Scientific American.

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

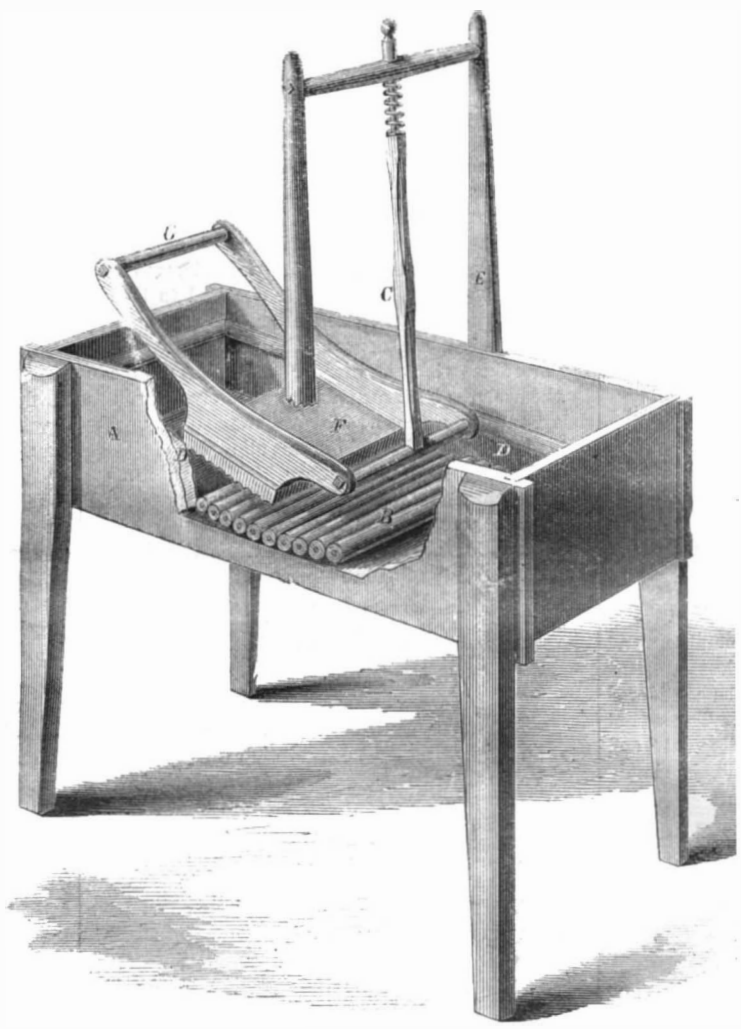
Vol. XV.—No. 4. [NEW SERIES.] NEW YORK, JULY 21, 1866. $3 per Annum, [IN ADVANCE.]

Improved Washing Machine.

Sore knuckles and aching wrists are the usual concomitants of the washing day, entailing the worse vexations of ill-humor and fretfulness. Many of the attempts to lighten the labors of the washerwoman and prevent the annoyances of washing-day, have been failures, being either too complicated to keep in order or requiring too much exertion to operate them. The improvement herewith illustrated possesses simplicity, and appears to be calculated to do the required work in a satisfactory manner.

A is a water-tight box, elevated at such a hight as will best suit the operator. Inside are a series of rollers, B, placed near the bottom, on an arc corresponding with the radius of the arm, C. These rollers turn freely on pivots in the cleats, D. The uprights, E, and the arm, C, support a washboard or dasher, F, of wood, corrugated on the under side. Propelled back and forth by the handle, G, it will be seen that the process of washing is similar to that of the old-fashioned wash-board, only much more efficient. The dasher is held to its work and yet allowed to yield to suit the material to be washed, by the spiral spring at the top of the arm, C. This machine has been in use about a year, and has received the unqualified commendations of all who have given it a trial.

Patented through the Scientific American Patent Agency Sept. 26, 1865, by Joseph Davenport, Berlin, Wis., to whom apply for further information.



DAVENPORT'S "COMMON-SENSE" WASHING MACHINE.

Cheap Ice Pitcher.

The following simple mode of keeping ice-water for a long time in a common pitcher is worth knowing. We have tried it:—Place between two sheets of paper (newspaper will answer, thick brown is better) a layer of cotton batting, about half an inch in thickness; fasten the ends of paper and batting together, forming a circle; then sew or paste a crown over one end, making a box the shape of a stovepipe hat, minus the rim. Place this over an ordinary pitcher filled with ice-water—making it deep enough to rest on the table so as to exclude the air—and the reader will be astonished at the length of time his ice will keep, and the water remain cold after the ice has melted.

Steam on Common Roads.

A paper was read before the French Academy, recently, "On Steam Locomotion on Ordinary Roads," by M. Seguier. The author said that Cugnot, 1770, was the first person who made a machine to run along the floor of the arsenal when he was constructing his dray to carry cannons. This dray was a carriage with three wheels—one in front, and two fixed upon an axle behind. The motive power was applied to the front wheel. This was made to bear the weight of the boiler, the water, and also the furnace, which was made of sheet iron lined with fireproof earth. The front wheel could be turned at right angles to the hind part, so that the dray could turn as easily as if it was drawn by horses. All modern engineers have applied the motive power to the hind wheels. The author alone, more than twenty years ago, attempted to apply the motive power in front. He then described at length the plan by which he proposed to carry this into effect. He would imitate, as far as possible, the plan by which horses are harnessed to a carriage in front, and give the driver the same power over each of a pair of machines that a coachman has over his horses.

Apropos to Seguier's paper, we observe it stated by a French paper, the *Journalle l'Aisne*, that on the 25th ult., the common-road traction engine, constructed by the firm of Albaret et Cie., of Liancourt, had descended the inclined road from Laon to the railway terminus, with a speed of 8 kilometres (5·8 miles) per hour. This incline is afterward mounted in eight minutes, with a load of 5 tuns, and with a pressure of steam of only 77 pounds on the inch. The inventors conclude from the experience of another trial they made, that the engine is capable of hauling 30 tuns, at a speed of from 2½ to 3½ miles an hour, from the terminus to Laon, up this slope.

Production of Beet-Root Sugar.

We spoke last week of the future prospects of sugar production in general; we now have to speak of the prospects of the manufacture from beet-root in France. The *Moniteur* gives us the result of the season of 1865-66, during which there were 419 factories in operation, producing in all, 282,000 tuns of sugar. The produce of the preceding season was only 163,000 tuns, so that the increase amounted to more than two-thirds of the former yield. M. Pezeyre, a well known writer on such subjects, says "that the native manufacture of sugar was never before so large or so flourishing." The abundance of the roots and the richness of their saccharine matter were the principal causes of the extraordinary increase in production recorded above; but it must not be forgotten that to the improved modes of manufacture must be attributed the greatly increased quantity of crystallized sugar—(we referred to the efforts of one manufacturer, M. Robert de Massy, in this direction in *The Grocer* of the second instant). Many sugar houses now produce two cwt. of sugar from a tun and a quarter of beet, which is a considerable increase upon the yield. There are sugar works which divide from twenty to thirty per cent among their shareholders, consequently the sugar fever has seized upon the agriculturists of those departments where the beet-root grows with success, and in some places the growers are subscribing their means in order to make their own sugar. Some few believe that in a short time there will be no such thing as molasses produced in France from beet-root, and that every ounce of extract will be made crystallizable, and that the increase in the growth of beet-root and the manufacture of sugar will proceed so rapidly that the price of the sweet product will be very greatly reduced. If these views are correct, and allowing perhaps for a little enthusiasm, there is no reason to totally discredit them; and provided also that a forced increase of cultivation does not give rise to some kind of disease in the roots—as happens constantly in such cases—this prospect as regards beet-root sugar may create a great change in the markets, for the improvement and increased development of beet-root sugar-making in France will have its effect in all other countries where the industry exists. The cheapening of beet sugar will certainly not aid the recovery of the sugar trade in the West Indies or elsewhere, but until the sugar cane can be made to yield the amount of juice that it ought to yield, it is a matter for congratulation that the beet-root prospects are so favorable. Caricaturists were very facetious half a century ago, over the notion of making sugar out of turnips, as they chose to call the roots, and one of them represented a nurse presenting an enormous beet-root to the little King of Rome, and saying "Suck, baby, suck! Papa says it's sugar." The commencement of the beet-root sugar manufacture, like that of many other good things, arose out of dire necessity, but men of science and others have turned the laugh against the caricaturists, for it is certain that nearly 300,000 tuns of sugar have been extracted from beet-roots in a single season. The progress of the trade reflects the highest honor upon our neighbors, and we heartily rejoice in their having found such excellent employment for the land and its cultivators.—*The Grocer*.

GUN TUBES.—It appears that the steel tubes of the Woolwich guns, although hardened in oil, will not withstand the action of the powder and the bite of the shot. In many cases the steel tubes have been deeply scored, and it is a question which, we believe, has been seriously mooted, whether they shall not, in future, be wholly abandoned.—*Engineering*.

GREAT TRIAL OF AGRICULTURAL IMPLEMENTS ---MOWERS, REAPERS, ETC----AT AUBURN, N. Y.

The trial of agricultural implements now progressing at Auburn, N. Y., is not only the largest but the most thorough ever held. The experiments are conducted under the auspices of the State Agricultural Society, and are not instituted merely to draw a crowd of gaping curiosity-hunters, but to ascertain, for the benefit of the parties chiefly interested—that is, farmers—the intrinsic value of the several machines of all classes offered for sale. The trials are severe and impartial, wholly and unreservedly so, and there is no opportunity for misrepresentation.

The judges are men uninterested in any of the machines, very thorough in their examination of the details, and *capable*. This last qualification is so rare on such occasions as these, that we italicise it.

Agricultural committees too often sit in their tents and *guess* at the merits of different machines without conscientiously examining them. The committee of gentlemen in this trial went over the field in the broiling heat of a July sun, noted every detail and peculiarly, questioned the exhibitors, obtained their views, and took notes of the remarks, and, in general, worked like men whose bread depended on their diligence.

The machines to be tried are such as are in general use throughout the country. As follows: Mowers and reapers for two horses; reaping machines (hand rakers), combined mowers and reapers, (ditto) combined reapers with self-acting or dropping attachment, combined reapers for use, as self-rakers or hand rakers, as desired, one-horse mowers.

Further—Horse-powers on the endless chain principle, sweep powers, thrashing machines, combined thrashers and cleaners, hay presses, fanning mills, horse rakes, hay tedders, machines for gathering and loading hay, horse-power hay forks, portable steam engines, hay and straw cutters, grain separators.

The most moderate person will allow that this is a tolerably comprehensive list, and when we add that there are *only* 46 mowing machines entered for competition (59 reapers and mowers together), including the previous 46, the reader will get some idea of the work before the Committee, and the magnitude of the interests involved.

We shall give, in brief, the points to be considered by the judges in making their awards. To attempt to follow the schedule statement with its "1st" and its (a), and the whole alphabet beside, is simply impossible.

THE POINTS TO BE CONSIDERED.

In deciding upon the machines—mowers—the judges will have a difficult task. It is easy to see that out of 46 different kinds there will be some "weak bretheren" who will be distanced in the race for notoriety; all cannot win, that is certain, and the contest will be very exciting, so that when it is narrowed to a few, as it inevitably will be, impartial and conscientious discrimination will be required. It is not improbable that the judges will find themselves compelled to make honorable mention, or give some other distinction equal to a gold medal, in order to do justice.

There will be a Committee on Grains and Grasses, who will report to the Chairman of the Judges on the points in their province. There will be a Committee on Weight and Price, whose duties are obvious: Committee of Description, a Committee of Mechanical Arrangements, who will examine the workmanship, details, how much the machine is heated after work, to what extent it is worn, etc., etc. There will be a Committee on Quality of Work, a Committee of Time, a Committee of Dimensions and a Dynamometer Committee, who will note the power required to draw the machines, side draft, and other details too numerous to mention.

THE PRIZES.

The premiums in each class, that is, each separate and distinct variety of machine offered, such as mower and reaper, hay fork, horse-power, etc., is the society gold medal—$75 or more in value—for the best machine, and a cash prize of $15 for the second best. No machines receive such distinction unless, in the opinion of the judges, they are really entitled to it.

Implements not included in the list before given, are allowed to enter the grounds for exhibition only by paying $5. Many availed themselves of this privilege, and we saw churn powers, corn shellers, hay elevators, corn planters, and many other useful implements. As there will be thousands of farmers present during the trial, which will last nearly two weeks from this date, July 13th, no better opportunity could be had for an advertisement.

THE WORK TO BE DONE.

The test of each machine is to mow one acre against time on precisely the same ground. A forty-acre lot was selected, and each division marked off into single acres by long stakes easily seen and numbered. The exhibitors drew for position by choosing slips of paper from a hat, which was numbered to correspond with a certain lot in the field, and thus found their places without confusion or envious feelings as to choice. For that matter little discussion could arise, as it would be almost impossible to find a field so uniform in character. These are the principal points; we are necessarily brief in our treatment of them for want of space and time.

THE START.

Before going to the field, which was some four miles from the Fair ground, all the machines entered for that trial were weighed on Howe's scale, expressly put up for that purpose.

A curious and enthusiastic crowd gathered about during the operation. The *Buckeye* machine entered by Adriance, Platt & Co., of Poughkeepsie, was run on the platform and the weight declared to be 594 lbs. Some discussion ensued after this weight was announced, in consequence of the proprietors changing machines with one of their patent, but not made by themselves; their own not having arrived through delay on the railroad. Matters were subsequently adjusted so that the weight was allowed.

D. M. Osborne & Co., Auburn, N. Y., then ran on their machine, known as the "*Kirby*" mower, and the weight was declared 670 pounds.

J. D. Wilber, Poughkeepsie, N. Y., the *Eureka* mower, put his machine on, and the weight was found to be 820 pounds. This was the largest machine on exhibition. It cuts a swath six feet wide and is an entire novelty in mowing machines. The cutter bar is directly in front of two very large wheels, and is operated by a bevel wheel and pinion, as usual, but arranged differently. Our readers can see an engraving and description of it on page 209, Vol. IX., of the SCIENTIFIC AMERICAN.

W. H. Halladay, of Auburn, then weighed his machine, the *American Mower*, and found it to be 590 pounds. After these preliminaries were settled, the people repaired in all manner of vehicles to the field. The road was crowded and after a short drive we came in sight of

THE FORTY-ACRE LOT.

The work to be done was on the farm of W. S. Leach, and was a field of heavy clover of the first seeding, having stems stout and strong, thickly interspersed with a goodly company of weeds twice as stout and strong as the clover. Of the weeds the exhibitors felt no terror, expressing their contempt freely; towards the clover, however, they were much more respectful, and made no secret of their dislike to such a severe test of their powers.

There were four machines tried at once. The *Buckeye*, the *Eureka*, the *American Mower*, and the D. M. Osborne or *Kirby* machine. Each were ranged opposite their respective lots with crowds of friends looking on from a respectful distance.

At a given signal from Mr. Superintendent Dwight the machines bent to their work, and went sweeping over the tough clover in an admirable manner. The knives whistled through the stems, and the gears flew around with great velocity, while the track clearers went silently through the grass and made the way clear for the next swath. On they went with great regularity. The *Buckeye* and the *Kirby* machine especially never faltering nor stopping. Where they passed great patches fell before them, and they made clean lanes through the stubborn clover without hindrance.

The *American Mower* met with some delay from clogging and the *Eureka* got out of order, from the slacking of a nut, which the exhibitor failed to tighten. This caused much delay, and in fact disabled the machine for a time. In spite of this casualty, however, it mowed the acre in 49 minutes, with the finger bar some of the time springing so that it played over the end of the guard. Much time was lost by the *Eureka*, through stoppage, and the accident was greatly regretted by the spectators. The peculiar condition in which this machine left the grass was noted by all who watched it. From the central position of the finger bar the stems stood as they were cut, the knives passing under, and the machine over without scattering them all over the swath. Mr. Wilber took his misfortune very philosophically and declared that he "had learned something." The box of the pitman rod was very hot after the trial.

The *Buckeye* machine was also watched with great interest for the steady, uninterrupted manner in which it performed. Mr. John P. Adriance, one of the proprietors, drove his own machine. Round and round it went, cutting evenly and true, with few or no stoppages. This was a small machine, with a bar four feet and four inches long. It cut the acre in 56 minutes, and came out of the trial in good order all ready for any number of acres.

The *Kirby* machine was also notable for the steady manner in which it went through. This machine performed its task in the shortest time of any, viz., 46 minutes, and the horses were in first-rate condition without visible distress of any kind; the journals were also very cool. The length of cutter bar was 4 feet and 8 inches. Some little merriment was created about this machine. At a meeting of the Committee, the night before the trial, it was set down as an essential feature of excellence in machines that they could be managed by any man; that is, a cheap man. Mr. D. M. Osborne drove his own machine; as his income is about $40,000 per annum, it was universally decided that he was a "cheap" man.

The *American Mower*, entered by W. H. Halladay, of Auburn, N. Y., performed very well, but at times the clover was a little too stout for it, and it clogged considerably. The pitman rod was pretty warm, and the box also, but when it is considered that this is a small machine, compared to some others, and that the acre was mowed against time, the driver having no opportunity to oil as he would commonly, it is not extraordinary that the inconvenience alluded to was experienced. The acre was cut in 59 minutes.

At the conclusion—these four machines forming the first trial—much discussion ensued among the spectators as to the comparative merits of each one, which was brought to a speedy close by the welcome announcement of dinner. A collation had been prepared in Mr. Leach's barn, and thither the hungry, thirsty, and excited multitude bent their way. Although the spot was quite remote from the town of Auburn, it did not appear either unfriended, melancholy, or slow, to judge from the noise and company assembled.

AFTER DINNER.

After this necessary proceeding was over the spectators returned to the field, now shaven and shorn of four acres, and hotter than words can express. Much delay took place by reason of the non-appearance of some of the exhibitors, who were misinformed of the time or who misunderstood when their turn came. But in a short time the *Cayuga Chief*, entered by C. Wheeler, Jr., of Auburn, N. Y., *Columbian Junior*, entered by American Agricultural Works, New York City, *Rhode Island Clipper*, entered by the Company of Newport, the *Yankee Mower*, entered by Dow & Fowler, Fowlersville, and Dodge, Stevenson & Co.'s machine, *Ohio* and *Buckeye* combined, tried their qualities on the field. We cannot notice each in detail, and for some we are obliged to omit mention, not because we do not appreciate their good qualities, but from the inexorable laws of column rules. At some future time we hope to remedy all deficiencies of this kind.

The *Cayuga Chief*, manufactured in Auburn, N. Y., was driven by C. Wheeler, Jr., and did its work well. Mr. Wheeler was placid and cool under the infliction of 120° of heat, more or less, and the glare of the midsummer sun never seemed to affect him in the least. The acre was mowed in 57½ minutes, and well done.

The *Yankee Mower*, Dow & Fowler, was driven by a man who had never sat on the machine before the trial and was totally ignorant of it, but the swath was laid as true as a chalk line could strike, and the action of the machine itself left little to be desired. The grass laid in good order, but the main working parts were very hot at the close of action, Time 48 minutes.

The *Columbian Junior* went over the acre, and seemed to be troubled with clogging. This was doubtless owing to some unfavorable condition of the machine which were not foreseen, as it always performs well and is much esteemed by those who use it. The acre was cut in 66 minutes.

Dodge, Stevenson & Co.'s machine went through its work creditably, but most of these last mentioned suffered from clogging. Indeed it is not at all wonderful, under the circumstances, as the lot was specially selected for its trying nature. Time 63½ minutes.

The *Rhode Island Clipper* was a favorite with many farmers, who watched its performance with enthusiasm. It ran very light and made but little noise; the horses did not sweat, and the swaths were well laid. The time was 55 minutes.

These trials concluded the experiments on the 11th inst. There were twelve machines tried and more should have come but something prevented them from putting in an appearance. One exhibitor told us that he had shipped a machine five weeks previously and that it had just arrived.

THE DYNAMOMETER TRIAL.

The test of draught and power expended by each machine was to have come off on the 13th inst. We were not able to wait for it, but shall have a full report at a later day

THE DYNAMOMETER.

The machine used on this occasion is Waterman's dynamometer, which registers with great accuracy the exact amount of force expended. We have been promised a full account of this remarkable instrument by the ingenious inventor. If he comes to time we shall publish it next week.

CONCLUSION.

It is expected that the trial of all the machines of all classes will occupy three weeks, and to say that much enthusiasm is shown by all present is using a mild expression. From morn till dewy eve the talk is "mower," "reaper," "mower," "reaper," over again. You hear fragments of conversation about finger bars, guards, gears, track clearers, and if every third man is not interested pecuniarily, his sympathies are enlisted in behalf of one or another concern.

MAGNITUDE OF THE MOWING INTEREST.

The amount of capital enlisted in the manufacture of reapers and mowers is enormous. A friend promised us the exact figures, but he failed to impart them. In 1865, 80,000 machines were manufactured in the United States, averaging $125 apiece Walter A. Wood, of Hoosic Falls, informs us that he makes about 6,000 machines a year. C. Wheeler, Jr., of Auburn, 8,000 in different parts of the country; in Canton and Akron, Ohio, there were 10,000 made in 1865, and this year about 7,000, while there are others who make from 500 to 15,000 machines a year. D. M. Osborne & Co., of Auburn, employ upwards of 500 men. All the manufacturers are behind their orders, and some say they put machines together from one day to another to supply customers instead of making up a lot at a time. Every year improves the trade, and it is acknowledged to be in its infancy.

FARMERS ALIVE TO THEIR INTERESTS.

At one time farmers were justly reproached with being a most conservative class of producers. All that is changed. As with mowing, so with other branches of agricultural machines. Hay forks, rakes, tedders, lifters, fodder cutters, and such, are examined, and all are anxious to get the best. This shows a laudable desire, and is at the same time favorable to the inventive spirits of the country, who will doubtless see the advantages likely to arise.

THE liabilities of Agra & Masterman's Bank, which recently failed in Liverpool, amounted to $95,000,000 in gold. During the panic which caused the failure, $15,000,000 of gold were paid over its counters in three weeks.

TESTING A TURRET.

The English distrust of their iron-clad ships had reached so great a pitch that nothing less than an absolute trial of the one claimed to be invulnerable, would still the public apprehension.

Firing at targets representing sections of ships' sides, had become a stale performance, and a series of trials on the turret of the *Royal Sovereign* was necessary to satisfy cavillers of the absolute impregnability of that structure.

These trials have accordingly come off, and are remarkable for one thing; not the utter failure of the turret, for that might have been foretold, but for the singular manner in which they were conducted.

Without further comment let us quote the details of the experiment from the London *Times*. The turret, be it understood, is not solid iron, but composed of wood and iron in the following manner: the frame inside is of T-angle iron, 10 inches by 6 inches, set 20 inches apart, from center to center. At the top of the turret the spaces are filled in solid with teak wood, and half-inch plates are riveted to the angle irons for a distance of 5 feet and 8 inches from the top to form an inner skin. Outside of this wood and iron a diagonal bracing of iron bands is formed 6 inches wide by three-quarters of an inch thick, which extends around the whole structure. This is again covered with teak 7 inches thick, and lastly a solid plate 5½ inches thick covers the whole. At the gun ports, however, an additional plate of 4½ inches thick is put on. Near the top a ring 14 inches deep by 2 inches thick is placed, and a slighter one 6 inches deep by three-quarters of an inch thick, is fastened. This is substantially the turret of the *Royal Sovereign*. We should add, however, that the turret is half below deck, and that a clear space of 3 inches is given all around it. The opening in the deck is strengthened by a heavy wrought-iron ring all around. The details of the experiment are as follows:—

"The turret selected was the after one, in which a single heavy gun is carried. The shot fired at it was steel from a nine-inch rifled gun, and weighed 246 pounds. The charge was 43 pounds, and the range 200 yards.

"At the first trial the shot struck near the edge of the gun port and broke off a jagged piece 12 inches diameter from the outer 5½-inch armor; it also bent back and broke the 4½-inch inner plating, mashed the wooden backing, and passed through into the turret, where its force was spent.

"A second steel shot conoidal-headed, of the same weight, with the same charge, was fired at the same range, and struck at the junction of two plates 12 inches from the top. Here the plating was only 5½ inches thick, and was driven by the shot twelve inches into the backing, the shot itself first shoving the inside, smashing the ring and everything else in its way.

"A third trial under similar conditions, except that the projectile was made to strike the deck 8 feet from the turret, and glance on to the plates, resulted in breaking out a piece 17½ inches long, 9 inches wide, and 3 inches deep."

These are the unadorned facts, and the result is loudly proclaimed to be in favor of the turret. Surely, this is a somewhat hasty conclusion to arrive at! Three solid shots are fired at a turret twenty feet in diameter, badly shattering it each time, but the real offensive instrument of war, which would cripple it, was not tried at all. If the showers of shell which burst against the monitor turrets during the war of the rebellion had been thrown at the *Royal Sovereign*, the Commission could have found the turrets inoperative after a few broadsides, by reason of the fragments jamming between the wrought-iron deck ring and the turret plates. Why were not a few ten-inch shell tried to test this point?

It is an axiom in mechanics that the strength of any structure is equal to that of the weakest part, so that the shots fired at the gun port, at the top, and at the deck, are no guides to judge of the invulnerability of the ship. What opponent would waste powder in firing at the turret when the broadside was exposed, and he knew that one shot fired at it would go crashing through in to the machinery that moves the turret and disable it immediately? That is the case of the *Royal Sovereign* A flimsy turret, mounted on a flimsy hull, is gravely experimented on by a Naval Committee, and because it did not fall to pieces at three shots is pronounced "satisfactory."

Some of our foreign mechanical cotemporaries are by no means pleased with the result. *Mitchell's Steam Shipping Journal* says "although the shot did not get beyond the wooden backing, a few more such blows would have placed the vessel *hors du combat*." The London *Times* says, "although the turret was much shattered it might have been wholly shot away without affecting the working of the turn table."

If the turret is shot away of what use is a turn table?

These experiments seem to have been tried very much as Isherwood's in working steam expansively—to silence the clamor of a clique incapable of judging for themselves. As "tests" of the invulnerability of the *Royal Sovereign* they are quite absurd.

Balloonists in Peril.

Several accidents occurred to aeronauts on the Fourth of July. A large balloon went up from Providence, R. I., with three men and two boys in the car. It was over-ballasted and rose but a few feet from the earth, barely clearing the trees and house tops, and going at the rate of sixty miles an hour. The balloon finally stopped at South Dedham, Mass., having been dragged through a pond, banged against a stone wall, and at last catching in a large elm tree. All of the men were seriously injured.

In this city a tight-rope dancer went up in a Montgolfier balloon. This style is open at the bottom, and rendered lighter than the atmosphere by filling it with rarefied air obtained by burning straw underneath it. The acrobat shot up to an immense hight with the balloon and continued to perform various antics as long as he remained in sight. After being in the clouds a short time, the rarefied air in the balloon cooled, and the machine came down earth-ward with great velocity. Happening to be over the North River at the time, the acrobat preferred to take the chance at a jump, and therefore leaped from the ropes at the hight of sixty feet from the water. He was only rescued after a long struggle, during which he was completely exhausted.

A New System of Digits.

A correspondent in St. Louis has sent us a long communication on the metric system, in which he proposes a new foundation for numerical calculations, by rejecting the two last figures of the decimal system, and making the number eight the limit of the digits. The advantages claimed are facility of subdivision, without fractions, and greater simplicity in calculations.

The article bears evidence of much thought and study, and the system proposed has the merit of simplicity and convenience; but an exhaustive treatise on the same subject has already been published, which proposes still another step in the improvement of our system of numeration. We refer to the "Tonal System," by John W. Nystrom, C. E. Mr. Nystrom selects sixteen, rather than eight, as the limit of the digits, because it is capable of infinite subdivision without fractions. He proposes six new characters in place of the numerals 9, 11, 12, 13, 14, and 15, and applies his system to common notation, mathematical calculations, time, measurement of superfices, solids, etc., and to navigation and astronomy.

We recommend our correspondent to procure a copy of the treatise referred to, if he desires to investigate the subject further. It is published by J. B. Lippincott & Co., Philadelphia.

POSTAL ORDERS.—The Postmaster General has authorized the issue of postal money orders to the amount of fifty dollars. Heretofore the amount was limited to thirty dollars. This system of postal orders is the safest and cheapest mode of remitting money, and we recommend our patrons to adopt it whenever they can do so.

EXCELLENT samples of silk have recently been exhibited at Sacramento in California. The worms are of the Japanese species and produce silk almost white in color, of very fine quality, but their cocoons are smaller in size than those of the ordinary worm.

SELF-REGISTERING BAROMETER.

Meteorology is a science yet in its infancy. To make it of general utility, its experiments and their records should extend over a per od and a territory sufficient to give the basis for a theory, the deductions of which should be reliable. The taking and recording of observations, in different places and for long periods, would entail a vast expense and necessitate the employment of a large number of persons. Mechanical means have been resorted to for the purpose of removing this difficulty, but hitherto their employment has not been attended with much success. Photography has been used as a means of recording the variations in the barometer, but the process is complicated, delicate, and difficult.

Professor Hough, director of the Dudley Observatory, has succeeded in attaching to the common siphon barometer, a system of mechanism, by which the variations of the mercury are noted and also printed. The apparatus may be seen in operation in the rooms of the New York Chamber of Commerce. We have not space for a detailed description, which could not be clearly understood without engravings, but will allude briefly to the principle and the manner of its application.

An ivory float is introduced into the shorter leg of the siphon, and is sustained by the surface of the mercury. It is smaller in area than the inside of the tube, and is kept from friction against the sides by wire guides passing through a disk secured above it. A wire rising from the float sustains a small brass disk in a horizontal position, both faces of which are plated with platinum. The ends of platinum wires are brought into close juxtaposition with the two faces of the disk. These wires are connected at the other end with electro magnets operated by a battery of sulphate of copper. In connection with these electro magnets is a one-toothed wheel, or a vibrating pallet, acting upon a larger wheel which elevates or depresses a fine screw. Whenever, by the rising or falling of the mercury, the float and disk are raised or lowered, the current is closed by the contact of the disk and one of the wires, causing the single cogged wheel to revolve, or the pallet to vibrate, thus moving the gear to the right or left as the mercury rises or falls. The wheel has forty teeth and the screw a pitch of fifty to the inch, thus registering a change on the surface of the mercury of 1-2000th of an inch.

The appliances for permanently recording the variations of the mercury, although somewhat intricate to the eye, are simply those in use in all clocks for recording time. The clock-work is driven by weights and connected to the elevating screw before mentioned. Two arms are provided with pencils, which are placed in contact with graduated paper on vertical cylinders, and record the fluctuations of the mercury in a manner similar to the indicator of a steam engine. The printing is done by a hammer, which is released by clock work when the mercury has raised or fallen to a certain extent, and strikes upon a cushion, between which and type set in a cylinder, a strip of white paper, backed by black impression paper, passes.

This apparatus, though far from perfect mechanically, seems to answer the design of the inventor, and establishes the fact that a cheap and reliable means of recording permanently the variations in the weight of the atmosphere is secured.

Chimogene---A New Anesthetic.

Prof. Vanderweyde, in the *Dental Cosmos* says :—"In experimenting with the highly volatile and gaseous products of distillation, I succeeded in producing a liquid boiling at any desired degree of temperature, say at 60 deg., 50 deg., 40 deg., or even at 30 deg. Fah., causing, by its evaporation, the most intense cold. I propose therefore to call it *Chimogene* (cold generator).

"The desired degree of its boiling point depends only on a slight modification in its preparation; in fact, it may be made so volatile that it requires very strong bottles and careful stoppering to hold it, as by lifting the stopper it foams like champagne, boiling at the common temperature; pouring it from the bottle in drops or in a small stream, it will be evaporated before reaching the floor.

"Having just read, on page 601, of the last number of the *Dental Cosmos*, the remarks about the want of such a liquid for anesthetic purposes, it struck me that this was the very thing needed, and I hasten, therefore, to bring this discovery to the knowledge of the profession."

CHAPPELL'S ADJUSTABLE TOILET GLASS.

The distortion of the image, when a person endeavors to obtain a view of the back of the head by the use of a hand mirror, and the lack of satisfaction in being compelled to depend upon the opinions of another for information as to one's appearance, have induced the inventor of this device to contrive something to render the person independent of outside assistance.

It consists of a hanging glass to be used in combination with a mirror on the wall, or dressing case, so as to give a double reflection, the face and rear view being seen together. It is suspended from the ceiling by a telescopic tube, the weight of the glass being equipoised by a weight, which, acting by cord and pulley, can be screened behind any article of furniture. The hanging glass, by the telescopic tube and weight, can be elevated or depressed to suit the hight of the person.

The device seems to be simple and effectual. It was patented through the Scientific American Patent Agency, Feb. 13, 1866, by Chappell & Godden, to whom all orders or letters for information should be addressed.

THE PROPOSED METRIC SYSTEM.

A correspondent from Pennsylvania desires that the adoption of the French metric system of weights and measures should be first prefaced by being adapted to the requirements of trade and commerce by graduating degrees. He thinks that the proposed system is too great and sudden a departure from the present plan to recommend itself to the people generally, and fears that the names of the different denominations in the proposed system bear such a similarity that confusion and trouble will inevitably result. He doubts if the French system, for common wants, is practically perfect. The proposed system, he thinks, should be, in a manner, adapted to the plan in general use, or that the nomenclature of measures should conform somewhat to that now in vogue.

The fact that the adoption of the new system in France is not universal nor popular, should, in his opinion, call for some compromise in regard to so radical and sudden a change. He proposes a system of nomenclature uniting the old and proposed new systems.

The proposed change is a radical one. No compromise with previous custom is provided for. The object is to provide a new, simple, and unchangeable scale for measures, whether of superfices or capacity. Any compromise between the proposed plan and the present custom would destroy all the advantages of the improvement, without advantaging those, whose indolence or unwillingness to learn, clings to the old standards. If a change is to be made, we, like our correspondent, desire it shall be as nearly perfect as it can be; but we cannot imagine how the new system can be improved by ingrafting upon it a portion of the defects of the old system.

The example of the people of France is no suitable one for us to follow. That they are slow to adopt a marked improvement need be no reason for us to reject it. There may be some inconveniences in the metric system—we think there are—but it is certain they are of less consequence than those which attach to our popular system. We have, to be sure, the qualifying fact that we have used them all our lives; on the other hand is the fact that scientists in all parts of the world have adopted the French system for their calculations.

We think it is better to adopt what has been so successful for many years, needing no improvement at the hand of even astute French Academicians than to propose alterations to *un fait accompli*.

CAUSE OF THE FAILURES OF THE ATLANTIC CABLE.

A correspondent—D. McD., Ohio—believes that the principal cause of the failures to successfully lay a telegraphic cable across the Atlanic, is the untwisting of the external casing, thereby weakening its tensile strain and bringing the suspended weight of the cable on its inner core and conducting strands. He assumes that the outer covering is twisted "against the sun"—to the left—while in coiling it on board it is coiled "with the sun," in the usual way. This coiling being twice performed, once on the tender and again on the *Great Eastern*, contributes still more to a weakening of the cable, and tends to cause kinks.

We do not know whether our correspondent is correct in his statement as to the direction of the spiral. If the cuts we have seen professing to represent the present cable are not reversed, the outer wires are laid around the core "with the sun." The Manilla yarn which covers these wires, however, is twisted the other way. Our correspondent says :—

"The iron wire forming only a casing over the other part, by untwisting, would become loose and separate from the core, and would stretch more than the conducting strand, which being but little affected by the untwisting, would have to sustain the whole weight of the cable or break—it is evident the conducting strand of the old is broken, for in no other way can they account for its not working: it is a principle of philosophy that the same cause will produce the same effect; upon that principle I predicted the last cable would be a greater failure than the one before it. My prediction has been verified and another cable lost. My reason for that prediction was, the cable was first coiled on board the *Amethyst*, and then on board the *Great Eastern*, thus having a second untwisting, and, in paying out the untwisting still continued.

"Now, it is evident that the same cause has produced the failure of the last cable, as the loose and untwisted state of that cable is shown by two pieces of iron wire, two inches long, being pressed into the strand between the wires forming the outer covering of the cable, which would have been impossible had the cable been coiled the way it was twisted."

D McD. is, however, in error in his supposition that the pressure upon the submerged cable, in the act of paying out, is greater than in air, if by pressure he means weight, as he must when referring to the breaking strain. The weight of the present cable is, in air, 31 cwt. per nautical mile; in water only 14¼ cwt. If his data are correct his deductions are worthy consideration, although it seems hardly possible that the managers of the enterprise should have overlooked the important matter of retaining the twist. He says :—

"If the cable is coiled the way it is twisted, that will twist it tighter, will shorten and make it stronger, while the conducting strand, being but little affected by the twisting, will be relieved from all strain and will not break, the outer part being made shorter by the twisting will have to sustain the whole strain. This will remove all cause for stopping, the point of suspension being constantly changing, the danger of breaking will be removed, the steamer enabled to hold on her course continually, landing the cable in good working order."

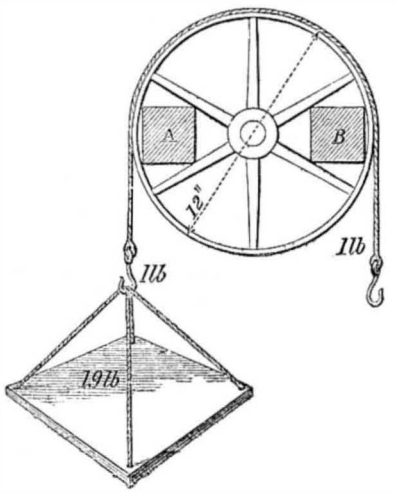
He believes that, with attention to this important matter of keeping the twist, the laying of a cable from Ireland to New York could be made a certain success, and he strongly invites the projectors of submarine lines of telegraph to the subject.

It is said that a plan is in contemplation to supply Buffalo from natural gas wells at Amherst, ten miles distant. A well now sunk flows 40,000 feet of pure gas every day, and five more are proposed.

Correspondence

Transmission of Power by Belts.

MESSRS. EDITORS:—I lately made a series of experiments to ascertain facts governing the transmission of power by pulleys with belts; the apparatus used is shown in the engraving.



The pulley, of cast iron, was supported on the timbers, A and B, in such a manner that it could not turn, and the trials were to be certain weights put on the ends of certain sized belts, when a preponderance would be put on one side until a perceptible motion occurred, when the whole was noted.

The following table will give the facts as they were taken:—

Diameter of Pulley.	Kind of Belt tried.	Thickness of Belt.	Width of Belt.	Weight on Platform—Platform and parts counted in.	Weight on Hook—Hook counted in.	Tension on belt.	Amount of Adhesion.	Proportion existing between the Tension and Adhesion.	Remarks. [Marked thus * doubtful.]
in's	Lea'r	in's	in's	lbs.	lbs.	lbs.	lbs.		
12	"	3-16	1	150	50	200	100	2 to 1	Same belt in each case, old but good
24	"	3-16	1	150	50	200	100	2 to 1	
12	"	3-16	2	151	50	201	101	2 to 1	old lathe belt sticky
12	"	3-16	2	300	100	400	200	2 to 1	old belt, good order
24	"	-1	2	150	50	200	100	2 to 1	do. do. do.
12	"	3-16	3	150	50	200	100	2 to 1	do. do. do.
24	"	3-16	3	300	100	400	200	2 to 1	do. do. do. *
12	Rubb'r	Gutta Percha	2	190	50	240	140	12 to 7	
24	"		2	369	100	469	269	28 " 13	do. do. do.
36	"		4	572	100	672	372	59 " 34	do. do. do.

NOTE.—The pulleys used were of cast iron and turned off to a smooth surface with very little curve on their face.

The deductions to be made from the above results, are, that the adhesion of any belt on a pulley is directly as the tension and not as the surface in contact, for the same results invariably attended the same tension, whether the belt was double the width, or the pulley double the diameter, or both.

Rubber belting adhered better than leather with the same tension; this was particularly the case when belting, which was worn and glazed somewhat on the bearing side by use, was tried. New belting did not give good results, and a great deal seemed to depend on the condition of the belt tried. This was not so much the case with leather belting, which was more uniform in the results, new belting gave very near the same result as old belting "not gummed up," for the more it was gummed the better was the adhesion.

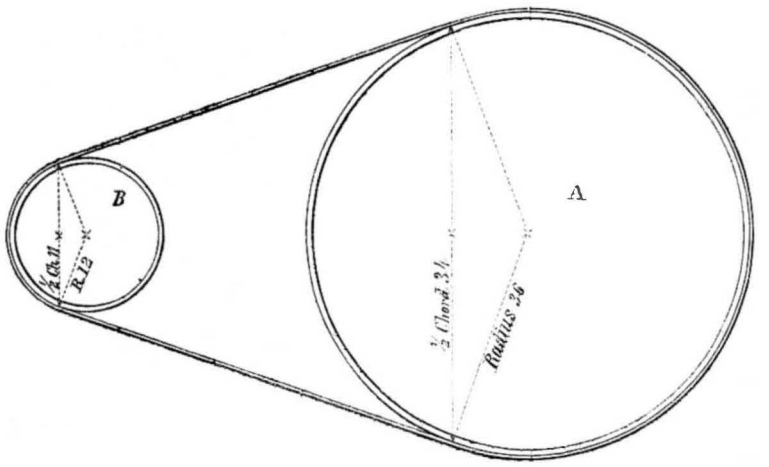
Another series of experiments were made to determine the reason why two pulleys of different diameters, working from the same belt, would not give out the same power—as the small pulley would invariably slip before it would give out the power the large pulley was capable of giving to it. In the case drawn, the tension of the belt would evidently be the same on both pulleys, and as the former experiments showed clearly that it was "tension." and not surface, that gave the effect, then why would they not transmit the same power?

The experiments made to demonstrate the facts were many and conclusive; I will not occupy your space with their enumeration, but give you the results which were arrived at, without bias or self-deception. I found that the following rules would express the facts of any case.

RULE FOR THE SMALL PULLEY.—If the radius of the pulley expresses the tension of the belt, then the one-half of the chord of the arc that the belt passes over, will express the proportion of that tension that the pulley is capable of receiving in that position.

RULE FOR THE LARGE PULLEY.—If the one-half of the chord of the arc that the belt passes over express the tension of the belt, then the radius of the pulley will express the proportion that the pulley is capable of receiving. [It can be seen that the cases are merely inversed].

As example is much better than precept, the following diagram will illustrate the facts as they are:



Small pulley.—$\frac{\frac{1}{2}\text{ chord}=11}{\text{Radius }12}$ of tension of belt.

Large pulley.—$\frac{\text{Radius}=36}{\frac{1}{2}\text{ chord}=34}$ of tension.

In looking at the diagram the idea must not be had that the tension of the belt is different on the pulleys, for it is not—the pulleys are merely in better or worse positions to receive it; for instance, the pulley, B, is no better than if its radius was one-half of its chord of contact of belt, if the belt was received on it and given from its parallel; while the pulley, A, is much better than its radius calls for, from its position, it having gained what was lost by B, without the tension being any greater on one than on the other. For it is evident that if there was a certain tension between A and B, continually, that it would act equally on both—as action and reaction are equal. By inspection of the diagram it is also evident that the greater the distance between A and B, the less the difference between the one-half of the chords and their radii; or, in other words, the nearer the top and bottom parts of the belt approach parallelism; consequently, the further such pulleys are apart the better they will work.

From my experiments I made up certain rules for practice in all cases, as I was able to bring the elements down to a fixed basis. Since doing so, I have never made a single failure, besides being able to increase the durability of the parts liable to wear, by really knowing what they were subjected to, and what could be demanded of them.

The following are my rules and practice:—

I always put the side of the belt which transmits the power on the bottom when the power is given out horizontally; in that position the slack side is where it should be—on the top; where the tightener—if one is used—should be. If power is transmitted vertically, I always put on a swinging tightener on the slack side, which operates by falling to a horizontal position.

I submit belts to 50 pounds, per inch in width, of tension, which is made up of the power to be transmitted and their own weight. Where the distance between centers of pulleys give sufficient tension, no tighteners are used. Where they are too close together I use tighteners—no curve on their face—of as large diameter as is convenient. I count on getting 20 pounds of adhesion from 50 pounds of tension in all cases.

I count the power to be transmitted as so many pounds at the end of a lever, of the length of the radius of the pulley—the velocity being in the calculation by which the number of pounds were got—and divide the number of pounds by 20, the adhesion, for the width of the belt in inches. I then see if the distance between centers will give the necessary tension to make the first calculation good, if not, the remedy is a tightener, if the distance cannot be increased. If the width of belt got by these means is too great, then the diameter of the pulley—or the radius, which is the same—must be increased; by doing so, the number of pounds to be transmitted at the end of the lever is diminished. I again divide by 20; and if the width is again too great, I again increase the lever until I get it down to what I want it; and the whole proceeding is as certain as it is simple.

The system adopted by most engineers, that of associating an inch in width of belt at a velocity of 1,200 or 1,400 feet per minute as equivalent to one horse-power in the same time, is erroneous in principle, and has done more to retard general information on the subject than any thing else in connection with it. I can take that rule and make it too much or too little, as I wish; in one case, by putting the pulleys too far apart, giving too much tension; and, in the other, by putting them too close together, giving too little tension. Therefore, a rule of that description is useless, as it works both ways, and will only suit one exact condition of circumstances. I hold that any rule should take in and provide for all the elements and changes of condition in the cases; or, if not, it is no rule at all, and is mere guess-work, as such is an injury rather than a benefit to the mechanic.

These are the reasons why I instituted the many experiments narrated. They were distributed over quite a period of time, and were made as opportunity offered, and can be relied upon as being as correct as my simple appliances would admit of; I was careful not to deceive myself.

ROBT. G. CARLYLE.

Virginia, Nevada, May 10, 1866.

[We are greatly obliged to Mr. Carlyle for the pains he has taken in writing these two articles—the one here published and one in a previous number. The practical information is of great utility. It is not astonishing that a narrow belt transmitted as much power as a wider one, when the tension was increased. Belts drive machinery by frictional adhesion to the surface of pulleys, and this is only another instance of the truth of Gen. Morin's rule, that friction is independent at the surfaces in contact, but is directly as the pressur Nevertheless it is not to be supposed that, in practice, a narrow belt is as *economical* as a wide one, for the strain imposed by the greater tension required by the narrower one to do the same work is very hard upon all details—lacings, bearings, and other parts.

To Keep a Saw in Order.

MESSRS. EDITORS:—Much has been said already on the above subject. But a plain man, unacquainted with technical phrases, would find much to puzzle him, and I think if he followed all the directions given, his saw would puzzle him still more. For the benefit of such men, using mills in hard timber, please give me a little space for a few practical rules.

First, To work well the saw must be perfectly round, set the guide up until it touches the shortest tooth. File all the rest, until they will pass, and it is round.

Second, Have the under edge of the tooth to range with a circle, three-fifths the diameter of the saw; the top or back of tooth one inch from the point, nearly one-eighth lower than the point. This is of vital importance.

Third, Spread the points of teeth with the upset, exactly alike on both sides, using a gage; but do not bend the teeth. Upset enough to make the saw clear perfectly.

Fourth File the teeth perfectly square and the

same length on both sides. The top near the point about one-sixteenth of an inch in length chisel-shape. This strengthens the point of tooth. One upsetting filed that way will last two days.

Fifth, Set the saw mandrel so that the saw, having run a straight line, will just show daylight between the saw at the center and the log.

Having got this right, never move it under any circumstances.

Sixth, Do not run your saw at the circumference two miles a minute, as advised by Mr. Emerson. If you do, you won't get back the same day; 450 revolutions for a 60-inch saw, is fast enough.

Seventh, File the under edge of your teeth once every 1,000 feet of lumber cut. A smart hand will do this in five minutes. It is the most profitable five minutes of the hour.

Eighth, When the lead gets wrong, stop and file your saw. Tinkering will not make a dull or a badly filed saw run well, and you cannot very easily make a well-filed saw run bad.

These rules, strictly followed, will enable any man, who can use a file, to run a mill with fair success whether his mill has end motion or not. If you undertake to saw 16,000 feet without filing the saw, do not blame end motion, or any thing else but your want of judgment, if you have trouble. If a dull saw will cut 16,000 feet in a given time, the same amount or more can be made by keeping the teeth sharp, and made much easier. What would you think of a man who would mow six hours without whetting his scythe. It can be done. But how much easier and better if he keeps his scythe sharp.

The Martin and Ashcroft attachment is an excellent thing for the purpose for which it is designed, but do not substitute it for filing and setting the saw. Mr. Ritchie's advice is good when he says, "when your saw commences to vary, correct it at once." But it is bad when he says "change the lead of your saw." The proof of this follows in Mr. Ritchie's own statements, that, "he finds it necessary to change the lead many times a day." In morals, it is said, one bad step leads to many more. The above confession proves that one bad move by a sawyer (moving the saw mandrel) leads to a like result in a mechanical point of view.

Ten years' experience with circular saw mills, both with and without lateral motion, leads me to the conclusions indicated. I put up one of the first circular mills used in Ohio—a Lee and Leavitt, with lateral motion. I have used three of their mills, one of Lane and Bodley's, no end motion, and one Blandy. They will all make good lumber if the saw is kept in proper order. If the saw is not filed and set right, neither of them or any other mill will work well. A. S. PETTIGREW.

Dayton, Ohio, June 13, 1866.

Coffee Making Again.

MESSRS. EDITORS:—Observing in your valuable paper various modes of making coffee economically and good, the object seems to be the extraction of all the strength of the coffee and the retention of all the aroma. I will mention a mode adopted by myself upward of twenty years since. I made use of a common coffee kettle with the spout corked tight and a lid fitting quite tight, into the top of which I inserted a piece of block-tin pipe which passed up through another vessel, holding about a pint of water, and bent down nearly to the bottom of the upper vessel into the kettle; I placed all the coffee to be boiled and nearly all the hot water, the balance, about half a pint I placed in the upper vessel with cold water, and boiled it for ten or fifteen minutes, until the water in the upper vessel got hot from the condensation of the steam containing the aroma, which, by this means, is all saved, as no odor of coffee is perceived during the boiling. A few moments after removing the kettle from the fire, a partial vacuum is formed in the kettle, and all the water in the upper vessel is forced into the lower one by the pressure of the atmosphere—thereby saving all the strength of the coffee and the aroma. F. W. KOHLER.

Philadelphia, June 29, 1866.

[Mrs. Glass once published a recipe for cooking a hare. At the outset she says "first catch your hare." This seems so applicable to coffee making, that we quote it. To make a palatable beverage one must have good coffee, or all the art and attention is thrown away. There are some who attach great value to retaining the extractive matter in the berry, but this seems to us a mistake. The extractive matter is bitter and, to our thinking, spoils the coffee. The aroma, or more volatile principle, is the one thing needful, and when that is dissipated, farewell to the pleasant, inspiriting, bracing cup that cheers but never inebriates; coffee made out of that left from the previous day, is rich in extract and rich in bitter, making a nauseous beverage. To be good it must be made quickly and drank immediately.—EDS.

Tape-Worm and Pork Eaters.

MESSRS. EDITORS:—I have noticed in the SCIENTIFIC AMERICAN notices of the theory that the tape-worm which infests the intestines of the human species is produced only from swine. Now it is a fact that throughout this colony and among all the Kaffir tribes, pork is considered an abomination and is never tasted while they are in a heathen state. It is also a fact that not one person in one hundred is free from tape-worm. It passes from them in enormous quantities, often without agency of medicine, as though the bowels became so full of the animal that a part must be discharged to make room for new growth. The only remedy they know, and that grows abundantly in this country, is the male fern.

On the other hand, those natives who have adopted European styles of living—eating pork—are not, so far as my observation extends, so much troubled with tape-worm as the wild natives. The diet of the latter consists chiefly of indian corn and sour milk. They eat the flesh of cattle, sheep, goats, antelopes, etc, but never of hogs or fowls.

One thing more I will mention, which may be of use to others. I have found rock oil—kerosene—a most effective vermifuge. I give it as an enema for the pin-worm, and by the mouth and as an enema for other kinds. It is free from the irritation which spirits of turpentine produces, and is quite as efficient. Has any body else had the same experience?

H. A. WILDER,
Missionary of A. B. C. F. M.

Measuring Logs.

MESSRS. EDITORS:—I have noticed the rules as laid down by Heber Wells and P. Rhoades for getting the contents of squared lumber from a log of given dimensions, and they are both very inaccurate.

Every mathematician knows that multiplying the diameter and half diameter of any circle together, will give the area of the largest square that can be inscribed within that circle; that extracting the square root of this number will give the side of this square, and that a square is of greater area than any other rectangular figure that can be inscribed within a circle; and from this we get the following rule for obtaining the exact contents of a square stick that can be obtained from a log of given diameter and length: multiply the diameter by half the diameter, this product by the length in feet, and divide by twelve; or, if the log is just twelve feet long, the multiplying the diameter and half diameter will give the number of feet required. For a fourteen-feet log, add one-sixth; sixteen-feet log, one-third; eighteen-feet log, one-half, etc., to the product of diameter by half diameter, which is much shorter than multiplying by length and dividing by twelve.

As examples we will take the two used by P. Rhoades. Log, 12 inches diameter, 16 feet long, will give us $12\times6=72$, then $72\times16=1152\div12=96$, or $72+\frac{1}{3}=72+24=96$.

Rhoades gives the contents at about 90 feet, though his rule will give but 64: $12-4=8\div2=4\times16=64\times4=256\div4=64$.

In his other example we have a log 12 feet long by 24 inches diameter, which he makes contain 300 feet, when the actual measurement is but 288 feet, as follows: $24\times12=288$, and, as the log is 12 feet long, this is the actual measurement. The rule given by Rhoades would make the contents of a square stick sawed from a log 30 inches diameter and 12 feet long, equal 507 feet, when the actual measurement is but 450 feet.

For square lumber, of course, the above measurements would not be the actual areas of the lumber as sawed, as the most of them give inches and fractions of an inch as the side of the square, whereas the lumber would be sawed to full inches, and by leaving a little of the bark on the corners would make more, or, by sawing down to the full inches less than the actual measurement, would give less than the calculated amount; but the foregoing is the only correct rule for obtaining the contents of the largest stick that can be obtained from a log of given dimensions. If the log is to be sawed into inch boards, from one-fifth to one-eighth will have to be deducted for saw cuts. This, of course, will depend upon the width of the cut. D. W. C. C.

Pottsville, Pa., June 28, 1866.

Weight of Oils.

The following table of the weight, per gallon, in avoirdupois, of petroleum and its products, we copy from the Titusville, Pa., *Herald*. It may prove convenient for many readers. The degrees of gravity are from Beaumé's hydrometer:—

COMMON BURNING OIL AT

40 degrees gravity weighs	6 pounds 14	ounces.
41 degrees gravity weighs	6 pounds 13 9-22	ounces.
42 degrees gravity weighs	6 pounds 12 18-22	ounces.
43 degrees gravity weighs	6 pounds 12 5-22	ounces.
44 degrees gravity weighs	6 pounds 11 14-22	ounces.
45 degrees gravity weighs	6 pounds 11 1-22	ounces.

BENZOLE COMMONLY USED IN PAINTING.

62 degrees gravity weighs	6 pounds	1 ounce.

GASOLINE.

70 degrees gravity weighs	5 pounds 12 6-20	ounces.
80 degrees gravity weighs	5 pounds 6 8-20	ounces.
90 degrees gravity weighs	5 pounds 00 10-22	ounces.
100 degrees gravity weighs	4 pounds 10 12-22	ounces.

THE RIGHTFUL INVENTOR THE FIRST TO MAKE THE INVENTION USEFUL.

Elisha Foote for the Board.

Apparatus for Carbonizing Air.

In these devices the gasoline or benzole is raised to the top of a vaporizing chamber by an elevator, and there falls in a shower through the air to be charged. The first conception of the plan unquestionably belonged to D. He experimented upon it as early as 1855 or 1856. It can hardly be said that he carried the idea into practical operation. He himself being witness states that he found practical difficulties in working his machine. The elevator did not work fast enough to supply the requisite quantity of benzole. He allowed a part of the air to escape from the pump to remedy the difficulty, and finally disconnected the elevator from the pump and revolved it by hand. The difficulties were of a mechanical nature, and might, and probably would, have been remedied by further trials and improvements.

He also, at about the same time, made a model of his device, but after that nothing further was done by him, by way of experiment or otherwise, to carry out his idea, until March, 1865—a period subsequent to S.'s application for a patent, and after D. had been informed of S.'s use of the elevator. The model was lost or destroyed in 1856. The machine was broken up and the brass and copper sold for old metal in 1860. A period of eight or nine years elapsed, during which nothing was done to perfect the invention and bring it into practical use. S. made a model of his invention in the fore part of November, 1864, and applied for a patent on the 12th of January following. In January or February he completed a working machine, and ever since has been engaged in the business of making his machines and introducing them into public use.

The first question presented is whether S. is to be regarded as having been anticipated by the previous experiments of D. We have been referred to authorities touching abandonment, and it is urged that in view of them D. cannot be regarded as having abandoned the invention by his delay to prosecute it. We do not think that the principles referred to properly apply to this case. Was D. the sole applicant for the patent, then indeed there would be but little question that he would be entitled to it. But a different question arises when two or more independent inventors apply for the same patent. Then he who first reduces his invention to practice is entitled to the patent, unless the other, though first in conception, was using reasonable diligence in adapting and perfecting it.

The principle which we think applicable to this case is thus stated by Mr. Justice Story in Washburn *vs.* Gould (3 Story, 133): "Whoever firsts perfects a machine and makes it capable of useful operation is entitled to a patent, and is the real inventor, though others may have previously had the idea and made some experiments towards putting it in practice," and in accordance with this we think that as between the two, S. is entitled to the patent.

An inventor may delay as long as he pleases to carry out his conceptions, but he has to run the risk of another's devising the same thing, and first reducing it to practical use.

As between S. and M. we also think that S. is entitled to the patent. M. was employed by S. to work on his first model, and while so employed he claims that he suggested to S. the use of a belt and buckets for his elevator. This is denied, but whether he did or not does not seem to us to affect the question. Such elevators are in common use. A person who conceives the general idea—or as it is termed, the principle of an invention, has a right to employ the skill and experience of a mechanic to carry it out into practical operation. It sometimes happens that the inventor is not himself a practical mechanic, and is obliged to obtain the aid of others to perfect his improvement. It seldom happens that an invention springs at once complete from his mind. It is oftener a matter of gradual growth and assumes a variety of forms and shapes before the best one is obtained. New ideas are suggested as the construction progresses, unexpected difficulties are encountered and have to be overcome. The assistants become possessed of the inventor's ideas and have their minds directed to his difficulties. To allow them to patent their suggestions would render their employment dangerous to the inventor and obstruct the progress of improvement. Any application by them for a patent under such circumstances is justly regarded with great distrust and disfavor.

The present case seems to us to be clearly within this principle, and we have no hesitation in deciding that S.'s rights are unaffected by the suggestion referred to.

VARIATION IN FORM NOT PATENTABLE.

BEFORE THE EXAMINERS-IN-CHIEF ON APPEAL.

S. H. Hodges for the Board.

Application for a Patent for Manufacturing Boots.

The improvement proposed by the applicant is that of forming the upper leather of a boot in one piece, giving it such a shape, that when the different edges are properly united, the result is the upper of a boot, and does not require crimping. This has been attempted by similar means before, as appears from several references which have been furnished. A distinction is attempted between the method employed in those cases and this, upon the ground that a more perfect fit is secured, owing to the peculiar shape in which the leather is cut. After the idea of making a boot, in this method, has once been perfected, and reduced to practice, it requires something more than such modifications as merely improve the shape, to merit a patent. There must be some decided change, some marked step taken, introducing a new principle altogether. Otherwise every variation in the cutting of coats, which would make them sit better, would be made the ground of an application. The amount of what the applicant

has done is to adopt a feature, once very familiar to the trade, a tongue over the instep. He says he saves leather, also; but the piece in Chilcott & Snell's boots, to which he refers, may be dispensed with, and leave the boot as good as his.

Another objection to allowing this claim, is the very indefinite description of the shape which is to be given to the leather. There is no rule which will guide the public in using the discovery after the patent has expired, or enable others to know whether they are infringing it, or improving on the invention. In McNamara vs. Hulse, 41 C. L. Rep., 258, a patent was held void on the mere ground that an angle, which it was necessary to observe, was not given in the patent. The decision of the Examiner is affirmed.

Washington, D. C., Oct. 22, 1862.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees :—

COMPOSITION FOR PRESERVING MEAT.—J. J. HARRISON, St. Mitchell. Md.—This invention consists of a composition of 8 pounds of salt, 4 of alum, and 4 of saltpeter.

CHEESE CUTTER.—JOEL HAINES, Middleburgh, Ohio.—In this improvement, by means of a knife arranged in the cheese box and a graduated arc and pointer, any number of pounds can be cut from a cheese of any ordinary weight and size.

PREPARING CHARCOAL.—G. W. FERRIS, Quincy, Ill.—The object of this invention is to remove from charcoal all foreign matter, and prepare the same so as to be particularly fit for clarifying spirituous liquors and also for filtering purposes in general.

HEATING AND COOLING AIR.—LOFTUS PERKINS, London, Eng.—This invention consists in an apparatus composed of one or more tubes, sealed at both ends, and containing water or other volatizable liquid, in such a manner that by alternately evaporating the water or other liquid in one end of the tube or tubes, and then condensing it in the opposite end, a heating or cooling effect can be produced on the atmospheric air or other aeriform bodies, and an apparatus is obtained which can be used with advantage for heating ovens, ventilating buildings, and for other similar purposes.

CULTIVATOR OR HORSE HOE.—ESEN STARR, Royal Oak, Mich.—his invention relates to a cultivator or horse hoe for cultivating crops which are grown in hills or drills. It consists in a peculiar construction of the implement, whereby the same is rendered very strong and durable, and made capable of operating in the most perfect and efficient manner.

TRANSMITTING MOTION.—JOHN BRIZEE, Alvarado, Cal.—This is a device for transmitting motion or power from a spring to machinery to be operated, and is more especially designed for operating portable or light machines, such, for instance, as washing machines, churns, sewing machines, etc., The object of the invention is to obtain a compact, simple, and efficient device for the purpose specified, one which will not be liable to get out of repair or become deranged by use.

RAILROAD SWEEPER.—EDWARD A. F. OLMSTEAD, New York City.—Thisinvention consists principally in the combination of one or more brooms with the axles of the car, and in the combination of the arms, levers, blocks, screws, bolts, and bars, by means of which the brooms are raised or lowered to adjust them.

BEEHIVE.—JULES J. JUSTIN, Milwaukee, Wis.—This invention consists in the combination of two rectangular boxes or hives with each other, and with a moth protector or frame, provided with an inwardly and downwardly projecting zinc guard, which prevents the moth from crawling up the inner sides of the hive, while it does not interfere with the entrance of the bees.

COOKING APPARATUS.—A. C. KASSON, Milwaukee Wis.—The object of this invention is to provide an apparatus by means of which many of the operations in cooking and treating articles of food, may be performed with less labor and care than are commonly required, and in a more perfect manner.

RAT AND MOUSE TRAP.—WILLIAM HENRY CAMPBELL, Brooklyn, N. Y.—This invention relates to a self-setting rat and mouse trap; it consists in the employment of an apartment provided with one or more pivoted platforms arranged with inclined guards, and a bait drawer, and placed over a receptacle into which the animals are precipitated.

GRAIN SEPARATOR.—J. F. DUNHAM, West Union, Iowa.—This invention relates to a grain-separating device to be applied to thrashing machines, and is designed to separate, effectually, weeds, straw, etc., from the grain after passing through the thrashing mechanism The invention is applied to the sieve of a thrashing machine.

DIAMOND HOLDER.—H. KARELSEN, New York City.—This invention consists of a tubular holder, which is provided with two sleeves, one of which is connected to the head into which a diamond is inserted, while the other connects with a notched tool intended to break off the glass, in combination with guide slots and lateral notches, in such a manner that both the diamond head and the glass breaker can be drawn in or pushed out, and that the same, when they are pushed out, by slightly turning the sleeves, are rendered rigid and prevented from receding spontaneously.

STOVE.—ROWLAND I. RATHBUN, Poplar Ridge, N. Y.—This invention consists in an attachment to a stove, so constructed and combined therewith that a shelf or place on which to set cooked victuals for keeping them warm is provided.

CULTIVATOR.—ANDERSON & EDWARDS, Princeton, Ill.—This invention consists in a novel arrangement of plows, whereby they may be adjusted with the greatest facility—all of them raised vertically out of the ground when necessary, and the two front plows adjusted laterally in order that they may be made to conform to the sinuosities of the rows of plants.

JOINT FOR RAILROAD RAILS.—J. W. SHIVELY, New York City.—This invention has for its object the constructing of a joint for railroad rails so that the rails will be firmly connected together, so that they cannot yield either in a lateral or vertical direction, and the hammering of the ends of the rails by the car wheels totally prevented, and the rails rendered equally as firm and solid as if they were constructed of a continuous bar of metal.

BARLEY FORK.—MARTIN C. REMINGTON, Auburn, N. Y.—This invention relates to the manner of attaching the bow to the fork whereby the former may be very readily applied to and detached from the fork.

ACCORDION.—CARL F. ZIMMERMANN, Philadelphia, Pa.—This invention consists in arranging the keys of the various octaves of an accordion so that the tones governed by the various keys are uniform throughout the entire range of the instrument, both in drawing and in compressing, and the operation of the instrument is thereby considerably facilitated; also in placing between the keys of the various octaves, severally, a distinguishing key, which gives the same tone in drawing and in compressing, so that the player is enabled to feel the various octaves with the greatest ease, and a uniform arrangement of the keys throughout the entire range of the instrument is rendered practicable.

SAFETY BRIDLE.—J. C. HAIMES, Lewistown, Pa.—This application, relating to bridles, consists in attaching the reins with shifting bearings, which form the points of attachment between the reins and bit ring.

PLOW.—GEO. WATT, Richmond, Va.—This invention consists in constructing the plow frame of one piece of cast iron, and a curved beam, the hooked end of which infringes upon the frame in combination with the brace; adjustable clamps, slotted block and wheel between the handles.

TOBACCO PIPE AND CIGAR HOLDER.—G. M. ROSS, AND WM. H. WEST, New York City.—This invention consists in a tobacco pipe having a cigar holder combined therewith, so that either can be used, and also in a novel construction of stem to check the flow of the nicotin liquid.

CULTIVATOR.—E. M. SORLEY, Neenah, Wis.—This is a convenient and useful implement of husbandry for breaking up stiff clayey soils, which, by a simple adjustment, may be converted into a cultivator or a drag, for making drill furrows.

FLANGE.—DAVID PATERSON, Jersey City, N. J.—This invention consists in a flange which is cast with strengthening ribs, and with radiating slots to receive the bolts, in such a manner that all the time and labor of boring holes in the flanges is saved, and a flange is obtained of superior convenience, strength, and durability.

MANUFACTURE OF SPOONS, FORKS, ETC.—D. J. FLEETWOOD, Birmingham, Eng.—This invention relates to certain improvements in the operations of shaping, bowling, and finishing spoons, or of shaping, pronging, and finishing forks, and is also applicable for performing analogous operations upon other articles of similar character.

PENCIL HOLDER.—DR. L. B. MYERS, Elmore, Ohio.—This invention consists in an elastic socket, capable of receiving and holding a pencil of larger or smaller size, and provided with any suitable means for attaching it to the garments of a person.

STARTING HORSE-RAILROAD CARS.—R. F. M. WELLS, Roxbury, Mass.—This invention relates to means for facilitating the starting of horse cars. It has for its object the obtaining of a simple arrangement of parts to affect the result, and one which will be compact and not liable to interfere or come in contact with obstructions on the road.

PACKAGE CASE.—P. L. SWINE, Shirleysburg, Pa.—This invention relates to a package case, especially designed to be used for the transportation of plants, although it can be applied with advantage to the transportation of other and various articles.

OILER.—JOHN KING, Ansonia, Conn.—This invention relates to an oiler, the construction and arrangement of which is such that oil can be forced through its nozzle at whatever hight it may be desired to use it, thus enabling machinery at hights above, being reached with the ordinary oiler to be oiled without the use of a stepladder.

QUILTING FRAME.—WILLIAM FREDERICK, Ashland, Pa.—This invention consists of a quilting frame formed by combining a set of rollers and nuts with each other and with the supports or legs of the frame, and in combination with the main part of the frame of a removable and adjustable part, for extending the quilt while being marked.

DITCHING MACHINE.—J. S. WEAVER, Dayton, Ohio.—This invention relates to a machine for opening ditches preparatory to putting in tile; and it consists in the combination and arrangement of the various parts by means of which the machine is adjusted and operated.

BURGLAR ALARM.—H. H. POTTER, Carthage, N. Y.—This invention consists in a novel and simple arrangement of mechanical devices for operating the striking hammer of the bell used in the burglar-alarm.

ARTIFICIAL LIMBS.—A. MCOMBER AND D. WALSH, Schenectady, N. Y.—The object of this invention is to improve the construction of artificial limbs both for amputations below and above the knee.

WINDOW BLINDS.—A. P. SMITH, Sterling, Ill.—This invention consists in a novel attachment to the operating rod for the slats of window blinds, whereby the slats, can be when either opened closed, secured and held in such position.

BLINDS.—W. F. REDDING, Saratoga Springs, N. Y.—This invention consists in so hanging the slats in the blind frame, that in case any one of their tenons should be broken, thus causing the slat to sag or drop down, such slat can be readily adjusted and brought to its proper position.

WASHING MACHINE.—P. H. HARDY, Terre Haute, Ind.—The object of this invention is economy in construction and ease in the management and operation of washing machines, and also the preventing of injury to clothes from too violent action of the rubbers or beaters.

WASHING MACHINE.—ROBERT M. YORKS, Schoolcraft, Mich.—The object of this improvement is to decrease the labor of washing clothes by enabling the operator to use a treadle for moving the board over the clothes, the board being brought back to its place by a spring.

MEAT SLICER AND VEGETABLE CUTTER.—E. P. WHITNEY, Stamford, Conn.—This invention consists in the arrangement of one, two or more knives, set with their blades in opposite directions to each other, and used in connection with set screws which enable them to be adjusted according as it may be desired to have the thickness of the slice, and in connection with lances or sharp points, which, while the knives are cutting the slice, serve to separate or cut the slice in an opposite direction.

SUMMER COOK OR BRAZIER.—N. O. BOND, Hyannis, Mass.—This invention consists of a cast-iron pan, having a perforated bottom, and sides tapering downward so as to adapt it to fit the holes of any common cooking stove or range. Suitable ribs cast on the inside of the brazier, at its upper part, to prevent the stove cover or any cooking vessel which may be placed therein, from excluding the draught. By this contrivance summer cooking can be performed with very little expenditure of fuel and with no more heat than is absolutely necessary for the purpose. The patent was granted Februarv 13, 1866.

Notes and Queries.

E. P. S., of N. Y.—If your chilled-iron box fitted the shaft and had a smooth surface, there would be no difficulty about its working if kept oiled.

T. S. M., of Pa.—You will find an article on the Pressure on the slide valve on page 151, Vol. XII. The pressure in the cylinder at the time of cutting off, also at the end of the stroke, the area of the ports, the superficial area of the back of the valve, and the back pressure on the piston, are conditions that must be taken into account in deciding this question.

S. B. S., of Tenn.—Your "essay on man" is not exactly adapted to our columns. It would be more appropriate in a physiological or educational journal.

G. C. N., of N. Y.—Consult any book on chemistry for the method of making sulphureted hydrogen. To make a nearly saturated solution of nitrate of silver in alcohol, pulverize the nitrate, and add about 30 grains of it to each ounce of alcohol; shake well and you have a saturated solution Pour off the clear solution and to each ounce of it add a few drops of alcohol and you have what you want.

B. R., of N. Y.—Gypsum is without doubt a valuable addition to some kinds of land. It contains sulphur, but o itself it has none of the peculiar properties of sulphur. Most manures are injured if they are thoroughly dried.

A. K., of Iowa.—Arnold's writing fluid contains indigo in addition to the ingredients found in the common ink

A. H., of ——.—Probably the precipitate in the case you mention is sulphate of potash. Why don't you test it?

O. C., of Mass.—It is well known that wood naphtha and concentrated alkaline solutions will cut gum shellac. You could not obtain a patent for the process:

S. T. H., of N. Y.—Common red or black ants are destroyed, and closets infested by them purified, in the following way: Take a sponge and sprinkle fine sugar over it. Set this where the ants most do congregate, and in a short time it will be full of them. Then throw the sponge into hot water. Repeat the process at will. You will find a recipe for metallic lining for machine boxes in the last volume.

W. A. L., of Ohio.—The steam siphon works on the same principle that an ordinary one does, the office of the steam being merely to exhaust the air from the tube. The pressure of steam required to do this varies with the conditions, it is not necessarily great so long as it will be above the atmospheric pressure. The nozzle need not be larger than the main pipe.

J. W. H., of Ga.—You cannot work a high pressure engine with a condenser as you propose, that is by having a pipe 35 feet long issuing from the bottom. Air would enter with the water and destroy the vacuum, besides there is uncondensed vapor in every condenser, which cannot be removed except by an air pump.

C. B. S., of Conn.—To find the distance to place your weight on the lever to get 80 pounds, you must, from the required weight on the valve in pounds, subtract the weight of the valve and the lever, multiply the remainder by the distance between the fulcrum and the valve, and divide by the weight in pounds on the lever, the quotient is the distance of the weight from the fulcrum.

O. P. H., of Mich.—The obstacle to easy draft in vehicles is friction of boxes on the axles. If any one says that a wooden axle runs easier than an iron one, they argue against known laws, which assert that the friction of two metallic surfaces is less than that of wood working on metal, both being well oiled.

J. W., of Ind.—You have neglected to cut off your decimals; the weight of water is 3777·5 pounds, and the power exerted by this in issuing under a head of ten feet, is precisely the same as in falling ten feet, 3777·5 pounds falling ten feet is 37775 foot-pounds of work, and if this amount of work is performed in each minute of time it gives 1 4775-3000ths horse-power. We presume Mr. Emerson meant to say that the saw should run with a velocity at the periphery of 900 feet per second.

A. S., of N. Y.—We publish the patent claims as they are sent to us from the Patent Office. Sometimes cases are suspended after they are ordered to issue, which may be the case with the one mentioned by you.

A. C., of D. C.—The idea of suspending a telegraphic cable in the air, and carrying it across the ocean, we consider wholly impracticable. The suggestion is an old one.

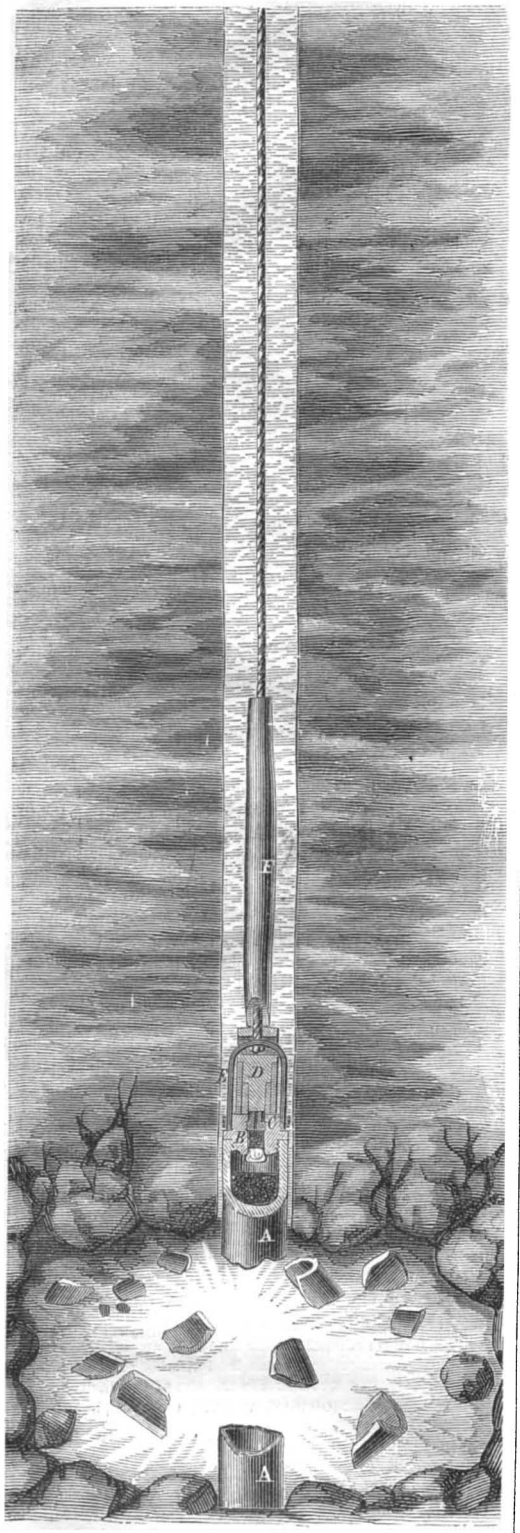
F. B. B., of N. Y.—Cannon fired over the water where persons have been drowned, cause a concussion which is generally successful in accomplishing the desired object.

J. J., of Mis.—H. C. Baird has the work you desire; we believe it was the "Practical Draughtsman."

Correspondents who write letters to us for information, are always required to sign their names to their letters. We insist upon the observance of this rule as an act of good faith

THE ROBERTS PETROLEUM TORPEDO.

The importance, in a commercial point of view, o petroleum and its products, is so great, and the dis covery of its uses is so recent, that although constantly employed in the arts and for domestic purposes, few persons have any adequate idea of its immense addition to the wealth of the country and world. Notwithstanding the amount of its production, the supply is hardly equal to the demand, and as its uses are extended by new discoveries of its value, the demand will correspondingly increase. In 1862 the production of petroleum in the United



States was 68,356,275 gallons, valued at $14,670,358 53; in 1863, 98,495,003 gallons, valued at $33,610,060 43; in 1864, 117,298,693 gallons, valued at $57,268,458 02, and in 1865, 145,638,191 gallons, valued at $77,073,605 71. Total value for four years, $182,622,422 69. This does not include the value of any of the products or manufactures of petroleum. Every facility for increasing the yield of such a source of wealth as this, is of national importance.

Such is the claim of the invention herewith illustrated. Petroleum appears to be stored in pockets or veins in certain oil-bearing rocks, technically called "sand rocks," and found at varying depths below the surface. It not unfrequently happens that a well, after having reached one of these veins, and yielded the petroleum in paying quantities, gradually ceases to yield, the passage leading into the well having become closed by the accumulation of paraffine or clogged by the deposition of other extraneous substances. Again, wells are sunk into the oil-bearing rocks at great expense, without striking a vein, and are abandoned as "dry holes." Col. E. A. L. Roberts conceived the idea of exploding a torpedo in such wells to fracture the rock and clear the closed passages or make artificial ones reaching the oil veins. The idea was acted upon, and was attended with such success that a company was formed with a capital of $300,000 for the manufacture and operation of the torpedoes.

The engraving represents a section of an oil well with the torpedo in the act of explosion. The body of the torpedo is a cylindrical flask of cast iron, A, in size adapted to the bore of the well or the amount of powder, or other explosive material required to produce the desired effect. The cylinder being filled with gunpowder, nitro-glycerin, or other explosive, the cap or priming chamber, B, is screwed in and packed under the shoulder with white lead to make its contents impervious to moisture. This cap is furnished with a nipple, C, which receives a percussion cap to be exploded by the hammer, D, which slides in a hole bored through the projection of the cap. A bail, E, passes through a slot in the head of the hammer, D, and is secured by its ends to two sides of the cap, B. By this bail the torpedo is lowered into the well. A hollow rubber tube surrounds the cap and hammer inside the bail, and is secured by strong thread at top and bottom, thus insuring perfect isolation of the contents of the priming chamber and flask from moisture.

The operation is perfectly simple. The torpedo being lowered to the bottom of the well or the point where the explosion is desired, a cylindrical weight, F, having a hole longitudinally through its center, is allowed to fall, and, guided by the line or wire that suspends the torpedo, strikes with force upon the hammer, compressing the rubber spring and exploding the percussion cap. A fuse is generally used, passing from the fulminating powder in the cap, through the powder in the case, to insure an explosion through the whole body of the torpedo at the same instant. The water in the well—with which all oil wells are filled—serves as a packing or wad to prevent an upward explosion.

The success of this device is amply well attested by prominent oil men and others who have witnessed the results of the trials. The Woodin well which, in December, 1865, was a "dry hole," was made to yield from 60 to 80 barrels per day, by two explosions. The Devine well, on the Tarr Farm, which had been a flowing well of large capacity, but had diminished to a pumping well of only three or four barrels per day, was made by one explosion to flow 80 barrels. The Keystone well, at the same place, yielding only three barrels per day, was made to flow from 160 to 180 barrels per day.

It is asserted by competent judges that the use of these torpedoes has, within sixty days, increased the production of oil in the Pennsylvania oil regions 1,400 barrels per day, valued at $1,400,000 per annum. Such results constitute a recommendation more valuable than individual testimonials.

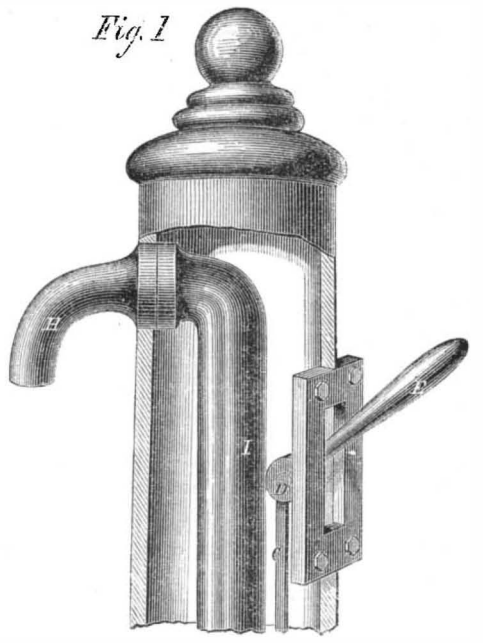
Patented April 25, 1865. Several suits denying Col. Roberts's priority of invention have been brought, but decided by the Commissioner of Patents in his favor. For further particulars apply to Walter B. Roberts, Secretary of the Roberts Petroleum Torpedo Co., No. 47 Bond street, New York, or to Col. E. A. L. Roberts, Titusville, Pa.

BIGGS AND FLINN'S HYDRANT.

The labor and expense of digging up a hydrant to repair the stop-cock or pipe, is frequently a very onerous, and always an expensive and unpleasant job. The object of this invention is to obviate the necessity of this task, and to relieve the cock of the weight of the operating rod. This latter object is accomplished by placing the cock, A, in a horizontal position, and providing the projecting head with a yoke, B, to which the rod, C, is attached, the upper end being connected by a joint, D, to a lever, E, entering from the outside of the stock and carrying its own weight and that of the rods. By raising or depressing this handle, the key is turned so as to admit or stop off the water. For the better security and uniform operation of the cock, a spring, F, is inserted under the head of the screw, G. The nozzle, H, can be unscrewed whenever it is necessary to remove the pipe, I, for repairs. This removal is effected by a hook wrench fitting the hexagonal nut, J, by which the cock and pipe can be unscrewed from the feed pipe, K.

An extra cock may be fitted to the pipe, I, within the hydrant, to stop off the water for repairs, or it may be attached to the feed pipe, K. The waste pipe, L, may be closed in summer, when there is no danger of freezing, by a plug entered from above.

Fig. 1



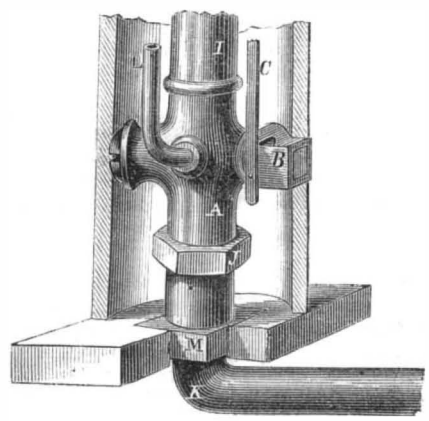
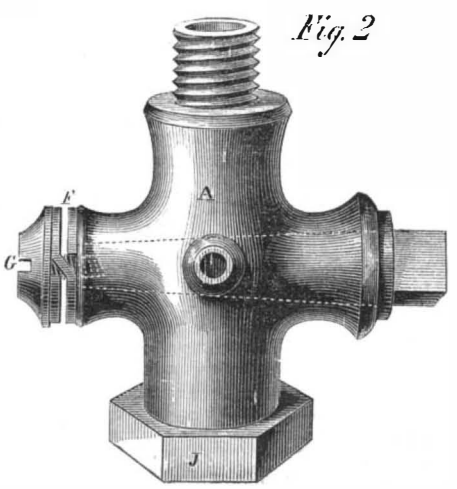


Fig. 2



The square projection, M, is firmly attached to the feed pipe, and bedded in the stone or plank foundation, to prevent any movement of the feed pipe in unscrewing the hydrant pipe. This constitutes a superior hydrant stop-cock, more durable than others, by the position of the key, and the constant pressure of the rod, and desirable for the facility it affords to repair the same at a great saving of expense and dirty drudgery.

Patented April 17, 1866. For further information and for rights to use or manufacture, address A. C. Flinn, Lancaster, Pa

THE
Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions for advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

☞ "The American News Company," Agents, 121 Nassau street, New York.

☞ American and Mexican News Company, Mexico, are Agents for the SCIENTIFIC AMERICAN.

☞ Messrs. Trubner & Co., 60 Paternoster Row, London, are also Agents for the SCIENTIFIC AMERICAN.

VOL. XV., No. 4, [NEW SERIES.] *Twenty-first Year.*

NEW YORK, SATURDAY, JULY 21, 1866.

Contents:

(Illustrated articles are marked with an asterisk.)

*Davenport's "Commonsense" Washing Machine.	47	First to Make the Invention Useful	52
Cheap Ice Pitcher	47	Variation in Form not Patentable	52
Steam on Common Roads	47	New Inventions	53
Production of Beet-root Sugar	47	Notes and Queries	53
The Great Trial of Agricultural Implements	48	*The Roberts Petroleum Torpedo	54
Testing a Turret	49	*Biggs & Flynn's Hydrant	54
Balloonists in Peril	49	Are Iron Safes Safe?	55
A New System of Digits	49	Experiments with Nitro-Glycerin	55
Selfe-Registering Barometer	50	Fire-Crackers ought to be Prohibited	55
Chimogene—A New Anesthetic	50	Cryptography—A Translation	55
*Chappell's Adjustable Toilet Glass	50	Patent Claims	56, 57, 58, 59, 60
The Proposed Metric System	50	Important to Inventors	61
Cause of the Failures of the Atlantic Cable	50	Special Notices	61
*Transmission of Power by Belts	51	Advertisements	60 61
To keep a Saw in Order	51	*Nevius's Hollow Grate Bars	62
Coffee Making Again	52	The Monitor Engine	62
Tape-worm and Pork Eaters	52	Wrought-iron Drums for Pulleys	62
Measuring Logs	52	*Pitman's Animal Trap	62
Weights of Oils	52	*Knoepke's Wash Basin	62
The Rightful Inventor—the			

ARE IRON SAFES SAFE?

In the ordinary transactions of life it is necessary that man should have confidence in man. It is true that confidence is frequently abused, yet the general law must be recognized, or there is an end to all proper business and social relations.

The good Book instructs us not to put confidence in princes. They have been a treacherous, plotting set since the days of the flood, and have wrought untold mischief upon the sacred rights of the people. Extending the idea to still more material things, we should say, in the light of experience, "put not your trust in fire-proof safes." In May, 1862, a terrible conflagration visited Troy, N. Y., destroying property valued at $3,000,000, including 671 buildings. This fire was one of the largest that ever occurred on this continent, and demonstrated that iron safes, supposed to be fire-proof, could be burned up, together with their valuable contents. At that time we warned our readers that "too much dependence should not be placed upon the perfect fire-proof qualities of any safes," and advised that, in all cases, they should be inclosed in brick work. The great fire that occurred in Portland, on the 4th of July, has demonstrated the soundness of our advice.

It appears from reports that the most safe safes were the bank vaults, which, being built in the ground, proved to be entirely reliable, their valuable contents being uninjured.

Self-registering thermometers in Lowell & Senter's bank vaults, built fifty years ago, showed only 110 degs. at the highest point in the lower vault, and 130 degs. in the upper vault.

The vault of the Merchants' National Bank, built some twenty-five years ago, was exposed to the heat for a long period, there having been many tuns of coal on fire in the cellar, but when opened the contents were found uninjured.

The ordinary fire-proof safes manufactured in this country are made of wrought or chilled iron. Space between the plating being left for the introduction of some good non-conducting substance, such as plaster, mica, asbestos, chalk, alum, fire clay, etc.

Prof. Eaton found by experiments that a perfectly dry filling was not so effective in withstanding heat as a mixture containing water. The reason for this is, that when the safe is exposed to intense heat, the imprisoned water is gradually liberated and converted into steam, and so long as this continues, the contents of the safe are protected. In a long-continued high heat, the safe gets red-hot, and its combustible contents becomes charred.

The good character of a safe depends, of course, upon its ability to resist heat, and in this particular the safes made in this country are as good as can be had in the world, but they are by no means perfect. It seems to us possible that inventive skill may yet succeed in producing a safe that will pass through the fiery ordeal, and deliver its contents unharmed. The subject is one that ought to receive a more careful study. Our present advice is, that, so far as practicable, iron safes should be placed upon a solid foundation, and inclosed in masonry, so as to prevent them from falling into the burning mass. Thus protected the ordinary fire-proof safe is quite sure to preserve its contents. If left unprotected, the losses at Troy and Portland are liable at any time to be repeated.

EXPERIMENTS WITH NITRO-GLYCERIN.

Col. Tal. P. Shaffner has lately made a report to the Secretaries of War and the Navy, of a series of experiments conducted by him at Washington, extending over a period of four days, designed mainly to demonstrate the use of nitro-glycerin—or nitroleum, as the Colonel calls it—in the explosion of mines. These experiments were conducted with similar experiments made with gunpowder, as a means of comparison. The results seem to confirm the fact that the explosive qualities of the liquid are far in advance of those of gunpowder. Among other trials two open targets, six feet long and five feet high, were made of two thicknesses of two and a-half inch oak plank, and placed vertically four feet apart in a pit, the sides of which were of stiff clay, and extending two feet above the structures. The floor between was an iron plate resting on timbers, and one side of the targets was lined with a plate of iron one-fourth of an inch thick. Of course the top and ends of this two-sided box were open. In each of two similar structures was placed a tin canister of a capacity of 300 cubic inches, one filled with powder, and the other with about eight pounds of nitro-glycerin. Being exploded, the powder did not disfigure the structure except to color it with the deposit of carbon upon its sides and floor. The nitro-glycerin tore the wood-work to pieces and threw fragments very high in the air. The iron floor was removed from its place and thrown upon its end, and the earth around was very much torn.

Two cast-iron pieces, weighing each about 300 pounds, had a hole an inch in diameter, and fifteen inches deep, bored in them, and after being charged, one with powder and the other with nitro-glycerin, they were closed by a screw plug one inch long. That containing the powder was uninjured, the powder discharging through the fuse vent, three-sixteenths of an inch diameter. The other was torn to pieces by the nitro-glycerin, the force extending downward from the bottom of the charge, leaving a cone with its apex at the bottom of the drill hole.

But one of the most remarkable of the experiments, or rather their results, was one with a wrought-iron piece, being a part of shaft, about five feet long, and twelve inches in diameter. In this was bored a hole 15 inches deep, one inch in diameter, and a plug one inch long screwed in the orifice. The plug was forced from the orifice, and the music of the air passing through the vent-hole lasted three minutes; it evidently reached a very high altitude. A second charge, tamped with loose earth, burst the iron into three pieces to the base of the drill. The pieces were subsequently examined, and they were found to be crystallized, and to a considerable extent restored to cast iron. Subsequently the bore was deepened to twenty inches and the aperture secured by a plug screwed in three inches. Twelve liquid ounces of nitro-glycerin were poured in and the charge ignited by electricity. The wrought-iron shaft was broken to pieces and the crystallized effect was clearly visible. This curious phenomenon is worthy of the most intelligent examination. Never before has wrought iron been made to change to a crystallized state by one blow. The chamber was greatly enlarged, indicating a compression of the metal. The broken pieces are at the War Department, and serve as monuments of a new scientific achievement.

Four musket barrels were placed in wrought iron cylinders, two filled with gunpowder and two filled one-third full with nitroleum. The musket barrels charged with powder, were exploded by electricity. They burst open, tearing the iron to pieces. The barrels charged with nitro-glycerin were next exploded, and the effect was very different from that produced by the powder. The barrels were flattened, and not so much broken to pieces; the force was so sudden and great that after the barrel had irregularly broken up and down, the iron appeared like rolled plate, even and polished.

In testing other qualities of the nitro-glycerin, Col. Shaffner says:—

"Plaster of Paris was saturated with it, and it proved to be non-explosive and non-combustible. Sawdust was placed upon the anvil under the hammer, but there was no explosion except as particles of nitro-glycerin. Gun-cotton was placed upon the anvil covered with the liquid, and the explosion on the fall of the hammer failed to ignite the cotton.

"During my experiments, Gen. Dellafield and other officers were not too timid to handle the nitro-glycerin in a tumbler, and those present saw me use it with as much freedom as though it was water. It is proper to state, however, that like all explosive compounds it should be handled with that degree of caution peculiar to its character. For example, when unconfined it may be stirred with a red hot iron containing some 600 deg. of heat; but if that heat was applied to it when confined it would explode. The explosive force of powder is estimated to be 13,000 pounds to the square inch, and by chemical, formula the explosive force of nitro-glycerin is about 212,000 pounds to the square inch.

I also exhibited to the officers present the cause of the recent explosion at San Francisco. The nitro-glycerin had been shipped in bottles and packed in saw dust, four bottles in each case; one or more of the bottles had been broken, and the sawdust became saturated with the liquid; and in this manner a new substance was formed which is susceptible of being exploded at a lower temperature than nitro-glycerin, and possibly at blood heat. The agents were opening the package, and perhaps a heavy blow was given particles of saw dust, which caused the explosion. Nitro-glycerin explodes by a violent percussion, and by 360 deg. of heat."

Col. Shaffner does not attempt to account for the "compression" of the wrought iron, nor for its entire change of structure. Indeed, we do not ascertain from the report that the outside diameter of the wrought-iron shaft was not increased, as well as the capacity of the bore. In relation to the change of structure in the iron by percussion, the correctness of the theory has been fully established by experiments, but that a single impact of exploding gases will accomplish this result seems doubtful. There is so great a difference in the texture of wrought iron, that until we know the precise character of that used in the experiment, it will be difficult to form a reliable opinion as to the agency of the explosion in effecting the assumed change.

Fire Crackers Ought to be Prohibited.

It is reported in the newspapers that on the 4th inst., a boy, in the city of Portland, lighted a Chinese fire cracker and carelessly threw it among some shavings in a cooper shop. The consequence was that the greater part of the city was burned and upward of $10,000,000 worth of property destroyed. The destruction of life and property in consequence of the free use of this mischivous explosive ought to cause stringent laws to be made, prohibiting its importation.

Cryptography--A Translation.

In the SCIENTIFIC AMERICAN No. 25, Vol. XIV., we published a cipher message from Geo. C. Round, of Conn., for which he requested a translation. It was probably too much of a puzzle, as none of our correspondents have succeeded in deciphering it. We append the author's translation.

"The signal code is the simplest and most difficult of all practicable ciphers. An entire change can be made after each word and not interrupt communication."

THE Postmaster General is making a stir about the abuse of the franking privilege. It is understood that some Members of Congress allow other parties to *fac simile* stamps of their names on envelopes for which a consideration is paid, and thus the postal revenue is defrauded. The great difficulty is to know how to put a check upon this despicable practice.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JULY 10, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

56,157.—CULTIVATOR.—Andrew P. Anderson and Byron Edwards, Princeton, Ill.:

We claim the beams, D, D, in combination with the plow-standards, H, H, and the plow-standards, E, E, substantially as and for the purposes set forth.

56,158.—FEEDING TROUGH FOR STOCK.—Benjamin Arnold, Arba, Ind.:

I claim the arrangement and combination of the various parts constituting the trough, platform, food-receptacle, and steps, all in the manner and for the purposes set forth.

56,159.—HARROW.—Jonathan Ayers, Canterbury, N. H.:

I claim the front tooth, B as made with the inclined knife edge, f, and the two double curved wings, g, g, as set forth.

I also claim each lateral tooth as made with the knife-edge, b, and the curved furrow opening lip, c, and the curved furrow opening lip or part, d, arranged as specified.

56,160.—MODE OF HANGING BELLS.—George E. Baker, Waukegan, Ill.:

I claim attaching a bell to, or suspending it upon, its supports by means of elastic cushions, substantially as and for the purposes herein shown and described.

56,161.—HORSE-SHOE.—Halsey H. Baker, New Market, N. J.:

I claim, 1st, The attachment of the collar, D to the shoe, A, by means of the tongues, f, on the said collar, and the pins or projections, d, in the socket, a, substantially as herein set forth for the purpose specified.

2d, The combination of the wood-block, E, with the collar, D, and shoe, A substantially as herein set forth for the purpose specified.

3d, The combination of the hardened pins, spikes, or wedges, with the wood-block, E, secured in the collar, D, substantially as herein set forth for the purpose specified.

4th, The lips or ribs, r, formed on the collar, D, and fitted upon the beveled sides of the flange, b, of the shoe, substantially as herein set forth for the purpose specified.

56,162.—BROOM-HEAD.—Frederick G. Bakes, Vevay, Ind.:

I claim, 1st, A broom-head or clamp composed of the parts, C, C′, D, D′ and E, E′, all combined, arranged, and operating substantially as set forth.

2d, In combination with the binding wires, H, H, I claim the screw-threaded hook, I, cylindrical nut, J, and washer, K, substantially as described and for the purpose set forth.

3d, In combination with the elements of the two foregoing claims, I also claim the barbed sheet-metal cylinder, B, for the purpose described and explained.

56,163.—ATTACHING TUBES TO OILERS.—S. V. Beckwith, Hamden, Conn.:

I claim the combination of the conically-formed tube, A, with its correspondingly formed seat in the neck, B, and secured therein so as to form a self-packing joint, by means of the spiral groove in the one and corresponding pins in the other, substantially as specified.

56,164.—TOOL FOR ADJUSTING LATHES TO TURN TAPERING SHAFTS.—William N. Berkeley, Cedar Rapids, Iowa:

I claim, 1st, The combination and arrangement of the plate, A, provided with a slot, a, and the arms, C, B, operating as and for the purposes herein set forth and described.

2d, In combination with the above, I claim the employment of the gauges or guides, E, arranged as and for the purposes specified.

56,165.—BLOWER.—H. B. Bigelow, New Haven, Conn., and George Murray, Cambridgeport, Mass.:

We claim the construction and arrangement of the fans, substantially as described, to operate so that one moves with a diminished velocity through a portion of its revolution, acting as a stop for the fan succeeding, it more rapidly revolving, substantially as herein described.

56,166.—TOOL.—Byron Boardman, Norwich, Conn.:

I claim, 1st, The combination of a cam, u, with the movable or fixed jaw-head of a monkey wrench, so applied as to form thereof a pipe wrench, substantially as described.

2d, The manner herein described of securing the pipe wrench cam within a recess, so that this cam will be firmly sustained by the solid metal surrounding it, during the operation of turning a cylindrical object, and allowed to play loosely when released, substantially as described.

3d, Securing the nut, g, within an oblong slot, i, in the handle, A, by means of the fixed pin, j, substantially as described.

4th, The combination of the permanently attached nut, g, and the screw-driver bit, h, formed on or applied to the shank, C′, of a monkey wrench, substantially as described.

5th, Securing a steel bit, h, to the end of the softer metal shank, C′, of the monkey wrench, substantially as described.

56,167.—FULMINATING COMPOSITION.—George Boldt, Chicago, Ill.:

I claim a fulminating substance to ignite cartridges by filling with it small cavities in the back part of conical projectiles, and using an igniting needle, said fulminating substance consisting of the ingredients above enumerated and prepared, and mixed as above described and specified.

56,168.—CARPET-BAG FRAME.—Peter Born, New York City. Ante-dated June 29, 1866:

I claim making the jaws and covers of frames of carpet-bags, valises, etc., of a series of veneers or layers of thin wood fastened together, in the manner herein specified.

56,169.—SHOVEL AND TONGS.—Robert D. Bradley, Preston, Md.:

I claim the combination of shovel and tongs, constructed and operating as described.

56,170.—HORSE HAY-FORK.—A. C. Briggs, North Easton, N. Y.:

I claim, 1st, The combination of the tine, C, with the bars, A and D, and catch, E, arranged and operating substantially as herein set forth.

2d, Constructing the tine, C, with a shoulder, as described, when used in combination with the bar, D, and slide, a, substantially as and for the purpose specified.

56,171.—DEVICE FOR TRANSMITTING MOTION.—John Brizee, Alvarado, Cal. Ante-dated July 3, 1866:

I claim, 1st, The combination of the oscillating frame, W, pendants, X, X, and spring, A′, with the crank, M′, all arranged to operate as and for the purposes specified.

2d, In combination with the parts above specified, I further claim the adjustable or rising and falling plate, Y, for the purpose explained.

56,172.—FEED-STOP FOR LATHES.—A. P. Brown, Worcester, Mass.:

I claim, 1st, The combination with the feed-rod of collar, J, and gear, I, and adjustable spline, K, substantially as set forth.

2d, The combination with feed-rod, C, of cars, G, G′, spiral spring, d, clutch-collar, J, gear, I, and adjustable spline, K, substantially as set forth.

3d, The combination with the feed-rod of an engine lathe of a feed-stop device, constructed and arranged as described, whereby the feeding or forward motion of the cutter or tool-frame can be automatically stopped at any desired point without stopping the feed-rod, substantially as set forth.

56,173.—CULTIVATOR.—Robert Bullock, South Mills, N. C.:

I claim the combination of the stock with the weeding-shears, the iron rod braces, the eye-holes, and iron bolts, when these several parts are arranged, constructed, and adjusted substantially as described.

56,174.—GATE.—J. P. Cadman, Freeport, Ill.:

I claim, 1st, The ways, D, D, provided with cogs, o, o, when pivoted to the uprights, C, C, and beam, F, as and for the purposes specified.

2d, The posts, H, K, and H, provided with pulleys, F and t, cords, m and m′, and rod, f, working the ways, D, D, arranged in the manner substantially as and for the purposes set forth.

3d, The treadle-rods, G, provided with semi-hoops, g, and weights, k, working the rod, f, as and for the purposes set forth.

4th, The gates, A and A, attached to the ways, D, D, by the strips and pulleys, e, secured by the posts, P, P, in combination with the posts, H, K and H, with pulleys, J and t, cords, m and m′, lever, E′, and rod, E′, in the manner arranged, substantially as and for the purposes herein specified.

56,175.—ANIMAL TRAP.—William Henry Campbell, Brooklyn, N. Y.:

I claim the combination with the pivoted platform, F, and receptacle, A, of the guards, G, and plates, H, which prevent the rats from making their escape by jumping back after the platform has tilted, as described.

56,176.—CHEESE-VAT.—J. A. Carlisle and George A. Bowers, Elgin, Ill.:

We claim, 1st, Cavity or opening, T, in combination with valve, A, packing, U″, levers, 1, 1″, and rod, H, the whole constructed, arranged, and operated substantially in the manner and for the purpose set forth.

2d, Pipes, O, and a, a″, when constructed, arranged, and operated with regard to its cavities or openings, substantially in the manner and for the purpose set forth.

3d, Pipe, h, packing, U, and nut, l, the whole constructed, arranged, and operated substantially in the manner and for the purpose described.

56,177.—GRAIN SEPARATOR.—John H. Chase and J. M. Tiffany, Montgomery, Ill.:

We claim in a grain-separating machine one or more hollow cylinders having narrow openings or passages in their convex surface, with V-shaped grooves upon the interior corresponding with the direction of said passages so as to keep the kernels of grain in the cylinder lengthwise over the said passages, substantially as and for the purposes herein shown and described.

56,178.—MICROSCOPE.—Otis N. Chase, Boston, Mass.:

I claim, 1st, A hollow transparent chamber, A, open at one or both ends, in combination with the lens, F, substantially as described.

2d, The projections, C, C, or their equivalents, in combination with the elastic band, D, for the purpose set forth, substantially as described.

56,179.—PURIFYING PETROLEUM, ETC.—Robert A. Chesebrough, New York City:

I claim the heating of bone-black by dry steam or otherwise, previous to using the same for filtering hydro-carbon oils.

56,180.—INDELIBLE PENCIL.—Edson P. Clark, Northampton, Mass.:

I claim the employment of the ingredients in combination with the nitrate of silver, substantially as and for the purpose set forth.

56,181.—HORSE-SHOE.—John N. Clarke, Cincinnati, Ohio:

I claim forming the sole of a horse-shoe substantially as described and shown, that is to say with transverse and diverging ridges, A, alternating with hollows, B, which are pierced at or near their crowns with the nail-holes, C.

56,182.—COFFIN.—Daniel Clarke, Ipswich, Mass.:

I claim the combination as well as the arrangement of the series of studs, b, b, b, b, and the series of notched catches, c, c, c, c, with the cover and case of the coffin.

56,183.—CORN PLANTER.—William Cogswell, Ottawa, Ill.:

I claim, 1st, The provisions for adjusting the width of planting and for dividing the machine as described by means of the divided axles and the divided connections at the fore part, as described and represented.

2d, The piece, G, constructed substantially as shown, affording a bearing for the seat supports, sockets for the divided axles, and pivoted attachment for the tongue.

3d, The piece, H, constructed as described, affording adjustable connections to the forward seats and beams, the loop for the rising and falling tongue, and attachment for the rear seat supports.

4th, The combination of the hopper, m, with its lugs, n, n, and the cap, o, the latter holding in position the cut-off rubbers, p, and the journal-boxes, s, s, of the oscillating feed cylinder.

56,184.—DEVICE FOR HOLDING BOOKS AND MANUSCRIPTS.—J. E. D. Comstock, New York City:

I claim, 1st, The combination of the lazy-tongs, B, with the clip, A, or its equivalent, and strips, C, D, substantially as and for the purpose specified.

2d, The extension strips, C′ and D′, in combination with the strips, C, D, and the lazy-tongs, B, substantially as specified.

3d, The combination of the clip, A, and strips, D, substantially as described.

4th, The combination of the clip, A, lazy-tongs, B, and strips, C, substantially as specified.

5th, The clip, A, when constructed in the manner shown and described, being in itself a clip of a new construction.

56,185.—SORGHUM MILL.—Robert Conarroe, Camden, Ohio:

I claim the series of pivoted stripper jaws, arranged in reference to the row of openings and provided with springs, substantially as and for the purpose described.

56,186.—GOVERNOR STOP VALVE.—John Crawley, Perrysville, Ind.:

I claim, 1st, The divided pipe, A, a, globe, C, and pipe, B, tubular valve, j j, and stem, P arranged and operating substantially as herein shown and described.

2d, The valve-stem, p with cams, h, h, k, k, the fixed cams, f f, stop-lever, L, and detachable governor rod, n, arranged and operating as and for the purpose set forth.

56,187.—COMPOSITION FOR MOLDER'S MATCH-PLATES.—George P. Darrow, Cincinnati, Ohio:

I claim the manufacture of molder's match-plates and follow-boards, by the use of plaster of Paris, iron dust, and sal-ammonia in solution, substantially as and for the purpose set forth.

56,188.—MACHINE FOR HOLDING SHEEP FOR SHEARING.—Justus Day, Murray, N. Y.:

I claim, 1st, The forked arms, C and D, operating for the purpose and in the manner set forth.

2d, The revolving table in combination with the buckles and straps, I, I, and the pins, J, J, J and C, operating in the manner and for the purpose described.

56,189.—HORSE RAKE.—George Deal, Wayne Township, Ohio:

I claim the combination and arrangement of the forwardly projecting hinged arms, I, I, adjusting screws or their equivalent, H, H, tooth roller, D, and teeth, L, L, substantially as and for the purpose herein specified.

56,190.—BUTTON-HOLE.—E. F. Dieterichs, Philadelphia, Pa.:

I claim a metal binding for button holes, said binding consisting of a number of plates arranged adjacent to each other and compressed to the fabric, all substantially as set forth.

56,191.—NAIL HAMMER.—Christopher G. Dodge, Jr., Providence, R. I.:

I claim a hammer, Fig. 1, constructed with a sheath, D, in the handle thereof for a screw-driver, so that when the hammer and the screw-driver are united, as shown in said Fig. 1, the handle of the latter will form a continuation of the handle of the former, and when the two tools are not so connected each can be used separately, the whole article being substantially as specified.

56,192.—WAGON-JACK.—William M. Doty, Janesville, Wis.:

I claim the arrangement of the sliding-bar, C, and lever-arm, F, clasp, E, and standard, A, combined and operating in the manner and for the purpose herein described

56,193.—FILTER.—Nicholas Downes, Syracuse, N. Y.:

I claim the combination of the cover, F, having the collar, F′, the reservoir, B, and cleansing-tube, C, and with or without the perforated disk, D, when severally constructed and arranged for use, substantially in the manner and for the purpose set forth.

56,194.—GRAIN-SEPARATOR.—J. F. Dunham, Fayette, Iowa:

I claim, 1st, The perforated plates, E, G, fitted in a shoe, A, of a thrashing machine, at the outer end of its screen, B, in connection with the spout, D, and inclined parts, b, c, of the bottom of the shoe, substantially as and for the purpose set forth.

2d, The rotating-frame or discharger, I, in combination with the perforated plates, E, G, arranged and applied to the shoe, A, and in relation with the screen, B, substantially as and for the purpose specified.

56,195.—WOOD-BORING MACHINE.—Seth C. Ellis Jersey City, N. J.:

I claim the jointed frame, F, G, bit-stock, m, pulleys, g, k, l, r, belts, u, s, and handle, H, the whole combined and arranged in relation with each other, and the driving-shaft, E, and table, B, substantially as and for the purpose herein specified.

56,196.—NECKTIE-HOLDER.—J. Albert, Eshleman, Philadelphia, Pa.:

I claim, 1st, A plate secured to a neck-band and adapted for the reception and retention of a detachable tie, substantially as described.

2d, The combination of the socket, A, or its equivalent, and a stud, a, as and for the purpose specified.

3d, The socket, A, with its projections, i, i, and the spring-catch, B, with its recesses, e, e, when constructed and adapted for attachment to each other and to a neck-band, substantially as set forth.

56,197.—REFINING SPIRITUOUS LIQUORS.—G. W. Ferris, Quincy, Ill.:

I claim, 1st, The within-described process of refining spirituous liquors, by passing the same under pressure through a series of filtering tanks, substantially as set forth.

Also, the arrangement of a series of filtering tanks placed gradually lower and lower, and provided with tightly-fitting covers and with connecting pipes, substantially as and for the purpose described.

56,198.—PREPARING CHARCOAL FOR FILTERING.—G. W. Ferris, of Quincey, Ill.:

I claim the within-described process of preparing charcoal by treating the same with corn meal, substantially as and for the purpose set forth.

56,199.—BELLOWS.—Edward Field, Cincinnati, Ohio:

I claim the arrangement of shaft, R, rod, S, lever, T, rod, U, crank, V, pulley, W, lever, X, treadle, Y, and handle, X, combined and operating substantially as and for the purpose specified.

56,200.—SPRING SEAT.—Luther W. Fillebrown, Jr., Wayne, Me.:

I claim the improved elastic seat made as described, viz., of the adjustable frame, C, the series of bow or arch springs, D, D, D, the frame, A, and the flexile covering, E, arranged and combined together, substantially as set forth.

56,201.—LIFE-RAFT.—L. F. Frazee, South Amboy, N. J.:

I claim the combinations of the drums, E, and casings, C, as described, cross-bars, D, and hinged rails, G, all constructed and arranged in the manner and for the purpose herein specified.

56,202.—QUILTING-FRAME.—William Frederick, Ashland, Pa.:

I claim, 1st, An improved quilting-frame formed by combining and arranging a set of rollers, G, H, and nuts, I, J, K, L, with each other, and with the legs or supports, A, B, C, D, of the frame, substantially as described and for the purpose set forth.

2d, The combination with the main part of the frame of the removable and adjustable part, M, N, O, constructed and arranged substantially as herein described and for the purpose set forth.

56,203.—ILLUMINATING APPARATUS.—Charles Geisse, Taycheedah, Wis.:

I claim, 1st, The combination and arrangement of the central tube, D, with the burner, C, substantially in the manner described and for the purpose set forth.

2d, Combining and arranging the movable branch pipe, E, with the burner, C, for starting the generation of gas in the latter, substantially as described.

3d, The sliding sockets, i, j, arranged and operating substantially as and for the purposes set forth.

4th, The combination and arrangement of the globular radiator, F, with the central tube, D, substantially in the manner described and for the purpose set forth.

5th, The combination of the pipe, G, with the burner, C, substantially as and for the purpose set forth.

56,204.—GAS HEATER.—Charles Geisse, Taycheedah, Wis.:

I claim, 1st, The combination and arrangement of the central tube, D, with the heater, C, substantially in the manner described and for the purposes set forth.

2d, The combination of the movable branch-pipe, E, with the heater, C, for starting the generation of gas in the latter, substantially as described.

3d, The combination and arrangement of the globular radiator, F, with the central tube, D, of the heater, C, substantially in the manner described.

4th, The combination of the conical mouth-piece, a, with the branch-pipe, B, when constructed and arranged to operate in relation to the heater, C, substantially as described.

5th, Constructing the central tube, D, with cog-teeth, as represented, when used in connection with a pinion for elevating and depressing said tube, substantially as described and for the purpose specified.

56,205.—PRESS FOR THE MANUFACTURE OF SUGAR.—Philo M. Gilbert, Kewanee, Ill.:

I claim the arrangement of the head, G, with its rollers, H, H, the screw, D, the press box, F, the disks, I, a, and c, block, J, slide, k, and frame, A, for forming a press, substantially as and for the purpose set forth.

56,206.—PEAT MACHINE.—Samuel D. and Samuel Gilson, Oswego Falls, N. Y.:

We claim, 1st, The combination of the curved arms, d, of the manipulator, C, with the rectangular grates, g′, for the purpose specified.

2d, The construction of the grates, g′, with one part vertical and the other part horizontal, for the purpose specified.

3d, The case, D, constructed of elongated shape to allow the lever or arm, F to revolve unobstructed, substantially as described.

4th, The revolving press, E, with the sliding lever, F, working through it, when made, arranged, and operated substantially as specified.

5th, The mode of relieving the journals of the press, E, by extending the shaft of the press at l′, beyond the slot through which the lever, F, works, substantially as described.

6th, The safety-chamber, G, arranged below the discharge, g′, and so constructed that the lever, F, may slide over it on its side walls and allow a part of the peat while under the greatest pressure to pass back below the end of the lever, in order to avoid accidents, substantially as described.

7th, The revolving mold, I, when so made, arranged, and operated as to form logs by uniform length and angular in their cross sections, for the purpose substantially as specified.

8th, The machine for mixing, pressing, and molding peat and other plastic substances, consisting of the mixing apparatus, the revolving press, E, with its sliding arm, F, and the revolving mold, constructed, arranged, and operated substantially as described.

56,207.—COUPLING FOR VEHICLES.—N. W. Gordon, Waupun, Wis.:

I claim, 1st, The combination of the plate, C, with the bolster, B,

2d, The combination of the plate, D, with the axle, A.

3d, The combination of plates, C and D, constructed and operating substantially as described and for the purpose set forth.

56,208.—MACHINE FOR PRINTING TEXTILE FABRICS.—John Green, Lowell, Mass.:

I claim, 1st, The use and application of two or more furnishing cams, D and E, or their equivalent, to the working or printing surface of a printing cylinder, said cams being constructed with one, two, or more furnishing surfaces, substantially as and for the purpose specified.

2d, Printing two or more colors with one cylinder, each color being deposited upon the printing surface of the cylinder, by a separate furnishing cam or its equivalent, substantially in the manner set forth.

3d, The arrangement of the cams, D and E, and cylinder, C, whereby two or more colors may be printed on the same piece of cloth or other material, substantially as herein set forth.

4th, The arrangement of the cams, D and E, and the cylinder, C, when used separately or in conjunction with the common printing rolls, 10, 11, 12, as set forth.

5th, In combination with the furnishing cams, D and E, for furnishing more than one color to the printing cylinder, C, I claim the detachable sections of such cylinder, arranged and made to operate substantially as and for the purpose specified.

6th, Printing textile or other fabrics, or yarns, to be knit or woven into fabrics in two or more colors by passing them between the cylinder, C, and the cams, D, E, substantially as set forth.

56,209.—WEATHER-STRIP FOR DOORS.—F. C. Gridley, Hudson, Wis.:

I claim the elevator shown at 2, when constructed as described and secured by means of the plate, H, substantially as set forth.

56,210.—SKIRT-SUPPORTING CORSET.—Catherine A. Griswold, Willimantic, Conn.:

I claim a bodice made upon a metallic form, opening before and behind, adjustable in the rear, and having shoulder-straps and fastenings for the support of the skirts, all substantially as shown and described.

56,211.—INVALID BEDSTEAD.—William A. Guyer, New York City. Ante-dated May 1, 1866:

I claim the combination of the three parts, B, C, D, adjustable shaft, E, and slotted strips, K, K, constructed and arranged to operate substantially as and for the purposes set forth.

56,212.—CHEESE-CUTTER.—Joel Haines, Middleburg, Ohio:

I claim the combination of the rotating platform, provided with the adjustable indicator-point, and the series of graduated arcs around the margin of the platform, substantially as and for the purpose described.

56,213.—BRIDLE.—Joseph C. Haines, Lewistown, Pa.:

I claim providing the driving rein with a shifting bearing, H, arranged and operating substantially as and for the purposes herein set forth.

56,214.—COMBINED CHAIR AND FAN.—Frederick Handschuh, Allentown, Pa.:

I claim, 1st, The levers, B and C′, as constructed, the cords, D and E, and the rod, F, with fan attached, the several parts being combined and used as and for the purpose specified.

2d, The bar, K, and the shaft, c, when used with the rod, F, substantially in the manner and for the purpose herein specified.

56,215.—WASHING MACHINE.—P. H. Hardy, Terre Haute, Ind.:

I claim the combination of the corrugated false bottom, G, the movable side pieces, E, E, set in angular grooves, and the beaters, D, movable from a point in the cover, B, substantially as described.

56,216.—SPRING BED.—B. D. Harrington, Boston, Mass.:

I claim a spring-bed, the springs of which are fastened to the sides of the bars, b, b, and are operated upon by bent levers in such a way that the bed-bottom presses upon one arm of the levers, causing the other arm of said levers to press upon the springs, substantially in the manner and for the purpose set forth.

56,217.—COMPOSITION FOR PRESERVING MEAT—James J. Harrison, St. Michael, Md.:

I claim the composition consisting of the ingredients in about the proportions and for the purpose described.

56,218.—PUMP.—Roger Hartley, Pittsburg, Pa.:

I claim, in double-acting plug-plunger pumps, the combination of the cylinder, A, having a stuffing-box, B, with the cylinder, N, and the gland, T, constructed and arranged as decsribed and for the purpose speci ed.

56,219.—BEE-HIVE.—Thomas Hawkins, Auburn, N. Y.:

I claim the arrangement chambers, C, box, E, chambers, C′, the base, H, and the tie, M, the whole constructed in the manner and for the purpose herein specified.

56,220.—MACHINERY FOR WEAVING WIRE ROPE.—F. Hazard, Mauch Chunk, Pa.:

I claim, 1st, The flanges, B, B′, B″, in combination with the axle, A, spool frames, C, C′, cranks, c, c′, and ring, E, constructed and operating substantially as and for the purpose described.

2d, The joints, b, b′, in combination with the flanges, B, B′, frames, C, C′, cranks, c, c′, and ring, E, constructed and operating substantially as and for the purpose set forth.

3d, The arm, j, and set-screw, h, in combination with the eccentric disk, d, cranks, c, c′, frames, C, C′, and shaft, A, constructed and operating substantially as and for the purpose described.

56,221.—PANTALOON-PROTECTOR.—C. W. S. Heaton, Belleville, Ill.:

I claim, 1st, The use of separate metallic strips, or their equivalents, in connection with a pliable band, or when attached directly to the garment, when such metallic strips are placed perpendicular with the leg of the wearer, substantially as described and for the purpose set forth.

2d, The use of separate metallic strips, or their equivalents, when attached as described, or in any other way substantially the same, either by passing the pliable band through the strips of metal, the metal strips being made like buckles, or in any other way, substantially in the manner and for the purpose set forth.

56,222.—HORSE RAKE.—George L. Heidler, York, Pa.:

I claim the arrangement of the independent teeth attached to the head in front of the axle, and the pressure-board to guide and press the teeth to the ground, constructed and operating as herein described.

56,223.—HOSE-COUPLING.—Robert Heneage, Buffalo, N. Y.:

I claim, in combination with the several parts of the coupling, constructed and arranged substantially as described, the stops, P′, P, as and for the purposes set forth.

56,224.—ROTATING-HOOK OF WHEELER & WILSON'S SEWING MACHINE.—James A. and Henry A. House, Bridgeport, Conn.:

We claim chamfering the Wheeler & Wilson sewing-machine hook, substantially in the manner and for the purpose set forth.

56,225.—CULINARY SINK.—Zebulon Hunt, Hudson, N. Y.:

I claim, 1st, The combination of the corrugated or fluted drainer, A, and removable slotted piece, B, with and forming part of the bottom of the sink, substantially as and for the purpose set forth.

2d, The flaring or flannel-shaped strainer, C, in combination with the drop partition or curtain, a, a, substantially in the manner set forth.

56,226.—FRUIT-JAR.—Josee Johnson, New York City:

I claim, 1st, The semi-ring, C, and cross-strap, C′, arranged to operate relatively to the body and cover of a self-sealing can or jar, substantially as herein specified.

2d, The partial spirals, b1, b2, arranged opposite to each other on the cover, in combination with a securing piece, C, C′, substantially as and for the purpose herein set forth.

56,227.—HORSE-RAKE.—E. O. Jones, Oakwood, Mich.:

I claim, 1st, The standards, C, C, grooved, as described, to receive the slotted ends of the levers, F, F, when used with the said levers and the rake-shaft, as and for the purpose specified.

2d, The levers, F, F, provided with the slotted arms, G, G, when used to catch the ends of the rake-teeth, as and for the purpose specified.

56,228.—WATER ELEVATOR.—Samuel F. Jones, St. Paul, Ind.:

I claim, 1st, Operating the valve, S, through the medium of the standard, o, and pendant, g, when constructed and arranged substantially as shown and described for the purpose set forth.

2d, In combination with the foregoing standard, o, and pendant, g, I claim the spouts, x and D, and the screen, T, when constructed and arranged as shown and described for the purpose set forth.

56,229.—EXCAVATOR.—Daniel Judd, Hinsdale, N. Y

I claim, 1st, The combination of the excavator, E, with side supports, d, and frame, A, substantially as described.

2d, Constructing the ends of the excavators with gudgeons, c, c, and stops, e, e, substantially as described.

3d, The forked guides, h h, applied to the excavator, in combination with the flanged pulleys, j, j, applied to the winding-shafts, G, substantially as described.

4th, The combination of the pawl and pinion applied to a vibrating arm with the excavator, E, spur-wheel, K, and shaft, G, substantially in the manner and for the purpose described.

56,230.—BEE-HIVE.—Julius J. Justin, Milwaukee, Wis.:

I claim the combination of the boxes, A, B, slotted as described, slats, G, and projecting guards, H, arranged and operating in the manner and for the purpose herein specified.

56,231.—DIAMOND-HOLDER.—J. E. Karelsen, New York City:

I claim a diamond-holder composed of a tube, A, provided with two sleeves, b, f, moving in notched slots, d, g, and containing the head, B, and the glass breaker, C, as a new article of manufacture.

56,232.—COOKING APPARATUS.—A. C. Kasson, Milwaukee, Wis.:

I claim, 1st, A cooking apparatus composed of a close box, capable of being thrown open as above shown, having openings in its bottom which are provided with flanges that fit in the boiler-holes of a stove or range, substantially as described.

2d, The box, A, made substantially as described with flanged openings on its bottom and with a hinged cover at its top, in combination with the perforated plate, H, substantially as shown.

3d, The combination of the box, A, the perforated plate, H, and the clock-work which gives rotary motion to said plate, substantially as above described.

4th, The adjustable bearing-bar, L, in combination with the roughened hub, J, of the revolving plate, H, substantially as described, for the purpose of supporting and revolving a coffee-roaster or other cylindrical article.

56,233.—OILER.—John King, Ansonia, Conn.:

I claim the combination of the oil vessel, A, tube, E, having plunger or piston, H, and discharge-spout, F, when said plunger is connected to a lever, M, or its equivalent, and the whole together is constructed and arranged so as to operate substantially in the manner described and for the purpose specified.

56,234.—OIL WELL TUBE.—Obadiah B. Latham, Seneca Falls, N. Y.:

I claim, 1st, The cylinder, C, and band, i, varying from a true circle and arranged in relation to the cylinder, H, and an external packing device, substantially as and for the purpose described.

2d, The sac, f, when used in combination with the parts, H, F, G, E, D and d, as and for the purpose set forth.

3d, The chisel, G, when used in combination with the described apparatus, for the purpose set forth.

4th, The whole apparatus arranged as described.

56,235.—PARING KNIFE.—Jacob Lebeau, Cincinnati, Ohio:

I claim, 1st, The combination of the handle, A, B, and blade, E, when the latter is adjustable on the former in its own plane, substantially as and for the purposes set forth.

2d, The combination of the gauge-piece, D, with the handle, A B, and blade, E, substantially as and for the purposes set forth.

3d, The scoop, G, in combination with the blade, E, and handle, A, B, as and for the purposes specified.

56,236.—CORN HARVESTER.—C. M. Lightner, Harrisburg, Pa.:

I claim, 1st, The platform provided with openings as shown, and having the knives, c, attached, in combination with the centrally located revolving knives, f, arranged and operating as shown and described.

2d, The combination and arrangement of the pivoted-bar, D, having the bent bars, o, attached as shown with the hook, m, all arranged to operate as set forth.

56,237.—GRAIN SEPARATOR.—Andrew J. and Henry Linebarger, Jackson, Ill.:

We claim the shaker, a, in combination with the rake-heads, g, constructed and operating substantially as described.

56,238.—WASHING MACHINE.—James Lochridge, Danville, Ind.:

I claim the combination of the rubbing-board resting upon springs, the movable rubber, 9, with the rollers, 1, 2, 3, and springs, 8, 8, and strips, 6, 6, for the purpose and in the manner specified.

56,239.—MACHINE FOR DRILLING AND COUNTERSINKING UMBRELLA-TIPS.—James W. Lyon, Brooklyn, N. Y.:

I claim, 1st, The stationary pusher and the hopper with its rear entrance, bottom groove, and short tube in front, in combination with the sliding-frame and main-frame, or shears, substantially as described.

2d, The combination of the holding mechanism with the feeding mechanism and the sliding-bed of a lathe, the mechanism and combination being such, substantially as herein described, as to grip and hold the blank, during the forward movement of the sliding-bed, to release and discharge the finished blank, and feed a new blank during the back motion of the sliding-bed.

3d, In combination with the socket-drill on the main-frame, or shears, I claim the cross-drill for drilling and countersinking the cross holes, when combined with the sliding-bed and operated by cams on the main frame, substantially in the manner described.

4th, In combination with the socket-drill on the main frame, I claim the feeding mechanism and the transverse or cross-drilling mechanism, the whole being arranged and combined substantially as herein-before described to feed, hold, drill, countersink, and discharge blanks supplied to the machine by the back and forward motions of the sliding bed, substantially as set forth.

56,240.—AUTOMATIC GAS COCK.—Charles MacRae, New York City:

I claim, 1st, Operating an ordinary gas cock by means of a spring, or its equivalent, applied directly to the cock, substantially as and for the purpose set forth.

2d, In combination with a gas cock, operated as above described, I claim the stop-wheel, G, and pawl, f, so arranged as to be released by the movements of the clock-work, substantially as herein described.

3d, In combination with a gas cock operated as described, I claim the hands, b and c, arranged to operate as and for the purpose set forth.

4th, The stationary dial provided with the two graduated circles in combination with the hands, b, c and d, when said parts are arranged to operate in connection with a gas cock, operated as herein described.

56,241.—CORN-CAKE MACHINE.—William Manning, Chelmsford, Mass.:

I claim, 1st, The stationary knives, c, and adjustable clearers or hoops, e, as herein described and for the purpose set forth.

Also, the former, 1, in combination with the adjustable clearers or hoofs, e, and knives, c, for the purpose specified and in the manner set forth.

56,242.—STEAM ENGINE.—James R. Maxwell and Ezra Cope, Cincinnati, Ohio:

We claim, 1st, The piston-head of a steam engine longer than its stroke, in the manner and for the purpose herein described.

2d, The piston-head of a steam engine longer than its stroke, with channels and ports in its sides, in combination with a cylinder having corresponding added length and ports leading to and from the main steam valve, in the manner and for the purpose substantially as described.

3d, The cylindrical piston-valve, C, with closed ends, and steam openings through its sides and bottom whereby to operate within the main piston, substantially as described.

4th, The independent steam pipe and valve, P, P, for admitting steam to the main piston, B, in cylinder, A, in the manner and for the purpose herein described.

56,243.—ARTIFICIAL LIMB.—Abner McOmber, Schenectady, N. Y.:

I claim, 1st, Giving a yielding bearing to the lower end of cord, U, by means of the elastic band, g, and vibrating bar, substantially as above set forth.

2d, Placing the elastic band, g, and vibrating bar, e, in a movable frame, d, and also fitting said frame in a cavity, G, in the ottom of the foot, substantially as shown.

3d, Bushing the hinges of artificial limbs with divided bushings, Y, of lignum vitæ or other hard wood, and taking up the wear of the bushing by means of a wedge, Z, operated substantially as above described.

56,244.—EMBOSSING PRESS.—J. C. Merriam and W. N. Weeden, Boston, Mass.:

We claim, 1st, The combination and arrangement of the channeled guide-arm, F, and its adjusting screws, with the dies, A, B, and their stationary and movable arms, C, D, applied together substantially as specified.

Also, the arrangement of the elevating screw, a, of the movable die-arm, viz., in the guide-arm, combined and arranged with the stationary and movable arms of the two dies, as set forth.

Also, the arrangement of the sheet-receiving recess or space, G, with the guide-arm, the dies, and their supporting arms, arranged and combined substantially as specified.

56,245.—LAMP BURNER.—Rufus S. Merrill, Boston, Mass.:

I claim, 1st, The combination in a fluid-burner, and with a collecting chamber surrounding the wick-tube, of an extinguisher or cap under the arrangement, and for operation substantially as herein-before set forth.

2d, Forming the collecting chambers of a conical jacket secured to a concentric sleeve adjustable by friction upon the wick-tube by means of an annular partition-plate, substantially as and for the purposes herein set forth.

56,246.—GRINDING MILL.—James W. Miles, Hubbardston Village, Mich. Ante-dated July 3, 1866:

I claim transmitting motion from the driving power through the mill-spindle to the runner by means of jointed driving-bars, F, operating tangentially against elastic bearings, D, or their equivalent, substantially in the manner and for the purpose as herein described and set forth.

56,247.—BOLT HEADING MACHINE.—James Minter, Lowell, Mass.:

What I claim as new is the notches, a, n, on the carrier, H,

operating in conjunction with the driver, D, or their equivalents whereby the same end is accomplished, substantially as above set forth and described.

56,248.—SAFETY POCKET.—George A. Mitchell, Turner, Maine:

I claim, 1st, A pocket made capable of expansion and contraction by the provision of folds in its sides and bottom and provided with metallic protectors as defensive armor, constructed and arranged substantially as and for the purpose specified.

2d, In combination therewith I claim the yielding cover, constructed and arranged substantially as described.

56,249.—STOCK-YARD.—Alvan Morley, Delaware township, Iowa:

What I claim as my invention is the construction of a stock-yard or grazing-pen, constructed substantially as and for the purpose specified, and named a "self-moving stock-yard."

56,250.—LAMP-WICK REGULATOR.—Hermann Mund and Erdmann Hoffmann, Chicago, Ill.:

We claim the wick-controller, g, constructed and applied to the burner, in the manner and for the purpose herein set forth.

56,251.—PENCIL-HOLDER.—L. B. Myers, Elmore, Ohio:

I claim an elastic socket capable of receiving and adjusting itself to hold a leadpencil of larger or smaller size, and having a hook or suitable device or means for securing it to the garments of a person, constructed and operating substantially as specified.

56,252.—APPARATUS FOR CLEANING BOOTS AND SHOES.—S. M. Newbury, Sparta, Wis.:

I claim an apparatus for cleaning boots and shoes, formed by combining the hinged clasp, A, C, D, with the brush, H, the whole being constructed and arranged substantially as described and for the purpose set forth.

56,253.—NECK-TIE.—James W. Navman, Boston, Mass.:

I claim 1st, The neck-tie consisting of the parts, A, B, B′, B″, and B‴, in combination with the supporter, C, secured together by the parts, D, D′, substantially as described.

2d, In combination therewith, I claim the elastic-loop, F, applied substantially as described.

56,254.—PLANING MACHINE.—Daniel Niles, Fly Creek, N. Y.:

I claim planing tapering shingles on one side by means of the revolving-cutter in fixed bearing, and feeding the shingles to such cutter upon a hinged adjustable frame, with feed-rollers that are in yielding bearings, and arranged to operate substantially as described and for the purpose set forth.

56,255.—GRAIN-DRYER.—Joshua Norton, 3d, Chicago, Ill.:

I claim, 1st, The concentric, now perforated, cylinders, C and c, having the ribs or flanges, F, attached thereto, as shown and described.

2d, In combination with the cylinder constructed as described, I claim the stationary-head, I, constructed and operating as set forth.

56,256.—RAILROAD-SWEEPER.—Edward A. F. Olmstead, New York City:

I claim, 1st, The arrangement of the brush-bars, in combination with the arms, S, and shaft, O, as described.

2d, The combination of the brush-bars, arms, U, and shaft, P, in the manner and for the purpose herein represented and described.

3d, The arrangement of the rods, W, levers, X, and screw-block, B, in combination with the shaft, P, bearing in the slotted arms, M, N, in the manner and for the purpose herein described.

4th, The combination of the scraper, F, rods, G, H, arm, I, lever, M, in the manner and for the purpose herein described.

5th, The arrangement of the brooms, R, T, gearing, O′, P′, R′, S′, brooms, V′, W′, pulleys, A2, B2, in combination with the frame, A, and wheels, E, F, G, H, constructed and operating in the manner and for the purpose herein specified.

56,257.—BURR BOX FOR BURRING MACHINES.—Ziba Parkhurst, Milford, Mass.:

I claim the improved burr-receiver or box, as provided with one or more guards, B, C, D, whether stationary or adjustable, and arranged substantially as herein-before described, the same being to arrest the waste filaments of fibrous material, so that they may be caused to fall back upon the burring machine, while the burrs or foreign matters are in the act of being discharged into the box.

I also claim the combination and arrangement of the lip, E, with the box and its guard or guards, as specified.

56,258.—MACHINE FOR TWISTING AND WINDING FIBERS.—Homer Parmelee, Philadelphia, Pa.:

I claim, 1st, The two rollers, E and E′, arranged to revolve on their own axes, and around a given center, in combination with a trough, D, or its equivalent, for receiving the fiber, the whole being arranged and operating substantially as and for the purpose herein set forth.

2d, The rollers, E and E′, each being composed of a block, w, with a central cavity, x, and a tube, y, of gum elastic, or equivalent material, substantially in the manner and for the purpose described.

3d, The combination of the rollers, E and E′, and the levers, 4 and 4′, or their equivalents, whereby the simultaneous inward and outward adjustment of the two rollers is attained.

4th, The said rollers, E and E′, and levers, 4 and 4′, in combination with the tubular shaft, F.

5th, The combination of the barrel for winding the strand of twisted fibers, with the wheels, M, the latter being arranged to guide the strand in a direct course, all substantially as and for the purpose described.

6th, The said wheels, M, and the train of wheels, L, I, I′ and I‴, or any equivalent train of wheels, in combination with the arm, J.

7th, A barrel arranged to revolve on and to traverse longitudinally an axis situated obliquely to the course taken by the guided strand, all substantially as and for the purpose described.

8th, The shaft, R, on which the barrel turns and traverses and the levers, q and q′, or their equivalents, in combination with the cams, R′, on the said barrel and the stops, R″ and R‴, the whole being arranged and operating substantially as and for the purpose specified.

9th, The barrel composed of the tube, P, cut longitudinally, and the heads, Q, Q, on applying which to the tube the latter is expanded, the contraction of the tube taking place on detaching the heads, all substantially as and for the purpose herein set forth.

56,259.—SOAP.—C. C. Parsons, Boston, Mass.:

I claim, as a new manufacture, soap in which the described petroleum residuum is one of the ingredients.

56,260.—MACHINE FOR DIGGING POTATOES.—Hollis M. Peavey, Swanville, Me.:

I claim the combination as well as the arrangement of the compound hoe, G, and its operative mechanism, with the scoop, E, and the vibratory separator, F, applied to a wheel-carriage and provided with mechanism for operating the said separator, as explained.

56,261.—BUTTON.—Clark M. Platt, Waterbury, Conn.:

I claim the button formed of a single piece of metal with the edge turned over and with one central hole as a new article of manufacture, as specified.

56,262.—BURGLAR ALARM.—H. H. Potter, Carthage, N. Y.

I claim the bell, C, or its equivalent, lever, I, having toothed arm, I′, bell-hammer, D, and springs, G and K, when arranged and combined together substantially as described and for the purpose specified.

I also claim the slotted upright, M, of the bed-plate, A, as and for the purpose described.

56,263.—MANUFACTURE OF CRUET BOTTLES.—William Pountney, Brooklyn, N. Y.:

I claim, 1st, Combining the plunger, E, and lip and mouth former, G (made or united in one piece), with the jaws, B, B, the said part, G, having a rotatory motion with the cruet bottle back and forth, arranged and operating substantially in the manner and for the purposes described.

2d, The combining and uniting the lip and mouth-former with the neck-former or plunger in one piece.

3d, The construction of the stopper-mold with a sliding bottom, plunger, or plug to push up the stopper by pressing with a lever, combined and operating in the manner and for the purposes described.

56,264.—KNIFE-SHARPENER.—Joel B. Pratt, Corning, N. Y.:

I claim the arrangement of the wheel with the standard, the bevel-wheel resting by its axle on a wooden frame and lapping two upright metallic posts, all arranged and combined as set forth.

56,265.—SNAP-HOOK.—J. Quinn and C. Summers, Columbus, Ohio:

We claim as a new article of manufacture the within-described snap-hook, constructed, arranged, and operating substantially as set forth.

56,266.—ATTACHMENT TO COOKING-STOVES.—Rowland I. Rathbun, Poplar Ridge, N. Y.:

I claim the combination with the stove of a shelf, C, constructed and arranged so as to accomplish the purposes specified.

56,267.—WINDOW-BLIND.—W. F. Redding, Saratoga Springs, N. Y.:

I claim the combination of the spindle, G, having collar, H, and spiral spring, F, when arranged in and connected to the slat and frame of a blind, substantially as and for the purpose described.

56,268.—MACHINE FOR CAPPING TACKS.—John C. Rhodes, East Bridgewater, Mass.:

I claim the combination of the rotary frame, A, and its dies, C, plungers, D, their springs, E, E, and clearers, g, and their operative mechanism with the stationary cam, G, the whole being arranged substantially in manner and so as to operate as and for the purpose herein-before described.

I also claim the combination of the rotary frame, A, and its dies, C, plunger, D, and clearers, g, with the stationary cam, G, and the spring, h, and stud, i, to operate as specified.

56,269.—TIRE MACHINE.—George T. Ridings, Shelbyville, Mo.:

I claim the combination of the block, A, B, with the eccentric clamp, C, when employed as and for the purpose set forth.

56,270.—ROTARY TIRE-HEATER.—George T. Ridings, Shelbyville, Mo.:

I claim, 1st, The arrangement of the above described tire-holder and drum in a vertical position, the tire-holder turning on a horizontal axis, and the whole operating in combination with a common forge-fire, substantially as set forth.

2d, The combination and arrangement of the adjustable tire-holder with the drum by means of the pillow-blocks, D2, and pawls, t, and the adjustable plates, g, as and for the purpose set forth.

3d, The combination and arrangement of the spodes, a1 and a3, and the segmental plate, b, with the endless screw, c1, and wheel, c2, as and for the purpose set forth.

56,271.—RAILWAY-FROG.—Addison Robbins, Orange, Mass.:

I claim the combination as well as the arrangement of the movable angle piece, G, and auxiliary rails, C, D, and their stopping devices applied together, substantially as described, with the crossing rails of the main and turnout tracks, as specified.

56,272.—TOBACCO-PIPE AND CIGAR-HOLDER.—G. M. Ross and Wm. H. West, New York City:

We claim, 1st, The combination of the pipe, A, and cigar-socket or holder, E, substantially in the manner and for the purpose specified.

2d, The enlargement, b, of the bore or smoke passage, c, c, of the stem, B, as and for the purpose herein specified.

56,273.—HAY-STACKER.—C. Rundell, Chicago, Ill.:

I claim, 1st, The herein described tubular stack-pole, consisting of the sections, A, A′, D, the same being constructed and operating as and for the purpose set forth.

2d, The plate, B, in combination with the sections, A and D, as and for the purpose specified.

56,274.—COTTON-SEED PLANTER.—John L. Russell, Pella, Iowa:

I claim, 1st, The wedge-shaped furrow-opener, F, suspended in an adjustable manner by steadying-studs, g, g′, and adjusting screws, H, H, and having a rotating trash-cutter, f, substantially in the manner and for the purpose set forth.

2d, The teeth or small shovels, m, in connection with and occupying a position between the furrow-opener, F, and the closing-roller, N, substantially as and for the purpose described.

3d, The tooth-rollers, C and D, with or without the flaring ends, c′, c′, d,′ d′, arranged one above the other in the seed-box, and operating as shown and explained, substantially in the manner and for the purpose specified.

4th, The sliding-roller and frame, N, n, scraper, p, elevating-lever, q′, and stop-chain, e, arranged and operating as shown and explained.

56,275.—WATER-ELEVATOR.—Jonas Rymond, Erwinna, Pa.:

I claim the combination of the crank, D, with the ratchet-wheel, B, the hub, E, and the spiral-brake spring, C, constructed and arranged as and for the purpose herein described.

56,276.—DISTILLING PETROLEUM.—Wm. H. Sangster and Theo. C. Spencer, Buffalo, N. Y.:

We claim, 1st, The combination of the tank, Fig. 2, or its equivalent the tube, C, and faucet, E, with a still for distilling petroleum, when constructed as and for the purposes herein substantially set forth.

2d, We claim the method herein described of condensing the vapor of petroleum by passing it directly through the water.

56,277.—HARNESS BELL.—Rudolph Schmidt, New York City. Ante-dated June 26, 1865:

I claim, 1st, Forming the spring for the clapper of flat pieces of metal, in the manner and for the purposes specified.

2d, Constructing the clapper with three or more radiating arms, in combination with the spring carrying such clapper, as specified.

56,278.—BED-BOTTOM.—Heber G. Seekins, Elyria, Ohio:

I claim the rollers, B, provided with mortises, a, arranged in an ascending and descending series, as and for the purpose described, in combination with cords, C, and pawl and ratchet, D, all substantially as described.

56,279.—RAILROAD RAIL.—J. W. Shiveley, New York City:

I claim, 1st, Providing the rail-ends with angular tongues, a, a, a, a, and angular recesses, b, b, b, b, when fitted and operating together as herein shown and described.

2d, The combination with the above-mentioned tongues and recesses of the double-check and lock-bar, C, substantially as herein shown and described.

3d, The combination of the said tongues, recesses, and check-bar with the chair, A, substantially as herein shown and described.

4th, The recesses, h, h1, h2, in combination with the rails, the check-pieces, and the chair, substantially as and for the purpose herein shown and described.

56,280.—HORSE-SHOE MACHINE.—Jacob Shinneller and John Brislin, Temperanceville, Pa.:

We claim, 1st, The revolving disk, w, provided with die, s, and clamp, y, when used in combination with the adjustable guide, J, or its equivalent, as herein described and for the purpose set forth.

2d, The lever, g, provided with the swedging and punching die, 8, and cutter, 6, when used in combination with the revolving disk, w, die, s, clamp, y, and guide, J, as herein described and for the purpose set forth.

3d, The cam, i, provided with the lug, 11, when used in connection with the lever, g, and the press tool, 4, as herein described and for the purpose set forth.

4th, The disk, o, and spring, p, when used in combination with the wheels or gear, m and n, as herein described and for the purpose set forth.

5th, The feeding-guide, l, provided with friction roller, X, when used in combination with the cam, k, spring, u, and disk, w, provided with die, s, and clamp, y, as herein described and for the purpose set forth.

56,281.—MODE OF SECURING AXES ON THEIR HANDLES.—George W. Simonds, Lynnfield, Mass.:

I claim the combination of the expander, C, the screw, D, and the step, E, applied to the tapering-chamber, B, of the axe helve, the whole being arranged and so as to operate substantially as specified.

56,282.—WINDOW BLIND.—A. P. Smith, Sterling, Ill.:

I claim connecting the slat-rod, D, to the blind-frame, through a catch and rack or notched bar, when all are arranged together, and so as to operate substantially in the manner described and for the purpose specified.

56,283.—HARNESS FOR HORSES.—Hector Craig Smith, Dublin, Ind.:

I claim, 1st, The hitching device consisting of a link composed of the following members, to wit, the horizontal bar, E, vertical end rods, F, G, and hitching-pin, H, together with their accessories or devices, substantially equivalent, all arranged to operate in the manner and for the purpose herein described.

2d, In combination with the elements of the preceding clause, I also claim the cross-head, K, and springs, I, j, or their mechanical equivalents, for the object explained and set forth.

56,284.—REVOLVING HOSE NOZZLE.—Isaac Smith and W. D. Tewksbury, New York City:

We claim the double oblique swivel-joint, so constructed that the tip is susceptible of arrangement at an acute or other angle, or in a right line with the body, or that it may be adjusted tangentially to the circumference of the body, in combination with the revolving collar, F, on the body of the nozzle, substantially as and for the purposes specified.

56,285.—STREET-SCRAPER.—Mathias Smith, Lake, Ill.:

I claim, 1st, The combination of the adjustable scraper, H, the guides, F, and lever, J, arranged and operating substantially as and for the purposes set forth.

2d, In combination with the said adjustable scraper, H, I claim the employment of the adjustable side-boards, L, arranged as and for the purposes described.

56,286.—CULTIVATOR.—E. M. Sorley, Neenah, Wis.:

I claim, 1st, The jointed adjustable cross-bar, B, with arms, b, b, in combination with the shifting braces, c, c, c, c, and the side frame, A, constructed and arranged substantially as and for the purposes herein described.

2d, The construction and arrangement of the shifting screw-headed and saber-shaped harrow teeth or cultivators with hollow backs, in combination with the frame, A, and the adjustable center cross-bar, B, with its draught-arms, b, b, applied and operated as herein stated.

56,287.—COFFIN.—Henry D. Sprague, Portland, Maine:

I claim, 1st, The attachment of a mirror to the lower side of the described kind of coffin-lids, as and for the purposes set forth.

2d, The combination of the jointed lid, brace, and mirror, in the manner and for the purpose set forth.

56,288.—CULTIVATOR.—Esen Starr, Royal Oak, Mich.:

I claim, 1st, The curved or segment-bar, B, at the rear end of the beam, A, in combination with the curved standards, J, J, provided with upper bent ends, a*, to abut or fit snugly against the rear side of said bar, B, and to which they are secured by bolts, substantially as shown and described.

2d, The standard, F, bent or curved as shown and secured in position by a brace rod or bar, H, from the beam, A, substantially as and for the purpose specified.

56,289.—CULTIVATOR.—D. C. Stover, Lanark, Ill.:

I claim the arrangement of the uprights, c, c, and bar, d, with the pendant bars, J, J, and plow-beams, D, D, L, L.

56,290.—PACKAGE-CASE FOR PLANTS.—P. L. Swine, Shirleysburg, Pa.:

I claim a package-case made substantially as herein described for the purposes specified.

56,291.—PROCESS FOR REMOVING VEGETABLE MATTER FROM WOOL.—William Sykes, Glenham, N. Y.:

I claim the described process consisting in plunging the wool into an acidulous solution, followed by treatment of lime-water and subsequent drying.

56,292.—MANUFACTURE OF BELTING, HOSE, ETC.—William A. Torrey, Mont Clare, N. J.:

I claim the combining and applying of the india-rubber and gutta-percha compounds, substantially in the manner and for the purposes above set forth.

56,293.—CANDLE-HOLDER.—Julius Verch, Albany, N. Y.:

I claim, 1st, The suspension of the candle-holder, E, with its apparatus by the chains, a, a, and the bands, c, c, with their springs, e, e, as described.

2d, The candle-tube, H, entirely closed on the sides and bottom, with its basin, h, serving to prevent the access of grease dripping to the spring, S, as described.

3d, The method of securing the cap, M, to the candle-tube, H, by the screw-collars, f and k, in the manner and for the purpose described.

4th, The combination of the outer tube, E, the candle-tube, H and the cap, M, with the globe, T, and its attachments to the candle-holder, in the manner and for the purpose described.

56,294.—BALING HAY.—Roswell Wakeman and Jas. L. Ballance, Port Deposit, Md.:

We claim putting up short cut hay or straw into compact bales for feed, substantially in the manner herein described and for the purposes set forth.

56,295.—CULTIVATOR.—G. W. Warren, Macomb, Ill.:

I claim, 1st, The inner frame, pivoted at its rear end to the main frame having the two rear plows attached permanently thereto, and having the pivoted bars, T, secured to it in the manner shown.

2d, The long standards, I, having the front shovel attached

thereto secured to the pivoted bars, T, underneath the axle and frame, and arranged as set forth.

3d, The screw, e, arranged to adjust the depth of the plow, in the manner shown and described.

56,296.—PLOW-CLEANER.—Oscar F. Warren, Pembroke, N. Y.:

I claim, 1st, The adjustable levers, O, G, F, so connected and arranged that the clearing lever may be operated either in front of a culter or in front of the plow standard, for the purpose and substantially as set forth.

2d, Connecting the operating lever, O, to the plow-handle, and within easy and convenient grasp of the hand of the plowman, so that the said operating lever will also serve as a handle to guide and hold the plow, substantially as set forth.

56,297.—WIND WHEEL.—Joseph C. Wate, Wilton Junction, Iowa:

I claim the wind doors, A, in combination with the springs, D, and brake, K, substantially as herein specified.

56,298.—PLOW.—George Watt, Richmond, Va.:

I claim, 1st, The frame, a, a, b, i, cast in one piece, and constructed as described, in combination with the mold-board, e, land-side, g, and point, k, the whole being constructed and operating in the manner and for the purposes set forth.

2d, The curved beam, c, which is constructed to impinge upon the frame behind the central point of resistance of the mold-board, substantially as described.

3d, The beam, c, in combination with the brace, m, and adjustable clamps, n, for affording lateral adjustment to throw the plow in and out of land, substantially as described.

4th, In combination with the curved beam, c, I claim the slotted block, b′, key, c″, and wheel journaled to and between the plow-handles, substantially as described.

5th, The wheel, d′, journaled to and between the plow-handles, substantially as described.

56,299.—DITCHING MACHINE.—J. S. Weaver, Dayton, Ohio:

I claim, 1st, The combination of the arch or frame, E, with the sills, F, G, the forward axle, C, the king-bolt, I, and friction-wheel, H, the parts being constructed and arranged substantially as described and for the purpose set forth.

2d, The combination of the guide-wheel, L, standard, K, and lever, M, with each other, with the frame of the machine, and with the forward axle, C, substantially as described and for the purpose set forth.

3d, The combination of the cog-wheel, X, with the rear axle, D, and with the elevator-belt, W, constructed and arranged substantially as described and for the purpose set forth.

4th, The combination of the crank-wheel, C′, and pinion-wheels, B′, with the toothed side-bars, S and T, of the elevator, substantially as described and for the purpose set forth.

5th, The combination of the guide and stiffening-bars, P and R, with the side-bars, S and T, of the elevator, and with the inclined grooved side-bars, N and O, of the frame of the machine, substantially as described and for the purpose set forth.

6th, The combination of the index, G, dial, H′, and cog-wheel, D′, with the pinion-wheel, B′, substantially as described and for the purpose set forth.

7th, The combination of the spring, F′, and catch, E′, with the cog-wheel, D′, substantially as described and for the purpose set forth.

8th, The shovel or cutter, I′, constructed as described, in combination with the side-bars, S and T, of the elevator, substantially as described and for the purpose set forth.

56,300.—SHEEP RACK.—Allen A. Webster, Fremont, Ind.:

I claim, as my invention and improvement in a sheep rack and cattle-feeding rack, the rack-pins denoted in the accompanying drawing and referred to in the foregoing specification by the letters E, E, E, E, E, E, E, E, E, E; and these rack-pins meeting and constructing shelter-tables, B, B, appearing in draught and specification, and also feed-drawers, denoted in the accompanying drawing and referred to in the foregoing specification by the letters A, A.

56,301.—RAILROAD CAR.—R. T. M. Wells, Roxbury, Mass.:

I claim the ratchet, D, keyed on the front axle, B, of the truck and encompassed by a segment, F, placed loosely on said axle, in combination with the pin or pawl, b, slide-bar, H, springs, J, J′, one or more, and the chains, I, I′, all arranged to operate in the manner substantially as and for the purpose set forth.

56,302.—CAR-BRAKE.—Edward Whitehead, Cincinnati, Ohio:

I claim a car-brake adapted to embrace the rails of the track, constructed substantially as described, of clamps, E, F, G, H, hinged as shown, and operated simultaneously by means of nut, M, and screw, N, as set forth.

56,303.—PAVEMENT.—Edward Whitehead, Cincinnati, Ohio:

I claim, 1st, The combination of the wooden paving-blocks, constructed as herein described, with upper members, A, lower members, A′, shoulders, C, and ledges, B, all arranged and adapted to operate as and for the purposes specified.

2d, The arrangement of congeries of wooden blocks, A, A′, C, B, with the metallic frame-curb or casing, D, D′, d, as set forth.

56,304.—PITMAN-HEAD AND CRANK-WRIST BOX FOR HARVESTING MACHINES.—Wm. M. Whitely, Jr., Springfield, Ohio:

I claim, 1st, The chilled box pitman-head, K, constructed with the internal screw, k, in combination with the jam-nut, L, and pitman-rod, M, substantially as described.

2d, The pitman-head, K, when cast in one piece over a taper chilled pin and provided with the internal screw, k, in combination with the jam-nut, L, pitman-rod, M, and chilled hollow spindle, A, substantially as described.

56,305.—MEAT AND VEGETABLE CUTTER.—E. P Whitney, Stamford, Conn.:

I claim the arrangement of the knives, D, with slots, d, screws e, lances, E, in combination with the disk, A, constructed and operating in the manner and for the purpose herein specified.

56,306.—LUBRICATING APPARATUS.—J. L. Wiggin and E. Folsom, South New Market, N. H.:

We claim the shaft lubricating apparatus, made in manner and for application to a shaft bearing or box, substantially as herein-before described.

56,307.—HORSE-SHOE.—Albert S. Wilkinson, Pawtucket, R. I.:

I claim, 1st, Hinging the bar, C, to the bar, A, by means of the tapering rivet, g, and washer, f, let into the upper surface of the bar, C, all substantially as described and indicated in sheet 1 of drawings.

2d, The combination of the bar-clips, d, d, with a toe clip, a, heel clips, e, e, and one or more hinge joints, g, g, substantially in the manner and for the purpose set forth.

56,308.—HORSE-SHOE.—Albert S. Wilkinson, Pawtucket, R. I.:

I claim, 1st, The method herein described for protecting the expanding screw, e, from injury, viz.: the attaching of the expanding screw to the clips above the shoe, and also the locating of said screw in between the heel clips, substantially in the manner and for the purpose specified.

2d, The combination of the shoe, A, A, heel clips, C, C, bar clips, D, expanding-screw, e, jam-nuts, f, f, in the manner and for the purpose represented and described.

3d, The combination of the curved heel clips, C, C, and bar clips, D, D, substantially in the manner and for the purpose set forth.

56,309.—HORSE-SHOE.—Albert S. Wilkinson, Pawtucket, R. I.:

I claim a continuous clip, B, B′, b, constructed as described, in combination with the notched bar, A, the whole being constructed and operated substantially in the manner and for the purpose set forth.

56,310.—HORSE-SHOE.—Albert S. Wilkinson, Pawtucket, R. I.:

I claim, 1st, The combination of the toe-calks, b and b3, with the plate, B, when connected with and attached to the shoe, in the manner described.

2d, Locating the toe-calk at the inner edge of the shoe, when constructed and applied in the manner described.

56,311.—ANVIL FOR MAKING HORSE-SHOES.—Albert S. Wilkinson, Pawtucket, R. I.:

I claim the shaping anvil, A, a, in combination with the studs or projections, B, b, the whole being constructed and operated substantially in the manner and for the purpose set forth.

56,312.—MACHINE FOR LABELING SPOOLS.—Aaron W. C. Williams, Hartford, Conn.:

I claim, 1st, The recesses, *, in the carrier, B, arranged relatively to the feeder, C, and the roller, D, substantially as and for the purpose herein set forth.

2d, The combination of the carrier, B, carrying the spools in succession, as specified, with the labeling device, G, adapted to present the labels thereto, substantially as and for the purpose herein set forth.

3d, The label-holder, G, in combination with the mechanism represented, or its equivalent, for rendering its action automatic, substantially as herein specified.

4th, The pressing-roller, I, in combination with the spool-carrier, B, labeling device, G, sizer, D, and spool-feeder, C, substantially as and for the purpose herein specified.

5th, The inclined surface, J′, on the vibrating-arm, J, in combination with the label-carrier, G, spool-carrier, B, and recesses, b, arranged as represented, so as to hold the spool-carrier firmly in position while the label is applied, and liberate it by the retreat of the label-carrier to allow the succeeding spool to be presented, substantially as herein specified.

6th, The catch, K, in combination with the spool-carrier, B, lever, J, and label-carrier, G, adapted to operate substantially as and for the purpose herein specified.

56,313.—DIE FOR FORMING BEADS ON THE EDGE OF SHEET-METAL VESSELS.—Samuel R. Wilmot, Bridgeport, Conn.:

I claim, 1st, The dies, A, B, constructed, arranged, and operating substantially as specified.

2d, The groove, c, in the die, B, formed as described, and acting in connection with the recess, a, of the die, A, for turning the edge of the blank, substantially as set forth.

3d, The combination of the elastic presser, C, with the dies, B and A, substantially as herein set forth for the purpose specified.

56,314.—PUMP PISTON.—David S. Wood, Delavan, Wis.:

I claim the two part loose packing, D, in combination with the channel, L, J, M, and the piston-head, B, substantially as and for the purpose specified.

56,315.—WHEEL VEHICLE.—G. B. Woodward, Bolivar, N. Y., and M. L. Smith, Scio, N. Y.:

I claim, 1st, The combination of the box, C, cast with the end-piece, b, central-piece, a, end-piece, b′, and nut, B, both end-pieces being provided with a flange, d, all constructed and operating in the manner and for the purpose herein specified.

2d, The spokes, C, secured to the felloes and part, a, of the hub as shown, when used in combination with the flanges, d, at the inner ends of the parts, b, b′, substantially as and for the purpose specified.

56,316.—GRAIN SEPARATOR.—James Woolener, Peoria, Ill.:

I claim, 1st, Opening the side of the shaking shoe like a door hung on hinges, and closing it and holding it firmly by means of the two rods at the top and bottom with nuts and screws as shown at m, m, Fig. 1, the rods and nuts are shown at k, k and l, l, Fig. 1, the section of which is shown at k, l, m, Fig. 7, thus holding the screens when inserted firmly in any desired position without slides or wedges or grooves.

2d, The metallic strip connecting the screens together as shown at a, Fig. 9, allowing the screens to change their relative position as shown by the dotted lines, a, b and a, c, Fig. 9, and allowing one or more of the screens to be removed by passing the head of the screw through the slot, as shown at a, Fig. 9.

3d, The arrangement of the two elevators, C and D, with the shoe, N, and box, E, as constructed for the purpose of more effectually separating and conveying away from the machine the different grades of seed, as is herein fully set forth.

4th, The flange roller shown at Fig. 10, to support and carry the shaking shoe, A, Fig. 1, as shown at c, d, Fig. 1.

5th, The position of the screens in the lower shaking shoe, N, as indicated by the dotted lines, the lower screen, L, being pushed down as far as the dotted line, g, and delivering its grain into the box, E, and the upper screen, K, being pushed down as far as shown by the dotted line, f, and delivering the superior grade of grain at the front of the mill, the screens being held in their position by a rod and nut as shown at n, Fig. 1.

56,317.—FLOUR-SIFTER.—K. F. Worcester, Nashua, N. H., and J. P. Perkins, Hollis, N. H.:

We claim the combination with the fingers, c, and brushes, d, secured to the shaft of the machine as herein set forth, of the cams and pins and spring or equivalent mechanism for giving a constant up and down motion to the same, the whole being constructed and arranged for operation substantially as and for the purposes herein shown and described.

56,318.—WASHING MACHINE.—Robert M. Yorks, Schoolcraft, Mich.:

I claim, 1st, The combination of the wash-board, G, the treadle, J, and the springs, K, connected to each other by ropes, I, I′, substantially as described.

2d, The cross-bar, M, working in grooves formed by the yielding bars, L, L, and the upper edges of the frame, B, substantially as described.

56,319.—ACCORDION.—Carl Friedrich Zimmerman, Philadelphia, Pa.:

I claim the distinguishing keys, K*, giving the same tone both in drawing and compressing, and arranged in combination with the keys, K, substantially as and for the purpose set forth.

56,320.—HARVESTER.—Francis C. Coppage, assignor to himself and Wm. Coppage, Terre Haute, Ind.:

I claim the zig-zag wheel, F, situated on the axle of the wheels, B, B, as described, in combination with the frame, H, pallets, J, J, levers, I, I, link, K, pitman, L, and cutter-bar, N, the whole being constructed, arranged, and operated in the manner and for the purpose set forth.

56,321.—SHOE FOR STAMPING MACHINERY.—P. W. Gates, assignor to himself and D. R. Fraser, Chicago, Ill.:

I claim as a new article of manufacture a solid shoe for stamping machinery produced by casting hard and soft metal together while both are in a molten state, the soft metal forming the stem of the shoe, while the hard metal forms the body of the shoe, substantially as described.

56,322.—PAINT.—J. Lewis Geroldsek, assignor to Henry W. Livingston, Livingston, N. Y.:

I claim the composition of material and the process of compounding the same, substantially as set forth in the foregoing specification.

56,323.—PROCESS OF MAKING CALLIPERS OR DIVIDERS.—James B. Gooding, assignor to Stillman White, Waltham, Mass.:

I claim the herein-before described new or improved process of making spring dividers, callipers, or other like articles, the same being accomplished by swaging, boring, sawing, and bending open the blank preparatory to further finishing and hardening it, as specified.

I also claim the improved article of manufacture as so made.

56,324.—HOSE-COUPLING.—John B. Mitchell, assignor to himself and C. M. Plummer, Portland, Me.:

I claim the combination in a hose-coupling of the swivel, 2, back-screw, f, nipple, 1, having shoulders, a, the center clutch, 8, with spaces, d, and projections, c, channels, i, and steady-pins, l, all substantially as and for the purpose set forth.

56,325.—ENVELOP MACHINE.—Robert Parks, assignor to E. J. Spangler, W. E. Lockwood, and E. D. Lockwood, Philadelphia, Pa.:

I claim, 1st, The cross-head, F, carrying knives and creasers, arranged substantially as described, and having a uniform reciprocating motion imparted to it, substantially as set forth for the purpose specified.

2d, The combination of the cross-heads, F, guide-rods, D, or their equivalents, yoke, C, and crank-shaft, B.

3d, The plate, G, made detachable from the cross-head, and having cutters and creasing plates, arranged substantially as set forth.

4th, The plate, G′, with its knives, the whole being made detachable from the cross-head, for the purpose specified.

5th, The plate, H, with its grooves and openings, the whole being made detachable from the stationary plate, E, of the machine, for the purpose described.

6th, The combination of the detachable plate, I, and its cutting edges, q, q, with the detachable plate, J, and its knife, r.

7th, The bars, P and P′, arranged and operating substantially as described.

8th, The stationary folders, R, constructed, arranged, and operating substantially as set forth.

9th, The adjustable connecting-rod, M′, rendered adjustable on the crank, substantially as and for the purpose described.

56,326.—FLANGE.—David Paterson, assignor to Austin R. Pardee, Jersey City, N. J.:

I claim a flange provided with radiating slots, b, and ribs, c, rising from the edges of said slots, to a level with a central hub, a, substantially as and for the purpose described.

56,327.—FURROWING PLOW.—Samuel Perry, Troy, N. Y., assignor to Charles H. Fort, West Troy, N. Y.:

I claim the adjustable standard, C, having the flat shave, K, attached to its lower end, in combination with the mold-boards, D, D, attached to said standards by links or joints, and provided with arms, E, E, which pass through the beam and are secured by a set-screw, F, the whole being constructed and operated in the manner and for the purpose set forth.

56,328.—GRAIN-FORK.—Martin C. Remington, Auburn, N. Y. assignor to himself and A. O. Remington, Weedsport, N. Y.:

I claim the construction and combination of the bow, C, and brace-rod, D, applied to the fork, substantially as and for the purpose specified.

56,329.—CHUCK.—Isaac Smith, assignor to himself and W. H. Haight, New York City:

I claim the conical screw and sliding threaded gripping jaws, D, arranged with reference to each other and with the conical body, B, and case, C, substantially as herein set forth for the purpose specified.

56,330.—CHUCK.—Isaac Smith, assignor to himself and Wm. H. Haight, New York City:

I claim, 1st, The combination of the screw-collar, c, sliding collar, D, inclined planes, E, and levers, I, substantially as herein set forth for the purpose specified.

2d, The arrangement of the rotating collar, C, sliding collar, D, and levers, I, with reference to each other and to the sliding gripping dog, B, and body, A, substantially as herein set forth for the purpose specified.

3d, The internally conical centering device, F, applied within the body, A, of the chuck, in the manner substantially as herein specified.

56,331.—MACHINE FOR RAKING AND LOADING HAY.—John P. Smith, Hudson, N. Y., assignor to himself, John B. Longley, Hudson, N. Y., and W. H. Sheets, Claverack, N. Y.:

I claim, 1st, The guards, N, in combination with the rake and endless elevating apron, substantially as herein set forth for the purpose specified.

2d, The elastic plates, n, arranged between the teeth and with regard to the endless elevating apron, substantially as herein set forth for the purpose specified.

56,332.—MACHINE FOR DRAWING CARTRIDGE SHELLS.—Amaziah S. Warner, Springfield, Mass., assignor to himself and Henry Reynolds, New Haven, Conn.:

I claim, 1st, The combination of the means substantially such as herein described, for moving and feeding the forms with the die and punch, substantially as and for the purpose specified.

I also claim, in combination, the disk or wheel for moving the forms, the guides for directing the forms, the carrier, or equivalent therefor, and the punch and die, substantially as and for the purpose specified.

56,333.—PUDDLING FURNACE.—George A. Whipple, assignor to himself and Jacob Painter, West Pittsburg, Pa.:

I claim constructing puddling, boiling, and heating furnaces with a chamber or space under the bottom plates or hearth, so constructed and arranged substantially as herein-before described as that steam may be generated or introduced therein, and come in contact with the under side of the bottom plates and interior surface of the boshes or chills so as to withdraw from them a portion of their heat, and thus aid in protecting them from the destructive action of the heat of the furnace.

56,334.—SLEIGH-KNEE.—Mary E. Francisco, Lake Mills, Wis., administratrix of the estate of Henry Francisco:

I claim a hollow cast metal sleigh-knee, which is constructed with bracket bearings on its ends, having closed sides adapted to receive the frame-work of a sleigh, substantially as herein described.

56,335.—BELLOWS.—John Bowden, Mitcham, England:

I claim the combination and arrangement of the chambers, diaphragms, valves, rock-shaft, and connections, substantially as herein described and shown in the drawings annexed.

56,336.—METHOD OF PRODUCING LIGHT.—Prosper Carlevaris, Turin, Italy:

I claim the employment of chloride of magnesium and of the carbonate and other salts in general of magnesia reduced to an indecomposable state, as and for the purposes herein described, by being introduced in a flame composed of oxygen in combination with hydrogen, or of such other gaseous compounds as are herein-above set forth.

56,337.—MANUFACTURE OF SPOONS, FORKS, ETC.—Daniel Joseph Fleetwood, Birmingham, England:

I claim, 1st, The employment or use in the manufacture of spoons, forks, and other articles of tools, B, each of which is partly die and partly matrix, substantially as and for the purposes described.

2d, The die-holder, C, with set screws, s, t, and wedges, a, in combination with tools, B, constructed and operating substantially as and for the purpose set forth.

56,338.—Apparatus for Heating and Cooling Air, etc.—Loftus Perkins, London, England:

I claim the use of tubes sealed at both ends and containing water or other volatizable liquid in heating and cooling atmospheric air and other aeriform bodies, and in heating ovens and in heating and ventilating buildings, as herein described.

56,339.—Lathe for Cutting Screws.—Joseph Tangye, Birmingham, England:

I claim, 1st, The combination in a screw-cutting lathe of a single slide-rest, with two or more tools or cutters, which operate simultaneously upon two or more different screw-blanks, all constructed and arranged substantially as described.

2d, The combination in a screw-cutting lathe of a head-stock and poppet-head, each provided with two or more centers, when constructed and arranged substantially as herein described.

3d, In a screw-cutting lathe constructed and arranged as herein described, I claim the special gearing actuated by the driving-pulleys for the purpose of rotating two or more screw-blanks simultaneously in the same direction as herein-before described.

56,340.—Churn.—John Cooper, Dublin, Indiana:

I claim the bowed or bent beaters, F, when constructed and arranged substantially as and for the purpose set forth.

56,341.—Lady's Dress Skirt-elevator.—Thomas V. Phelps, Worcester, Mass.:

I claim, 1st, The combination of rings, C, D and B, with the tape, A, substantially as set forth.

2d, The combination of the looping device above described with the bottom of the skirt of a dress, substantially as set forth.

56,342.—Measuring Faucet.—John G. Baker, Philadelphia, Pa.:

I claim, 1st, The revolving cylinder, D, when arranged eccentrically to the cylinder, A, and inclosing the feed-port, I, and in combination with the rotary-piston, G, when constructed and arranged as a measuring-faucet, substantially as described.

2d, The cylinder, D, when inclosing feed-port, I, and provided with a wide slot, a, for the escape of the fluid from the center outward, substantially as described.

3d, The graduated dial-plate, Q, in combination with the reversible index, P, worm-wheel, O, and worm, N, as arranged in relation to a measuring-faucet, all substantially as and for the purposes set forth.

RE-ISSUES.

2,299.—Combined Shoulder-brace and Suspender.—David W. Canfield, New York City. Patented December 16, 1862:

I claim a combined shoulder-brace and suspenders in which the ends of the strap, A, united in the rear, at which point of junction the back-straps are secured, substantially as described and for the purpose specified.

2,300.—Wristband.—P. Tenney Gates, Plattsburg, N. Y. Patented March 13, 1866:

I claim, 1st, An elastic wristlet or adjuster, in combination with a pendent cuff of any description connected to the wristlet by elastic cord or otherwise.

2d, A wristband or cuff having both ends finished and buttonholed, and thus adapted for reversing, when unattached to any other garment, and arranged substantially as described and for the purpose set forth.

3d, A cuff pendent from an attachment of the arm, substantially as and for the purpose set forth.

2,301.—Nail Plate-feeding Machine.—John C. Gould, Boonton, N. J. Patented May 12, 1857:

I claim, 1st, The feed or nipper-rod, Z, and the feeding-device, S, S′, in combination with the rod, T, and nose-piece, V, as and for the purposes specified.

2d, Fixing the bar, F2, on which the rack, F3, is formed upon a shaft, Y, journaled within and supported by a vibrating box or bearing, L′, substantially as and for the purpose set forth.

3d, Supporting the nose-piece and feeding-devices upon a hinged or pivoted shaft, M, to adapt them to be turned back to render the cutters accessible, as described.

4th, Connecting the nose-piece with the driving-shaft by means of the two rods, V, V′, adapted to be disconnected as described to admit of the turning back of the nose-piece.

5th, The combination of the rock-shaft, G, vibrating-box, L′, rock-shaft, Y, bar, F2, cogged rim, d, and nose-piece, U, substantially as and for the purpose specified.

2,302.—Centrifugal Machine.—Geo. B. Hartson, and E. J. Woolsey, New York City. Patented Feb. 13, 1866:

We claim, 1st, Supporting and driving the centrifugal separator from below, substantially as and for the purpose herein shown and described.

We also claim the method of constructing the centrifugal separator with a hollow hub in the center of the lower hub thereof as described, the said hub being provided with a pulley for the driving-belt below the bottom plate, and fitted to run on and combined with the steed of the base-plate, in the manner and for the purpose specified.

We also claim the said centrifugal separator in combination with the cap or cover provided with holes or channels covered with funnel-shaped hoods, as described, to force currents of air in and through the said apparatus to aid in effecting the separation as described.

2,303.—Machine for Dressing and Finishing Threads, etc.—William Kiefer, assignor to E. Burgy and Louis Guillemin, New York City. Patented Feb. 7, 1865:

I claim, 1st, The arrangement of the gum or size-bath, e, wiper, g, and flat heater or heaters, h, i, and a winding frame, constructed and operating substantially in the manner and for the purpose described.

2d, In combination with the gumming device and heater, I claim the winding frame, constructed and operating substantially as and for the purpose described.

2,304.—Ash-pan Drawer for Stoves.—James A. Lawson, Troy, N. Y. Patented June 16, 1863. Ante-dated April 7, 1863:

I claim, 1st, The ash-pan drawer, A, for cooking or other stoves, or for furnaces, having the bail, B, and the handle, C, thereto attached, and arranged within an inclosed ash-pit or chamber, and in combination with the fire-grate or fire-chamber thereof, in the manner and for the purposes substantially as herein described and set forth.

2d, The arrangement of an ash-pan drawer, having the bail, B, combined therewith, within an inclosed ash-pit or ash-chamber of a stove or furnace and in combination with the fire-grate or fire-chamber thereof, in such manner as to receive the ashes and other material falling therefrom and thereafter be removed in the manner substantially as herein described and set forth.

3d, The employment of an ash-pan for cooking or other stoves or for furnaces, constructed in the manner substantially as herein shown and described, in combination with a surrounding or inclosed ash-chamber or ash-pit, so that no dust or other matter shall escape from or by reason of the falling of ashes or other material from the burning of fuel upon the fire-grate into the room where such stove or furnace is used, in the manner substantially as herein described and set forth.

4th, The bail, B, in combination with the ash-pan drawer, A, and with the tops, a, a, and handle, c, in the manner substantially as and for the purpose herein described and set forth.

2,305. Ash sifting Pan for Stoves.—James Spear, Philadelphia, Pa. Patented April 15, 1862:

I claim the application of a sifting-pan capable of being vibrated to the hearth of a stove or range, substantially in the manner and for the purpose herein described.

2,306.—Shirt-collar.—(Div. A.)—The Union Paper Collar Company, assignees by mesne-assignments of Walter Hunt. Patented July 25, 1854; re-issued April 4, 1865:

We claim a shirt-collar, or wristband or bosom, made of a fabric composed of paper and muslin, or an equivalent fabric, having a surface covered with enamel, substantially as and for the purpose above specified.

2,307.—Shirt-collar.—(Div. B.)—The Union Paper Collar Company, assignees by mesne-assignments of Walter Hunt. Patented July 25, 1854; re-issued April 4, 1865:

We claim a shirt-collar, bosom, or wristband, made of a fabric composed of paper and muslin, or an equivalent fabric, having a smooth white surface coated with transparent varnish, for the purpose specified.

2,308.—Plating, Tempering, and Hardening Iron and Steel.—The American Metal Company, assignees by mesne-assignments of Elliot Savage. Patented December, 26, 1865:

I claim, 1st, Heating the metal by immersing it in a bath of melted cyanide of potassium, substantially as described.

2d, Cooling the metal by immersing it in a cooling liquid, substantially as described, after it has been heated in a bath of melted cyanide of potassium, substantially as described.

2,309.—Paper Shirt-collar.—(Div. A.)—James A. Woodbury, assignee of Andrew A. Evans, Boston, Mass. Patented May 26, 1863:

I claim as a new article of manufacture a collar made of long fiber paper, substantially such as is above described.

2,310.—Paper Shirt-collar.—(Div. B.)—James A. Woodbury, assignee of Andrew A. Evans, Boston, Mass. Patented May 26, 1863:

I claim as a new article of manufacture a collar made of long fiber paper, substantially such as above described, and coated or varnished, as and for the purposes above set forth.

2,311.—Solar Camera.—David A. Woodward, Baltimore, Md. Patented Feb. 24, 1857:

I claim, 1st, Adapting to the camera obscura a lens, or lenses, and reflector, in rear of the object glass, in such manner that it is made to answer the two-fold purpose of a camera obscura and a camera lucida, substantially as and for the purpose specified.

2d, The arrangement and combination of the condensing lens, H, or lenses, D′ and H, negative slide or holder, N, and achromatic lens or lenses, E, made adjustable with regard to each other, for condensing the sun's rays upon and through the negative, and focusing them upon prepared paper, canvas, or other suitable material for photographic purposes, substantially as described.

2,312.—Whiffle-tree Attachment.—John C. Garner, Ashland, Pa. Patented Dec. 26, 1865:

I claim the plate, C, provided with the lips, as shown, and secured to the bar, A, by the bolt, D, in combination with the tube, E, fitted in the whiffle-tree, and the plate, F, at the front side of the latter, the bolt, D, passing through the tube, E, and all arranged to operate in the manner substantially as and for the purpose herein set forth.

DESIGNS.

2,353.—Statuette.—Samuel Conkey, New York City.

2,354.—Clock-case Front.—Nicholas Muller, New York City.

2,355.—Trade-mark.—Charles A. Perry, assignor to himself and Thomas Perry, Chicago, Ill.

NEW RATES OF ADVERTISING:

FORTY CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising colums, except on payment of one dollar a line each insertion, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

PATENT OFFICE.

PATENTS GRANTED FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *twenty years*. Statistics show that nearly ONE-HALF of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after so many years' experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office.

Judge Mason, formerly Commissioner of Patents, says, in a letter addressed to us:—"In all your intercourse with the Office, I always observed a marked degree of promptness, *skill*, and fidelity to the interests of your clients."

Ex-Commissioner Holt says:—"Your business was *very large*, and you sustained and justly deserved the reputation of *marked ability* and *uncompromising fidelity* to the interests of your clients."

Ex-Commissioner Bishop says:—"I have ever found you faithful and devoted to the interests of your clients, as well as *eminently qualified* to perform the duties of Patent Attorneys."

EXAMINATIONS.—If an Inventor wishes our opinion in regard to the probable novelty of his invention, he has only to send us a pencil or pen-and-ink sketch of it, together with a description of its operation. For an Opinion, without examination at the Patent Office, we make no charge, but if a

PRELIMINARY EXAMINATION AT THE PATENT OFFICE is desired, we charge the small fee of $5. This examination involves a personal search at the Patent Office of all models belonging to the class, and will generally determine the question of novelty in advance of an application for a patent. Up to this time we have conducted over TWELVE THOUSAND Preliminary Examinations, thus showing a more intimate knowledge of inventions at the Patent Office than can be possessed by any other person or firm.

If an inventor decides to apply for a patent, he should proceed at once to send us, by express (charges prepaid) a model not over one foot in size, and substantially made. He should also attach his name and residence to the model.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Cavat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Canadians have to pay $500.

FOREIGN PATENTS.—Messrs. MUNN & CO. have had more experience than any other solicitors in this country in procuring foreign patents, and have old-established agencies in London, Paris, Brussels, Berlin, Vienna, and other large cities. Foreign business should never be intrusted to other than experienced agents.

If an inventor wishes to apply for a patent, all he has to do is to write to us freely for advice and instruction, and he will receive prompt attention. If his invention contains any patentable features, he can depend upon getting his Letters Patent. All communications considered confidential. Send models and fees addressed to MUNN & CO.,
No. 37 Park Row, New York.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of our reception of their funds.

A GOOD SET OF SECOND-HAND TIN AND Sheet-iron Tools, Patterns, etc. Terms cash. For particulars and description, address GEO. G. ATWOOD,
4 2*] Geneva, N. Y.

FOR SALE IN NEW MARKET, FREDERICK County, Maryland, my Residence and Machine Shop; eight miles from nearest Machine shop, one mile from railroad station, on turnpike, fertile country, good opening for business. Address as above. [1*] ISAAC S. RUSSELL.

STATE RIGHTS OF A VALUABLE PATENT For Sale. Apply to S. HARTSHORN, No. 62 Center street. 1*

WANTED—RESPONSIBLE AGENTS TO Sell a Valuable Patent. Inclose 25 cents to
4 1] S. J. HOMAN, Box 420, Newburgh, N. Y.

BOILERS OF ALL KINDS FOR SALE AT Franklin Boiler Works, foot of Morgan-st., Jersey City.

BROUGHTON'S PATENT GAGE COCKS, Graduating Lubricators, Transparent Oil Cups, Warranted the best in the Market. Sold, Wholesale, by John Ashcroft, Todd & Rafferty, Woodward Steam Pump Co., and all large dealers.
5 13] BROUGHTON & MOORE, Manufacturers, New York.

LUMBER CAN BE SEASONED IN FROM Two to Four days, by Bulkley's Patent, at an average cost of $1 per M. from the green. For Circular or information, address C. H. BULKLEY, No. 2 Case Building,
4 8*] Cleveland, Ohio.

MACHINERY AND MACHINISTS' TOOLS, all kinds, including the LEONARD & CLARK PREMIUM LATHE. Also, Steam Engines, Saw Mills, Wood Cutting Machinery, etc., etc. Steamboat and Machinery Repairing at the
48*] QUASSAICK MACHINE SHOP, Newburgh, N. Y.

IMPORTANT TO BLACKSMITHS.—The most Economical and valuable Bolt-Heading Machine in the world, at a price within the reach of every blacksmith—only $120. A Wonderful Labor and Time-Saver. Send for Circular to L. E. OSBORN, Sec.'y "Davis Bolt-Heading Machine Co.,"
4 5*] New Haven, Conn.

TO MANUFACTURERS.— For Lease, a Lot 50 feet front by 150 feet deep, with privilege of 25 horse steam power. Inquire at *NEW IRON FOUNDERY* on Sneemen street, Mott Haven, two blocks north of Harlem Bridge. Castings of all kinds made to order on short notice.
1*] WAIT & STEDMAN.

PERSONS HAVING SECOND-HAND POWder Presses, Crusher and Cylinders for sale, may find a purchaser by addressing HOOVEN BROS., Weatherly, Carbon county, Pa. Manufacturers of the above articles please send circulars. 1*

10 CASES DAMAGED ENGLISH BOOKS, Bohn's Library, etc., just received from Auction, selling cheap. American and English Books at the following low prices:
1000 School and Children's Books.....10 cents each.
2000 Books on History, Theology, etc.....20 cents each.
3000 Books of Travels, Biography, etc.....30 cents each.
500 Books, Scientific, etc.....50 cents each.
Catalogues free. [1*] LEGGAT BROTHERS, 113 Nassau-st.

WINTER'S IMPROVED CIRCULAR SAW-MILL, and appurtenances, with Lane's Patent Set and Feed Works.
The Brooklyn Saw-Mill Company write, May 5, 1866: "We have in use Winter's Mill, with Lane's Patent and Emerson's Independent Tooth Saw, and regard them superior to any other in use, and among the greatest improvements of the age."
Pamphlets furnished.
WINTER & CO.,
4 4 No. 40 Broadway, New York.

LITTLEFIELD'S PATENT SCAFFOLDING. One of the simplest and best contrivances for Builders and Painters that has ever been invented, is the Scaffolding recently patented by the subscriber.
The utility and simplicity of this scaffolding, and the safety and ease with which it is adjusted, recommends it to all who have occasion to use the article. State, County, or Single Rights for sale low. Address HORACE LITTLEFIELD,
4 3*] Lewis Cass county, Iowa.

T. N. HICKCOX,
Manufacturer of
STAMPED AND PRESSED BRASS GOODS,
Lamp and Lantern Trimmings, Plain and Fancy Brass Caps for Pomatum and Mucilage Bottles, Baggage and Key Checks, etc. Labels for Oil Cans, Stoves, House Furnishing Goods, Insurance Companies, etc. Steel Dies of any Design Required, Manufactured on the premises, by experienced workmen, under the most careful supervision; Pressess and Light Machinery manufactured to order. Brass Goods Dipped, Lacquered, Silver-Plated, etc. Prompt attention paid to articles of new manufacture and Patent Goods; Models for the Patent Office neatly executed. Salesroom, 280 Pearl-st., N. Y., Factory, cor. John and Pearl-st., Brooklyn. 4 4*

NEW BRICK MACHINE— In successful operation since 1854. Common labor, with one brick maker only, required. Worked by one man, makes 4,000 per day; by horse, 7,000 to 12,000; by steam, 16,000 to 25,000. Cost from $100 to $600.
DRYING TUNNEL, Patented 26th February, 1861, for "drying bricks, tile, pottery, cores for castings, and other manufactures of clay and sand: grain, fruit, vegetables, pea nuts, lumber, glue, starch, whiting, sugar, bagasse, guano, leather, hides, fish, meat, salt peter, alum, and other chemicals." Bricks molded one day are set in the kiln the next. For further particulars, in a pamphlet, giving full instructions on brick setting and burning with wood or coal, address, sending fifteen cents.
FRANCIS H. SMITH, Box 556, Baltimore, Md.

A RARE CHANCE FOR INVESTMENT A Manufacturing Firm, having added to their business another branch—the manufacture of a new and popular utensil needed in every family—find themselves, from want of capital and facilities, unable to meet one-tenth of the rapidly increasing demand, and purpose to dispose of the business. They will either sell out the business and patents, or they will put the business into a Stock Company, or give license to manufacture, for a reasonable royalty on each utensil made.
The profits are large, demand unlimited, business strictly cash, and monopoly secured by two patents dated respectively Nov., 1865, and March, 1866. Papers and Books can be shown, demonstrating that from 25 to 40 per cent on the capital invested can be made every three months.
Parties wishing to investigate further will address
A. B., Box 355, Syracuse, N. Y.,
Giving address and the amount they would wish to invest. 4 2

CIRCULAR AND GANG SAW MILLS OF the Most Approved Construction, Grist Mills and Mill Fittings, Wood Working Machinery of all descriptions, in Store and for sale low, by J. B. FULLER,
26 4] No. 8 Dey street, New York.

MANUFACTURERS OF TEXTILE FABRICS DUTCHER'S PATENT TEMPLES, adapted to weaving all kinds of goods. Also
THOMPSON'S PATENT OIL CANS
for oiling Machinery; neat and economical. Furnished by
21 13 eow* E. D. & G. DRAPER, Hopedale, Mass.

TO DYERS AND INK MANUFACTURERS.— The Cheapest form in which you can buy "Tannin" for making a Black Dye, or Ink is N. Spencer Thomas's Extract of Hemlock Bark. It also colors a beautiful Tan Color. Price only Ten Cents per pound. Send for a Circular. Address the Manufacturer,
N. SPENCER THOMAS,
21 now 6t* Painted Post, Steuben county, N. Y.

FOR WHEEL, FELLY AND SPOKE MAchinery, Spoke Lathes, Hub Mortising and Boring Machinery, etc., address J. A. FAY, & Co., Cincinnati, Ohio. 5tfc

MACHINERY.—S. C. HILLS, NO. 12 PLATT street, New York, dealer in Steam Engines, Boilers, Planes; Lathe, Chucks, Drills, Pumps; Mortising, Tenoning and Sash Machines, Woodworth's and Daniels's Planers, Dick's Punches, Presses and Shears; Cob and Corn Mills; Harrison's Grist Mills, Johnson's Shingle Mills; Belting, Oil, &c. c

F. U. STOKES, MODEL MAKER, NO. 7 West Fourth street, Cincinnati, Ohio. 4 4

CAN I OBTAIN A PATENT?—FOR ADVICE and instructions address MUNN & CO., 37 Park Row, New York, for TWENTY YEARS Attorneys for American and Foreign Patents. Caveats and Patents quickley prepared. The SCIENTIFIC AMERICAN $3 a year. 30,000 Patent cases have been prepared by M. & Co.

SETS, VOLUMES AND NUMBERS. Entire sets, volumes and numbers of SCIENTIFIC AMERICAN (Old and New Series) can be supplied by addressing A. B. C., Box No. 773, care of MUNN & CO., New York

JUST PUBLISHED—THE INVENTOR'S AND MECHANIC'S GUIDE.—A new book upon Mechanics, Patents, and New Inventions. Containing the U. S. Patent Laws, Rules and Directions for doing business at the Patent Office; 112 diagrams of the best mechanical movements, with descriptions; the Condensing Steam Engine, with engraving and description; How to Invent; How to Obtain Patents Hints upon the Value of Patents; How to sell Patents. Forms for Assignments. Information upon the Rights of Inventors, Assignees and Joint Owners. Instructions as to Interferences, Reissues, Extensions, Caveats, together with a great variety of useful information in regard to patents, new inventions and scientific subjects, with scientific tables, and many illustrations. 108 pages. This is a most valuable work. Price only 25 cents. Address MUNN & CO. 37 Park Row, N. Y. 15tf

INCRUSTATIONS PREVENTED by WINANS' Incrustation Powder. Cost $3 to $5. 11 Wall-st., N. Y. 26 5*

DRILL CHUCKS.
OLMSTED'S PATENT,
Self-centering and Tightening, made from the best Cast Steel, and every piece is hardened. It is the smallest and most substantial Chuck in the market. We make two sizes. No. 1 will open ⅜-in.; No. 2 3-16-in. Outside diameter, No. 1, 1 and 7-16-in.; No. 2, ⅝-in. Either Chuck will hold the finest wire. Larger drills can be used than the size to which the Chuck opens. The ⅜ Chuck will drive a 1-inch Drill, no wrench is used. Will be forwarded to any address on receipt of price.
Price:—No. 1, $7; No. 2, $5.50.
Illustrated in the Scientific American.
L. H. OLMSTED, Stamford, Conn.

DRILL CHUCKS.—The Trade, generally, are supplied with OLMSTED'S PATENT DRILL CHUCKS. 2

RICHARDSON'S PATENT RATCHET WRENCH, Illustrated on Page 248, Vol. X. (New Series). State Rights for sale. Address
1*] J. T. MIDDLETON, P. O. Box 704, New London, Conn.

IMPORTANT TO MANUFACTURERS AND Inventors.—SMITH & GARVIN, No. 3 Hague street, New York, Machinists and Model Makers, are now ready to make proposals for building all kinds of Light Machinery, Manufacturers' Tools, Models, etc. Satisfactory reference given. 26 8*

FABRICATION OF VINEGAR.—Prof. H. Dussauce, Chemist, is ready to furnish the most recent French processes to manufacture Vinegar by the quick method, with and without alcohol, directly from grain, etc. For further information address 13 Avenue Bugeaurd, Paris, France. 2 3*

WATER WHEELS.—VALENTINE'S PAtent Improved Turbine is superior to the Jonval Turbine, combining freedom from choking up, cheapness, and durability with great economy of water. Send for Circular.
26 3*] VALENTINE & CO., Fort Edward, N. Y.

BRAYTON'S SAFETY STEAM GENERATOR AND ENGINE.—A Perfect Success.—By this invention the long sought-for object has been accomplished; to wit: A means by which Steam can be Generated safely, so that there shall be no more danger from explosion than with the hot-air engine, and at the same time retain all the power of the steam engine. This much sought-for result has at last been accomplished, and after many severe tests we feel fully warranted in offering this Steam Generator and Engine to the public as a perfectly safe power, and at the same time a cheap power. As a generator of steam for heating buildings, etc., there is not its equal in use. For further information or circular, address R. A. HUTCHINSON, Agent, No. 8 Dey street, New York 3 3*

TWO POWERFUL HYDRAULIC PRESSES For Sale by T. W. KRAUSE,
26 eow 5*] 74 and 76 West Washington street, Chicago, Ill.

MASON'S PATENT FRICTION CLUTCHES, for starting Machinery, especially Heavy Machinery, without sudden shock or jar, are manufactured by
3 3] VOLNEY W. MASON, Providence, R. I.

FOUNDERY AND MACHINE SHOP FOR SALE. In Good Running Order, with good, durable water power. For particulars, address Post-office box 346, Jamestown, New York. 2 6*

NEW PHYSIOGNOMY; OR, SIGNS OF Character as manifested through Temperament and External Forms. With 1,000 Illustrations. By S. R. WELLS, of the PHRENOLOGICAL JOURNAL. One handsome 20mo volume, 768 pages post-paid, $5. Agents wanted.
3 3] FOWLER & WELLS, No. 389 Broadway, N. Y.

TO SOAP MANUFACTURERS.—WHILE IN Europe, Prof. H. Dussauce, Chemist, is ready to furnish plans of Factories and drawings of Apparatus, with the French processes to manufacture the white and marbled soap, family, soft, silicated, transparent, and fancy soaps. Recipes to prepare every kind of lye. For further information address 13 Avenue Bugeaurd, Paris, France. 2 3*

SPIRAL SPRINGS.—FOR $1 I WILL SEND Directions for Making Pressure Spiral Springs out of Iron Wire that is more durable than Steel. Address
2 3*] Box 1394, Meadville, Pa.

BIND YOUR OWN MUSIC, NEWSPAPERS, etc, Use ADHESIVE BINDING TAGS (Heyl's Patent). Circulars and samples, etc., sent gratis. Address, inclosing stamp, H. R. HEYL & CO., 113 South 4th street,
24*] Philadelphia, Pa.

CHICKENS!!— LIVE CHICKENS ON PAPER,
In imitation of a Painting in Oil, by
A. F. TAIT.
It is so successful
A CHROMO-LITHOGRAPH,
That even Connoisseurs generally take it for the Original.
Size, 10x12.....Price, $5 per copy.

Sold in all first-class Picture Stores throughout the country
Will also be mailed on receipt of price by the Publishers,
L. PRANG & CO.,
159 Washington street, Boston, Mass.
639 Broadway, New York. 3 2

COTTON MACHINERY FOR SALE BY THE HARRISBURG COTTON MILL COMPANY, Harrisburg, Pa.
Two (2) 30-inch Pickers, one Beater each, strong Machine Iron frame, in good working order.
One (1) 30-inch Picker, two Beaters, New—rebuilt.
Four (4) 30-inch Pickers, two Beaters each.
One (1) Willey, or Cotton Opener, New, with Trunk
One (1) Willey, or Cotton Opener.
Six (6) Railway Heads, four Rolls each.
Eight (8) Drawing Frames with Coilers, four Deliverers each, with spare Rolls, Stands, etc.
One (1) Cloth Folding and Measuring Machine, in good order.
One (1) Reel—45 Spindles—New and Good.
One (1) Taunton Speeder.
One (1) Baling Machine for Yarn or Carpet Chain. 3 4*

ORDERS FOR BELT STRETCHERS— Capable of taking in a 12-inch Belt—filled on Sight of Order. Other Sizes put up on Short Notice.
WILL SELL THE ENTIRE RIGHT LOW.
Send for Circular. [3 4] SEYMOUR ROGERS, Pittsburgh, Pa.

FOR SALE— The whole or State Rights of Shedd & Glockner's Child's Exercising Chair and Scale, Patented Nov. 21st, 1865, a cut of which was published in the American Artisan, Vol. 3, New Series, No. 7, of June 20, 1866. For information address SHEDD & GLOCKNER, 288 Grand street, Williamsburgh, N. Y.
N. B.—Orders for Chairs received. 3 2*

PATTERN & MODEL MAKERS, Gearing Cocks, Valves, and Engines Patterns of every description.
COTTON GINS! COTTON GINS!! COTTON GINS!!!
Improved Double or Single-roller Sea Island Cotton Gins constantly on hand. Apply to ANDERSON & SCHERMERHORN, Rear of 47 Ann street, New York. 3 3*

CAMDEN TUBE WORKS (OFFICE AND Manufactory Second and Stevens streets, Camden, N. J.) Manufacturers of Wrought Iron Welded Tube of all sizes; Peace's Improved Gas Pipe Screwing Machines for both Hand and Power; Pipe Vises, Stocks, Dies, Taps, Reamers, Tongs, and all other tools used by Steam and Gas Fitters. Also, Upright Drill Presses for both Hand and Power, constantly on hand, and ready for delivery. 2 4*

THE MOST VALUABLE MACHINE FOR Builders and Carpenters, Furniture, Carriage, Agricultural Implement, Sash and Door, Waived and Straight Molding, and Piano Manufacturers, complete for all kinds of Irregular and straight work in wood, hard or soft, superior to all others, having the capacity of 20 good mechanics, called the Variety Molding and Planing Machine. We own 9 patents covering the valuable inventions for machines with upright mandrels. We hear there are parties manufacturing machines infringing on some one or more of our patents. We caution the public from purchasing such infringements. Our patents secure to us the machine with either iron or wooden table through which are two upright mandrels, having cutters in each head held by a screw nut; also, combination collars, saving 75 per cent in cutters, feed table to plane and cut, irons outside the cutters, preventing wood from taking undue hold. Also guards acting as plane stocks, making it safe for a boy to run.
These machines are manufactured for America and Europe, only at the Hamilton Machine Works, No. 211 East Twenty-second street, New York. All communications addressed there will receive prompt attention. Agents solicited. Send for circular giving full description. 1 3*

THE CELEBRATED "SCHENCK" WOODworth Planers, with new and important improvements, are manufactured by the Schenck Machine Co., Matteawan, New York T. J. B. SCHENCK, Treas. JOHN B. SCHENCK,
17 13* Pres't.

GUN MACHINERY FOR SALE CHEAP.— Call on or address
1 4*] THE GREENE RIFLE WOKS, Worcester, Mass.,
F. W. HOOD, Supt.

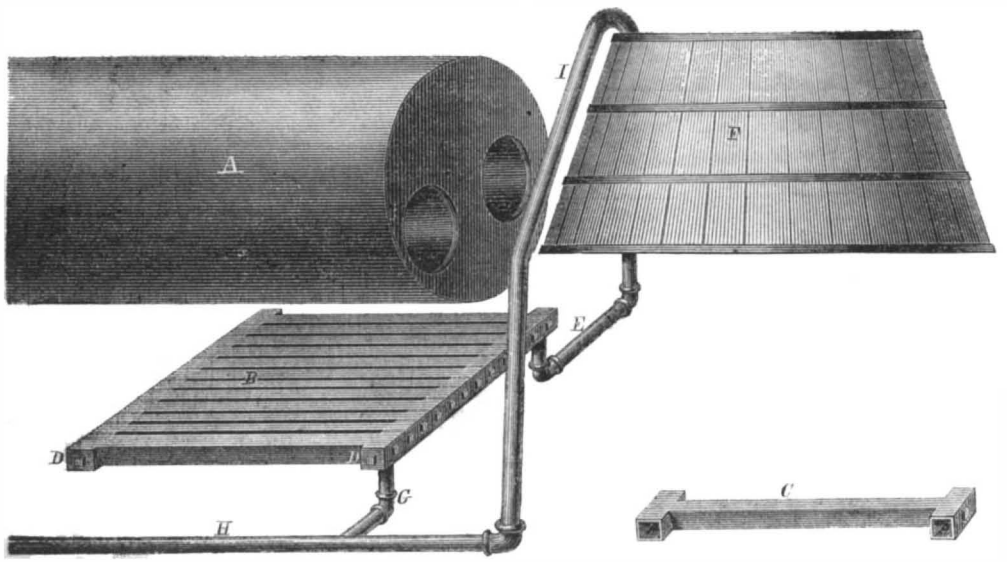
THE HARRISON BOILER—A SAFE STEAM BOILER.—This new Steam Generator combines essential advantages in Absolute Safety from explosion, in first cost and cost of repairs, durability, economy of fuel, facility of cleaning, and transportation, not possessed by any other boiler.
It is formed of a combination of cast-iron hollow spheres—each 8 inches in external diameter, and ⅜ths of an inch thick, connected by curved necks. These spheres are held together by wrought iron bolts with caps at the ends. The form is the strongest known. Its strength to resist internal pressure is very great—unweakened as it is by punching or riveting, which lessens the strength of the wrought iron boiler plate about forty per cent. Every boiler is tested by hydraulic pressure at 400 pounds to the square inch. It cannot be burst under any practicable steam pressure.
Under pressure which might cause rupture in ordinary boilers, every joint in this becomes a safety valve. No other steam generator possesses this property of relief under extreme pressure without injury to itself, and thus preventing disaster.
It is not affected by corrosion, which soon destroys the wrought iron boiler. Most explosions occur from this cause. It has economy in fuel equal to the best boilers, arising from the large extent and nearness to the fire of its heating surface, as also from the waved line of this surface which, thoroughly mixing the gases, induces better combustion, and breaking the flame, causes the heat to be more effectually absorbed than in the ordinary tubular or cylinder boiler.
It gets up steam quickly, and with little fuel. It produces superheated steam without separate apparatus, and is not liable to priming or foaming.
It is easily transported, and may be taken apart so that no piece need weigh more than eighty pounds. In difficult places of access, the largest boiler may be put through an opening one foot square. It is readily cleaned inside and out. Under ordinary circumstances, it is kept free from permanent deposit by blowing the water entirely out, under full pressure once a week. It requires no special skill in its management. Injured parts can be renewed with great facility, as they are uniform in shape and size. When renewed the entire boiler remains as good as new. The greater part of the boiler will never need renewal unless unfairly used.
A boiler can be increased to any extent by simply adding to its width, and being the multiplication of a single form, its strength remains the same for all sizes. It has less weight, and takes less than one-half the ground area of the ordinary cylinder boiler, without being increased in hight.
Any kind of fuel may be used under this boiler, from the most expensive to refuse coal dust.
Drawings and Specifications free of charge. For descriptive circulars or price address JOSEPH HARRISON, Jr.,
Harrison Boiler Works, Gray's Ferry Road,
1 6* Adjoining U. S. Arsenal, Philadelphia.

COLTON'S MAPS, 172 WILLIAM ST., N. Y. Pocket Maps of all the States and Territories, showing the Counties, Principal Towns, Railroads, etc. Sent free by mail. We publish the largest assortment of WALL MAPS and ATLASES in America. Catalogues sent free.
13*] G. W. & C. B. COLTON & CO., New York.

Improved Grate for Steam Boiler Furnaces.

Every engineer and fireman knows the annoyances and vexation attending the burning-out of his grate bars, and the unpleasant labor attending the removal of the clinkers. Proprietors, also, are aware of the loss caused by the coal falling through bent bars, and the increased consumption of coal rendered necessary by frequent cleaning of the grate. The object of this improvement is to obviate these difficulties.

A represents a boiler under which is the grate, B, formed of sections, as shown at C. These are cored, or cast hollow, and have square transverse projections



NEVIUS'S HOLLOW GRATE BARS.

at each end, also cast hollow. The grate portion of the bars are beveled from the top, or are narrower on the bottom than on the face, in the manner af ordinary bars. These bars are placed together, as shown in the engraving—the ends of the projections being planed and a packing, of copper or other suitable material, being introduced between their faces. A bolt (head shown at D) passes through the grate on each end, from side to side, and is secured by a nut, binding the whole firmly together. Every alternate packing has an aperture only large enough to admit the bolt, D, and the others are cut to allow the full caliber of the bar, so that the passages in the grate, from one side to the other, pursue a serpentine course.

Water is introduced by the pipe, E, from the tank, F, and, following the line of these passages, arrives at the pipe, G, having traversed the length of each bar. The grate thus becomes a heater, and prepares the water for the boiler, which it reaches by means of the pipe, H, which conducts it to the force pump. In case of steam forming in the grate, a blow-off pipe, I, conducts it to the tank, thus avoiding back pressure.

It is claimed that this grate is very durable, and that while the bars are kept cool and prevented from warping, the heat is utilized in warming the water. They have been in use about a year and given perfect satisfaction.

Patented through the Scientific American Patent Agency, January 23, 1866, by G. S. Nevius, Bushnell, Ill., to whom apply for further information.

The Monitor Engines.

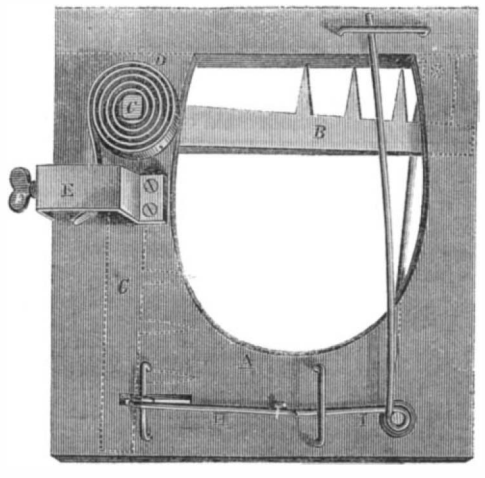
Mr. John Bourne says:—"That the monitor type of engine is incapable of improvement I by no means assert, but that it is marked by many features of excellence and originality, and in every respect a better type of engine than that generally adopted in our navy, I am prepared to maintain. Perhaps the double piston-rod type of screw engine is preferable to the monitor type; but that engine we also owe to the genius of Ericsson and his assistants, for it was by Count Rosen—Ericsson's representative in England—that this species of engine was first introduced in the *Amphion*, the first screw vessel constructed in this country with the engines below the water line. It is an easy thing to raise captious objections against any form of engine, but much less easy to originate a better; and I do not know that Mr. Isherwood or any one else has succeeded in doing this in the case of the monitor engine, taking all the conditions of the problem into account."

Wrought-iron Drums for Pulleys.

Messrs. Hudswell & Clarke, of England, are now making a number of drums of wrought iron. The drums are only of about half the weight of those of cast iron, and by their use, the weight upon the bearings of the shafting is much reduced, belts also are found not to slip on them, as they do on cast-iron drums, and last much longer; in fact, at Messrs. Hudswell & Clarke's own works they state that they have been enabled to reduce their belt account one-half since they have used the wrought-iron drums.

PITMAN'S ANIMAL TRAP.

It is a well-known fact that most of the fur-bearing animals are extremely shy and suspicious of danger. The sight of a trap is frequently sufficient to alarm them, and the concealment of the apparatus



is sometimes impossible. For those who make a business of insnaring this game, and who are compelled to take long tramps, carrying their traps, lightness and portability are essential qualities in good traps.

The contrivance illustrated by the annexed engraving claims to be a trap possessing the requisites of efficiency, lightness, strength, certainty of operation, and facility of concealment.

The trap, A, is a piece of wood, having a hole through which the animal must pass to reach the bait, or in traveling its accustomed paths. B is a jaw armed with teeth, having a pivot, C, passing through the wood, to which is attached a powerful coiled spring, D. The end of this spring is held in the clamp, E, by the thumb-screw, F, which can be tightened to give the requisite tension. The dotted lines, at G, show the position of the jaw when the trap is set. It is held in position by a wire swivel, H, passing through the wood. The other end of the swivel is secured by the end of the lever, I, which slips over it. This brings the long arm of the lever, I, across the opening or passage, so that the animal, in attempting to pass through, pushes it toward the side of the opening, which frees the latch, or swivel, and the spring brings the jaw up with great force, transfixing the game. The trap will work equally well in all positions and can be set in hollows, bogs, and along water courses frequented by mink, musk-rats, beaver, or other animals valuable for their fur. It can be so easily concealed that it is not necessary to place it under water for mink, who, at times, will not step into the water for the most tempting bait.

Patented through the Scientific American Patent Agency, June 4, 1861, by Decatur Pitman, Fort Madison, Iowa, whom address for State or county rights.

KNOEPKE'S WASH BASIN.

This is designed to prevent the annoyance of having the soap in a separate dish from the water, and is one of those small and apparently unimportant improvements which sometimes prove to be just what was needed.

It is simply a common wash bowl, A, struck up from a sheet of tin or other metal, or made in parts and soldered. It differs from the ordinary bowl in having a soap cup, B, firmly attached to the inside of the rim and having a strainer at the bottom for draining the soap. The wash stand or table can be kept free from soap stains and water by its use. Its advantages can be seen at a glance.

Patented May 15, 1866, by J. C. Knoepke, No. 910 North Second street, Philadelphia, whom address for further information.

EUROPEAN capitalists are planning to build a railroad through Central America, connecting the Atlantic with the Pacific, and surveyors to be employed upon the route are soon to arrive at Honduras.