN OPERATION ALMOST EVERY KIND OF IMPLEMENT USED IN HARVESTING HAY

Some Out-of-the-Ordinary Forgings

Fishing Tools, Carboy Racks, An Adz-Eye Hammer and An Ax

BERT HILLYER

SOME of the tools, the harpoon, hook and spear, used by the fishermen along our bays are made by the blacksmith. In the first place, the fishermen fish with a seine or haul-net which they load on a boat. Then, starting from a point of land, they row out in the bay, describing a large half circle and dropping

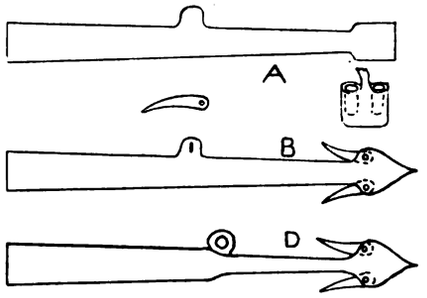


FIG. 1—THE HARPOON

their net as they go along. Later, as they pull the net ashore, which is partly done with a stationary engine and windlass, the fish that have been surrounded are forced together in a smaller space, the water becoming more and more agitated with the fish as they near land. In the summer months, July and August, the fisherman keeps a sharp lookout to see whether there are any sharks in the net. The shark may be recognized by his long black fin sticking out of the water now and then, and by the frantic efforts of the smaller fish to get out of his way. The owner of the net is far from delighted when he sees a shark in the net, for he at once views trouble ahead, because if he should make a miss with the harpoon or hook, the shark would take a header and go through the side of the net, leaving a big hole for the escape of the remainder of the fish. In order to capture him successfully, they get as near as possible, plunge in the harpoon, and then get out of the way. The crew on shore have a rope which has been attached to the harpoon or hook, whichever is used. As soon as the strike is made, they run up the beach bringing Mr. Shark with them; an operation to which he strenuously objects, and after which he is killed. He is then cut up and loaded in wagons by the farmers, to be used as fertilizer. So he comes to some good at last.

This is the manner in which the harpoon is made: Take a piece of round steel and draw out a shank, as at A, Fig. 1. Then flatten the end and bend it over as at B, Fig. 1, so that you can drill two holes straight down alongside of the shank. Now, straighten the end out again and draw it down to a sharp point. Flatten back part of head, so that the holes are rectangular in shape, except on the outside end, which is left rounding. Then make two small barbs, shaped as at C, and riveted in the two slots with countersunk rivets. A piece of thin pipe is then welded on shank in which to fit the wooden handle. The barbs in the head should work freely, so that they will close when going into anything and spread out and fasten when starting to pull out. A small place is cut each side of slot to

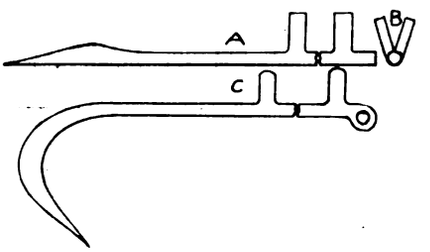


FIG. 2—SHOWING THE HOOK

allow them to spread the right distance, and to stop them from going any further. The eye is made as shown, a slot cut and swelled out and rounded. The finished tool is shown at D.

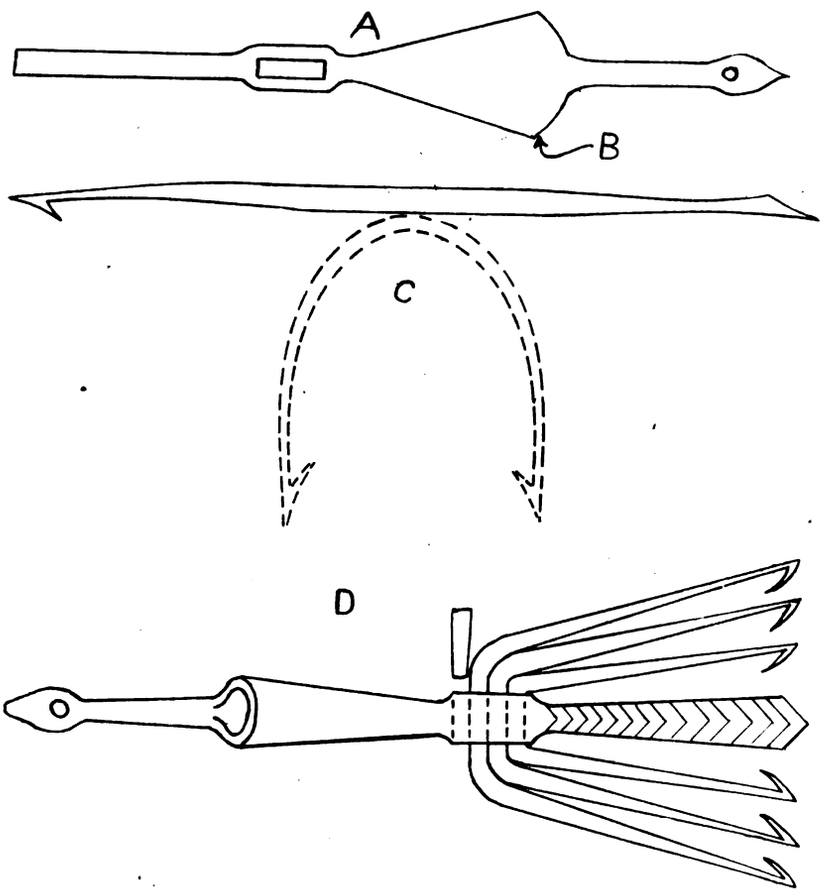
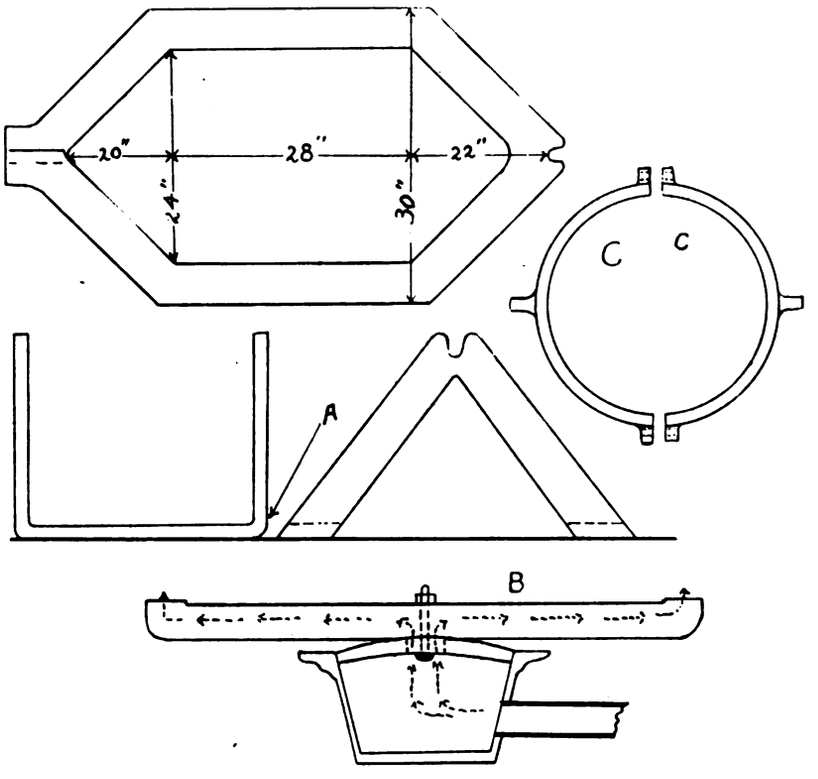


FIG. 3—SHOWING HOW THE SPEAR IS MADE

The hook is more simply made. A piece of flat steel is taken and forged similar to Fig. 2, A. The lugs are split down the middle, as shown by the end view at B, and then drawn out thin. The ends are welded, forming a ring through which a wooden handle is fastened. The eye on the end of hook is made by punching a long slot, then swelling out round, and working over horn of anvil, until eye is formed at C, Fig. 2. A rope is fastened to this eye and takes the strain off the handle which is used only for the purpose of striking.



THE RACKS ARE USED TO HOLD CARBOYS OF ACID

The spear is made to catch eels in the winter time when they have bedded in the mud. A hole is cut through the ice large enough to work the spear around in several directions. The spear is then pushed down; if it hits anything, the prongs spread apart, and when pulled up the object hit slips back to the sharp point which goes into it, holding it securely. The way to make a spear is to take a piece of $\frac{7}{8}$-inch round, mild steel and punch a slot $\frac{1}{4}$-inch by $1\frac{1}{2}$-inches long. Fuller in near each end of slot. Then draw one end out flat about $\frac{3}{16}$-inch by 1 inch, and flatten out the other end for socket. In doing this, put a fuller on lengthwise, in order to make it spread more. Leave a small narrow part, A, Fig. 3, above the socket to go up and to fasten on handle. Then bend flat part, B, for socket—the ends being brought together and either brazed or welded. Now take a piece of spring steel $\frac{1}{4}$-inch square and draw down tapering, as at C, Fig. 3. This shows one end bent and the other end ready to be bent. It is then bent in the center to a U-shape as shown by the dotted lines. There are three or four of these prongs according to what is ordered. They are then placed through the slot and a key made to wedge them in tightly. But before being wedged in they should be tempered. Then drive key in tightly and cut off flush with outside. Rivet the small end to keep it from coming out. The finished spear with key ready for inserting is shown at D, Fig. 3.

Carboy Racks or Cradles.

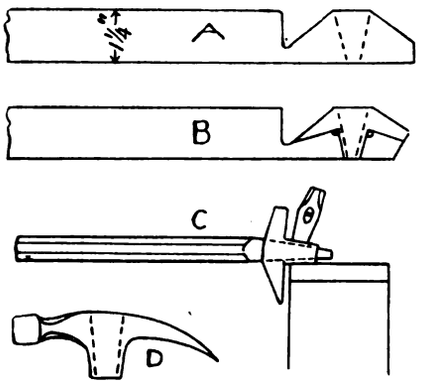
These racks or cradles are used to hold carboys of acids and other liquids when in use so the contents may be poured out easily and without accident. A band is made with two lugs on it and fastened a little above the middle of the carboy. These lugs when set in the slotted ends of the rack allow it to swing easily, so that any quantity can be poured out without difficulty. The rack in the engraving is made in two pieces welded at the ends. The stock is $\frac{3}{4}$ inch by 3 inches and is bent on its edge, as shown, before welding. One end shown is welded and the slot cut out, while the other end is ready to weld. After the ends are welded and finished, the frame is bent at right angles as at A. To do this, we need to bend two corners at once, and as the frame is too wide to heat in an ordinary fire we take a piece of pipe 27 inches long, flatten it on one side about four or five inches in the center and drill a hole large enough for blast to come through. Then drill a small hole opposite, so that a T-headed bolt can be put crosswise in the tuyere hole and screwed tight down on plate. Clay is then packed around to make it tight, and we have two fires from one forge. (A long, narrow fire can be made by closing up the ends of pipe and drilling small holes along the center of the pipe, or it can be bent circular and used for heating when shrinking on bands or rings.)

Now, to finish our rack, we lay one side in each fire and bend it without any trouble. This rack could be made by bending to right angles before welding, but it would be so unhandy to handle in welding, and it could not be turned over in the fire, so that I believe the former method to be the best. The band that goes around the box part of carboy is made in two halves with a round lug in the center of each. It is then clamped together with bolts as shown at C.

Making an Adz-Eye Hammer.

The adz-eye hammer is one of the most difficult to make. This kind of an eye is mostly used on carpenter's, horseshoer's and upholsterer's hammers. The advantage of this over a short eye is that it has more bearing surface, due to its being longer in the eye, and thus holds the handle firmer. To make a good adz-eye hammer, take a piece of $\frac{3}{4}$-inch by $1\frac{1}{4}$-inch tool steel, and forge to shape similar to A. Then punch hole through center. In punching the hole be careful to get it straight and true. Now, turn stock over on the side and punch two small holes, one on each side of and at right angles to the hole you punched first, and cut out the stock as at B. In cutting, cut the two long cuts first on the flat, then turn up on the edge and cut down to the holes.

Now, take a piece of steel about 20 or 24 inches long and forge an eye pin on it. Then throw the ends of hammer back and stick the eye rod through, as at C. This enables you to forge the eye out long, thin and tapering. Then draw the hammer out octagonal between eye and face, leaving the face larger. Draw out opposite end, tapering



MAKING AN ADZ-EYE HAMMER

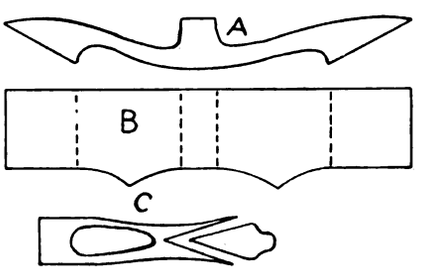
to a sharp end. It should be drawn out in a swedge to make the top part rounding. Then split the claw end as far up as desired.

After finishing up nicely, temper it, and then have it magnetized. Almost any electrician will do this for you. After that, all you need to do when wanting to tack up something is to put the head of the tack on the face of the hammer, and it will remain there and hit the spot where you want to drive it. You can tack anything up as high as you can reach with the end of the hammer, and have the other hand free to hold it up. You can tack down carpet without mashing your fingers, and your wife will not have to leave the room on account of the language you use in speaking to the carpet or hammer. Another thing, when you are pulling up tacks they stay right on the end, so that you can pick them off with your finger. The old way would cause them to fly off the hammer and get lost until you picked them up with your bare feet when going to bed.

How to Make an Ax.

It is a common occurrence to draw out an ax in the blacksmith shop, but it is seldom that one is made outright.

To make one, take a piece of 1-inch by 3½-inch soft steel and forge to shape shown at A. The dotted line shows the piece before fullering, and the arrows signify where to fuller in. Then, when flattening out thin part XX put fuller in sideways and draw out V-shaped points as at B. Now, bend as at C, and weld



HOW TO MAKE AN AX

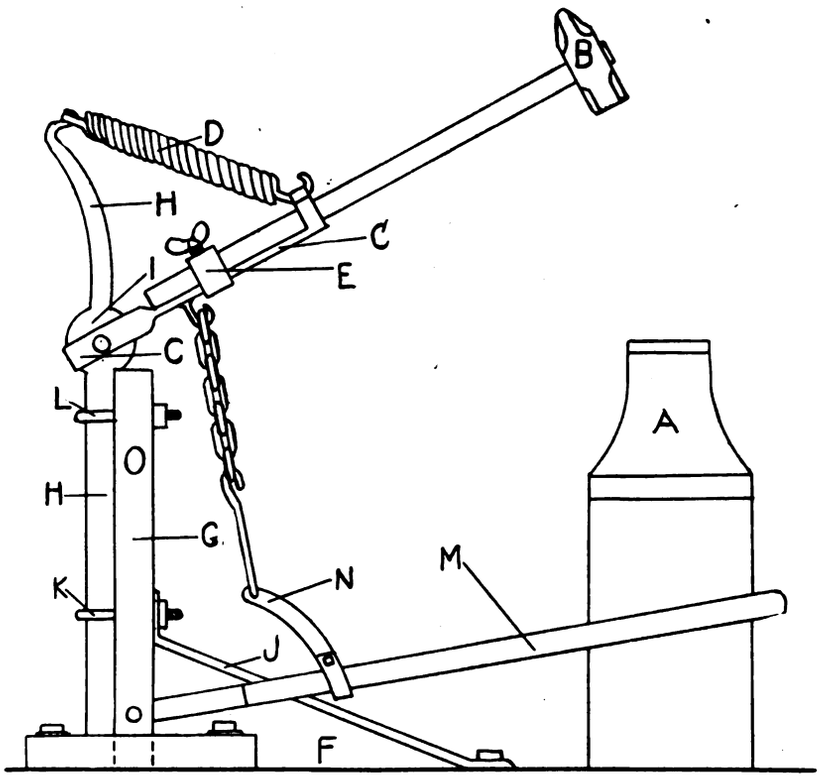
up point of eye, leaving ends open to receive wedge-shaped piece of tool steel. This is then driven in and the outside laps closed down tightly, so that no dirt can get to it. Now, take a careful heat and weld up, using a little borax. A good many use expensive welding compounds, the directions of which always say good clean heats should be used. Now, if you use common borax and take good clean heats, you do not need anything else. I know there are many who will differ with me on this point, but take the best welding compound on the market (and they are all the best) and use a dirty heat, then notice the kind of weld you have.

To return to the ax-making, after welding up, draw it down fairly thin on top and bottom, but leave it heavy in the middle, so that when it is sunk in the wood it will not stick and wedge itself fast. The last hammering on the flat edge should be done at a low heat, with quick, light blows to pack the grain but stop when it begins to show black. Then heat evenly all over and lay aside to cool. When cold, grind up to shape. Then have a good fire that will heat the ax evenly all over. It is best to heat the back part of the ax first and then gradually back to the edge. The heat should be the lowest heat that will make it hard. A good bath in which to temper is common salt and rainwater. Move ax up and down in the water when quenching; then polish or brighten and draw to a blue. The quality or life of an ax depends upon the steel that was used and the manner in which it was worked and tempered.

How to Make a Foot Power Hammer.

LEIGH MILLER.

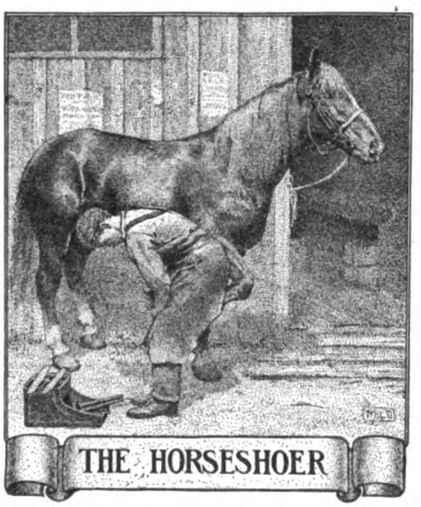
Here is a description of a very useful tool which I designed and made last winter. It is a foot power hammer, made with an ordinary blacksmith's sledge. A is the anvil; B the sledge with a square handle; C the iron to hold the sledge handle; D is a 12-inch brake spring; E is a clamp to hold sledge handle to C; F is a hardwood plank, 12 inches by 24 inches, securely fastened to floor, and contains a mortise



A PRACTICAL FOOT POWER HAMMER EASILY MADE

to receive the post, G; H is a round piece of iron 1½ inches in diameter, flattened at I to about 2½ inches wide; C is split and goes each side of I and is bolted. The distance from I to the hook at the top end of H is 18 inches. This part can be bent back to give the hammer any amount of sweep desired. A brace, J, holds the hammer post securely, and is fastened to the post by the bottom grip at K, which passes through it. The grip, K, should be drawn tight against the wood at the back side, so as to be solid and let H slide easily. The top grip, L, should be set into the post, G, so that when the

nut on the front side is tightened it will grip H firmly by loosening L. The hammer can be swung to any point on the anvil, or to one side when not in use, or raised to any desired height. The foot lever, M, is offset, so as not to strike the brace at J. It is fastened to the opposite side of the post, so there will not be any side pull on the hammer. The lever, M, is a piece of 1-inch by ½-inch sleigh shoe steel. N is flat iron, with end hooked around M and fastened with a bolt. C is made of a piece of 2-inch by ½-inch stock and is split and the ends welded together to receive the handle and hold the spring. The other end is split and each side given a quarter turn to fit. I let the ends go clear across, in order to keep the hammer from swinging sideways. Clamp E, hooks over each side of C. A piece of leather can be put on top of handle to keep the thumbscrew from spoiling the handle. There are two braces fastened to post G at O to hold it firmly sideways. The rest will, I think, explain itself from the illustration.



Shoeing for Toe and Quarter Cracks.

LESTER SIMS.

With reference to shoeing or curing a case combining both toe and quarter crack, first select a broad web concave shoe. Make it into a bar shoe, the bar to have good length and breadth; meaning plenty of bearing surface on the frog. After it is fitted, take toe steel about ½ inch by ⅜ inch or ⅜-inch square and weld a calk full length across the bar. Then weld two more calks running lengthwise with the shoe, about two inches or more apart according to size of foot, and on each side of the toe crack, as shown. Then draw up two stiff clips, which are not to be let into the foot too deeply so that they wedge the hoof tight when the nails are drawn. The shoe should be bowed down, bent slightly between the two calks, away from and under the toe crack, while the hoof is dressed to form an arch. Then ease the quarter and heel from the quarter crack all the way back, making sure that you have plenty of frog pressure, as it is of all importance in this case. If the frog is not prominent, then make a hole in the bar and rivet leather to fit the frog.

If these instructions are properly carried out when the shoe is nailed and drawn hard, as well as the clips, you will find the toe and quarter cracks drawn nicely together and no more working, for they are bound to stay. To cure them, as the owner is a veterinarian, trim the usual V at the coronet and fire through wall at lower edge of coronary bands to touch laminae. Do firing with a thin iron brought to a sharp edge and about ⅛-inch wide. This causes the process of healing and knitting together of laminae and wall which grows down solidly, providing you keep the cracks from working. After the firing is done, use tar bandages until soreness disappears. Then, as a hoof dressing and to be applied around coronet to stimulate a good, healthy tough growth, nothing in my opinion beats the old-fashioned soft soap, the kind with which our grandmothers used to do the washing.

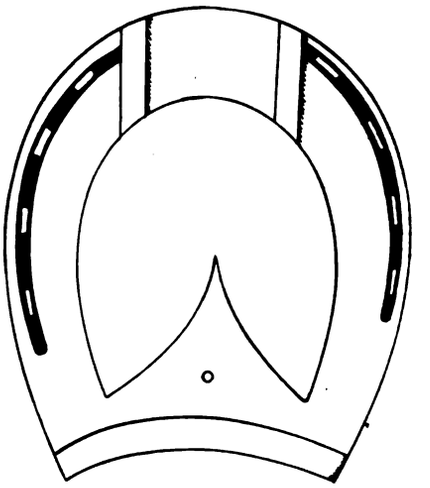
Curing Cracks in the Hoof.

J. T. BROOKS.

I never use a plate or nail to hold the cracks together. This method, to my mind, only tends to cause friction and the edges of the cracks to rub. Consequently it keeps the foot in a state of unhealthy action. I have been very successful in treating hoof cracks, but I treat them as follows:

First, the foot is dressed as usual, and then, in case of a quarter crack, cut out a portion of the wall from the crack back to the heel, cutting it as low as possible. Then the crack is grooved from top to bottom, cutting it down to the quick. By grooving the crack in the form of a V, the friction is relieved and a new growth is promoted immediately.

It is not necessary to groove toe cracks, as they are more easily handled, and can be held rigid by a good, strong shoe. All quarter-cracked feet should be shod with a bar shoe. The shoe should be dropped or offset at the crack so as to give the heel proper protection at all times from pressure at the heel back of the crack. In the treatment of any crack a good hoof ointment



SHOEING FOR TOE AND QUARTER CRACKS

should be used to stimulate and help nature in growing a healthy hoof.

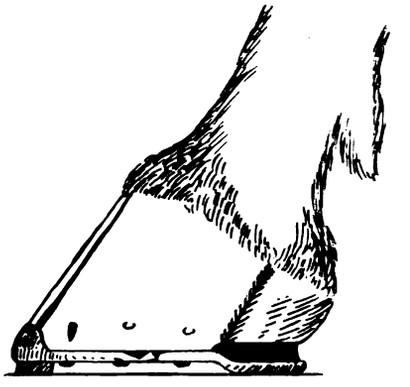
Curing Punctures and Cracks of the Foot.

F. UNDERDOWN.

South Africa.

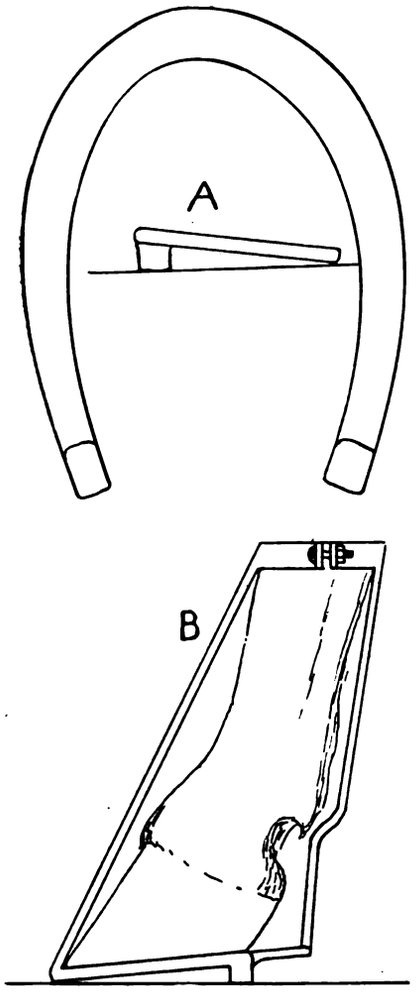
This is how I treated the foot of a horse that picked up a nail. First of all, I soaked the foot in warm water, after which I found, with a probe, that the coffin bone had been touched and was a little diseased. I put the horse in a pair of stocks that I fixed up, and for seven days probed and dressed the wound with Eliman's embrocation with a syringe every morning. During this time I fed the horse on nothing but bran. After seven days I freed him from the stocks and did not dress the foot for two days. Then, when I saw that no more pus oozed from the holes, I dressed the wound with a weak solution of blue stone, continuing until the sore was quite healed. After a month's rest the horse went quite sound.

Another job I had was a horse with a very bad crack at the quarter. I widened the edges of the crack in a



CURING CRACKS IN THE HOOF

V-shape. Then I put on a shoe with one clip at the toe, another inside and two clips on the outside—one at each side of the crack. The shoe, when finished, was the exact shape of the foot, with a good seat all around. I then blistered the coronet of the foot with mercury, removed the shoe in three weeks' time, and the horse was fit to go on duty, In four months the crack disappeared altogether and the horse is now quite sound. This was the worst case I have ever seen. The



TWO SPECIAL SHOES

crack was one quarter of an inch open at the coronet and bleeding. The V was cut right through the horn to the quick for the purpose of relieving all pressure on the parts affected.

Two Special Shoes.

T. E. WILSON.

Here are two special shoes which I have never seen described before and which I think will be of benefit to some readers.

The first shoe is for an animal that has been foundered and as a consequence walks far back on his heel. The shoe is made to fit the foot without a toe calk, but high heel calks are used, and the shoe is made long at both branches so as to extend back from the heel some three inches. The horse I used this on left the shop walking on the affected foot. It is of course understood that a very heavy shoe is necessary to keep it from bending.

The other shoe is more in the nature of a brace. It has high heel calks, no toe calk and is generally applied by a veterinarian when both tendons in the hind leg have been cut above the ankle. The shape of the device is shown in the engraving at B. The offset at the back is to allow for dressing the wound. The forked bands at X go around the leg of the animal and are held secure by means of bolts, after protecting the leg with suitable padding or bandage. The bars leading from the toe and from the heels keep the leg straight while the tendons knit together. The band at the top keeps the device from moving sideways. Except at the top where the bands bolt together the entire device is welded solidly.

The First Vehicles in America.

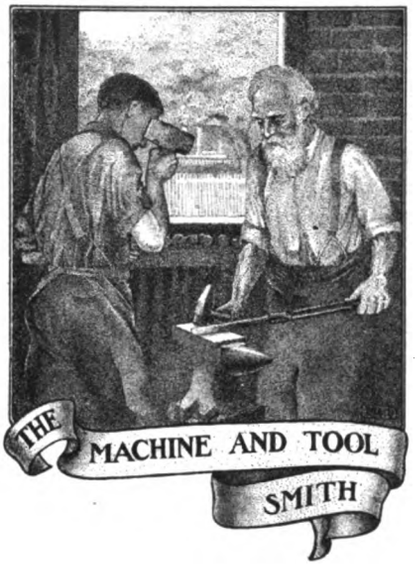
W. O. B.

The first vehicles used on the American Continent were two sticks or poles which were attached, first to the sides of a dog, and later, after the coming of Cortez and the conquest of Mexico, to the sides of a horse. The ends of these poles were allowed to drag on the ground behind, the load to be transported being slung between the poles on a hide. And this primitive conveyance served a wide range of usefulness. It originated with the Indian, and the frontiersmen of that time were not above using it. This vehicle enabled one to move a light load faster than with an express wagon of today, and while it would not carry as heavy a load as a modern wagon it would go over a thousand places where no wheel could turn.

This vehicle, however, seldom got farther south than Texas in our Northern Hemisphere. The burdens of the South were carried on the backs of dogs, and later on the backs of horses and mules. And at times, it is said, that these dog-trains numbered as many as 500 animals one in front of the other.

Later still, the crude ox-cart, made entirely of wood without a single nail or scrap of iron, was used to carry the loads. This cart—this old carreta—had big ponderous wheels, each made of three pieces of cottonwood which ran on a huge wooden axle. And these vehicles with their wooden wheels on wooden journals without axle grease or lubricant of any kind gave vent to a shriek that was audible at a greater distance than any sound of our present day, not excepting the devices used on our automobiles.

The last of these old carreta has long since disappeared from the scenes of its activities. There are, however, several of these old vehicles to be found in the museums and curio exhibitions of the Pacific Coast.



How to Harden and Temper a Hammer.

J. N. BAGLEY.

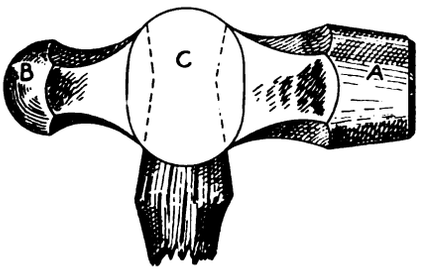
A great many blacksmiths can forge a perfect hammer, but when they come to the tempering they fall down. Now, the shape of the hammer has much to do with the way it is hardened and tempered, and I have seen hammers lying in the junk pile with the corners broken off, some hollow in the face, and if you inquire into matters the steel will, of course, be the cause, not the smith.

The first step in hardening the hammer is to get the fire in a perfect condition, as steel should not be heated in a fire that contains clinkers and sulphur. The coal should be in such a condition that very little, if any, smoke comes from it. We will harden a hammer as shown in Fig. 1.

First place the hammer in an upright position. Heat very slowly; keeping close watch to see that neither the corners nor the outside heat faster than the center (this is where a great many fail), or it will crack in the hardening bath, or be sunken in the face after it has been used a short time. Heat to

a good, clear cherry red and plunge into the cooling bath, keeping the same position it had in the fire. Leave in the bath until it is perfectly cold.

After it is taken from the bath, polish the face that has been hardened and



MANY SMITHS FAIL IN TEMPERING

place the hammer again in the fire, with the polished end sticking out and B, or the pene end, in. Heat very slowly. The object is, while the hammer is in this position to get a hardening heat at end B, and draw the temper to a blue at the face or end A. If the hardening, or pene end, is heating too fast for the color to show at the face, A, stop blowing until the color begins to run toward the face, being careful to keep end B at the proper hardening heat. When both ends are at the desired point cool at once as before. The face is now properly tempered and the pene end hardened to be tempered. It will not matter very much whether or not the temper is drawn from this end, as there are no corners to break off; but if the temper is to be drawn I have never found anything better than hot or melted lead to draw the temper in this case.

Small hammers may be hardened all over, as already described, polished brightly, and the temper drawn with the blow torch, applying the flame at the eye of the hammer. If the heat runs to the small end, causing the temper to draw faster, apply the flame nearer the face of the hammer. When the color has reached the desired point, cool, and the job is complete.

One thing to remember in hardening the hammer is that at no time harden the eye of the hammer, as it will be likely to break. The proper temper in the hammer will show a light blue color.

A hammer tempered after this method will give universal satisfaction at all times and will be found far superior to many hammers that are purchased at the hardware stores, as it will neither crack at the corners nor get hollow in the center. I have seen hammers offered for sale at the hardware stores that were hard at the corners and a good sharp file would cut the center.

How to Forge a Drill.

J. N. BAGLEY.

Many a time some special job is at hand requiring a drill of some size that does not happen to be in the shop. It can be forged in the following way and will meet every requirement.

Procure a piece of tool steel—about seventy-five points carbon will be the best—and forge the shank first, as shown at C; for a brace or a round shank may be made; for the drill press the round shank will be required.

Forge as shown in Fig. 1, leaving A somewhat wider than the finished drill is to be. Then hammer on the edges until it has the shape shown at B, in Fig. 2. Now, grind to the required size before putting in the twist. Then heat to a forging heat, and place in a vise and with a pair of tongs or a wrench twist to the left until it is as shown in Fig. 2. Form the extreme cutting end with the hammer and grind to shape on the cutting edge. Harden and temper, drawing the color to a light blue for ordinary work. Do not harden the shank, as it will break very easily. Many odd-sized holes may be drilled by grinding the point of the cut edge to one side.

Tempering and Working Steel.

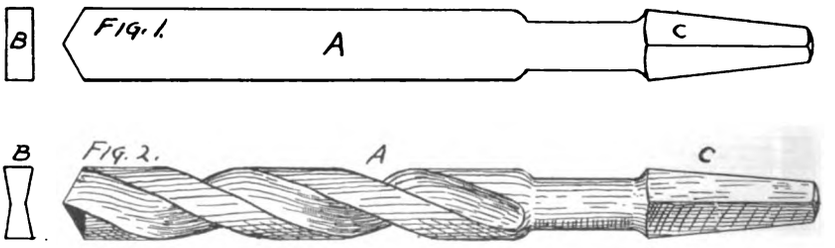
RODERICK MACDONALD.

First, heat the steel to a dark red in a clean forge fire, the fuel being as free from sulphur and phosphorus as possible. Sulphur tends to make steel or iron brittle while hot, while phosphorus tends to make steel or iron brittle when cold. Charcoal fire would be preferable. Care should be taken to prevent the steel from coming in contact with the cold blast from the tuyere iron. When the steel is heated to a dark red, plunge the steel into a receptacle containing Chloride of Sodium (common salt.)

This operation may be repeated until the steel is at a forging heat, then work the steel rapidly and uniformly until brought nearly to the finished shape. Then substitute the following composition:—One part by weight of (sal-soda) (sulphate of copper,) (chloride of ammonium) one half by weight of (nitrate of potassa) one part common salt. These said ingredients should be well mixed and pulverized. Heat the steel as before, having it coated with this mixture, and hammer it rapidly and uniformly again until brought to the finished shape.

Now, heat to a slow cherry red and plunge it vertically into a bath of the following compound: Soft water, (rain-water preferred) 2 gallons; alum, sal-soda, sulphate of copper, of each 3 ounces; nitrate of potassa (saltpeter) 2 ounces; chloride of sodium (salt) 12 ounces.

This treatment of steel has been tried with satisfaction by many smiths. As to colors in tempering, let me say as the result of years of observation and experience that colors are not to be taken as infallible guides. In order to get the best results the utmost care should be taken in treating the steel from the very moment it is heated until it is ready for use. We take, for instance, a smith who has a cold chisel to dress and temper with the one heat. He may be in a hurry, the water may be colder than he thinks it to be. He plunges the chisel in and when he takes it out it is still warm, but not warm enough to draw the temper to his satisfaction. In order to hasten the temper he will likely enough subject the steel to some sudden heat, perhaps plunge it into a smoky fire. The sudden exposure to heat may produce a dark blue color, while the heart of the steel remains unchanged. In order to convert a bar of steel into edged tools, it must of necessity undergo the following processes: Forging, Annealing, Hardening and Tempering. In factories with facilities for making tools for the market the work of treating the steel is assigned to different operators. After the steel is forged, the furnace man or the annealer



MANY TIMES A SPECIAL JOB REQUIRES A SPECIAL DRILL

takes it and treats it as follows: He takes as many chests as the case may require and puts a thin layer of charcoal in the bottom of them. He then puts the steel on top of that, placing the steel and charcoal alternately until the chest or box is full, the last layer being of charcoal. He then puts the cover on and seals it with fire-clay so that the box is air-tight. All this is only preparatory to the annealing. He then puts the chests into a furnace having an upper and lower compartment; the steel in the upper division, the bottom division being exclusively for the fire. He fires the furnace for seven or eight hours with cord wood. Both fire and steel are allowed to cool gradually. After the articles have been treated in the milling room they are assigned to another man for hardening and tempering. The steel is now slowly heated in a furnace fitted for this work. It is brought to a cherry red heat and then cooled in water at a mild temperature. The articles are then polished and put in a charcoal oven to draw the temper to the proper degree. There are several other methods in vogue without any essential difference from the above.

It has been said that the best steel is the greatest triumph of metallurgy, and that metallurgy is the glory of chemistry. It is not necessary that a toolsmith should be a metallurgist. The art of working steel can be acquired only by line upon line, here a little and there a little. Some entertain the idea that twenty or thirty years' practice must necessarily qualify them as experts. The fact of the matter is that something new can be learned every day. It is not my object to weary the reader with a long-winded talk on furnaces or pyrometers to register the degrees of heat. Such equipments are not usually at the disposal of country smiths, rock miners, farmers, railroad men, etc., who have to employ other methods. I may here refer briefly to such tools as cold chisels, stone drills, wood cutting tools, etc. It is customary with tool dressers to sharpen and temper a drill or chisel with the one heat, but that is not the best method of treating the steel. I may here relate some cases that came under my observation. In one case a number of drills came one day into a blacksmith's shop. The sharpening of these drills was assigned to two different men. One man sharpened and tempered his lot of drills without subjecting them to any annealing, or in other words he dressed and tempered them with the same heat. The other man took his lot of drills and sharpened them, allowed them to cool, and re-heated them for the tempering, putting a private mark upon them so that he might know them when they would return. When the drills came back to be sharpened those drills that were sharpened and tempered by the first man showed flaws in the corners of the blades, while the others showed no flaws whatever. I recollect reading a letter written by a man employed in sharpening drills at the time. The letter was in substance as follows:—"Two gangs of men were employed in drilling and blasting rocks. A wager was put up by the men as to who would accomplish the most work in a given time. Each gang had their drills sharpened by different smiths. One of the smiths took no special care in dressing his drills, while the other man first sharpened the drills, then allowed them to cool. In tempering he heated the steel to a cherry red and then cooled them off, after which it took him from ten to fifteen minutes in drawing the temper of each drill. When the temper was drawn he allowed them to cool without dipping them in the water. Suffice it to say that his gang gained the day."

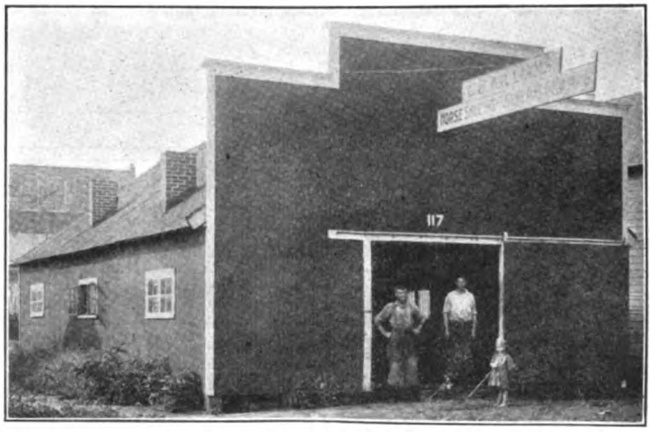
Some years ago I met an old American Indian who had a reputation for making good knives and, being in conversation with him, I felt bold enough to ask him some questions as to his methods. Although his answers and explanations were somewhat indefinite I gleaned from his remarks that it was his custom to take worn-out files and then build a fire, using wood as fuel. He built the fire in such a way as to give it a good draft, heated the steel in the wood fire, forged his work and buried the steel in hot ashes, allowing the steel and the ashes to cool together. He then heated the steel slowly and uniformly to a dark red and cooled it by putting it vertically into the water. He then drew the temper to a straw color tinged with blue and allowed it to cool in the wind without dipping it into any liquid. The writer knew of a village smith who was considered an expert on tempering tools, although he was inclined to keep the art of tempering as a matter of secrecy. Nevertheless, I incidentally learned that it was his custom in tempering a tool to allow it to cool in the air without dipping it into water after the proper degree of hardness was obtained. It may be a well-known fact to all who take a special interest in working steels that it has been tradionally told that the famous Damascus blades were annealed, heated to a cherry red, then subjected uniformly to a strong current of wind, the tempering being left for a cold, windy day in winter.

Tempering is a process of softening, not, as is generally supposed, of hardening steel. Tempering is a process peculiar to steel.

For the benefit of the layman, I might say a word or two on tempering springs. One method is as follows:—Heat the



MR. J. L. LARUE'S NEW SHOP IN INDIANA



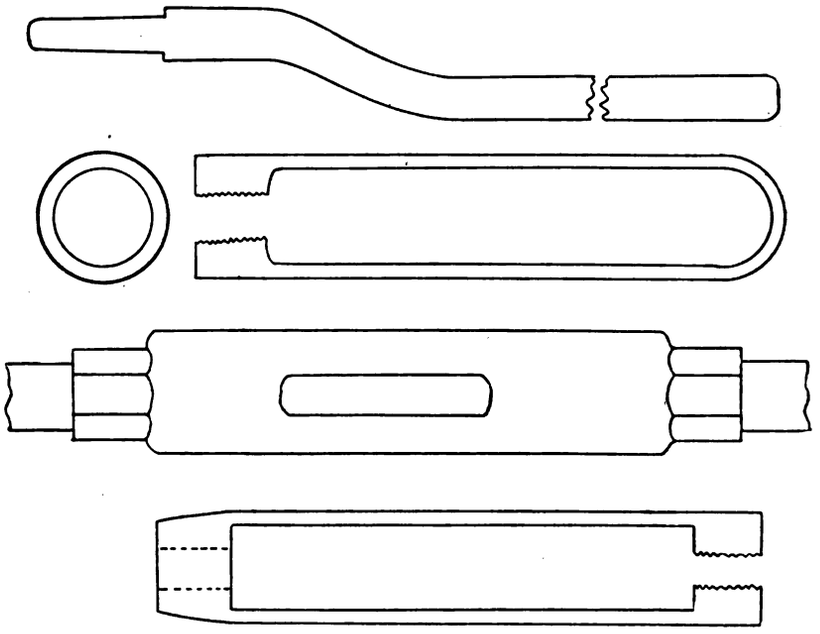
A GENERAL SHOP OF OKLAHOMA, RUN BY C. W. WILLIAMS

spring to a cherry red, quench in cold water till cold. Then dip it in oil, raw linseed oil is considered best. The oil is then burned off over a clean fire till the spring is glossy black. Some would allow the spring to cool off, while others would quench it in cold oil. Some use a mixture of tallow and resin instead of oil. Without being tedious to the reader I here give a few formulas for welding. Some of them have been sold by agents at profitable figures.

Two ounces Copperas.
One ounce Saltpeter.
One ounce Prussiate of Potash.
One ounce Black Oxide of Manganese.
Six ounces common Salt.

Sal Ammoniac and Borax is good for iron.

Another compound is made for steel or iron as follows:



ANOTHER METHOD OF FORGING TURNBUCKLES

Potter's clay, wet with strong brine, dried and powdered and used like borax or sand.

I have found powdered glass mixed with good clean sand to be very good for any ordinary weld.

It is to be remembered that the quality of coal used as fuel has much to do with the success of a weld. I might also say a word or two about brazing or soldering. Different fluxes may be used on different metals. Sal Ammoniac is the one commonly used on copper or brass. Borax for iron. Resin on tinned iron and resin or tallow on lead. One part copper and one part zinc make a good soft spelter. Six parts copper and thirty-five parts zinc makes good hard spelter for brazing. Thirteen parts copper, five parts zinc and eighty-two parts silver make a good spelter for brazing or soldering band saws, etc.

There is also a soldering fluid made as follows: Take equal parts Muriatic Acid and water, dissolve as much zinc scraps as the acid will take. It may then be thinned by adding an equal quantity of water. This process will take up an hour or more.

I now bring this essay to a close, hoping that its contents may prove of some practical benefit to any that may be interested in such study.

How to Forge Turnbuckles.

W. W. WATT.
South Africa.

In forging turnbuckles, let us say for a 1-inch rod, the hole would need to be about $\frac{1}{8}$ of an inch. For tapping, we have a bent hand mandrel (see A in the engraving) such as is used for making swivels. First, I make two ferrules of about 1 inch by $\frac{3}{4}$ inch with thin scarfs to lap well over, but I do not weld as yet. I then take a piece of $\frac{3}{4}$-inch by $\frac{3}{8}$-inch stock, fully twice the length of the finished article, jump up and scarf both ends, circling or curving both insides to the shape of the ferrules, and bend as a link in the center to go on ferrule, making it narrow enough to fit on tightly. Then I put it in the fire and weld slightly with a light hammer, put in mandrel and widen the hole easily. Then take another heat, and as you take it from the fire slip in the mandrel, and with a few light and quick blows the end is finished. Then cut the other end and jump up ends as with the first, proceeding in the same manner, and it is ready for screwing. No boring out is needed.

I have made several for 1-inch rods from a $1\frac{1}{4}$-inch pipe. Put a 1-inch plug in the ends and finish ends the same as a hexagonal nut. Then I cut a hole in the center, right through the pipe, 2 inches by $\frac{1}{2}$ inch, by boring four holes and chipping and filling out. This is a very good turnbuckle and is very quickly made. If anyone has a different style, let us have his ideas for the good of the craft. I appreciated the article on turnbuckles in our March number. It is only by the exchange of our different methods that we can enlarge our scope of usefulness—therefore, send in your ideas.

Some Notes on Forging Swivels at a Reformatory.

THOMAS F. GOOGERTY.

In teaching boys forging at the Illinois State Reformatory I have recently made some notes that may be of value to those interested in this kind of work. A class of thirty boys were given as an exercise a swivel to forge. The engraving shows some of the swivels made. They were made from $\frac{1}{2}$-inch round, soft steel. The time consumed in finishing one was from three to four hours, and no swivel was accepted from a boy unless it was made neat and strong. This class of boys work in the forge shop two hours each day, and at the time these swivels were made the boys had been working in the shop from one to twenty-two months.

Twelve boys out of the class of thirty were able to forge a swivel that would pass inspection. The remainder failed, owing perhaps in some measure to the fact that they had not been working as long at forging, also on account of their inferior mechanical ability compared with the twelve who succeeded in doing the work.

Of the twelve boys who completed the work, three were sixteen years old, seven were seventeen, one eighteen and one nineteen. Eight were white boys and four colored. Some had worked in the shop longer than others, but the average number of hours previous to forging the swivel was 624.

Of the eighteen who failed to do the work, six were colored and twelve were white boys. Two were fifteen years old, seven sixteen, three seventeen, three eighteen and two nineteen. Average number of hours in shop was 397.

Nationality of boys; eight Germans, two Polish, ten colored, seven Yankees, one Russian and two English. You

will note that the colored boys seem to hold their own with the white ones.

Trade and Technical Education in Other Countries—8.

W. H. DOOLEY.

France.

France was the first nation to open the eyes of the world to the charm and fascination of clever products of industrial art. Her supremacy in the display of tasteful, artistic articles of all descriptions and uses at the World's Fairs of 1851, 1855 and 1862 was universally recognized and commented on.

The cause of all this was not far to find. For centuries, especially since the time of Colbert, France has cultivated the sense of the artistic and beautiful through a highly developed system of education in art. So complete are her art schools that other nations have copied her methods. Manufacture and agriculture are the industries, and one will find in every city, colonies of working men. The same industry is handed down from father to son, each one being equipped in turn by technical instruction, in addition to a collegiate course, so that a high order of intelligence directs the industry which becomes the pride of the family. To excel artistically as well as to succeed commercially is the object which every city and town gives money freely to the fostering of technical schools.

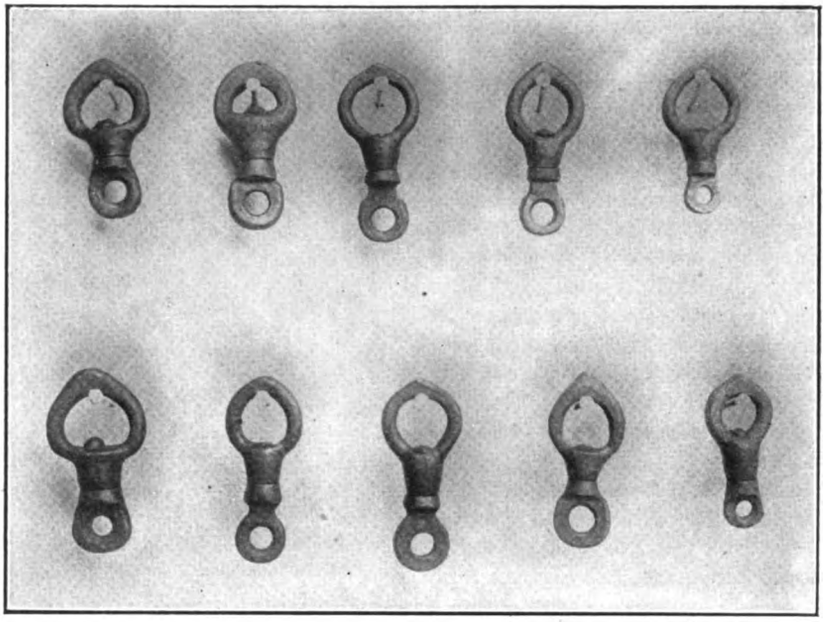
After the Paris Exposition of 1878, France became greatly interested in industrial education, especially trade and technical education as applied to handicraft trades. The handicraft trades in France were formerly exacting as regards the duties and obligation of their members.

Under this guild system, each trade was divided into three classes: masters, journeymen and apprentices. Each class was governed by definite regulations which were vigorously enforced.

A journeyman could not become a master unless he fulfilled certain requirements which called for great skill, long labor and heavy outlay of money. Apprenticeship was severe and lasted for a long term of years, but the instruction given by the master had to be thorough and to cover its trade in its entirety.

In the early beginning of the 19th century, guilds were abolished and every person was given the liberty to apply himself to whatever art or craft he desired, provided he had a license and conformed to certain regulations. This act seriously interfered with the apprenticeship. Great industrial changes took place, and instead of a man making an entire article he made only part of it. As a result, the old artisan disappeared in France.

Independent bodies took up the movement, and in this way manufacturers got in control of a great many schools. Independent societies formed schools, and, as a result there are continuation industrial schools maintained by trade unions, trade schools governed by religious orders, societies and manufacturers.



SOME SWIVELS MADE AT ILLINOIS REFORMATORY

At present one finds an elaborate system of trade, technical and art schools organized and controlled by the government. As a general rule the development of institutions through so many independent bodies has caused very little duplication.

Although, when there is duplication, it is of great interest to see and study the two systems of industrial and trade schools; those run by private interests and those operated by the government. The private schools present such features as indicate their origin, especially those run by manufacturers. They show that they are operated only in the interest of the management and without reference to the general education of the students.

The public schools, on the other hand, show their superiority in both management and thoroughness of instruction. The institutions maintained by the government are only to prepare students for particular, definite occupations. The main purpose in most of them is to provide facilities by giving a broad, industrial training, which combines a thorough course of scientific and technical study, with enough practical work to render students expecting to enter the handicrafts or factory work familiar with the manual operations of the various trades.

The schools are in most cases splendidly equipped with shops for the practice of the principal metal and woodworking trades. The task of founding special trade schools for the education of purely trade institution in respect to highly specialized branches of work has been left to local government.

In 1900, the State started a logical system of state schools for trade and technical instruction. They were established to meet educational needs in the different parts of the country. They were established without any particular relationship to one another. As a result, France has today a complete system of industrial education, operating under public auspices, furnishing technical education to all grades, from the teaching of simple operations to the teaching of engineers for the most advanced technical work.

They may be grouped under the following types: Schools for advanced industrial education, schools for decorative and industrial art, practical schools of commerce and industry, national trade schools, trade schools for different trades, trade schools for a single trade, general industrial schools, trade and technical, and continuation schools and industrial drawing schools.

The schools for advanced industrial

education correspond to our higher technical and polytechnical schools. They aim to prepare sons of manufacturers for the industries and advanced scientific work.

The school for decorative and industrial art prepares the pupil for industrial art work by teaching him art from the standpoint of the industries. In most art schools the tendency seems to be in the direction of pure art, preparing for the great art schools.

At the National School of Industrial Arts at Roubaix there is an industrial and art museum, a library of ten thousand volumes and a collection of models, machines and appliances for demonstration. Finally, there is a hall capable of seating six hundred and fifty people for public lectures on art, music, the history of tissues and other decorative industries, geography and music. This is a free school, and has night and day classes.

The night classes are designed more particularly for youths occupied during the day who seek to become skilled workmen, designers, overseers in mills and heads of factories. The intention is to give to them such thorough instruction that they may become competent to fill situations demanding intelligence and capacity.

The practical school of commerce and industry aims to prepare commercial employees and artisans who can be immediately utilized in the counting room and shop. The advantages of a commercial education are not to be underestimated. Industry and commerce have undergone a profound transformation. Everything is sacrificed to the end to be attained, which is to produce quickly and cheaply.

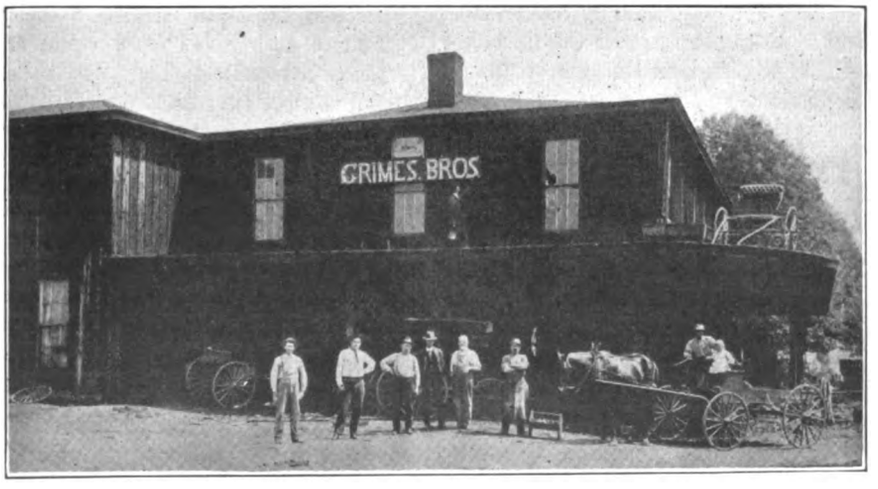
Never, however, in the history of the world has there been such a demand for men possessing sufficient theoretical knowledge and accustomed to the practice of the shop and office. It seems that the more men turned out of these schools, the more the public realizes the necessity of this phase of education.



A GENERAL SHOP OF KENTUCKY THAT IS WELL EQUIPPED

The commercial high school of Lille is worthy of mention. As the aim is to give practical instruction to different classes of pupils, it is divided into four sections:

The section of commerce and banking is the most popular course and contains the most students. It seems as if most pupils do not have a sufficiently clear idea of their future careers to specialize their studies. Particular attention is given in this section to the study of modern languages, English and German being obligatory.



GRIMES BROS. HAVE USED SUCCESSIVELY HORSE POWER, STEAM, AND THEN GASOLINE, AS POWER

The section of textiles—spinning and weaving—was organized at the request of many spinners and manufacturers of linen dress goods and other products of this region.

The section of coloring matter—dyeing, printing, finishing and bleaching—is well equipped and aims to prepare the student for the industries dealing in coloring matter.

The section of brewing—sugar-making and distilling work—also responds to the requirements of the industry and manufacturers in the north of France.

The National trade school aims to prepare the student for the wood and metal industries. Students enter at thirteen. Girls are also admitted to certain courses.

The trade schools for single trades aim to give the student a complete training: as complete as can be taught in any school, in some particular trade. In some schools shop work is the principal part, while in others the time is equally divided between theory and practice.

The industrial schools aim to teach industrial intelligence; that is, to give an all-around industrial education in which scientific theory occupies a prominent part.

The trade and technical continuation schools are institutions for the instruction of workmen and apprentices. It supplements shop training. It is the only means of reaching those actually engaged in the industries. The tuition is free.

The decided tendency of all these schools is to educate the pupils artistically as well as in skillful manipulation. Places in the school are eagerly sought by ambitious young people who desire to prepare themselves for higher positions in the trade, for they recognize that this education means greatly increased earning ability.

In the middle of the 18th century, special agricultural courses began to be given in France, and in the latter part of the century a few special schools were established. By this time, a general interest in agricultural instruction had

been aroused and agricultural societies had become numerous.

It was not, however, until the agricultural school law of 1848 was passed that a general system of agricultural instruction was provided for. It provided for farm schools of practical instruction. As a result of this, one finds an excellent system of agricultural instruction in the French school.

Such, in brief, is the system of industrial education. But the industrial art education is the phase which has done and is doing so much to render French taste and workmanship the standards for other nations, and to build up and sustain a vast export trade in merchandise, in which originality of design and intelligent handicraft of the educated artisan form the principal elements of value.

The average French workman has profited much by this form education. He lives comfortably and, in addition, puts a part of his earnings away each year. The French artisan deserves the highest praise for his industry, thrift and artistic turn of mind.

Nowhere are the highest products of French industry more cordially appreciated, more eagerly and liberally purchased than in the United States. The thirst for knowledge, for the refinement which is the outgrowth of centuries of old-world civilization, are recognized everywhere as characteristics of a large and growing population of American people.

A Well-Equipped General Shop of Kentucky.

GRIMES BROS.

Our shop, built in 1887, is 40 feet by 80 feet, consisting of two ten-foot stories with a thirteen-foot flat roof porch around one side and end, level with the second floor. We do almost all kinds of repair work from the simplest kind of farm implement work to that of the automobile (the smith of the present day who cannot boast of doing auto work does not seem to be much in the business). As to the equipment of the shop, we will say that we have had power of some kind for twenty-five years, first horse power, then steam, but now we have gasoline, which is by far the best for the character of work done in a shop like ours. We have a 12 H. P. International Engine; one planer; one 36-inch Defiance band saw; one jointer; one shaper; one mortising machine; one boring machine; a drill press, etc. We (or the senior members of the firm) took up the business of blacksmithing the first of January, 1876, and have spent 33½ years in this village, presiding over the anvil almost all this time.

We have no organization among the smiths here, but we feel the need of one sorely, as prices in some cases are ruinous, and especially with the smith who has to do all his work by hand. We will give you prices on a few articles, so our brother smiths may compare them with other sections of the country, as we consider this feature of the paper of great value.

Tire setting, either cold or hot, up to 2 inches	$ 2.00
Wagon axles up to 3½ inches	2.50
Bolsters, back and front, from	$1.50 to 2.50
Each section of felloe, up to 2 inches	.25
For spokes set new	.15
Stub axles on buggies or special wagons	$ 5.00 to 6.50
Reaches	.75 to 1.00
Buggy rims, each	5.00
Painting	6.50 to 10.00
New rubber tires	16.00 to 17.50



"Hello! Mr. Editor:" exclaimed Ben Edwards, dropping into the Editor's "Forge Room."

"Hello! Ben!" returned the other, "You're quite a stranger."

"Just got into town from the west," continued Edwards making himself comfortable in a chair beside the Editor's "forge." "I'm on my way to a new job with an eastern company—going to take charge of their smith shop. This company makes a specialty of bronze and bronze casting, and while I'm here I want to know something about bronze. I know that the metal is an alloy composed of copper, tin and zinc, but that is about all I do know of it."

"Have one of these" returned the Editor, handing Edwards the cigars, "and then I will try to tell you a little about bronze. In the first place there are several points to remember in the making of bronzes. The process must proceed quickly, the metals used must be vigorously stirred, so as to blend thoroughly, and the casting must be carried on immediately after making of the metal.

"The process in short, is carried on about as follows: The copper is first melted separately, and the tin, zinc and other metals, if any, after heating are then added. The entire mass is then thoroughly stirred and the casting then made.

"The reason for carrying out the process quickly is so that there will be no loss of zinc, tin or lead by oxidation. The need of thorough stirring is apparent on account of the different specific weights of the metals used. The lighter metals naturally coming to the top of the mixture and the heavier ones going to the bottom, unless kept thoroughly mixed. Then, also, after the castings are made they must be cooled quickly, as the several metals making the bronze have a tendency to form separate alloys of different composition.

"There are several different kinds of bronzes, and they are usually called by a name signifying their use, as: Art bronze, statuary bronze, gun bronze, machine bronze Then, too, there are: aluminum bronze, bismuth bronze, silicon bronze and phospher bronze, besides some other bronzes of more or less importance.

"Of course, after you have been on your new job for awhile, Ben, you will know all about bronzes and the different metals used in making them."

"Yes, I suppose after a month or two I'll know something more about bronzes and how they are made," returned Edwards. "Now what is this phosphor bronze we hear so much about as a bearing metal? Is it simply a bronze containing phosphorus?"

"Yes, it is a bronze containing phosphorus, but it is not simple by any means," returned the Editor. "You see, phosphorus is very dangerous to handle and there is great risk from fire with it. In making phosphor bronze, a bronze containing an extra high percentage of phosphorus is first made. The operation of introducing the phosphorus into the bronze is a very exacting and dangerous one, therefore it is found more convenient to make a bronze containing, say, 6 per cent phosphorus, and then to use this metal to make the bearing metal which contains on the average about .3 per cent phosphorus."

"The composition of the bearing metal is about as follows: 79.7 per cent copper; 10 per cent tin; 10 per cent lead; 0.3 per cent phosphorus. And to make it you take 140 pounds of copper, place it in the melting pot, cover with charcoal and melt it. When melted, the lead and tin are added; 17½ pounds of each metal. This is allowed to warm up, but not any hotter than is necessary. Now, ten pounds of the high percentage metal is added and the entire mass well stirred. The metal is then poured.

"Phosphor bronze is an excellent metal for use in cases where strength and resistance are required. Its strength being nearly double that of ordinary bronze."

"Well, I've got a much better idea and a greater respect for bronze, now," returned Edwards, rising and reaching for his hat. "But I must be getting along. If you are ever down my way I'll feel insulted if you don't stop in. I want to thank you for a very interesting talk and to say good-bye." And, with a hearty hand shake, Edwards went out.

The Last Job.

W. O. B.

Jim Fair the smith up at Sneetz'es Crick is a purty good sample o' yer ol' time village smithy an' preacher. This is one o' his fay-vo-rite sermons.

When yer forge an' its fire air lifeless;
An' yer bellus hes crumbled ter dust,
When yer bench, an' yer drill, an' yer anvil
Air rotted an' kevered with dust;
When yer sledge an' yer hammer air broken
An' thur faces air battered an' worn;
When yer a-pern is hung on the anvil—
An a-pern all rag'ed an' torn;

Jim stopped in his hammerin' an' preachin' t' take a second heat. Then he continued—

When ye've forged yer las' knife fer the butcher;
When ye've shaped up yer las' piece o' steel;
When ye've done yer las' job o' tool hardnin';
An' hev fix'd up the las' ol' cart wheel;
When ye've hard'ned an'welded an'tempered
Fer the las' time on this here earth;
When ye've pointed the las' shovel an' lister,—
Hev got about half what thur worth;

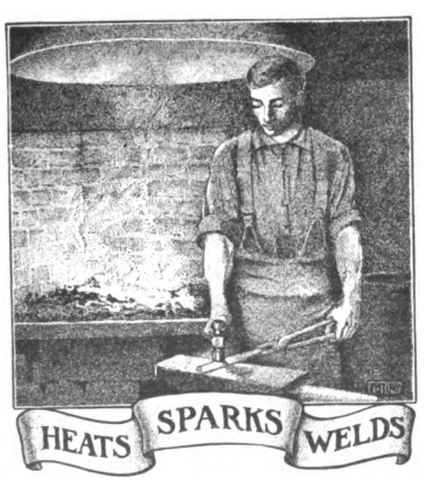
Here Ol' Man Grasty shifted kinda oneasy on his nail keg—guess he must owe Jim sum money.

When ye've turn'd yer las' shoe on the anvil,
Hev fitted it to sum poor beast;
When ye've driv in the las' nail t' hold it,
An, yer pare'in's an' rasp'in's hev ceased;
When ye've fix'd the las' wagon'an' carriage;
Hev put in the las' axle an' rim;
When ye've done yer las' job o' repairin'
With the lite in yer eyes gettin' dim;

An' here Jim kinda fix'd his eyes on Joe Demers. They say Joe's eyes air gettin' so bad he hes t' ware glasses when he eats.

When yer las' job is done, an' ye've finished
Yer work an' yer not comin' back;
When the work y' picked out is completed
An's been sent t' the Inspector's rack;
Will He find any flaws er defacement?
Will He see any crack er defect?
Will He find any faulty konstruction,
When yer life work He comes ter inspect?

Here a loud bang on the anvil told us thet the sermon wus ended—an' y' could hear Charlie Foster's Waterbury tick from way across the shop.



One thing about the high cost of living—no one can charge it up to the blacksmith.

We know a smith who is so lazy he won't even make an effort at collecting the money that is due him.

> **Uncle Billy Martin says;** "Most men find it a good site easier ter be pie-us than ter be honest."

Profit is your excuse for doing business. If you don't make a profit you have no excuse—and had better quit.

That old proverb about having "too many irons in the fire" seems to have the blacksmith in mind every minute.

Surely there is one point in which you excel your competitors—look for it and then shout about it, and keep a-shoutin'!

Remember how a good word from the boss cheered you when you were an apprentice? Try it on the shop kid occasionally.

Don't forget that ornamental iron number—we want to make it the best of its kind. The editors are counting on your assistance.

The key that opens the shop in early morning is more likely to be the key to success than is the key that unlocks the night latch.

Are you allowing the sky to shelter valuable stock? How about that miscellaneous collection of vehicle and implement parts outside the shop?

Some smiths kick about the unreasonableness of some customers, and yet these same smiths will whack a horse with the rasp simply because they themselves are out of sorts.

Are you reading Thornton's new series? Let us know what you think of his talks on letter writing. Perhaps you have some questions on some special features of collecting or soliciting by mail?

"Got t' go t' lodge t'nite, an' I'm late now. Come in t'morrow an' pay thet thur bill"—and Tom pulled the shop door shut with a bang and hurried down the street, leaving the man with a bill to pay standing before the shop.

Of course you don't agree with everything you read in "Our Journal." 'Tis not expected that you would. But when you don't agree, tell us your side—'tis only by a free and full discussion of smithing questions that we smiths can grow and expand.

Of course you're going to take a much needed rest—if only for a few days it will enable you to do your work better and more willingly. And when you go on your vacation don't forget the Missis and the kiddies. They need a change occasionally and you'll enjoy it better with them.

Success depends upon the man. The same heat that hardens clay will soften wax. It's the makeup of the material that determines the result. It's a man's makeup that determines whether or not he will succeed. It's the stuff that's in him—not his job, his surroundings, his business.

Snow and ice is due again in four months—will they find your county still unorganized. Will sharpening time find you getting the same old prices?—working at a loss, or at best, coming out even? Better get busy with those easy plans—the Secretary is glad to send them free. Will you send for them today?

Don't order a hard grinding wheel simply to economize. A hard wheel is more apt to heat the work or to become glazed than a soft one. It also requires more power to do the same amount of work. Big production is economy—get the wheel that will do the biggest amount of work in the shortest time—other things considered equal.

Isn't it reasonable to believe that a boy will take up smithing as a profession if he can be shown that it will pay as a business? The boy wants to be shown and it's up to the smith to show him. And to make any business pay, one must buy close, sell at a fair profit and work with system. An organization will enable you and your brother smiths to get better prices, to buy closer and to study economical business methods. The association may be made to solve the apprentice problem.

You don't read every single item in the daily or weekly newspapers, do you? Of course you don't—every single item does not interest you. Also, every single item in "Our Journal" may not interest, but in a year the total number of hints, items and articles relating directly to your line of work will more than pay you for the time and money you invest. Any man who cannot get more than the cost of a year's subscription out of THE AMERICAN BLACKSMITH in a year is not interested in blacksmithing.

Hardly a week that we do not hear of some smith falling victim to some sharper's oily tongue. And the fake subscription agent is by no means the least active. The latest that has come to our notice is the chap who takes orders for a supposed new paper on woodworking. He has approached one or two of "Our Folks," telling them that the new magazine will be published by us. Look out for him, folks. And to be on the safe side **DON'T** give money to anyone you don't know. Be on the safe side and mail it.

It is impossible, perhaps, to run a smithing business on a strictly cash basis, but bring the credit end of the business down as low as possible. Be slow in giving credit to the slow-pay customer. Keep after those owing you. When you extend credit for a certain definite time see that that time is not exceeded. The money your customers owe you won't buy shoes for the baby nor new stock for your business. You owe it to your family, your business and to yourself to keep constantly at the heels of your debtors. Keep collections low.

Hear ye! Hear ye! Friend Tardy is going to get a down draft forge— but wait till we tell it all. Tom had occasion to use his steel square the other day. Well, after an hour's search he discovered it hanging on the forge chimney near the roof. So he pulled up that old rickety chair of his. He had just grabbed hold of the square when the entire chimney came down, with Tom, to the floor. Friend Tardy was laid up for a day with a bruised knee—but the chimney is still lying just where it fell and Tom is using the old forge without a chimney. He put a piece of tin over the hole in the roof, so the rain wouldn't put out his fire. If you enter the shop now while Tom is working you almost smother. Tom says he is going to install a down draft forge—soon as he can spare the money.

Association Notes.

In regard to the Blacksmith Association of the State of Kansas, I think it would be advisable that laws be enacted through the State Legislature to the effect that all those who have not served their apprenticeship must learn their trade and receive a diploma. This absence of apprenticeship and preparation is a great detriment to the mechanics of the State of Kansas. Therefore, I believe it would he right to pass such laws, which would prove to be very beneficial to the blacksmiths of the United States. It is my opinion that all blacksmiths and wagonmakers should insist upon getting their rights.

W. D. HAGER, Kansas.

American Association of Blacksmiths and Horseshoers.

Before beginning my regular monthly talk on organization I want to quote from a letter I just received the other day.

"I have complied with your instructions and have been surprisingly successful. All who were present at the meeting were very much interested in this movement, and we have arranged for another meeting at a near date. To complete the organization before our next meeting I will see all of the smiths who were not present, and there is no doubt in my mind but that every smith in this county will join our Association." JOHN F. BECKER, Chairman.

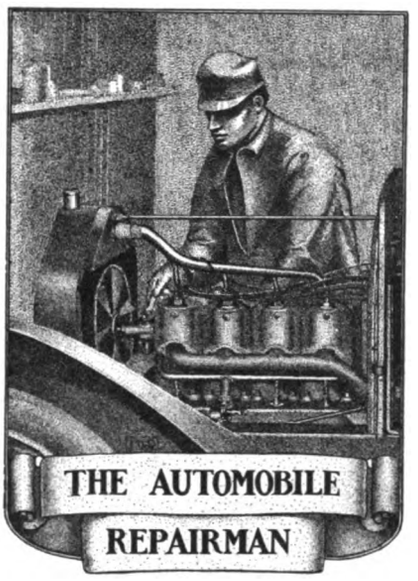
There is no reason in this world why you cannot make as good a start in your county. If you will talk to your brother smiths you will find them anxious and willing to join hands with you in the formation of a County Association.

Just mention the subject to your neighbor. You will find him willing to help, and by talking to other smiths in the county as opportunity presents you will find your Association taking shape and almost organizing itself.

You know that you deserve better prices, better protection and more harmony in craft circles. With all the smiths in your county working together you cannot only demand better prices, but you can protect yourself against the dead-beat and the slow-pay customers. You can demand better quotations from the jobbers and manufacturers. You can overcome the price cutting evil. You can solve the apprenticeship problem, and there is no end to the number of questions that you can meet successfully by means of an organization. You owe it not only to yourself and to the craft in general but to your family also to get the proper price for your work and the proper protection so you can collect what is due you.

There is no better time than right now to start the movement in your county. Roads are good, and you will find that your brother smiths now have time to attend the meeting. The best time to start is today, and the best way to get started is to ask for my easy plans for the formation of branch associations. You will be surprised how little effort is necessary. May I hear from you today? Address me P. O. Box No. 974, Buffalo, N. Y.

THE SECRETARY.



The Piston and Its Rings.—2

H. W. SLAUSON, M. E.

Whether a ring is suitable or not for use again in the piston can be determined by an examination of its outer surface. Even though it may not have been broken or stuck in its groove a ring may be worn to such an extent that it will fail to hold compression sufficiently, and if this is the case it should be discarded. If the outer surface is worn bright and smooth it indicates that all points have been in contact with the cylinder wall, and it is evident that the ring has been performing its duty well. If portions of the outer surface are blackened, however, it is a sign that the burned gases from the explosion have been "blowing through," and that the ring does not hold its compression at these points. It is almost too much to expect that the top ring should be perfectly smooth and bright with no blackened portions, for this ring alone cannot possibly hold the entire force of each explosion. The other rings supplement the work of the top one, and it is only when all are blackened in portions of their outer surface that an undue loss of compression and explosive force will be exhibited. If the blackened portions of the various rings lie one above the other it is evident that the charge has blown by in a straight line and that none of the rings have served to stop it sufficiently. In this event the rings which seem to be in the worst condition should be replaced with new ones.

The fitting of a new ring in a groove is an important and delicate job and requires considerable patience and skill to obtain the best results. The majority of piston rings are made of the best quality of cast iron, although many manufacturers use a special process steel in their construction. In view of the variety of sizes and materials it is better to use rings which have been obtained from the manufacturer of that particular motor. It is impossible to keep such a variety in stock, however, and if the owner of the car has none in his possession and he is in too much of a hurry to wait until the order can be filled from the factory rings which will serve the purpose can be turned out on almost any engine lathe.

The inner edge of many rings is cut eccentric with the outer edge, and the thinnest portion is at the ends. This makes the ends more springy than the back and also helps to hold the ring in its proper position in the groove. After the ring has been cut to the approximate size to fit its groove it may be ground and polished by laying it flat on a piece of fine emery cloth and giving it a rotary motion. This will serve to grind it to size to fit its groove and will also polish out the tool marks left from the lathe. Before the grinding is completed the ring should be tested for size by placing it in the groove backwards, so that it can be rolled around and each portion of its upper and lower sides can come in contact with the corresponding parts of the groove. This will test the size of each portion in the approximate position it is to occupy, and is much easier than forcing the ring into place and removing it several times. Portions of the surface of the ring which seem to bind in the groove should be ground more than the rest on the emery cloth until the ring seems to be an even fit all around.

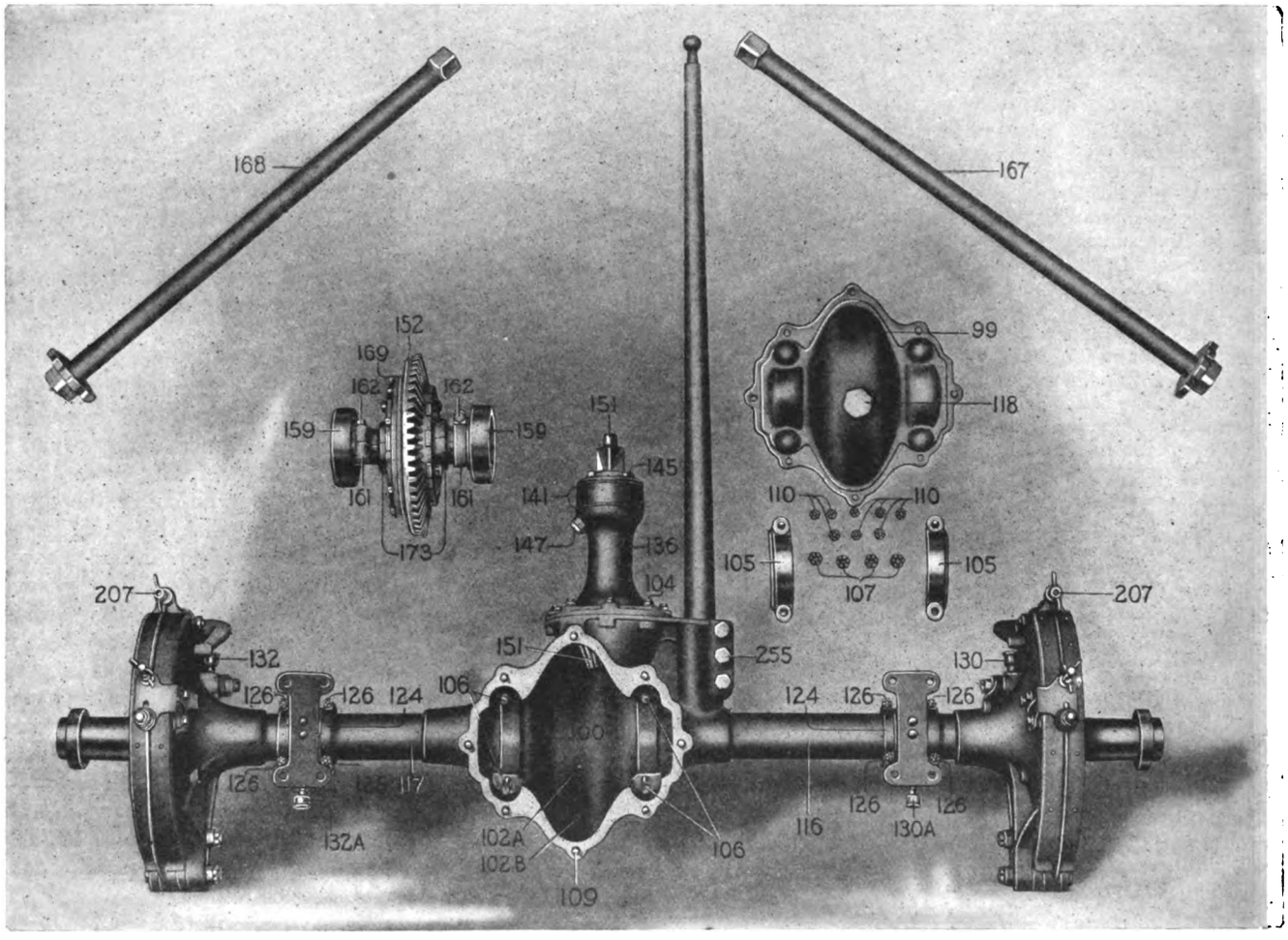
Care should be taken in replacing the rings to see that the ends of each come on either side of the pin which should be found in every groove. These pins serve to keep the rings from moving around the piston and hold them in the same relative position with each other. Notches will be found in the ends of each ring which should fit around the pin when the ring is

compressed. Were it not for these pins, the rings would probably move around the piston so that, at some time or other, the joints between the ends of each would all lie in the same line along the surface of the piston. This would form a straight line outlet for the compression and explosive force of the charge, and the efficiency of the motor would be greatly reduced. To prevent this the pins in successive grooves are placed on opposite sides of the piston so that the joints of the rings are "staggered," as it were, and one will not lie directly above another. Inasmuch as the groove is deeper than the greatest thickness of the ring the latter may sometimes be placed in the former with its ends opposite the pin instead of surrounding it. Care should be taken to avoid this, and it should be made certain that all the rings lie with the pins between the ends when the piston is placed in the cylinder.

Many rings are ground after having been fitted to their grooves in the piston, and while this is not absolutely necessary it gives better results and helps to overcome the "stiffness" which will always be found to a greater or less extent in every motor equipped with new piston rings. This grinding is generally done by hand after the piston has been placed in the cylinder. The grinding material may be the same as that used for valves—a mixture of finely-powdered emery and oil,—and it should be applied in generous quantities to the rings, piston and cylinder walls. If the cylinder has been removed from the crank case it should be clamped securely to a bench. The piston, with the grinding material in place, should be moved up and down in the cylinder with a twisting or rotary motion, so that all portions of the rings come in contact with every point on the cylinder wall throughout the stroke. A convenient handle for imparting this motion may be made by passing a heavy, round piece of wood through the crank shaft bearing of the connecting rod, the lower cap of which should be screwed in place. The connecting rod will still be attached to the piston by means of the wrist-pin bearing, and thus both the thrust and the twist can be given to the piston. This operation should be continued until the piston moves in the cylinder with comparative ease. The grinding material should be renewed frequently.

The above operation is sometimes known as "lapping in" the piston rings. If extra power is available in the shop the rings may be lapped in by assembling the motor and running it by means of a belt attached to its flywheel. The motor should be run under these conditions for several hours until all the new rings are worn to a perfect fit. In many motors the rings are not lapped in, the makers relying on the first few days' running to wear the parts to a perfect fit. This does not give as good results, however, as either of the above methods.

It will be more difficult to return the piston to the cylinder than it was to remove it, for each ring must be compressed closely before it will fit around the inside walls. By an arrangement consisting of a length of well-annealed stove pipe wire about eight



REAR AXLE SHOWING DIFFERENTIAL REMOVED

or ten inches longer than the circumference of the piston the rings may be held in place easily until they are slipped down into the cylinder. On each end of this length of wire should be attached round wooden handles and, when this arrangement is looped around a ring so that the ends cross, the ring may be compressed by pulling the handles in opposite directions. As this is done to each succeeding ring the piston may be slipped easily into the cylinder. In some motors having a portion of the crank case cast with the cylinders this ring-compressing arrangement cannot be used. In this case the rings may be held compressed by means of stout, tarred cord tied around each. As the cylinder is slipped down over the piston the cords will be pushed down onto the connecting rod from which they can be removed easily.

Adjusting, Repairing and Caring for an Automobile—6.

With Special Reference to the Stevens-Duryea.

Rear-Axle Adjustment.

ADJUSTMENT.—The meshing of large bevel gear No. 152 with bevel pinion gear No. 151.

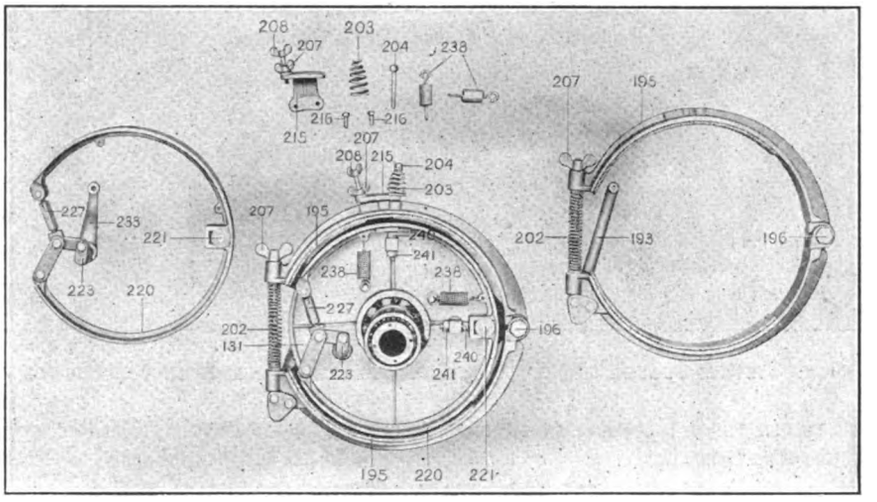
Remove cap No. 99 by unscrewing castle nuts No. 110 from studs No. 109. Release cap screws No. 162 (of which there are two) that will allow pinch collars No. 161 (two in number) to be turned on differential case cover No. 173. As pinch collars No. 161 are both right-hand threads, it will be necessary to back off one before advancing the opposite one. Be sure before tightening pinch collars No. 161 that all side play has been taken up and complete differential rotates free in ball cups No. 159.

TO REMOVE NO. 152.—Remove cover No. 99, withdraw axle numbers No. 167 and 168. Four castle nuts, No. 107, should be unscrewed from studs No. 106, allowing caps No. 105 to be removed.

The entire differential with bearings can then be withdrawn.

ADJUST NO. 151.—Remove lock wires No. 141 and keys, also plug No. 147. Unscrew aluminum dust cap No. 145, and insert in hole at No. 147 a short piece of ¼-inch round steel and advance or back off, adjusting nut No. 140 (which is inside of housing No. 136). After properly meshing No. 151 with No. 152 tighten both No. 140 and No. 145 and drill new holes into adjusting nut No. 140 and dust cap No. 145. Insert keys and return lock wires No. 141.

TO REMOVE NO. 151.—Disconnect universal joint which is attached to square on No. 151.



THE BRAKES—ONE COMPLETELY ASSEMBLED

Remove housing No. 136 by unscrewing nuts No. 104. Take off lock wires No. 141, also keys. Take out aluminum cap No. 145 (right-hand thread) that will allow the removal of the lock wire No. 143 and key. Left-hand hexagon nut No. 142 can then be taken off, allowing tail shaft bevel gear No. 151 to be withdrawn from the large end of housing No. 136.

Tail shaft bevel gear No. 151 cannot be removed from small end of housing No. 136.

ALIGNMENT OF REAR WHEELS WITH FRONT WHEELS OR CHASSIS FRAME.—Release castle nuts No. 126 and slide axle spring seat bearings No. 124 on axle tubes No. 116 and No. 117.

After adjusting, clamp spring seat bearings No. 124 tight to axle tubes.

Bolts No. 255 should be kept tight.

LUBRICATION.—Rear axle center containing differential. Remove taper plug No. 102B and hexagon plug No. 118. Pour in heavy oil until it overflows at No. 102B.

To drain, remove taper plug No. 102A.

Give attention about every 750 miles.

Grease cups No. 130 and No. 130A, No. 132 and No. 132B, should be given a turn or two every 200 miles and refilled every 500 miles.

Rear wheels should be removed and annular bearings packed with grease every 1,000 miles.

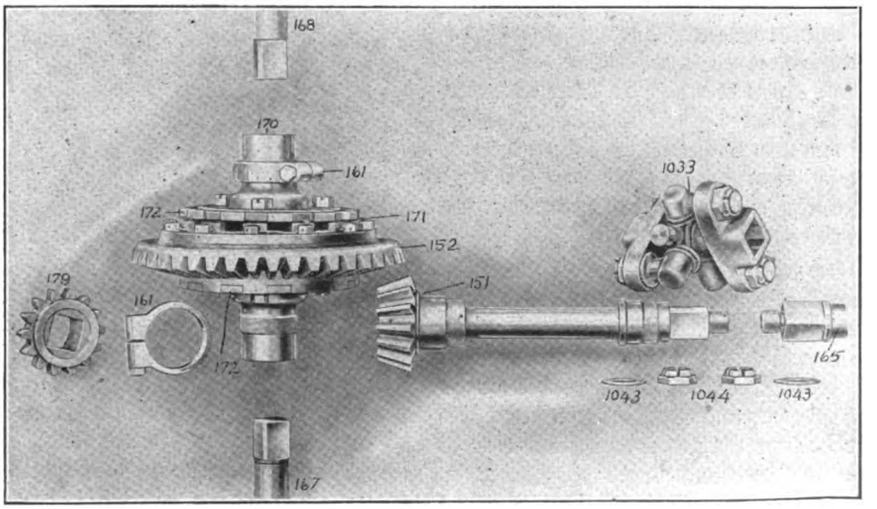
Foot Brakes.

OPERATION.—A pressure on foot lever No. 1471 (at right of steering post) contracts the upper and lower halves of brake shoe No. 195.

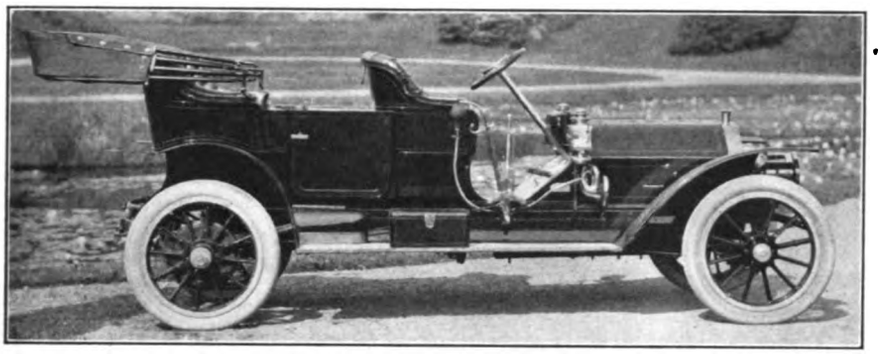
A simple equalizing device allows an even application of pressure to both right and left wheels.

Use foot brake under all normal running conditions.

ADJUSTMENT.—Jack up rear wheels, adjust clearance of brake shoes from drum by wing nut studs No. 208 and lock with nuts No. 207. Spring No. 203



THE PINION SHAFT AND DIFFERENTIAL OF THE REAR AXLE



THE STEVENS-DURYEA MODEL X FOUR CYLINDER, 24-HORSEPOWER TOURING CAR

will return shoes to proper position as brakes are released.

It is quite essential that you have equal clearance from drum at all points.

To tighten foot brakes turn wing nuts No. 207.

Emergency Brakes.

OPERATION.—A forward movement of hand lever No. 1363 expands brake shoes No. 219 and No. 220.

As these are emergency brakes, all pressure is positively applied through a series of draw rods without slip joints.

ADJUSTMENT.—Jack up rear wheels, release hand lever, and remove wheels. (As adjustment to both brakes will be found much more satisfactory). See that adjusting studs No. 240 are in contact with shoe No. 220 and that shoe follows outside edge of flange No. 131.

Shoe No. 220 can be adjusted to correspond with flange by adjusting studs No. 240 and locked with nuts No. 241.

Hand Brake Cam Shaft Lever.

No. 233.—It should be adjusted (when hand lever No. 1363 is released) to stand about one half of an inch away from outside of axle tube. Turnbuckles No. 227 expand or contract shoe for final adjustment.

Rear Axle Pinion Shaft and Differential.

PINION SHAFT.—The power from engine is received at the rear axle by pinion shaft No. 151 which in turn transmits to large bevel gear No. 152. The bevel pinion gear and shaft are forged integral doing away entirely with tapers, keys and nuts at the point of greatest strain in the entire drive line.

DIFFERENTIAL CASE.—Differential case No. 170, on which large bevel gear No. 152 is bolted, has dove-tail edges into which the covers accurately fit. This construction relieves the strain on all gears and studs in differential case and allows the power to be delivered to rear axle without loss.

This is the last of the Stevens-Duryea series. A new series of articles on another standard car will begin in an early number.

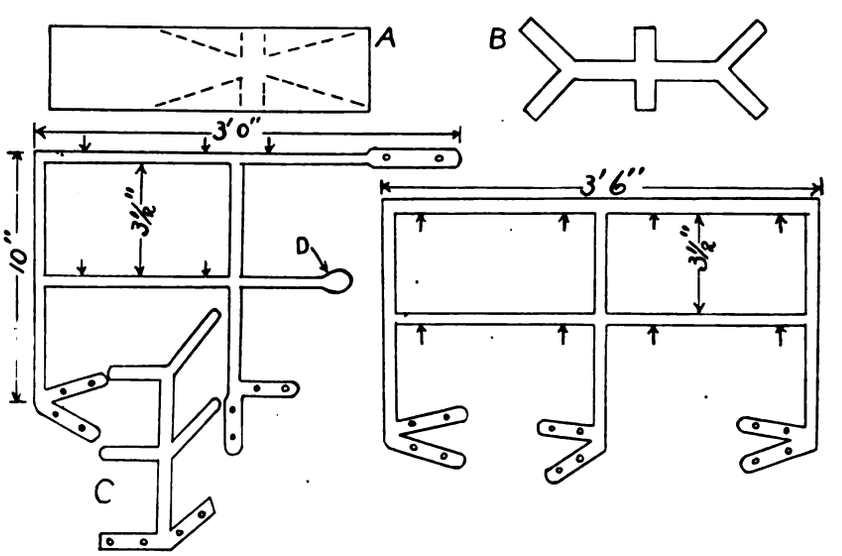
An Automobile Package Rack.

M. E. KOCH.

I wish to describe quite a difficult forging I had to make. It was for a rack on the back of an automobile. All the T's and crosses were forged from the solid piece, and welds then made at the arrow marks, there being eighteen welds in the entire finished rail, making one entire piece when completed.

I will endeavor to explain how I forged the corner posts. I took a piece of 2-inch by ½-inch tire steel and cut it as at A on the dotted lines; next, I cut or split as at B, and rounded the ends except those at the bottom end, which I flattened for screw-holes to fasten the rail to the bottom of the auto. Next, I bent the stubs at right angles to each other, as at C. The round rails are $\frac{7}{16}$-inch round, soft steel, and the feet for the posts being forged to about 1 inch by $\frac{3}{16}$-inch, and about 4 inches long, with screw-holes to fasten to body. At D in the side view is a little ball to make it more artistic. The T's and crosses could be welded, but they would not be so strong as the forged ones, especially if a little dirt should get in between the weld and leave a little place that did not weld.

In forging the corner posts and also the other three one must be very careful to avoid getting any cold shuts in the steel which will weaken it where the strength is most needed. If any of the other brothers know any better way of making this rack, let us hear from them, as this is my first experience at a forging of this kind. If there is anything not clear to anyone about this forging I will be pleased to explain more fully concerning any detail asked for.



HOW TO MAKE A PARCEL CARRIER

Soliciting Business and Collecting Accounts by Mail.

A Series of Straight-to-the-Point Articles Illustrated with Letters that have "Turned the Trick."

BY THORNTON.

Compare the letters you receive—they are practical instruction papers on how to write and how not to write your business letters. They will tell you what to say and what not to say. Of course, I don't mean to say that you should copy the business letters you receive. Make your letters personal, use originality, don't say something simply because someone else has said it.

In comparing the letters you receive you will notice that the man who makes the biggest and best impression on you is the fellow who is enthusiastic about his proposition. When you write your letters be enthusiastic. Know what you are talking about—know it so thoroughly that not one single item or part of the subject is unfamiliar to you. If

you are writing about buggies, know every bolt, brace and stay from top to tire. Convince yourself first that the vehicle is the best that it is possible to build. Then you can convince others. But not before. Is it reasonable to believe that a man who does not thoroughly believe in his business or his goods can convince others of their superiority? Is it possible to believe that a preacher who did not believe could get others to do so? But, you say, the preacher talks to you direct—he doesn't write letters trying to convince you that you should do thus and so. He preaches, talks, speaks direct. Yes, and the sooner you realize that letters are simply spoken words placed on paper the sooner you will write business-bringing letters. The sooner you write your letters in the easy going style of speech, the sooner you will notice that your letters are building trade.

Now, suppose we take up each part of a business letter in detail. The first and most important part of a business letter is the opening, the part that gets the reader's attention. If you don't get the reader's attention, if you don't interest him at the beginning you may as well not write at all. For no matter what you say after your poor beginning, no matter how well you state it, your man is not likely to read about it. Therefore, get your prospective customer interested at the start. Make him read your letter by getting him interested right at the start. And this applies not alone to letters asking for business, but to those asking for money as well.

Now, let us compare the opening sentences of several letters that are before me. The first one begins as follows:

DEAR SIR:—I am writing to tell you that we have just received a big shipment of "Rough Rider" shoes from one of the big factories. These are in all the regular sizes and were made especially for our house. But we had to order a big quantity to get them under our own brand and must move them quickly.

That isn't as bad as it might be, but how much better to start the letter this way:

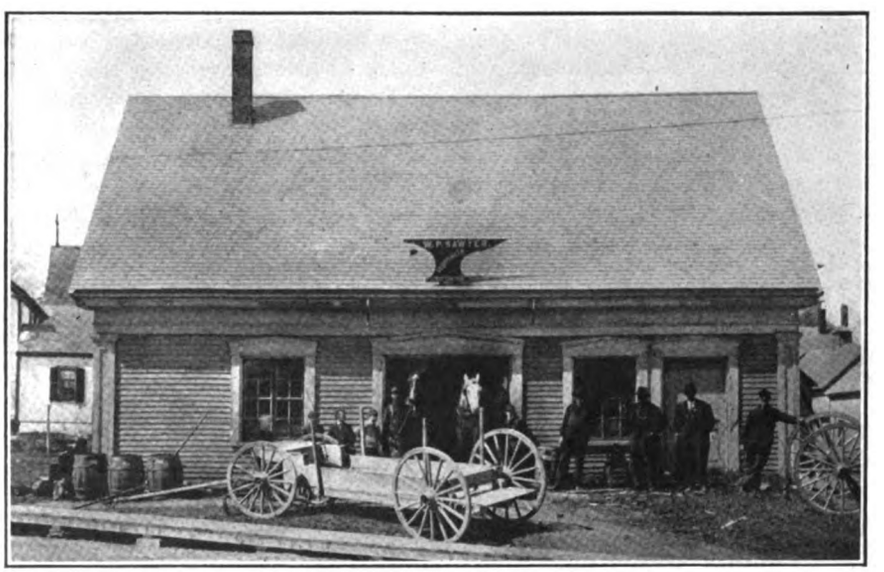
DEAR SIR—If I could take you through the factory that makes our "Rough Rider" shoes—show you just what kind of stuff goes into them—you would not hesitate one minute to order a good big lot at the price I am offering them.

Don't you think that is better? The opening sentences can then be followed up with the reasons for the low price.

The next letter has been sent me by a blacksmith for criticism. I'll just quote the opening paragraph:

DEAR SIR—If I can save you money, why don't you save it? The prices below are just a sample of the savings you can make by bringing your work to my shop. Just give me a trial—bring in a sample job and get a sample of my work and prices.

Now let us change this around a little. I won't criticise the original, but want simply to show a revised opening paragraph in contrast.



MR. W. P. SAWYER, OF MAINE, RUNS A GENERAL SHOEING AND SHIP-SMITHING SHOP

DEAR SIR—Don't think that because the price is low that my work is done carelessly, or that I use poor material. Bring in a job—anything will do—if I don't repair it to your satisfaction I'll stand the cost.

Now, take a sample letter asking for money. How often have you read or even you, yourself, have written:

DEAR SIR—I sent you a bill some time ago, have you forgotten all about it? I would much appreciate it if you would pay it at an early date—it is now long past due.

Now, suppose we write that man in this fashion instead:

DEAR SIR—You have been so busy that you have overlooked that little bill of mine, I know how easy it is to forget these little things when a man is busy.

Now, I want to ask a favor—On the fifteenth I am compelled to meet a big bill for the new stock I put in this spring. I must get in some money quick. Won't you kindly make it a point to pay your little bill by that date. I must count on some of my friends to pay their bills and I hope I can count on you at this time.



More About Cold-Tire Setting in Africa.

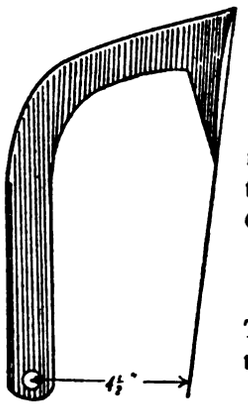
F. UNDERDOWN.

South Africa.

I noticed that letter from a brother smith of this country, in which he says, in regard to the cold tire setter, that a certain tradesman had to replace a pair of wheels at two thirds their original cost after using the cold tire setter on the original ones, and another had to put in three felloes after using this supposed terrible machine. I do not disbelieve him for a moment, as one half the supposed smiths in this country never actually learn their trade. They visit a blacksmith's shop for a couple of hours, watching the smith work. Then they come out of that shop as blacksmiths, buy a pair of pear-shaped bellows, an old anvil, a piece of a vise, a hammer, and with these they start doing work and making work and ruining every wheel they handle. I, myself, in watching this species, have seen them cut a tire off a wheel if it is a bit loose in the nave or felloes. They cut three quarters or one inch out of the felloes and replace the tire, or try to, two inches or more smaller than the wheel, and drive the tire on with sledge hammers without a platform or anything of the

kind. Before a wheel has stood this treatment three times the spokes begin to break off at the back on the naves or hubs. The owner wonders why the wheels fall to pieces so soon, and lays the blame on the original maker, giving him a bad name. Now, in behalf of this "terrible machine," the cold tire setter, I would like to say that before a man can use this machine he must have some idea of how to use the tools he handles. He may be a first-class workman in the old-fashioned way of doing things, but if he fails to use judgment in working with this machine it will pay him better to keep it as an ornament, and continue working in the old-fashioned way. I saw a wagon here which was built in Natal in this country, and the tires were put on with the cold tire setter. The wheels had stood twelve months, and were in good condition with the tires still tight. Therefore, if a set of tires will stand twelve months on a new set of wheels in British Bechuanaland without being reset, great credit is due the "terrible machine," the cold tire setter, when same is used by experienced hands. What is very necessary in this country is an organization, a Blacksmith's Association, which will prohibit any man from following the trade unless he can produce a qualified certificate.

I would like to tell a little about our country—British Bechuanaland. This is a very dry country, and a great portion of it is surveyed. The Government surveyed a block of forty-nine farms last year. On sending a boring machine up here they found water on sixteen of the farms, and did not bore on the others. The Government sold these farms, and the people who bought the unbored farms have been trying to find water by hand, with no success. They have applied to the Government for a drill, but it has no machine available. What is badly needed here is a gasoline traction drill which would not require water to drive it, and which would be capable of boring a six-inch hole to a depth of one thousand feet.



A Cant Hook

It is not every blacksmith who can make a Cant Hook or Swamp Hook that will catch and hold. Try one of Correll's and you'll be

Satisfied

The price is $1.25 and the material they're made from is guaranteed.

Correll & Son, Chauncey, Ill.

A SAMPLE ADVERTISEMENT, SUBMITTED BY CORRELL & SON

A Most Difficult Problem

To cure a horse of "Corns" in the feet and to 'xpand contracted hoofs has been

Solved by Correll

If you don't believe it, ask Thomas Whiteside, James Bache, Parm Hockman or Will Shipman or any other customer for whom we've done such work.

Correll & Son, Chauncey, Ill.

A GOOD EXAMPLE OF SMITH SHOP ADVERTISING

Gun and Novelty Repairing—15.

W. G. MUMMA.

Receipts, Formulas and Notes.

Here are given a number of receipts, notes, etc., that are directly appliable to the needs of the mechanic. These have been compiled from various sources, written and rearranged so that the mechanic will have no difficulty in using or applying them.

Keep such metals as lead and tin out of the forge fire. They are apt to interfere with the welding or working of iron or steel.

See that the fire does not get hollow under the piece that you are working.

Have your tools handy and in convenient reach when working at the fire or forge.

After the steel becomes heated to a red do not leave in the fire, as soaking it in the fire makes it brittle.

To hand-forge fine steel, heat no higher than a bright red heat.

All of the different parts of guns and other work of a similar nature can be forged up by using swages, formers and dies on the anvil; almost any shape can be thus made.

After a forging has been finished and to relieve it of all undue strains, heat it to a red heat and then let it cool gradually and slowly.

To clean rust from steel, mix to a paste: 10 parts of tin putty; 85 parts of prepared buckshorn; 25 parts of spirit of wine. Cleanse the steel with this preparation and finally rub off with fine blotting paper.

In forging old files, the teeth must be ground out with an emery wheel, for they will always show if you attempt to hammer them out.

If steel be left in the fire a long time it will lose its steely nature and partake of the nature of cast iron. When steel has been subjected to heat not absolutely uniform over the whole mass, careful annealing should be resorted to. Overheating and restoring should be only permissible for purposes of experiment—the process is one of disintegration and is always injurious. A good, soft heat is safe to use if steel be immediately and thoroughly worked. Be careful not to overdo the annealing process. If carried too far, it does great harm and is one of the most frequent modes of destruction which the steel-maker meets in his daily troubles.

Steel is entirely mercurial under the action of heat, and a careful study of the tables will show that there must of necessity be an injurious internal strain created whenever two or more parts of the same piece are subjected to different temperatures. It is hard to induce the average worker in steel to believe that very little annealing is necessary, and that a very little is really more efficacious than a great deal.

Gear teeth generally have a corner broken off first, after which they go rapidly to pieces. This may be avoided and the teeth made much stronger by thinning down the edges with a file, thereby bringing the whole strain along the center of the teeth. Gear teeth fixed this way will not break unless the strain be sufficient to break off the whole tooth.

To make varnish adhere to metal, add a small per cent of boracic acid to it.

To drill glass, stick a piece of stiff clay or putty on the part where you wish to make the hole; make a hole in the putty the size you want the hole in the glass (reaching to the glass, of course). Now, into the hole pour a little molten lead, when, unless it is very thick glass, the piece will immediately drop out.

Turpentine and black varnish put with any good stove polish is the blackening used by hardware dealers for polishing heating stoves; if properly put on it will last throughout the season.

Bronze is rendered malleable by adding to it from one half to two per cent of mercury.

Drill points, heated to a cherry red and tempered by being driven into a bar of lead, will bore through the hardest steel or plate glass without perceptibly blunting them.

Look to the pulleys and see that they are well balanced before they are put in position. A pulley much out of balance is a sure method of throwing the shafting out of line.

The width of a keyway should be one quarter of an inch for each inch of diameter of the shaft; the depth should be one half of its width.

The economical speed of shafting should be from 125 to 150 revolutions per minute for machine shops—woodworking shops a little faster.

To prepare zinc for painting, apply sulphuric acid and water for a quarter of an hour; then wash off clean with water and dry.

A good lubricator: Plumbago and tallow thoroughly mixed makes a good lubricator where the surface is wood.

To prevent metals from rusting, melt one ounce of rosin in one gill of linseed oil, and while hot mix with it with two quarts of kerosene oil. Apply with a brush or rag to any tools that are not to be used for a long time.

To bronze iron castings, after having thoroughly cleaned the castings, immerse them in a solution of sulphate of copper. The castings will then take on a coating of copper. Then wash thoroughly in water.

To polish nickle plate and to brighten and to prevent rust, apply rouge with a little fresh lard oil on a piece of wash leather or buckskin. Rub the bright parts, using as little of the rouge and oil as possible. Then wipe off with a clean rag, slightly oiled. Repeat the wiping every day and the polishing as often as possible.

To tin brass and copper, make a mixture of: 3 lbs. of cream of tartar; 4 lbs. of tin shavings, and 2 gals. of water, and boil. Now put in the articles to be tinned and continue the boiling. The tin will be precipitated on the articles, which must be first cleaned. This method is a cheap substitute for the electric process of plating, or plating by melting tin.

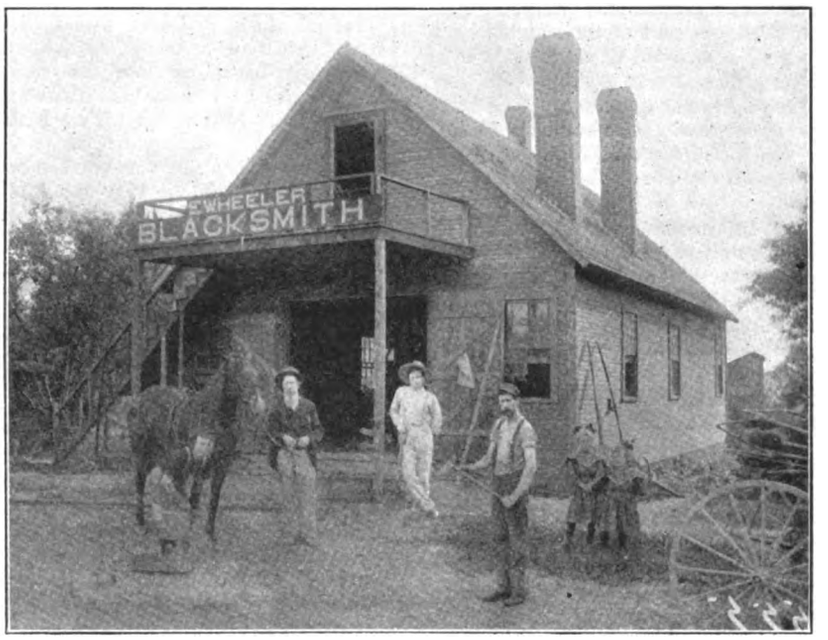
A very durable black paint for out-of-door work and for many other purposes is made by grinding charcoal in linseed oil with sufficient lithrage or drier; thin for use with boiled linseed oil.

To polish zinc take and mix thoroughly: 3 ozs. of powdered rotten stone; 2 ozs. of pumice stone; 4 ozs. of oxalic acid, and 2 qts. of rain water. Let it stand a day or two before using. Stir or shake it up when using and after using. Polish the zinc with a dry rag or woolen cloth or chamois skin. The more the zinc is rubbed, the longer it will stay bright.

To remove old varnish, use a mixture of: 5 parts of 36 per cent silicate of potash; 1 part of 40 per cent soda lye; 1 part of sal ammoniac. Apply with a swab and then scrape off.

The wooden parts of tools, such as planes, chisels, etc., are made to have a nice appearance by French polishing, but it adds nothing to their durability. A better way is to let them soak in linseed oil for a week or so, and then rub with a new cloth for a few minutes every day or so. This produces a beautiful surface and has a solidifying effect on the wood.

To thaw out frozen steam or water pipes use the soldering or brazing torch.



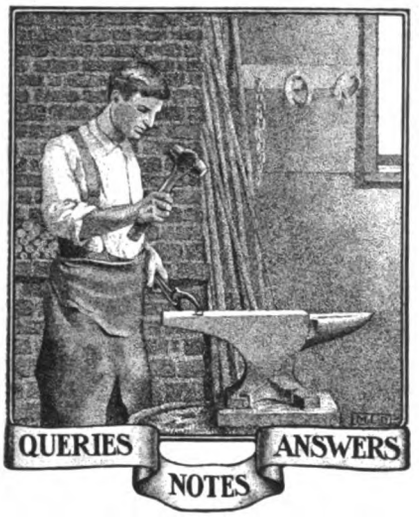
THE GENERAL SHOP OF MR. E. WHEELER, OF ILLINOIS

Brass can be melted in a forge or a furnace by using a graphite crucible; keep it well covered while in the fire. Handle it with tongs made for such work. Have the top of the melted brass covered with fine charcoal, as this will prevent the zinc from burning out.

To temper a knife-blade heat it to just a red, and then put it in a bar of common yellow soap, edge down, simply cutting the hot blade into it; this way will make it hard enough.

To drill cast iron draw the chill from cast iron by laying the piece on the fire, sprinkle a good coat of sulphur on the part to be softened, and blow slowly until the sulphur is burned off. Proceed with drilling or other work, as may be required.

(To be continued.)



Cure for Shoe Boils Wanted.—I would like to learn, through "Our Journal," how to remove shoe boils, or the growth appearing on the lower part of the shoulder of a horse. WM. CURLING, Texas.

Wants a Four-Horse Evener.—Can any of the boys give me a plan of the four-horse evener for a plow, i. e., a common 16-inch sulky which will work without having one horse out on the plowed ground?

J. B. GILWICK, Colorado.

Wants Information on Horse Stocks.—Would like to hear from some of the journal readers as to the working of the Barcus horse stocks. I want to know about their working qualities from some one who is using them. Will it pay me to buy one?

W. E. MURCHISON, Georgia.

Copper Welding.—In answer to Mr. W. B. Terry, Oklahoma, I weld copper the same as I do steel—heat it, scarf it, use a little borax and take a light heat. But it must be remembered that copper is a very tender metal and the work must be done fast and light, It takes practice.

C. W. METCALF, Iowa.

Wanted Cure for Founder.—Can any of my brother workmen suggest a remedy for a mule which has been foundered, leaving his feet very sore and causing him to lie down most of the time when not working, and to go lame when at work? I have used shoe pads, but without desired results.

H. Y. TERRELL, Maryland.

Wants to Temper Self-Hardening Steel.—Could someone give me a process of tempering self-hardening steel? Is it to be cooled in water or by a cold blast? I have tried both ways, but do not seem to be successful. I have to do turning as well as smithing.

R. H. GRAEFE, South Australia.

Wants to Remove Spots From Horse.—I would like to know whether I can take white spots off a horse without injuring the animal. I also have an excellent little mare with a white face. If there is any manner possible of removing it I wish some good brother would inform me of it through these columns.

W. H. MCCLURE, Louisiana.

Curing Cracked Hoof.—In answer to Mr. G. E. Henderson of Kentucky, would say I turn a clip each side of the crack, fit snugly and cut across the crack at the coronet. Then I give the horse a tonic for the blood, the same as I would for any sore. I have worked at the forge forty-eight years, and am seventy-four years old.

C. P., New York.

Split Hoof Remedy.—In reply to Brother Henderson I have had some experience with split hoofs. I find the best way is to make a plate and bend it to fit the front of hoof. Put six little ⅜-inch screws about 1½ inches from hair, and take weight off foot. Then fasten on plate so crack will go together. Keep up this process and I believe the foot will grow together.

R. T. PRICE, Kentucky.

Treatment Desired.—I have a jack to shoe, who has unusual growth in his front feet. The bottom in front of the frog seems pithy and porous, and has a discharge through the holes. His heel grows faster than his toe, and he wants to walk on his heel altogether. Will some fellow smith please give me information concerning the manner to treat and to shoe him?

R. T. PRICE, Kentucky.

Cracked Rock Drills.—I would like to ask through the columns of THE AMERICAN BLACKSMITH for the cause of the cracks in my rock drills. I never heat drills above a bright red. Is that too high a heat for drill steel, and if so, would it cause aforesaid cracks? The drills were cracked before tempering. I would be very thankful for an answer from some experienced blacksmith. MINER, California.

Two Handy Kinks.—I find that a good way to preserve hammer handles in this dry country is to bore a small hole in the end of the handle and plug with soft wood, after filling with linseed oil. I learned this from my helper.

I also find that a good way to make short, heavy stud bolts is to shoulder down a square on the end of a rod and then thread the round end and also thread a nut to use for the head of the bolt. I then back the nut on over the squared end a little and screw bolt in by means of wrench on squared end of same until nearly tight. Then I tighten the nut, and, if necessary, cut off squared end.

J. B. GELWICK, Colorado.

Handling Horses in Kentucky.—If you should ask a fine horseman in Kentucky when he first began handling horses, he would very likely tell you, "before I was old enough to remember." When I first came to Kentucky I was surprised to see such small boys bringing large horses and mules to the shop to be shod, and thought their parents very unwise to allow such small children to even be around where horses were. But I have changed my mind now, and like to see the little fellows come. The small boy in the picture seems to have no fear on a horse's back and can ride finely. The animal is 17 hands ½-inch high and is wheel mule on four-mule road grader. The team is valued at $1,200.00.

E. B. PATTERSON, Kentucky.

Wants Information on Pattern-Making.—Although I work in a blacksmith shop I am not a blacksmith, but a turner, fitter and patternmaker, and I would like to see something on pattern-making in this paper. We have a foundry in the shop in which I work, and I make all the patterns as well as do the turning and fitting. The class of foundry work we do here is principally in connection with farming machinery, such as harvesters, threshers and horse powers. portable and traction engines, plows (stump jump), cultivators, drills, etc. We often get broken or worn out parts to make which necessitates having new patterns made. I find that high-speed air-hardened steel is the best for my all-round turning and boring.

DAVID B. FRISKEN, New South Wales.

A Power Shop of Wisconsin.—The machinery in my shop consists of one 20 H. P. I. H. C. gasoline engine; one 2 H. P., I. H. C. engine; a Bowsher Combination feed mill; a 26-inch band saw; a pony planer; a drill press; a circle saw; an emery wheel stand; a turning lathe; a saw gummer and a pole rounder. I have also a Western Chief portable forge; a tire bender; a shrinker; a shear and many other small articles to make an up-to-date shop. The ground floor of my shop is all of concrete, which I like better than the plank floor. I do all kinds of work, shoeing as well as repairing. and I have work for two or three men all the year around, but I cannot get a good man in this country, so I must do what I can alone.

THEO. A. DORSHNER, Wisconsin.



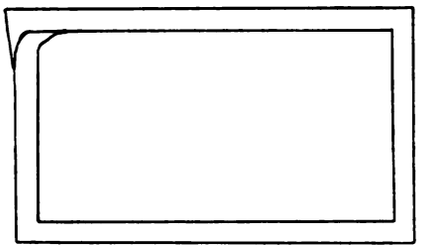
THEY BEGIN HANDLING HORSES EARLY IN KENTUCKY

"Those Fifty Lister Lays."—I have read with much interest the different articles in all the numbers of "Our Paper," but the one which attracts my attention most is "Those Fifty Lister Lays." In the March issue, Mr. G. B. Jewett of Nebraska says it is nothing uncommon to sharpen that many in one day and, more than that, it is not a day's work with him.

If he can take a dull lister lay and in two heats sharpen it and true it up so the farmer can take it home and put it on without any trouble, and leave the share without the prints of a hammer, (for without this it is not a first class job) I will be willing to take a week off and visit him and learn how it is done. One man cannot do it in one day, (50 lays in ten hours) and do first class work. T. E. WILSON, Missouri.

A Letter From South Australia.—I like the paper, in sofar as new ways of doing work are given, but, of course, the shoeing differs from our way. Here we use no calks, but do only plain shoeing; charging five shillings ($1.22) per set, both large and small, with the exception of stallions, for

which we charge ten shillings ($2.43). In our shop we build ploughs and cultivators all out of spring steel. No castings are used except wheels—all is hand forged. We get about twenty-five pounds ($121.66) for four furrow ploughs. The harvest has



HOW TO MAKE A DERRICK HAND

been very good and work plentiful, but one cannot get good smiths, as they are very scarce—in fact, all skilled labor is scarce. Wages are from one to three shillings ($ .24 to $ .73) per hour for good men.

R. H. GRAEFE, South Australia.

The True Spirit.—I have been working at the trade since 1879; came West to the Texas Panhandle and located among strangers, bought a little shop and some tools, and in three hours I was hammering away. I sent for "Our Journal," and must say my work is a delight instead of a task—I get so much valuable information from so many of the jolly old craft boys. They make the shop the jolliest place in town, which I am sure you will find, too, if you read "Our Journal." How I would love to see all the craft and shake their scaly hands and tell them that there is more honor in our black hands than in the diamond in the other fellow's ring. Teach the boys the dignity of labor again. I would rather be an honest American blacksmith than be a crowned head of Europe.

S. L. ARNN, Texas.

Making a Derrick Band.—The stock to be used is $\frac{3}{16}$ of an inch thick by 5 inches wide. The difficult part of this job is the welding, because it is so wide. I find that the best way to weld such bands is in the corners. You need to bend only three corners and the weld makes the other corner. Also, it is bound to heat correctly where desired, and this form of scarf leaves plenty of stock on which to work. To weld, heat a fire brick hot and put it on the inside corner of the band that is to be welded. Have a clean fire and take a good heat. Then slip the rectangle over tail end of the anvil and pull back, so that scarf is up solid against the corner of the anvil. Now strike on the top while the helper strikes on the side, using good rapid blows with a backing hammer. I have, before this, in welding very thin stock, had another fire to heat a heavy piece quite hot just below a welding heat. Then I make the weld on top of that, which keeps it hot and gives one a chance to make a good weld. The hot piece is brought over just before one is ready. A piece bent at right angle, made hot and laid over corner of anvil, could be used on this job, but I do not think it will be needed.

BERT HILLYER, New Jersey.

Fire Pot Clay and a Bolt Puller.—I would like to give the boys a couple of kinks that perhaps will surprise them. I see they have a good deal of difficulty in keeping clay in their forges. I have no trouble with mine. I take an old bucket, go out in the middle of the road and get enough yellow clay to line the forge. Then put in it one teacup of common salt and mix it thoroughly. Then, with a mason's trowel, I put the mortar around the tuyere iron nicely on Saturday night. By Monday morning the forge will be ready to be used if one is a little careful with it.

For pulling small bolts there is nothing better than a claw hammer with a small gas pipe for a handle. Let the handle extend through the eye of the hammer about ½ inch. Then drill a small hole through the end and put a rivet through it so the handle will not pull out. I think they will find they have a tool with which they would not like to part.

LEWIS LOPER, Kansas.

Shoeing for Toe and Quarter Cracks.—In reply to G. E. Henderson, Kentucky, who gives a horseshoeing problem in the May issue, I wish to state a similar case which I treated successfully last summer.

First, I trimmed the foot in the proper manner and removed pressure right under the cracks. Then I took a No. 6 nail and hammered it out to make it longer and thinner. I then made a bit as thick as



SHOEING FOR HOOF CRACKS

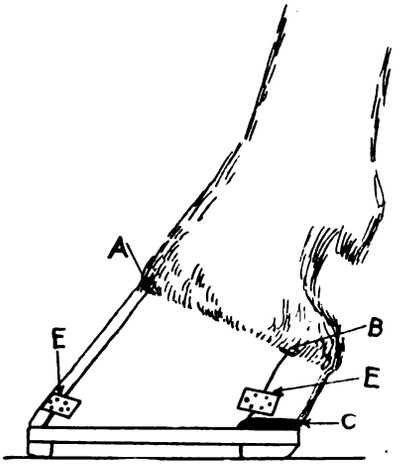
the nail, started a hole on each side of the crack and drilled toward the center of the crack until both sides met. Then I took my nail and drove it through, clinching on both sides. You can buy special clinches and also clinch tongues, but they leave the clinch on the outside and the animal is liable to tear them off. I put two clinches through each crack, one about as close to the hair as strength of hoof permits, and the other about 1½ inches below. Next, I made a bar-shoe. This shoe removes some weight from the hoof, at the same time holding the hoof more solid, as the chief object is to keep the hoof from moving and to give the crack a chance to heal. Therefore, the animal should not be worked, if possible. You may think it unnecessary for me to warn against working the horse, but some people do not seem to recognize a limit to an animal's strength. Then I made a screw plate, as shown in the April number, and after nailing the shoe on I packed the sole with dressing, warmed and puured in hot pine tar and screwed on plate. Last, I took a rasp and filed across the crack as close to the hair as possible, until it bled, as this will keep the crack from growing. If it fails to help the first time, I repeat. I also come up with another rivet after a month or five weeks. The horse will be relieved at once after the rivets have been put through the cracks and will soon get over his lameness. Just try this and let us know how you succeed.

FRED SCHULZE, California.

The Horseshoeing Problem.—In answer to Mr. G. E. Henderson, Kentucky, would say that if he will follow my method I will guarantee the best of results. In the first place, make a solid bar shoe and weld on the heel calks lengthwise of shoe, as at M. When you have it nailed on, take a piece of steel and make a firing iron, with a sharp blade, as at N. Now, heat it red hot and burn a crease at right angles with the crack, as shown at A and B, at the coronet band—not in the hoof but up about ¼ inch in the hair, burning it nearly through the hide. Before nailing on the shoe, cut the heel so there will be no pressure on the shoe, as shown at C. Now, when all this is accomplished, take some plates of steel about $\frac{1}{16}$ or ⅛ inch thick and about 1⅛ inches by 2½ inches long, and put from three to four holes in each end. Then fit it to the hoof, fastening it on with ¼ inch or ⅜-inch screws as shown at E E. After putting plenty of vaseline salve on the burns, put on a bandage for a few days to keep out dirt, thus helping it to heal quickly. It is best to keep the horse in a stall for at least two weeks, and longer, if he can be spared, and carry his feed and water to him. I believe this explanation is plain enough for my brother reader, and if he will follow it, he will gain a reputation and hold his customer.

C. W. METCALF, Iowa.

An Opinion From Iowa.—I may be a little late about getting in on this, but let me say a few words. I do not think that it would be a good idea to run a series of religious sermons or articles in your paper. Not that I am against religion, but because I think it would look out of place in a paper of this sort. Your paper is just about all that it could be as it is. You ask about the automobile articles; yes, keep them coming—they are good. I think a good cartoon would not come amiss. "Around the Forge Fire" is excellent. A short story would be O. K., if it would be of interest to the trade. The general plan pleases me very well. I would prefer short articles



CURING CRACKED HOOF

to the longer ones. Shop pictures do not interest me a great deal. I guess you about cover the field in general. I do not think of anything that you leave out. I think that your paper is about the neatest and

of the most value to the trade of any paper I have ever read. L. T. DURMAN, Iowa.

An Axle Welding Kink.—In answer to P. G. Bible, Georgia, I would like to give my method which I think is the best way to secure a perfect weld. Secure a top joint from a four-bow top, bend to shape and attach to side of anvil block, as at A, showing hook in position for axle to be placed under it. Now scarf each end of axle ready to weld and, with a sharp chisel, cut notches in the axle, as shown at B, so that they will hook together. Then bring axle up to proper heat and place under hook, as shown. Lift up gently on end to prevent axle from bouncing when being welded, and the result is a good weld every time. I have welded several hundred in this way and never had an axle break in the weld. When not using the hook, fold it down out of the way, as shown by dotted lines at A. E. E. WARNER, Iowa.

A Reply To That Challenge.—I like to agree with my brother blacksmiths about any reasonable proposition, but I think brother G. W. Kinsman has made a challenge that does not sound good to me. Of course, he is in Georgia and I am in North Carolina, and it would be foolish to even think about going there to see it done or for him to come here and do it. I do not want Brother Kinsman to think I am for one minute doubting his veracity, but I do somewhat doubt his ability. The reason I make this statement is that a great portion of the bar iron we use today is puddled or made from the very smallest scraps, such as old bolts, nuts and similar scraps, and it all needs to be welded. That is the main thing on which I base my opinion; and, besides that, when I make a weld I have always relied upon it, and I think I can still. Now, I do not want Brother Kinsman to take any offense at what I have said, for I was only expressing my views. R. L. JONES, North Carolina.

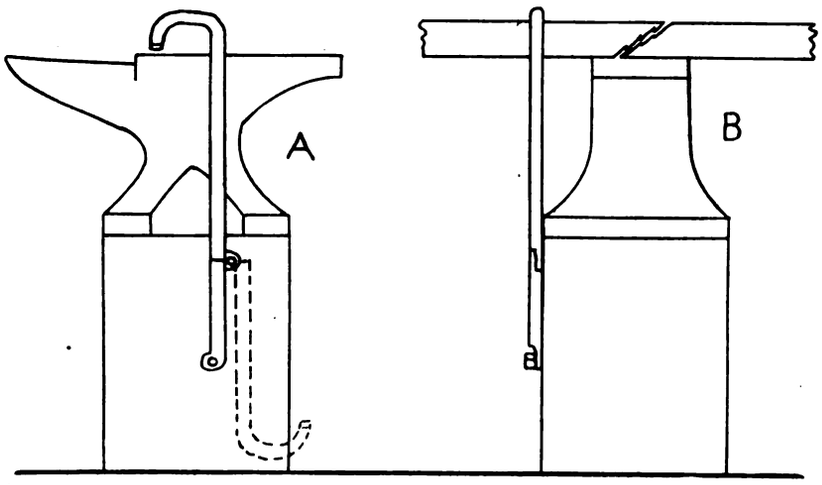
Crumbling Steel.—In answer to the question put by Mr. W. R. Fitzpatrick, of South Africa, in the February issue "What causes cast or tool steel to crumble or break away when it is being welded?" I should say it is caused by too high a heat for the grade of steel that he is welding. If our brother is not familiar with the different grades of steel it is not a subject for wonderment that he is surprisde at its crumbling in welding, and I believe that if he will take lower heats he will have no more trouble with his steel. A low-grade steel will stand a very high heat in welding, but a high-grade steel has to be welded at a very low heat. The higher the degree of carbon in the steel the more careful we must be, and some of our high-speed steel is almost impossible to be welded at all. Cast steel will crumble very easily if the heat is not right. Thus, the successful steel worker must make a great and close study of the metal he works. He must know the different grades and also the uniting heat. He cannot expect to work all kinds of steel as he would iron—if he does, you can realize what the result must necessarily be.

C. W. METCALF, Iowa.

Thread Standards and Wood Axles.—In reply to Mr. G. W. Sidders, Ohio, the V-thread, $\frac{1}{33}$ or $\frac{1}{64}$ oversize is for the blacksmith. Why? Because all bar iron is from $\frac{1}{64}$ to $\frac{1}{32}$ large, so when you buy a set of screw plates and dies get the oversize, always. The standard size is for the machinist whose work is all turned to exact size.

In answer to the axle problem, to lay off an axle so as to get the proper gather and pitch, it largely depends on the condition the wheel is in. But the proper rule is as shown at A in the engraving. Draw a line across the end, ½ inch from edge and from that measure about 12 inches from end. Now, draw a line from the line on the end back to the 12-inch mark as shown. Now draw a center line on the end from top to bottom, as at B. then draw another line across end, 1½ inches up from the bottom line Mark the center between these two lines, but ¼ inch in front of the perpendicular line. Set your compass and describe a circle 1¼ inches in diameter. Draw a line from the top line of your circle back to a point on the top 12 inches from the end and saw off the two wedge shaped pieces. Now proceed to put in shape to fit the skein.

C. W. METCALF, Iowa.



A DEVICE TO SIMPLIFY THE WELDING OF AXLES

A New Spoke-Tenoning Machine.—I have been intending to make a spoke-tenoning and boring machine different from anything I have ever seen or of which I have ever heard. I intend to make it on the same principle as I would make one of those horse-clipping machines. I will have a countershaft run from my main shaft just over my wheel bench, with tight and loose pulleys. Then to flatten the countershaft and punch a hole in the end of it. Then I shall make a chain of $\frac{5}{16}$-inch soft steel and put this inside a rubber hose. One end of this chain will go in the end of the shaft, while on the other end I shall fit a chuck to take a hollow auger and bit. I should like to get the views of my brother craftsmen on the subject, and also to know whether any have ever used anything like this. The advantage this offers is that you can cut your spoke tenons without moving your wheel, change your bit, turn to your vise and bore your rim without any adjustment except the changing of the bit. Because your shaft is flexible you can walk around your wheel with it if you so desire. I should like to know what others of the craft think of it.

R. L. JONES, North Carolina.

From an Ohio Smith.—I have seen only one item from an Ohio smith, so far, and I thought I'd join him and see if we couldn't make things a bit livelier. I am a young blacksmith and young at the business, and it would not do for me to criticise the older smiths, but we are never too old to learn. I refer to E. O. M., of Tennessee, and would say that if I were repairing the wheel I would saw a little out of the rim, and I think there would be no crying in the hub. And if the spokes are worn in the hub take them out and wedge and glue them in.

To drill springs or any high-carbon steel with an ordinary drill bit, without drawing the temper, use a little turpentine, and note the results.

I would like to quote a few prices we have up here in Northern Ohio. They are higher than is usual in some places, and a good deal lower than in others.

Old and new shoes, each	$ .20 and $ .35
Bar shoes, each	.75 and 1.00
Pads with packing, extra	.15
Inch-rims and tires, each	1.00
Spokes, Patent, each	.20
Spokes, Band, each	.15
Setting tires, each	.50 and .60

Other work in proportion.

G. P. NORMAN, Ohio.

Removal of Broken Studs.—I see that some brothers use a square punch in removing broken studs. I think I have a better way. I was once sent on a job to a brick factory to repair a gear in the clay pit. There were four broken studs (that had been used in place of broken cogs) one inch in diameter. I got a ¾-inch drill and drilled in the centers of the broken studs about three fourths of the way through. Then I got a ¾-inch left-hand tap and screwed it in till it got so tight that it came off; the stud being a right-hand thread. Always take as big a tap as you can use without getting in the original thread. As I am a machinist I have a great many broken studs to take out, and I have found this an excellent way. Almost every machine shop has all kinds of left-handed taps.

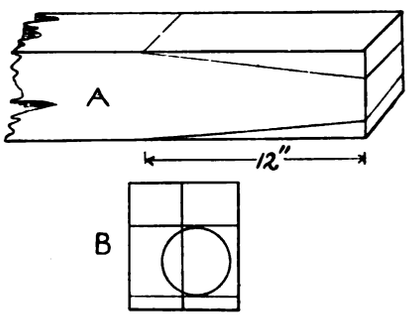
Being a machinist one would think that I wouldn't take THE AMERICAN BLACKSMITH, but some other craft paper, but I want to say that just the article by Robt.

B. Kerr about tempering high-speed steel to cut chilled iron was worth the price of the paper, not to mention the other receipts of Mr. Mumma and others. The boys asked me how I tempered my tool to stand, and I told them. An old man told me that he paid three dollars for that receipt alone. I think that THE AMERICAN BLACKSMITH is all right, and hope that it may have prosperity.

ELMER F. NAILOR, New York.

Brazing Information Wanted.—I would appreciate a little information concerning brazing. FRED SCHULZE, California.

In Reply.—Somehow or other the impression has gotten about among smiths generally that brazing is a mysterious process—a magical, wand-waving method of joining metals together. In truth, there is lots and lots of smith work many times



LAYING OUT WOOD AXLES

more difficult and more complicated. Briefly stated, brazing might be explained as soldering with brass. The process consists of thoroughly cleaning the surfaces to be joined. They are then clamped together, heated, a flux applied and the brass or spelter sprinkled on. The heating is then continued until the spelter flows into the joint, making a solid union of the two pieces.

The special points to bear in mind when brazing are: 1, absolute cleanliness. The surfaces of the parts to be joined must be absolutely free from grease, dirt, soot, rust and other foreign matter; 2, the joint must be properly protected from the oxidizing influences of the air and fire while heating —therefore, the necessity of using borax; 3, the fire must be a clean bright red bed of coals, not a new, green fire, but one that is well coked; 4, heating must be gradual, so as not to burn either the ends of the pieces to be brazed or the spelter. As in everything else connected with smithing, practice is necessary to continued and permanent success.

F. H. J., New York.

To Temper Stone Tools.—In answer to Wittmer Bros., Oklahoma, in the March issue, I would like to say that it depends largely on the kind of stone that he has to cut, and another very important thing is in the heating and dressing of the tools. Tools for cutting stone must be worked at a moderate heat, that is, about what you would call a lemon color. Just bring to a bright heat for the first drawing heat, but by no means allow the steel to grow hot enough to sparkle the least bit, for if you do it will make the steel brittle, and the result will be a broken tool the first time it is used. It had better be worked at a lower heat; and be careful not to strike the tool on the edge with your hammer in the finishing heat, as it will crack the grain of the steel and the corners will break without any apparent reason for breaking. This last heat should be just a cherry red. In the bath for hardening, use two pounds common salt, two ounces saltpeter, one half ounce alum and two ounces sal-ammoniac to three gallons of soft water and heat the tool to a cherry red.

Now, here is another very important feature in tempering—when you dip the tool into the bath, do not dip it and hold it in one position, but plunge your tool with a slow motion straight into the bath and out. Just leave enough heat in it to draw temper to a pigeon blue.

C. W. METCALF, Iowa.

A Letter from New Jersey.—I have been in the blacksmithing and wheelwrighting business for thirty-four years, and have installed in my shop a three and a half horse-power gasoline engine, a band saw, a jointer, a circle saw, an emery wheel and an old-fashioned turning lathe. My shop is thirty-two feet by sixteen feet, two and one-half stories high, with a twenty-two by sixteen foot basement. I possess the usual smithing and wheelwright tools, and always keep a good stock of everything with which to work.

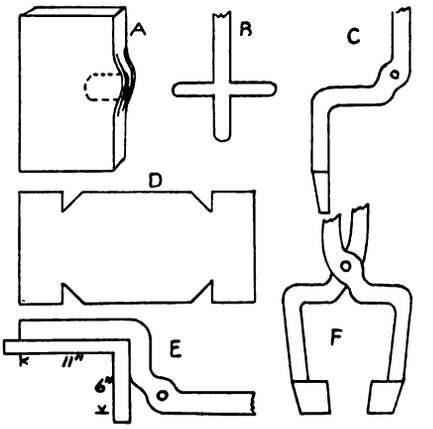
I will not endeavor to tell anyone exactly how to shoe a horse properly, as that is one of the hardest things a man can put on paper, for there are so many different kinds of feet to shoe. My book on shoeing says to shoe the horse according to the foot and leg, and this statement is backed by sixteen of the best veterinarians of the United States. Furthermore, my customers live in an area of twelve miles in which five shops are located. I do not mean to say that I do all the work or shoeing, but people come long distances to have me shoe their horses. I am now sixty-two years old, and do all my work myself.

One year is all that I ever worked with any smith, as my father had a shop for his own use on his farm, and I learned to make things when but a small lad. There is some work that I made forty-eight years ago still in use in my neighborhood. I charge more for my work than some of my neighbor smiths.

RYERSON TRANGER, New Jersey.

Forging Crucible Tongs.—In answer to Edward Adam, Ohio, who asks for information regarding crucible tongs, would say I have a good many to make, so will give him my way. In the first place I do not think it necessary to make double claw, unless he uses very heavy pots. I take a piece of Norway iron, eight inches long, four inches wide and one inch thick, drive a punch well down in the center of the edge, then drive it on the horn of the anvil and with fuller work up a good scarf, leaving the piece as at A. Next, I cut off a piece of 1⅛-inch square stock, long enough to make the shank. Upset and scarf this, as at B. Then I take separate heats and drive the pointed end well down into the pad. It is always best to be sure, so I take a second heat and with this heat also draw one end of pad down to size. A heat on the other side should finish it. I next bend it, as at C. Then I work out the point, and punch hole, bend pad to circle of pot and weld on handle. These should be four feet seven inches from rivet to end. I then heat and loosen rivet, heat the pad separately and fit to pot. If there are many to be made it pays to have an iron form to fit a pair made of this stock, this form to weigh about 35 pounds.

If one has a power hammer, the best way is to forge them solid. I take a piece of machine steel seven inches wide, 1½ inches



FORGING CRUCIBLE TONGS

thick and 14 inches long, mark off 3¼ inches on each end, heat the whole piece, and with my necking tool cut it down, as at D. I then draw the center down as much as I can and cut in half with my hack. I then heat one end and draw it out to the required size and length. After both have been drawn I turn and finish the pad. This will finish nine inches by four inches. They are now ready to bend and finish as the ones welded. I can finish a pair quicker out of the solid than I can to weld up and there is no weld to give out. At E I give my way of getting measurements with the square. It should measure six inches to center of hole and eleven inches from under side of shank. The tongs as they are finished are shown at F.

In these parts we use but few forged tongs, as we get them cast of steel and weld on the handles, and they are about fifty per cent stiffer than iron or machine steel. The ones used here are cast in Branford.

HOMER N. POPE, Connecticut.

A Letter from Illinois.—I started in the blacksmith and repair business in May, 1907, having worked at the trade long enough to find out that it did not pay to work by the year, even at $625.00. I had $150.00 when I began; now I own my shop and lot, have an International gasoline engine, a rip saw table, an emery stand, a power drill, a trip hammer, a saw gunner, an Ideal lawnmower sharpener, a Little Wonder disc sharpener, a punch and shear, a combined power grind stone, and two Royal blowers, besides other hand tools that go to make a general shop complete.

Every time I read about some of Tom Tardy's experiences in the columns of "Our Paper" I think of the fellow I bought out. He had been in this town thirty years, and was still blowing fires with an old man-killing bellows. There were very few tools in the place. He growled if work came and growled if it didn't; would ask a customer for his pay before the job

was done, and would dodge salesmen and collectors as a farmer dodges sparks from a welding heat. When I began to run the shop I made it a point to be there early, remain as late as necessary, be pleasant to my customers, never boast of what I could do, but let the work speak for itself, and always meet my bills. I also made it a point to subscribe for THE AMERICAN BLACKSMITH, which I think is the best paper for the craft that I ever had the pleasure of seeing. W. H. DYER, Illinois.



A GENERAL SHOP OF MICHIGAN, RUN BY MR. W. E. MOORE

Welding Spring Plates.—I read Mr. Mosier's article on welding spring plates, in the April number of "Our Journal," and must say that it is the most complicated way to weld springs or anything else that I ever saw or heard described.

I have not been pounding iron so long as Mr. Mosier, but I think I know a better and much quicker way of welding springs than he has, so I will tell how I do the job. I take the broken spring and proceed the same as when welding ordinary soft steel or iron, except in the heating part, when I upset the ends to be welded sufficiently to allow for finishing, and make as short a lap as possible to do a good job, being careful not to get more than a bright red heat on the spring at any time during the process.

The main thing about the job is not to get the steel too hot at any time. The next important thing is to have a clean fire and good coal. Spring steel is a high-carbon steel, and if gotten hot enough at any time to show sparks you might as well throw the spring away, as it will not be of much good for a spring after that. No matter how good the weld, if it has been overheated, the spring will break at the first hard jolt that it gets.

Mr. Mosier also says not to hammer the spring on the edges. I suppose that the spring would fall apart if he did. However, if the spring will not stand hammering on the edges it is not fit to put on the job. When I weld springs I finish the edges in the round swedges and they do not open up, either. I must also say that I use Climax Welding Compound for all welding, which I find very good and much better than plain borax. Mr. Mosier does not state what kind of flux he uses, but if he never has tried Climax he will find something very valuable with which to weld.

M. E. KOCH, California.

A Michigan Smith Shop.—In the accompanying photograph, the lady holding the horse is my wife. The man nearest me is Mr. H. Cleveland, who works for me, and the next man is Mr. A. Haines, a man who has worked for me in tire setting time for nine years. He is seventy-five years old and can do a good day's work. We have no union here, but we got together and raised the prices; some of which are now as follows:

Old shoes set	$ .20
New, 1 to 5	.35
Larger	.40
Bar	.75

Every blacksmith in the county but two raised their prices.

W. E. MOORE, Michigan.

Prices and Organization.—The Editor asks us what we think of our paper. I think it is as good as it could possibly be, but, if it had a sermon in it, it would be better, of course, and I, for one, am in favor of the Editor publishing one every month.

Another thing that I want to speak about is this: brother craftsmen, do you know that we are going to become an organized body some day, and the quicker we do it the better it will be for us? Now, you take a country smith—he has more or less of the scab shops to contend with. The people go there for a little or nothing. They will curse at your prices. I think we ought to have a bill passed to make all smiths pay a license fee on his forges, enough to cut those scab shops out, for they do not make anything, and it makes it harder on the good smiths who are in the business for the money there is in it. Just so long as we allow this to go on we never will get our prices raised with any satisfaction.

It would do me good to get such as these under my foot. I know men who owe their smiths, then purchase themselves little outfits to do their own work and do all in their power against their past smiths to whom they owe bills for years. I have had experience with that kind, myself, and I tell you it goes against the grain.

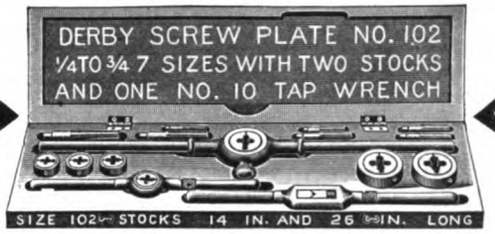
Take this home to yourselves—consider this before you speak. Every craft is organized except the blacksmiths. The merchants are organized and agree on prices that stand, and when things go up at one place it is the same everywhere else. And this is the way it should be with our craft. The material we must use is going up and if we go up in our prices someone is always ready to crow about it. If any brother smith wants to write me and discuss this I would be very glad to hear his views on the subject. C. C. DONNELL, Texas.

Desires Timber-Seasoning Information.—I would be very grateful if any of my brother blacksmiths and woodworkers would give me pointers on how to season timber. I have discontinued the blacksmith business and am now running a woodworking shop. I am going to do a deal of turning, and as I have plenty of timber here in the woods but no saw-mill to saw it I am thinking of splitting it out to the proper size, boil it in water until it turns black and then kiln-dry it in a small kiln with fire. It does not make any difference how black it gets, as I will turn all of that off, anyway. The idea is to get it dry as soon as possible and with as little cost as I can, as there is but very little profit in it unless you can handle it quickly. It would be too much expense to get it out and put it up in sheds and let it air-season, as the price of building material is sky high here and it would take quite a large shed to store away enough to keep my lathe going. If any of the brethren have had any experience along this line I would be much obliged to them if they would express their views through THE AMERICAN BLACKSMITH. Seasoning timber is all Greek to me, inasmuch as I have always allowed the other fellow to do the seasoning for me.

Although I have quit the blacksmith business, still I am glad to get the paper and see what the boys are doing. They have my hearty support in the movement for better prices as the smiths do not get their just dues—they have to do the hardest work of anyone and then lose a part of it in bad accounts. This I know from actual experience, as I have been through the mill, having worked at the anvil quite a number of years, as well as at the wood bench; and under existing conditions I am content to let the other fellow do this work, as I cannot do it at the prices that are prevailing here. I can make good money here on contract work, but I cannot stand the hot sun, so am going to drop back to my woodworking establishment. I will be in the shade there and can thus do a good day's work.

I have a 2 H. P. Gade air-cooled gasoline engine, and it is a dandy. I have Park's rip and cross cut saws; a band saw; a 14-inch wood turning lathe; an emery grinder and will put in a boring machine and small hand planer, also a power grindstone so there will be no excuse to work with dull tools. Although my engine is really too small, still it is a stayer, and I have never been able to stall it yet. I have stopped the saw, but did not even check the engine, so I believe I will continue to use it so long as it will pull my outfit.

WOODWORKER, Texas.



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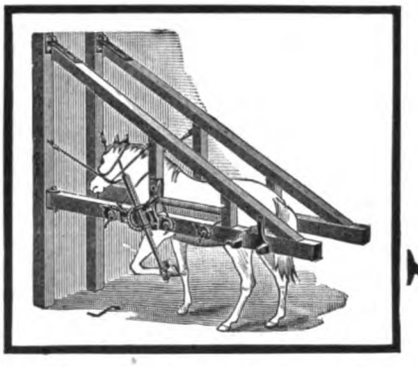

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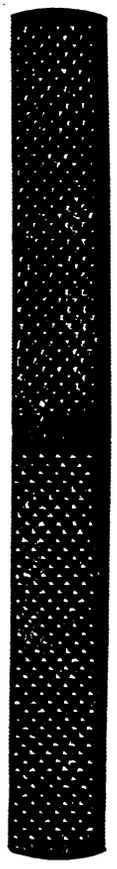

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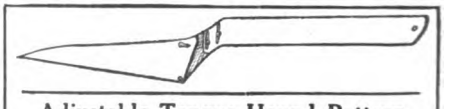

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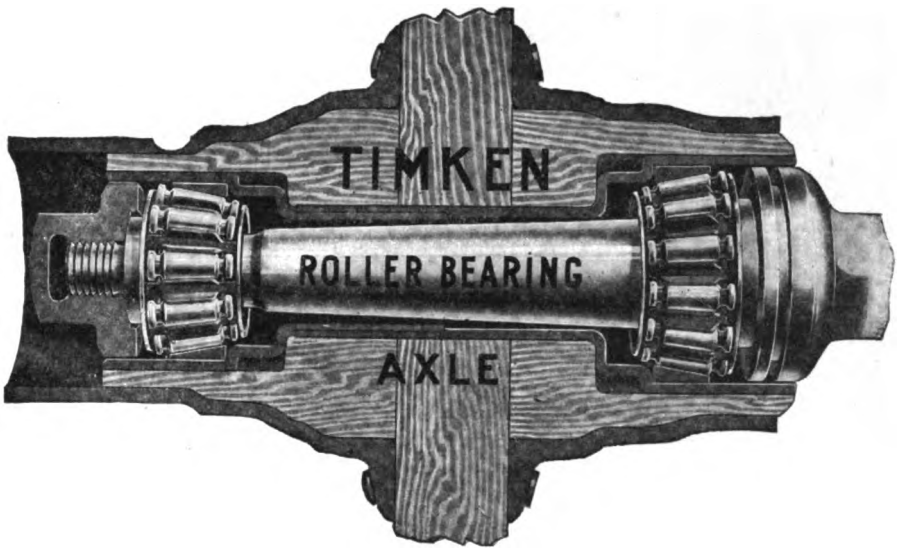

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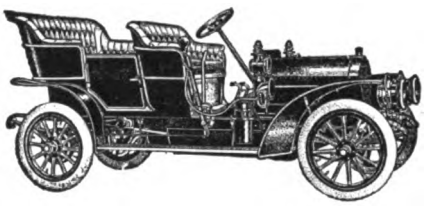

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This extremely beautiful water color we have had reproduced in ten colors as a most appropriate art calendar. The calendar is 8 x 9½ inches and reproduced on good, heavy coated cardboard, with a date pad of convenient size and harmonious tint.

Free to "Our Folks"

We are going to present one of these calendars **free of charge** to every reader whose subscription is paid up to January, 1911. If your subscription expires before that time better get in line for one of these beautiful art subjects.

For Advertising

your own business we have secured a limited number of these fine calendars, which we offer at cost. They will bear no advertising except your own business card of ten words or less. This we will print at the top of the calendar without extra charge. We offer these calendars to subscribers of "Our Journal" only—you must be or become a regular reader before you can get any of these calendars.

If you want calendars order them now. We have made special arrangements this season, and our first calendars will be ready for delivery about November 15th. But don't wait—be sure of getting some.

The American Blacksmith Company
P. O. Box 974 Buffalo, N. Y.

Equipped with the No. 200



Buffalo Blacksmith Tools

Have proven their worth for over 30 years

Buffalo No. 660
Portable Down Draft Forge
No Smoke, Soot or Gases

Buffalo No. 200
Silent Blower

Guaranteed to produce a stronger blast than any other blower made; also against repairs, due to wear, for ten years.



Buffalo No. 200 Silent Blower

Write today for Catalog

Buffalo Forge Company
Buffalo, N.Y.

STAR STEEL SHAPES



FOR FALL WORK

STAR

QUICK REPAIR SHARES

Will Help You

They are made 12 in., 14 in., 16 in. and 18 in. Right and Left Hand, in solid cast, crucible or soft center steel.

Your jobber will supply them.

Star Manufacturing Company

Carpentersville, Ill.



It's our business to know how to make quality goods. Our customers know how well we know how.

The reputation of "F-S" superfine Coach Colors is so well established that no argument is needed.

FELTON, SIBLEY & CO.

Manufacturers of Paints, Colors and Varnishes

136-140 N. 4th St., PHILADELPHIA

Saves Figuring You will not have to stop to figure out this or that dimension on a piece of work. Just refer to

FODEN'S MECHANICAL TABLES

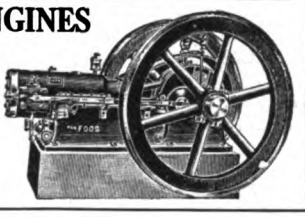
This book gives Circumferences of Circles by eighth inches up to twenty feet, weight of Rectangular Iron, Round and Square Bar Iron, Angle and Sheet Iron, and other miscellaneous tables. Cloth Bound. Price, 50 Cents, Sent to any part of the world postage prepaid.

American Blacksmith Company, P. O. Box 974, Buffalo, N. Y., U. S. A.

FOOS

JUNIOR GASOLINE ENGINES

are built in the **Largest Exclusive Gas Engine Plant in America.** Catalog 49 tells of superior points in gas and gasoline engines which have been evolved as a direct result of twenty-two years' experience in manufacturing the Foos Gas Engines. Send for it.



The Foos Gas Engine Company
SPRINGFIELD, OHIO

Air-Cooled Motors



1 1-2 to 10 H.P.

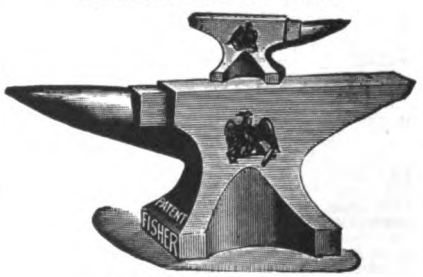
THE BEST ON THE MARKET

Agents Wanted Write for Prices

The Air-Cooled Motor Co.
LANSING, MICH.

"EAGLE" ANVIL WORKS ESTABLISHED 1843

200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



NONE BETTER MADE OVER 300,000 IN USE

THE ANVIL OF MANY MEDALS.

The "EAGLE ANVIL" has taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always says: "Nothing but an Eagle for me." Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few years' use.

VISES OF MERIT

The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last a lifetime.

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base.

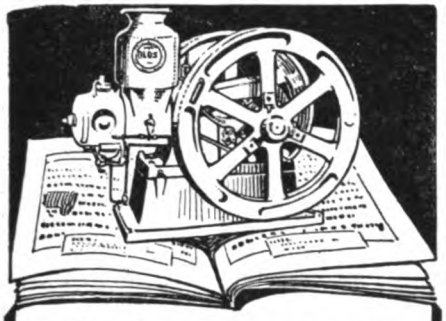
Write for our descriptive Anvil and Vise Catalog.

Our goods are handled by reliable dealers everywhere.



PARALLEL STRONG AND DURABLE.

FISHER & NORRIS, 33-47 Fair St., TRENTON, N. J.



Read our catalogue

If a gasoline engine is worth buying, it is worth thinking about, worth studying into. The reasons an

Olds Gasoline Engine

will appeal to you are the same that have induced thousands of shrewd, practical farmers to look into the engine question carefully, to investigate the Olds and then select it because it was exactly what they needed, and the price was right for what they got.

Send for our new catalogue; it is worth its weight in gold to you.

Seager Engine Works

1012 Seager St., Lansing, Michigan

Boston Philadelphia Binghamton Omaha Kansas City Minneapolis Los Angeles

FOR CURRENT HEAVY HARDWARE PRICES SEE PAGE 38.

Most Stupendous Gasoline Engine Offer Ever Made



FREE TRIAL OFFER

Here is the first free offer of the kind ever made: The best 3 H. P. gasoline engine on earth for all around general hard use—SCHMIDT'S CHILLED CYLINDER GASOLINE ENGINE. The perfect new model with a 5-year guarantee.

Send No Money We send the engine to you without a cent down and let you use it for ten days as if it was your own. Get all particulars by sending your name and address to us today. The lightest 3 H. P. gasoline engine on the market for general use. The only 3 H. P. with **Yager Process Chilled Cylinder.** Try this wonderful new model engine and if you are not pleased send it back at our expense.

Sent Free On this amazing special limited offer we will send this engine to you on your simple request for a working trial. Use it ten days. If you like it then you may order it. If you don't like it send it back. If you want to keep it you may take your time to pay for it. Easy monthly payments and a 5-year guarantee. This is the perfect engine today or we couldn't make this offer—this amazing free offer.

Save All Dealer's Profits You save all dealer's and agent's profits if you act on this limited offer now. You will be amazed when you get all of the particulars of this unparalleled special offer. The perfection of the engine, the **quality and the price and terms** will astound you. Best engine for farm, shop, dairy, or any 3 H. P. use. Easiest engine to move around and handle in every way, most economical of gasoline. Just send your name and address and get catalogs and all particulars free. Write today.

SCHMIDT BROS. CO. ENGINE WORKS, Dept. 721Z, Davenport, Iowa



10 DAYS FREE TRIAL

We will ship you a **"RANGER" BICYCLE on approval, freight prepaid** to any place in the United States *without a cent deposit in advance*, and allow ten days free trial from the day you receive it. If it does not suit you in every way and is not all or more than we claim for it and a better bicycle than you can get anywhere else regardless of price, or if for any reason whatever you do not wish to keep it, ship it back to us at our expense for freight and you will *not be out one cent.*

LOW FACTORY PRICES We sell the highest grade bicycles direct from factory to rider at **lower prices** than any other house. We save you $10 to $25 middlemen's profit on every bicycle—highest grade models with Puncture-Proof tires, Imported Roller chains, pedals, etc., at prices no higher than cheap mail order bicycles; also reliable medium grade models at **unheard of low prices.**

RIDER AGENTS WANTED in each town and district to ride and exhibit a sample 1910 Ranger Bicycle furnished by us. **You will be astonished** at the *wonderfully low prices* and the liberal propositions and special offers we will give on the first 1910 sample going to your town. **Write at once** for our *special offer.*

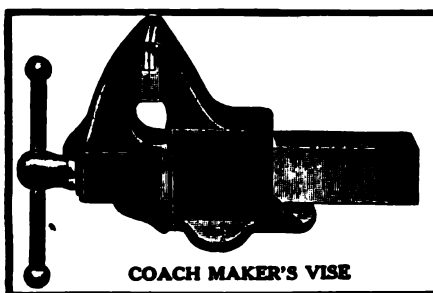
DO NOT BUY a bicycle or a pair of tires from *anyone* at *any price* until you receive our catalogue and learn our low prices and liberal terms. **BICYCLE DEALERS:** you can sell our bicycles under your own name plate at double our prices. Orders filled the day received.

SECOND HAND BICYCLES—a limited number taken in trade by our Chicago retail stores will be closed out at once, at **$3 to $8 each.** Descriptive bargain list mailed free.

TIRES, COASTER BRAKES, single wheels, inner tubes, lamps, cyclometers, parts, repairs and everything in the bicycle line at **half the usual prices.**

DO NOT WAIT but write today for our *Large Catalog* beautifully illustrated and containing a great fund of interesting matter and useful information. It only costs a postal to get everything. **Write it now.**

MEAD CYCLE COMPANY, Dept. M.196, CHICAGO, ILL.



COACH MAKER'S VISE

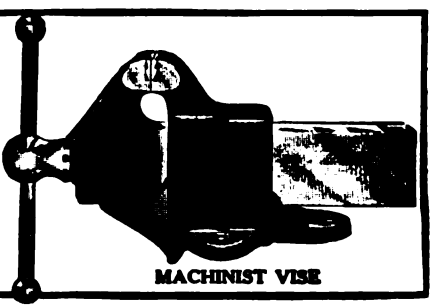
VISES

A TYPE AND SIZE FOR EVERY SERVICE

Send for Catalogue of the largest and most complete line manufactured

ROCK ISLAND MFG. CO.

CHICAGO: 45 Lake St. **Rock Island, Ill.** **NEW YORK 136 Liberty St.**



MACHINIST VISE

Trade Literature and Notes.

A very attractive offer is made by Schmidt Bros. Co., Davenport, Iowa, in their advertisement appearing on Page 32 of this issue, and every reader who is contemplating installing a gasoline engine will find it to their advantage to write them for catalogues and full particulars of the offer they are making whereby you can secure their engine on trial and do not have to keep it unless you are thoroughly satisfied.

THE RUTHERFORD RUBBER COMPANY, of Rutherford, N. J., have just sent us some interesting information regarding the horseshoe pads which they are manufacturing. They state that they are the originators of composition back pads, which, by their peculiar construction are giving universal satisfaction. By a special process of their own the back and calk are vulcanized together, thereby eliminating every possibility of a separation. In the case of other pads it has been necessary either to sew or cement the calk and the back together. In the case of the pad by the Rutherford Company, it is all in one piece, which they claim to be a decided advantage over the old-style leather back pad. Their composition, it is also claimed, will not water soak or become soggy, which has been offered as an objection to some forms of pads. Neither is their composition subject to any contraction or expansion from various conditions of moisture and temperature. The Rutherford Rubber Co., in fact, guarantees the entire pad to be perfectly impervious to water, and that they will keep the horse's feet in better condition than is possible with any pad which either becomes soggy, or which contracts or expands with varying conditions of moisture and temperature.

N. J. SMITH, of Halstead, Kans., in this issue advertises a patent of an adjustable wagon hound pattern for sale. Readers who are interested in this proposition might do well to correspond with him. Mention THE AMERICAN BLACKSMITH.

THE ANTI-BORAX COMPOUND CO., of Fort Wayne, Ind., are marketing a welding compound which they claim is "Perfect." They say it will weld at 250 degrees lower heat than any other; that it is more economical than any other and that it is good for either high or low grade of steel. They claim it is excellent for tire and axle welding, for spring steel and tool steel, and that toe calks welded with it won't knock off. Readers who are interested might write to them, mentioning THE AMERICAN BLACKSMITH. asking for a sample.

IF YOU HAVE A PATENT TO SELL, or want any books, circulars, etc., on what to invent or how to obtain a patent, write to our representative Patent Attorneys. All of them are reliable men, who will do their very best for you. Mention THE AMERICAN BLACKSMITH when writing to them.

DO YOU STILL PERSIST IN USING the old-style greased straight axles in your vehicle building, or are you up to date in your methods, trying to solve that old question of friction? This is what the Timken Roller Bearing Company, Canton, Ohio, asks you. They think that they can assist you in doing this. Write to them for facts. Their advertisement is included in this issue.

HAVE YOU NOTICED what the House Cold Tire Setter Company, of St. Louis, Mo., claim each month in their advertisements? They say their machine will save you money. All they ask is that you kindly write to them for details.

New Books.

FLYING MACHINES—CONSTRUCTION AND OPERATION, by W. J. Jacksmon and T. H. Russes, 250 pages, fully illustrated. Flexible leather, $1.50. In cloth, $1.00.

This is a practical book, which shows by means of illustrations and working plans and a thoroughly interesting text how to build and navigate a modern air ship. There is also an introductory chapter by Octave Chanute. The theory and development of the flying machine is gone into very thoroughly, with explanations by illustrations and text, as to how and why the flying machine flies. Full directions are given for the building of the glider, also a real flying machine of the biplane type. Anyone desiring to keep up with the latest designs and progress in flying machine construction will do well to purchase a copy of this book.

THE HOW AND WHY OF THE AUTOMOBILE, by Fay L. Faulote, 200 pages, 250 illustrations, cloth, Price $1.00.

This book is written by a former instructor in Detroit Motor School. It is written in plain, everyday language, so as to be easily understood by even those who are but slightly acquainted with mechanics. The subject of automobile construction and operation is gone into very thoroughly and carefully, beginning with the theory of the gas engine to the determination of horsepower and the finish of the machine. The various parts of the automobile, such as motor designing, transmission, methods of driving carburetor, etc., are fully explained.

If there are any of the parts of the automobile or its mechanism that you do not understand, you will find a very full and clear explanation.

TRIMMINGS FOR EVERYTHING ON WHEELS

Wholesale Manufacturers

Write For Catalogue and Prices.

INDIANA TOP & VEHICLE CO., Lawrenceburg, Indiana, U. S. A.

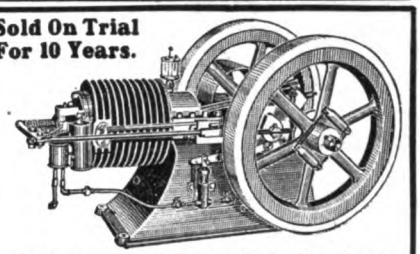
Convert Your Bicycle Into A Motorcycle



using our attachable outfit. Fits any wheel. Also stationary and marine motors, either finished or rough castings. Send 2c stamp for catalog.

Steffey Mfg. Co., 2942 Girard Ave., Philadelphia, Pa.

Sold On Trial For 10 Years.

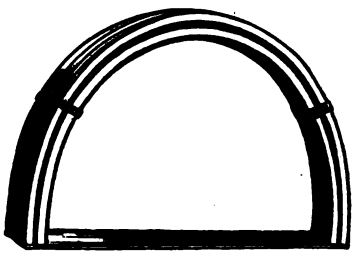


For the past ten years we have been selling the Gade Engine on trial. Use it 30 days free. Pay no money down. We stand back of it with our Five Year Guarantee.

The cylinder is cooled without the use of water or fans. Find out how we can save you one third on gasoline. Do it now, before we place an agent in your town.

Gade Bros. Mfg. Co., 18 North St., Iowa Falls, Iowa

Oak Rims



Low prices on all sizes, especially rims 2 inches and under in depth, any size tread.

3x2 all heights, up to and including 4' 4", $3.35, delivered, freight prepaid to your nearest railroad station, cash with order. All other sizes in proportion.

We guarantee that our rims are equal to the best made, and we sell from factory to consumer, saving you all the extra profits.

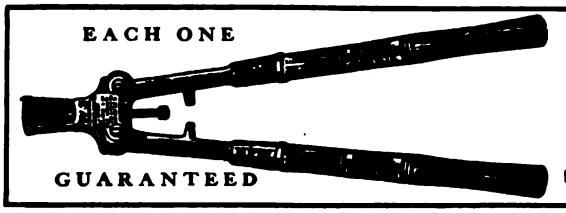
Send us your inquiries.

Illustrated catalog on your request.

May Bending Works

Steubenville, Ohio

EACH ONE



GUARANTEED

BOLT CLIPPERS

CHAMBERS BROS. CO.

N. Fifty-Second St., PHILADELPHIA, PA.



HONEST DEALINGS.

Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in American Blacksmith advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

Electric Lights

For Every Home and Factory

We manufacture isolated lighting plants, suitable for farm house, cottage and small factory use, ranging in price from $250.00 up to $375.00. These prices include engine, dynamo, storage battery and switchboard. You can use the engine for pumping water, sawing wood, churning butter, etc.; at the same time you can run the dynamo and charge the storage battery at no extra expense, hence the current used for lighting costs practically nothing.

Write today for interesting information on the lighting subject.

The Dayton Electrical Mfg. Co.

151 St. Clair Street Dayton, Ohio



STAR POWER HAMMER

WORTH MORE COST LESS

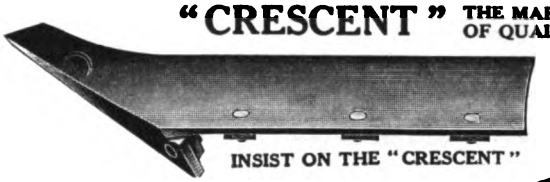
Than Any 50-lb. Steel Head Hammer on the Market.

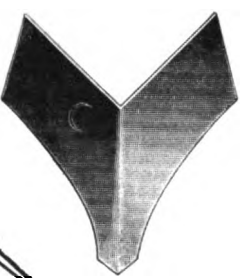
Hook'er to your Ingin.

Thousands of satisfied customers. Send for letters and Catalogue.

Star Foundry Co., Albert Lea, Minn. U. S. A.

"CRESCENT" THE MARK OF QUALITY





INSIST ON THE "CRESCENT"

Save labor and increase your profits by using Fitted Shares. We make the best.

Write for our 1910 Catalog

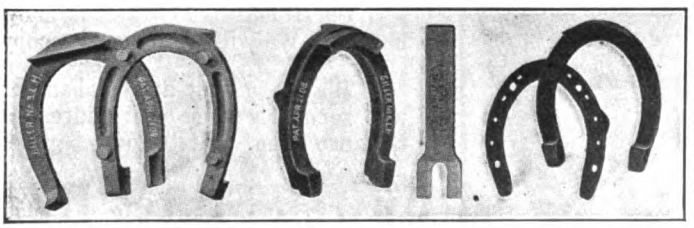
CRESCENT FORGE & SHOVEL CO.

HAVANA, ILL. U. S. A.

Manufacturers of High Grade Fitted Plow Shares and Agricultural Shapes

TRUE FIT TRADE MARK

THE CUSHION INTERCHANGEABLE HORSESHOE



The Best, Most Practical Shoe Ever Put On The Market.

Outlasts three of the common kind, and price is the same. Old shoes easily and quickly detached and new ones substituted.

Write today for particulars and prices

THE GILLER ACME HORSESHOE CO., 3513 Fort Hamilton Ave., BROOKLYN, N. Y.



GOES LIKE SIXTY
SELLS LIKE SIXTY
SELLS FOR SIXTY
$60
GILSON
GASOLENE
ENGINE
For Pumping, Cream Separators, Churns, Wash Machines, etc. FREE TRIAL
Ask for catalog—all sizes
GILSON MFG. CO. 39 Park St. Port Washington, Wis.



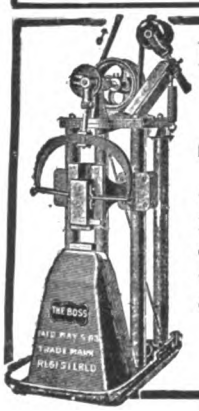
RUBBER TIRED RUNABOUT, $42.00
Top Buggy, $35. Buggy Tops, $4.60
Write for 100-page Catalog.
It's free. Compare our prices.
Established 1887.
BUOB & SCHEU,
500-520 East Court St,
CINCINNATI, OHIO.

MORGAN & WRIGHT PADS
ARE GOOD PADS

STEEL WHEELS



To Fit Any Wagon
Plain or Grooved Tire
Farmer's Handy Wagons
All Standard Types
Special Inducements to Blacksmiths
Write Today for Agency
EMPIRE MFG. CO., P. O. Box 301. Quincy, Ill.



NOVELTY
IRON WORKS
BOSS HAMMER
For Plow Work, Wagon Work, Heavy Work, Any Work.
"Will strike as you like." Heavy or light at full speed or less. A broken anvil will cripple no other part of the hammer.
G. E. DAVIS, Mgr.
DUBUQUE, IOWA.

CLASSIFIED BUYER'S GUIDE.

To Find Address of any Firm given here, consult their advertisement.

For its location in this issue, see Index on Page 17.

Anvils.
Columbus Forge & Iron Co.
Eagle Anvil Works.
Hay-Budden Mfg. Co.
Horace T. Potts Co.
Wiebusch & Hilger.
Peter Wright & Sons.

Annealing Furnaces.
National Economic Gas Blast Co.

Automobile Specialties.
Cray Brothers.

Axles.
Timken Roller Bearing Axle Co.

Axle Gauge.
Cray Bros.

Axle Nuts.
Cray Bros.

Blacksmiths & Wagon Builders Tools & Supplies.
Beals & Co.
Buffalo Forge Co.
Campbell Iron Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Champion Tool Co.
Cray Bros.
Cummings & Emerson.
Heller Bros.
E. F. Reece Co.
Silver Mfg. Co.
Wells Bros.
Wiley & Russell.

Blowers.
Buffalo Forge Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Electric Blower Co.
Roth Bros. & Co.

Bolt Clippers.
Chambers Bros. Co.
Champion Tool Co.
H. K. Porter.

Bolt Cutters.
H. B. Brown & Co.
Wells Bros.

Books.
Chas. C. Thompson Co.

Building Materials.
Chicago Housewrecking Co.

Built Up Wood.
Joel H. Woodman.

Calks.
Franklin Steel Works
Rhode Island Perkins Horseshoe Co.
Phœnix Horseshoe Co.

Calking Machines.
American Calking Mach. Co.
L. S. P. Calking Machine Co.
Rowe Calk Selling Co.

Carriage Top Dressing.
West Mfg. Co.

Carriage Rims.
May Bending Works.

Carriage Specialties.
C. C. Bradley & Sons.
Crandal, Stone & Co.
Cray Brothers.

Coke.
Bourne Fuller Co.

Corporations.
Lawyer's Corp. Trust Co.

Cycles.
Mead Cycle Co.

Disc Grinders.
A. E. Durner.

Drills.
Buffalo Forge Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Silver Mfg. Co.

Emery Grinders.
Kerrihard Company.
Crescent Machine Co.
Waupaca Novelty Works.

Emery Wheels.
Chicago Wheel & Mfg. Co.

Fifth Wheels.
Dayton Fifth Wheel Co.

Files & Rasps.
Heller Bros. Co.
Nicholson File Co.

Forges.
Buffalo Forge Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Silver Mfg. Co.

Gas & Gasoline Engines.
Air Cooled Motor Co.
Ajax Iron Works.
H. L. Chapman.
Fairbanks-Morse & Co.
Foos Gas Engine Co.
Gade Bros. Mfg. Co.
Wm. Galloway Co.
Gilson Mfg. Co.
International Harvester Co.
Kansas City Hay Press Co.
New Era Gas Engine Co.
New Way Motor Co.
Schmidt Bros.
Sheffield Gas Power Co.
Sidney Tool Co.
Steffey Mfg. Co.
M. Steiner & Co.
Temple Pump Co.
Waterloo Gasoline Engine Co.
Witte Iron Works.

Gas Lamps.
Brilliant Gas Lamp Co.

Gears.
Akron Selle Co.

Hammers.
Champion Tool Co.
Heller Bros.

Hardening Solutions.
Anti-Borax Compound Co.

Hoof Cutters.
Bliss Mfg. Co.

Hoof Pads.
Rutherford Rubber Co.

Horseshoes.
Bryden Horseshoe Co.
Giller Acme Horseshoe Co.
Phœnix Horseshoe Co.
Rhode Island Perkins Horseshoe Co.
U. S. Horseshoe Co.

Horseshoe Nails.
Capewell Horse Nail Co.
Union Horse Nail Co.

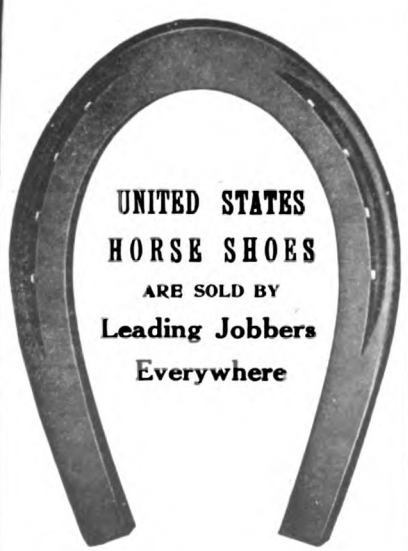
Horseshoe Pads.
Morgan & Wright.
Revere Rubber Co.
Rutherford Rubber Co.

Horse Stocks.
Geo. Barcus & Co.

Horse Training.
Prof. Jesse Beery.

Hub Borers.
Abbott & Co.
Silver Mfg. Co.

Igniters.
Dayton Electrical Mfg. Co.
Knoblock-Heideman Mfg. Co.



When You Buy Horse Shoes

Is it not preferable to make your selection from the most complete line and the best shoes on the market?

United States Horse Shoes

"In a Class by Themselves"

Our Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today.

We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.

United States Horse Shoe Company
Rolling Mills and Factory, ERIE, PA.

Iron.
Bourne Fuller Co.
Campbell Iron Co.
Milton Mfg. Co.

Knives.
Woodworth Knife Works.

Lathes.
Sebastian Lathe Co.
Sidney Tool Co.

Lawn Mower Grinders.
Chicago Wheel & Mfg. Co.
Vulcan Iron Works.

Lighting Systems.
Brilliant Gas Lamp Co.
Dayton Electrical Mfg. Co.

Machinists' Tools.
Morse Twist Drill & Machine Co.

Magnetos.
Dayton Electrical Mfg. Co.
Knoblock-Heideman Mfg. Co.

Nuts.
Milton Mfg. Co.

Paints & Varnishes.
Campbell Iron Co.
Felton, Sibley & Co.

Patents.
H. S. Hill.
N. J. Smith.

Patent Attorneys.
Chas. E. Brock.
Chandlee & Chandlee.
Watson E. Coleman.
Herbert Jenner.
Havell & Havell.
R. S. & A. B. Lacey.
C. L. Parker.
James J. Sheehy & Co.
N. J. Smith.
Milo B. Stevens.
Geo. E. Tew.
E. E. Vrooman.

Planes.
Gage Tool Co.

Plow Shares.
Crescent Forge & Shovel Co.
Star Mfg. Co.

Plumbing Supplies.
Chicago Housewrecking Co.

Poles.
Boob Wheel Co.

Pole Ends.
Crandal, Stone & Co.

Power Hammers.
Fairbanks, Morse & Co.
Kerrihard Company.
Macgowan & Finigan.
Mayers Bros.
Modern Sales Co.
Novelty Iron Works.
Star Foundry Co.
Sterling Machine Works.
West Tire Setter Co.

Printers.
Hausauer-Jones Printing Co.

Pulley Breaking Bridles.
Prof. Jesse Beery.

Punches.
Badger State Machinery Co.
Bertsch & Co.
Buffalo Forge Co.
Little Giant Punch & Shear Co.
Luther Mfg. Co.

Rubber Horse Shoes.
Rutherford Rubber Co.
Revere Rubber Co.
Walpole Rubber Co.

Saws, Band.
Crescent Machine Co.
Sidney Tool Co.
Silver Mfg. Co.
Waupaca Novelty Co.

Schools.
International Correspondence School.
Rose Polytechnic Institute.

Screw Plates.
A. J. Smart Mfg. Co.
Butterfield & Co.
Hart Mfg. Co.
E. F. Reece Co.
Wells Bros. Co.
Wiley & Russell Mfg. Co.

Shafts.
Boob Wheel Co.

Shaft Couplings.
C. C. Bradley & Son.

Shaft Ends.
Crandal, Stone & Co.

Shears.
Bertsch & Co.
Buffalo Forge Co.
Little Giant Punch & Shear Co.

Spoke Machines
House Cold Tire Setter Co.
Silver Mfg. Co.

Springs.
Harvey Spring Co.
Raymond Mfg. Co.
J. H. Sessions & Son.

Steel Stamps.
Fred C. Kautz & Co.
Geo. M. Ness, Jr.

Steel.
Bourne Fuller Co.
Firth Sterling Steel Co.

Steel Shapes.
Crescent Forge & Shovel Co.
Star Manufacturing Co.

Stocks & Dies.
Butterfield & Co.
Canedy-Otto Mfg. Co.
Champion Blower & Forge Co.
Hart Mfg. Co.
E. F. Reece Co.
A. J. Smart Mfg. Co.
Wells Bros. Co.
Wiley & Russell.

Tenoning & Boring Machines.
Silver Mfg. Co.
Sidney Tool Co.
Vulcan Iron Works.

Tire Heaters.
Rochester Tire Heater Co.
West Tire Setter Co.

Tires, Rubber.
Morgan & Wright.

Tire Setters.
Brooks Tire Machine Co.
House Cold Tire Setter Co.
Luther Mfg. Co.
Mayers Tire Setter Co.
National Hydraulic Tire Setter Co.
Rochester Tire Heater Co.
West Tire Setter Co.

Tire Shrinkers.
Buffalo Forge Co.

Tools.
Champion Tool Co.
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Tops & Trimmings.
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Transfer Signs.
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Cleveland Twist Drill Co.
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Veterinary Remedies.
Newton Horse Remedy Co.
W. F. Young.

Vises.
Eagle Anvil Works.
Chas. Parker Co.
Prentiss Vise Co.
Rock Island Mfg. Co.

Wagons.
Akron-Selle Co.

Washers.
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Wagon Standards.
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Welding Compound.
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Cortland Welding Compound Co.
Phillips-Laffitte Co.
Weldarine Mfg. Co.

Welding Plates.
Phillips-Laffitte Co.

Well Drills.
Ft. Smith Well Drill Mfg. Co.

Wheels.
Boob Wheel Co.
Buob & Scheu.
Cray Bros.
Madison Wheel Co.

Wheels, Metal
Electric Wheel Co.
Empire Mfg. Co.

Wood Working Machinery.
Buffalo Forge Co.
Crescent Machine Co.
Sidney Tool Co.
Silver Mfg. Co.
Waupaca Novelty Works.

ONLY 60 CENTS Did you ever try to shoe a horse that would not stand still? By the use of my great

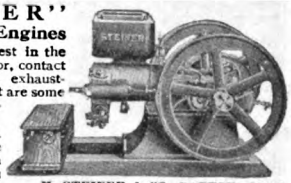


Pulley Breaking Bridle you can make the most restless horse stand as quiet as a lamb—even ugly horses, stallions, etc., completely subdued while being shod. Price, Only 60c postpaid. You should own one.

Will bring business to you. Send for circular telling all about it.

PROF. J. W. BEERY, PLEASANT HILL, OHIO.

"STEINER"
Hoppercooled Engines



are by far the cheapest in the long run, our governor, contact maker, watercooled exhaust-valve, water-lip jacket are some of the numerous advantages.

Send for catalog A and state what size you are interested in or what purpose you intend to use it for.

M. STEINER & CO., DAYTON, OHIO.

The Campbell Iron Co.
ST. LOUIS, MO.
Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material.
WESTERN AGT. FOR DITZLER COLORS IN JAPAN.
Write Dept. B. your requirements.

THE REVELATION GAS BLAST



Blow Pipe, $12.50.



Furnace for Hardening, Tempering, Annealing, Melting, $30.00.

Use Gas and Water only—no bellows, no air compressor. The process is simple and produces a strong and steady blast. Invaluable where no kind of power is obtainable. For brazing, soldering, hardening, tempering, annealing, melting, etc. Save labor and money.

National Economic Gas Blast Co., 88 John St., N. Y.

Shoe Boils, Capped Hock, Bursitis
are hard to cure, yet
ABSORBINE



will remove them and leave no blemish. **Does not blister** or remove the hair. Cures any puff or swelling. Horse can be worked. $2.00 per bottle, delivered. Book 6 D free.

Mr. F. C. Beinhauer, 1108 Bradford St., Pittsburg, Pa., writes, March 23, 1910: "I have used ABSORBINE with great success, once for removing a curb, and for big knees on my pacing horse, Johnnie O., 2.17¼."

W. F. YOUNG, P. D. F., 230 Temple St. Springfield, Mass.

See Page 32—If you want more customers, their good will, more business, more trade, and therefore more profits, don't fail to see the "Calendar" advertisement on that page.

The American Blacksmith Company, Box 974, Buffalo, N. Y., U. S. A.

"NEW EASY" 4 Sizes **BOLT CLIPPERS** "EASY" 2 Sizes

THE GENUINE TOOL



KNOWN AND PREFERRED EVERYWHERE

H. K. PORTER EVERETT, MASS. U. S. A.

SELL WHAT YOU DON'T NEED

Get rid of some of that stuff that is simply taking up valuable room in your shop. Announce it for sale in our Classified Columns. 25 cents per line. Figure seven words to the line and count in the address.

THE AMERICAN BLACKSMITH CO., Box 974, Buffalo, N. Y., U. S. A.

HAVE YOU ANY FRIENDS

in the smithing craft whose good will you especially esteem? There is no better way of showing them your friendship than by a small gift; there is no gift which such a friend would appreciate more than a year's subscription to The American Blacksmith. It will remind him of you constantly for an entire year, and furnish him with interesting, valuable reading which he will greatly like. If you have any friends who are not subscribers, write us for terms of subscriptions for them.

AMERICAN BLACKSMITH CO.
P. O. Box 974, BUFFALO, N. Y., U.S.A.

DON'T BUY GASOLINE ENGINES UNTIL YOU INVESTIGATE "THE MASTER WORKMAN," a two-cylinder gasoline, kerosene or alcohol engine, superior to any one-cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE. **THE TEMPLE ENGINE MFG. CO., 492 West 15th St., Chicago.** THIS IS OUR FIFTY SIXTH YEAR.

Current Heavy Hardware Prices.

The following quotations are lowest prices generally quoted at Chicago, June 11, 1910, and are subject to fluctuations. Corrected for The American Blacksmith by the National Heavy Hardware Reporter, Chicago.

Correspondents report absolutely no changes in Chicago prices at this date. Iron and steel from the mill are still difficult to get.

Trade during the past month is reported as about normal. This is, without doubt, due to the very poor weather. Jobbers reported large orders during March, but these very promising conditions have fallen away greatly.

An event of importance in this connection is the organization in Chicago of the American Iron and Steel and Heavy Hardware Association, embracing the United States. The association starts with 134 members.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—
$2.00 rates, full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$2.00 rates, full extras.

Toe Calks—

	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—

6 x ½ and smaller	60–10%
Larger and longer	50%

Machine Bolts—

4 x ½ and smaller	60–10%
Larger and longer	50%

Nuts—

Less than 10 lbs. of a size	$2.50 off
From 10 to 50 lbs.	3.00 off

Washers—
Same price as nuts.

Skeins—
Cast 65%

Malleables—
Common $ .09

Half Patent Axles— 65%

Springs—

Single Spring, each	$1.25
Springs, black and half bright	.06

Hickory Lumber—Per Foot—

1 to 2½	$.09
2½ to 4¼	.10

Ash and Oak Lumber—Per Foot—

1–1½	$ .07	2½–3	$.08
1½–2	.07½	3½–4	.09

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
½"	$70.00	$70.00	$80.00
⅝"	70.00	73.00	85.00
¾"	73.00	80.00	90.00
⅞" 1" 1¼"	77.00	85.00	109.00

Rough Hickory Axles—

	Each.
3 x 4 6 ft	$ .55
3½ x 4½ 6 ft	.90
4 x 5 6 ft	1.10
5 x 6 6 ft	2.00
4 x 5 6½ ft	1.20
4½ x 5½ 6½ and 7 ft	1.80
5 x 6 6½ and 7 ft	2.50
5½ x 6½ 7 ft	3.00

Finished Hickory Axles—

For 2½ and 2¾ Skeins	$ .95
For 3 Skeins	1.10
For 3¼ Skeins	1.35
For 3½ Skeins	1.50
For 3¾ Skeins	1.80
For 4 Skeins	2.10

Rough Oak Bolsters—

Short	$.07½
12–14–16 ft.	.08½

Finished Oak Bolsters—

2¾ x 3¾ and under	$ .60
3 x 4	.65
3¾ x 4¾	.80

Rough Oak Wagon Tongues—

4 x 4 x 2 x 4 x 12 and smaller	$ .95

Finished Oak Wagon Tongues—

3¼ and smaller	$1.20
3½	1.25
4	1.30

Two Inch Sawed Hounds

	Per Pair
Tongues	$ .35
Front	.40
Hind	.50

Patent Wheels—

A. B. No. 13 and under	45 %
D. No. 13 and under	35–5 %
All Grades, No. 17 to 33	35–5 %
All Grades, No. 39 and Larger	25–5 %
C. No. 13 and under	40–2½ %

Cupped Oak Hubs— Set.

x 8 x 9	$1.40
7 x 9 x 10	1.50
8 x 9 x 10	1.55
8 x 10 x 11	1.80
9 x 10 x 11	1.95
9 x 11 x 12	2.00
10 x 12 x 13	3.00
11 x 13 x 14	4.20
12 x 14 x 15	5.10

Plain End Oak Hubs-Set.

10 x 14	$3.30
11 x 14	4.20
11 x 15	4.50
11 x 16	5.10
12 x 16	5.75
12 x 17	6.30
13 x 18	7.00

Rough Sawed Felloes-

1½ x 2 "	$1.45	2 x 2½"	1.85
1½ x 2½"	1.65	2½ x 2 "	4.35
1½ x 2½"	1.75	3 x 3 "	5.25
		3 x 3½"	5.50

Ironed Poles, White, XXX—

1¾ x 2½" No. 2	$3.80
2 x 2½" No. 3	3.80

Ironed Shafts, White, XXX—

1¾" x 2 " and smaller	$1.95
1¾ x 2 "	2.20
1¾ x 2½"	2.70

Farm Wagon Bows—

Round Top, ¾ x 2 "	$ .60
Flat Top, ¾ x 2 "	.75
Round Top, ¾ x 2½"	1.35

Standard size Piano Bodies with Seats—
Each $4.25

Plow Beams—

1 Horse	$ .60
2 Horse	.75
3 Horse	.90

All Hickory and Oak Spokes and Patent Spokes-
Discount from Weis & Lesh List No. 5.. 5%

Wagon Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2½ x 38"	$2.05	$2.80	$4.00
2½ x 42"	2.70	3.90	5.25
2½ x 46"	4.15		
3 x 44"	4.35	6.70	8.38
3 x 48"	5.25	7.50	10.00

Single Trees—Oval—

	Mixed Forest Second Growth	White Second Growth
2½"	$1.50	$2.70	$3.35
2½"	1.60	2.75	3.50
2½"	1.65	2.80	3.65
3 x 36"	2.30	3.30	4.10
3 x 38"	2.35		
3 x 40"	2.50	3.85	4.65

Single Trees—Round—

	Forest	Second Growth
2½"	$1.90	$3.45
2½"	1.90	3.50
2½"	2.00	3.60
2½"	2.65	4.10
3 "	3.20	4.65

Oval Plow Doubletrees—

2½ x 36"	$1.60
3 x 40"	2.40

Flat Plow Doubletrees—
1½ x 3½ x 42" $2.75

Wagon Doubletrees—

2 x 4 x 48"	$3.40
2½ x 48"	4.50
2½ x 4½ x 50"	4.90
2½ x 4½ x 52"	5.25
2½ x 5 x 52"	6.00
2½ x 5 x 54"	6.75
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—

	Forest
2½ x 30" and under	$ .90
2½ x 30" and under	1.15

Buggy Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½" and smaller	$2.50	$3.50	$4.50

Express Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.80	$3.55	$4.80
2½"	3.40	4.50	5.25
3 "	3.40	4.15	5.50

Express Singletrees, Turned—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.25	$2.50	$3.50
2½"	2.75	3.50	3.75
2½"	3.25	3.75	4.50

Express Singletrees, Square Center—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.75	$4.00	$5.00
2½"	3.25	5.20	5.75

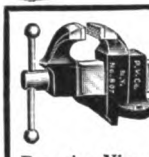
Buggy Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2 x 42"	$2.60	$3.25	$4.25
2½ x 2½ x 42"	3.00	3.50	5.00

CUMMINGS & EMERSON
Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.

HANDY LAMP
GASOLINE LIGHTING SYSTEM
Gives a 300 Candle Power Shadowless Light the instant you move the lever. Turns up or down, like gas, burns when not in use, or can be turned up instantly when more light is needed. It floods a 50-foot space with a brilliancy like daylight. Far cheaper than gas, kerosene or electricity, and so simple that anyone can use it. Catalog A. B. tells why. Send for it now.

BRILLIANT GAS LAMP CO.
DEPT. 12, 42 STATE ST. CHICAGO, ILL.

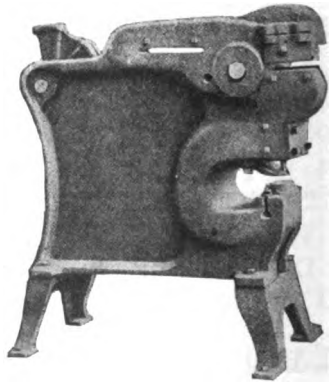

PRENTISS
Patent Vises
BEST MADE
Large Illustrated Catalog Free
Prentiss Vise Co., Hardware Bldg., New York



We Manufacture
SHEARS AND PUNCHES
Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.
BERTSCH & CO.
Cambridge City, Ind.

CORPORATIONS ORGANIZED
Incorporate your business under liberal Delaware Laws and avoid personal or partnership liability. Fraternal insurance and business companies organize at minimum cost. Different kinds of business may be transacted under the same charter. Law fully adjudicated by our courts. Write for information.
LAWYERS' CORPORATION TRUST CO.
WILMINGTON, DEL.

HARVEY BOLSTER SPRINGS
Also Carriage and Auto Springs
Sold by leading jobbers or write us.
Harvey Spring Co., Box 31, Racine, Wis.

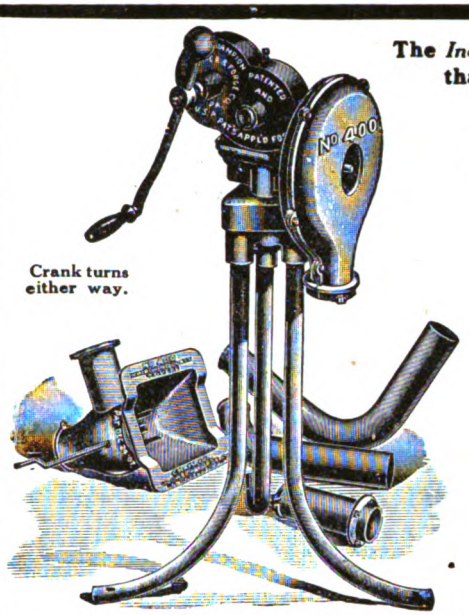

No. 5 Combined Punch and Shear

Punches ⅝ in. hole through ⅝ in. iron. Shears 5 in. x ½ in. flat iron bars. Shears 1¼ in. round iron bars. Shears 8 in. x ¼ in. band iron.
Our Large Descriptive Circular will interest you. So will our price.
BADGER STATE MACHINERY CO.
19-25 Trinity Street Janesville, Wis.

The *Incomparable* 400 Blower, the one great *Heirloom* that will be handed down *from one generation to the other. Ask what the owners say*

MADE WITH BALL BEARINGS ONLY

Nearly Half A Million in Use

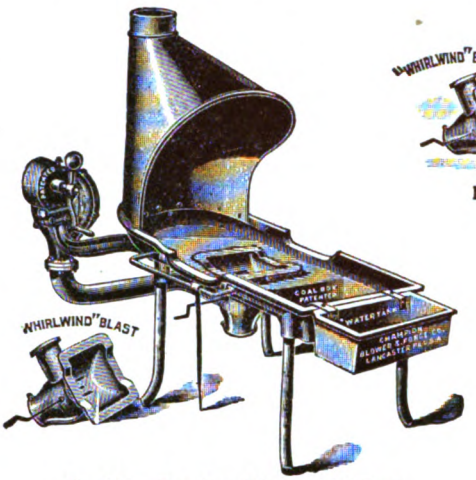
The No. 400 is the Blower that has REVOLUTIONIZED the World in Making Hand Blast



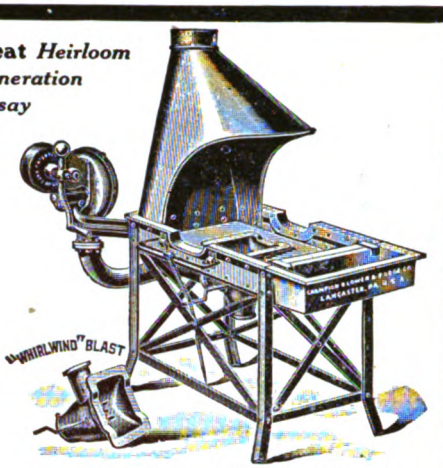
Crank turns either way.

No. 400

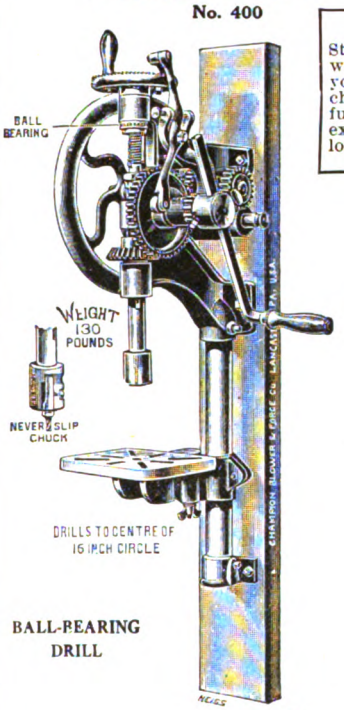
The No. 400 Steel Blower will serve the youngest mechanic faithfully without expense for a long lifetime.



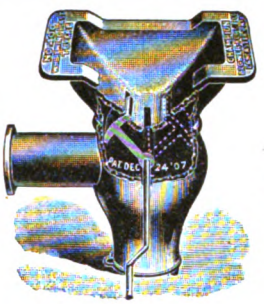
No. 433. Cast Iron Blacksmiths' Forge



No. 408. Steel Blacksmiths' Forge



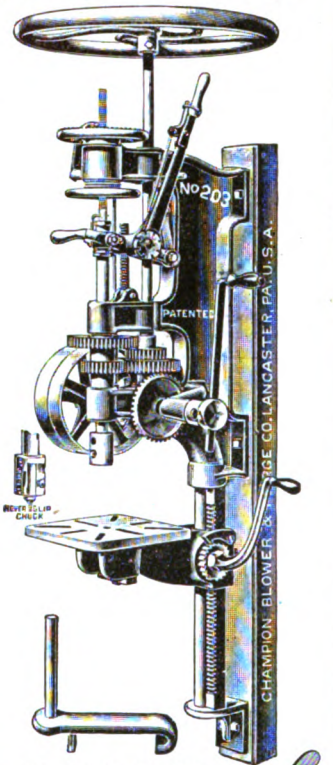
BALL-BEARING DRILL



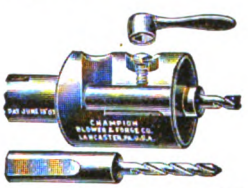
A Tuyere Iron That Makes A Whirlwind Blast.

The No. 400 Champion "Whirlwind" Blast Anti-Clinker, Heavy Nest Tuyere Iron is furnished with all No. 400 Blowers WITHOUT EXTRA COST.

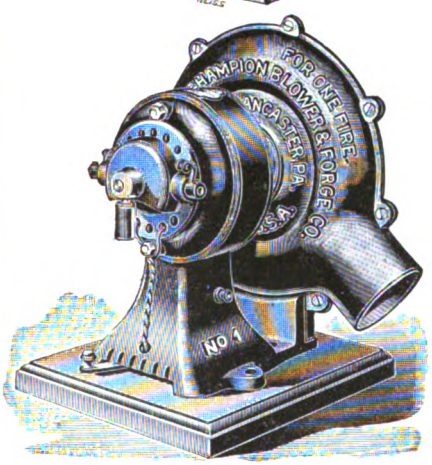
The "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron produces a circular, rotary whirlwind blast and concentrates the heat in the tuyere nest, not permitting it to blow up and out of the chimney, therefore, makes a hotter fire and heats the iron one third quicker, saving much coal.



No. 203. Self-feed and Double Compound Lever-feed Drill.



The Champion Patented Never-Slip Chuck is applied to all CHAMPION DRILL SPINDLES without extra charge.

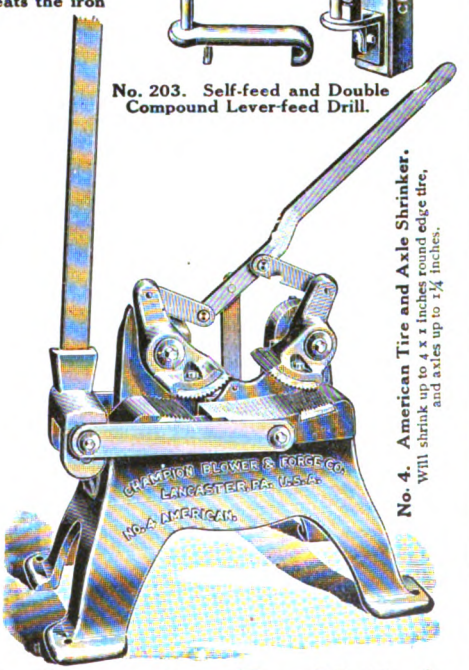


No. 1—One-Fire Variable Speed Electric Blacksmiths' Blower, with five speeds for LIGHT, MEDIUM and HEAVY fires.



Screw Plates in four styles, cutting up to 1½ in.

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power Blower, or Electric Blower, write for our free catalogue, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4 x 1 inches round edge tire, and axles up to 1¼ inches.

THE CHAMPION BLOWER & FORGE CO., Lancaster, Pa., U. S. A.

"E-Z" Welding Compound

TRADE E-Z MARK — FOR ALL GRADES OF STEEL — WELDING COMPOUND

PAT. MAY 27, 1902

WILL MAKE PERFECT WELDS

AT 250 DEGREES LOWER HEAT THAN ANY OTHER

"E-Z" **will stick** to the metal when metal is at low heat and is **excellent** for Spring Steel, Tool Steel, Tire or Axle Welding.

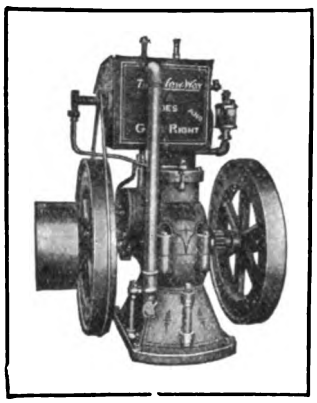
For sale by all leading Jobbers. Send to us for **free prepaid sample.** Manufactured only by

ANTI-BORAX COMPOUND COMPANY

MANUFACTURERS OF

WELDING, BRAZING AND TEMPERING COMPOUNDS

Fort Wayne **Indiana** **U. S. A.**



THE "New-Way" AIR COOLED ENGINES

ORIGINAL AIR COOLED — QUALITY COUNTS — "NEW-WAY" ENGINE — QUALITY COUNTS — GOES AND GOES RIGHT

For Blacksmith Shop Use

No Water to Freeze—No Tank to Fill

You ought to know what Blacksmiths who are using The "NEW WAY" Engines say about them. A post card will bring our catalog and a book of letters from users, that may save you buying two engines to get one you can use.

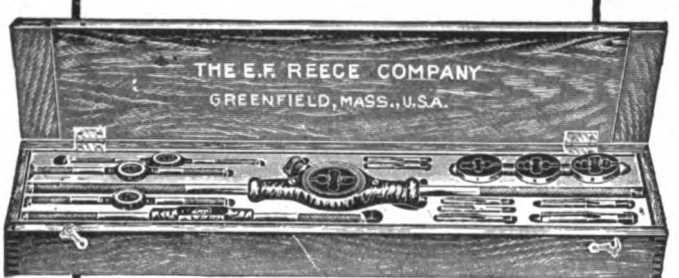
WRITE FOR CATALOG K.

THE "New-Way" MOTOR COMPANY
LANSING, MICHIGAN, U.S.A.

60 Sheridan Street

Reece Combination Screw Plate No. 103

$8.25 NET WILL BUY ONE



The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16 — 18, 3-8 — 16, 7-16 — 14, 1-2 — 12, 5-8 — 11, 3-4 — 10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustable, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only $8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

THE E. F. REECE CO., Greenfield, Mass., U. S. A.

Ask your dealer to show you the



Trenton Anvil

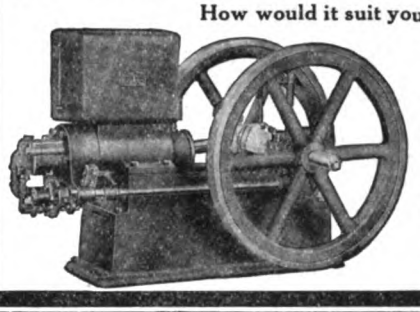
The favorite of blacksmiths and horseshoers everywhere

It has the shape
It rings like a bell
It does the work

Ask for the INDIAN CHIEF Blacksmith Vise.

$ MORE DOLLARS; LESS WORK $

How would it suit you to take the agency for

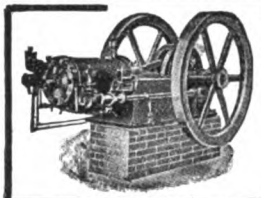


WITTE GASOLINE ENGINES

Your experience is worth something. If you use a "Witte" your customers will want them; **why not sell them and make the profit?** Our engines are **GUARANTEED FIVE YEARS**

Have been on the market 25 years; advertised and sold everywhere. **Lots of good selling points.** Write for introductory proposition, stating size you can use.

WITTE IRON WORKS CO.
1617 Oakland Ave. Kansas City, Mo.

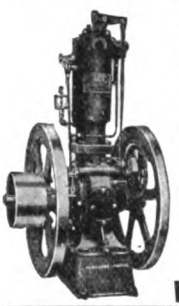


THE AJAX GAS AND GASOLINE 4 Cycle 5 to 10 H. P. ENGINES

For the small power user there are no better engines made. Their construction combines strength, simplicity and economy. Backed by the most accurate workmanship, made of the highest grade of material, every part interchangeable, our engines give years of satisfactory service. Learn more about them. Our big illustrated catalog mailed **free** on request,

AJAX IRON WORKS, CORRY, PA.

Get Two Profits On One Engine

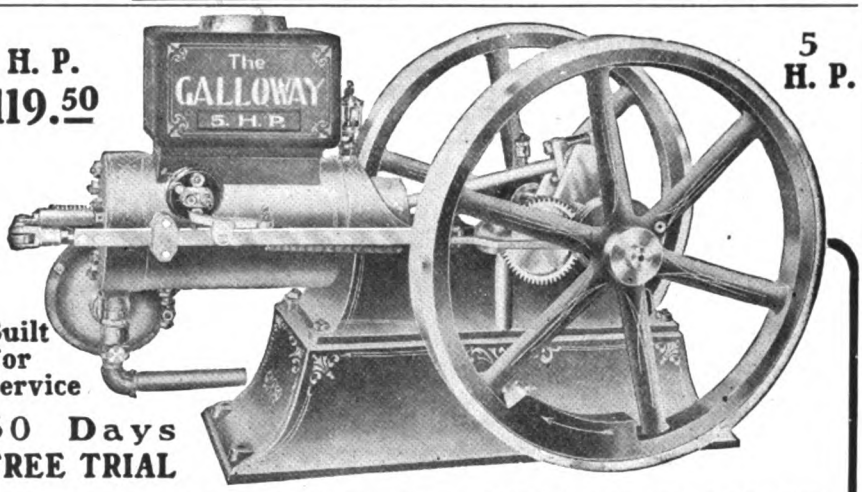


Many blacksmiths can nearly double their profits by having a reliable **Fairbanks-Morse** gasoline engine in their shop to operate their machinery. By becoming an agent you get your engine at the agent's price and save dollars in time and hard work. Then, it's so easy to demonstrate their many superior features to your customers when in actual operation.

SEND FOR CATALOG NO. 487 AK.

Fairbanks, Morse & Company,
481 WABASH AVE., :-: CHICAGO, ILL.

5 H. P.
$119.50



5 H. P.

Built For Service

30 Days FREE TRIAL

THE GALLOWAY GASOLINE ENGINE

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa

will run your shop at several times its present capacity and enable you to take lots of jobs that you have to turn down now because you have not the capacity.

Only four things to do: **Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start,** and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high-grade engine for 15 years. Over 2,500 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember the bore and stroke counts and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests,

On the larger sizes, if it is not entirely convenient for you to pay all cash, I will take your note for the balance at the regular rate of interest for 6 months.

The price given is for the 5-horse power only, but we make these engines in seven sizes.

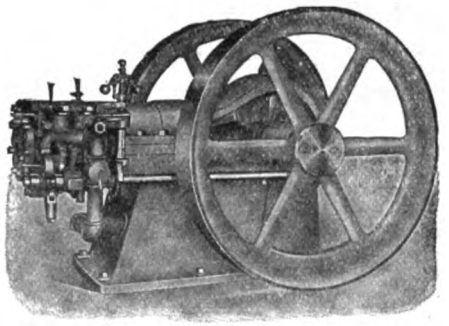
Note my special proposition to blacksmiths.

I have a plan by which every blacksmith can partly or entirely pay for his own machine. It's good; it's away out of the ordinary; and you will be overlooking a big chance if you don't write for my proposition.

Ask for my free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure.

WRITE TODAY. **WILLIAM GALLOWAY, President.**

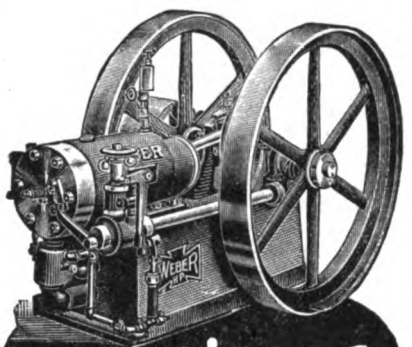
THE WILLIAM GALLOWAY COMPANY, 577 Jefferson St., Waterloo, Iowa.



Write for booklet describing full line of Gas and Gasoline engines, from 3 to 100 H. P. Special inducements to dealers as agents.

Sold Under A Positive Guarantee.

The New Era Gas Engine Co.
No. 63 Dale Ave. Dayton, Ohio.



The Engine of Reliable Records

Getting the most engine for your money does not mean buying the cheapest—it is a matter of securing an engine that will give reliable results year in, year out—the speed must be steady and uniform—absolute interchangeability of parts assured—actual power must equal rating. Every requirement of the blacksmith who wants a simple, reliable, powerful engine for all light work—running drills, emery wheels, blowers, etc.—is met by the

Weber
Gas or Gasoline Engine

Some of its special features are—underground gasoline reservoir for main gasoline supply—gasoline pump, pumping supply to engine; surplus returning to reservoir—electric igniter—heavy and rigid construction (see cut)—a perfect control governor by which the operator can change speed instantly—all parts easy of access and guaranteed interchangeable—small number of moving parts. It takes but little room, adds to capacity of shop and costs little to operate,

Sold Under Our Absolute Guarantee

Write today, telling us for what you need power and we will send you our new handsomely illustrated catalog fully describing the Weber Engine best suited to your requirements.

Sheffield Gas Power Co.
121 Winchester Place Kansas City, Mo.

Let it Furnish Power for You

Blacksmiths Can Set the Self-Setting PLANE



right the first time trying. Just drop the plane iron and cap back in the plane and turn a thumb screw and it is set exactly right. Five seconds does it. They are sent on trial. Ask any Carpenter. We will send you a hard, tough Carpenter's Pencil if you will send us ten addresses of plane users and mention this paper.

CAGE TOOL COMPANY, VINELAND, N. J.



STEEL STAMPS

Steel Letters and Figures

BURNING BRANDS

Stencil Dies, Stencils, Etc.

GEO. M. NESS, JR.

61 Fulton St., New York

Price List sent upon application





WHEELS

Steel Tire, per set, . . $ 6.25

Rubber Tire, per set, . 13.30

Rubber Tires put on at $6.70 per set.

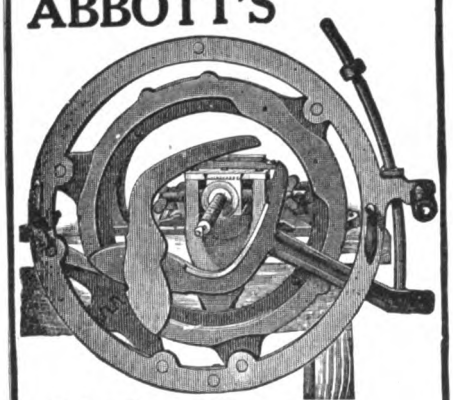
Auto Tops, $25.00. Buggy Tops, $5.00.

Buy from the manufacturer. We can save you money.

BUOB & SCHEU

500 COURT ST. CINCINNATI, OHIO

ABBOTT'S



Little Giant Hub Borers

AND Abbott's Box Puller

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

PHINEAS JONES & CO., Newark, N.J.

General Agents for the Eastern States

"TOOLS THAT WEAR" HELLER'S CELEBRATED AMERICAN HORSE RASPS, FILES AND FARRIER'S TOOLS

will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and Tempered by a Secret Process.



HORSE RASP.

New Catalogue Mailed Free on Application.

HELLER BROTHERS CO., Newark, N. J., U. S. A.

BORAX-ETTE FOR STEEL TRADE MARK REGISTERED AUG. 22 1905 A PERFECT WELDING FLUX.

PREPARED ESPECIALLY FOR WELDING FAR SUPERIOR TO COMMON BORAX

Try Borax-ette for Welding Toe-Calks

THEY WON'T KNOCK OFF

It makes steel weld like iron. It has no equal for welding tires, axles and springs

FOR SALE BY ALL DEALERS

SAMPLES FREE

CORTLAND WELDING COMPOUND CO., Cortland, N. Y.

We make the following sizes:
No. 1, 3 in. wide, 14 in. high
" 2, 3¼ " 14 "
" 3, 3¼ " 10 "
Weight per set of 4, 16 pounds.



The Bruce Malleable Wagon Standard

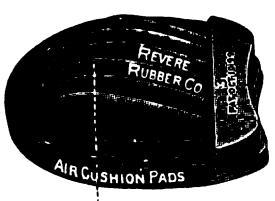
Tested thoroughly and guaranteed strictly as represented. Note its great advantages over the old style.

1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.
2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.
3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only a ⅞-in. face.
4. Great time saver. Can be attached to bolster in one fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, write today and ask for prices.

A. H. HARSHBARGER, Danville, Ill.

AIR CUSHION RUBBER HORSESHOE PADS



SEE THAT CUSHION?

It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



Heavy Leather Back

NO LAMENESS

NO SLIPPING

Write us for further information

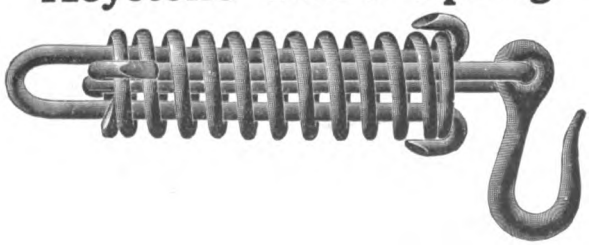


Exposed Leather Back

REVERE RUBBER COMPANY

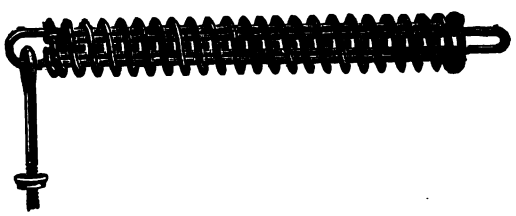
Sole Manufacturers BOSTON, MASS.

Keystone Trace Spring



makes the load lighter for the HORSE and the road smoother for the DRIVER.

Raymond Pole Spring



takes the weight of the Pole off the Horse's back.

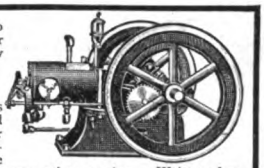
Every Comfort for the Horse is Economy for the Owner

Manufactured by

RAYMOND MANUFACTURING COMPANY, LTD., CORRY, PA.

For Sale by Jobbers

YOU cannot afford to buy an engine to use or to sell until you know more about the

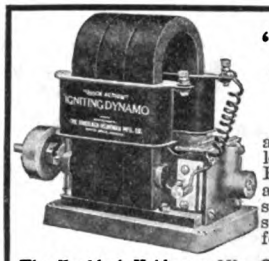


ECONOMIZER

the engine that pleases every customer and never comes back after the 30 days' trial, because they do more work for a dollar than any other engine. Write today.

H. L. CHAPMAN
Box A Marcellus, Mich.

WHEN WRITING TO ADVERTISERS MENTION THE AMERICAN BLACKSMITH



"Quick Action"

Igniting Dynamos Excel all others.

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heideman Mfg. Co., South Bend, Ind.

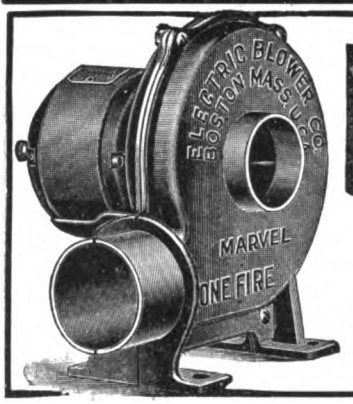
HORSE SHOE BAR IRON

—MADE BY—

The Milton Mfg. Company,

MILTON, PENN'A.

Is of Superior Strength and Quality. We can prove it. Write us.





MARVEL

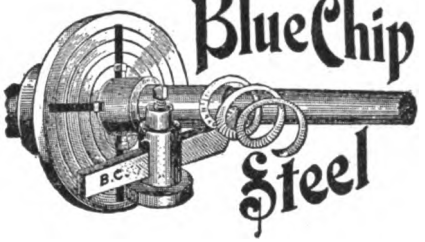
"One Fire" Variable Speed Electric Forge Blower

$28.00 Net

Gives 100 per cent greater air pressure than any other "one fire" outfit.

30 days' Free Trial, through your dealer.

ELECTRIC BLOWER COMPANY
BOSTON, MASS.



Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.

McKEESPORT, PA.

Selling Agencies

NEW YORK CHICAGO
BOSTON PHILADELPHIA

"CHICAGO"

EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



"CHICAGO"

WHEELS SAVE TIME

They're made of stuff that cuts

Emery Wheels, Glue, Emery, Polishing Wheels, Grinding Machinery

136 Page Catalogue for the Asking

Chicago Wheel & Mfg. Co.
108 SO. ABERDEEN ST.
CHICAGO, U. S. A.

SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades
Fully guaranteed
All sizes in stock

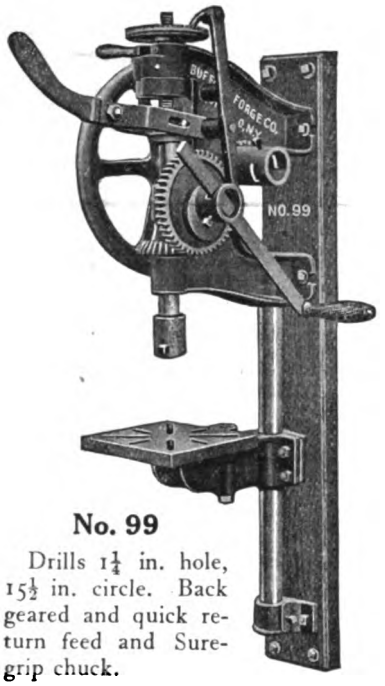
THE
BOURNE-FULLER CO.
IRON STEEL
PIG IRON
COKE

Cleveland, Ohio.

Buffalo Ball Bearing Drills

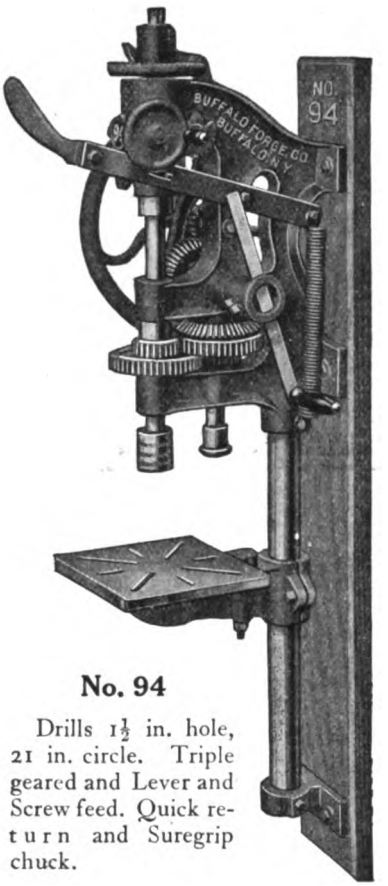
Equipped with All the Latest Time and Labor Saving Devices

The Only Drills with Ball Bearings at the point of High Speed Friction



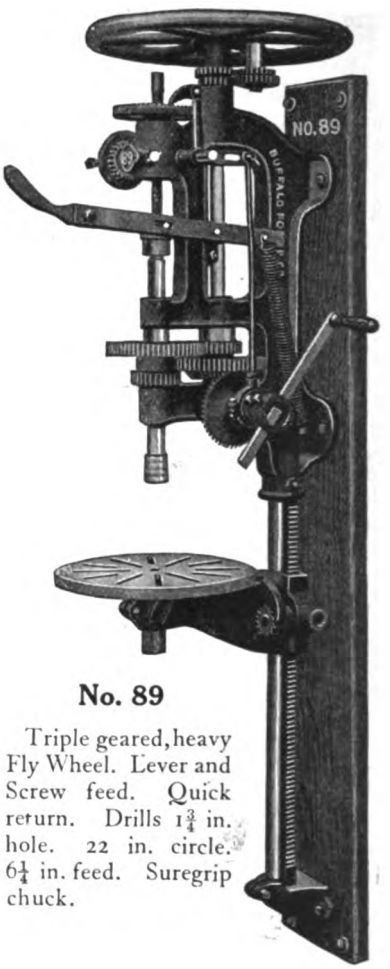
No. 99

Drills 1¼ in. hole, 15½ in. circle. Back geared and quick return feed and Suregrip chuck.



No. 94

Drills 1½ in. hole, 21 in. circle. Triple geared and Lever and Screw feed. Quick return and Suregrip chuck.



No. 89

Triple geared, heavy Fly Wheel. Lever and Screw feed. Quick return. Drills 1¾ in. hole. 22 in. circle. 6¼ in. feed. Suregrip chuck.

You will find these drills easy to operate at their full capacity. The end thrust of the swiftly revolving drill spindle is balanced upon ball bearings. All journal bearings are extra long, bored and reamed in the solid metal of the frame. The gears mesh perfectly. All parts are accurately fitted, and operate without lost motion, back lash, or noise.

A half turn of the small lever at the feed screw head gives hand lever control with

Full and Instant Return of Drill Spindle

You do not have to turn back the feed screw or even lift the drill from the work. Think of the time and labor you save. A half turn back instantly and reliably locks the power feed.

Each of these Drills is equipped with

Buffalo Suregrip Chuck

which has no projecting parts to injure your hands or tear your clothing. The chuck positively locks the drill with a half turn of the collar, and without the use of a tool.

Write now for Catalog 178 A. B.

Buffalo Forge Company
Buffalo, N.Y.

20,000 Bargains for Iron Workers!

From Sheriffs', Receivers' and Manufacturers' Stocks

All goods sold on a binding guarantee. Your money back if you're not satisfied.

Every article in this advertisement is guaranteed brand new and first class.

CHICAGO HOUSE WRECKING CO.

Our plant covers 40 acres of ground and is one of the most wonderful mercantile institutions in the land. Our capital is one million dollars. Our responsibility is unquestioned.

Our stock includes practically everything under the sun. Millions of dollars' worth of brand new, high grade merchandise **bought by us at various sales** is offered to the public **at prices usually less than the original cost of production.** We offer an exceptional opportunity to those who buy now, so send us a trial order. This will convince you.

Read every word of our greatest sale. **Never before** have prices been cut deeper than those quoted in this advertisement. **Every item** means a **big saving for you. Make your selection at once.**

SPECIAL SALVAGE SALE OF ENTIRE CARGO STEAMER "WISSAHICKON"

Merchant Bar Steel in Stock.

The following brand new steel bars are in the same condition as rolled at the mill, except slightly rusted as they were at Cargo from the steamer "Wissahickon" recently foundered near Detroit, Mich.

☞**Send us a list** of quantity and sizes you can use and we will quote you prices way below the market.

Lot No. AB 211.		Rounds Bar Steel.
10,000 ft.	¼ in.	16 to 18 ft. lengths
10,000 ft.	⅜ in.	" " " " "
10,000 ft.	½ in.	" " " " "
10,000 ft.	⅝ in.	" " " " "
2,000 ft.	1¼ in.	" " " " "
11 – 3½ in.		rounds 22 ft.
13 – 4 in.		" " "
5 – 4½ in.		" " "
2 – 6 in.		" " "

Lot No. AB 212		Squares Bar Steel.
1,000 ft.	⅜ in.	sq., 16 to 18 ft. long
500 ft.	1 in.	sq., 14 to 16 ft. long
500 ft.	1¼ in.	sq., 16 to 18 ft. long

Lot No. AB 213		Flats. Bar Steel.
2,000′ 1 x¼	in.	14 to 16 ft. lengths
400′ 1 x½	in	" " " " "
1,500′ 1½x⅜	in.	" " " " "
1,000′ 1½x½	in.	" " " " "
700′ 1½x⅝	in.	" " " " "
200′ 1½x¾	in.	" " " " "
500′ 1½x⅞	in.	" " " " "
200′ 2 x½	in.	" " " " "
2,000′ 2 x⅝	in.	" " " " "
300′ 2½x⅝	in.	" " " " "
200′ 2½x½	in.	" " " " "
10,000′ 2½x⅜	in.	" " " " "
100′ 6 x1	in.	" " " " "
400′ 4 x½	in.	8 " 12 " "

Lot No. AB 214.		Steel Bands in Scrolls.
30	bundles,	1 x⅛ in.
14	"	1¼x⅛ in.
26	"	1½x⅛ in.
14	"	1¾x⅛ in.
30	"	2 x⅛ in.
10	"	2½x⅛ in.
25	"	3 x⅛ in.
30	"	4 x⅛ in.
8	"	5 x⅛ in.
10	"	6 x⅛ in.
6	"	6 x⅛ in.

Lot No. AB 216.		Steel Hoops in Coils.
12 coils	1 inch	20 gauge
12 coils	2 inch	14 gauge

Lot No. AB 217. Steel Channels (up to 32 ft. long).

10 ton 3 inch 4 lbs. to the foot
10 ton 4 inch 5½ lbs. to the foot

Lot No. AB 218. "T" Steel
10 ton 3½-inch flange, 4 inch stem by ½-inch thick.
In lengths up to 24 feet.

Lot No. AB 220.		Steel Plates.
39 – ¼	in.x5	ft.x10 ft. plates
10 – ⅜	in.x5	ft.x10 ft. "
5 – ½	in.x5	ft.x10 ft. "
3 – ⅝	in.x5½	ft.x20 ft "
1 – ⅝	in.x5	ft.x27 ft. 5 in."
1 – ½	in.x5	ft.x27 ft. "

☞Don't fail to write at once and send us a list of sizes you can use.

New Wrought Anvils 5c. per lb.



Best quality, form and finish. Steel face is a solid piece planed smooth after welded.

Lot No. 4-A-115.

Absolutely guaranteed. Weight 150 to 200 lbs.
Price per lb..... 5c.

Horseshoe Nails, 5c. lb.



Lot No. 4-A-B-96.

Queen City Special, cold rolled Horseshoe Nails, sizes 7, 8, 9, put up 25 lbs. bulk in a box.
Price, per lb... 5c.

"Bonanza" forged and pointed, warranted Horseshoe Nails, made of best Swedish stock, sizes 7, 8, 9, put up in bulk, 25 lbs. to box.
Price, per lb..... 6c.

2,000 boxes of **"Bay State"** cold rolled Horseshoe Nails, made of best Norway Iron, sizes 7, 8, 9 and 10.
Price in bulk, 25 lbs. to box..... 5½c. lb.
Or in 5 lb. cartons ..... 7½c. lb.

Sledges, Etc.

Lot AB No. 37.

Cast steel, in first class condition.

1 lot of **Spauling Hammers,** ranging in weight from 10 to 18 lbs.

1 lot of **Mason's Double Face Hammers,** ranging in weight from 10 to 18 lbs.

1 lot of **Single Sledges,** ranging in weight from 14 to 25 lbs.
Price per lb. of any of the above, 3c

Vises.

Lot AB No. 12.

Quick Acting Vises of the Emmert make, strictly A1, brand new, first class in every particular. These are regular box bench vises ranging from 90 to 150 lbs.
Price per lb., as they come..... 5c

Wrought Iron Steel Faced Anvils.

Lot AB No. 13.

Some of these were wet, otherwise in fairly good condition. Weights ranging from 175 to 400 lbs.
Weights up to 250 lbs., pr.lb. 5c Heaver weights, per lb..... 4c



Neckyoke Ferrule and Ring

Lot AB No. 24.

Consists of 150 Oliver Mfg. Co.'s Neckyoke Ferrule and Ring, figure No. 80½-1⅛" ferrule with 3¼x7-16" ring.
Price, each..... 6c

Mixed Bolts, 2½c. per lb.



10 tons brand new mixed **Machine** and **Carriage Bolts,** first class condition, **various sizes mixed** together, from ⅜ to 1 inch diameter and from 2 to 10 inches long.

Price F. O. B. Chicago:
In lots of 25 to 100 lbs.....3c. lb.
In lots of 100 to 500 lbs.....2½c. lb.
In lots of 500 lbs. and up.....2½c. lb

$36 $36 Buys 2 H. P. New Gasoline Engine.



A brand new 2 H.P. electrical ignited Gasoline engine, complete in evrey detail. Ready to run when you receive it, for..... $36.00

This is the greatest offer ever made on Gasoline Engines. This engine is strictly brand new, first class and covered by a binding guarantee. It is the **well known "Superior" make.**

4 H. P. Gasoline Engine for..... $64.00

Larger sizes at equally low prices.

Our five-year guarantee on these engines protects you. Shipped with the understanding that if not entirely satisfactory, may be returned at our expense. No fairer offer could be expected. Every blacksmith or iron worker should have power in his shop, and here is your opportunity.

☞ Write for our great Gasoline Engine Catalog. Tells you how to buy these high grade engines at lowest prices.

$2.95 Ball Bearing Grindstones.



Lot No. 4-A-1266. **Strongest and easiest** running Grindstone on the market. **Angle steel frame. Ball bearing journals.**

60 lb. 2½ in. stone, weight 85 lbs. Price..... $2.95

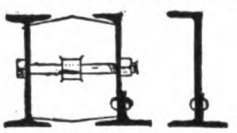
Steel Roofing, per 100 feet, $1.60



100,000 Squares of new Steel Roofing, which we are selling at the following prices, freight prepaid,
Flat.....$1.60
Corrugated, V-Crimped or Standing seam, 1.85

At these prices we prepay freight to all points **east of Colorado,** except Oklahoma and Texas. Quotations to these points on application. Our high grade **Galvanized Rust Proof Roofing** at prices ranging from **$3.00** per square up. Write today for free sample and Great Book on Roofing.

Structural Steel 1½c. Lb.



Over 10,000 tons of Angles, Channels, Tees, "I" Beams, round, square and flat Bars, all first class stock, standard size and lengths, at..... **1½c. per lb.** and up,

You must send us a list of your wants in merchant or structural steel. for prices that will mean a big saving to you.

Horse Shoes $3.00 per Keg.



Brand new Horseshoes, made by Eagle Horseshoe Co. First class order.
Lot No. B-2500
25 kegs No. 0
22 kegs No. 1
Price per 100 lb. kegs.... $3.00

☞FILL OUT THIS COUPON

Chicago House Wrecking Co., Chicago:

I saw your advertisement in **American Blacksmith.** Am interested in the following items:

_____

_____

_____

Do you want Free Mammoth Catalog ? Do you want Free Gasoline Engine Bk ?

Do you want Free Roofing Book ? Do you want Free Structural Steel Bk ?

My Name_____

Town_____

R.F.D._____ P.O. Box_____

County_____ State_____

Aug., 1910, Am. Blk.

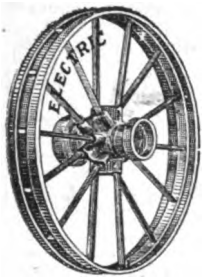
Chicago House Wrecking Co. *35th & Iron Sts.* CHICAGO



WEST'S CARRIAGE AND AUTOMOBILE TOP DRESSINGS. For rubber, leather, and imitation leathers. Preserves all tops permanently. Will not get brittle or crackle. Finish equal to new top.

Send for Sample.

West Mfg. Co., Rockford, Ill.



WE MAKE

STEEL WHEELS

TO FIT ANY AXLE
PLAIN OR
GROOVED TIRE

STEEL OR HICKORY AXLES
ANY SIZE

OUR GROOVED TIRE.

A FULL LINE OF
WOOD AND STEEL FARM TRUCKS
WITH STEEL OR WOOD WHEELS
WRITE FOR LARGE CATALOG AND PRICES

ELECTRIC WHEEL CO., Box A, Quincy, Ill.

THE PERFECT POWER HAMMER



W. C. NORRIS
Manufacturer of Iron Sucker and Connection Rods,
Tiona, Pa.

MACGOWAN & FINIGAN FOUNDRY & MACHINE Co., St. Louis, Mo.

Gentlemen:

Your letter asking how I like your Perfect Power Hammer, received. In reply will say that the two I have in use have given me "PERFECT" satisfaction; they are all right. I have two other makes in use, but I have found your Perfect Hammer much the best of the three; it is much better in every way, more convenient and durable. The fact that I have sent you today an order for two more of the Hammers is evidence that I am pleased with them. Yours truly, W. C. NORRIS.

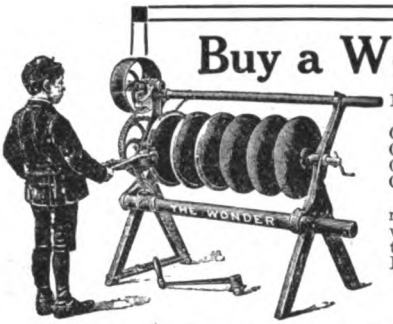
Will ship to any responsible party on approval. If not as represented, no sale. Made in three sizes:

2½ inch square,	30 lb. ram—shipping weight				1100 lbs.
3 "	"	40 "	"	"	1150 "
4 "	"	80 "	"	"	1800 "

Write any jobber for prices, or

Macgowan & Finigan Foundry & Machine Co.
ST. LOUIS, MO.

When you write to an advertiser name The American Blacksmith.



Buy a Wonder Disc Sharpener

Because THE WONDER is the only machine adjusted to all conditions.
Can shear any part of edge to any bevel.
Can shear back from edge as far as required.
Can use tool on either side of disc.
Can shift from one disc to another.
Can do all this without the turn of a set screw or nut, is a positive feed, automatically adjusts itself to wobbling or bent discs; knives made of best grade self-tempered steel; will last a lifetime; for hand and power. For prices write to your jobber or

A. E. DURNER, Manufacturer

Main Office: Evansville, Wisconsin, U. S. A. Made in Evansville, Wis., and London, Ont., Canada

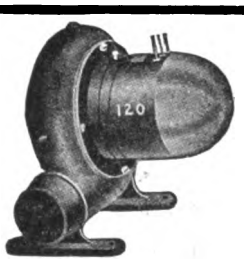


The Finely Tempered Drill

It Has Never Been Equaled

The CLEVELAND Twist Drill Co.

New York CLEVELAND Chicago



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A Cast Iron Cover with machined joints protects the WORKS. Cover can be easily opened on its hinge to see the WORKS. Ask for information.

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136 Liberty Street NEW YORK

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HAUSAUER-JONES PRINTING COMPANY

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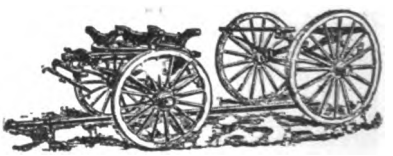
PRINTERS
PUBLISHERS
BOOKBINDERS

Let us submit an estimate on your printing requirements whether they be large or small.

Our facilities enable us to do work reasonably.

: Our organization enables us to do work well. :

Selle Gears

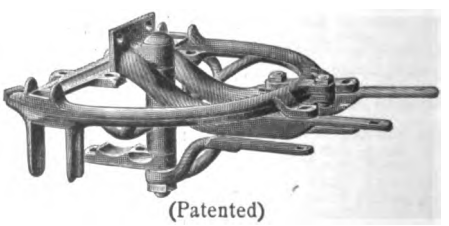


All Styles and Sizes

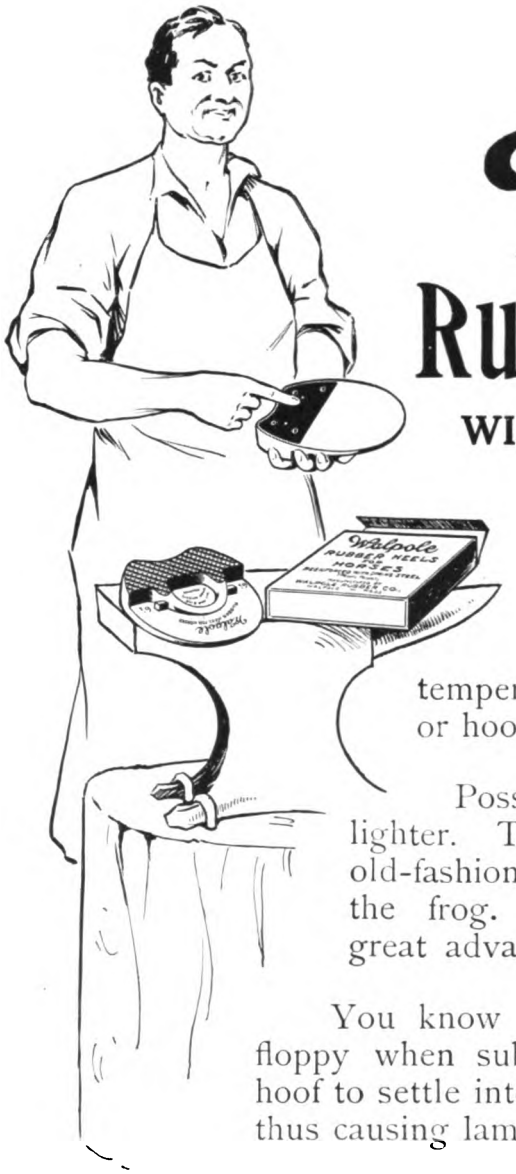
THE AKRON-SELLE CO.

CAT, 4. AKRON, O.

If you can not secure
The Dayton Fifth Wheel
of your Hardware Jobber
make a fuss about it to
The Dayton Malleable Iron Co.
Dayton, Ohio



(Patented)



"Why didn't some one think of this Spring Steel Plate before?"

Walpole

Rubber Heel for Horses

WITH PATENT SPRING STEEL PLATE

When you examine the Walpole you will immediately see its superiority and advantage over all so-called hoof pads or bar shoes.

Made of high grade rubber—reinforced with tempered spring steel plate—the most resilient heel or hoof protection possible.

Possesses every feature of a bar shoe—yet much lighter. The spring steel plate takes the place of the old-fashioned bar—furnishes a larger bearing surface for the frog. Then again it protects the heel—the one great advantage.

You know how quickly all other so-called pads become floppy when subjected to water, snow or slush, allowing the hoof to settle into the pad and bear on the corn or tender spots, thus causing lameness.

This spring steel plate, coming next to the hoof with an even, firm pressure, overcomes this fault and positively relieves all soreness, tenderness, bruises or corns.

The Walpole affords the horseshoer an opportunity to regulate not only the frog, but sole and wall pressure to suit every individual foot. The rubber is unexcelled for its holding qualities on ice or wet surfaces, wood—stone or asphalt pavements.

Do not let another day pass without giving the horses the benefit of the Walpole Rubber Heel.

Nothing even near enough to them to take their place.

Send us a sample order today. You cannot afford to overlook their superiority and profit possibilities.

Walpole Rubber Co., 185 Summer Street, Boston, Mass.

BOTH

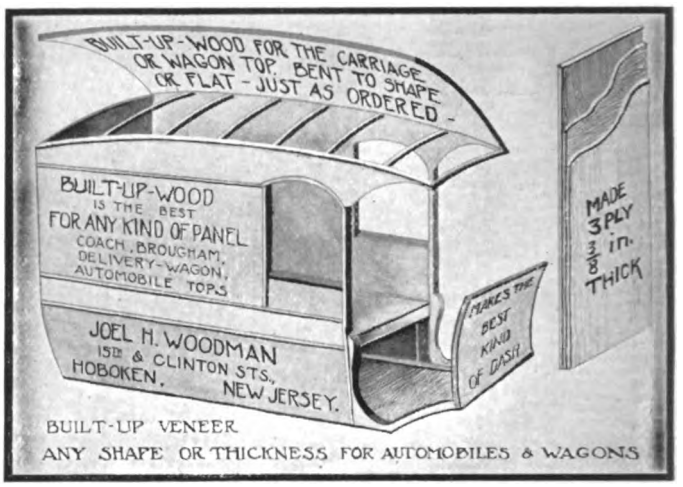
EVEN AND OVER-SIZE THREADS

cut with each  set of dies

That is one thing that can be done with a "Duplex" Die Stock. Learn of the further points of difference between it and others.

THE HART MFG. CO.

50 Wood Street CLEVELAND, O., U. S. A.

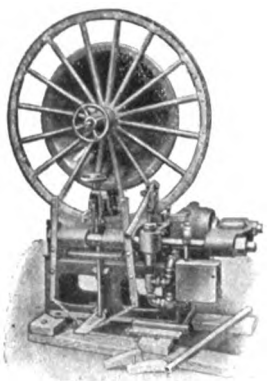


Troy, N. Y., July 8th, 1910.

BUFFALO FORGE CO.,
Buffalo, N. Y.

Gentlemen:—I've delayed recommending the "Crain Combination Woodworking Machine" because in the first place, I was unfamiliar with machinery; in the second place I wanted to give it thorough tests in all its combinations, and am prepared to state now that it is simply wonderful. Would not be without it for anything, and do hereby highly recommend it to wagon shops, as it does the work of several machines. but only takes up room for one.

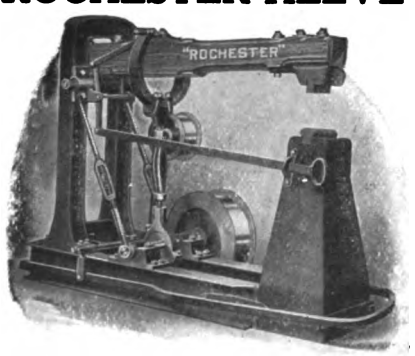
Yours truly,
(Signed) J. F. BERTHELSEN.



THE GREATEST
MONEY MAKER
for a blacksmith is a
Scientific Hydraulic Tire Setter

Write for catalog and prices to
National Hydraulic Tire Setter Company
KEOKUK, IOWA

ROCHESTER HELVE HAMMER



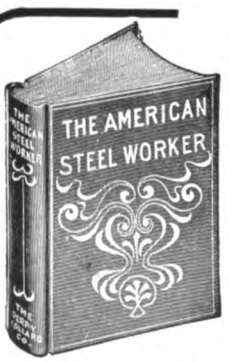
(The Hardest Hitter)

Forging dies set crossways of helve. Welding dies set lengthways.

The best hammer made for general work, and a dandy Tire Welder.

MADE IN SIX SIZES

THE WEST TIRE SETTER CO., Rochester, N. Y.



BIGGER AND BETTER THAN EVER

Is the New Edition of

THE AMERICAN STEEL WORKER

It's written in good plain English, and tells you just what you want to know, on buying, working, tempering, hardening, welding or selling steel.

Over 350 pages, well illustrated.

Price, **$2.50** MONEY BACK IF NOT SATISFACTORY

THE AMERICAN BLACKSMITH COMPANY
BOX 974 BUFFALO, N. Y. U. S. A.

FIRST MADE IN AMERICA

HAY-BUDDEN SOLID FORGED ANVILS

A LONG STEP FORWARD

SOLID FORGED STEEL TOP
Welded to a
SOLID FORGED BASE
Making a
SOLID FORGED ANVIL

The Gold Medal Anvil
HIGHEST AWARD
Omaha 1898 Pan-American 1901



OVER 150,000 IN USE

The **ENTIRE TOP** being one piece of high grade **FORGED STEEL** makes a **LOOSE FACE IMPOSSIBLE.**

TEMPERED "JUST RIGHT".
By our own process, the weld at the waist is a **LASTING UNION.**

Experience has proved their worth and demonstrated that **"HAY-BUDDEN" Anvils** are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., 254 NORTH HENRY ST. BROOKLYN, N. Y.

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VOLUME 9

THE AMERICAN BLACKSMITH

NUMBER 12

A Practical Journal of Blacksmithing and Wagonmaking

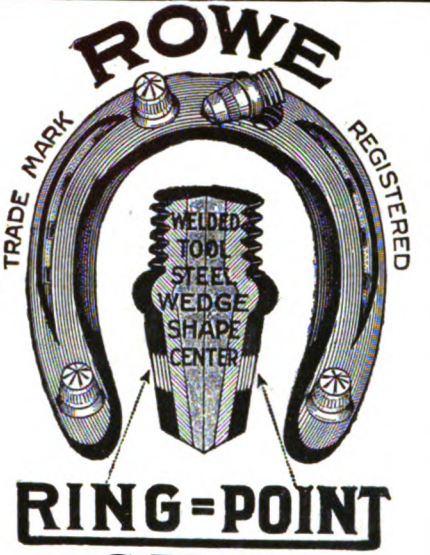
BUFFALO N.Y. U.S.A.

SEPTEMBER, 1910

$1.00 A YEAR
10c A COPY

Horseshoers! You Can Make

Good, Easy Money By Having This Sign On Your Shop



RING-POINT CALKS

BETTER TOOL STEEL CENTERS

It will cost you nothing. All you have to do to get it is to write us that you will handle Rowe Ring Point Calks—the new-old Calk that your customers are going to ask for. We will even stand the whole expense of putting it up. This sign will be truly a good luck sign for you, as it will give you virtual control of the Calk business in your town or district, and the profits on Ring Points are generously good.

Good Profits In Ring Points

Ring Points is the new name we have adapted for our famous Tool Steel Center Calks. During the past year these leaders in the Calk market have been greatly improved and are vastly superior to Tool Steel Center Calks which have heretofore led the market.

Ring Points have no real competition. They are uniform in quality. Exhaustive tests by experts also proved them to have greater strength and more uniform wearing qualities.

Ring Points are the only Calks that always wear sharp. Easy to remove, they never work loose. Fit any shoe made for Calks. They are the Calks that please your customers and keep them pleased.

Don't Bother With Old Fashioned Wire Pin Calks

when Ring Points mean less trouble and good profits for you. You can guarantee Ring Points, and we will stand back of your guarantee and make good to you.

Profits Go To You

We believe that profits should go to the horseshoer, and every one who handles Ring Points has the assurance that he is getting fair treatment. We send all business received from advertising to the horseshoers and not to the retail stores. We maintain prices to consumers so that no one can undersell you.

If you doubt what we say, look us up. You will find that our treatment of horseshoers has won us the indorsement of the Master Horseshoers' National Protective Association. Is not that proof that we will keep our promises?

NO OTHER ROWE BRANDS WILL HAVE ADVERTISING HELP



Ring Point Square Ring Point Round

Big Advertising Campaign Under Way

Our big advertising campaign last year was the greatest thing in the trade. The rush for our Calks found many of the horseshoers unprepared to meet the demand. That was a direct loss to you and to us. Therefore, we are starting early this year, so you can be prepared. Our advertising this year will be four times as large. Our new Ring Point Calks are already in the jobbers' hands. You can get yours any time—but we advise you to order now.

Good News For You

Our advertising means big business for you, but that is not all. We are not going to take chances that our advertisements will not be seen. We are going after every horse owner in your town and tell him the good points of Ring Points. If you handle Ring Points, he will be sent to you. We cannot here go into details of this campaign for business, but if you write us, we will tell you all. We want to regard the horseshoers of America as partners, as it were, and all of us work together for our mutual profit.

Remember—if you want to get the benefits of all this trade making, profit winning business, you must handle Ring Points. No other Calk will receive our help.

SPECIAL TO HORSESHOERS WHO HAVE NEVER HANDLED OUR GOODS

There is probably not a horseshoer in North America who has not heard of us and does not know the merit of our Calks. But you cannot know it as you ought unless you have investigated. We will be glad to send you "split samples" of Rowe Calks and other old fashioned wire pin kinds. As a judge of iron and steel you can soon convince yourself from these samples that Ring Points are the Calks that will bring you the profitable business.

Your jobbers and their salesmen will shortly be calling on you to sell you your supply. Do not fail to order.

Write us today a letter something like this:

THE ROWE CALK SELLING COMPANY, Hartford, Conn.
I will handle the Ring Point Calks this winter, and shall expect you to furnish and put up for me without cost, one large sign bearing the Ring Point trade-mark, and give me other advertising helps.

Name .....
Address .....
Your Jobber's Name .....
Your Jobber's Address .....
Name of Local Billposter .....

The Rowe Calk Selling Company

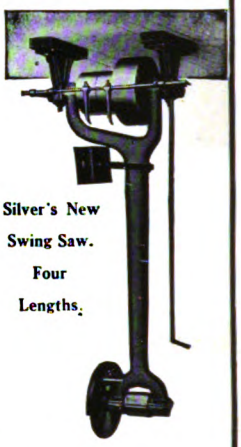
2701 Mechanic Street Hartford, Conn.

THE SILVER MFG. CO.

365 BROADWAY SALEM, OHIO.



This Large Illustrated Book FREE—Send NOW



Silver's New Swing Saw. Four Lengths.

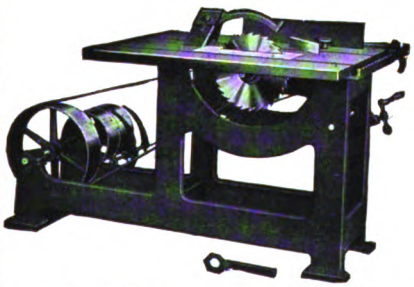
84 pages—64 illustrations, covering our full line of Post and Power Drills, Portable Forges, Band Saws, Jointers, Saw Tables, Swing Saws, Hub Boring and Spoke Tenon Machines.

Don't hesitate to write for it today. That's what we printed it for. Even if you feel that you don't need better tools, it will pay you to examine this illustrated book and get our prices.



SILVER'S NEW JOINTERS

Five Sizes—8, 12, 16, 20 and 24 inch. New "patent applied for" features.



SILVER'S SAW TABLES

Send for circular of Saw Tables and Swing Saws.

SEND TODAY FOR THIS CATALOG

or for any of the following booklets:

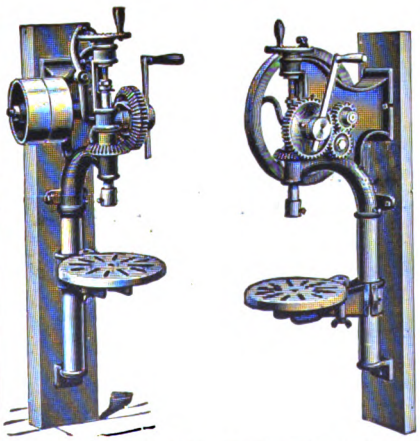
BAND SAWS AND JOINTERS—describing 20" Band Saws for foot or belt power or combination; also 26, 32, 36-inch Power Band Saws with new features; also five sizes of Jointers.

HUB BORING AND SPOKE TENONING MACHINES—illustrating and describing several sizes of each.

PORTABLE FORGES—illustrating and describing 14 styles.

DRILLING MACHINES—covering our line of some 22 distinct machines.

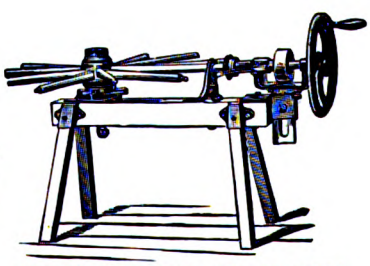
POWER DRILLS—illustrating our line of 20" machines with lever feed, lever and wheel feed, power feed with automatic stop, power feed with back gears and automatic stop.



Our Booklet, "Drilling Machines", illustrates 22 kinds we make.



Our Portable Forge Booklet illustrates some 14 kinds. We have a size to suit your needs. Strong and durable. Attractive designs.

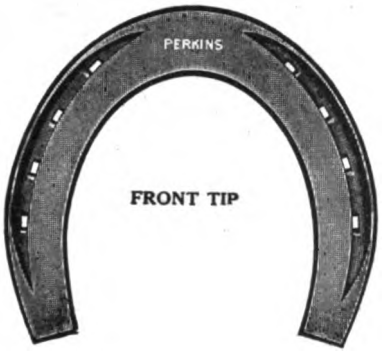


SPOKE TENON MACHINES

in Seven Sizes. Fitted with Star Hollow Auger.



Look for this Trade Mark ★ The Star brand beats all others





★ PERKINS ★

HORSE SHOES

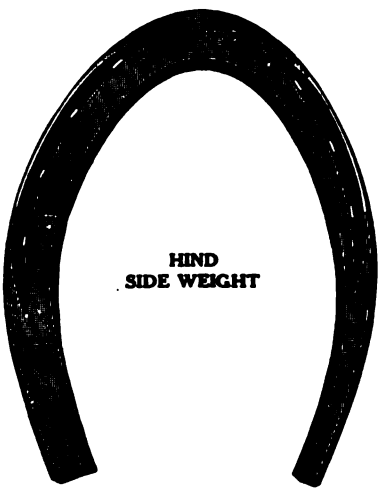
AND

TOE CALKS

The **SUPERIOR** Kind

Have more points of superiority than any other make. An up-to-date shoe for up-to-date Blacksmiths.



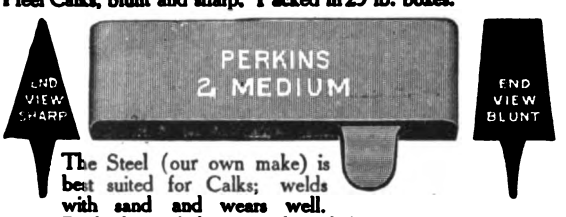


Perkins Shoes have given satisfaction wherever used. Our line is complete and every shoe guaranteed. Made in all styles and sizes. Send for sample, New Pattern City and Steel Countersunk. Free for the asking. We gladly send

COMPLETE CATALOG AND SAMPLE FREE

PERKINS

Made in Medium, Long and Extra Long, both blunt and sharp, also Medium and Long Country and Heel Calks, blunt and sharp. Packed in 25 lb. boxes.

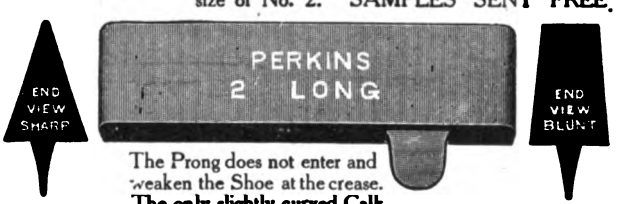


The Steel (our own make) is best suited for Calks; welds with sand and wears well. Perfectly graded in Length and Size.

WRITE TODAY.

TOE CALKS

Chisel Pointed Prong. These cuts show exact size of No. 2. SAMPLES SENT FREE.



The Prong does not enter and weaken the Shoe at the crease. The only slightly curved Calk sold.

MANUFACTURED BY

RHODE ISLAND PERKINS HORSE SHOE COMPANY

PROVIDENCE, RHODE ISLAND.



THE ONLY WAY TO FIND OUT THAT

LAFFITTE WELDING PLATES

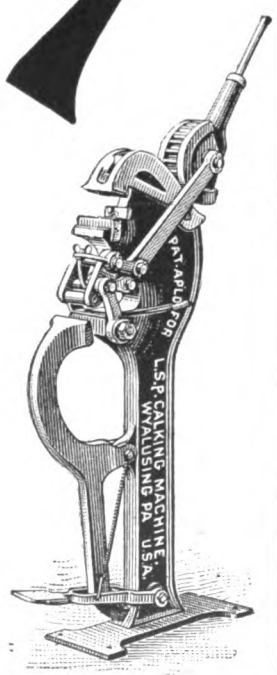
WILL DO ALL WE CLAIM
IS TO TRY THEM

SEND FOR SAMPLES AND CIRCULARS—NO CHARGE

THE PHILLIPS-LAFFITTE CO.

PENNA. BLDG. PHILADELPHIA, PA.

7 REASONS WHY



You Should Have The L. S. P. Calking Machine

The Only Calking Machine

1. It is the only calking machine advertised in a trade paper to which a patent has been granted, running no risk of litigation.
2. The only calking machine used by the United States Government.
3. The only machine that makes every possible kind of a heel calk.
4. It is not a foot vise, nor a heel bending device, but a CALKING MACHINE.
5. One pull of lever makes either sharp or blunt heel calk, another pull welds sharp or blunt toe calk, and forms clip, if so desired.
6. All working parts made of a special grade of steel.
7. Holds the record, 41 shoes heel-calked sharp in 25 minutes and 33 shoes calked complete in 45 minutes.

This machine works equally as well on old shoes. Takes up only 8 x 16 inches floor space, stands three feet, three inches high, and weighs 131 pounds. Write now for particulars and prices.

United States Office, L. S. P. Calking Machine Co., Wyalusing, Pa., U.S.A.
Canadian Office, National Machine Co., Brighton, Ont.

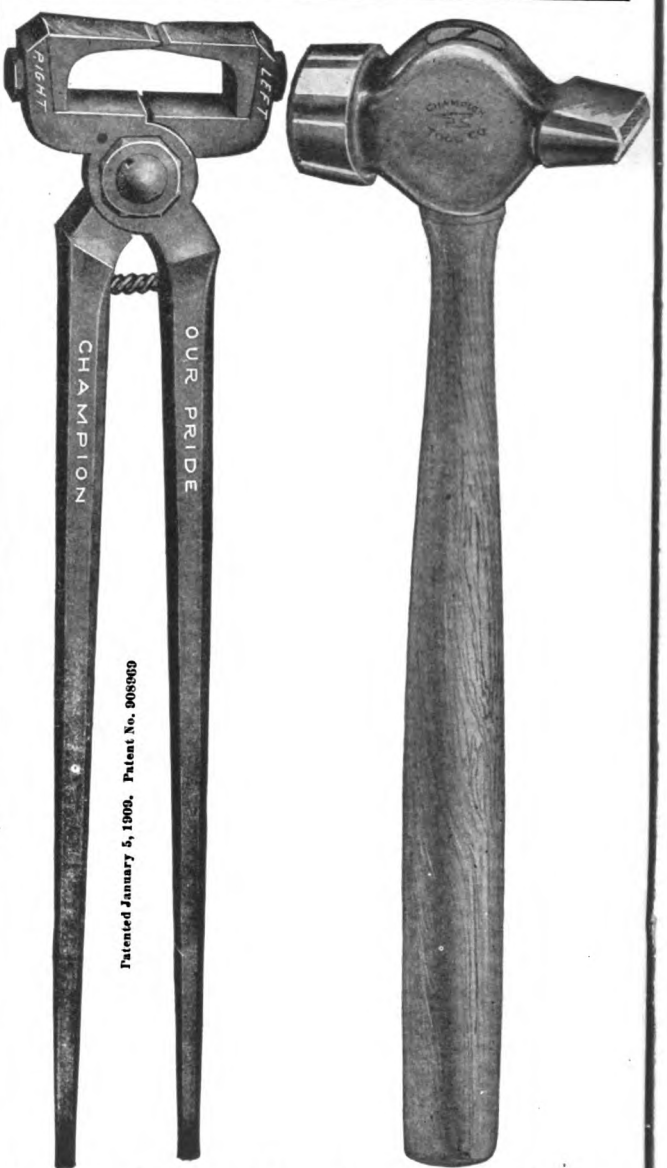
ONE CENT

spent for a postal card is all our

Forty Eight Page Catalog

will cost you. You should have this book, which shows

86 Labor-Saving Tools



No. 81 Our Pride No. 81 Ball Bearing Hoof Shear
12 inch 14 inch
BALL BEARING JOINT
Interchangeable Blades
Drop Forged

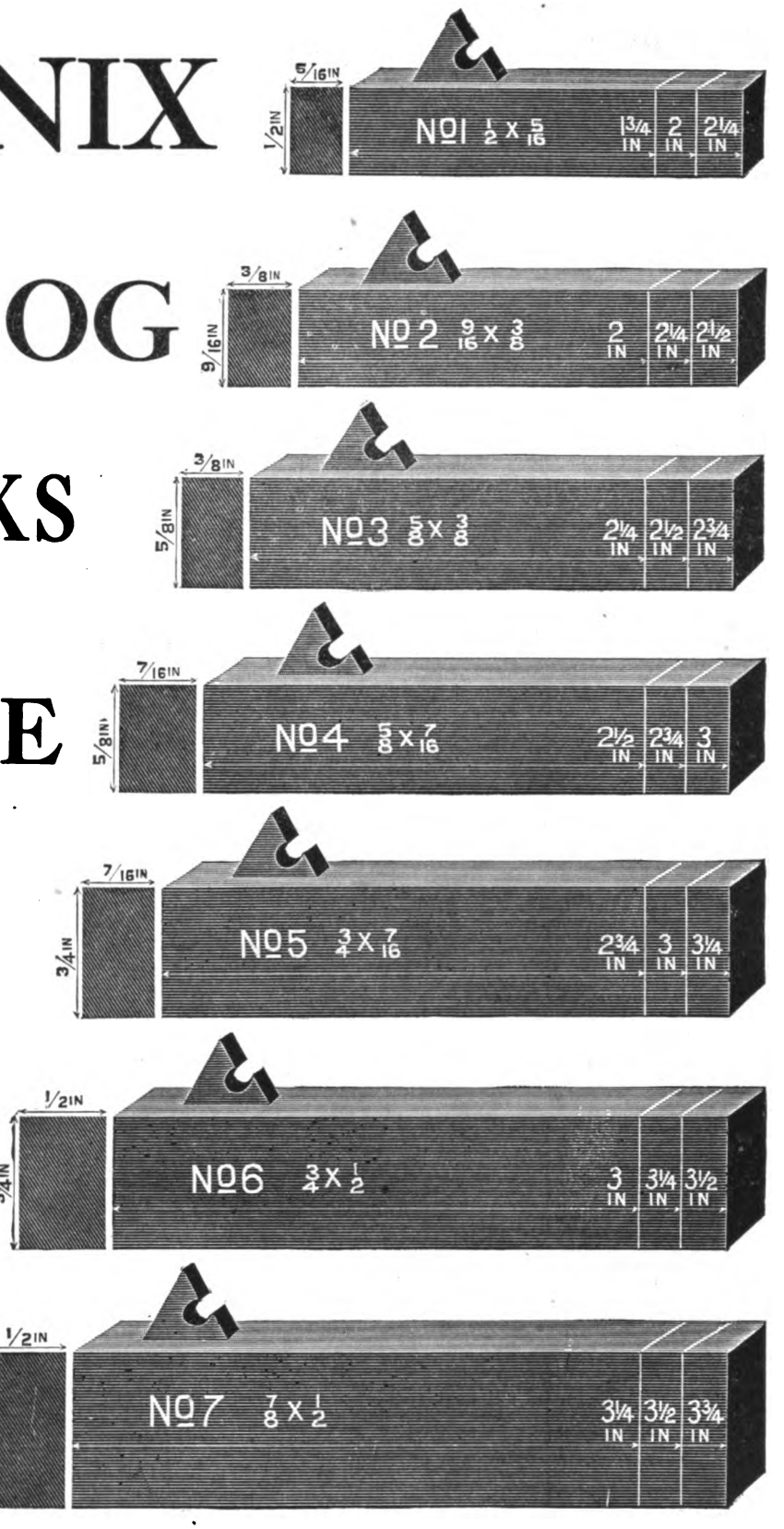
No. 12 Electric Sharpening Hammer
Weighs 1 3-4 lbs. to 3 lbs.
Swings Just Right
Drop Forged

Our tools are tempered in PLAIN COLD WATER and can be redressed and retempered by any practical man.

CHAMPION TOOL CO.

Dept. A. MEADVILLE, PENNA.

PHOENIX BULLDOG TOE CALKS ARE THE BEST



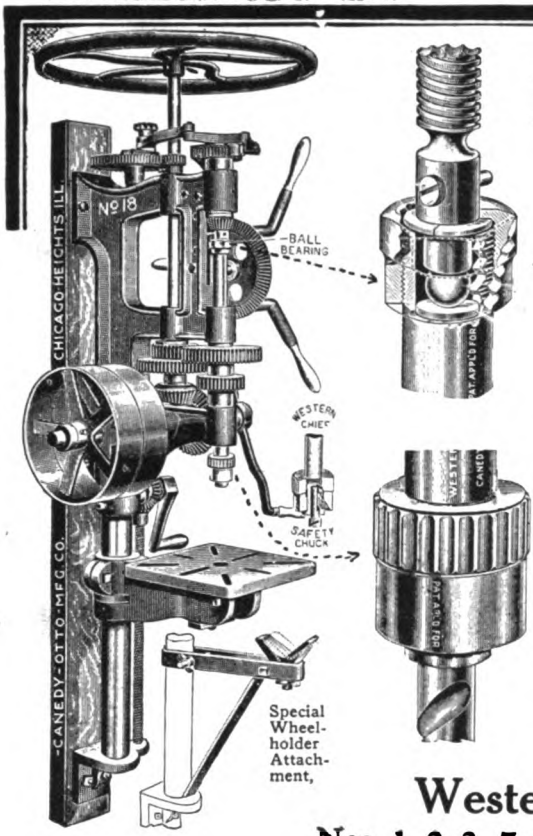
YOUR DEALER CAN FURNISH THEM MADE BY—

PHOENIX HORSE SHOE CO.

Largest Manufacturers of Horse and Mule Shoes in the World

Rolling Mills and Factories:
Joliet, Ill., and Poughkeepsie, N. Y.

General Offices:
Rookery Building, Chicago, Illinois



Special Wheel-holder Attachment,

Ball-Bearing and Safety Chuck

Ball-Bearing

A single Steel Ball resting on a hardened Steel Disc. This contact of Ball and Disc forms a bearing in which the friction is too little to estimate.

Safety Chuck

It is opened and closed with the hand.

No more set-screws to mar and bruise the shanks of bits.

No more wrenches to tighten and loosen set-screws.

No more twisting of bits in the chuck.

No more trouble in inserting and removing bits from chuck.

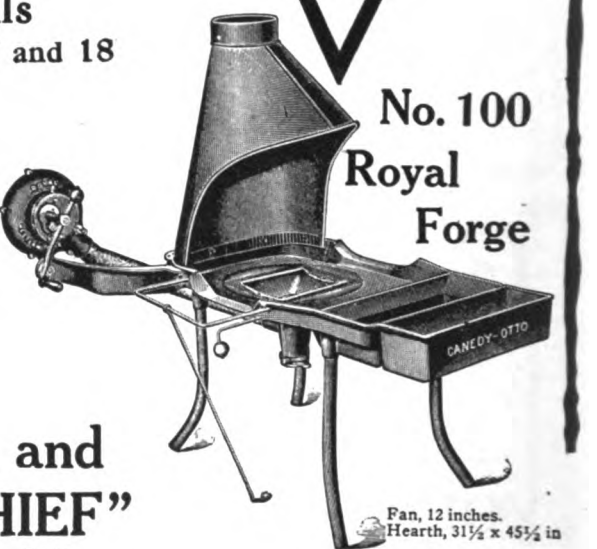
A Feature of TO-DAY

Wrench? NO!

Western Chief Drills

Nos. 1, 2, 3, 7, 12, 14, 15, 16, 17 and 18

FORGES—BLOWERS—DRILLS—



No. 100 Royal Forge

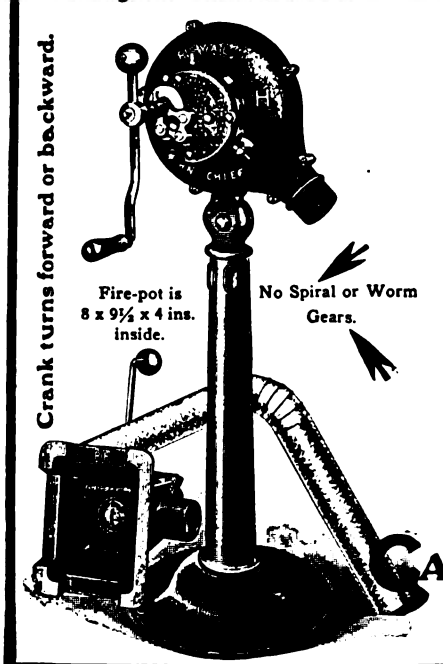
Fan, 12 inches.
Hearth, 31½ x 45½ in

The Names — "ROYAL and WESTERN CHIEF"

When found on a Forge, Blower, Drill, or other Blacksmith Tool—mean that that article is better than the ordinary. They mean that in its construction the best materials and the highest skill obtainable have been employed. They mean that years of experience have served to perfect it. They mean the tool is a success, and quality alone has made it so. Dealers and Blacksmiths in general will procure what they like best. We must deserve before we can obtain trade. There is no doubt about our deserving, because our production grows rapidly.

There is a reason—Quality

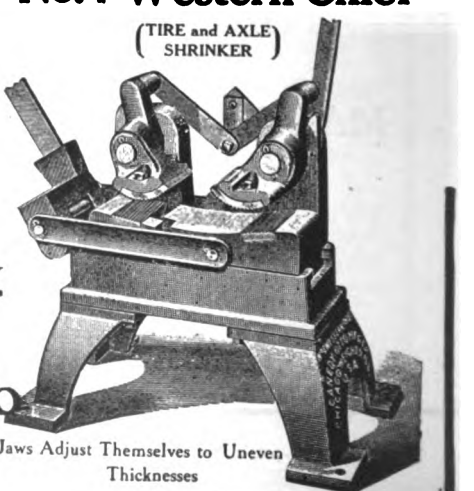
Royal Blower



They are all the Best!

No. 1 Western Chief

(TIRE and AXLE SHRINKER)



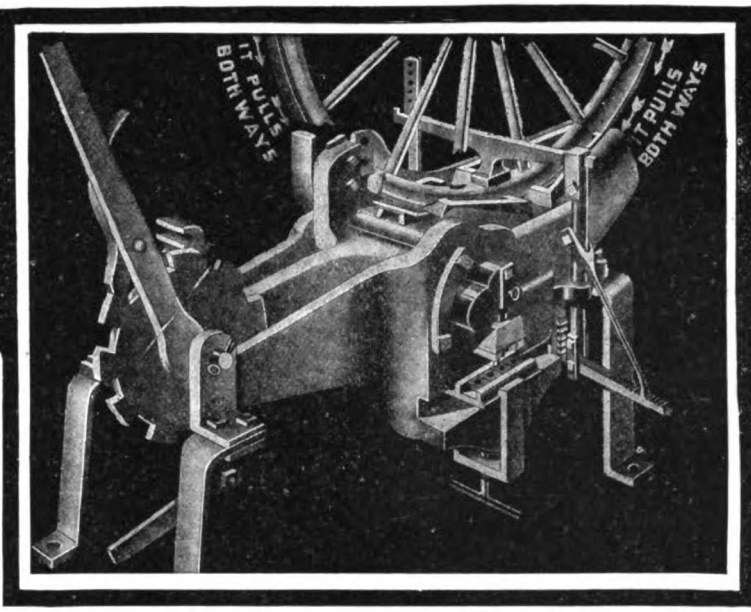
Jaws Adjust Themselves to Uneven Thicknesses

MADE BY

CANEDY OTTO MFG. CO.

CHICAGO HEIGHTS, ILL.

THE HOUSE COLD TIRE SETTER



WILL MAKE MORE MONEY FOR YOU

NOT ONLY THE BEST

BUT ALSO THE CHEAPEST

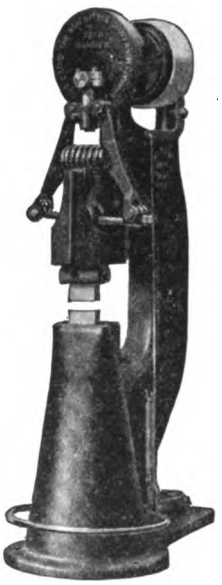
TAKE NOTICE—You Can Have Our Machine In Your Shop

and see for yourself that it does the work just right before you are required to pay a cent on it. ***Do You Want to Build Up Your Business and Make Money?*** If so, don't hesitate to buy at once. It does quicker and better work. Doesn't keep your customers waiting. They are as plain and simple as the old hot shrinker. Doesn't get out of fix or wear out. They are made of molded tool steel and highly tempered. One man can operate it. The heads move with the curve of the wheel. Do not kink tires, and—think of it—no oil pumps to get out of fix and leak; no big screw to get full of dirt and stick, and no eccentric power to puzzle over.

Now is the time to buy and get it advertised in time for the season's work.

HOUSE COLD TIRE SETTER CO., 216-218 S. Third St., ST. LOUIS, MO. J. F. House, 201 Church St. Toronto, Ont., Canada.

The New Little Giant Power Hammer



Stands for what is best in design, material and construction. It does THE WORK efficiently and quickly and is always under perfect control.

This high degree of perfection in Power Hammers is the result of fifteen years' experience.

Made in three sizes:

25 lb. 50 lb. 100 lb.

Suitable for forging material up tc 5 in. in diameter.

Will do anything and everything that can be done on Power Hammer.

Recommended by over 3,000 satisfied users.

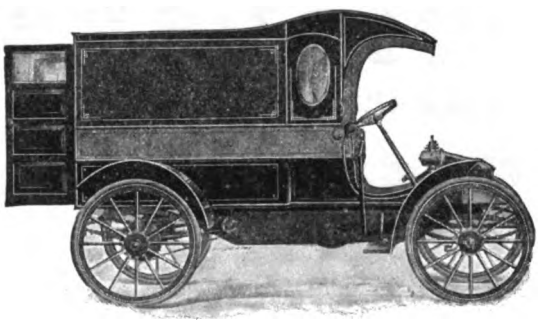
Manufactured by

MAYER BROTHERS COMPANY

MANKATO, MINN.

AGENTS: United States—All Jobbers
New Zealand—Alex Storrie, Ltd., Invercargill
Manitoba, Saskatchewan and Alberta—Melotte Cream Separator Co., Winnipeg

WRITE NOW FOR FULL INFORMATION



The Motor Delivery Wagon

and

What It Means to the Blacksmith and Carriage Man

Hundreds of merchants in all parts of the country are replacing horse-drawn vehicles with up-to-date auto delivery wagons, because they are more satisfactory and less expensive, to say nothing of their value from an advertising standpoint.

Blacksmiths and carriage dealers are the logical people to supply these vehicles, and we have just what they want in our

Motor Delivery Chassis, with Running Gear

We furnish everything all ready to run except body; you build open or closed body, as desired, and paint job. Takes body 40x60 to 72" back of seat. Capacity 1500. 22-24 H. P. Speed, 20 miles.

We have an extraordinary proposition for prompt acceptance. Write immediately for complete description and wholesale price.

ASK FOR THIS BOOK

Our 448 page Net Price Catalog for 1910 quotes lowest wholesale prices on a complete line of Carriage Hardware, Blacksmith Tools and Motor Car Supplies. Tells how to build and repair Autos. Its use will save you money on everything you buy, no matter where you live. It is free to the trade. You should have a copy. You need it. Write for it today.

CRAY BROTHERS, 1113 W. 11th St., Cleveland, O.

Insist on Getting "E-Z" Compound

TRADE E-Z MARK
FOR ALL GRADES OF STEEL
WELDING COMPOUND

The best compound for Lap, "V", Butt or Jump Welds. Will successfully weld tool, plow, open hearth or Bessemer steel, and makes stronger, smoother welds at a lower heat than any other compound. Sticks to the metal and does not boil up while fluxing.

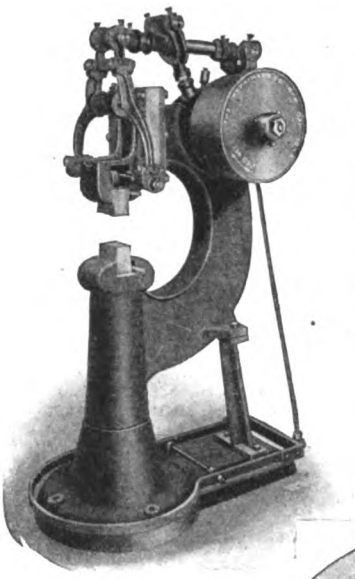
Samples will be sent free to anyone on request

Crescent Welding Compound

is used the same as Borax, but is much better because it adheres to metal and will weld at 250 degrees lower heat. The BEST for welding spring steel, tool steel tires or axles. A trial will convince you. Your jobber has both Crescent and "E-Z" Compounds.

CRESCENT WELDING COMPOUND TRADE MARK

Anti-Borax Compound Company
Fort Wayne Indiana



That the
KERRIHARD Power Hammers
will do the work we claim for them and can be depended upon is an established fact, by virtue of the hundreds of testimonials we have in our offices. If you want a power hammer that is absolutely the best in every way, you should not hesitate in installing one of the latest models now.

When it comes to the most for the money, the Kerrihard Combination Grinder has them all beat. Ask about them.

You know that the shop with the best equipment always gets the work. We can furnish the best at the right price. We will be glad to tell you about the KERRIHARD. This is the day.

The Kerrihard Company
Kerrihard Station
RED OAK, - IOWA



"MORSE"
SETS OF BIT STOCK DRILLS



No. 13. Set Bit Stock Drills, 1-16 to 1/4 inch by 32nds, 5-16 to 3/8 inch by 16ths, boxed.

No. 14. Set of Bit Stock Drills, 1-16, 3-32, 1/8, 5-32, 3-16, 7-32, 1/4, 5-16, 3/8 inch, in case.

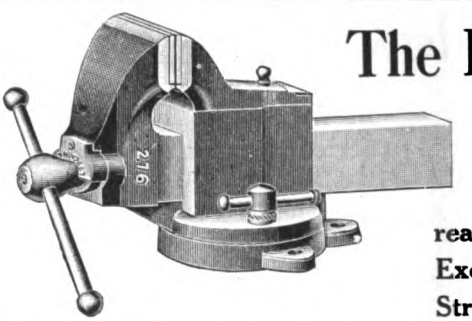
Other Sets of Drills consist of Taper Shanks, Straight Shanks and Straight Shank Machine Bits.

All are illustrated in our 1910 Catalogue.

A copy sent on request.



Morse Twist Drill & Machine Co.
New Bedford, Mass., U. S. A.



The Parker Vises

Always ready for use. Excel in Strength, Durability, Finish

38 Styles, for all purposes and in size to suit

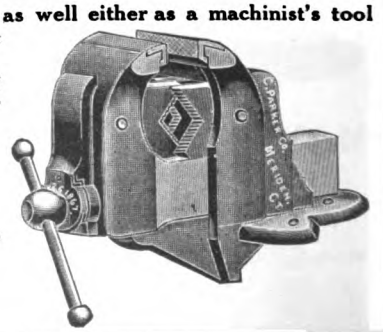
Parker vises will be found in the best equipped shops in the country. No other vise has given to the trade such general satisfaction. Our new line of improved vises has reinforced sliding jaws, making the Parker vises stronger and more durable than ever.

Made of a blending of steel and best iron in the castings

This is our Best Combination Vise

Can be used equally as well either as a machinist's tool or for holding pipe. A very satisfactory tool.

Our latest catalog mailed free on application.



The Chas. Parker Co.
Meriden, Conn.

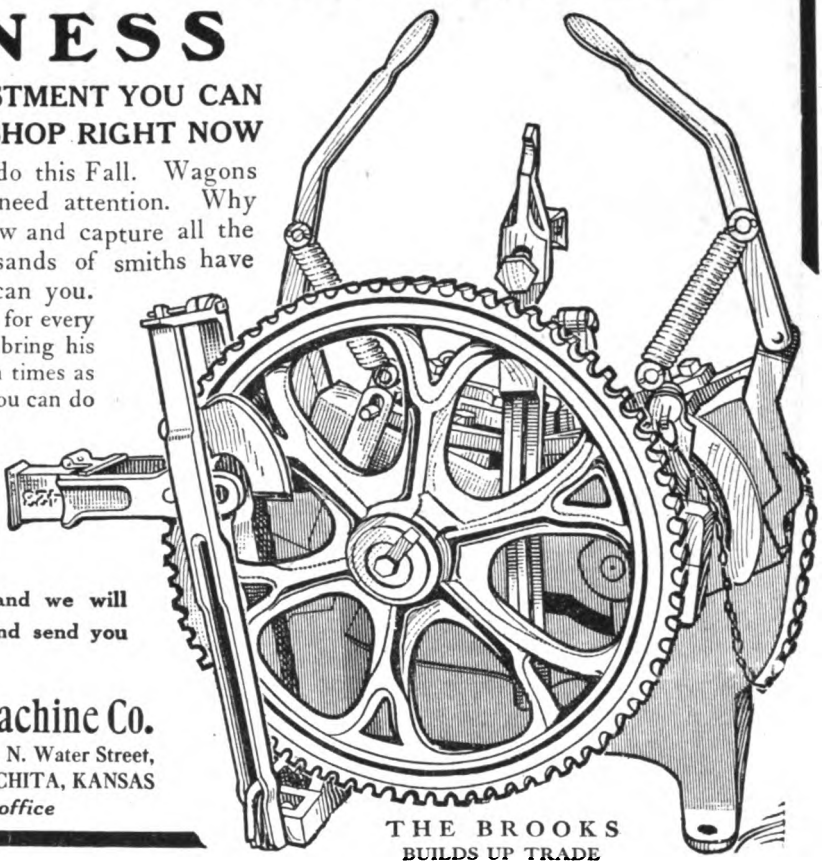
The Brooks makes the Smith rich

A BROOKS FOR FALL BUSINESS

IS THE BEST INVESTMENT YOU CAN MAKE FOR YOUR SHOP RIGHT NOW

There will be considerable tire setting to do this Fall. Wagons and buggies running all summer long will need attention. Why not order a Brooks Cold Tire Setter right now and capture all the tire setting work in your locality. Thousands of smiths have done it with the Brooks machines and so can you. The Brooks will build up your other trade also, for every new tire setter customer you get will naturally bring his other work to your shop. The Brooks will set ten times as many tires in a day and do the work better than you can do by the old hot process. It will earn its cost in a few weeks. The Brooks is the best made and thoroughly guaranteed.

OUR FALL OFFER WILL INTEREST YOU



THE BROOKS BUILDS UP TRADE

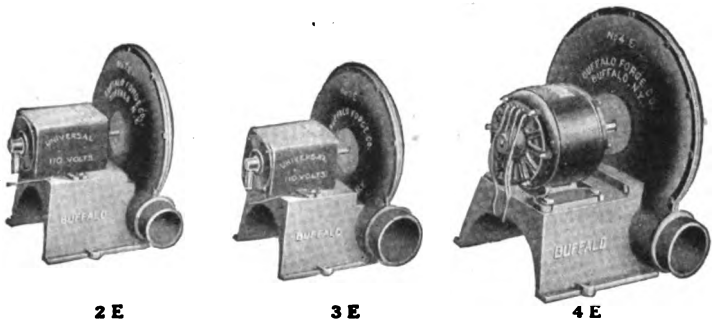
The Brooks endorsed and used by the United States Gov't

Write us today about it and we will give you full particulars and send you illustrated catalog.

The Brooks Tire Machine Co.

857-859 Ellicott Square, BUFFALO, N. Y.
121 N. Water Street, WICHITA, KANSAS

Write to nearest office



2E 3E 4E

Buffalo Variable-Speed, Universal Electric Forge Blowers

In A Class By Themselves

Operated perfectly on either direct or alternating current, and the same speed variations are possible on either. The Buffalo Universal Motor makes it possible to operate this outfit on any 110 volt circuit. It makes no difference what kind of current you have, just tell us the voltage and we will supply all the necessary information.

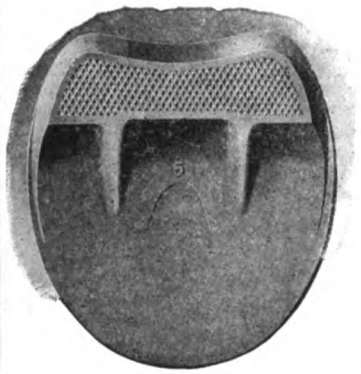
The Speed Regulator is entirely independent of the motor and may be installed at any place convenient to the operator. The blower may be placed back of the forge so as to deliver the blast directly into the tuyere.

Made in several sizes, suitable for all classes of work, from one horseshoer's fire up to several forges used for heavy work.

Write for catalog, giving prices and full particulars

Buffalo Forge Company
Buffalo, N.Y.

STERLING HOOF PADS



These pads are about as much better than the old style leather backed pads as those are better than none. Our pad is one smooth, solid piece of rubber. The calk is vulcanized onto the back and stays there. The entire pad is perfectly impervious to water, and will keep horses' feet in better condition than is possible with wet and soggy leather, which contracts and expands with varying conditions of moisture and temperature.

The construction of these pads is our own device and invention and is fully protected. There is and can be no adequate substitute.

Prices about the same as for leather backed pads. Dealers are requested to write for discounts and open territory.

Trade Mark

MANUFACTURED BY

Rutherford Rubber Co. :: Rutherford, N. J.

Distributors of Our Pads:

Detroit, Mich.,—Rutherford Rubber Company, 870 Woodward Ave.
New York City,—Regal Hoof Pad Company, 201 Fulton St.
Syracuse, N. Y.,—Central City Rubber Co., 129 E. Water St.
Philadelphia, Pa.,—Philadelphia Rubber Tire Company.
Jacksonville, Fla.,—McGraw Bros. & Vogt.
New Orleans, La.,—F. H. Bayley, 407 Hennen Building.
Norfolk, Va.,—Virginia Supply Co., 115 Cove St.
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Atlanta, Ga.,—Beck & Gregg Hardware Co.
Cincinnati, O.,—The G. B. Schulte Sons Co., 716 Main St.
St. Paul, Minn.,—C. J. Smith & Co., 16 W. Fourth St.
Winston-Salem, N. C.,—Smoak & McCleary.
Columbus, O.,—The Griswold-Sohl Co., 79 Front St.
Washington, D. C.,—Washington Rubber Co., 10th and F Sts.
Savannah, Ga.,—Jones-Kessler Co.
Wheeling, W. Va.,—Miller & Stein.
Louisville, Ky.,—Fulton, Conway & Co.
St. Louis, Mo.,—Campbell Iron Co., 809-819 Cass Ave.
Boston, Mass.,—Butts & Ordway, 33 Purchase St.
Scranton, Pa.,—The Bittenbender Co., 120 Franklin Ave.
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Pittsburg, Pa.,—McLean & McGinnes, 1427 Liberty Ave.
Memphis, Tenn.,—Pidgeon Thomas Iron Wks.
Troy, N. Y.,—Mont. G. Curtis Co.
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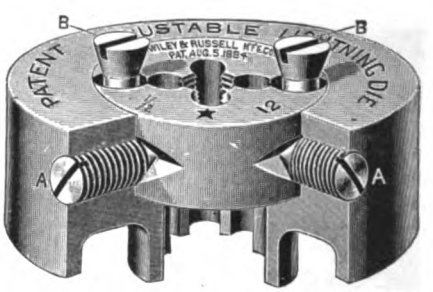
GENUINE LIGHTNING SCREW PLATES





Read This Testimonial:

Harper, Iowa, July 25, 1910.

Wiley & Russell Mfg. Co., Greenfield, Mass.

Dear Sirs:—I purchased a set of Lightning Screw Plates, Taps and Drill Machine, the first in Keokuk Co., Iowa. I have been using the Lightning Screw Plate for thirty years and it proves satisfactory. They are still giving satisfaction, and I advise every one in need of such tools to buy no other make.

Truly yours. MICHAEL PAULY.

Note the Perfect Adjustment

The taper-headed screws act as gauges, always bringing the cutting edges of dies exactly central with work.

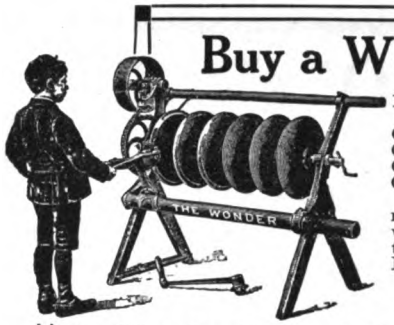
No other make of dies gives you this accurate and reliable adjustment.

Write for Catalogue 34D

Sole Makers

Wiley & Russell Mfg. Co.

Greenfield Mass. U. S. A.



Buy a Wonder Disc Sharpener

Because THE WONDER is the only machine adjusted to all conditions.
Can shear any part of edge to any bevel.
Can shear back from edge as far as required.
Can use tool on either side of disc.
Can shift from one disc to another.
Can do all this without the turn of a set screw or nut, is a positive feed, automatically adjusts itself to wobbling or bent discs; knives made of best grade self-tempered steel; will last a lifetime; for hand and power. For prices write to your jobber or

A. E. DURNER, Manufacturer

Main Office: Evansville, Wisconsin, U. S. A. Made in Evansville, Wis., and London, Ont., Canada



ACCURACY

Is the Paramount Feature of

"CLEVELAND" TOOLS

The ~~CLEVELAND~~ Twist Drill Co.

New York CLEVELAND Chicago



Roth Forge Blowers

A Cast Iron Cover with machined joints protects the WORKS. Cover can be easily opened on its hinge to see the WORKS. Ask for information.

ROTH BROS. & CO.

136 Liberty Street NEW YORK — 1390 West Adams Street CHICAGO, ILL.

HAUSAUER-JONES PRINTING COMPANY

253-257 Ellicott St., Buffalo, N. Y.

PRINTERS
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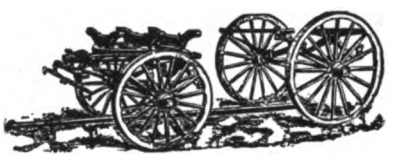
BOOKBINDERS

Let us submit an estimate on your printing requirements whether they be large or small.

Our facilities enable us to do work reasonably.

: Our organization enables us to do work well. :

Selle Gears



All Styles and Sizes

THE AKRON-SELLE CO.

CAT, 4. AKRON, O.



WEST'S CARRIAGE AND AUTOMOBILE TOP DRESSINGS. For rubber, leather, and imitation leathers. Preserves all tops permanently. Will not get brittle or crackle. Finish equal to new top.

Send for Sample.

West Mfg. Co., Rockford, Ill.

THE REVELATION GAS BLAST



Blow Pipe, $12.50.

Furnace for Hardening, Tempering, Annealing, Melting, $30.00.



Use Gas and Water only—no bellows, no air compressor. The process is simple and produces a strong and steady blast. Invaluable where no kind of power is obtainable. For brazing, soldering, hardening, tempering, annealing, melting, etc. Save labor and money.

National Economic Gas Blast Co., 88 John St., N. Y.

THE PERFECT POWER HAMMER



W. C. NORRIS
Manufacturer of Iron Sucker and Connection Rods,
Tiona, Pa.

MACGOWAN & FINIGAN FOUNDRY & MACHINE Co., St. Louis, Mo.

Gentlemen:

Your letter asking how I like your Perfect Power Hammer, received. In reply will say that the two I have in use have given me "PERFECT" satisfaction; they are all right. I have two other makes in use, but I have found your Perfect Hammer much the best of the three; it is much better in every way, more convenient and durable. The fact that I have sent you today an order for two more of the Hammers is evidence that I am pleased with them. Yours truly, W. C. NORRIS.

Will ship to any responsible party on approval. If not as represented, no sale. Made in three sizes:

2½ inch square,	30	lb. ram—shipping weight				1100	lbs.
3 "	"	40	"	"	"	1150	"
4 "	"	80	"	"	"	1800	"

Write any jobber for prices, or

Macgowan & Finigan Foundry & Machine Co.

ST. LOUIS, MO.

When you write to an advertiser, name The American Blacksmith.

The Dayton Fifth Wheel is sold by nearly every Carriage Hardware Jobber

The Dayton Malleable Iron Co.
Dayton, Ohio



(Patented)

Forged from ONE SOLID PIECE



If you want the BEST order a

PARAGON *Swedish SOLID STEEL Anvil*

Newest Process *Absolute Guarantee* *Finest Material*
Perfect Shape and Finish *Write for Descriptive Booklet*

Manufactured by
SÖDERFORS BRUKS AKTIEBOLAG
FALUN, SWEDEN

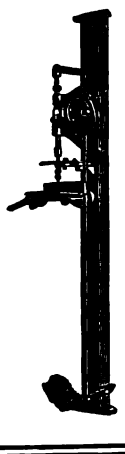
For sale by All Leading Dealers

General Sales Agents for the United States
HORACE T. POTTS & COMPANY
PHILADELPHIA, U. S. A.

A Time and Labor Saver In Every Shop

In twelve minutes you can cut tenons on a set of wheels with a

Universal Tenon and Boring Machine



Every shop owner should investigate this simple and powerful machine by writing now—today—for our catalog, which is mailed free to anyone on request to

VULCAN IRON WORKS
MASON CITY, IOWA

The Greatest Labor Saver

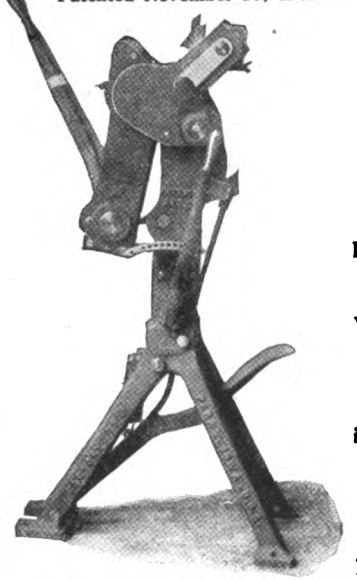
EVER PLACED IN THE HORSESHOER'S SHOP, IS THE VERDICT OF THE USERS OF THE

American Calking Machine

"FOR THE MAKING OF GOOD HEEL CALKS"

The Only Machine On Earth that Makes Perfect Ready-to-Use Heel Calks, On Any Size Shoe, Without The Use of A Hammer

Patented November 16, 1909



HOW THEY TALK!

"It is a grand thing for the horseshoer."
"It is a great success."
"The machine is O. K."
"Am using it with perfect success."
"A great thing for sharp shoes."
"The heels were perfect."
"It is all it is claimed to be."
"I am very much pleased with my machine."
"It does the work perfectly."
"One of the greatest labor saving devices I have ever seen."
"It is working fine."
"Would not take three times its cost and be without it."
"It is very satisfactory."
"It has proved all you claim for it."
"We like it very much."
"I would not take $1,000.00 for my machine if I could not get another."
"No horseshoer should be without it."
"The more I use it the better I like it."
"It will prove a great boon to horseshoers."
"I would not know what to do without it."
"We do better work with it, and with much less labor."

The remarks quoted above have been made by purchasers of the

American Calking Machine

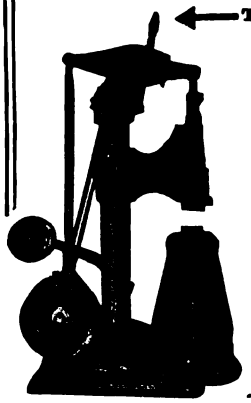
IT WILL PAY YOU TO HAVE ONE

Order Now For Your Fall Work. We Cannot Guarantee Prompt Deliveries In October and November.

ASK YOUR DEALER FOR PRICE, OR WRITE US

American Calking Machine Company
PERRY, IOWA

Modern Power Hammers Make Profitable Helpers



This Lever is only found in the "Modern" Hammer. It makes possible a light or heavy blow at **high speed.**

Every blacksmith and repair shop owner should investigate this hammer. It

Makes Smithing Easy.

No. 1, shown here, is a light, quick-acting hammer, covering a wide range of work.

No. 2 is designed especially for use in large repair shops and factories. Both of these are completely described in our booklet—sent to anyone on request. Write for one.

Modern Sales Company

GRINNELL, IOWA

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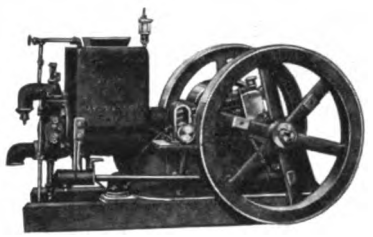
Gibson Battle & Co., Ltd., Melbourne, Australia Agents for Australia

K. C. Junior Gasoline Engines

STEAM COOLED **SINGLE PISTON**



3-5-8-10 H.P.

Power Guaranteed

SIMPLE
ECONOMICAL
LOW PRICED

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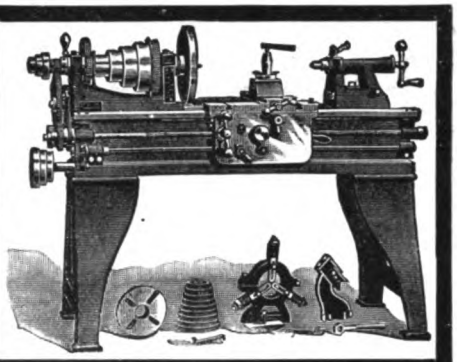
Built for Business



Our new 15-inch engine lathe, with all time and labor-saving improvements, heavy and substantial, a modern, practical, high grade, low priced lathe for Automobile builders, repair shops, and general jobbing shops.

Investigate its Merits

WRITE FOR

Catalogue of Lathes, Tools and Supplies.

The Sebastian Lathe Company,
124-126 Culvert St., Cincinnati, Ohio.

Reece Combination Screw Plate No. 103

$8.25 NET WILL BUY ONE



The No. 103 Reece Combination Screw Plate

includes one Reece Adjustable Guide Stock, 24 inches long for 2 7-32 inch diameter DIES; Three individual Full Mounted Stocks; Seven Plate Taps and Seven Reece Adjustable Dies, cutting 1-4 — 20, 5-16 — 18, 3-8 — 16, 7-16 — 14, 1-2 — 12, 5-8 — 11, 3-4 — 10. REMEMBER that this is practically a FULL MOUNTED SET. REMEMBER that the Stocks have MOTTLED FINISH; that the DIES are adjustable, and make perfect threads at one cut; that four persons can use dies from this set at the same time because there are FOUR STOCKS. And LAST, but not LEAST, REMEMBER THE PRICE is only $8.25 NET, and the Screw Plate guaranteed to give satisfaction or your money will be refunded.

Can You Afford to Neglect This Great Opportunity?

We request you to place your order with your dealer. If for any reason he cannot fill the order (and he can if he wants to), THEN send to us. DO NOT ACCEPT SUBSTITUTES—INSIST on having the REECE COMBINATION SCREW PLATE No. 103.

THE E. F. REECE CO., Greenfield, Mass., U. S. A.

Little Giant



A. L. A. M. STANDARD SCREW PLATE

Many blacksmiths are making good money out of automobile repairs. These are desirable jobs—are you prepared to handle them?

LITTLE GIANT A. L. A. M. Standard Screw Plates will put you in a position to do automobile repairing successfully—they are preferred by good men who do good work.

Send for Catalog 22B

WELLS BROTHERS COMPANY

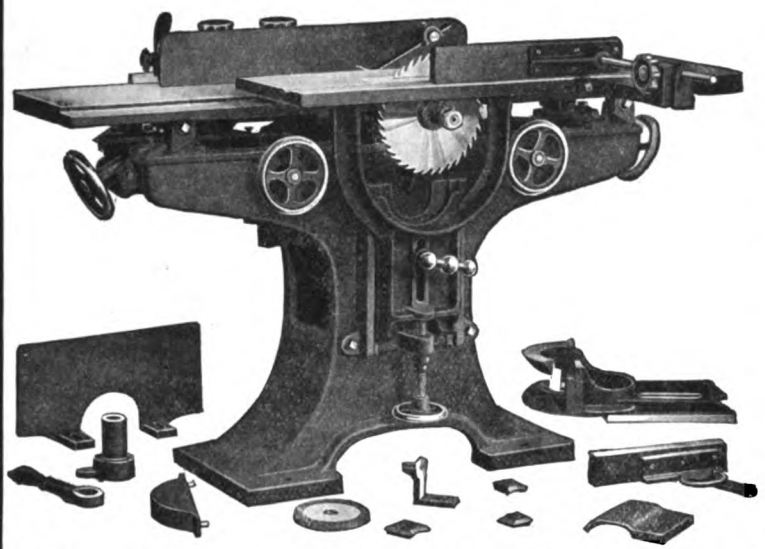
GREENFIELD MASS. U. S. A.

NEW YORK CHICAGO LONDON

Mr. Blacksmith———This Machine Is Built For You

THE CRESCENT Variety Wood Worker will do jointing, make molding, do boring, sawing, dadoing, round poles, tongues and felloes.

Read this letter



Lake Geneva, Wis., May 14, '10.

The Crescent Machine Co.,
Leetonia, Ohio.

Gentlemen:—Yours of recent date to hand. In reply would say that I have used your Variety Wood Worker for the last five months and am more than pleased with it. Don't see how I ever got along without it. The Wood Worker, in connection with the Crescent Band Saw, is worth more to me than a man for repair work. They never get on a spree and are always ready for business.

Yours truly,
J. H. RUSSELL.

This machine in a live blacksmith and repair shop should pay for itself within about six months.

Machine can be driven with electric motor or gasoline engine.

The Crescent Machine Co., 245 Main Street, Leetonia, Ohio

A Spoke Tenoner–Sizer–Rim Borer

Another one of the 14 machines successfully operated on the FAMOUS Universal Woodworker. Adjustable in all directions to accommodate all sizes of wheels and felloes.

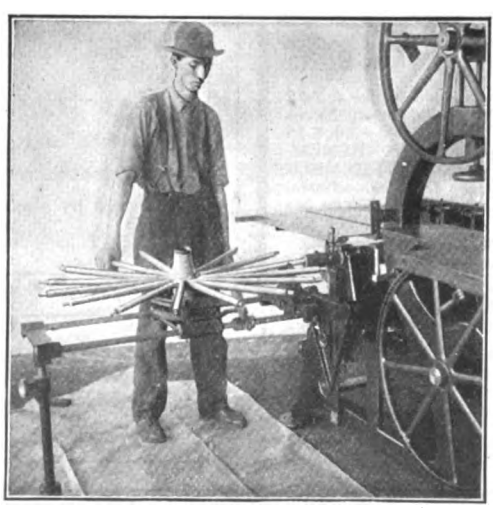
This machine will pay for itself in half the time required by any other woodworker. Because it does twice as much, your profits start twice as soon.

Sidney Tool Company

Sidney, Ohio

The FAMOUS consists of the following complete machines:

1 A twelve inch jointer.
2 A saw table—14 in. saws.
3 Two side power feed molder and edger.
4 SPOKE TENONER, SIZER AND RIM BORER.
5 Complete single spindle shaper.
6 Pony planer.
7 Drum sander.
8 Disc sander.
9 Boring machine.
10 Hollow chisel mortiser.
11 Single end tenoner.
12 Emery grinder.
13 Band saw.
14 Pole, tong, shaft and felloe rounder.



Any operation can be done complete without driving the rest of the machine. This is what makes it FAMOUS. It's the machine for YOUR SHOP. Sent on approval. Why buy 14 different machines and use so much floor space. This machine is a complete woodworking plant in itself, all on one base. Just a few simple adjustments and you have 14 different machines. It is a proven fact that you save money as soon as you purchase this woodworker. Catalogue and circular sent on request. Write today.

"Little Giant"
PUNCHES AND SHEARS

Better than a Blacksmith Helper.

Over 3,000 in use. Good the world over.

WHY?



Kei Road, Cape Colony,
S. A., Aug. 12, 1909.
Little Giant Punch
& Shear Co.,
Sparta, Ill., U. S. A.

Dear Sirs: — Enclosed please find Money Order to the value of £1-11-0 in settlement of your acct, The Punch and Shear came safely to hand last Monday and I am very pleased with it indeed. If I can at any time sell one I will do so and will try to do all I can to forward the sale in the Cape Colony. The machine cost me landed here £13-10-0, and I consider it worth twice as much. I find it only takes one man to work the lever and I thought it could not be worked with less than two. I consider every blacksmith should have one, as they save a lot of labor and money.

Yours faithfully,
(Signed) pp
R. G. RISTROW.

You don't have to take our word for it, but get our booklet of Testimonials.

WRITE FOR NEW CATALOGUE

Little Giant Punch & Shear Co.
210 S. Market St. SPARTA, ILLINOIS

Have You Seen It?

The New Improved

BLACK GIANT

COMBINED UPSET, PUNCH AND SHEARS

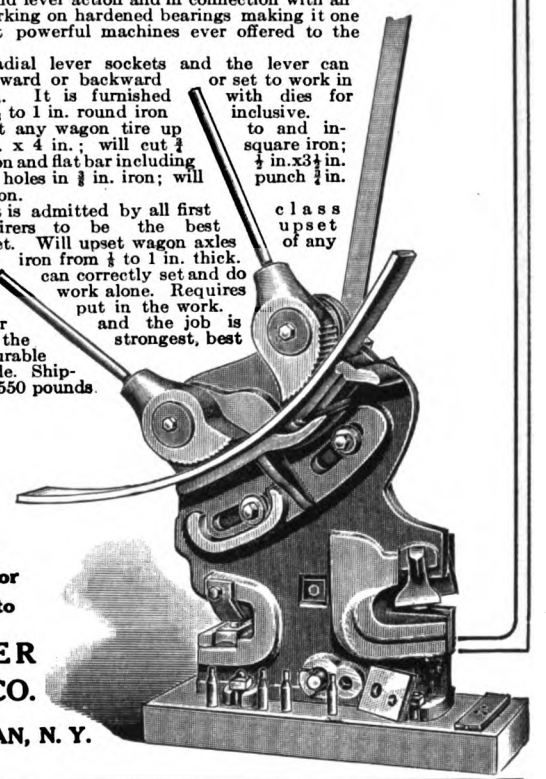
Has compound lever action and in connection with an eccentric working on hardened bearings making it one of the most powerful machines ever offered to the trade.

It has radial lever sockets and the lever can be pulled forward or backward or set to work in any position. It is furnished with dies for cutting off $\frac{5}{16}$ to 1 in. round iron to and inclusive.

Will upset any wagon tire up to and including 1 in. x 4 in.; will cut square iron; $\frac{3}{4}$ in. round iron and flat bar including $\frac{1}{2}$ in. x $3\frac{1}{2}$ in. Will punch $\frac{3}{4}$ holes in $\frac{3}{8}$ in. iron; will punch $\frac{7}{8}$ in. holes in $\frac{5}{16}$ iron.

The upset is admitted by all first class wagon repairers to be the best upset on the market. Will upset wagon axles of any kind of iron from $\frac{1}{4}$ to 1 in. thick.

One man can correctly set and do all ordinary work alone. Requires no change put in the work. Pull the lever and the job is done. It is the strongest, best and most durable machine made. Shipping weight 550 pounds.



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LUTHER MFG. CO.

OLEAN, N. Y.

INSIST ON "STANDARD" CALKS

BUY FROM YOUR DEALER



FRANKLIN STEEL WORKS

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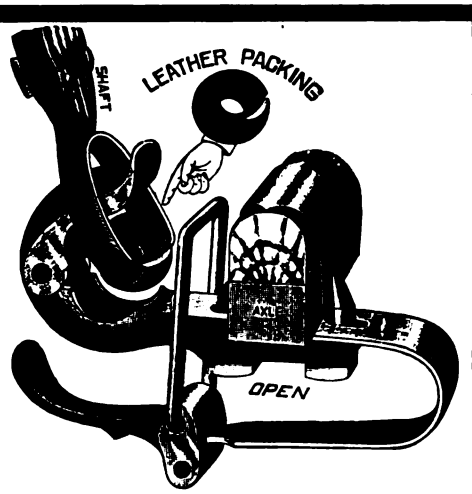


Placing the loop over the end of the cap and drawing the thumb lever back until it rests against the flat spring closes the coupler, keeps it closed, and takes up the wear of the leather packing.

Unless a Carriage Coupler is furnished with a moulded leather bushing and steel spring just like this it is not a Bradley.



THE

BRADLEY Carriage Coupler

All Steel, Noiseless, Quick Shifting, Ball Bearing.

The ONLY Carriage Shaft Coupler that is furnished with a

One-Piece Moulded Leather Packing

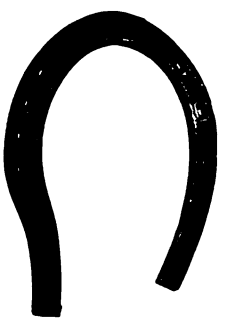
A packing that will outwear any other packing ever made. It fits the ball and socket. It is held in place by a spring steel retaining ring. It may be put on and taken off in a jiffy, and it stays where it is put.

C. C. BRADLEY & SON

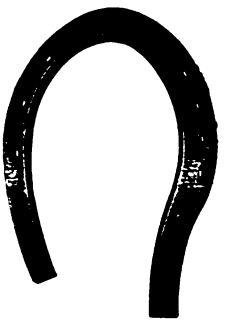
SYRACUSE, N. Y.

Boss Steel Countersunk Side Weight Shoes

A DROP FORGED SHOE OF EXCEPTIONAL MERIT



45 per cent more weight on the heavy side



No. 1	Light	weighs	9	ounces	No. 1	Medium	weighs	10½	ounces
No. 2	"	"	10½	"	No. 2	"	"	12	"
No. 3	"	"	11½	"	No. 3	"	"	13½	"
No. 4	"	"	14	"	No. 4	"	"	16	"

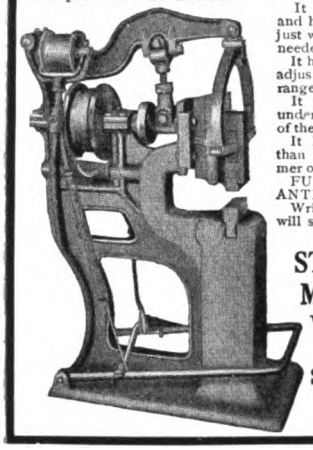
These are packed in wooden boxes, each containing 10 pairs

Manufactured by

Bryden Horse Shoe Co., Catasauqua, Pa.

The Sterling Hammer

The Sterling Hammer is built for business It is exceptionally strong, durable and simple in construction.



It has the weight and has the strength just where it is most needed

It has the necessary adjus ments for a wide range of work.

It is at all times under perfect co trol of the operator.

It has fewer parts than any other Hammer of equal capacity.

FULLY GUARANTEED.

Write for price—it will surprise you.

STERLING MACHINE WORKS

STERLING, ILL.

WE HAVE QUIT

the manufacturing of buggies, and have on hand a large amount of buggy material that we will make interesting prices on, to move it.

KENTUCKY BUGGY COMPANY
OWENSBORO, KY.

HANDY LAMP
GASOLINE LIGHTING SYSTEM

Gives a 300 Candle Power Shadowless Light the instant you move the lever. Turns up or down, like gas, burns when not in use, or can be turned up instantly when more light is needed. It floods a 30-foot space with a brilliancy like daylight. Far cheaper than gas, kerosene or electricity, and so simple that anyone can use it. Catalog A. B. tells why. **Send for it now.**



BRILLIANT GAS LAMP CO.
DEPT. 12, 42 STATE ST. CHICAGO, ILL.

Learn Automobile Repairing

Every blacksmith should have the I. C. S. Course in Automobile Running and Repairing, because the knowledge of the principles of operation and of the construction of automobile parts increases one's ability to make quick and good repairs. And this ability always brings the highest wages.

The time is quickly coming when every hamlet in the land will have its quota of automobiles, and the capable blacksmith is sure to get business, not only from local owners but from tourists as well.

The Course has been written by the best automobile experts in the country and is taught successfully by mail. You can learn all about our method of instruction by sending the enclosed coupon.

International Correspondence Schools,
Box 1302, Scranton, Pa.

Please send me free booklet and full particulars regarding your Course in Automobile Repairing.

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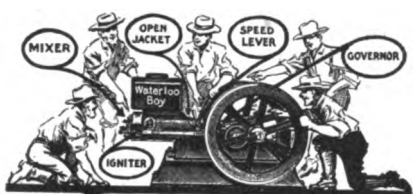
FORT SMITH WELL DRILL MFG. CO.
Fort Smith, Arkansas, U. S. A.



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THE WATERLOO BOY

5 YEAR GUARANTEE

has all of the good points that go into any gasoline engine besides many exclusive patented features. A few days' trial will enable you to point out the superior points that make the

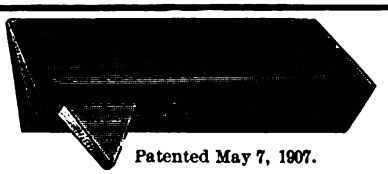
WATERLOO BOY

the best engine for every conceivable purpose We will send to any responsible person a Waterloo Boy on 30 days' free trial and if it does not do all and more than we claim, if you are not satisfied that it is the best, cheapest and most economical engine to operate, send it back and we will pay the freight both ways. Can you think of a more liberal proposition than this? Write today for our free catalogue, showing styles and sizes and our free trial offer blank.

WATERLOO GASOLINE ENGINE CO.,
T. 198 W. 3rd Ave., Waterloo, Iowa.

YEARLY CAPACITY 15000 ENGINES

30 DAYS FREE TRIAL



Patented May 7, 1907.

LUDVIGSEN BROS. WELDED STEEL CENTER TOE CALKS.

It is a self-sharpening Calk. The hard steel plate in the center and the two outside soft iron plates are welded together and shaped to a sharp Calk.

Sample sent on request.

Address

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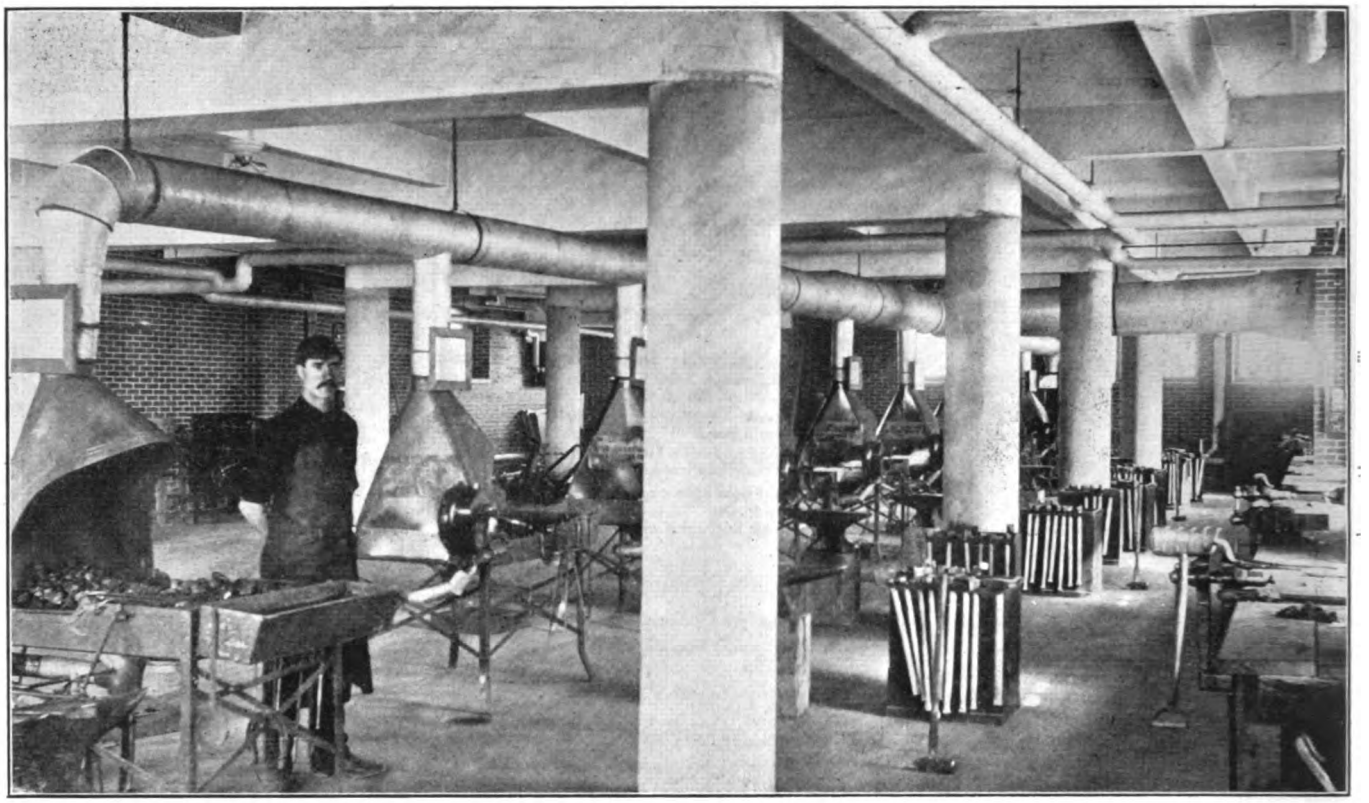
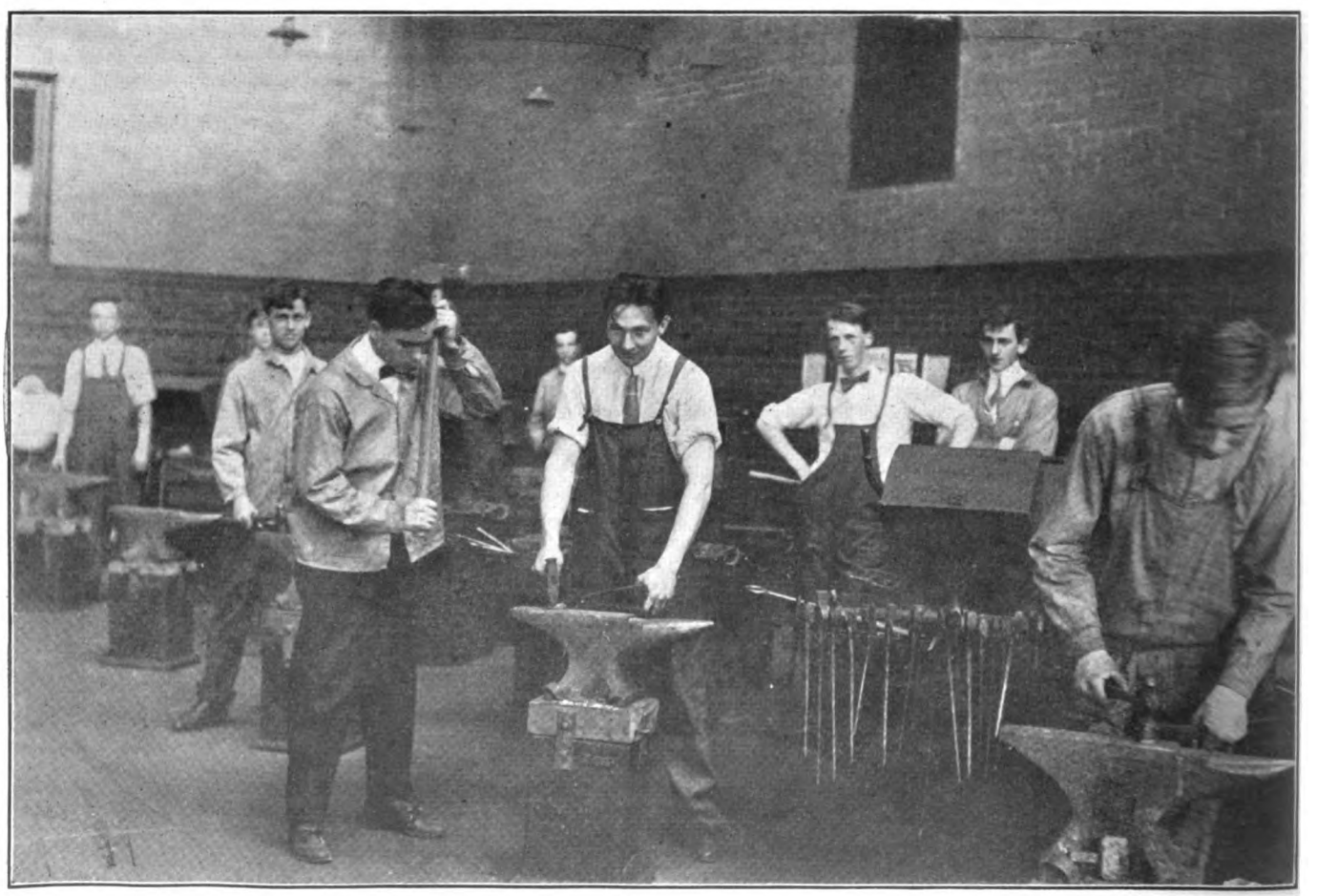
JACKSON, MINN.
or 47 Second St., MILWAUKEE, WIS.



THE FORGE ROOM AT MACDONALD COLLEGE, QUEBEC, CANADA



A CORNER OF THE FORGE ROOM AT THE UNIVERSITY HIGH SCHOOL AT THE UNIVERSITY OF CHICAGO



The University High School of the University of Chicago

W. A. RICHARDS

Instructor of Forging and Foundry Practice

THE University High School of the University of Chicago, School of Education, was formed by the union of the Chicago Manual Training School and the South Side Academy, as a model school for practice teaching in manual training and academic work, and also as a preparatory school for an engineering college.

In Belfield Hall are located the shops for instruction in woodwork (bench work, turning, cabinet work and pattern making), molding, forge and machine work. The shops are large rooms having ample blackboards and space for lectures. The rooms are well lighted; all except the machine shop having the saw-tooth roof construction, giving a soft, uniformly distributed light with no direct sun and very little shadow. A large and well-arranged store and tool room connects with each shop.

Although all the shops are fully equipped for twenty-four students, an attempt is made to limit the number in a class to twenty.

The wood shop consists of two rooms, in the larger of which are placed the benches and lathes, while the other is a fully-equipped machinery room. Connecting with the machinery room is a large dry kiln.

The foundry has a Hoyt trunnion cupola of improved design, two brass furnaces and two Millett core ovens. Connecting with the foundry is a separate lecture room fitted with a revolving blackboard to facilitate lecture work in molding.

The forge shop is equipped with Buffalo down draft forges, power shear, drill press, wet and dry emery wheels, tempering furnace, and a power hammer is shortly to be added. The machine shop has various sizes and makes of lathes, shapers, milling machines, planes, grinders, drill presses, turret lathes, etc.

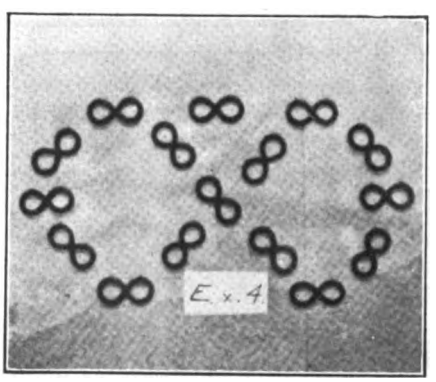
Work of three distinct grades is taught in each of the shops, viz.: high school manual training, a teachers' preparatory course and a university course for students taking engineering work. The high school work extends throughout the fall, winter and spring quarters. The college work is given in the spring quarter. During the summer quarter the shops are open from six to eight hours a day for teachers' courses.

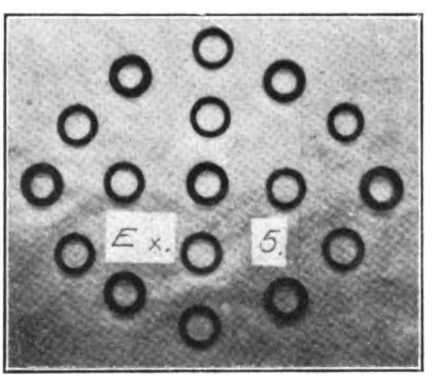
The shops are correlated as far as possible, many problems being carried through all shops. In the wood shop the patterns are made for the foundry, in the foundry, castings for the machine shop and, in the forge shop, forgings are made that are finished in the machine shop.

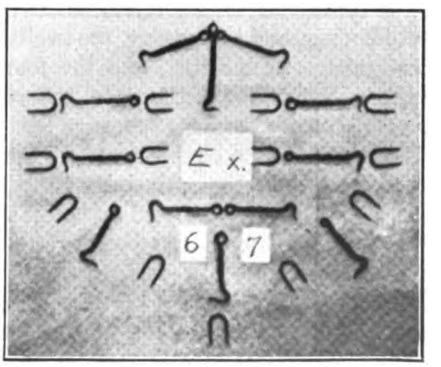
The Forge Course.

The forge course covers a period of seven months—five days a week and two hours a day. Six months of this time is devoted to making forty-six exercises to bring out the principles of heating, drawing out, upsetting, bending, punching, splitting, riveting, welding and hardening and tempering of tool steel. The last month is devoted to some original work, as andirons, lawn seats, etc. Great stress is laid on holding and using the hammer properly, and the exercises are made out of heavy iron. Lectures are given weekly throughout the course on forging and allied subjects.

Each student is supplied with a set

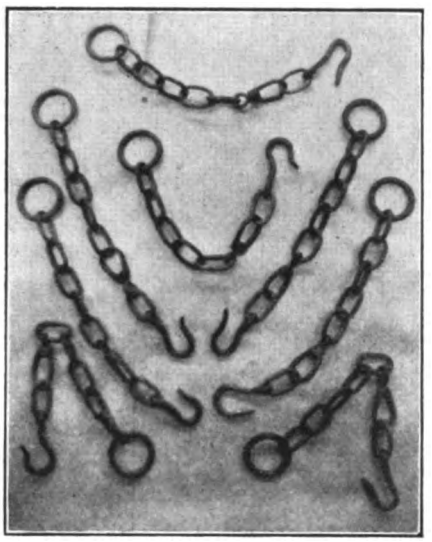






EXAMPLES OF REGULAR EXERCISES AT THE UNIVERSITY HIGH SCHOOL AT CHICAGO

of notes and exercises as shown, and these are supplemented with class and personal instruction. The first and second pages show drawings of the anvil in perspective and the forge in section, on which all the parts are shown and named. On the third page the method

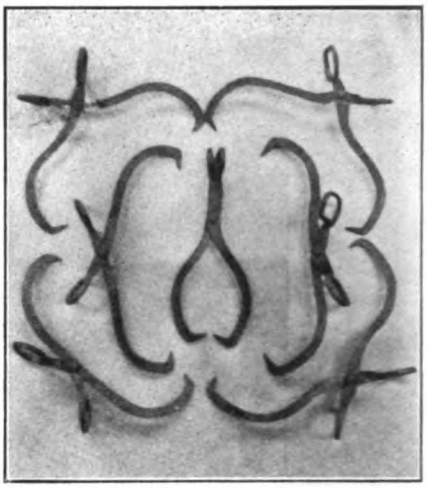


SOME CHAINS, HOOKS AND SWIVELS

of making the fire is explained by drawing and description. Then three pages supplement the first lecture, which is on tools and their uses, and a class demonstration on fire building. A talk is also given on various types of fires and their uses.

The first exercise consists of drawing down ½-inch square iron to ⅜ inch square, cutting it off to a certain length and truing the ends. This introduces the use of the square, straightedge and the hardy for cutting off. The second is to upset a piece of ½-inch square iron, 5 inches long, until it becomes 3 inches long, the section being kept square and perfectly uniform throughout. The third teaches drawing out and forming sections other than square, also drawing to a point. The fourth to the eighth teach bending and twisting, and the eighth, punching; the ninth, tenth and eleventh the use of the fuller, flatter or set hammer, and the swedge, the twelfth and thirteenth, splitting, and the fourteenth, the working of the metal to form a sharp outside corner or an edge bend. The fifteenth is a supplementary exercise to apply the principle already learned. The sixteenth and seventeenth bring in the use of the beading tool, while the eighteenth and nineteenth are for practice. The twentieth gives a good opportunity to use the sledge, and introduces riveting. Exercises 21 to 33 bring out the various ways of welding, i. e., welding chain links, ring, swivel hook, collar, washer, bolt, angle weld, tee weld, with both flat and round stock, and flat to round (jump weld). The ring swivel and hook are all added to the chain. Exercise 34 is an open end wrench, which is casehardened, and 35, blacksmith's tongs, either plain or box. Exercises 36 to 43 cover the tools, such as chisels, center punch and lathe tools; 44 is a pair of nippers; 45 a screwdriver (usually forged from an old file) and 46 a lathe dog.

The course as outlined is given to high school classes. The same work is taken up in teachers' classes, to which are added other heavier and more difficult exercises, the theory being studied along with the work. In addition to actual shop work, methods of teaching the work are discussed, outside reading is assigned on forge shop subjects, on which a report is read before the class, followed by a general discussion. The design and equipment of school forge shops forms an important part of the work. Each student is given the plan of a room and told to make a layout for a class of a given size, which he presents to the class. This opens up a very valuable discussion, bringing out points that will be of great service when the student



ICE TONGS FORGED BY STUDENTS

becomes a teacher and is called upon to introduce the work.

The college class is given a short course taken from the above, covering the important principles.

Shop mathematics is introduced in all the courses as much as possible, and the student's attention is called to the connection of forge work to other branches whenever occasion arises.

The engravings show several examples of work done by students, also several specimen pages from the set of

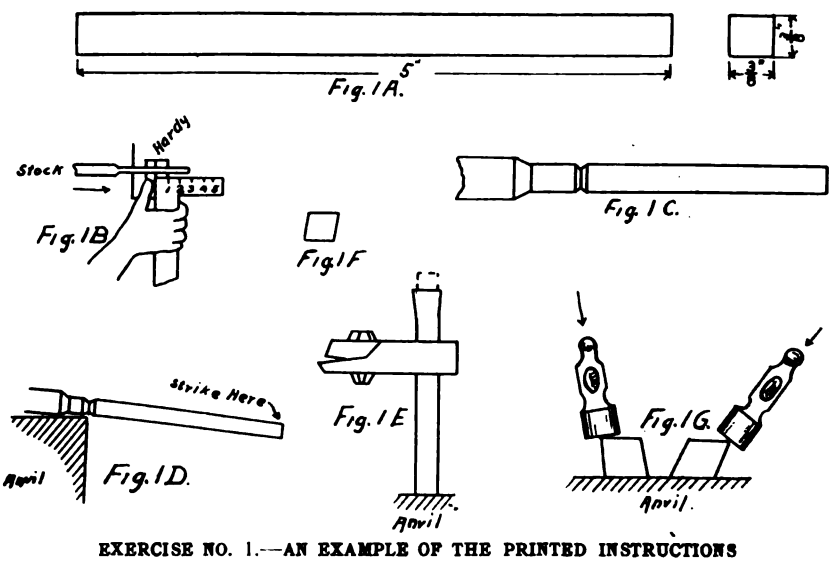
EXERCISE NO. 1.

Stock:—Norway Iron, ½x½ inch—conveniently long for handling.

Explanation:—One end of the stock is to be drawn until a length of 5 inches or more is ⅜x⅜ of an inch. Five inches of the drawn portion is then to be cut off on the hardy and the cut end squared. The finished piece, Fig. 1A, must be smooth, true to size, square in section and straight.

Operation:—Beginning near the end of the stock, strike every other blow on a given face, and the alternate on the adjoining faces. Occasionally turn the work so that the two faces previously on the anvil may be brought under the hammer. To mark where it is to be cut, hold the square to the edge of the hardy, across which slide the stock, as indicated by the arrow, Fig. 1B, until its end is opposite the 5-inch mark on the square. Put down the square, take up the hammer and strike a light blow. After this, cut on all four sizes, Fig. 1C. Break the piece off by bringing the cut over the edge of the anvil, Fig. 1D, and deliver a blow on the end of the piece. To square the cut end, first upset Fig. 1E and then draw to size.

Caution:—If it is discovered that the stock is becoming diamond shaped, Fig. 1F, instead of square in section, hammer on the high side, as shown in Fig. 1G.



EXERCISE NO. 1.—AN EXAMPLE OF THE PRINTED INSTRUCTIONS



SWAN-STREET COLLEGE, LIVERPOOL, ENGLAND

notes and exercises which are supplied each student.

Trade and Technical Education in Other Countries—10.

W. H. DOOLEY.

England.

England is losing her prestige as a manufacturing nation. Continental countries say it is due to lack of industrial education. Outside of the opportunities offered for attending technical schools in the evening, the training of the great mass of English workmen is confined to the shop. On account of the subdivision of labor and competition, the workshop is on longer a training shop, but a place for turning out commercial products.

The need of England, so far as the working man is concerned, is for a higher education generally. That the English workman is fully alive to the necessity of industrial education is shown by the resolutions adopted at the last Congress of Trades held by the Trade Union Congress. Labor Members of Parliament are in favor of industrial schools to fill out the modern apprenticeship system, so that it shall give to the young apprentice the old-time breadth of learning which the young apprentice received in the small general shop.

In such a congested region as England the subject of the unemployed is one constantly uppermost in the minds of industrial leaders; and there is a strong feeling among the most advanced thinkers on industrial educational topics that England is losing a great opportunity in not providing industrial educational facilities for this class, whose very unfortunate condition provides them with time for attendance upon industrial schools. Ninety-eight per cent of a procession of unemployed in London recently had no training for any trade or profession, and depended for their existence on charity.

In 1851 the first World's Exposition at London aroused interest in technical education and furnished funds for educational work. This interest soon died, and it was not until 1880, when all the continental countries had provided means for industrial training, that England took the first step toward the modern technical education of artisans. In 1884 England was beginning to feel foreign competition, particularly at that time from Germany. This led to the report in 1884 of the Second Royal Commission on Technical Education. In 1889 an act permitting local taxation for technical education was passed. This provided that local authorities might tax themselves a "penny in a pound." Later a bill was passed setting aside a certain proportion of the excise on the sale of liquor for technical education. As a result of this act there are

EXERCISE NO. 24.

Stock:—Norway Iron, $\frac{1}{4}$x$\frac{3}{4}$x3$\frac{1}{2}$ inches, and $\frac{3}{8}$-inch round x 5 inches long.

Explanation:—Center punch at the center of stock; fuller on one side $\frac{3}{16}$ of an inch deep and $\frac{3}{4}$ of an inch from punch mark on each side, Fig. 24B. With top and bottom fullers fuller the sides $\frac{1}{8}$ inch deep at the same point as the other fuller marks, as shown by Fig. 24C. Draw out the ends to nearly $\frac{3}{8}$ inch round, as shown by dotted lines, Fig. 24C. Punch $\frac{3}{8}$-inch hole, "a," Fig. 24C. Heat to a welding heat, place on mandrel and bend to form shown by dotted lines, Fig. 24D.

Make Eye:—Place the $\frac{3}{8}$-inch round stock in a swage and hammer each end to half round for 1$\frac{1}{2}$ inches, Fig. 24E; bend as shown by Fig. 24F; take welding heat on part "a," Fig. 24F, and weld, hitting close to the end first, working to the point; draw to $\frac{3}{8}$ inch round. Place in swivel and rivet, as in Fig. 24G. Cut off ends "a-a," Fig. 24D, to proper length to make swivel correspond with chain. Add to chain with additional link.

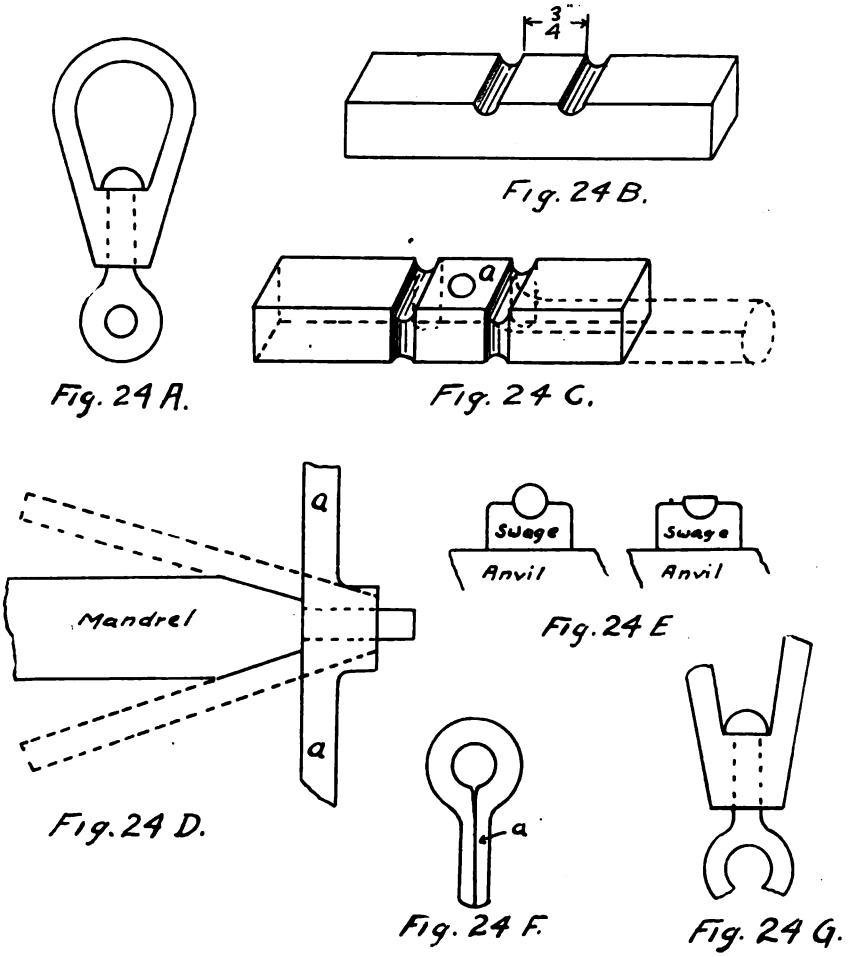


Fig. 24 A. Fig. 24 B. Fig. 24 C. Fig. 24 D. Fig. 24 E. Fig. 24 F. Fig. 24 G.

EXERCISE NO. 24.—HERE THE STUDENT IS TOLD HOW TO MAKE A SWIVEL

over forty so-called technical institutions and polytechnics of considerable size flourishing and steadily growing in England, while there are smaller ones and new institutions being started yearly.

Most of the schools for technical instruction in England carry on two lines of instruction. (There are no secondary schools corresponding to our high schools appointed by taxation.) The first line of instruction is general scientific instruction, with scarcely any literature, but with considerable manual training for those between the ages of about fourteen and seventeen who can afford to attend day classes. Such work is conducted in the evening classes. The instruction conducted in the evening attracts by far the larger number of students and comes nearer to trade instruction. In some schools the practical instruction along trade lines is far more marked than in others. The evening classes, however, and a few day classes of a somewhat corresponding character, differ from what would be understood in America or the Continent of Europe as distinct trade schools, in that, while the instruction is both theoretical and practical and is intended to bear directly upon some particular trade in each case, the purpose is not to supersede the training of the workshop, but merely to supplement it.



THE IMPERIAL INSTITUTE, LONDON, ENGLAND

The pupils, whose ages range from fourteen to fifty, but most from fifteen to thirty, are given lectures and textbook work on the application of science, drawing, and set to their particular trade, and in many of the classes there is given the opportunity in a sort of a workshop laboratory to handle all the tools and machinery and acquire a more thorough knowledge of all the processes of a trade than is attempted at the bench or factory. The schools aim to supply what the shops do not give and to keep the student abreast of the latest developments of invention and of the application of science to his trade.

Of course, it is impossible in an attendance of two or three evenings a week of about two hours each for about thirty-five weeks in a year to gain the manipulative will and speed which is obtained in the workshops and factories. It is conceded by some of the teachers of the technical classes that with more time and money and a larger amount of direct workshop instruction in a trade where science and knowledge are more needed than manipulative will, the whole of the trade could be taught in the school.

The fees of these technical instructions have been a little more than nominal. In London they are usually from one dollar to three dollars for the entire year's session of about eight months. No school so far as learned, except the technical school of Bradford, England, has undertaken to derive any income from the sale of articles made by the students. The expensive laboratories and workshops have been a heavy financial burden.

On top of this has come (what all in England seem to consider essential) the scheme of stimulating attendance and interest in educational work by a great

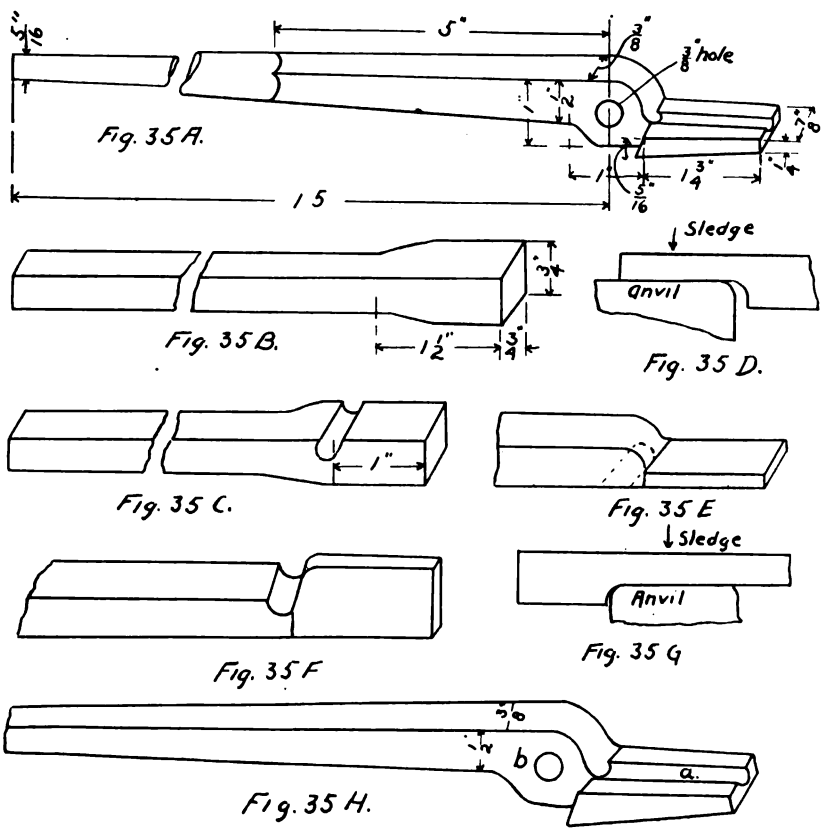
EXERCISE NO. 35.

Stock:—Norway Iron, two pieces, $\frac{1}{4}$x$\frac{1}{8}$x10 inches long.

Explanation:—Two pieces are to be finished to size shown by Fig. 35A, and these pieces riveted together to form a pair of tongs.

Operation:—Upset one end, as shown by Fig. 35B. Fuller as shown by Fig. 35C. Draw out jaw with sledge, as shown in Fig. 35D. This will leave the piece, as shown by Fig. 35E. Fuller again, as shown by Fig. 35F, and the dotted lines, Fig. 35E. Draw out the handle with sledge, as shown by Fig. 35G, to the shape shown by Fig. 35H. Punch hole for a $\frac{3}{8}$-inch rivet, as shown at "b," Fig. 35H. Fuller, as shown by "a," Fig. 35H. Finish by drawing the handle to the dimensions shown by Fig. 35A, and rivet the two pieces together.

Caution:—Make each half exactly like the other.



EXERCISE NO. 35.—STUDENTS ARE ALSO TAUGHT TO FORGE A PAIR OF TONGS

number of prizes and scholarships and exhibitions. According to the regulations governing the scholarships and exhibitions awarded by the Lancashire County Council, the chief distinction seems to consist in the fact that the former are valued at about $2.92 per annum and are good for a term not exceeding three years' terms; while the latter are valued at $24.33 each, if for



A UNIQUE ADVERTISING CARD

evening classes, and as high as $75 if for day classes, and are good for one year. In other words, exhibitions are a sort of short term scholarship.

The City and Guilds of London Institute has influenced and stimulated technical education in England by offering prizes and grants for those attending workshop classes. It has so shaped its examinations during the last twenty years so as to arouse interest and at the same time add dignity to the trades.

There are a great many reasons why industrial and electrical education has not made more progress than it has. The devotion of the English to sports and the excitement occasioned by the different wars and outbreaks in the colonies have started interest in education and science preparation for work in life. All English teachers deplore the lack of enthusiasm for education among all classes, and in technical education they regret that the theoretical classes dealing with the application of science to any special trade are not as popular as the practical workshop classes, although the process of the latter is closely associated with the knowledge of theory.

Class distinctions also are a serious drawback. There seems to be a great difficulty in mixing the wage earners of the various occupations or the wage earners and the clerk and the foreman. Hence, in the technical classes care has to be taken lest the artisans imagine that they are being crowded out by a high social stratum of so-called middle-class students. The hours of labor, while fewer in England than on the Continent, usually begin so early in the morning, that is, about six, with an intermission for breakfast, that the apprentices and other young workmen are too sleepy when the time for evening school arrives to give close application to the mathematical and other branches. The attempt has been made in many places to get employers to let off the students of the evening school, if under twenty-one, at an earlier hour, or let them begin work later in the day. This has not been done to as large an extent throughout the country as is desired.

Another serious obstacle to the progress of technical education is the indifference of employers. There is little marked opposition to the schools by the employers and there are many large firms in every city that endorse the work heartily. Some give prizes for excellence in the technical classes, and also pay in whole or in part the fees of the workmen of the trade. Among the mass of employers, however, there is comparative indifference as to the work of the institutes. If the employers were more interested, it is thought that they might encourage a far larger attendance of their employees, not only by shortening the daily time of work of their apprentices and other young men attending the institute, but also by advancing these more rapidly who could show, through attendance at the technical classes or otherwise, that they had especially fitted themselves for such advancement. Teachers of trade classes and the principal of the institutes are constantly asserting that there is more need of educating the employees than the men with regard to the advantages of technical instruction.

A very serious obstacle, in fact, the most serious of all, is the poor general education of the workman. Nearly all of the artisan class leave school at twelve or thirteen, and after earning small amounts in doing odd jobs about the street or in the factories settle down at fifteen or sixteen as general laborers or factory operators, or enter upon the learning of a trade. When they go to the evening technical classes at fifteen or sixteen they have forgotten much of what they knew upon leaving the elementary school.

To bridge over this gap from twelve or thirteen to sixteen years of age is now the aim of all English educators. The trend of opinion seems to be fair in extending the compulsory education from twelve to fourteen, as in Germany and other continental countries. In fact, there is a law in England now that children must attend school until fourteen, although they begin to work at twelve—half day at school and half day in the mill. A further suggestion is to develop day combination schools like our high schools. When as many as can possibly afford it can have a chance to continue their general education of a marked scientific and industrial training character till sixteen years of age.

The government is very particular about the selection of teachers for the workshop classes. Three qualifications are necessary: First, practical familiarity with the work taught, such as best can be acquired by holding a position as foreman in some first-class establishment; second, most of the scientific and art principles applicable to the work taught and such as can be acquired with best technical institutes; third, natural ability as teachers. In many



A NEBRASKA POWER SHOP, RUN BY MR. H. BUSH

cases it has been found very difficult to combine these qualities. Some of the teachers in the evening classes continue to practice their trade by day. Where that is not done, special care must be exercised by the teacher to keep in touch with the latest progress of workshop practice.

The government of England gives aid to those institutions for technical learning; consequently there is national control of industrial education; yet the local conditions vary enormously, and no one plan will stand as a representative example of the whole country.

In Liverpool, with its great technical school which cost upwards of half a million dollars, there are one thousand five hundred pupils in the evening classes. During the day time, however, except for some special summer classes of adults, this finely constructed and well-equipped building is practically unoccupied. As a rule, pupils do not apply for instruction in this school unless they are working or have worked in the trade they wish to study. Courses are given in all the trades.

The Manchester School of Technology is housed in a magnificent building, which cost one million five hundred thousand dollars and which is run on a correspondingly large scale. The enormous running expenses are paid in part by the state, part by the city and a part by the students' fees.

London seems to be fairly well provided with projective schools of the class in Manchester and Liverpool, for it has seven such institutions. Its provisions for elementary technical education assures enormous propositions.

Outside of Liverpool there is a school situated in Booth, a city having a population of sixty thousand. There are two hundred and fifty day pupils in this school. No one is admitted to the special trade classes except those engaged in trades in which the knowledge they would obtain here is required.

In the county of Northampton there is the Northampton County Technical School. Since this county is given over to the shoe industry, the classes are for shoe workers. There are seven schools located in the most prominent centers of the county. The instruction commences in September and ends in May, covering a period of thirty-two weeks. The classes meet from eight to ten, two evenings a week. The attendance varies with the trade. Out of a half million people in the county there are but seven classes, with a total membership of twenty-eight students, and this in area covering about one hundred miles, whose staple industry is the manufacture of boots and shoes.

In every manufacturing center one will find a small technical school, consisting of well-equipped classes in some instances, to classes with very little outside of models.

The poor man's chance in England may be chiefly summed up thus: Free elementary education by the payment of tuition; secondary education; comparative scholarships for secondary and advanced education.

The Smith and Criticism.

JAMES MASON.

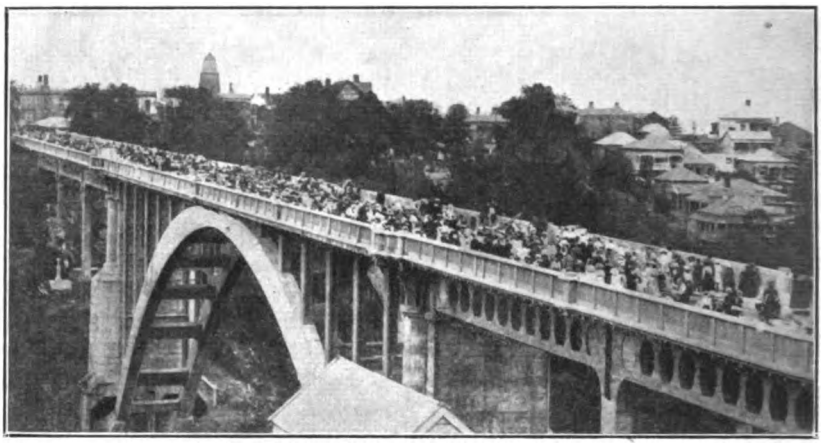
The smith and smith-work have long been the objects of criticism, and this craftsman and his craftsmanship seem to lend themselves particularly open for judgment. The reason is not far to seek, as there is no trade where more alternative methods are employed or where the eye, brain and manual dexterity are more called upon. The fact that in executing any piece of work the smith is left to his own initiative and allowed to pursue his own method may be readily seen is the reason that he immediately becomes the object of criticism.

Two good smiths may be working from the same drawing or pattern, and while the essential points are right in both jobs, there will be to the trained eye certain features discernible that will distinguish one man's work from another's. Then, too, the methods employed by each smith may be entirely different. This in itself always proves food for discussion. A smith should at all times welcome criticism of his work, and the knowledge that one's work is to be judged by one who knows a good job from a poor one is the best encouragement to put forth one's best efforts.

Welding by Means of Oxy-Acetylene.

W. O. B.

In the process of welding by means of the oxy-acetylene blow-pipe two gases are employed—oxygen and acetylene. The acetylene is formed by the union of carbon and hydrogen, and when these unite heat is absorbed, but when acetylene is broken up into hydrogen and carbon, heat is given off. And in the oxy-acetylene blow-pipe the heat produced when oxygen is consumed and the heat given off when acetylene is broken up are both used in developing a flame of such a high temperature as to reach 6,000 degrees Fahr., and more. With such a tool, having a heating power from two to three times that required to melt the ordinary metals, almost incredible results are obtained.

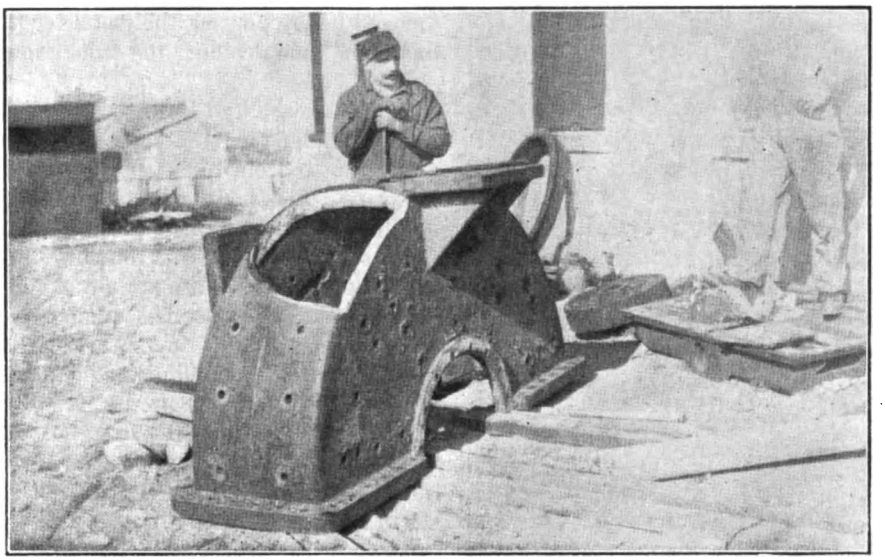


GRAFTON BRIDGE, AUCKLAND, NEW ZEALAND, SAID TO BE THE LONGEST FERRO-CONCRETE BRIDGE IN THE WORLD. IT TOOK THREE YEARS TO COMPLETE IT AND A SMITH WAS FOREMAN OVER THE WORK

Owing to the small flame which issues from the blow-pipe, the heat is highly concentrated, and in addition the oxygen and acetylene are mixed before issuing from the burner. The flame consists of a minute, brilliant, central flame, which is enveloped by a rather large dull flame.

The process of welding by means of oxy-acetylene is very different from the process usually meant by the term welding. The ends of the metals to be joined are chamfered instead of lapped or butted joints. There is then added to the joint, after the joint itself is heated to a fluid state, drop by drop of molten metal from a rod or special wire, in much the same way as in soldering.

For example, in welding two pieces of steel a solder stick of the same metal is used. But when two different metals



BEFORE WELDING; PUMP CASE 2½ INCHES THICK, THREE PIECES BROKEN OUT TO BE WELDED IN PLACE

are to be joined the stick should be the same material as the one of the two which melts at the lowest point. For example, in the case of joining a piece of cast iron to steel, a piece of cast iron should be used as a solder stick. The reason for this is that molten cast iron dropped on steel that has already been brought to a welding heat will not chill before a union is formed. When steel is dropped on cast iron, unless the iron is heated so high as to be in danger of being burned, it chills the melted steel dropped upon it. The melting point of cast iron is lower than that of steel.

The welding of cast iron is really the most satisfactory of all metals, as the metal becomes sufficiently fluid to leave a smooth surface. In a molten state this metal flows much like mercury; that is, it hangs together in balls. These balls have to be broken up by what is known as scaling powder. This is used much in the same manner as the flux in brazing.

Considerable care must be exercised as to the nature of the filling stick used, as iron containing scrap will often cause trouble in hardening. It is, however, no trouble to obtain soft welds when care is taken in selecting this material. Care should also be taken not to overheat the metal and to allow it to cool off slowly.

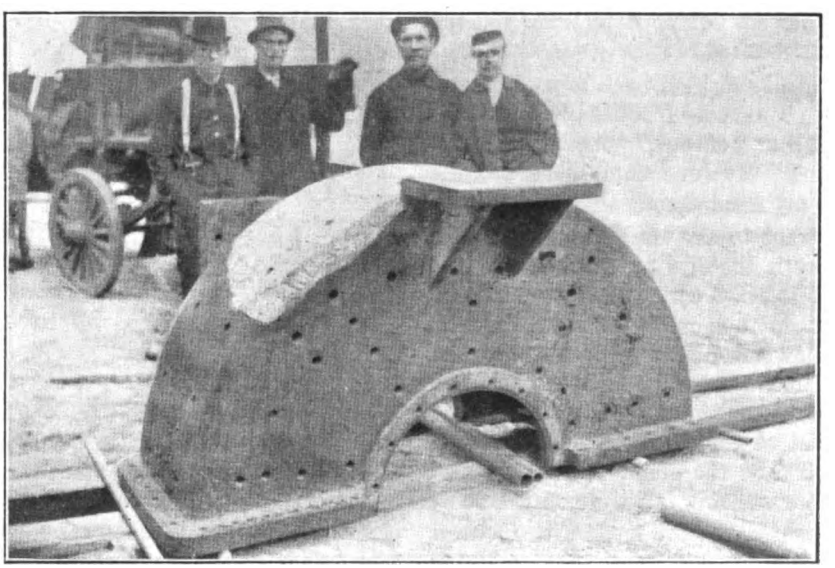
Steel does not become so fluid and can, therefore, be worked in any position. It is possible to work on the under side, thus making it possible to weld locomotive frames together and even add metal to the under side of the upper flange. When adding metal the full force of the flame must not be allowed to play on the solder stick unless it is in contact with the larger body of metal.

As in ordinary welding, the amount of carbon contained in the steel has a good deal to do with the strength of the weld. High-carbon steels do not always prove satisfactory, but high-speed steel can be welded to machinery without trouble, thus enabling manufacturers to make a considerable saving in the amount of high-speed steel used.

Possibly the most radical development which this process has produced is the satisfactory welding of aluminum. Great care has to be taken in handling this metal, but, notwithstanding the difficulties, very successful work is being carried out.

Brass is more difficult to work than most metals and requires more experience, on account of the zinc which burns very readily, leaving a yellow powder on the weld and also leaving blow holes.

For cutting steel and iron the action of the oxy-acetylene blow-pipe is really marvelous. The operation is performed by heating the metal first to a red by the ordinary welding flame, and with this flame continued a jet of pure oxygen is turned on which unites with the carbon of the metal and disintegrates it with surprising rapidity. The cut is narrow and smooth with no material injury by oxidation. Cuttings can be made in any shape, and this process should prove especially valuable in making dies and in fitting plates.



AFTER WELDING; LENGTHS OF WELDS ELEVEN FEET. THIS REPAIR SAVED NEARLY THREE WEEKS' DELAY

A Good Talk on General Topics and Wheels in Particular.

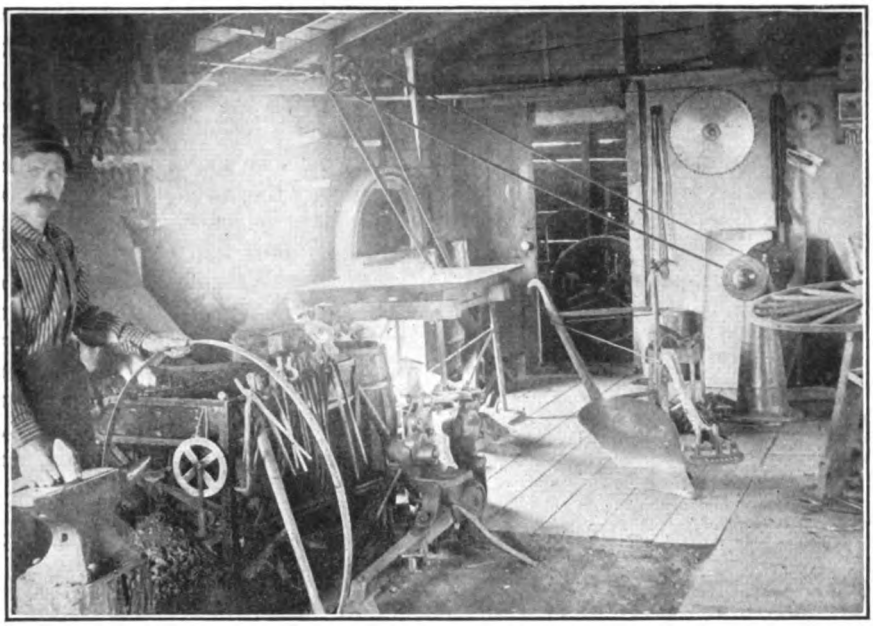
J. VESTAL.

Do not think for one moment that I am trying to get up an argument, but we can never learn without asking and watching others.

The first thing I want to say is—I never boast of my long past experience, as I notice several do. They will give you some simple little thing, and then will say, "I know, for I have had ten or twenty years of experience." If it takes a man twenty years to learn the blacksmith trade he had better never start.

In this day and time, with the good books, the trade journals, the up-to-date tools and machines he has before him, with the best of journeymen workmen that are onto their job to help him every day, it should not take a man long to know his trade.

Someone will get up now and ask the best way to forge and make a hammer, when he can go to the hardware store



MR. O. M. SEVERSON, OF IOWA, SAYS "OUR JOURNAL DOESN'T COME OFTEN ENOUGH"

and get a hammer for forty cents, and a better one than a blacksmith can make in an ordinary forge in four hours.

Now, if a man's time isn't worth more than that in his place of business, then he had better close up and go to work for a brother who has something to do.

Just a few days ago an old man came and had me turn him some draw-knife handles, and after I got them made for him he told me that he was making some draw-knives and that he would not give one of his make for a half dozen of those you can buy. He was an old man and I wouldn't argue with him. But the idea of telling me that he could make a better knife than is made in the factories that are fixed for the business, and have everything from the raw material to the best of mechanics, with the best of equipped factories for the manufacturing of such goods.

Now, I must get back to my point at which I aimed. I noticed in a number of "Our Journals" one thing—axle setting. My June number has brought it to my mind again.

I want to ask Mr. Gunn, or anyone, "Why is the dish put in a wheel?" I want to know why the wheel has to set on a plumb spoke to be right? I want to know how he can set each end or arm of an axle correct and both the same by heating the axle in the center only? I want to know how Mr. Gunn can set his axle on the plumb spoke, and also the tire set flat or full width on the floor.

When wheels are made with the dish in them and then put up to machine called a "rim jointer," and faced up as the wheels lay on the butt end of the hub and revolves around to the cutters, those cutters face up the rim and make the wheel a true circle at the same time.

When he said set on a plumb spoke, did he think that all axles have the same taper? You see that this makes quite a difference. He plumbs from the center of his spoke in hub to center on the floor. Some spokes are $\frac{7}{8}$ of an inch at hub, when others are $3\frac{1}{2}$ inches. What is he going to do in this case?—just set any way and let the top of the wheel go where it may?



Babbitting Boxes.

J. N. BAGLEY.

In preparing to rebabbit the old box, naturally the first thing to be done is to remove the old metal that still remains. This may be done with a small chisel usually, but in some cases, however, owing to the shape of the box, it is necessary to heat the box until the metal will run. All grease must be removed before pouring the metal for the new box, thus avoiding the troublesome "blow holes."

First, we shall go through the operation of babbitting the solid box, after removing the old metal and grease, as already explained. Cover the shaft with a thin sheet of paper, draw it tight and stick the ends with mucilage. If the paper and mucilage are not at hand an application of common laundry soap will answer as well, but either one or the other must be used or the metal will fit so tightly to the shaft that it will be impossible to turn it after it is cool, and the shaft and box would become as one piece, which would necessitate placing it in the fire, melting out the metal and repeating the job.

Before pouring the metal into the box, the shaft must be blocked up until it is in exact line and as near as possible to the center of the box. Now, place good, stiff putty or clay around the shaft and against the end of the box until no metal will run past. Whittle a soft pine stick and place it in the oil hole, letting it protrude a little distance above the box, with the lower end resting on the shaft. This will leave the oil hole to the shaft and save the time drilling one, also avoiding the danger of a shaving from the drill being left in the box, which might cause unusual wear. To get a good, smooth box, it is necessary to leave air holes at the end on the top side of the box, and to make or mold a little funnel around the air hole, as well as the hole where the melted metal is to be poured.

A great deal depends upon the proper heat of the metal to get a perfect box, and, like making a weld, the person doing the job must use judgment, and consider the size of the shaft, box, etc. In most cases, have the metal just hot enough to flow freely, and when all is in readiness pour the metal just as fast as you can, not stopping until it appears at the air holes.

In babbitting the split box, proceed the same as for the solid box, except that liners made of a number of thin pieces of cardboard are placed between the two halves of the box and against the shaft. This will, of course, divide the metal. To let the metal run from the top half of the box to the lower, cut a few small V-shaped notches in the liners close up to the shaft, screw the two halves together securely, and you are ready to pour the metal, as already described in pouring the solid box.

As soon as the babbitt is cool, remove the screws holding the halves together

and drive a sharp chisel between, cutting the metal remaining next the shaft caused by the V-notches. Cut away all sharp edges that are left and, with a small three-cornered chisel or similar instrument, make oil channels leading from the oil hole outward, never in the reverse direction.

The best sized ladle for this kind of a job is one holding from five to seven pounds of melted metal, as a larger one cannot be handled well. If this amount of metal will not run the box, it is best to have two ladles and a helper; and in this case have two holes to pour the metal. In case a box is to be babbitted and no babbitt metal is at hand, a very good substitute will be found in ordinary zinc. Just as the metal is hot enough to pour, drop a small piece of rosin into the ladle, as this will greatly improve the condition of the box. I have used this method for a number of years and find it as good as any I have ever tried.

Gun and Novelty Repairing—16.

W. G. MUMMA.

Receipts, Formulas and Notes.

To make emery sticks take a piece of pine, or other wood, about the size and shape of a file. Glue a piece of emery paper or cloth on, and after dry, use the same as a file. Sandpaper can be used the same way for work on wood.

To anneal small tools or pieces of steel heat up slowly to a red, and then take two pine boards and lay the hot steel between them, and screw them in a vise. As the steel is hot it sinks into the pieces of wood and is firmly enclosed in an almost air-tight charcoal bed. When taken out after cooling it will be found to be very soft. This operation can be repeated if necessary. The boards prevent the steel from becoming cooled off too quickly, especially if the pieces are small.

When steel is hot through it should be taken from the fire immediately and forged as quickly as possible. Soaking in the fire causes steel to become dry and brittle and does it very great injury.

A piece of steel, properly tempered, should be finer in grain than the bar from which it is made.

In dressing up wood be sure to leave no plane marks, bruises, dents or scratches of any kind. All corners and angles should be sharp and clean, and otherwise have the work clean and smooth, so as to have a finished appearance—all joints to be close and well made; it takes practice to do all this.

Soldering aluminum: The following is a receipt for a successful solder for aluminum. Take and mix by melting together 28 parts of block tin; 3 parts of lead; 7 parts of spelter, and 14 parts of phosphor tin. The phosphor tin should contain ten per cent of phosphorous. When soldering aluminum clean off all dirt and grease from the surface of the metal. When the molten solder covers the surface of the metal, scratch through the solder with a wire brush, by which means the oxide is broken and taken up. Quick work is necessary. Then proceed to solder the parts together.

A good welding compound is made as follows: 20 parts of borax; 1 part of subcarbonate of iron. Steel can be heated very hot and welded by using this compound.

To caseharden thin pieces of hoop iron take prussiate of potash and pulverize it finely, and heat the iron to a cherry red. Then dip into the prussiate of potash, or sprinkle it on until it melts. Then plunge into cold water and you have a good, hard surface.

A good receipt to clean brass articles: Take six large spoonfuls of cider vinegar and two spoonfuls of salt, and put in a bottle and keep ready for use. Apply with a small cloth, rubbing well. All stains will disappear and the brass will be as bright as when new. Wash the vinegar off after polishing, and dry the brass, as it will become discolored if left on.

To straighten out a coil spring heat it to a red heat, place it over a rod or bolt in the hardy of the anvil, and pull it out straight by one end.

A good way to make an end wrench is to take a piece of iron about two inches long and about the size wanted, heat up and forge one end to the shape and size of the nut. Then weld a rod into the other, form a handle on the rod, and file and finish up.

Receipt for casehardening iron: 1 oz. each of blue vitriol, borax, prussiate of potash and charcoal; 2 pts of common salt; 1 gal. of linseed oil; 1 qt. of boiling water. Pulverize the solids and boil in the water, and then add the linseed oil. Heat the iron to a cherry red and immerse, stirring the mixture while it is cooling. By using this you can make edge tools out of iron.

Reamers require the most careful treatment in making, hardening and tempering. It is best to anneal them before finishing them. Slowly and evenly heat them to a bright cherry red, quench in an oil bath, holding them vertical when drawing the temper.



GOOD SIGNS ON A NEAT APPEARING SHOP HELP BUSINESS

A good liquid glue can be made by taking: 3 parts of good glue; 12 parts saccharate of lime. Dissolve in water, warming it well. Any consistency may be had by varying the quantity of saccharate of lime.

Copper and tin alloys have the property of becoming much softer and ductile when treated as follows: Heat to a dark red or to the melting point of lead, and immerse in water. The alloy thus treated can be worked under the hammer and straightened without cracking.

The pickle for gray iron castings is generally made by mixing sulphuric acid and water in the proportion of two or more parts of water to one part of acid. The articles to be pickled are immersed in this bath, where they are allowed to remain for a short time. They

are to then be removed and the acid is allowed to act upon their surfaces until the scale has loosened, when they are washed off with water. The brush or file can then be used.

To pickle brass or gun metal castings, a mixture of nitric acid and water may be used in the proportion of five parts of water to one part of acid, the treatment being the same as for iron castings.

Oil may be used to advantage on new files which are put to work upon narrow fibrous metals of a hard nature. Some workmen fill the teeth with chalk.

To remove oil from the teeth of a new file a ready way is to rub chalk or charcoal across the teeth, and brush thoroughly. By repeating the operation a few times the oil will be entirely absorbed, and the file will be in the best possible condition for use upon cast iron.

All files must be kept clean, and they should be kept separately in a drawer, each kind to themselves, and not mixed up with other tools. Files that have been used should be first used on castings or other iron that has some scale on them for such pieces are very destructive to new files.

If the work is small and delicate the vice should be higher than when heavy and large pieces are to be filed.

To harden mill picks or similar work take: 2 ozs. of alum; 2 ozs. of salt petre; ½ oz. of sal ammoniac; 1½ ozs. of salt; 3 gals. soft water. Mix thoroughly, heat the picks to a cherry red and plunge them in this preparation, but draw no temper.

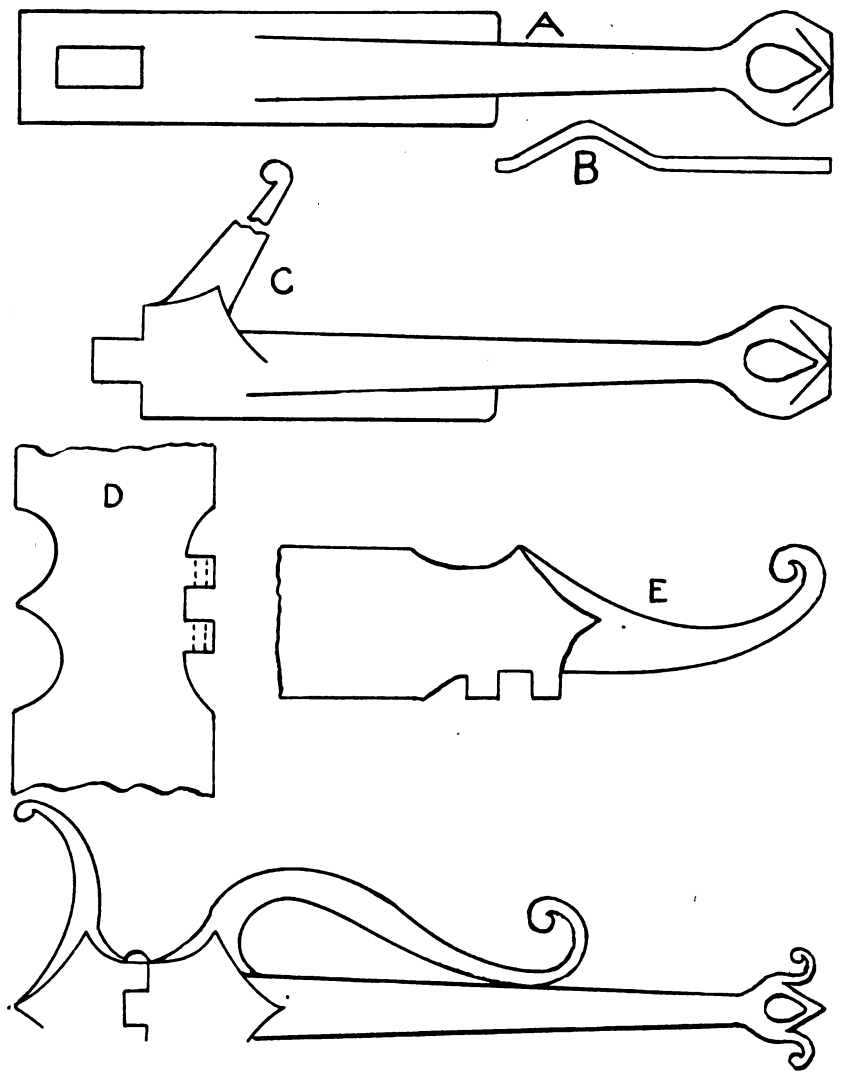
To weld buggy springs take one piece of the spring, scarf it, and weld on to it another piece of a spring—a little less than one inch longer; now upset at the end, and also upset the end of the other piece to be welded on. Then proceed to scarf and weld carefully, and the job should stand.

(To be continued.)

Forging Hinges.

BERT HILLYER.

The forging of hinges is a very common piece of work. Generally, they are made very plainly, but if a little more time were spent on them they could be made very artistic and pleasing to the eye. The way to make a hinge, as shown in the engraving, is to take a piece of iron wide enough to allow splitting out the two pieces on the sides and leaving a fairly proportioned piece in the middle. To make the hinge part, draw down the end and make two cuts with a thin, hot chisel very nearly through, just enough to be able to see the cut from the opposite side. The length of the cuts should be the thickness of the iron added to the diameter of the pin multiplied by three and one seventh. Then bend with the cut part on the inside. The reason this cut is made is that the welding may be done better. There is no fear of burning the inside edges of your hinge in welding, and you can drift the hole out better for the pin of the hinge. It also makes it easy to cut out the piece afterwards without spoiling the hole. The end of the lap should always come on the back of the hinge to be welded, so that if any marks are left in welding they will not show.



THE VARIOUS STEPS IN FORGING AN ORNAMENTAL HINGE

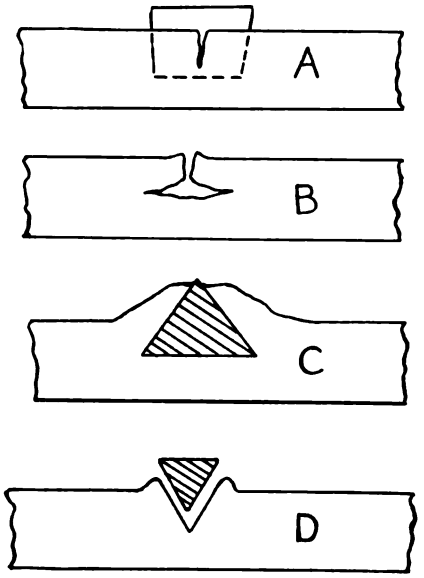
The hinge part being completed we now start to throw out the scrolls and shape them to suit. But before we draw these down to the right size a piece of round iron should be taken and bent, as shown at B. This is to be driven in the hinge when hot, to make the diamond-shaped corners, and the iron should be drawn down smaller from the imprint, which will leave the block partly raised. In forging, we left a piece large enough through which to punch a hole, as shown in the end of C. Now do the same with the other side. In forging out the scrolls be sure to make them graceful and free from kinks.

To make the other half, take a piece of iron and fuller in, then draw out as at D. If you have a power hammer it is best to make them out of one piece, but if not, weld the hinge part on the side of the flat piece, then draw out the ends, leaving round disc on each end, and then bend.

How to Put In a Dutchman Correctly.

BERT HILLYER.

Sometimes a forging that has a crack in it comes in the shop. If it is a hurry-up job (and all repair jobs are) and the crack is not too deep, it can be repaired with what is termed in shop talk "A Dutchman." This is made by cutting a triangular piece from the corner of a piece of square iron. Now, the quality



HOW TO PUT IN A DUTCHMAN

of the job depends on the way the "Dutchman" or wedge is put in. Some smiths take a chisel and drive it in crossways of the break. Then they put the wedge in the hole and weld it up (see A in engraving). This way is useless. It is impossible to make a good job. They batter the head of the wedge down when at a welding heat so that the crack is filled up and closed. It may look all right from the outside, but if cut into, you will find it is not welded and that the crack is farther apart and the metal stretched by the hammering. Also, it will be wasted away at each end of the wedge, making a miserable looking job.

The proper way is to make a cut on the side of the piece (see B) clear through at the bottom of the break. As it stretches, throw the broken ends up and drive the triangular piece in from the side, as at C. This way gives you plenty of stock for welding in the right place, and the laps or parts are so constructed that they will be forced into one another from the blows. Be sure and close down the ends over the triangular piece tight, so that no dirt can get in; then place the part, with the piece in, down in the fire, and with a good heat weld up.

Another way is to cut the crack out in a V shape at an angle of 90 degrees. Then take a fuller and work a lip up on each side of the V. Then make a piece to fit in the place cut out. Then take separate heats and weld them together. Many valuable forgings are saved in this way.

How to Keep a Hammer Handle Tight.

BERT HILLYER.

There is no mechanic that has more bother about keeping hammers on the handle than the blacksmith. This is on account of the heat from the hot iron drying out the wood and also expanding the eyes to a certain extent. That, with the jar it receives on striking the iron or steel on the anvil, soon loosens the wedge, which comes out, and then off comes the hammer head. This can be overcome by drilling a $\frac{3}{16}$-inch hole in the back part of hammer (see engraving), then countersink to fit the screw. Then saw a slot down in the handle for the wooden wedge; now drive the wedge tight and put screw through wedge, as in engraving. It pays for the trouble it takes to do this, and you get a more solid blow, nothing being loose.

"Better Than Any Before."

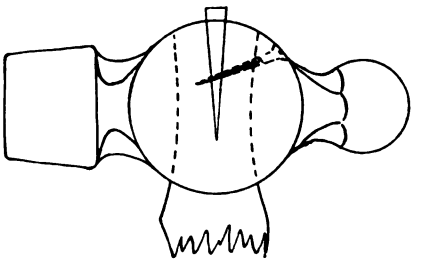
That's what folks say about our 1911 calendar—that's what you'll say when you see it. And then, too, you'll want some to advertise your own business. Send in your order NOW. You'll be sure of getting some NOW. We've received a considerable number of orders. Send your order right NOW—TODAY.



"Here's an item that rather interests me," said the Editor, turning the pages of an exchange. "It's only a small item of a few lines, but it means a whole lot. It reads: 'A man who is in the habit of buying vicious horses when he can buy them cheaply and by proper handling makes good horses of them says that no horse ever was born balky, but may be made so by the driver.'"

"Why is that of special interest to you?" questioned Benton.

"I wonder if the same isn't true of boys," returned the Editor: "I wonder if it isn't the driver in both cases who makes them both vicious. I don't believe that an animal given proper care and attention from birth will turn vicious unless forced to do so through vicious treatment. I don't believe that horses are born vicious. And I don't think a boy born of even vicious parents, if given proper care, treatment and teaching, will turn vicious. But, I do believe that vicious treatment will turn him vicious. And every employer whether he has but one shop kid or employs an army of workmen, is responsible for his men. If they get vicious treatment they will turn vicious."



AN EASY METHOD OF FASTENING HAMMER HANDLES

"But do you think that good treatment by an employer can make a vicious man a good man?" queried the other.

"No, I do not," returned the Editor. "The employer exercises supervision over the man for a period amounting to about one third of each working day. You can't tame an animal by working him for a few hours each day and allowing him to roam the jungle the remainder of the time. You can't break a horse by leading him about a part of the day and allowing him to return to his untamed mates the rest of the time.

"But vicious treatment during working hours is very likely to turn the man vicious. I believe it's the environment that makes the boy and man good or bad. The boy or man usually referred to as naturally vicious or bad is made so by his surroundings. He is born of bad or vicious parents. The neighborhood into which he is brought is vicious and the home and everything connected with it fairly breathes viciousness. Were that same child brought into different surroundings he would turn out differently.

"And all this talk simply leads us to a realization of the employer's liability—to a realization of the fact that vicious treatment will make vicious employees. You can't—"

But George Neuroth came in at this point. He isn't a blacksmith, but occasionally drops in for a word of advice. His specialty is machine work.

"Hello! Mr. Editor" exclaimed the newcomer, "I want some help from Friend Benton. I've got some copper work to do, and am up against it good and proper. What's the best thing to use in turning the stuff?"

"Why, what have you used?" asked Benton. "Soapy water or turpentine?"

"Have used both", returned the other, "and neither is the proper thing. I don't know what to use next, and thought you'd be able to help me."

"Well, let's see what I've got on the subject," said Benton, turning the leaves of his notebook. "Here we are. For turning copper, nothing is better than milk."

"That's simple enough" returned Neuroth. "Now, how about drilling—what is best as a lubricant in drilling copper?"

"I think you'll find tallow about the simplest and easiest thing to use," replied Benton. "There are, of course, lots of complicated receipts for lubricating solutions for copper, but tallow answers about every purpose and you don't waste any time fixing it up. And that is one thing that queers some receipts. They're so complicated that it takes a professional chemist to understand and prepare them. Of course, some receipts must necessarily be complicated, but I always choose the simplest ones when there are two or more and when all are of about the same value." And with a bow to the Editor and Neuroth Benton went out.

The Modern Horseshoer.

W. O. B.

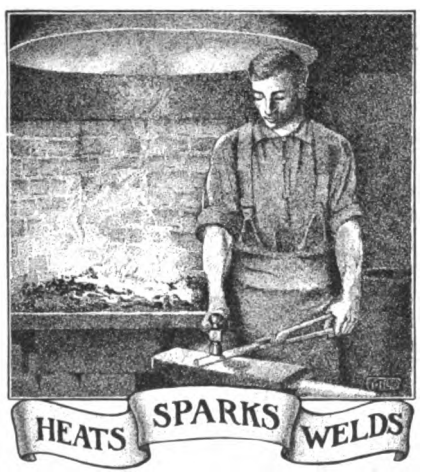
Thay say thet one o' these here long-hare'd inventers hes invented a mashine fer filin' horses' feet. I'm jes' antis-ipatin' his further efferts a little in these here rimes.

Now, it's simple—jes' a-tatsh it
T' the back o' Bill er Nell.
Then y' fit a dinky rat-shet
T' 'er tail an' ring the bell.
When she gits 'er tail a-switschin'
An' the dynamo starts up
Y' kin go back t' yer stitschin'
Er yer foolin' wit' the pup.

How it werks? Well, I'll explain it—
Thurs a strap an' knife y' see,
Thay jes' hold the foot an' plane it,
Jes' es true es it kin be.
Then a dingus with a pinshur
Grabs the shoe an' hol's it tite,
While the hammer an' a clinshur
Air a-workin' all thur mite.

When the pore beast gits on-stedy,
Then the fony-graff says: "Whoa,"
An' a dingus gits all ready
With a chair 'er garden hoe.
If she lifts 'er foot it lams 'er,
An the fony-graff says: "Hey!
Whut-t-'ell," an' then it dams 'er,
'Till thurs nothin' left t' say.

Now, y' see, it's jes' es simple
Es a modern air-o-plane.
It will cause the cheeks t' dimple,
Free the body from all pane.
It will make the coat es glossy
Es a polished marble stand;
It re-jew-vi-nates the mossy,
Gives 'em speed t' beet the band.



Cheap help is usually the most expensive.

An emergency often proves to be an opportunity.

Appearances count—has your shop a neat, busy and prosperous air about it?

Some chaps seem to think that there ought to be a factory for making opportunities.

Ever think that your courtesy or discourtesy toward a customer affects your business?

And when you take your vacation don't come back without learning at least one sermon from nature.

The man who works for pay alone and nothing else usually gets what he works for—and nothing else.

Did you ever hear of any business man reaching success by comparing his product with that of his competitors.

The apprentice who attends strictly to his own business is likely to soon have a business of his own to attend.

You can't toughen a horse to hard work in a day. And the same applies to the shop boy. Start him in at easy stages.

Do you enjoy having your neighbor cut prices? Then why not do unto your neighbor as you would that he do unto you?

Funny, but it's true, just the same—some men know more about the shortcomings and faults of other shops than they do about their own.

Every job you do is an advertisement—a good one if it pleases the customer, a poor ad if it displeases him. Are your jobs good advertising?

A good time now to paint—just look at your shop as a stranger would. See any need for paint, patching or fixing up? Better do it now.

Don't put it in the safe—when you get hold of a good idea be generous and big hearted enough to give it to the craft. Send to us for publication.

Troubles grow just in proportion to the amount of worrying you do over them. Starve your troubles by smiling continually, persistently, everlastingly.

Ever stop to think of the smile as a trade winner? Smiles make friends, friends make trade—the more smiles the more friends; the more trade the more profit.

Catalogues are worth keeping, generally, and the wise smith does keep them. He files them so he can lay his hand on any one he desires at any moment.

When a belt gets to breaking every little while it is generally cheaper to buy a new belt—patching an old belt takes not only your time but the machine's as well.

Good salesmanship is not the art or selling a man something he doesn't want. It's the art of finding out what he wants and then filling that want perfectly in every particular.

Hard work alone won't bring success. One must work with brain as well as brawn. An ant cannot make honey, work as hard as it will. You must mix brains with your work.

It's hard sometimes to get a man's order, and ofttimes harder to get your pay. Make a careful study of both ends of the business. Success in both means more money for you.

System is necessary to the successful management of any business, but when system becomes a means of making "red tape" it had best be discontinued and a new start made.

There are lots of troubles that we see coming down the road toward our place that will simply hustle right by if we pay no attention to them. Get busy and you won't have time for troubles.

And then, too, there's no reason on earth why a local Association cannot buy supplies in large quantities and save a neat sum. Write for easy plans today. The Secretary is waiting for your postcard request.

You can't take care of the fall rush unless you prepare for it. It's none too early now to get tools and machines into shipshape. And don't forget you'll need new stock if you want to do work promptly.

> **Uncle Billy Martin says:** "Thur's a black sheep in 'most ev'ry fold an' sometimes thur's two er three—but did y' ever see a markit price on black wool?"

You can increase net profits by cutting down expenses, stopping waste, buying closely and cutting out needless expenditures. Net profit is the difference between the money you pay out and what you take in.

Some men carry so many old wornout troubles that they appear like walking gloom factories. Forget it, and smile. Nothing on God's green earth is half so healing for body, brain and heart. Forget it and smile.

You get six months' credit on your own subscription if you send us a brand new reader—one whose name is not now on our lists. A good way to get your paper free of charge—will you help us toward a bigger family, a bigger paper?

If a peddler sells a smith a bit of welding compound for two dollars—one which he could make for about thirty cents if he would spend a dollar for a year of THE AMERICAN BLACKSMITH, how much does the smith lose by not reading "Our Journal"?

Don't give up the craft.—If it's not paying you, raise your price. If the work is too hard, install power. If trade is poor, advertise. If the locality is bad, move. Skilled craftsmen are getting scarcer every day, and wages rise accordingly. So stick.

Of course he had to quit business. No man can carry on the business with the money outstanding. Come to find out, this Kansas smith had a list of old accounts that hadn't been drummed up for years. One must keep right on the heels of the "owers."

"Judge a man by his home."—but there's one smith we know whose home looks neat and nice. But then we've seen his wife chop the wood, paint the stoop, hang the screens, spade the garden, mow and rake the lawn—and do it, too, when her husband was at home. One need but look at Tom Tardy's shop to get at a solution of the problem.

Every one that has seen it says our calendar for 1911 is the best we have yet published. And that is saying a good deal. You'll get one if your subscription account is paid up to or beyond January, 1911. So get in line. And then, too, you'll want some for advertising your own business. See the advertising columns for prices and full particulars. But you'll need to order quickly—its none too early right now to order what you want.

Don't flinch, flounder and fall. Go at things with a determination and will. Dig right in with all your might. Don't do anything with half-hearted effort. When you work, in heaven's name work, WORK, WORK. When you rest, go at it just as thoroughly and conscientiously. Dig right in with all your might. Keep your life well balanced. Work hard when you work and rest thoroughly when you rest. Then —you can't flinch, flounder and fall.

American Association of Blacksmiths and Horseshoers.

Don't let a postcard stand between you and better prices, better profits, better trade conditions, you want these better conditions. You want better harmony in the trade. You want the money you ought to have—every craftsman does. But why let a postcard stand in the way? You would gladly spend a penny to gain these better trade conditions, wouldn't you? Then spend a penny for a postca d—address it to the "Secretary" and ask for "Easy Plans."

The ease with which my plans can be carried out will surprise you. There is little effort necessary to start an organization, and a ter once started it practically runs itself. To get things going this winter write now, this very minute, and get my instructions. You'll want the protection of an organization as soon as you can get it—so, don't delay.

If any craftworker in the world deserves his earnings it is the smith. The only way to get it, in this age, is to organize and insist upon it. No good will ever come of a lot of smiths pulling this way and that, trying to get what they deserve. Constant coöperation and persistent pulling together will accomplish most any good and desirable thing. The other smiths in your locality realize that better craft conditions are necessary. The steady advances in all lines have made them realize this need. Why not organize, raise your prices and get what you deserve? There is no reason why you cannot start a protective movement in your county. Ask for my help. I will give you every help and assistance, supply instructions and organization literature, call meetings and put forth every effort to form a healthy, growing association in your county.

But write today.

It will take less than a minute to address a postal card to me, P. O. Box 974, Buffalo, N. Y., and by next mail you'll get complete easy plans for building a strong association in your county. Don't let a penny postal stand between you and better prices, better profits, better trade conditions. Do it now.

THE SECRETARY.

The Fannin County, Texas, Association.

Y. M. BLEDSOE, SECRETARY.

Fannin County Branch of The American Association of Blacksmiths and Horseshoers met in regular session at Bonham. The organization was completed by electing officers and adopting the constitution and by-laws. The quarterly dues were placed at $ .25 per quarter, in advance. Eight new members were enrolled, making a total of nineteen, representing the following towns: Ravenna, Dodd City, Windom, Honey Grove, Leonard, Oakland, Edhube. Following is a list of the officers:

R. E. Grogan . . . . . President
J. S. Kennedy . . . Vice-President
W. J. Hickman . . . . Treasurer
Y. M. Bledsoe . . . . . Secretary

The Association adopted a partial price list which follows. There is a live interest among the trade, and I think there will be a good deal doing in association work in Texas before long. The blacksmiths of the State are at a great disadvantage on account of the collection laws of this State, and we are going to make an effort to have the Legislature change them, so as to make them more fair to our interest. The following is the partial price list adopted:

HORSESHOEING.

No. 0, 1, 2, 3, per set	$1.25
No. 4, per set	1.35
No. 5, 6, per set	1.50
Resetting, per set	.80
Toed Shoes, extra, each	.12½

WAGON WORK.

Filling and rimming, (oak) set..	$18.00
Filling and rimming, Bois d-arc.	33.80
New set Bois-d-arc wheels	50.00
Set tire, hot	2.50
Set tire, cold	2.00
New Axle, Hind	3.25
New axle, front	3.50
Bolster-Rocking	2.00
Bolster, hind	2.00
Bolster, sand	2.00
Coupling pole	1.25
Wagon tongue	3.00
Wagon tongue, hounds, set	2.00
Wagon hounds, hind, each	1.25
Wagon hounds, front, straight	1.25
Wagon hounds, bent	3.50
Brake beam	1.50
New wagon body (pine)	20.00
New wagon body, dray style	20.00
Bottom in old body	3.50
New sleepers, each	.50
Staples for dray body, each	.15

BUGGY WORK.

Set tire, hot	$3.00
Set tire, cold	2.50
Set axle, front	1.50
Set axle, hind	1.25
New shaft	$1.50 to 1.75
Reach-bent	1.50
Reach-straight	1.75
Sharpening plow share, 12"—14".	.25
Sharpening plow share, 16"	$ .35
Making long bridge bolts, rods, chains, etc., per lb	.10

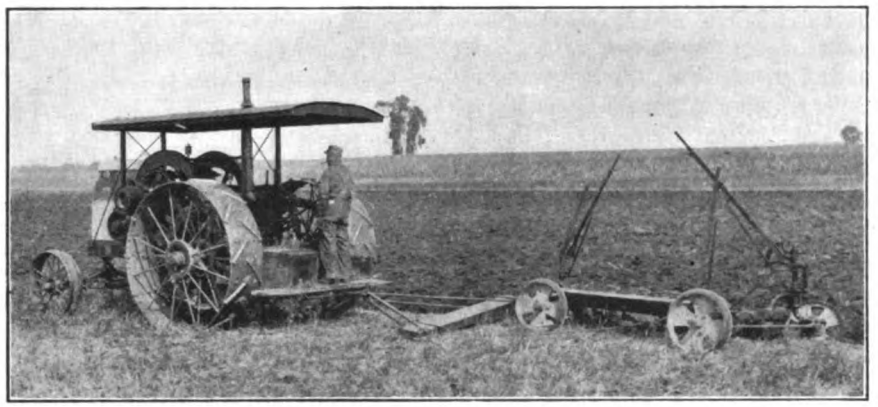
A Talk on Welding Axles and Managing the Forge Fire.

C. W. METCALF.

A man may be of great skill in the art of working iron and steel and yet may fall down on some very simple piece of work. Some men understand the nature of the metal they are working and yet do not understand the nature of their forge fire. If Brother Bible will refer to one of his back numbers—I have forgotten which number, maybe W. O. B. can give the number (page 86, January, 1910)—I wrote an article on the forge fire and the keeping of the smith coal, and if he will read the article carefully he may plainly see what may have been the cause of his brother smith's failure in welding his buggy axle. Although I do not say that it was the cause—for the cause might have been in the steel, for we find some steel as dirty as the coal. If the steel is clean and the smith understands his fire there is no reason for a failure.

Now, we will weld the axle: In the first place, we must have a fire that will furnish a clean welding heat, and in order to obtain this your coal must be free from slag, dirt, cinders, brass, copper, zinc, or anything that will corrode or oxidize the metal which is to be welded. Then heat your axle and scarf, and when properly scarfed take your hot chisel and cut a few notches in the scarf to prevent it from slipping when you make your weld. When this is all done, place in the fire with the long point up and heat slowly, and when the steel comes to a welding heat use a little clean sharp sand for a welding flux. It is better than borax for axle steel. Now, there is an important point, and it is that if the steel sizzles and sputters when you take it from the fire do not try to weld it, for it is impossible, but plunge it in your slake tub and partly cool it. Then, with the hot chisel, hack it across the scarf and break the scale which has formed on it, and then clean out your fire. For when steel gives this appearance it shows that there is too much sulphur in the coal, or that there is dirt of some kind, and if not in the fire, it lies hidden in the steel.

I remember one time a neighbor blacksmith of mine had a set of 1½-inch axles to weld. He had welded one and done a good job on it; the next one he had tried several times and failed. He asked me to come and help him out, so



AN INTERNATIONAL TRACTOR PULLING A MULTIPLE DISC PLOW

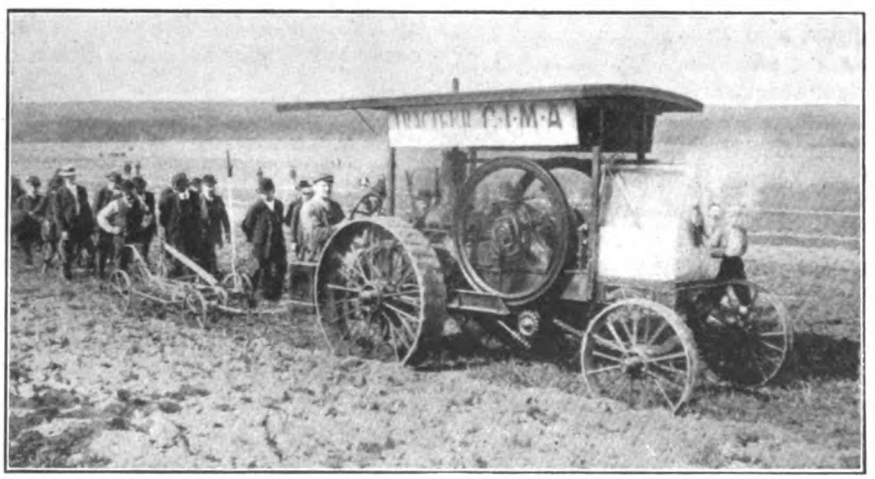
I dropped my work and went. He showed me what he had run up against, and he had nearly spoiled the axle, heating it so many times, but he had not burnt the steel. I asked him what he had used for a flux. He said, "borax." I told him he had done wrong in using borax and, another thing, I said, "You have tried to weld it with a dirty fire. I will try and see what I can do with it." So I built a fire and shaped up the ends of the axle, took a heat and made a perfect weld the first heat. Now, he could handle the steel as well as I could, but the point was that he didn't understand his fire. Sometimes, when I have poor coal I throw a handful of salt in the fire and on the coal—that takes the sulphur out.

The Gasoline Traction Engine and the Blacksmith.

And while you are preparing to care for the automobile don't forget the gasoline traction engine. This machine is practically in its infancy—it is just beginning to be recognized as a factor in the cultivation of the large farm. The practical, up-to-date smith must keep up with the times—he must know how to take care of these machines when they are temporarily out of commission.

To get an idea of what the gasoline tractor can do, it may be well to draw a comparison between it and the ordinary method of working a farm. The gasoline tractor it is said will plow, harrow and roll a ten-acre field in one day, at a cost of from 50 to 75 cents per acre. Under the old way with men and horses it is estimated that it would take ten men and twenty horses to do the same work in the same time, and the cost of the plowing alone would be $1.00 per acre.

Then at harvest time the farmer uses the same engine to pull two or more harvesters and later does his own threshing with the gasoline tractor. Finally, he loads his produce on a number of wagons and draws it to the elevator or railway station, and one manufacturer reports that one 20-horsepower tractor alone has hauled fifteen tons for two hours, using only five gallons of gasoline.

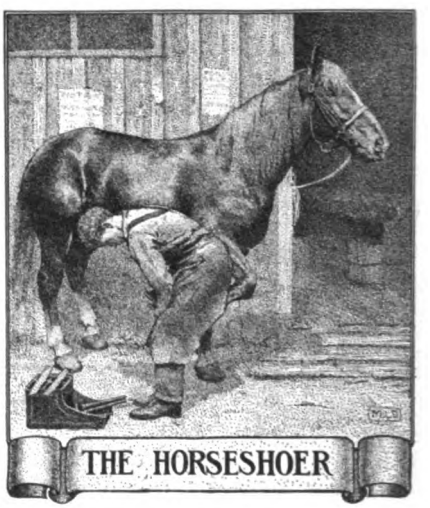


AN AMERICAN GASOLINE TRACTION ENGINE IN FRANCE

And between seasons the same engine is used to saw wood, pump water, grind feed, operate the separator and do a hundred other odd jobs that usually go to make the farmer's lot a hard one.

These engines have come to stay. They have been thoroughly tested and their possibilities are almost unlimited. They have invaded Europe, and in a recent contest at Amiens, France, the prize for the gasoline tractor doing the best all-around work was awarded to the American engine.

This comparatively new field of opportunity for the smith opens many new avenues of profit. Not only will the smith be called upon to repair these machines, but he can act as agent for the sale of them, handle parts, and this naturally leads to the handling of accessories, such as lubricant, fuel and the like.



A Talk on Treating Corns.

L. G. ROBERTS.

In the issue of April, 1910, I read a letter by Brother Ray Vollmer and agree with him as regards a reasonably heavy shoe, according to the work the horse has to accomplish.

With regard to corns, I consider two kinds, namely, hard corns and sappy or wet corns.

Hard corns are a fungoid growth upon the inner sole at its junction with the horny laminæ and beneath as well as at the side and rear of foot bone. They are generally caused by a lateral compression of the horny hoof and inward upon the sensitive parts. I consider that this has been proved by the fact that the contracted foot is generally accompanied by the hard corn.

The sappy corn is caused by a bruise from an uneven ground surface, or from a shoe being fitted too short or being allowed to remain on the foot too long.

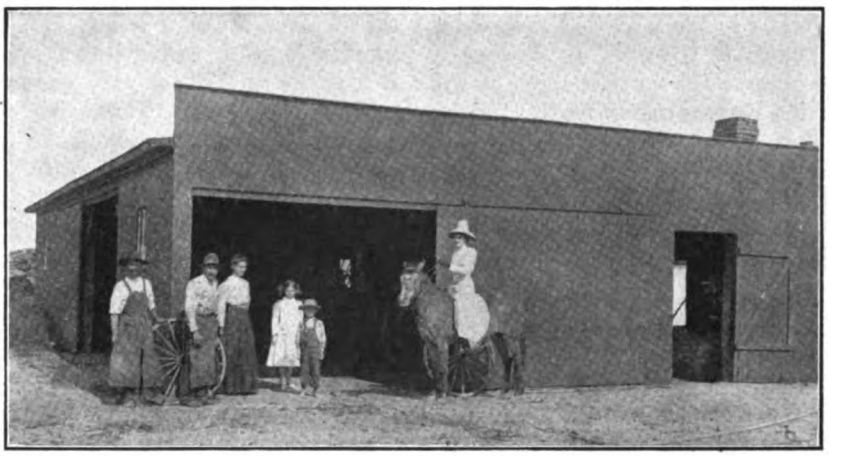
I have so far achieved the greatest success in shoeing horses that have corns by giving them an even wall bearing surface from heel to toe and by giving

them as broad a bearing at the heel as practicable, at the same time lowering the corn bed clear of the shoe. Beyond this I do not believe in further interfering with the corn except in bad cases of festered corns, when it is necessary to cut away sufficiently to remove the pus and thus avoid a quittor. In cases where it is necessary to take the weight off the heel I use a bar shoe, and thereby save breaking down the quarters by springing the heel. I may say I have never seen a horse's action improved by springing the heels. I have had many horses in a bad state that have had their heels sprung for years without success, and by giving a full bearing and treating as above-mentioned have made them go sound.

For Stumbling and Striking.

C. W. METCALF.

To shoe the horse that strikes the bottom of his front foot with his hind foot and stumbles in front, for treatment I would shorten the toes of the front feet as much as I could from the bottom and use a toe weight and roller motion shoe for the front feet. Leave the toes as long as possible and if the heels are high dress them down. A proper shaped foot should measure 4½ inches from coronet band to the toe, and at heel should measure 1½ inches. Now, use a common shoe on the hind foot, with or without calks, as you please, but bear in mind if the toe measures less than 4½ inches set the shoe ahead far enough to make it come to that measurement. If the horse strikes badly it won't hurt to extend the shoe farther. That is my method and it gives good results. If the front joints are stiff they should be bathed with some soft oil or liniment to soften them. Sweet oil is very good and, still better, if sweet oil and alcohol of equal parts are used.



A WELL-EQUIPPED POWER SHOP OF MISSOURI, RUN BY MR. ED. MULDOON

Dividing the Circle.

LOUIS FERRELL.

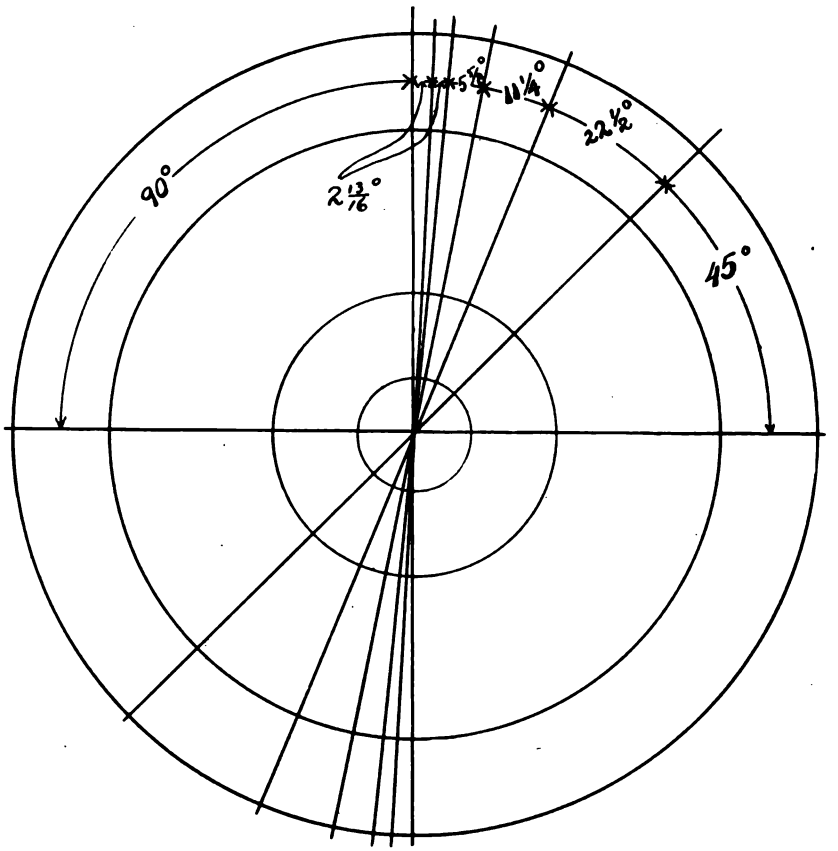
As I have never seen anything like this in "Our Journal," and I have seen several men stuck on the "degree question," I will try to explain the parts of a circle. For instance, someone wants a piece of iron 3 ft. 6 in. long, 10 inches on one end, bent at an angle of 45 degrees and 7 inches of the other end 5⅝ degrees. Every circle has 360 degrees, whether it is $\frac{5}{16}$ of an inch in diameter or ten feet in diameter.

Now, to get the correct angle of the 10-inch end of the bar, draw a circle 20 inches in diameter; then draw a line through the center, equally dividing the circle in halves from 360 degrees to two parts of 180 degrees. Then divide again. That divides the circle into quarters of 90 degrees each. Then, dividing the quarter circle in half, gives us 45 degrees. Now bind your iron to that given slant and you have a 45-degree angle on your 10-inch part. Proceed with the other end in the same way. You will have to find how many parts the circle is divided into to find the 5⅝ degrees.

For instance, divide the circle in four equal parts. You have 90 degrees to each part, and into eight you have 45 degrees in each, and in sixteen you have 22½ degrees in each, and in sixty-four you have 5⅝ degrees in each part. The smaller the number of degrees you have, the larger amount of times your circle is divided.

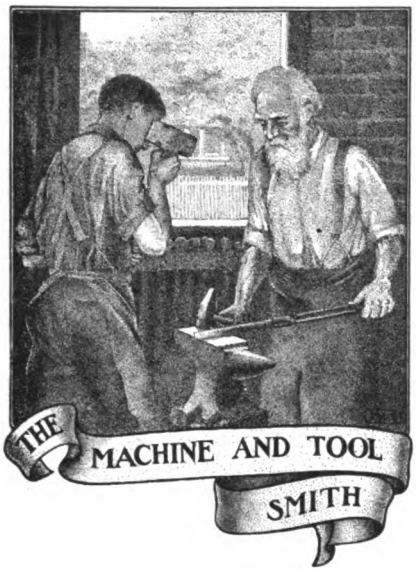
Reasoning in this manner: Take your circle, divide into four equal parts, giving you ninety degrees each; divide one of the 90-degree divisions in two, giving two 45-degree divisions; one of these divided by two gives you two 22½ degrees each; this by two gives you 11¼ deg. each; this again by two gives 5⅝ deg., and then two of 2 13/16 degrees.

Now, this is the way I understand the circle. If some brother understands it more thoroughly than this I would like to hear from him.



THE DIVISIONS OF A CIRCLE ARE PUZZLING TO SOME SMITHS

Now, as to the man that magnetizes his punch on the anvil by holding it 95 degrees to the north, I think he will hold it 5 degrees east of north.



The Value and Heat Treatment of Steel.

CHAS. WESLEY.

Steel is the King of All Metals, on account of its great importance in every branch of manufacture. Perhaps we could get along without copper, zinc, or lead and many other metals, but how could we get along without steel?

Steel is a great metal, but there are many who do not know its value and do not treat it right. We all understand that it requires intelligent treatment and handling. There is often, however, a great deal of trouble occasioned by the man working with steel not being allowed sufficient time to treat it properly, the boss or foreman telling him this must be forged in such and such a time, it must be shipped, or we promised to express it, etc., etc. Those who work in large factories know about the difficulties of a man who is forced to work steel, especially in the automobile factories where nowadays there is a great rush every day to fill out orders. Practice of this kind is very bad, for, on account of this poor treatment and handling, many tools and other articles are spoiled. Overheating, irregular heating, insufficient time for hardening and too high heat for carbonizing are some of the reasons why tools crack, become brittle and are ruined. There is no metal known to man that in its working up needs as much skill, science and brain as that of the working of steel.

While we have hundreds, and perhaps thousands, of blacksmiths working with steel, how many of them would be able to explain to you how steel is made in all branches? It is a very deep study. In these days—the steel age—we can get steel suitable for any kind of work, but it should be remembered that too much care cannot be taken in heating for forging, hardening and tempering. Time taken with this metal is well spent and is money in the pockets of manufacturer and consumer.

And here it may be well to repeat an old story which is ever new: At the building of King Solomon's Temple, when it was well under way, King Solomon came to inspect it, and as he went around, passing from one mechanic to another, he asked each one what part he performed. One said, "I mix the mortar to lay stone and bricks up with." "Very well," said the King and told his servant to pour out a drink of wine for the man. He next spoke to the mason, saying, "What part do you perform?" "I lay up the stone and bricks." He also got a drink from the bottle. He next came to the carpenter, who said, "I make the woodwork." So, of course, he got a drink, too. So the King passed from one to another of the workmen. Last of all they came to the blacksmith. "Well, my man, what part of this great work do you perform?" Wiping the sweat from his brow he answered: "My dear King Solomon, you see all these mechanics here! Well, I make the tools for each and all of them." "Here," said King Solomon, "take this," giving him the wine, bottle and all. You see that King Solomon considered the blacksmith of some importance.

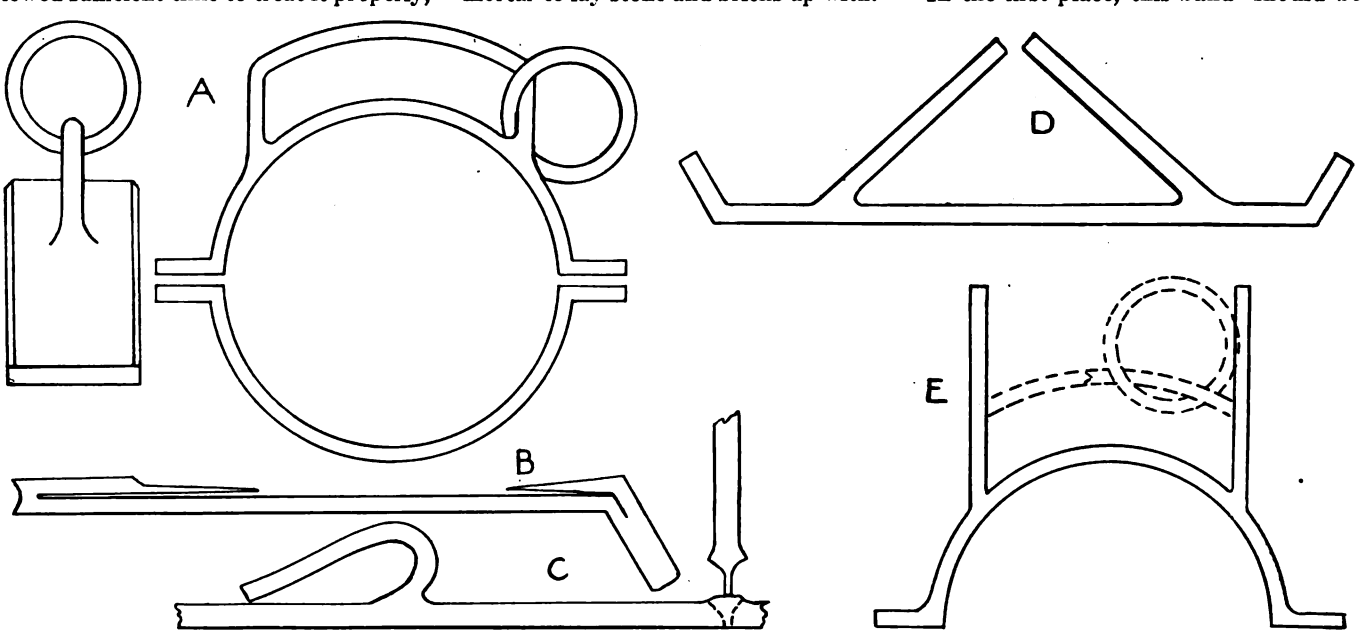
So I say, "all success and honor to steel-makers, tool-makers and blacksmiths forever." The steel-maker makes the steel. It leaves his hands and it is dependent on the blacksmith to develop it into delicate tools. From him it goes to other mechanics, but it should be remembered that if anything goes wrong the smith is greatly responsible for it.

Therefore, is not blacksmithing the king of all trades, and to learn it and succeed does it not require more brains and mechanical genius than any other trade?

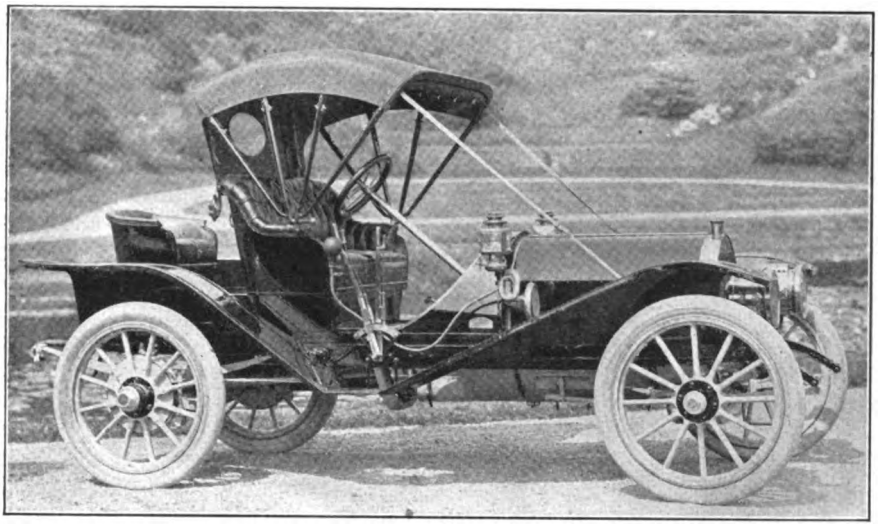
How to Forge a Traveler Band.

BERT HILLYER.

I shall endeavor to give a description of, and the process of making a traveler band such as is used on sailing vessels. In the first place, this band should be



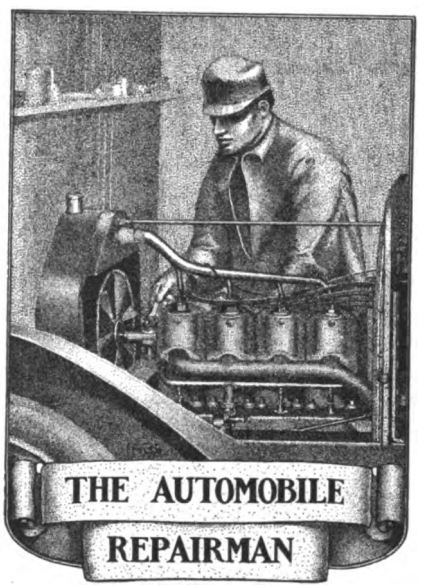
A TRAVELER BAND IS USED ON SAILING VESSELS—HERE IS SHOWN THE STEPS IN ITS FORGING



A STEVENS-DURYEA, MODEL XXX, RUNABOUT, FOUR CYLINDER, 24 HORSE POWER

made of a good quality of iron and particular pains should be taken to make good, sound welds. Then take the diameter of the band on the inside and add once the thickness of the iron, and multiply by 3⅐. Then divide by two, which will give you the length of one of the half-bands, minus the lugs on the end. It is hardly worth while to explain how to ge the circumference of a band, as most all smiths know that—there being six different ways. After figuring out what it takes to make the half-band, add four times the width of the iron and cut off that length. Adding four times the width is to allow for doubling over the iron on the two ends and welding down to make the lug and corners heavy When doubling over end cut partly through with chisel, as this makes it bend easily and just where you want it. Then weld up end, bend down (see B in engraving), and weld up lap; but before doing this, the center should be marked and an equal distance each side should be upset, where the traveler ends are to be welded on after upsetting. A small hole is punched through and a bob punch driven in to make it like a countersink. Then a piece of round iron, a little more than one half the length of the traveler, is made, as at C. A good many people will suppose the reason for punching a hole in the band or flat piece is to rivet the stem in, but it is not. In the first place, it is to let the heat through in that particular spot where you desire it hottest; secondly, it leaves a place for the slag and dirt to free themselves; and, thirdly, it distinctly marks the spot to place the stem when at a welding heat.

After welding on one stem it will need to be bent back and down, so that a heat can be taken for the other one. The stems should then be bent in towards one another, so that when the band is bent they will stand straight. The band is then chamfered on the sides and bent to the correct radius. Next, the ring is made and slipped on, the stems are bent and then welded as per the dotted lines at E. Then the other half of the band is made. Both half-bands should be a little short of meeting on the ends—about ¼ of an inch opening between them—so that when bolted together they would squeeze up tightly on the wood.



Care and Repair of the Bearings of the Motor.

HAROLD WHITING SLAUSON.

A broken crank shaft will disable a motor more completely than any other accident, and the only remedy is to send to the factory for a new part. Although the blacksmith, or the most expert automobile repairman, for that matter, cannot mend a broken crank shaft, he can at least do much toward preventing such an accident. More broken crank shafts are caused by worn or imperfect bearings probably than by any other reason, and too much care cannot be taken with this part of the motor.

A two-cylinder motor will probably have a two-bearing crank shaft; the crank shaft of a four-cylinder engine will have three or five bearings, while the number of bearings on a six-cylinder motor may run as high as seven. Every one of these bearings must be lined up properly, so that each will receive its share of the load or force on the crank shaft. If one bearing should be slightly lower than another, the crank shaft will either be unsupported at one point, or it will be sprung out of line, and if a crank shaft is sprung out of line while carrying a heavy load, it is almost sure to break.

The crank shafts of the majority of modern automobile motors turn in ball bearings, and these, of course, require but very little attention. An occasional broken ball may be replaced easily, and if the crank case has been properly designed and machined all the bearings will line up properly. In some of the older motors, however, the bearings are of the plain babbit or bronze type, and the renewal of these becomes a very particular job. The new babbit or bronze bearings should be fitted in much the same manner as those at the crank shaft end of the connecting rod, and an explanation of the methods employed for the latter will serve as directions for renewing both.

Greater care must be taken with the connecting rod bearings in the four-cycle motor than in the two-cycle, for in one case the connecting rod is pushing down on the crank shaft, while on the suction stroke, the crank is exerting a *pull* on the lower half of the bearing of the connecting rod. This change in the direction of the forces on the connecting rod makes necessary, a bearing in which there is no "play." A loose bearing would be worn quickly, and the continued knocking and pounding would soon entirely destroy the bearing material. The force in the two-cycle motor is always downward, or, in other words, it is always a push, and, in consequence, whatever play there may be in the bearing will not be apparent when the engine is running with a load.

A knock or pound in the cylinder of a motor, when not caused by advancing the spark too far, is generally the sign of a loose connecting rod bearing, and should be attended to at once. If the

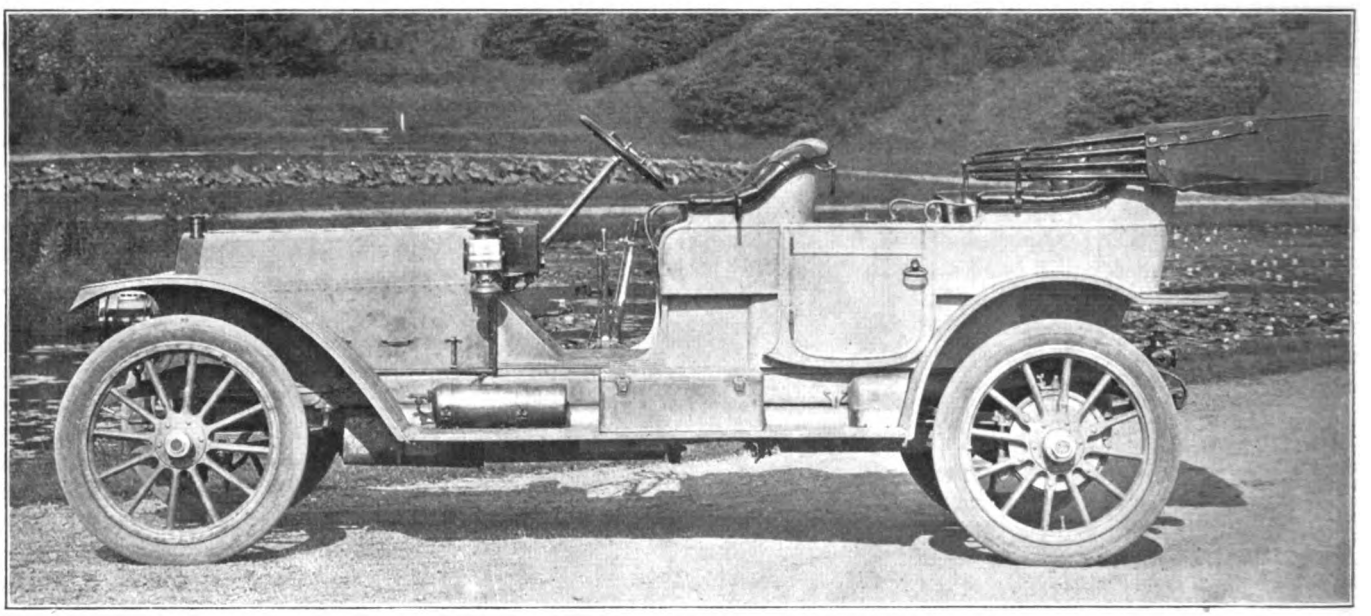
bearing is of babbit it may have been heated through a lack of oil and will probably have "run out" entirely. The renewal of babbits is so familiar to every smith or machinist that it will not be dwelt upon here, but a few words regarding brass or bronze bearings might not be out of place.

Brass or bronze bearings are used in many cars at the crank shaft end of the connecting rod, and, if given plenty of oil, perform satisfactory service. Such bearings will not run out as quickly as will a babbit when allowed to become hot, but they are liable to seize or "freeze" and will soon be literally cut to pieces if the lubrication is defective. When this happens, the bearing must of course be renewed entirely, and it then becomes necessary to scrape in the new parts. It is to be assumed that the bearing metal is so much softer than the crank shaft that the latter will scarcely have been scratched by the heat and seizing which destroyed the brass or bronze, and, in consequence, this should require no attention when the bearing is renewed.

After the brass or bronze pieces have been driven into the upper and lower halves of the bearing box so that they are held firmly in place, the bearing must be scraped so that a perfect and uniform fit is obtained at all points of its surface. In order to fit these bearings perfectly, the cylinder should be removed from the crank case so that the connecting rod and piston will have freedom of motion. The new parts of the bearing should then be covered with bluing and the lower half of the box screwed in place to the lower end of the connecting rod until the crank shaft is held tightly in the journal. The connecting rod should then be swung back and forth several times through a small arc, and the two halves of the bearing box taken apart. The new bearing pieces will be uneven in places, and in consequence, the pressure will not be distributed uniformly. This uneven distribution of the pressure will be indicated by the marks of the bluing on the brasses. At the "high places," or points at which there is too much metal, the bluing will have been worn off, and these are the portions which must be scraped down. This is done with a sharp tool made for the purpose, and by means of which, thin shavings of the metal may be taken off from the proper places. When the points from which the color has been worn have been scraped down, another coat of bluing should be applied, and the halves of the box replaced as before. This time a greater amount of the color will be worn off, but it will require several such trials and scrapings before a uniform wear is apparent. When the bearing pieces have been scraped so that their surface is fairly uniform they should be again covered with bluing for a last test, and when the box is screwed in position the crank shaft should be revolved several times so that all points of its bearings will be brought in contact with the surface of the brasses, as under ordinary running conditions. This will probably bring to light several more uneven places in the surface of the new bearings, but patience must be exercised until all have been scraped down so that most of the bluing is worn off uniformly. It is only in this manner that a perfect bearing can be obtained.

The proper tightness at which the bearings should be set is a delicate matter. It should not be set so tight that there will be any danger of binding or seizing when the motor first starts, and yet it should be remembered that all bearings are bound to wear loose in a short time, and, in consequence, the halves of the box should be screwed somewhat closer together at first than would be proper for permanent running. In any event, plenty of oil should always be supplied to a motor that has just been equipped with new bearings, and there should be no play apparent when the connecting rod is moved sideways.

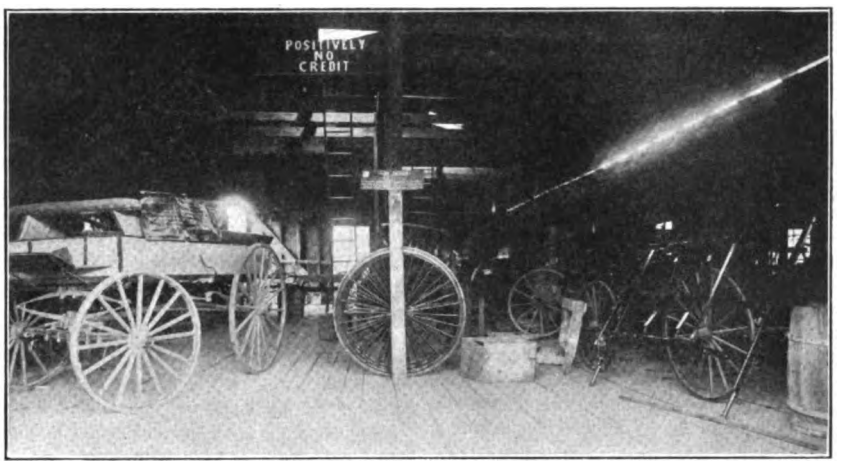
Although there are cap screws passing through the two halves of the bearing box, these are merely intended to hold the parts in place, and are not by themselves supposed to regulate the tightness of the bearings. These cap screws, or nuts, should be screwed tightly in place, and, in order to prevent too much pressure on the crank shaft, shims are provided between the flat portions of the two halves of the bearing box. When the two halves of the bearing box are screwed together all of the pressure is received by these shims so that the crank shaft need be held in its bearing only as tightly as desired. These shims consist of thin strips of tin or other metal, and by reducing their number the bearing may be tightened, while adding to them prevents the halves of the box from being drawn so closely together. There should be an equal number of shims of



A STEVENS-DURYEA TOURING CAR. MODEL AA, SIX CYLINDER, 35 HORSE POWER

the same thickness on each side of the box.

The wrist pin bearing, or upper end of the connecting rod, does not require as much attention as the crank shaft bearing, owing to the fact that it turns through but a small angle and the wear



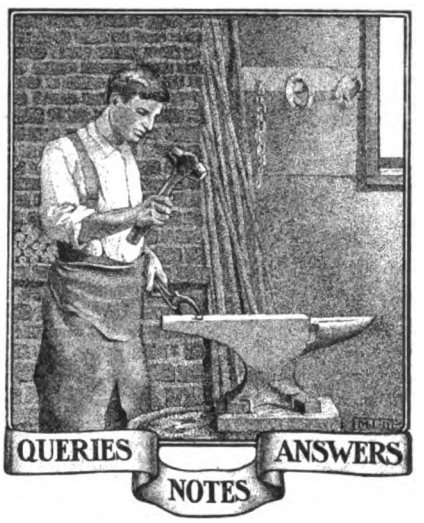
INTERIOR OF GENERAL SHOP, RUN BY MORGAN SWANN, MISSISSIPPI

is correspondingly light. This will sometimes wear loose, however, and will require attention before the motor can be said to be in perfect condition. In most motors the wrist pin is held rigidly in position in the walls of the piston, while the upper end of the connecting rod is provided with a brass bushing. Some gasoline engines, however, are designed with the wrist pin secured firmly to the upper end of the connecting rod, and with the brass bushings located in the sides of the piston wall in which the wrist pin turns. In either design, the wear is taken up by replacing the old brass bushing with a new one. Such a bushing can be made easily in a lathe if no spare parts of this kind are on hand. In case of excessive wear a liner, consisting of a thin sheet of brass of the proper length, may be placed around the inside of the old bushing and form a new surface on which the wrist pin may move.

A simple method of taking up lost motion in a wrist pin bearing is sometimes resorted to, in case of an old motor to which a quick repair is to be made. This consists in removing the wrist pin and connecting rod, placing the bushing of the latter on an iron block, and by a few blows on another block placed on the end of the bushing, so upsetting the brass that the diameter of the opening is reduced, and the lost motion of the bearing thus taken up. Although this is a quick and easy method of tightening a wrist pin bearing, it is not to be recommended in the case of high-grade automobile motors. The wrist pin is generally so much harder than the brass bushing in which it turns that the former will seldom wear to any noticeable extent. Should a new wrist pin be needed, however, it may be made easily on a lathe by turning down a steel rod to the proper diameter and length.

If a crank shaft bearing has run hot to such an extent that the surface of the shaft itself is injured a more serious repair problem confronts the blacksmith or garage man. If a brass or bronze bearing has been allowed to become dry the heat set up by the friction may harden parts of the bearing material until the surface of the crank shaft will be scratched and even cut. In this case the crank shaft must be removed entirely from the motor and set up in the lathe. If the shaft is then revolved at high speed, the surfaces may be smoothed down with a fine file and pieces of emery cloth, but for the most satisfactory work an electric grinder is necessary. This consists of a small, portable electric motor on the spindle of which may be mounted any one of a number of emery wheels of different sizes. The electric grinder should be mounted in the tool carriage of the lathe, and with the crank shaft revolving in one direction and the emery wheel in the other, a uniform and highly polished surface may be obtained. By continuing this operation for a sufficient length of time, a cut or gash of considerable depth may be taken out. Every crank shaft will be provided with two sets of centers, one for the bearings of the shaft itself in which it revolves while in position in the motor, and the other for the connecting rod bearings. Four and six-cylinder motors will require additional sets of centers for the cranks that are not in the same plane. In whatever shape the crank is made, however, no difficulty will be encountered in centering the bearing so that it will revolve accurately.

After renewing a burned-out bearing it is a good idea to mix a small amount of flaked graphite with the oil in the crank case. This graphite will gradually work into the bearing and will fill all the microscopic pores of the metals of both the crank shaft and the box. Even when the oil has run out, the graphite will remain in place, and, as it is a lubricant in itself, such a precaution will many times prevent a burned-out bearing. Graphite is not affected by any degree of heat, and motors have been known to run for a considerable length of time with no other lubrication than this peculiar form of carbon. While it is not advisable to rely on the graphite entirely for lubrication, it will save many annoying accidents in the event that the oil supply is cut off from the crank shaft and connecting rod bearings.



Vulcanizing Tires.—I would appreciate a bit of information on the vulcanizing of tires. I have an electric machine, but no experience. W. J. McANERNY, Oklahoma.

Association Notes.—I have been successful in having our Legislature pass a blacksmith lien law, but am sorry to say it was vetoed by the governor.

C. W. FRED. KEMP, Maryland.

Lubricating Liquid Wanted.—Will someone please tell me through these columns what the white, soapy liquid used in machine shops for lubricating drills and tools is, giving formula and cost per gallon?

J. D. BROWN, Ontario.

The Oldest Horse.—Messrs. Beck and Cole, of California, want to hear about the oldest horse. The oldest one we know about is a sorrel coach horse that weighs about twelve hundred. He is past thirty-one years old and is used every summer on a coach team. He acts like a colt and will run away any chance he can get. He has been shod in this shop regularly for the past twenty years. J. H. McPEEK, New York.

To Make the Wheel Polish.—I made me a home-made polishing wheel, according to

directions in Volume 9, Page 231, and it does not perform the work. It merely heats and does not polish the tools. I want to know through "Our Journal" the best way to make it polish, how to put emery on it, and where I can purchase the emery. The wheel took me some time to make and I cannot afford to lose the work.

S. SULLIVAN, Oklahoma.

More About Cold Tire Setters.—I want to say a few words about a tire setter which I have installed. It is the Mayer's Tire Setter. I have seen several and have worked with other kinds, but I like this one best of all. Any smith who has no cold tire setter is behind. He can save so much time and hard work, and time is money. Not only that, but it does not keep customers waiting at the shop for work, and that is a good advertisement. I can set four tires in a few minutes and go on to something else. I am well pleased with my machine. I believe that the company is just as good as the tire setter. I know by experience that it is all O. K. W. E. EATMAN, Alabama.

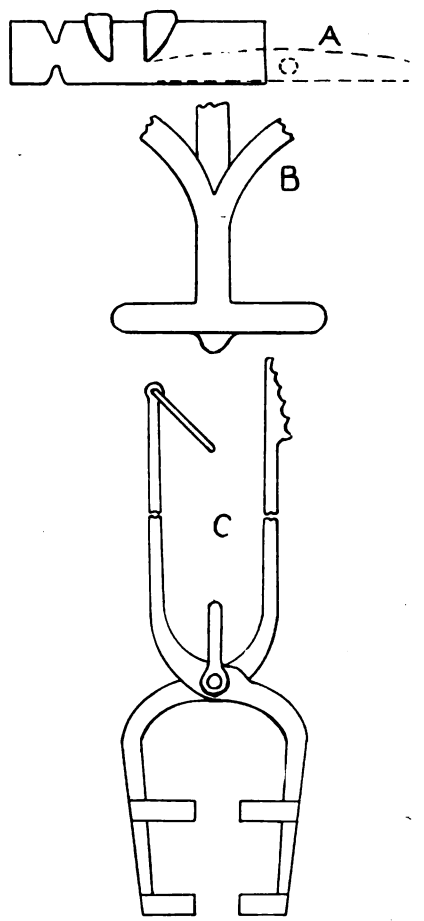
A Letter from Nebraska.—I have a shop 30 by 60 feet. I have all power tools, a 3-horsepower Weber engine, an emery stand, a power drill and a Little Wonder disc sharpener. I have two fires with Royal Blowers and am now putting in a power blower and rip saw. I use a Mole tire setter but am thinking of putting in a Mayer's power setter. I do all kinds of wood and iron work, and do gas engine and auto work. I find a great deal of valuable reading matter in your paper. I started three years ago to learn the trade and find that there is something to be learned every day. The following list gives some of my prices:

New shoes, each	$ .65
New buggy rims	1.30
New buggy spokes	.24
Buggy poles	3.00
Buggy pole circles	1.00
Wagon tongue	$3.00 to 3.25
Set wagon tires, per set	2.00
Set buggy tires	3.00
Sharpening plow lay	.35
Pointing plow lay	1.00
Sharpening shares, set of 4	1.00
Sharpening shares, set of 6	1.30
New shovels, set of 4	4.00
New shovels, set of 6	4.50
New plow lay	$4.00 to 5.00
New lister lay	3.00 to 4.00

O. A. WELCH, Nebraska.

Tongs for Handling Crucibles.—Edward Adam of Ohio wishes to know how to make tongs for handling crucibles, but, as he fails to tell for what size crucible he desires the tongs, I cannot say what size stock he should take. Also, I do not know whether he is going to make the tongs with or without a steam hammer, and each way requires a different method. I have made these tongs in various ways. and I think this one is the best if he has a steam or power hammer so that he can make them out of the solid. Take a piece of rectangular stock and, when hot, place it on its edge and put two side fullers in, similar to A. Then partly cut off and draw out reins, as dotted lines show, and cut from bar. You have the reins now with which to handle it. Take a hot cutter and split the two lumps down the center. The front end shown at B shows it split and drawn out, and the back one split ready to be drawn. Now take each half and fit it to the crucible. I think Brother Adams will find all crucibles tapering small at the bottom, so that all the set he will need to have will be to have tongs touch crucible evenly all the way around. The shackle is for hooking with the crane hook to lift from furnace after the link is slipped in one of the notches in the opposite rein. BERT HILLYER, New Jersey.

More on Setting Axles.—Allow me to say a few words in reply to Brother W. H. Gunn, on "How to Set Axles," in the June number of Our Valued Journal. In the first place, I am not sure of what he means when he says, "The principle of setting axles by a fixed rule is that the bottom and the front should be at right angles, as shown in the engraving." But, more particularly, I desire calling his attention to an error most members of the craft are laboring under, and that is that the tire on a dished wheel sets flat on the ground, when the lower spoke is standing plumb, a thing (I mean the plumb spoke) generally desired in setting axles; but you can't have both. I think I can make it plain to Brother Gunn without a sketch. In the first place, remember there is, or should be, no flare



TONGS FOR HANDLING CRUCIBLES

in wagon tires. Then, suppose we have a 6-inch tire on a dished wheel and we stand that wheel on a perfectly level floor. Now, supposing the wheel stands alone, the top of that tire will surely be directly over the bottom; now, then, lean that wheel until the bottom spoke stands plumb; then see if the tire is setting flat on the floor. If Mr. Gunn will look at his own sketch, on page 214 of the June number, he can see just what I mean.

I will not give my views on setting axles now. You can find them on page 85 of the latest January number.

L. VAN DORIN, California.

From the Mountains of Georgia.—I am located in the mountains of northeast Georgia, where we have little money, but plenty of good, pure air and good cold water in the summer season. I have all the work I can do, but prices are low, and often I do my work on time and have to wait a long while before I receive my pay. I have a wood shop eighteen by forty-eight feet and a blacksmith shop sixteen by twenty-four feet. My equipment consists of a No. 400 blower, a good anvil, a Rennold's tire bolting machine, a Stoddard's hot shrinker, a tire bender, two pairs of bolt clippers and other small tools too numerous to mention. In the wood shop I have a five-horsepower Davis Gasoline Engine, a French burr grist mill and a utility crusher to grind corn in the ear. They both do good work. I have a rip saw that I made myself, a drill that I run either by hand or power, and I keep a good deal of material on hand; buying all my material at wholesale price. I make most of my rims, and sell Wilburr Stock food as a side line. Here are some of my prices. new shoes, plain, 70 cents; new shoes, steel toed, $1.00; spokes, best second growth, each, 20 cents; front hounds, $2.50; hind hounds, $2.00; tongues, $1.00; bolsters, $1.00; axles, from $1.50 to $2.00; putting on tires, from 50 cents to $1.00. I enjoy reading THE AMERICAN BLACKSMITH, and for the three years that I have been reading it it has been a great deal of help to me. EMORY N. KEENER, Ga.

Some Don'ts.—A Good Kink.—As I have seen no craft news from North Alabama I came to the conclusion that I would submit a few lines. I find that the reading of "Our Journal" keeps me from being careless in my work and my collections. Our prices are not very good in this part of the State, although they are as good as some prices I have seen published. My work is mostly buggy and wagon repairing, shoeing and plow work.

I should like to give the craft a few "Don'ts." Don't leave your tongs in the slack tub, as there are more tongs rusted out than worn out by actual use. Have a convenient place whereon to hang them. Don't use your anvil for heavy work without cooling after each heat. Don't let the loafer draw your attention while taking a heat, as it is apt to make your metal "sizz" beyond redemption.

I should like to give the wheelwright a kink. This is the construction of a spoke puller for putting on heavy rims. For the lever, take a suitable piece of wood, two feet long, and bore two holes at one end, four inches apart. Take a piece of ¾-inch round iron, and make two eye bolts. Insert these through the holes in the lever. Now, make two eye hooks, and turn these in the eye bolts. To operate, place the hooks over the spoke tenons to be pulled in, and the rest is easy. I have been in the smithing business seven years, and the above spoke puller is the best one I have ever used. I have put on three-inch rims by myself, with but very little trouble. J. F. P., Alabama.

On the Making of a Water Tuyere.—Mr. J. Weber, of New York, asks for information concerning water-tuyere irons. The first thing is to see that you have clean water for its use, as tuyere irons soon get filled with sediment, and so keep the water from getting up to the nose. They require to be taken out and cleaned, say every six or twelve months, where water is silty or brackish, or there will be trouble. I am writing this as it seems like a double event to me. Last week I paid a visit to one of the town blacksmiths. He asked me if I could get him an old tuyere-iron, as his was burnt out. I said, "Make one, they are forged in England, and why can't we forge them here." He said, "I have an old one up here; have a look at it." Well, I did. It had been a 16-inch iron. As we looked at it, I said, "There you are; see, that one has been hand-made. It is a pattern for you. But, if you like, come to my shop, I will do the old one up for you." This is the way I put a new nose in: I made a ring from 1-inch square to fit over the inner tube and inside the outer. Then I made a smaller ring out of ¼ inch square stock, with 1 inch hole, and feathered the edge to cover the face of the big ring, and welded it on as I had to reduce. Then I made a reducing ferrule and put it inside the inner tube, with the point out level with the nose. I then warmed and closed neatly together, and took a good heat and run the taper mandril through the inner tube. Then I did the rest with the hand hammer. Well, my friend said to me, "I never saw one done before," and I said, "No more did I." So he paid me well for work he ought to have done himself. YOUNG AUSTRALIA.

That Porter for Pouring Crucibles.—In making a shank or porter in which to carry the crucible when pouring, take a piece of rectangular iron as thick as the band is to be wide and wide enough to forge two stubs on it. The length should be enough to allow welding on handle. First find out how much stock it takes to make the band. It takes the thickness of the stock added to the diameter multiplied by 3.1416 to get the circumference. Now find how many cubic inches there are between the stubs which are to stand opposite to one another when the band is bent round. To find the cubic inches, multiply the thickness by the width and then by the length. This will give you the number of cubic inches between the stubs. Now, mark off the same amount in the stock from which it is to be forged, and fuller in as at A. After being drawn down to the right size it is bent on its edge to a radius. This is done so that it will have the right bevel for the crucible when it is bent around in its flat to make the ring. The engraving at B explains how to get the right radius when bending ring on its edge. We have the ring about finished, except welding and truing up, which needs no explanation. The handles are drawn out tapering, the end scarfed to receive the cross-piece in welding and afterwards bent out for handholds. It is then welded, as at C. BERT HILLYER, N. J.

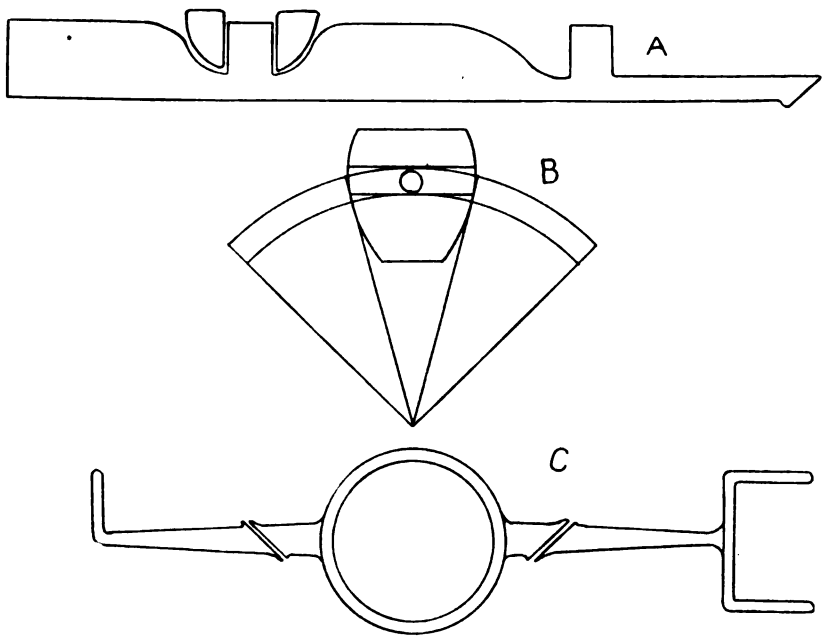
A Talk on Cold Setting.—I have been thinking for a long time of writing you a letter, but "Our Journal" has always been full of letters written by "Our Craftsmen," whom I thought were men of more intelligence and experience than myself, and I thought that the space could be filled up with better writers than myself, but I have read so many amusing things that I will have to say something.

I am running the only power shop in the immediate neighborhood in six miles of where I was born and raised; so most of my customers are old friends and schoolmates, and when I invested $1,200.00 in stock and tools three years ago they thought I was rather extravagant, being ten miles from the railroads. But with my experiences and the advice I had gotten from reading the best of journals for the last three years I have made up my mind that no shop was complete without power and tools, and I knew that good tools meant good work. Good work meant good patronage and good pay.

I have a gasoline engine; a Buffalo blower; a 200-lb. Trenton anvil; a Universal Woodworker; a 14-in. rip saw; an emery tool grinder; a Buffalo drill; a Crescent emery wheel; a Kerrihard power hammer; 15 pairs of tongs; and a complete set of woodworking tools. I have all necessary anvil tools, and last, but not least, a Brook's cold tire setter; and right here I must say something about Br. Bain's articles on cold tire setting in the January issue.

I don't want the craft to think that I am a critic, but when they jump on my best friend I will have to fire back, and I consider the cold tire setter my best friend. I have shrunk four tires and had the money in my pockets in twenty minutes; giving my customer entire satisfaction, and when I run across a job like the one he speaks of I do something like he does, only better.

I take my tire bolting machine (which I forgot to mention above) and remove all bolts, slightly marking the tire and rim on back sides; removing tire; wedging all spokes; running the saw through the joints of the rim, if necessary; replacing the tire cold; inserting all bolts, and tightening and cutting same, also done with my bolting machine. Then I put the wheel in my cold tire setter, drawing it up just right; no guess work, no measurement, no mistake, but just right; never soil a newly painted wheel; no hammer mark, no charred rim, nothing that will show that the wheel has ever been worked on, except the wheel being tight and new nuts and washers on the inside of the rim, for life is too short for me to fool with old ones.



HOW TO FORGE A PORTER FOR POURING CRUCIBLES

I suppose that there are some men that will simply draw them up with the cold tire setter, but they are men that care but little for their reputation and less for their customers' purses, but don't blame the cold tire setter.

The cold tire setter, which I consider is almost perfection, has to have a man to operate it, and he has to be a man of experience, honesty and judgment, exercising all three qualities to give a machine justice.

It is not made for tightening spokes in the rim or shortening the rim, but tightening the tire only. I use it for all new jobs and all repair jobs. It is very seldom I ever have to heat a tire, and as a rule they are only those that are too large for my machine.

I have tightened tires most every way in the last 15 years. I have stripped the wheels, cut the tire and shrunk them on the anvil. I have used five different kinds of hot tire setters, and I have one of Mole's, which I consider one of the best hot tire setters made, but my success with the cold tire setter has surpassed it all.

In regard to prices, I have my own. I work as if the other man was not here, except I never underbid him. We are the best of friends and he often spends the forenoon with me. A man that will talk wrongly about his competitor will do most anything. I try to do the best of work and charge the right prices, also do my best to collect. I will not work the second time for a man who doesn't pay me for the first job. I try to do just what I say I will. I try to be very positive and plain with my customers and have a distinct understanding in regard to prices and time, and my trade is growing every day.

O. T. JONES, Mississippi.

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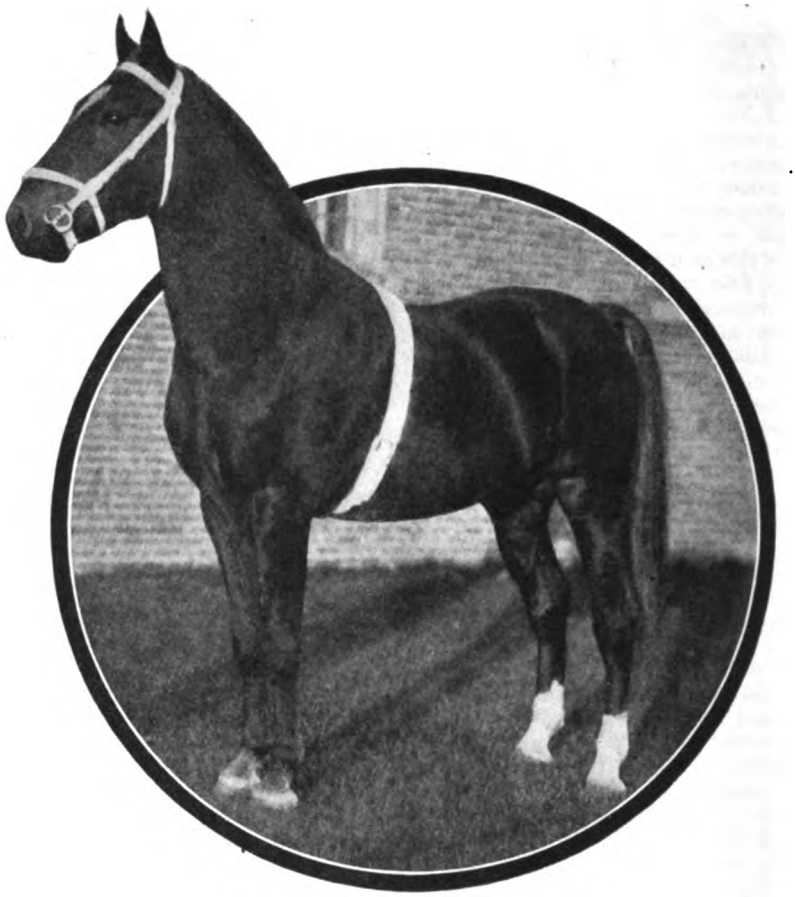

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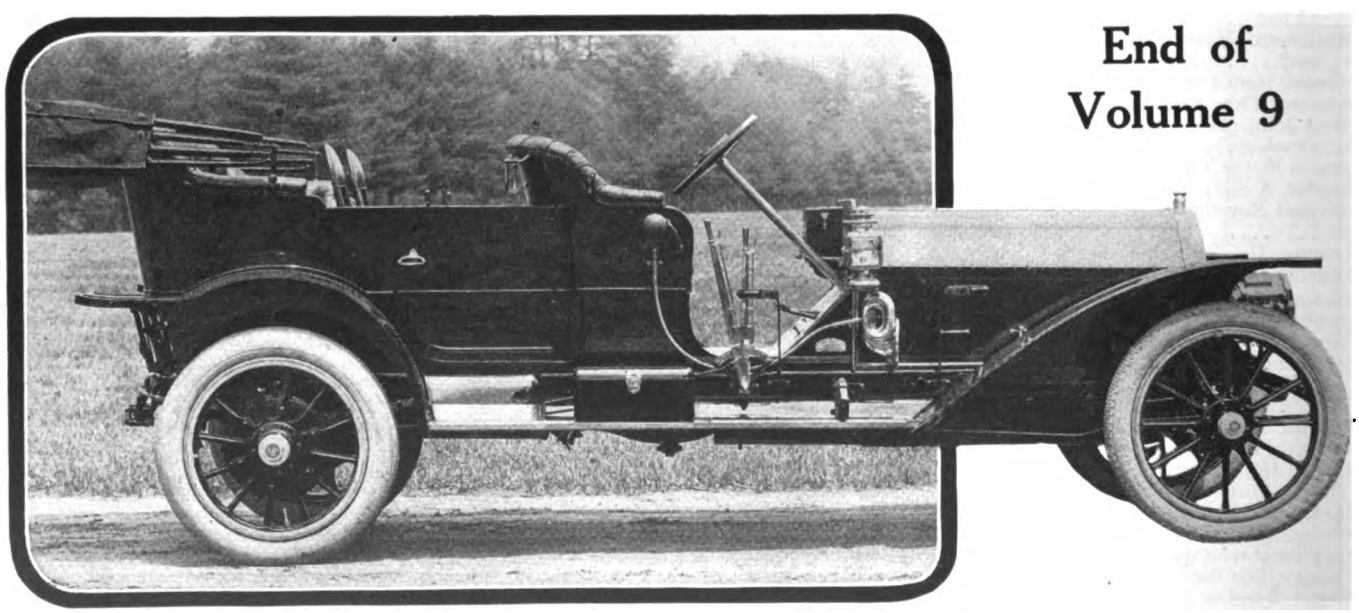

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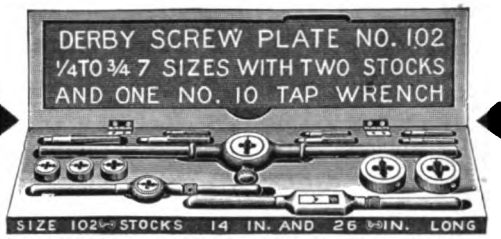

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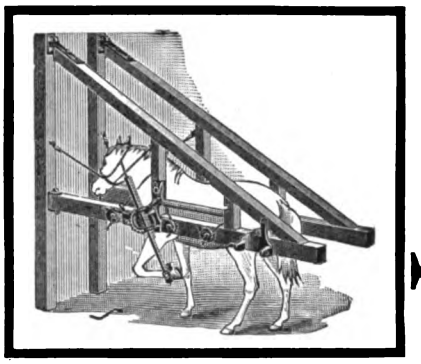

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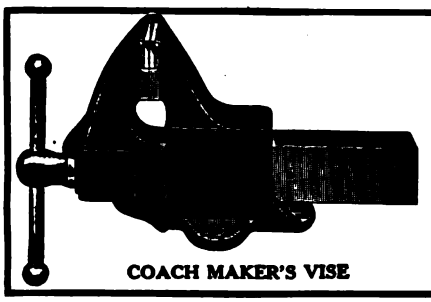

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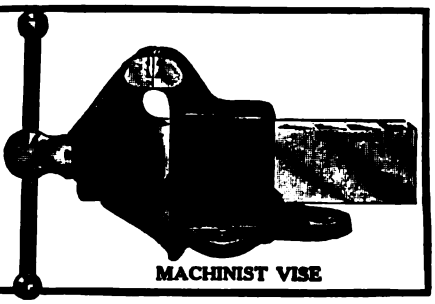

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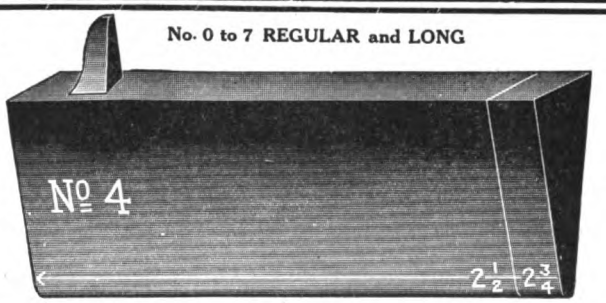

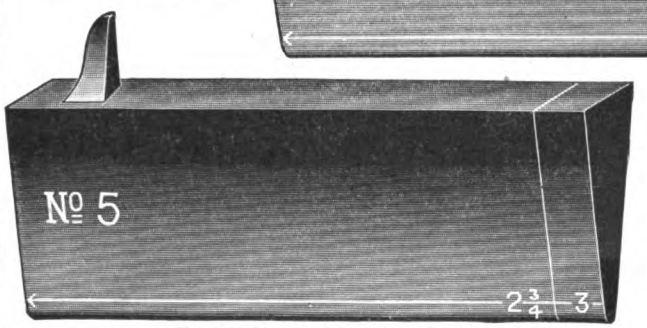

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These Toe Calks weld and drive perfectly. Insist on getting them.

Write for our illustrated catalogue

American Horseshoe Company

Phillipsburg, N. J.



THE "New-Way"

AIR COOLED

GIVES

HIGHEST QUALITY

BEST SERVICE

Notice all the working parts are enclosed and protected.

BLACKSMITHS

The "New-Way" is absolutely guaranteed to cool by air, in your shop or anywhere.

Some "New-Way" Points:

1. AIR COOLED—No water to freeze in winter. Guaranteed not to overheat in summer.
2. ONLY ONE PLACE TO OIL All bearings are oiled by the engine itself. The "New-Way" never forgets, while you might.
3. NO HACKING—No igniter, no pump to get out of order.
4. VALVES can be removed, cleaned and replaced in ten minutes. Compare with others.
5. You see these advantages. So will others.

Here is a good opportunity for you to do a Profitable Engine Business. Ask us for our Agency Offer

Send a Postal to

THE "New-Way" MOTOR COMPANY
LANSING, MICHIGAN, U.S.A.

60 Sheridan St.



FOR STRENGTH SAFETY AND QUALITY OF MATERIAL.

Northwestern Horse Nails

ARE THE BEST ALL AROUND

The most perfect in form and finish. Made of the best Swedish Iron. Will hold a shoe longer than any other nail made. Note the re-enforced point—makes it easiest to drive and the safest to use.

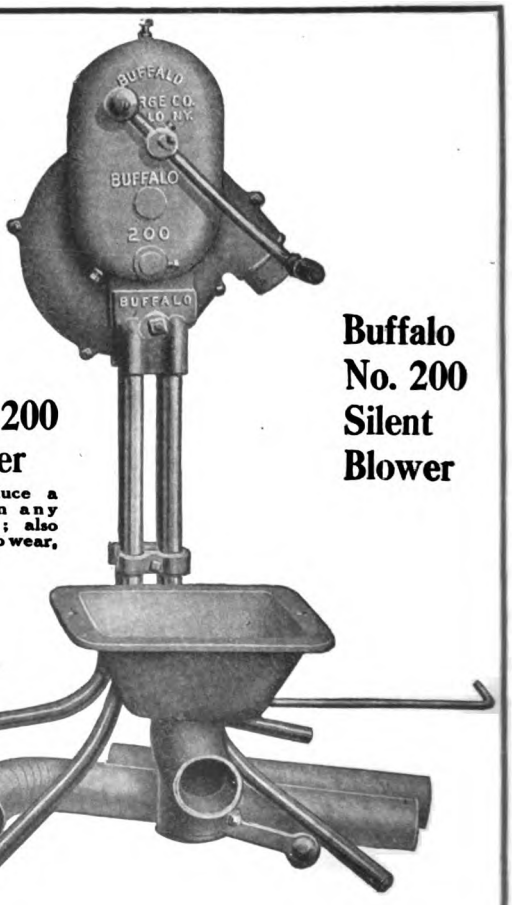
UNION HORSE NAIL CO., CHICAGO, ILL.

Equipped with the No. 200



Buffalo Blacksmith Tools

Have proven their worth for over 30 years



Buffalo No. 200 Silent Blower

Guaranteed to produce a stronger blast than any other blower made; also against repairs, due to wear, for ten years.

Buffalo No. 660 Portable Down Draft Forge

No Smoke, Soot or Gases

Buffalo No. 200 Silent Blower

Write today for Catalog

Buffalo Forge Company
Buffalo, N.Y.

STAR STEEL SHAPES



FOR FALL WORK

STAR

QUICK REPAIR SHARES

Will Help You

They are made 12 in., 14 in., 16 in. and 18 in. Right and Left Hand, in solid cast, crucible or soft center steel.

Your jobber will supply them.

Star Manufacturing Company

Carpentersville, Ill.



Paint should be like a good wife—"wear well." Thousands of painters are "wedded" to "F-S" products.

Raven-Gloss carriage paints are the choice of so many finishers that we are confident they must excel.

FELTON, SIBLEY & CO.

Manufacturers of Paints, Colors and Varnishes

136-140 N. 4th St., PHILADELPHIA



Why Not Get This Extra Profit?

Every farmer who comes into your shop is a live prospect for a FAIRBANKS-MORSE Gasoline Engine, and selling is easy when they can see one of these reliable engines running your machinery and relieving you of the hard work. Then, by becoming an agent, you get your own engine at the agent's price.

Mention this publication and write now for agency proposition No. 487 A. N.

FAIRBANKS, MORSE & CO.

481 WABASH AVENUE CHICAGO, ILL.

HAVE YOU ANY FRIENDS

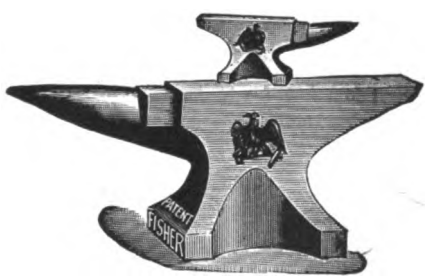
in the smithing craft whose good will you especially esteem? There is no better way of showing them your friendship than by a small gift; there is no gift which such a friend would appreciate more than a year's subscription to The American Blacksmith. It will remind him of you constantly for an entire year, and furnish him with interesting, valuable reading which he will greatly like. If you have any friends who are not subscribers, write us for terms of subscriptions for them.

AMERICAN BLACKSMITH CO.

P. O. Box 974, BUFFALO, N. Y., U.S.A.

"EAGLE" ANVIL WORKS ESTABLISHED 1843

200 DIFFERENT WEIGHTS AND SHAPES FROM 10 LBS. TO 800 LBS.



NONE BETTER MADE OVER 300,000 IN USE

THE ANVIL OF MANY MEDALS.

The "EAGLE ANVIL" has taken FIRST PRIZE wherever exhibited. When a man who KNOWS is ordering he always says: "Nothing but an Eagle for me." Because he knows that the body of the Eagle Anvil is made of unyielding crystalized iron, with hardened steel face, and not of fibrous wrought iron, that is sure to settle in face after a few years' use.

VISES OF MERIT

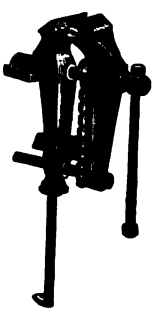
The "FISHER" Parallel Leg Vise is the only Leg Vise made having jaws that always remain parallel at whatever opening.

It is made heavy enough to withstand all strains and will last a lifetime.

We also make a light, parallel BENCH VISE of superior quality, fitted with plain or swivel base.

Write for our descriptive Anvil and Vise Catalog.

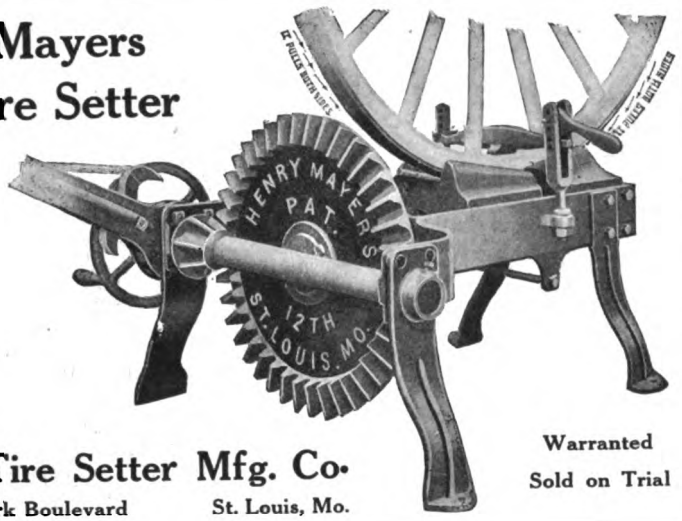
Our goods are handled by reliable dealers everywhere.



PARALLEL STRONG AND DURABLE.

FISHER & NORRIS, 33-47 Fair St., TRENTON, N. J.

This Is Mayers Cold Tire Setter



Write for Prices and Terms

Warranted Sold on Trial

Mayers Tire Setter Mfg. Co.
4030 Forest Park Boulevard St. Louis, Mo.

THE NIPPERS YOU OUGHT TO HAVE

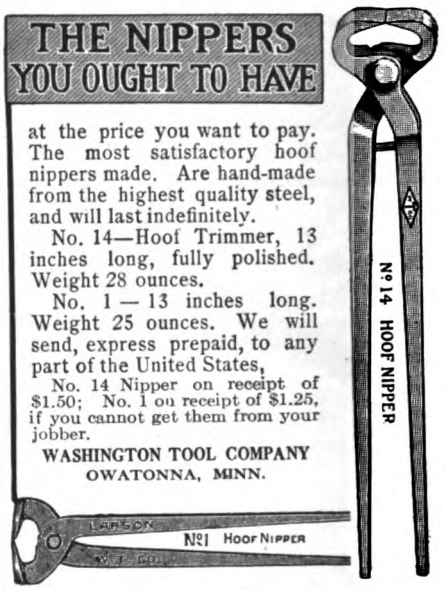
at the price you want to pay. The most satisfactory hoof nippers made. Are hand-made from the highest quality steel, and will last indefinitely.

No. 14—Hoof Trimmer, 13 inches long, fully polished. Weight 28 ounces.

No. 1 — 13 inches long. Weight 25 ounces. We will send, express prepaid, to any part of the United States,

No. 14 Nipper on receipt of $1.50; No. 1 on receipt of $1.25, if you cannot get them from your jobber.

WASHINGTON TOOL COMPANY
OWATONNA, MINN.

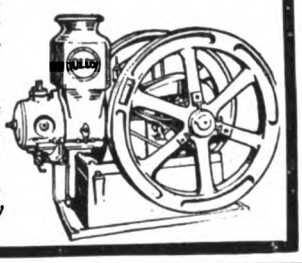




You really should have our interesting catalogue (mailed free).

Olds Gasoline Engines

have exclusive features that are absolutely necessary in a satisfactory engine, making them the most economical to own—30 years the standard gasoline engine of the world—you are guaranteed against any repair bills for one year. Know all about the Olds when you are offered "something just as good."



Seager Engine Works, 1012 Seager St., Lansing, Mich.
Boston Philadelphia Binghamton Omaha Kansas City Minneapolis Los Angeles

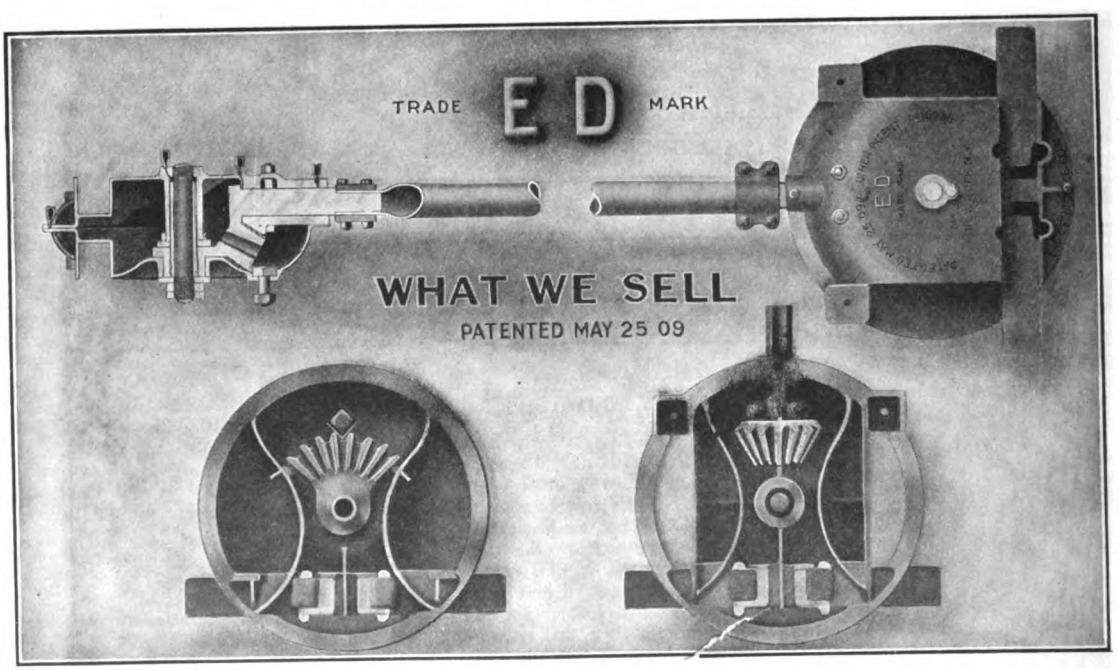
HONEST DEALINGS.

Before an advertisement is accepted for this Journal, inquiry is made concerning the standing of the house signing it. Our readers are our friends and their interests will be protected. As a constant example of our good faith in **American Blacksmith** advertisers, we will make good to subscribers loss sustained from any who prove to be deliberate swindlers. We must be notified within a month of the transaction giving rise to the complaint. This does not mean that we will concern ourselves with the settlement of petty misunderstandings between subscribers and advertisers, nor will we be responsible for losses of honorable bankrupts.

The "E. D." Automatic Double Short-Turning Gear

FOR CARRIAGES AND WAGONS

It Turns A Low Down Straight Sill Wagon in Half the Ordinary Space Required



It Does Not Add To The Cost Of The Wagon

For particulars see

(1) Our exhibit at Cincinnati and Chicago.
(2) The August issue of "The Carriage Monthly."
Or, send for our catalogue.

EADIE VEHICLE GEAR CO.,
1 Madison Avenue, New York

EACH ONE



GUARANTEED

BOLT CLIPPERS

CHAMBERS BROS. CO.

N. Fifty-Second St., PHILADELPHIA, PA.

TRIMMINGS FOR EVERYTHING ON WHEELS



Wholesale Manufacturers

Write For Catalogue and Prices.

INDIANA TOP & VEHICLE CO., Lawrenceburg, Indiana, U. S. A.

Convert Your Bicycle Into A Motorcycle



using our attachable outfit. Fits any wheel. Also stationary and marine motors, either finished or rough castings. Send 2c stamp for catalog.

Steffey Mfg. Co., 2942 Girard Ave., Philadelphia, Pa.



Electric Lights

For Every Home and Factory

We manufacture isolated lighting plants, suitable for farm house, cottage and small factory use, ranging in price from $250.00 up to $375.00. These prices include engine, dynamo, storage battery and switchboard. You can use the engine for pumping water, sawing wood, churning butter, etc.; at the same time you can run the dynamo and charge the storage battery at no extra expense, hence the current used for lighting costs practically nothing.

Write today for interesting information on the lighting subject.

The Dayton Electrical Mfg. Co.

151 St. Clair Street Dayton, Ohio



STAR POWER HAMMER

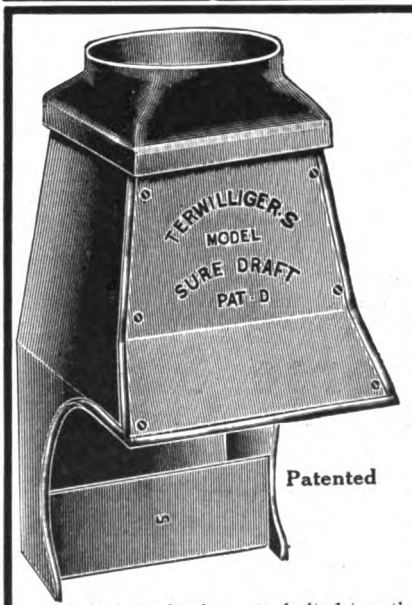
WORTH MORE COST LESS

Than Any 50-lb. Steel Head Hammer on the Market.

Hook'er to your Ingin.

Thousands of satisfied customers. Send for letters and Catalogue.

Star Foundry Co., Albert Lea, Minn. U. S. A.



Patented

Look! Listen, Mr. Blacksmith.

This Is Terwilliger's Model Sure-Draft Forge Chimney

Have you seen it? Newest and best device to improve your shop equipment. Cheaper than a brick chimney. Draws better. Will not burn or rust out in a lifetime.

Made Entirely of Cast Iron. Takes 10-inch Pipe or Tile at Top. Weight 100 Pounds. 31 Inches High. 15 inches wide.

Has been on the market for some time. Sells on sight. One jobber has sold over 100 of them this season, and placed their order for 100 more for immediate delivery. With this you have more room on your forge. You can change your fire from one part of shop to another without loss. You have the strongest possible draft.

It is made in six parts, bolted together, allowing for expansion and contraction. It is placed close to the fire, like a brick chimney, so you have the advantage of a brick chimney and hood as well. The cinders go up the chimney instead of on back of your neck. Order one of your jobber.

Price $6.00. Fully guaranteed.

THE SURE-DRAFT COMPANY, Station A, KANSAS CITY, MO.

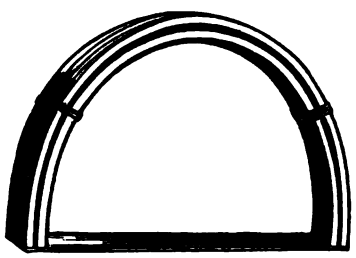
Trade Literature and Notes.

THE ROCK ISLAND VISE COMPANY, of Rock Island, Ill., (with branch offices in Chicago and New York City) would be greatly pleased to have blacksmiths, wheelwrights, wagon makers, etc., write to them for their catalogue. They claim it describes the largest and most complete line of vises ever manufactured. Even if these mechanics are not in the market at present for a vise, it won't do them any harm to keep in touch with the trade, for sooner or later they will need one. This Company says that they are able to extend a very good proposition to customers.

THE G. M. YOST CO., of Meadville, Pa., recently purchased the entire plant and equipment of the Meadville Vise Co., of the same city. This addition to their factory will mean a greatly increased output. Readers who are interested in the purchase of a vise might do well to write to them for particulars and prices.

THE RUTHERFORD RUBBER COMPANY, of Rutherford, N. J., send us some interesting information regarding the horseshoe pads which they are manufacturing. They state that they are the originators of composition back pads, which by their peculiar construction, are giving universal satisfaction. By a special process of their own the back and calk are vulcanized together, thereby eliminating every possibility of a separation. In the case of other pads it has been necessary either to sew or cement the calk and the back together. The pad of the Rutherford Company is all in one piece, which they claim to be a decided advantage over the old-style leather back pad. Their composition, it is also claimed, will not water soak or become soggy, which has been offered as an objection to some forms of pads. Neither is their composition subject to any contraction or expansion from variation of moisture and temperature. The Rutherford Rubber Co., in fact, guarantees the entire pad to be perfectly impervious to water, and that they will keep the horse's feet in better condition than is possible with any pad which either becomes soggy or which contracts or expands with varying conditions of moisture and temperature.

Strictly Ohio Oak and Hickory



Mr. Consumer of rims, does this interest you?

Ohio hardwoods are famous for the toughest material for rims. We use nothing else.

A price list to your door for the asking.

Our prices are the lowest, and grades and workmanship the highest known to the art of rim making.

From factory to consumer is our motto.

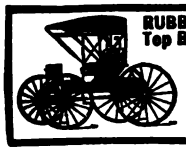
If you are awake to your own interests you will buy all your rims from us. We will ship you from a single piece to a carload.

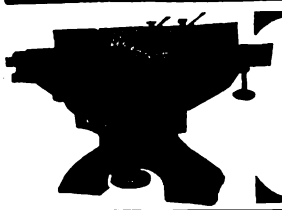
Don't delay asking for price list.

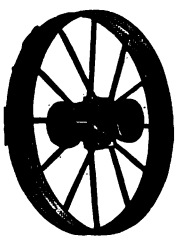
May Bending Works

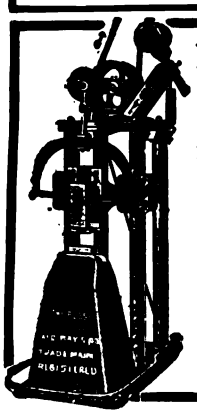
Steubenville, Ohio


GOES LIKE SIXTY
SELLS LIKE SIXTY
SELLS FOR SIXTY
$60
GILSON
GASOLENE
ENGINE
For Pumping, Cream Separators, Churns, Wash Machines, etc. FREE TRIAL
Ask for catalog—all sizes
GILSON MFG. CO. 39 Park St. Port Washington, Wis.


RUBBER TIRED RUNABOUT, $42.00
Top Buggy, $35. Buggy Tops, $4.60
Write for 100-page Catalog.
It's free. Compare our prices.
Established 1889.
BUOB & SCHEU,
500-520 East Court St.
CINCINNATI, OHIO.


BICKNELL'S
Handy Jointer
with No. 350 attachment
Ask your jobber.
BICKNELL MFG. & SUPPLY CO.
Janesville, Wis.

STEEL WHEELS

To Fit Any Wagon
Plain or Grooved Tire
Farmer's Handy Wagons
All Standard Types
Special Inducements to Blacksmiths
Write Today for Agency
EMPIRE MFG. CO., P. O. Box 301, Quincy, Ill.


NOVELTY
IRON WORKS
BOSS HAMMER
For Plow Work, Wagon Work, Heavy Work, Any Work.
"Will strike as you like."
Heavy or light at full speed or less. A broken anvil will cripple no other part of the hammer.
G. E. DAVIS, Mgr.
DUBUQUE, IOWA.

CLASSIFIED BUYER'S GUIDE.

To Find Address of any Firm given here, consult their advertisement.

For its location in this issue, see Index on Page 17.

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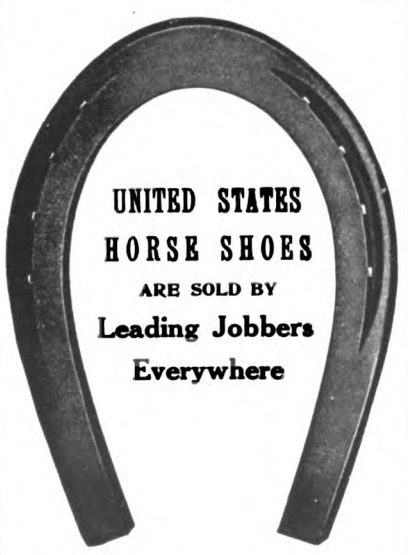
UNITED STATES
HORSE SHOES
ARE SOLD BY
Leading Jobbers
Everywhere

When You Buy Horse Shoes
Is it not preferable to make your selection from the most complete line and the best shoes on the market?
United States Horse Shoes
"In a Class by Themselves"
Our Illustrated Catalogue shows all sizes and patterns. The book is free. We will gladly send a copy to your address. Write today.
We are giving away a handsome souvenir stick pin to every smith who sends his name and address. Did you get one? Don't wait until they are gone. Write today.
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Champion Tool Co.
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Well Drills.
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Boob Wheel Co.
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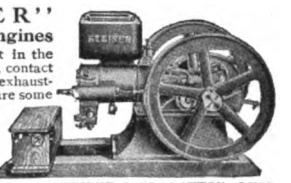
ONLY 60 CENTS Did you ever try to shoe a horse that would not stand still? By the use of my great **Pulley Breaking Bridle** you can make the most restless horse stand as quiet as a lamb—even ugly horses, stallions, etc., completely subdued while being shod. Price, **Only 60c postpaid.** You should own one.



Will bring business to you. Send for circular telling all about it.

PROF. J. W. BEERY, PLEASANT HILL, OHIO.

"STEINER"
Hoppercooled Engines
are by far the cheapest in the long run, our governor, contact maker, watercooled exhaust-valve, waterslip jacket are some of the numerous advantages.
Send for catalog A and state what size you are interested in or what purpose you intend to use it for.



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The Campbell Iron Co.
ST. LOUIS, MO.
Carry complete line of Horseshoers' Supplies, Wagon and Carriage Material.
WESTERN AGT. FOR DITZLER COLORS IN JAPAN.
Write Dept. B. your requirements.



OUR GROOVED TIRE

WE MAKE
STEEL WHEELS
TO FIT ANY AXLE
PLAIN OR
GROOVED TIRE

STEEL OR
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ANY SIZE

A FULL LINE OF
WOOD and STEEL FARM TRUCKS
With Steel or Wood Wheels
WRITE FOR LARGE CATALOG and PRICES
ELECTRIC WHEEL CO., Box A, Quincy, Ill.

ABSORBINE



will reduce inflamed, swollen Joints, Bruises, Soft Bunches. Cure Boils, Fistula or any unhealthy sore quickly; pleasant to use; does not blister under bandage or remove the hair, and you can work the horse. $2.00 per bottle at dealers or delivered. Horse Book 7 D free.

Mr. Geo. Anderson, Oak City, Utah, writes: "April 28, 1910. Am very grateful to you for a can of ABSORBINE I used last year. It raised the value of one animal $50.00."

W. F. YOUNG, P. D. F., 230 Temple St. Springfield, Mass.

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THE GENUINE TOOL
KNOWN AND PREFERRED EVERYWHERE
H. K. PORTER EVERETT, MASS. U. S. A.

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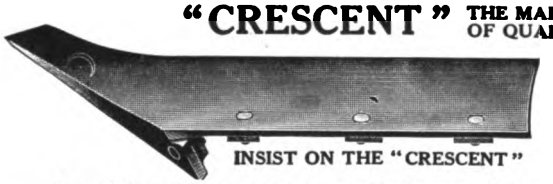

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Save labor and increase your profits by using Fitted Shares. We make the best.

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CRESCENT FORGE & SHOVEL COMPANY
HAVANA, ILL. U. S. A.
Manufacturers of High Grade Fitted Plow Shares and Agricultural Shapes

Never Accept Imitations

When a dealer or jobber tries to impose substitutes for the *good advertised articles,* write us or the manufacturer. We will see that you get the genuine—what you want.

DON'T BUY GASOLINE ENGINES UNTIL YOU INVESTIGATE "THE MASTER WORKMAN," a two-cylinder gasoline, kerosene or alcohol engine, superior to any one-cylinder engine; revolutionizing power. Its weight and bulk are half that of single cylinder engines, with greater durability. Costs Less to Buy—Less to Run. Quickly, easily started. Vibration practically overcome. Cheaply mounted on any wagon. It is a combination portable, stationary or traction engine. SEND FOR CATALOGUE. **THE TEMPLE ENGINE MFG. CO., 493 West 15th St., Chicago.** THIS IS OUR FIFTY SIXTH YEAR.

Current Heavy Hardware Prices.

The following quotations are lowest prices generally quoted at Chicago, Aug. 11, 1910, and are subject to fluctuations. Corrected for The American Blacksmith by the National Heavy Hardware Reporter, Chicago.

With the exception of quotations on Merchant Bar Iron and Steel Bars, there are no changes in prices at the various jobbing centers.

There seems to be a slacking up of business generally, as there has been for the past several weeks.

The demand for wood stock has been considerable and prices are firm.

Collections are reported easier, with prospects of betterment.

Horse Shoes—

All Iron Shoes	$4.40
Steel Shoes	4.25
No. 0 and No. 1 25c. extra. 15c. per keg additional charged for packing more than one size in a keg	
Mule Shoes	4.90
X. L. Steel Shoes	5.50
Countersunk Steel Shoes	6.00
Tip Shoes	5.75
Goodenough, heavy	6.00
Goodenough, sharp	6.50
Toe Weight	7.00
Side Weight	9.25
E. E. Light Steel	5.50
Steel Driving	5.50
O. O. Mule Shoes, extra	1.50

Merchant Bar Iron—
$1.90 rates, full extras, and 20 cents per 100 pounds extra for broken bundles.

Steel Bars—
$1.90 rates, full extras.

Toe Calks—	Per box.
Blunt	$1.25
Sharp	1.50

Carriage Bolts—	
6 x ½ and smaller	60–10%
Larger and longer	50%

Machine Bolts—	
4 x ½ and smaller	60–10%
Larger and longer	50%

Plow Lays—	
Solid Cast	$.08½
Crucible	.09½
Soft Center	.12

Malleables—	**Half Patent Axles—**
Common .09	65%

Springs—	
Single Spring, each	$1.25
Springs, black and half bright	06

Hickory Lumber—Per Foot—	
1 to 2½	$.09
2½ to 4½	.10

Ash and Oak Lumber—Per Foot—			
1–1½	$ .07	2½–3	$.08
1½–2	.07½	3½–4	.09

Yellow Poplar Lumber—Per M. Feet—

	6 to 12	13 to 17	18 to 24
¼"	$70.00	$70.00	$80.00
⅜"	70.00	73.00	85.00
½"	73.00	80.00	90.00
⅝" ⅞"	77.00	85.00	109.00

Rough Hickory Axles—	Each.
3 x 4 6 ft	$ .55
3½ x 4½ 6 ft	.90
4 x 5 6 ft	1.10
5 x 6 6 ft	2.00
4 x 5 6½ ft	1.20
4½ x 5½ 6½ and 7 ft	1.80
5 x 6 6½ and 7 ft	2.50
5½ x 6½ 7 ft	3.00

Finished Hickory Axles—	
For 2½ and 2¾ Skeins	$ .95
For 3 Skeins	1.10
For 3¼ Skeins	1.35
For 3½ Skeins	1.50
For 3¾ Skeins	1.80
For 4 Skeins	2.10

Rough Oak Bolsters—	
Short	$.07½
12–14–16 ft.	.08½

Finished Oak Bolsters—	
2½ x 3½ and under	$ .60
3 x 4	.65
3½ x 4½	.80

Rough Oak Wagon Tongues—	
4 x 4 x 2 x 4 x 12 and smaller	$ .95

Finished Oak Wagon Tongues—	
3½ and smaller	$1.20
3¾	1.25
4	1.30

Two Inch Sawed Hounds	Per Pair.
Tongues	$ .35
Front	40
Hind	.50

Patent Wheels—	
A. B. No. 13 and under	45 %
D. No. 13 and under	35–5 %
All Grades, No. 17 to 33	35–5 %
All Grades, No. 39 and Larger	25–5 %
C. No. 13 and under	40–2½ %

Cupped Oak Hubs— Set.		**Plain End Oak Hubs Set.**	
x 8 x 9	$1.40	10 x 14	$3.30
7 x 9 x 10	1.50	11 x 14	4.20
8 x 9 x 10	1.55	11 x 15	4.50
8 x 10 x 11	1.80	11 x 16	5.10
9 x 10 x 11	1.95	12 x 16	5.75
9 x 11 x 12	2.00	12 x 17	6.30
10 x 12 x 13	3.00	13 x 18	7.00
11 x 13 x 14	4.20		
12 x 14 x 15	5.10		

Rough Sawed Felloes—			
1½ x 2"	$1.45	2 x 2½"	1.85
1½ x 2½"	1.65	2½ x 2"	4.35
1½ x 2½"	1.75	3 x 3"	5.25
3 x 3½"	5.50		

Ironed Poles, White, XXX—	
1¾ x 2½" No. 2	$3.80
2 x 2½" No. 3	3.80

Ironed Shafts, White, XXX—	
1¾" x 2" and smaller	$1.95
1½ x 2"	2.20
1½ x 2½"	2.70

Farm Wagon Bows—	
Round Top, ½ x 2"	$ .60
Flat Top, ½ x 2"	.75
Round Top, ⅝ x 2½"	1.35

Standard size Piano Bodies with Seats—	
Each	$4.25

Plow Beams—	
1 Horse	$ .60
2 Horse	.75
3 Horse	.90

All Hickory and Oak Spokes and Patent Spokes—	
Discount from Weis & Lesh List No. 5	5%

Wagon Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2½ x 38"	$2.05	$2.80	$4.00
2½ x 42"	2.70	3.90	5.25
2½ x 46"	4.15		
3 x 44"	4.35	6.70	8.38
3 x 48"	5.25	7.50	10.00

Single Trees—Oval—

	Mixed Forest Second Growth	White Second Growth
2½"	$1.50	$2.70	$3.35
2¾"	1.60	2.75	3.50
2½"	1.65	2.80	3.65
3 x 36"	2.30	3.30	4.10
3 x 38"	2.35		
3 x 40"	2.50	3.85	4.65

Single Trees—Round—

	Forest	Second Growth
2½"	$1.90	$3.45
2½"	1.90	3.50
2¾"	2.00	3.60
2½"	2.65	4.10
3"	3.20	4.65

Oval Plow Doubletrees—		**Flat Plow Doubletrees—**	
2½ x 36"	$1.60	1½ x 3½ x 42"	$2.75
3 x 40"	2.40		

Wagon Doubletrees—	
2 x 4 x 48"	$3.40
2½ x 48"	4.50
2½ x 4½ x 50"	4.90
2½ x 4½ x 52"	5.25
2½ x 5 x 52"	6.00
2½ x 5 x 54"	6.75
Mixed Second Growth	50 % advance
White Second Growth	100 % advance

Oval Plow Singletrees—	Forest
2½ x 30" and under	$ .90
2½ x 30" and under	1.15

Buggy Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½" and smaller	$2.50	$3.50	$4.50

Express Doubletrees—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.80	$3.55	$4.80
2¾"	3.40	4.50	5.25
3"	3.40	4.15	5.50

Express Singletrees, Turned—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.25	$2.50	$3.50
2¾"	2.75	3.50	3.75
2½"	3.25	3.75	4.50

Express Singletrees, Square Center—

	Mixed Forest Second Growth	White Second Growth
2½"	$2.75	$4.00	$5.00
2¾"	3.25	5.20	5.75

Buggy Neck Yokes—

	Mixed Forest Second Growth	White Second Growth
2 x 42"	$2.60	$3.25	$4.25
2½ x 2½ x 42"	3.00	3.50	5.00

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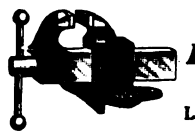
Blacksmith and Wagon Makers' Supplies,
PEORIA, ILL.

ESTABLISHED 1836
BEALS & CO.
Iron, Steel and Hardware
Tools and Supplies for Horseshoers and General Blacksmiths
Carriage Hardware and Woodwork
44, 46, 48, & 50 Terrace, BUFFALO, N. Y.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Hand or power, for shearing and punching plates, bars and angles. Send for Catalogue C.
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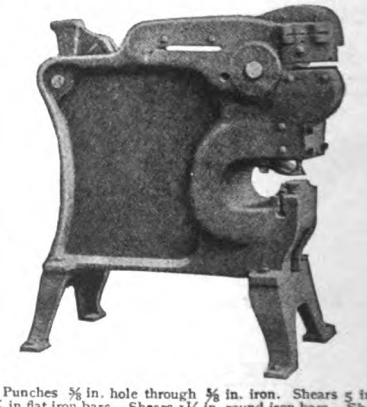
HARVEY BOLSTER SPRINGS
Also Carriage and Auto Springs
Sold by leading jobbers or write us.
Harvey Spring Co., Box 31, Racine, Wis.

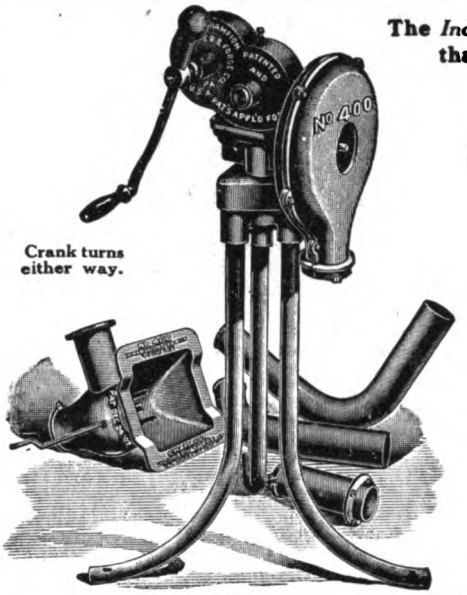

No. 5 Combined Punch and Shear

Punches ⅝ in. hole through ⅝ in. iron. Shears 5 in. x ½ in. flat iron bars. Shears 1¼ in. round iron bars. Shears 8 in. x ¼ in. band iron.
Our Large Descriptive Circular will interest you. So will our price.
BADGER STATE MACHINERY CO.
19-25 Trinity Street Janesville, Wis.

The *Incomparable* 400 Blower, the one great *Heirloom* that will be handed down *from one generation to the other. Ask what the owners say*

MADE WITH BALL BEARINGS ONLY

Nearly Half A Million in Use

The No. 400 is the Blower that has REVOLUTIONIZED the World in Making Hand Blast



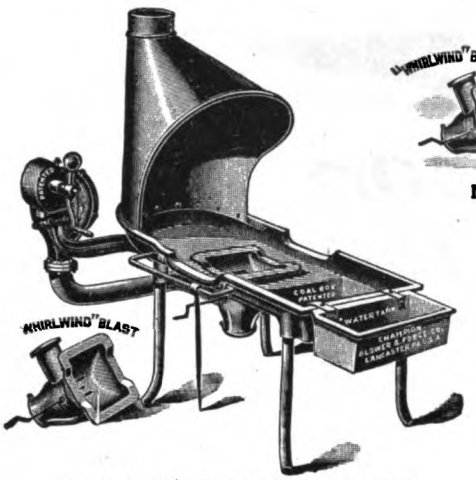
Crank turns either way.

No. 400

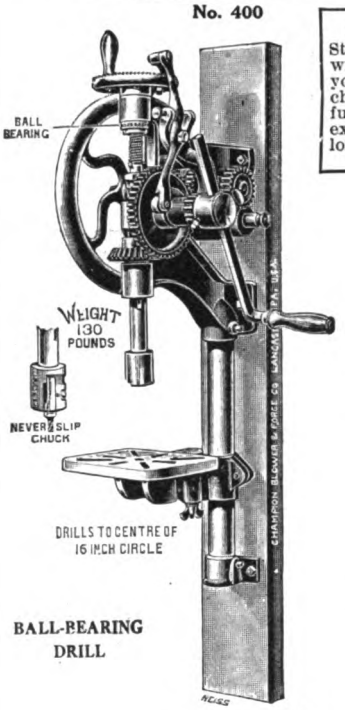
The No. 400 Steel Blower will serve the youngest mechanic faithfully without expense for a long lifetime.



No. 408. Steel Blacksmiths' Forge



No. 433. Cast Iron Blacksmiths' Forge



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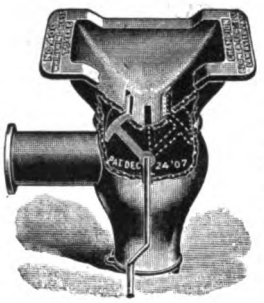
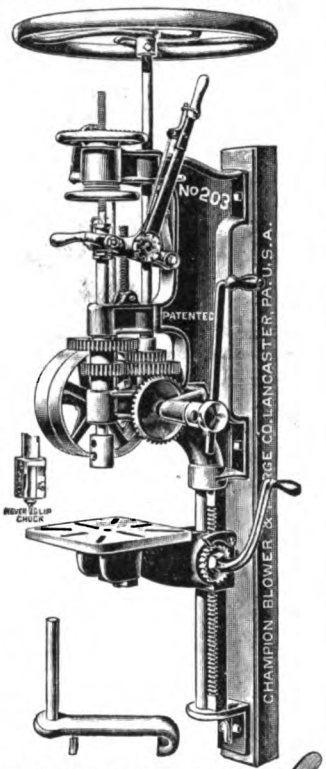


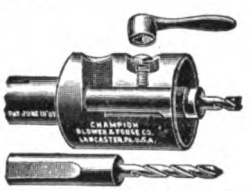
A Tuyere Iron That Makes A Whirlwind Blast.

The No. 400 Champion "Whirlwind" Blast Anti-Clinker, Heavy Nest Tuyere Iron is furnished with all No. 400 Blowers WITHOUT EXTRA COST.

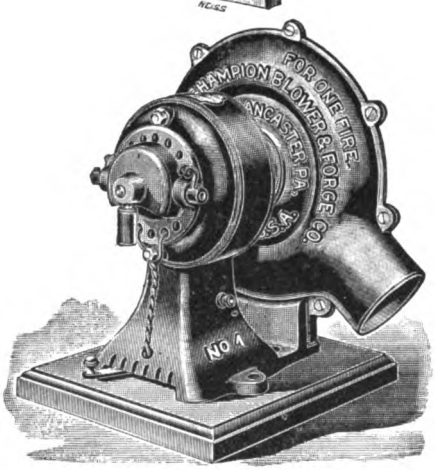
The "Whirlwind" Blast Anti-Clinker Heavy Nest Tuyere Iron produces a circular, rotary whirlwind blast and concentrates the heat in the tuyere nest, not permitting it to blow up and out of the chimney, therefore, makes a hotter fire and heats the iron one third quicker, saving much coal.



No. 203. Self-feed and Double Compound Lever-feed Drill.



The Champion Patented Never-Slip Chuck is applied to all CHAMPION DRILL SPINDLES without extra charge

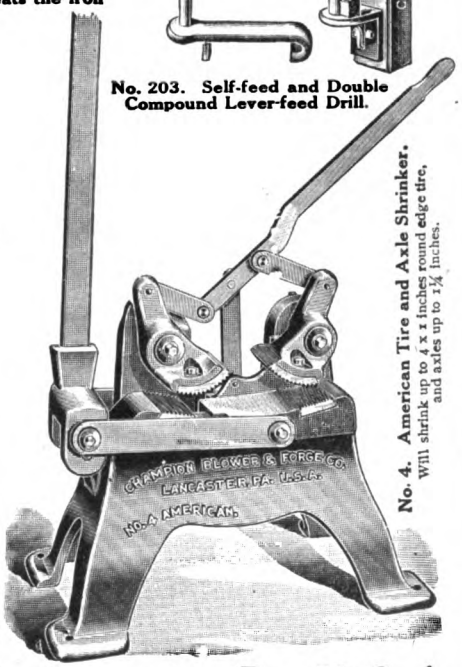


No. 1—One-Fire Variable Speed Electric Blacksmiths' Blower, with five speeds for LIGHT, MEDIUM and HEAVY fires.



Screw Plates in four styles, cutting up to 1½ in.

Before purchasing a Hand Blower, Forge, Drill Press, Tire Bender, Tire Shrinker, Screw Plate, Power Blower, or Electric Blower, write for our free catalogue, which always shows the greatest variety of improved Blacksmith tools built under one control in the world.



No. 4. American Tire and Axle Shrinker. Will shrink up to 4 x 1 inches round edge tire, and axles up to 1¼ inches.

THE CHAMPION BLOWER & FORGE CO., Lancaster, Pa., U. S. A.

Ask your dealer to show you the



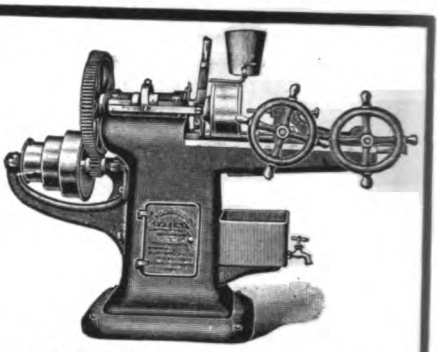
Trenton Anvil

The favorite of blacksmiths and horseshoers everywhere

It has the shape
It rings like a bell
It does the work

Ask for the INDIAN CHIEF Blacksmith Vise.

THE
MERRIMAN
Bolt Threader
Best on Earth



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THE HEAD IS NEARLY EVERYTHING

The Merriman Bolt Cutter Head is noted for: Simplicity of the Head—only four parts. Great Durability—few repairs needed. Square Bearing of the Dies in the Ring. Solidity of the Dies like a Solid Die. Uniformity of the Product—Bolts all the same size. Effectiveness of Operation—Cheapest help can understand and run it. No machine turns out work more rapidly.

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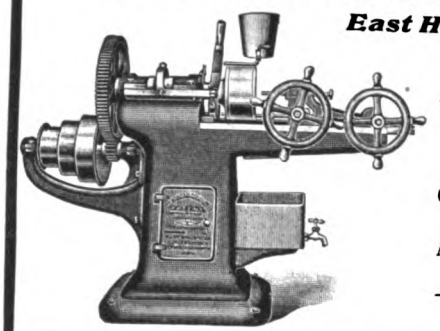

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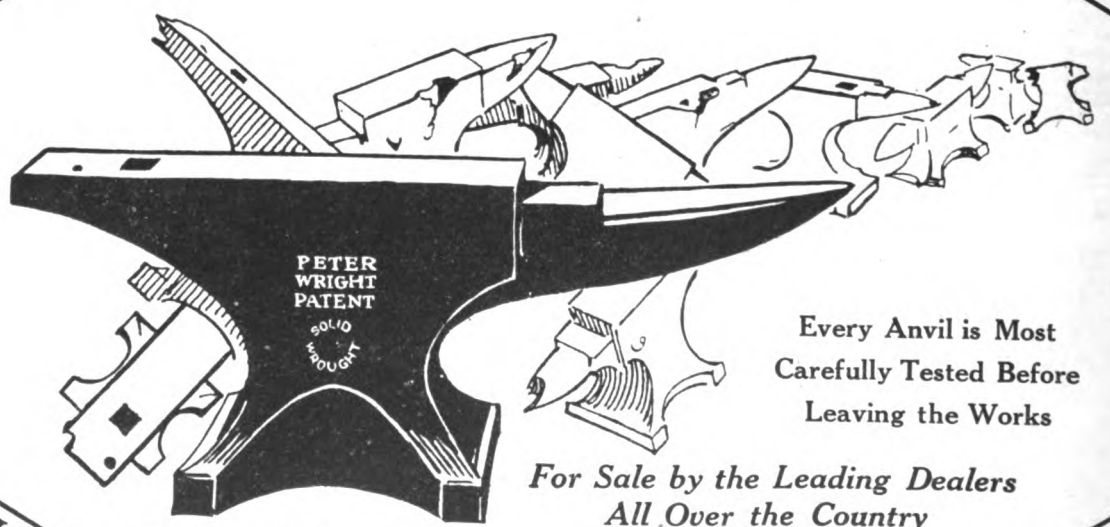
"WRIGHT'S ANVILS OUTLAST ALL OTHERS"



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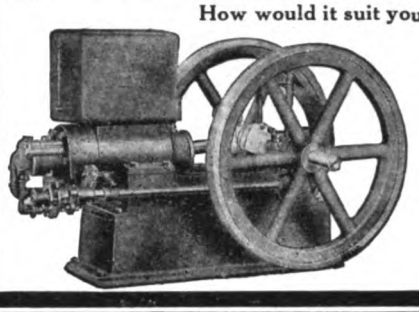

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Your experience is worth something. If you use a "Witte" your customers will want them; **why not sell them and make the profit?** Our engines are **GUARANTEED FIVE YEARS**

Have been on the market 25 years; advertised and sold everywhere. **Lots of good selling points.** Write for introductory proposition, stating size you can use.

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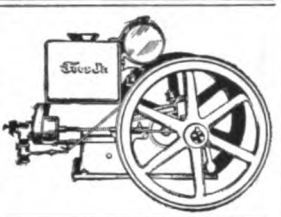
Send for catalogue No. 49.



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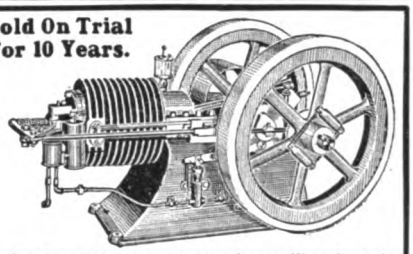
Sold On Trial For 10 Years.



For the past ten years we have been selling the Gade Engine on trial. Use it 30 days free. Pay no money down. We stand back of it with our Five Year Guarantee.

The cylinder is cooled without the use of water or fans. Find out how we can save you one third on gasoline. Do it now, before we place an agent in your town.

Gade Bros. Mfg. Co., 18 North St., Iowa Falls, Iowa

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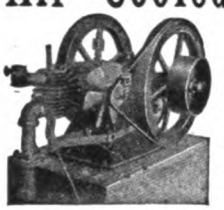

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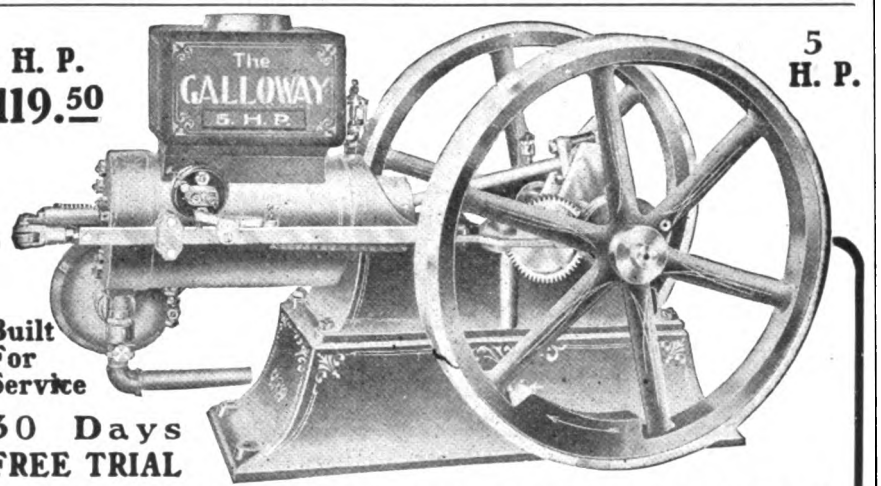
The Air-Cooled Motor Co.
LANSING, MICH.

5 H. P. $119.50

5 H. P.



Built For Service

30 Days FREE TRIAL

THE GALLOWAY GASOLINE ENGINE

Owned and Made Exclusively by the William Galloway Co., Waterloo, Iowa

will run your shop at several times its present capacity and enable you to take lots of jobs that you have to turn down now because you have not the capacity.

Only four things to do: **Turn on the switch, turn on the oil, turn on the gasoline, give the fly wheel a start,** and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high-grade engine for 15 years. Over 2,500 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember the bore and stroke counts and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake tests.

On the larger sizes, if it is not entirely convenient for you to pay all cash, I will take your note for the balance at the regular rate of interest for 6 months.

The price given is for the 5-horse power only, but we make these engines in seven sizes.

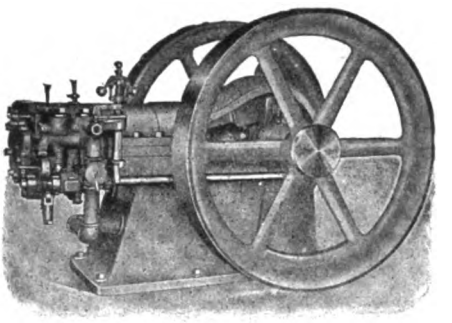
Note my special proposition to blacksmiths.

I have a plan by which every blacksmith can partly or entirely pay for his own machine. It's good; it's away out of the ordinary; and you will be overlooking a big chance if you don't write for my proposition.

Ask for my free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure.

WRITE TODAY. **WILLIAM GALLOWAY, President.**

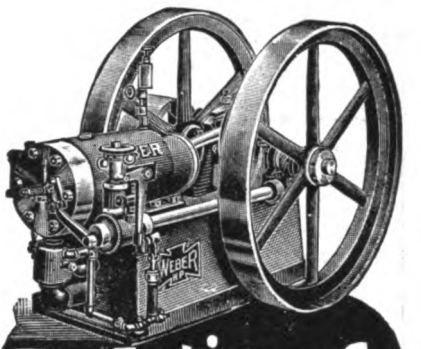
THE WILLIAM GALLOWAY COMPANY, 577 Jefferson St., Waterloo, Iowa.



Write for booklet describing full line of Gas and Gasoline engines, from 3 to 100 H. P. Special inducements to dealers as agents.

Sold Under A Positive Guarantee.

The New Era Gas Engine Co.
No. 63 Dale Ave. Dayton, Ohio.



The Engine of Reliable Records

Getting the most engine for your money does not mean buying the cheapest—it is a matter of securing an engine that will give reliable results year in, year out—the speed must be steady and uniform—absolute interchangeability of parts assured—actual power must equal rating. Every requirement of the blacksmith who wants a simple, reliable, powerful engine for all light work—running drills, emery wheels, blowers, etc.—is met by the

Weber
Gas or Gasoline Engine

Some of its special features are—underground gasoline reservoir for main gasoline supply—gasoline pump, pumping supply to engine; surplus returning to reservoir—electric igniter—heavy and rigid construction (see cut)—a perfect control governor by which the operator can change speed instantly—all parts easy of access and guaranteed interchangeable—small number of moving parts. It takes but little room, adds to capacity of shop and costs little to operate.

Sold Under Our Absolute Guarantee

Write today, telling us for what you need power and we will send you our new handsomely illustrated catalog fully describing the Weber Engine best suited to your requirements.

Sheffield Gas Power Co.
121 Winchester Place Kansas City, Mo.

Let it Furnish Power for You

Blacksmiths Can Set the Self-Setting PLANE



right the first time trying. Just drop the plane iron and cap back in the plane and turn a thumb screw and it is set exactly right. Five seconds does it. They are sent on trial. Ask any Carpenter. We will send you a hard, tough Carpenter's Pencil if you will send us ten addresses of plane users and mention this paper.

GAGE TOOL COMPANY, VINELAND, N. J.



STEEL STAMPS

Steel Letters and Figures

BURNING BRANDS

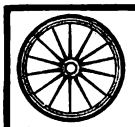
Stencil Dies, Stencils, Etc.

GEO. M. NESS, JR.

61 Fulton St., New York

Price List sent upon application





WHEELS

Steel Tire, per set, . . $ 6.25

Rubber Tire, per set, . 13.30

Rubber Tires put on at $6.70 per set.

Auto Tops, $25.00. Buggy Tops, $5.00.

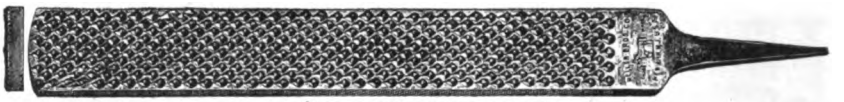
Buy from the manufacturer. We can save you money.

BUOB & SCHEU

500 COURT ST. CINCINNATI, OHIO

"TOOLS THAT WEAR" HELLER'S CELEBRATED AMERICAN HORSE RASPS, FILES AND FARRIER'S TOOLS

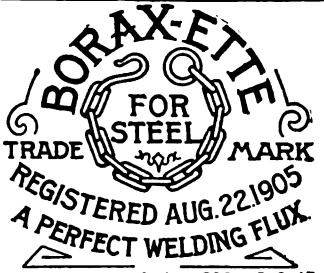
will save you Time and Money. Their Superior Quality sets a known and tested Standard of Excellence. All made from our own Production of Special Refined Clay Crucible Steel and Tempered by a Secret Process.



"TANGED HORSE RASP."

New Catalogue Mailed Free on Application.

HELLER BROTHERS CO., Newark, N. J., U. S. A.



PREPARED ESPECIALLY FOR WELDING FAR SUPERIOR TO COMMON BORAX

Try Borax-ette for Welding Toe-Calks

THEY WON'T KNOCK OFF

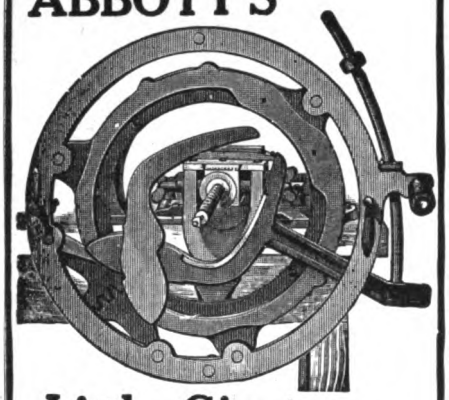
It makes steel weld like iron. It has no equal for welding tires, axles and springs

FOR SALE BY ALL DEALERS

SAMPLES FREE

CORTLAND WELDING COMPOUND CO., Cortland, N. Y.

ABBOTT'S



Little Giant Hub Borers

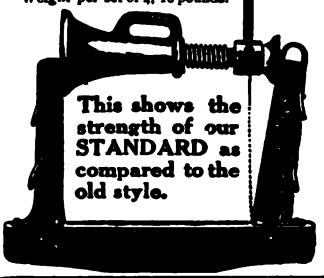
AND Abbott's Box Puller

Made by ABBOTT & CO., Hudson, Mich., and sold by all Dealers in Carriage Makers' Machinery.

PHINEAS JONES & CO., Newark, N.J.

General Agents for the Eastern States

We make the following sizes:
No. 1, 3 in. wide, 14 in. high
" 2, 3¼ " 14 "
" 3, 3¼ " 10 "
Weight per set of 4, 16 pounds.



The Bruce Malleable Wagon Standard

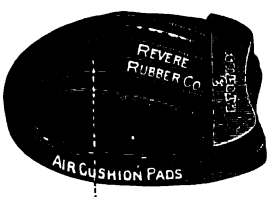
Tested thoroughly and guaranteed strictly as represented. Note its great advantages over the old style.

1. Made of best grade malleable iron. Has been tested thoroughly by factories and wagon makers.
2. It is attached to bolster by means of two bolts passing through bolster from the side, and one bolt from top to bottom of bolster, thus holding standard perfectly solid, and at the same time strengthening end of bolster, which in old style is weakened by mortise.
3. The Malleable Iron Standard has a 3½ in. face at base, which prevents wear on wagon box, while the old style has only a ⅞ in. face.
4. Great time saver. Can be attached to bolster in one fourth the time required to put on wood stake. Adapted to new and repair work.

If you have never tried the Bruce Standard, write today and ask for prices.

A. H. HARSHBARGER, Danville, Ill.

AIR CUSHION RUBBER HORSESHOE PADS



SEE THAT CUSHION?

It fills with air at each step. That's what breaks concussion. That's what prevents slipping. That's what keeps the foot healthy. That's what cures lameness.

Twelve Different Styles



Heavy Leather Back

NO LAMENESS

NO SLIPPING

Write us for further information

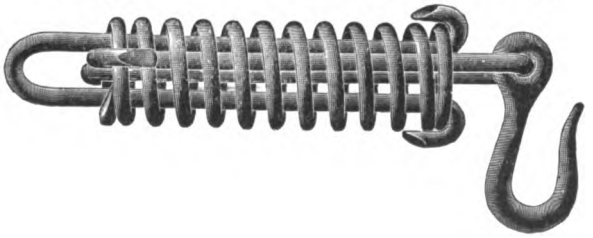


Exposed Leather Back

REVERE RUBBER COMPANY

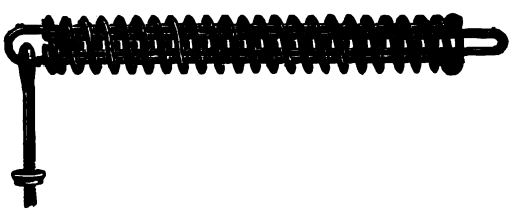
Sole Manufacturers BOSTON, MASS.

Keystone Trace Spring



makes the load lighter for the HORSE and the road smoother for the DRIVER.

Raymond Pole Spring



takes the weight of the Pole off the Horse's back.

Every Comfort for the Horse is Economy for the Owner

Manufactured by RAYMOND MANUFACTURING COMPANY, LTD., CORRY, PA.

For Sale by Jobbers

FODEN'S MECHANICAL TABLES

SAVE ALL FIGURING!

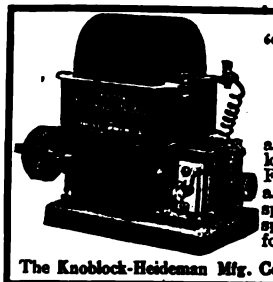
Tell at a glance how much stock to use for oval or elliptical hoops of any size, the circumferences of circles, weight of flat, square and round stock, and the weight and strength of ropes and chains

Should be in every progressive Smith's hands

Bound very neatly in green cloth. Price, 50c.

AMERICAN BLACKSMITH COMPANY, Buffalo, N.Y.

WHEN WRITING TO ADVERTISERS MENTION THE AMERICAN BLACKSMITH



"Quick Action"

Igniting Dynamos

Excel all others.

The only generator that cannot lose its magnetism. For either make and break or jump spark work. Also spark coils. Send for Catalogue B.

The Knoblock-Heidemann Mfg. Co., South Bend, Ind.

"CHICAGO"

EMERY WHEELS CUT QUICK

A wheel that will do the work in one-fourth to one-half less time is by far the cheapest in the long run. A wheel that will save only one hour per day during your busy season would pay for itself in full.



Dissatisfied with Iron you are now using?

TRY "MILTON" BARS

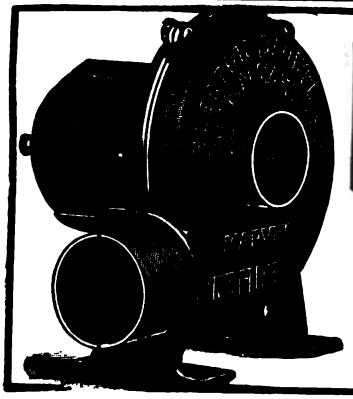
FOR BOTH QUALITY AND SIZE.

Many Blacksmiths using them with very best results.

Write for Prices.

THE MILTON MANFG. CO.,

MILTON, PENNSYLVANIA.





MARVEL

"One Fire" Variable Speed Electric Forge Blower

$28.00 Net

Gives 100 per cent greater air pressure than any other "one fire" outfit.

30 days' Free Trial, through your dealer.

ELECTRIC BLOWER COMPANY

BOSTON, MASS.

"CHICAGO"

WHEELS SAVE TIME

They're made of stuff that cuts

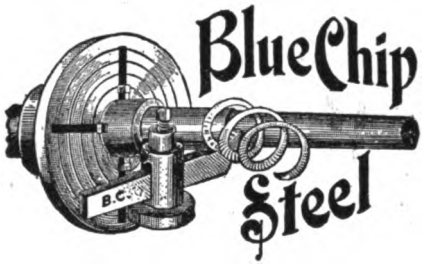
Emery Wheels, Glue, Emery, Polishing Wheels, Grinding Machinery

136 Page Catalogue for the Asking

Chicago Wheel & Mfg. Co.

108 SO. ABERDEEN ST.

CHICAGO, U. S. A.



Will turn off blue chips on any kind of work.

Firth-Sterling Steel Co.

McKEESPORT, PA.

Selling Agencies

NEW YORK CHICAGO

BOSTON PHILADELPHIA

SCOTT'S CRUCIBLE TOOL STEELS

Made in all grades
Fully guaranteed
All sizes in stock

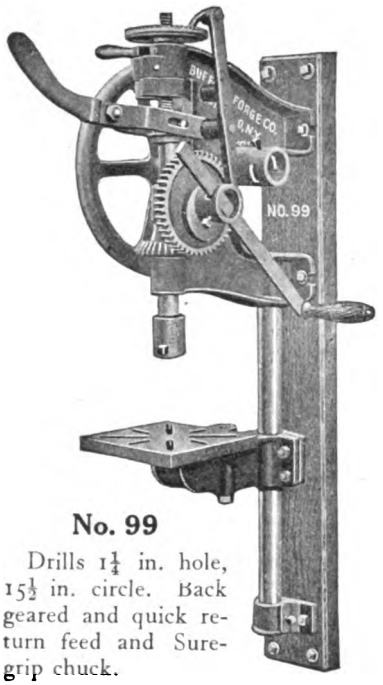
THE
BOURNE-FULLER CO.
IRON STEEL
PIG IRON
COKE

Cleveland, Ohio.

Buffalo Ball Bearing Drills

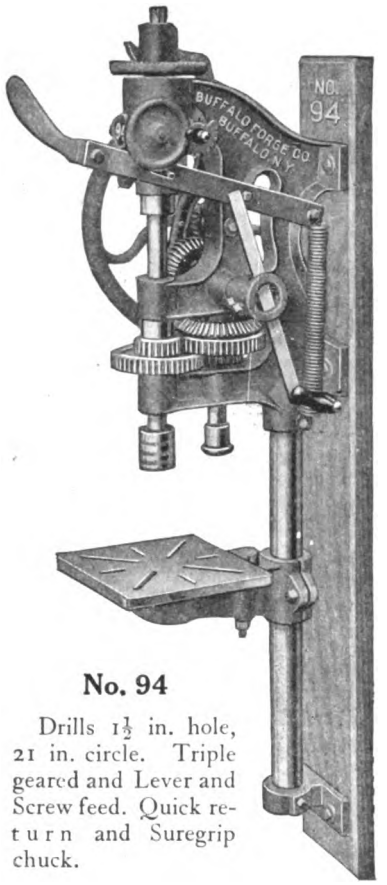
Equipped with All the Latest Time and Labor Saving Devices

The Only Drills with Ball Bearings at the point of High Speed Friction



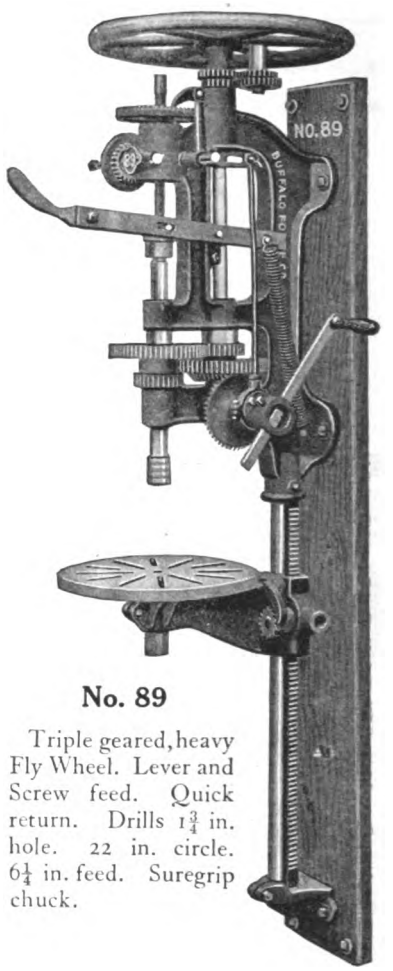
No. 99

Drills 1¼ in. hole, 15½ in. circle. Back geared and quick return feed and Suregrip chuck.



No. 94

Drills 1½ in. hole, 21 in. circle. Triple geared and Lever and Screw feed. Quick return and Suregrip chuck.



No. 89

Triple geared, heavy Fly Wheel. Lever and Screw feed. Quick return. Drills 1¾ in. hole. 22 in. circle. 6¼ in. feed. Suregrip chuck.

You will find these drills easy to operate at their full capacity. The end thrust of the swiftly revolving drill spindle is balanced upon ball bearings. All journal bearings are extra long, bored and reamed in the solid metal of the frame. The gears mesh perfectly. All parts are accurately fitted, and operate without lost motion, back lash, or noise.

A half turn of the small lever at the feed screw head gives hand lever control with

Full and Instant Return of Drill Spindle

You do not have to turn back the feed screw or even lift the drill from the work. Think of the time and labor you save. A half turn back instantly and reliably locks the power feed.

Each of these Drills is equipped with

Buffalo Suregrip Chuck

which has no projecting parts to injure your hands or tear your clothing. The chuck positively locks the drill with a half turn of the collar, and without the use of a tool.

Write now for Catalog 178 A. B.

Buffalo Forge Company
Buffalo, N.Y.

"Price Wrecking Bargains"

From Sheriffs', Receivers' and Manufacturers' Stocks

All goods sold on a binding guarantee. Your money back if you're not satisfied.

Every article in this advertisement is guaranteed brand new and first class.

CHICAGO HOUSE WRECKING CO.

Our plant covers 40 acres of ground and is one of the most wonderful mercantile institutions in the land. Our capital is one million dollars. Our responsibility is unquestioned.

Our stock includes practically everything under the sun. Millions of dollars' worth of brand new, high grade merchandise **bought by us at various sales** is offered to the public **at prices usually less than the original cost of production.** We offer an exceptional opportunity to those who buy now, so send us a trial order. This will convince you.

Read every word of our greatest sale. **Never before** have prices been cut deeper than those quoted in this advertisement. **Every item** means a **big saving for you. Make your selection at once.**

SPECIAL SALVAGE SALE OF ENTIRE CARGO STEAMER "WISSAHICKON"

Merchant Bar Steel in Stock.

The following brand new steel bars are in the same condition as rolled at the mill, except slightly rusted as they were at Cargo from the steamer "Wissahickon" recently foundered near Detroit, Mich.

☞**Send us a list** of quantity and sizes you can use and we will quote you prices way below the market.

Lot No. AB 211. Rounds Bar Steel.

10,000 ft.	¼	in.	16	to	18	ft. lengths
10,000 ft.	⅜	in.	"	"	"	"
10,000 ft.	½	in.	"	"	"	"
10,000 ft.	⅝	in.	"	"	"	"
2,000 ft.	1	in.	"	"	"	"
11 – 3½		in.	rounds		22	ft.
13 – 4		in.	"		"	"
5 – 4½		in.	"		"	"
2 – 6		in.	"		"	"

Lot No. AB 212 Squares Bar Steel.

1,000 ft.	¼	in.	sq.,	16	to	18 ft. long
500 ft.	1	in.	sq.,	14	to	16 ft. long
500 ft.	1¼	in.	sq.,	16	to	18 ft. long

Lot No. AB 213 Flats. Bar Steel.

2,000′	1 x¼	in.	14	to	16	ft. lengths
400′	1 x½	in.	"	"	"	"
1,500′	1½x⅜	in.	"	"	"	"
1,000′	1½x¼	in.	"	"	"	"
700′	1½x⅝	in.	"	"	"	"
200′	1½x½	in.	"	"	"	"
500′	1½x⅝	in.	"	"	"	"
200′	2 x½	in.	"	"	"	"
2,000′	2 x⅝	in.	"	"	"	"
300′	2½x⅜	in.	"	"	"	"
200′	2½x½	in.	"	"	"	"
10,000′	2½x⅞	in.	"	"	"	"
100′	6 x1	in.	"	"	"	"
400′	4 x½	in.	8	"	12	"

Lot No. AB 214. Steel Bands in Scrolls.

30	bundles,	1 x3/16	in.
14	"	1¼x3/16	in.
26	"	1½x⅜	in.
14	"	1½x½	in.
30	"	2 x⅜	in.
10	"	2½x⅜	in.
25	"	3 x⅜	in.
30	"	4 x⅜	in.
8	"	5 x⅜	in.
10	"	6 x⅜	in.
6	"	6 x5/16	in.

Lot No. AB 216. Steel Hoops in Coils.

12 coils	1	inch	20 gauge
12 coils	2	inch	14 gauge

Lot No. AB 217. Steel Channels (up to 32 ft. long).

10 ton	3	inch	4 lbs. to the foot
10 ton	4	inch	5¼ lbs. to the foot

Lot No. AB 218. "T" Steel
10 ton 3½-inch flange, 4 inch stem by ½-inch thick.
In lengths up to 24 feet.

Lot No. AB 220. Steel Plates.

39 –	¼	in. x5	ft. x10	ft. plates
10 –	⅜	in. x5	ft. x10	ft. "
5 –	½	in. x5	ft. x10	ft. "
3 –	5/8	in. x5½	ft. x20	ft. "
1 –	¾	in. x5	ft. x27	ft. 5 in. "
1 –	½	in. x5	ft. x27	ft. "

☞Don't fail to write at once and send us a list of sizes you can use.

New Wrought Anvils 5c. per lb.



Best quality, form and finish. Steel face is a solid piece planed smooth after welded.
Lot No. 4-A-115.
Absolutely guaranteed.
Weight 150 to 200 lbs.
Price per lb..... **5c.**

Chain.

Lot Wis-No. 19. 1 lot of ¼-inch Steel Coil Chain. Straight link. Weight, 1,425 lbs.
Price per lb **3½c**

Sledges, Etc.

Lot Wis-No. 37. Cast Steel in first-class condition.
1 lot of **Spauling Hammers,** ranging in weight from 10 to 18 lbs.
1 lot of **Mason's Double Face Hammers,** ranging in weight from 10 to 18 lbs.
1 lot of **single Sledges,** ranging in weight from 14 to 25 lbs.
Price per lb. of any of the above **3c**

Soft Steel Bands.

Lot Wis-No. 50. **About 200 bundles new stock,** in strictly first-class condition, consisting of the following sizes:
½"thick by 1", 1½", 1¾", 2", 2½", 5" and 6" wide.
⅛" by 1", 1½", 1¾", 2", 3", 3½", 4", 5" and 6" wide.
☞Write quantity needed for prices.

Machine Bolts.

Lot Wis-No. 138.

300 ¼ x6	100 ½ x6	120 ⅝x10½
125 5/16x14	300 ½ x9	450 ⅝x12
800 ⅜ x1½	200 ½ x10	100 ⅝x17
2,000 ⅜ x1¾	1,000 ½ x12	125 ⅝x1½
2,100 ⅜ x3	200 ½ x15	250 ⅝x2
1,050 ⅜ x5½	50 ½ x17	450 ⅝x7
800 ⅜ x6	50 ½ x18	100 ⅝x15
100 ⅜ x14	125 7/16x14	75 ⅝x16
500 7/16x2½	1,600 ⅝ x1½	100 1x7
250 7/16x10	300 ⅝ x2	200 1x9½
1,500 ½ x1½	250 ⅝ x14	100 1x12
1,000 ½ x2	100 ⅝ x20	115 1x14
1,000 ½x2½	5 00 ¾ x9	150 1x18
3,000 ½ x3	550 ¾ x9½	100 1½x5
3,000 ½ x4		

Coach Screws.

Lot Wis-No. 139.

500 ¼ x3	100 ⅜x5½	200 ½x5
800 ¼x4½	750 ⅜x6	800 ½x6
750 ¼x5	200 ⅜x7	200 ½x8
2,600 ¼x6	500 ⅜x8	2,600 ½x9
200 ¼x9	200 ⅜x8½	100 ½x10
2,600 ⅜x4	100 ⅜x12	100 ½x7



Neckyoke Ferrule and Ring.

Lot AB No. 24.
Consists of 150 Oliver Mfg. Co.'s Neckyoke Ferrule and Ring, figure No. 80½-1⅛" ferrule with 3¼x7-16" ring.
Price, each **6c**

Mixed Bolts, 2½c. per lb.



10 tons brand new mixed **Machine** and **Carriage Bolts,** first class condition, **various sizes mixed** together, from ⅜ to 1 inch diameter and from 2 to 10 inches long.
Price F. O. B. Chicago:
In lots of 25 to 100 lbs.....3c. lb.
In lots of 100 to 500 lbs .....2½c. lb.
In lots of 500 lbs. and up.....2½c. lb

Lag Screws.

Lot Wis. No. 140.
200 ⅜x7. 1,000 ½x3. 10,000 5/16 x 3½.
For price, write quantity you can use.

Tapped Nuts.

Lot Wis-No. 141.

2 kegs, ⅜" Hex.	3 kegs, ½" Sq.
1 keg, ½" Hex.	7 kegs, ⅝" Sq.
1 keg, ⅝" Hex.	5 kegs, ¾" Sq.
1 keg, ¾" Sq.	2 kegs, ⅞" Sq.
1 keg, ⅞" Sq.	2 kegs, 1" Sq.

Write list of your wants for special prices.

Blank Nuts.

Lot Wis-No. 142.

1 keg, 5/16" Hex.	2 kegs, ¼" Sq.
3 kegs, ⅜" Hex.	1 keg, 7/16" Sq.
1 keg, 7/16" Hex.	7 kegs, ½" Sq.
1 keg, ½" Hex.	4 kegs, ⅝" Sq.
2 kegs, ⅝" Hex.	4 kegs, ¾" Sq.
3 kegs, 1" Hex.	3 kegs, ⅞" Sq.
2 kegs, 2" Hex.	1 keg, 1" Sq.

Special prices will be quoted upon application.

Cap Screws.

Lot Wis-No. 91. New Cap Screws, first class order, never touched by the water, as follows:

1,320 ⅜"x2 "	360 ⅜"x1¼"
165 ⅜"x2¼"	680 ⅜"x1½"
150 ⅜"x2¾"	405 ⅜"x2 "
250 ⅜"x3 "	825 ⅜"x2¼"
115 ⅜"x3¼"	350 ⅜"x2½"
430 ⅜"x1 "	140 ⅜"x1¾"
280 ⅜"x1¼"	250 ⅜"x2¾"
290 ⅜"x1½"	310 ⅜"x2½"
815 ⅜"x2 "	190 ⅜"x3 "
375 ⅜"x2½"	105 ⅜"x3½"
175 ⅜"x2¼"	340 ⅜"x4 "
835 ⅜"x2¾"	210 ⅜"x1 "

Price on above 3½c per pound in 100 lb. lots. 4c per pound in less quantities.

Studs.

Lot Wis-No. 93. Following brand new Studs, never touched by the water. Many in original packages.

390 ⅞"x5 "	1,045 ⅞"x3½"
965 ⅞"x4½"	2,895 ⅞"x3 "
300 ⅞"x4 "	1,045 ⅞"x2¾"
225 ⅞"x3¾"	385 ⅞"x4 "
275 ⅞"x3½"	880 ⅞"x3½"
2,615 ⅞"x2¾"	1,290 ⅞"x2 "
750 ⅞"x2½"	1,390 ⅞"x2¼"
535 ⅞"x3¼"	450 ⅞"x1½"
1,265 ⅞"x3 "	295 ⅞"x2 "
300 ⅞"x2½"	930 ⅞"x1¼"

Price in 100 lb. lots, per pound, 3½c. In less quantities, 4c.

Horseshoe Nails, 5c. lb.



Lot No. 4-A-B-96.
Queen City Special, cold rolled Horseshoe Nails, sizes 7, 8, 9, put up 25 lbs. bulk in a box.
Price, per lb..... **5c.**
"Bonanza forged and pointed, warranted Horseshoe Nails, made of best Swedish stock, sizes 7, 8, 9, put up in bulk, 25 lbs. to box.
Price, per lb..... **6c.**
2,000 boxes of **"Bay State"** cold rolled Horseshoe Nails, made of best Norway Iron, sizes 7, 8, 9 and 10.
Price in bulk. 25 lbs. to box..... **5½c. lb.**
Or in 5 lb. cartons ..... **7½c. lb.**

Nuts.

Lot Wis-No. 95. Brand new Nuts, fresh clean stock, never touched by the water.

260 ⅞",Sq.H.P.	685 ½",Sq.H.P.
1,055 ⅝",Hex.C.P.	2,050 ½",Hex.H.P.
580 ⅝",Hex.H.P.	250 ⅝",Hex.H.P.
2,160 ⅝",Hex.H.P.	1,945 ⅝",Sq.H.P.

Price per pound, in 100 lb. lots, 3½c. In less quantities, per pound, 4c.

Carriage Bolts.

Lot Wis-No. 137.

1,000 ¼x2½	31,000 ⅜x4	300 ½x14
1,100 ¼ x1	2,000 ⅜ x4½	150 ½x15
9,000 ¼ x1½	1,000 ⅜ x5	200 ½x17
2,400 ¼ x3	1,000 5/16x5	300 ⅝x3½
3,000 5/16x2	1,000 5/16x5½	200 ⅝x4
5,500 5/16x2½	200 5/16x6½	500 ⅝x5½
4,600 5/16x3	125 5/16x16	2,200 ⅝x6
2,000 5/16x3½	1,200 ½x2½	100 ⅝x7
2,000 5/16x4½	8,000 ½ x3	200 ⅝x9½
1,000 5/16x6	300 ½x3½	100 ⅝x10
500 ⅜ x½	2,200 ½ x4	1,000 ⅝x12
500 ⅜ x1	11,100 ½ x5	175 ⅝x14
3,500 ⅜ x2	5,000 ½ x5½	50 ⅝x18
300 ⅜ x3	2,650 ½ x6	50 ⅝x20
6,400 ⅜ x3½	200 ½ x11	
2,400 ⅜ x3¾	1,150 ½ x12	

☞FILL OUT THIS COUPON

Chicago House Wrecking Co., Chicago:
I saw your advertisement in **American Blacksmith.** Am interested in the following items:

_____

_____

_____

Do you want Free Mammoth Catalog ? Do you want Free Gasoline Engine Bk ?

Do you want Free Roofing Book ? Do you want Free Structural Steel Bk ?

My Name_____

Town_____

R.F.D._____ P.O. Box_____

County_____ State_____

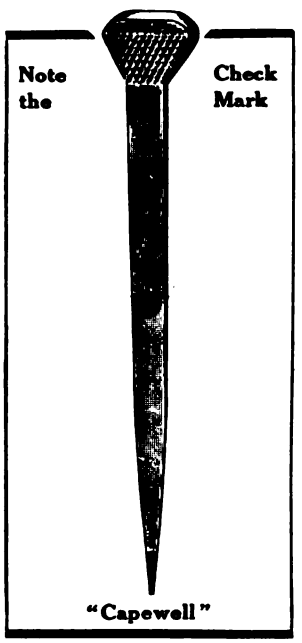
Sept 1910, Am. Blk.

P.O. Box_____

Chicago House Wrecking Co. 35th & Iron Sts. CHICAGO

"Capewell" Horse Nails Only

have the **Check Mark** on the face of the **Head,** as shown in the illustrations below. This mark has for many years distinguished the **best horse nail in the world** from all other brands.

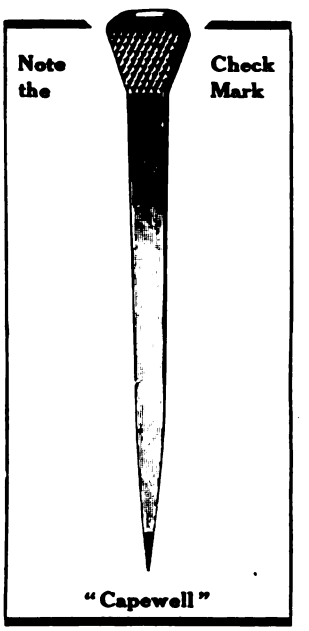


Easiest to Drive

"Capewell" nails are easiest to drive because they are absolutely uniform in length, breadth and thickness.

Safest to Use

because they do not damage the most delicate hoof, or split in driving.



Always be particular to **drive nails bearing this particular Check Mark** on the face of the head and absolute satisfaction will certainly follow. There is **no nail to compare with "The Capewell" in quality.** This fact is generally recognized by the horseshoers of the United States.

Made by

The Capewell Horse Nail Company

Hartford, Conn., U. S. A.

BRANCHES:

New York, Buffalo, Portland, Ore., Baltimore, Chicago, St. Louis
Detroit, Boston, Philadelphia, Denver, Cincinnati
San Francisco, New Orleans, Toronto, Canada, Mexico City, Mexico, Yokohama, Japan

More "Capewell" Nails are driven in the United States than of all other brands combined

Every Horseshoer Should Recommend

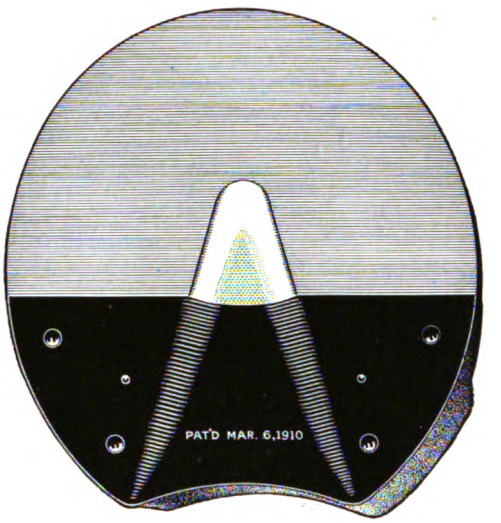
Walpole

Rubber Heels For Horses

Because they make it possible to overcome the most stubborn cases of soreness, tenderness, bruises or corns.



Here are two illustrations of the Walpole Rubber Heel—shoe side and hoof side. Note the spring steel plate of the hoof side, a feature lacking in all other so-called hoof pads. This is what keeps the foot firm and even, a relief to "sore spots." Prevents the rubber from breaking near the heel or becoming floppy.



Walpole Rubber Heels are as much superior to so-called hoof pads or bar shoes as pneumatic tires are to solid tires.

The patent spring steel plate fits the heel in a firm, even way. Also reinforces the rubber heel so that it will withstand water, snow or slush—cannot become soft and work up onto the tender spots, bruises or corns, thus causing lameness.

Other so-called pads have no reinforcement and offer little resistance to water. They quickly become floppy and annoying to the horse. The spring steel plate not only overcomes this fault, but serves as a protection also to the rubber heel, therefore giving much longer wear.

In short, the Walpole Rubber Heels keep the foot as Nature intended—properly supporting the arch or frog—allowing the joints to flex in a natural way.

Be the first in your locality to offer your customers the great advantage of the Walpole Rubber Heels for Horses.

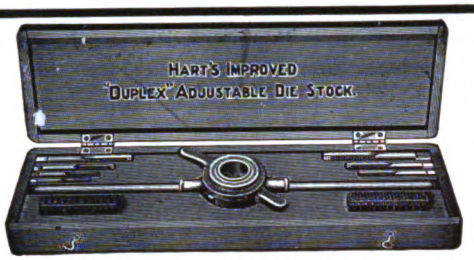
Send us a sample order today.

Walpole Rubber Company

185 Summer Street **Boston, Mass.**

SHARP DIES

are what are needed in order to cut good threads, and you can always have them if you use a

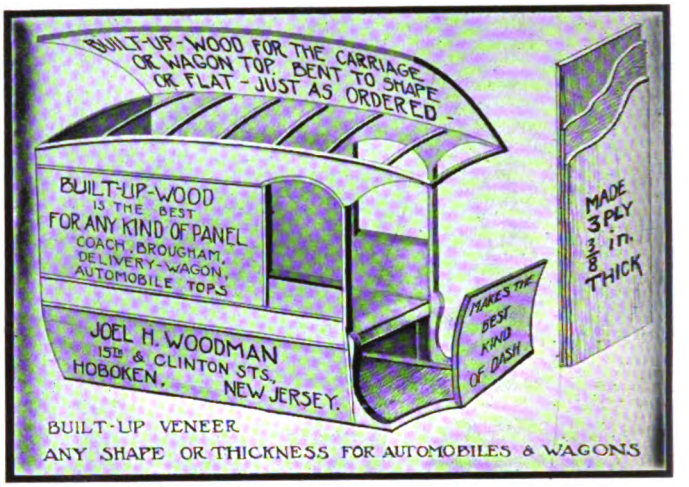


"DUPLEX" DIE STOCK SET

The dies in these sets are easier to sharpen than a knife; this fact enables you to get the full wear out of them. *Write us.*

THE HART MANUFACTURING CO.,

50 Wood Street, :: :: Cleveland, O., U. S. A.



Troy, N. Y., July 8th, 1910.

BUFFALO FORGE CO.,
Buffalo, N. Y.

Gentlemen:—I've delayed recommending the "Crain Combination Woodworking Machine" because in the first place, I was unfamiliar with machinery; in the second place I wanted to give it thorough tests in all its combinations, and am prepared to state now that it is simply wonderful. Would not be without it for anything, and do hereby highly recommend it to wagon shops, as it does the work of several machines. but only takes up room for one.

Yours truly,
(Signed) J. F. BERTHELSEN.



Say! Mr. Blacksmith,
have you heard about the new tire setter called

THE SCIENTIFIC HYDRAULIC?

Blacksmiths are just wild about it where it is used, and the manufacturers are either **crazy** or **dead sure** they have a "cinch" on the other fellows for they actually **warrant** it to be **better** than any other and will let you be the judge.

GET ONE QUICK IF YOU WANT TO KNOCK OUT YOUR COMPETITORS.

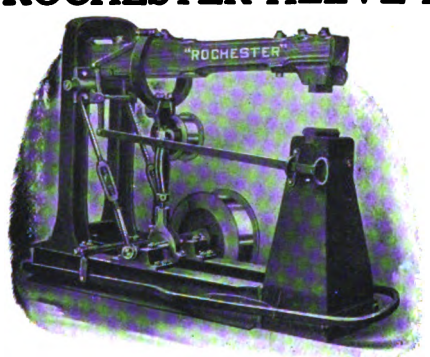
Write for information at once to

National Hydraulic Tire Setter Co.

KEOKUK, IOWA.



ROCHESTER HELVE HAMMER



(The Hardest Hitter)

Forging dies set crossways of helve. Welding dies set lengthways.

The best hammer made for general work, and a dandy Tire Welder.

MADE IN SIX SIZES

THE WEST TIRE SETTER CO., Rochester, N. Y.

"GOOD-AD" WINDOW SIGNS PALM FECHTELER & CO.

Decalcomanie Transfers For All Purposes

"GOOD-AD" WINDOW SIGNS PALM FECHTELER & CO.

Scrolls, Figures, Flowers, Letters, Animals, Stripings, Numerals, Corners, Etc., Etc.

Special Name Plates of all descriptions. Buggy Ornaments in Sets.

Plaid Designs for Automobile Panels. Cane Work effects. Basket Work effects.

For the auto painter who has exhausted his ideas on distinctive color combinations.

Inexpensive ***New*** ***Stylish***

WRITE FOR SAMPLES

PALM, FECHTELER & CO., 67 Fifth Ave., NEW YORK

CHICAGO ST. LOUIS MONTREAL TORONTO

FIRST MADE IN AMERICA

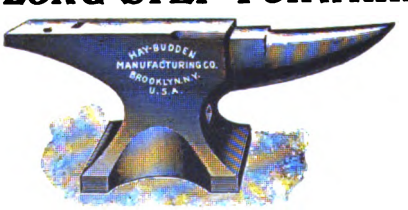
HAY-BUDDEN SOLID FORGED ANVILS

A LONG STEP FORWARD

SOLID FORGED STEEL TOP
Welded to a
SOLID FORGED BASE
Making a
SOLID FORGED ANVIL

The Gold Medal Anvil

HIGHEST AWARD
Omaha 1898 Pan-American 1901



OVER 150,000 IN USE

The **ENTIRE TOP** being one piece of high grade **FORGED STEEL** makes a **LOOSE FACE IMPOSSIBLE.**

TEMPERED "JUST RIGHT".

By our own process, the weld at the waist is a **LASTING UNION.**

Experience has proved their worth and demonstrated that **"HAY-BUDDEN" Anvils** are Superior in Quality, Form and Finish to any others on the Market.

HAY-BUDDEN MFG. CO., 254 NORTH HENRY ST. BROOKLYN, N. Y.