A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XL.—No. 14. [NEW SERIES.]

NEW YORK, APRIL 5, 1879.

NEW ACOUSTIC APPARATUS.

BY GEO. M. HOPKINS.

remarkable; they are both wave motions, governed by similas a telescope. It is, in fact, a portable and adjustable lar laws, and may be illustrated in the same way. Both may whispering gallery, having many useful applications. used in connection with the reflector, to increase its effect

be reflected, refracted, condensed, or diffused by similar means. The particular action of sound to be dealt with here is that of reflection, examples of which are presented in every echo; and whispering galleries are but the exhibition of the same thing, although more rare. A few of them have a world-wide reputation.

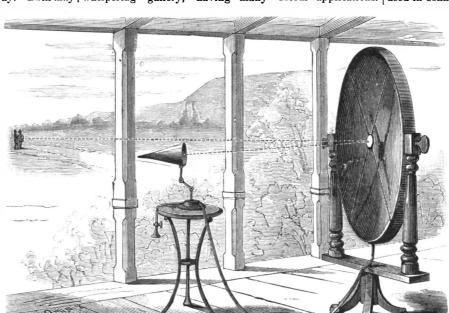
In his article on sound in the "Encyclopædia Metropolitana," Sir John Herschel mentions the abbey church of St. Albans, where the tick of a watch may be heard from one end of the edifice to the other. In Gloucester Cathedral a gallery, of octagonal form conveys a whisper 75 feet across the nave. In the whispering gallery of St. Paul's the faintest sound is conveyed from one side of the dome to the other, but is not heard at any intermediate point. The dome of the capitol at Washington is an excellent whispering gallery. These effects are due to an accidental arrangement of the walls.

Sails of ships are sometimes inflated by the wind so that they act as concentrating reflectors of sound. Arnott says that in coasting off Brazil he heard the bells of San Salvador from a distance of 110 miles. by standing before the mainsail, which

happened at the time to assume the form or a concave reflector, focusing at his ear.

Sounds may be received and conveyed by means of metallic parabolic reflectors, so that many times the volume of too faint to be heard. Such reflectors of necessity have a wires are stretched across the face of the reflector at right direction.

fixed focus, and are available under certain conditions only. The accompanying engravings represent a form of sound re-The analogy between sound and light is in many respects | flector that may be focused as readily and directed as easily



ACOUSTIC APPARATUS. Fig. 2.

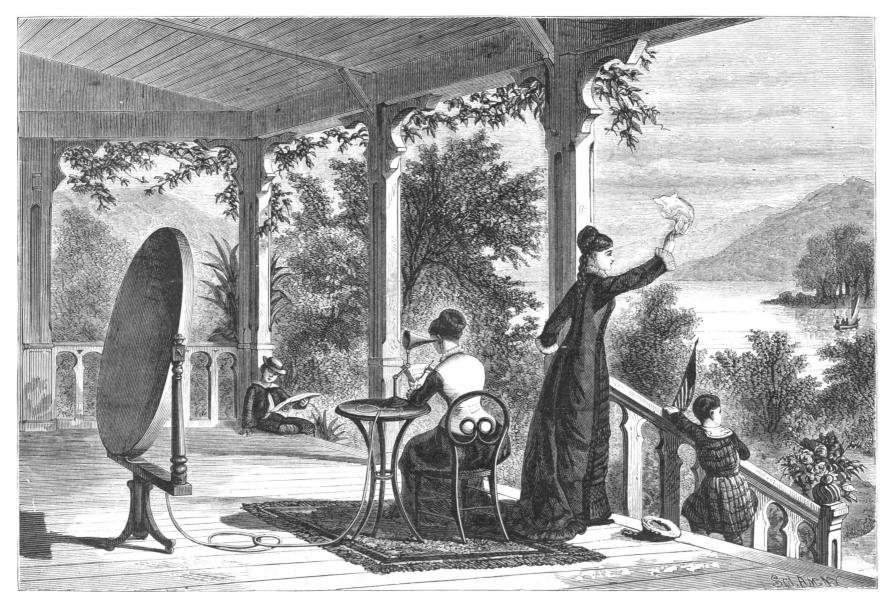
angles to each other, and support at their intersection a small plane mirror, the office of which is to determine the position of the reflector in relation to the direction of the sound. A small ear trumpet or funnel, which is shown on the table, is

> by gathering a portion of the sound that might escape the unaided ear.

> The reflector is adjusted by looking through the ear trumpet toward the small plane mirror, and moving the sound reflector until the source of sound is seen in the mirror. The reflector is then focused by exhausting the air from behind the flexible head until the required degree of concavity is reached, which will be when sounds are distinctly heard in the ear trumpet. The air is readily exhausted from the reflector by applying the mouth to the mouthpiece.

> The details of the construction of the apparatus will be seen in Fig. 2. The larger engraving clearly shows the manner of using. The lady sitting at the table hears in the trumpet what is said in the boat on the lake in the distance, and it is not impossible that the voyagers may hear from the sails of their boat what is said on the porch. Of course the operation of the instrument may be reversed—that is, sounds made at the focus of the reflector may be projected in parallel lines over long distances, but in practice a speaking trumpet is found to be better for this purpose. engraving shows but one of the applications of the reflector. It would be a

These will be hinted at further on. The instrument is simple matter to provide for a deaf person an instrument on very simple, consisting essentially of an airtight drum, this principle. It could hang on the walls of the parlor one head of which is rigid, the other elastic. This drum, unnoticed, as it might take the form of a richly framed picor, more properly, reflector, is mounted on pivots in a ture, and would concentrate a great volume of sound at a sound that naturally strikes the ear will be concentrated, ren- swiveled support, and is provided with a flexible tube single point. The same device may also be applied to an dering audible sounds that might otherwise be too distant or having a mouthpiece and stop cock at its free end. Two auditorium to project the voice of the speaker in any required



NEW INSTRUMENT FOR CONCENTRATING AND PROJECTING SOUNDS.

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT NO. 37 PARK ROW, NEW YORK.

O. D. MUNN.

A. E. BEACH

TERMS FOR THE SCIENTIFIC AMERICAN.

MUNN & CO., 37 Park Row, New York.

The Scientific American Supplement

is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, with handsome cover. uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, \$5.00 a year, postage paid, to subscribers. Single copies 10 cents. Sold by all news dealers throughout the country. Combined Rates.—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year, postage free, on receipt of seven dollars. Both papers to one address or different addresses, as desired.

The sufest way to remit is by draft, postal order, or registered letter. Address MUNN & CO., 37 Park Row, N. Y.

Scientific American Export Edition.

The SCIENTIFIC AMERICAN Export Edition is a large and splendid periodical, issued once a month. Each number contains about one hundred large quarto pages, profusely illustrated, embracing: (1.) Most of the plates and pages of the four preceding weekly issues of the SCIENTIFIC AMERICAN, with its splendid engravings and valuable information: (2.) Commercial, trade, and manufacturing announcements of leading houses. Terms for Export Edition, \$5.00 a year, sent prepaid to any part of the world. Single copies 50 cents. For Manufacturers and others who desire to secure foreign trade may have large, and handsomely displayed announcements published in this edition at a very moderate cost.

The SCIENTIFIC AMERICAN Export Edition has a large guaranteed circulation in all commercial places throughout the world. Address MUNN & CO., 37 Park Row, New York.

In people of Massachusetts, as regards work and wages, relatively below their position when gold began to go up, is shown by statistics, which we believe to be worthy of the ut-most confidence.

"The following is the per centum of increase of wages in 1878 over 1860 in the several trades: Agricultural laborers, per day 33 per centum, per month 15; manufacture of arms, 19; artisans' tools, 38; blacksmiths', 47; bookbinding,

VOL. XL., No. 14. [New Series.] Thirty-fifth Year. NEW YORK, SATURDAY, APRIL 5, 1879.

Contents.

(Illustrated articles are n	narked with an asterisk.)
Acoustic apparatus, new* 207	Mining district, Leadville 213
American tools, Netherlands for. 214	Monkeys, working 215
Artisans, American and English 209	Motor, Miss Hosmer's 209
Astronomical notes 216	Neutral line, Gary's a leged 208
Barnum calls for a new invention 209	Neutral line, note from Mr. Gary 209
Belting, speed of [46]	Notes and queries 218
Bobac, the	Parabola [4] 218
Books at auction, rare old 211	Patents, American, recent 214
Bridge, East River, security of . 209	Patents, Amer , some recent* 211
Bridge, Niagara [54]	Pencils, colored, for glass 216
Buffalo, domestication of the 2'3	Petroleum, refined [12] 218
Cattle, mute 211 Cement to stick rubber to iron[49] 219	Phonograph [13]
Chloride of lime as an insecticide 213	Pumps, air, locomotive [11] 218
Coal field, Ohio	R. R. brakemen, dangers to 211
Coal fields, Western Iowa 213	Safes, fillings for [17]
Copper, refined [6]	Serpents, poison of
Cranberry marsh, Wisconsin 211	Shell heaps, Aleutian Islands 215
Decision, Supreme Court 216	Silence, advantages of 213
Dynamo-electric machine [5] 218	Silence advantages of. 218 Siphon, automatic, new* 216
Engine, small stationary [10] 218	Steamship, ocean, large 211
Engines, yacht, prices for [32] 29	Steel, magnetized [47] 219
Explosion, ice [24]	Surveys, National 217
Geissler. Heinrich 209	Tag, shipping, new* 211
Gun barrels, browning [71] 220	Telephones [13] 218
Ink, aniline black [15] 218	Tinned ware, lead poisoning208
Inventions, miscellaneous 216	Torpedo launch, Herreshoff210
Labor and the cost of living 208	Tortoise shell, to polish [61] 219
Lace, to clean [63] 219	Varnish, alcoholic shellac [50] 219
Lawn mower, improved* 211	Varnish, black, cheap [14] 218
Lawn, the	Vitriol, effect of on skin[42] 219
Meat canning by machinery 209	Washing machine,improved*217
Millers, victory for 211	Why so depressing?

TABLE OF CONTENTS OF

THE SCIENTIFIC AMERICAN SUPPLEMENT

THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 170.

For the Week ending April 5, 1879.

Price 10 cents. For sale by all newsdealers.

I. ENGINEERING AND MECHANICS.—The Lighthouse of Chiptona, at the mouth of the Guadalquiver. Spain. With general description and one page engraving. Heavy Ordnance, a puner by J. A. Longridge, M. E. Showing the true law for the distribution of metal, with dimensions for guns according to the true law, with comparative costs of guns as now made, and the cost if properly made. Modern musketry, showing the weights of arms adopted by different governments. The De Bay propeller, a new form of double screw, which throws the water astern in a line with the vessel's keel, and thus increases the speed of the vessel. Comparative trials of the De Bay and Griffiths screws, and tables of relative performances. Illustrations and descriptions of the apparatus for testing the effective power of these and other propellers. With interesting and valuable particulars, and 5 illustrations. Description and diagram of a durable spur wheel, that has run for 26½ years day and night.—Itahn's Iron Scaffolding for Buildings, with I engraving; a light, strong, durable, and effective improvement.—Zinc Dust as a Cause of Fires; curious examples.

II. TECHNOLOGY.—The International Exhibition, Australia, to be

light, strong, durable, and effective improvement.—Zinc Dust as a Cause of Fires; curious examples.

II. TECHNOLOGY.—The International Exhibition, Australia, to be opened in October, 1879. With 1 engraving showing the building, description, dimensions, and other interesting particulars.

The Manufacture of Vermicelli, with description and 5 engravings of the latest and best machinery now used in this important industry.—The New Grain Separator of M. MILLOT, now extensively used in switzerland, with description and 1 engraving, showing construction and operation.

On Theory and Practice in Bread Making. By Mrs. Geo. M. WHITAKER. A plain, practical, valuable paper, with directions for the making of good bread, each step being well explained, and the science of the art clearly shown. Every lady who wishes to understand how to make good bread should read this paper.

Suggestions in Rural Architecture, with engravings of plans, elevation, and description of a handsome Dairy Cottage.—Interesting and Valuable Experiments on the Porosity of Building Stone.—How Oysters are Changed with Copper in France.—Interesting Statement of the earnings of Working People in Great Britain.—Productions of the United States Mints in 1878.—A New Form of Adding Pencil, with engraving and description.

The New Lebrousse Paper Pulp Machine, with engraving and description.

scription.

Designing for Textiles, valuable suggestions, with 1 engraving.—Apparatus for Testing the Evenness of Yarns, with 1 engraving.

Sliver Guide for Spinning Machines, with 1 engraving.—A Drag for

Throstle Bobbins, which are the control of Colors. By M. Cross. Containing much valuable article, showing how to prepare and apply various fine colors to the best advantage.—On the Classification of Colors. By M. Cross. Containing much valuable comparison.

information.

Manufacture of Solid Carbonate of Ammonia from Gas Liquors. By F. W. BROTHERS. Description and 1 engraving of the apparatus.—

Prohibitions of the Government of Zurich in respect to the use of poisonous substances in the arts and in foods.

poisonous substances in the arts and in foods.

I. ELECTRICITY, LIGHT, HEAT, ETC.—On some Improved Methods of Producing and Regulating Electric Lights. By HENRY WILDE. A valuable and interesting paper, read before the Manchester Literary and Philosophical Society.—Description of Plante's Secondary Battery.—Description of a New Device for Magnetizing Compass Needles—Dynamo-Electric Machines. By Professors HOUSTON and THOMPSON. A valuable and instructive paper.—Dr. Fay's Theory of Electricity.—On a Condenser of Valuable Capacity. By C. BOYS.—Mathematical Estimate of the Pressure in the Radiometer.—Spectrometric Measurement of High Temperatures. By A. CROYA.—A New Different Colors of the Spectrum on the Development of Animals. By E. Young.—On Tides and Tidal Currents. By Professor Purser.

IV. CHEMISTRY, METALLURGY, ETC.—Thallium Trithionate.—Anlline Dithionate.—Hypoxanadic Dithionate —on the Steeling of Copper Plates. By R. Borroger.—On the Absorbing Powers of Vegetable Charcoal. Interesting particulars.

V. ARCHÆOLOGY.—Archæological Explorations in Tennessee. By F. W. PUTNAM, Curator of the Peabody Museum, with 17 illustrations, showing various figures, objects, and utensils obtained from mounds in Tennessee, with interesting particulars.

In Tennessee, with interesting particulars.

ASTRONOMY.—Is the Moon Inhabited? A most interesting paper by CAMILLE FLAMMARION. Describing a large number of observations by various astronomers, tending to show the probabilities of life on the surface of the moon, the existence of an atmosphere, vegetable life on the moon, probable character of animal and vegetable life on the moon, how the question of lunar inhabitants may be resolved, etc.

LABOR AND THE COST OF LIVING.

Notice was taken last summer of the encouraging results obtained by the Massachusetts Labor Bureau in the inquiry as to the numbers of employed and unemployed men and women in that State. It will be remembered that the number of people seeking work was then about 28,500. The tenth annual report of the Bureau, just published, gives the result of another canvass, made in November, from which it appears that only 23,000 people in Massachusetts were then in want of work and could not get it. If the industrial condition of Massachusetts may be taken as an index of the industrial condition of the whole country, we arrive at the encouraging conclusion that not more than one per cent of the population of the United States began the winter unemployed. This, notwithstanding the fact that the relative proportion of those seeking employment and depending on it for support was probably much greater than ever before. Multitudes who had retired from business in flush times, had been driven to seek work again in consequence of failing investments; and for similar reasons many young people and dependents upon wealthy parents and relatives had been set adrift to crowd the labor market.

That the reduction of wages consequent thereupon, and the return of prices to a gold basis, had not brought the working people of Massachusetts, as regards work and wages,

arms, 19; artisans' tools, 38; blacksmiths', 47; bookbinding, 14 to 17; boots and shoes, 2.6; boxes, 13 to 38; bakers, 13 to 38; brickmakers, 9; building trades, 16; cabinet making, 6 to 16; carpet making, 23; carriages, 30; clothing, 8; dressmaking, 19; leather making, 28; linen and jute manufacture, 20 to 28: machinery manufacture, 27: metallic fine work and jewelry, 25; millinery, 23; musical instruments, 8; paints, 28; paper, 41; printing, 30; silk manufacture, 45; soap and candles, 13; stone working, 8; manufacture of woolen goods, 33; worsted goods, 22. The following are the occupations and the percentage of decrease of wages: Bleaching, dyeing, and printing of cloths, 3 per centum; preserving meats, pickles, etc., 2; envelope making, 11; shipbuilding, 32.

"The returns from 63,515 employes in the occupations considered, in the cities and towns visited, show that average weekly wages, on a gold basis, were twenty-four and four tenths per centum higher in 1878 than they were in 1860.

"It is found that the prices of groceries has advanced over 1860.7 per centum; provisions, 28; fuel, 5; boots, 18; rents, 25; board, 49; while drygoods have fallen 9 per centum. On all the items entering into the cost of living the average price was 141/2 per centum higher in 1878 than it was in 1860. The following figures show the per centum which the prices of the following articles in 1872 exceed the same in 1878: Groceries, 43; provisions, 17; fuel, 44; drygoods, 40; boots, 21; rents, 105; board, 37. On all of the above items the average per centum of cost in 1872 above the same in 1878 was 54 per centum.

"The results of the investigation relative to wages and prices are as follows: Wages have advanced, compared with iron armature, being polarized by the magnet, in turn 1860, 24.4 per centum, and the cost of living 14.5 per centum, which on its face shows a pecuniary advantage to the workingmen of 9 9-10 per centum.

Careful inquiry was made by the officers of the bureau of 345 retail dealers in ten cities and towns containing a population of 530,000, to ascertain the amount, quality of goods purchased now compared with the same several years since, together with the ability to pay for the same. From these inquiries the following conclusions are reached: That the workingmen of Massachusetts, in the majority of cases, have the best quality of food, though not in so great quantity and variety as in previous years; that they are practicing a rigid economy in purchases of clothing, drygoods, boots and shoes, house-furnishing goods, and fuel; and that the majority continue to pay their bills promptly.

"Comparing this state of affairs with the previously ascertained relations of wages and prices, which shows in 1878 an advance over 1860 of 24 4-10 per centum in average weekly made of the decrease in hours of labor in many industriesit would seem almost like stating an axiom to prophesy that, provisions, etc., and no cut down in wages, the condition of the workingman in this State, within a comparatively short period, will be better, considering all circumstances, than it ever has been since the foundation of our Commonwealth."

What is true of Massachusetts in this respect, there is ample reason for believing to be true of the whole country.

DANGERS OF LEAD POISONING FROM THE USE OF TINNED WARE.

According to recent investigations made, both in England and this country, it seems that we would do well hereafter to examine very carefully the tin employed in coating utensils that are used for cooking or preserving food of any kind. Since tin has fallen in price it is not very uncommon to meet with samples which contain lead to a considerable amount, of adulterating it and thus avoiding loss on the price at which the magnet.

it is necessary to sell it. The results of this, of course, may prove serious. Dr. R. C. Kedzie, President of the State Board of Health of Michigan, in a recent report on this subject says: "I have examined a large number of specimens of tin plate, of vessels made of tinned iron, of tin spoons, and iron spoons coated with tin, both teaspoons and tablespoons. and find in almost every instance that the tin is alloyed with lead; in almost every case the lead was present in some quantity, and often in very large quantity. Nor is the lead confined to the poorer qualities of tin, but some of the highest priced and 'first quality of tin plate' contains a large quantity of lead. It is an astonishing fact that a large proportion of the tinned wares in the market are unfit to use because of the large quantity of lead with which the tin is alloved."

The dangers that are likely to ensue from the use of articles tinned with such an alloy are these: The alloy of tin and lead will tarnish, or, more properly speaking, oxidize much more readily than pure tin; and the oxide of lead thus formed. is very soluble in acetic acid or vinegar (forming "sugar of lead"), and also in lactic acid or the acid of sour milk: it will form, too, salts with malic and citric acids which exist in our common fruits, such as apples, cherries, strawberries, currants, etc. Indeed, as Dr. Kedzie very truly observes, any of our acid fruits when cooked in vessels containing any lead, or even when left in such vessels for some time, are very liable to take up some of the poisonous metal, and to become thereby unfit for food, inasmuch as all salts of lead are poisonous; and the danger is the greater because lead compounds are cumulative poisons. "A person may not be poisoned by one or two small doses, but even if a very minute dose is taken for a long time, the person may be broken in health or even lose his life."

Fortunately the test for lead is a very simple and easy one, and almost everybody has it in his power to make the application of it and determine satisfactorily whether his tinware contains any of the poisonous metal in sensible quantity. For this purpose Dr. Kedzie recommends that a drop of strong nitric acid be placed on the tinned surface by means of a glass rod or splinter of wood, and that the acid be rubbed over a space as large as a dime, warmed gently until dry, and that two drops of a solution of potassium iodide be then dropped on the spot. If the tin contains lead a bright yellow iodide of lead will form on the spot. The test is one that can be very rapidly applied, and the results are decisive.

GARY'S ALLEGED NEUTRAL LINE.

Mr. G. T. Milliken, in a letter to the Editor of the Sci-ENTIFIC AMERICAN, dated March 13, 1879, maintains that the explanation of the behavior of the nail, contained in the issue of the Scientific American, March 8, page 144, is not correct. That explanation was as follows: "At a certain point the nail leaves the sheet iron and falls to the ground, simply because, by reason of its approach to the attracting pole, it tends to fly to it, but in leaving the piece of sheet iron, the force of gravitation acts more strongly than the force of attraction, and the nail consequently falls to the

Mr. Milliken's explanation is as follows: "The sheet polarizes the nail which is suspended from it, and this polarity (of the nail) is necessarily reversed when brought within the direct control of the magnet, or sufficiently near thereto to be more powerfully affected by it than by the sheet iron, the power of which to increase its ability to control the nail, as they both approach the magnet, depends upon its thickness and area." Mr. Milliken's explanation is essentially the same as that which he criticises. The lines of force from a magnet, it is well known, radiate from the poles and diverge as the distance from the pole increases. This can be noticed in the ordinary experiment of the action of iron filings near a magnetic pole.

The particles of the sheet iron armature of Mr. Garv are in the condition of the iron filings. Each one would separate from its neighboring particle and tend to fly to the attracting magnet if it were not held to the neighboring particles by the forces of cohesion and elasticity. The nail, however, is in the condition of a detached particle of the armawages, and an average advance in cost of living of 14½ per ture; its reversed polarity prevents its remaining attached to centum, which means a pecuniary betterment of 10 per the last particles of the armature, and it falls, if it is not near centum in the general condition of the workingman in Massa- enough to be attracted to the magnet. The lines of force of chusetts in 1878 as compared with 1860, no account being the magnet, however, act upon it just as they would upon a small iron filing and draw one end of it toward the magnet while the other end is repelled. When the armature and with a revival in business, a gradual decline in the prices of | nail are very near the magnet, the nail is strongly attracted to the magnet, just as iron filings are strongly gathered about the pole. When the nail is at a suitable distance it is less strongly attracted to the pole, just as an iron filing is less strongly attracted to the pole at a little distance. In other words, a chain of magnetic nails, hanging together vertically by their mutual attractions end to end and suddenly submitted to the action of a strong magnetic pole placed at right angles to the chain, will separate and behave like iron filings, and also like Mr. Gary's armature and its nail. The explanation of Mr. Milliken does not differ from that given in the issue of the Scientific American, March 8. In short, every particle of the armature tends to fly to the magnet; the nail, which for the time being is part of the armature, also tends to fly to the magnet. This tendency necessarily implies opposite polarities in the ends of any two neighevidently added to the more expensive metal with a view boring particles which move in converging lines of force to

A CONTRAST BETWEEN AMERICAN AND ENGLISH ARTISANS

One secret of the ready adoption of mechanical and other American workmen to receive and welcome new labor-sav- and were more affected by heat and cold. ing inventions. Nine out of every ten of them either are workmen will see an industry driven out of their country, and possible among artisans educated by a liberal patent law to appreciate the ultimate benefit of labor-saving devices.

One of the largest machinists in England recently purand other springs by machinery, but his workmen positively refused to avail themselves of it. It ended in his sending the contrivance to Belgium, together with suitable material, and the springs are actually made there and returned To the Editor of the Scientific American: to England.

THE SECURITY OF THE EAST RIVER BRIDGE.

At a meeting of a sub-committee of the New York Assembly Committee on Finance and Navigation, to investigate the charge against the Brooklyn Bridge, some very interesting testimony was taken.

The charges were that the bridge when completed will impede the free and common navigation of the East River; be a serious obstruction to the commerce of New York, and to cities; will not be of any substantial benefit to either, while it will reduce largely the value of property on the East River in both cities: and that it will be an insecure structure, on account of its great length, and cannot be properly stayed and protected at its great height against strong winds.

Mr. Philip B. Low, a practical ship-rigger, said that he had made measurements of ships' masts and estimates from draughts, and according to these, in his opinion, all ships not pole, and both ends of the iron will be polarized and of opexceeding 875 tons burden, with possibly here and there an exception, could pass light and unladen under the bridge at iron is now brought in contact with the poles of the magnet any point where it was 134 feet above the river at half tide; beneath it, its polarity is changed; each end of the iron is largest steamships that always discharge in the North River, is in contact. and the large pleasure yachts, there were no barks, brigs, or schooners, except the two schooners, the Matilda Cranz and the Frederick, that could not readily pass under the bridge at than when not in contact. half tide, and very few which could not do so at full tide; and he thought that there were not more than two ships arriving in this port in a year which would require the housing of topmasts.

Col. William H. Paine, Assistant Engineer of the bridge, testified that the weight of the New York tower masonry was 93,000 tons. The pressure at the bottom of the caisson, on the bed rock, was four and a half tons to the square foot; at iron one or two inches above the magnet; put several thickthe base of the stone work eight tons, and at the base of the nesses of paper across the poles of the magnet, to keep the center column, between the roadways, and on a level with iron from contact when lowered down toward the magnet. them, the pressure was twenty-nine and a half tons to the Now take a common box compass, or any other; hold it square foot. That was the greatest weight. Stone of a similar character to that of which the tower was built had stood a pressure of 5,000 tons to the square foot.

With regard to the settling of the towers, Col. Paine said that in building the caisson of the New York tower a number of timbers had been bolted together. In this operation there passes the neutral line; or place the needle on the iron, raise was a gain of 21% inches, the timbers not coming together. He had expected that the tower would settle at least that much. Careful observations had been made. As the stone experiment by which the old law of the change of polarity is work arose above the water, spikes were put in the masonry and careful levels taken. The result was that the tower had settled only 114 inch, one half of what had been expected. This settling had been very evenly distributed over the whole surface of the tower.

Touching the strength of the bridge, Col. Paine said that the elements of strength were the towers, the anchorages, and tends to fly to it and it falls to the ground." the cables. The anchorages served to hold the cables. There were first four large bed plates of iron. To these were se-There were 60,000 tons of masonry in each bed plate. The strain on each plate would be 1,769 tons. thus showing a change of polarity in the iron? The bars had a strength of 12,875 tons. In every particular there had been an effort to make every part of the bridge stronger than the estimates in the original plan of Mr. suspended from it, and that this polarity of the nail is re-Roebling. The strength of the cables was 12,000 tons each. pass from the towers down, and be secured to the trusses at of the sheet iron or the existence of any so-called neutral money by it. various distances. They controlled the weight, so that the bridge would not act; that is, one part sink and another rise. No part of the bridge could sink without a corresponding elevation in another part. The stays prevented this. They sustained a strain of 1,439 tons each, on each side of the bridge. They were the great feature of Mr. Roebling's plan, and made the bridge superior to all others, which were made only with suspenders. These stays prevented the wind under the bridge from lifting it. They also prevented swinging, for they were on an angle, being nine feet further in at the bridge than at the towers. They converged. The force of the wind would bring all the stays and two cables to resist it. There

the opposite side of the bridge. This was an improvement on the Niagara bridge, where the storm stays were attached improvements in this country lies in the willingness of to distant objects. There they worked against each other,

Being asked to give the strength of the bridge in detail, or hope to be successful inventors; and all have learned to Col. Paine said that when the bridge was filled with cars, look upon invention as one of the surest means not only of teams, and passengers there would be a distributed strain of improving the inventor's condition, but also that of those 30 pounds per square foot. The bridge was able to stand a called upon to build or operate the new machine. In counstrain of 89-100 ton to the lineal foot. It had been calcutries where the patent laws do less to foster invention and to lated that 7,200 teams could pass in an hour, at the rate of create a kindly feeling toward improvements on the part of 200 feet in a minute; 80 cars could be allowed on the bridge all workmen, the case is very different. There the preju- at once, allowing six minutes for crossing; each car would dice against labor-saving devices is often so strong that hold 100 passengers. Thus 80,000 passengers could cross in an hour, besides those on foot. The strain on the anchorage themselves left without employment, rather than change their was about four times less than the margin of safety; that on mode of working. Such suicidal foolishness would be im- the suspenders eight times less. The safe distributed load of the bridge was 1,311 tons. This it could carry safely, and it had a margin of safety of five; that is, when the bridge was filled to its full capacity, it was then able to carry a weight chased a valuable invention for making railway carriage five times greater. The weight of the bridge itself was

THE NEUTRAL LINE.-A NOTE FROM MR. GARY.

Having read an article on "Gary's Alleged Neutral Line," on page 177, of March 22, and also on page 144, of March 8, I feel assured you will allow me a limited space to present the other side of the question.

It is well known that a bar of iron held with one end near the pole of a magnet becomes magnetized or polarized by induction; that the end of the bar nearest to the pole of the magnet is of opposite polarity to the pole of the magnet. while the other end of the iron is of like polarity. Now, if the end of the iron nearest the magnet is brought in contact the growth and prosperity of the port; will not adequately with the pole of the magnet, the iron changes its polarity provide a certain and safe mode of travel between the two and becomes of the same polarity as the magnet. This is a well known law of magnetism.

We will now suppose the end of the bar of iron is held above the north pole of a horseshoe magnet, the iron will become polarized, the end above the north pole of the magnet will be a south pole, the end farther away will be a north pole. Now, if the north pole of iron is moved around above the south pole of the magnet, it will still be a north posite polarity to poles of the magnet beneath them. If the that in his opinion, with the exception of a very few of the of the same polarity as the pole of the magnet with which it

> If a thick piece of iron is used it will absorb or neutralize the magnetic waves when in contact, and show less polarity

> What I claim as my discovery is: that the iron, if of proper proportions, will change its polarity before it comes in contact with the magnet. As a proof of this, take a horseshoe magnet of contact power of seven to ten pounds; take a bar of iron from one eighth to one fourth inch thick, long enough when placed across and above the poles for the ends to project out over the poles three or four inches; raise the level near the end of the iron; lower the iron evenly down to the paper; keep the iron as near as possible between the compass and magnet; do not place the compass too near the iron, as it will or may change the polarity of the needle as the iron changes its polarity. The needle will reverse as it the iron and lower it; it will dip one end and then the other as it passes the line and stand level while on it. Or try any proved in one end of the iron, as it comes in contact, and it will prove, that under the conditions I have named, the polarity changes before it comes in contact.

> In regard to the experiment with the nail, the writer, on page 144, says: "It (the nail) falls to the ground simply because, by reason of its approach to the attracting force, it

Why did not the writer have the fairness to state that the nail, when still nearer the attracting force than the point where it drops off, will cling to it again, and before the iron anchorage, and of the 60,000 there were 6,639 tons over each comes in contact, the point of the nail turning outward,

iron armature being polarized it polarizes the nail which is versed when brought within direct control of the magnet. The stays are to assist in sustaining the load. They would The nail drops of course without any change of polarity

> Does not the writer know that when a nail is in contact with an induced magnet, or any other magnet, it has the same polarity, and is a part of the same? Now, as it clings to the iron, and both move together toward the magnet, why are we to suppose one changes its polarity without the other changing also? The fact is they both change. At the point where they change they are both neutral, and will not cling together, but above and below they are polarized, and will strictly true. At any rate, Melbourne is not that far ahead of cling together; if it is not so, then I have discovered that opposite poles repel and like poles attract each other.

was also a system of heavy stays running from the towers to discover new laws and new facts without "a feeling of utter contempt for scientific men," as the writer remarks on page 144? The law of gravitation was not discovered in a laboratory, nor was the power of steam, nor electricity. I believe the world expects our learned professors to teach us what has been discovered, and not that there is nothing more worth knowing; and I believe the discovery of a new law is of as much value to the world, if discovered by Franklin with his kite, Newton with an apple, Faraday with his magnets, iron filings, and paper, a lumberman with a ten-penny nail, as if discovered by a learned professor in his labora-W. W. GARY.

Huntingdon, Pa., March 17, 1879.

[Remarks.—None of the experiments here mentioned by Mr. Gary are new; there is no neutral line in any such sense as he asserts; what he above specially claims as his discovery is simply a very old, well known phenomenon imperfectly and erroneously alluded to in his italics.

Everybody will agree with what our correspondent says about laboratory discoveries, Newton and the apple, Franklin and the kite string; but it does not necessarily follow that Gary has discovered anything with a ten-penny nail. All he appears to have done is to revive a few time-honored experiments and trot out before the public an ancient perpetual motion delusion.]

MISS HOSMER'S MOTOR.

Miss Hosmer, who announced the discovery by herself of a magnetic perpetual motion machine before Mr. Gary, has found out by trial that the thing will not operate, and has abandoned the field. Her application for patent in England was given up after the provisional patent was obtained.

HEINRICH GEISSLER.

The world of science has lost a distinguished follower in Dr. Heinrich Geissler, who died at Bonn on the 24th of January. He was born in the village of Igelshieb, Germany, in the year 1814. Having early in life mastered the art of glass blowing, he, after many years of wandering, settled at length permanently at Bonn, finding here constant employment in the preparation of articles requisite for scientific research—a kind of work which had peculiar attractions for him. He was a master of his art, and in his hands the treatment of glass by the blowpipe attained a perfection that had been before unknown.

He planned and manufactured apparatus of the most delicate construction and of the greatest accuracy, and for the last thirty years there has been issuing from his workshop a constant succession of the most novel and ingenious devices for the furtherance of scientific discovery. He was the inventor, among other things, of the mercury air pump, the vaporimeter, the normal thermometer, and the normal aerometer. But the apparatus with which his name is most closely identified in the popular mind is that of the "tubes" which bear his name, and which were designed for the exhibition and study of the phenomena that accompany the discharges of electricity in various gases and vapors. One of the earliest investigations of Dr. Geissler was undertaken jointly with the celebrated physicist, Plücker, in 1852. They made, at this time, a series of observations on the expansion of water, and established the maximum of density at 3.8°; this was effected by means of a very delicate contrivance, in which the expansion of the water was exactly compensated by the introduction of mercury. In 1869 Geissler and Vogelsang together, having decomposed quartz and topaz by means of a galvanic current and collected the resulting gases in a vacuum, demonstrated the presence in the cavities of these minerals of liquid carbonic acid, the presence of the carbonic dioxide being shown in the vacuum by the electric arc. Not long after this Geissler succeeded in changing, by the action of the electric current, ordinary phosphorus into the amor-

In very many respects the career of Dr. Geissler was similar to that of Ruhmkorff, whose death we chronicled a year ago. Both arose to positions of honor, and to a certain degree of fame, in the scientific world, from the lower walks of life; and both gave, by means of their familiarity with scientific facts and principles, and their constructive ability, an impulse to the march of original physical investigation.

In announcing his death to the Berlin Chemical Society, the President, Dr. Hoffmann, said that Dr. Geissler could be best described in the English words "a self-made man."

Mr. Barnum Calls for a New Invention.

To the Editor of the Scientific American:

Cannot all our boasted Yankee ingenuity devise a cheap The writer, on page 177, of March 22, says: "The sheet means of rendering cotton and linen canvas waterproof? All of my show tents are made of "Methuen duck," and 1 am obliged at much expense to send it to France to get it waterproofed. Any person in this country who can accomplish the same thing effectually can make considerable P. T. BARNUM.

Bridgeport, Ct., March 15, 1879 .

Meat Canning by Machinery.

We are happy to be informed that the assertion of the British Farmers' Gazette (cited in our issue of February 22, page 116), to the effect that by means of newly invented machinery the meat canners of Melbourne could fill twenty-four cans in the same time that one is filled in Chicago, is not St. Louis. A correspondent in the latter city writes that the St. Louis Beef Canning Co. can all their meats by machinery, We cannot destroy old laws or old facts, but may we not and are confident that its process is not surpassed anywhere.

THE HERRESHOFF TORPEDO LAUNCH.

A short time since we noticed this remarkable little vessel; we now present engravings of it, for which we are indebted internally, and within which is a coil of about 300 feet of 2 perheated, and is led thence to the engines. It is claimed for to the London Graphic and Engineering. This launch, as will inch pipe, coiled to nearly the diameter of the chamber. this boiler that it cannot explode destructively, inasmuch as be remembered, was built in Bristol, R. I., for the English This coil is continued at the top so as to form a kind of dome there is but a very small quantity of water in it at any time,

Government. It arrived in the Thames on New Year's Day, having crossed the Atlantic on the deck of the National Line steamer Denmark.

The boat, which is shown in section in Fig. 2, is 59 feet 6 inches long, by 7 feet 6 inches beam and 5 feet 6 inches deep, with 1 foot 3 inches draught of water, there thus being 4 feet 3 inches of freeboard. Her working draught, however, is 4 feet 6 inches, as the screw and rudder are both placed below the keel. The vessel is constructed with five watertight bulkheads, and her hull is of composite construction below the water line, having a steel framing covered with wood planking. The upper part of the hull is wholly of steel, the plates being one sixteenth inch thick, the top sides sloping inward, and the upper work forming a protective superstructure for the crew and machinery. She is propelled by a screw, which is placed beneath the vessel in a central position, and which is driven by a direct-acting condensing engine placed in the forward part of the boat.

The diameters of the steam cylinders are 10½ inches and 6 inches respectively, with a 10 inch stroke, and they are of 100 horse power estimated. There is an independent feed pump and air pump. The stoke hole is inclosed, and is supplied with air by a Sturtevant blower, which is driven by an independent engine of 21/2 horse power. The propeller is a two bladed screw, 38 inches in diameter and 5 feet pitch, the screw shaft being 23 feet in length. The

shown in section in Fig. 3, consists of a circular combustion the top of the separator, and returns through a short coil

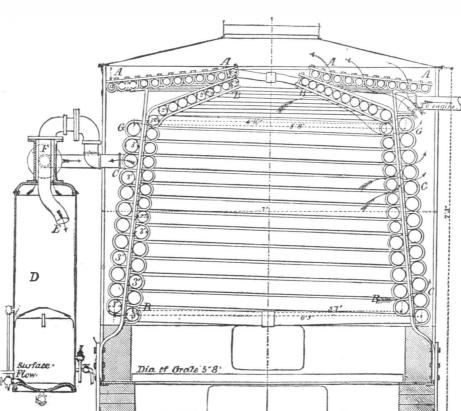


Fig. 3.-HERRESHOFF STEAM GENERATOR.

vessel is steered by means of a balanced rudder placed a under the cover of the combustion chamber. By the side of of her official trial over the two knot course in Long Reach.

chamber, which in the present instance is 4 feet in diameter placed inside the combustion chamber, where it becomes su-

and that it is distributed along the entire length of the coil. A rupture at any point would only be attended by a moderate blowing off of steam. The rapid circulation of the water is found to prevent the deposit of salts, the surplus water not converted into steam carrying with it all im-

One condition of the contract was that the hull should be strong enough to be slung from a ship's davits without bending or "springing," and the larger engraving represents the vessel being lifted by the big crane at the Victualing Yard, Deptford, fully manned and equipped, her weight in that condition being about eight tons. The First Lord of the Admiralty was present, accompanied by Admirals Hood, Wellesley, and Sir Houston Stewart, the Controller of the Navy, and Mr. Barnaby, the Chief Constructor.

The vessel was then lowered into the water, and steam got up in five minutes after lighting the fire. The great handiness of the boat, and her powers of rapid stopping, starting, and turning, were next shown. She was stopped from full speed in a distance of one third her length, and immediately went astern at a rate nearly equal to her forward speed. She then, at full speed, turned in complete circles of a diameter of three times her length, and this either going ahead or astern. Her guaranteed speed is sixteen knots an hour, and this, it is stated, she attained with two tons of coal on board, on the occasion

short distance from the stern and under the ship, the helms- the boiler is a separator, into which the steam passes before Altogether the Herreshoff torpedo launch promises, from its man being located in a stern cabin with a protected look-out it goes to the engine. The water from the feed pump is ad- powers of maneuvering and the great rapidity with which it raised just above the deck. The hull and machinery together | mitted at the top of the coil, and during its course to the bot- | can be got ready for sea, to form an important addition to

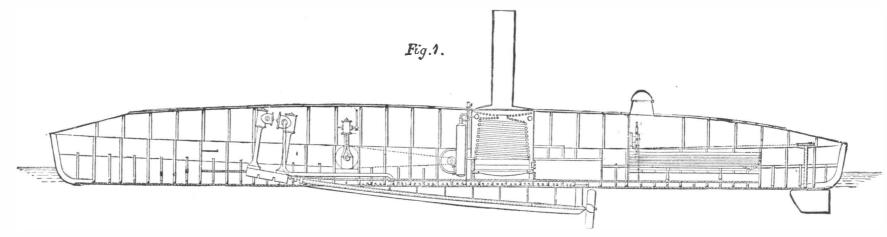
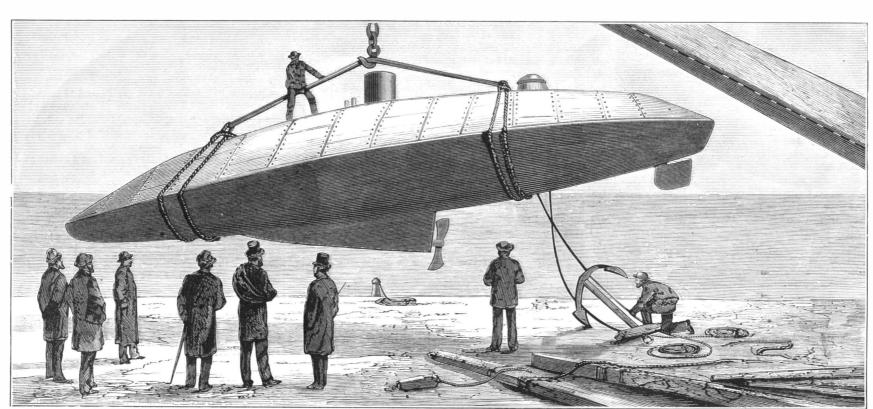


Fig. 2.-MACHINERY OF HERRESHOFF TORPEDO LAUNCH.

stitutes another novelty in this boat. The boiler, which is and can be blown off as required. The steam is taken from their earliest stages are accelerated by heat.

weigh 6 tons, but with the working crew of four men, and | tom the greater portion of it becomes converted into steam. | our naval resources, while its numerous special features give fuel, stores, and two torpedoes on board, the boat weighs | Having passed through the entire length of the coil, the steam | it particular interest from a mechanical point of view. and water are discharged together into the separator, in such Steam is supplied by a Herreshoff coil boiler, which con- a manner that the water is entirely separated from the steam,

Dr. H. Briem proves that plants grow luxuriantly when



THE HERRESHOFF TORPEDO LAUNCH, RECENTLY BUILT AT BRISTOL, R. I., FOR THE BRITISH GOVERNMENT.

Dangers to Railroad Brakemen.

Before the February meeting of the Car Builders' Association, Mr. D. A. Hopkins, one of the veteran railroad men of the country, related his experience as a freight train brakeman during his younger days, and described the perils to which this class of railway employes are exposed, especially in winter. They must run upon wet and icy running boards, and jump from one car to another in the darkness—a distance of from three to four feet. A single slip or a false step sends him to a horrible death. Statistics gathered as long shipping tags, patented by Mr. John M. Goodridge, of Norago as in 1852 showed that the proportion of men killed in this vocation on certain roads was greater than that of soldiers killed in ordinary warfare; and if railroad officers would give as much care to the protection of these men as they do the safety of passengers and freight, two thirds of the accidents that now occur might be avoided. As one means of prevention, the cars should be brought closer together. Another was by providing an iron upright guard around which a man might throw his arm while applying the brake, so that in case of the breaking of the chain, or slipping of the wheel, he could have something to hold on to.

According to the National Car Builder, Mr. Hopkins strongly urged the importance of well constructed cars. To secure this it was necessary that railroad companies should pay better prices for cars, so that builders could afford to use better material and workmanship. Contract cars, he contends, are apt to contain poor iron, cross grained wood, knotty sills, and other imperfections, which enhance the risks and dangers of train men; and in the matter of cost was poor economy after all.

A Victory for the Millers.

The United States Circuit Court decided the cases of the American Middlings Purifier Company against the millers of St. Louis, March 12, in favor of the defendants, on the ground that the reissued patent does not conform to the original, and is therefore invalid. The Minnesota cases follow the St. Louis cases. The plaintiffs will probably appeal to the United States Supreme Court.

AN IMPROVED LAWN MOWER.

The lawn mower, like many other machines, has passed through successive stages of improvement until it is now quite complete, besides being made at a reasonable price.

The accompanying engraving represents one of the improved machines made by Messrs. Lloyd, Supplee & Walton, of 625 Market street, Philadelphia, Pa. The points of power for operating the cutters. Each revolves independent- break when doubled over the wire in the case of baled hay. of revolutions, which occurs in turning from the straight other goods in bags. course, either in the return cut, or in avoiding obstacles. A purchaser is wanted for this patent and the entire male bushel, and the average day's work is not more than two or

The machine is capable of cutting close to stumps or shrubbery without danger of damaging the cutters.

As will be seen by reference to the engraving, the cutting cylinder being of skeleton form is very light. The three wheels, having the necessary lugs for holding the cutters are made of malleable iron, the cutters being all steel, and bent and tempered in dies under hydraulic pressure, which gives them a uniform curve. A very simple adjusting device is applied to the cylinder. by means of which each end may be set separately to the cutter bar, and when once adjusted, is firmly secured in position. The cutters, as in other machines, are self-sharpening. A roller of small diameter follows the cutters, and receives sufficient pressure from the propelling power ap plied, to smooth the turf after the cut. The machine seems to be durable

the moving parts render necessary but a very moderate expenditure of force in operating, and it is claimed by the makers to be the lightest moving machine in use. Seven sizes are made, giving width of cut ranging from ten to eighteen inches.

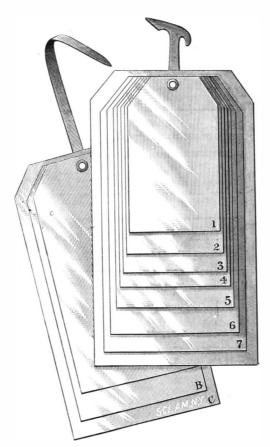
A Large Ocean Steamship.

The new Guion steamship, the Arizona, which was launched at Glasgow March 10, is the largest merchant vessel in the world with the exception of the Great Eastern.

Her length is not equal to that of the Inman steamship City of Berlin, but her carrying capacity is greater. She carries four masts, rigged like those of the Germanic and Britannic of the White Star Line, and two smoke funnels; has first and second cabins, each capable of accommodating 125 passengers, and registers between 5,000 and 6,000 tons.

A NEW SHIPPING TAG.

The accompanying engraving represents two forms of



GOODRIDGE'S PATENT SHIPPING TAG.

difference between this and other machines of its class may folk, Va. One form is provided with a metallic barbed hook, be seen at a glance, and as it embodies some radical changes and is designed especially for baled goods, such as cotton, we will refer briefly to such as are considered improvements. bagging, hay, etc., and is said to be very popular in the Two independent driving wheels of large diameter are used, South. The barbed hook is made of four cross tin, giving it having as narrow faces as is consistent with the requisite ample strength to be thrust into the bale covers, and not

ly of the other, on the same shaft, which also carries the The long hook, or Universal Tag, as its name implies, is driving gears. The wheels are connected with the shaft by capable of universal application; the long tongue of tin may then emptied into his box of a bushel capacity. The pickmeans of a ratchet, so that the speed of the cutters is always be readily wrapped about some portion of the article to be governed by that of the wheel making the greater number tagged, and is also in general use for marking phosphates and on reporting to the superintendent at the close of the day,

this country. The first third of the collection comprised 2.619 lots, sixty-seven of which sold for more than \$100 each. and twenty-four for more than \$200 each. The part sold brought in all \$48,830, nearly one fourth of which went for the twenty-four works just mentioned. Among the more valuable of these were Captain John Smith's "Historie of Virginia, etc.," which went to the Lenox Library for \$1,800; a perfect copy of the first book published in America. "The Whole Booke of Psalmes," which brought \$1,200; the first edition of Eliot's Indian Bible, \$1,000; John Brereton's "Relation of the Discoverie of the North Part of Virginia." \$800: and other copies of rare and valuable books, which brought from \$700 down to \$200 each. To a very large extent the more valuable works of the collection were bought for public and society libraries, where they are likely to remain permanently.

A Wisconsin Cranberry Marsh.

One of the largest cranberry farms in the world is known as Sackett's Marsh, near Berlin, Wisconsin. It comprises 750 acres of marsh, about one fourth of which is under cultivation. The yield has sometimes reached the enormous total of 35,000 bushels. According to a correspondent of the Tribune, this marsh is admirably fitted by nature for its present use, and its advantages of location could not have been improved upon by the experienced cranberry culturist. It is necessary to flood the entire surface during the winter, and this is rendered easy by the fact that the marsh is a basin lying in a wooded tableland, with an outlet at the lower end, across which has been constructed a dam 225 yards long and 41/2 feet high, with double flood gates for regulating the height of the overflow. As soon as the crop is gathered the gates are dropped, and the marsh gradually becomes submerged by the autumn rains, the melting snows, and the drainage from the higher ground until it becomes a lake. This often freezes to a considerable thickness, furnishing a skating rink that puts to blush the contracted affairs of that name found in cities. In this manner the soil receives its only cultivation, and the tender plants are protected from the rigors of a Wisconsin winter. It is not uncommon for the marsh to be flooded eight or nine months in the year, the water not being drawn off until June.

The picking begins in October, when the inhabitants of the surrounding country turn out in a body for the work, not less than 3,000 pickers being employed at a time. The marsh is so wet and yielding as to preclude the possibility of driving teams across except on a corduroy road leading to the buildings in the center, where the gathered berries are cleaned and packed for market, and where the pickers from a distance are lodged and fed.

A movable wooden railroad track runs from the warehouse to the center of operations, and a car is loaded with the boxes of berries, each person picking into a pan, which is ers receive a ticket for every bushel loaded on the car, and receive credit for the whole. The price paid is 75 cents a

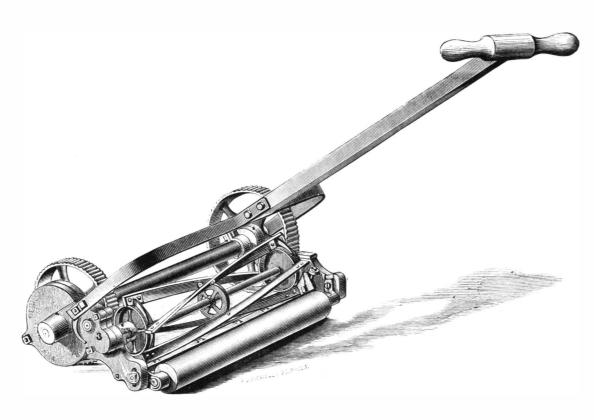
> is not uncommon to pick five bushels, and a few experts have been known to pick seven bushels in a single day. The picking being often hurried on account of threatened approach of frost, a second picking is sometimes necessary, for which about a dollar a bushel is paid. The car, on being loaded with the filled boxes, is drawn by a team of horses to the warehouse, where the berries are hoisted on an elevator to the upper stories, and disposed of in such manner as to secure the best ventilation. The floors are covered with tier upon tier of boxes of berries, there being sometimes 20,000 bushels under the roof at one time. On the ground floor, large fanning mills are in motion, into which the berries are running from hoppers in the upper stories, and all leaves and other impurities are blown out, after which they are put

> three bushels, although it

throughout. The independent wheels and the lightness of chinery used in the manufacture of these tags. For full par- | in barrels and hauled to Berlin, and from there shipped to the Milwaukee and Chicago markets. A coopering establishment on the property manufactures the many thousand barrels which are annually required.

Mute Cattle.

M. Paul Bert, in a recent lecture at the Sorbonne, on the late Claude Bernard, narrated a singular stratagem which history and literature of America. In some departments the was invented by the latter during the last Franco-German collection was without an equal; and as a whole the library war, and which might be utilized without difficulty under



PENNSYLVANIA LAWN MOWER.

ticulars apply to Robert Baldwin, attorney at law, corner Fayette and Calvert streets, Baltimore, Md.

Rare Old Books at Auction.

The late Mr. George Brinley, of Hartford, Conn., a man of wealth and literary taste, spent many years and a large amount of money collecting rare books relating to the early was the most important and valuable ever offered for sale in the same or even under different, circumstances. It was proposed to revictual Paris, which was strictly blockaded by the German forces. A large number of cattle had been collected, waiting for an opportunity to cross the German lines. But a difficulty was to silence these animals, as their cries would attract the attention of the enemy. Claude Bernard proposed to practice upon them the section of the nerve which enables them to emit their usual cries. The operation is so easy that it could be executed in a few seconds by an ordinary butcher. None of the animals appeared to suffer in any way by the mutilation which made them mute. Unfortunately, however, the military movement proved a failure, and for other causes the revictualing could not take place.

It would be greatly to the relief of the public if this same method could be applied to cats, which make night hideous with their caterwaulings.

SOME RECENT AMERICAN PATENTS.

An improved cranberry picker, invented by L. & Z. Hall and W. Crowell, of Dennis, Mass., is shown in Fig. 1. It consists of a hinged back, provided with closingsprings and handles for operating it, and having on the side opposite the handles a series of inclined wire fingers for pulling the berries from the vines. The picker is operated by opening the jaws and inserting them under and over the vines, and drawing the implement from the vines, which escape, while the berries are retained by the fingers.

A new grafting implement is shown in perspective in Fig. 2; in detail in Fig. 3; and Figs. 4, 5, and 6, show three different forms of grafting that may be done with the implement. To one of the jaws are fitted angular knives, as shown in Fig. 3. The opposite jaw is simply a flat bearing surface which supports the stock or scion while it is cut. This tool is the invention of Mr. William H. Gray, of Lama City, lowa.

The novel picket pin, shown in Fig. 7, is the invention of Mr. P. J. Tweed, of Blair, Neb. It has a spiral corkscrew-like shank and a hollow head, containing a washer for receiving the end of the tedder rope. With a pin of this kind the tedder rope cannot become twisted nor will it wind around the pin.

An improved induction apparatus, for lighting by electricity, invented by the late J. B. Fuller, of Brooklyn, N. Y., is shown in perspective in Fig. 8, and in section in Fig. 17. The inventor's aim in the construction of this apparatus is to operate along the main electric circuit a large number of small lights, each being placed in a local circuit, whose currents are induced by the currents of the main circuit. Two magnet cores are arranged parallel with each other, and connected magnetically at the ends, as shown in Fig. 17. Around the center of each of these cores is a soft iron head, and at a short distance from each side of this is a head of insulating material. The outer ends of the cores are coiled with insulated copper wire, and so connected together and to the electric generator as to produce, when in action, two consequent opposite magnetic poles at N and S. A. B. C. D. and E.

represent the connections of these coils. Between the iron heads and these coils are wound smaller coils of insulated wire, the fineness of which depends upon the tension of the current required.

There is an iron arm hinged to one of the iron heads, so as to swing over upon the seat connecting magnetically the poles, N and S, as shown in Fig. 8. Now, if electric currents be sent through the main circuit, flowing around the large coils, and rapidly changing, in alternately opposite directions, the magnet cores will as rapidly change polarity, and these changes will induce in the small coils electric currents of greater or less tension, according to the fineness of the wire composing the small coils.

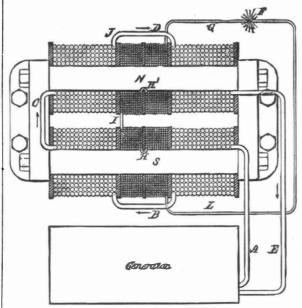


Fig. 17.-PLAN OF THE FULLER ELECTRIC LIGHT.

around the pin.

An improved induction apparatus, for lighting by electricity, invented by the late J. B. Fuller, of Brooklyn, N. Y., is shown in perspective in Fig. 8, and in section in Fig. 17.

The inventor's aim in the construction of this apparatus is to operate along the main electric circuit a large number of capacity, as shown in Fig. 17.

These connections for producing any changes in the circuits are made by means of ordinary switches, plugs, or keys. The arm which extends across the face of the coil in Fig. 8, acts as a governor of the light, by strengthening or weakening the magnetic poles, and thereby varying the strength of the current.

lating material. The outer ends of the cores are coiled with insulated copper wire, and so connected together and to the electric generator as to produce, when in action, two consequent opposite magnetic poles, at N and S. A, B, C, D, and E,

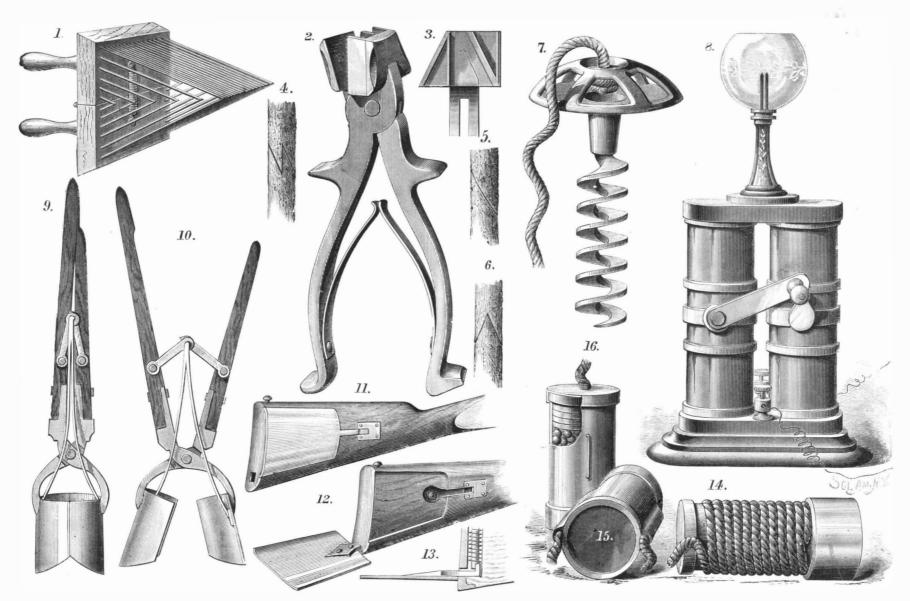
each or any lamp may be lighted or extinguished independently from the others.

An improved post hole digger, patented by Mr. W. H. Ryan, of Moline, Ill., is represented in Figs. 9 and 10. The invention consists chiefly in a cleaning device which descends when the handles of the implement are opened. The transplanter is forced into the soil in the usual way, and when withdrawn it brings up a clod of earth between the shovels. When the handles are spread to drop the clod the toggle which connects the handles is wholly or partly straightened out, thrusting the scrapers down inside of the shovels, expelling the clod and scraping from them any adherent clay or earth.

It is very well known that by throwing up an earthwork of a very few inches in height, and especially by excavating in the earth ditches of just sufficient depth to allow the men to lie on their faces or backs, and not be above the level of the ground in which the ditches are dug, troops may remain a long time exposed to the enemy's fire without serious loss. as the shot will be thrown over them, or striking the earth in front, ricochet over them. These earthworks may be thrown up or the ditches dug in a very few minutes-in less time than will be required by the enemy to get the range of the troops-if each man has his musket or rifle provided with a spade or intrenching tool. Figs. 11, 12, and 13 illustrate a novel tool of this description, invented by Mr. James L. Buskett, of St. Louis, Mo. The spade when not in use fits a recess in the side of the gun stock, as shown in Fig. 11, but when it is required it may be quickly placed in the position shown in Figs. 12 and 13.

Figs. 14, 15, and 16 represent an improved shot cartridge for sporting purposes, invented by Mr. H. H Schleber, of Rochester, N. Y. In this cartridge the shot are confined within a separable case, which is provided, either outside or inside, with a time fuse, which operates, when ignited and consumed, to release the case, and to allow the shot to spread at a distance from the gun. The case is held together during the earlier part of the flight of the cartridge by the fuse itself, which, in this construction, is wound spirally about the case, or by a wrapper or other suitable fastening of combustible material, which is burned in two by the fuse, the combustion of the fuse in either case operating to destroy the fastenings which hold the case together, and to allow it to fall away from the shot. The rear end of the fuse cartridge is filled with wadding, to lighten it to prevent it from turning sidewise during its flight through the air. The engraving shows three forms of this cartridge.

At a meeting of the Royal Society, Edinburgh, Professor Tait gave some account of experiments he is conducting with the view of determining the connection between the rate of speed and the electro-motive force of a Gramme magneto-electric machine. He is not yet through with this investigation, but thus far the results have appeared to him to show that the electro-motive force varies approximately in the duplicate ratio of the rate of turning



A FEW RECENTLY PATENTED NOVELTIES.

The Leadville Mining District.

to add that it is an extremely lively town.

until 1871, when he discovered the mines on Mount Bross with iron oxide; where that is deficient, the ore is galena. and Mount Lincoln. In 1873 he prospected the tract about The first placer claim was located by Mr. Stevens in 1874.

1876, and conveyed to Stevens and Leiter.

first ore was struck in Fryer Hill. Then Rische, Hook, and they all were once united." to the attack of that mammoth deposit.

Mining Journal, as follows:

'Nearly in the center of the State of Colorado, the crest line of the Rocky Mountains breaks abruptly to the direct of the claim. A later decision, in the case of the New Dis- not, however, appear to be all equally good, some mines east for twenty miles, departing from and then resuming a covery lode against the Little Chief, denies that these de-showing a larger percentage of ash than others; on its westsoutherly seventy miles in a beautifully timbered valley, be-location. If the first decision is sustained the vast wealth railroads, the Springfield, Jackson, and Pomeroy, and the tween the main range on the west and the Park range on the of the Leadville deposits will fall to a lucky few; if the lat- Dayton and Southeastern, will, when completed, run east, a lateral elevation fifteen miles from the axis, beginning ter, a multitude of men will share the spoil. at the break and prolonging itself south into the Greenhorn and Wet Mountain ranges, a hundred miles below.

"About twenty miles from the head of this Arkansas val-

fused but immense volume, washed from the outcrops of the meat of the buffalo of the plains. this deposit, has accumulated in inchoate bodies, whose ver-

taining well defined fissures of magnitude, bearing ore like good feed, I think." true lodes; for example, the Printer Boy, a well known gold mine, a gash vein, and numerous silver mines, such as the terms. in a crevice carrying iron oxide and pyrites for vein filling not strong. They are also very cowardly, very playful, and noticed that a patch of land which has been treated in this and gangue. The ore runs from thirty to eighty ounces of very cunning. silver, and thirty to eighty per cent of lead; these fissures carry no carbonates, though, from late discoveries on the same horizon beyond Little Evans Gulch to the N. E., it carriages exactly alike, not because I do not build each one to their trunks pieces of tow smeared with a mixture of may be supposed that they lead through porphyry to lime, as well as I know how, but in building that I learn how to chloride of lime and hog's lard, and ants and grubs already and may merge into deposits identical with those below. make the next one better. When I placed these carriages of in possession will rapidly vacate their position. The limestone that underlies the porphyry seems to pervade mine in the Exhibition building, I thought them perfect, but the entire country; it is believed to be the same as that at the now that I have spent three months looking over the carriages Moose mine, and on the east of the Park range in Buckskin, of other builders, I see that they are not so." Here is an in science, people first say "It is not true," then that "it is and as developed also in the main range and across to the Gunnison, as well as south to Silver Cliff and Saguache. men. illustration of the value of these shows to intelligent tradescontrary to religion," and, lastly, that "everybody knew it before."—Agassiz. Gunnison, as well as south to Silver Cliff and Saguache. Imen.

Silurian fossils are found in it; the color is drab, and the The first house was built in Leadville, Colorado, in 1877; quality often silicious. In contact with the iron veins it benow it is said to have a population of 10,000. It is needless comes deeply impregnated with rust; these veins are brown and red hematites, sometimes carrying magnetite and man-In 1864, Mr. Wm. H. Stevens, the founder of Leadville, ganese oxide enveloping the lodes of argentiferous galena, went to Colorado from Lake Superior. He was a practical carbonate of lead, chlorides of silver, and the native metal. miner, and pursued his calling in Park and Gilpin counties Generally the carbonates and chlorides affect association

California Gulch, now so famous for silver; but he was look-vein of hematite, about the color of brick to burned brick, from 80 to 100 feet. Two strata, the upper and the lower, ing for gold, and did not at first dream of the value of the from four to eight feet thick, lying on a downward dip to are each from 31/2 to 4 feet in thickness, with other lesser carbonate ore that was so abundant about him. Ultimately the east of 15°, between porphyry and lime, both well destrata. he discovered its nature, and while ostensibly carrying on fined, but the whitish porphyry especially showing a line of unprofitable placer mining operations, much to the derision contact unbrokenly continuous and everywhere sharply the attention of seekers for new homes and those who desire of his neighbors, he discovered and defined the remarkable marked, not stained, with impregnations from the vein. to open new industries in a rapidly growing and prosperously outcrop of silver-bearing ore that takes in the Adelaide, The walls are undulating but not parallel, more resembling rising new country. Coal of the best grades is sold at the Camp Bird, Iron, Bull's Eye, Limestone, and Rock mines. the expansions and contractions of vein walls, nor is there banks at \$2 and \$2.50 a ton, while engine coal, slack, is sold any appearance of stratification in the deposit, or of con- at so low a rate that an ordinary manufacturing engine can The limitation act of Congress took effect June, 1875, and cordant regularity in the pay vein. At places the vein is be run at 25 cents a day. The lands are as yet mostly broken soon after Mr. Stevens began to survey for patents. Then disintegrated to sand, but it is mostly to be worked with prairie; probably not one fourth is taken up in farms, and is he told his neighbors that he was after silver, not gold; and powder. The carbonate of lead is sometimes found as ceru- held at from \$5 to \$10 an acre. The prairie is of as rich and the wonderful development of the Leadville district began. site, purely white and in clusters of long crystals; again, it fertile a quality as can be found in the West, and the elevation In the fall of 1876, Walls and Powell discovered the Ade- is massive and pinkish, with a certain metallic aspect; or, above the sea being 1,500 feet, gives the locality a salubrity laide, and shortly after the Gallaghers discovered Camp again, compact and blue drab, not unlike limestone. It of climate unsurpassed. Large numbers of cattle graze the Bird. In the summer of 1877 Mr. Stevens began to work sometimes penetrates, sometimes surrounds, bunches of free range, which, with hay costing only the labor of putting the Iron mine, which had been located by H. B. Woods in galena, which ore is often found in large pockets, and not up, gives this locality advantages for stock purposes. Grand The Fryer Hill deposits were discovered in the spring of Bowlder counties. The slide on the Iron mine is fifteen feet center. It has permanent water for steam, and the coal basin 1878, suggested by Cooper's discovery in 1877 of the Car-thick, but the outcrop of the vein at the surface of the rock comes to the very limits of the town. bonate mine on an outcrop lower than the line of the Iron in place is mathematically plane. This outcrop continues mine outcrops. In that spring Stevens and Fryer made sur- on the plats already mentioned; but above and below it are veys for the prolongation, decided on a point to sink, and two other lines of distinct exposure, but underlain by the there, in the present plat of the New Discovery mine, the same series of rock, so that no observer can but imagine development of a new coal field in Ohio. The coal is known

supervened carried a host armed with pick and shovel over no little litigation, with decidedly conflicting decisions. In in the history of coal mining in Ohio. Like some other the case of Stevens & Leiter against Williams, the court de-rare coals, notably the block coals of the Shenango Val-The situation and geology of this new mining district have cided that the deposits of Leadville came under the same ley of Pennsylvania, and the Mahanoy Valley of Ohio, been described by Francis L. Vinton, in the Engineering and law as fissure veins, the oldest claim holding the vein the Wellston coal appears to be of limited area. So far through all its dips and spurs and angles wherever it may as the search for it by boring and opening has gone, go, so long as it does not go beyond the produced end lines 75,000,000 to 100,000,000 tons have been developed. It does general course that closely approaches north. At this point posits are veins or lodes, and lays down the rule that the ern limit also it falls below two feet six inches of height; are the headwaters of the Arkansas River, that flows thence miner cannot follow them beyond the limits of his surface eastward it rises to four feet six inches. Two narrow gauge

The Domestication of the Buffalo.

Col. Ezra Miller, of Mahwah, N. J., has been making some ley is Leadville, situated near the river and within the gen- experiments which have led him to the conclusion that it will scarcely a word for more than half a century. He was not eral débouchure of several gulches—the Evans, Stray Horse, pay to breed buffaloes, both pure blood and crossed with our dumb; he could talk well enough; but he became convinced California, Iowa, and Empire, that have been cut in the domestic cattle. Relating his experience with these animals at an early stage of his life that more harm than good was western flank of the Park range by their torrents, exposing lately, the Colonel said: "I have proved to my own satisfaction wrought by speech, and remained true to bis principles ever a uniform geological section throughout, and a series of several points. First, that buffaloes can be tamed. Second, after. When his first child was born he rode seven miles in faults and slips or throws, whose effect has been to ar-that it doesn't cost one half as much to keep a buffalo as to quest of a physician. He carried slate and pencil, wrote a range lines of similar outcrops, one above the other, like keep an ordinary cow. Third, they can be fattened as quickly statement of the situation, returned with the medicine man, "The upper sedimentary rock is limestone. This is un- just as good. Fourth, they are as good milkers as our Alder- ties in silence. His wife, who survives him, says no woman derlain by quartzite and schists to gneiss, and covered above neys; and fifth, they are as good butter makers. The milk of ever had a kinder husband. The relations between the by a thick, solid formation of trachytic porphyry. In the the buffalo is a little yellower then that of the Alderney, but couple were always pleasant, and Mrs. Inman has remarked vicinity of Leadville there is found often between the lime very sweet and rich, and there is more cream than in the to her neighbors: "If Ishael talked as much as I do, the and porphyry a metallic deposit sometimes as regular as a Alderney milk. As to the quantity of milk given by buffalo Lord knows what might happen." Some of his written retrue lode, consisting of iron oxides carrying a sort of pay cows, they will average with the average milker. The ud-plies to the questions of acquaintances who were curious to vein of silver ore and some gold. This silver ore is character der of the buffalo cow is very small indeed, but the milk veins know why he preferred silence to speech are worthy of menteristically argentiferous galena; but the lead is to a great are immense. This is a provision whereby nature enables tion. One retort was: "A good listener is to be preferred extent modified into carbonate, and this, when disintegrated them to run faster than if cumbered by a large udder. I am to a poor talker." Another was: "I want to prove that a to sand, mingled with equally loose iron ore, has given ori- of the opinion that the most desirable cross is with the big man can be happy and hold his tongue." Another: "I am gin to many peculiar belts so easy to mine, and of ore so Dutch cattle that have such big udders. I think that crossing trying to think of something good enough to say out loud." adapted to smelting, that though their grade may be not them with our short-horns will give remarkably good beef. A clergyman once asked Inman whether he didn't think the thing extraordinary for first-class mineral, yet their economic But the beef from our buffaloes more than met my expectal Lord gave him his tongue to be used. The penciled reply value is remarkable. Moreover, in certain localities, a con- tions. It was sweet and juicy and tender, not at all like was: "The Lord gave me a mind that tells me when to use

"Now, in drawing the balance between the buffalo and tical dimension is anything from ten to fifty feet, whose title the ordinary cow. I find these facts: The buffalo can be kept between Syracuse and Rochester, the vehicle was halted in in silver is pretty regular, and whose almost only cost to at one half the cost of the cow: that's one point for the buf-front of a country tavern. A child was sleeping on the falo. We will assume, to give the cow a fair show, that she porch. Inman, looking out, saw a large black snake crawl "The porphyry that overlies Fryer Hill seems, by com- yields more milk and butter. That balances the account so to the side of the infant. Grasping his wife's arm, he mon admission of experts and miners, to differ structurally far. The buffalo is fully equal to our stock in the quality of shouted, "See!" and, pointing to the snake sprang from from that on the Iron Hill. It resembles a drift of porphyry meat. So they are still on even terms; but its hide is worth the stage, pursued the reptile some distance, and finally killed bowlders, pebbles, and breccia, lightly cemented, and is defour times as much, so it comes out far ahead in the last it. He left a snug fortune, which his son inherits. His last scribed by the miners as gravel. The porphyry on the Iron heat, as horsemen say. The hide from my bull was a beau-written massage was: "Silence is golden." His off-penciled Hill is massive, hard, compact, and homogeneous, a con-tiful specimen. It was better than a \$25 robe I bought to admonition to his son was: "Keep your mouth shut." tinuous formation back to the summit of the range, and con-compare with it. The fur was longer and finer, the result of Syracuse Standard.

The buffaloes herded with the other cattle on the best of What surprised the Colonel most was their weak-Tiger, Nelly, and Last Chance, in the first of which, con-ness. He supposed they were very powerful; but they are once desert ground on which a little chloride of lime has been siderably exposed by shaft and drift, are two continuous not. He has seen a yearling Alderney bull push a three sprinkled. Plants may be protected from insect plagues by veins of argentiferous galena from four to eight inches wide, year old buffalo bull uphill. They are fast, but they are

WESTERN IOWA COAL FIELDS.

The Western Iowa coal basin lies at the foot of the "Middle Terrace" of the State Geological Survey. The newly opened fields are situated on the North Raccoon River, Green county, and are traversed east and west by the Iowa division of the Chicago and Northwestern Railroad, and north and south by the Des Moines and Fort Dodge Railroad. Mr. E. J. Couch, of Grand Junction, asserts that in these beds an "The Iron mine of Stevens & Leiter is a belt or zone or abundance of fine bituminous coal is found at a depth of

The abundance of assured fuel, at cheap rates, is inviting to be distinguished from the similar ore of Clear Creek and Junction promises to become an important manufacturing

A New Ohio Coal Field.

Mr. Andrew Roy reports, in the Coal Trade Journal, the as the Hill or Wellston coal. The coal is remarkably pure Tabor opened the Little Pittsburg, and the excitement that The extremely slight dip of the Leadville veins has led to and easy of access, and promises to play an important part through the heart of this new coal field.

The Advantages of Silence.

Ishael P. Inman, who died in Utica recently, had uttered as ordinary beeves, and on half the food, and their meat is and received the announcement of his paternal responsibilimy tongue."

In 1842, while he was traveling with his wife in a stage

Chloride of Lime as an Insecticide,

Le Cultivateur remarks that rats, mice, and insects will at brushing their stems with a solution of it. It has often been way remains religiously respected by grubs, while the unprotected beds round about are literally devastated. Fruit An eminent French coachmaker says: "I never build two trees may be guarded from the attacks of grubs by attaching

Whenever a new and startling fact is brought to light

Why so Depressing?

describes, as follows:

"Unwonted depression and uneasiness, accompanied with loss of appetite and inability to sleep, are the prevalent causes of complaint just now among the 'tolerably well' section of the community; and, with a large measure of accuracy, the condition, modified as it is by individual peculiarities of state and idiosyncrasies, is attributed to the weather. The relations which subsist between such mental depression as constitutes melancholia and the defective discharge of its functions by the skin may help to explain the phenomenon. The connection of cause and effect may not be clearly made out, and the part which the nerve-centers play in the production of the result may be as obscure as that which they exercise in the control of occasional pigmentary deposits; but the broad fact remains. When the skin does not act freely. when its functions are seriously impeded or arrested, melancholy broods over the mind, just as in the case of a subject of melancholia, as a formulated disease, the skin becomes dense and inactive. It is not a random conjecture, therefore, that the intense and prolonged, albeit unaccustomed and unexpected, cold and damp work their depressing influences mainly through the skin. This is a trite remark, but it is one that may with advantage be made just now, because, in the interests of health-preservation, especial pains need to be taken to secure the freest possible action of the great surface system of excretory glands and the transuding apparatus generally. Warmer clothing, especially at night, frequent ablutions, with sufficient friction, and the promotion of skin activity by every legitimate form of exercise, are obvious measures of health which everybody ought to under stand and all should practice."

AN IMPROVED PRESS.

The press shown in the accompanying engraving is designed more particularly for pressing tobacco in hogsheads, but it is equally applicable to pressing other bulky substances. The chief novelty of the invention consists in a suspended hydraulic jack, which may be readily moved from one hogshead to another, avoiding the necessity of a duplication of jacks and greatly facilitating the operation of

A general idea of the construction and the manner of working the press may be gained from the larger engraving

ing. Two heavy beams, A, which are separated at their upper edges by a series of blocks, are clamped together by bolts and supported by standards that rest on two corresponding beams below, and are connected by iron rods, that are provided with a novel device which admits of easily removing the rods should occasion require. The lower timbers of the press are placed below the floor of the packing room to afford a smooth floor surface.

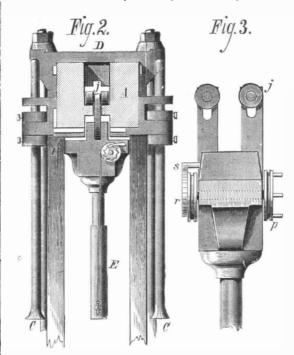
the larger engrav-

The timbers, A. are provided with iron or steel plates, F, on the underside, and rails, f, extend along their adjacent faces. From these rails the horizontal jack, E, is suspended by the slotted straps, \hbar , and the rollers, j, the slots admitting of the free movement of the jack along the track when it is not in operation, and allowing the shoul ders of the jack to come into contact with the plates, F, when pressure is exerted, without injury to the rollers.

above the tobacco, and clamped by the collars and set screws following is a translation of the decree referred to:

sition. For this purpose two chains are attached to its lower During the early spring months it is common to hear per- end and connected with a sort of diminutive windlass at the sons speak of their feelings in the manner the London Lancet head of the jack, which is provided with the ratchet, r, and

> The inventor says that with this press one man can do the pressing for nine packers, and that its capacity is about four times that of an ordinary screw press. The power of the



DEANE'S HYDRAULIC TOBACCO PACKING PRESS.

press is limited only by the strength of the timbers and the power of the jack; it may vary from one ton to one hundred tons. It is very compact, and is so simple that any ordinary wood worker may construct it.

Further particulars may be obtained from the inventor, Mr. Francis B. Deane, Lynchburg, Va.

The Netherlands Open to American Tools.

The Department of State is in receipt of a dispatch from Details are shown in Figs. 2 and 3 which do not appear in the American Consul at Amsterdam, drawing attention to a

comprised all finished tools which serve mechanics as an aid in their work. Further, parts of tools, such as hammers, spades, chisels, etc., without handles, and augers without piercers, etc., provided they are in the condition in which they are bought by mechanics in the stores and afterward fitted for use by putting on the handles, piercers, etc. Tools of spelter or zinc remain dutiable, likewise mathematical, surgical, chirurgical, optical, and musical instruments."

RECENT AMERICAN PATENTS.

An improved mill for grinding bones, phosphates, and similar articles, has been patented by Mr. T. O. Cutler, of Jersey City, N. J. It consists of a stationary top section, having notched concentric ridges, and a revolving runner, provided with a series of beaters and a notched circular ridge, running between the ridges of the stationary portion.

Mr. Henry Groth, of New York city, has devised a motor for moving dancing figures and other mechanical toys. It consists of a heavy flywheel, which is impelled by unwinding a cord from a sleeve connected by a clutch with its shaft. A spring drum rewinds the cord, so that it may be unwound several times in succession to secure the required speed.

An improved matt for cotton-seed oil presses has been patented by Messrs. J. L. Perkins and G. O. Baker, of Selma, Ala. It consists of two plates of wood fitted to the press box, connected together by a canvas hinge, and provided with sheet metal linings and with an intermediate hinged sheet metal leaf.

A tool for rolling or expanding boiler flues or tubes has been patented by Mr. John II. McGraw, of Oswege, N. Y. It consists in a segmental head having grooves, in which are placed rollers. A central wedge pin is provided for expanding the head.

Mr. John Birks, of Ogdensburg, N. Y., has patented a measuring scoop, which will indicate both the weight and bulk of its contents. It has the usual marks of a liquid measure to indicate the quantity of an article, and it has attached to its handle a spring balance for weighing its contents.

An improved bird-seed reservoir has been patented by Mr. Owen W. Taft, of New York city. It consists in a reservoir pivoted in a frame which supports the cage. It may be arranged as a standard, or it may be provided with means for suspending the bird cage while it is itself suspended by a chain or cord.

An improvement in bed bottoms, patented by Mr. W. H.

Leininger, of Salem. Oregon, consists in forming the bottom of wires, which pass around pins set at the ends of the bed frame and over rubber strips. This arrangement gives elasticity to the bed bottom, and prevents the formation of sharp bends in the wire.

An improvement in the construction of buildings, which consists in sheath ing the inside of the studding instead of the outside, and applying vertical strips to the sheathing to which the lathing is nailed, has been patented by Mr. H. R. Crane. of Crawfordsville,

Mr. William P. Silvernail, of Pittsfield, Mass., has patented an improved hose pipe supportby means of which the pipe may be easily directed and controlled under any practicable head of water.

An improved bridle bit, which may be used either with a hard-mouthed or a tender-mouthed horse by simply reversing it, has been patented by Messrs.

DEANE'S HYDRAULIC TOBACCO PACKING PRESS.

package is moved to the next; but before this can be done tariff of the Netherlands, and one which the Consul thinks Miss. the retaining bars, C, must be brought down upon the boards is not generally known among American exporters. The Mr. J. R. Spencer, of Avilla, Mo., has devised an animal

panding as the jack is removed. When the cylinder of the agricultural implements and sewing machines, are free of form on which the animal first steps will remain firm and jack is raised it is sometimes desirable to retain it in that polimer that in this exemption are unyielding until the weight comes upon the other.

The jack, E, after having compressed the contents of one ministerial resolution effecting an important change in the A. W. Holland and Edgar N. McKimm, of Lathrop,

trap, in which there are two pivoted platforms whose free at the top of the press. This prevents the tobacco from ex- Tools of wood, iron, copper, steel, and other metals, as lends meet and are held by the same device, so that the plat-

In an improved motor, patented by Mr. Joseph Plattenburg, of Allegheny, Pa., an elastic rubber belt is wound by hand power in a stretched condition upon a drum. The power of the belt is utilized by ingenious mechanism for driving light machinery, pumping, etc.

An improved sash fastener, patented by Levi P. Treadwell, of Danbury, Conn., consists of a slotted curved bolt which slides on a screw in the meeting rail of the lower sash, and is capable of entering notches in the stops and in the

A sewing machine invention-which improves the feed and enables the operator to simultaneously slacken the thread and raise the presser foot-has been patented by Mr. Thomas Shanks, of Baltimore, Md.

THE BOBAC.

The bobac, or Poland marmot, is one of the true marmots, and is a native of parts of Northern Europe and Asia. It measures twenty inches from the nose to the end of the tail, and is covered by a thick reddish-brown fur, somewhat raw, a habit indeed which largely prevailed till lately, for darker on the back. The throat and a part of the belly are grayish white, and the tip of the tail is nearly black.

The bobac is a gregarious animal, living in small bands of is remarkable, however, that Mr. Dall finds no trace what is tated to be in great request among native merchants as a

thirty or forty. It inhabits the plains and stony undulating sections, avoiding forests and sandy soil. Like the prairie dog, it is a very social animal; grassy. moist sections of land are frequently found covered with numerous hillocks, formed of earth thrown out in excavating their spacious subterranean dwellings.

In the bobac settlement a very industrious and restless life prevails through the summer. The young, which are born in April or May, are then nearly grown up and have acquired a fondness for play. At sunrise they leave the burrow and quench their thirst by licking the dew from the leaves of the surrounding plants. The forenoon is spent playing and grazing, the afternoon in sleeping in their burrows. Toward evening they appear again and graze previous to retiring for the night,

They seldom deprive the immediate surroundings of their homes of vegetation; welltrodden paths lead to a feeding ground situated generally at a distance of several hundred feet; further than this they dare not

In June they commence to gather their winter provisions, consisting of hay, roots, etc. As soon as the weather becomes cool in the fall they become sleepy and very slow in their motions. During the latter part of August they may be seen after a cool night coming out of their burrows, falling on one side and then on the other as if intoxicated, and they lose their playfulness.

During the month of September they retire for hibernation, and close the entrances to their burrows with stones, sand, grass, and their own excrements. From this time until winter sets in they lead a sort of automaton life.

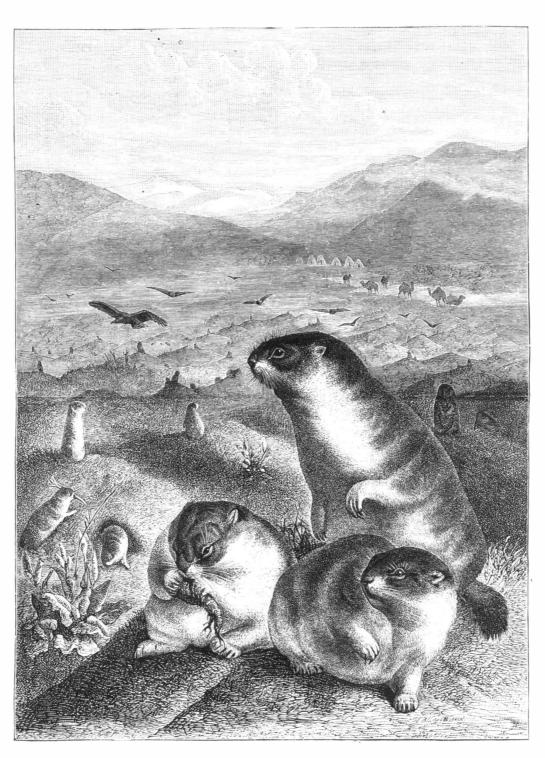
The burrows are very extensive, and are generally most spacious where the ground is quite hard. According to Radde the distance between the mouth of the burrow and the nest is from fifteen to twenty feet, rarely

the animals.

tellites of Mars."

The Shell Heaps of the Aleutian Islands.

In a volume of ethnological papers—recently issued by the government as part of the series recording the progress and researches of the Geological and Geographical Survey -is recorded, among other matters of interest, Mr. Dall's examination of the shell heaps of the Aleutian Islands. These shell heaps, extending over tracts of many acres in extent, exhibit three layers. The lowermost consists principally of shell and spines of an Echinus, such as is still eaten raw by the natives. Considering that there is but little to eat of these animals, it can be easily imagined how great a number it takes to feed even a single family; vet so vast is the accumulation of their remains that Mr. Dall reckons 2,000 years for the duration of the earliest period of inhabitation of the islands by wandering coast-folk of very low culture; this he calls the "littoral period." Immediately over this deposit lies a layer in which fish bones predominate, showing a change of life, or the arrival of new tribes subsisting on fishing, but probably eating their fish the old men ascribe the diseases which have afflicted modern generations to the pernicious practice of cooking food. It drowns, and finally devours him. The Siamese ape is also



THE BOBAC.—(Arctomys Bobac.)

more than forty-two feet. The principal passages branch off ever of the use of fire till the close of this second, or "fish- throughout the monkey society of the neighborhood, and about six feet below the surface, in several directions; some ing period," as he names it. Improvements in weapons, etc., of the branches are blinds, all of the others lead to the nest. took place, as the specimens show, and in the uppermost or The nest is especially prepared for hibernation, being made mammalian layer the remains found, with their harpoon larger and softer. During winter the temperature in the heads, skin dressers, ivory tags for skin boats, lip ornaments, burrow never falls below the freezing point. In December etc., indicate the condition of a population of hunters and manous families from generation to generation. the bobacs fall into a death-like sleep, in which condition fishers up to the highest level of the Esquimau or Innuit they remain until March, when they awake. During the race, to which the Alcuts are supposed to belong. Mr. Dall's first week or so after awakening they are very logy, and conclusions, if sound, have an important bearing on the desuffer for want of food, there being no grass; nettle and velopment of civilization, so that his evidence from the Aleurhubarb stalks are their only nourishment. As soon as the tian shell heaps deserves careful sifting. In another paper first grass appears it is eagerly devoured, but it acts as a he discusses the origin of this Esquimau or Innuit race, strong cathartic and frequently destroys large numbers of which he agrees with Dr. Rink in considering as the outermost wave of population driven up to the northern coasts from the more hospitable central regions of North America. At the general meeting of the British Royal Astronomi- Here he joins issue with Mr. Markham's theory of their mical Society, February 14, the gold medal of the Society was gration from Asia, at the same time pointing out that his presented to Prof. Asaph Hall, of the Naval Observatory, question is that of whence the Innuit last came, not the re-Washington, "for his discovery and observations of the sa- mote problem of the absolute origin of the American races, probably from the Old World.

Working Monkeys.

It is one of the curious things in nature that the animals nearest to man in the order of development are of little or no use to him industrially. There has never been a time when strong races of men have not compelled their weaker brothers to work for them. But, barring the showman and the organ grinder, the meanest of men have not been able to subjugate or inslave their simian relatives. An ancient Arabic proverb accounts for the freedom of apes by the fact that they shrewdly refuse to talk: "well they know that were they to speak they would be made to work; so they wisely hold their tongues.'

The proverbial prudence of the monkey appears to fail in a measure, however, in the land of the white elephant. An Austrian resident at the Court of Siam reports that in that country the monkey is trained to fish for crabs with his tail, as comical a pursuit as can well be imagined, except, perhaps, for the worthy and intelligent ape engaged in it, who sometimes gets a "bite" from a monster crab that he is totally unable to land, and falls a victim to the superior weight of his Cancer Ferox, who drags him into the water,

cashier in their counting houses.

Vast quantities of base coin obtain circulation in Siam, and the faculty of discrimination between good money and bad would appear to be possessed by these gifted monkeys in such an extraordinary degree of development that no mere human being, however carefully trained, can compete with them. The cashier ape meditatively puts into his mouth each coin presented to him in business payments, and tests it with grave deliberation. If it be genuine he hands it over to his master. If it be counterfeit, he sets it down on the counter before him with a solemn grimace of displeasure. His method of testing is regarded in commercial circles as infallible; and, as a matter of fact, his decision is uniformly accepted by all parties interested in the transaction. But, though a true and invaluable servant to his own particular master, it seems that his moral character is not altogether irreproachable. His deplorable passion for fruit renders him the terror of Siamese market gardeners, who find brute force inadequate to restrain him from visiting their orchards, and therefore have recourse to divers and sundry stratagems, one of which is reported to be as successful as it is certainly ingenious. A specially active and enterprising ape is captured and carefully sewed up in the skin of a tiger cat. He is then turned loose in the orch ard of his predilection, and straightway clambers, as well as he may, incumbered by an unfamiliar garment, into the branches of a fruit tree among his unclothed fellows. Scarcely do these latter set eyes upon him with all his feline terrors thick upon him, when a dreadful panic strikes them, and they scramble away with piercing screeches and agonized chatterings. Never more do they return to an orchard which they believe to be infested by the deadliest enemy of their race. The startling intelligence is rapidly disseminated

the wily gardener enjoys an absolute immunity from depredation forever afterward, for the very thought of a tiger cat appals the simian soul, and doubtless the tale of "the awful apparition in Ting-tse's orchard" is handed down in quadru-

A TABLE of wages and the cost of living, with the price of staple articles of commerce, going back as far as the year 1200, has been published lately. It shows that wages during the thirteenth century were about 50 cents a week. In the next century they advanced some 15 cents, and continued to advance slowly until, in the last century, they had reached \$1.87. The average for farm labor in the same countries at present is \$3.80 per week.

Wheat in the thirteenth century averaged 71 cents, or eight and a half days' labor, a bushel. Now wheat is worth, wholesale, in Europe, about \$1.46 a bushel, or two and a half days' labor. In six centuries meat has nearly trebled in price; but wages have increased more than sevenfold.

Astronomical Notes.

OBSERVATORY OF VASSAR COLLEGE.

The computations in the following notes are by students of Vassar College. Although only approximate, they will enable the ordinary observer to find the planets.

M. M. POSITIONS OF THE PLANETS FOR APRIL, 1879.

Mercury.

Mercury can be found in the first week of April by its nearness to Venus. It sets at 8 P.M. on the 1st, a little south of the point at which Venus sets. Mercury is stationary, referred to the stars, on April 6; it then has a retro grade motion until the 29th. As the motion of Venus is direct, the two planets separate rapidly, and on the 30th Mercury sets at 5h. 10m. P. M.

Venus.

Venus is coming nearer to us, and setting later. On April 1 Venus rises at 6h. 55m. A.M., and sets at 8h. 43m. P.M., more than two hours after the sun. On April 30 Venus rises at 6h. 44m. A.M., and sets at 9h. 52m. P.M. An ordinary glass will show that the disk of Venus is not wholly illuminated, and the change of phase can be watched from night to night. The bright star some degrees south of Venus on April 25, is Aldebaran.

Mars.

Mars is not likely to be seen by the ordinary observer. It rises on April 1 at 3h. 24m. A.M., about two hours before the sun, and sets at 1h. 3m. P.M., on the 30th. Mars rises after the sun and sets at noon; it is not possibly seen.

Jupiter.

Jupiter, the largest, and perhaps the most interesting, of the planets, is now coming into view in the morning. On April 1 Jupiter rises at 4h. 19m. A.M., and sets at 2h. 54m. P.M. On April 30 Jupiter rises at 2h. 39m. A.M., and sets at 1h. 28m. P.M. Although Jupiter is nearly 10° south of the celestial equator, on April 30 it rises more than two hours before the sun, and can be easily recognized.

Saturn.

On April 1 Saturn rises nearly with the sun, and sets before the sun at 5h. 49m. P.M. On the 30th Saturn rises at 4h. A. M., nearly 2° north of the celestial equator, and can perhaps be seen before the sun rises.

Uranus is the only planet, more distant from the sun than the earth is, which can be found in the evening.

On April 1 Uranus rises at 2h. 48m. P.M., comes to the meridian at 9h. 32m. P.M., and sets at 4h. 15m. A.M. of the next day. On April 30 Uranus rises at 0h. 51m. P.M., comes to the meridian at 7h. 32m. P.M., and sets at 2h. 20m. the next morning.

Uranus is south of the bright star Regulus on April 30, 23, and 2° east of the star.

It may be found, when on the meridian, by looking east of Regulus, and as far from the star as four diameters of the moon.

Brorsen's Comet.

Brorsen's comet, which was first seen in 1846, and was perceived to have a period of five and a half years, has returned this year, having been seen by the director of the observatory at Arcetri, Florence.

An ephemeris of the comet, published in the Astronomische Nachrichten, gives its place on March 21, as nearly that of the star Xi Ceti. The comet should be looked for in March among the stars of Aries, but its apparent motion northward is very rapid, and in April it should be looked for among the stars of Perseus.

Brorsen's comet is not yet visible to the eye, but can be readily found with an ordinary telescope.

It appears as a hazy star of the seventh magnitude, throwing off a short train. It is increasing in brightness and coming into better position, as it sets later in the evening.

Although at this time near Venus, its motion among the stars is so much more rapid than that of the planet that it will soon be much further north. Following the ephemeris of Schulze, the comet will be more than 7° north of Venus April 1st, and on April 15th about 20° north of the planet and among the stars of Perseus.

MISCELLANEOUS INVENTIONS.

Mr. Jotham W. Wakeman, of Jersey City, N. J., has deslips, which may be moved downward as the writing progresses, the copy thereby being kept before the scholar's eye.

An improved tablet for blank paper, letter heads, bill heads, sheet music, letters, etc., has been patented by Mr. Bredell true siphon, and rapidly brings the level back again. C. Murray, of Denison, Texas. Tubes are arranged across the covers where they join the back, and are provided with springs connected by cords, which draw the tubes together so as to clasp the edges of the papers.

A band bracelet, made of a single thickness of metal, having at its edges raised ornamental work and projecting flanges, which are made higher than the ornamental work to bone dust or superphosphate, or any fertilizer that will add the rule being that a conveyance of a described invention carprotect it, has been patented by Mr. Charles Hein, of Corona, N. Y.

improved pocketbook, the back of which consists of a channeled flange or rim, whose ends are pivoted to the sides diluted blood from a slaughter house, just previous to a both are included in the instrument which conveys the deof the frame thus dispensing with hinges at the back and giving great strength and durability to the book.

Mr. Aaron C. Vaughan, of Shane's Crossing, O., has patented a nut lock, consisting of a longitudinally grooved bolt neglect to run the mowing machine over frequently. Once Bowles, 2 Brown Ch., 84.

a groove or locking seat about its edge, and a wire key arranged in the longitudinal groove of the bolt and bent twice at right angles.

An improved machine for cutting off the projecting ends of the pegs of boots has been patented by Mr. R. T. Ellifrit, of Platte City, Mo. The inventor employs a revolving circular saw, whose mandrel turns in bearings in a guard casing that is pivoted to the upper end of an upright hollow standard or stock.

An improved trap for preventing the escape of sewer gas into houses, has been patented by Mr. J. T. Bladen, of Brooklyn, N. Y. It consists of a cover of novel construction, which may be closed so as to thoroughly seal the drain pipe, or it may be opened to permit of the escape of water from the sink. It may be easily applied to any sink, basin,

Mr. Hermann H. Heiser, of Denver, Col., has patented an improved girth iron for ladders, in which the metal loop is provided with strengthening bars, which are arranged with reference to the lacing bar so as to prevent the lacing strap from getting out of position.

An improved lath-sawing machine, patented by Mr. James Little, of Evansville, Ind., is designed to cut, at one operation, a bolt from a slab or plank and saw the bolt into lath of a uniform size. The machine has a series of saws on a vertical mandrel and a corresponding series of spreaders and gauges, and it has a horizontal mandrel carrying a saw which separates the lath from the edge of the bolt.

Messrs. J. J. Christie and J. Overton, of Henderson, Tenn., have patented an improved wrench and crimper for nut washers, which consists of a hooked arm which is pivoted to a wrench. The hook is placed under the edge of a washer, and the wrench being placed on an adjacent nut and turned, binds the washer.

An improved type-writing machine, patented by Antonio Michela, of Turin, Italy, may be used to print stenographic or phonetic signs. It is also capable of recording syllables. The machine cannot well be described without engravings.

Mr. Pedro F. Fernandez, of San Juan, Porto Rico, has invented an attachment for sewing machines for soaping or waxing the thread as it passes to the needle. The invention consists in a clamp for holding a small cylinder of wax or soap, and having a binding screw for securing it to the needle arm or bar.

NEW AUTOMATIC SIPHON.

In a communication to the Edinburgh Photographic Society Dr. William Taylor gives the following description of an apparatus designed to serve as an overflow pipe to tanks or other vessels not already fitted with means to that end, and without in any way altering such vessels. It is specially applicable to tanks with a fluctuating supply of water, in which it is necessary to maintain a constant level.

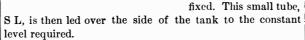
As its name implies, it is self-acting, and while at once carrying off any sudden influx of water, it will not bring the

> of water is carried from the bottom of the tank. Into the tank, T, is passed the waste pipe, A B, of a diameter greater than the feed to tank. This waste pipe is bent into the form shoulder, at S, a small hole is made, over

which a small tube is

level below a certain

fixed line. The excess



rapidly carries off the water to the level, L. When it reaches this air is admitted by the small pipe through the orifice at hensive, and include the extended term in case an extension L, and the waste pipe ceases to be a perfect siphon. If, now, should be granted. During the term for which the patent vised a school writing book, with sliding or adjustable copy a small stream of water flow into the tank the same quantity is granted the assignee of all the right of the patentee in the passes through the partial siphon, A B; but should a rush same may assign and convey the patent for the residue of of water into the tank take place, bringing the water above the term granted, or he may continue to make, use, and vend the level, L, the waste pipe is at once converted into a the patented improvement, but his title to the invention

> In the sketch the pipes have been drawn projecting from the tank. This has been done for simplicity; but, of course, in practice these pipes are laid close to the side of the tank.

-The Lawn.

an additional rich green tint to the turf, is always recom- ries with it all the incidents, and all the authorities concur in pensed by securing the most conspicuous grass plat in the the inchoate right to obtain a renewal or extension of the Mr. John G. Klett, of Brooklyn, N. Y., has invented an neighborhood. The best lawn we ever saw, says an agri-patent is as much an incident of the invention as the inchoate cultural writer, was occasionally treated to a sprinkling of right to obtain the original patent; and if so, it follows that shower. When the soil is soft, run the roller over; it helps scribed invention, without limitation or qualification. Emgypsum will also freshen up the grass. But above all, never How., 493; Clum vs. Brewer, 2 Cart. C. C., 520; Carnan vs. and a nut having one or more radial grooves in its face, and a week is none too often during a wet season.

Another writer on the treatment of lawns suggests the use of oil of vitriol touched to the heart of the plantain. He says it will kill more surely than digging it out. And if it will exterminate the weed to an inconsiderable extent, it is certainly better than digging it out, which we have tried with discouraging success. We have dug over a lawn till nearly every vestige of green was gone, determined to get rid of the plantain at all hazards, but it invariably got the best of the grass in returning, and it seemed rather to thrive the better for the cultivation it had received by our exterminating process.

Colored Pencils for Glass.

The following formulas for the composition of pencils for sketching on glass, porcelain, etc., are those used at the factory of A. W. Faber, of Stein, near Nürnberg, Germany:

1.—BLACK.

Lampblack	10 parts.		
White wax	40 ''		
Tallow			
2.— white.			
Zinc white	40 parts.		
White wax			
Tallow			
3.—LIGHT BLUE.			
Prussian blue	10 parts.		
White wax	20 ' ''		
Tallow			
4.—DARK BLUE.			
Prussian blue	15 parts.		
Gum arabic			
Tallow			
5.—YELLOW.			
Chrome yellow	10 parts.		
Wax			
Tallow			
1 anow	10		

The colors are mixed with the fats in warmed vessels, levigated with the same, and are then allowed to cool until they have acquired the proper consistency for being transferred to the presses. In these the mass is treated and shaped similarly as the graphite in the presses for ordinary pencils.—Deutsche Gewerbe Zeitung.

SUPREME COURT DECISION.

OWNERSHIP OF THE SECOND TERM OF AN EXTENDED PATENT.

In the appeal of George Hendrie vs. Thomas Sayles the decree of the court below was confirmed for the following reasons: From the papers in this case it appears that prior to the granting of the patent the inventors conveyed and set over all the right, title, and interest whatever which they had, or by letters patent would be entitled to have and possess, in the described invention, to an assignee, who subsequently, after the patent was granted, assigned to the complainant "all his right, title, interest, and claim whatsoever which he then had or may have in and to said invention and patent, and any extension thereof that may hereafter be granted," with certain specific exceptions not material to this investigation. Before the term of the original patent expired application was made for an extension, which was granted in due form for seven years.

Controversy having arisen between these parties, the complainant instituted the present suit against the respondent for infringing his right under the extended term. Service having been made, respondent demurred that the complainant shown, with the should- had not in and by his bill of complaint made any such title er, S, about half an in himself to the extended term of the patent as would eninch lower than the title him to relief. Hearing was had, and the court overruled level of water required the demurrer and entered a decree in favor of the complainin the tank. On the ant, the respondent electing to stand upon his demurrer. upper surface of this Prompt appeal was taken to the Supreme Court by the respondent, who maintains, as in the court below, that the bill of complaint showed no legal title to the extended term in the complainant.

The Supreme Court holds that, "when the patentee assigns the patent to a purchaser, the assignce acquires only the exclusive right during the term for which the patent was grant-Now, when the waste pipe is put into action as a siphon it ed, unless the assignment contains words showing that the parties intended that the instrument should be more compreterminates when the term of the patent expires. .

"Apt words are, therefore, required where the conveyance is of an existing patent to show that the conveyance includes more than the term specified in the patent; but where the conveyance is of the invention, whether before or after the patent is obtained, the rule is otherwise, unless there is The man who puts on a frequent little sprinkling of salt or something in the invention to indicate a different intention, the appearance greatly. The application of a little ground mons vs. Sladden, 9 Off. Gaz., 354; Gayler vs. Wilder, 10

"Viewed in the light of these suggestions, the court is of

opinion that the entire interest in the invention passed from the inventors to the assignor of the complainant by the instrument of assignment which they executed to him before the patent was granted, and that the patent was properly issued in the name of their assignee. They, the inventors, do not controvert the exclusive right of the complainant, nor does the respondent deny that the terms of the assignment from the assignee of the inventors to the complainant are amply sufficient to convey to him all that he claims if his assignor at the time held the title to obtain the extended term and the court being of opinion that the assignor of the complainant did hold that right, it follows that there is no error in the record."

AN IMPROVED WASHING MACHINE.

The accompanying engraving represents an improved colored dorsal band, bordered by a dotted line on each side; produce the young; nor is it necessary, so long as the States

washing machine recently patented by Mr. Erasmus L. Keys, of Muncie, Ind. It has been the aim of the inventor, in devising this machine, to imitate as nearly as possible the operation of rubbing the clothes by hand on an ordinary washboard. This is done by passing the clothes between ribbed or corrugated rollers, B D, under pressure given to the two upper rollers by the spring, f, and at the same time giving the upper rollers a longitudinal motion by means of cams, I, at the ends of the larger roller, B. The relative position of the three rollers is clearly shown in Fig. 2. A guard, G, at each end of the machine prevents the clothes from coming into contact with the metallic parts of the ma-

The upper rollers yield to accommodate clothes of varying thickness without interfering with this longitudinal motion.

The machine, although very simple, appears to be made on the right principle.

DE KAY'S SNAKE,

BY C. FEW SEISS.

It is impossible to write the true life history of an animal from only a lifeless specimen. Buffon attempted it, but how often has he committed grave errors by so doing! Thus, in one instance, he says, while examining the skin and head of a black skimmer (Rhynchops nigra): "We see from its bill that life was to such a formed bird a burden, and that capturing and devouring food was difficult, if not painful." On the contrary, its bill is admirably fitted for its mode of life. Dr. Holbrook, in his "North American Herpetology," says: The De Kay snake "feeds on various insects, as crickets, swallow a mammal, bird, frog, or toad, and as it was velt, one of the State Fish Commissioners, emphasis was

not a water snake, tadpoles and fishes were out of consideration, and hence came then to the conclusion that it must be insectivorous. My observations have proved this assertion to be an error. I have had many of these snakes in captivity, from a month to over a year. I never saw one of them even attempt to catch or eat a grasshopper, beetle, bug, fly, moth, frog, or toad, but from the first time until now I never saw one refuse to seize and swallow an earthworm Lum bricus), unless the snake was sick and blind, previous to casting its skin. This was not only the case with individuals taken in Pennsylvania, but a living specimen sent to me from Massachusetts had the same vermivorous habits, and refused to eat all insects placed in its cage. If the worm seized happened to be small, the snake would double the worm, and swallow both parts at the same time.

until he could seize it by the head or tail. When the worm was swallowed head foremost, the snake had little to do but permit the worm to creep down the ophidian gullet, of its own free will. And this it could do more rapidly than the snake could have done in the usual manner of drawing it in by the backward and forward motion of its jaws. Instinct seemed for retreat; but alas for Lumbricus! he little dreamed it would be the hole he should occupy-his grave.

I have discovered that young garter snakes (Eutania) feed provide for themselves; they need no food or care, they con- consolidated surveys.

entirely upon earthworms, and not upon insects, as some have asserted. I have seen Eutanias the day after birth voraciously attack and devour earthworms, and I am of the opinion that many other species of our land serpents while immature feed wholly upon these common annelids.

De Kay's snake is generally crepuscular in habits, and rarely quits its retreat during midday, unless the weather be cloudy or rainy, when it moves about in search of worms. In captivity, however, I have, on cold days, several times seen it leave its hiding place to bask for hours at a time in the sunshine. At such times it would throw itself into a coil, and bury its head either under the pebbles or beneath the folds of its body, to shield its eyes from the rays of the sun, which seemed unpleasant. The Stoveria Dekayi is of a pale brown color above, with a yellowish white or clay

Fig.1.

KEY'S WASHING MACHINE.

ry length is about one foot.

The other species of the genus, the S. occipitomaculata, is salmon red (in life) beneath, and has the head generally marked with three pale spots, hence its name.

Some have considered these serpents to be merely immature striped snakes (Eutanias), but let it be distinctly understood that the majority of serpents come into the world marked and colored like their parents.

Trout and Bass Farming.

The addition of our popular food supply during recent years, by the restocking of exhausted streams and lakes, has been of great public advantage. There still remain countless small brooks and ponds capable of being made useful grasshoppers, etc." Now it is probable, he, in examining and profitable with very little trouble. In a paper read behis specimen, saw it was almost too small to capture and fore the New York Farmers' Club, by Mr. Robert B. Roose-

vert worthless insects or waste water grasses into human food. The trout or bass from a farmer's pond costs him nothing but the trouble of catching, and compares in excellence on his table with his best poultry, to say nothing of pork that has been fed twice a day for months. The only loss of time or labor is in the catching, and to reduce that it is only necessary to make the fish abundant.

Mr. Roosevelt did not advise farmers, except in rare cases where they have unusual facilities, to undertake the artificial hatching of fish, but he urged them to utilize such ponds and streams as they can without labor or expense. This might not yield the greatest possible profit, but it would bring fair returns, and in no wise interfere with other occupations.

"It would be irksome," he said, "for the farmer to watch over the incubation of trout eggs, which require months to

> take this labor upon themselves and furnish, to all who need them, trout fry already hatched. If gentlemen owning suitable streams or ponds desire to stock them with trout they have only to apply at the State hatching-house, and, where a number combine, the expense to each is trifling. After the trout fry are placed in their proper element--and it must not be forgotten that only cold spring-water is suited to them -they will take care of themselves. In the course of a year or two they will have attained an edible size and can then be caught. Nothing is simpler than this, and yet how many streams and fine fresh brooks there are that perhaps once abounded with trout which are now wholly depopulated. There is, however, another kind of fish known as the fresh-water bass, which is possibly even more valuable than the trout for the farmer's use. It is not so exact-

beneath, flesh-color, or soiled yellowish-white. Its ordinaling in the character of the water in which it will live, and will grow more rapidly; more important still, it needs no culture or care whatever, or any time.

"The parents, which are fairly prolific, lay their eggs in a sort of nest and watch over them till they are hatched. Bass have never failed to increase rapidly where they have been introduced, and they are suited to almost any pond. These are especially the fish to be used where water farming is to be combined with land farming in the simplest and easiest way. Nothing is required but to place a few pair of mature fish, which can be easily transported in any water they are expected to populate, and they will attend to the rest themselves. They can hold their own with any other species, even against the dreaded pickerel; they increase rapidly and grow quickly, and as human food they are excellent."

The Poison of Serpents.

Some interesting observations have recently been made on

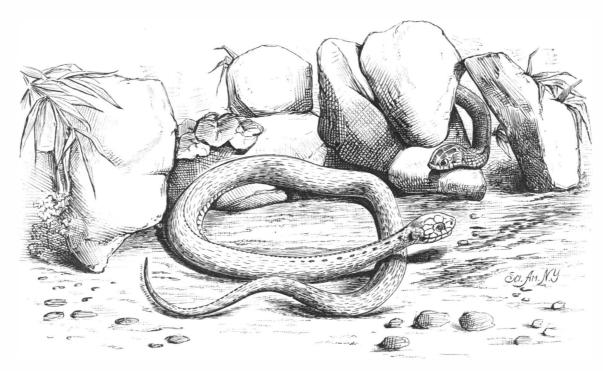
the poison of serpents by M. Lacerda, in the physiological laboratory of the National Museum, at Rio Janeiro, and which have led the experimenter to conclude that, in some cases at least, the venom contains an organized ferment, presenting some analogies to bacteria. M. Lacerda states that a drop of poison removed from a rattlesnake under the influence of chloroform, and examined with the aid of the microscope, appears as "a species of filamentous protoplasmic matter, consisting of a cellular aggregation disposed in arborescent form resembling certainly copods.'

These cells are fully described in a paper read before the French Academy of Sciences. Similar phenomena were observed in the blood of animals that had been bitten by a rattlesnake, and it was found that such blood was capable of setting up the same change in the blood of other

was always followed by the death of the animal.

The Directorship of the National Surveys.

It was announced, March 11, that the Directorship of the National Surveys is to be given to Clarence King. The apnot half as much so as making the broad acres laugh with pointment will give general satisfaction. Mr. King is not to tell the worm that the snake's gullet was a pleasant hole a harvest" seems to the inexperienced. Fish farming has only a most capable man for the place, but his relations its rules and limits, precisely as land farming has, but is to other laborers in the same field hitherto have been such as simpler and far more productive. Once hatched the fish to give promise of harmonious action in every part of the



DE KAY'S SNAKE.

If the worm was large, the snake worked and maneuvered laid upon the fact that in many places inland, and not ac- animals when injected hypodermically, and that this change cessible to the sea, that great storehouse of fish food, there is difficulty in obtaining even the commonest sorts of fish. If the farmer can add to his usual crops a crop of fish he will be benefiting his neighbors as well as himself. To do so may seem to many at first glance a difficult operation, but

TO INVENTORS.

An experience of more than thirty years, and the pre paration of not less than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequaled facilities for procuring patents everywhere. In addition to our facilities for preparing drawings and specifications quickly, the applicant can rest assured that his case will be filed in the Patent Office without delay. Every application, in which the fees have been paid, is sent complete—including the model to the Patent Office the same day the papers are signed at our office, or received by mail, so there is no delay in filing the case, a complaint we often hear from other sources. Another advantage to the inventor in securing his patent through the Scientific American Patent Agency, it insures a special notice of the invention in the SCIENTIFIC AMERICAN, which publication often opens negotiations for the sale of the patent or manufacture of the article. A synopsis of the patent laws in foreign countries may be found on another page and persons contemplating the securing of patents abroad are invited to write to this office for prices, which have been reduced in accordance with the times and our perfected facilities for conducting the business Address MUNN & CO., office SCIENTIFIC AMERICAN.

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Steam Tug Machinery, Engines, Boilers, Sugar Ma chinery. Atlantic Steam Engine Works, Brooklyn, N.Y. Valves and Hydrants, warranted to give perfect satis

faction. Chapman Valve Manuf. Co., Boston, Mass. Assays of Ores, Analyses of Minerals, Waters, Commercial Articles, etc. Technical formulæ and processes Fuller & Stillman, 40 & 42 Broadway, N. Y.

Jarvis Patent Boiler Setting, same principle as the Siemens process for making steel; burns screenings and all kinds of waste fuel, without blower.

A. F. Upton, Agent, 48 Congress St., Boston, Mass. Kimball's Catarrh Cigarettes, an instantaneous relief

and a pleasant smoke. They contain no tobacco For Sale or Exchange.—A partly finished Foot Lathe

swing 10 x 30 inches. W. Bulkeley, Ballston, N. Y. Ten years' experience has enabled Mr. A. H. Downer. 17 Peck Slip, N. Y., to produce a liquid for the prevention and removal of scale in steam boilers, which is per-

will convince the most skeptical of its utility. For Shafts, Pulleys, or Hangers, call and see stock kept at 79 Liberty St., N.Y. Wm. Sellers & Co

Lathes, Planers, and Drills, with modern improve ments. The Pratt & Whitney Co., Hartford. Conn

Important. - See Hogins' Patent Laundry Table, illus trated in last week's SCIENTIFIC. For State, Canada, or entire right, address A. H. Hogins, Box 15, Morris-

Artists, call at 36 Platt St., N. Y., and see lantern with oil lamp for tracing card pictures to any size.

Wanted-A manufacturer to make on contract 500,000 improved Screw Wrenches. Address Lock Box 146, Athol, Mass.

Manfs. of Rubber Rolls, address A. T. Melvin, Pitts ville, Md.

For best Portable Forges and Blacksmiths' Hand Blow ers, address Buffalo Forge Co., Buffalo, N. Y.

American Watch Tool Co., Waltham, Mass. Lathes Watchmakers. Dentists, and Jewelers. Special machinery for watch and clock factories

Makers of Hydraulic Motors and Elevators, please end circulars and price lists to C. L. Allen, Box 442, Worcester, Mass.

For Sale Cheap.—Second-hand 8 foot Boring and Turning Mill, Lathes, Planers, Drills, Bolt Cutters, etc. Circulars. D. Frisbie & Co., New Haven, Conn.

Wanted-A man to take charge of and run a Stove Foundry. Must be thoroughly competent. Address. with references, X. R., Baltimore P. O., Md.

Steel Stamping Figures, 1-16 to $\frac{1}{2}$ in., \$1 per set. All work warranted. C. L. Alderson, Cleveland, O.

For Sale. - 60 H. P. Engine, one 35 H. P. Boiler: A

No. 1. Box 28, South Windham, Conn. Manufacturers and other owners or occupants of large buildings, will conserve their interests by sending for samples and price list of H. W. Johns' Asbestos Liquid Paints, H. W. Johns Mfg, Co., 87 Maiden Lane, New York, sole manufacturers of genuine Asbestos materials

Gutta Percha. pure and sheeted, for sale in quantities to suit. Anderson & Reynolds, Salem, Mass

Wanted-Second-hand Corliss Engine, 100 to 125 H.

P. Address P. O. Box 1208, New Haven, Conn 17 and 20 in, Gibed Rest Screw Lathes. Geo. S. Lincoln & Co., Hartford, Conn

Pamphlet of "Bu Wheel" sent free by N. F. Burnham, York, Pa.

Gaume's Electric Engine. 171 Pearl St., B'klyn, N.Y. Diamond Planers. J. Dickinson, 64 Nassau St., N. Y. Engines, 1/2 to 5 H. P. G. F. Shedd, Waltham, Mass. Case Hardening Preparation. Box 73. Willimantic, Ct

Vertical Burr Mill. C. K. Bullock, Phila., Pa. Sheet Metal Presses, Ferracute Co., Bridgeton, N. J.

Excelsior Steel Tube Cleaner, Schuylkill Falls, Phila., Pa. Mundy's Pat. Friction Hoist, Eng., of any power, double and single. Said by all to be the best. J. S. Mundy, New-

The Scientific American Export Edition is published monthly, about the 15th of each month. Every number comprises most of the plates of the four preceding weekly numbers of the SCIENTIFIC AMERICAN, with other appropriate contents, business announcements etc. It forms a large and splendid periodical of nearly one hundred quarto pages, each number illustrated with about one hundred engravings. It is a complete record of American progress in the arts

Send for Circulars of Indestructible Boot and Shoe Soles to H. C. Goodrich, 40 Hoyne Ave., Chicago, Ill. For Sale .- 7 foot bed Putnam Planer, \$350. A. A.

Pool & Co., Newark, N. J.

Bevins & Co.'s Hydraulic Elevator. Great power, implicity,safety,economy,durability. 94 Liberty St.N.Y.

A Cupola works best with forced blast from a Baker Blower. Wilbraham Bros., 2,318 Frankford Ave., Phila.

Special Planers for Jointing and Surfacing, Band and croll Saws, Universal Wood-workers, etc., manufacured by Bentel, Margedant & Co., Hamilton, Ohio.

Steel Castings true to pattern, of superior strength and durability. Gearing of all kinds. Hydraulic cylinders, crank shafts, cross heads, connecting rods, and machinery castings of every description. For price list and circular, address Chester Steel Castings Company, Evelina St., Philadelphia, Pa.

Elevators, Freight and Passenger, Shafting, Pulleys, and Hangers. L. S. Graves & Son, Rochester, N. Y.

Machine Cut Brass Gear Wheels for Models, etc. (new list). Models, experimental work, and machine work generally. D. Gilbert & Son. 212 Chester St., Phila., Pa.

Holly System of Water Supply and Fire Protection for Cities and Villages. See advertisement in SCIENTIFIC AMERICAN of this week.

Diamond Self-clamp Paper Cutter and Bookbinders' Machinery. Howard Iron Works, Buffalo, N. Y.

Best Power Punching Presses in the world. Highest Centennial Award. A.H.Merriman, W. Meriden, Conn. Improved Steel Castings; stiff and durable; as soft and easily worked as wrought iron; tensile strength not less than 65.000 lbs. to sq. in. Circulars free. Pittsburg

Steel Casting Company, Pittsburg, Pa. Electro-Bronzing on Iron. Philadelphia Smelting ompany, Philadelphia, Pa.

Hand Fire Engines, Lift and Force Pumps, for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N.Y., and 93 Liberty St., N. Y. city, U.S.A.

Vertical and Yacht Engines. F. C. & A. E. Rowland, New Haven, Conn.

Wm. Sellers & Co., Phila., have introduced a new Injector, worked by a single motion of a lever.

Shaw's Noise Quieting Nozzles and Mercury Pressure Gauges. T. Shaw, 915 Ridge Ave., Philadelphia, Pa.

For Solid Wrought Iron Beams, etc., see advertise ment. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

H. Prentiss & Company, 14 Dey St., N. Y., Manufs. Taps, Dies, Screw Plates, Reamers, etc. Send for list. Presses. Dies, and Tools for working Sheet Metal, etc. Fruit & other can tools. Bliss & Williams, B'klyn, N. Y.

Nickel Plating.-A white deposit guaranteed by using ur material. Condit, Hanson & Van Winkle, Newark, N.J. Hydraulic Elevators for private houses, hotels, and public buildings. Burdon Iron Works, Brooklyn, N. Y.

The Lathes, Planers, Drills, and other Tools, new and second-hand, of the Wood & Light Machine Company, Worcester, are being sold out very low by the George Place Machinery Agency, 121 Chambers St., New York.

Hydraulic Presses and Jacks, new and second hand. athes and Machinery for Polishing and Buffing Metals E. Lyon & Co., 470 Grand St., N. Y.

Solid Emery Vulcanite Wheels-The Solid Original Emery Wheel—other kinds imitations and inferior. Caution.—Our name is stamped in full on all our best Standard Belting, Packing, and Hose. Buy that only. The best is the cheapest. New York Belting and Packing Company, 37 and 38 Park Row, N. Y.

Portland Cement-Roman & Keene's, for walks, cisterns, foundations, stables, cellars, bridges, reservoirs, breweries.etc. Remit 25 cents postage stamps for Practi-cal Treatise on Cements. S. L. Merchant & Co., 53 Broadway, New York.

Needle Pointed Iron, Brass, and Steel Wire for all purposes. W. Crabb, Newark, N. J.

Manufacturers of Improved Goods who desire to build up a lucrative foreign trade, will do well to insert a well displayed advertisement in the SCIENTIFIC AMERICAN Export Edition. This paper has a very large foreign

Galland & Co.'s improved Hydraulic Elevators. Office 206 Broadway, N.Y., (Evening Post Building, room 22.)



HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after reasonable time should repeat them.

of a personal character, and not of general interest, ever been tried in marine boilers as a preventive of curing a di- or tri-chloride. should remit from \$1 to \$5, according to the subject, priming, and if considered safe to use with steam at 50 as we cannot be expected to spend time and labor to obtain such information without remuneration.

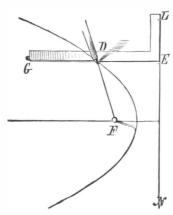
MENT referred to in these columns may be had at this known effect of the use of other oils in such cases, office. Price 10 cents each.

(1) J. E., Jr., writes: I have a bichromate battery composed of 12 cells; after 2 weeks I find that the carbon plates are covered with crystals; they interfere with the working of the battery. My belief is that I saturated the solution with too great an amount of bichromate. The battery is constructed after the form published in Scientific American, No. 146, consisting of porous cup, zinc, and carbon; the solutions are salt and sulphuric acid. A. They are crystals of potassio-chromium alum (K2('r2(SO4)4 24 Aq). They invariably form after a time in the bichromate battery when the acid bichromate solution becomes partially exhausted and concentrated by evaporation. The bichromate solution should be more frequently renewed.

(2) L. B. asks: How many horse power is a boiler, 10 feet long, 42 inches diameter, with 36 3-inch tubes, or an engine, 8 inch cylinder, 12 inch stroke, making 150 revolutions a minute, at 60 lbs. pressure? A. Boiler, 16 horse power nominally. Engine, 20 horse

(3) C. N. M. asks how the preparation is made now used by manufacturers of colored. glazed, and plated papers, to render the article partly waterproof, or to resist, in a measure, the rubbing away of the color when slightly moistened. A. The paper is heavily sized with a prepared glue size, and the printed colors protected by the subsequent application of a thin, colorless spirit varnish.

(4) A. G. asks how to describe a parabola by mechanical means. A. Place a straight edge to the directrix, E N, and apply to it a square, L E G; fasten



at G oneend of a cord equal in length to E G; fix the other end to the focus, F; slide the square steadily the moment it leaves the rifle, its progressive speed (as along the straight edge, holding the cord taut against the edge of the square by a pencil, D, and it will de-

(5) W. B. M. asks: 1. Could a double dynamo-electric machine be made after the plans in Sci-ENTIFIC AMERICAN SUPPLEMENT No. 161, by placing two similar machines together end to end, and connecting the two armatures so as to form a continuous shaft, with magnets as to bring dissimilar poles into juxtaposition? A. It might be done, but a single large magnet would be better, using an armature made in two sections, one shorter than the other, the shorter one being used to excite the magnet. 2. Could the current from one machine, arranged to work either with or without a battery, be alum. No. 11. Steam and water vessels. No. 12. Reused to excite the magnets of the other machine, and thus, as it were, multiply one machine by the other? A. Moistened sponge and powder. No. 14. A system of This has been done in several different machines. 3. Could a dynamo-electric machine made with permanent magnets be coupled on to one of the other kind in a erate carbonic dioxide on contact with the acid. No. manner similar to the above, with a great advantage in 16. Paper pulp and alum. No. 17. Raw cotton, sawthe way of power of current produced from the second dust, and whiting. No. 18. Ashestos, plaster cement, machine? A. Yes; Wilde's machine is arranged in this chemical salts, and alum. No. 19. Asbestos, marble way.

by removing the sulphur that it will not tarnish more than tin or nickel? If so how refined so that it will tarnish the least? A. No; chemically pure copper quickly tarnishes in the air unless protected by a lacquer.

(7) B. R. J. asks: What is the cause of the drumming noise in some furnaces when the door of the boiler is closed tightly? I am now running a boiler which shakes the building to the foundation when the door is closed tightly. A. It is generally due to uneven firing, holes being formed through which the air rushes with great velocity. The noise can generally be stopped by the judicious application of a little coal.

York awarded the prize offered for best method of ob- plastering. Can I cement it together with plaster of taining rapid canal navigation without injury to the canal? A. Yes. 2. Was this prize offered simply for best method of preventing the washing away of the of Paris is generally used to cover the stone after makbanks by the waves from the canal boat? A. No; it was found by experience that this washing was not caused by any of the boats that were tried, at the slow speed that they developed.

(9) G. G. asks: Can the telephone be worked by using a small creek in place of the second or return wire? A. Yes.

(10) D. E. J. asks where to find out how to make a small stationary engine. A. Consult the back numbers of the Scientific American and Supplement.

have also noticed that a steam fire engine will also show more pressure of water in the hose than there is steam pressure in boiler. A. The pressure which an air pump will deliver against, will depend on the diameter of the pump and power applied.

or 60 lbs pressure and if so what has been the general results. A. We are not aware of the use of petroleum should expect beneficial results. We would advise inbe closely watched.

(13) A. E. W. asks: 1. Has the phonograph been perfected so that a speech, sermon, or a 6 horse power (actual) would not drive it more than 5 musical piece may be registered by having the speaker We think not. 2. Has there ever been a telephone invented in which a diaphragm and artificial magnet are placed in the circuit of a common electrical battery? A. Yes.

(14) W. H. C. asks: Can you inform me if there is a cheap residuum of the distillation of petroleum of which can be made a cheap black varnish, and if so what solvent is used? A. The pitchlike residue remaining in the stills, where the distillation is not forced at the last, is sometimes sold as an artificial asphalt. It is soluble for the most part in oil of turpentine, benzine, or benzole.

class aniline black ink, something that will flow easy, for sale.

be black when first written, and will not get thick when left standing a long time. A. Triturate $\frac{1}{4}$ ounce of commercial soluble nigrosine and 1 drachm of alum, with about 1/4 pint of hot water, and digest for an hour in the water bath at 212° Fah., strain the resulting solution through a piece of fine cotton cloth, and dilute with a little hot water, if necessary, for use. It is well to add a few drops of clove oil to prevent alteration. 2. How to make a good blue ink. David's blue ink is just the color I want, but the trouble with it is, it wont flow when it gets a little old.
 I would prefer an aniline ink if there is any that will give a rich deep blue. A. Use Nicholson's soluble aniline blue in place of nigrosine as above. 3. How to make an aniline red. A. Warm gently 3 drachms of Porrier's soluble scarlet or red scarlet with about 1/2 ounce of water, and add a few crystals of tin salt (stannous chloride), or use a strong slightly ammoniacal aqueous solution of aurine or coralline. Address the chemists who advertise in these columns. 4. Would it be practicable to produce an electric light, the machinery to be driven by a weight? How large a weight would it take to produce electricity enough to light a room 15x20 feet with as much light as 3 or 4 gas burners would make the weight to fall 10 feet in five hours? A. With the Werdermann or Sawyer-Man lamps we think it would require the fall of about a ton weight through from 6 to 8 feet a minute.

(16) J. J. C. asks: If a rifle be shot off perpendicularly on a moving railroad car, where will the ball fall? A. By "perpendicular" we suppose you mean "vertical"; if so, when leaving the rifle the ball would have the same progressive velocity as the car, but well as its vertical velocity) is gradually reduced, and its path will be a curved one; the ball striking the ground in advance of the point from which it was fired and in rear of the position of the rifle at the instant of the ball striking the ground, as the latter has continued to advance with the train and with velocity unretarded.

(17) H. J. L.-We give below 19 patented fillings for safes: No. 1. Residuum of soda water manuthe commutators at the outside end; and so winding the facture. No. 2. Soapstone. No. 3. Tiles, alum and clay. No. 4. Alumina and ammonium alum. No. 5. Copperas and gypsum. No. 6. Starch, water, gypsum. No. 7. Alum in small pieces embedded in gypsum. No. 8. Epsom salt and gypsum. No. 9. Cement, lime, sawdust, and silicious mortar. No. 10. Paper pulp and movable water vessels between the casings. No. 13. fusible pipes with water. No. 15, Sulphuric acia in bottles with fusible plugs, and sodium carbonate to iibdust, pipe clay, gypsum, glycerine, mucilage, magnesium (6) R. A. G. asks: Can copper be so refined and sodium sulphates, borax, alum sal soda, and paraf-

> (18) C. W. C. asks (1) if a tank lined with sheet lead would have any poisonous or injurious effect upon the water in case it was used as a cistern for rain water. A. Water stored in such a reservoir would not be fit to drink. 2. Can you inform me of any paint that can be used to paint the inside of a rain water tank so that water may be kept in it? A. Several well dried coats of good asphaltum varnish may be applied; but it would be better and safer to collect the water in clean wooden hogsheads or cemented cisterns

(19) R. H. H. writes: A French burr mill-(8) J. S. B. asks: 1. Has the State of New stone has come apart just between the face and the Paris without taking it all apart? A. A good cement can be made of alum and powdered burrstone. Plaster ing the joints with the cement.

(20) D. & C. write: 1. We run our mills with a Leffell wheel. The wheel is situated 60 feet from mill shaft and connected by a shaft 60 feet long. Will we gain any power by putting water house and wheel nearer, and how much? A The gain will be very slight, and will hardly justify the expense of moving. 2. Please tell us how to bend rims, buggy shafts, plow handles, etc., cheaply, without the use of a steam boiler. Can they be bent by simply boiling? A. They can be softened by boiling, but the operation is more (11) C. M. P. asks: Why will a locomotive tedious than when a steam box is used. 3. How can having an air pump, pump more pressure of air into the we mix up Portland cement mortar to resist the action air drum than there is steam pressure on the boiler? I of water? A. You can make a mixture of 1 measure cement and 2 measures of sand.

(21) W. S. writes: To try a proposed experiment, I will need a bi- or tri-chloride of sodium. Can this be obtained, or made cheaply, and what process? A. Sodium is a monad metal, and combines with but Persons desiring special information which is purely (12) J. R. F. asks if refined petroleum has one equivalent of chlorine. You will not succeed in pro-

(22) H. writes: 1. I want to build a steam launch 47 feet long, 101/2 feet beam, slanting at sides 8 Any numbers of the Scientific American Supple- for checking foaming in boilers, but from the well inches each side, and in front about 10 feet of bottom flat; will a 6 horse power boiler and engine propel it in the swift water of our Western rivers, the Ohio and troducing it in small quantities at first, and that its effect Wabash, say a fair rate of speed 5 or 6 miles up stream? The boat will be built light, one deck, boiler and engine 1,400 lbs, empty. The boat will not draw light with boiler and engine in place more than 6 inches. A. No, a or 6 miles per hour in smooth water. 2. What position a few feet from the instrument, say 15 or 20 feet? A. of wheel would be most advantageous, on sides or at stern? A. Stern. 3. Would belt gearing answer as well as cogwheel? A. Belting would not do as well as gearing; it would become wet and slack, and slip. 4. Could wire belting be made available? A. No.

> (23) W. H. W.—The plant is the evergreen or pyracanth thorn (Cratægus pyracantha), a native of the south of Europe, distributed several years ago in the United States as a hedge plant. It is excellent for the latter purpose, in a climate no more severe than that of Virginia. An accidental variety with white berries has proved hardy near New York in the most severe winters. The plant is propagated by cuttings, although (15) A. B. H. asks: 1. How to make a first dealers in shrubsand trees might possibly have seeds

- a "peculiar explosion took place on the Ottawa river; about one hundred feet square of ice, twenty inches thick, was thrown up into the air, followed by a loud report; it is supposed to have been caused by the gas from a deposit of sawdust in the bed of the river." I wish to ask: What kind of gas was generated; also what was the action of the gas, and why did it explode? A. We cannot explain the occurrence on the hypothesis that it was primarily caused by sawdust. We have known such explosions to occur through the sudden yielding of thick ice at its weakest point to the stress of air confined and condensed by an unusually strong or obstructed current below.
- (25) J. A. L. asks: 1. What is the resistance per mile in copper wire, No. 17 and No. 25 American gauge? A. Approximately 20 and 168 ohms respectively. 2. What temper is best for strong and constant magnets? A. Astraw color. 3. What is the best method of magnetization, by currents or by friction, on a permanent or electro-magnet? A. By contact with a strong electro-magnet or by inclosing them in a helix traversed by a strong electric current. See Scientific AMERICAN SUPPLEMENT, No. 142. 4. What should be the lifting power of a horseshoe magnet, weight half a pound? I made one which will lift nine times its weight: is that a good one? A. Your magnet does very well. 5. Can I obtain from you back numbers of the Scien-TIFIC AMERICAN or the SUPPLEMENT, giving directions for making telephones, microphones, or phonographs? A. Telephones, No. 142. Microphones, No. 163. Phonographs, No. 133. 6. What kind of carbon will do for Edison's telephone, and how can it be made? A. The carbon used in Edison's telephones is deposited from burning kerosene oil. Mr. Edison's method is to set a lamp smoking, collect the carbon, and form it into buttons under strong pressure.
- (26) Bolckow asks: 1. Will two steam enat right angles, give more or less power than one engine 2x4, using a flywheel to overcome the dead center, with a steam pressure of 100 lbs, per square inch in the boiler? A. More, 2. Did Congress ever pass a law prohibiting the running of traction engines over public roads? A friend of mine claims Congress did enact such a law, while I claim that it did not; that the roads are open to all, and that the driver of an unruly horse runs his own risk. Who is right? A. You are right.
- (27) C. S. asks: Does using the flywheel as a driving pulley detract from its efficiency as wheel on the flywheel shaft affect the efficiency of the
- (28) M. P. asks: How can I conveniently straighten brass or iron wire without a wire straightener? A. It cannot be done without a straightener of some kind. Probably the simplest straightener is three steel pins driven into a plank. If the pins are under the second, and over the third, it may be straightened well enough for some purposes.
- (29) B. A. M. asks whether the greater bearing is on the upper or lower side of the crosshead when the engine is running back. A. On the upper
- (30) C. E. A. asks: 1. What is the power of an engine with 4 inch stroke, 21/2 inch bore, running 600 revolutions per minute, with 120 lbs. of steam? A. If worked without cut-off, 5 horse power, 2. What are the dimensions of an upright boiler which would run such an engine? A. You would require a vertical tubular boiler of 95 feet heating surface. 3. Can a boiler be made from coils of gas pipe? If so, how is the best way to coil the pipe, and how much pipe will it take, and what will it cost for a boiler for the above engine? A. A boiler of coiled pipes can be made. Apply to iron
- (31) X. Y. Z. writes: 1. I have an electric engine; the magnets are wound with No. 17 cotton covered wire (Stubs' gauge). I want to use Daniell's battery with porous cups 4 inches high and 1% diameter. What quantity and intensity shall I use to get the most power? A. It depends altogether on the construction of the engine. You can easily determine by experiment which method of connecting up the batteries is best. 9 How many of the above cells will it take to make an electric light to light a room 12 feet square? A. 50. 3. How can I loosen the binding screws, that are corroded in carbon plates? A. It is possible that soaking them in hot water may be of some benefit.
- (32) R. B. N.—Prices for yacht engines: 3 inch cylinder x 5 inch stroke, \$640: 316 inch cylinder x 5 inch stroke, \$720; 4 inch cylinder x 6 inch stroke, \$800, including boiler, propeller, and appurtenances. For maker's address, see our advertising columns or insert an advertisement in the Business and Personal column.
- (33) A. F. B. asks: What is the length of taining it. 1 lb. of No. 28 copper wire? Also of 1 lb. of No. 24 copper wire? A. By Birmingham W. G., of No. 28 there would be 1686.34 feet; of No. 24, 683 feet. By American W. G., of No. 28 there would be about 1955 feet; of No 24, there would be about 827 feet,
- (34) M. F. S. asks: Will a fish placed in a pail of water increase the weight? The pail is supposed to be brimful. A. If the pail is so full that the fluid will 400 feet of 2 inch (inside diameter) pipe hold? water displaced by the fish runs over, the pail will weigh A. About sixty-five and one third United States gallons. the same as before, as the specific gravity of the fish is the same as that of water.
- (35) J. V. A. asks: What are the proper diof sustaining a weight of 20 lbs.? A. Jamin by artreatment it receives

- in boilers, namely, impure water, deficient circulation, or small steam capacity. The remedy to be applied would depend upon which of these causes operated. The introduction of oil with the feed water in small quantities will frequently check foaming for a time.
- (37) H. C. P writes: Lam making a drawing camera from "Aids to Drawing" in SUPPLEMENT, No. 158, and have two double convex lenses about one inch in diameter, and I would like to know how to use them, and at what distance from the lenses to place the ground glass, and about what size box it would require for the camera so as to bring the rays to a focus and make the image appear plain on the glass. A. You will need but one lens, which may be either single or double convex. For practical purposes you may get its focal length by holding it remote from a window in front of a white surface, and moving it back and forth until a clear image is seen on the white surface. The distance between the lens and the surface is the same as that which should separate the lens from the ground glass. The size of the ground glass and of the box will of course be controlled by the size of the image which the lens is capable of forming.
- (38) W. H. R. writes: 1. The saw mill here contains a circular saw driven by a direct belt from the pulley on the shaft of the turbine water wheel, the belt running over guide pulleys up to the saw. It is now desired to use the power without running the saw and for other purposes, and not wishing to go to the expense of putting in a bevel gear, as that in this case would be rather an expensive job, we wish to know if a quarter twist belt from the water wheel to a line shaft is practicable for the heavy work of driving a 46 inch circular saw. $\ A.\ A$ quarter turn belt would not do well for so heavy work, and would wear very rapidly, 2. The center of the pulley on the saw shaft is at right angles with a line drawn through the center of the drivgines, size 2 inch bore and 4 inch stroke, with cranks ing pulley. What is the correct position for the driving pulley on the line shafting so as not to use a guide pullev? A. For ascertaining position of pulleys, see p. 27. (5), current volume of the Scientific American. 3. Is it a good method of stopping and starting the saw to use a belt tightener? A. We see no objection to this plan.
- (39) B. F. M. writes: It takes from 10 to 18 barrels of water per day to run a grain separator with an agricultural engine. I propose to make a tin pipe, 1 foot diameter, 6 feet high, terminating below in a 20 gallon tank, from which an extra pump is to elevate a continuous stream in at top of pipe, running over shelves a flywheel. Does the use of a pulley larger than a fly- to the bottom, the exhaust all discharging into bottom of said pipe. How much water can I probably save? flywheel? A. No, in either case; but the effect Would it not be more economical to dispense with nozwould be better if the flywheel were larger than the pul- zle and consequent back pressure, and use small fan to createdraught? A. By changing the exhaust as proposed, you could probably effect a saving of between 15 and 20 per cent.
- (40) D. L. D. asks: In discharging a rifle does the recoil occur at the moment of explosion or after the ball leaves the muzzle? A. It commences at in the rapids of Niagara river for the bridge to Goat properly arranged and the wire is drawn over the first, the instant of explosion, and continues until the pres- Island. It is a mystery to me, and doubtless is to many sure is relieved by the exit of the ball.
 - (41) W. E. F. writes: I use a large iron tank, in which I boil a vegetable fiber under 60 lbs. steam pressure. The fiber contains tannic and other acids and iron. I am told that the iron and acids in the fiber combine with the iron of the boiler, forming a kind of ink which dyes the fiber, making it hard to get white; but that if I can use a boiler in which the iron plates alternate with zinc plates (if practicable) this will establish a galvanic or electric condition that will prevent the formation of this black ink or dye; or that if I secure a few zinc plates to the inside of the boiler, the same happy result will be obtained. Is this the case ? A. The arrangement of a few plates of zinc, in good contact with the iron within the tank, as suggested, would doubtless protect the iron and fiber, but you will probably find that the addition of a few ounces of carbonate of soda introduced with each charge will prove as effectual and more economical.
 - (42) T. J. B. asks: What effect would vitriol have on the skin, and what is it used for? A. If you refer to undiluted oil of vitriol (sulphuric acid), would quickly disorganize or char the skin. The acid diluted with from 10 to 30 parts of water is sometimes administered in very small quantities as a refrigerant, to check profuse perspiration, in skin diseases to relieve the itching, and in dyspepsia, etc.
 - (43) C. E. S. asks for the process so genwith copper. I can deposit the copperall right, but cannot get the luster or polish. Castings are very small. will average about 1 oz. each and easily handled. A. Rub the clean iron, or tumble it in a barrel for a few minutes with bran, sand, or saw dust, moistened with a solution of 31/2 ounces of copper sulphate and 31/2 ounces of sulphuric acid in about 3 gallons of water, rinse in running water, and dry in sawdust. The iron should not be allowed to remain too long in contact with the copper solution or absorbent materials con-
 - (44) T. T. P. asks: Could a siphon be made to turn a water wheel with sufficient force to pump the spent water back and up to the proper elevation to again supply the siphon, thus causing the wheel to be kept in motion by the same water? If not, why not? A. No, because it would require a creation of power.
 - (45) L. W. Y. asks: How many gallons of
- (46) E. L. asks (1) how to ascertain the speed of belting. A. Multiply the diameter of the pulley in feet by 3.1416 times the number of revolutions mensions for making a compound bar magnet capable per minute. 2. Could you tell me the necessity of having the lever and ball attachment to the valve stem of a ranging together several thin plates magnetized to governor save for the purpose of changing the speed? saturation succeeded in making bar magnets which sup- A. The object is to render the governor more sensitive. an 8 inch diameter cylinder and 10 inch stroke, or one port 15 times their own weight. The dimensions of a See Scientific American, vol. 31, p. 389. 3. In your magnet to support a given weight will vary greatly with opinion is it a detrimental practice for firemen to admit cylinder and 10 inch stroke. the quality of the steel from which it is made and the cold water on the hot ashes in the furnace to avoid dust when cleaning fire? A. Yes.

- (24) F. J. writes: Our newspapers state that is horizontal. A. There are several causes of foaming A. It depends upon how it is used. If submitted to jars rapid in its action than the costly instrument alluded or shocks, or if the armature is applied and removed manytimes in succession, the magnet will be injured. in "Notes and Queries:" 1. How to accomplish a more 2. Does it lose its magnetism from non-use? A. If pro-rapid action of the pen? A. By using a stiff spring in the vided with an armature it may improve. 3. Does the quality make any difference? A. Yes. 4. I have flat be made more rapid than the revolutions of the wheel bar steel \(\frac{1}{4}\x3\frac{3}{4}\). Can I have that size magnetized to of the electric pen. 2. Whether a one cup Grenet ballift from 4 to 8 lbs.? A. It may sustain the weight tery with induction coil, as commonly used in medical mentioned, but it probably will not lift it.
 - wheel and 2 inch rope for hoisting purposes. The groove in the wheel and the rope have both worn very smooth. so the rope slips with a heavy load. Can anything be done to the wheel to make the rope hold better? A. Wind the wheel tightly in the bottom of the groove with small tarred rope.
 - (49) E. H. asks for a receipt for making a ement to stick rubber to iron. A. Fuse together equal parts of gutta percha and pitch. For cement receipts see Scientific American Supplement, No. 158.
 - (50) O. H. P. asks for directions for making alcoholic shellac varnis .. A. Place a quantity of gum shellac in a bottle; pour over it enough 95 per cent alcohol to cover it. Allow it to stand for 24 hours, shaking it occasionally.
 - (51) T. C writes: I wish to propel a Sharpie boat, with padale wheels, at the speed of 12 miles per hour. The boat is fifty feet long with 8 feet beam, and draws $8\,to\,10$ inches water. 1. What should be size and power of boiler and engine? A. We would not advise the use of paddle wheels in so small a boat; you can hardly attain the speed you want, except by the use of feathering wheels. The power required could not well be determined without knowing the model of the boat. 2. Would two cylinders be better than one? A. For maneuvering, yes; otherwise, no. 3. Would I gain any-
 - (52) E. G. A. asks: Through what chemical process is the paper passed that is used in recording telegraphic messages, a blue mark being produced each time a current of electricity is passed through it? A. The paper is saturated with one of the following solutions: 1. Nitrate ammonia, 2 lb.; muriate ammonia. 2 lb.; ferricyanide of potassium, 1 oz.; water, 1 gallon. 2. Iodide potassium, ½ lb.; bromide potassium, 2 lb.; dextrine or starch, 1 oz.; distilled water, 1 gallon
 - (53) C. B. asks: 1. Does it make any difference whether the screw end of a phonograph shaft rests in a Babbitt metal bearing instead of a steel one? A. No. 2. What is meant by elastic tubing in description of phonograph in Supplement No. 133: does it mean small rubber hose, and which way should they be placed, end ways or flat, and how many pieces? A. Small rubber tubing placed flatwise; it requires 4 or 5
 - (54) S. B. G. asks how the pier was put others who have seen the rapids. A. Mr. P. A. Porter, one of the owners of Goat Island, furnishes the following account of this piece of engineering: First, a large and strong bulkhead was built in the shallow water near the shore; a solid backing was put in behind this. and the whole well floored over with plank. On this platform, and parallel with the river, several strong rollers were securely fastened. Large oak trees were felled and hewed "tapering' so that when finished they were about 18 inches square at the butt, 15 inches square at the top, and about 80 feet long. Large auger holes were then bored through the smaller ends of these. Two of these timbers, laid parallel and 6 feet apart, were on the rollers and projecting over the water, and the ' jars, shore ends heavily weighted down. Levers were then applied, and these timbers were run out until their front ends reached an eddy in the water. Two men, each provided with a strong iron-pointed pike staff (through the holes in the upper ends of which some 10 feet of new rope was drawn), walking out to the ends of these timbers, drove their pikes down among the stones, and tied the timbers to them. Around these pikes the first pier was built and filled with stone. Other timbers were then run out, all were planked over, and the first span was finished. The other spans were completed in the
 - (55) B. B. S. asks: Which will require the least battery, a double telegraph line two hundred yards and Peruvian guano, say about half and half of each, erally used for coating malleable or gray iron castings in length, or a single line with ground wire same length? may be mixed together for fertilizing purposes; or A. The double line.
 - (56) F. G. & S. write: We have an upright boiler, 9 feet high by 4 feet diameter, 124 2-inch flues. which leaks very bad at times. When there is a hot fire in the boiler the flues scarcely leak at all, but as soon as we throw in fresh coal and deaden the fire it commences to leak. The flues are rolled; if the flues were beaded, would it stop them from leaking? A. Your leakage must be due to unequal expansion and contraction. Beading the tubes would probably remedy the trouble in a measure. How is your feed water introaffect the leakage?
 - (57) G. W. & S. ask: Is a belt in a half twist liable to slip as much as one running straight? A. If by half twist you mean running shafts at right angles to each other, the twist belt is more liable to slip. as it has less surface of contact with the pulleys.
 - (58) F. C.-In experimenting with a magnetic motor I am at a loss for a non-conducting material. The magnetism penetrates all substances I have been likely to answer my purpose? A. No.
 - (59) M. F. asks: Which of two engines has the most power according to steam consumed: one with with a 7 inch diameter and 12 inch stroke? A. 8 inch
- (60) O. B. H. writes: In No. 8, Vol. XL. of the Scientific American, in the description of an (36) J. G. S. asks: What is the cause of (47) J. J. L. asks: 1. How long will mag- "Electric Pen," you say toward the end of the article is made to cohere by heating the mixture until the foaming in boilers, and what is the remedy? My boiler i netized steel, with constant use, retain its magnetism? referred to: "The pen may readily be made far more shellac is melted.

- to." Will you be so kind and inform the writer of this interrupter, and adjusting it carefully, the sparks may practice, will answer in connection with the pen? A. A medical coil is not suitable for the purpose. 3. How (48) H. M. R. writes: We have a 6 foot many cups of a Grenet battery without induction coil it would require to furnish a current strong enough to perforate common note paper? A. It cannot be done by the batteries alone.
 - (61) C. N., Jr., asks (1) for the best mixture for polishing tortoise shell. A. Tortoise shell is usually finished by filing, scraping, and the application by a buff wheel of powdered pumice stone and water, putty powder and water, and lastly by means of rotten stone in water. 2. What can I do with a gunstock that has had a very severe wetting so that it has raised the grain of the wood and made it rough? A. File it, scrape it, and polish it, by applying to it with a woolen cloth, alcoholic shellac varnish, 2 parts, boiled linseed oil, 1 part, well shaken together before each application. The polish must be rubbed briskly after each application until the surface is smooth and dry.
- (62) E. L. asks: What is the horse power value of a jet of steam through a one inch pipe 50 feet from the boiler, at a pressure of 50,75, and 100 lb, per square inch respectively? A. There is no definite relation between the discharge of steam through a pipe and the horse power at 50 lb. pressure per square inch (total); the weight of steam discharged would be \$4.6 lb. per minute; at 75 lb. pressure, 51'39 lb. per minute; and at 100 lb. pressure. 67'8 lb. per minute; but the horse power these several pressures of steam are equal thing by gearing up with cog wheels to increase frevo- to will depend upon the manner of its use, whether in condensing or non-condensing engines, simple or compound, and to what extent it is used expansively.
 - (63) C. M. S. asks how to clean lace. A. Lace may be restored to its original whiteness by first ironing it slightly, then folding it and sewing it into a clean linen bag, which is placed for 24 hours in pure olive oil. Afterwards the bag is to be boiled in a strong solution of soap and water for 15 minutes. then well rinsed in lukewarm water, and finally dipped into water containing a slight proportion of starch. The lace is then to be taken from the bag and stretched on pins to dry.
 - (64) T. A. M. asks: Is there any remedy for air holes in plaster of Paris casts for moulding rubber stamps? A. By properly mixing the plaster air holes may be avoided. Take about the quantity of water required for mixing the batter, sprinkle into it the plaster, allow it to settle to the bottom, pour off the surplus water, stir it carefully, and pour. After pouring, it is well to jar the type to liberate any air bubbles that may adhere to the face of the type.
 - (65) J. J. M. asks: Do you know anything better than borax for welding steel? A. The following has been suggested, but we cannot vouch for it: " Heat the pieces to be joined together, roll them in marble dust, and join them promptly, subjecting them to a good hammering." Should any of our correspondents find this a practicable method we should be pleased to hear from them.
- (66) C. G. writes: I have some cider which is boiled down; one quart of it may be diluted with 4 quarts of water and taste good. When I mix water with it and let it stand for a few weeks, it spoils. How can I remedy it? A. Add a small quantity of calcium sulphite placed at right angles to the river, the smaller ends lying to the cider, and keep it from the air in bottles or scaled
 - (67) O. A. S. asks: 1. What is the average cost of quicksilver by the cwt. or ton? A. Mercury it quoted at 55 cents per lb.; the cost varies considerably with the market. 2. Does the supply exceed the demand? A. No. 3. If by a new discovery it should become useful in large quantities generally over the United States, for mechanical purposes (I mean in addition to its present uses), what would be the prospect of procuring it? A. Quicksilver mines are few in number. An increased demand for the metal would, for a time at least, proportionately increase its market value.
 - (68) P. J. N. asks if unleached wood ashes whether there are chemical properties in one which would neutralize the chemical properties in the other, and thus deteriorate their fertilizing value? I propose using this combination in the cultivation of the potato. A. The addition of a small quantity of the ashes to the manure used at the time of planting will prove advantageous; the quantity mentioned would be excessive. Consult Johnston's "Agricultural Chemistry," and "Chemistry of the Potato," Bliss.
- (69) B. A. M. asks: 1. By what means is glue maintained in the liquid state? A. Use strong duced? Does not the starting or stopping of the feed acetic acid. 2. How is slating fluid or slating silica made? A Dissolve water glass in boiling water to a thin syrup, and form into a paste with a mixture of equal parts of dry plaster of Paris and fine calcined clay passed through an 80 inch sieve. 3. What are the principal uses of silicate of soda, and how can it be made sufficiently fluid to flow easily? A. It is used extensively in the manufacture of artificial stone, in mortars, cements, and lutes, as a vehicle for pigments in fireproof paints and varnishes, in stereochromy, in soaps, and certain laundry preparations, in metallurgy able to find. Do you know of any non-conductor that is as a flux, and in various laboratory operations. It may be dissolved and diluted with boiling water.
 - (70) E. F. F. & H. S. P. write: In making the cakes of powdered carbon, peroxide of manganese, and gum lac, as expressed in Scientific American SUPPLEMENT, No. 159, page 2528, Fig. 48, how is the gum lac made to mix freely with the other ingredients? A. Gum shellac powdered is mixed with the peroxide of manganese and carbon in a dry state. The whole

(71) W. S. writes: I have a breech loading E shot gun which has had the browning taken off by salt water. I would like to ask how to stain gun barrels a rich brown such as seen on our best guns. A. 1. Mix chloride of antimony to a thin cream with olive oil, and apply this uniformly to the warm iron. It should be left undisturbed until the requisite degree of color is developed. A few drops of nitric acid is sometimes added to the paste to hasten the operation. 2. Nitric acid, ½ oz.; sweet spirits of niter, ½ oz.; spirits of wine, 1 oz.; cupric sulphate (blue vitriol), 2 oz.; chloride of iron tincture, 1 oz.; water, 40 oz.; warm the water, dissolve in it the powdered copper salt, cool and add the other materials. Use the burnisher and scratch brush to produce the markings. For polishing a piece of hard wood is used. Finish while warm with rather thin pale shellac varnish (colored with dragon's blood if desired), polished after drying with the hard wood polisher. The time required to properly brown the iron is about 24 hours. The iron should be scoured or cleaned with moistened lime before applying the browning composition.

MINERALS, ETC.—Specimens have been received from the following correspondents, and G examined, with the results stated:

A. C. O.-No. 1. A serpentine rock. No. 2. Contains quartz, orthoclase, magnetic pyrites, and traces of copper glance. No. 3. Serpentine rock containing much iron sulphide. No 4. Quartzite and ferruginous earth I or ocher.—G. H. P.—The silicious limestone (not shale) containing bituminous matters offers no positive indications that petroleum exists in the locality in paying quantities; on the contrary, thousands of dollars have been lost by oil seekers in this rock. See chapters on petroleum in Professor Winchel's "Sketches of Creation."-J. S. F.-It appears to be a wax of the paraffine series (ozocerite or hatchettite). If found in large quantities, of some value. Larger specimens are desirable to settle the question.

COMMUNICATIONS RECEIVED.

On Perpetual Motion. By J. K. On the Gary Motor. By W. W. G. On the Analysis of some Ancient Pieces of Metal. By A Simple Ellipsograph. By S. W. B.

[OFFICIAL.]

On the Telephone. By F. F. P.

INDEX OF INVENTIONS

Letters Patent of the United States were Granted in the Week Ending February 25, 1879, AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, will be L furnished from this office for one dollar. In ordering, please state the number and date of the patent desired. and remit to Munn & Co., 37 Park Row, New York city.

	Me
Amalgamating ores, apparatus for, C. E. Ball 212,644	Me
Ammonia, muriate of, W. Gentles	M
Axle box, car, G. J. & S. J. Shimer 212,631	M
Axle box, car, J. N. Smith212,755, 212,756	M
Axle lubricator, vehicle. E. Gollipher 212,684	M
Balances, lever, C. F. Kleinsteuber 212,559	M
Basket, L. W. Beecher	Ne
Basket, S. Friend	Nı Oi
Bed bottom, spring, A. S. Burnham	Or
Bed, invalid, Southard & Sears	Ov
Beehive, W. J. Driver	Pa
Bell ringing device, E. Perry	Pa
Binder for paper tablets, B. C. Murray 212,729	Pa
Blackboard, A. H. Lorton	Pa
Blackboard holder, A. H. Lorton 212,612	Pa
Bolt, L. F. Burrell 212.539	Pa
Book, copy, J. W. C. Gilman 212,597	l'a
Book, copy, J. W. Wakeman	Pe
Boot and shoe manufacture, E. Mann	Pi Pl
Bottle stopper and fastener, H. W. Putnam	Pl
Box, C. Reese (r)	Pl
Bridge, A. J. Ross	Pl
Brush, blacking, F. Chamberlin	Pl
Bung, barrel, G. 11. Gillette	Pl
Burial casket, J. R. Nelson	\mathbf{P}_0
Butter and lard box, J. W. Rogers 212,625	ľ
Butter, filling veneer boxes with, G. W. Bradley. 212,651	Po
Cap, L. Girbardt (r)	Po
Car coupling, E. H. Janney	Po
Car coupling, J. A. Mason 212,563	Pr Pr
Car coupling, R. B. Potter 212,743 Car door grain D. F. Spees 212,633	Pr
Car door, grain, D. F. Spees	Ρι
Carpet sweeper, E. B. Moore	Ρι
Carriage top cushion spring, R. E. McCormick 212,720	Rε
Cartridge shell uncapper, S. E. Keighley 212,558	Ra
Catarrh remedy, S. T. Dobyns 212,667	Re
Check row cords or wires, knot or stop for, L. L.	Ro
Haworth	Ro
Churn dasher, J. S. McKee	Ru
Churn power, Fern & Bligh	Sa Sa
Churn, reciprocating, W. Bradberry	:Sa
Clasp for elastic bands, E. S. Smith 212,578	Sa
Clothes line holder, J. A. Worley 212.641	Sa
Convertible chair, T. H. Wolverton 212,778	Sa
Cornices of paper, etc., constructing, J. M. Byron 212,589	Sa
Cultivator, Flenniken & Hall 212,546	Sa
Cultivator, E. Ruhlmann	Sa
Curtain roller bracket, L. H. Gano	Sa
Derrick stake, R. P. Williams	Sc
Door cross bar, R. Condon	Se
etc., H. J. Peistring	Se Se
Drain pipe, Webb & Stanley	Se
Driving wheel, Craver & Wishart 212,663	Se
Duster, feather, C. W. Nichols 212,732	Se
Dynamometer, rotary, Morin & Seilliere 212,728	Se
Earthenware glazing, I. Hollis	Sh
Earthenware pots, etc., cover for, N. Plympton 212,567	Sh
Eave trough hanger, J. P. Abbott	Sh
Envelope, J. H. Guest	Sh
	OII

'nvelone machines drier for A A Rheutan	
Invelope machines, drier for, A. A. Rheutan	212,611
explosive compound, W. Miller	212,690
aucet, vent, W. F. Classeather renovator, T. E. Livesey	212,714
eed cutter, Tatum & Harvey	212,706
ilter, B. P. Chatfield liter, air, E. M. Greenmay, Jr. (r)	212,658 8,590
frearm, breech-loading, Deeley & Edge, Jr	212,593 8.601
irearm, breech-loading, W. R. Finch (r)	212,657
ire escape ladder, Twitchell & Clark	212,768
og and alarm horn, J. B. Tarrolding seat, J. M. Perkins	212,736
olding table, G. W. Low ruit picker, Bushnell & Calhoun	
ulling mill, Wood & Stormurnace grate, J. A. Allen	
alvanic body wear, D. P. Bible	212,650
as retort discharger, A. Q. Ross212,569,	212,571
as retorts, charging, A. Q. Ross ate roll, G. D. Rowell	212,574
lass, crystallizing, W. Gibson212,681, lassware, covered, C. L. Knecht (r)	212,682 8,595
lassware grinder, B. Fischerriddle, G. Staley	212,674
rinder and pulverizer, J. T. Davis	
rinding, granulating, and treating wheat and bran, machine for, F. Wegmann	212,774
ame, harness, W. B. Hayden	212,722
arvester, cotton, R. H. Pirtlearvester finger guard, J. M. Weaver	
lat box, R. R. Ferry	212,673
lats, blocking, stretching, etc., House & Wheeler	212,554
eat and moisture regulator for factories, elec-	
trical, J. M. Bradford	212,654
lide and skin planer, H. A. House loop, M. E. Hubbard	212,555 212,701
lorse boot, T. T. Furlong	
lose for street washers, C. Gumlich, Jr	212,599
usking and pruning device, D. E. Dopp	212,544
	212,590
nspirator, W. R. Park	
ournal box, J. E. Defreest ournals, machine for dressing the bearing caps	212,665
of railway carriage, J. N. Smith ournals of railway car axles, dressing, J.N. Smith	212,754
ey fastener, Dopp & Waltersnit jacket, B. Wechsler	212,543
amp, J. H. Irwin	212 603
amp, J. W. Ogden	212,733 212,562
amp chimney or globe protector, C. E. Willis amp globe cap, Nichols & Alexander	212,776 212,619
antern, J. H. Irwin (r)ath sawing machine, J. Little	
etter carrier's pouch, R. Haleightning rod. G. S. Knapp	212,551
ock, W. H. Taylor	010 (9)
nonmotive exhaust pine I (! Tippell	212,000
oom shuttle driving mechanism, C. I. Kane	212,707
oom shuttle driving mechanism, C. I. Kane umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann	212,707 212,694 212,645
oom shuttle driving mechanism, C. I. Kane umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston	212,707 212,694 212,645 212,587 212,697
oom shuttle driving mechanism, C. I. Kane umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone	212,707 212,694 212,645 212,587 212,697 212,621
oom shuttle driving mechanism, C. I. Kane umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston echanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer	212,707 212,694 212,645 212,587 212,697 212,621 212,721 212,738
oom shuttle driving mechanism, C. I. Kane umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston echanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower, lawh, T. J. Sayre	212,707 212,694 212,645 212,587 212,697 212,621 212,721 212,738 212,568 212,626
oom shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston echanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case. S. R. Dummer	212,707 212,694 212,645 212,587 212,697 212,621 212,721 212,738 212,626 212,695 212,695 212,545
oom shuttle driving mechanism. C. I. Kane umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth. E. T. Houston echanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r)	212,707 212,634 212,645 212,587 212,697 212,621 212,721 212,738 212,626 212,695 212,769 8,600
oom shuttle driving mechanism, C. I. Kane umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston echanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan ii can, W. C. Ba tels (r) ptometer, P. Boeringer	212,707 212,634 212,645 212,587 212,697 212,621 212,721 212,738 212,626 212,695 212,769 8,600 212,536
oom shuttle driving mechanism. C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone easuring machine, cloth. E. T. Houston. echanical movement, C. E. Patric etallic vessel or measure, G. W. McKim. otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre. usic stand, G. W. Hessler. eedle case, S. R. Dummer. ut lock, A. C. Vaughan. il can, W. C. Ba tels (r). ptometer, P. Boeringer. ven door, J. Krenig. acking for stuffing boxes, G. C. Phillips. adlock, permutation, N. A. Young.	212,707 212,694 212,645 212,587 212,697 212,692 212,721 212,738 212,568 212,695 212,545 212,769 8,600 212,536 212,739 212,739 212,739 212,739 212,739
oom shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston echanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips addlock, permutation, N. A. Young unnier, M. A. Bryson	212,707 212,694 212,645 212,697 212,621 212,721 212,738 212,568 212,626 212,545 212,769 8,600 212,536 212,712 212,739 212,739 212,739 212,538
oom shuttle driving mechanism. C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone easuring machine, cloth. E. T. Houston echanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. upper hanger, G. Barber	212,707 212,634 212,645 212,587 212,697 212,621 212,721 212,738 212,626 212,626 212,545 212,769 212,769 212,738 212,769 212,739 212,739 212,730 212,730 212,730 212,536
oom shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston echanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. aper hanger, G. Barber aper web damper, S. D. Tucker	212,707 212,634 212,655 212,587 212,621 212,721 212,721 212,738 212,568 212,695 212,569 8,600 212,536 212,712 212,536 212,732 212,582 212,582 212,582 212,582 212,582 212,582 212,582 212,582 212,582 212,582 212,582 212,585 212,767
oom shuttle driving mechanism. C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone easuring machine, cloth. E. T. Houston echanical movement, C. E. Patric. etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker eg float, R. T. Ellifrit leture frame clamp, W. H. Harrison	212,707 212,634 212,657 212,697 212,697 212,621 212,721 212,738 212,568 8,600 212,769 212,769 212,769 212,769 212,769 212,769 212,769 212,769 212,769 212,769 212,552 212,552 212,552 212,552 212,552 212,553 212,552 212,552 212,553 212,552 212,553 212,552 212,553
oom shuttle driving mechanism. C. I. Kane. umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston eethanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig	212,707 212,635 212,587 212,697 212,697 212,621 212,721 212,738 212,585 212,585 212,585 212,515 212,712 212,738 212,585 212,738 212,73
oom shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone eesure, tailor's, T. R. Boone eetanical movement, C. E. Patric eetanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. uper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker. agfoat, R. T. Ellifrit leture frame clamp, W. H. Harrison. lanter, C. Musgrove lanter and fertilizer distributer, corn, A. M. Gooch lanter, corn, E. Emmert lanter, corn, J. Kelly	212.707 212.635 212.634 212.635 212.637 212.697 212.697 212.697 212.697 212.697 212.638 212.636 212.63
oom shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston eethanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. uper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker eg float, R. T. Ellifrit ceture frame clamp, W. H. Harrison lanter, C. Musgrove lanter, corn, E. Emmert lanter, corn, J. Kelly lanter, corn, J. Kelly	212.707 212.635 212.635 212.637 212.637 212.637 212.637 212.637 212.637 212.638 212.638 212.638 212.638 212.545 212.759 212.758 212.759 212.758 212.759 212.758 212.759 212.758 212.759 212.758 212.759 212.758 212.759 212.758 212.759 212.758 212.759 212.758 212.759 212.758 212.759 212.758 212.759 212.750 212.750 212.750 212.750 212.750 212.750 212.750 212.750 212.75
oom shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone eesuring machine, cloth, E. T. Houston eehanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfieiderer ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. aper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker g float, R. T. Ellifrit letture frame clamp, W. H. Harrison lanter, C. Musgrove lanter and fertilizer distributer,corn, A.M.Gooch lanter, corn, E. Emmert lanter, corn, D. Kelly lanter, corn, N. O. Starks look, sulky, C. F. Search ockethook, J. G. Klett	212.707 212.635 212.584 212.636 212.637 212.697 212.697 212.697 212.697 212.697 212.698 212.626 212.636 212.636 212.636 212.636 212.769 212.789 212.588 212.636 212.767 212.638 212.636 212.767 212.638 212.636 212.767 212.638 212.636 212.767 212.638 212.636 212.767 212.638 212.636 212.767 212.638 212.767 212.638 212.767 212.638 212.767 212.638 212.767 212.638 212.767 212.638 212.767 212.638 212.767 212.638 212.76
oom shuttle driving mechanism. C. I. Kane. umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston eethanical movement, C. E. Patric eethanical movement, C. E. Patric eethalic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower and reaper knife sharpener, C. Prince ower lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips alching for stuffing boxes, G. C. Phillips alching for stuffing hoxes, G. C. Phillips alching, M. A. Bryson. apper and cardboard, marbleized, Adams & Bott. aper hanger, G. Barber apper pulp, coffins, etc., of, Buck & Irland apper web damper, S. D. Tucker apper web damper, S. D. Tucker agfloat, R. T. Ellifrit. letture frame clamp, W. H. Harrison lanter, C. Musgrove lanter, corn, E. Emmert lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, N. O. Starks low, sulky, C. F. Search bocketbook, J. G. Klett bocketbook, C. C. Kohlmann bocketbook fastening, J. M. Riley	212,707 212,635 212,636 212,731 212,637 212,637 212,637 212,637 212,638 212,636 212,636 212,731 212,732 212,732 212,732 212,732 212,732 212,732 212,732 212,732 212,732 212,732 212,732 212,732 212,732 212,732 212,733 212,734 212,734 212,734 212,734 212,735 212,734 212,73
com shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston eechanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. aper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker ag float, R. T. Ellifrit cleture frame clamp, W. H. Harrison lanter, C. Musgrove lanter, corn, J. Kelly lanter, corn, J. C. F. Search locketbook, J. G. Klett locketbook, J. G. Klett locketbook, J. S. Khelt locketbook, J. S. Khell lock of flied of the control of the	212.707 212.695 212.634 212.635 212.635 212.637 212.697 212.697 212.697 212.697 212.698 212.626 212.636 212.636 212.736 212.768 212.769 212.758 212.750 212.75
oom shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone eesuring machine, cloth, E. T. Houston eehanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfieiderer ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. aper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker agfoat, R. T. Ellifrit cleture frame clamp, W. H. Harrison lanter, C. Musgrove lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, N. O. Starks low, sulky, C. F. Search ocketbook, C. C. Kohlmann ocketbook fastening, J. M. Riley ortfolio, C. J. Stromberg ost office box, J. Schall rinter's quoin, R. F. Gillin rinting machine, S. D. Tucker jone of the control of	212.707 212.635 212.587 212.697 212.697 212.697 212.697 212.697 212.697 212.697 212.698 212.698 212.698 212.698 212.698 212.59
oom shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy alt kiln floor, F. Baumann easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston easuring machine, cloth, E. T. Houston eethanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer ower and reaper knife sharpener, C. Prince ower lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young annier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker eg float, R. T. Ellifrit teture frame clamp, W. H. Harrison lanter, C. Musgrove lanter and fertilizer distributer,corn, A. M. Gooch lanter, corn, E. Emmert lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, J. G. Klett bocketbook, J. G. Klett bocketbook, C. C. Kohlmann bocketbook fastening, J. M. Riley ortfolio, C. J. Stromberg bost office box, J. Schall rinter's quoin, R. F. Gillin	212.707 212.685 212.584 212.685 212.684 212.685 212.685 212.685 212.686 212.685 212.686 212.685 212.686 212.685 212.686 212.58
oom shuttle driving mechanism. C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston. eethanical movement, C. E. Patric eethanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince. ower lawn, T. J. Sayre usic stand, G. W. Hessler. eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer. ven door, J. Krenig. acking for stuffing boxes, G. C. Phillips andlock, permutation, N. A. Young annier, M. A. Bryson apper and cardboard, marbleized, Adams & Bott. aper hanger, G. Barber apper pulp, coffins, etc., of, Buck & Irland apper web damper, S. D. Tucker agfloat, R. T. Ellifrit. letture frame clamp. W. H. Harrison. lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, J. Starks. low, sulky, C. F. Search ocketbook, J. G. Klett bocketbook, J. G. Klett bocketbook, J. G. Klett cocketbook, J. G. Klett cocketbook, J. G. Klett cocketbook, J. G. Schall rinter's quoin, R. F. Gilllin rinting machine, S. D. Tucker copelling canal boats, R. Werner cump, double acting, J. G. Wolf unching machine, H. Blundell	212,707 212,635 212,638 212,63
com shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone	212.707 212.635 212.637 212.637 212.637 212.637 212.637 212.637 212.638 212.638 212.638 212.638 212.638 212.732 212.738
com shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone eesuring machine, cloth, E. T. Houston. eesuring machine, cloth, E. T. Houston. eechanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler. eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer. ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. uper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker. agfoat, R. T. Ellifrit leture frame clamp, W. H. Harrison. lanter, C. Musgrove lanter and fertilizer distributer, corn, A.M. Gooch lanter, corn, J. Kelly lanter, corn, D. Starks. low, sulky, C. F. Search bocketbook, J. G. Klett bocketbook, J. G. Klett cocketbook, C. C. Kohlmann cocketbook fastening, J. M. Riley cortfolio, C. J. Stromberg cost office box, J. Schall rinter's quoin, R. F. Gillin rinting machine, S. D. Tucker copelling canal boats, R. Werner ump, double acting, J. G. Wolf unching machine, H. Blundell ail, J. McMullen ailway, portable, J. J. Jova. efrigerator, J. Platte cock drill, G. M. Gilthens.	212.707 212.635 212.584 212.636 212.637 212.697 212.697 212.697 212.697 212.697 212.698 212.626 212.63
com shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston. eethanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pficiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson apper and cardboard, marbleized, Adams & Bott. aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker eg float, R. T. Ellifrit ceture frame clamp, W. H. Harrison. lanter, corn, E. Emmert lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, J. G. Klett bocketbook, J. G. Klett bocketbook, G. C. Kohlmann bocketbook fastening, J. M. Riley ortfolio, C. J. Stromberg bost office box, J. Schall rinter's quoin, R. F. Gillin rinting machine, S. D. Tucker ropelling canal boats, R. Werner ump, double acting, J. G. Wolf unching machine, H. Blundell ail, J. McMullen ailway, portable, J. J. Jova. efrigerator, J. Platte bock drill, G. M. Githens. bubber articles, mould for, J. Stepp	212.707 212.635 212.636 212.634 212.635 212.637 212.637 212.637 212.637 212.638 212.636 212.63
com shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone eesuring machine, cloth, E. T. Houston. eechanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler. eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young annier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. uper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker agfoat, R. T. Ellifrit leture frame clamp, W. H. Harrison. lanter, Corn, E. Emmert lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, N. O. Starks. low, sulky, C. F. Search locketbook, J. G. Klett bocketbook, J. G. Klett bocketbook, J. G. Klett cocketbook, J. Schall rinter's quoin, R. F. Gillin rinting machine, S. D. Tucker copplling canal boats, R. Werner ump, double acting, J. G. Wolf unching machine, H. Blundell aii, J. McMullen aiiway, portable, J. J. Jova. efrigerator, J. Platte cock drill, G. M. Githens. otary engine, R. Pickens abber articles, mould for, J. Stepp ddion, Ashton & Hayward. addle girth iron, H. H. Helser.	212.707 212.635 212.536 212.536 212.538 212.536 212.53
com shuttle driving mechanism, C. I. Kane, umber loader and unloader, J. J. Hennessy, alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston. eethanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower and reaper knife sharpener, C. Prince ower lawn, T. J. Sayre usic stand, G. W. Hessler. eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young annier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker eg float, R. T. Ellifrit teture frame clamp, W. H. Harrison lanter, corn, E. Emmert lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, J. G. Klett bocketbook, J. G. Klett bocketbook, G. C. Kohlmann bocketbook fastening, J. M. Riley ortfolio, C. J. Stromberg bost office box, J. Schall rinter's quoin, R. F. Gillin rinter's qu	212.707 212.635 212.637 212.637 212.637 212.637 212.637 212.637 212.638 212.638 212.638 212.638 212.638 212.638 212.638 212.638 212.638 212.638 212.738 212.739 212.749 212.74
com shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone eesuring machine, cloth, E. T. Houston. eesauring machine, cloth, E. T. Houston. eehanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler. eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer. ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young annier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. uper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker. agfoat, R. T. Ellifrit leture frame clamp, W. H. Harrison. lanter, C. Musgrove lanter and fertilizer distributer, corn, A.M. Gooch lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, N. O. Starks. low, sulky, C. F. Search bocketbook, J. G. Klett bocketbook, J. G. Klett bocketbook, C. C. Kohlmann bocketbook fastening, J. M. Riley ortfolio, C. J. Stromberg bost office box, J. Schall rinter's quoin, R. F. Gillin rinting machine, S. D. Tucker copelling canal boats, R. Werner ump, double acting, J. G. Wolf unching machine, H. Blundell ail, J. McMullen ailway, portable, J. J. Jova. efrigerator, J. Platte ock drill, G. M. Githens. otary engine, R. Pickens abber articles, mould for, J. Stepp didron, Ashton & Hayward. addle girth iron, H. H. Helser littirer, L. Bemelmans. lith washer, common, L. Bemelmans. lith sasher, common, L. Bemelmans.	212.707 212.635 212.584 212.636 212.587 212.697 212.697 212.697 212.697 212.697 212.697 212.698 212.698 212.698 212.698 212.59
com shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston. eethanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young annier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker eg float, R. T. Ellifrit teture frame clamp, W. H. Harrison. lanter, corn, E. Emmert lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, J. G. Klett bocketbook, J. G. Klett bocketbook, J. G. Klett bocketbook, G. C. Kohlmann bocketbook fastening, J. M. Riley ortfolio, C. J. Stromberg bost office box, J. Schall rinter's quoin, R. F. Gillin rinting machine, S. D. Tucker copelling canal boats, R. Werner lump, double acting, J. G. Wolf unching machine, H. Blundell ani, J. McMullen ani	212.707 212.635 212.637 212.637 212.637 212.637 212.637 212.637 212.638 212.648 212.648 212.648 212.648 212.648 212.648 212.648
com shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone easuring machine, cloth, E. T. Houston. eechanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips addlock, permutation, N. A. Young annier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. aper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland apper web damper, S. D. Tucker gefloat, R. T. Ellifrit lecture frame clamp, W. H. Harrison lanter, C. Musgrove lanter, corn, E. Emmert lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, J. Schall cinter's quoin, R. F. Gillin rinting machine, J. M. Riley portfolio, C. J. Stromberg bost office box, J. Schall cinter's quoin, R. F. Gillin rinting machine, S. D. Tucker copelling canal boats, R. Werner land, J. McMullen ail, J. McMullen ailway, portable, J. J. Jova. defrigerator, J. Platte ook drill, G. M. Githens otary engine, R. Pickens abber articles, mould for, J. Stepp addiron, Ashton & Hayward addle girth iron, H. H. Helser at drier, L. Bemelmans at twasher, common, L. Bemelmans.	212.707 212.695 212.695 212.694 212.695 212.69
com shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone eesuring machine, cloth, E. T. Houston. eehanical movement, C. E. Patric etailic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfieiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler. eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer. ven door, J. Krenig acking for stuffing boxes, G. C. Phillips acking for stuffing boxes, G. C. Phillips andlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. aper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker. agfoat, R. T. Ellifrit leture frame clamp, W. H. Harrison. leanter, C. Musgrove lanter and fertilizer distributer, corn, A.M. Gooch lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, J. Search bocketbook, J. G. Klett bocketbook, C. C. Kohlmann bocketbook fastening, J. M. Riley ortfolio, C. J. Stromberg bost office box, J. Schall rinter's quoin, R. F. Gillin rinting machine, S. D. Tucker copelling canal boats, R. Werner ump, double acting, J. G. Wolf unching machine, H. Blundell ail, J. McMullen ailway, portable, J. J. Jova. efrigerator, J. Platte bock drill, G. M. Githens botary engine, R. Pickens busher articles, mould for, J. Stepp ddron, Ashton & Hayward. busher articles, mould for, J. Stepp ddron, Ashton & Hayward. busher articles, mould for, J. Stepp ddron, Ashton & Hayward. busher articles, mould for, J. Stepp ddron, Ashton & Hayward. busher articles, mould for, J. Stepp ddron, Ashton & Hayward. busher articles, mould for, J. Stepp ddron, Ashton & Hayward. busher articles, mould for, J. Stepp ddron, Ashton & Hayward. busher articles, mould for, J. Stepp ddron, Ashton & Hayward. busher articles, mould for, J. Stepp ddron, Ashton & Hayward. busher articles, for Boenelmans. bush fastener, L. P. Treadwell busher,	212.707 212.635 212.636 212.637 212.637 212.637 212.637 212.637 212.637 212.637 212.637 212.637 212.638 212.648 212.658 212.638 212.648 212.65
com shuttle driving mechanism. C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone easuring machine, cloth. E. T. Houston. eethanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips addock, permutation, N. A. Young annier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. aper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland apper web damper, S. D. Tucker ag float, R. T. Ellifrit teture frame clamp, W. H. Harrison lanter, corn, E. Emmert lanter, corn, J. Kelly lanter, corn, J. C. Klett bocketbook, J. G. Klett bocketbook fastening, J. M. Riley ortfolio, ('. J. Stromberg bost office box, J. Schall rinter's quoin, R. F. Gillin rinting machine, S. D. Tucker boughling canal boats, R. Werner lump, double acting, J. G. Wolf lanching machine, H. Blundell lail, J. McMullen lail drier, L. Bemelmans lat washer, common, L. Bemelmans lat washer, common, L. Bemelmans lat washer, common, L. Bemelmans	212.707 212.635 212.637 212.637 212.637 212.637 212.637 212.637 212.638
com shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone eesauring machine, cloth, E. T. Houston. eechanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. Aper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker ag float, R. T. Ellifrit teture frame clamp, W. H. Harrison lanter, Corn, E. Emmert lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, N. O. Starks low, sulky, C. F. Search cocketbook, J. G. Klett bocketbook, J. G. Klett bocketbook, C. C. Kohlmann cocketbook, G. C. Kohlmann cocketbook, J. S. Klett cocketbook, G. J. Stromberg sot office box, J. Schall rinter's quoin, R. F. Gillin rinting machine, S. D. Tucker copelling canal boats, R. Werner ump, double acting, J. G. Wolf unching machine, H. Blundell ali, J. McMullen alid way, portable, J. J. Jova defrigerator, J. Platte cock drill, G. M. Githens otary engine, R. Pickens abber articles, mould for, J. Stepp did rior, A. Shton & Hayward did rior, A. Shton & Hayward did ron, A. Shton & Hayward ush fastener, L. P. Treadwell ush fastener, L. P. Tr	212.707 212.635 212.568 212.56
com shuttle driving mechanism. C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone easuring machine, cloth. E. T. Houston. eethanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips addock, permutation, N. A. Young annier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. aper pulp, coffins, etc., of, Buck & Irland apper web damper, S. D. Tucker eg float, R. T. Ellifrit teture frame clamp, W. H. Harrison lanter, corn, E. Emmert lanter, corn, J. Kelly lanter, corn, S. C. Lucker lanter, corn, J. Kelly lanter, corn, S. C. Lucker lanter	212.702 212.635 212.636 212.637 212.637 212.637 212.637 212.637 212.638
com shuttle driving mechanism, C. I. Kane. umber loader and unloader, J. J. Hennessy. alt kiln floor, F. Baumann. easure, tailor's, T. R. Boone eesauring machine, cloth, E. T. Houston. eechanical movement, C. E. Patric etallic vessel or measure, G. W. McKim otion transmitter and reverser, P. Pfleiderer. ower and reaper knife sharpener, C. Prince ower, lawn, T. J. Sayre usic stand, G. W. Hessler eedle case, S. R. Dummer ut lock, A. C. Vaughan il can, W. C. Ba tels (r) ptometer, P. Boeringer ven door, J. Krenig acking for stuffing boxes, G. C. Phillips adlock, permutation, N. A. Young unnier, M. A. Bryson aper and cardboard, marbleized, Adams & Bott. Aper hanger, G. Barber aper pulp, coffins, etc., of, Buck & Irland aper web damper, S. D. Tucker ag float, R. T. Ellifrit teture frame clamp, W. H. Harrison lanter, Corn, E. Emmert lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, J. Kelly lanter, corn, N. O. Starks low, sulky, C. F. Search cocketbook, J. G. Klett bocketbook, J. G. Klett bocketbook, C. C. Kohlmann cocketbook, G. C. Kohlmann cocketbook, J. S. Klett cocketbook, G. J. Stromberg sot office box, J. Schall rinter's quoin, R. F. Gillin rinting machine, S. D. Tucker copelling canal boats, R. Werner ump, double acting, J. G. Wolf unching machine, H. Blundell ali, J. McMullen alid way, portable, J. J. Jova defrigerator, J. Platte cock drill, G. M. Githens otary engine, R. Pickens abber articles, mould for, J. Stepp did rior, A. Shton & Hayward did rior, A. Shton & Hayward did ron, A. Shton & Hayward ush fastener, L. P. Treadwell ush fastener, L. P. Tr	212.707 212.637 212.637 212.637 212.637 212.637 212.637 212.637 212.637 212.637 212.637 212.637 212.638 212.63

-		
5	Sketching rack, C. C. Shepherd 212,629	HOW TO REMOVE STAINS AND
1	Soldering clamp, W. H. B. Flender 212,675	Spots from Linen, Cotton, Woolens, and Silk. Being a
6	Speculum and syringe, W. Harz 212,600	table of Specific Directions, showing how to proceed in
0	Spinning machinery, T. Wrigley	table of Specific Directions, showing how to proceed in removing from each of the above kinds of goods any
n	Spinning machine spindle, J. A. Miller	stains of the following character, to wit: Stains of Sugar, Glue, Blood, Albumen, Grease, Varnish, Oll, Paints, Stearine, Vegetable Colors, Ited Wine, Fruit Stains, Red
1	Spinning machine top roll, Fenton & Champlin 212,670	Stearine, Vegetable Colors, Red Wine, Fruit Stains, Red
4	Spoon, nursery and medical, J. W. Force 212,677	Ink, Alizarine Ink, Iron Rust, Ink made with Galls, Lime, Lye, Alkali Stains, Tannin, Green Nut Stains, Coal Tar
6	Steam boiler and pipe covering, G. Kelly	Stains Wagon Grease Acid Stains etc. By means of
0	Steam boilers, indicator for water supply pipes of,	Stains, Wagon Grease, Acid Stains, etc. By means of this valuable table of directions any person, by pro- viding himself with a few simple chemicals, and using them as directed, may readily clean any species of the
e	C. Sprod	viding himself with a few simple chemicals, and using
3	Steam generator, J. L. Kite	above goods, and if necessary set up a cleaning shop.
1		above goods, and if necessary set up a cleaning shop. This is one of the most convenient and valuable papers
7	Stone, artificial, Greer & O'Hair	on the subject ever published. Contained in SUPPLE- MENT 15S. Price 10 cents.
	Stove and range, cooking, G. H. Sherman	MENT 135. Trice to cents.
6	Stove, cooking, H. L. Howse	DYSPEPSIA. BY DR. C. F. KUNZE.
8	Stove, magazine, C. Gage	Symptoms Appetite Diminished Stomach Digestion
b	Stove pipe thimble, J. Allingham	Symptoms. Appetite Diminished, Stomach Digestion much slower than Normal Constipation. Symptoms in Children. Chronic Cases. Dyspepsia as caused by
6	Stoves, etc., door for, W. Miller 212,618	in Children. Chronic Cases. Dyspepsia as caused by
1	Street sprinkler, D. Mansfield	too much Food; by Indigestible Food; by General De- rangement; by Altered Conditions of Innervation. Treatment. Nourishment should be Easily Digestible;
8	Tackle block, J. W. Norcross	Treatment. Nourishment should be Easily Digestible;
U .	Thermostat and manual circuit closer, A. D.	taken Little at a Time; and Digested before more is
1	Blodgett	taken Little at a Time; and Digested before more is taken. Necessity of Fewand Plain Dishes. Treatment when Stomach is Overloaded. Aiding Gastric Juice.
0	Thrasher and cleaner for peas, etc., J. J. Sweatt. 212,763	Treatment in Febrile Diseases. Contained in SCIENTIFIC AMERICAN SUPPLEMENT NO. 129. Price 10 cents. To be had at this office and of all newsdealers.
3	Thrashing machine band cutter and feeder, W.H.	TIFIC AMERICAN SUPPLEMENT No. 129. Price 10 cents.
1	Bassett 212,583	A O DE MAG AT CHIS OFFICE AIRI OF AIR DEWSGEARERS.
0	Testing machine, T. Olsen 212,734	BALDNESS.—BY GEORGE H. ROHE,
4	Time lock, Kook & Hall 212,610	M.D. A brief but Highly Useful paper, showing the
2	Toy, bell, J. Brunner 212,537	causes of Baldness, how Dandruff is produced, why the
5	Toy railway, C. C. Shepherd 212,630	Hairfalls off, with explanations of Kafosi's Prompt and
4	Trace fastener and protector, T. J. Christy 212,660	with Directions and General Advice for Preventing
9	Treadle, J. P. Council	Baldness, Restoring and Preserving the Hair. This is
4	Trellis, flower, G. E. Jenks 212,604	Effectual Remedy and Recipe for the same; together with Directions and General Advice for Preventing Baldness, Restoring and Preserving the Hair. This is one of the most Iseful, Practical, and Valuable Papers concerning the Treatment of Baldness ever published.
٠	Truck, car, G. Vincent	Contained in Supplement 161. Price 16 cents.
1	Truck, hand, M. Johnson	
1	Type writing machine, A. Michela	AIDS TO DRAWING.—A VALUABLE
•	Valve for hydraulic engines, etc., G. Johnson 212,556	nanor containing. (1) Ungravings and Descriptions of
۸		paper containing: (I) Engravings and Descriptions of the Construction and Use of the PANTAGRAPH, for Accurately and Quickly Copying Drawings, Photographs,
~	Valve, safety, J. C. Schaefer	Accurately and Quickly Copying Drawings, Photographs,
ή.		Maps, Diagrams, etc., making the Copies larger or shaller Lorof the same size of the original. Any intelligent nerson
o o	Vehicle brake, C. J. Walser	Maps, Diagrams, etc., making the Copies larger or snaller or of the same size of the original. Any intelligent person may construct and use the Pantagraph by following the
ź	Vehicle platform spring, T. G. Mandt	directions here given. (2) Also, Drawings and description
	Vehicle spring, J. H. Deniger	for the Construction of the CAMERA LUCIDA, a simple
ï	Vehicle spring, W. P. Hansell. 212,688	and valuable little instrument for making drawings direct from the object, and in copying, Enlarging, or Diminishing Drawings, Photographs, etc. (3) Also, Drawings and description of the CAMFRA OBSCURA,
_	Vehicle spring, B. S. Porter	Diminishing Drawings, Photographs, etc. (3) Also,
3	Ventilator, G. Hayes (r)	a simple, effective, and cheaply made little instrument
1	Ventilator cap, P. J. Belford 212,647	a simple, effective, and cheaply made little instrument by which Landscapes, Dwellings, and other objects may
5	Vessel, ice breaking, F. M. Mahan	be easily drawn by my person with accuracy, although unskilled in drawing. (4) Also. THE SKETCHING FRAME, with drawings and descriptions for Construc-
1	Wagons, chute for coal, G. W. Rodenhausen 212,746	FRAME, with drawings and descriptions for Construc-
5 i	Water closet, etc., valve. A. E. Jennings 212,704	
6	Water closets, etc., outlet for, A. G. Myers 212,730	others for assistance in outdoor drawing, portraiture, etc. (5) Also, THE REFLECTING DRAWING BOARD.
)	Water wheel, J. L. Beers 212,646	A simple device in which the reflection from a pane of
1	Wheel clamp, S. W. Gear 212,549	glass is made to throw down upon paper an image of the
1	Whiffletree, F. R. Willson, Sr 212.639	drawing to be copied; all the operator has to do being
1	Wind engine, L. King 212,709	to draw the outline before him. (6) Also, THE TRANS-PARENT DRAWING TABLE, showing how to construct
) ;	Wire cage, M. Grebner (r) 8,594	l a drawing hoard in which the light is thrown under and
0	Wrench, L. S. Starrett 212,760	upward birough the drawing, thus greatly facilitating the making copies of only trawing. (7) Also THE PROPERTY ON ALDIVIDERS; being a simple instrument for enlarging or reducing drawings from ne scale to another with Accuracy and Rapidity. (8) Also, THE PRESENCE THE STATE OF TH
1	Wrench and crimper for nut washers, Christie &	PROPORTIONAL DIVIDERS; being a simple instru-
5	Overton	ment for enlarging or reducing drawings from one scale
ı	Yoke, neck, C. Hauff	PERSPECTIVE RULER. A simple device for the Cor-
1		PERSPECTIVE RULEH. A simple device for the Correct and Expid Drawing of the Perspective lines in Drawing. The construction of all these various instru-
9	MDADE MADEO	Drawing. The construction of all these various instru-
3	TRADE MARKS.	by plain, simple directions to enable any person at a
0 '	Canned goods, A. Stephani & Co	small cost to make and use them. This is the most
3	Catarrh remedy, A. De Voe	nients is illustrated with engravings, and accompanied by plain, simple directions to enable any person at a small cost to make and use them. This is the most Valuable Paper of the kind ever published. The whole contained in SUPPLEMENT 138. Price libents.
3	Cigars, J. Elbling	contained in Sufflesie at 103. Free meents.
2	Cigars, cigarettes, and smoking and chewing to-	
	bacco, S. Jacoby & Co	

Flour, E. F. Jackson. Grain cradles, scythe snaths, etc., Semple & Birge .. 7,051

wood, Bridgeport Wood Finishing Company.... 7,050 Shirts, collars, cuffs, etc., O. S. Baldwin ... Smoking and chewing to bacco, cigars and cigarettes, Goodwin & Co...

DESIGNS.

22010101	
Carpet, J. Campbell11,037,	11,038
Font of printing types, R. Smith	11,039
Handkerchief, A. Tilt	11,033
Knitted fabric, D. Briggs	11,030
Knitted fabric, C. Jackson 11,031,	11,035
Knitted fabric, H. A. Truitt	11,036
Match boxes, H. Rosenberg	11,040
Padlocks, C. H. Beebe	11,041
Pistol handles, H. H. Hopkins	11,034
Pocketbook fasteners, L. B. Prahar	11,042

English Patents Issued to Americans.

From February 25 to February 28, inclusive

Bolts, machinery for packing.-C. D. Rogers, Provi-Card setting machines.-J. Russell et al., Springfield,

Files, process for sharpening.-D. W. Watson, Malden

Lanterns.—E. B. Requa et al., Jersey City, N. J Motors.-E. Molera et al., San Francisco, Cal. Mowing machines.—P. Mast et al., Springfield, Ohio. Paper for covering silver.—J. Torrey, New York city. Piston rod packing.—T. Tripp, Boston, Mass. Quoins.—R. F. Gillin, Brooklyn, N. Y. Revolvers.—W. C. Dodge, Washington, D. C. Sifting apparatus.—J. T. Parlour, Brooklyn, N. Y. Staples, machine for clinching.—G. W. McGill, N.Y.city.

Advertisements.

Inside Page, each insertion --- 75 cents a line. Back Page, each insertion --- \$1.00 a line.

(About eight words to a line.) an head advertisements at the the same rate of the properties of the same rate of the by measurement, as the letter press. Adversements must be received at publication office as early copies. Thursday morning to amend in neal issues. tisements must be received at pnontation office as Thursday morning to appear in next issue,

LARGEST ASSORTMENT IN THE WORLD of Plays, Dramas, Comedies, Farces, Ethiopian Dramas, Plays for Ladies only, Plays for Gentlemen only, Wigs, Beards, Moustaches, Face Preparations, Burnt Cork, Jarley's Wax Works, Tableaux, Charades, Pantomimes, Guides to the Stage, and for Amateurs Make up Book, Make up Boxes, New Plays, SAMT, FRENCH & SON, 38 East 14th St., Union Square, New York, Catalogues sent FREE!!!

Sawing machine, circular, F. McDonough 212,615
Sawing machine, drag, D. F. Silcott 212,575
Scoops, wooden. W. C. Freeman 212,678
Seed dropper, Inclined. A. N. Newton 212,731
Self-acting brake or friction coupling, E. Becker. 212,584
Sewing machine, T. Shanks. 212,678
Sewing machine, J. D. Wright 212,581
Sewing machine attachment, P. F. Fernandez. 212,671
Sewing machine needle, W. T. Berry. 212,531
Sewing machine rimmer, N. Ingalls, Jr. 212,671
Shaft coupling, W. D. Forbes. 212,574
Shaft hanger, H. D. Cone. 212,571
Shaft hanger, H. D. Cone. 212,571
Shoe nails, scroll package for holding, H. N. Allen 212,671
Shoe scalloping machine, W. Manley. 212,718
Sink guard and cover, J. Magee. 212,674
Sink guard and cover, J. Mag ON THE PROGRESS OF AERONAUTICS.



COPYRIGHTS, TRADE MARKS, ETC.

Messrs. Munn & Co., in connection with the publication of the Scientific American, continue to examine Improvements, and to act as Solicitors of Patents for

In this line of business they have had over thirty YEARS' EXPERIENCE, and now have unequaled facilities for the preparation of Patent Drawings, Specifications, and the Prosecution of Applications for Patents in the United States, Canada, and Foreign Countries. Messrs. Munn & Co. also attend to the preparation of Caveats, Trade Mark Regulations, Copyrights for Books, Labels, Reissues, Assignments, and Reports on Infringements of Patents. All business intrusted to them is done with special care and promptness, on very moderate

We send free of charge, on application, a pamphlet containing further information about Patents and how to procure them; directions concerning Trade Marks, Copyrights, Designs, Patents, Appeals, Reissues, Infringements, Assignments, Rejected Cases, Ilints on

the Sale of Patents, etc.

Foreign Patents.—We also send, free of charge, a Synopsis of Foreign Patent Laws, showing the cost and method of securing patents in all the principal countries of the world. American inventors should bear in mind that, as a general rule, any invention that is valuable to the patentee in this country is worth equally as much in England and some other foreign countries. Five patents-embracing Canadian. English. German, French, and Belgian-will secure to an inventor the exclusive monopoly to his discovery among about one HUNDRED AND FIFTY MILLIONS of the most intelligent people in the world. The facilities of business and team communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The expense to apply for an English patent is \$75; German, \$100; French, \$100; Belgian, \$100; Cana-

Copies of Patents.-Persons desiring any patent issued from 1836 to November 26, 1867, can be supplied with official copies at reasonable cost, the price depending upon the extent of drawings and length of specifications.

Any patent issued since November 27, 1867, at which time the Patent Office commenced printing the drawings and specifications, may be had by remitting to this office \$1.

A copy of the claims of any patent issued since 1836

will be furnished for \$1.

When ordering copies, please to remit for the same as above, and state name of patentee, title of invention, and date of patent.

A pamphlet, containing full directions for obtaining United States patents sent free. A handsomely bound Reference Book, gilt edges, contains 140 pages and many engravings and tables important to every patentee and mechanic, and is a useful hand book of reference for everybody. Price 25 cents, mailed free.

Address

MUNN & CO.

Publishers SCIENTIFIC AMERICAN, 37 Park Row, New York. BRANCH OFFICE-Corner of F and 7th Streets, Washington, D. C.

RUBBER BACK SQUARE PACKING. BEST IN THE WORLD.

For Packing the Piston Rods and Valve Stems of Steam Engines and Pumps. B represents that part of the packing which, when in use, is in contact with the Piston Rod.

A the elastic back, which keeps the part B against the rod with sufficient pressure to be steam-tight, and ye A the clastic back, which keeps the part Bagainst the rod with summent pressure to be a ates but little friction. This Packing is made in lengths of about 20 feet, and of all sizes from ½ to 2 inches square.

JOHN H. CHEEVER, Treas. NEW YORK BELTING & l'ACKING CO., 37 & 38 Park Row, New York,

STEAM PUMPS.

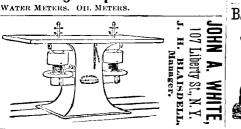
HENRY R. WORTHINGTON,

239 Broadway, N. Y. 83 Water St., Boston. THE WORTHINGTON DUPLEX PUMPING ENGINES FOR WATER WORKS—Compound, Condensing or Non-Condensing. Used in over 100 Water-Works Stations.

STEAM PUMPS-Duplex and Single Cylinder.

Price list issued Jan. 1, 1879, with a reduction exceeding 30 per cent.

WATER METERS. OIL METERS



WANTED

Soft, Strong. CASTINGS Plain, Galvanfzed, and Smooth CASTINGS Bronzed or Nickled Iron or Brass CASTINGS to order promptly.

per 1,000. 1,000 Fine 9x12 Circulars, \$2.50. Price fist cestimate and samples for stamp. 250 Bill Heads, \$1. "Local" Printing House, Silver Creek, N. Y.

HOW TO SELL PATENTS. We send our page book



YALE VERTICAL MILL



LAP WELDED CHARCOAL IRON Boiler Tubes, Steam Pipe, Light and Heavy Forgings, Engines, Boilers, Cotton Presses, Rolling Mill and Blast

Work. READING IRON WORKS, 261 South Fourth St., Phila.

Lathes, Planers, Shapers

Drills, Bolt and Gear Cutters, Milling Machines. Special Machinery. E. GOULD & EBERHARDT, Newark, N. J. B. W. Payne & Sons, Corning, N. Y.



Eureka Safety Power cyl. ht. space. wt. price 31/6x4 | 48 in. | 40x25 | 900 | \$150 56 46x30 1600 250 4x6 5x7 72 72x42 2700 400 Also, SPARK ARRESTING PORT-ABLES, and Stationary Engines for Plantations. Send for Circulars.



of this Paper. The Illustrated

ICTIONAR Containing nearly 29,500 words.

Orthography, Pronunciation and Defin-itions, according to the best English and American Lexicographers.

and American Lexicographers.
Very handsomely bound in Cloth and illustrated with 125 Engravings, sent free to any reader of this paper upon receipt of 56 cts. to pay actual postage and packing charges, Address C. E. H U N T, Rockland, Mass., dealer in books, bibles, &c. : This great offer is good for 60 days only, and is made solely for the purpose of introduction. But two dictionaries will be sent to one address. This appears but once. Order Now. Send silver, currency or stamps.

NARRISON FOR ALL PURPOSES. Brooklyn, E. D., New York. STEAM PUMP, W



SALESMEN, ATTENTION!

HANCOCK INSPIRATOR

The following Letter speaks for itself:

The following Letter speaks for itself:

LIMA, O., Feb. 24th, 1879.

Messrs. FAIRBANKS, MORSE & Co., Cleveland, Ohlo.

Gentlemen: The Hancock Inspirator I bought of you is far superior to any pump I ever saw, and the most economical boiler feeder! Know of. I am trailing water 40 feet and lifting 17 feet. Since I have been using the Inspirator. I use one-third less wood than I did with a pump for the same power. It requires no belts, no oiling, no packing, and there are no valves to get out of order. I have not lost one minute with it since I had it put on. Besides all this my boiler is perfectly free from scale. The water I use is hard, and with the pump I had to clean the boiler every two weeks and would find from one-fourth to one-half inch thickness of scale on the flues, whi h was hard to remove. After using the Inspirator two weeks I opened my boiler for the purpose of cleaning it. and found the scale that had formerly adhered to the boiler loose and lying on the bottom. Since that time I have had it open twice only, and all I found in it was a soft, sandy looking substance, very little of it, and easy to get out. With the Inspirator I can run at least 30 days without cleaning out. I have just taken the Inspirator apart to see if it was filling up with lime. It is as clear as the day it was put up as I can prove by five men who work in my mili and were present when I had it apart. I would not take \$500 for the Inspirator apart and Descripting Chemical servers.

 ${f T}^{\alpha}$ Illustrated and Descriptive Circulars sent on application to

Hancock Inspirator Co., 52 CENTRAL WHARF, BOSTON.

Baker Rotary Pressure Blower.



(FORCED BLAST.) Warranted superior to any other.

WILBRAHAM BROS. 2318 Frankford Ave. PHILADELPHIA

\$57.60 AGENT'S profits per week. Will prove it or forfeit \$50. New articles, using particles, all. Address W. H. CHIDESTER, 218 Fulton St., N. Y.

DYERS AND MANUFACTURERS FIND Thomas' ONE DIP dyes, Jet Black No. 44 and Blue Black No. 55, the best and fastest blacks known. They soften all fibers and all fabrics. Fur or wool lasts dyed in two hours at one operation. Raw cotton carded and spun as well after as before dyeing. Cotton and wool mixed goods beautifully dyed at one operation. Economical and very convenient. Recipe books GRATIS, Address N. SPENCER THOMAS, Elmira, N. Y.



An engine that works without Boller. Always ready to be started and to give at once full power. SAFETY. ECONOMY, CONVENTENCE. Burns common Gas and Air. No steum, no coal, no ashes, no fires, no danger, no extra insurance. Almost no attendance.

THE NEW OTTO SILENT GAS ENGINE. Useful for all work of small stationary steam engine. Built in sizes of 2, 4, and 7 H. P. by SCHLEICHER, SCHUMM & CO., 3045 Chestnut Street, Phila., Pa. H. S. Manning & Co., 111 Liberty St., N. Y., Agents.

EPSY or FITS

by DR. ROSS' REMEDIES. Established thirteen years. TRIAL PACKAGE SENT FREE. Cures speedy absolute and permanent. A patient after suffering for 15 years writes:

ZANESVILLE, O., Aug. 30, 1878.

DR. ROSS, Richmond, Ind.—Dear Sir: I have been permanently cured by your treatment, for which I am truly grateful. During the past three years I have recommended you to others who have also been cured. No money could be a few of the cure of the

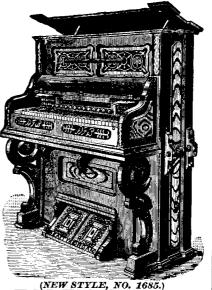
AHEAD OF ALL COMPETITION!



SEVEN SIZES FOR HAND USE.
Weighing from 32 to 51 lbs.
THREE SIZES FOR HORSE POWER.
The complete victory and highest awards at the exhaustive Field Trial at the Paris World's Exhibition in 1878, together with those at the great hundred duytrial at the Centennial in 1876, prove that these machines fully maintain their reputation as the best Lawn Mower yet made. Do not buy worthless imitations, when the genuine can be had for the same money.

GRAHAM, EMILEN & PASSMORE,
Patentees and Manufacturers.
631 Market St. Philadelphia, Pa.
Send for Descriptive Catalogue with prices.

\$1,000 PIANO FOR \$255 \$340 ORGAN FOR \$85.



(NEW STYLE, NO. 2023.)

Thousands Now in Use that are AT CIVING ENTIRE SATISFACTION.

BEATTY ORGAN

MY PRICE, ONLY \$85.00.

ORDER NOW

DANIEL F. BEATTY, Washington, New Jersey, U. S. America.



L. SMITH HOBART, President.

JOHN C. MOSS, Superintendent.

TYPE-METAL RELIEF PLATES. A SUPERIOR SUBSTITUTE FOR WOOD-CUTS

AT MUCH LOWER PRICES.

Persons desiring illustrations for Books, Newspapers, Catalogues, Advertisements, or

for any other purposes, can have their work done by us promptly and in the best style.

Our Relief Plates are engraved by photo-chemical means; are mounted on blocks type-high ready for use on any ordinary press, and will wear longer than the common stereotype plates.

They have a perfectly smooth printing surface, and the lines are as deep, as even, and as

sharp as they could possibly be cut by hand.

Electrolypes may be made from them in the same manner as from wood-cuts.

Copy. The engraving is done either from prints or pen-drawings. Almost all kinds of prints can be re-engraved directly from the copy, provided they be in clear, black lines or stipple, and on white or only slightly tinted paper.

Pen drawings, suitable for engraving by us, must be made with thoroughly BLACK ink,

on smooth, white paper. They should usually be made twice the length and twice the width of the plates desired. When such drawings cannot be furnished us, we can produce them from photographs,

pencil sketches, or designs of any kind accompanied with proper instructions. Photographs taken in the usual way, and of any convenient size, we can use.

Change of Size.—Wood-cut prints of the coarser kind may often be reduced to

half their lineal dimensions, while others will admit of very little reduction, and some of none at all.

Most lithographic and steel-plate prints will admit of no reduction. Very fine prints of any kind may be enlarged moderately without detriment. Any prints which cannot be satisfactorily reduced or enlarged may be redrawn and

thus brought to any desired size.

In all cases of reduction and enlargement, the relative proportions remain unchanged.

Proofs.—Whenever desired, we will furnish tintype proofs of the drawings made

us, for approval or correction, before engraving. A printed proof is furnished with each plate. Time.--We cannot usually engage to fill an order for a single plate in less than from

three to six days; larger orders will require longer time.

Estimates will be promptly furnished when desired. That these may be definite and correct, the copy to be used—whether print, photograph, sketch, or drawing—should always be submitted for our examination, together with a distinct statement of the size of plate wanted, and of any other details to be observed.

Terms.—To insure attention, all orders must be accompanied by an advance of half

the price charged, the balance to be paid on delivery.

Electrotyping and Printing.—We have recently added to our establishment excellent facilities for making electrotypes, and also three power presses specially fitted for printing plates of all sizes in the finest manner.

Artificial Light.—We have just introduced this most important facility, which

enables us to prosecute our work in cloudy weather, and to push forward hurried orders in

References.—Our plates are now used by the principal publishers in this city, and

by most of the leading houses in every State in the Union.

Our General Circular contains a few specimens of the various kinds of our work, and will be sent on receipt of stamp. We have just prepared five special circulars, as follows

- No. 1. Portraits and Figures.
- 2. Buildings and Landscapes.
 3. Machinery and Apparatus.
- 4. Maps, Autographs, and Ornamental Lettering 5. Reproductions from Wood-Cuts, Steel-Plate Prints, and Lithographs.

These will be furnished at ten cents each.

Advertisements.

Inside Page, each insertion --- 75 cents a line. Back Page, each insertion --- \$1.00 a line. (About eight words to a line.)

Engravings may head advertisements at the same rate per line, by measurement, as the letter press. Adver-tisements must be received at publication office as early as Thursday morning to appear in next issue.



O LARGE CONSUMERS OF FINE LIGHT Mallcable Iron Castings, we can offer special inducements in the way of VERY SUPERIOR QUALITY GUARANTEED, and at fair prices. Being ourselves large consumers and requiring the most perfect castings, other work is insured the same attention.

MALLORY, WHEELER & CO.,
NEW HAVEN, CONN.

MPORTANT FOR ALL CORPORATIONS AND MANF'G CONCERNS. - Buerk's Watch-man's Time Detector, capable of accurately controlling the motion of a watchman or patrolman at the different patrol of the best for the part of the controlling the motion of a watchman or patrolman at the different patrol of the best for the part of troning the motion of a watchman or patrolman at the different stations of his beat. Send for circular.

J.E. BUEKK, P.O. BOX979, BOSTON, Mass. N.B.—The suit against Inhaeuser & Co., of New York, was decided in my favor, June 10, 1874. A fine was assessed against them Nov. 11, 1875, for selling contrary to the order of the court. Persons buying or using clocks infringing on my patent will be dealt with according to law.

DOUBLE PITMAN PRESSES.
STILES & PARKER PRESS CO., Middletown, Ct.



The J. L. Mott Iron Works, 88 and 90 BEEKMAN ST., Manufacturers of DEMAREST'S PATENT

WATER GLOSETS.

Simple in construction, perfect in operation, thoroughly excluding all sewer gas, and cleanly in every way.

Mill Stones and Corn Mills. We make Burr Millstones, Portable Mills, Smut Machines, Packers, Mill Picks, Water Wheels, Pulleys, and Gearing, specially adapted to Flour Mills. Send for catalogue

J. T. NOYE & SON, Buffalo, N. Y.

HOW TO SELL PATENTS.—This little book fully explains how all patents can be sold for good prices. Price 25 cents. L. D. SNOOK, Barrington, Yates Co., N. Y.

Pond's Tools,

Engine Lathes, Planers, Drills, &c. DAVID W. POND, Worcester, Mass.

CHAFTING PULLEYS, HANGERS, etc. a specialty. Send for Price List to A. & F. BROWN, 57-61 Lewis Street, New York.

PARTIES HAVING GOOD PATENTS FOR SALE cheap, agricultur or hardware goods preferred, may find a customer by addressing P. O. Box 12, Joliet, Ill.

FOR SALE.-LETTERS PATENT OF Wilhide's Celebrated Noiseless Self-setting Rat and Mouse Traps. Thoroughly introduced. Traps sold by all dealers. Address Owners and Manufacturers, J. T. WILHIDE & BRO., York Road, Carroll Co., Md.

AIR COMPRESSORS, HOISTING ENGINES AND OTHER MINING MACHINERY; MANUFACTURED BY GRIFFITH & WEDGE. ZANESVILLE, OHIO.

FOR TEN DOLLARS CASH, we will insert a seven-line advertisement one week in a list of 269 weekly newspapers, or four lines in a different list of 337 papers, or ten lines two weeks in a choice of either of four separate and distinct lists containing from 70 to 140 papers each, or four lines one week in all four of the same lists, or one line one week in all six lists combined, being more than 1,00 papers. We also have lists of papers by States, throughout the United States and Canada Send 10 cents for our 100 page pamphlet. Address Gp. O. P. Kowell & Co., Newspaper Advertising Bureau, 10 Spruce Street, New York.

ICE-HOUSE AND COLD ROOM.—BY R. G. llatfield. With directions for construction. Four engravings. Supplement No. 59. Price, 10 cents.

Roots' Positive Blast Blower.



P. H. & F. M. ROOTS, M'f'rs, Connersville, Ind. S. S. TOWNSEND, Cen. Agt., 6 Cortlandt St. COOKE & BECCS, Sell'g Agts., NEW YORK. SEND FOR PRICED CATALOGUE.

The George Place Machinery Agency

Machinery of Every Description. 121 Chambers and 103 Reade Streets, New York.

60 Chromo and Perfumed Cards [no 3 alike], Name in Gold and Jet, 10c. CLANTON BROS., Clintonville, Ct.

ROOF PAINTING. For \$5. by Post Office Order recipe for making Langhorne's English Gum Coating Paint and other mineral paints, with full instructions for roof and sidewall painting. This paint is used by the U. S. Government. Address M. LANGHIORNE.

708 E Street, Washington, D. C.

EDMUND DRAPER, Manufacturer of First-class Engineers' Instruments. Established in 1830. 226 Pear St., Phila., Pa.

J. LLOYD HAIGH,



CAMERON STEAM

Also known as the "SPECIAL" PUMP, is the standard of excellence at home and abroad. For Price Lists, address

CAMERON PUMP WORKS.

Foot East 23d Street, New York.



SHEPARD'S CELEBRATED \$50 Screw Cutting Foot Lathe.
Foot and Power Lathes, Drill Presses,

Foot and Power Lathes, Drill Presses, Scrolls, Circular and Band Saws, Saw Attachments, Chucks, Mandrels, Twist Drills, Dogs, Calipers, etc. Send for catalogue of outlits for amateurs or artisans.

H. L. SHEPARD & CO., 331, 333, 335, & 337 West Front Street, Cincinnati, Ohio.

ESTABLISHED 1844.

JOSEPH C. TODD

ENGINEER and MACHINIST. Flax, Hemp, Jute, Rope, Oakum and Bagging Machinery, Steam Engines, Boilers, etc. I also manufacture Baxter's New Portable Engine of 1877. Can be seen in operation at my store. A one horse-power portable engine, complete, \$125; two horse-power, \$225; two and a half horse-power, \$250; three horse-power, \$275. Manufactured exclusively by

J. C. TODD, 10 Barclay St., New York, or Paterson, N. J.

Wood-Working Machinery,

Such as Woodworth Planing, Tonguing, and Grooving Machines, Daniel's Planers, Richardson's Patent Improved Tenon Machines, Mortising, Moulding, and Re-Saw Machines, and Wood-Working Machinery generally. Manufactured by WITHERBY, RUGG & RICHARDSON, 26 Salisbury Street, Worcester, Mass, (Shop formerly occupied by R. BALL & CO.)

only Machines giving a solid core showing exact re of rocks passed through.

THE AMERICAN DIAMOND ROCK BORING CO. SEND FOR PAMPHLET. NEW YORK.



WARRANTED THE BEST. 1 H. P. Boiler & Engine, \$150. 2 H. P., \$175. 3 H. P., \$200. Tested to 200 lbs. Steam.

LOVEGROVE & CO., 152 N. 3d St., Philadelphia, Pa., Builders of Engines and Bollers, 1 to 100 horse power. Send for circulars and prices, and state size and style you want.

Harris' Corliss Engine,

place where this engine can be obtained. Send for pumphlet containing full details; also list of sizes with H. P. For the convenience of Western parties meaning business and wishing to confer with me at any stated time at their mill or works, I will visit them by receiving notice and giving me a latitude of 2 to 4 weeks. Those visiting New York and wishing to confer with me there by appointment, will find me or my agent every Wednesday (or Thursday if so stated in appointment) at H. T. Brewster's office, 97 Liberty Street.



MILLS

For Crushing Bones, Fire Brick, Clay, Phosphates, Hoofs, Horn, also for Grinding Wheat. Tobacco, Paint, Sate, Corn, Sumac, Coal, Chulk, Bark, Coffee, Black Lead, Saltvetre, Cochineal, Spices, Ores, and many other substances. Shafting, Pulleys and Machinery In general, Manufactured by WALKER BROS. & CO.

23rd and Wood Streets, Philadelphia

MINING MACHINERY. Engines. Boilers, Pumps, Coal and Ore Jigs, Dust Burning Appliances. Drawings and advice free to customers. Jeanesville Iron Works (J. C. Haydon & Co.). Address HOWELL GREEN, Supt., Jeanesville, Luzerne Co., Pa.

SCHOOL OF ELECTRICITY AND CHEMISTRY,

455 FOURTH AVENUE, NEW YORK.

Instruction and Laboratory Practice in Electricity, Inorganic Chemistry, and the Construction of Apparatus Unequaled facilities for experiments in electricity.

A. FLOYD DELAFIELD, Instructor.

CHROME STEEL.
WAREHOUSE, 98 WILLIAM ST., NEW YORK.
JOHN W. QUINCY, Manager.
Unequaled for strength, durability, and uniformity. Send for circulars for proof that it will do 50 percent, more work than any other Cast Steel and that it is cheapest and best to use.

A DAY to Agents canvassing for the Fire-side Visitor. Terms and Outfit Free. Ad-dress P. O. VICKERY, Augusta, Maine.



BEST AND CHEAPEST SCREW CUTTING ENGINE LATHES

SEE FULL DESCRIPTION IN AMERICAN JULY SCIENTIFICANED CATALOGUE GOODNOW & WIGHTMAN 176 WASHINGTON ST BOSTON MASS.

MACHINIST GOODS And Small Tools of all kinds. Catalogues sent

A. J. WILKINSON & CO., Boston, Mass.

THE DRIVEN WELL. Town and County privileges for making Driven Wells and selling Licenses under the established American Driven Well Putent, leased by the year to responsible parties, by

wm. D. ANDREWS & BRO., NEW YORK.

Address JOHN A. ROEBLING'S SONS, Manufacturers, Trenton, N. J., or 117 Liberty Street, New York. Wheels and Rope for conveying power long distances. Send for circular.

PIG PAY.—With Stencil Outfits. What costs 4 cts. sells rapidly for 50 cts. Catalogue free. S. M. SPENCER, 112 Wash'n St., Boston, Mass.

STEAM AND HYDRAULIC Passenger and Freight Elevators STEAM ENGINES AND BOILERS, WHITTIER MACHINE CO., Boston, Mass.

Retail 9 CENTS per pound. Warranted of the hardest temper, and never to settle.

Better than any English make, and only one that is fully

Established 1843. Steel Horn, warranted not to break, and Face of Best Cast Steel.

!!WARRANTED!!

50 sizes, from 1-2 lb. to 800 lbs. Catalogues furnished on application.

DUOTO VISITING CARDS—Now all the rage in Paris. One dozen beautiful gilt edged (round cornered) Cards with your name and photograph, onl 60 cents; 2 dozen, \$1. Full particulars and a 50-pag book free. E. NASON & CO., 111 Nassau St., New York

WETHERILL & BROTHER, PHILADELPHIA.

WHITE LEAD



OUR FRESH STOCK OF

WHITE HOL

IS NOW READY. This, with our complete assortment of

RARE AND FANCY WOODS,

is particularly worthy of the attention of wholesale buyers. In addition, our usual complete stock of sawed Hardwood, Lumber, and Veneers, figured and plain; Burls, etc.

GEO. W. READ & CO., 186 to 200 Lewis Street, New York.

FOR SALE—GEAR CUTTER,

Been in use only eighteen months; will cut gears, both Spur-Bevel-Miter and Spiral, from four feet to one inch in diameter. Is complete with counter-shaft and several cutters. Machine made by Pond, of Worcester. Index made by Browne & Sharpe. Cost \$900. Will sell for \$250. Address J. G. STOWE, 126 Main Street, Cincinnati, O.

FOR IRON AND STEEL LATHE DOGS, BOTH FOR Machinists and Amateurs, send for circular to C. W. LE COUNT, South Norwalk, Conn,

SALESMEN \$125 A Month and Expensed WANTED \$125 Send & Month and Expensed WANTED \$162 Signal & Month and Expensed WANTED \$162 S

Hydraulic and Jack Screws ALBERT BRIDGES, 46 Cortlandt St., New York.

NOVELTIES, NOTIONS,

Watches, Cheap Jewelry, Stationery Packages. Agents and country stores supplied. Illustrated circular free. J. BRIDE & CO., Manufacturers, Salesroom, 297 B'way, New York. Address letters to P. O. Box 2773.



JENNINGS' WATER CLOSETS PRICES REDUCED

SEND FOR CIRCULAR 94 BEEKMAN STREET NEW YORK THE TANITE CO. STROUDSBURG, PA.

EMERY WHEELS AND CRINDERS. LONDON-98t. Andrews St., Holborn Viaduct, E. C. LIVERPOOL-42 The Temple, Dale St. GEO. PLACE, 121 Chambers St., New York Agent.

ROCK DRILLING MACHINES

AIR COMPRESSORS.

MANUFACTURED BY BURLEICH ROCK DRILL CO.
SEND FOR PAMPHLET. FITCHBURG MASS.

PATENTS at AUCTION.

Regular Monthly Sales. For terms, address N. Y. PATENT EXCHANGE, 67 Liberty Street, New York.

MACHINISTS' TOOLS. New AND IMPROVED PATTERNS. Send for new illustrated catalogue.

Lathes, Planers, Drills, &c.
NEW HAVEN MANUFACTURING CO.,
New Haven, Conn.

Pyrometers. For showing heat of Ovens, Hot Blast Fipes, Boiler Flues, Superheated Steam, Oil Stills, etc.
HENRY W. BULKLEY, Sole Manufacturer, 149 Broadway, N. Y.

NATSONS NON CHANGEABLE GAP LATHE HAS CHORK JAMES WATSON GREAT FACILITIES FOR LARGE OR MEDIUM SIZE WORK JAMES WATSON ST PHILA.

SPARE THE CROTON AND SAVE THE COST. Driven or Tube Wells

furnished to large consumers of Croton and Ridgewood Water. WM. D. ANDREWS & BRO., 414 Water St., N.Y., who control the patent for Green's American Driven Well.

NAT'L BOLT & PIPE MACHINERY CO., Mfrs. of Hand and Power Bolt and Pipe Cutters. Bolt Pointers, Bolt Headers, Hot and Cold Pressed Nut Ma-chinery, Taps and Dies, etc. Send for Cir. Cleveland, O.

CROSCOPES, Opera Glasses, Spectacles,
Meteorological Instruments, at greatly reduced
rices. Send three stamps for Illustrated Catalogue. R. & J. BECK, Philadelphia, Pa. HAND SAW MILL SAVES THREE MEN'S S. C. HILLS, 78 Chambers St., N. Y.

DAMPER REGULATORS **BEST** AND WEIGHTED GAUGE COCKS.
MURRILL & KEIZER. 4 HOLLIDAY ST., BALTIMORE.

THE 1879

Pennsylvania Lawn Mower.



LLOYD, SUPPLEE & WALTON, PHILADELPHIA.

Working Models

And Experimental Machinery, Metal or Wood, made to order by J. F. WERNER, 62 Centre St., N. Y. FARM LAW. ADDRESS OF HON. ED-FARM LAW. ADDRESS OF HON. EDMUNDH. BENNETT, delivered before the Massachusetts State Board of Agriculture. This is an essay embracing complete and practical information, valuable not only to the farmer but to every one. Showing how to Buy a Farm; Bargains that are not Binding; Boundaries, and where they are in Streams, Ponds, I akes, or on the Stashore; what a Deed of a Farm includes; Rights in the Road. Farm Fences: their Legal Height, etc. Kailway Fences. Stray Cattle; Cattle on Railways; Impounding Cattle. The Farmer's Liability for his Animals. The Law on the Dog. The Farmer not Liable for his Dogs. Water Rights and Drainage; Damming; Diverting the Course of a Stream. Surface water; Inderground Water. Trespassing, in Summer and in Winter. Hunting and Fishing. Fruit Trees on Boundary Lines, etc. Contained in SCIENTIFIC AMERICAN SUPPLEMENT 166. Price 10 cents.

WROUGHT IRON BEAMS & GIRDERS

THE UNION IRON MILLS. Pittsburgh. Pa.. Manufacturers of improved wrought iron Beams and Girders (patented).

The proprietor, advanced in years and desirous of retiring from active control of business, would sell at a bargain, or convert into a joint stock company and retain an interest himself, a Foundry and Machine Shops, with all their machinery and fixtures complete, and now crowded with custom work, having cost upwards of sixty thousand dollars, and the only ones of magnitude for 120 miles on the Mississippi River, on various points of which may be seen specimens of work of these shops at Stillwater, Winons, McGregor. Dubuque, Fulton, Lyons, Clinton. Muscatine, and on many of the boats. For particulars, address the proprietor at Clinton Iowa. A. P. HOSFORD.

FOR IRON AND STEEL LATHE DOGS 2027.

ICE AT \$1.00 PER TON. The PICTET ARTIFICIAL ICE CO., LIMITED, Room 51, Coal and Iron Exchange, P. O. Box 3083, N. Y.

Liquid Paints, Roofing, Boiler Coverings, Steam Packing, Sheathings, Fire Proof Coatings, H. W. JOHNS M'F'G CO. 87 MAIDEN LANE, N.Y.

\$10 to \$1000 Invested in Wall St. Stocks makes fortunes every month. Books sent free explaining everything.

Address BAXTER & CO., Bankers, 17 Wall St., N.Y.

THE "Scientific American" is printed with CHAS. ENEU JOHNSON & CO. SINK. Tenth and Lombard Sts., Philadelphia, and 59 Gold St., New York.