# SCIENTIFIC AMERICAN

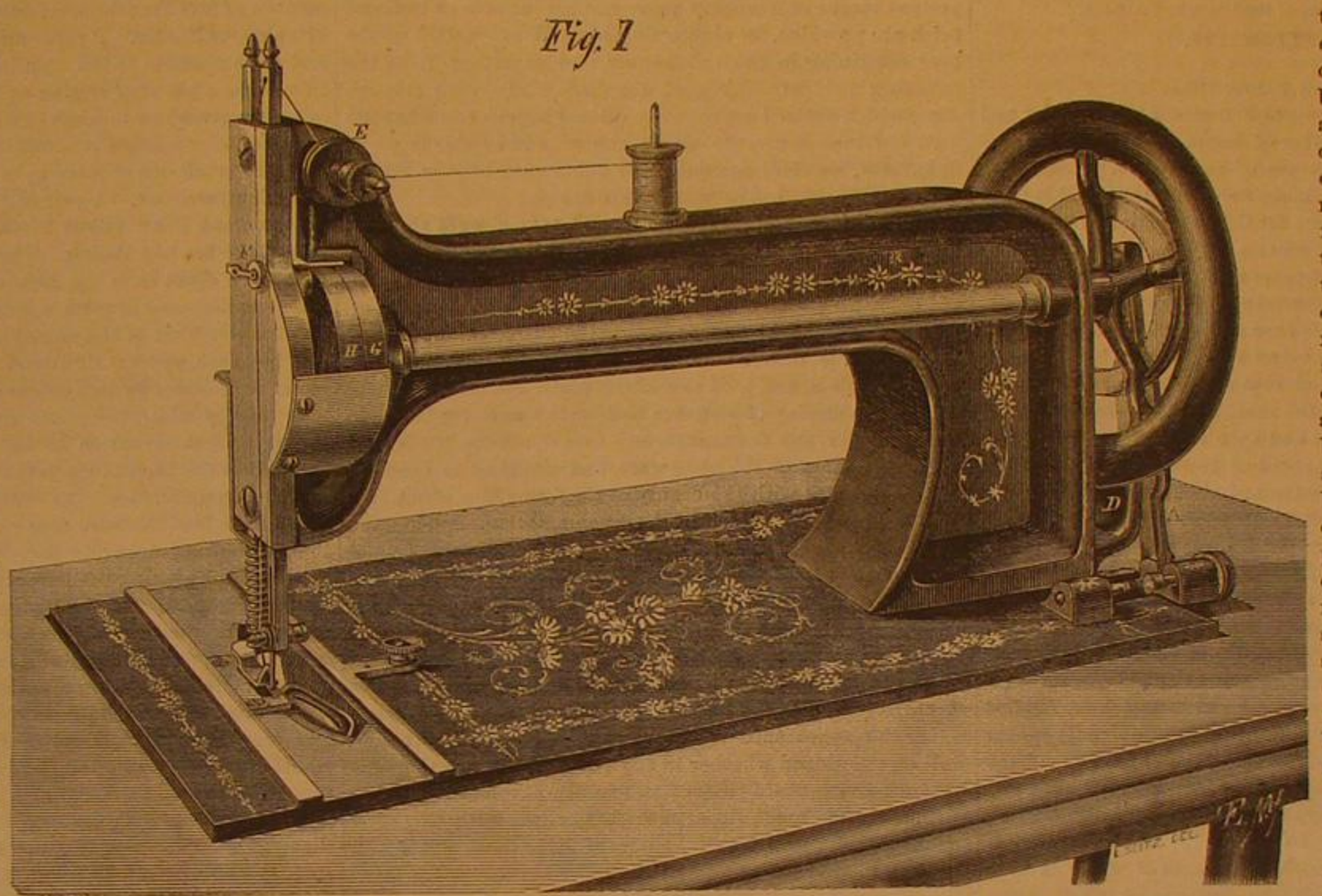
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## Improved Device for Actuating the Shuttle and Needle in Sewing Machines.

Some of the larger sewing machines are very noisy; the proper regulation of the thread tension is another difficulty not always overcome, and the loop in shuttle machines is often retained too short a time, so that occasionally the shuttle has not time to pass through it and a stitch is dropped. To remedy these defects is the object of the improvement illustrated in the accompanying engravings. Fig. 1 is a perspective view of the Grover and Baker improved machine for sewing heavy goods; Fig. 2 is a view of the under side of the table at the wheel end, and Fig. 3 a similar view of the other end.

*Fig. 1*




GROVER & BAKER'S IMPROVED SHUTTLE SEWING MACHINE.

The first improvement is the means of connecting the driven pulley on the upper shaft, which drives the needle bar, with the lower, which drives the shuttle lever. This connection is made by a bar, A, Figs. 1 and 2, the upper end of which is strapped to a pin, B, Fig. 2, on the driven wheel which pin may be considered the wrist of a crank. The other end of the bar turns on a stud forming a part of a block that slides in a T-shaped groove in a flange, C, Fig. 2 secured to the lower, shaft. Between these two points, however, is a fixed stud or arm, D, Figs, 1 and 2 with a screw on which plays the bar, A, by means of a longitudinal slot. Thus the connection between the two shafts is made without the employment of intermediate gears or cranks, producing a noiseless motion with diminished friction.

The next improvement is the manner of equalizing the tension of the thread. For this purpose a pair of circular plates or disks, E, Fig. 1, are placed upon a horizontal stud. Between these the thread for the needle passes, and they are graduated in their contact by a thumb nut and spiral spring, as seen. To take up, or rather to retain the slack of the thread caused by the upward movement of the needle bar, a similar pair of disks are placed on the needle bar plate, as at F, Fig. 1, held together by a flat spring and opened by a prominence on the needle bar, which, as it passes, throws the outer one from the inner and permits the thread to escape.

*Fig. 2*

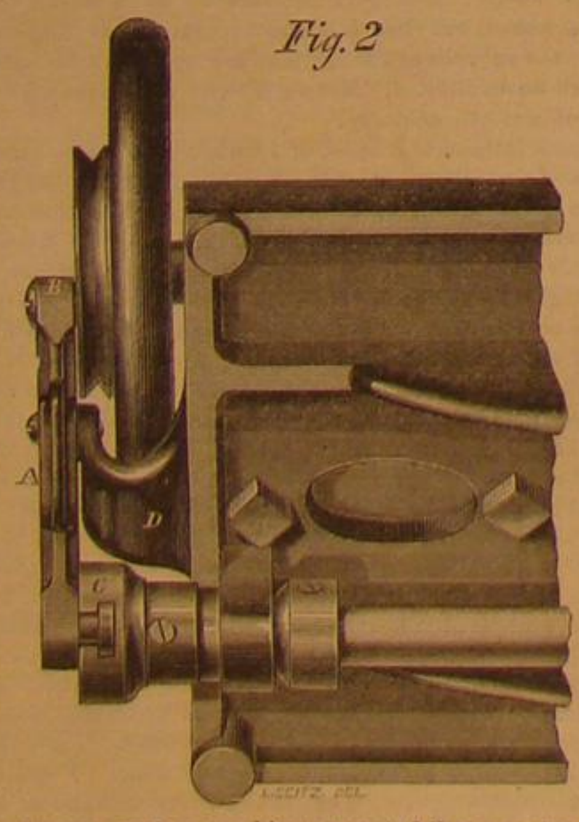
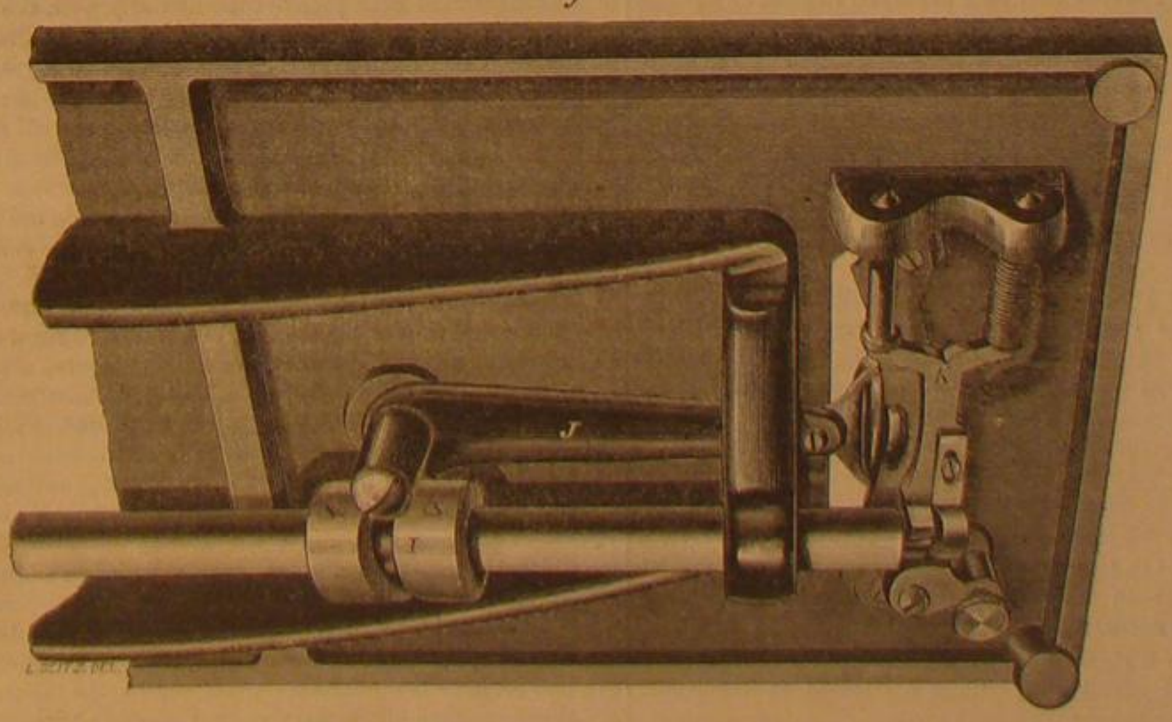



*Fig. 3*




Those who use sewing machines cannot fail to perceive the advantages of these simple tension devices.

The third, and possibly most important improvement, is the method of giving motion to the needle bar and the peculiarity of that motion. The object is to allow plenty of time for the passage of the shuttle through the thread loop, and this is assured by a very simple device. On Fig. 1 is seen a disk, G, which is secured firmly to the frame that supports the needle bar and the upper shaft; it does not turn. On its face is cut a cam groove in a form approaching an oval. Just outside of this disk is another, H, of the same diameter, which is fastened to the shaft and rotates with it. Through this is cut a radial slot, through which passes a stud attached to the needle bar, and on that stud is a steel roller that traverses the oval slot in a fixed disk. Now, the result is that the motion of the needle bar is governed solely by the direction or form of that slot. The arrangement is such that while the shuttle is being passed from one side to the other the needle bar, and consequently the needle, itself, is stationary, and the loop is left intact until the shuttle has passed through, when the needle moves rapidly up or down. With this device it is not possible that the thread should engage with the shuttle in its passage, and, consequently there can be nc slipped stitches. Such an advantage as this cannot escape the notice of those who use sewing machines in their daily work.

Fig. 3 shows the cam, I, which gives motion to the shuttle bar, J. This moves the shuttle in a race which is the segment of a circle of which the shuttle bar is the radius. The movement of the shuttle is, of course, positive, as in other machines. The lower shaft on which the cam, I, is secured gives motion to the feed, K.

For heavy work, especially, these devices are well adapted. They diminish the noise of the machine, distribute friction, and prevent undue wear of the sewing thread. All these points of improvement are sufficiently evident by an observation of the engravings.

Further information, and an opportunity of witnessing the operation, as well as of comparing the improved machines with others, may be obtained by a visit to the depot of Grover & Baker's sewing machines at 495, Broadway, New York city, or by addressing as above.

## Autumnal Diseases.

These are chiefly diarrhea, dysentery, and various grades of fevers, from slight "creeps" to congestive chills, for fever is the reaction of coldness, but when there is not power enough in the system to react from the cold stage, death is certain, as in congestive chill, in which the blood becomes so cold, so thick, and so impure that it ceases to circulate, becomes stagnate, and the machinery of life stops forever. Hundreds of thousands die every autumn of the three forms of disease mentioned, but not one need die, they are avoidable diseases, their causes being known and all that is required is to bring a very moderate amount of intelligence to bear in avoiding those causes. A baby will avoid putting its finger in the candle a second time; it remains only to grown-up stupids to expose themselves to the causes of disease year after year and thus recklessly imperil health and even life itself.

The cause of autumnal diseases is an emanation from the surface of the earth in those localities where are found in combination heat, moisture, and vegetable matter, such as leaves, wood, etc., for the heat of eighty degrees combined with moisture induces decay, and from this decaying substance something arises which, if breathed or otherwise taken into the system, induces the disease mentioned sooner or later.

What this emanation is, has hitherto been merely a conjecture, because it was impalpable, so like thin air, that the atmosphere which contained it when subjected to chemical analysis yielded nothing beyond the constituents of pure air. But within a year or two it has been ascertained that if a quantity of air of a miasmatic locality is bottled up and is conveyed to a sleeping apartment, the person who breathes it will, in a short time, have more or less decided symptoms of fever and ague; and on examining his saliva or the inside of his mouth a living, moving thing is clearly visible with microscopic aid. Observation and experiment have shown incontrovertibly that there are two ways of escaping the ill effects of having these living things introduced in the system,

persons must avoid living in localities where the land is rich, flat and moist, or they must drain those lands; but it is possible to live in such places, and have reasonably good health simply by keeping in the house of mornings, with a brisk blazing fire until breakfast is eaten, and take supper at sundown, because it has been found that these emanations are more poisonous at sunrise and sunset and that if the stomach is excited to action by the process of digestion the emanation is rendered innocuous, perhaps from the fact, in part, that the juices of the stomach at the time of digestion are of a character to destroy the life of these living things; but the fact remains the same, whether this supposition is true or not.

A practical use may be made of this subject in the light of these facts, in reference to breathing night air. Very many advocate the raising of windows in a sleeping apartment summer and winter all the year round; the theory seems a good one, but experience will not corroborate it. Persons living on water courses where the "bottom lands," as they are called, are rich, luxuriant, and damp will save health and life itself by keeping all outside doors and windows opening into chambers closed from sundown to sunrise during the three autumnal months, in fever and ague or intermittent localities.—*Hall's Journal of Health.*

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## THE EXPOSITION.

### A GERMAN PAPER MILL.

In an annex of the kingdom of Würtemburg is erected and kept in operation for a number of hours each day, a train of machinery for the manufacture of paper from wood. The finished paper indeed is not made here, but the wood is thoroughly reduced to pulp, ready for the production of paper in the ordinary manner. The process as here carried on is as follows: The wood, which appears to be quite green, is sawed into lengths of twelve or fourteen inches, by a circular saw. A man with a drawing knife then strips off the bark, and in this state, the round wood being already split into two or three pieces, it is introduced into the grinder. The face of this is the same in width as the length of the pieces of wood, and these are laid across it and held against the revolving face by screw clamps. The speed of revolution is about 100 turns per minute, with a diameter of about three or four feet. The screws that press the blocks of wood against the face of the grinder are each provided with a nut worked by a worm, for the purpose of slowly feeding up and maintaining the pressure as the wood is worn away. These worms are all driven by a belt passing over the pulleys on the ends of their shafts, and to allow for irregularities in the hardness of the wood, the connection between the pulleys and the worm shaft is made by a reversed ratchet, the pawl being held against the teeth of the ratchet by a short and stout india-rubber band attached to a pin on the side of the pulley. If the pressure required to screw up the nut increases beyond a certain limit, the pawl will slip upon the teeth of the ratchet, stretching the india-rubber band and fail to screw up until the resistance becomes reduced. A current of water is kept passing over with the grinder, and the ground wood passes off with this to a revolving drum of coarse wire gauze placed on a lower level and some little distance in advance of the former apparatus. The drum is furnished with an automatic comb, which removes from its surface and throws into a receptacle in front of the drum all coarse pieces of wood or chips that may have been formed, while all the true pulp, even though quite coarse, passes through the meshes of the wire drum and out at one side into a receiving tank provided for it. It does not remain here, however, but flows immediately through a four-inch, or thereabout, copper pipe into another grinder of a conical form, revolving about a vertical shaft, and then again passes to a tank containing a revolving cylinder similar to the first, but of a finer mesh, where it is still more finely strained, and this process is repeated yet once or twice more, so that pulp of several degrees of fineness is obtained, the water at last flowing off nearly clear and returning to be pumped back to the first portion of the apparatus, or running to waste, as the case may be. The pulp, as collected in the last tanks, is quite uniform in substance, and seems to possess considerable fiber and tenacity. The paper manufactured in this way appears to be of excellent quality, and if a certain proportion of cotton pulp is mixed with it, it may be used for almost all the usual purposes of paper made from cloth.

Within the past month most of the buildings in the park, as well as the streets around it, have been completed, and there is not now so much of that unfinished appearance which detracted considerably from the general effect during the first months of the great Exposition.

### SCHOOL HOUSE AND COTTAGE.

The United States have added several creditable structures in the grounds, such for instance as a primary free schoolhouse, containing the usual furniture and apparatus of such an institution; in reference to which we can also say that no attempt has been made to produce display by introducing things not in actual use. It looks serviceable and practical. Then we have a portable farm cottage from Louisiana, which is rather more pretentious, having a Grecian pediment and columns before the door.

### HOT-AIR ENGINES.

More important than this is a building or roof, under which is placed Mr. Shaw's hot-air engine. This has been in course of erection ever since last March, but from bad workmanship has given a great deal of trouble in getting to work. At last, however, it is in operation, and appears to work with a will. This is a machine which theoretically is important, while the practical difficulties, which have always been the chief ones to overcome in this class of engines, appear to have been pretty effectually surmounted. As has been often proposed before, the whole of the products of combustion are applied directly to the piston to produce motion, thereby utilizing a greater proportion of the heat than is possible when these are only used to raise a separate volume of air to an equal temperature with themselves. If the products of combustion are then allowed to escape, and only the air which they have heated used, it is evident that perhaps half the heat is thrown away bodily, unless a very large body of air is raised to a low temperature and worked at a very low pressure. The great difficulty in the way of using the hot gases from the fire directly in the cylinder has been the apparent impossibility of preventing the surfaces from cutting, by the combined action of the heat and dirt. Mr. Shaw seems to have obviated this by attaching to his pistons a drum of a diameter very slightly—say one eighth of an inch—less than that of the cylinder, and a length equal to the stroke, and providing an arrangement by which before each stroke the annular space between the drum and the cylinder is filled with cold and clean air of the same pressure as that which comes upon it afterward. Having no way of escape, this air remains in the space during the stroke and protects the working faces from injury by preventing the hot and dirty gases from impinging at all upon them. As a further and very important means of economy, regenerating surfaces of iron and brick are provided, for abstracting as much as possible of the heat remaining in the exhaust air, and imparting it to the incoming cold air. A trial was had lately with this engine, which showed an economy of coal superior to what has been obtained with the steam engine, and as this is yet in its infancy, we shall no doubt hear much more of it in future.

### GLASS WARE AND PLATE.

But as it is raining, let us go in and take a walk through the passages of the main building. Truly the magnificence of the French department surpasses the power of description, and casts all others quite into the shade. The central portion, or the straight piece connecting the two circular portions, at the ends, is devoted to the display of bronzes, tapestry, glass, porcelain, and gold and silver plate, and without question such a display of elegance and taste was never before to be seen under any circumstances. One is almost bewildered by the brilliancy of the glass ware, and stopping to examine it he is charmed with the beauty of the forms into which it is fashioned, and the delicacy of the ornamentation. Among the plate is a service made for M. Petin, of the celebrated firm of Petin, Gaudet & Co., ornamented with appropriate representations of the machinery employed in the manufacture of iron and steel, arranged in groups at the corners and other prominent points. In another case is a set of gold vases enameled in various colors with beautiful devices, in such a way as entirely to hide the precious metal, and thus presenting rather the appearance of finely painted porcelain. It may well be questioned whether in any palace in Europe there exists such an exquisite piece of taste and workmanship. This portion of the French department has called forth the most unbounded admiration from visitors of all nations, and it well deserves to have done so.

### SCIENTIFIC APPARATUS.

Returning again to objects of a more practical nature, we notice the fine collection of scientific apparatus which the French makers exhibit. They have, as we know, always been celebrated for their proficiency in this branch of manufacture, and their reputation is here well sustained. A very good collection of air pumps is exhibited, presenting some features worthy of notice. The pistons are made in length say twice the diameter of the cylinder, and are simply of brass with a number of small grooves turned on their face, a system now sometimes used as a substitute for packing in the pistons of small steam engines. A very neat substitute for a parallel motion, or means of converting the motion of the crank into that of the piston rod, is adopted in these pumps, and quite frequently in other French machines. It consists of a fixed internal gear placed concentrically with the crank shaft, and within this another gear of just half the diameter on the pitch line, secured to the crank and revolving with it.

Firmly fastened to this is an arm carrying a pin in such a position that when the crank is horizontal or at half stroke, this shall be exactly opposite the center of the internal gear. As the small gear goes around the inner circumference of the former, it will be seen that this pin which moves the piston rod will travel in a straight vertical line, while the construction of the motion is extremely simple.

### TRACTION ENGINES AND AGRICULTURAL MACHINERY.

A portion of the park is devoted to traction engines of various descriptions and the machines there exhibited are of interest as showing the progress that has been made in the application of steam. The importance of steam power for agricultural purposes is becoming more fully appreciated now in Europe as the very large number of portable engines adapted to this end, which have been sent to the Exposition, clearly shows. The traction engines are chiefly intended for the same use, the gearing being so arranged that in addition to the ordinary functions of portable farm engines they may be used as locomotives in drawing wagons. The examples exhibited illustrate admirably the practice of the different makers, and perhaps in no class of machinery in the Exposition are the distinctive characteristics of French and English design more strikingly shown.

Messrs. John Fowler & Co., of Leeds, who are among the most prominent makers of agricultural machinery in England, send a traction engine of simple and substantial construction. The power is furnished by a pair of horizontal cylinders, and the gearing, though such as to permit of the pistons working at a tolerably high speed, consists of but few wheels, and these have teeth of good size, being in fact if anything too heavy. The driving wheels receive their motion from a large gear wheel running on the same shaft and placed just inside of the former, a friction clutch being employed to throw them in or out of gear. The machine is steered by a chain passing around a pitch pinion and taking hold of the forward axle on each side of the center. The pinion is moved by a worm gear on the upper end of its shaft. Messrs. Aveling & Porter also have an engine which has proved its capabilities for work by drawing five loaded wagons weighing 35 tuns up a slight grade. In this engine a single horizontal cylinder is employed, and the motion is so reduced by gearing as to enable this to supply all the power required, while from the high speed so necessitated no trouble from working over the centers is experienced. The motion is imparted to the driving wheels by a pitch chain passing over a pinion in connection with the gearing, and a large pitch wheel turning on the same shaft with the driving wheels. A stout pin is used to clutch the chain wheel to the drivers, and by withdrawing this the engine is free to work while remaining at rest, while if one pin only be withdrawn the engine is enabled to turn easily around a short corner. The steering is effected by a single knife edged wheel in front, which supports merely enough weight to give it a proper bite on the ground without imbedding it too deeply.

A third engine which stands by the side of those already mentioned is of French construction being built by Messrs. Lotz, Fils ainé, of Nantes. It presents a marked difference in design and workmanship to the English engines. It is intended to be used as a plowing engine as well as for traction, and this of course gives rise to some of its peculiarities, but like many Continental machines it is full of light rattle traps which are never so much out of place as in an engine for rough use like an agricultural one. A pair of vertical cylinders are employed, the crank shaft pillow blocks being secured in an extension of the fire box casing. The driving wheels are moved by a pitch chain as in the last mentioned engine, and more than one diameter of pitch wheel is provided so that the speed and tractive force of the engine can be varied. All the gearing, however, appears light and inferior. The barrel of the boiler is encircled by two drums for winding in or out the wire rope by which the plows are to be drawn. These bear, through the intervention of rollers, on an inner ring or seat fastened to the shell of the boiler, and are driven by gearing at their circumference. An over ingenious moving guide is provided to lead the wire rope on the drum in such a manner that it shall not over-ride itself, the motion resembles that used in some slotting drills for traversing the tool back and forth. A longitudinal shaft runs along the top of the boiler to convey motion from the engine gearing to the drums.

The same makers exhibit a traction engine with a single vertical cylinder working a pinion shaft from which motion is communicated to the driving wheels by a pitch chain. It is steered by a single wheel in front. Notwithstanding the manifest inferiority in design of these engines to the English, they have received a medal of a much higher class than the latter! There is nothing from America in this line; indeed, though there is a large demand for portable engines with us there appears to have been but little done as yet with traction or plowing engines.

The display of farming implements in general is very good. That in the English department is much the most complete, but this, as compared with what we might have shown, is due in part to their greater proximity to Paris, since the tools that are to be seen in the American annex are not lacking in merit, while it is easy to recognize an American model in very many of the machines in the English department. As a rule the French tools are inferior in design and workmanship to either the English or American. As already stated in a previous letter the grand prize in this class has been awarded to Messrs. Howard, of Bedford, England. Their system of steam plowing is represented by a model in the British annex, but their full size apparatus is at Billancourt, one of the suburbs of Paris, where are grounds more suitable to such an exhibition. Messrs. Fowler also have a fine display of similar machinery.

Messrs. Ransomes & Sims, of Ipswich, also large manufacturers of agricultural machinery exhibit among other things a very useful arrangement of thrashing machine in combination with apparatus for cutting up the straw for fodder for animals in countries such as Spain, Turkey, Mexico, etc., where grass is not grown for hay. The straw which is raised in these countries, is quite thick and nutritive, and if it be cut with an ordinary hay cutting machine, thus leaving the edges strong and sharp, the palates of the animals are so injured by the passage of the rough food over them that they absolutely refuse that kind of fodder. It is necessary, therefore, to bruise the straw so as to destroy its stiffness in order that it may be of any use. In this machine the straw is passed into the box containing two rollers fitted with knives and lugs which pass between pairs of similar ones on the side of the casing; these run at a high speed and from the rapid motion and peculiar shape of the cutters the straw leaves the machine thoroughly bruised and prepared for the cattle.

In the French and Belgic grounds are exhibited model barns and barnyards showing various approved plans of stalling cattle, sheep, etc., and the opportunity is also taken to exhibit specimens of choice breeds of stock. Fresh milk and sandwiches are served out to those who are fond of such plain fare in the little restaurants adjoining.

The awards of medals in this department has been such as to devide the honors pretty equally between the principal nations, Wood and McCormick receiving gold medals in the United States, and about the same number being awarded to French and English exhibitors. The Americans have always shown the greatest aptitude for this class of work, and the greatest originality in invention, but they have not carried

it quite so far in all directions as has been done in England.

The Emperor of Russia obtained a grand prize for efforts to improve the equine race, exemplification of what he had done being given by a splendid lot of horses, which are exhibited at certain hours in the day in an enclosure in front of their stables, which are very complete in arrangement. The English have also several exhibitions of stalls showing modes of drainage, feeding, watering, and ventilation, besides many other details of minor importance but which tend to give a look of neatness and comfort to a stable, and which have a real utility beyond mere appearance. SLADE.

## AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The sixteenth annual meeting of this association, held this year in Burlington, Vt, was brought to a close on Monday, Aug. 26th. This society is a much more democratic body than its younger branch, the Academy of Science, whose meeting at Hartford we noticed two weeks ago, no limit being enforced upon its number of members, any person sufficiently interested in the progress of science to contribute the small annual fee being eligible for membership. The association had its origin in a convention of geologists at Philadelphia in 1840, when an organization was effected under the name of the Association of American Geologists and Naturalists. Its sphere was subsequently enlarged and the present title selected, the first meeting being held in 1848. The objects of the association, as set forth in its constitution, are to promote intercourse between those who are cultivating science in different parts of the United States, to give a stronger impulse to scientific research, and to procure for the labors of scientific men increased facilities and wider usefulness. There are now over five hundred names upon the roll of membership, but less than one fifth of this number were present at any one of these meetings.

The afternoon session of the first day was opened by Prof. Lovering, who exhibited an apparatus for making sound visible. By a suitable arrangement, the air pulsations caused by a sounding organ pipe are communicated to a burning gas jet, producing corresponding vibrations of the flame. A revolving mirror is employed to make these vibrations visible to the eye. By this arrangement the relative velocities of different classes of vibrations given by theory were verified. A singular result was noticed when two pipes of precisely the same pitch were placed side by side; they tended to silence each other, the vibration of the one rising while falling in the other. Prof. Newcomb read the second paper, on a "new determination of the distance of the sun," the calculations having been made at the Washington Observatory. Ten years since astronomers began to suspect that the value of the sun's distance found by Encke from the transits of Venus observed in 1761 and 1769, was largely in error. This distance, 95,300,000 miles, had long been received as the standard. But all the modern tests which could be applied to it indicated that it was about three millions of miles too great. In the year 1862 circulars were issued independently from the observatories of Washington and Pulkowa, (the Russian national observatory situated near St. Petersburg,) inviting the coöperation of astronomers everywhere in a general attempt to determine the parallax of Mars at apposition of that year. The plan was generally adopted, and nearly every active observatory in the world engaged in the observations, which occupied ten weeks. It was the most extended coöperate effort on the part of astronomers which had been made during the century.

Through the pressure of other duties and the illness of the astronomer who had proposed the work, the Pulkowa observatory had not been able to undertake the discussion of this great mass of observations, so that for five years their result remained unknown. Last winter an arrangement was made between the observatories at Washington and Pulkowa, by which this discussion was placed in possession of the speaker, to be executed and published by authority of the Naval Observatory. It is now complete, and the sun's distance is determined to be 92,340,000 miles, and the velocity of light is thus reduced to 185,500 miles per second.

Prof. C. S. Lyman, of Yale College, exhibited a new apparatus for illustrating the motion of the waves of the ocean. Mr. Roosevelt followed with a paper on the distribution of the precious metals in the United States, and Prof. E. N. Horsford closed with an essay on the subject of bread, which is an old hobby of his.

"The Relative Value of Gold and Silver for a Series of Years" was the theme of the opening paper of the second day's meeting, by Mr. E. B. Elliott. It seems that in 1700 the average market value of gold was 15·5 times that of silver. In 1841–1848, the average was 15·8; in 1849–1852, 15·5; and since 1852 it has averaged, at first 15·33, and later 15·4. It is now about the latter figure, quite persistent, and tending rather in favor of gold, by the increasing production of silver. The production of the latter in the world is on the increase, and the present value of the metals is not likely to be reversed or particularly changed, except in favor of the higher price of gold. Prof. Hall followed and repeated the remarks concerning the Cohoes mastodon, made by him at the late Hartford meeting, but which then caused a spirited discussion. Both conclusions, as to the age of the mastodon and those relating to the glacial action in the distribution of the bones, being disputed, Prof. Dawson, of Montreal, declared himself a disbeliever in the American glacial theory; other eminent geologists held the same opinion, and the mastodon was in turn referred to several ages before, after, and during the glacial periods. At this point of the proceedings the members were divided into the two sections of (A) mathematics and physics, and (B) natural history and geology.

The papers read at this first session of section A were of such a character that no report such as our limited space will permit, would do justice to them. The subjects and their authors were the following: 1. Remarks on meteorological results deduced from the new method of registration; G. W. Hough. 2. Remarks on the laws of winds; Prof. J. B. Coffin, of Lafayette College. 3. On the periodicity of the aurora; Prof. Lovering. 4. Occupations of the people classified; E. B. Elliott, the eminent statistician. 5. On the determination of latitude from observations in the prime vertical; W. A. Rogers; 6. On new diagrams and derivation symbols, illustrating the prominent characteristics of chemical elements; Prof. S. D. Tillman.

In section B: 1. "The study of the orthoptera of North America" was treated by L. H. Scudder, of Boston. 2. "Traces of ancient glaciers in the White Mountains," by G. L. Vose. The speaker found glacial scratches 5,350 feet above the sea on Mount Washington, and he considered this peak as the center of the glacial system. 3. Prof. Marsh read a paper on the "Origin of lignilites or epsomites." 4. Prof. Hall explained the "Geographical distribution of fossils in the Hamilton, Portage, and Chemung groups." 5. Mr. L. E Chittenden interested the audience with an account of a species of shell, the *Liminea megasoma*, found only in lakes Huron and Champlain, and rapidly disappearing even there.

At the general session on the third day, Dr. Gould read a paper on the "Velocity of transmission of signals by the telegraph." Previous to the year 1849, it was supposed that the velocity of electricity through wires was too great to be measured. In that year, Sears C. Walker discovered, while measuring longitude, a perceptible retardation. Between Washington and St. Louis the velocity was found to be only 15,000 miles per second. On the submarine cable between Greenwich and Brussels the velocity was only 8,000 or 9,000 miles. On the Atlantic cable, Prof. Gould found the velocity to be between 7,000 and 8,000 miles per second, being greatest when the circuit was made by the two cables. Incidentally it was shown that the usual practice of telegraphers to increase the power of their batteries is entirely unnecessary and unwise. A single element is sufficient to produce the signal through 4,100 miles of the cable. The speaker mentioned the fact that he had transmitted signals from Valentia to Newfoundland with a battery composed of a percussion cap, a drop of acid, and a morsel of zinc, and had also transmitted signals on wires from which the battery had been removed, by the previous charge alone. The insulation of the cables improved by time, and signals were sent most rapidly by alternating positive and negative currents.

The second speaker was Prof. Horsford, who lectured on the structure of ice, in relation to the sudden disappearance of ice on Lake Champlain. This ended the scientific exercises of the general session, the other papers being referred to their appropriate sections.

In section A, Prof. Hungerford read a paper relative to experiments with snow at a temperature below 32°. He attempted to show that snow could be then changed directly into ice, by simple pressure. He was followed by Prof. Hough in an abstruse paper on "Personal equation in transit observations." Dr. Bradley claimed "Tellurium as a metal." His reasons for this classification have previously appeared in these columns. Prof. Tillman next presented his "Method of representing musical intervals upon a spiral projection." The exercises in this section closed with Prof. Hyatt's paper on the "Value of wood spirit for practical purposes." In section B, Prof. Newberry exhibited portions of a fossil fish from Devonian rocks in Delaware, Ohio, remarkable for its size, it being probably not less than twenty-five feet long. The second paper was by Mr. Scudder, of Boston, on fossil insects of North America. Prof. Hitchcock read a paper on Winooski marbles at Colchester, Vt. Prof. Verrill, of Yale College, on zoological affinities of tabulated corals. Prof. Worthen followed with a paper on the coal measures of Illinois. Prof. Dawson read the last paper, on new points in geology in Nova Scotia and New Brunswick.

At the general session on Monday, after the passage of resolutions tendering thanks of the association to George Peabody for his donations in behalf of science, the society proclaimed itself as cordially in favor of the introduction of the metric system of weights and measures, but opposed to change the weight of the existing monetary unit, the gold dollar.

In the sectional meetings papers were read on the geology of the state of Maine, and another on the geographical distribution of radiates on the western coast of North America. "Climate glacial epoch in North America," also a paper on the "Ripton sea beaches," both by Prof. Hungerford; "Geology of Vermont," by Prof. Hitchcock; and "Ichthyological fauna in Lake Champlain," by Mr. Putnam.

After some business transactions, the session was declared adjourned, to meet next year in Chicago.

## The Late Obed Hussey.

In the annexed history, from the *Ohio Farmer*, we regret to notice the absence of the name of a citizen of Maryland, says the *Turf, Field and Farm*, to whom, undoubtedly, belongs the credit of having invented, and brought into practical use, the first reaper and mower ever seen upon this continent. We allude to the late Obed Hussey, of Baltimore. We remember, when quite a young man, the interest with which we watched him, hour after hour, toiling upon the rude materials, which, at the bidding of his genius, were soon to be fashioned into the machine, which has done so much to lessen the toil of the farmer and cheapen the food of mankind. We remember his many heart breaking discouragements, and the brave perseverance with which he encountered and overcame them. We remember, too, rejoicing with him at the first successful trial of his mower, made on the estate of the late Gustavus Weems, in Annie Arundel Co., near Herring Bay. If we are not mistaken, the heirs of Hussey are now reaping, in the shape of a royalty on part of his invention, the reward which he, unfortunately did not live to enjoy.

Most people take it for granted that reapers and mowers are quite of modern invention, but such a conclusion is far from being correct. Others have supposed that some American Yankee first conceived the idea of constructing a machine for cutting grain with horses or oxen; but history informs us that reapers were in operation before Columbus discovered the Western Continent, and that the sickle and the scythe, in some of the oriental countries, had been superseded by reapers that were worked by one or two oxen, in the early part of the Christian era.

The first account of a machine to reap grain appears to be that given by Pliny the Elder, who was born, it has been supposed, about the year of our Lord 23—more than 1800 years ago. This historian says:—"There are various methods of reaping grain. In the extensive fields of the lowlands of Gaul, vans of a large size, with projecting teeth on the forward edge, are driven on two wheels through the standing corn (oats and barley are called corn) by an ox yoked in a reverse position—with the machine forward of the ox. In this manner the ears (or what we call heads of barley or panicles of oats) are torn off and fall into the van. In some places the stalks are severed in the middle by sickles, and the ears, or heads of grain, are stripped off between two hatchels."—Palladius, an Eastern ecclesiastical writer, gives the following account of reapers in A. D. 391. In the Gallic lowlands they employ a more expeditious method of reaping, requiring the assistance of a single ox during the whole of harvest time. A cart is constructed which moves on two wheels. A low box of boards is constructed on the wheels, and the boards in front are lower than the rest. Behind this cart two shafts (or thills) are fastened, like the poles of a sedan chair. To these an ox is yoked and harnessed, with his head turned towards the cart; and the ears, or heads, are gathered in the box, and the driver regulates the elevation and depression of the teeth with a lever."

The next account of a reaper is given in proposals, submitted in Britain in 1785, for constructing a reaper. This machine was propelled by a horse or ox, clipping the heads of grain and depositing them in a large box, which was emptied when it was full into a store roon. In the details of this machine, a drive wheel, pulleys, pinions, tooth wheels, and iron combs, or teeth, are spoken of.

In 1799 another reaper is spoken of as being propelled by a horse behind it, which cut and laid the grain in a swath, on one side of the reaper. A boy could manage the machine, and with one horse could cut a swath about two feet wide, or rather more than could be reaped in the same time by six men with sickles.

In 1806 Mr. Gladstone produced a reaper for cutting grain, delivering the straw into gavels to be bound. Drive wheels, pulleys, bands, etc., are alluded to in the details of this reaper.

In 1807 Mr. Pluckenett constructed a machine in which a horse drew the machine instead of pushing it forward, according to the usual custom of operating reapers. After this period many inventors entered the field with reapers of an improved construction, and in 1823, Mr. Mann, under the auspices of the Highland Society of Scotland, brought forward a new reaper, which was worked with one horse and which could reap 10 acres in 10 hours.

In 1830 a mowing machine was produced, and soon after that a combined reaper and mower is spoken of. After that time the celebrated McCormick reaper entered the field, astounding Americans as well as farmers of the Old World.

## The Petroleum Fuel Mania.

A successful experiment was made last week on the Ohio River with petroleum as a substitute for coal in navigation. The *Cincinnati Gazette* says of the new method of raising steam: "The advantages of this arrangement are so obvious that it seems almost superfluous to speak of them, yet we cannot resist pointing out a few of them. First, we have the economy of the fuel itself, $20 worth of petroleum being equal to $50 worth of coal. Then, there is the economy of weight and space, which is as one to ten. In addition to this we have the saving of wages of firemen and coal-heavers, the saving of time in taking the fuel on board, and above all, the perfect control of the engineer over the fire, and complete absence of danger from sparks. The explosive qualities of petroleum have hitherto been the great bugbear by which our enterprising steamboat builders and machinists have been scared off. We are not at all surprised at this, for steam itself had to struggle hard ere it could assert its supremacy over every other power in use, and we feel satisfied that coal will give way to petroleum as the tow path gave way to the railway."

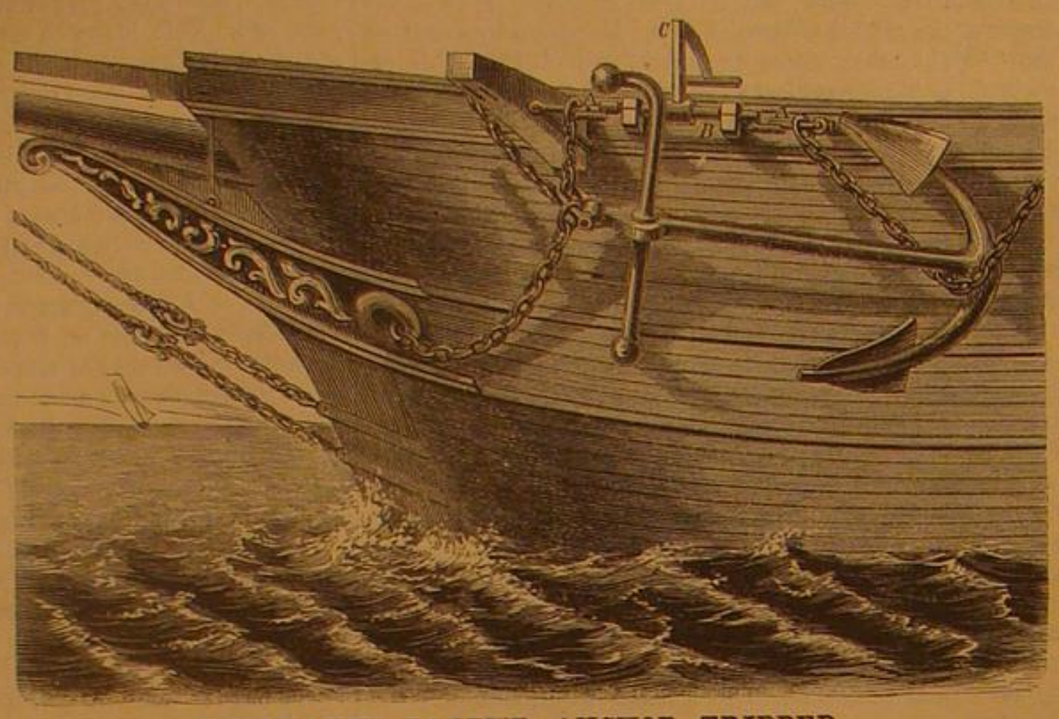
The above is an excellent sample of the rubbish concerning the use of petroleum for fuel, which has been circulating in newspapers for the past few months.

GERMAN MOURNING CANDLES.—These are made by heating paraffine with the shells of the Anacardium nut, which contains a black resin soluble in paraffine. While the paraffine is liquid it is of a dark brown color, but on solidifying it becomes jet black. The candles have a very thin wick and burn without giving off any unpleasant odor or vapor. Who will invent some combination of chemical substances to incorporate into sterine or wax candles which will give a variety of colors when burning, say red, green, or yellow. The demand for such an article would be very great for illuminating purposes.

### Improved Device for Tripping Anchors.

The ordinary mode of hanging a ship's anchor is by securing its ring near the cathead by a chain called a "ring-stopper," and bringing its flukes well up to the rail by means of a chain called the "shank painter" which passes around the shank of the anchor. The ends of these chains are fastened upon fixed hooks, or their equivalents, and when it becomes necessary to let go the anchor its fluke end is raised and one of the flukes hung on the rail until the end of the painter can be released, when the anchor is swung forward far enough to slacken the ring-stopper and allow one of its ends to be released, when the anchor may be let go. These successive operations require the strength of several men and a good deal of time, at a period when the labors of the men are required elsewhere and the time is of the greatest value.

The object of the anchor tripper seen in the accompanying engraving is to save this labor and time, and permit the anchor to be tripped instantly under all circumstances, which must be of very great value in cases of emergency when the lapse of a few moments may involve the loss of the ship.




HEITMANN'S PATENT ANCHOR TRIPPER.

With this improvement both the ring-stopper and shank-painter are retained, but only one end of each is secured on fixed hooks, the other ends being held on pivoted latches, A, which, when not held in a horizontal position, are allowed to swing freely in a vertical plane. They are thus held by a bar, B, called a "keeper," which is sustained in bearings on brackets projecting from the ship's side. Each end of this keeper is off set and concaved to receive the ends of the latch bars as seen in the engraving. A bent lever, C, is securely fastened to the keeper by which it may be operated from on deck. This lever is represented in the engraving as partly raised so that its form may be seen; but when in its normal position, with the anchor slung, it rests upon the rail. It may be secured here by a catch if desired, but it is so shaped as to render its accidental displacement hardly possible, even without such precaution.

In operation the anchor is brought up to its proper position behind the cathead when the free end of the ring-stopper is passed through its ring and over the latch, A, which is then rested in the concave portion of one end of the keeper. The free end of the shank painter is then passed under the shank and the ring on its end slipped over the other latch, which is placed in the corresponding receptacle at the other end of the keeper. To trip the anchor it it only necessary to raise the lever, C, sufficiently to release the latches, when tbe anchor descends, held only by the cable through the hawse hole. This simple operation can be performed in an instant by only one man. The advantages of such a device are obvious to all those whose experience on the sea has learned them wisdom. It was patented through the Scientific American Patent Agency by Capt. B. H. Heitmann, who may be addressed at Galveston, Texas, relative to the sale of rights or the disposal of the whole patent.

### GOULD'S STOPPLE FOR SODA-WATER BOTTLES.

The design of the device shown in the engraving is to afford a ready means of opening and closing the aperture of soda-water bottles, the stopple being always attached to the



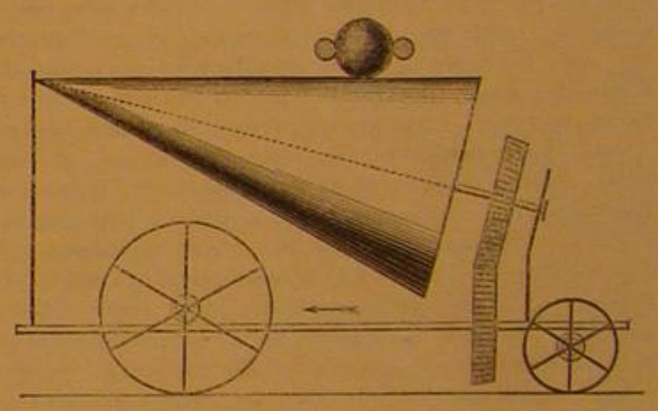
receptacle of the liquid. The stopple is simply a globe of rubber, or of any other elastic substance, turning on an axis passing through its center, the bearings of which are eyelets of metal to prevent wear. Around the neck of the bottle is a coiled spring, a portion of which passes through the sphere that forms the stopple and acts as the axle on which it turns. By the pressure of the thumb on the side of the stopple it can be rolled from its seat and returned, the tension of the spring retaining it accurately on its seat.

With this device there can be no loss of stopples. The enormous waste and consequent expense of corks is a very serious item of cost in securing the mouths of bottles, but in this device is entirely prevented. Patented July 30, 1867, by John H. Gould, Newburyport, Mass., who will reply to all interogatories relative to the improvement.

### DYNAMOMETERS AT THE PARIS EXHIBITION.

The friction brake is a very rude instrument for the refinement of modern engineering and machine making. It is a very useful and simple contrivance, and it is adapted to tell approximately how many horse power a water-wheel or a windmill gives out in its action, or how much power is consumed by a millstone or other uniformly rotating mechanism. But when it comes to the investigation of more complex and irregular movements, when such a question arises as what precise point or portion of a curved cam suffers the greatest strain during its revolution, and what proportion this strain bears to that which cams of other shapes or curves will have to undergo if substituted for the first, when it comes to watch and compare the relative consumption of power between different spinning and weaving machines, or between different headstocks of a mule, or between differently constructed parts of a single mule headstock—then the friction brake of course is no longer applicable, and a delicate, scientific, yet simply constructed instrument becomes a generally acknowleged desideratum. Such an instrument is what engineers now call a rotation-dynamometer, and a perfect instrument of this kind is yet to be designed. The name rotation-dynamometer is given to distinguish it from those instruments which measure and register linear exertions of power, or forces exerted in a straight line, such as the pull of a locomotive engine or of a tug-boat Dynamometers of that kind present no difficulty in their construction, and there exist a considerable number of such instruments all practically perfect,or nearly so, in their action and performance. Most of these instruments are based upon the production of a diagram, one element of which is represented by the tractive force or linear strain exerted, while the other element represents the time or space of movement through which that exertion had taken place. The area of that diagram representing the product of the tractive effort multiplied by the space through which it has been exerted gives the precise amount of work performed. The form and outline of the diagram itself in those instruments which produce a visible diagram of that kind indicates at the same time the precise fluctuations, changes, and other characteristic features connected with the exertion of power, and thereby gives one of the finest, most trustworthy, and useful records of the performances of machinery which we have in practical mechanics. The steam engine indicator is in reality nothing but a linear dynamometer registering the exertions of the steam pressure as connected with the space traveled through by the piston, and it is certainly one of the finest, most suitably contrived, and most perfect instruments at present at the command of mechanical engineers. For a rotation-dynamometer, the problem consists in producing the same register of power and space with regard to rotatory movements as the indicator gives for a straight-lined exertion of power. We require a diagram showing the amount and variation of power exerted upon a pulley by the belt running over it during the time that any given machine which is driven by that pulley performs its operation. The dynamometers hitherto made for this purpose suffer from several defects. Most of them are complicated and costly instruments, difficult to keep in order, and unreliable in their indications. Others of a simpler nature are interferred with in their indications by alternation of friction and other elements, such as the centrifugal force, which, varying in amount with the speed of rotation interferes with the indications of the dynamometer, which are then correct only at one given speed, and more or less far removed from the true mark as the speed differs from the normal velocity. The Exhibition contains two rotation-dynamometers; they are the best of their kind ever made, and both invented in France. Still our general remarks apply to both of them, and they leave plenty of room yet for any really simple and practical instrument of their kind. The two dynamometers we speak of are those of M. Taurines, in Paris, and of M. Engen Bourdon, the well known engineer of the same town. The dynamometer of M. Taurines is a very complete instrument. It was invented some five years ago, and used in a series of experiments made for determining the power consumed by different engineers' tools at the workshops in Indret, apparently with much success. It consists of a pair of pulleys mounted upon a solid shaft and upon a surrounding hollow shaft respectively, and connected together by a pair of segment springs. The transmission of power from one pulley to the other,through the action of these springs, causes the latter to alter their shape, and thereby a tension is exerted parallel with the axis of the two shafts which carry the pulleys. In this direction a small carriage, moving on four wheels and upon a pair of straight horizontal rails, is attached to the springs by a connecting rod, and this carriage is traversed forward and backward upon the rails, according to the action of the measuring springs connected to the two main shafts. The position of the carriage on the rails is therefore equivalent to the strain exerted through the pulleys, and corresponds to the position of the pencil point in the steam-engine indicator. The second element, or the space traveled through, corresponds to the number of revolutions made by the pulleys, and this is transmitted to the indicator in the following way:—

The carriage previously referred to carries upon its frame a long nicely finished cone, which revolves round its own axis in two bearings, mounted so that the upper line of the cone remains always horizontal. This cone is geared by a pair of bevel wheels, so as to revolve with the two driving-pulleys and to make the same number of revolutions. At the top of this cone, and in frictional contact with it, is a sphere guided between rollers which are also in frictional contact with the sphere. The contact between the cone and the sphere,theoretically, is a mathematical point, and this point corresponds to the pencil-point of the other indicators. Now as the cone revolvolves, the sphere follows the movement of the point of contact, and receives an amount of motion which is due to the circle described by the point of contact upon the surface of the cone during the revolution of the latter. The position of the carriage and cone upon the rail is therefore the element which determines the size of the circle of contact between the cone and the sphere. The annexed diagram shows the relative



position of these elements, and it will be seen from it that the movement of the carriage in the direction of the arrow brings the broader part of the cone in contact with the sphere, and that for one revolution of the cone the sphere will make a greater number of turns in proportion to the increased diameter of the circle of contact. The number of revolutions made by the sphere, and counted by a common engine counter moved from one of the small friction guides,is a fraction of the product of power and distance traveled through,or an equivalent to the work performed. It is necessary only to read off the figures of a suitably arranged counting apparatus to arrive immediately at the power indicated by this instrument, and so far, its use is very convenient; but, on the other hand, it cannot be denied that the apparatus is very complex, and that its elements are liable to derangements and inaccuracy on account of slip, particularly when exposed to sudden changes of power. M. Bourdon's dynamometer consists of a pair of pulleys, each on a separate shaft, and the two shafts are geared together by means of a pair of spur-wheels with inclined teeth. The inclined gearing exerts a longitudinal pressure proportionate to the strain transmitted through it, and due to the angle of the teeth. There is therefore an end thrust caused by this gearing, and this is taken up by one of the shafts which is free, endways, in its bearings, and presses endways against a spring. The spring transmits its movement to a pointer, and in this manner the amount of strain transmitted is registered upon a scale. This instrument, although simpler than the first,is liable to be interfered with in its indications by the changing influence of friction, and so we find ourselves compelled, in the face of those two best indicators yet made, to declare that an absolutely perfect instrument of the kind yet remains to be invented.—*Engineering.*

### WATCHES AT THE EXPOSITION.

No section of horology shows greater advance since the Exhibition of 1851 than that of pocket chronometers and watches. The most striking feature is an improved proportion of all the works; but the most essential points of improvement are the increased weights and diameters of the balances, the importance of which in the construction of a pocket watch is now fully established. Although France makes a larger exhibition of watches than England, those exhibited by the latter country are decidedly the best.

The escapements principally in use formerly in watches were the chronometer or detached escapement and the duplex; these, though excellent in themselves, are not well

adapted for these railroad days, because they will not bear rough usage. They have accordingly been almost entirely superseded by the lever escapement, which is particularly suited for all the ordinary usages of life; and, when all the other parts of the watch are of the same quality as the pocket chronometer, a most reliable timekeeper is obtained. A watch with an uncompensated balance spring is seriously affected by changes of temperature, particularly when not worn habitually. Ten degrees of Fahrenheit causes a watch to vary seven minutes per week; hence the difficulty of regulating watches, except to the owner's particular wear; yet, if a watch be regularly worn, it is remarkable how nearly this error is balanced.

Great pains have been taken during recent years in England to improve the manufacture of ordinary watches. The best works are made in the Lancashire villages, and a considerable quantity of these works are annually exported to the United States, where they are cased and finished. According to the census of 1861, 23,427 persons were engaged in that year in the watch trade in England, the greater portion of whom reside in Lancashire.

Though the first-class chronometers in France are, as a rule, inferior to those of English manufacture, they are—and especially when considered in relation to the very important question of price—very remarkable for their general excellence. Pocket chronometers and watchmaking have been hitherto but a very secondary manufacturing interest in France; but of late years it has greatly revived.

It is, however, in cheap watches that France makes the greatest show. The efforts made by M. Goutard, of Besançon, to revive watchmaking in France, which were rewarded by a medal in 1862, appear to have been very successful. The clock and watch trade of France has, indeed, acquired enormous proportions during recent years. It is officially represented as amounting to 35,000,000 francs annually. The principal seats of the trade are for clocks, Paris; for watches, Besançon; and for large turret clocks, Monez (Jura). At Besançon 15,800 men, women, and children, are employed in the manufacture of watch movements. There are 132 workshops, and 150 houses in the trade give out work to be executed in the private dwellings of the artisans. The Besançon watch trade manifests considerable improvement since 1855. Of 223 exhibitors in the French department of watches and their movements, ninety-seven come from Besançon. In 1845 this town produced 51,191 watches; in 1855, 141,043; in 1865, 296,012; and the number is now said to surpass 300,000 annually. The declared official value of the watches and movements in 1866 was 17,000,000 francs. The principal establishment at Besançon is the Ecole Municipale d'Horlogerie, which maintains 250 pupils, and is directed by a professor.

There is also a large watchmaking trade carried on at the Cluses (Savoy), where there is a school for teaching watchmaking. St. Nicholas d'Aliermont is an important seat of this art; out of an adult population of 2,500, upwards of 1,000 are engaged in watchmaking. Astronomical clocks and chronometers are also fabricated here. The total number of timepieces annually made in this town is stated to be 144,000, valued at upwards of 1,000,000 francs. They are for the most part sent to Paris. It is worthy of remark that for the more delicate workmanship women are preferred, at St. Nicholas d'Aliermont, to men.

An attempt has been lately made by some Paris watchmakers to introduce a decimal system of time in watches, dividing the day into ten hours, the hours into one hundred minutes, and the minutes into one hundred seconds. The best illustration of this decimal division will be seen in the watches exhibited by F. Cacheleux (France.)

The watch manufacture of Switzerland is represented in the present Exhibition by one hundred and sixty-three exhibitors, sixty-seven of whom come from the Bernese Jura. It is not a little curious that, while France is now endeavoring to supplant Switzerland in the manufacture of cheap watches, the watch trade of the latter country appears to have come from France, which enjoyed a monopoly in making these instruments when their manufacture was unknown in Switzerland. This branch of industry, for which the latter country is so remarkable, is of comparatively recent growth, and is said to have been founded by French refugees who fled to these mountain villages for shelter from political persecution at the close of the last century. Even as late as fifty years ago it had not grown to any great extent; factories were few in number; a large number of the watchmakers being agriculturists or small farmers, who in the winter season devoted their time to watchmaking.

The repeating motion, for which Swiss watchmakers are now celebrated, had its origin in England; and when such complicated mechanism as that involved in the construction of a repeater is considered, it is evident that there must have been a large amount of mental mechanical ingenuity among the Swiss, for they had formerly little communication with England or France, access to these countries being difficult; and yet in a very short time after the art of watchmaking was introduced into Switzerland good watches were made, including beautiful and accurate repeaters. In 1851 the watch trade had grown to an enormous industry, some of the Swiss houses making as many as 500,000 watches yearly, and a large number running out their 10,000 and 20,000 per annum. These watches are not, of course, either of high class or high price. Most of the works continue to be made in the country parts of Switzerland; but those with beautifully finished cases and delicate workmanship are principally constructed in Geneva. The movements are almost entirely made in the Val de Joux, by various hands. A remarkable exception may be seen in the case of a repeater exhibited by August Baud (Switzerland, 3), all the parts of which have been constructed by himself. Watches will be found in this department from the humble, but by no means rough, watch, of 8 francs, to the pocket chronometer of 1,250 francs. Among the cheap watches are some curious specimens constructed, for exportation to China. A school for teaching watchmaking, founded in Geneva in 1824, turns out exceedingly fine work. Pupils are admitted at the age of fourteen, and many remain in the establishment four years and a half, during which time they are taught all horological processes. The terms are—for natives of Switzerland, 5 francs a month; and for those of other countries, 20 francs. Natives of Switerland also enjoy the advantage of being provided gratuitously with all necessary watchmaking tools. During the winter months the pupils have the privilege of attending gratuitous courses of lectures, given in the evening, on geometry, mechanics, and linear drawing. There are also four other schools in Switzerland, with professors at their heads.

The chief characteristic of the Swiss first-class watches is their horological ingenuity. Many combine movements of an extremely complicated nature, while the finish of the cases in the majority of the specimens exhibited leaves nothing to be desired.

Those interested in the curiosities of watchmaking will find in the French as well as in the Swiss department several extremely minute watches. The smallest is that exhibited by A. Rodanet & Co., which is set in the stem of a gold pencil.

It is worthy of notice that the fusee on which the English watchmakers rely so much in the construction of their best watches is entirely suppressed among the Continental makers. The absence of this important movement can only be accounted for by a desire to produce a cheap watch. Winding with the pendant—or, as it is popularly called, the keyless watch—is very general among the watches exhibited. This invention, however, is by no means so novel as is generally supposed, having been first introduced by Mr. John Arnold in 1823, for the convenience of a naval officer who had lost his right arm.

L. Gindraux, and R. Claxton, and S. Holdsworth, exhibit very complete and in many respects remarkable collections of clock, chronometer, and watch jewels, set and unset. They consist of diamonds, rubies, sapphires, chrysolites, garnets, and aqua marines, which are the stones used for horological purposes. There are jewel-holes of every description, clock and chronometer pallets, ruby rollers for the duplex escapement, ruby cylinders for horizontal movement; solid chronometer rollers, which serve the purpose of impulse and roller combined; ruby pins, flattened, oval, and triangular; caps and points for marine compasses, and draw-plate holes capable of drawing gold wire from 1,000 to 2,500 yards to the ounce troy. Mr. Holdsworth has also a case of assorted watch jewels for exportation, in order to meet a want long felt by watchmakers living at a distance from the place of manufacture, by which means they have a regularly assorted number of jewels in different sizes.

Switzerland exhibits a great variety of watch movements, jewels, and dials. The glass dials, with gold enamelled figures, exhibited by Corcelle-Tournier & Co., are extremely beautiful, and highly deserve examination.

Some machines are also shown in the Swiss department of ingenious construction, applicable to the manufacture of clocks and watches. It is worthy of remark that the clockmakers were the first who employed special machines for their manufacture. Their wheel-cutting engine has been ascribed to the celebrated Dr. Hooke, who is said to have invented it in 1655. Its use rapidly spread through England and the Continent. The gradual improvement of this machine, and the successive forms which it assumed as the art of construction was matured, form a very interesting history. English clockmakers have largely contributed to its perfection. Henry Sully, an English clockmaker, who removed to Paris in 1718, carried with him, among other excellent tools, a cutting-machine, which excited great admiration in that city. The form of the Continental engine is, however, derived from the engine improved by Hulot, in 1763. The fusee engine, which is another special clockmaker's machine, has also tended greatly to the perfection of machines for working in metal; and in many other ways the horologist has been of signal advantage to mechanical science.

There is, indeed, no branch of mechanical art on which man has devoted more labor than that relating to horology. Many artists in watchmaking work at artizans' wages, and many horologists of various countries cultivate their art *con amore*, devoting themselves to its improvement with extraordinary energy and assiduity.

The advantages to be derived from the possession of a clock or watch of perfect accuracy (were such a thing possible) could hardly be over estimated. The science of asronomy in particular would receive important benefit from such an instrument. But as no time-keeper has yet been constructed that can be relied on as being absolutely free from error, it is evident that there is still room for improvement. The sources of irregularity have long engaged the attention of many able scientific investigators; and, as we have seen, very numerous contrivances for counteracting them have been devised.

An impartial examination of the progress made in horological science since 1862, as represented by the Paris Exhibition of this year, is highly satisfactory. Absolute perfection has not, indeed, been obtained; but great progress has been made, and the result is that excellent timekeepers are much more common than they were a few years ago; and their prices, although wages have risen considerably during recent years, are much less than they were.—*Illustrated News.*

## Science Familiarly Illustrated.

### Chemistry of a Cup of Tea.

A little shrub grows in various parts of the world, principally in China and Japan, which produces leaves of a very remarkable chemical character; and vast numbers of people of all nations have somehow acquired the habit of steeping the leaves in water, and using the infusion freely as a beverage. The plant (*Thea Sinensis*) is a polyandrous evergreen shrub, growing three or four feet high, and bearing a white and somewhat odorous flower. According to botanical classification, it belongs to the camellia family, and is therefore allied to the beautiful flowering shrub which adorns our greenhouses and gardens.

It was evident to the earliest consumer that tea contained some mysterious principles which distinguished it from all other productions in the vegetable world but it remained for modern chemistry to unravel the mystery and point out the peculiar nature of these agents. Chemistry has solved many curious problems in the world of organized matter, but scarcely any more interesting than those connected with the tea plant. We learn from its teachings that there is stored up in tea a complex substance identical in composition with that found in coffee, cocoa and mate. It is called theine. This substance in coffee is called caffeine; in cocoa or broma, theo-bromine. Although the names are different, they are essentially alike in chemical composition. Tea affords a much larger amount than coffee; and the caffeine of commerce is in fact prepared by manufacturing chemists, from tea. Theine or caffeine is used to a considerable extent by physicians of the homœpathic school, as a hypnotic, or medicine for producing sleep, their theory leading them to employ an agent which causes wakefulness, to cure it. The element nitrogen enters largely into the composition of theine; and wherever we find this predominating in any alimentary substance, we may be sure that its effects upon the system will be of a marked or active character. Theine is prepared in the laboratory upon a large scale from spoiled tea, or that which is damaged in transportation black tea being preferred, on acconnt of its affording a better yield. One hundred pounds are usually manipulated at once, and from this amount about twenty-six or twenty-eight ounces of beautiful white, silky crystals of theine are obtained.

Besides this remarkable principle, tea contains tannic acid, to which it owes its astringency; a volatile oil, to which it owes its peculiar aroma; a large amount of caseine, and other substances common to all plants.

In order to present more clearly or precisely the chemical nature of tea, we may state that one pound of good tea contains about a third of an ounce of theine, two and a half ounces of caseine, one-twelfth ounce of volatile oil, two and a half ounces of gum, half an ounce of sugar, half an ounce of fat, four ounces of tannic acid. Mineral matter or ash, water, and woody fiber, make up the remainder.

Caseine, of which there is so large a quantity, it will be remembered, is the nutritive principle of milk; vegetable caseine, or legumen, is analogous in principle. Tea is therefore a highly nutritious substance, and fully capable of forming flesh and sustaining life. Peas and beans are highly concentrated forms of food, and yet analysis shows that the better qualities of tea are as rich in the nitrogeneous element or nutrient principle as are these seeds. Caseine is identical in composition with the muscular fiber and with the albumen of the blood, and is easy of assimilation.

In preparing the infusion, but little of the caseine is dissolved, and also but a small amount of tannin; therefore we throw away in the infused leaves these two preponderating principles. A cup of tea holds in solution the theine, volatile oil, sugar, and small portions of the tannin, gum, and caseine. Why should we not consume the infused leaves as food? We might do so, and secure a large amount of nourishment; but the presence of so much insoluble tannin would produce astringent effects of an unpleasant character. Remove this and exhausted tea leaves might at once be regarded as a valuable dietary article.

In preparing a cup of tea, we employ water heated to nearly or quite the boiling point, as experience has proved this temperature to be necessary to dissolve out the principles desired. The peculiar solvent powers of water are wonderful, not only when considered in connection with tea leaves, but all other substances upon which it exerts specific action. Its solvent powers are wisely controlled and limited, and its physical and chemical relations to all substances, organic and inorganic, are marvelously adjusted. But, however strongly tempted to enlarge upon this point, we can only call attention to its effect upon tea. Its power over tea leaves is limited, and it can dislodge and hold in solution only such principles as are necessary to form the beverage in the highest perfection. Suppose it was capable of dissolving all the tannin, the infusion would be more in place in the vats of the tanner than upon the tea table. However nourishing and healthful is the caseine or gluten, it would, probably, if the whole amount were present in tea, impair its flavor, and interfere with its charactiristic appearance and effects. The adjustment of its solvent powers upon tea is probably perfect, when the condition under which it acts are understood and adhered to. It is capable by long-continued boiling, in connection with tea, of extracting an undue proportion of tannin, and thereby rendering the infusion unpleasantly astringent; but no amount of boiling will render one half of the whole quantity soluble.

No chemical substance can be added to tea to improve its flavor or general healthfulness. Some of the alkaline carbonates, like soda, aid the water in dissolving the caseine, but its addition spoils the tea.

If the soil and the conditions of our climate were favorable

for the cultivation of the tea plant in our gardens, it would be of but little service to us unless we were acquainted with the nice methods of drying or curing it. The green leaves when first removed from the tree, are like the leaves of most other plants, having but little astringency, no odor or bitter taste. Like coffee, the peculiar characteristics of tea are developed by roasting; and this is a very nice process. The Chinese are so adroit at the business as to be able to prepare a half-dozen qualities of tea from the same leaf. Important chemical changes are wrought in the leaf by the process of drying and roasting, so that the same leaf furnishes the green and black tea of commerce.

As regards the exact physiological effects of tea upon the upon the animal economy, different opinions continue to prevail. It is quite unnecessary to discuss this point. The writer has for a series of years carefully observed its effects upon himself, and is free to state, that it is no matter of wonder with him, that "brain workers," in all the years since tea was introduced, have regarded it with the highest favor. It has a power to subdue irritability, refresh the spirits, and renew the energies, such as no other agent possesses. When the system is exhausted by labor or study, a cup of tea re-invigorates and restores as no form of food or other beverage can. As regards the ultimate effects of tea-drinking, it can be said that Bishop Huet, of Avaranches, the celebrated scholar, who wrote in its praise at the age of ninety, affords by no means a solitary instance of longevity coupled with its free use. Tea saves food by lessening the waste of the body, soothes the vascular system, and affords stimulous to the brain. The young do not need it; and it is worthy of note that they do not crave or like it. Children will frequently ask for coffee, but seldom for tea. To aged people whose powers of digestion and whose bodily substance have begun to fail together, it is almost a necessity. Like all blessings, it is liable to abuse, and hence has arisen much of the prejudice against its use. There may be some declaimers against the moderate use of tea, whose consistency or moral sense may not be unlike that of Mr. Henry Saville, who writing to his uncle, Secretary Coventry, about two hundred years ago, remarked that many of his friends "had a base unworthy Indian practice, in calling for tea, instead of pipes and bottles after dinner." If the use of tea is a pernicious habit, we may remark, as did the same writer at the close of the letter to his uncle, "The truth is, all nations are growing so wicked as to have some of these filthy customs."—*Boston Journal of Chemistry.*

### Weather and Mortality Chart.

Dr. W. F. Thoms, of this city has prepared a very interesting and valuable chart exhibiting in the plainest manner the principal facts concerning the meteorology and mortality of the city of New York during the year 1866. The chart has a surface of only about one and a half square feet, yet if the information it gives were put in the ordinary form of tables it would fill a large volume. This economy of space and plainness of detail is secured by representing the facts by lines of various colors and positions. The chart will serve admirably as a model for keeping meteorological records.

As an example of the comprehensiveness of the chart, we quote the following facts which are presented concerning the week ending July 21st:—

| | |
|---|---|
| Mean Temperature—Thermometer | 83 |
| Highest Range of Temperature | 102 |
| Lowest Range of Temperature | 60 |
| Mean Weight of Atmosphere—Barometer | 29·96 |
| Highest Range of Barometer | 30·10 |
| Lowest Range of Barometer | 29·87 |
| Mean Humidity | 48 |
| Inches of Rain | 1·74 |
| Days of Easterly Winds | 4 |
| Days of Westerly Winds | 3 |
| Days of Clear Weather | 4 |
| Days of Cloudy Weather | 3 |
| Total Mortality—Deaths from all Causes | 1,362 |
| Mortality from all Diarrheal Diseases | 442 |
| Mortality from Cholera | 48 |
| Mortality from Inflammation of Lungs | 18 |
| Mortality from Typhus and Typhoid Fevers | 16 |

The chart is published by D. Appleton & Co., 443 Broadway. Price $1.

### MALLEABLE CAST IRON.

Malleable cast iron, as has been proved by the careful experiments of M. Tresca, has a coefficient of elasticity and an elastic limit equal to that of good wrought iron. For a repetition of complicated articles difficult and expensive to forge, we cannot imagine a better material; and there can be no doubt that malleable cast iron has not yet had justice done to it by the engineer. Though its manufacture is getting rather widely spread on the Continent and in England, it is yet in the hands of comparatively few people, and is, in fact, almost secret. The most noted English malleable cast iron founder is Mr. John Crowley, of the Kelham Works, Sheffield, and of Manchester. A bar of his manufacture, five sixteenths of an inch in diameter and about a foot long, with a fracture like steel, is now before us. Few would guess that large quantities of such rods are cast to make the common fish-tail gas burners by cutting them up and turning and boring them in the lathe.

The discovery of the process of making cast iron malleable is ascribed to Samuel Lucas, whose specification describes the chief features of the mode still adopted in the manfacture. Dr. Percy has pointed out that Reaumur, as long ago as 1722, published this process. The difference between the positions of Reaumur and the Lucases—Samuel and Thomas—in the matter is, that Reaumur never carried out the discovery on a commercial scale, and that he left this to be done by the Englishmen. In any case, Reaumur seems to have preferred the use of a mixture of chalk or of calcined bones, and not red ore, for decarbonizing the metal.

The pig iron used in the manufacture of malleable cast iron must be free from phosphorus and sulphur. The best materials are hence Swedish and Styrian pigs, made with charcoal from the purest ores. The last kind is used in the southern parts of Germany, but its price makes it impossible to employ it in England or even in northern Germany. The most usual material is hence pig iron made with coke from the hematite ores of the Cumberland districts. A small proportion of Swedish pig is sometimes, but probably very rarely, added. The pigs with the whitest fractures are preferably employed for larger castings, and those with a grayer fracture for smaller articles. As is usual in these cases, the proportions of the mixtures used are made a mystery by the different makers, but there can be little in this, as different establishments use pigs with different brands and varying mixtures. The principal thing is evidently to have as little phosphorus or sulphur as possible. Some years ago a patent was taken out in France for mixing in the crucible from two per cent to seven per cent of red copper with the cast iron intended to be made malleable, in order to give it more fusibility, and to obtain castings with a better surface. We are not aware, however, whether this plan has been much adopted.

The pig is usually melted in crucibles, sometimes of plumbago, and holding about fifty or even sixty pounds—the usual size of steel crucibles—which, in the ordinary method of pouring out by hand, is determined by what an ordinary man can lift. The crucibles are covered up, in order to prevent the access of impurities from the coke, with a consequent waste in skimming the fluid metal. As with the crucibles, the furnaces used are generally those employed in melting pot steel, being from two to three feet square, and holding four crucibles. No blast is used, as the resulting saving in time would be counterbalanced by the increased consumption of coke. In this part of the process the principal point is to attain as high a temperature as possible for pouring the metal into the mold. The melter mostly tells this by dipping a red hot iron bar into the crucible, on withdrawing which the fluid iron should spring off in sparks. The crucible is then taken up by a pair of tongs, and, after skimming the surface of its contents, it is emptied as quickly as possible.

The molds are made in green or in dry sand in the usual manner, but great care has been taken with the small and complicated details, the molding of which forms the most economical application of malleable cast iron. These are best cast together and broken off when cold. With heavier and more complicated castings it is very important carefully to determine where to place the feeders for forming, so to speak, reservoirs for holding the extra fluid metal intended to follow up the shrinkage. If this be neglected, small cracks are produced, which are completely visible under the subsequent operation of annealing. Such feeders must not be placed at any sudden changes in shape of the casting, such as at any corners—*e. g.*, at the pins cast on levers, and so on. The castings produced are remarkably brittle, and many wasters are produced in cleaning them. This operation is best done when they are thoroughly cooled down. To delay this till after the annealing process would of course be attended with the obvious difficulty of having to deal with a tough, malleable material. It is also important to take the castings out of the molds as soon as possible, in order to avoid the production of cracks, as the shrinkage in cooling is considerable. In fact, almost double the usual allowance for shrinkage must be made in the patterns, though this sometimes varies, as might be expected, with the mixtures employed. The molding boxes are set either quite vertical or at a considerable inclination. The first position is always employed with smaller castings. The molding should be done very neatly, in order to save as much as possible any cleaning after annealing.

The last and the most important, difficult, and expensive process is decarbonizing or annealing the castings. They are placed, together with powdered hematite or red ore, in cast iron cases or muffles, and kept at a high temperature for a long time. These boxes, cast with sides about an inch thick, either have covers or are piled in the furnace one above another, any openings or cracks being luted with clay. Only round muffles were used at one time, but square boxes are now employed. The castings are packed in these boxes with alternate layers of hematite ore, which is placed so as to form both the bottom and the top layer. In packing the boxes with hematite care must be taken that thin and thick castings do not come together. The boxes containing the larger ones must also be set in the furnace nearest to the fire, and those with the smaller articles in the hinder part. If this is not done, in the first case the smaller castings are burnt, and in the second the larger ones get only half decarbonized.

The decarbonizing furnace is simply constructed; the grate is in front, and the fire gases are induced between the boxes placed in the hinder part of the furnace. Or they may consist of square chambers with an inlet at the side from a door for charging and discharging; and with a bottom divided into longitudinal rows, between which are placed two or three narrow gratings extending the whole length of the furnace. The flues open from two places in the roof. A damper at the side serves to watch the firing, which must be done with great care, and any access of air to the castings prevented. On lighting the fires the temperature is raised to a bright red at the end of twenty-four hours; this heat is then regularly kept up for three, four, or even five days, according to the size of the castings and the amount of annealing it is wished to give them. At the end of that time the fire is allowed to fall and the temperature to diminish during twenty-four hours; when the furnace can be opened and discharged. The boxes are then unpacked and their contents cleaned. The annealing operation is a very delicate one. With too high a temperature, should the hematite be not mixed with a sufficient proportion of previously used ore, or should the air make its way in, the castings are most likely burnt. An unequal or a too low temperature has for result an imperfect decarbonization and brittle castings. The most considerable expense in this manufacture consists in the renewal of the cast iron cases, which easily crack under the heat, and cannot often be used more than once.—*The Engineer.*

### MANUFACTURING, MINING, AND RAILROAD ITEMS.

Two lines of telegraph connect Jerusalem with Europe.

The railway over the Alps, is known as the "Fell railroad" from its being constructed in accordance with the patents granted to a gentleman of that name.

To pass through the Mount Cenis tunnel, when it is completed, will occupy over half an hour, and it is for this, among other reasons that many expect the over-mountain railway,—which only possesses a concession for working until the tunnel line is opened for traffic—will have its privileges extended so as to make it practically a permanent concession.

The total annual value of the gold and silver manufactures in France is set down at $19,128,000. The number of manufacturers is 1,250, and 30,500 persons find employment in the trade. Since 1855 the masters and workmen have formed themselves into a common association for the amicable adjustment of their respective interests.

The zinc mines of Lehigh county, located near Friedensville, in Saucon township, Pa., have been worked for fifteen years. The ore is carted to South Bethlehem and then made into oxide of zinc and metallic sheets. A singular fact in relation to these mines, is that the working of one shaft to a depth of 150 feet, has drained all the wells and springs for three miles up and down that part of the valley, and left the inhabitants no alternative but the use of surface water.

The Strasbourg line of railway, has introduced a three story passenger railroad car. The ground floor is the first class, the second class apartments above, while third class passengers must climb to the highest story.

The value of improvements in machinery may be estimated from the fact that in 1819 it required two furnaces, each with a high chimney shaft, to produce 1000 feet of glass per week, while now two furnaces, with but one shaft produce 12,000 feet, with the same if not a smaller consumption of fuel.

Sweeden owns 500 iron mines which yielded in 1864, half a million tuns of ore. All the smelting and refining processes are carried on with wood charcoal. Very little bar iron is manufactured, the annual product never exceeding 300,000 tuns of pig. By the Bessemer process some 3,200 tuns of steel were produced in 1864. The amount of cast steel in the same year was 4,500 tuns.

The corner stone of the Cameron Railroad Bridge across the Missouri river at Kansas City, Mo., has been laid and the structure is to be finished in one year. The bridge will be of iron 1,400 feet long and with a draw in the river channel of 362 feet. This bridge with the one now building across the Mississippi, at Quincy, will furnish direct communication with New York and Boston, and make Kansas City an important distributing point.

The Mount Cenis tunnel will be lined in its entire length with stone quarried in the immediate vicinity of the two entrances. At the present time, the excavations, or headings, are about 1,500 metres in advance of the amount lined.

The total length of electric telegraphs in the world, not including the submarine, amounts to upward of 180,000 miles, which is more than enough to go round the earth half a dozen times.

That portion of Pensylvania purchased from the Indians in 1749, for the sum of $500, embraced all the middle and southern coal fields. The northern, or Wyoming and Lackawanna district, was part of a purchase, reaching from the south-western to the north-eastern boundaries of Pennsylvania, and the whole area cost but $10,000.

Iron ore is found in every part of Italy and yields from forty-five to sixty five per cent of excellent iron. The mines are situated at considerable hights above sea level, and though almost inaccessible in winter, this is the only season when they can be worked on account of the quantity of water and badness of the air at other times of the year. There are only thirty eight blast furnaces in the whole country. The number of establishments for making machinery is seventy, but the raw material used, is almost wholly of foreign origin. At Genoa and Naples locomotives and tenders are turned out, but their actual cost is greater than those imported.

## Recent American and Foreign Patents.

*Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.*

SPINNING JACK.—A. B. Woodbury, Ashuelot, N. H.—This improvement relates to an improvement in spinning jacks, and consists in devices to be attached to a common spinning jack, which shall compel the spinner to draw the jack out the full distance to the bumpers.

ADJUSTABLE PARALLEL SHIP BUILDER'S MOLD.—Jesse J. Cassidy, Wilmington, N. C.—The nature of this invention consists in providing an instrument for the use of ship builders, by which the lines of curved patterns may be readily and accurately transferred to the timbers to be hewed and dressed for building a vessel.

ECCENTRIC BORING BAR FOR SCREW CUTTING.—E. S. Chapell, Milton, Mass.—This invention relates to an improved construction of a boring bar for cutting screws and nuts, or internal and external screw cutting, and consists in a round bar with eccentric centers or turning points in the ends, provided with a head sliding and turning freely thereon.

THILL COUPLING.—John Knox, Mount Gilead, Ohio.—This invention relates to an improvement in the construction of a coupling for the shafts of buggies, wagons and other light vehicles, and consists in employing a coupling pin with a ring, groove, or recess around the middle, in which is fitted the end of a spring secured to the shaft and let through the eye, to hold it in place, instead of a screw and nut in the ordinary way of fastening the coupling pin. This device has the advantage of great convenience in readily attaching and detaching the shaft from the wagon, together with the security and safety of the fastening.

HAND HAY RAKE.—J. S. Grant, Sidney Center, Me.—This invention relates to a hand rake designed for raking and gathering light grass and scatterings of hay from a cart or windrow, for gathering grain straw from the swath into gavels for binding, and also for gleaning in the grain field, especially where the stubble is cut high, all of which work is accomplished without stopping or lifting the rake from the ground.

BRICK PRESS.—W. L. Drake, Sturgis, Mich.—This invention relates to a machine for pressing bricks after being molded either by machinery or by hand, and when sufficiently dry or hard to receive and retain an impression. The object of the invention is give the bricks a perfect shape, sharp or circular corners, and also give one side a concave surface, which is desirable in order to form interstices to receive and hold the mortar in laying a wall.

FLY OR BALANCE WHEEL.—Robert Rice, Mineral, Ill.—This invention consists in constructing a fly or balance wheel with a series of internal chambers arranged in such a manner that by partially filling said chambers with water or other suitable fluid, the gravity of the latter will be rendered subservient as an assistant motor or an economizer of power.

CHUCK FOR LATHES.—James M. Smith, Seymour, Conn.—This invention relates to a chuck for turning lathes, and has for its object simplicity of construction, facility in manipulating it to hold or grasp articles to be turned or drilled, and also to release said articles, and also the admission within the chuck of long articles, such as rods, drills, or other articles to be held by it, for which ordinary chucks are not adapted.

FLY NET.—Geo. W. Lee, Jerusalem, N. Y.—This invention relates to a new and useful improvement in the construction of leather fly nets for horses whereby with the same amount of stock a net is made more durable and to have a lighter appearance than usual.

LOCK.—E. L. Gaylord, Terryville, Conn.—This invention relates to a lock of that class which are designed for articles having lids, such as pianofortes, sewing machines, etc.

SCREW PLATE FOR CUTTING SCREWS.—Henry Gill, Mansfield, Ohio.—This invention consists in providing a screw plate with circular dies fitted in sliding or adjustable plates which are placed on guide rods secured in a stock and all arranged in such a manner that the dies may be turned so that a fresh or new cutting surface may always be obtained whenever the dies become worn at one point. These circular dies are flattened or cut off so as to have plane surfaces, to admit of the dies working or cutting up to a shoulder on a bolt or rod.

LOCK.—W. H. Murphy, Versailles, Ohio.—This invention relates to a novel arrangement of parts within the lock, whereby to draw in the bolt a certain combination of movements must be performed with the key.

TANNING COMPOSITION.—William Johnson, Shirleysburg, Pa.—This invention has for its object to furnish an improved composition for tanning which will tan the skins thoroughly in a very short time.

COMBINED SNAP HOOK AND BUCKLE.—Seth W. Perkins, Geneseo, Ill.—This invention has for its object to furnish an improved combined snap hook and buckle, simple in construction, strong and durable, easily attached and detached, and which can be manufactured at a comparatively small expense.

YARD FOR SHIPS.—E. Masters, Cleveland, Ohio.—This invention has for its object to furnish an improved yard for ships, stronger, lighter, more durable and more easily repaired than those constructed in the ordinary manner.

SPRING BED BOTTOM.—J. S. Grant, Sidney Center, Me.—This invention has for its object to furnish an improved spring bed bottom, simple, effective, and reliable in construction, and which can be so adjusted as to form a spring bolster or elevated back support for an invalid.

MACHINE FOR GATHERING AND HUSKING CORN.—J. D. Hill, Fort Scott, Kansas.—This invention has for its object to furnish an improved machine by which corn may be gathered and husked automatically as the machine is drawn through the field.

BOTTLE STOPPER.—H. S. Carley, Cambridgeport, Mass.—This invention consists in securing to the stopper two or more wire rods which project from the under side of the stopper and are inserted into the bottle. The rods are spread apart by their own spring so that their lower ends press against the inside of the neck of the bottle. At their lower ends they are bent out so that they can catch under a shoulder formed on the inside of the bottle.

WAGON SEAT AND SPRING.—R. L. Allen, New York City.—This invention relates to a new manner of hanging seats on heavy one or two-horse trucks, or other device, and consists in so arranging springs under the seat that they are made perfectly elastic and in hinging the springs to the supporting posts so that the seat and all its appendages can be swung forward and out of the way whenever desired.

STEAM ENGINE GOVERNOR.—John Eddy, Barnesville, Ohio.—The object of this invention is to render the action of the ordinary centrifugal governor more sensitive to variations of speed in the engine than is usual by the common method.

HAND PLOW AND HOE.—Daniel W. Colburn, Loami, Ill.—This invention consists in constructing the blade of a hoe with a curve or bend somewhat similar to the mold board of a plow so that it will, when in use, cast or throw the earth to one side. It also consists in attaching the blade to the handle in such a manner that it may be reversed and used either like an ordinary hoe or by shoving it forward operate like a plow and make a continuous furrow to receive seeds.

CRANK MOTION.—A. Bicknell, Boston, Mass.—This invention consists in arranging two or more auxilliary connecting rods with the pitman and cross head of a steam engine for the purpose of enabling the engine to start from any point at which the piston may have been stopped or any position of the crank, and also to enable the piston to exert its power more advantageously and economically in passing the dead centers than can be done with a pitman alone in the ordinary connection.

DIAL PLATE BUTT HINGE MACHINE.—Adrian Rais, Waterbury, Conn.—This invention relates to improvements in machinery for making butt hinges and consists in mechanism so constructed that the two right and left match blanks which form a butt or hinge shall be conveyed from feed boxes respectively by automatic devices to and upon the periphery of dial plates or disks which rotate and first present the blanks to dies for bending the knuckles, after which operation they are presented to the mills and after they have been milled are carried opposite and introduced into a nailing device where the match blanks are united and fastened together by the nail or rivet and when thus finished are discharged from the machine. The whole operation is therefore automatic and continuous from beginning to end.

WAGON LOCK.—Andrew Downer, Hammondsville, Ohio.—This invention has for its object to furnish an improved lock or brake for attachment to wagons with which the action of the horses in holding back and drawing will apply the brake to and remove it from the wheels, and with which the reverse movement of the wheels in backing the wagon will remove the brake shoes or rubbers out of the way.

APPARATUS FOR RAISING SUNKEN VESSELS.—Richard W. Hallett, Hudson City, N. J.—This invention has for its object to furnish an improved apparatus by means of which sunken vessels may be easily raised to the surface of the water and floated to any desired place.

VISE.—H. E. Long, Plymouth, Mass.—This invention has for its object to furnish an improved vise, the head of the movable jaw of which shall be so constructed that it will adjust itself to the various forms and thicknesses of the objects held without its being necessary to adjust the position of the lower end of the movable jaw every time a different article is placed in the vise.

HAY ELEVATOR.—G. F. Hipp and J. B. Fast, Nova, Ohio.—This invention has for its object to furnish an improved machine for operating a hay fork or elevator more conveniently and satisfactory.

SLED.—Jacob Shaaber, Reading, Pa.—This sled is so constructed that its two sides with the seat, which is made of flexible material, can be folded together and opened from each other, and in the latter position, by the simple weight of the person upon the sled, is there held and sustained.

CLAMP FOR HINGES.—Eli L. Seger and Samuel L. Smith, Yonkers, N. Y.—This clamp is intended for butt hinges, more particularly, and is so constructed that it can be placed over the leaves of a hinge when closed and so operated as to firmly and tightly hold and bind them together, thus preventing their being opened one from the other until the clamp is released.

FIRE ESCAPE.—T. S. Diblin, New York City.—This invention relates to a fire escape of that class in which a flexible ladder is employed. The invention consists in an improved manner of constructing a flexible ladder for the purpose, and in a peculiar manner of securing the windlass to the window sill, whereby the windlass, with the ladder secured upon it, may be adjusted and firmly secured in an open window very expeditiously wherever the device is required for use, the flexible ladder being unscrewed from the windlass so that the occupant of a building may descend from the open window to the ground or pavement.

CULTIVATOR.—W. A. Moody, Montezuma, Iowa.—This invention consists in an improved manner of applying the plow beams to the frame of the machine, whereby the same may be moved or adjusted with facility and be under the complete control of the device or operator. The invention also relates to an application of the double tree to the machine whereby the same may be balanced in order to relieve the necks of the draft animals of any undue weight.

ALARM MONEY DRAWER.—Ira Robbins, Hughesville, Pa.—The nature of this invention consists in constructing an alarm money drawer, which, in order to be opened, is operated upon by keys on the under side of the drawer which will cause the bolts to fall and allow the drawer to be opened by turning and pulling the handle thereof.

MILLER'S ALARM.—C. N. Taylor, Cookstown, N. J.—The object of this invention is to so arrange a miller's alarm, that as soon of the corn in the hopper descends to a certain mark the alarm will be sounded.

DIAMOND KEY.—B. F. Southgate, Bridgewater, Vt.—This invention relates an improved key for holding cranks, shafts, and other machinery, and consists in a wedge shaped key, the section whereof is a diamond fitting into a V-groove in the crank or shaft and into a V-groove corresponding thereto in the bearing.

PUMPS.—E. C. Kellogg, Rome, N. Y.—This invention relates to cattle or stock pumps, and is adapted for forcing water from wells by the weight of the animals when standing upon the platform suitably connected with the pump therefor.

PITCHER.—W. S. Rooney, Albany, N. Y.—This pitcher is more especially designed for sirups, and is so constructed at its nozzle as to prevent the drippings from running down the outside of the pitcher, and to convey them back into the body or reservoir of the pitcher.

CHARGES FOR SHOT POUCHES.—Columbus Johnson, Clarksville, Mo.—This charger is constructed with two tubes, one arranged to slide within the other and with the outer one provided with an opening communicating with the pouch, and an opening communicating with the discharge spout or tube, and with the inner so constructed and arranged that by pushing or forcing it in, the opening to the pouch is closed at the same time the opening to the discharge is opened, so that the shot contained within the inner tube between the openings of the outer and discharge tubes, compress to the discharge tube and thence out of it to and into the barrel of the gun.

ADJUSTABLE RAIL FOR BUGGY SEATS.—James Carlisle, Mount Gilead, O.—This top-rail adjusts itself to the seat by its own spring, and is there held by the fastenings with which it is provided.

MACHINE FOR SAWING WOOD.—G. C. Lathrop, Danville, Mich.—This invention relates to a hand-sawing machine, which can be operated by one man, who is seated in a swinging chair, and which can be adjusted on uneven ground, so that it will always stand in a level position.

POWDER PRESS.—William Welch, Bridgeport, Ct.—This invention relates to an improvement in the manner of securing the cap for covering the sliding box in the gate of a power press, to the gate, said sliding box being the bearing for the eccentric shaft whereby the gate is operated.

SCALE BEAM.—Elisha P. Crain, New York city.—This invention relates to a device for strengthening the graduated lever used on platform or counter scales, so that the same may be held in its seated position, and will remain in the same.

TRACE FASTENER.—Chas. Hayden, Newark, N. J.—This invention relates to a device for attaching traces to whiffletrees, and consists in pivotting a slotted plate to the end of a pin, which is secured to the whiffletree in such a manner that the same may form a continuation of the pin, when the brace is to be attached or removed, or it will be at right angles with the same when the trace is attached, thereby securely holding the latter in position.

MACHINE FOR MAKING BUTTON RINGS.—S. B. Lane, Waterbury, Ct.—This invention relates to a machine shaping and cutting from a long wire, small pieces, or rather making from the wire small circular springs for fastening vest, and other buttons.

LEATHER-BACKED HORSE BRUSH.—Obadiah Jones, South Englewood, N. J.—This invention relates to a new kind of horse brush, and to the manner of making the same, and consists in making a leather-backed, round-faced horse brush, and in inserting a cone, which is made of one or more pieces of leather, or other suitable pliable material, between the back and face leather coverings, whereby the desired shape is given to the face cover, in which the bristles have before been secured.

HOSE COUPLING.—Albert S. Allen, Providence, R. I.—This invention relates to a new device by which the water can be easily discharged from hose, and by which firemen will be better enabled to carry such emptied hose up ladders, or along the ground or floors.

BOTTLE STOPPER.—Horace S. Carley, Cambridgeport, Mass.—This invention consists in having a slotted cork holder which can be moved up and down, being guided by a pin projecting from a ring or collar which is arranged around the neck of the bottle. The same pin carries an eccentric cam, which can be turned so as to press upon the cork holder, thereby pressing the cork into the mouth of the bottle, and holding it there.

HAY KNIFE.—H. M. Smith, Kalamazoo, Mich.—This invention relates to a hay knife for cutting hay from the mow or stack, and it consists in a peculiar construction of the knife, whereby the hay or straw may be cut from the mow or stack with the greatest facility, and with a moderate expenditure of power.

DEVICE FOR ADJUSTING THILLS IN CARRIAGES.—M. J. Mellyn, Roxbury, Mass.—This invention consists in constructing a peculiar-shaped lever gripe, whereby the rubber or elastic substance which is placed in contact with the thills of a buggy to prevent rattling, is compressed so that the thills are easily attached.

SELF-MEASURING CAN.—T. D. Arkle, and H. C. Green, Bridgeport, Ohio.—This invention consists in forming a measuring vessel inside a can, into which the liquid is discharged, and the quantity which it is desired to measure is indicated on the outside of the can by an index finger, which is operated by a float in the measuring vessel.

SHADE FIXTURE.—Stewart Hartshorn, New York city.—This invention relates to an improvement in that class of shade fixtures, in which the shade roller is provided with a spiral spring for automatically winding up the shade, and is designed to obviate an objection attending the original device, which consists in the unwinding of the spring whenever the shade roller is removed from its brackets or bearings, a contingency which involves the necessity of winding up the spring previous to the replacing of the roller in its bearings, and which cannot be done by an unskilled person without considerable difficulty.

FAN.—J. Bloom, New Brunswick, N. J., and A. Bloom, New York city.—This invention consists in a novel combination and arrangement in connection with gearing actuated by springs, of one or more wheels, suitable for agitating and forcing the surrounding air in one or more directions; or of one or more holders, suitable to receive the stems or handles to the fans in common use, and thus, through such holders, and the fans which they carry, produce the desired agitation of the air, either by imparting to such holders a rocking, or forward and backward, or a rotary motion.

CLOTHES DRYER.—Robert M. Morriell, Plymouth, Ind.—This invention has for its object to furnish an improved clothes dryer so constructed and arranged as to have a very large amount of drying surface in a comparatively small space and when not in use may be folded into a very small compass.

BURGLAR ALARMS.—E. F. Mallory, West Springfield, Pa.—This burglar alarm is so constructed and arranged in its several parts that as the door or window is opened to which it is applied, an alarm will be sounded.

CLOTHES PINS.—J. P. R. James, Read's Landing, Minn.—This invention consists in a novel combination and attachment of a spring to the jaws of a clothes pin whereby the spring cannot become loose, nor detached from the pin.

CENTERING TOOL.—Reuben Haworth, South New Market, N. H.—This invention consists in a spindle which is attached to the lathe which spindle holds the centering drill in its end and around which there is a sleeve which supports a centering cup which sleeve and cup are crowded forward by a spiral spring.

OIL CAN.—George Hatch, Pomeroy, Ohio.—This invention consists in placing in the can, near its top, a horizontal partition or false bottom which extends about three fourths across the diameter of the can forming thereby a recess, on which bottom or partition I place a lifting pump and a drip strainer.

UNIVERSAL JOINT.—Anton Zwiebel, Burlington, Wis.—The object of this invention is to construct a universal joint that is to be used especially on thrashing machines, which is made without projecting bolts or pins, and which can be easily taken apart for renewing the knuckle joints, when the arms are worn out.

CONSTRUCTING ORDNANCE.—T. W. Hornsby, Simpsonville, Ky.—This invention relates to a mode of constructing wrought iron and steel ordnance which may be made in whole or in part of teel, wrought iron, or any other metals that are susceptible of being worked into ordnance in conformity to this improvement.

EXTRACTING AND PURIFYING OIL.—Carl Otto Heyl, Berlin, Prussia.—The object of this invention is to extract oil from all oleagenous seeds principaly by the instrumentality of a chemical agent, and the invention consists in subjecting the crushed oleagenous seed to the action of sulphuret of carbon when the seed is placed in a vase or series of vases and in passing the products, or oil, through a distilling apparatus.

VARIABLE CUTT-OFF.—J. L. Dickinson, Dubuque, Iowa.—This invention consists in placing an oscillating cut-off valve in communication with the steam chest of the engine, and in attaching to the rod or stem of the oscillating valve an arm, which is operated by two eccentric rods having different motions which are connected with the arm by means of a slide, the position of which slide on the arm is controlled by the governor, thereby cutting off the steam at an earlier or later point also decreasing or increasing the throw of the cut-off valve.

OBSTETRICAL SUPPORTER.—S. B. Manley, Cony, Pa.—This obstetrical supporter is so arranged as, in all cases of obstetrics, to be efficient and serviceable, and when applied, to cause every exertion made by the patient, whether with the feet, hands, or knees, to impart all the necessary and desired assistance.

GRAIN METER.—James C. Walker, Waco Village, Texas.—In this invention the grain is poured into a cylinder shute, where, in falling, it rotates a wheel, the revolutions of which, recorded by an indicator, mark the quantity of grain.

COTTON AND HAY PRESS.—John S. Schofield, Macon, Ga.—In this invention the arms which operate the screw do not rise and fall with the screw. Secondly, the press can be worked upward or downward, by hand, by horse-power, or by any other power.

METHOD OF CASTING ALUMINUM IN FINE MOLDS.—Jas. B. Bean, Baltimore, Md.—In this invention the metal is cast into fine molds, under pressure of a high column of the metal itself, contained in a conduit of soapstone, earthenware, or other similar substance, heated to about the melting point of the metal to be cast. The molds, at the moment of casting, are filled with hydrogen, or other gas, containing no oxygen.

CHURN.—D. C. McNeil, M.D., De Witt, Iowa.—This improvement in churns consists in a revolving dasher composed of two paddles, each consisting of two rectangular frames of unequal dimensions, set at right angles to one another upon an axis. A reciprocating motion, imparted by a treadle, operates a crank rotating the axis. The churn box is provided with a semi-cylindrical bottom in which is a faucet to run off the buttermilk. The dashers or paddles, are then removed from the churn and the butter readily removed at a single operation.

WASHBOARD.—Pierre Audanin, New York City.—This invention consists in forming the corrugations or grooves on the washing or rubbing surface of a washboard, at an angle of inclination more or less great to the length of the rubbing surface, whereby the water expressed from the clothes as they are rubbed, is more freely conducted off and down into the tub in which the board is placed.

## Answers to Correspondents.

*CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.*

*SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."*

☞ *All reference to back numbers should be by volume and page.*

Jones.—"I have finally cured my boots of squeaking; not however, as two correspondents recommended, by driving pegs into the soles, as that did no good whatever, but by saturating the soles with woodchuck's oil." We all unite in congratulations. Our friend now steps a softly as a kitten.

J. L. W.—"Correspondents frequently use such words as gum, pitch, turpentine, oil, spirits, etc. These are generic terms; what do they mean when used specifically? If correspondents would be more definite and tell us what kind of gum, pitch, etc., they mean they would make themselves more intelligible to their readers." A good hint.

J. C. B., of Ill.—India-rubber in strips makes a good joint for the glass of an aquarium. The glass and rubber are held together by a rigid frame work of wood or metal.

H. W., of Pa.—The mineral is iron pyrites. It is not likely that you will find a deposit of coal in your neighborhood.

R. G., of Conn.—The best explanation of the hardness of specimens of ancient mortar is its antiquity. Mortars and cements containing silica in favoring circumstances are constantly progressing in improvement. The information which the ancients had about mortars has received important additions in modern times.

S. J., of N. Y.—We are not aware that mellite or honey-stone has been found in America. It is a very rare mineral. . . Please send your new method of estimating barium.

A. L., of Pa.—In the Holtz electrical machine, the inductors are pasted on to the spear head insulators, by means of shellac, varnish or gum arabic, and on the side of the spearhead toward the revolving plate.

J. B. U., of Md.—We advise you to get Silliman's Chemistry and Ganot's Physics. In these books you will find the information you seek, fully and plainly set forth.

J. C., of Mo.—Soldering irons or any thing else might be heated by galvanic electricity. The only drawback is that this sort of heat would cost a hundred times more than coal or gas heat.

N. G., of O.—The mixture of oxide and chloride of zinc has been much used by the dentists under the name of artificial bone, osteoplastic and other fanciful names for filling teeth. The objections to it for that purpose are that it contracts on hardening and that it is somewhat soluble in the liquids of the mouth. If the cement were cheap enough it might be extensively used for other purposes.

A. E. S., of N. Y.—You have re-invented the electro-magnetic engine of Dr. Charles G. Page. Such engines have been built on the large scale and are probably as good as any other engine depending upon electricity. In the present state of our knowledge electricity costs too much to be used as a motive power.

D. & P., of Mich., want a cheap preparation to make the shingle roof fire proof of a factory where shavings and saw dust are used as fuel under the boiler. We suggest a trial of a strong solution of chloride of calcium or of magnesium to be occasionally, and especially after rains washed over the roof. These substances are powerful absorbents of water and will keep the roof wet. They are waste products in several large chemical manufactures, where they are thrown away.

## Business and Personal.

*The charge for insertion under this head is 50 cents a line.*

For Sale—Foulds' Automatic Hinge for Window Shutters.—This is the most convenient window-shutter hinge ever invented. There being no danger of breaking hinges and dropping shutters, as is very often the case now. The entire right for sale low, or will sell the Eastern and New England States. Address Cherry & Eckman, Cleveland, Ohio.

Proprietors of Planing Mills having in use a Gray & Wood Planer will please send their address to David R. Miller, 109 Paxton street, Harrisburgh, Pa.

G.M. Danforth & Co., Inventors' Exchange, see advertisement.

New invention. A potato digger which puts the potatoes in a bag and the small ones apart in a box. The original was made by a blacksmith at very little cost, which will be saved by the work on three acres of potatoes. Patent rights to sell: C. G. Grabo. Address care of Schober Bro., Detroit, Mich.

## TOTTEN AND TOPLIFF'S CAN OPENING KNIFE.

It is not improbable that the sale of canned fruits, vegetables, meats, etc., would be largely increased if people generally knew that a handy and efficient implement for opening the cans could be cheaply purchased. The engraving represents such an instrument which by repeated trials we have found to be the "right thing in the right place."

As seen in the engraving it is a simple knife of a peculiar form, having an edged hook at the point. In opening a sardine box or fruit can, the knife is held in a vertical position and the hook pushed through the tin. This requires but little force, a child of seven or eight years easily opening a can of common tin. The knife is then brought gradually down



to a horizontal, the blade being a lever of which the hook is the fulcrum. The knife passes as readily through the tin as an ordinary knife through paper. By repeating the operation a square piece can be cut out of a sardine box, or two cuts may be made on the end of a fruit can, crossing each other at right angles, and the corners then turned back. The knife is equally convenient and handy for paring fruit, or any other purpose for which a kitchen knife is used, as its peculiar adaptation as a can opener does not interfere with these offices.

It was patented through the Scientific American Patent Agency, January 22, 1867, by S. E. Totten and C. L. Topliff. For rights to manufacture address C. L. Topliff, Box 773, New York city.

## CALIFORNIA SILK.

From the earliest settlements in this country down to the present time, public attention has at different periods been directed to the subject of silk raising. Indeed, this appears to have been one of the earliest and most successful industries practised in this country, for it is related that silk made from material grown in Virginia was worn by Charles II, at his coronation in 1651. Planting mulbery trees for rearing silkworms was frequently in the early history of the colonies, made incumbent upon property holders by legislative action, and prior to the Revolution it was considered quite fashionable for ladies to devote their leisure moments to tending silkworms, the cocoon silk being sent to England to be manufactured. The state of Georgia was settled chiefly because its climate was deemed peculiarly suitable for raising silk, and liberal appropriations were made to the colony by Parliament for its encouragement. A rich brocade woven from Georgia silk was worn by Queen Caroline as a court dress. Nor were the Southern states the only ones interested, for each of the older states have at times been extensive silk raisers, but from various causes the industry has finally fallen into disrepute.

Although practically a failure in the Eastern states, this employment seems destined at no distant day to assume importance in the Pacific states, particularly in California. The climate of this favored region is dry, warm, and equable, having all the requisites for success. Our exchanges from that state speak quite favorably of the new adventure and anticipate its developement in time into an important industry. A pioneer in this enterprise is Mr. Louis Prevost, of San José, who has had some previous experience in this line, and who, in his system of treatment has deviated somewhat from the usual manner of raising the worms, introducing improvements whereby time and labor are saved, and consequently increasing the prospects of making the business a paying one.

One of the most marked innovations on the old methods, is feeding with branches of the mulberry trees instead of leaves, a change which seems to work admirably. Sufficient food can now be gathered and distributed to 80,000 hungry worms by only three hours labor per day; then again the trees prosper better by cutting away a portion of the shoots entire instead of partially stripping all the twigs, while the leaves themselves retain their freshness much longer in that warm climate, by remaining attached to the stalk. So dry is the air in San José that remnants of leaves and other offal are soon completely desiccated, so that in a room where 80,000 worms are feeding on trays which are never removed for cleaning, the air is at all times entirely free from smell.

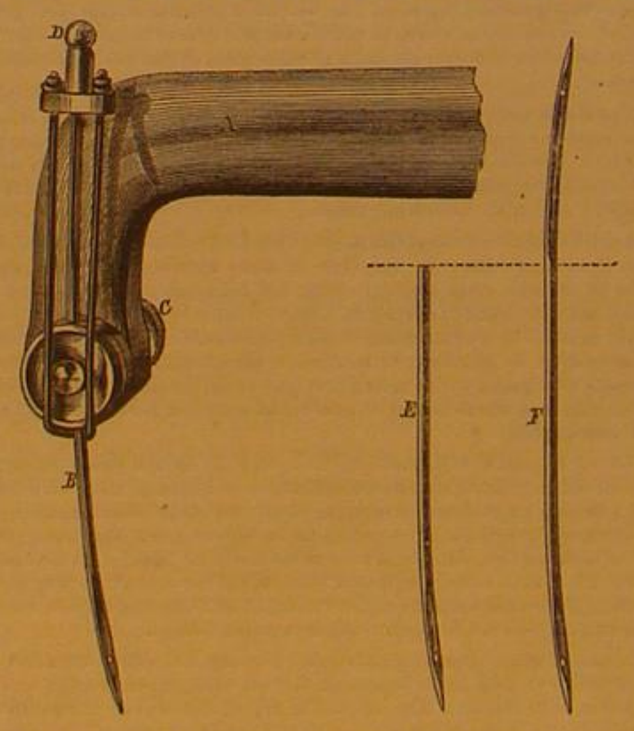
The demand for the worm eggs, both for home use and exportation, is so great that Mr. Prevost decided this year to save no cocoons for silk, but has allowed all the larvæ to undergo the full metamorphosis and pass through the crysalis into the moth state. He estimates his crop as from 12,000,000 to 15,000,000 eggs, and three crops may be raised a season. The French and Italian silk masters do not preserve any larvæ that are not hatched by the fourth day of incubation. Mr. Prevost hatched out all his eggs this year and kept each day's production separate. The first day's crop of worms and the twelfth day's as shown by the results, are equally valuable, the worms last hatched growing to as large a size, and the cocoons being as fine as from those that first left the shell. All these experiments go to show the superior vitality and the healthy condition of California worms over European.

## HARRIS' DOUBLE NEEDLE FOR SEWING MACHINES.

Since the advent of sewing machines, and especially since the principles of their construction and operation have been recognized and adopted, much time has been devoted to the perfection of details, generally with beneficial results. The engraving illustrates one of these. It is a double needle, or two needles in one, and was patented by H. A. M. Harris, of Philadelphia, Pa., Aug. 6, 1867.

Its advantages are, economy in stock, by which there is a saving of about one-fourth, and a saving of time in handling, and diminished cost of production. The ordinary manner of making needles is to make two in one piece, and then cut them in half, thus producing single needles. If the length of a single needle is two inches, it requires four inches of steel to make two, while with this improvement it takes only three inches to make a double needle. Of course, so made, there is no need of cutting them in two, and that labor is saved, which with the less handling required, it is believed, will pay for the grinding, drilling, and polishing of the extra point. The inventor claims that if a single needle can be bought for seven cents, one double needle can be sold for ten cents, being a great saving.

The engraving shows the free end of a vibrating arm or needle bar, A, to which the needle, B, is secured on its side by means of a bolt which is set up by a thumb nut, C. A hole for the reception of the needle is made through this bolt behind the head, and the inner face of the head has a semicircular groove as a seat for the needle. To prevent pricking the arm of the operator and to guard the upper point of the needle from injury, a cap, D, of soft metal, as type metal, is




placed over it, and held by a piece of elastic cord as seen in the engraving. E and F show respectively the ordinary single needle and the improved double needle with their relative lengths.

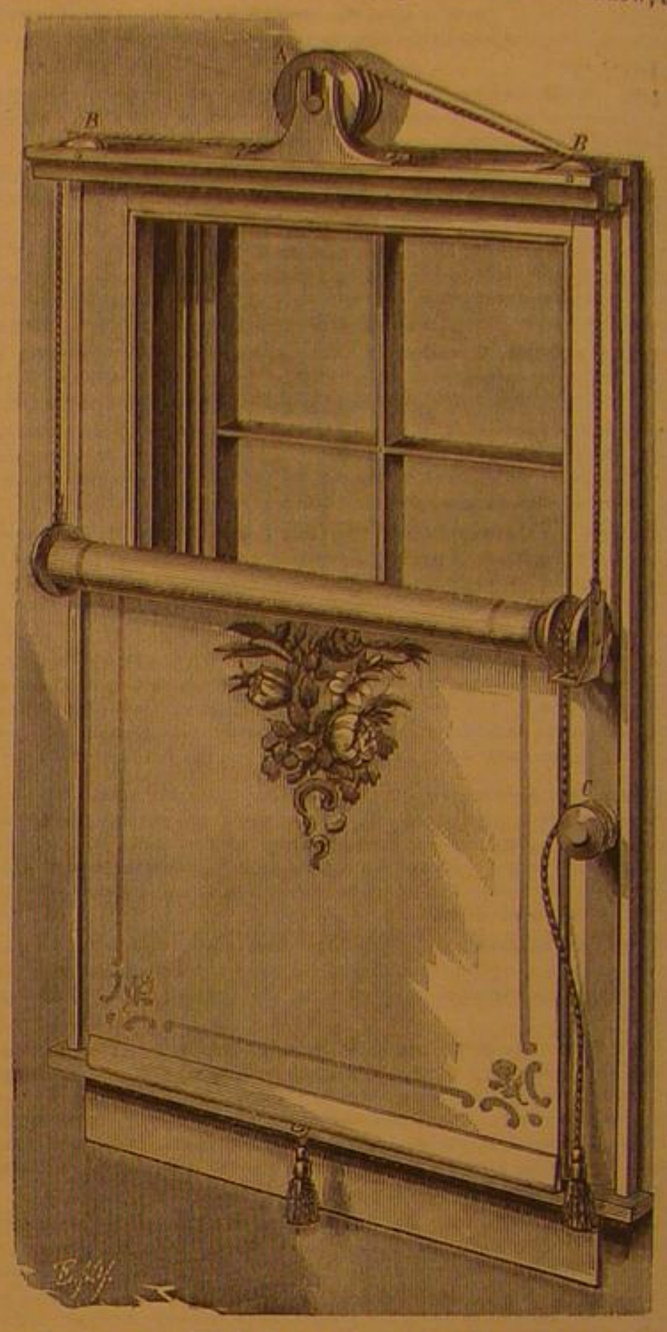
This style of needle can be applied to all machines. It is easily adapted to all which use the curved needle, and those which use the straight needles can be built to use the double needle. The full right is for sale by the patentee, who may be addressed at King's Hotel, West Philadelphia, Pa.

### How to Make Good Cement Walks.

Having previously graded and rolled the ground, heat your tar very hot, and with a long-handled dipper begin at one end of a pile of quite coarse gravel, pouring on the tar, quickly shoveling over and over so as to mix thoroughly. Cover the ground two and a half or three inches deep with the tarred gravel and then roll. Clean the roller with a broom as you proceed. Then put on a layer of finer tarred gravel one and a half inches thick, and roll. Then sprinkle the surface with hot tar, spreading the tar with a broom; finally, cover the surface with a light coat of fine sand, and your walk is complete, ready for use. It will improve in hardness by age. Provide portable tar kettles, screens, a roller not very heavy, and tools for systematic work, and you can hardly fail to derive satisfaction.

## COX AND HILL'S WINDOW SHADE ATTACHMENT.

The engraving to which this description refers presents a novel method of attaching shades or curtains to windows by which the shades are capable of being rolled or raised either from the bottom, as is the usual way, from the top, or thrown off sideways, so as to uncover any portion of the window, as




may be desired. With these advantages it may be made as ornamental and elegant as any other, and entails but little labor in its construction or fitting up.

Across the top of the window frame there is nailed or screwed a cleat or strip having a dovetail rib; this is a fixture. The whole machinery for moving the shade in any direction belongs and is attached to a bar, of a length corresponding to the width of the window or window frame, which has a groove to receive the dovetail rib. This bar may be an elegant molding in front, and has, on a support on its top at the center a deeply grooved pulley, A, attached to which is a coiled spring, which, when other tension, as that of the hand, is withdrawn, rotates it. Wound in the groove or score of this central pulley are two cords, which lead from the pulley to the ends of the bar, and over pulleys, B, placed therein. Thence they extend to metallic supports of the roller of the shade suspending the curtain. A separate cord is wound about the axis of a pulley, on one end of the roller bar, to be used to actuate the shade, as in ordinary window fixtures. A button or knob, C, may be attached to any convenient portion of the window frame for the purpose of "belaying" or securing the actuating cord.

The operation of this simple device is easily seen. If it is required merely to raise the shade, as is ordinarily done, the hand pulls on the depending cord and the shade is wound up. If the shade is lowered, and it may be desirable to admit the light from the upper portion of the window only, the loop of the tassel at the bottom of the shade is fastened to a hook or button on the window sill, and by pulling on the cord at the side, the upper part of the shade with its roller comes down, as seen in the engraving, when it may be secured in position by winding the actuating cord around the button or knob, C. When the cord is released the coiled spring attached to the pulley, A, will bring the shade up to place. The lateral movement of the shade is easily effected by simply sliding the bar at the window top.

This device was patented through the Scientific American Patent Agency July 30, 1867, by H. J. Cox and Wallace Hill, who may be addressed relative thereto at Long Eddy, Sullivan county, N. Y.

SWISS CARRIAGE ROADS.—There is not in the whole of Switzerland a toll gate. The government forbids by law any thing which may tend to interrupt or interfere with travel in or between the different cantons. The magnificent public roads which one finds everywhere throughout the country are kept in order at the expense of the cantons through which they run, the federal authorities having each paid, however, at the construction, one half of the expense.

THE GREAT CANADA CHEESE manufactured about one year ago at a factory near Ingersoll, is still in a good state of preservation, and is suspended on pivots in the factory, so as to be easily swung over for the gratification of visitors. Thirty-five tuns of milk were used in manufacturing this cheese, which weighs 7,000 pounds.

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## THE WATER SUPPLY OF LONDON---DECREASE OF RAIN FALL, AND POLLUTION OF STREAMS.

The constantly increasing demand of London for water, produced by the yearly augmentation to the population and the extension of manufactures, together with the continually lessening summer flow of the Thames, is a source of grave apprehension to Parliament and the thinking portion of the British Metropolis. Not only is the rapidly increasing demand, and the rapidly decreasing volume of water during the summer months, a source of uneasiness, but the pollution of the Thames and its tributaries by the modern system of sewage causes even greater solicitude. This sewage, the offspring as it is of the extension of population, is an evil, it seems, which, while it cannot be prevented, is capable, by proper engineering, of having its polluting influence so far ameliorated as to be comparatively innocuous.

This subject, of the London water supply, both with regard to maintaining a supply throughout the year adequate to meet the increasing demand as well as to correct the pollution of the streams—the sources of supply—by the contaminating effects of the sewage from the cities near their banks, has been the subject of a very valuable and interésting paper lately read by Mr. Denton before the London Society of Arts.

It is explained, in the first place, that the decrease in the summer volume of flow of the Thames is caused by the fact "that the rain fall is getting positively, though gradually, less in quantity from the disafforesting of the woodland, the improved cultivation of the soil, and the drainage of lands and districts; that although by the drainage of land we gain an increase of water in the winter season, we suffer a diminution in summer." And with respect to the pollution of the streams, that "the sewage of towns is corrupting our rivers and streams in their transit through the country to the sea, proportionally as the sewage of towns extends and the summer flow of rivers becomes less." Thus, while the increase of population and manufactures is rapidly increasing the sewage, the rivers into which this foul sewage is emptied are each summer becoming less and less in volume, and hence the pollution is increasing proportionally as these causes are augmented. This indeed is a state of affairs which we should be very loth to contemplate for our city of New York, and it is a matter which will tax the skill of the English Engineers to the utmost to render the sewage harmless and to maintain an adequate water supply for their metropolis throughout the year.

With respect to the diminution of the rain fall, the following table, prepared by Prof. Austed, and published in the Journal of the Royal Agricultural Society of England, is both interesting and instructive as illustrating the effects of the works of civilization on meteorological phenomena:

| Years. | Mean rain fall. Inches. | Mean of 14 years. Inches. |
|---|---|---|
| 1815—1821 | 28.7 | 28·3 |
| 1822—1828 | 27·9 | 26·1 |
| 1829—1835 | 24·3 | 24·7 |
| 1836—1842 | 25·1 | 24·6 |
| 1843—1849 | 24·1 | 24·0 |
| 1850—1856 | 25·8 | 23·8 |
| 1857—1863 | 23·7 | |

On this data Mr. Denton observes, "If we deduce that the rain fall is gradually declining, we cannot reject from consideration the counterbalancing circumstance that land drainage, which is taking place all over the country, discharges into the rivers from the land a *larger* quantity of water than found its way to them before drainage, and more than is actually lost to the rivers by the lessened rain fall." And if the whole of the land which sheds its water into the Thames was wet land, there would be a constant gain in the volume of the river by the extension of the drainage system, but as the wet lands form but a small portion of this surface, and "the water of drainage issuing from our clay lands is not constant, it is, for the most part, discharged in the winter months, when both soil and air are frequently in a state of saturation, and when vegetation is dormant, and ceases to flow in summer, when evaporation is active and the demands for vegetation can hardly be satisfied." Thus the drainage adds to the derangement of the water supply, and the more the drainage is extended and improved, the more, proportionally, will this derangement increase, and "the floods of winter and the droughts of summer" will both increase.

Now there seems to be but one way that the great excess in winter—an excess sometimes so great as to cause serious floods—can be made to balance and supply the deficiency caused by the droughts of summer. This method is to store enough of the winter's surplus to supply the deficiency in summer, and this is the method recommended by Mr. Denton. Of course storehouses for such vast quantities of water means the construction of huge reservoirs, containing enough for two months, or thereabouts, metropolitan supply. This is a plan already being carried out in one of our largest eastern cities, by building a huge reservoir to be filled by the surplus of the season of plenty, to be let into the mains when the lake, from which the supply is drawn, runs low. To show how much in excess the rain fall is over the wants of the population—that is, if it can be collected and made available, it has been calculated, that while the mean average rain fall of the Thames Basin is twenty-six inches, "it only requires three-fourths of an inch of the surplus of winter, from the whole water shed of the Thames, or one and one-half inches from one moiety of the water shed to satisfy the whole population with it." Or, to put the matter more practically, as Mr. Denton remarks, "as it will only be necessary to collect water for six months of the year, one-half an inch of rain, falling on an acre of land, is sufficient to supply two persons with thirty gallons each per diem for six months, and no winter passes by in which there does not run off to the sea, without serving any useful purpose, in excess of the mean summer flow of the river, at least five times the quantity required to meet the supply of the metropolis in the dry times of the summer, when the river cannot fairly part with any portion of its volume; and this or any portion of it may be stored for compensation to the river if reservoirs were properly constructed for the purpose."

It would thus appear that the means necessary to be adopted to maintain an adequate water supply, as regards quantity, are clearly pointed out, and it only remains to free the river water from the pollution of the sewage, to have the supply amply sufficient both as regards quantity and quality. An enormous volume of water is pumped out of the Thames daily bythe five water companies; they extract from that river sixty millions of gallons daily, which they have the power to increase to one hundred millions.

It is stated that the flow of the Thames—which should always, it is maintained, be kept at a standard flow of say 450 millions of gallons per diem, is often reduced in dry summers by the pumps of the water companies to 300 to 350 millions. With respect to neutralizing the polluting effects of the constantly increasing sewage, the problem appears to be much more difficult than to store up an adequate supply of water as regards quantity alone. As the summer flow is decreasing and the sewage is continually increasing, both the difficulties and necessities of a correction of this growing evil are apparent.

Rivers, to answer one of the purposes for which it seems nature intended them, must receive the liquid shed into them by the land which they drain, and at the same time supply the population with pure water; but if the river is dirtied by impurities, one of these important objects is at once defeated. And the very small quantity of sewage necessary to render the water unfit for culinary purposes is quite remarkable; it is concluded that "as soon as sewage can be detected by chemical analysis to exist in an appreciable degree in the water we are called on to drink, it is a vital error to use it."

Now, of all the methods proposed for the abstraction of the impurities from sewage, there is only one which scientific men regard as possible to be applied on a scale at all extensive, and that is the distribution of the sewage over land. And even this requires a surface and a proper subsoil, together with the right sort of vegetation to extract and assimilate sufficient of the impurities to render it safe to allow it to mix with water to be used for drinking purposes.

These conclusions, on this point, are thus briefly summed up in the paper alluded to:—

1st. That sewage run over a surface of land which has neither natural or artificial drainage to assist vegetation in retaining the deleterious elements, altogether fails to secure that degree of purity which will allow of its being discharged into rivers from whence may be taken water for drinking purposes, though the operation may serve to clarify and improve its character sufficiently to allow of its being utilized in rivers for navigation and for many other riparian uses.

2d. That land artificially drained to a depth of a few feet, affords, if irrigated, only an imperfect means, in conjunction with vegetation, of separating from sewage its objectionable elements.

3d. That when sewage can be lifted upon high and fertile grounds with a free and porous subsoil, which will admit of its penetration to a considerable depth after it has fed vegetation on the surface, a perfect means of purification may be attained.

The latter plan, which is the only one which thoroughly purifies the sewage, will in most cases require the use of steam engines, pumps, pumping stations, reservoirs, conduits, and other engineering appliances, and a constant outlay for attendance and repairs. It is estimated that it will annually cost some $30,000 to raise the sewage of 250,000 persons 100 feet high and a distance of five miles.

The above remarks and extracts cannot fail to impress upon the reader the extraordinary degree of complication the uses and abuses of progress entail on such an absolutely essential matter as a proper supply of pure water. To maintain life, three wants must be supplied—air, water, and food. Formerly it was only the latter that demanded the sweat of one's brow; but now a supply of pure water not only demands the most skillful engineering talent, but also the expenditure of vast quantities of labor.

## SPEED OF THE 15-INCH SHOT.

While Captain Noble and the British artillerists are speculating on the capacity of the 15-inch American cast-iron navy smooth-bore cannon, with a velocity of shot less than 1,200 feet per second, we on this side of the Atlantic are wondering why they do not indulge in a little mathematics with respect to the effect of the 453-lb. ball at higher velocities. Are they afraid to "penetrate" "rack" or to produce a tremendous "non-local effect" on their targets—the representatives of the strength of the British navy—even on paper?

Fifteen hundred feet is a common velocity with our 453-lb balls: it is given in the text book on ordnance used by the military schools all over the country, where the American idea is taught how to shoot.

And while Capt. Noble, the eminent ordnance mathematician of Her Majesty's service is astonishing his brethren and tickling the patentees of small-bore ordnance and the small-bore members of Parliament, by his skill in holding the 15-inch ball down to a velocity of less than 1,200 feet per second, with a harness of algebra, and the power "per circular inch" down to a certain number of "foot tuns," our farmer boys are using a school book which shows that the ball goes some 1,500 feet per second. That is, as the square of 1,170 is 1,368,900, and the square of 1,500 is 2,250 000, about 63 per cent more *vis viva* than this mathematical gymnast thinks to be possible.

The following extracts from Benton's text book on Ordnance speak for themselves and illustrate our meaning:

The navy 15-inch trial gun was fired 900 times with charges varying from 35 to 70 lbs., mostly mortar or navy cannon powder . . . Our army 15-inch gun has been fired without injury 250 times with charges varying from 40 to 100 lbs. of mammoth powder—the same that was used in England in trials against the target. One hundred of these rounds were with 100 lbs. of powder and spherical projectiles of 450 lbs. each. 15-inch gun No. 105 has likewise been fired as follows, namely:

| No. of times fired. | Charge. | Weight of ball. | Velocity. |
|---|---|---|---|
| 2 | 60 lbs. | 430 lbs. | 1191 feet. |
| 3 | 70 lbs. | 431 lbs. | 1278 feet. |
| 3 | 80 lbs. | 433 lbs. | 1355 feet. |
| 3 | 90 lbs. | 452 lbs. | 1433 feet. |
| 2 | 100 lbs. | 453 lbs. | 1509 feet. |

Now, ye artillerists of Shoeburyness, the next time you project a 15-inch ball against your 8-inch solid slab backed by 18 inches of teak and a thin iron skin, or even against your much vaunted "Hercules" target, be sure and put plenty of powder behind it. We are not particular about the kind, no matter whether it is English, Dutch, French, or Japanese, only make sure to put in sufficient to drive the ball at least 1,500 feet per second.

At the late trials with the 15-inch at Shoeburyness, according to the official statements published in the scientific journals, it was demonstrated that 50 lbs. of the English powder was equal to 60 lbs. of the mammoth grain imported from America, hence, according to this ratio it will require 83⅓ lbs. of the Shoeburyness powder to equal 100 lbs. of the mammoth grain. So if it is the intention of the English trials to find out the real power of the gun, that is the charge which should be employed; and in order that the trial may be comparative, the gun should be exactly the same distance from the target that it was on the trial already made.

Waive your excessive delicacy just once; do not be afraid of bursting the big cast-iron smooth-bore. But it is not so much the success of this lump of cast iron that we are interested in, as it is in the pleasure of witnessing the demolition of the absurd small-bore system on which you have wasted millions. The English ordnance engineer started with a loud blowing of trumpets years ago to build 13·2-inch wrought-iron Armstrong rifles, but finding they were no go, these gun-makers were driven to smaller calibers, hence the arguments of their mathematicians to prove them to be the best.

We are willing to hazard the prediction that before long the British small-bore system of naval ordnance will be as completely smashed, as the "reputation of Sir William G. Armstrong, the whilom great "rifle engineer."

With respect to the character of the metal best adapted for projectiles for iron-clad warfare, it will not, we think, be denied but that the invention—or discovery—of the advantage, of chilled cast-iron shot for the penetration of armor, is as applicable and adds as much to the efficiency of smooth-bore ordnance as it does to the rifle.

Therefore, on the trials to which we have alluded, any advantage which the nine-inch rifle may have had over the big smooth-bore, owing to the peculiar character of the iron its shot was made of, or in the method of casting it, it is not an advantage in any way whatever due to the gun itself. And it is quite clear that, in order to make a fair test, each gun should be fired with the best projectile known, capable of being used in the gun. In other words, no advantage should be permitted of one gun over the other, except such advantages as are due solely to the piece itself, such as strength, caliber, and method of rifling.

## PROGRESS OF THE PNEUMATIC RAILROAD.

The first practical example of the Pneumatic Railroad ever constructed in this country has just been completed by the Holske Machine Company, No. 528 Water street, and will

form one of the prominent features at the exhibition of the American Institute in this city, now just opening. The pneumatic tube is six feet in diameter, composed of fifteen thicknesses of wood veneers, wound and cemented one upon the other in alternate spirals. This makes a tube of remarkable strength and rigidity, although the total thickness of wood is only an inch and a quarter. This tube is made under J. K. Mayo's patent. The blowing apparatus consists of a wheel 10 feet in diameter, made on the principle of a screw propeller. The pneumatic car consists of an open vehicle with a valve or disk at one end, which fits the tube. The car seats twelve passengers. The tube is over 100 feet long.

Messrs. Holske have also built a Pneumatic Postal Dispatch for the exhibition. It consists of a pneumatic tube 24 feet in length and two feet square, having a lamp-post letter-box arrangement upon it, and a pneumatic car within. The construction is such that when the car, which is driven by air pressure, passes through the tube, it collects the letters from the lamp-post. The intention is to lay down these tubes through the city for the speedy collection and delivery of postal matter.

The above railroad and postal devices are made from designs by Mr. A. E. Beach, of the Scientific American, and their practical operation will be more fully described hereafter.

### English Patents.

The Lord Chancellor, the Master of the Rolls, and the late and the present Attorney-General (the latter then Solicitor-General), as commissioners of patents, report that 2,124 patents were passed in the year 1866. The amount received in the year for stamp duties, the fees being now paid by means of stamps, was £114,461, which was more than double the expenditure of the department, though this must have been upon a liberal scale, if we may judge from the first item, £9,428, paid in fees to the Attorney-General and the Solicitor-General, and £856 to their clerks. The receipts included £31,400 for continuing old patents beyond the first three years of their term of fourteen years, and £21,900 for continuing old patents beyond the first seven years of their term. The fee of £50 for continuing a patent beyond its third year is paid on about 30 per cent. of the patents issued, and the other 70 per cent. become void at the end of three years. The further sum of £100, payable at the end of the seventh year is paid on about 10 per cent. of the patents issued, so that 90 per cent. are allowed to become void at the end of the seventh year.

### Chloro-Iodized Collodion.

A friend of ours is working entirely, both in the gallery and the field, with chloro-iodized collodion; the results are excellent; we are inclined to believe they are better than can be obtained with a bromo-iodized collodion. Our own experience with a similar collodion is equally satisfactory; we get more detail and better work in general with the chloro-iodized than with the bromo-iodized collodion.

*Formula.*—Alcohol, 4 ounces; ether, 4 ounces; pyroxyline, 48 grains (more or less); iodide of ammonium, 40 grains; chloride of ammonium or magnesium, 8 grains.

Chloride of magnesium is more easily soluble in alcohol and ether, and therefore preferable. Our friend has 24 grains of chloride of ammonium in this quantity of collodion, but we are certain so much will not dissolve.—*Humphrey's Journal.*

## OFFICIAL REPORT OF PATENTS AND CLAIMS

**Issued by the United States Patent Office,**

FOR THE WEEK ENDING SEPTEMBER 3, 1867.

*Reported Officially for the Scientific American*

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

| | |
|---|---|
| On filing each Caveat | $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. Residents of Canada and Nova Scotia pay $500 on application.

☞ *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.*

68,334.—Door Lock.—E. Allen and J. Brady, Norwich, Ct.

1st, The combination of the two opposite sets of tumblers, the key, I, notched on both sides or edges, and the cam, D, applied to operate simultaneously on both sets of tumblers, substantially as and for the purpose specified.

2d, The cam, D, constructed with teeth, g, the sliding frame furnished with bolts, G, and spurs, h, and the two opposite sets of tumblers, arranged to operate in relation with each other and with the key, I, springs, c, and stop, n, substantially as and for the purpose specified.

68,335.—Mode of Preparing Tan Bark for Use.—Alexander Appleby, Brownfield, Me.

I claim bark prepared by being rendered flexible and flattened and reduced by means substantially as described; and furthermore,

I claim the process as hereinbefore specified for preparing bark for transportation and use as explained, such consisting in rendering the bark soft and flexible, by moisture or steam, and next flattening it and removing from it the rosa, by means as set forth or the equivalent thereof.

68,336.—Rig for Sloops and Schooners.—John Atwood, Jr., Provincetown, Mass.

1st, I claim in combination with the stationary mast, A, the secondary or additional mast, B, when the latter is so arranged as to be capable of being firmly fixed to the deck and form a support to the stationary mast, or of being raised so as to form a continuation of the said stationary mast, as and for the purpose specified.

2d, I claim in combination with the secondary mast, B, the guides, a a, the eyes, b, and crosstree, c, as described.

68,337.—Rotary Engine.—Wm. Atwood, Cape Elizabeth, Me.

1st, I claim the construction of the chamber, having inclined and horizontal portions on the interior faces of the cylinder heads, as and for the purposes described.

2d, The rotary piston, D, with its slots and alternating wings, E, as and for the purposes described.

3d, In combination with the cylinder chamber, the rotary piston and alternating wings, the arrangement of the four ports of the cylinder, substantially as and for the purposes described.

68,338.—Key for Locks.—A. G. Batchelder, Lowell, Mass.

I claim the key, A, as made with the notch, a, arranged in its shank, and with respect to its bit, c, substantially in manner and for the purpose as specified.

68,339.—Business Card and Pin Cushion.—De Witt C. Beamer (assignor to himself and James Markland), Philadelphia, Pa.

1st, I claim a combined hermetically sealed, scented, perfumed business card and pin cushion, constructed substantially as above described and for the purposes set forth.

2d, The combination of the piece of lapping, B with the board, A, and strips, E E, the lapping having a hole, a', for the reception of a perfume material, and arranged substantially as described and for the purposes set forth.

68,340.—Bending Machine.—L. H. Beckwith, Port Jervis, N. Y., assignor to himself, M. Colgan, Port Jervis, and M. M. Livingston, New York city.

1st, I claim a forming lever, in combination with a holding box and former, the whole constructed and arranged substantially as described, and having a mode of operation substantially as set forth.

2d, The combination of the set screws, D I, and stops, F s, with the holding boxes, substantially as and for the purpose herein specified.

3d, The cam shaped clamp, C, in combination with the holding box, B, and adjustable stop, s, substantially as specified, for holding the bar or rod in the holding box while being operated upon.

68,341.—Strap Attachment.—Alma Bedford, Coldwater, Mich.

I claim an improved fastening device consisting of a clamping plate made concave or with an upturned edge, combined by means of a central independent screw, with an opposite plate of smaller diameter or demension, the whole arranged and operating substantially in the manner and for the purpose herein set forth.

68,342.—Machine for Framing Match Splints.—Jacob Bentz, Brooklyn, N. Y.

1st, I claim the employment of a splint clamp feeding device arranged to work in connection with the machine for framing and filling the splint clamp with splints, substantially as and for the purpose herein shown.

2d, The employment of the cams, S S, the levers, R R, and connecting rods, T T, for the purpose of automatically operating the said feeding device with the operation of framing and filling of the splint frames, substantially as herein shown.

3d, The employment of the slot, U, in connection with the grooved bed, C, and hopper, B, and plungers or comb, E, substantially as and for the purpose herein described.

68,343.—Straw Scatterer.—Montgomery Blair, Barry, Ill.

I claim the foregoing described machine with its combination of pulleys, rollers, and revolving rakes, and stop rakes, all moved by means of bands and pulley attached to common wagons.

68,344.—Manufacture of Hose.—Glaucus H. Bonnaffon, Allagheny City, Pa.

I claim strengthening hose or belting by plates or straps of metal, or other suitable material, connected with the riveting in the folded edges, which plates or straps are also riveted to the hose or belting at points laterally back from the main riveting, substantially as and for the purposes above set forth.

68,345.—Preparing Short Cut Straw for Feed.—Charles Brown, Buffalo, N. Y.

I claim preparing short cut hay and straw, by crushing and winnowing to produce an improved article of food for cattle and horses, substantially as described.

68,346.—Machine for Removing the Seed from Broom Corn.—James D. Brown, Preble County, Ohio.

I claim the wheel, B, provided with teeth or spikes, b b, and the chute, D, arranged and in combination with the whole substantantially as herein set forth and for the purpose specified.

68,347.—Railway Car Seat.—Justus A. Brown, Bath, Me.

1st, I claim the reciprocating arm, C C, pivoted to the seat, A, with the bar, g, connected to their lower ends, and having the back, B, pivoted to their upper ends, which is provided with pin, c, playing into the slot, d, of the back, as represented and described.

2d, The pin, c, in combination with the back, B, operating with the slotted arms, C, pivoted to the seat frame, substantially as described for the purpose specified.

68,348.—Hose Coupling.—John R. Buchanan, Chicago, Ill.

I claim the combination and arrangement of nut, D, barrel thimble, B, and hose, C, arranged to operate substantially as and for the purpose set forth.

68,349.—Buoy Safe.—F. O. Buisson, Nantiat, France.

I claim a buoy safe composed of a metallic buoy made up of separate compartments provided with lids or doors and outside cork armor, substantially as specified.

68,350.—Apparatus for Testing Deep Wells.—T. Burr and T. Wakelee, Battle Creek, Mich.

1st, We claim the packing boxes, B B C C C2 C2, constructed and operating substantially as described and for the purpose set forth.

2d, The gas pipe, D, in connection with the packing band, substantially as and for the purpose set forth.

3d, The lever, I, in combination with the connecting rods, G G, brake, E, extension rods, F F, and packing bands, B B C C C2 C2, substantially as described and for the purpose set forth.

68,351.—Apparatus for Coating Metal Plates with Tin and other Metals.—H. W. Butterworth, Philadelphia, Pa.

1st, I claim rollers, a and a', combined with a pan for containing molten lead, substantially as and for the purpose herein set forth.

2d, The pan, B, in combination with the rollers, a and a' and b and b', geared together so as to operate together substantially as described for the purpose specified.

3d, The arrangement of the curved apron, b2, in the bottom of the pan, B, in respect to the rollers, a and a' and b and b'.

68,352.—Grain Fork.—Abram Clow (assignor to himself and Charles Clow), Port Byron, N. Y.

1st, I claim the arrangement of the sockets, a' and C, placed in line, so that in seating the center tooth, B', it must be driven through both sockets, as herein described and for the purpose specified.

2d, Also the elevated rests or supports, f f, for steadying and stiffening the bow, D, substantially as and for the purpose specified.

68,353.—Window Ventilator.—Samuel Darling, Bangor, Me.

1st, I claim combining with an ordinary window sash a ventilating device inserted in the sash itself, substantially as described.

2d, In combination with a ventilating device substantially such as described, openings or perforations in the sash inclining downward and outward.

3d, In combination with double sashes, one or more ventilating tubes inserted therein and provided with a valve, substantially as described.

68,354.—Churn Dasher.—Geo. H. Dow, Freeport, Ill.

I claim the valve seat, D, and valve, D', in combination with the dasher, B, and shaft, A, when constructed as and for the purpose set forth.

68,355.—Clothes Dryer and Stand.—W. H. Earnest, Parkersburg, W. Va.

I claim the revolving head, C, flat at its top and with a circumferential groove on its edge, around which is passed the wire, E, having a series of arms, D, suspended by means of narrow slots at their inner ends, said arms being grooved at their sides and beveled on their upper edges, the whole supported by the stand, A, as specified.

68,356.—Centrifugal Machine for Washing Sugar.—George E. Evans, Boston, Mass.

1st, I claim a removable cone for forming a wall of sugar in centrifugal machines constructed and operated substantially as described.

2d, In centrifugal machine for washing sugars, I claim operating a removable cone placed within such centrifuga's by lifting it while the centrifugal is being revolved for the purpose of forming a wall of sugar, in the manner and for the purpose substantially as described.

68,357.—Machine for Separating Tinned and Galvanized Articles of Metal.—Herbert E. Fowler, Walcottville, Conn.

I claim the vibrating separator, fitted substantially as specified, in combination with the supply hopper, as and for the purposes set forth.

68,358.—Cow Milker.—George H. Gardner (assignor to himself and A. B. Cooley), Philadelphia, Pa.

1st, I claim the combination with the vessel, A, of a piston, B, its rod, d, and the operating lever, C', the whole being constructed, arranged, and operating substantially as set forth for the purpose specified.

2d, The branch pipes, D, rendered adjustable on the vessel, A, substantially as and for the purpose herein set forth.

3d, The adjustable teat cups, G, strengthened by the rings, v v1 and v2, substantially in the manner described.

4th, The manner substantially as described of securing teat cups, G, to the branch pipes.

68,359.—Amalgamator.—H. A. Gaston, Nevada City, Cal.

1st, I claim the dies, E, in the bottom of the pan, constructed and operating in combination with mullers, A, essentially as described.

2d, The mullers, A, when constructed of a spiral form, whereby they are made to spread or grind the pulp when rotated in one direction and to loosen it from the bottom when rotated in the opposite direction, substantially as described.

68,360.—Method of Holding Whips.—John Gibson, Jr., Albany, N. Y.

1st, I claim constructing whips with a hollow butt or handle end, for the purpose substantially as set forth and described.

2d, I claim the standard, C, with or without the elastic washer, e, or its equivalent, attached to the body, dickey seat, dash, or any other part of the carriage or sleigh, for the purposes set forth and described.

3d, The hollow or bore, a, of the whip handle, in combination with the standard, C, for holding the whip, substantially as set forth and described.

68,361.—Buttener for Shoes.—John F. Goldthwait, Boston, Mass.

I claim a buttoner substantially as described, consisting of a continuous loop, enlarged at C, for the purpose of receiving the button, and narrowed at d, to suit the eye of the button.

68,362.—Drilling Machine.—Wm. D. Grimshaw, Newark, N. J. Antedated Aug. 18, 1867.

1st, I claim the sides, t, clamped to the standard, b, and receiving the bed, u, constructed and arranged in the manner and for the purposes specified.

2d, I claim the pulleys, d r and s, arranged as set forth, in combination with the drill stock, k, treadle, g, and crank, 2, as and for the purposes specified.

68,363.—Preparing and Treating Vegetable Fibers.—Charles Heaton, New York city.

1st, I claim subjecting crude vegetable fibrous material to any chemical treatment which softens and shrinks its bulk without disintegrating the same, for the purpose set forth and described.

2d, Preparing bamboo or other crude vegetable fibrous matter for transportation and subsequent disintegration as a fiber-producing material, by means of an alkaline or a caustic alkaline solution.

3d, Softening and preparing bamboo, or other crude vegetable fibrous matter, by means of an alkaline solution, when so applied as not to disintegrate the material, but simply to prepare it for mechanical reduction, as fully set forth.

4th, The process of disintegrating bamboo or other like crude vegetable fibrous matter, by means of the beating or rag engine or its mechanical equivalent, when such bamboo or other fibrous matter has not been reduced to a pulpy mass by chemical action or when the material has not been previously subjected to a treatment which destroys its woody conformation, but has been prepared for the mechanical disintegration by being softened in an alkaline solution.

68,364.—Boot Heel.—John Hubbell, Buffalo, N. Y. Antedated Aug. 25, 1867.

I claim extending the metallic heel plate upwardly sufficient to meet the upper leather, as represented at a3, and making the front part concave as shown at a4, for the purpose and as described.

68,365.—Rolling Rubber into Sheets and Applying the Same to Fabrics.—David C. Hull, Chelsea, Mass.

I claim the improvement in the manufacture of sheets of rubber by means of rollers, the same consisting in the formation of two separate sheets, by two pairs of reducing rollers, and subsequently bringing together and uniting the two sheets so made by means of two rollers and by the pressure of such sheets between such rollers, as specified.

I also claim the new manufacture or compound rubber sheet as made by such process or means.

I also claim the duplex or compound rubber sheet making machine, as composed of the two pairs of reducing rollers, B C and D E, and one or more compressing rollers, F, the whole being to operate substantially as and for the purpose described.

I also claim the above described improvement in the application of rubber to cloth by means of rollers, the same consisting in the formation of two separate sheets of rubber by two separate sets of reducing rollers and applying and pressing by means of two rollers, such two sheets together and upon a single piece of cloth or upon two pieces of cloth, so as to unite the sheets and cloth in manner as specified.

I also claim the new manufacture or compound rubber coated cloth or its equivalent, made by means and in the manner specified.

68,366.—Cooking Range.—M. C. Hull, New York City.

1st, I claim in a range or stove provided with an elevated oven, a descending flue in the lower portion of the range, for the purpose and substantially as set forth.

2d, I claim the arrangement of the air pipe, k, smoke flue, n, and elevated ovens, o, o', in combination with a range or stove having a descending flue, substantially as and for the purpose set forth.

3d, I claim a conical register introduced in the hot air flue around the smoke flue, in the manner and for the purposes specified.

4th, I claim forming a chamber, for non-conducting material, above the top oven flue, for the purposes and as set forth.

5th, I claim inclining the upper plate of the top oven flue, so as to deflect the products of combustion down upon the top of the oven as set forth.

6th, I claim the air flue, k, within the smoke flue, n, in combination with an air heating range or stove, substantially as set forth.

68,367.—Drying Oils for Paints.—Fleury Huot, N. Y. City.

I claim the manufacture of drying oils having a body adapted to paint, &c., by the acid reaction in the manner specified.

68,368.—Car Seats and Couches.—Isaac W. Lamb, Salem, Michigan.

1st, I claim the backs, B, hinged to the seats and connected by rods to upper movable berths, constructed and arranged as described.

2d, The arms, b, b', in combination with the movable backs, as and for the purpose set forth.

3d, In combination with the arm, b, b', and backs, I claim the arrangement of cords, rollers and pulleys, for the purpose set forth.

4th, I claim the stops, o, o', in combination with the seat frame and arms, b, b'.

5th, I claim the upper couches, D, D', attached to the seat backs by long and short rods, all constructed and arranged as described and for the purpose set forth.

6th, In combination with the upper couches, supported and operated as described, I claim curtains, c, c, as and for the purpose set forth.

68,369.—Horse Collars.—William Leonard, Boston, Mass.

I claim a horse collar, the bearing surface of which is made of rubber compound, when the edges of such rubber are reinforced to enable the rubber to be secured in position, substantially as set forth.

Also, in combination with the above, I claim interposing between the rubber and the stuffing, c, the cloth, h, substantially as and for the purpose described.

68,370.—Paper Stock.—Heman S. Lucas, Chester, Mass.

I claim the application of the fibres of the stalks and leaves of the plant *Spartina Juncea*, (or low Rush Salt Grass,) to the manufacture of paper stock.

68,371.—Platform Scales.—C. C. Lyman, Edinboro, Pa.

I claim the cams, G, shaft, D, and pulleys, H, as arranged in combination with the platform, B, for the purpose and in the manner set forth.

68,372.—Cattle Stanchions.—Chas. H. Mann, Fairlee, Vt.

I claim the rotary stanchion, as well as its arrangement and combination with a holding frame or its equivalent, the whole being substantially as described.

68,373.—Sofa Bedstead.—Chas. F. Martine, Boston, Mass.

1st, I claim the spring catch, a, and pin, e, in the stationary section, D, and the notched opening in the hinged section, C, of the arm for securing said sections together as and for the purpose specified.

2d, The latches, G G, pivoted to the back, L, and used in combination with the staples or loops, I, I, and cord, J, for disengaging both ends of the back simultaneously, substantially as specified.

68,374.—Machine for Stirring Starch.—Purdy Mason and James W. Brant, Oswego, N. Y.

1st, We claim the tank, A, with its glass stave or window, as and for the purpose set forth.

2d, The use of the adjustable gates, G, G, with their weights and cords for regulating them, substantially as herein set forth.

3d, The combination and arrangement of the tank, A, and shaft, D, with its arms with the sleeves, H, H, cords, J, J, and gates, G, G, as and for the purpose specified.

68,375.—Apparatus for the Manufacture of Soda Water and for Aerating Liquids.—John Mathews, Jr., New York City.

1st, I claim a soda-water or other aerating apparatus, having its pump feed and agitator or mixer, so arranged in relation to its condenser or reservoir as that all joints in the latter above its average water level may be dispensed with as herein specified.

2d, In soda-water or other aerating apparatus the combination with the reservoir or condenser, C, a reciprocating discharge pipe or tube, J, to the pump, substantially as and for the purposes herein set forth.

3d, The combination of the stationary hollow plunger, D, reciprocating pump cylinder, F, reciprocating discharge pipe, J, connected therewith, receiving and delivery valves, and reservoir or condenser, C, essentially as specified.

4th, The volutes, L, M, or their equivalents, acting as agitators or mixers, arranged on the reciprocating pump discharge pipe, where it projects into the reservoir, C, or otherwise similarly driven for action therein, as set forth.

5th, The combination with the pump for direct action thereby of an agitator or agitators within the condenser.

68,376.—Gates.—Isaac H. McOmber, El Paso, Ill.

I claim the block, G, roller, H, staple, C, and bolt, D, shaft, E, and spring, F, constructed and arranged to operate as and for the purpose set forth.

68,377.—Steam Engine.—Cyrus H. Merrick, Pittsburg, Pa.

1st, I claim so constructing the steam valves and ports of the cylinder of a reciprocating engine as to open a communication for exhaust steam between the two ends of the cylinder at or about the time when the live steam is cut off and before the completion of either stroke, substantially as and for the purposes above set forth.

2d, Balancing the piston of a reciprocating engine by the use of exhaust steam or other fluid motor employed while the crank is approaching to, passing and receding from the dead points or centers, during any desirable portion of the stroke, substantially as and for the purpose above described.

3d, So constructing and arranging the steam valve and ports of a steam engine as to admit steam to cylinder during the middle of each stroke, and for a greater or less proportion of such stroke, in combination with one or more openings or communicating passages from end to end of the cylinder fitted with a valve or valves or other suitable device for permitting or preventing the flow of stream, in order to balance the piston, substantially in the manner and for the purposes hereinbefore set forth.

68,378.—Washing Machine.—Lewis Merrifield, Lagrange Center, Ind.

I claim the combination and arrangement of the frame, D, grooved rollers, B B, rubber, K, tub, H, with the springs and catches, E, all as and for the purpose specified.

68,379.—Curbing.—Jeremiah Miller, Pittsburg, Pa.

I claim a metallic curbing or metallic base for railings fences and similar purposes consisting of a cap or crown piece, web, flange and gutter constructed substantially as and for the purposes described.

68,380.—Hose Coupling.—Peter H. Niles, Boston, Mass., assignor to himself and Agustus Russ, Cambridge, Mass.

1st, I claim the construction of a self-packing coupling composed of an elastic ring expanded into a recess in the opposite section of the coupling by means substantially as described.

2d, I claim the expanding ring, D, in conformation with the recess, G, forming a self-packing coupling substantially as above described.

3d, I claim the ring, D, nut, B, washer, C, and flange, E, acting in combination substantially as above described.

68,381.—Wood Screws.—Richard J. Nunn, Savannah, Ga.

1st, I claim the nails or locking brads, b, in combination with the screw having its head constructed with nicks or notches, a', substantially as and for the purpose herein set forth.

2d, The supplemental head, c, in combination with the locking brads, b, and the notched head of the screw, substantially as and for the purpose herein set forth.

68,382.—Condenser.—Frederick Ortlieb, Williamsburg, N. Y.

1st, I claim the outer siphonic pipe through which the water from the condenser flows for extracting the air and gases from the steam condensing spaces through a pipe or pipes communicating therewith essentially as set forth.

2d, The combination of the water circulating or siphonic pipe, C, with the pipe, D, or its extension, D', made adjustable so as to regulate the outflow through the pipe, C, for operation in connection with the condenser substantially as specified.

68,383.—Lining in Stoves.—Austin Packard, Brooklyn, N. Y.

I claim fastening or securing fire brick or soap stone lining in the fire boxes or fire pots of stoves, ranges, cabooses or in other places where such linings are or may be used substantially as hereinbefore set forth.

68,384.—Canning Fruit.—C. J. Paine, Young America, Ill.

1st, I claim the improved mode herein described for canning fruit, etc., by means of steam introduced into the body of the fruit, etc., whilst the same is in a cold state, substantially as set forth.

2d, I claim the special use of the pipe, C, provided with the perforations, E, and operating in the manner and for the purpose substantially of specified.

3d, The filler or funnel, D, provided with the collar, D', in combination with the pipe, C, and operating so as to be adjusted to any height can or jar, in the manner substantially as herein set forth.

4th, The combination of the pipe, C, filler, D, provided with the collar D', and boiler, A, arranged and operating as and for the purpose specified.

68,385.—APPARATUS FOR SLABBING SOAP.—Harvey and Alvah Phelps, Albany N. Y.

1st, We claim the employment or use of the attachable and detachable frames, F, constructed as described and the same secured to the movable frame, k, by means of the clamps, H H, or their equivalents for the purpose specified.

2d, We claim in combination with the frames, E F, and clamps, H, the windlass, A, frame, B, guide bars, d d, and sliding bars, c c, the whole being arranged to operate in the manner and for the purpose shown and described.

68,386.—COTTON ELEVATOR.—William Potter and Ebenezer Crane, Lowel, Mass.

1st, We claim the employment of the endless aprons in the manner and for the purpose substantially as set forth.

2d, We claim the employment of points, o, projecting from the apron slats, as and for the purpose set forth.

3d, We claim the binder rolls, c, combined with the apron, B or C, as and for the purpose specified.

68,387.—WINDOW SHUTTER FASTENING.—Ralph Reed, Pittsburg, Pa.

I claim the bar, C, constructed and used with the window shutter and sill, substantially as and for the purpose set forth.

68,388.—PIPE JOINTS.—John H. Rhodes, Brooklyn, N. Y.

I claim the combination of the slip sleeve, B, made of an arched or bulging from between its ends of soft metal or other suitable compressible material, with a compressing jacket or clamping rings, C C', of a harder or less pliable character, for operation in connection with the ends of separate lengths or sections of pipe, A A', substantially as specified.

68,389.—SOFA BEDSTEAD.—L. Schaefer, Cleveland, Ohio.

I claim the adjustable arms, F, dowel pins, G, and movable back, H, when constructed and arranged in combination with the sections, A B, in the manner substantially as described.

68,390.—THRASHING MACHINE.—W. J. Sloan, Bloom, Ill.

I claim a feeder having frame, A, guards, E, and endless apron, B, in combination with cylinder, H, having curved arms, I, when constructed substantially as and for the purpose set forth.

68,391.—STAGING.—Seabury Sowle, New Albany, Ind.

I claim the within described skid constructed and used substantially in the manner and for the purpose set forth.

68,392.—POTATO PLOW.—J. P. Stanton, Fredericktown, N. J.

1st, I claim the employment of a hand lever for shifting laterally the side ploughs, substantially as described.

2d, I claim such lever combined with devices for locking the same in different positions.

3d, I claim such lever combined with a slide connected with the side plow beams.

4th, I claim such lever combined with a side spring operating as a self-acting locking device.

68,393.—CULTIVATOR PLOW.—W. H. Startzman, Big Lick, Va.

I claim the arrangement with the beam, A, and shank, B, of the stirrup, C, set screw, E, brace, F, bolt, B', and the teeth, G, made reversible with the same or different shaped ends, as and for the purpose set forth.

68,394.—MILL PICK.—W. B. Stephens, Stephen's Mills, N. Y.

I claim the combination and arrangement of the bars, A A', steel plate, B, and set screw, C, when constructed and used for the purposes specified.

68,395.—CARRIAGE JACK.—O. B. Sutton, Kensico, N. Y.

I claim the notched locking bar, D, pivoted to the leg, B, its upper face bearing against the staple, E, secured to the leg, A, and retaining on its lower face the link, F, attached to the lifting bar, C, which is pivoted to the two legs, A and B, operating substantially as described for the purpose specified.

68,396.—BRICK MACHINE.—Lewis Sylvester, Philadelphia, Pa.

1st, I claim the combination of the reciprocating mold box, its compartments and followers, the box, G, and its partitions, n, and the reciprocating ram with its recesses for the reception of the said partition the whole being constructed and arranged substantially as and for the purpose herein set forth.

2d, The combination of the above with the hopper, G.

3d, The pin or key, d, for connecting the ram, F, to the rod, E, in combination with the devices herein described, or the equivalents to the same whereby the ram and rod may be made a fixed part of each other or may be made to move to a limited extent independently of each other for the purpose specified.

4th, The mold box, follower, r, their rods, r', and plate, L, in combination with the arms, P, and the appliances herein described or their equivalents whereby the said arms are caused to yield on forcing the clay into the compartments of the said box, are carried upwards with the box and are made the medium of forcing the bricks from the box, all substantially as set forth.

5th, The bearing off boards, i, constructed and applied to a brick machine substantially as described, so as to serve as a medium for stripping the bricks from the followers as set forth.

6th, A steam pipe, l, communicating with the compartments, x, of the box, G, substantially as and for the purpose herein set forth.

68,397.—WHEEL HUB.—B. F. Taft, Groton Junction, Mass., assignor to Ames Plow Company, Boston, Mass.

I claim the combination as well as the arrangement of the series of lips, or bridges, c c, the cap plate, C, and the hub part, A, provided with the sleeve, B, and the spoke receiving cavities or mortises arranged within it and with respect to the said lips substantially in manner as heretofore specified and as represented in the accompanying drawings.

68,398.—OVER SHOES.—H. G. Tyer, Andover, Mass.

I claim the new process described of making a vulcanized shoe with an elastic gore, the same consisting in the insertion within the shoe during the construction of it and prior to vulcanization of it, of muslin, stocking net, or other equivalent fabric, (however such fabric may have been prepared,) in connection with vulcanizable India rubber or India rubber compounds, placed on or between layers of the said fabric, and to a removal of part of the shoe lining, the whole being substantially as hereinbefore set forth.

68,399.—SELF-RELIEVING GRAPE GATHERER.—Calvin Wadsworth, Madison, Ohio.

I claim as a new article of manufacture the divided basket or receptacle herein described, consisting of the hinged halves, A A', and hasp, D, arranged so as to operate in the manner and for the purposes specified.

68,400.—MILK BUCKET AND STRAINER.—D. N. West, Smithsburg, Md., assignor to himself and J. Mong Hughes, Greencastle, Pa.

In combination with a bucket, can or any other vessel for holding and transporting milk, an invertible cover, which is a cover and strainer both, so that the same vessel may be used to milk into, to strain the milk, and convey it to market or elsewhere, substantially as and for the purpose described.

68,401.—FRUIT BOXES.—J. F. and O. B. Whitney, Milton, N. Y.

We claim the box constructed, with hinged movable upper and lower sides, f, substantially as and for the purpose specified.

68,402.—MODE FOR RECOVERING LOST ANCHORS.—Charles Barton Whittemore, Boston, Mass.

1st, I claim the supplemental lifting line in combination with an anchor cable, said line being passed through the anchor ring or its equivalent, and so arranged as to be paid out with the anchor cable, substantially as described.

2d, The buoy in combination with the supplemental lifting line applied to the anchor and its cable substantially as and for the purposes set forth.

3d, The combination of the lifting line, g, anchor cable, B, and loop, i, or its equivalent substantially as and for the purposes set forth.

68,403.—EARTH PULVERIZER AND SEEDER COMBINED.—Carman Wilson, (assignor to William L. Smith,) Stamford, Conn.

1st, I claim the combination of the toothed roller and harrow frame, when arranged that whenever the machine is in position to operate upon the ground the roller shall be in advance of the harrow substantially as herein specified.

2d, In combination with such earth pulverizing device, I claim the revolving seed-sowing cylinder, F, constructed and operating substantially as herein specified.

68,404.—WIND WHEEL.—M. W. Woodruff, Belle Isle, N. Y.

1st, I claim the sails, J, constructed with several flat surfaces arranged at different angles, for equalizing their pitch in proportion to their velocity and distance from the center of motion substantially of herein shown and described and for the purpose specified.

2d, The hollow main shaft, C, sliding shaft, k, carrying toothed rack, l, and pinions, g, in connection with the pivoted sails, J, and governor, K, all constructed and operating substantially as and for the purpose set forth.

3d, The antifriction carriage, R S, with horizontal steadying rollers, t t, supporting the bed plate, S, substantially in the manner and for the purpose set forth.

4th, The collar, Q, having an arm or steadying projection, q, working in the bifurcated lower arm of governor lever, r, in connection with the sliding shaft, k, and pivoted sails, J, as herein set forth and for the purpose described.

5th, The gimbal connection, T u, and ring, W, in combination with the lever, P, pitman, D, and revolving bed-plate, o, as herein shown and for the purpose set forth.

68,405.—HORSE HAY FORK.—Edwin Yancy, Utica, N. Y.

I claim the curved lever, E, provided with the rest, L, and pivoted to the arm, D, in combination with the hook, H, link, F, point, B, and shank, A, arranged as and for the purpose substantially as set forth.

68,406.—FURNACE FOR ROASTING ORES.—John Agrell, and John Klepzig, San Francisco, Cal.

1st, We claim a furnace for roasting ores, etc., provided with a rotating hearth with the fire acting on its upper surface as described. We also claim providing a rotary hearth with a door to discharge the ores or contents acted on by the fire.

2d, We claim mounting the rotating hearth of a reverbatory furnace and rollers substantially as described.

3d, We also claim providing the revolving hearth with partitions to hold the brick lining in place.

4th, And in combination with the rotating hearth we claim the stationary stirrers.

5th, We also claim making the shaft which holds the stirrers hollow, for the purpose of supplying steam to the ores, roasted on the hearth.

68,407.—LIGHTNING ARRESTERS.—Arthur Barbarin, New Orleans, La.

1st, I claim the application and use in connection with a paratonnerre, or lightning arrester for telegraph wires, cables etc., of one or more permanent magnets or electro-magnets as and for the purposes herein described.

2d, A lightning arrester in which one or more permanent, or electro-magnets, are combined with the telegraph wire or cable, and other parts of said arrester in the manner shown and described, or in any other form of mechanical arrangement substantially equivalent to the same as set forth.

68,408.—COMPOUND OF CORK, RUBBER, ETC.—Louis Bauhoefer, (Henry Hauer Executor) Philadelphia, Pa.

I claim a composition, consisting of a combination of india-rubber, or gutta-percha, with particles of baked or charred cork, as set forth.

68,409.—APPARATUS FOR RECTIFYING AND DISTILLING.—Gustave Bequet, Son, (assignor to himself and Moritz Pinner) New York City.

1st, I claim an apparatus adapted for to make rum, wiskey, alcohol, French spirits and kindered articles when constructed substantially as described.

2d, Constructing a rectifying or distilling column in such a way as to enable the passing through different channels or chambers, within the same column of articles or vapors of different quality or degree, all substantially as described and for the purposes set forth.

3d, Dividing the interior of a rectifying or distilling column into parts in such a manner that either part could be used for a specific purpose without interfering with the functions or operations of the other part or parts, all substantially as herein described.

4th, Using within the interior of one and the same rectifying or distilling column sections, divisions or passages of a variety of constructions, substantially as herein set forth.

5th, Using the cap, c, the stop-cocks, D1 and D2, the passages, E1 and E2, the pipes, F1 F2 G H I, the passages, l and k, or either of these parts, in combination with a rectifying or distilling column, where the latter is divided into compartments substantially as herein described.

68,410.—ROTARY PLOW.—E T. Bussell, Indianapolis, Ind.(assignor to himself and W. A. Candee and Jacob Eldridge).

1st, I claim segment driving wheels, S, compassing less than half a circle, when used in combination with pinions, p, for the purpose of rotating each auger upon its own axis at the proper point for most effectually breaking and pulverizing the earth substantially as shown.

2d, Supplementary yielding cogs, b b, when the same are attached to flat springs as shown, and these, in connection with the segments, S, as and for the purpose stated.

3d, Dirt shield, f, and its adjunct, e, when these are used and made substantially as shown, and for the purpose specified.

4th, Castor wheel, p2, and roller, m, or their equivalents, when the same are used for graduating the depth of this rotary plow, and for transporting the same from place to place.

68,411.—MACHINE FOR LOOSENING EARTH TO BE EXCAVATED OR REMOVED.—W. H. Butler, Chicago, Ill.

1st, I claim the combination of the frame, B, having the chisels, T, arranged therein as described with the frame, A, provided with the mechanism for moving the frame, B, thereon substantially as set forth.

2d, I claim one or more chisels, T, arranged to be operated as set forth for loosening or digging up the earth preparatory to removing the same substantially as and for the purpose set forth.

68,412.—FEED AND STRAW CUTTER.—A.P. Chapin, Chicopee Falls, Mass.

I claim the semi-circular knife, K, in combination with the knife bar operating in the gate frame, or standards, A A, as set forth and for the purposes described.

68,413.—MEANS FOR HANGING RUDDERS.—W. N. Clark, (assignor to himself and James B. Clark) Chester, Conn. and W. N. Clark, assigns one half his right to Henry Pember.

I claim the plate, F, and tongue, T, in combination with the hinged rudder, R, substantially as herein described and for the purpose specified.

68,414.—MACHINE FOR MANUFACTURING HOES.—W.T.Clement and Edward V. Foster, Northampton, Mass.

1st, We claim the within described for the drop, K, composed of the anvil, I, and pin, J, the latter being full on the side forwards the throat or edge of the hoe and contracted on the opposite side and arranged relatively to the drop, K k k', so as to act on the material, D d, of a hoe substantially in the manner and for the purpose herein set forth.

2d, We claim in connection with the above, making the inclination of the pin, J, adjustable by means of the screws, j1 j2 or their equivalents so as to vary the inclination of the eye of the hoe at will within moderate limits substantially as herein specified.

68,415.—APPARATUS FOR TURNING CRANK PINS ON LOCOMOTIVE DRIVING WHEELS.—Chas. J. Clifford, New Hampton, N. J.

I claim the frame, A, constructed as described in combination with the screws, l and d, frame, C, and the operating mechanism, all constructed and arranged as set forth.

68,416.—FORMING GLASS CHIMNEYS FOR LAMPS.—M. H. Collins, Chelsea, Mass.

I claim the combination and arrangement of the skeleton frame or series of wires, C, with the rod, A, or such rod and the disk, B, such being for use in manner as set forth.

2d, I also claim the combination and arrangement of the piercer, D', with the rod, A, and skeleton frame or wires, C, or such and the disk, B.

3d, I also claim the combination and arrangement of one or more springs, D, and prongs, F, with the rod, A, and the skeleton frame or series of wires, C.

4th, I also claim the combination of the piercer, D', the rod, A, and one or more springs, D, and prongs, F.

5th, I also claim the combination of the springs, F, with each of the prongs, D, the whole being arranged substantially as specified.

68,417.—BUNG FOR CASKS AND BARRELS.—M. C. Cronk, Auburn, N. Y.

I claim a bung with the parts, B T and n, made and operated substantially as and for the purposes described.

68,418.—RESERVOIR PEN HOLDER.—John Darling, Stone, North Britain.

1st, I claim the tubular slide or shield, F, in combination with the tubular holder and its elastic reservoir tube, D, as described.

2d, The flexible diaphragm or pad, a, and sliding head or plunger, E, arranged in respect to the reservoir, A, substantially as and for the purpose set forth.

68,419.—COMBINED ROLLER STALK CUTTER AND MARKER.—J. W. Dilly, Roseville, Ill.

I claim rollers, L L, cutters, P P, journal, S, and frame, A, combined in the manner described and arranged substantially as described for the purposes set forth.

68,420.—OPERATING FEED WHEEL IN SEWING MACHINES.—Arnold Doll, Cleveland, Ohio.

1st, I claim the cam, G, and arm, D, provided with a shoulder, E, the whole constructed and arranged in combination with the wheel, B, for the purpose and in the manner substantially as set forth.

2d, Cam wheel, N, arm, O, slotted arm, I, and link, L, in combination with the cam, G, arm, D, and spring, P, arranged and operating as and for the purpose substantially as described.

68,421.—RAILWAY.—Zebina Eastman, Chicago, Ill.

I claim the rail, a, having a longitudinal groove or concavity in its upper surface adapted for the reception of the convex rims of wheels of cars and other vehicles and formed with a downwardly projecting rim, b, for securing the rail in position upon the ties, when the upper edge of the rail on each side of the groove is notched in the manner and for the purpose described.

68,422.—MODE OF PRESERVING COFFEE—August Eikrenkotter, and Frank Silver, Searsville, Cal.

We claim the process herein described for preserving coffee.

We also claim the product as herein described, as a new article of manufacture.

68,423.—METHOD OF MAKING AXE BLANKS.—J. W. Ells (assignor to himself and I. C. Breed), Pittsburg, Pa.

I claim a bar of iron formed substantially in the manner and to the shape herein described, to the end that the same may be divided by cutting transversely into sections of which each shall constitute an ax blank as described as an improved article of manufacture.

68,424.—MACHINE FOR MAKING HOLES FOR PLANTING.—E.R. Ensign, East Hartford, Conn.

I claim the combination of the blade, B, with the beam, A, the handles, H H, and the wheel, W, substantially as specified, the whole forming a machine for making holes for planting as herein described.

68,425.—KNITTING MACHINE.—S. V. Essick, Mansfield, Ohio.

I claim the needle, L, constructed as described the spring, D, the main sliding piece, B, the lever, A, the wheel and rim, J and R, the thread holder, E, the ratchet, F, the spring, P, and the cornered wheel, H, all arranged and operating substantially as described and for the purpose set forth.

68,426.—APPARATUS FOR DISTILLING PETROLEUM.—Hiram B. Everest, (assignor to The Vacuum Oil Company), Rochester, N. Y.

1st, I claim the combination of two or more vacuum petroleum stills, so arranged that the oil is fed from one retort into the other as it increases in specific gravity during the distillation and economizing the use of steam used in the vaporization of the oil in the retorts, by passing it first through the heating pipes in the retort containing the heavier oils, and afterwards conducting it through the heating pipes in the retort or retorts containing the oils of lighter specific gravity, as herein set froth.

2d, The construction of a horizontal elongated cylindrical or elliptical vacuum retort for petroleum arranged and operating in the manner and for the purpose herein set forth.

3d, Connecting the retorts of a vacuum still with the condenser or condensers by two or more goose necks, so as to distribute the exhaust in the retort or retorts, and thus prevent drawing the oil over at the same time facilitating the escape of the vapor as herein set forth.

4th, So combining the capacious condenser or condensers, with the retort or retorts and the condensing coil or coils, that said capacious condenser or condensers will serve as a check to diminish the direct action of the exhaust pump upon the oil in the retorts as set forth.

5th, Placing the receiving vessels, F F', in such a position as to allow the distilled oil to be discharged by its own gravity and without passing through the pump as set forth.

6th, Surrounding the upper portion of the retort or retorts by a jacket, or, its equivalent for the reception of steam or hot air to prevent condensation as described.

7th, The use in combination with a vacuum still or stills for petroleum and a steam generator of an independent super-heating furnace for heating the steam as specified.

8th, The construction of said super-heating furnace in combination with a steam boiler substantially as and for the purposes set forth when and in connection with a vacuum petroleum still.

9th, The construction of a super-heating for distilling purposes for numerous sections of small straight pipes for advantage of heating surface with facility of building and repairs as shown.

10th, Connecting the main induction and eduction steam pipes, L D', leading from the super-heating to the still with the sections of small heating pipes within the retorts by means of a steam chest, K', bolted to the head of a still, substantially as and for the purposes set forth.

11th, Placing the small sections of heating pipes in the retort in upright position substantially in the manner and for the purpose set forth.

12th, The application to an oil gage to a vacuum petroleum still arranged and operating substantially as set forth.

13th, The combination of a steam generator, super-heating furnace and vacuum apparatus, as a whole constructed and operating substantially in the manner set forth.

14th, The separation of petroleum into the constituent parts specified, and about the proportions named, by means of an apparatus as herein described.

68,427.—SHEEP TABLE.—Green Fenton, Streetsboro, Ohio.

I claim the herein described sheep table provided with adjustable sides, D, foot block, C, and pillow, B, when constructed and arranged in the manner and for the purpose substantially as set forth.

68,428.—TRUSS PAD.—Thos. StClair Ferriss, Nashville, Tenn.

I claim providing a truss button or pad with a perforated wooden core as and for the purpose specified.

68,429.—MACHINE FOR MAKING SEWING MACHINE NEEDLES.—Thaddeus Fowler, Seymour, Conn.

I claim in combination with an intermittently revolving feed wheel carrying a series of mandrels, a dog or pawl for moving said feed wheel when said dog or pawl rakes against the mandrels, themselves as a ratchet to turn the wheel by substantially as described.

2d, I also claim in combination with a feed wheel and a series of mandrels therein, and with the milling and drilling mechanism, a mechanism for stopping and holding the blank under the drill at a quarter revolution or the position it occupied at the mills substantially as and for the purpose set forth.

3d, I also claim in machine drilled needles, the drilling of the hole through the blank, from the bottom of one groove to the bottom of the opposite groove by a mechanism arranged and automatically operated, substantially as herein described and represented.

68,430.—MACHINE FOR REDUCING WIRES FOR NEEDLE BLANKS.—Thaddeus Fowler, Seymour, Conn.

1st, I claim in combination with the turning ratchets, mandrel and blank holder, the dies, F and E, for reducing, and allowing the blanks to elongate under the reduction, substantially as described.

2d, I also claim in combination with the turning ratchets, mandrel, blank holder and dies, tappet wheel, ', with its tappets so arranged as to strike the die, whilst the feed is at rest, substantially as described.

68,431.—WRENCH.—Jas. N. Freestone, Williamsburgh, N. Y.

I claim the sliding piece, S, with its tooth, O, handle, H, jaw, C, and spring, X, all constructed and arranged to operate substantially as described.

68,432.—ENGINE HOSE.—E. W. French, South Scituate, Mass.

1st, I claim a hose sewed through the lapped edges, from inside to outside, when the ends of the pieces of which the hose is formed are joined together by a diagonal row or rows of stitches at one continuous operation, as described.

2d, I claim, in combination with the rows of stitches, formed as above described, a welt or covering, as and for the purpose specified.

68,433.—FEED-WATER HEATER.—J. G. Goesel, St. Louis, Mo.

1st, The combination of a vertical steam drum, receiving steam either from the exhaust of a steam engine or directly from a steam generator, and an inside hot-water tank, substantially as described.

2d, The combination of said steam drum with a series of vertical pipes, being connected at both ends, substantially as described.

3d, The combination of the inside water tank, D, and pipe, C, connected at its upper end with the series of pipes, B, and discharging the already hot water near funnel, f, substantially as described, and for the purpose specified.

4th, The combination of inside water tank, D, with pipe, E, connected to the upper part of water tank, D, and conducting the water through steam space of steam drum, either directly or by means of force pumps to boilers.

68,434.—GATE HINGE.—D. H. Gould, Troy, N. Y.

I claim the employment of the bar, p, in combination with the jaws, d d', serving as a guide and support to the parts folding within the jaws, substantially as set forth.

68,435.—GAS APPARATUS.—D. M. Graham, Evansville, Ind.

1st, I claim the construction of a portable gas apparatus with refining and deodorizing chambers, substantially in the manner and for the purpose herein set forth.

2d, The introduction of air into the deodorizing chamber, E, by means of the stop cock, G1, substantially in the manner and for the purpose as herein set forth.

3d, The combination of the tank, A, generator, B, and burner, M, with the refining and deodorizing chamber, substantially in the manner and for the purpose as herein set forth.

4th, The arrangement of the tank, A, generator, B, chambers, E and F, stop cocks, G1 and G, pipe, b, pipe, d, inner cylinder, c, chamber, H, pipe, e, gasometer, I, main pipe, L, and burner, L, and burner, M, substantially in the manner and for the purpose as herein described.

68,436.—LOCK FOR CAR SEATS.—E. Hambujer, Detroit, Mich.

I claim the lock for car seats, consisting of the spring bolt, a b c, catching in the recess of the arm, H, and operated by the screw key, as herein represented and described.

68,437.—STOVEPIPE TO PROMOTE COMBUSTION.—E. Hambujer, Detroit, Mich.

I claim the construction of the flue or pipe of fuel-burning apparatus by dividing the same by an oblique diaphragm A, forming a cold air chamber, open at the bottom, into the throat of the stove or furnace, into which chamber the external air is admitted by one or more pipes or openings, retarding the escape of smoke and partially consumed gases from the fire, and securing a more perfect combustion and economy of fuel, substantially as and for the purpose shown.

68,438.—SWIFTS.—Almone Haskell, Harrison, Me.

I claim the swifts, as herein described, combining the various devices set forth, in the manner and for the purpose specified.

68,439.—CAR COUPLING.—George Hardy Henfield, San Francisco, Cal.

1st, I claim the cam, F, operated by the bar, m, in combination with the jaws, D, closed as herein described.

2d, I also claim the sides, A, jaws, D, spring, E, cams, D and F, and levers, M and N, together with the bar, I, the whole operating as a coupling, substantially as herein described.

68,440.—CULTIVATOR TEETH.—Benj. F. Hisert, Norton Hill, assignor to himself and Geo. W. King, Schoharie, N. Y.

I claim a cultivator tooth or plow attached by a vertical joint to the beam so as to swing horizontally, as and for the purposes set forth.

68,441.—MACHINE FOR CUTTING OFF THE ENDS OF CIGARS.—Frederick W. Hoffman, Morrisania, N. Y.

1st, I claim the arrangement of the knife, J, attached to the knife, G, in combination with the spring bearing, m, in the manner and for the purpose substantially as described.

2d, I claim the arrangement and use of the spring, v, to guide the end of the knife, G, substantially as set forth.

68,442.—SPRING FOR BED AND OTHER PURPOSES.—Joseph Hyde, Troy, N. Y.

A spring composed of the slat, A, or its equivalent, the spring, D, with the fulcra, c, constructed, arranged and operating substantially in manner and for the purposes herein shown and described.

68,443.—CORN PLANTER.—D. W. Jacoby, Shelbyville, Ill.

1st, I claim the metallic cut-off with the rollers, R R, to prevent the cutting of corn, substantially as described.

2d, The manner of regulating the size of the hole in the dropping plate by a semicircular ring in the circular plate, in the manner described.

3d, The combination of the cut-off, D, with the rollers, R R, the top plate, C, and the semicircular ring, B, in the circular plate, A, substantially as described and for the purpose set forth.

68,444.—LOOM HEDDLE.—Chas. Kennedy, Philadelphia, Pa.

I claim a heddle wire, composed of flat wire or metal strip, in which an eye is formed by cutting or splitting the wire and bending the several parts away from each other, as herein set forth.

68,445.—FOUNTAIN PEN.—M. Klein and H. W. Wynne, Keokuk, Iowa.

1st, I claim the air opening, C, with the spring valve, B D, at the top of the ink chamber, A, as and for the purpose specified.

2d, The rod, F E, to raise the air valve, B, with its enclosed passage way, G, substantially as specified.

68,446.—DIE FOR SWAGING MATTOCKS, HOES, ETC.—Christian Konold, Snowden, Pa.

I claim a die for forging mattocks, grub hoes, and similar implements, having two faces, one of which extends across the die, at one end, and is shaped so as to form the blade with thin sides, having a longitudinal-curved ridge down to its center, and making the other part of the die with a concave face terminating at one end in an incline for giving the cutting edge its proper bevel and rounding the face of the blade some distance therefrom towards the eye, as hereinbefore shown and set forth.

68,447.—MOP PAIL AND WRINGER.—Eli H. Lord, Homer, and Egbert Hinman, Syracuse, N. Y.

1st, We claim the combination of the mop pail with the springs, C C, the adjustable rollers, B B, the bail, d, the screw, h, the whole constructed and operated in the manner described.

2d, We claim the bail, d, both for the purpose of a bail, and also for a lever for the purpose of separating the rollers, in the manner described.

68,448.—BANK CHECK.—Albon Man, Brooklyn, N. Y.

1st, I claim the tubular arrangement of the several series of figures and of cyphers, substantially as and for the purpose herein specified.

2d, I claim making each column in a different style from any of the other columns, substantially as and for the purpose herein set forth.

3d, I claim the increasing strength or blackness from one side of the table to the other, substantially as and for the purpose herein set forth.

4th, I claim varying the blackness of the background in the reverse order from that in which the blackness of the figures is varied, substantially as and for the purpose herein set forth.

5th, I claim continuing the columnar arrangement beyond the series of figures so as to provide spaces for the figures to be written therein, substantially as and for the purposes herein set forth.

68,449.—SHEEP CHAIR AND VAT.—George D. Matcham, Pittsfield, Ohio.

I claim the adjustable chairs, G, table, I, and furnace, K, in combination with the vat, A, in the manner and for the purpose substantially as set forth.

68,450.—MACHINE FOR CUTTING AND FOLDING PAPER.—Enos H. McArthur, Hillsdale, N. Y.

1st, I claim the application of a folding apparatus to a paper-cutting machine, substantially as and for the purposes herein set forth.

2d, I claim the movable part, H, of a folding table, in combination with the stationary part, H1, of the same, and folding plate, L, operating substantially as and for the purposes herein set forth.

3d, I claim, in combination with a folding machine, the folding plate, L, substantially as and for the purpose herein specified.

4th, I claim, in a folding apparatus, the folding plate, L, in combination with tappes, L1, cam wheel, Q, spring, L3, operating substantially as and for the purpose herein set forth.

5th, I claim, in a paper cutter, the knife, G, in combination with the angle levers, f4 f5, slot, g, and pin, operating substantially as and for the purpose herein set forth.

6th, I claim the provisions for adjusting the folding table to the different widths of paper to be folded, substantially as and for the purpose herein specified.

68,451.—CARRIAGE JACK.—Jasper P. Moore, Boston, Mass.

I claim my improved carriage jack, made as described, viz: with the slider to encompass and slide on the standard, and with a series of holes, a a a, arranged in the latter in manner and for the purpose specified.

I also claim the slider as made with the three ears, b c d, arranged so as to project from it and with respect to each other, as explained.

68,452.—CAR BRAKE AND STARTING APPARATUS.—Thos. W. Murray, New York city.

1st, I claim the partial ratchet wheels, 2 and 4, pawls, 3 and 8, weighted lever, 9, and lever, 1, all constructed and combined as described and for the purpose set forth.

2d, In combination with the above, I claim the arm, 6, and cam fixed on the wheel, as and for the purpose set forth.

68,453.—TOOL.—John L. Nettleton, New Haven, Conn.

I claim the combination of the sliding bar, D, and its movable ratchet teeth a, with the parallel rack bars, B and C, and cross bar, A, when all the parts are constructed, connected, and fitted for use, substantially as herein described and set forth.

68,454.—DIE FOR MAKING HEADS FOR ELLIPTIC SPRINGS.—Joseph Palmer, Concord, N. H.

1st, I claim the right and left dies, constructed substantially as and for the purpose herein described.

2d, The application of the ears, fig. 5, to the ends of the main leaf of an elliptic spring, substantially as and for the purpose herein described and set forth.

68,455.—DETACHABLE BUGGY TOP.—Albert M. Plimpton, Hornellsville, N. Y.

1st, I claim the keys, j j, attached to the spring holders, k k, operating substantially in the manner herein described.

2d, I claim the combination of the metal straps, c c and d d, with their openings, e e e e, the vertical studs, h h and i i, with their notches, f f, and the keys, j j, on the spring holders, k k, for the purposes set forth.

68,456.—CLOSING BOTTLES.—N. Prescott, Dorchester, Mass.

I claim the bottle stopper for bottles, cans, and other similar vessels, constructed and applied substantially as described.

I also claim the bottle stopper, b, with the curved slit, n, constructed and operating substantially as described.

68,457.—WASHING COMPOUND.—H. C. Putnam and B. F. Johnson, Squaw Grove, Ill.

We claim the washing compound, consisting of the herein stated ingredients, taken in quantities and proportions set forth, the whole prepared in the manner herein described and specified.

68,458.—MACHINE FOR STRIPPING SORGHUM.—Samuel A. Rankin, Fairhaven, Ohio.

1st, I claim the arrangement of the slides, N and O, operated by weights and cords, in combination with the plate, P, or an equivalent of the latter, all substantially as described and for the purpose set forth.

2d, I claim the combination of the plate, P, slides, N and O, and knife, B, substantially as described and for the purpose set forth.

3d, I claim a combination of the whole, substantially as herein set forth and for the purposes specified.

68,459.—MACHINE FOR DRYING FRUIT.—Dennis Rice, Shelburn Falls, Mass.

I claim the combination and arrangement of the box, a a a, with the glass door, b b b, and the apertures, c c c, and the cupola, d d d, and the shelves, e e e, substantially as and for the purposes described.

68,460.—AXLE BEARINGS FOR WAGONS.—Hamilton Richardson, Janesville, Wis.

1st, I claim the axle, A, having its arm or journal, composed of the single solid piece, with the friction rings or ferrules, a, applied thereto at its opposite ends, as herein shown and described.

2d, I claim the axle, A, provided with the flange, n, projecting over the inner end of the box, when used in combination with the box, B, having the collar, i, arranged to shut over the shoulder on the outer end of the axle, as shown and described.

68,461.—DUMPING REEL FOR HARVESTERS.—E. P. Russell, Manlius, N. Y.

1st, I claim raising the cradle shaft at both ends at the same time that the cradles are revolved and carried backward by means of cam, G, plate, H, and crank, L, substantially as and for the purposes set forth.

2d, Cams, G, plate, H, lever, I, arms, J, and crank, L, combined and operating substantially as described.

68,462.—HAY AND COTTON PRESS.—J. S. Schofield, Macon, Ga.

I claim a hay or cotton press, constructed as above described, and having the screw, G, arms, I I, ring, H, box, D, platform, K, and frames, A and L, all combined and arranged in connection with each other to form a press which may rest, in working, either on the frame, A, or in an inverted position, on the frame, L, substantially as and for the purpose described.

68,463.—NUTMEG GRATER.—A. S. Skillin and G. W. Reed, (assignors to themselves, H. L. Hanson, and J. L. Butler), Portland, Me.

We claim the arrangement of the handle or stock, a, the rotary grater, b, spring arm, c, thimble, d, and head, e, for a rotary nutmeg grater, as herein set forth and described.

68,464.—OPERATING CONDENSING ROLLERS IN CARDING MACHINES.—Edwin Stafford, Philadelphia, Pa.

I claim giving to the rubber or condensing rollers of a carding machine a double reciprocating motion, substantially as and for the purpose described.

68,465.—BELT TIGHTENER.—T. G. Stansberry, Medora, Ill.

I claim the slotted shaft, B, provided with a crank and ratchet wheel in combination with the strap, A, having tined hooks at its ends, arranged to operate substantially as shown and described.

68,466.—HULING PLATE.—N. A. Swett, Westerbrook, Me.

I claim the heeling plate, A, when it has the lip, b, the hollow projection, a, and when the same is secured to a last, in the manner described, and then employed as set forth for the purposes specified.

68,467.—THEATRICAL SCENERY.—W. Tanner, N. Y. city.

I claim the manufacture of theatrical water scenes, by arranging strips of this polished or lustrous metal in respect to each other substantially as described, upon the stage of a theater, and in the light thereof, as set forth.

68,468.—BUCKLE.—W. McK Thornton, Clinton, Wis.

1st, I claim the combination of the front positions, b b, of the curved side bars, A A, of such width as to receive between them, and afford side supports for the hame tugs, substantially as described.

2d, A trace buckle, constructed and operating substantially in the manner described.

68,469.—CULTIVATOR.—H. H. Tietjens, Lyons, Iowa.

I claim a hand plow, when constructed and operating, substantially as described.

68,470.—APPARATUS FOR DISTILLING.—John Trageser, and Ignatz Illofsky, New York city.

We claim a series of condensing and boiling apparatus, arranged alternately, and fitted in, substantially in the manner specified, and for the purposes set forth.

68,471.—PRINTING PRESS.—L. T. Verney, Paris, France.

1st, I claim the plate, K, its projections, p, levers, L, and connecting rods, L', in combination with the shaft, E, cylinder, E1, projections, p2, and q, the whole being constructed, arranged, and operating, substantially as set forth.

2d, The adjustable guides, r, pins, b and b', plates, N, and levers, O, arranged on the plate, K, and operating in connection with the cylinder, E', substantially as and for the purposes specified.

3d, The traversing ink reservoir, H, its rollers, 1 11 12, in combination with the inking rollers, f', substantially as described.

4th, The combination of the above, the sliding roller, f', and levers, n n, the whole being arranged and operating substantially as specified.

5th, The vibrating bar, I, operating in combination with the cylinder, E1, and its plate, E2, substantially as set forth.

6th, The traversing reservoir, m', in combination with the cylinder, E1, its plate, E2, and the roller, f3.

68,472.—GRAIN METER.—J. C. Walker, Waco Village, Texas.

I claim the combination and arrangement of the wheel, B, annular chute, A, and brush, C, in a grain meter, substantially as and for the purpose specified.

68,473.—LOW WATER DETECTOR FOR STEAM GENERATOR.—J. V. Weitz, Cleveland, Ohio.

1st, I claim the arm, H, stays, k, weighted rods, L L', as arranged in combination with the sleeve, F, and valve, C, for the purpose and in the manner set forth.

2d, The vertical arm, M, crank, M', and cam, N, in combination with the valve, C, as and for the purpose described.

3d, The lever, N', when operated conjointly by the crank, M', and weighted rods, L, in combination with the valve, B, as and for the purpose set forth.

4th, The eccentric, Q, cam, Q', and lug, b, as arranged in combination with the cam, N, for the purpose and in the manner substantially as described.

68,474.—ARMOR FOR SHIPS OF WAR.—Timothy Whitby, York Road, Lambeth, England.

I claim the protecting those parts of vessels and other structures that are required to be rendered shot proof by the combination of an exterior casing of chill cast metal blocks, and wrought plating, the plating being employed to inclose and retain the chill cast pieces as herein described.

68,475.—VINE TRELLIS.—Levi H. Whitney, Vallejo, Cal.

1st, I claim the combination of the bearing wires, B, lateral wires, C, and vertical wires, D, for the purpose of forming a trellis as described.

2d, The thimbled loop b, shown in fig. 3, substantially as and for the purpose described.

3d, The perforated tag, G, shown in fig. 6, in combination with the trellis wires, B, substantially as shown and described.

4th, The vertical wires, D D, equally spaced and spread apart at their upper ends, and grouped together at their lower ends so as to be secured at a single stake at the hill, substantially as shown and described.

68,476.—SPINNING JACK.—J. H. Winterbottom, and J. Lord, Philadelphia, Pa.

1st, We claim the lever, N, adjustable slides, H and Y, bar, S, curved projection, T, and wheel, R, in combination with a spinning jack, in the manner and for the purpose substantially as shown and described.

2d, The bar, S, curved projection, T, and wheel, R, in combination with the starting bar, O, of a spinning jack, substantially as described.

68,477.—HEMP BRAKE.—Conrad Witt, and Andrus Sina, Davenport, Iowa.

1st, I claim the manner in which the flax or hemp is carried into and taken from the machine by canvas platform, f, running upon rollers, e e1, e2, e3, e4, fig. 2.

2d, We claim the form of the construction of the cylinder break rollers, e e' e'', with knives, d, meshing into each other, and as regulated by slide journal, l, fig. 4.

3d, We furthermore claim cleaners, j' j'', shown in fig. 2.

68,478.—ESCAPE VALVE HOSE COUPLING.—Albert F. Allen, Providence, R. I.

1st, I claim so arranging a hose coupling, that the flow of water toward the nozzle can be instantly stopped or resumed without interrupting the working of the engine, substantially as and for the purpose herein shown and described.

2d, The perforated sleeve, C, in combination with the perforated cylinder, A, and nuts, a b, all made and operating substantially as and for the purpose herein shown and described.

68,479.—WAGON SEAT AND SPRING.—R. L. Allen, N. Y. city.

1st, I claim bringing the springs to eyes, a, formed above and in front of the posts, B, so that the springs will have their fulcra upon the outer ends of the posts, B, and securing the seat, D, upon the said springs, substantially as and for the purpose herein shown and described.

2d, The posts, B, springs, C, and seat, D, in combination with the staples, E, all made and operating substantially as and for the purpose herein shown and described.

68,480.—AUTOMATIC MEASURING CAN.—Thomas D. Arkle, and Harry C. Greer, Bridgeport, O.

1st, I claim the construction and arrangement within the can, A, of the measuring vessel, C, provided with the float, C', to one side of which the index, a, is secured, as and for the purpose specified.

2d, The drip can, G, connected with the inclined tube in the can, A, near its bottom, provided with the spiral spring, all arranged as described, for the purpose specified.

3d, The combination and arrangement of the can, A, having bottom, B, provided with downward projecting discharge tubes, measuring vessel, C, float, C', index figure, a, plate, F, sliding drip pan, G, and inclined tube, containing the spiral spring, and the pump, H, as herein set forth, for the purpose specified.

68,481.—WASHBOARD.—Pierre Andanni, New York city.

I claim the washboard, when constructed of the two boards, B, having inclined grooves, D, and fitting together in the center of the frame, A, in such a manner that the grooves, D, incline downward upon each side from the center, whereby the water expressed from the clothes is allowed to run off freely and without accumulating in the grooves, as and for the purpose specified.

68,482.—CRANK MOTION.—William Bicknell, Hartford, Me., assignor to himself and Alfred Bicknell, South Reading, Mass.

I claim the employment of two or more auxiliary rods, D D', in combination with the pitman and crank of a reciprocating engine, arranged and operating substantially as and for the purpose herein described.

68,483.—HOUSE FAN.—Julius Bloom, New Brunswick, N. J., and August Bloom, New York city.

1st, We claim the combination of the fan wheel, D, constructed as described, and the up and down swinging fan frame, arranged in front of said fan wheel, as herein set forth, for the purpose specified.

2d, The construction and arrangement of the common fan holders, K and L, upright, M, rod, N, operated by the gearing, B, as herein set forth, for the purpose specified.

3d, In combination with the running gearing, m, I claim the hook-shaped arm, J4, fixed to rock shaft, K4, and L4, cross bar, M4, on spindle, N4, whereby the upward and downward swinging fan frame is operated, as and for the purpose specified.

68,484.—BOTTLE STOPPER.—Horace S. Carley, Cambridgeport, Mass.

1st, I claim the slotted cork holder, E, in combination with the pin, G, on the ring, F, all made and operating substantially as and for the purpose herein shown and described.

2d, The above, in combination with the cam, H, the same turning on the pin, G, as and for the purpose described.

68,485.—BOTTLE STOPPER.—Horace S. Carley, Cambridgeport, Mass.

I claim a bottle stopper, consisting of the cord, A, made of india-rubber, or other suitable material, and provided with one or more spring wires, B B, which project downward from the work, and which are made and operating substantially as and for the purpose herein shown and described.

68,486.—RAIL FOR BUGGY SEAT.—James Carlisle, Mount Gilead, O.

I claim the bearing bar, C, to a buggy or other seat, in combination with the rail, E, when both are constructed so that the one will fasten to and upon the other, substantially as and for the purpose described.

68,487.—ADJUSTABLE SHIP BUILDER'S MOLD.—Jesse J. Cassidey, Washington, North Carolina.

I claim the adjustable parallel ship builder's mold, constructed and operating substantially as and for the purpose herein shown and described.

68,488.—BORING BAR FOR BORING AND SCREW CUTTING.—E. S. Chapell, Milton, Mass.

I claim the eccentric sliding boring bar, A, in combination with the worm and gear, g g', and lever, q, constructed, arranged, and operating substantially as and for the purposes herein described.

68,489.—COMBINED PLOW AND HOE.—Daniel W. Colburn, Loami, Ill.

I claim a hoe, having its blade, C, constructed of curved form, similar to the mold board of a plow, in order to cast or throw the earth at one side, substantially as and for the purpose set forth.

68,490.—SCALE BEAM.—Elisha P. Crain, New York city.

I claim the tie rod, C, arranged above a scale beam between the stud and front pan, f, substantially as and for the purposes herein shown and described.

68,491.—FIRE ESCAPE.—Tertullus S. Diblin, New York city.

I claim the combination of the fire escape, composed of a frame with its cross rods, spurs, screws, and windlass, and rope ladder, the whole arranged substantially as and for the purpose set forth.

68,492.—VARIABLE CUT-OFF VALVE GEAR.—J. L. Dickinson, Dubuque, Iowa.

1st, I claim, in combination with the sliding block, C, formed of the parts, 1 and 2, and actuated by the governor, substantially as shown and described, I claim the eccentric rods, E and F, acting upon the bar, D, or its equivalent, and upon the oscillating valve, thereby imparting to the arm the motion of either eccentric rod, as the speed of the engine requires, substantially as shown and described.

2d, The arm, G, and bar, D, in combination with the valve stem, A, to support and maintain eccentric rods, E and F, at a uniform distance from the valve stem, or its equivalent, substantially as described.

3d, I claim the two eccentric rods, E and F, arranged with reference to the governor and arm, G, for the purpose herein set forth.

68,493.—WAGON LOCK.—A Downer, Hammondsville, O.

1st, I claim the combination of the system of levers, F G J K, with the pointed and slotted rod, C, and with the brake bar, M, substantially as herein shown and described, and for the purpose set forth.

2d, Attaching the brake shoes, R, to the brake bar, M, by the ears, r', and curved staples, S, substantially as herein shown and described, and for the purpose set forth.

68,494.—BRICK PRESS.—W. S. Drake, Sturgis, Mich.

I claim the box, F, and plunger, E, in combination with the slide or stop, G, arranged to operate in the manner substantially as and for the purpose set forth.

68,495.—STEAM ENGINE GOVERNOR.—John Eddy, Barnesville, Ohio.

I claim the combination of the pillar, A, levers, B C, connecting rod, D chains, E F J, pulley, G, and weight, H, substantially as described, for the purpose specified.

68,496.—PIANO LOCK.—E. L. Gaylord, Terryville, Ct.

I claim the two bolts, E E, working on separate or on a common center or pivot, g, in combination with a vertically moving slide, B, connected with the bolts, and all arranged substantially as shown and described.

68,497.—PIANO LOCK.—E. L. Gaylord, Terryville, Ct.

I claim the two bolts, B B, arranged so as to work on a single pivot or center, c, or on different pivots or centers, in combination with a horizontally moving slide connected with the bolts as shown, and all arranged to operate in the manner substantially as and for the purpose set forth.

68,498.—SCREW PLATE FOR CUTTING SCREWS.—Henry Gill, Mansfield, Ohio.

I claim the circular dies, C C, with plane surfaces, e e, arranged, adjusted, and held in position, in the manner substantially as and for the purpose specified.

68,499.—BED BOTTOM.—J. S. Grant, Sidney Center, Me.

1st, I claim the combination of the coiled wire springs, E, or their equivalent, the hooks or supports, D, with each other, with the side and end rails, B and C, and with the ends of the cross slats, F, of the bedstead, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the adjustable supports, G, with the springs, E, and side rails, B, of the bedstead, substantially as herein shown and described and for the purpose set forth.

68,500.—HAND HAY RAKE.—J. S. Grant, Sidney Center, Me.

1st, I claim the shoes or rockers, b b, in combination with the rake head, A, arranged and operating as and for the purpose herein described.

2d, The forked handle, D, having its prongs pivoted to the arms, E E', on the rake head, A, in combination with the segment rack, c, the spring dog, h, the levers, d g, the cord, k, provided with the knob handle, m, and the lifting brace, l, constructed, arranged and operating as and for the purposes herein set forth.

68,501.—APPARATUS FOR RAISING SUNKEN VESSELS.—R. W. Hallett, Hudson City, N. J.

1st, I claim the air chambers, C, constructed substantially as herein described in combination with the chains, B, flexible tubes, D, and air chamber, E, as and for the purpose herein shown and set forth.

2d, The combination of the clutches, F, or their equivalent, with the chains, B, and air chambers, C, substantially as herein shown and described and for the purpose set forth.

68,502.—SHADE FIXTURE.—Stewart Hartshorn, N. Y. City.

I claim the attaching of a pawl and ratchet or notched hub to a window shade roller provided with a spring or to parts connected with said roller in such a manner that the tension of the spring will, without any manipulation or adjustment of parts whatever, always be preserved whether the roller be fitted in the brackets or bearings or removed therefrom, substantially as set forth.

68,503.—OIL CAN.—George Hatch, Pomeroy, Ohio.

I claim placing the pump in the recess, B, and attaching and holding it in place by the pipe, a, flange, c, and hook, d, substantially as described.

68,504.—CENTERING TOOL.—Reuben Haworth, South New Market, N. H.

I claim the spindle, A, and sleeve, B, the cup, C, the spring, E, and the drill, D, constructed, arranged and combined and operating substantially as herein shown and described for the purposes set forth.

68,505.—TRACE FASTENER.—Charles Hayden, Newark, N. J.

I claim the pin, A, when provided with the shoulder, a, and ears, b, in combination with the slotted plate, B, and pin, c, all made and operating substantially as and for the purpose herein shown and described.

68,506.—APPARATUS FOR EXTRACTING OIL FROM ANIMAL AND VEGETABLE SUBSTANCES.—Carl Otto Heyl, Berlin, Prussia, assignor to Rudolph Sieg, New York City.

1st, I claim the construction and arrangement of the basis, A, sulphuret of carbon vessel, B, distilling vessel, C, connecting pipes, a, purifying vessel, F, basins, G and H, connected by space, I, desiccating apparatus, J, condenser, P, and reservoir, S, as herein set forth for the purpose specified.

2d, The construction and arrangement of the desiccating apparatus, J, provided with screw conveyor, K, revolving vertical shaft, N, having arm, L, provided with teeth or buckets and blowers, M, as herein shown and described for the purpose specified.

3d, The construction of the suspended vase provided with a removable perforated bottom having central conical projection and a removable perforated partition near the top whereby the seed chamber, A, is formed, as herein shown and described for the purpose specified.

4th, The combination of the basins, G H, when connected together by the space, f, having the downward projections, g, as herein set forth for the purpose specified.

68,507.—GATHERING AND HUSKING CORN.—J. D. Hill, Fort Scott, Kansas.

1st, I claim removing the husks from the ears of corn substantially in the manner herein shown and described, that is to say, by means of hooked teeth with cutting edges attached to an endless apron or belt.

2d, The combination of the belt or endless apron, K, having hooked teeth, S, and buckets, T, attached to it, the shafts, J and L, and receptacle, R, with each other and with the frame, C, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the pulley, D, band, E, pulley, F, shaft, G, and bevel gear wheels, H and I, with each other and with the wheel, A, frame, and shaft, J, for the purpose of imparting motion to the endless apron, K, substantially as herein shown and described and for the purpose set forth.

4th, The combination of the guides, M, constructed as described, knife, O, and spout, P, with each other, with the frame, C, and receptacle, R, substantially as herein shown and described and for the purpose set forth.

5th, The combination of the fans, U, shaft, V, pulleys, Y and Z, and belt, X, with each other and with the shaft, L, frame, C, and endless apron, K, substantially as herein shown and described and for the purpose set forth.

68,508.—HAY ELEVATOR.—G. F. Hipp and J. B. Fast, Nova, O.

We claim the wheel, D, and sweep, J, in combination with each other when said wheel and sweep are constructed, arranged and operated substantially as herein shown and described and for the purpose set forth.

68,509.—MANUFACTURE OF CANNON.—T. N. Hornsby, Simpsonville, Ky.

I claim constructing in the manner described and of the several parts specified consisting of the tube, B, having notches, g h, notched sheet, A, bands, d F, breech piece, D, trunnion brace, G, breech band, H, and breech, J, as herein set forth.

68,510.—CLOTHES PIN.—J. P. R. James, Read's Landing, Minn.

I claim the spring, C, when secured to the jaws, A, by having its long arms, C, fitted in dovetail grooves upon the inner face of the jaws, A, and held in position by means of the staples, a, whereby all lateral movement of said jaw is prevented, as and for the purpose specified.

68,511.—TANNING COMPOSITION.—William Johnson, Shirleysburg, Pa.

I claim an improved tanning composition formed by the combination of the above-mentioned ingredients with each other, substantially in the proportions herein set forth.

68,512.—CHARGER FOR SHOT POUCHES.—Columbus Johnston, Clarksville, Mo.

1st, I claim the combination of the inner and outer tubes, A and B, having side ports and discharge tubes, I, when all are arranged together substantially as and for the purpose described.

2d, I also claim the adjustable plunger or piston head, N, to the inner tube, A, substantially as described for the purpose specified.

68,513.—LEATHER-BACKED HORSE BRUSH.—Obadiah Jones, South Englewood, N. J.

I claim the round-faced leather-backed horse brush constructed as described consisting of the strips of leather, D, of unequal length glued together and to the back, A, composed of strips of leather, a, the bristle plate, B, secured to the smaller pieces of the core, D, bent around said core and secured to the back, A, as herein set forth for the purpose specified.

68,514.—CATTLE PUMP.—E. C. Kellogg, Rome, N. Y.

I claim the platform, A, bearing the rocker beam, G, arranged in relation with the oscillating cylinder, as herein set forth for the purpose specified.

68,515.—THILL COUPLING.—John Knox, Mount Gilead, Ohio.

I claim the spring, c, combined with the slotted eye bolt, e, and grooved coupling pin, g, arranged and operating substantially as described.

68,516.—MACHINE FOR MAKING BUTTON RINGS.—S. B. Lane, Waterbury, Conn.

1st, I claim an improved machine for making button rings, made and operating substantially as herein shown and described.

2d, The revolving pin, B', in combination with the knife, D, and roller, F, all made and operating substantially as herein shown and described.

68,517.—SAWING MACHINE.—G. C. Lathrop, Danville, Mich.

1st, I claim the arrangement of the oscillating frame, G, pivoted at its center upon its cross heads, X, spring, L, weight, T, pivoted spring seat, O, grind, M, and saw, K, as herein set forth for the purpose specified.

2d, The adjustable itoothed supports, E, passing through the frame, A, and the pawls, F, constructed and arranged as described whereby the level of the machine is regulated, as herein shown and described.

68,518.—FLY NET.—L. B. and G. W. Lee, Jerusalem, N. Y.

We claim a leather fly net having its horizontal or longitudinal strips, A, placed edgewise, with the strands, B, passing directly through the same a plurality of times in the manner of a lacing and in a vertical direction, substantially in the manner as and for the purpose herein set forth.

68,519.—WOOD VISE FOR A JOINER'S BENCH.—H. E. Long, Plymouth, Ind.

I claim the combination of the pivoted head, E, having the pivoted button, H, and provided with the holes for the passage of the arms, I, pivoted to the face plate, G, said face plate having the plate, g', constructed as herein set forth for the purpose specified.

68,520.—BURGLAR ALARM.—E. F. Mallory, West Springfield, Pa.

I claim the combination of the spring, A, provided with anvil head in combination with hook loop when both are constructed and arranged together for operation substantially as and for the purpose described.

68,521.—OBSTETRIC SUPPORTER.—S. B Manly, Corry, Pa.

I claim the elastic or air cushion, B, provided with side straps, F, and elastic knee and foot bands or straps, substantially as and for the purpose described.

68,522.—YARD FOR SHIPS.—Edward Masters, Cleveland, O.

I claim the improved yard made in three parts, A B B, and strengthened by brace rods, D, and ring plates, c' G F, substantially as herein shown and described and for the purpose set forth.

68,523.—CHURN.—D. C. McNeil, M. D., DeWitt, Iowa.

I claim, 1st, The churn consisting of the churn box, A, and paddle dashers, C C', all as set forth in combination with the treadle, F, connecting rod, working beam and crank, or their respective equivalents, in manner substantially as above set forth and described.

2d, The paddle dashers, C C', having their axis, D, journalled in the movable uprights, b, in manner and for the purposes substantially as described.

68,524.—ADJUSTING THILLS TO CARRIAGES.—Martin J. Melyn, Roxbury, Mass.

I claim the lever, A, and the clamp, B, formed of the parts, C and D, arranged and combined substantially as described for the purposes specified.

68,525.—CULTIVATOR.—W. A. Moody, Montezuma, Iowa.

I claim the fitting of the front ends of the plow beams, G C, on pendant rods, F, and connecting the beams by chains, M, to eccentrics, L, on a shaft, K, the beams being connected by a bow-shaped rod or bar, H, all arranged to operate in the manner substantially as and for the purpose set forth.

68,526.—CLOTHES DRYER.—Robert M. Morriell, Plymouth, Ind.

I claim, 1st, The posts, I, of the wings, F, pivoted to the cap, C, and base, A, and slotted to receive the ends of the bars, f2, as herein set forth whereby the wings, F, are operated independently of each other, as and for the purpose specified.

2d, The combination and arrangement of the pivoted and slotted posts, f', removable cap, C, removable base, A, and standard, D, as herein described for the purrose specified.

68,527.—PADLOCK, ETC.—W. H. Murphy, Versailles, Ohio.

I claim the lever, F, in combination with bolt, D, when both are constructed, arranged and hung together substantially as and for the purpose described.

68,528.—WIRE SNAP HOOK.—Seth W. Perkins, Genesco, Ill.

I claim an improved snap hook formed of a single piece of wire bent into substantially the form shown and described, that is to say, with a ring loop, a', to receive the strap and with its hooked ends, a2, overlapping each other in combination with the single or double buckle tongue, as and for the purpose set forth.

68,529.—MACHINE FOR MAKING BUTT HINGES.—Adrian Rais, (assignor to the Scoville Manufacturing Co.) Waterbury, Ct.

I claim, 1st, the rotary carrying disks, D, D, withdrawal slides for receiving the right and left hinge blanks from the feed boxes, C, C, and conveying them successively to the bending, milling and nailing devices, constructed and operating substantially as herein shown and described.

2d, The pawls, a, a, connected with the slides, E, E, in combination with the rotary carrying disks, D, D, all constructed, arranged and operating substantially as and for the purpose herein described.

3d, The spring dogs, a2 a2, in combination with the rotary carrying disks, D, D, all constructed, arranged and operating substantially as and for the purpose herein described.

4th, The slides, E', E', provided with the arms, e e', in combination with the rotary carrying disks, D, D, arranged and operating substantially as and for the purpose herein described.

5th, The combination of the rotary carrying disks, D, D, with the devices described, for bending, milling and nailing the hinge blanks, the said combination being organized and operating substantially as herein shown and described.

68,530.—FLY OR BALANCE WHEEL.—Robbert Rice, Mineral, Illinois.

I claim a fly or balance wheel, provided internally with compartments of the form, substantially as shown, and partly filled with water or other suitable fluid, to operate in the manner and for the purpose set forth.

68,531.—ALARM MONEY DRAWER.—Ira Robbins, Hughesville, Pa.

1st, I claim the sliding keys, a the inclined rest, d, and bolts, e, acting in the manner and for the purpose substantially as shown and described.

2d, I also claim the collar, r, as attached to the handle of the drawer, operating in the manner and for the purpose substantially as described.

68,532.—MOLASSES CUP.—W. S. Rooney, Albany, N. Y.

I claim the construction and arrangement of the semi-circular plate, D, secured to one side of the pitcher, A, in an inward inclined position, and provided at its center and lower edge with the inclined spout, C, as herein set forth, for the purpose specified.

68,533.—CLAMP FOR HINGES.—Eli P. Seger and Samuel L. Smith, Yonkers, N. Y.

We claim a clamp for hinges, etc., consisting of frame, A, and eccentric or cam, C, substantially as and for the purpose described.

68,534.—SLED.—Jacob Shaaber, Reading, Pa.

I claim a sled, constructed substantially as and for the purpose described.

68,535.—TRACE FASTENER.—James L. Short, Gosport, Iowa.

I claim, 1st, the metal box, A, attached to the shaft or singletree, substantially as described.

2d, The catch, B, held down by the spring, C, combined with the trace tug, E, or their respective equivalents, substantially as and for the purpose described.

3d, The singletree attachment formed of the box, A, catch, B, and spring, C, or their respective equivalents, substantially as described.

4th, The combination with the above described singletree attachment of the guard, D, or its equivalent, substantially as described.

5th, The employment of the safety cord, d, with the singletree attached, with or without the guard, D, substantially as herein specified and described.

68,536.—HAY KNIVES.—Harmon L. Smith, Kalamazoo, Mich.

I claim the blade, A, in combination with the shank, B, curved or bent to a form, a semi-circular foot piece, b, and fitted in a handle, C, all arranged substantially in the manner as and for the purpose specified.

68,537.—CHUCKS.—James M. Smith, Seymour, Ct.

1st, I claim the screw collar, D', fitting over the tube, B, and provided with the groove, b, for receiving the right angular arm, a', of the jaws, C, and with the flange, f, fitting into the groove, e, of right angular arm of said jaw, as herein set forth for the purpose specified.

2d, The jaws, C, when provided with the flanges, d, and having their inner right angular ends connected to the screw collar, D', arranged in re-

lation with the tube, B, having the circular plate, A, whereby articles of any length are held, passing through said tubes and plate as herein shown and described.

3d, The construction and arrangement of the annular plate, A, double screw threaded tube, B, collars, D' and D, and flanged jaws, C, as herein shown and described for the purpose specified.

68,538.—DIAMOND KEY.—B. F. Southgate, Bridgewater, Vt.

I claim the diamond key, C, fitting in V A shaped grooves in shaft and bearing, or their respective equivalents, in manner and for the purposes substantially as described.

68,539.—GRINDING MILLS.—C. N. Taylor, Cookstown, N. J.

I claim the combination of the plate, a, in the hopper with the cord or chain, C, swinging bell, B, elbow clapper, e, and pin or stud, f, substantially as and for the purpose herein shown and described.

68,540.—LOCKING DEVICE FOR GATES IN PRESSES.—William Welch, Bridgeport, Ct.

1st, I claim the plate, C, secured to the gate, of a power press by means of the pins, e, having cranks, f, and slotted plates, h, as herein shown and described.

2d, The box, B, when made of two pieces in combination with the plates, d, d, for the purpose of permitting the easy removal of the box, substantially as herein shown and described.

3d, The arrangement of the removable box, B, between the plates, d, and pins, e, on the plate, C, as herein set forth for the purpose specified.

68.541.—SPINNING JACK.—A. B. Woodbury, Ashmelot, N. H.

1st, I claim the movable pin, n, provided with a spring in combination with the twist gear wheel, h, arranged and operating substantially as and for the purposes herein described.

2d, The cap cover, q, connected with the lever, l, in combination with the movable pin, n, in the twist gear, h, the stop, k, on the cord, j, and the jack, C, arranged and operating substantially as and for the purposes herein set forth.

68,542.—UNIVERSAL JOINT.—A. Zurebel, Burlington, Wis.

I claim the combination of the ring, A, having semi-circular flanges, a, b, wooden pin, B, lips, d, on knuckles, c, and shank, C, all constructed as described.

68.543.—SAFETY CAR PLATFORM.—C. R. Abbott, Elmira, NY.

I claim the safety way herein described, when composed of the sliding tubes or bars, e, socket joints, g and f, substantially as and for the purposes set forth.

68,544.—CORN PLANTERS.—J. K. Andrews and J. Deloss Green, Antrim, Ohio.

1st, We claim the two frames, A and B, hinged together, as seen and provided with the wheels, F, F and G, when used and operating as and for the purpose set forth.

2d, The hopper, J, bar, K, and roller, L, L, arranged and used with the frame, A, as and for the purpose set forth.

3d, The arrangement of the lever, a, bar, d, with the frames, A and B, and bar, K, as and for the purpose specified.

4th, The rollers, L, L, or their equivalents, used in the manner substantially as and for the purposes set forth.

68,545.—PLOW CLEVIS.—Harrison W. Austin and William Schaw, Kalamazoo, Mich.

We claim the construction and arrangement of the vertical bar, A, double tice, D, single tubs, E, E and F, as herein described for the purpose specified.

68,546.—ROTARY MEASURING FAUCETS.—John G. Baker, Philadelphia, and William Harbster, Reading, Pa., assignors to the Enterprise Manufacturing Co., of Philadelphia.

We claim the valve, c', constructed and operating substantially as described, in combination with the rotary measuring faucet.

68,547.—MACHINE FOR CONNECTING STRIPS OF METALS.—Henry A. Bartlett, Philadelphia, Pa.

1st, I claim the former, D and D', dies, g, g', and g'', when constructed and operating substantially in the manner and for the purposes set forth.

2d, I claim the combination of the clutch as described, with the former, D', by means of levers, e, e', f, o, l, l, j, l, m, and the whole operating substantially as described and for the purposes set forth,

68,548.—APPARATUS FOR AND METHOD OF CASTING ALUMINUM.—Jas. B. Bean, (assignor to self and A. H. Balderston,) Baltimore, Md.

1st, I claim the flask, B, B', in combination with the frame or holder, A, having the posts, a, a, a, a, and the set screw, a', a', constructed as and for the purpose specified.

2d, The flask, B, B', having the vents, C, C, and the gate, d, all constructed and arranged substantially as described.

3d, Stopping the vents, C, C, with the small rods, e, e, e, as and for the purpose set forth.

4th, The conduit, D, composed of soapstone or other similar material in combination with the gate, d, as described.

5th, I claim supplying fluid metal to compensate for the contraction of the metal in the mold, as well as to secure a denser casting by means of the detachable reservoir, D, heated previous to pouring the metal, substantially as described.

6th, Expelling the atmospheric air from the mold by means of, and substituting therefor, a gas, which is destitute of oxygen, in the manner and for the purpose set forth.

7th, The flask, B B', constructed, gated, and rented, substantially as described, in combination with an interior lining composed of pumice stone and plaster of paris, in proportions, substantially as set forth.

68,549.—CULTIVATOR.—J., S. and Wm. Benson, Lebanon, Pa.

1st, We claim the use of the blocks, g' g'', more or less in number, and the blocks, z z, more or less in number, arranged upon the rods, l, and so combined with the standards, t, as to allow the arrangement of either standards or blocks on either side of the bars, s s, when desired, and for the purposes specified.

2d, We claim the guides, h h, when arranged, combined, and used, substantially in the manner described, and for the purposes set forth.

68,550.—PLOW.—E. L. Bergstresser, Hublersburg, Pa.

1st, I claim the slotted plate or plates whereby the angle of presentation of the plow, both vertical and horizontal, is adjusted, in the manner described.

2d, The block standard, or plate, to which the handles are connected, adapted to fit and to be adjusted upon the adjacent face of the plate, or angle iron attached to the plow beams, substantially as described.

3d, The angle iron constructed as described, or its equivalent, provided with the vertical and horizontal slots, and adapted to be used in connection with the plow beam and handles, or handle block, substantially as and for the purpose set forth.

68,551.—BED BOTTOM.—B. R. Boynton, Keeseville, N. Y.

I claim providing the slats with slots, and the springs with loops, upon their upper ends, said loops being pressed through the slots, and confined by means of straps, substantially as specified.

68,552.—CURTAIN FIXTURE.—E. T. Briggs, Boston, Mass.

I claim the tape, L, or its equivalent, for connecting the rod or spindle, D, to the block, K, or to the casing, A, operating substantially in the manner and for the purpose set forth.

I also claim the bracket, H, with its bearing, and the lever, M, with its notch or recess, U, in combination with the plate, G, or its equivalent, with its arbor, s, and projections, d e, constructed, arranged, and operated, substantially as and for the purpose set forth.

68,553.—FENCE, GATE.—Nicholas Burch, N. Fairfield, O.

1st, I claim the rotating guide, F, and eye, G, in combination with the gate, substantially as and for the purpose set forth.

2d, The rotating guide, F, roller, L, guide rollers, K, bracket, G, in combination with the gate, substantially as and for the purpose set forth.

68,554.—CARRIAGE BOLT.—O. C. Burdict, New Haven, Ct.

I claim a bolt, having formed upon one or more sides of its neck a rib, a, substantially in the manner and for the purpose as set forth.

68,555.—HEADING BOLT.—O. C. Burdict, New Haven, Ct.

I claim the combination of the dies, a a, and b b, acting simultaneously, and moved in guides, radially, to a common center, by means of the levers, N, and cams, P, in combination with holding dies, E and E', and upsetting die, M, all constructed and arranged to operate substantially in the manner as herein set forth.

68,556.—NUTT MACHINE.—O. C. Burdict, New Haven, Ct.

1st, I claim the levers, L, arranged so as to operate the several sides of the die, in combination with the crowner, l, and the punch, F, all arranged to operate substantially in the manner described.

2d, The combination of the weight, W, with the crowner, l, arranged so as to make the said crowner self-adjusting, substantially in the manner described.

3d, The auxiliary swaging dies, 2 2, when arranged to operate with the two parts of the die, c c, substantially as and for the purpose specified.

68,557.—PLATE LIFTER.—James A. Burns (assignor to himself and T. B. Carpenter), New Haven, Ct.

I claim the two clasps, B and C, in combination with the handle, A, when the said clasps are both hinged to the handle, and constructed and arranged so as to operate substantially as described.

68,558.—SKATE.—Robert Carmichael, Newark, assignor to to Frederick Stevens, Essex County, N. J.

I claim the combination of the clamps, F F, as constructed with the screw shaft, E, as and for the purpose set forth.

68,559.—CHECK HOOK.—Ernest Denning, Middletown, Ct.

I claim the check hook, A, formed with a screw shank, Z, and nut, C, and combined with a tongue, D, substantially as described, as an improved article of manufacture.

68,560.—CHURN.—John E. Finley, Memphis, Tenn.

I claim the combination of the flanged wheels, C C C F F, with the air cups, D D, the thimble, B, and middle thimble, E, and thumb screw, E, the nut, H, and key, J, for the purpose herein set forth.

68,561.—PROCESS FOR DISINTEGRATING AND DESULPHURIZING ORES AND MINERALS.—William T. Goodwin, East N. Y., and Charles R. Squires, New York city.

We claim, 1st, The use of oyster, clam, or other shells or bone, for the purpose of desulphurizing, disintegrating, dissolving, and separating rocks and ores, in the manner substantially as described.

2d, Burning oyster, clam, or other shells or bone, or limestone, in furnaces or retorts, with rock or ore, for the purpose of disintegrating and desulphurizing such ore or rock preparatory to extracting the gold or other precious metals, substantially as described,

3d, Burning oyster, clam, or other shells, or limestone or bone, in retorts, and securing the gases obtained therefrom in bags or vessels, to be used as and for the purpose substantially as described.

4th, Heating rock or ore in a retort, for the purpose of disintegrating and desulphurizing the same, and also for the purpose of securing and retaining the particles of the precious metals, which may be driven off from the ore and deposited in a vessel, substantially as described.

68,562.—BUTTON.—R. H. Guilford, West Cheshire, Ct.

I claim a button formed of wire, as a new article of manufacture, substantially as herein set forth.

68,563.—SEED SOWER AND CORN PLOW.—Patrick Hackett, New Genesee, Ill.

I claim, 1st, The combination of the seeding cylinder, D, and the fixed plow, H, and removable plow, H' so that the machine may be used for seeding, cultivating, or plowing corn, substantially as described.

2d, The combination of the frame, B, with arms, B2, beams, G, and shovel standards, H, and H', and rod, I, arranged substantially as set forth.

3d, The combination of the tongue, A, frame, B, and plows, with the rod, I, constructed and arranged to operate substantially as described.

4th, The combination of the wheels, C, pulleys, E and F, and seeding cylinder, D, constructed with adjustable slides, C, and arranged to operate substantially as set forth.

68,564.—BOILER FOR CULINARY PURPOSES.—William H. Henderson, Franklin, Ind.

I claim the steamer, B, provided with a flange, C, extending down into a pot or vessel, A, as and for the purpose specified.

68,565.—BLAST FURNACE FOR MAKING IRON.—David W. Hendrickson, and James P. McLeane (assignors to David W. Hendrickson), New York city.

1st, We claim the use of the air pump, C, to produce and keep up a uniform blast.

2d, We claim commingling the super-heated steam and hot air in the same tweer or tweers, E E', which are suitably arranged through the walls of the furnace, A, and operated by means of an air pump, or its equivalent power, substantially as above set forth.

68,566.—FURNACE FOR MAKING IRON.—David W. Hendrickson and James P. McLean (assignors to D. W. Hendrickson), N. Y. city.

1st, I claim the vertical flue, D, through the center of the boiler, and forming a part of the same with shoot, s, which passes transversely through the boiler, B, at any suitable angle for the purpose, set forth and shown in the drawings.

2d, We claim the non-conducting plastic coating, P P P'', P''' P'''', prepared and applied in the manner and for the purpose substantially as described.

68,567.—NAIL CLINCHER.—John Koyl, Rockford, Ill.

I claim a clincher when constructed with adjustable heads, A1 or B1, substantially as set forth.

68,568.—HAY AND COTTON PRESS.—Moses McElroy, Springfield, Ill.

I claim the herein-before described arrangement of a double platen power press consisting of the double screws upon the rods, A, the double endless screws, D D1, sours, B, platens C C, and plates, F F, forming bearings for the endless screw, D, supported by shoulders upon the rod, A, which pass through them, substantially as described.

68,569.—HITCHING STRAP.—John D. Miller, Russellville, Pa.

I claim, as an article of manufacture, a halter or hitching strap composed partly of elastic and partly of rigid material, as herein described.

68,570.—WHIFFLETREE IRON.—F. B. Morse, New Haven, Ct.

I claim the herein described whiffletree iron as an article of manufacture.

68,571.—PAPER-RULING MACHINE.—William B. Pollock, Holyoke, Mass.

I claim, 1st, The combination of the middle bearing, b, end bearings, n n, and rod, e, with the strip, A, substantially as described.

2d, The simple clamp, B or C, constructed as described, with the projection, D1, in combination with the nut, g, bearing, n, rod, e, and its register wheel, d,

3d, The clamp for using detached pens when constructed and operating substantially as described.

4th, The combination of two simple clamps, or of two clamps for using detached pens, or of one clamp of each kind, with the strip, A, the whole and each part thereof constructed and operating, substantially as described.

5th, The use, in a paper ruling machine, of two clamps or series of pens, each clamp or series having an independent lateral adjustment in combination with a supporting strip.

68,572.—CARRIAGE JACK.—Parker C. Porter (assignor to himself and R. M. Mansur), Augusta, Me.

I claim the notched or stepped bar or lever, in combination with the pivoted leg or pendant, constructed and operating in the manner and for the purpose set forth.

68,573.—WASHING MACHINE.—A. Powell, Coxsackie, N. Y.

I claim, 1st, The combination of the vertical ribs, C, and the dasher, constructed of the pieces, e1 e2 e3 e4, substantially as described.

In combination with the above, the detachable handle, G, constructed with forked end straddling the piece, e1, of the dasher, substantially as described.

68,574.—THRASHING MACHINE.—C. C. Reynolds, N. Y. city.

I claim hanging the teeth to the concave of grain-thrashing and other machines, that they can be swung in and out of position, substantially as described.

68,575.—HAME FASTENER.—John R. Richardson, New Castle, Pa.

I claim the bar, B, with its groove and opening, D, and with its ears, e e, between which is pivoted the tongue, C, constructed as described, for securing the slotted bar, A, in the manner and for the purposes specified.

68,576.—CLOTHES WRINGER.—Warren Rowell, New York city, assignor to the Metropolitan Washing Machine Company, Middlefield, Conn.

1st, I claim, in the gearing of clothes-wringing machines having two or more sets of teeth arranged to present the teeth of one set opposite the spaces in the other set, on the same shaft, as herein specified, reducing the number of the teeth and increasing the pitch thereof, substantially in the proportion and so as to accomplish the purposes herein set forth.

2d, I claim the manufacture of step gear, cast in pairs, the formation of a connection or support between the teeth to strengthen them, substantially as herein set forth.

3d, I claim a ring, D, betweeen the gears, A B, arranged substantially as described so as to prevent them from meshing deeper than is desired, as herein set forth.

4th, I claim, in the manufacture of step gears, when cast double, so constructing the ring, D, by casting it in one with the gears, that it shall at the same time strongly support the lath and prevent the gears from working deeper than desired at the nearest approach of the rolls, all substantially as and for the purpose herein set forth.

5th, I claim beveling the faces, d1 d2, of the ring, D, and the corresponding faces of the teeth which come in contact therewith, substantially as and for the purposes herein set forth.

68,577.—ELECTRO-MAGNETIC PUMP.—C. H. Rudd and G. W. Shawk, Cleveland, Ohio.

We claim the magnets, A A1, as arranged in combination with the armature, J J1, piston, F, and rods, a c, in the manner and for the purpose substantially as set forth.

2d, The application of the electro-magnetic apparatus to the pump, when constructed and arranged to operate conjointly, as and for the purpose substantially as specified.

68,578.—SPRING.—George C. Smith and Boswell S. Judson, Matteawan, N. Y.

We claim the wooden plates, B B1, the rubber plugs, C C, and the metallic springs, A A, connected and used substantially as and for the purpose set forth.

68,579.—CAR BRAKE.—James L. Smith, Tuscola, Ill.

I claim the arrangement of the wheel, C, with its shoulders, x x, lever, D, hinged as shown, and with its shoulder, z, in combination with the brake shaft, F, dog, H, and ratchet, G, in the manner and for the purposes specified.

68,580.—STONE-DRILLING MACHINE.—A. M. Southard, Savannah, Mo., assignor to himself and W. J. Hobson.

1st, I claim the arrangement of the shaft, F, and its pinions and lever, P, with the plates, G and G1, and their shaft, H, arms, o o, and gear wheels, I and J, as and for the purpose herein specified.

2d, The disks, N N, constructed as described, and used in combination with the bars, L L, shaft, F, plates, G G1, shaft, H, arms, o o, and gear wheels, I and J, the whole arranged and operating as specified.

3d, The arrangement of the bars, L L, in and with the adjustable eyes, c c, as and for the purpose set forth.

68,581.—HARVESTER PITMAN.—Geo. L. Squier, Buffalo, N. Y.

I claim the connecting rod, A, provided with a conical wrist pin, A1, in combination with a compensating rubber, or spiral spring, C, and screw nut, d, for the purpose and substantially as described.

68,582.—MEDICAL COMPOUND.—Wm. H. Tate, Orleans, Ind.

I claim a medicine composed of the extract of arctium burs, combined with the spirits of lavender and alcohol, substantially as herein specified.

68,583.—LOOM.—Thomas G. Thompson and Barclay Ballard, Richmond, Ind.

1st, We claim the brackets, K K, in combination with the bottom ports, F F, pivots, I, and the side rails, A A, all constructed and arranged as herein described.

2d, The combination of the warp beam, L, spur wheel, J, pivoted let-off lever I, rack, l, stop, T, cloth ream, D, ratchet wheel, d, take-up lever, H, and pawls, 5 and 6, when constructed, arranged, and operating as and for the purposes herein set forth and described.

68,584.—FILE.—Alfred Weed, Boston, Mass.

I claim, as a new article of manufacture, a file, when made substantially as described.

68,585.—FILE HANDLE.—Alfred Weed, Boston, Mass.

I claim a tool-holding handle as made with jaws arranged to have an adjustment with respect to each other, one or both of which are provided with a transverse rib or ribs and a longitudinal groove or grooves, constructed substantially as described.

68,586.—BILLIARD-TABLE CUSHIONS.—C. E. Wilcox, Milwaukee, Wis.

I claim a billiard-table cushion, when made with slot, C, in its top, substantially as and for the purpose described.

68,587.—HAY RAKER AND LOADER.—Milo Webb, Chenango Forks, N. Y.

1st, I claim the arrangement of pulleys, M O Q R S T, endless cords, U, and rakes, V W, in the described combination with the clearing finger or rake, 7, as set forth.

2d, The combination of the endless series of rakes, W, the guards or directors, 4, and conducting fingers, 8, all constructed and arranged substantially as and for the purposes set forth.

3d, The combination, with an endless series of rakes, of the rocking beam, Y, for enabling the bottom rake to skim without tearing up the ground, in the manner set forth.

4th, I claim the adjustable bracketed bearings, Z, in combination with the rocking beam, Y, for the purpose explained.

5th, The combination of the pulley, Q, and carrier, X, with the endless rakes to tighten them, as described.

68,588.—INKSTAND.—Samuel Darling, Bangor, Me.

I claim an ink reservoir, having a central recess or depression, in combination with a follower, having a gage cup projecting so much below the body of the follower as to admit of being inserted sufficiently into the ink while the body of the follower is always above the ink.

I also claim the rib, K, as arranged in cavity, D, in combination with the cover, C, substantially as and for the purposes described.

I also claim the opaque belt or band, on the interior of the reservoir, in combination with the plaster of Paris, or its equivalent, as and for the purposes specified.

REISSUES.

2,758.—AGRICULTURAL FORK.—Abram and Charles Clow, Port Byron, N. Y., assignees of Charles, Abram and Charles N. Clow. Patented Dec. 8, 1857.

1st, We claim in combination the metallic head, A, and wooden tines, B, substantially as and for the purpose herein specified.

2d, The arrangement of the ribs or braces, f, running obliquely from socket to socket, and crossing with relation to each other upon opposite sides of the head, as and for the purpose set forth.

3d, The arrangement of the sockets, a a, diverging laterally from the rear to the front of the head, in the manner shown and for the purpose set forth.

4th, The conical sockets, a, when made tapering from the rear of the head toward its front in connection with the wooden tines, B, and metallic head, A, substantially in the manner and for the purpose set forth.

5th, The brace, E, and bow, D, when attached to each other with a hinge joint so as to fold together without being detached from each other, substantially in the manner and for the purpose described.

6th, The jointing of the bow, D, on to the head, for the purpose and in the manner substantially as described.

2,759.—SUGAR-CANE MILL.—S. L. Denney, Christiana, Pa. Patented Sept. 28, 1858.

1st, I claim eccentric boxes when used to support the journals of shafts or cylinders for the purpose of effecting compensation for the wearing away of the journals and bearings, substantially as described.

2d, The eccentric boxes, E, in combination with the arms, c c, and the lever, F, as and for the purpose set forth.

2,760.—GRATE FOR FURNACES.—Eugen Langen, Cologne, Prussia. Patented Nov. 14, 1865.

1st, I claim the employment of two or more shelves, or their equivalents, adapted to receive fuel and allow it to be pushed forward thereon, into and under the fire at different levels in combination with grates, or their equivalents, connected therewith at different levels, the whole being arranged for joint operation substantially as and for the purpose herein set forth.

2d, I claim the cinder section or ash pits, j, arranged relatively to the shelves and grates at different levels, substantially as and for the purpose herein set forth.

3d, I claim the grated door, z, turning on trunnions as represented and arranged to operate relatively to the cinder support, j, and the superior portions, f g, of my compound grate, substantially in the manner and for the purpose herein specified.

2,761.—BARREL WASHING MACHINE.—Jonathan Peacock, Rockford, Ill. Patented March 13, 1866.

1st, I claim the combination substantially as described of the clamping frames (arranged end to end) with the locking device so that the barrels in each frame may be revolved independently of those in the others or all may be revolved together,

2d, The arrangement of the clamping frames, as described, whereby the barrels in each frame are counterbalanced by those in the other.

3d, The combination in the manner described of the adjustable clamping rails with the rotating heads.

4th, Arranging the slots in which the clamping rails, d, are adjusted parallel to each other and tangentially to the axis of rotation of the frames, as described.

5th, The arrangement as described above the rotating clamping frames of the water trough divided into compartments by the transverse partition provided with the valve which regulates the supply of water to one of the compartments whereby I equalize the quantity of water admitted to each barrel.

6th, The arrangement as described of the trough, the slide valve in its bottom and the filling pipes.

7th, The combination as described with the water trough and filling pipes of the lifter which simultaneously withdraws all the pipes from the barrels and holds them out of the way of the revolving barrels.

EXTENSIONS.

DESIGN FOR A SPOON HANDLE.—George Sharp, Philadelphia, Pa. Letters Patent No. 1,880. Dated Jan. 5, 1864.

I claim the globular finish consisting of the parts, A a2 a3, as an ornamental design for the ends of the handles of the articles of table use specified.

COOKING STOVE.—Giles F. Filley, St. Louis, Mo.—Letters Patent No. 9,788. Dated June 14, 1853. Reissue No. 873. Dated Dec. 27, 1859

I claim, 1st, The following enlargement of the side flues, C C and D D, from the space above the oven to the flue space, E, which extends under the entire front end of the oven and also the flaring enlargement of the central flues, F and G, from the flue space, E, to the upper end, G, for the purpose of increasing the draft of the stove, substantialty as herein set forth.

2d, I also claim separating the front of the oven from the front plate of the stove and also from the hearth plate and from the back plate of the fire chamber by means of the flue space, H, which communicates freely with the flue space, E, and is closed at all other points, the said arrangement enabling the flue space, H, to arrest the great amount of heat that will be radiated from the back plate of the fire chamber, and conduct the same (by means of the circulation which it will create in said flue space) into the flue space, E, for the purpose of producing the beneficial results herein particularly set forth.

LOOM.—Christopher Duckworth, Mount Carmel, Conn. Letters Patent No. 9,815. Dated June 28, 1853. Reissue No. 2,018. Dated July 4, 1865. Div. 1.

1st, I claim a power loom which is provided with many-celled shuttle boxes the movements of which are automatically controlled in such manner that the cells of the boxes can be skipped over and any desired shuttle thrown from any box in the combination according to the character or figure to be woven, substantially as described.

2d, Providing for operating many-celled shuttle boxes so as to bring any desired shuttle into action by means of pawls, ratchets and reversible tappets, in combination with pattern surfaces which will control the figure to be woven, substantially as described.

3d, The use of tappets which receive both a rotary and an oscillatory motion from a pattern or patterns in combination with many-chambered shuttle boxes, substantially as described.

POWER LOOM.—Christopher Duckworth, Mount Carmel, Conn. Letters Patent No. 9,815, dated June 28, 1853. Reissue No. 2,019, dated July 4, 1865. Again reissued No. 2,193, dated March 13, 1866. Division A.

I claim the combination of a reversible mechanism, with the reversible revolving tappets used in the loom to move the shuttle boxes in a vertical direction, substantially as and for the purpose described.

Also the combination of the pattern mechanism of the loom with a reversible ratchet mechanism and the reversible revolving tappets, substantially as and for the purpose described.

POWER LOOM.—Christopher Duckworth, Mount Carmel, Conn. Letters Patent No. 9,815, dated June 28, 1853. Reissue No. 2,019, dated July 4, 1865. Again reissued No. 2,194, dated March 13, 1866. Division B.

1st, I claim giving alternate movement to the shuttle boxes in a horizontal plane, by means of pawls, reversible tappets, and a contrivance which will automatically control the movement of said pawls, substantially as described.

2d, Giving an alternate diagonal movement to the shuttle boxes by means of pawls, reversible tappets, and a contrivance which will automatically control the movements of said pawls, substantially as described.

3d, The combination of reversible tappets with shuttle boxes which are so applied to the loom that they will admit of being moved either laterally, vertically, or diagonally, substantially as described.

4th, Giving an intermittent oscillating or rotary movement to a shuttle box actuator by means of pawls and ratchet wheels, which are controlled by can surface, t, or its equivalent, substantially as described.

5th, The use of tappets which receive a forward and backward movement or a continuous rotary movement, in combination with many-chambered shuttle boxes at both ends of the latne, which boxes are connected together by a lever, G, and operated simultaneously by means of said tappets, substantially as described.

6th, Giving a reciprocating movement to many-chambered shuttle boxes of looms by means of contrivances which are controlled automatically, in such manner that the boxes are moved a greater or less distance by a single vibration of the lathe, so as to throw the shuttles in regular order, or to skip a shuttle, according to the figure which it is desired to weave, substantially as described.

SIDE LIGHT FOR SHIPS.—Enoch S. Hidden (assignee of Enoch Hidden), New York city. Letters Patent No. 9,811, dated June 21, 1853. Reissue No. 1,553, dated Sept. 8, 1863. Reissue No. 1,638, dated March 15, 1864.

I claim, 1st, The combination, substantially in the manner described, of a turning flange, arranged, shaped, and operating substantially as specified, with a glass frame and suitable interposing packing, whereby the packing may be compressed and the frame held shut or have liberty to open under a mode of operation substantially as set forth.

2d, I claim, in combination with a glass frame and a turning flange substantially such as are described, a pin and a stop operating substantially as set forth.

3d, I claim a stationary frame with projecting lugs having long mortises therein, in combination with pins projecting from a glass frame, both substantially such as herein set forth, so that the glass frame may be opened and shut substantially as set forth.

And lastly, I claim, in combination with a stationary frame attached to the side or deck of a vessel, a sleeve or ring of lead or other ductile metal, soldered or otherwise joined thereto, so that it can be flanged or turned over the edge of the opening through the vessel, thereby making the joint between the stationary frame and the vessel water tight, substantially as described.

MANUFACTURING COPYING PAPER.—William Mann, Philadelphia, Pa. Letters Patent No. 9,536, dated Jan. 11, 1853. Antedated July 11, 1852.

I claim the copying paper herein described composed of Manilla fiber or the equivalent thereof, tempered with cotton or its equivalent, substantially as herein set forth.

ELECTRO-MAGNETIC ALARM.—Lucy A. Pope, administratrix of Aug. R. Pope, deceased, Somerville, Mass. Letters Patent No. 9,502, dated June 21, 1853. Reissue No. 566, dated June 8, 1858.

I claim, 1st, The mode of breaking and completing the circuit or vice versa, that is by the spring circuit breaker operating to cause the vibration of the armature.

2d, So combining a hammer and bell with the self-vibrating armature, that the vibrations of the latter shall produce a continued ringing of the bell under circumstances substantially as described.

3d, The combination of these parts (viz., the circuit breaker, hammer, bell, and vibrating armature), or their equivalent or equivalents, with a self-acting spring or key in a door or window, to operate so as not only to bring them automatically into action when the door or window is open, but maintain a continuous or continued ringing of the bell, by the interruption of the electric current without intervention of other machinery.

CULTIVATOR PLOW.—Wm. Hyde, Townsend, Ohio. Letters Patent No. 9,798, dated June 21, 1853.

I claim the cultivator herein described, with adjustable supplementary wings, so constructed as to cultivate the soil superficially near the roots of the plants and deeper at a distance therefrom, the wings being adjustable to any required angle with the bottom of the furrow, so as to give any desired degree of inclination to the sides of the ridges or hills and to change their inclination from time to time to adapt them to the varying stages of the growth of the plant, the whole being constructed and operating as described.

GUIDE FOR CORDING AND HEMMING UMBRELLA COVERS.—S. C. Bloodgett, Bridgeboro, N. J. Letters Patent No. 10,336, dated Jan. 3, 1854. Antedated July 3, 1853.

I claim the guide for cording or hemming umbrella covers, arranged upon a stand with a curved slot to fold the hem around the cord, and a hole

through which the cord is passed to its place; and this I claim whether the guide be used alone or attached to a sewing machine.

SHEET METAL BEAM.—Richard Montgomery, New York city. Letters Patent No. 9,842, dated July 12, 1853. Reissue No. 2,968, dated July 2, 1867.

I claim a beam formed of sheet metal bent into a series of longitudinal folds, the sides of which are flat and parallel and the tops and bottoms uninverted and inverted arches respectively.

I also claim the combination with such beam of a pair of saddles to support its ends, substantially as herein set forth.

METHOD OF HEADING SCREW-BLANKS, RIVETS, ETC.—William E. Ward, Port Chester, N. Y. Letters patent No. 9,508, dated Dec. 28, 1852

I claim, in combination with the swedge header and die plate substantially as specified, the giving of a back or receeding movement at the end of the heading operation to the follower against which the point of the thread rests during the heading operation, substantially as specified that the rod or wire may be upset outside of the die, whilst resistance is made by the follower against the end of the rod and then as the follower retires causes the part to upset to be griped between the surface of the die and the swedge to complete the form of the head, the surplus metal being thereby forced into the shank, as set forth.

MACHINE FOR BACKING BOOKS.—Simeon M. Elder, Portland, Me., administrator of John A. Elder, deceased, Westbrook, Me. Letters patent No. 9,886, dated July 25, 1853.

1st, I claim hanging the frame, carrying the pressure roller, K, upon, and eccentrically to the center of motion of the arms, F, so that the center of motion of the frame can be raised at pleasure, in the manner and for the purposes described.

2d, The combination of the wedge, M, and bars, W and V, when connected with the jaws of the clamps as described, for the purpose of keeping the center of the book, whatever its thickness, vertical with the bearings, G, of the swedging frame, W, as described and set forth.

MACHINE FOR TURNING IRREGULAR FORMS.—Lauren Ward, administrator of Richard Ward, deceased, Naugatuck, Conn. Letters patent No. 9,822. Dated June 28, 1853.

I claim the combination of the jointed levers, n and n, suspended by their upper ends with the crank, j, and connecting rod, k, when so constructed and arranged as to elevate or depress the inner part, O O, of the carriage, and the toothed cutter, c, in such a manner as to give a regular elliptical form to the polygon where the opposite longitudinal sections will be equal, and similar when the whole is constructed, arranged and combined substantially as herein described.

I also claim the use of the notched collet, d, on the toothed center, c, and the curved bar, Y, in combination with the jointed levers, n and n, to give regular and irregular forms to different parts of the same elliptic polygon, when the whole is constructed and combined, substantially as herein described.

MODE OF DRIVING RECIPROCATING SAWS.—Isaac Brown, Cecilton, Md. Letters patent, No. 9,835. Dated July 19, 1853. Reissue No. 425. Dated Feb. 3, 1857.

I claim the mode herein described for applying the power of the engine to the saw gate or frame, without being permanently connected therewith so that the piston shall be in a great measure relieved from any lateral motion, which the gate may have, which causes it to bind or cut in the cylinder substantially as described.

I also claim driving one or more saws between two cylinders as well as driving one or more saws on each side of a single cylinder, and the self adjusting piston rod or the self-adjustable slides which accomplish the same result as are herein before described.

ANTI-FRICTION BOX.—Geo. Y. Perry, (assignor to John Rice,) Philadelphia, Pa. Letters patent, No. 9,912. Dated Aug. 2, 1853.

I claim making the rollers in the form of double frustra reversed, and united at their bases and traveling in circular grooves of nearly corresponding form of the surface between which the rollers are interposed substantially in the manner and for the purpose herein specified.

MACHINE FOR FORMING BUTTON BACKS AND CONNECTING THE EYES THERETO.—Jay C. Cook, Middletown, Conn., assignor through mesne assignment to the City Manufacturing Co., &c., Waterbury, Conn. Letters patent, No. 9,146, dated July 27th, 1852. Reissue No. 1,446, dated April 7th, 1863.

I claim, 1st, the jointed clamps, i, i, (fig. 2,) and the tongue, n, (figs. 1, 3,) to form the eye, when combined with the slide, L, with its stationary and movable jaw, a and b, the movable jaw and slide being worked by a jointed lever, c, c', to feed the wire, the whole constructed and operated substantially as described.

2d, The die for punching and forming the button back, composed of the punch, S, and bed, Q, when combined with the slide, p, p, and feeding cylinder, P, when constructed and operated substantially as described.

3d, The jointed fingers, u u, for receiving the button back when formed and punched, and conveying it to and placing it on the eye, when combined with the setting and riveting punch, U, when arranged, combined and operated, substantially as described.

4th, Holding the eye of the button in the mechanism that forms the eye until and while the back is placed upon and fastened to it.

EYES FOR MILL STONES.—Edmund Munson, Utica, N. Y. Letters patent, No. 9,859, dated July 19, 1853.

I claim the spiral wings, arranged in such manner as to perform the double office of feeding the grain and supporting the stone.

SOCKET FOR AUGUR HANDLES AND BRACES.—Asahel H. McKinsley, Higginsport, Ohio. Letters patent No. 9,939, dated Aug. 16, 1853.

I claim the peculiar arrangement of mechanism by which I enable the supplying and unshipping of the bit and handle of an auger or other boring tool, that is to say the socket having a circular head and vibrating cap, whose aperture can be made at one position to coincide with the mouth of the socket and in the other position to oppose its straight edges to the projecting corners of the shank, the cap being retained in the desired position by spring and notch as described, or its equivalent.

SUBMARINE TUNNELS.—William Miller, (administrator of Jos. R. Miller, deceased,) Pensacola, Fla. Letters patent No. 9,899, dated Aug. 2, 1853. Reissue No. 2,504, dated March 12, 1867. Reissued to the American Submarine Tunnel Co., New York City.

I claim the construction, arrangement and formation of submarine and subterranean avenues, by means of cast iron sections united together by flanges and bolts, in the manner and for the purpose herein described.

APPARATUS FOR GRINDING AND SHARPENING METALS.—Samuel Darling, Bangor, Me. Letters patent No. 9,976, dated Aug. 30, 1853.

I claim the combination of the holder of the article to be ground with a grindstone or grinding disk, substantially in the manner herein set forth, so that the article and the stone will change positions relatively to each other during the operation in three directions, namely, towards each other, and parallel with, and transversely to the axis of the stone.

PULP FROM WOOD, &C., FOR THE MANUFACTURE OF PAPER.—Chas. Watt and Hugh Burgess, London, Eng., assignors to Wm. F. Ladd, New York City, and M. L. Keen, Philadelphia, Pa. Letters patent No. 11,345, dated July 18, 1854. Antedated Aug. 19, 1853. Reissue No. 608, dated Oct. 5, 1858; again in two divisions. Reissue No. 1,448, dated April 7, 1863.

We claim a pulp suitable for the manufacture of paper, made from wood or other vegetable substances by boiling the wood or other vegetable substance in an alkali under pressure, substantially as described.

PROCESS OF TREATING WOOD AND OTHER VEGETABLE SUBSTANCES, IN THE MANUFACTURE OF PAPER PULP.—Chas. Watt & Hugh Burgess, London, Eng., assignors to Wm. T. Ladd, New York city, and M. L. Keen, Philadelphia, Pa. Letters Patent, No. 11,343, dated July 18, 1854. Antedated Aug. 19, 1853. Reissue, No. 608, dated Oct. 5, 1863; again, in two divisions. Reissue, No. 1,449; dated April 7, 1863.

We claim, 1st, The process of treating wood or other vegetable substance, by boiling in an alkali under pressure, as a process, or preparatory process for making pulp for the manufacture of paper from such woods or other vegetable substances, substantially as described.

2d, We also claim the process of treating resinous woods by boiling in an alkali under pressure, and treating the product with chlorine, and its compounds with oxygen, for making white pulp for the manufacture of paper from such substances as described.

CIDER MILL.—John Krauser, Tylersburgh, Pa.—Letters Patent, No. 9,972. Dated Aug. 30, 1853.

I claim, 1st, So arranging the hopper with reference to several operating parts of the machine, that the fruit or other substances contained therein shall not rest directly upon or against the roughened exterior of the grinding cylinder; but directly upon so much of the upper surface of the anterior ends of the pistons or plungers, as shall be found operating or exposed within its inclosed sides, for the purpose of agitating the incumbent substance so as to insure and facilitate the filling of the cells, as the pistons recede from the cylinder; and in the second place, which is a consequence of the first, viz., to cause the incumbent substance to press upon the cumbent, or that contained within the cells, so as to oppose the upheaving or ejectment of the same while in the act of being pressed against the passing teeth of the revolving cylinder, c, by the action of the alternating pistons or plungers, as herein more fully described and set forth.

NOTE.—SIXTY-FIVE patents in the above list were] procured through the agency of the SCIENTIFIC AMERICAN.—*Eds.*

## PENDING APPLICATIONS FOR REISSUES.

*Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address* MUNN & Co., *37 Park Row, N. Y.*

64,734.—IMPROVEMENT IN EYELETING MACHINE.—William N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Dated May 14th, 1867. Application for reissue received and filed August 27, 1867. Div. B.

I claim, 1st, the adoption and use of a common receptacle or hopper, for holding the eyelets when promiscuously thrown in, and supplied with a means of reaching the heading mechanism substantially as described.

2d, Agitating the eyelets so as to present them in proper position to the eyelet feeding mechanism substantially as described.

3d, A promiscuous eyelet holding hopper, an eyelet feeding mechanism, when combined and operating substantially as described.

4th, In combination with the above, a work supporting table, substantially as described.

5th, The combination of eyelet hopper, holding pin and header, substantially as described.

6th, The combination of eyelet hopper, heading mechanism, and work feeding device, substantially as described.

64,734.—EYELETING MACHINE.—William N. Ely, Stratford, Conn., assignee by mesne assignments of N, Ames and J. E. Gowen. Dated May 14, 1867. Application for reissue received and filed Aug. 27, 1867. Div. C.

I claim, 1st, A reciprocating puncher, constructed, arranged, and automatically operated, substantially as described.

2d, A reciprocating punching table, constructed and arranged so as to be alternately removed and replaced, substantially as described.

3d, The reciprocating puncher, in combination with the movable punching table, substantially as described.

5th, The combination of puncher, work holding table, and work feeding device, substantially as described.

6th, The combination of a puncher and guage, for the line of holes, substantially as described.

67,734.—EYELETING MACHINE.—William N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Dated May 14, 1867. Application for reissue received and filed Aug. 27, 1867. Div. D.

I claim, 1st, the combination of a puncher and header, constructed and arranged so as to be automatically operated for punching the holes and heading the eyelets substantially as described.

2, The combination of a puncher and header with a movable punching table, substantially as described.

3, The combinatioin of a work-supporting table with an automatically reciprocating puncher and header, arranged and operating substantially as described.

4th, The combination of puncher, header, work-supporting table and work-feeding device, substantially as described.

5th, The combination of a punching and heading mechanism with an eyelet holding hopper, substantially as described.

6th, The combination and arrangements of parts by which punching the holes, furnishing, inserting and heading the eyelets is automatically accomplished, substantially as described.

64,734.—EYELETING MACHINE.—William N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen, Dated May 14, 1867. Application for reissue received and filed Aug. 27, 1867. Div. E.

I claim, 1st, A puncher and header operating reciprocally when combined, arranged and operating so as to strike alternately on or over the same fixed point, substantially as described.

2d, A reciprocating heading seat in combination with the puncher and header, when arranged and operating at the same fixed point, substantially as described.

3d, A laterally-reciprocating punching table in combination with the puncher, header and heading seat, all arranged and operating at the same fixed point, substantially as described.

4th, The reciprocating punching table and heading seat so combined, arranged and operating as to alternately occupy the same place for punching holes and threading eyelets at the same point, substantially as described.

5th, Supplying the eyelets from a common hopper to the heading seat or holding point by a belt and groove, substantially as described.

6th, The work-feeding device, constructed and arranged with an eyeleting machine, substantially as described.

7th, The adjustable gage in combination with the holding table for regulating the line of eyelets, substantially as described.

8th, Punching the holes, furnishing, inserting and heading the eyelets at the same fixed point automatically, substantially by the means and in the manner described.

64,734.—EYELETING MACHINE.—William N. Ely, Stratford, Conn., assignee by mesne assignments of N. Ames and J. E. Gowen. Dated May 14, 1867. Application for reissue received and filed Aug. 27, 1867. Div. F.

I claim, 1st, The combination of rod, J, and lever, I, arranged and operating substantially as described.

2d, The combination of rods, J and K, arranged and operating substantially as described.

3d, The combination of rods, J and K, and lever, I, arranged and operating as described.

4th The combination of rods, J and K, spring, I', and lever, I, arranged and operating substantially as described.

5th, The combination of rods, J and K, lever, I, and header, C, arranged and operating substantially as described.

6th, The combination of header, C, lever, C', and pitman, F', substantially as described.

7th, The combination of hopper, N, rods, J and K, and header, C, substantially as described.

8th, The combination of punches, B, lever, B', pitman, G', substantially as described.

9th, The combination of puncher, B, and sliding plate, U, substantially as described.

10th, The combination of plate, U, and levers, V and I, substantially as described.

11th, The combination of puncher, B, header, C, sliding plate, U, and rods, J and K, substantially as described.

12, The combination of puncher, B, header, C, plate, U, rods, J and K, hopper, N, belt, R, and groove, X, substantially as described.

13th, The combination of table, U, and pawl, Y, substantially as described.

14th, The combination of table, U, and guide, W, substantially as described.

15th, The combination of puncher, B, or header, C, with pawl, Y, or guide, W, substantially as described.

16th, The combination of hopper, N, with bristles or flexible arms, o, substantially as described.

49,647.—WALL BUILDER AND STUMP EXTRACTOR.—George W. Packer, Jr., Mystic River, Conn. Dated Aug. 29, 1865. Application for reissue received and filed Aug. 21, 1867.

1st, I claim the within-described mode of laying masses in a wall, or equivalent work, that is to say, partially turning the vehicle so as to bring the mass over the point desired, without moving the wheels across the same, substantially as herein specified.

2d, I claim the within-described combination and arrangement of the pyramidal frame, M M1 M2, and curved reaches, E1 E2, with the four wheels and their accessories, substantially as and for the purposes set forth.

3d, I claim the employment of braces, P1 P2, or their equivalents, in combination with the struts, M, etc., and the curved reaches, P, etc., and arranged to be supported on wheels, substantially in the manner described so that the braces shall aid in maintaining the curvature or arching condition of the reaches by connecting each to the struts above at one or more points, as and for the purpose herein set forth.

4th, I claim the spherical based rocker, having the king bolt, D, connected thereto by a loose joint as represented in combination with a trussed frame, M etc., and with the wheels, substantially as and for the purposes herein set forth.

66,430.—PITMAN CONNECTION FOR HARVESTER.—Hiram L. Wanzer, New York City. Dated July 2, 1867. Application for reissue received and filed August 23, 1867.

I claim, 1st, connecting the pitman, B, to the pitman wheel, A, of a harvester, by means of a round or polygonal pin, a, having an eccentric projection, d, and made and operating substantially as and for the purpose herein shown and described.

2d, The tapering pin, a, when arranged in combination with the washer, e, and nut, b, all made and operating substantially as and for the purpose herein shown and described.

3d, I claim the pin, i, in combination with the packing, k, all made and operating substantially as and for the purpose herein shown and described.

57,125.—PULLEY ATTACHMENT FOR RAISING WEIGHTS.—George W. Gregory, Watertown, N. Y. Dated August 14, 1866. Antedated February 14, 1866. Application for reissue received and filed August 27, 1867.

1st, I claim an adjustable pulley support having one or more sockets or eyes, or their equivalents, by which the pulley can be attached to the pulley support, and the pulley support changed from place to place, for the purpose set forth.

2d, An adjustable pulley support, having one or more sockets, or their equivalents, by and through which the pulley support may be operated and changed from place to place, for the purpose set forth.

3d, An adjustable pulley support, provided with means for changing the same from place to place, and with means for supporting the pulley.

64,734.—EYELETING MACHINE.—William N. Ely, Stratford, Ct., assignee by mesne assignments of N. Ames and J. E. Gowen. Dated May 14, 1867. Application for reissue received and filed August 27, 1867. Division A.

I claim, 1st, A reciprocating heading seat, constructed, arranged, and operated, substantially as described.

2d, A reciprocating piston, or holding pin, in combination with the heading seat, when constructed, arranged, and operated, substantially as described.

3d, A spring piston rest, in combination with the reciprocating heading seat, and holding point, substantially as described.

4th, The reciprocating heading seat and piston, in combination with a vertical header, substantially as described.

5th, A reciprocating heading seat, in combination with a header, and work-supporting table, substantially as described.

6th, A heading seat, header, and work supporting table, in combination with a work-feeding device, substantially as described.

7th, A reciprocating header, constructed, arranged, and automatically operated, substantially as described

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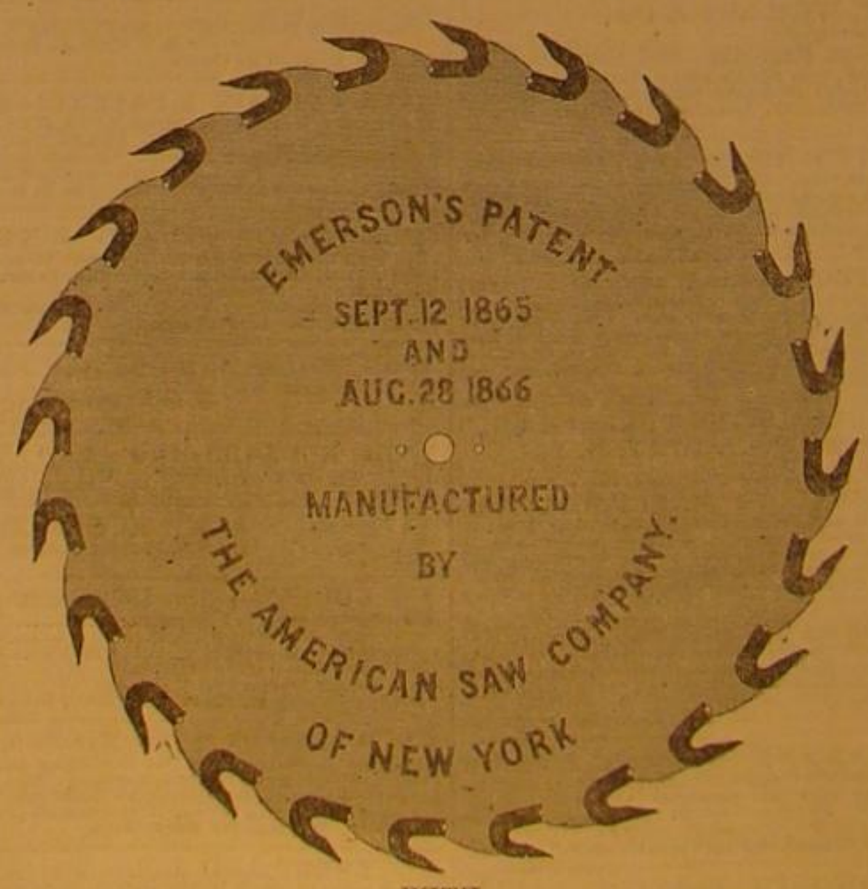
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# SCIENTIFIC AMERICAN

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Vol. XVII.—No. 13. [NEW SERIES.] NEW YORK, SEPTEMBER 28, 1867. $3 per Annum. [IN ADVANCE.]


### Method of Regulating the Speed of Wind Wheels.

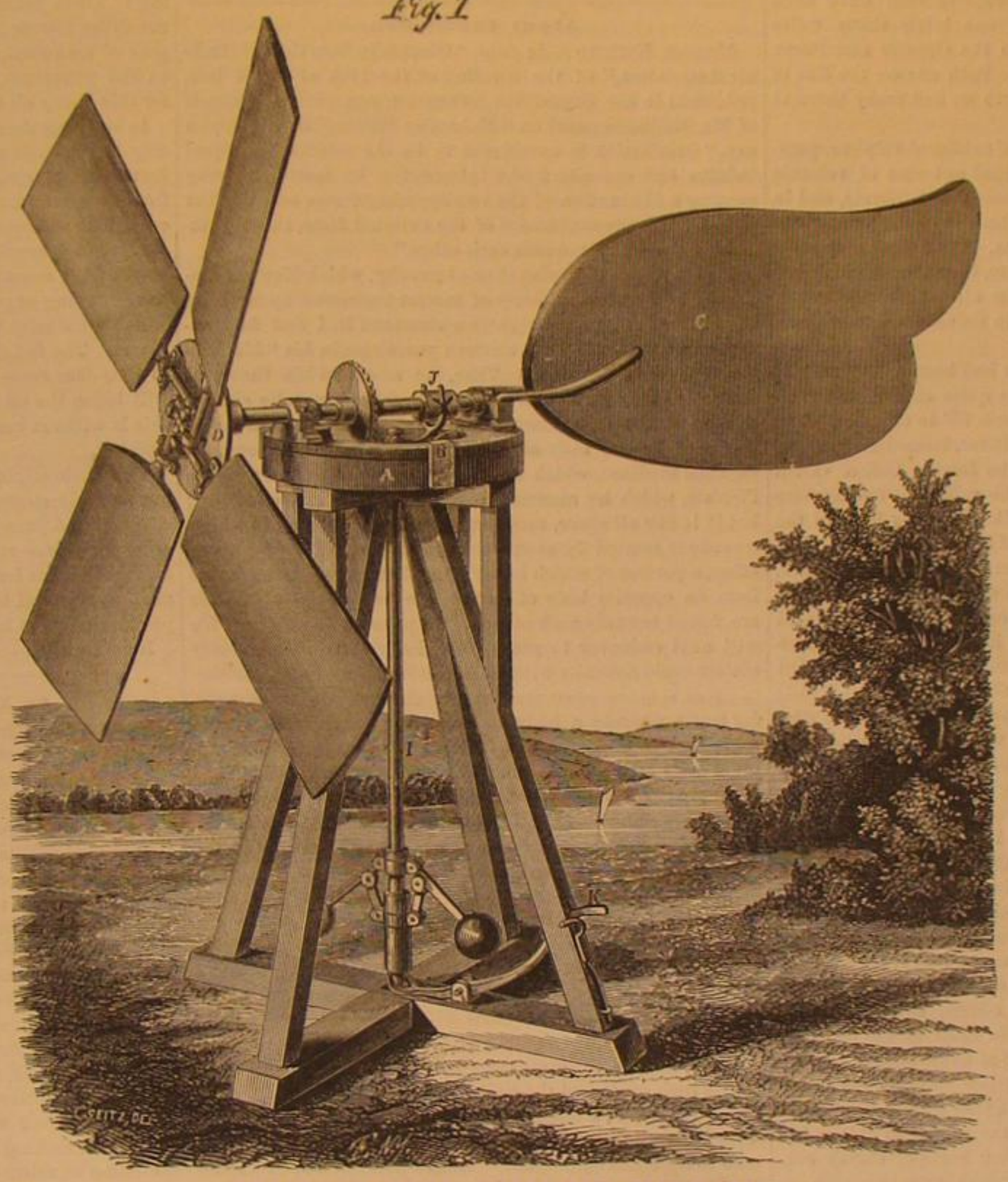
The power of the wind being free for all to use as much or little as required, the next requirement is to collect and transmit the largest amount of power in the most economical manner. The machine for this purpose should be simple, strong, durable, and moderate in cost, qualifications the inventor is certain this mill possesses. It is constructed on true scientific and mechanical principles, and has no delicate or fragile parts liable to be broken or deranged. The speed of the mill is controlled very effectually by the governor in consequence of its direct and absolute connection with the fans.

Fig. 1 is a perspective view of the model, the construction of the frame of which may be varied to suit circumstances. Fig. 2 is an enlarged view of the hub or spider of the wheel, showing the manner of connecting the fan shafts with the regulating power. The shaft of the wheel is hollow from end to end, and is mounted in boxes fixed on an annular plate which is free to turn in either direction by means of grooved rollers traversing a circular rail on the annular framing, A, at the top of the supporting frame. The annular plate is held in position by means of overlapping clamps or guides, B. The vane, C, can thus rotate the plate and its appurtenances so as always to present the fans to the wind.

The horizontal shaft carries a flange or spider, D, which is the hub of the wind wheel. On this are mounted the fans, the shafts, E, of which turn in boxes, F. These are plainly seen in Fig. 2. The inner ends of these shafts carry pinions or segments of pinions, G, the teeth of which mesh into a four-sided rack, H. This rack is attached to a shaft or rod sliding within the horizontal wheel-shaft, which, as before stated, is hollow. Now it will be seen that if the rack is thrown either outward or inward it will, by means of its teeth engaging with those of the pinions on the fan shafts, partly rotate the fans and present their edges at a greater or less angle to the direction of the wind.

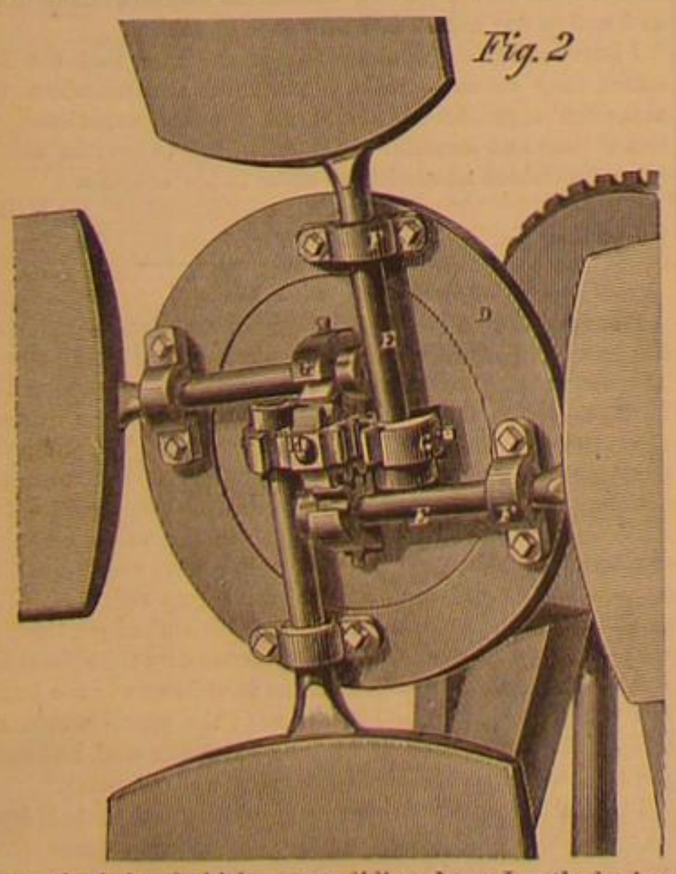
It remains to be seen how this simple device for feathering the fans is made self-regulating. The regulator is attached to an upright shaft, I, which is hollow and has a rod running through it which connects in the usual way so as to be operated by the horizontal movement of the balls. At the top the rod connects with and operates a bell-crank lever, the forks of which move a sliding sleeve, J, on the horizontal shaft. This sleeve, by means of pins pressing through the internal shaft and working in slots in the outer shaft, can communicate a reciprocating movement to the four-sided rack and consequently change the position of the fans. The regulator is driven by means of bevel gears, which connect the horizontal and upright shafts. The lever, K, under the regulator, is used to stop the mill, which is done by depressing the hand end of the lever, thus elevating the balls and presenting the fans edge to the wind. A catch holds the lever in place when depressed. Power can be transmitted from the upright shaft which drives the governor, either through the medium of bevel gears or pulleys and belts.

*Fig. 1*



TRULL'S PATENT EXCELSIOR WIND MILL.

*Fig. 2*



The operation of the governor can be readily comprehended from the foregoing description. As the velocity of the governor increases, the balls fly from the center, operating the connections with the fans and presenting their surfaces at a more and more acute angle to the force of the wind, which will consequently reduce the speed of the mill. Of course, under opposite circumstances the action and result are reversed. The patent for this invention, issued to Nehemiah Trull, of Shaker Village, N. H., October 4, 1864, has been in force nearly three years, and a number of the mills are now in use, giving good satisfaction. Those interested should address D. Arthur Brown & Co., the manufacturers, at Fisherville, N. H.

### Mystery of the Great Pyramids.

For several thousand years the object for which the "Great Pyramid" was constructed was a mystery to the whole world, and many of the most learned savans have exhausted surmise and speculation in their fruitless efforts to solve the riddle. A few years ago a gentleman in London, a Mr. Thomas Taylor, conceived the idea that the structure was inspired by Divine Providence to afford the Egyptians a standard for their weights and measures. This theory found but few proselytes among scientific men in Europe, but fanciful and far-fetched as it is, it has recently found an advocate on this side of the water, in the person of Professor Eaton, of New York, who read an elaborate essay on the subject the other day before the University Convocation at Albany. In support of this view he said that the pyramid was perfectly symmetrical, with five sides and five angles. It was originally 762 feet on each side, and is now the highest and largest building erected by man. Sir Isaac Newton had devoted his time and labor in analyzing the ancient cubit, and came to the conclusion that it was 25 inches, and a little more. The circle which forms the correlative to the pyramid consists of 365¼ of these cubits, thus corresponding to the year. The pyramid was made plane to the meridian, without hieroglyphics or secret inscriptions, as all burial places of antiquity did have which are found everywhere else. The box which was found in the center of the body has been commonly supposed to be a sarcophagus, but there is no appearance to bear this theory out. No procession of priests could enter, and it is indeed difficult for any one. The granite of which a portion of the pyramid is made is not found near at hand, and indeed not closer than Mount Sinai. The structure seems to be built on the most correct principles of geometry. It concludes in pointing with the North Star, or that star which, in the precession of the equinoxes, four thousand years ago was the North Star. Professor Eaton then proceeded to show that the temperature of the central room was uniform throughout, thus affording a place for keeping weights and measures; that the box affords an exact liquid measure; that water was found in the pyramid itself, thus giving pure material for careful examination; that the opening in the pyramid looked out on the lower culmination of the North Star at the time of its erection, and not on the upper, because the Pleiades would interfere with this view; and that it is on the exact spot for the purposes of taking astronomical observations.—*Journal of Commerce.*

### The Tea Plant in South Carolina.

A recent visit to Alfred L. Acee, M. D., near Bellevue, Talbot Co., Ga., enables us to record some facts in relation to the tea plant, which may be new, interesting, and perhaps instructive to our readers. The seeds were sent seven or eight years ago, by Senator Alfred Iverson to Dr. Acee. They were imported from China to the Patent Office of the United States. Dr Acee placed them in a box prepared with virgin soil or chip manure until they germinated and then transplanted them as they sprouted to his garden of select fruit trees and vineyard. They there, to the number of forty shrubs, are now flourishing in everlasting green, and full of vitality notwithstanding their exposure to Summer's heat and Winter's cold, the storm and the sunshine. The shrubs are now about seven feet high. The folliage is very dense, and what is singular, if not peculiar, the shrub seems to improve and grow more green by striping its leaves. It presents at the same time bare twigs and tender and full-grown leaves. The seeds in size and color resemble a hazlenut, and three are contained in each capsule. The flower is white and scentless—*Columbia, S. C., Phoenix.*

KEROSENE LAMP EXPLOSION.—Recently, as Mr. Nathan Todd and wife, of Rowley, Mass., were retiring, the latter attempted to blow out the light, which immediately communicated with the kerosene, causing an explosion. Mrs. T. was in her night dress, which took fire, burning her severely. Mr. T. at length smothered the flames and extinguished the fire, but not until he as well as his wife was badly injured. The accident arose from blowing the flame down into the lamp. —*Newburyport Herald.*

Blowing down the chimney is a very poor way of extinguishing a lamp. It requires a good degree of dexterity and a considerable amount of breath. It should never be resorted to except the object be to blow up the lamp. The eas'est way of extinguishing a lamp happens to be the safest; turn the wick down pretty low and give a slight puff at the bottom of the chimney.

## THE GEYSERS OF CALIFORNIA.

The Geysers of California are situated in lateral ravines of Pluton River, a tributary of Russian River. In gaining a clear idea of the California Geysers, it will be necessary to forget the geysers of Iceland, with their columns of water and capitals of cloud. Upon approaching those upon Pluton River, your first impression is that there has been a great conflagration, and that the fire engines are blowing off steam preparatory to going home. The gorge is lined with masses of smouldering ashes, from which hot steam is being drifted, by the wind, and, in some places, you can imagine that the embers are ready to relight. In the bottom of the cañon, turbid and blackened water, from which vapor slowly lifts, is running among the discolored rocks. Here and there, escaping steam hisses, and, in some places, roars like the "exhaust" of an engine.

In other smaller cañons and depressions on an irregular table land, there are like appearances of chemical activity. The rocks in the vicinity are mainly sandstones and silicious slates, which are highly metamorphic. The intermediate varieties are innumerable, all belonging to the Cretaceous Series, which is largely represented in the northern Coast Range of the State. Two belts of eruptive rock have been observed in this part of the State, one lying thirty miles south, and the other found between the Geysers and Borax Lake, twenty or more miles away. Both are on the line of former volcanic activity, and near both we find many thermal springs.

Beside hot springs, incrustations of sublimed sulphur, pumice, and the light lavas are regarded as traces of volcanic action. These are found in many places in California, and in Nevada. The writer has observed these indications near the summit of the extinct volcano, Shasta. In all cases they point to former igneous activity. Therefore, the steam springs and the Solfataras may be considered, for all practical purposes, as the poor relations of volcanoes in reduced circumstances. Such are the Geysers.

Upon the 28th of May, 1866, there had been a slight fall of rain. The morning of the 30th was quite cloudy, the thermometer ranging at eight o'clock from 60° to 62° Fah. The temperature of the water in Pluton River, immediately above the confluence of the stream from the Devil's Cañon varied from 65° to 70°. At the mouth of the cañon the temperature of the water was 90°, and upon walking up the bank of the stream the different temperatures of 95°, 97°, and 100°, were noticed. A light vapor was rising from the surface of the water.

The first spring where ebullition was observed had a temperature of 135°. There was a free escape of sulphydric acid from the cloudy water, and here the hot, stifling moisture began to make the walk one of discomfort. Upon the right hand several small springs of 190°, all giving off sulphydric acid, were boiling violently, and at the edge of a queer miniature cave on the same side, there was a furious little cauldron seething at 200°. Several of the springs had low forms of cryptogamic vegetation growing upon the walls of the basins, and, in some instances, confervæ were observed thriving in water of a temperature of 145° Fah. Seventy or eighty rods from the mouth of the cañon, there is a jet of escaping steam, and a little further on there is an escape pipe, nearly ten inches in diameter, through which steam is forced out several feet. Part of the steam condenses at five feet from the orifice, the rest ascends as light vapor, and is borne away by the wind. The greatest degree of temperature observed was 206° Fah., where there was, of course, as in the other cases mentioned, apparent ebullition from escape of gases. In no instance was the temperature of 500° noticed, which Mr. Bowles speaks of in his entertaining "Across the Continent." Obviously, this is a slip of a flying quill.

Upon the east and west sides of the cañon, at this point, the ground is made up of decomposing rocks of clayey consistence, and of various colors dependent upon metallic oxides; each little locality seeming to be a laboratory for the decomposition of silicates. Wherever the light soil was dry, there was no vegetation whatever; wherever there was a good degree of humidity, confervoid growths were scattered. Near springs, a few rods further east, a species of grass, Panicum, was seen growing; and, in one instance, at the water's edge where the panicle was bathed in slowly-rising vapor. This species is abundant near fumaroles, which are little natural blast chimneys, lined with crystalline needles of sublimed sulphur.

This leads next to the the subject of incrustations, which for our purpose we may divide into three groups, namely: silicic acid, sulphates, and sulphur. The first comprises the crystals of quartz, which are found upon slates embedded in the soil. They are minute, but very perfect.

The sulphates, such as crystals of ferric and magnetic sulphate, and the alums were not seen in their best estate. The rain of May 28th had dissolved the largest ones, and while we regretted this loss, we consoled ourselves with the thought that the rain, which had robbed us of our jewels, had added intensity to the chemical action going on around and below. It is stated upon good authority that the action is more intense during, or at the close of the rainy season, which is the winter of California.

The sublimed sulphur presents the two prevailing forms; namely, that which has crystallized with free access of air, and resembles the obtuse oblique rhombic prisms of sulphur familiar to chemists; and that which is produced under pressure, and has a slight inclination of the vertical axis.

In some limited localities there are effloresced salts, and pale, faded carbonates. At one spot, a light green cupric carbonate was partially covered with a darker green confervoid growth, and each shaded into the other like colors on a palette.

But the salts just referrrd to are those which have been left by the heavily-charged water. Imagine, therefore, the variety of dissolved salts which must have been formed, by the over-heated steam and sulphur acids, from the rocks which are being so rapidly leached under pressure. The solutions are, almost in every case, acidulated by a high sulphur acid; free sulphur floats in the water, and sulphydric acid escapes with violent ebullition. It must be supposed that in these acidulated solutions, the iron exists as a ferrous salt, since sulphydric acid has this reducing power.

In one spring, which is very nearly neutral, the iron has been incompletely precipitated and is suspended, in the agitated water, with other insoluble sulphides. Another spring is strongly acidulated, and contains only the merest trace of the sulphydric acid, which everywhere fills the atmosphere. The rationale of the reactions observed at the Geysers is not obscure, but so far as the writer is aware, no careful analysis of the waters and sinter have been made upon the spot.—*American Naturalist.*

## Correspondence.

*The Editors are not responsible for the opinions expressed by their correspondents.*

### About Gravitation.

MESSRS. EDITORS:—In your "Gleanings from the Polytechnic Association," of the meeting of the 11th of April last, published in the SCIENTIFIC AMERICAN, you give a synopsis of Mr. Malling's paper on "Molecular Motion," in which you say, "Gravitation is considered to be the resultant of equal infinite and opposite forces intercepted by matter, thereby causing a diminution of the two opposing forces between the atoms, and a preponderence of the external force, thereby impelling the atoms towards each other."

This mechanical explanation of gravity, which Newton considered as simply a property of matter impressed upon it by the Divine Creator, if I rightly understand it, I find first advanced by Prof. Bassnett, thirteen years ago, in his "Mechanical Theory of Storms," True, he advances his theory of gravity as only incidental to his main subject, yet he clearly announces the proposition that gravity is a physical effect produced by one body of matter upon another, through a physical medium, which he supposes to be the ether of the Plenists, which he assumes to possess inertia and elasticity; but if it fills all space, must be without ponderosity, in which waves are created by atomic motion, producing a propelling effect, a portion of which being neutralized by opposing waves from an opposite body of matter, the two bodies of matter are forced towards each other. On page 23 he says: "We will next endeavor to prove that the gravity of planetary matter could not exist without this ethereal medium, by showing that it is the effect produced by the interference of *opposing waves*, whereby a body is prevented from radiating into space its own atomic motion from the side opposite which another body is placed, as much as on the opposite side, and consequently it is propelled by its own motion towards the other body; and this effect, following the simple law of inertia and radiation, is direct as the mass and inverse as the squares of the distances."

Again, on page 155, he says: "If action be equal to reaction and all nature be virbrating with motion, these motions must necessarily interfere and some effect should be produced. A body radiating its motion on every side into a physical medium, produces waves. These waves are a mechanical effect, and a body parts with some of its motion in producing them; but should another body be placed in juxtaposition, having the same motion, the opposing waves neutralize each other and the bodies lose no motion from their contiguous sides, and therefore the reaction from the opposite sides acts as a propelling power and the bodies approach or tend to approach each other." Am I correct in understanding Mr. Walling as reproducing Bassnett's mechanical theory of gravity? Is this theory original with Prof. Bassnett, or by whom was it previously advanced? J. D. CATON.

Ottawa, Ill.

### The Comets Again.

MESSRS. EDITORS;—I notice in your paper of the 7th inst., a communication advancing the theory that the tails of comets are composed of *refracted light.*

Now it seems to me that your correspondent must be somewhat in the dark, both as to the nature of light, and the observed phenomena of comets.

According to his theory, there could be but one tail to a comet, which must necessarily be of a conical form, extending in a perfectly straight line in a direction diametrically opposite to the sun, in *every instance.* Now let us see how this corresponds with observed phenomena.

Very few comets of large size have been attended by straight tails; that of 1744, which appeared on the 7th or 8th of March, had *six* tails, from 30° to 44° in length, curved nearly in a quadrant; in the appearance of Halley's comet in 1835, the tail had a strong curvature; and the magnificent comet of Donati, in the autumn of 1858, is probably within the memory of most of the readers of the SCIENTIFIC AMERICAN; it is this comet which furnishes my principal refutation of Mr. Wilhelm's theory.

I have open before me a monogram upon this comet, by Prof. George P. Bond, of Cambridge, published by A. Williams & Co., of Boston, in 1858; on the 25th page is a cut, which, as I can attest, is a faithful representation of the comet, on the evening of October 10th, of that year; the tail springs up from the nucleus in a sharp and regular curve, for nearly half its length; the rest drifts away to the northward in nearly a straight line, upon looking at which, it is impossible, to me at least, to resist the conviction that it is composed of nebulous matter, as evidently left behind by the motion of its head, as the smoke of a locomotive by the progress of the train.

It is unnecessary to mention further instances, though I could bring up a number, all tending to the same end—that is, to prove that the commonly received theory concerning these appearances is as yet the nearest approximation to the the truth. P. S. YENDELL.

Dorchester, Mass., Sept. 1867.

### Coal Oil for Fuel.

MESSRS. EDITORS:—It appears to me that Col. Foot, Spencer, and other inventors, in their experiments with petroleum as a steam fuel, have overlooked or are not well posted in one of the best and cheapest oils for that purpose, namely, coal or rather shale oil. In number nine, present volume, of the SCIENTIFIC AMERICAN, you state that petroleum heat costs six times more than coal heat at present prices. We have no assurance that petroleum will long remain at its present low price. Now what I wish to say is, that coal or shale oil, free from all impurities, and from eighteen to twenty degrees Baume, can be produced here in any quantity for fifteen cents or less per gallon in bulk. This I will prove by the following: Three years ago, I put up a number of the improved revolving retorts in Beaver county, Pennsylvania, for the purpose of manufacturing lamp oil, and completed them in time to find petroleum, too low in price and too light in gravity for this heavy oil to compete with for lamp purposes.

In working these retorts, we charged each one with seventy-five bushels or three tuns of coal six times in twenty-four hours, receiving from twenty-five to twenty-seven barrels from each retort, or about sixty gallons of oil from a tun of coal. The expenses, mining the coal, eighty cents per tun, or say, for fuel, breaking the coal, etc., $7; eighteen tuns per retort, $18; average labor for each retort, $4,50. Now we have running expenses for each retort, $22,50 per day, for which we receive twenty-five barrels of oil, less than $1 per barrel. The freight to Philadelphia or this city is from sixty to sixty-four cents per hundred, or about $2 a barrel, which will bring the oil here about 7½ cents per gallon. Of course this is without barrel, or there will be five cents added for packing.

This shale oil, in my opinion, is the only rival coal has for our Atlantic steamers. The difference of gravity between shale oil and petroleum is so great—one at twenty, and the other forty-five—shows you at once the superiority of shale over petroleum for fuel purposes. My experience has taught me that shale oil has nearly double the intensity of heat that petroleum has at forty-five gravity. C. G. W.

New York.

### An Iron Worker on Tweers.

MESSRS. EDITORS:—Our works are supplied with water taken directly from a spring flowing from magnesian limestone beds. The water is very hard, in other words thoroughly saturated with carbonate of lime in solution with, no doubt, a slight percentage of sulphate of lime. The tweers we have always used until about 18 months ago, were made either of coiled gas pipe in cast iron, or of cast iron alone, but hollow, each intended to admit a constant stream of water through it to preserve the metal of the tweer from burning. When in place in the furnace their longest duration was from 4 to 6 weeks, not unfrequently burning out in as many days.

Having heard that copper tweers had been used formerly in Europe, although now generally abandoned in favor of iron tweers, I undertook to test their efficacy. The result of the trial surpassed my most sanguine expectations. Two of them were in active use 10 or 12 months, supplied with the same hard spring water, before either of them showed any evidence of leaking from the effects of burning, and during that time no attempt was made to wash out or otherwise remove the scale. When removed, the scale proved to be about the thickness of an egg shell, compact, yellowish, and amorphous, with smooth fracture, and with little or no free sediment and no light, porous, calcareous incrustation or lumps as found in our heater and boilers.

I have sent this communication in the hope that the facts stated may prove to be of some value to furnacemen who alone can appreciate, as the result of costly experience, the loss of time and material and the damage to hearths arising from the sudden admission of water in the crucible.

E. H.

Irondale, Mo.

### Pumping Hot Water.

MESSRS. EDITORS:—I have charge of a factory wherein are 1,200 feet of pipe used for heating the building in the winter. The condensed water from this piping is considerable and all flows through a steam trap into a tank set in the ground; this condensed water is nearly boiling hot. We pump this water back into the boiler again. With due deference to your opinion I must say that any ordinary pump will not do it. The effect is a pounding sound in the valve chamber, chattering of the valves as though they were very unwilling to leave their seats, trembling of the pump rod, etc. (This establishment is new). After the steam fitters had got through with their work and steam put on for the first time the result was as I have stated. I thought the trouble was in the pump, but soon satisfied myself it was not; the pump would not supply the boiler; I could not keep the water cool, and could use no other. "Necessity is the mother of invention."

I picked up a book the other day with an article in it headed "Getting Under Way," and one of many reasons given why the pump would not work was this: "The check valve may get stuck and not drop on its seat, letting the hot water flow back to the pump and hot vapor form in the valve cham-

ber, thus preventing the valves from working." I can pump it now boiling hot without any trouble.

I think, Messrs. Editors, if you invite the attention of your correspondents to this subject you will find I am right. Some may have had experience like mine; if so I can sympathise with them, for to have a whole establishment depending on you, and a tubular boiler driven to its utmost, and then be bothered for water is not a very desirable situation.

Hingham, Mass. JOHN C. GARDNER.

[Our correspondent states that he can pump hot water with the ordinary force pump, but he fails to state how he does it. From our experience we feel assured that to pump hot water the pump should be—in some way—different from one intended to pump cold water.

In starting a new engine and boiler nothing is more important than an inspection of the feeding pump. Some manufacturers are reprehensibly careless in building their pumps. The writer once started a new establishment in Nova Scotia, and after firing up, attempted to feed the boiler, but the pump refused to work. After an hour of great anxiety and labor we found one of the composition valve seats had not been put fairly into place. It stood about one-sixteenth of an inch above the hole for its reception in the casting. The consequence was that the water, backing from the boiler, went under the flange of the valve and held it up from its seat. Except for this the pump was well constructed, and after the seat was driven home no more trouble was experienced.—EDS.

### Artificial Stone--Its Local Value.

MESSRS. EDITORS:—I see on page 1 No. 4 Vol. XVII., dated July, an article on artificial stone, invented by a Mr. Ransome, of England. We would like to have all the information you can give us. We have concrete machines, but they do not give satisfaction. The chemical combination is too slow, and not sufficiently adhesive. We want something better, something that will not crumble down by rain and frost. If what you say about Ransome's blocks being so hard and solid is true it is the very thing we need out on the prairies for houses, barns, walls, and fences. Can you inform us what the expense per inch or foot of this material will be for manufacturing it? We have sand, gravel, lime, gypsum, salt, and soda. Now if we only knew how to mix them chemically it would be a favor of untold magnitude. We prize the SCIENTIFIC AMERICAN and expect it to assist us in overcoming the difficulties we meet with in the scarcity of timber. We have the most beautiful, most fertile, and healthful country in the world; but the consumption of the immense coating of grasses has almost eradicated our timber. We being a fast people cannot wait till it is planted and grown. We have the material here for the stone. Now we want you to find out, and tell us all about the manufacture, definite proportions, and machinery necessary to manufacture the stone. L. McCurdy.

Carrolton, Iowa.

[Those who are practically acquainted with the manufacture of artificial stone, are advised to turn their attention Westward. Here at the East we have an abundance of natural building material with which artificial stone is not likely to compete.—EDS.

### The Crystallization of Honey.

MESSRS EDITORS.—I have several times seen it stated in the SCIENTIFIC AMERICAN and elsewhere, that the crystallization of honey is caused by the action of light. In opposition to this theory, allow me to present two facts. We frequently take up honey late in the season (in Nov. and Dec.) place it in tin pans and set them on shelves in the cellar. Some of the honey, of course, leaks out of the cells and in a few weeks will be found crystallized in the bottom of the pans. Yet no light enters the cellar from the time we bank the house in October until some time in March.

Again, our strained honey we put in earthern jars, and after replacing the covers, set them in a dark closet where no light enters. In the spring the honey that remains unsold or unused, will be found completely "candied." In my opinion exposure to the air, and cold have more to do with the crystallization of honey than light. J. L. W.

### That Big Saw.

MESSRS. EDITORS:—In a recent article on the Emerson saw you state that the saw was capable of sawing 50,000 ft. of inch lumber in 10 hours with 50 horse power or in other words it only requires one horse power to saw 1,000 ft. of lumber in 10 hours.

This assertion of Emerson's that with his saw, "it only requires to saw 1,000 ft. of lumber (inch) in 10 hours, one horse power" has done me a good deal of damage because with my experience I find it to be impossible.

Another assertion of Emerson's is "that it only requires 15 horse power to drive a 52 inch circular saw of his make as strong as it could be driven, and that it would at least cut 10,000 feet of inch lumber in 10 hours."

Now I would feel obliged if you would give me your opinion as to the feasibility of the foregoing and also how much power it requires to cut 10,000 feet of lumber per day with a 52 inch circular saw, as I would like to know whether the result of all my experience has left me in the wrong.

LAMAR FOOS.

New Haven, Conn., Sept. 6, 1867.

[Before we comment on the above perhaps Mr. Emerson and the correspondents will express their views on the subject.—EDS.

### Rapid Disintegration of Granite.

MESSRS. EDITORS:—A few weeks since, as I was going from Bucksport to Ellsworth, Me., some five or six miles beyond Bucksport I noticed large boulders crumbling to pieces. These boulders looked like coarse granite and varied in size from a cubic yard to fifty in dimension; they are in all stages of disintegration, some just commenced, some nearly, and others wholly disintegrated and changed to coarse gravel, which is used in some places to macadamize the roads. So far as my observation extended this disintegration was confined to a space of about two miles. I found that it was a fact well known for twenty miles around. I have been in many different countries but have never seen anything like it and it has interested me much. JAMES EMERSON.

Lowell, Mass.

Translated for the Scientific American.

### Shooting Trial of the Army Target School at Spandau, Prussia.

On the morning of the 6th of July a trial of skill in musketry was witnessed by the Crown Princes of Prussia and Italy, at the target grounds of the Army-Target-practice School, and was arranged in the following manner: At the commencement five men fired five shots each at a moving target (figure of a man) at a distance of 130 paces with the following result: 25 shots, 18 hits; average hits, 72 per cent.

After this, five men fired five shots each, lying down, at some moving targets (men's heads); distance 200 paces; result: 25 shots, 18 hits, 72 per cent. A trial in quick-firing by various marksmen was then made with the Peabody and Martini rifle and the Prussian needle gun, during one minute, lying down; distance, 400 paces; result: Peabody 12 shots, 7 hits; Martini, 11 shots, 7 hits; needle gun, 11 shots, 9 hits. A fire at covered marks (5 targets posted at proper intervals behind an embankment 10 feet high) was then commenced. Thirty men were posted in squads of ten at the respective distances of 400, 600, and 750 paces from the embankment; ten men fired at the same time ten shots each, lying down, slow fire; result: 489 marks found in the five targets out of 300 shots. There was no sight or other guide whatever placed upon the edge of the embankment. A sort of sham fight was then executed by 96 men with 4 officers, upon the grand stand; distances not previously given. This company took position in a wood in bodies of 24 each. At the signal, "deploy as skirmishers" one squad deployed to the edge of the wood and, lying down, commenced firing at a number (32) of half-sized figure targets; distance 200 paces; result: 120 shots, 50 hits, 42 per cent. Two targets were then seen approaching, each representing the front of a section of infantry, which advanced a distance of from 300 to 200 paces towards the edge of the wood, when they were fired upon by 24 men during one minute, quick-firing; result: 188 shots, 157, hits, 84 per cent. The enemy then retreated, but suddenly another body of imaginary troops (single figure targets but only half visible, owing to the undulating ground,) appeared at a distance of about 200 paces, whereupon two of the squads (48 men) deployed as skirmishers, firing in common time and lying down; result: 275 shots, 134 hits, 49 per cent. The enemy disappeared, when, bringing up his reserves, he suddenly displayed two targets each representing the front of half a platoon, but two squads of 24 men fired each three volleys at 300 paces distance, which caused him to retreat; result: 138 shots, 103 hits, 75 per cent.

A number of the enemy's skirmishers under cover (32 single figure targets) now became visible a little further back, when one of the squads (24 men), after having deployed as skirmishers opened fire upon them, lying down, distance 170 paces; result: 117 shots, 55 hits, 47 per cent. At the same time 10 officers, 5 on each wing of the line of skirmishers, fired the same distance at a target which was moved rapidly backward and forward (representing a man on horseback riding at a brisk trot); result: 45 shots, 40 hits, 89 per cent. Cavalry suddenly appears (large cavalry target 96 feet long, 8 feet high), and is opposed by three squads (72 men) who give a volley at 300 paces; result: 70 shots, 56 hits, 80 per cent. But the cavalry continues to advance, which is demonstrated by suddenly drawing up the small cavalry target, 48 feet long, 8 feet high, at a distance of only 200 paces, when 72 men deliver two volleys upon them, which causes them to disappear, in place of which an infantry column of the enemy, 40 feet long, 6 feet high, shows itself at a distance of 300 paces. The 72 men discharge two volleys at it; result: 144 shots, 111 hits, 77 per cent. The whole company now advances upon the enemy's column in a general attack, which ends the fight. The trial was concluded by firing with ordinary cartridges at a barrel of powder, also with explosive cartridges at a wooden wall made of two sides of boards with straw packing. The powder barrel exploded at the first shot and the wall ignited after firing the second shot.

### ASPHALT PAVEMENT IN PARIS.

Visitors to Paris are generally surprised at the appearance of the pavement of a great number of streets in the central parts of the town, and still more at the peculiar mode of making and repairing this asphalt pavement if they chance to see those operations carried out. The asphalt pavement was introduced in Paris in 1854, by M. Momberg, chief engineer, and M. Vandrey, engineer of the municipal service of the town of Paris. The first street paved in this manner was the Rue Bergère. The asphalt used for this purpose is a natural composition of pure carbonate of lime and of bitumen or mineral tar. It is found in abundant quantities at Seyssel (Ain) in France, and at Val-de-Travers, in the canton Neuchâtel, in Switzerland. In the first-named locality the layers of bituminous limestone are from four to seven yards deep, and of very uniform composition, containing about sixty-six per cent of bitumen and thirty-four per cent of carbonate of lime. The natural stone is crushed into powder by machinery, and afterward heated to a temperature of about 140° Cent. It then remains in the state of a dry, fine powder, somewhat similar in its consistency to molders' sand, and in this form it is employed in the streets. The roads to be paved are first covered with a layer of concrete made of gravel and cement, and this layer is carefully dried before the application of the asphalt cover. The asphalt powder is then reheated and spread over the surface of the concrete in an even layer of about four centimetres, or $1\frac{3}{5}$ inches, in thickness throughout. After this the powder is rammed and compressed by means of heated cast-iron rams worked by hand. This being done, a heated roller is passed over the surface. The roller weighs about four hundred weight, and is repeatedly traversed over each short length of pavement newly rammed in. Two larger rollers, one of sixteen hundred weight and one of about two tuns weight, are afterward employed for flattening down the surface of the whole. The pavement is finished and ready for use immediately after cooling, say two or three hours after the first roller has completed its work. The asphalt pavement has now had an extensive and complete trial, and its advantages are very numerous. There is neither dust nor mud produced by it, and its surface wears no more than one millimetre, or one-twenty-fifth of an inch in thickness per annum in streets having a lively traffic. At the beginning there is a compression caused by the weight of the vehicles rolling over the pavement, but the whole gets soon into a state of uniform density, and the street then remains in a perfect state for a long time, requiring very little repair. There is no noise whatever from the wheels of carriages in asphalt-paved streets, so that there is a certain danger caused by this to pedestrians from the want of warning of the approaching carriages. This, however, disappears by degrees, as the public become more and more acquainted with this kind of pavement. The tractive force required by the carriages passing over asphalted streets is very considerably reduced, and still more important is the reduction of the wear and tear of carriage wheels, springs, and axles, a reduction which is due to the absence of all concussion and vibration in the rolling of the carriage wheels over the smooth and uniform surface of the street.—*Engineering.*

### Causes of Acute Bronchitis.

In our climate, both forms of the disease are very common. The essential feature of the disease consists in an inflammation of the bronchial tubes, and is commonly produced by cold and moisture, applied generally or locally, as by means of damp clothing, or exposure to a cold, moist, variable atmosphere, especially, after the body has been overheated by exercise or crowded rooms, or the inhalation of metallic dust or gases. Dr. Charles T. Jackson, the distinguished chemist of Boston, nearly lost his life on one occasion by an attack of acute bronchitis, caused by the sudden inhalation of chlorine gas. Ipecac, in powder, when inhaled by some individuals, will cause bronchitis. The dust of newly cut hay, and the pollen of the rag weed, in some persons will produce the same effect, also the flowering of roses, and the inhalation of dust, exhaled from the foliage of growing plants and trees. Hooping cough is no doubt a certain form of bronchitis, induced by a specific morbid poison directly on the bronchial mucous membrane.

A very severe form of bronchitis often accompanies some of the eruptive fevers, measles, scarlatina, and small-pox, constituting a most dangerous and sometimes fatal complication. In measles, the recession of eruption is frequently followed by a great increase in the bronchial disorder, which is announced by the great increase of cough, and sudden oppressive dyspnœa. From the suddenness of the production and disappearance of the latter symptoms, which is occasionally observed in the cases, it has been suggested, that it is possible they may be rather congestive, than inflammatory, although if the congestion continue, bronchitis is the final result.

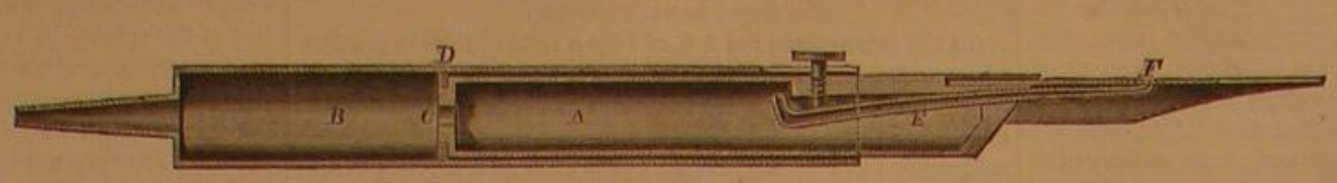
There are also many chronic diseases which may be said to favor the developement of acute bronchitis, these are Bright's disease of the kidneys, and diseases of the heart and lungs. It often occurs during the progress of pulmonary tuberculosis, and sometimes proves very fatal to the patient.—*Med. & Surg. Rep.*

DISINFECTANTS.—Mr. Crookes, says the *Medical Times*, has shown that the favorite disinfectant, chloride of lime, is about the least efficient of any of those substances reputed to possess disinfectant qualities. Chlorine itself is very little better, for if used in large enough quantities it will in time destroy the virus, but as it acts by way of oxydation, and as living virus resists this longer than dead oxydizable matter, before the gas can attack a virus everything else that it can oxydize will be oxydized first. And if when pure, chlorine is so slow of acting, when adulterated with eighty per cent of lime, its value is proportionately less. In sulphurous and carbolic acid, on the other hand, there are substances absolutely destructive of every kind of living thing of low organization, such as cattle plague virus is supposed to be. These substances, besides destroying the virus, attack it at once, and arrest all putrefying tendency.

DEATH IN THE BOTTLE.—A singular explosion case is reported by the engineers of the Manchester Boiler Association. An earthenware bottle of about a quart capacity was used, when full of hot water, as a bed warmer. After filling it on a previous occasion, the cork was tied down with a waxed end. When the bottle was next brought into requisition, instead of being emptied of its cold water and refilled with hot, it was put, all tightly corked, into the oven of a kitchen range, to be heated up entire. In a short time a violent explosion took place, the bottle was burst, and pieces of the oven door were thrown into the room with such violence as to instantly kill one person, and seriously injure two others.

### Improvement in Fountain Pens.

Much of the annoyance of the fountain pens which has prevented them from being generally adopted, has arisen from the difficulty of replenishing the fountain and of insuring a regular flow of ink to the pen nibs. The pen represented in the accompanying engraving is believed by the inventor to obviate these difficulties and to be as handy and convenient in use as the ordinary pen. The holder is double, like that of the common pen and pencil case, one part, A, sliding within the other, B. This latter is furnished at the top with a tapering pipe, which, when the case is to be filled, is placed in the ink, and the portion, A, worked up and down. This produces a vacuum or "suction," and the ink rushes up and through an opening, C, in the head or end of the inner case, A. This head is packed on its periphery, with a ring, D, of rubber or other suitable material to make it fit the interior of the outer case air tight. A bent tube, E, leads from the reservoir, A, to the pen, F, and conducts the ink to near the nibs. The flow is regulated by the thumb screw, by which the inner end of the tube, E, may be removed from or advanced to the inner surface of the pipe, A.



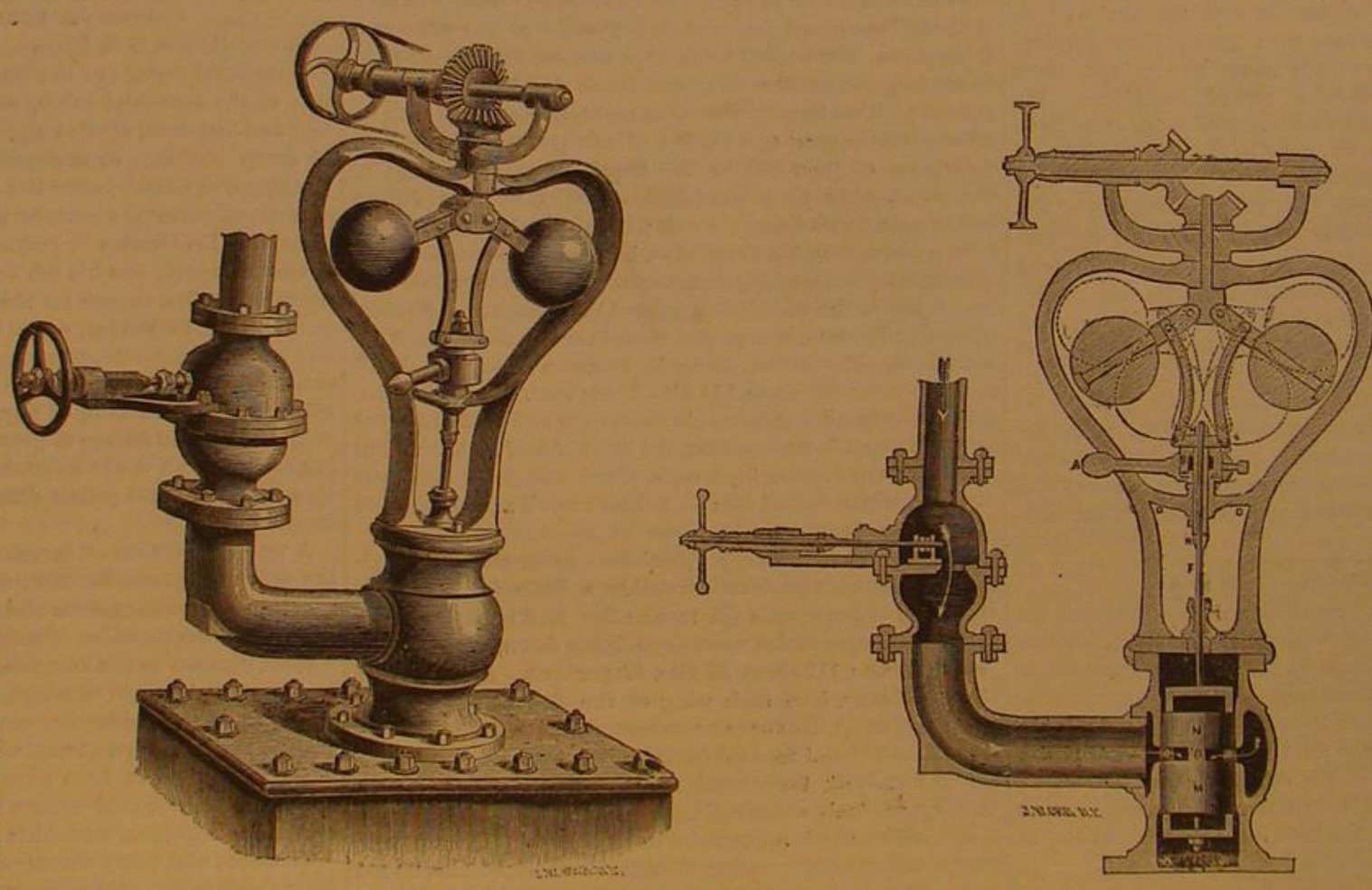

CHARLES' PATENT FOUNTAIN PEN.

Letters Patent, obtained through the Scientific American Patent Agency, were issued Aug. 13, 1867, to Jas. S. Charles, Box 245, Omaha, Nebraska, who will answer all inquiries relative to the improvement from those interested.

### Improved Safety Governor and Valve.

The damage resulting from the breaking or slipping off of the governor belt of an engine, or when any accident disconnects the governor from the other machinery, is frequently great. It can be avoided only by some automatic or self-operating attachment to the governor which will instantly close the throttle or the inlet valve and stop the engine. This is effectually done by the governor represented in the engravings. It has had a seven years trial, and in all cases performed its allotted task satisfactorily.

One of the illustrations exhibits a perspective view of the governor and a portion of a steam chest, and the other a vertical section. By an examination of the latter the construction and operation of the governor can be plainly seen. A is a cam lever having a spiral groove, which works on a stationary pin and raises the balls of the governor from the position shown in the lower dotted lines to that they occupy in the engraving. It will be seen that this movement operates the valve, N, and permits the introduction of steam in the direction indicated by the arrows. When the engine is started, and up to speed, the balls rise, their governing range being between their position as shown and the upper dotted circles. When the balls fall to the point indicated by the lower dotted circles the safety valve closes the steam ports instantly and stops the engine. This can never occur except the balls be deprived of their rotary movement from accident or otherwise. The other parts of the governor are sufficiently well represented in the engravings to render particular reference to them unnecessary. It will be noticed that the vertical motion of the valve is very slight, so that the governor is very sensitive to the slightest change in speed. It proves to be admirably adapted to rolling mills, where engines are subject to frequent sudden strains and also in grist mills, effectually overcomming "back lash." The manufacturers have so much confidence in its superiority that they propose to send one or more to engine builders, and if, after thorough trial, they do not give entire satisfaction, to return the money and expense of freight.



SNOW'S COMBINED GOVERNOR AND VALVE.

It was patented Oct 11, 1859, and reissued May 13, 1862. Glen & Hall of Rochester, N. Y. are the sole manufacturers, and to them all letters desiring further information should be addressed. See their advertisement in another column.

### A Tunnel Through a Volcano.

English engineers have nearly completed a railway tunnel through a volcanic range in New Zealand. The plains of the Canterbury settlement, in the southern of the two great islands of New Zealand, are divided from the port of Lyttleton by almost impracticable hills, and in May, 1861, the local government accepted an offer to complete a line of railway from Lyttleton to Christchurch in five years; the cost of a tunnel two thousand eight hundred and thirty-eight yards long, and called the Moorehouse Tunnel, being fixed at £195,000. The works were at first carried on under great disadvantages, on account of the Otago gold fever and other causes.

This tunnel affords, it is believed, the first instance where a complete section of an extinct volcano has been opened out. The rock in the tunnel is a series of lava streams and beds of tufa, intersected by vertical dykes of phonolite. The lava streams generally consist of scoria, overlying a coarse pink trachyte, which passes gradually through shades of gray, purple and blue into a black finely-grained dolorite, intensely hard and tough; the lightest and softest rock being at the top, and the densest and blackest at the bottom. Regarded from an engineering point of view, the work is considered eminently successful.

Wherever difficulties have been met they have been quickly and successfully overcome. A siphon six hundred yards long was employed for the drainage of the upper half of the tunnel. The system of ventilation has proved perfectly adapted to the requirements of the case, and has been not only effective but simple and comparatively inexpensive. The engineers of the Mont Cenis tunnel have found it necessary to adopt similar means of ventilation in that famous work. In the first instance air was driven in by fans worked by horse-power, but this soon proved quite insufficient; and when the works extended some distance, much time was lost owing to the difficulty of getting rid of the smoke. To obviate this on the Lyttleton side, the upper portion of the tunnel was partitioned off by a floor or brattice, about nine feet above rail level, forming a smoke flue connected with one of the shafts, at the bottom of which was placed a furnace, which, by rarefying the air, caused a steady current up the shaft, and drew the smoke away from the face of the workings.

A similar plan was adopted at the north end, the chimney of a forge being led into the shaft, and answering the purpose of a furnace, but the brattice was only continued for a short distance beyond the upcast shaft. On the Lyttelton side this system answered perfectly well, and the ventilation has continued good ever since; but on the Heathcote side where the work for the last quarter of a mile has been driven by a top heading (the temporary floor being left above the permanent rail-level for drainage purposes) the ventilation at the close of the work became sluggish, and recourse was had to driving air on the face by means of four fans driven by an eight-horse steam engine. This proved perfectly successful.

The system employed to secure the correctness of the alignment of the two ends of the tunnel was very simple. A permanent mark was fixed in the center line of the tunnel, on a tower built on the dividing range, nearly mid-way between the two ends. A transit instrument being placed on the meridian of the tunnel, as well as of the tower on the hill, it could be seen at once whether the flame of a candle in the center line of the work inside the tunnel was in a vertical plane with the mark on the tower. But it was also desirable in case of error, to have the means not only of correcting, but of calculating the amount of such error, and this could be readily done. The permanent mark on the central tower consisted of a batten six inches wide, with a black stripe one inch wide down the center. The eye-piece of the transit instrument being furnished with five vertical wires placed at equal distances apart, the value of the space between any two wires at a distance equal to that of the mark on the tower could be ascertained by reference to the width of the batten, which thus gave a scale by which the error in the position of a light placed in the tunnel under the tower could be rated with great exactness. It has been by this means that the alignment has been tested from time to time and the proof of the correctness of the system has been established by the present result.

In spite of the peculiarity of the work, the health of the men has been generally very good. Accidents have been of rare occurrence, and of comparative unimportance.

### Lobsters.

Crabs are to lobsters what the *True Flag* is to the *New York Ledger*—the same thing only with "no continued *tails*." Cuvier, the French naturalist, calls them the short-tailed lobsters, and distinguishes the lobster proper as the long-tailed lobsters. The principal difference is in the length and structure of that member. If you are an eater of lobsters you will be thankful for the variations, for the most available flesh is in the tail, which is still more interesting to the anatomist for its complex structure, the muscles making a curious network, crossing in every direction, to give the necessary variety to the movement of that organ and its appendages. The tail is sheathed in scale armor, of which the lobster is probably the oldest wearer—six horny rings, armed with sharp points at the termination of the upper arch, and in the center of the lower, and so beautifully jointed that one plays into another with great ease, but let little fingers beware of getting caught among their thorns when the lobster rolls up his tail for a leap. Fastened to the lower segment of the rings are little hairy swimmers or "false feet," on which the female lobster glues her eggs, and carries them till they are hatched. You will see them, like the fine clusters of red beads, on the boiled lobster. You fancy, perhaps, that the splendor of the shell of the boiled lobster is his badge of seamanship—the red shirt; but he does not wear it upon ordinary occasions. It is the gay dress he puts on in which to appear in society, while his home suit is of dark green, touched with a dull red here and there. Hot water brings out his beauty, as affliction does the character of a saint

Feeders on lobsters are warned against the fatal charms of some mysterious "lady," found in his head, as they say, rather loosely. But the lady is not so attractive as to be dangerous, and perhaps not dangerous in itself if it were attractive; and it is not found in the head. It is simply the stomach, placed in an economical nearness to the mouth; for the lobster is a greedy eater, and very far fram select in his choice of meat. A sort of bony framework, peculiar to this crustaceon, keeps the stomach distended even when empty. On these ribs are five teeth, by which the voracious lobster is enabled to chew his meat after he has swallowed it—an arrangement that would be invaluable to our hasty feeders, who bolt their food and run. The membrane of the stomach distended by these original "hoops," and somewhat wrinkled, forms the dress of the "lady;" and where the ribs of this queer skeleton meet, the bony knob makes her head; and the "poison" is in the contents of the stomach, as well it may be, for the lobster feeds on every dead thing he can lay his five pairs of jaws to! Jaws, I say; but I might say feet, for to the oddity of having his ribs in his stomach, and his teeth on his ribs, he adds that of having five or six pairs of legs in his mouth. From their use and place we call them jaws; but from their structure and succession they seem to be a continuation of the series of feet.

The lobster's eyes are complex, or composed of many lenses, each a perfect organ of vision. They are hard and horny without, and put at the ends of two jointed fingers, which he runs out of the window of his head when he wishes to look about him, but when he sees danger ahead, he pulls them in and stores them away behind a thorny beam, which projects where his nose should be.

Like fishes, the lobster breathes through gills. The single, broad band of plate armor that covers his body comes down and forms a protection for the gills, under its projecting caves. This keeps them from drying up in the sun, and enables him to live a long while out of water. In common with crabs of all kinds, the lobster has a trick of throwing off his legs just when a boy would be for taking to his, that is, when he gets caught. This is done neatly at the joint nearest the body; and after a few days, without a drop of restorative or invigorator, a new member sprouts, and soon replaces the old one. If, as Darwin would say, we have all been lobsters, what a pity that in the progress of the species this knack should be numbered among the lost arts.—*George S. Burleigh, in "Our Boys and Our Girls."*

## Science Familiarly Illustrated.

### What Old Leather and Bones are Good For.

Articles are not to be despised because worn out, for wearing out means, almost always, only a change of use; when an article becomes useless for one purpose its being fitted for others. This fact is well exemplified in the value of old leather and bones. Let us consider the latter first because of its variety of uses. The fresh bones from the butcher's stall, as those of beef, which have been entirely stripped of the flesh, are excellent bases for soup. Indeed, bones alone make a far better soup than meat alone; and even after being cooked, unless boiled, bones are superior materials for this purpose. Even the rib bones of a piece of roasting beef, after having been placed once on the table, although marrowless, are good soup bones, and the skeleton of the turkey, gosling, or chicken, which as a roast has done its duty, will make a nourishing broth. Gelatin and not fat is the true foundation for soup, and this is largely contained in bones. So much for the domestic uses of bones; now let us look at their other uses.

First, then, the bone boiler deprives them of their fat, which is used for a hundred purposes, from the basis of fancy soaps and pomatums to the "slush" for ships' masts. The gelatin becomes the "isinglass" put up in fancy colored papers and sold at the groceries for making jellies, soups, and blanc mange; or it enters into the composition of jujube paste and gum drops. Old bones are the foundation of the much valued fertilizer known as superphosphate of lime. Ground and mixed with sulphuric acid they restore to the soil what it had given us in our wheat.

But they are almost invaluable in the arts. Very much of our "ivory handled" cutlery, probably nearly all of our ivory handled umbrellas, parasols, and whips, many similarly ornamented canes, etc., are handled with bone and not true ivory. In fact, some of the bones in our domestic animals approach very nearly in texture to genuine ivory. We have seen a complete set of dental instruments handled with horse bones, which made as fine an appearance as the real ivory. Bone buttons are so commonly used that only an allusion to them is necessary. Almost all, if not quite all the phosphorus employed in the arts and sciences is procured from old bones. It is probably the most valuable extract which bones yield.

But it may be questioned whether any other use for old bones can equal in value that to which they are put in the manufactures of iron and steel; and here comes in the value of old leather. The carbon contained in bones and leather is a necessary element in case-hardening iron, and also in some instances of hardening steel. For the first purpose prussiate of potash, or ferro-cyanide of potassium is largely used, but it is a general belief among mechanics that its effects are not so thorough as those from the employment of ground bones and leather scraps. The article to be carbonized or case-hardened is packed in an iron box with the ground bones and leather and exposed to a red heat for several hours—more or less, as the depth of the cementation desired—then removed and plunged into water. Its surface becomes hardened steel. For some parts of gun work and of machinery this is a very necessary process.

Then there are occasions when an extra hardness to steel is desirable; such as the hardening of dies for "raising" the steel "mills" used in engraving calico-printing rollers. These are treated in precisely the same manner as articles of iron to be case-hardned. They are prepared for being engraved—which is done by hand—by being deprived of a portion of their carbon by a process of annealing, when they become nearly if not quite as soft as silver. To harden them this carbon must be restored, and for this purpose it is doubtful if anything is better than the old bones and leather scraps which we so thoughtlessly cast aside as valueless. Fortunes were made during our late war by gathering and sending to market the bones of horses, mules, and the edible animals which accompanied our armies, together with the cast-off scraps of leather, in the form of equipments. The above are only a part of the uses of these despised articles, but our object was mainly to draw attention to the value of what are too often considered used up and worn out materials.

### THE EXPENSE OF A HERO.

The old saying that republics are always ungrateful should not be accepted without liberal exceptions. While republics, as history shows, are for the most part very parsimonious with respect to expenditures which are really important—except perhaps when their existence is at stake, then money flows like water. But, on the other hand, when expenditures the most lavish, which cannot in any way benefit the nation, are necessary for some ostentatious purpose, the amount is immediately forthcoming. No voice is raised against them, no one apparently possessing the courage to brave the indignation of those noisy patriots who are always ready to grant any sum they think necessary for the display of national vanity. A case in point is the vast and quite unnecessary expense incurred in sending the immense wooden frigate *Franklin*, to Europe for no other object, in reality, than to give two or three naval officers and their wives a change to indulge in the reciprocity of champagne, balls, and dinners.

If this expensive and idle excursion could raise the price of American securities in foreign markets, we would certainly have nothing to say, thinking perhaps that the game was worth the powder; but it can have no more influence on our national progress or security than would be secured by letting the match-wood *Franklin* go over Niagara Falls.

It is quite safe to assert that the expenses of such a craft as the *Franklin* are over $2,000 per diem; or in round numbers, nearly a million dollars a year, and this to keep a vessel in commission in foreign waters which is utterly useless as a war vessel. As far as a representative of actual power is concerned, there is not a cadet in any of the European schools who does not know that the poorest of their iron-clads could set her on fire with their shells, blow her up, or sink her with her army of sailors and marines, in a very short time.

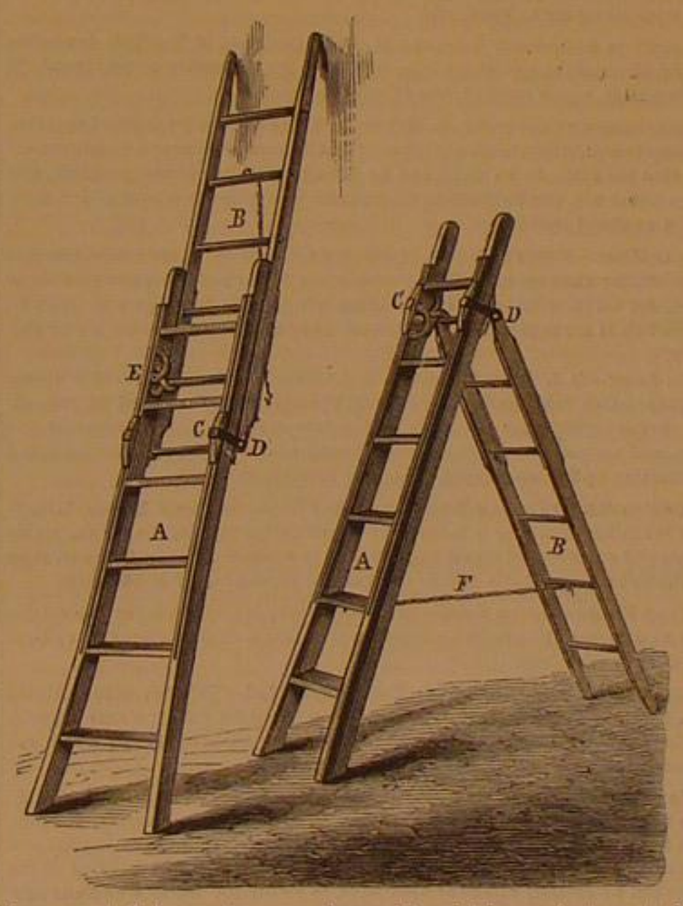
The *Franklin* is the representative of that obsolete class of kindling-wood vessels which can never again be used to advantage in Naval warfare. It is true they are very elegant as yachts, but it would be almost as agreeable and far less expensive—when it is deemed necessary by the Hon. Secretary for our gallant admirals and their families with their ladies' maids, to air themselves in foreign parts at the expense of the Nation—to supply them with a steam yacht, about one-fifth the size of the *Franklin*—in fact such as are used by many of the English swells, Mr. Lancaster, for example. A yacht such as we have suggested could, of course, save the immense expense of a regiment of men, and a few brass howitzers would answer just as well for salutes as the tuns of cast iron installed in the *Franklin*.

The money saved might be devoted to the benefit of the one armed and legless Union soldiers one frequently sees about the street operating on grind organs.

A friend at our elbow hints bravery and bloody combats. Admitted, but then let it be borne in mind that frequently more men were killed and wounded in before-breakfast skirmishes in the Armies of the Potomac and the West than in both the engagements of Mobile and New Orleans put together.

### VOGELMANN'S COMBINED STEP AND EXTENSION LADDER.

This combination ladder appears to be exceedingly simple in construction and easily adjusted. The main portion, A, is furnished with steps, while the other, B, has simply "rounds." As a step ladder, B is a support or brace to A. In the bars of A, are channels or grooves in which slide the ribs of blocks,




C, connected by a strap or clamp, D, which projects at the back sufficiently far to receive a bolt or rivet that acts as a hinge to attach the portion, B, to the step ladder, A. At or near the upper step of A is pivoted a double hook, seen at C and E, the swing of which is governed by a semi-circular guide. A line or iron rod, F, prevents too great a spread of the two portions when combined as an ordinary step ladder, while the engagement of the lower prong of the double hook with the upper round of B, holds the two parts in their relative vertical position.

When used as an extension ladder the part, B, is slid up on A to the requisite point and held by the engagement of the upper prong of the double hook with one of the rounds of B. The union and steadiness of the two parts in this position is further assured by ribs on B fitting in channels in A, as well as by the rigidity of the clasps, D. By unhooking the line or rod, F, and sliding B with its blocks, C, and clamps, D, entirely off, the two ladders can be used separately, and whether thus separated or together the two can be folded instantly for transportation or moving from place to place.

Patented July 30, 1867, by Timotheus Vogelmann, who may be addressed relative to this apparatus at Hamilton, Ohio.

### Making Railroad Iron Direct From the Furnace.

Mr. Daniel E. Brady writes us that he is erecting a furnace for producing steel and iron for making railroad bar direct from the furnace, and that it will be in operation by Sept. 15th, when he will invite all interested in steel and iron to witness its operation. The furnace is located one-and-a-half miles from Rockbridge, Alum Springs, in Rockbridge county, Va., and only six miles from the Virginia Central Railroad.

SALT FOR INVALIDS.—"Should salt be used as seasoning in rice or any other article of food prepared for invalids?"

No. Salt should not be used by either sick or well people in any form. It is never useful; always injurious.—*Herald of Health.*

## Editorial Summary.

ELIMINATION OF HYDROGEN.—M. Heurtebise communicates to a late number of *L, Invention* a plan for producing and economically employing hydrogen gas, which is both new and valuable. He places charcoal in a retort and raises it to a red heat, then passing a stream of carbonic acid over it, each molecule of the acid absorbs two atoms of carbon forming two molecules of oxide of carbon. In another retort heated red hot he passes two currents, one thus obtained and another of superheated steam, when two atoms of carbonic acid and two equivalents of hydrogen gas result. The carbonic acid gas is again passed over the heated charcoal and four equivalents of hydrogen are obtained. A continuous action is thus kept up, with a steady supply of hydrogen.

THE PNEUMATIC IN FRANCE.—Written telegraphic dispatches are transmitted from the central telegraph station in Paris to various other points of business through iron tubes three and a half inches diameter, laid down not very far under the surface. At each station there is a reservoir of water compressing by its weight a reservoir of air beneath it. The telegrams are placed in a cylinder fitting the tube air tight; the compressed air is turned on, and the cylinder with its roll of dispatches is shot through to the next station, or, if by any chance it sticks fast at any point, the water from the reservoir is let in, and by the fall of water the point of stoppage is marked. The system is as simple as it is economical.

THE GLOVER MUSEUM, a valuable collection of specimens of natural history, has at length come legally into the possession of the Government. The price paid was $10,000. The collection is the result of fifteen years spent in scientific research by Mr. Glover and the expenditure of several thousands of dollars. The museum, which now fills two rooms in the Patent Office building, will soon be removed to the new building, now in process of construction for the Agricultural Department, and it is to be made the nucleus for an extensive collection of specimens and books calculated to impart information on the various branches of industry connected with agriculture.

TREDEGAR IRON WORKS.—These works, at Richmond, Va., covering eight acres of ground, employed during the past month six hundred hands, and disbursed $25,000 in wages. The Richmond *Dispatch* says:—"Among the heavy jobs just completed and now being shipped, are two iron bridges of superior construction. One of these is for the road now building between Columbia, S. C., and Augusta, Ga. It will cross the Congaree river, and consists of three spans 160 feet long and seven spans 80 feet in length. The aggregate weight of this bridge will be within a fraction of 500,000 pounds. C. Shaler Smith, Esq., of Baltimore, is the engineer."

MAP OF THE MOON.—Our nearest planetary neighbor is being mapped out for our inspection and study, on a scale of 200 inches to the moon's diameter. The work has been undertaken by an English scientific body, and two sections just completed comprehend two areas of twenty-four superficial degrees each, which are equal to 17,688 square miles in the two. On these sections the plains, craters, mountains, valleys and other objects are laid down in outline, each known object being referred to in the text accompanying the map.

FRENCH VELOCIPEDES.—In Paris the young men have inaugurated velocipede clubs, and may frequently be seen riding through the streets at a great speed. The fabrication of these vehicles has been brought to such perfection, both for velocity and lightness, that at high velocity they are scarcely visible, and the man has the comical appearance of flying through the air on an imaginary tread mill. Experts in this mode of locomotion make twelve miles an hour, and a higher speed will be attained.

TO IMITATE MAHOGANY.—The surface of any close-grained wood is planed smooth, and then rubbed with a solution of nitrous acid. Next apply with a soft brush a mixture of one ounce of dragon's blood dissolved in a pint of alcohol and with the addition of a third of an ounce of carbonate of soda. When the polish diminishes in brilliancy, it may be restored by the use of a little cold-drawn linseed oil.

POISONING BY CHLORINE VAPOR.—Professor Maisch says that a direct antidote to the poisonous effects of the inhalation of chlorine is sulphuretted hydrogen, the halogen combining instantly with the hydrogen, liberating sulphur. The professor has tried it himself after accidentally inhaling chlorine, and obtained immediate relief. The same remedy would doubtless be effectual in the cases of bromine poisoning.

DENTAL AMALGAM.—A young lady who had been languishing for several years in St. Louis under a mysterious disease which baffled the skill of the most eminent physicians, it has been ascertained by a dentist, was dying from a slow poison distilled through the system by the amalgam with which two of her teeth had been filled.

ASPARAGUS is a very healthful article of diet, for the reason that it is nutritious, easily digested, and contains no properties which are injurious to the human organism.

An interesting historical print, a fac-simile of the death warrant of Charles I. of England, has been issued by Thos. F. Carter, Louisville, Ky.

Two English inventors have just exhibited in the streets of Paris a musical locomotive, which ran backwards and forwards to the air of "The Tannhauser March."

NEW NOMENCLATURE OF DISEASES.—The result of labors extending through several years, of committees appointed by the London College of Physicians appears in a new nomenclature and classification of diseases. This work has been prepared voluntarily and gratuitously, and will henceforth be used by the medical departments of the English army and navy. Each title is translated into the Latin, French, German, and Italian languages, so as to come into general use abroad as well as at home. In the new nomenclature the utmost precision of language consistent with intelligible simplicity has been aimed at and attained. The first necessity of sanitary records, is that for statistical and scientific purposes the same thing shall be always signified by the same title. The above mentioned work furnishes the means by which this end may be attained, and coming from so high authority, its acceptance as a universal standard, seems certain.

"COMPARISONS ARE ODIOUS."—Some writer of leisure on an exchange, has been figuring upon the amount of noise which an average sized man would be capable of making provided his voice power as compared with that of a locust, was commensurate with his greater size and weight. Supposing that the lord of creation weighs as much as sixteen thousand of the stentorian insects whose notes can be recognized at the distance of one sixteenth of a mile, then the human competitor ought to be able to make himself heard one thousand six hundred miles away, and when he sneezed "his house ought to fall about his ears." Again, supposing a flea to weigh one grain, which is more than its actual weight, and to jump one and one half yards, a man of one hundred and fifty pounds, with jumping powers in proportion, could spring from his office in this city and land among the affrighted inhabitants of Cochin China.

THE DIET OF MOLES.—A champion for these indefatigable excavators has been found in a Mr. Weber, one of the *savans* of Zurich, Switzerland. This gentleman examined the stomachs of a number of moles caught in different localities, but failed to discover therein the slightest vestige of plants or roots; whereas they were filled by the remains of earth worms. He shut up several of these animals in a box containing earth and sod with growing grass and a smaller case of grub or earth worms. In nine days, two moles devoured 341 white worms, 193 earth worms, 25 caterpillars, and a dead mouse. Fed with a mixed died of raw meat and vegetables, the moles ate the meat and left the plants; and when vegetables exclusively were dealt out to them, in twenty-four hours both died of starvation.

CHEMISTRY OF RIPENING FRUIT.—The chemical changes which fruit undergoes in passing from a green into a ripe state, have been made the subject of study by Dr. Dupré and communicated by him to the London Chemical Society. Although the relative quantity of acid in the fruit diminishes as the ripening progresses, the absolute quantity remains tolerably constant, or at least diminishes very slowly. There can therefore be no doubt that the sugar increases in quantity, and it seems not unlikely that this development takes place through the action of the acid similarly to the production of sugar from starch by the action of diluted acids. In one hundred average-sized apples gathered in September, October, and November, Dr. Dupré found 2·5 grammes, 1·9 gramme, and 1·8 gramme of tartaric acid respectively.

INFINITESIMAL MEASUREMENTS.—The Kensington Museum is to be recipient of a measuring machine demonstrating the one millionth part of an inch. This instrument and three original true planes, are to be perpetually preserved, and a sufficient endowment has also been made for providing funds for the delivery of lectures explanatory of such instruments. The donor, Mr. Whitworth, of ordnance notoriety, says their importance will be manifest when it is considered that the value of every machine, when made of the best material, depends on the truth of its surfaces and the accurate measurement of its parts.

SMALL MIRRORS, it is announced, are placed outside the windows of the private houses in Brussels and other German cities, by means of which the lady inmates are able to see, without looking out, those passing by in the street below, the figures being reflected in the glass. A visitor is seen by the same means when he appears at the door, and "at home" or "not at home" is often thus determined upon.—*Phil. Ledger.*

Many dwelling houses on the Fifth Avenue and in other fashionable streets in this city have had adjustable mirrors thus placed and in operation for a number of years. Can it be possible that such a contrivance is a novelty in Philadelphia?

A farmer in Naperville, Ill., a few days ago saw his machine on fire from the effect of friction, and in an attempt to extinguish the fire, got his left foot in the machine, and was badly mangled. In looking to the man's injuries the fire was forgotten and it consumed the machine.

C. Z. CUTTING, Assistant Examiner in the Patent Office, Washington, and brother-in-law of Senator Doolittle, died Sept. 1st of typhoid fever.

THE annual New York State Fair, for the exhibition of Agricultural and industrial products, will open in Buffalo, on Tuesday, October 1st.

### The Science of Blacking Your Boots.

By a member of the Boot-black Brigade. Don't do it in the sun-shine, for it won't shine your boots. The warmth dries the blacking rapidly and prevents a good polish.

## Recent American and Foreign Patents.

*Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.*

CORN PLOW.—John R. Thomas, Mifflintown, Pa.—In this invention the plow can be adjusted so as to throw the dirt in rows or not, at pleasure. The shape of the plow point and the means of attaching and regulating the pitch of the plow are also improved.

AUTOMATIC BARREL FILLER.—Wm. S. Payne, Petroleum Center, Pa.—This barrel filler is designed to be used for filling casks, tanks, cisterns, the water tanks of steam engines, and in general all vessels or receptacles that are to be filled with liquids. Its object is to economize labor, one man with my barrel filler being able to accomplish the work of six men without it.

CARBURETING AIR.—Levi Stevens, Fitchburg, Mass.—This invention consists in the use of a new device for regulating the flow of the carbureting fluid into, and preserving it at the proper level in the carbureting chamber, of an apparatus which combines the meter wheel and regulator patented by me April 9th and June 11th, 1867.

FLOOD GATE.—C. B. McKinney, Houston, Ohio.—Attached to sills buried in the ground parallel to the direction of the water course are posts which form guides for the gate which is raised by the pressure of the stream against the lower bar which presents an oblique face to the current.

CLOTHES HORSE.—James Greenhalgh, Jr., Glendale, R. I.—This invention has for its object to furnish an improved clothes horse, so constructed as to furnish a large drying surface when extended, and which, when not in use may be folded into a small compass, and which shall at the same time be simple, strong and inexpensive in construction.

COMBINED CORN SHELLER AND FAN MILL.—J. P. Hoagland and Moser, Centralia, Pa.—This invention has for its object to furnish an improved machine by means of which the corn may be rapidly and thoroughly shelled and cleaned ready for use or market at one operation.

GRINDING ATTACHMENT FOR LATHES.—Charles Coester, Jr., and A. B. Lawther, Bridgeport, Conn.—This invention has for its object to furnish an easy and convenient means by which a grinding wheel may be applied to an ordinary lathe.

BRAKE FOR HORSE POWER.—A. D. Tingley, Adrian, Mich.—This invention has for its object to furnish an improved brake for attachment to horse powers which shall be simple in construction, effective in operation, easily and readily applied, and wholly out of the way.

DITCHING PLOW.—William R. Clark, Indianola, Ill.—This invention has for its object to furnish an improved machine for forming open ground ditches easily and quickly, which shall be simple in construction and effective in operation.

WASHING MACHINE.—Moser D. Webber, Woodbury, Vt.—This invention has for its object to furnish an improved washing machine so constructed and arranged as to be easily operated and to wash the clothes quickly, evenly and without injury to the fabric.

SLIDE FOR EXTENSION TABLES.—H. Olds, Syracuse, N. Y.—This invention has for its object to furnish an improved slide for extension tables, simple in construction, easily applied, and effective in operation.

SIDEBOARD OR CLOSET.—J. B. M. Fifield, Philadelphia, Pa.—This invention consists in combining with a sideboard or closet, a table-board, in such manner that the table, to be used, can be brought into the proper position, but when not in use, can be made to all external appearances a part of the sideboard or closet itself.

SNAP HOOK.—Henry S. North, Middletown, Conn.—This invention consists in extending the rear end of the movable jaw to the hook, beyond its axis or joint, for forming an arm for a spring bolt to pass through and lock it, which bolt is arranged to slide in the tail end to the fixed arm or jaw of the hook.

PIN BOOK.—G. L. Turney, London, Eng.—This invention relates to a holder for pins, which is in the form of a book, the pins being inserted in the several leaves constituting the book, which leaves are bound together at one edge, and are provided with suitable shaped cover or lid pieces for inclosing or shutting up the whole series of leaves forming the book.

LUBRICATOR FOR STEAM ENGINES.—Clark W. Doten, East Boston, Mass.—This invention relates to a method of constructing lubricators for the steam chests and cylinders of steam engines, and it consists in operating valves by a tubular feeding spindle and in the general arrangement of its parts.

STEAM ENGINE.—John Fairclough, St. Joseph, Mo.—This invention relates to a new method of admitting steam into a steam engine cylinder, and exhausting it therefrom.

VALVE MOTION.—John R. Fish, Fort Wayne, Ind.—This invention relates to a new and improved arrangement whereby steam valves which are controlled in their motion by a link, are made to operate uniformly under all circumstances during the revolution or stroke of the engine.

WAGON HUB.—Welcome C. Tucker, Richmond Switch, R. I.—This invention relates to an improvement in the construction of wagon hubs, and consists in connecting the hub with the axle by cap flanges and securing the hub on the axle with a cap flanged nut, in such manner that the bearing of the axle shall be entirely closed at both ends, to retain the oil and exclude dust and dirt.

SHIFTING RAIL FOR BUGGY SEATS.—C. Disser, West Union, Ohio.—This invention relates to the securing of the rail to buggy seats, more particularly to and around the back and ends of such seats, whereby, while it can be set on and removed from the seat with ease and readiness, when on, it is perfectly firm and secure.

STOVE.—F. Gilman, Minneapolis, Minn.—This invention consists in constructing the sides and end, and also the top and bottom plates of the stove, in such a manner that a series of vertical air tubes shall surround the stove, and also in the arrangement of the ashpit and grate, in combination with a heating stove.

FOUNTAIN PEN HOLDER.—Peter Gabriel, Seymour, Conn.—These improvements consist in constructing the pen holder in such a manner that if its end holding the pen be dipped into the ink, with the opposite or upper end of the holder in the mouth, the ink can be sucked or drawn up into the body of the holder, which is made hollow therefor, and without danger of the ink coming in contact with or being drawn into the mouth. Also, in a novel construction of the holder at the end at which the pen is inserted, whereby the supply or flow of ink to the pen from within the holder can be entirely stopped, and also regulated and adjusted at pleasure, and according to the quantity which may be necessary for this or that writer who may be using the pen, and to such a degree of nicety as to obviate all possibility of blotting the paper from a too large quantity of ink upon the pen.

GRAIN MEASURE.—N. M. Lurton, Newbern, Ill.—This invention relates to a method of measuring grain as it comes from the thrashing machine, and it consists in providing a box into which the grain is delivered, with a revolving wheel and indicator, at its upper part, and a slide at its lower end with a measure attached.

SELF-REGISTERING THERMOMETER.—Martin Ames, New Ipswich, N. H.—This invention relates to an improvement in a thermometer for registering the extremes of temperature that may occur within any stated period, and consists in connecting coils of metal in the form of ribbon of different capacity, for contraction and expansion, under the influence of different degrees of heat, with a suspended needle or vernier for indicating the temperature above and below zero, upon a circular graduated scale, and connected therewith two other independent hands or pointers, which are moved in opposite directions by the action of the needle, to be kept at the lowest and highest point of divergence from the starting point of the needle, and thus indicate the change of temperature that may take place within a given time.

RAILROAD CAR BRAKE.—Thomas B. Comins, Jr., Lowell, Mass.—This invention consists in attaching the cam directly to the end of the shoe bar and not to the lower end of the shoe, the shoe being done away with and the cam only applied as a brake which, it has been found, operates better than the shoe alone and as good as the shoe and cam combined. The eccentric is weighted so as to swing clear of the wheel, when not applied.

ROTARY PLOW.—Henry Berkstresser, Quaker Bottom, Ohio.—This invention relates to a rotating plow, and consists in placing several plows, with their mold boards, on one side upon the periphery of a large wheel, which is mounted on a truck frame, and connected by gear with driving wheels attached to the truck frame or carriage in such a manner that the wheel with the plows shall revolve and open a furrow by the successive penetration of the plows into the ground.

MACHINE FOR LINING PERCUSSION CAPS.—Andrew J. French, Waterbury, Ct.—This invention consists in the use of a horizontal sliding plate, which is provided with holes which are arranged in rows, and in which holes the caps are placed. A punch is brought down into each hole, lining all the caps in succession, the punch moving on a stationary guide across the said horizontal plate, so as to come over each hole in one row of holes in the plate. When one row has been lined, the plate is moved so that the next row is brought under the punch, which moves along this row, lining each cap in the same. All the movements are automatic, and all the parts are moved at the proper time and in the proper direction, by simply revolving the driving shaft.

LOCK AND ALARM ATTACHMENT FOR MONEY DRAWERS.—J. H. Weaver, Columbus, Ohio.—The object of this invention is to so arrange the lock of a money drawer, that the said drawer can be easily opened by all persons who are acquainted with its mechanism, while, when burglars, or others, not being acquainted with the mode of operating the same, try to open it, it will not only effectually resist all attempts at opening, but an alarm will also be sounded, while such an attempt is being made.

TRAPSETTER.—Israel Miller, Bryan, Ohio.—This invention relates to an improved trapsetter, and consists of a shaft carrying a baiting rod. A common box or cage will serve for a trap, which is placed inverted with one edge on the ground, and the opposite edge resting on a flange on the outer edge of the shaft, the shaft is set on end in a cup so that a very slight touch on the baiting rod is sufficient to upset it when the box trap falls, confining the game without injuring it.

BREECH-LOADING FIRE-ARM.—M. Pidault and G. E. Lagieze, Paris, France.—This invention relates to a new breech-loading fire-arm which although of very simple construction and of great strength, allows rapid firing, only few motions being required for loading and firing.

VALVE.—G. L. Grant, Rockville, Conn.—This invention relates to a valve of novel construction which is arranged altogether without any packing, which can be used as a globe or check valve and which will always keep itself free from dirt.

NOZZLE FOR HOSE PIPES.—Charles Crook, Yonkers, N. Y.—The nature of this invention consists in making a nozzle for hose pipes in such a manner that it can be adjusted so as to throw a large or small stream of water without the necessity of changing nozzles as has heretofore been done.

THRASHING MACHINE.—Benjamin Yeakel, Allentown, Pa.—The object of this invention is to construct a thrashing machine which may be regulated so as to adapt the machine for use on long or short straw and which will therefore be very useful and practicable on all farms.

FRAME FOR MIRRORS, ETC.—O. L. Gardner, New York City.—This invention principally consists in constructing a frame for mirrors, etc., in such a manner that its side pieces can be adjusted either nearer to or farther from each other and there set according to the size of the glass, etc., to be placed therein within certain ranges or limits, whereby frames can be made or built as to be more generally adaptable for the reception of mirrors of varying widths.

WATER WHEEL GOVERNOR.—Charles D. Blakeslie, Grand Rapids, Mich.—This invention which relates to a water wheel governor and consists of a curb of a size to correspond with the water wheel and volume of water to be used having apertures for the inlet of the water upon two cylindrical valves which revolve against each other and are automatically operated by a ball governor.

COCKEYE.—John Haggerty, East Springfield, Pa.—This invention relates to an improvement in cockeyes and consists in a bed of malleable iron in which a spring bolt is set and held in place by a sliding plate. This is sewed between the two thicknesses of leather in the tug, and clamps the head of the whiffletree.

ATTACHMENT FOR BREAST COLLARS.—R. E. Miles, Louisville, Ky.—This invention consists of an attachment for breast collars, and is adapted for double harness. It is intended to keep the collar secure in place when backing, and this object is attained by attaching the round leathers or straps and martingale to the loops of the attachment, and running the former to the rings and thence to the pad.

EAVE-TROUGH HOLDER.—John Marshall, Hartland, Mich.—This invention which relates to an improvement in eave-trough holders, consists in an arrangement of metal straps and ties by which the trough is hindered from rising out of its seat and kept securely in place.

SNAP HOOK.—Enoch Covert, Farmer Village, N. Y.—This invention, which relates to an improved snap hook, consists in having the spring which operates the closing bar, countersunk in the shank of the hook.

CHAIN CLASP.—P. W. Dalton, Jersey City, N. J.—This invention relates to a device for securing and holding hogs in the process of slaughtering.

FOOT TRIP HAMMER.—This invention consists in an arrangement whereby a trip hammer is operated by the foot, with the aid of springs and a rack and pinion, by which the hammer is made to traverse the anvil, and also in the device for reversing the hammer.

VENTILATION OF ROOMS, ETC.—Orren S. Trexler, Naperville, Ill.—This invention relates to a method of ventilating rooms in dwelling houses, manufacturing establishments, and all buildings or apartments where vapor arises and where it is desired to introduce fresh air.

CORN DROPPER.—Charles E. Lipe, Fort Plains, N. Y.—This invention relates to a device for dropping corn, and it consists in a novel construction and arrangement of parts, whereby the desired work may be done very expeditiously and in a perfect manner.

TRAP FOR CATCHING QUEEN BEES.—Volney Leonard, Springfield, Pa.—This invention relates to a trap for catching queen bees during the issuing of a swarm from a hive, and is designed to prevent the swarming of bees, or to place swarming under the complete control of the apiarian.

FLYING ATTACHMENT.—Wm. F. Quimby, Wilmington, Del.—This invention relates to a flying attachment whereby a person will be enabled to fly or propel himself through the air, similarly to birds. The invention consists substantially of two lateral or side wings and one dorsal wing, constructed, arranged, and applied in such a manner as to be capable of being operated by the combined action of the arms and legs.

THILL COUPLING.—Cook C. Lawrence, Homer, Mich.—This invention relates to an improved plan of constructing a coupling for the thills or poles of carriages and wagons, and consists in bolting together two plates on the under side of the pole or thills provided with segments or disks on their ends which match, when closed, to form nearly a complete disk, in the center of which is a hole for receiving the end of a plate in the bottom of the axle clip, the end of the plate is slotted to receive the periphery of the disk, and they are so connected that the thills are held fast while they are readily coupled and uncoupled.

CAR BRAKE.—Thomas B. Comins Jr., Lowell, Mass.—This invention relates to an improved car brake, which is so arranged as to bear with more than usual power upon a point on the periphery of the wheel, while the pressure is still increased by the application of a spring which, although it serves to increase the pressure of the brake, still prevents the same from being dull, and makes the whole elastic, and more durable, and effective than the brakes now in general use.

SKID AND FRICTION ROLLER.—Francis Van Doren, Adrian, Mich.—This invention relates to a device which may be used as a skid for transporting goods from one place to another, and which can be used as a friction roller, for moving goods and for facilitating the loading and unloading of carts, etc.

LIFTING JACK.—Albert Jackson, Clifton Springs, N. Y.—The object of this invention is to obtain a lifting jack for raising the axles of vehicles, which may be constructed at a very small cost, be strong and durable and capable of being operated with the greatest facility.

HORSE HAY FORK.—M. D. Birge, Grand Rapids, Mich.—This invention relates to a new manner of operating a horse hay-fork of that class in which a spirally shaped tine is used. The invention consists in swivelling the shaft of the fork in a frame, which is suspended by a rope from the roof of the barn, or from some other movable or stationary apparatus.

SUSPENSION BEAM SCALE.—C. E. Gage, Fond du Lac, Wis.—This invention relates to improvements in a suspension beam scale for weighing heavy weights and grain in bags and consists in attaching a bag holder to the beam for weighing grain and a device for balancing the scale.

WOOLEN LOOMS.—Chas. Schilling, Auburn N. Y.—This invention relates to a new and improved mechanical device for effecting the shed motion in power looms for weaving woolen goods, and consists in the arrangement of reverse cranks upon the driving shaft to work the piston rods which operate the jacks in the place of the more complicated arrangement of separate cranks and connecting rods.

HOISTING APPARATUS.—William Rung, New York City.—This invention relates to a hoisting apparatus in which by an endless chain motion is imparted to a shaft, on which an endless screw is arranged, which meshes into a worm wheel, that is mounted on another shaft. The latter is connected by differential gearing with two shafts, on which the drums, over which the endless hoisting chain passes, are mounted. One of the drum-shafts can be easily thrown out of gear, for the purpose of lowering the hook pulley, which slides in the lower part of the hoisting chain. The four shafts are hung in a casing which is suspended from a stationary frame, and which is provided with suitable lids for giving access to the shafts for lubricating and cleaning purposes.

SHEEP SHEARS.—George Hilgar, Brownington, Pa.—This invention relates to a new manner of attaching and operating the third or center tine of sheep shears, and consists in arranging all the parts, that the said third tine can be easily secured to sheep shears of ordinary construction, those having but two tines, and so that the said third tine can be easily removed if desired.

RIDING ATTACHMENT FOR PLOW.—Lorenzo Doming, Ottawa, Ill.—This invention relates to a riding attachment which is capable of having any ordinary tillage plow attached to it. The invention consists in a novel manner of connecting the plow to the riding attachment, and in a peculiar construction of the latter whereby it is believed that several advantages are obtained over the ordinary riding attachment in use.

TRACE FASTENER.—E. F. Lacy, Danville, Ill.—This invention consists in a novel combination and arrangement with the frame of such buckle of a clasp and spring to the wedge, whereby all possibility of the wedge becoming separated from the buckle is entirely obviated, and the working forward of the trace strap, when it is slack wholly prevented.

## Answers to Correspondents.

*CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.*

*SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."*

☞ *All reference to back numbers should be by volume and page.*

D. M., of O. asks why elongated shot go endwise when the text books of physics teach that a rotating body will revolve about its shorter axis? Of course the question has reference to rifled projectiles whose rotating movement is due to the spirality of the gun's grooves, so far as the principle quoted affects the question. Elongated shot from a smooth bore do not always go, or rather strike endwise. If fired from a distance so short that the shot pursues a nearly direct line the shot would be expected to strike end on; but if fired at an elevation so it describes a curve, the longer axis of the shot has a natural tendency to pursue the right line and the further this is departed from the more liable the shot is to strike in some other manner. A simple diagram will readily show this. The subject, however, is one involving several principles whose relative bearings on the result are not yet clearly understood.

M. B., of Mich.—We have never yet heard a satisfactory explanation of the cause of the delicious weather which prevails in this latitude at the season known as Indian summer.

E. B., of Kansas.—The only way to keep writing ink thin with which we are acquainted is to protect it from the atmosphere. The air not only evaporates it but oxidizes it and renders it thick. Those inkstands which have a tapering funnel in the mouth will preserve the ink in its normal state much longer than the ordinary kind because less of the surface is exposed.

J. J. T., of N. J.—We believe the author of "Vestiges of Creation" is not publicly known. The book is supposed to have been written by the Chambers, of Edinburg, Scotland. Its theories are not generally accepted by naturalists of any note.

T. S. S., of Wis.—The band saw is simply an endless saw of thin, flexible steel which runs over pulleys or rollers just as ordinary belts of leather. We believe we once illustrated a band saw.

W. M., of Pa., would like some correct rule to estimate the power of a non-condensing or high-pressure engine, as he finds in the text books rules for low-pressure engines only. He asks that the rule be published, and gives the following as an example: High-pressure, horizontal engine, diameter of cylinder, 12 inches; length of stroke, 20 inches; revolutions per minute, 95; pressure in boiler, 90 lbs.; length of steam pipe, 30 feet. Ans; We have often given the rule asked for, but will repeat it. Multiply the area of the piston by the average pressure in the cylinder—not the boiler—and that by the number of feet the piston travels per minute; divide the product by 33,000 and the result is the horse-power. You can ascertain the actual pressure of steam in your cylinder only by the indicator. If you have 90 lbs. during the full stroke the power of your engine is 97·2 horse-power. If you know the effective power in your cylinder multiply it by 1·08 and the product will be the horse power.

L. D. G., of Mass., asks "what is the composition of 'white metal?'" We apprehend that the term is not a specific one. It is used in a general way by artificers, some understanding by it one composition and others another. German silver and other compositions of copper and zinc are called "white metal." A mixture of copper 4 lbs., and tin 8oz.; of copper, 10, and zinc and nickel 5 each; of tin, 100, antimony, 8, copper, 4, and bismuth, 1, and several other compositions each produce a white metal.

G. W. H., of N. Y., and J. B. C., of Mich.—It is doubtful if any simple process is known by which hard castings of the differing qualities of iron can be certainly and unfailingly annealed. In practice we have found that packing the articles in a cast-iron box with powdered lime, or lime and iron borings or forge scales together, and luting the cover with clay, then exposing it to a steady heat (red heat) for several hours was quite effectual. Of course the cooling process must be very gradual.

A. W., of N. Y.—The Armstrong gun if of small size is a breech-loader. The large guns are muzzle-loaders.

C. P. P., of Kansas says: "It frequently occurs that the flues of boilers using the water of the Missouri become perforated in spots from the size of a pea to that of a silver half dollar. This applies more particularly to those in mills on the banks, while the boilers in the boats are not affected in the same manner." We can give no reason for this peculiar action of the water, but have noticed it in our experience. We have known a set of tubes in a heater rendered useless in two years from this cause, while precisely similar ones in other places, where the same water was used, lasted six years. Perhaps some of our practical correspondents can give an adequate reason.

L. T., of Pa., asks "What proportion of a steamboat does the machinery, including the boiler, occupy?" We are left to guess whether the proportion referred to means space or tunnage, whether the boat is a propeller or side wheel, etc. Of course a categorical reply is out of the question. We publish this inquiry as a specimen of many others received weekly, which are thrown aside without reply, simply because the writer has not given us the data we should have. Be explicit if you expect a reply.

M. W., Jr., of La., hopes we may continue our articles on boilers, and especially give some information on setting boilers. He is about putting up a nest of double-flue boilers and desires information. In No. 9, of Aug. 31st, current volume, first page, you will find the knowledge required. The only alteration advantageous to him in burning bituminous coal, is to enlarge the air pipe behind the bridge wall to about eight inches.

C. A. M., of N. Y.—Suppose a piece of iron a foot, more or less, square, with a round hole of one inch in the center be heated red, will the hole become larger or smaller by the expansion? We think, larger. 2. Suppose the external dimensions of the piece to remain the same but the size of the hole to be greatly increased. Would the same answer be applicable to this second condition? We see no reason why it should not.

J. F. R., of Vt.—The best paint for boilers we know of is asphaltum dissolved in spirits of turpentine over a gentle fire. Pulverize the asphaltum and dissolve as much as will be taken up by the turpentine. If pure it will last.

R. C., of N. Y., asks what favorable inducements are held out to practical men—mechanics—to settle in Virginia or other Southern States. We know of no peculiar inducements different from those afforded by climate, soil, natural productions, and locality. In these respects some of the other Southern States are perhaps superior.

J. G., of Me.—The making fac-similies of the impressions of coins and medals for exhibition is not prohibited by law. But an attempt to imitate all the qualities of a coin so that the copy might be used for money, would come within the law against counterfeiting. The most perfect way of copying the impressions of medals and coins is by the use of the galvanic battery.

B. L., of Ill.—We know of no better way of brightening the brass of an engine than the use of friction with rotten stone and oil, drying off with whiting or lamp black. Vinegar or a weak solution of oxalic acid followed by whiting is often used, but not with so great economy.

W. J. C., of Ind.—We have no faith whatever in the virtues claimed for the divining rod.

J. M., of Kansas, is washing woolen goods with a very hard water, "so hard that it renders the timbers of a dam in the stream as white as though they were whitewashed." He also says: "The bottom of the creek is solid lime stone; small coal veins crop out in the water and a green scum forms on the top during dry, hot weather." He has used soda ash to soften the water, and potash soap in washing. But the results are all unsatisfactory; the goods refuse to become clean. The impurity of the water is probably mainly, sulphate of lime, which would be precipitated on heating the water to its boiling point. All lime salts may be precipitated by adding to the water a solution of oxalic acid or oxalate of potash. The water, however, appears to be somewhat extraordinary and we recommend that a chemical examination be made of it.

J. A., of W. I.—Notwithstanding all that has been said in praise of amorphous phosphorus it appears not to have come into use. The increased trouble and expense of using it seem with the manufacturers to outweigh the considerations of safety to the workmen. You need no special receipt to enable you to use it in the manufacture of matches. Use it with the same materials you employ with ordinary phosphorus.

J. B., of Md.—There is no simple test of lubricating oil so good as the actual trial by an experienced observer. The total virtue of oil is made up of a great variety of independent properties, most of which require special tests. A perfect lubricating oil would have just sufficient viscidity to keep the axle and bearing from coming in contact, would be unaffected in consistency by changes in temperature, would be involatile, and would not change from chemical causes.

J. H., of N. J.—We suggest that you send an account of your supposed discovery of errors in astronomical data to Prof. Loomis, of Yale College, who will probably give you useful advice. Your polite communication in its present form is not available for this paper.

J. R., of Iowa.—Consult Wise on Ballooning for the information you seek.

W. H. H., of Ill.—A process for procuring soluble alumina at a cheap rate is certainly desirable. There would be no difficulty in finding sale for the article. The prejudices of those who use the salts of alumina would not stand long against their pecuniary interests. But remember that the soluble alumina must be afforded at a cheap rate.

J. T., of N. Y.—The magneto-electric light has been used for making photographs, but as yet only in an experimental way. There are however, reasons for believing that the light will be so economically produced that it will come into extensive use.

Engineer.—You will find reliable information on the value of hydro-carbon fuel in Ronalds & Richardson's Technology, Gmelin's and Miller's Chemistry and Balfour Stewart's Treatise on Heat. In the last two, are descriptions of the apparatus and processes used in the determinations.

I. S., of Kansas.—The mineral you send is plaster of Paris; the crystallized variety is called selenite. It is used for manure and for stucco work. We know of no special treatise on the mineral.

J. P. O. makes us wade through three written pages as a prelude to a simple inquiry about the inventive rights of employés which is answered in our little book of instructions but which we cannot send as he gives no address. If long-winded correspondents would place their inquiries first and the preface last, it would save us much time.

## Business and Personal.

*The charge for insertion under this head is 50 cents a line.*

Isaac J. Bogert, Fayette, Iowa, is the inventor of an improved tool. They are wanted in every saw mill in the country. Small capital only required to make them. Also, a new cheese press. Every farmer needs it. Thousands of these improvements can be sold, and he thinks there is a fortune in each. He wants to make arrangements with parties who are willing to put in a small amount of money to make and introduce these inventions. Address, by mail, as above.

All Patentees of Stone-drilling Machines send their address, with illustrated circular, to Geo. Phillips & Co., box 220, Black Hawk, Gilping county, Colorado Territory.

M. W. Manville, London, Canada, desires to obtain Paper-Bag Machines.

Parties wishing to purchase a good steam engine please address W. Burlingame, Exeter, N. H.

Persons wishing to buy small Patented articles of utility will please address, with stamp, Lechner & Stump, Sheridan, Pa. Samples 50c.

Manufacturers of Sulphuric Acid and Sulphur from Pyrites, etc., please address Abraham Reeder, Newburgh, Cumberland county, Pa.

Cotton-seed Hulling Machine Wanted. Address W. M., box 4658, New York city.

New Orleans Agency to sell Patents, etc. See Advertisement.

For Sale—Foulds' Automatic Hinge for Window Shutters.—This is the most convenient window-shutter hinge ever invented. There being no danger of breaking hinges and dropping shutters, as is very often the case now. The entire right for sale low, or will sell the Eastern and New England States. Address Cherry & Eckman, Cleveland, Ohio.

New invention. A potato digger which puts the potatoes in a bag and the small ones apart in a box. The original was made by a blacksmith at very little cost, which will be saved by the work on three acres of potatoes. Patent rights to sell: C. G. Grabo. Address care of Schober Bro., Detroit, Mich.

## NEW PUBLICATIONS.

COLORADO IN THE UNITED STATES OF AMERICA. Schedule of Ores Contributed to the Paris Exposition. By J. P. Whitney, of Boston, Mass. London, E. C.: Cassell, Pelter, & Galpin.

The first gold medal of the Exposition was awarded to the Colorado ores. To Mr. Whitney the mineralogists of the world are indebted for a description of these specimens and for a chapter of useful information about Colorado and its resources. The handsome pamphlet containing this information is illustrated by two excellent maps, one of the United States and Territories, and one of Colorado, the latter one of the best that we have yet seen.

THE IRON MANUFACTURE OF GREAT BRITAIN, Theoretically and Practically Considered by W. Truran, C.E. Second edition, revised by J. A. Phillips and W. H. Dorman, C.E. New York: D. Appleton & Co.

This work is without doubt one of the best practical treatises on this subject in this or any other language. It is written by an iron metallurgist of great experience and practical skill of a high order. Of course, those familiar with the manufacture of iron are aware that Mr. Truran's views with respect to the use of hot blast are not regarded by iron managers as orthodox; in fact, according to the interpretation his critics put upon his views in this particular, the experience with furnaces during the past six or seven years does not appear to corroborate his conclusions. We are free to say, however, that in our opinion Mr. Truran, on this head, has been greatly misrepsented, and we have heard more than one furnace manager assail his views without in reality knowing what they were. Dr. Percy, the author of a late work on the metallurgy of steel and iron, assailed him in a very acrimonious and undignified manner. Dr. Percy's dissent from Mr. Truran would have carried more weight if it had been otherwise expressed.

THE MORTALITY OF NATIONS: An Address Delivered before the American Equal Rights Association, in New York, May 9, 1867, by Parker Pillsbury.

Whatever opinion may be entertained of Mr. Pillsbury as a reformer, it cannot be denied that he is a close and logical reasoner. This address bears the marks of scholarship and philosophical thought. It advocates the legal equality of the sexes, including the right of suffrage, a measure which is favored by some of the foremost thinkers of the age, by such men as John Stuart Mill and others of the progressives.

THE MECHANICIAN AND CONSTRUCTOR, Part VIII. By Cameron Knight. London: E. & F. Spon.

We have before directed attention to this serial as a work of the greatest practical value to the machinist, engineer, and general iron worker. Its illustrations are as valuable as the best mechanical drawings, and they and the text descend to the minutest details. It can be obtained by subscription of John Wiley & Son, 535 Broadway, New York city.

THE FOULING AND CORROSION OF IRON SHIPS: Their Causes and means of Prevention, with the mode of application to the existing Iron-Clads. By Charles F. T. Young, C.E., etc., author of "The Economy of Steam Power on Common Roads," "The Best Mode of Protecting London from the Ravages of Fire," "Fires, Fire Engines, and Fire Brigades," etc. With illustrations. London: The London Drawing Association, 7 Duke st., Adelphi, W. C. pp. 212.

In addition to the subjects indicated in the title page, this book discusses the relative merits of wood and iron for ship building, and concludes unreservedly in favor of the latter. The book is throughout made entertaining by appropriate historical illustrations. The arguments are distinctly and earnestly set forth, and the author everywhere shows himself to be master of his subject. The publication is timely, and we have no doubt that it will have a profound and lasting influence on the art of ship building.

A TREATISE ON ASTRONOMY, Spherical and Physical, with Astronomical Problems, and Solar, Lunar, and other Astronomical Tables. For the use of Colleges and Scientific Schools. By Wm. A. Norton, M. A., Professor of Civil Engineering in Yale College. Fourth edition, revised, remodeled, and enlarged. New York: John Wiley & Son, 535 Broadway. pp. 557.

Norton's Astronomy has for a long time been a favorite text book, and in its greatly improved form has no rival. The work comprises an account of the most recent discoveries and of the most plausible theories. We shall make use of the work as the most reliable authority on the subjects of which it treats. The publishers are deserving of praise for their part of the labor—the elegant illustrations and the handsome typography.

A TREATISE ON THE SCREW PROPELLER, etc., by John Bourne, C. E. Part XXIII. London: Longmans, Green, Reader, & Dyer.

This treatise, when completed, will be undoubtedly an authority among marine engineers. The plates are superb and give illustrations of some of the finest engines ever constructed, while the accuracy of the text is assured by the name of the eminent author. Van Nostrand receives subscriptions for this and other foreign, scientific, and mechanical publications.

## EXTENSION NOTICES.

Erastus T. Bussell, of Indianapolis, Ind., having petitioned for the extension of a patent granted to him the 29th day of November, 1853, for an improvement in combined india rubber and steel springs, for seven years from the expiration of said patent, which takes place on the 29th day of November, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 11th day of November next.

James Watt, of Charlestown, Mass., having petitioned for the extension of a patent granted to him the 6th day of December, 1853, for an improvement in valve arrangement for steam hammers, for seven years from the expiration of said patent, which takes place on the 6th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of November next.

Melvin Jincks, of Dansville, N. Y., having petitioned for the extension of a patent granted to him the 13th day of December, 1853, for an improvement in turnkeys, for seven years from the expiration of said patent, which takes place on the 13th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 25th day of November next.

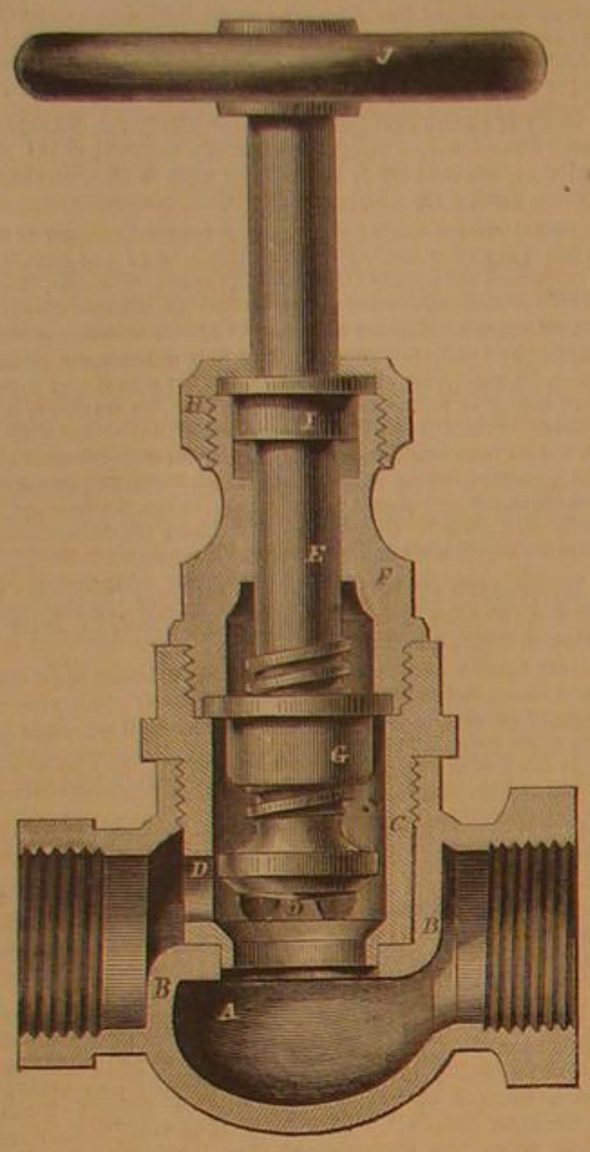
William Wisdom, of Brooklyn, N. Y., having petitioned for the extension of a patent granted to him the 20th day of December, 1853, for an improvement in cleansing hair and feathers from insects, etc., for seven years from the expiration of said patent, which takes place on the 20th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of December next.

Lucian B. Flanders, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 6th day of December, 1853, for an improvement in replacing cars upon railroad tracks, for seven years from the expiration of said patent, which takes place on the 6th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of November next.

Joseph Nock, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 3d day of December, 1853, for an improvement in hinge for inkstand covers, for seven years from the expiration of said patent, which takes place on the 13th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 25th day of November next.

### STIERLE'S IMPROVED GLOBE VALVE.

It is difficult with the ordinary globe valve to re-seat the valve when worn, as any revolution of the hand wheel—and consequently the valve—forces the latter to its seat. If the valve is to be ground to place, the globe or case must be removed, a work sometimes of difficulty, or, at least, of inconvenience. The valve shown in the engraving has an independent seat and an adjustable nut, by which the grinding of the valve to its seat may be effected without disconnecting the globe coupling from the ends of the pipe.




In the engraving, A represents the connecting shell or globe, threaded at each end to receive the pipes, and having a diaphragm or partition, B, as usual. Seated in this shell by a thread, is the valve seat, C, which has a number of openings around its lower end, as seen at D. The valve stem, E, threaded as usual, passes through the hub, F, which screws into the valve seat, C, at its top. The nut, G, rests by its collar on the shoulder of the valve seat, C, and is prevented from turning with the valve stem by projections on the bottom of the hub, F, fitting into corresponding slots in the flange of the nut, G. The valve stem is packed in the usual manner by a cap nut, H, and a gland or follower, I. The valve is turned, as usual, by a hand wheel, J.

From the foregoing description of the parts the operation and the advantages of this valve can be readily understood. When in use its action is precisely like that of the ordinary globe valve, but its main advantages are more perceptible when the valve is to be re-seated or ground. As will be seen, the valve seat, with all its connections, may be removed, and by unscrewing the hub, F, sufficiently to disengage the snugs on its lower end from the slots in the flange of the nuts, the valve stem may be revolved to seat the valve, the globe or shell remaining as a connection between the pipes. A new valve seat, or new valve can be put in place of an old one without sacrificing the other portions. This style of valve is peculiarly applicable to those of cast iron with brass mountings.

It was patented through the Scientific American Patent Agency, Oct. 2, 1866. For further particulars and for rights to manufacture, address Charles Stierle, 520 Vine street, near 15th, Cincinnati, Ohio.

### A New Process for Preparing Anatomical Specimens.

Dr. Brunetti, of Padua, who received a gold medal at the Paris Exhibition, has generously communicated to the international Medical Congress the following particulars of his valuable invention. The process comprises four several operations, viz: 1, the washing of the piece to be preserved; 2, the *dégraissage*, or eating away of the fatty matter; 3, the tanning, and 4, the desiccation.

1. To wash the piece M. Brunetti passes a current of pure water through the blood vessels and the various excretory canals, and then he washes the water out by a current of alcohol.

2. For destroying the fat he follows the alcohol with ether, which he pushes, of course, through the same blood vessels and excretory ducts; this part of the operation lasts some hours. The ether penetrates the interstices of the flesh, and dissolves all the fat. The piece, at this point of the process, may be preserved any length of time desired, plunged in ether, before proceeding to the final operations.

3. For the tanning process M. Brunetti dissolves tannin in boiling distilled water, and then, after washing the ether out of the vessels with distilled water, he throws this solution in.

4. For the drying process Dr. Brunetti places the pieces in a vase with a double bottom filled with boiling water, and he fills the places of the preceeding liquids with warm, dry air. By the aid of a reservoir, in which air is compressed to about two atmospheres, and which communicates by a stop-cock and a system of tubes, first to a vase containing chloride of calcium, then with another heated, then with the vessels and excretory ducts of the anatomical piece in course of preparation, he establishes a gaseous current which expels in a very little time all the fluids. The operation is now finished.

The piece remains supple, light, preserves its size, its normal relations, its solid elements, for there are no longer any fluids in it. It may be handled without fear, and will last indefinitely. The discovery is a magnificent one, and the sooner medical schools are provided with full cabinets of natural and pathological pieces the better.

### Can a Name be Signed Twice Alike!

A very interesting will case is now going on in Massachusetts. Miss Robinson claims, under a bequest, the property of her aunt, Miss Howland, valued at several hundred thousand dollars, and produces a will, and a subsequent declaration confirming and explaining the will. This declaration bears signatures exactly similar to the will, and the defence claim that they were traced from the undoubted signature to the will, and that they are too exactly like that signature to be genuine. This is the sworn opinion of several experts. Some of them testify to having discovered signs that the doubtful signatures were first written with a lead pencil and afterwards with pen and ink. Professor Agassiz swears that he is unable to detect such signs with a microscope; other experts testify that such close resemblances between signatures of the same person written at different times are not impossible or novel, and that it is precisely in such a cramped handwriting as Miss Howland's that they are to be looked for. Professor Pierce was called in as authority upon the doctrine of chances. He said:

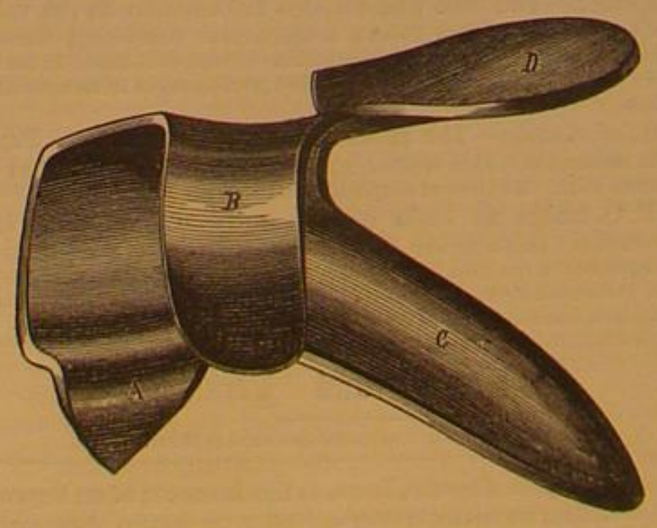
"In the case of Sylvia Ann Howland, this phenomenon—the exact coincidence of signatures—could only occur once in the number of times expressed by the thirtieth power of five or more—exactly, it is once in two thousand six hundred and sixty-six millions of millions of millions of times or 2,666,000,000,000,000,000,000,000. This number far transcends human experience. So vast an improbability is practically an impossibility. Such evanescent shadows of probability cannot belong to the actual life. They are unimaginably less than the least things which the law cares not for. The coincidence which is presented to us in this case cannot therefore be regarded as having occurred in the ordinary course of signing a name. Under a solemn sense of the responsibility involved in the assertion, I declare that the coincidence which has here occurred must have had its origin in an intention to produce it."

This view is strengthened by the fact that the signatures to the will and to the declaration were not written on ruled lines, which makes an exact coincidence still more improbable.

A minor, but important question related to the comparative excellence of the Globe and Voigtlander lenses. The principal expert on one side used one, the principal expert on the other side used the other.

### ROBINSON'S CORN HUSKING SHIELD.

Although envious machines have attempted to annihilate the joyous scenes of the corn husking frolics, yet most of the maize grown in the country is still, probably, husked by hand.



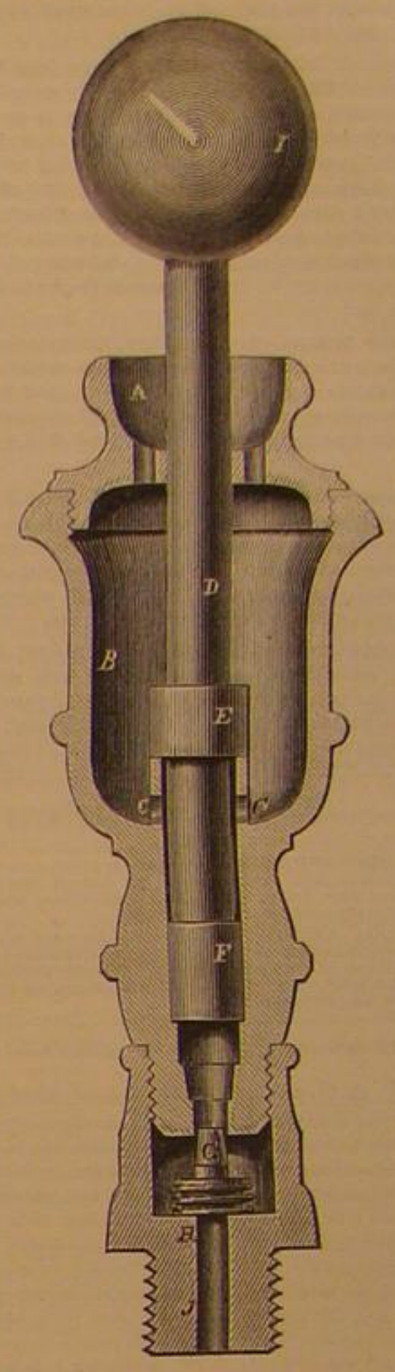

It is hard work and trying to the toughest hands. The engraving represents a shield to be worn on the thumb for facilitating the operation of husking. It is made of a piece of sheet brass or steel, cut to shape and bent to form. The point, A, is intended to split the husk; the strap, B, envelopes the thumb just back of the first joint; C is a curved brace fitting the base of the thumb on the inside of the hand, and D, is the portion covering the opposite upper portion of the thumb. Its manner of use can be readily understood from this description. It was patented April 16, 1867. For further particulars address A. C. Robinson & Co., Louisiana, Pike county, Mo.

### The Way to Health.

The only true way to health is that which common sense dictates to man. Live within the bounds of reason. Eat moderately, drink temperately, sleep regularly, avoid excess in anything, and preserve a conscience "void of offence." Some men eat themselves to death, some drink themselves to death, some wear out their lives by indolence, and some by over exertion, others are killed by the doctors, while not a few sink into the grave under the effects of vicious and beastly practices. All the medicines in creation are not worth a farthing to a man who is constantly and habitually violating the laws of his own nature. All the medical science in the world cannot save him from a premature grave. With a suicidal course of conduct, he is planting the seeds of decay in his own constitution, and accelerating the destruction of his own life.

### JARECKI'S LUBRICATING CUP.

The engraving presents a sectional view of one of the best and most effective cups for introducing oil to the steam chest or cylinder of the engine we have yet seen. It is perfectly simple in construction and exact in operation. It is adapted either to oil or tallow, and is constructed to prevent all back pressure from the engine. The cup, A, has a perforated bottom through the holes of which the oil or tallow reaches the reservoir, B. Rising in the center of this reservoir is a hollow cylinder, with perforations seen at C.




The stem, D, passes through this cylinder having a stop-collar, E, on it and a piston, F. This piston fits, air-tight, a bore through the stem of the reservoir, B, which at its lower end receives a valve or plug, G, having a spiral spring which bears at one end on the shoulder of the stem, H, and at the other end on the shoulder or flange of the valve plug, G.

The handle, I, is of wood and by raising it the lubricating material which has percolated into the reservoir, B, is allowed to pass down through the passage in which the piston, F, works, which is raised so that its lower edge is above the apertures, C. The act of raising the knob, I, and piston, F, creates a vacuum in the passage and the valve, G, closes the aperture between the steam chest and oiler, so that no steam can pass into the latter from the former. By pressing the valve stem down, the oil is forced into the steam chest in the same manner as the action of the air pump, the head of the valve, G, which rests on the projection, H, having cross scores on its under side for the passage of the oil or lubricant. The end stem, J, screws into the steam chest.

The valve is made of hardened steel, and the lower end of the stem is also faced with hardened steel, which prevents wear. This lubricator was patented through the Scientific American Patent Agency, Aug. 6, 1867.

For further information address H. Jarecki & Co., 89 East Ninth street, Erie, Pa., who are the sole manufacturers.

### PRODUCING A VACUUM IN GUNS BEFORE FIRING.

A correspondent, Owen Redmond, of Rochester, N. Y., says that he constructed a smooth bore musket in which he produced a partial vacuum the amount of which was indicated by an index attached to the barrel for that purpose. It varied from one to two pounds per square inch and required, to produce it, at least half a minute, a sufficient objection to its practicability in action. The result was highly satisfactory in regard to the increased power of penetration. Mr. Redmond thinks it might be applied to the firing of heavy guns, he having a plan by which fifty can be exhausted of air at once.

D. G. Smith, of Carbondale, Pa., says he produced vacuums in guns six or seven years ago, by pasting a piece of paper over the muzzle and exhausting the air from the barrel by an air pump through a small cock near the muzzle. He also speaks of the increased penetration of the missile and the lessening of the recoil.

### Advantages of Advertising.

The following paragraphs of letters ordering a continuance of advertisements in the Scientific American, were received one day last week:

J. H. Bodine & Co., Mount Morris, N. Y., say, "We have found by experience that every dollar spent in advertising in the Scientific American is worth more to us than $10 spent in advertising in any other journal in the United States."

C. J. Fay, Camden, N. J., says, "I intend to keep my advertisement going in this wide-world paper. I am quite sure that 70 per cent of inquiry letters to me say: 'I see your advertisement in the Scientific American,' and I presume 10 to 20 per cent more, see the same but do not mention it. Fair wind and plenty of it for the Scientific American."

# 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.

☞ "The American News Company," Agents, 121 Nassau street, New York
☞ "The New York News Company," 8 Spruce street.
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## ENGINES AND BOILERS---HYDROGEN IN BOILERS, BURNING BOILERS, SETTING BOILERS.

A correspondent inquires "what is the advantage of a high pressure over a low pressure engine or *vice versa*? One person tells me that the reason why the low pressure engines are not generally used in manufactories is that they are so bulky. If so, why use them on steamers? They do not usually have spare room there. Another says they use them on steamers because they give more power from the same coal; but they are of slow movement, then why not use them on shore, and if a quicker movement is required speed up the machinery by belts etc.?"

In England the low pressure or condensing engine has, until lately, been the favorite. Latterly, however, the high pressure is being used very extensively. We always doubted if there was anything gained by using the low pressure condensing engine except under certain conditions. The extra first cost, frequent repairs, and greater care and skill in working it neutralizes to a great extent the advantages obtained from condensation. Another objection to their use on land is that it is frequently difficult to get a supply of water for generating steam, to say nothing of the twenty-nine additional volumes for condensation. The condensing engine is not necessarily slow in movement. It may move as fast as the non-condensing engine; in fact from 350 to 800 feet per minute for the piston is no unusual speed, the latter of which may be considered pretty good speed for a non-condensing engine. One very good reason why condensing engines are used for marine purposes is that the steam is gotten rid of noiselessly. If one has traveled on Western rivers, where non condensing engines are used, and then at sea, where condensing engines are the rule, he would appreciate this fact.

Another correspondent, J. G., believes that a boiler will not explode without a sufficient cause, and that with sufficient water and a steady fire explosion is impossible. His theory of explosions—acknowledged by himself as not original—is that hydrogen, one of the gases which compose water, is the cause of explosions. He says: "May not a boiler be heated when the water is low to a temperature sufficient to decompose the water, or a portion of it, the oxygen combining with the iron and the hydrogen left free, which fluid, if ignited, would, in my opinion, produce an explosion violent enough to shatter the strongest boiler?"

This gas theory comes to us about once a month, on an average. We have replied to it repeatedly. The decomposition of the water supposed by our correspondent is a fact well established, but the hydrogen must be ignited to explode, and it is doubtful if our correspondent can tell us how hydrogen can be made to explode without a sufficiency of oxygen to make it inflammable. If the oxygen of the water has combined with the iron it certainly is not in combination with the hydrogen, and no oxygen from the atmosphere can enter the air tight boiler. The hydrogen notion is an exploded idea.

"B. O. B." of Canada says that by burning coke and the crude tar which accumulates on the bottom of oil stills he can run his five horse power engine with half the expense of wood fuel; but he is told that this fuel will rapidly burn out and destroy his boiler.

The information of our correspondent is correct. His boiler will not last so long using coke or coal oil as using wood. One reason is that the heat is more intense, and if not distributed, will act like the concentrated heat of a forge. But the principal reason why these fuels will destroy the boiler is that they contain sulphur which rapidly disintegrates the material of the best boiler iron.

An interesting communication from N. A. V., of Mass., which is intended merely as an inquiry, but which gives some facts that may be of value to others, says: "There are some points in setting a boiler which are not referred to in the interesting and valuable article on that subject in your issue dated Aug. 31st, which I think deserve attention; viz. the proper distance between the boiler and grate; is it proportionate to the area of the grate surface, or is a certain fixed distance always best? I had several evaporating pans, about thirteen inches above the grates, and it became necessary to raise the level of one pan; to save the time the grates were not disturbed, but the fire space was made five inches higher and after the change a tun of coal did one-third more work than before. Since then I have altered other furnaces and they have all operated in the same way. Does the same principle hold good in a steam boiler, and what is the best hight? Many furnaces are improperly bound together. A boiler should have a pair of strong rods, say of three-quarter round iron at the front end, one pair through the bridge wall, and another at the back end, also one pair lengthwise through each side wall. The binders should be of bar iron, one and a half by three quarters inches, turned up six inches at the end, for the rod to pass through, and put on edgewise. A furnace so secured will stand twice as long as one without proper binders and there will be no annoyance from the breakage inseparable from cast iron binders."

The proper distance from the grate to the boiler is an important point. It was inadvertently omitted in the article to which reference is made. Where space will allow we think about two feet from the bottom of the boiler to the grate is the right distance when using anthracite coal. For bituminous coal thirty inches is better. We think, from our experience with evaporating pans, you would find a better result by dropping your grate still lower. Such binders as you suggest are, we believe, generally used. The proper binding of the masonry of a furnace is a very important matter, and the suggestions of our correspondent appear to be timely and valuable. We are quite certain that money, trouble, and time could be saved by proper attention to the setting of boilers. No subject is more important to mechanics and manufacturers, and we shall soon present another illustration of this matter.

## THE COAL PRODUCTION OF ENGLAND.

Our readers will remember that it is not a very long time, since the predictions of Sir William Armstrong relative to the probable exhaustion of the coal supply of England and the discussion of this subject in the House of Commons by Mr. Gladstone and Mr. Mill, caused considerable consternation in Great Britain.

Speculations of all sorts were indulged in by the press, the geologists propounded all sorts of theories and put forward all sorts of estimates as to the total quantity of coal actually deposited in the British Islands.

The political economists portrayed the most dreary future for England, and indulged in minute descriptions of the effects of the gradual falling off in coal supply—the gradual decrease of manufacture, and consequent impossibility of maintaining the present population, which must gradually decline by emigration or otherwise until a balance was reached between the mouths to be fed and the means of supplying them. Without adopting any of the estimates of the geologists as to the total quantity of coal in the British Islands, which, indeed, vary so much as to cause serious doubts to be entertained with regard to the accuracy of their predictions—it will be interesting to note that many eminent authorities estimate that beyond the depth of 4,000 feet, assuming the rate of increase to be about 15 per cent. per annum, the coal will be exhausted in about one hundred years.

All authorities seem to agree that 4,000 feet is maximum depth from which coal can be raised, simply on account of the high temperature, and that even at this depth and with the best ventilation, the colliery can only be worked during the cool months of winter.

To show the difference of the opinions that exist as to the total supply, the following opinion expressed by the *Quarterly Journal of Sciences*, three years ago, is given: "We are inclined to place the possible maximum of production at 100,000,000 tuns a year; and yet it has been shown that even with this enormous 'out put,' there is coal enough to last eight centuries."

The following table of the coal raised to the surface in England for the last twelve years will show that "the possible maximum of production" of this high authority was reached and surpassed in only two years from the date of its utterance. And also that since the great discussion in Parliament on this subject, the ratio of increase has been some 14 per cent.:

COAL RAISED IN ENGLAND FOR TWELVE YEARS.

| *Years.* | *Tuns.* | *Years.* | *Tuns.* | *Years.* | *Tuns.* |
|---|---|---|---|---|---|
| 1855 | 64,453,079 | 1859 | 71,979,765 | 1863 | 83,292,515 |
| 1856 | 66,645,450 | 1860 | 84,042,698 | 1864 | 92,787,873 |
| 1857 | 65,394,707 | 1861 | 83,635,214 | 1865 | 98,150,587 |
| 1858 | 65,068,649 | 1862 | 81,638,338 | 1866 | 101,630,543 |

COAL EXPORTED DURING THE SAME PERIOD.

| | | | |
|---|---|---|---|
| 1855 | 4,976,902 | 1861 | 7,855,115 |
| 1856 | 5,879,779 | 1862 | 8,301,852 |
| 1857 | 6,737,718 | 1863 | 8,275,212 |
| 1858 | 6,529,483 | 1864 | 8,809,908 |
| 1859 | 7,006,949 | 1865 | 9,189,021 |
| 1860 | 7,321,832 | 1866 | 9,916,344 |

Consequently, the coal used in England during this time, was

| | | | |
|---|---|---|---|
| 1855 | 59,476,177 | 1861 | 75,780,079 |
| 1856 | 60,765,671 | 1862 | 73,336,486 |
| 1857 | 58,656,989 | 1863 | 80,017,303 |
| 1858 | 58,479,166 | 1864 | 83,977,965 |
| 1859 | 64,972,816 | 1865 | 88,961,566 |
| 1860 | 76,720,866 | 1866 | 91,714,299 |

The home consumption has thus increased during the last twelve years, 54 per cent., and hence if the ratio of increase goes on at this rate, the eight centuries of 80,000,000,000 tuns supply existing in 1864, will be reduced in one hundred years by about forty-five billions, and in another one hundred years the eighty billions will be exhausted with no further increase in the ratio of consumption; but if the same ratio obtains, then the succeeding fifty years after the first one hundred will alone take out over one hundred billions.

But we think the opinion that the present ratio of increase cannot continue for such a period of time as even fifty years, is fully warranted, from the fact of the immense labor required to mine such vast quantities of coal.

## THE EAST RIVER BRIDGE.

Engineer Roebling's report seeking to establish the practicability of the bridge project, prepared for the edification of the members of the New York Bridge company, has been made public. The leading points of his plan of construction and the dimensions of the proposed bridge, have already appeared in our columns. From the City Hall Park on this side, to the Brooklyn terminus on Fulton and Sands streets, the total length will be 5,862 feet. Of this whole length 3,480 feet will be suspended in three openings, the central span being 1,600 feet from center to center of the suspension towers. The cost of this structure is very exactly estimated by Mr. Roebling at $6,675,357. On the assumption that on the completion of the bridge as many people will avail themselves of this means of passage, as now patronize the five Brooklyn ferries, a fine investment, yielding extraordinary returns is promised to the members of the N. Y. B. company. To sink iron tubes below or upon the bed of the river, he denounces at best, as a temporary shift, and permanent tunnels of masonry only to be built when money is worth 2½ per cent, and the population shall have increased ten fold. In this we beg leave to differ from the distinguished exgineer, as our opinion, founded on some attention given to this and similar projects, is that it is very much cheaper, more feasible, and profitable to use the bed of the river as a roadway than to suspend such a structure as that proposed by Mr. Roebling one hundred and sixty feet above the water. It might be a curiosity as a work of art, and monument of engineering skill, but it might also be a monument of the folly of its builders.

We have before had occasion to remark that for an expenditure of less than the sum of money which it is proposed to spend on this single aerial bridge, the people of Brooklyn might lay down several spacious and enduring tunnels. Indeed all of the principal business streets of Brooklyn and Williamsburgh could be directly connected with New York on the subterranean plan, and sooner or later these tunnels will be constructed.

It may be well for all who propose to invest this immense sum of seven millions in a single bridge to consider what would be the probable effect upon their investment, of the laying down of these underground roadways. With such competition the bridge would have to be maintained at a dead loss, instead of a profit; so it strikes us.

## FAIR OF THE AMERICAN INSTITUTE.

According to announcement, the Thirty-Seventh Annual Exhibition of the American Institute of this city, was opened on Thursday, the 12th, inst., in the commodious armory of the Twenty-second Regiment, on Fourteenth street near Sixth Avenue, the building being fitted up and temporarily enlarged for the occasion. The opening of the exhibition on the day appointed was as usual premature, a large part of the space allotted to exhibitors, not being occupied, while many of the articles in position were not ready for public inspection. Although as yet very incomplete, the Fair promises during its six weeks continuance, to present a full and fine display of the products of American industry.

The opening address, on Thursday evening, was delivered by Horace Greeley, the president of the Institute. Gen. Halpine was advertised to read a poem on the occasion, but was confined to his residence by sickness. Mr. Greeley, in welcoming his audience to this festival of labor, asserted that the American Institute was about to commence the erection of a palace of Industry, which shall give a place to perpetual as well as to annual exhibitions. Within this building on the 4th of July, 1876, is to be opened the most magnificent Exposition that the world has ever yet seen, and hither the world is invited to come and see what America has done and can do, and to place in competition with it all that has been or can be done by the rival skill of the Old World.

### The Recent Boiler Explosion.

On Tuesday, Sept. 10th, a boiler in Twenty-eighth street, this city, exploded and shot into the air, descending on the roof of a dwelling house at some distance, and passing through the roof and three floors to the basement or cellar. Its explosion and consequent fall caused the death of several persons. It was an upright boiler of somewhat peculiar construction, which has been illustrated and described in this paper. The real cause of the explosion cannot, as yet, be more than surmised, as up to the time of writing no investigation, either individual or official, has been made. One is ordered, however, and if close scrutiny and the assistance of practical men can determine the facts we shall have them to present to our readers in our next issue. In the meantime we forbear the expression of any opinion, which must necessarily, under the circumstances, be of but little worth.

THE CUBAN CABLE.—The shore line of the cable, after various mishaps and discouraging delays caused by unpropitious weather, has at last been successfully laid. Congratulatory telegrams were transmitted through the wires on the 10th inst., by the Captain General of Cuba, to the Council of Ministers at Madrid, on the completion of this last link in the chain of direct telegraphic connection between the Spanish possessions and the Mother country.

## EDITORIAL CORRESPONDENCE.

*The Tyrolean People—Munich—Its Fine Arts and Monuments—A Curious Old Custom—Nuremburg—Its Antiquity and Inventions.*

STRASBURG, Aug. 23, 1867.

During my two months of continental travel, I have met with no people that interested me so much as the inhabitants of the Tyrol.

In my childhood I was accustomed to hear songs of the "Green Hills of Tyrol." I was therefore prepared to view with delight the beautiful scenery of their mountain homes, and the rustic manner of their lives. As yet few railways have penetrated the valleys of the Tyrol, and travelers have not demoralized or modernized their primeval habits of simplicity. Most of the journeying through this region has been done by post carriage, which always carries with it a deal of romance and pleasure, that quickly passes away the moment the locomotive goes whistling through the land. A railway was opened from Innsbruch to Botgen, on the 15th of this month, through the valleys of Mount Brenner; so that now these comparatively solitary mountain passes are broken through, and the traveller has only to take a seat in the rail car at Munich and peek through the windows to see the beauties of the Tyrol and so on down to Italy—remembering as he rushes through, that along these defiles the barbarian Kings swept down from the North and overthrew the Roman Empire. The climate of the Tyrol is salubrious; the water pure; the land fertile, and the stream and mountains yield the finest fish and game, while all along the roadsteads and meadows many flowers grow indigenous, which are carefully cultivated in our gardens at home. The men wear stockings without feet, breeches that drop off at the knees, and hats tapering to the crown like a sugar-loaf with the green silk band and feather, and for Sunday, a broad leathern girdle or waist-band richly embroidered in silk. The women wear the old fashioned Pompadour waist, which sets up close under the arms; fancy neck bands made of small steel chains and clasped in front, similar to dog collars; an immense head-gear made of black silk, tied about the back of the head, and falling behind down to the waist. The Tyroleans are a people of very strong religious feelings, not unmixed with superstition, and all along the roadway the traveler cannot fail to notice the frequent occurrence of the crucifix and other emblems of their religious faith, which are rarely ever passed without a reverential bow. The practice seems to one not accustomed to it, almost like the idolatrous worship of the heathen. I regretted much that my time was so limited that I could not stay longer in the mountains of Tyrol.

Leaving Salzburg for Augsburg and Munich, the journey is accomplished in a few hours, and for most of the distance the country is a perfect plain, under a good system of husbandry; but Munich stands 2,000 feet above the sea, and the seasons are much more backward than at Vienna.

The city of Munich is interesting chiefly on account of the great attention which has been paid to the fine arts, and for its very fine monuments and splendid public edifices, for nearly all of which the city is indebted to the private purse and public spirit of ex-King Ludwig, who now resides in his palace in the city, at the advanced age of eighty-two years. The arts of painting in fresco, in encaustic and upon glass, are practised to great perfection, and it is said that more than one thousand artists reside in Munich, either attracted from other countries by the encouragement held out to them, or bred and educated on the spot. The old and new Pinacothek contain a vast collection of fine paintings of the early and modern schools. The Glyptothek contains a remarkable though not large collection of ancient and modern sculpture.

That the King was very fond of the beautiful is evidenced from the fact that whenever he saw a beautiful female face, no matter what her station in life might be, he was always desirous to have it painted to adorn the walls of his palace. The collection, which is freely shown to the public, is arranged in two of the apartments of the King's palace, and always attracts much attention. For some unexplained reason, the picture of the unfortunate Lola Montez, who was one of the King's favorites and resided in a small house near his palace, has been removed.

The Royal Library of Munich is one of the most valuable in the world, and second in size only to the Imperial Library of Paris. The building is very large and the grand staircase is very splendid. The magnificent collection of books and manuscripts, numbering upwards of 800,000, are cleverly arranged in seventy-six cabinets; and among the valuable collection of ancient works, I was shown a New Testament in Latin, 1454—being the first book ever printed; the first specimen of the art of lithography, which was invented in Munich in 1800, by Sennefelder; MSS. copies of the Gospel, written in gold letters in 870; and many other very curious and ancient books and papers, which are here preserved with great care. One of the cabinets contains a fine collection of the works of American authors.

Munich boasts of having the largest bronze statue in the world. It stands opposite to the Bavarian Temple of Fame, which was also constructed by the old King to commemorate the virtuous deeds of those Bavarians who have distinguished themselves in peace and war. This collosal figure represents the Protectress of Bavaria, with a huge lion standing at her side. In her right hand is a sword, and the left hand holds upward a wreath of flowers. The entire figure is in the most beautiful proportions, and is sixty-five feet high, weighing 230,000 pounds. It stands upon a granite pedestal thirty feet in height, through which a circular stairway leads to the head of the figure, where seats are provided for eight persons. My curiosity induced me to crawl up through the figure, where I was assured that through the eyes a fine view of the city could be obtained. By the assistance of a tallow candle and any amount of bodily gyration I succeeded in getting into the head. The day was quite warm, and I began to fear that I should come down thoroughly roasted as the reward of my ambition.

I visited the Royal Bronze Foundry, where I hoped to have witnessed the process of casting bronze figures; but at the time of my visit, no casting was being done. In the Museum of the Foundry, there are splendid models of collossus, and life figures of Washington, Jefferson, Marshall, Clay, Benton, and other of our eminent citizens, from which bronze casts have been taken for our country. There are also models of the splendid bronze doors of the Capitol, and an Equestrian Statue of Washington is now finishing, as I was informed, for Cincinnati. The familiar names of Trenton, Yorktown, etc., upon pieces in the hands of the dusky burnishers, excited a pleasing interest in that strange place.

In Munich, as at Frankfort-on-the-Main, they still practise the singular custom of keeping the remains of all deceased persons, or that are supposed to be dead, for a certain number of days to prevent premature burial.

In a building at the entrance to the cemetary the bodies are placed upon iron cots in a recumbent or half-sitting posture and upon the wrists are fastened rings which connect with wires, and alarm bells hung in the adjoining rooms of the watchmen. Each cot is numbered to correspond with the number fastened under the bell, so that in case there should be the slightest motion of the body an instant alarm would summon the watch to the spot. In an adjoining room there is a bed carefully prepared, a bath tub, electric apparatus, and restorative medicines to be employed in cases of resurrection.

At the time of my visit I counted the bodies of eight infants and eight adults all serenely reposing in a profusion of flowers and watchmen were sitting in solemn silence awaiting the click of the bell. In Frankfort not a single case of resurection has yet occurred but at Munich they had a case many years ago, so they say. Visitors view this ghastly spectacle from the outside through windows which are common to all who have a taste for such sights. Some of the churches in Munich are very curious, especially the Basilica or St. Bonifacius, built in 1835–50 by King Ludwig in imitation of Roman Basilica of the fifth and sixth centuries, to celebrate the event of his silver wedding. Externally it resembles a railroad station with a colonnade front, but the interior is splendid. The roof of wood painted blue with stars of gold is supported by sixty-six monolithic columns, each cut from one piece of gray Tyrolean marble which divide the interior into three naves producing a grand effect. The floor is mosaic and the ceilings are adorned with some very fine fresco paintings illustrative of the life and labors of St. Bonifacius. The old King has fixed his own sarcophagus in one of the side aisles where in a few more days his bones will be entombed and the Basilica will thus become his monument. It is very pleasant to look upon so many fine churches, palaces, and monuments, but it is truly sad to reflect that the money required to build them was wrung from the sweat, brawn and muscle of the hard-working men and women of Bavaria. It detracts very much from the real pleasure of travel on the continent to witness the degrading contrast that exists between the wealthy and producing classes. The injustice and oppression heaped upon the backs of the working classes, and which compels them to support by their labor and their arms, the wanton extravagancies and wars of those who claim to rule by divine right, must some day invoke the vengeance of a just God. At Nuremberg I realized more vividly than in any other city that I was in a foreign land. The narrow streets, overhanging houses, with their pointed gables plainly mark the antiquity of the place, which has come down almost untouched from the Middle Ages. It was once a very prosperous free city and during its prosperity the arts and sciences flourished to such an extent that many inventions are credited to its inhabitants. A paper mill was built here in 1390. Cannon were cast in 1336. A machine for drawing wire was put into operation in 1360. In 1560 Hans Lobsinger invented the air gun. Denner invented the clarionet in 1690. Nuremberg also claims the honor of first manufacturing playing cards, egg shaped watches and gun-locks, and in a dungeon under one of the towers of the old city wall there is to be seen at this moment a machine called the Iron Virgin which opens by secret springs and is armed inside with spikes which pierced the body of the victim thrust into its awful folds. The Nurembergers are not disposed to claim the honor of this invention. The honor of the invention of the guillotine for cutting off heads is claimed for a French physician from which the instrument takes its name, but among the frescoes that adorn the walls of the old town-hall there is a representation of this machine painted upward of three hundred years ago, which shows that it is of much earlier date than the French Revolution.

To employ the expressive figure of speech of one of our distinguished fellow citizens, I have "swung around the circle," and now find myself once more on the Rhine in the ancient old town of Strasburg which is chiefly famous for being well fortified, and for its tall cathedral spire, and *patés-de-fois-gras* or enlarged geese livers. Every thing is in a state of fermentation as the Emperor and Empress Napoleon are expected to sleep here to-night on their return from Salzburg where they have been to pay a visit to the Emperor and Empress of Austria. An enthusiastic Frenchman said to me "there must be a war next year." I asked him why, and he seriously declared that "there were too many people in the world and it was necessary to kill off some of them."

S. H. W.

## OFFICIAL REPORT OF PATENTS AND CLAIMS

**Issued by the United States Patent Office,**

FOR THE WEEK ENDING SEPTEMBER 10, 1867.

*Reported Officially for the Scientific American*

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

| | |
|---|---|
| On filing each Caveat | $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. Residents of Canada and Nova Scotia pay $500 on application.

☞ *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.*

68,589.—HOT AIR FURNACES.—James Albee, Boston, Mass.

I claim arranging the lining or fire pot in relation to the corrugations of the casing, in such a manner that the descending draft flues, C, C' C'', &c., are formed substantially in the manner and for the purpose set forth.

68,590.—METHOD OF COATING AND WATER-PROOFING WHIPS.—M. Anton, (assignor to self and C. F. Vonder Luke,) Huntington, N. Y.

I claim the water-proof and mastic composition when composed of the ingredients set forth and the mode of applying the same to fabrics, substantially as herein specified.

68,591.—SHEEP CHAIRS.—A. D. Atwood, Saybrook, Ill.

I claim the revolving seat C, in combination with the flexible back, F or G, substantially as and for the purpose set forth.

The fleece tables, D, in combination with the seat, C, and backs, F G, substantially as described.

The movable ribs, M M, in combination with the back bar, F or G, substantially as set forth and described.

The spring, J, and back, F, in combination with the seat of a sheep chair.

A sheep chair constructed with the pedestal, A, crosshead, B, seat, C, and table plate, N, fitted to each other, substantially in the manner shown, so that the whole may be taken apart without the removal of any fastening.

The fleece table, D, constructed as described, so that by the removal of the rim wire, said table may be folded like a fan.

68,592.—DEVICE FOR NICKING SCREWS.—J. A. Ayers, (assignor to National Screw Company,) Hartford, Ct.

I claim the use of two or more screws situated in different planes and operating successively upon the heads of screws or screw blanks to form a dovetailed nick or slot, substantially as set forth.

68,593.—MACHINES FOR MAKING NEEDLES.—Richard T. Barton, New Haven, Ct., assignor to self and Wm. H. Fisk, West Meriden, Ct.

1st, I claim the combination of the cams, C1 C2 C3 C4 C5 C6 C7 C8 C9; and the levers, L2 L3 L4 L5, N N E T and U, the feeding mechanism, F, the cutter H, the feeding rack, M, the bar, K, the sharpening tools, Q Q1, the punch, V, the shearing press, X, and the milling tool, Y, all constructed and arranged substantially as specified, the whole forming a machine for making needles, as herein set forth.

2d, The sharpening tool, Q Q1, constructed substantially as herein described.

68,594.—CARRIAGE WHEEL.—Augustus Beale, Stamford, Ct.

I claim in combination with a spoke and felly of the wheel of a vehicle, the socket, D, and screw cap, C, when both parts are constructed, arranged and operating in substantially the manner herein specified.

68,595.—KNITTING MACHINES.—Dana Bickford, Boston, Mass.

1st, I claim the combination of the pivoted cam, G, indicator, D, and set screw, C, as and for the purposes set forth.

2d, I claim the clasp, E, in combination with the cylinder, A, as and for the purposes set forth.

68,596.—CARRIAGE AXLE AND HUB.—Lafayette Blair, Painesville, Ohio.

1st, I claim enclosing within a hollow tube, H, an elongated spindle constructed as shown in fig. 5, and secured therein by the nut, I, the said tube, H, being provided with bearings, h h', annular flanges, a b, notch, g, lubricating holes, e d, and the said nut, I, with the broad annular flange, I' and screw hole, d', all operating as and for the purposes set forth.

2d, I claim the hollow tube, J, provided with the sleeve, K, screw hole, i, and plug, L, in combination and operating in connection with the subject of my first claim, substantially as and for the purpose stated.

3d, I claim the arrangement of the annular rim, G, of disk, D, and annular flanges, a b, of tube, H, whereby an annular recess, k, is enclosed for the purpose of allowing water or dirt to escape through the hole, g, substantially as herein set forth.

68,597.—APPARATUS FOR BREAKING THE STEMS AND LEAVES OF TOBACCO.—Nicholas H. Borgfeldt, New York City.

I claim the scolloped sharp edged circular ribs, b b', on the rollers, C C', in combination with the comb shaped scrapers, D D'' substantially as and for the purpose set forth.

68,598.—STEAM GENERATORS.—J. F. Boynton, Syracuse, N.Y.

1st, I claim the perforated tube, B, within the boiler, or its equivalent, for equalizing the temperature of the steam in the boiler, as described.

2d, In combination with a steam boiler, I claim the automatic heater and feeder, when constructed, arranged and operating substantially as described.

3d, I also claim in combination with a steam boiler, a double registering thermometer, to indicate the temperature and thereby show the pressure of the steam in the boiler, substantially as described.

4th, I also claim, in combination with a steam boiler, a thermometer of metal, suspended in the boiler, as shown at T', in the drawing, and mounted with a glass tube to exhibit the column of mercury, as described.

68,599.—WASHING MACHINE.—Thomas Brown, Roseburg, Oregon.

I claim the combination of the frame, B, jointed at d, with the beater, C, and ribs inclined towards the center, and the rubbers at the bottom of the tub, also similarly inclined, all arranged and operating substantially as and for the purposes herein described.

68,600.—IMPROVEMENT FOR PREVENTING A HORSE FROM RUNNING AWAY WITH A CARRIAGE.—Edward E. Burnham and George Brown, Gloucester, Mass.

We claim the employment or combination of the elastic band or connection with the carriage wheel and the rein of the harness, under circumstances, and for the purpose specified.

And we also claim the application of the elastic band or connection to the carriage body, the wheel and the driving rein or reins, substantially in manner as specified.

And we also claim the combination of the safety strap, E, with the band, D, applied to or to be applied to the carriage wheel and rein or reins of the harness as specified.

68,601.—CAR BRAKE FOR STOPPING AND STARTING CARS.—George E. Burt and Edwin A. Hildreth, Harvard, Mass.

1st, We claim the spring case, a a', constructed in such a manner with pins, p p', and supporting flanges, that the spring may be wound in either direction substantially as described.

2d, The extension, c'', upon the disk, a, fitted into the case, a, on the axle as described and for the purpose set forth.

3d, The double case, a a', constructed as described and arranged to slide upon the axle and catch in stops, d d substantially as described and for the purpose set forth.

4th, The lever, B, with secondary lever, P, in combination with the case, a a', and operating the same.

5th, In combination with lever, B, and case, a a', the pawls, e e', springs, f f, and stops, g g', constructed and arranged substantially as described and for the purposes set forth.

6th, The construction of a car brake with mechanism substantially as described and so arranged that the friction of the wheel on the brake pad, H, shall tend to draw on the brakes and clamp the wheel between the brakes, G and H, substantially as and for the purpose set forth.

7th, In combination with the above, we claim the operating devices consisting of the lever, C, shaft, E, arms, J J, lever, I, and treadles, y y, substantially as described.

68,602.—ROTARY STEAM ENGINES.—Luman Carpenter, Oswego, N. Y.

I claim the combination of the piston, P, with the plate, G, crank, C, and cylinder H, so as to produce a rotary motion, substantially as herein set forth.

68,603.—ADJUSTING SPIRIT LEVELS.—Samuel N. Chapin and Augustus Stanley, New Britain, Ct.

1st, We claim a bed of vulcanized rubber, M, or equivalent elastic material arranged relatively to the adjusting screw, c, and to the adjustable leveling device, B or D, substantially as and for the purpose herein specified.

2d, Constructing the case, E, which carries the short glass, D, with a part, E', or its equivalent, standing at right angles to the glass, D, in combination with means for adjusting the same, operated at the edge of the body, A, substantially as and for the purpose herein specified.

68,604.—SAFETY STIRRUP.—Sam'l F. Clark, Middletown, Ct.

1st, I claim the combination of the bars, a, with the horizontal band, d, and the upright part, e, substantially as described.

2d, The combination of the pivoted sole, b, with the band, d, and sides, e, substantially as described.

3d, The combination of the bars, a, the band, d, the sole, b, and the upright sides, e, the whole forming a safety stirrup, substantially as herein described.

68,605.—COUNTING HOUSE RULER.—Daniel Webster Clegg, San Francisco, Cal.

I claim a ruler, A, having a concave bottom with graduated holes or openings, B B, substantially as specified and for the purposes set forth.

68,606.—APPARATUS FOR STOPPING RUNAWAY HORSES.—Samuel M. Cooper, Fairfax county, Va.

I claim the binding of the legs of the horses by the means of the above invention and the application of straps in combination with chairs and levers, operating substantially as and for the purpose set forth.

68,607.—CORN DROPPING ATTACHMENT TO HOES.—Charles W. Colton and Edmond L. Staples, Cincinnati, Ohio.

1st, We claim a seeding attachment to a hoe, consisting of the sliding

receptacle or hopper, B, pocket, D', and brush, H, substantially as described and represented.

2d, The combination of the hoe, A, receptacle or hopper, B, tube, D, brush, H, pocket, D', adjustable gauge, I, and spring, L, all arranged and operating in the manner and for the purpose specified.

68,608.—DINNER PAIL.—S. B. Cox, Buffalo, N. Y.

1st, I claim the combination with the cover, C, and cup, D, of the grooved india rubber ring, K, the adjustable hinge, J, and spring catch, k, substantially as and for the purpose set forth.

2d, The combination with the pail, A, and cup, B, of the lugs or projections e and g, the socket, f, and spring catch, h, substantially as herein above set forth.

3d, The combination with the cup, D, and lamp, E, of the fender, F, supports, G G, and sockets, n n, substantially as set forth.

4th, The combination with the box, I, of the cover, b, and spring, c, substantially as and for the purpose set forth.

68,609.—GRADUATING ACCELERATING CARTRIDGES FOR ORDNANCE, &c., James M. Crockett, Newbern, Va

I claim the construction of the chambered cartridge in separate sections as fitted together at a b c and d, when arranged and combined as herein described and for the purposes set forth.

68,610.—LAND ROLLER.—H. L. Currier, Oregon, Ill.

1st, I claim the combination of the front roller, with the independent and loosely hinged hind rollers, arranged and operating as described.

2d, The combination with the front roller of the drivers seat and detachable tongue, all arranged and operating as described.

3d, The arrangement of the series of rollers, one behind the other, as described, for the purpose of successively rolling the same surface by a single passage of the machine.

68,611.—MACHINE FOR BURNISHING THE EDGES OF THE SOLES OF BOOTS AND SHOES.—Emory B. Cushing, (assignor to self and Albert R. Cushing,) Boston, Mass.

1st, I claim the standard, k, and the combination and arrangement of the machinery connected therewith, namely, the treadle, e, the shafts, F, o and s, and their gearing, whereby the hand and foot movements are secured, so that the boot or shoe will follow the burnisher, substantially in the manner and for the purpose above set forth.

2d, I claim the cross head, t, in combination with the screw, x, the rest, u, and the sliding arm, v, whereby any sized boot or shoe is held, and also whereby the motion following the burnisher is secured substantially in the manner and for the purpose above set forth.

3d, I claim the combination and arrangement of the clutches, f f' f'', with pulleys, g g', whereby is secured the change motion of the cross head, n, that the boot or shoe can turn from one shank to the other, substantially in the manner and for the purpose above set forth.

4th, I claim the combination and arrangement of the gauges or guides, e, with burnishing tool, d, which do not revolve with the burnishing combined and in connection with the cam movements in the sliding box, c, whereby the guides are adjusted to the edges of the soles, substantially as set forth.

5th, I claim the combination and arrangement of the cam groove, a, and the bent arm, b, working in the cam groove in the face of the pulley, D, whereby is secured the thrust or hand-like motion, substantially in the manner and for the purpose above set forth.

68,612.—BED BOTTOM.—R. H. Cutter, Cleveland, Ohio.

I claim the above described bed bottom as a new article of manufacture.

68,613.—COTTON AND HAY PRESS.—William Deering, Louisville, Ky.

I claim the shaft, S, with the fusee barrel, K, in combination with the rope, P, and sheaves, e and f, and the lower reten, H, arranged and proportioned in the manner and for the purpose described.

2d, The screw terminal, S2, upon the shaft, S, fitted into a female screw within B, in the manner and for the purpose described.

3d, The arrangement of the platens by which when operating the upper one is stationery and the lower one movable, in the manner and for the purpose described.

4th, The combination of the lever, M, with its ratchets and pawls, shaft, S, fusee barrel, K, screw, S2, rope, P, sheaves, e and f, upper and lower platens and box, A, in the manner and for the purposes described.

68,614.—ATOMIZING TUBE.—C. H. Eccleston, Oxford, N. Y.

I claim an atomizing instrument in which the contiguous air and fluid tubes are connected to the vertical or cup tube so as to be reversible with relation thereto, substantially as set forth.

68,615.—HARVESTER.—D. L. Emerson, Rockford, Ill.

1 claim the drooping harvester frame, hereinbefore described, the droop at the grain wheel being produced by the bend of the bar of the frame and at the driving wheel by the branching of the frame, substantially as above set forth.

2d, I also claim the combination of the grain wheel with the frame of the machine by means of an arm so arranged as to permit the said wheel to turn horizontally a limited distance, substantially as set forth.

3d, I also claim the combination with a rake head of the tooth sockets rigidly secured thereto through which sockets the rake teeth project and moved endwise transversely to the rake head and held by punch screws, as described.

4th, I also claim the combination of the frame of the harvester and the dratt bar thereof by a hinge hooked lifting lever, swinging standard and arm, substantially as set forth.

5th, I also claim the arrangement of the arm of the dratt bar, the hooked lifting lever and swinging fulcrum standard, in such relative positions that the strain upon the lever tends to lock the members in their positions when the finger beam is raised beyond a certain distance.

6th, I also claim the combination of the frame of the harvester, draft bar, hooked lifting lever, perforated swinging standard, arm and pin, substantially as set forth.

7th, I also claim the combination of the frame of the machine and driver's seat with adjustable hanging stirrups, substantially as set forth.

68,616.—CLOTHES AND PICTURE HANGER.—F. M. Everingham, Collingwood, N. Y.

I claim the extension bar, A, the hook, B, the upright bar, C, and the dovetailed slot, D, in the upright bar when the same are constructed, combined, and used in the manner as substantially set forth and described.

68,617.—IRONING MACHINE.—Patrick G. Flanedy, San Francisco, Cal.

I claim, in combination with the lever frame, I, the cross head, K, the ways, J J, straps, K1 K2, and frame, L, substantially as and for the purposes described.

I also claim the lever, M, in combination with the slotted arm, N, shaft, O, pedal, d, and spring, c, substantially as and for the purposes set forth.

68,618.—REIN HOLDER.—B. S. Fletcher, Cornish, N. H.

I claim the combination of the plate, A, with its serrated ridges, e e, and the lever, D, with the revolving cam, C, either surrounding a hub, B, or inclosed within a case, B, as set forth, and arranged and operating substantially as and for the purpose set forth.

68,619.—RAILWAY CAR.—John Foreman, Pottstown, Pa.

I claim the combination described of the diagonal tie bolts, e e and f, with the longitudinal beams, posts and diagonal braces of the body of a car, for the purpose specified.

68,620.—BOX FOR TRANSPORTING STRAWBERRIES.—Henry C. Freeman, South Pass, Ill. Antedated Aug. 27, 1867.

1st, I claim the subdivisions of the drawer, as formed and described in the specification.

2d, The mode of opening each subdivision by a movable slide, b.

3d, The gate, as formed and described in the specification, also the mode of securing it by a spring catch, d.

4th, The whole in combination as above described and claimed in its parts.

68,621.—WOOD-BENDING MACHINE.—S. C. and E. O. Frink, Indianopolis, Ind.

1st, We claim the bed plate, P, and former, U U, when constructed as set forth.

2d, We claim the pin, g, the eccentric, R, shoe, N, and clamp, x d W, when used for taking up the slack of the spine.

3d, We claim the base piece, E, the back plate, k, the clamp, x d W, in combination with the strap, L, substantially as described and set forth.

4th, We claim the segments, Y Z, when constructed as described in combination with the strap, L, substantially as set forth.

5th, We claim the shoe, N, and clamp, a, in combination with the rod, b, substantially as set forth and described when used to hold the material in a bent position.

68,622.—DOOR LOCK.—H. R. Gillingham (assignor to himself, C. R. Gillingham and A. L. Huggins), Baltimore, Md.

I claim the combination and arrangement of the vertical sliding tumblers, P P, operated by the spring levers, L L, pivoted between the side bolt plates, G and H, the latter being held and secured by the spring pin, D, in both the locked and unlocked position of the bolt, substantially in the manner herein shown and described.

68,623.—DRIVING BIT.—David Hale, Boston, Mass.

I claim a driving bit having a bar covered with a removable tube of rubber or rubber compound, the bar being provided with a screw cap which permits application or removal of the tube, substantially as set forth.

68,624.—WASHER.—Joseph Hale, Somerville, Mass.

I claim for employment with wheels and axles, or similarly, washers of wood with the grain, substantially as described, when formed by softening, bending and drying.

Also the process described for forming washers of wood by bending a strip into a helix and then subdividing it, substantially as described.

68,625.—BELT TIGHTENER.—J. M. Hawley, Holton, Ind.

I claim a belt tightener consisting of the sliding rollers, C C, roller frames, B, windlass, D, and cords or chains, g g, applied to a frame, A, and operating substantially as described.

68,626.—WASHING MACHINE.—John Highbarger, Sharpsburg, Md.

1st, I claim the rocker, B, having the side pieces, B' B', slats, b b, rollers, R R, and seat, S, in combination with the corrugated wash chamber, A, substantially as and for the purpose specified.

2d, The combination of the rocker, B, with the cords, C, weights, W, and pulleys, P P, substantially as and for the purpose specified.

68,627.—ROCKING CHAIR.—Richard Hoffmann, N. Y. City

1st, I claim constructing the side frames of a rocking chair of elastic strips b b' e e', substantially as and for the purposes set forth.

2d, The combination of removable cross bars, a s1 a2, with the elastic side pieces, B C, of a rocking chair, substantially as and for the purpose described.

3d, The flexible back, E, in combination with the seat, D, top cross bar, a', and side pieces, B C, constructed and operating substantially as and for the purpose set forth.

4th, The yielding stops, e, in combination with the runners of a rocking chair, constructed and operating substantially as and for the purpose described.

68,628.—STOVE-PIPE THIMBLE.—Azariah Hutchinson, Monterey, Ohio.

I claim a fire-proof base for stove flues consisting of a bed plate, A, having a central aperture, B, and radial arms, C D E e, etc., when used in connection with the cylinder, H h H', for the reception of a stovepipe, the whole being arranged and operating substantially as herein explained and for the purpose set forth.

68,629.—SYRINGE.—Thomas Lewis, Malden, Mass.

I claim the removable perforated disk, c, with the male screw thread on its outer edge, adjusted to fit the female screw thread, b, substantially as described and for the purpose set forth.

68,630.—CUPPING INSTRUMENT.—Edward J. Leyburn, Lexington, Va.

1st, I claim the application to a cupping glass of a spurred disk, E, substantially as described.

2d, The use of an adjustable device for irritating the skin, in combination with a cupping glass, substantially as described.

3d, An irritator, E, constructed substantially as described and adapted for use in a cupping glass, substantially as described.

68,631.—TANNING.—George L. Loversidge, Bury Bank Cottages, Eng.

I claim subjecting hides to the action of the within-described ingredients, in the manner set forth.

68,632.—MEDICAL COMPOUND.—Wm. S. Lyon, Tranquillity, Ohio.

I claim the combination of the above-mentioned ingredients, substantially as described.

68,633.—MOLD FOR MAKING GLASS GOBLETS, GLASSES, ETC.—Joseph Magoun, East Cambridge, Mass.

1st, I claim the combination of the separate body matrix, L (in one piece as described), and its holding mechanism, or the equivalent thereof, with the series of stem mold, sections, G G G, arranged together and applied to them supporting frame so as to be movable in radial directions, as specified.

2d, I also claim the combination and arrangement of the foot mold or matrix, B, with the separate body matrix, L (in one piece as described), and the stem mold sections, G G G, arranged so as to be movable in radial directions as specified.

3d, I also claim the foot mold or matrix, B, as made in one piece without any vertical joint, when arranged and combined with a series of stem mold sections, G, to open apart over the said foot mold, as specified.

4th, I also claim the combination for holding the body matrix, L, down to the mold sections directly underneath it, such combination consisting of the annular clamp, T, and its projections, o p, the stationary recessed posts, p, and the cams, m, such posts being supported by the platform, U, and the cams being applied to the body matrix, as specified.

5th, I also claim the combination and arrangement of the cammed annulus, o, with the mold frame, the series of stemmed sections, G G G, the body matrix, L, and its holding mechanism, substantially as described.

6th, I also claim the combination of the lower plunger, C, and its supporting foot, D, with the raising plate or device, E, so as to render the latter capable of being revolved independently of the said plunger and foot, as explained,

7th, I also claim the combination of the edge forming annulus or cap, M, with the body matrix, L, and its holding mechanism, whether the latter be applied directly to the matrix or to the said annulus placed on the said matrix.

8th, I also claim the combination of the finger, y, and notched projection, Z, with the mold frame, and the body matrix, L, when the latter is combined and arranged with a series of stem mold sections, G G G, to operate or move in radial directions, as described.

68,634.—BAGGAGE LABEL.—J. M. March, Washington, D. C.

I claim securing the label of baggage or freight cars, trunks, or other baggage parcels which can be shifted only by the proper person when applied to baggage or freight cars and from the inside when applied to trunks and other baggage parcels.

68,635.—PLOW.—Thomas March, Dallas, Mich.

I claim the method herein described of constructing the mold board and land side of a plow, substantially as described.

68,636.—MODE OF OPERATING WINDOW SHUTTERS.—Wm. C. Marshall, New York City.

I claim the pivoted latches, D, extending through the wall one end operated by the tappet rod, E, the other end holding the self-closing shutter, C, substantially as shown and described.

68,637.—BABY JUMPER.—A. H. Mason, Binghamton, N. Y.

I claim the combination of the standard, B, and arm, E, with the sockets, C C and D, the swivel, F, hoop, O, saddle, H, and waist coat, I, all constructed substantially as described for the purpose set forth.

68,638.—POST HOLE AUGER.—Samuel McCray, Woodstock, Ill.

I claim the shaping the cross plate so as to receive the wings in a position inclining about eleven degrees from a right angle to the rod also the projections upon the forward outer points of the wings.

68,639.—MAKING BUTTER.—Mrs. D. H. McGregory, Detroit, Mich.

I claim the herein described way of making butter by the employment of the materials above specified, producing thereby a new article of manufacture.

68,640.—SAFETY ATTACHMENT FOR WATCH CHAINS.—Louis Mendel, Albany, N. Y.

I claim a projecting point or pin applied to a watch chain as a safety attachment, in the manner described and for the purposes herein set forth.

68,641.—LEATHER HOSE.—Chas. F. W. Meyer, Oconomowock, Wis.

I claim uniting the pieces, constituting a leathern hose pipe, by a lapped seam sewed with leather thongs, in the manner herein described.

68,642.—HARVESTER.—W. K. Miller (assignor to C. Aultman & Co.,) Canton, Ohio.

I claim, in combination with the grain table, or platform, the ball, I, working in connection therewith, for the purpose and in the manner substantially as herein set forth and described.

68,643.—CULTIVATOR.—G. Moore (assignor to John Deere, C. H. Deere, S. H. Velie, and G. W. Vinton), Moline, Ill.

1st, I claim the axles, B, constructed substantially as herein shown and described, for the attachment of the plows and wheels of a cultivator, as set forth.

2d, I claim the double-acting clevis or device for attaching the plows to the axle, said device consisting of the plates, n o and m, and bolt, o, all constructed and arranged to operate substantially as described.

3d, I claim the plate, h, when constructed and used in connection with the standard, G, and brace, d, substantially as described.

4th, I claim the cultivator having its several parts constructed and arranged for joint operation, substantially in the manner and for the purpose herein set forth.

68,644.—HINGE.—James A. Morrell, Chicago, Ill. Antedated Aug. 26, 1867.

I claim the eccentric, B, in combination with the wing of the hinge, m, substantially as described and for the purpose set forth.

68,645.—BED BOTTOM.—Robert B. Nevens (assignor to himself and Stillman Bushee), Lowell, Mass.

1st, I claim the adjustable sliding stirrups, D, or their equivalent, applied to the side rails, E, and spring bars, A, and arranged for action and effect, substantially in the manner and for the purpose set forth.

2d, And in combination with the stirrups, D, I claim the knees, F, or the equivalent thereof, when applied and arranged substantially as and for the purpose set forth.

3d, And in combination with the stirrups, D, and knees, or equivalent, I claim the spring bars, A, applied and arranged in the manner and for the purpose substantially as specified.

4th, And in combination with the stirrups, D, and knees, F, and spring bars, A, I claim the employment of transverse bars, B, and a series of slats, C, in the manner and for the purpose set forth.

68,646.—RUNNING GEAR FOR VEHICLES.—B. F. Paine, Roseville, Ill.

1st, I claim the bed plate, g, in combination with the arm, H, axle, N, and spindle, X, constructed as described and for the purpose set forth.

2d, The jointed tongue, B, pivoted to the bed, as described.

3d, The rod, M, in combination with the rods, R, tongue, B, and axle, N, substantially as described and for the purpose set forth.

68,647.—INSTRUMENT FOR OBLITERATING STRICTURES IN DUCTS OR NATURAL PASSAGES FOR ANIMAL FLUIDS.—Geo. N. Palmer, Greene, N. Y.

I claim the sheath or cone-pointed tube, A, sliding rod, D, knob, E, and guide pin, e, as constructed and arranged, in combination with the pivoted blades or lancet points, f f, for operating in the manner as and for the purposes herein set forth.

68,648.—CORN CULTIVATOR.—Wm. H. Parlin, Canton, Ill.

I claim the strong, durable, and economical frame or attachment between the tongue and axle or wheels, as secured by the simple bars, A, in manner and form as shown, or in any similar form, upon the same principle.

I also claim the extension hooks, k k, in the beam holder, C, substantially as above described, and as in drawings shown, or any similar hook, in similar connections, and for the uses herein described.

68,649.—AUTOMATIC SELF-CLOSING BARREL FILLING APPARATUS.—W. S. Payne, Petroleum Center, Pa.

1st, I claim the combination of the tubes, A1 and B, jointed at D, with the vertical tubes, E and G, the valve, E1, valve rod, e, handle, F, rod, g, stop, H, spring, I, and trigger, P, substantially as and for the purpose specified.

2d, The combination of the float, K, rod, L, lever, M, pitman, N, lever, O, trigger, P, cord, R, and weight, T, substantially as and for the purpose specified.

68,650.—HOSE COUPLING.—D. T. Perkins and C. F. Hovey, Springfield, Mass.

1st, I claim the fixed ears or inclined lugs, E E, formed upon the parts of a hose coupling, for interlocking and holding such parts in contact, substantially as described.

2d, A hose coupling formed of the part, A, and duplicate part, A1, each having two ears or inclined lugs thereon, as described, in combination with the slotted keys, K, pins, e, and key seats, the whole constructed and operating substantially as set forth.

3d, The method of applying packing to a hose coupling by means of the channels, f n f, and packing, p, inserted therein, substantially as set forth.

68,651.—ANIMAL TRAP.—Samuel S. Rain, Lowville, N. Y.

I claim the use of the suspended cage, I, attached to the cross bar, C, together with the pendant, F, and the lock, 1 2 3 4 5 K, as herein described.

68,652.—BOOT AND SHOE SHANK.—Andrew Jacob Rice and Andrew James Rice (assignors to Andrew Jacob Rice), Salem, Mass.

We claim, as an article of manufacture, a shank made of leather and steel, secured together by rivets, all substantially as described.

68,653.—FIREPLACE.—Edward Y. Robbins, Cincinnati, Ohio.

1st, I claim making the general front of the grate concave throughout its hight so as to form a highly heated channel of draft for smoke and dust of ashes, entirely within the fire place, and up through the entire hight of the grate, and also to secure cross radiation for the purpose of keeping the front of the fire bright, substantially as set forth.

2d, I claim a grate composed of or containing a series of two or more such concavities or recesses.

3d, I claim, in certain cases, constructing the grate concave in the front lines of its vertical as well as of its horizontal sections, for the purpose of securing a greater amount of cross radiation, *i. e.*, up and down, as well as from side to side, thus increasing the brilliancy and incandescence of the front of the fire and causing it to radiate more heat into the room, substantially as above set forth.

4th, In combination with a grate with its main front shaped into such a recess or recesses, I claim making the fire back parallel, or nearly parallel with the general front of the grate, substantially as above set forth.

5th, I combination with a grate of the above shape, and set as above described, with shallow coal space, from the front bars backward to the brick fire-back, I claim the use of a canopy, either horizontal or arched, over the back part of the fire, and coming forward to within a few inches of the arch of the fireplace or mantel.

68,654.—SLIDE REST FOR LATHES.—J. G. Rominger (assignor to himself and J. F. Johnson), Philadelphia, Pa.

I claim the combination and arrangement of the plate, A, the worm wheel, b, confined therein, and secured to the short spindle, a3, of the bed, B, of a slide rest, and the worm spindle, c, all as set forth for the purpose specified.

68,655.—CHURN.—H. D. Rumsey, Homer, N. Y.

I claim the bellows, B, in combination with the pipe, D, and arms, F, the latter being provided with the orifices, d, in the manner and for the purpose described.

68,656.—HOSE COUPLING.—Oliver Salgee, New York city.

I claim a hose coupling formed with inclined or cam flanges upon one part of the coupling, in combination with a movable ring surrounding the other part of the coupling, and provided with lugs, taking over said inclined flanges in the manner specified, to bring the surfaces of the couplings together, as set forth.

68,657.—FIREBOX FOR FORGES.—Henry Sayler and Jeremiah Bair, St. Paris, Ohio.

1st, We claim the fire pan, A, having the double walls, and otherwise constructed as herein shown and described.

2d, In combination with the pan, A, made as described, we claim the pipes, C D, connecting it with the reservoir, B, when arranged to operate as set forth.

68,658.—GATE.—Calvin Shepard, Binghampton, N. Y.

I claim the lever catch letter B, and the ready fastener letter C, as shown in the combination.

68,659.—CHAIR AND DESK.—C. B. Sherman, Troy, N. Y.

I claim the combination of the chair, A, desk or table, B, with the arm, C, and ball and socket joint, D E, each being constructed, arranged, and combined substantially in the manner and for the purposes herein fully described and set forth.

68,660.—SCHOOL DESK AND SEAT.—Henry M. Sherwood, Chicago, Ill.

I claim the arm, C, provided with the socket, m, and the shoulders, n and n', in combination with the arm, a, provided with the stud, f, and stop, g, when constructed and arranged for joint operation substantially as described.

68,661.—PAINT FOR WOOD, METAL, AND WOVEN FABRICS.—C. D. Smith, Chicago, Ill.

I claim the paint prepared out of ingredients and in the manner herein described, and of any color, to be applied to wood, metals, and woven fabrics, substandially as herein set forth.

68,662.—CULTIVATOR.—Perry W. Smith, Abingdon, Ill.

1st, I claim the combination of frame pieces, A A, bars, D D D D, knuckles, E, and adjusting bars, O O, substantially as described and for the purpose set forth.

2d, The vertical adjustment devices, bars, O O, and knuckles, E E E E, substantially as described and for the purpose set forth.

3d, The metallic uprights, D D D D, arranged as described and for the purpose set forth.

68,663.—STEAM GENERATOR.—J. N. Snowdon and H. Wilkins, Brownsville, Pa.

We claim the arrangement of a series of zigzag or coiled feed-water pipes in the heating chamber, y, of the rear end of a steam boiler, substantially as and for the purposes set forth.

68,664.—MATERIAL FOR FLOORS OF MALT KILNS.—Reinhard Speidel, New York city, assignor to the Clinton Wire-Cloth Company, Clinton, Mass.

I claim, 1st, The pressing and rolling of wire cloth in the manner and for the purpose described.

2d, The application of rolled or pressed wire cloth as a bottom to malt kilns in the manner and for the purpose described.

68,665.—SORGHUM EVAPORATOR.—Ebenezer Sperry, Miami Village, Kansas.

I claim the boiler, A, when its bottom, a al, is constructed as herein described and set forth.

2d, I claim the combination and arrangement of the boiler, A, the elevators, B B1, and troughs, B2, substantially as and for the purpose described.

3d, The arrangement of the cleanser, D D1 D2, substantially as and for the purpose set forth.

4th, The sinks, E, with or without the sub sinks, E2, substantially as and for the purpose set forth.

5th, The arrangement and combination of the stand-pipe, B4, and elevator, B3, substantially as set forth.

6th, The combination of the pipes, f2 and f3, with the cooler, F F2 F3, substantially as set forth.

7th, The arrangement and combination of the corrugated cylinders, g4, with the exterior casing, g3, and the pipes, G g, as set forth.

8th, The combination of the hot-air chamber, h3, with the finishing chamber, h4, and drying chamber, H, arranged substantially as set forth.

68,666.—COMBINATION APPARATUS FOR CARBURETING AIR.—Levi Stevens, Fitchburg, Mass.

I claim the combination of the cups, g g, with the tubular arms, g1 g1, attached to the revolving shaft, D, so as to rotate with it and bent at their inner extremity so as to discharge their fluid contents into the chamber, A', all constructed, combined, and arranged substantially in the manner and for the purpose set forth.

68,667.—ANTI-FRICTION JOURNAL BOX.—Henry T. Stith, Stanton, Kansas.

I claim the box, A, and ring, B, in combination with rollers, C, all constructed, arranged, and applied in the manner and for the purpose substantially as set forth.

68,668.—BEDCLOTHES CLAMP.—Alfred Storm, Rutland, Vt.

I claim the clasp constructed with a frame, B, and jaws, C D, operated substantially as described.

2d, The jaw, D, arranged so as to be adjustable to varying sizes of bed rails substantially as described.

68,669.—REFINING PETROLEUM.—F. Sylvester, N. Y. city.

1st, I claim refining and purifying petroleum oil by passing it through hot water, substantially as described.

2d, Refining and purifying petroleum by washing it in hot water and macerating with bone black, or its equivalent, substantially as described.

3d, The devices herein shown, whereby the water is heated and circulated, and the oil forced through the hot water, substantially as described.

68,670.—CORN PLOW.—John R. Thomas, Mifflintown, Pa.

1st, I claim the plow points, d d, having the form above described, substantially as and for the purpose specified.

2d, The method of adjusting the direction of the plows, above described, by means of the bolts, G G, the braces, F F, and the holes, l l, passing in different directions through the side beams, B B, substantially as and for the purpose described.

3d, The washers, H H, substantially as and for the purpose specified.

68,671.—CEMENT.—D. B. Tooly, Albion, N. Y.

I claim a cement composed of the ingredients above mentioned in about the proportions set forth.

68,672.—VALVE GEAR FOR STEAM ENGINES.—H. Uhry, New York city.

1st, I claim the collars, e g, in combination with the rod, f, and tubular valve stem, b, substantially as and for the purpose described.

2d, The cam slide, i, in combination with the collars, g e, rod, f, and tubular valve stem, b, substantially as and for the purpose set forth.

3d, The roller, j, connected to the governor spindle, l, in combination with the cam slide, i, collars, g e, rod, f, and tubular valve stem, b, substantially as and for the purpose set forth.

68,673.—GANG PLOW.—H. J. Wattles, Rockford, Ill.

1st, I claim the combination and arrangement of the plowing frame, B B, wheels, H H', caster wheel, F, frame support, E, chains, I J J', with crank, f, operating substantially as described and for the purpose set forth.

2d, The combination and arrangement of the wheel, H', with the sliding support, K, groove piece, L, segment lever, M, spring stop, h, with stationary segment, k, when constructed and operating as described.

3d, In combination with the chain support, I J J', the arrangement of the spring pawl, e crank, f, and ratchet wheel i, operating substantially as described.

4th, The combination of the stubble turner, N, with a plowing mechanism, as described.

5th, Attaching the team to the plowing mechanism by the evener, O, and the chains, P P, being of unequal length, the whole arranged to draw directly upon the plows in such manner as to avoid all side draft, substantially as described.

68,674.—WIND WHEEL.—L. H. Wheeler, Beloit, Wis.

1st, I claim the flexible regulating vane, J, operated by the weights, cords and pulleys substantially as described, in combination with the side vane, O for the purpose set forth.

2d, The vane, J, constructed with the braces, K K, stops, Y', and strap, Y as and for the purpose set forth.

3d, The hollow shaft, D, in combination with the flexible vane, J, cords, R H, and connecting rod, S, so that said cords and connecting rod may not influence the action of the vanes, Q, and the supporting frame, as set forth and described.

68,675.—FILTER.—Wm. H. Wiley, Fredonia, N. Y.

I claim a water filter having a hollow, porous cylinder, A, in arrangement with the inverted cup, B, for the purpose and substantially as described.

68,676.—WASHING MACHINE.—A. T. Williamson, La Crosse, Wis.

1st, I claim the combination of the sleeve elbows, F, having recesses conforming to the shape of levers, B, and washers, i k h, arranged substantially as and for the purpose set forth.

2d, The combination of back board, L, having wings, m, in combination with the recessed washer, i k h, sleeve elbows, F, levers, B, and the double lugs, E D, arranged substantially as and for the purpose set forth.

68,677.—CLASP FOR HOOP SKIRTS.—Samuel R. Wilmot, Bridgeport, Conn., assignor to the Colby Skirt Company.

I claim the combination in hoop skirts of the following parts or devices for connecting the ends of diagonal hoops, B, to the edges of horizontal hoops, A, to wit, a metallic or other strap, C, attached to a horizontal hoop, and perforated where the strap projects beyond the edge of the hoop, and a strap, E, attached to the end of a diagonal hoop, and jointed to the strap, C, when the said straps are so constructed and arranged that the end of joint, G, of strap, E, after it is attached to strap, C, is permanently secured to the diagonal hoop by being confined beneath the flanges, F F, of strap, E, substantially as above set forth.

68,678.—CORN CULTIVATOR.—Marmaduke Wilson, Marquette, Wis.

1st, I claim the levers, H and I, used in combination with the tongue, G

and cross bars, B B', of a cultivator frame, arranged and operating substantially as and for the purpose set forth.

2d, The combination of the standards, C C C C, with the frame, A A B B', and braces, E E, as and for the purpose set forth.

3d, The clevis, o, attached to the cross bar, B, in combination with the adjustable tongue, G, and levers, H I, substantially as and for the purpose set forth.

68,679.—CULTIVATOR.—Wm. B. Young, Chicago, Ill.

1st, I claim the combination in a straddle-row cultivator, of the main frame, split tongue, jointed plow beams, and wheels.

2d, the combination of wheels and jointed plow beams in a straddle-row cultivator, the beam on each side having its joint or point of attachment out of the line of motion of its set of plows.

3d, The combination in a straddle-row cultivator of wheels, doubletrees, whiffletrees, jointed plow beams, and frame, when the plow beams are jointed forward of the whiffletrees.

68,680.—RIVETING MACHINE.—John Adt, Wolcottville, Conn.

1st, I claim the two hammers, D, so combined and operated as to simultaneously strike the two ends of the rivet in heading the same, by means substantially as herein set forth.

2d, The combination with the reciprocating hammers, D, of sleeves, C, and springs, e* e*, the whole arranged to operate substantially as and for the purpose herein set forth.

3d, The combination of the cam wheels, C*, and carriages, B, with the reciprocating hammers, D, constructed and operating substantially as and for the purpose herein set forth.

4th, The adjustable stop plates, F, in combination with the carriages carrying the riveting hammers, substantially as and for the purpose herein set forth.

68,681.—SELF-REGISTERING THERMOMETER.—Martin Ames, New Ipswich, N. H.

1st, I claim the independent needles, r w, in combination with the thermometer needle, n, arranged and operating as and for the purpose described.

2d, The combination of the hollow shaft, b, the pin, s, the needle, n, and the metallic ribbon coils, d d1 d2, constructed, arranged and operating as herein shown and described.

68,682.—CUT-OFF FOR WATER CONDUCTORS.—E. B. Armstrong, Columbus, Ohio.

1st, I claim the revolving cut-off, C C', in combination with the external casing, A, and extension pipes, B and B', substantially as and for the purpose set forth.

2d, The combination and arrangement of the casing, A, pipes, B and B', internal intermediate partition, A', cut-off, C C', and internal pipe, D, substantially as described.

3d, The combination of the casing, A, pipes, B and B', cut-off, C C', handle, C2, and spring, E, substantially as described.

68,683.—HORSE HAY FORK.—J. H. Arnold, Troy, Pa.

1st The sliding tine, C, and locking catch, D, in combination with the main tines, A B, substantially as and for the purpose specified.

2d, The guard, d, in combination with the tines, A B, substantially as and for the purpose herein set forth.

3d, The recess, s, and stud, c', of the sliding tine, arranged in relation with the strap, c, and locking catch, D, substantially as and for the purpose specified.

68,684.—GATE.—H. F. Balschmiter, Davenport, Iowa.

I claim the gate, C, when provided with the rolling weights, E, in the manner and for the purpose specified.

68,685.—PERMUTATION TRUNK LOCK.—Henry Basch, Chicago, Ill.

I claim the combination of the grooved slats, a a and d d, grooved rails, F F, and hinged plate, K, with sliding T-shaped notched bars, B and G G, and slots, D and H H, constructed as described, the whole arranged and operating substantially as and in the manner herein set forth and for the purpose specified.

68,686.—PROCESS OF VAPORIZING HYDROCARBON LIQUIDS.—John A. Bassett, Salem, Mass.

I claim vaporizing hydrocarbon oils for heating purposes by a bath of melted metal, in the manner substantially as set forth.

68,687.—CONDUCTOR'S TICKET PUNCH.—Jacob Beck, Philadelphia, Pa.

1st, I claim the concentric bearing rings or flanges, f g, of the joint, F, substantially as described for the purpose specified.

2d, The inclosed coiled spring, G, of the joint, F, substantially as described for the purpose specified.

3d, The seat, E, in combination with the spring, C, substantially as described, for the purpose specified.

4th, The spiral spring encircling the stripper, a, substantially as and for the purpose described.

5th, The construction of the joint consisting of the circular parts, d, and corresponding parts, d', of the jaws and handles, substantially as described

6th, The combination of the flexible cushion, D, and spring, C, applied to the stripper, a, substantially as described for the purpose specified.

68,688.—CATAMENIAL GUARD AND SUPPORTER.—John A. Belvin, Jr., Baltimore, Md.

1st, I claim the combination of the front, back, and middle parts, A B C, the elastic straps, D and E, and the sponge, F, when constructed and arranged substantially as described for the purpose specified.

2d, The absorbent, consisting of the flat pieces of sponge, F, jointed together and conforming to the shape of the middle part, B, in combination therewith and with the front and back pieces, A and C, substantially as described for the purpose specified.

68,689.—ROTARY PLOW.—Henry Berkstresser, Quaker Bottom, Ohio.

1st, I claim the plows, e e, fitted upon the periphery of the wheel, E, constructed and arranged as shown and described, as and for the purpose specified.

2d, The combination of the wheel, E, with the tilting frame, A, the draft pole, F, and the lever, d, arranged and operating substantially as and for the purposes set forth.

68,690.—HORSE HAY FORK.—M.D.Birge, Grands Rapids, Mich.

I claim the spiral fork, A, when fitted in a frame or plate, B, and when connected by means of gear wheels, or their equivalents, with a drum, D, in combination with the catch, F, all made and operating substantially as and for the purpose herein shown and described.

68,691.—HORSE POWER.—Jacob Bish, Dayton, Ohio.

I claim the boss, o, of the frame, A, and the corresponding cavity of the frame, B, and the relation of the bolt, D, to the same, in the manner substantially as described and for the purpose specified.

68,692.—GATE FOR WATER WHEELS.—Chas. D. Blakeslee, Grand Rapids, Mich.

1st, I claim the cylindrical valves, D, revolving against each other and having apertures, G G, substantially as and for the purposes described.

2d, In combination with the above I claim the curb, A, provided with the aperture, B and C, as and for the purpose specified.

68,693.—HORSE RAKE.—Isaac W. Boatman, Seven Mile, O.

I claim the frame, e f g, with its handle, h, provided with hinged links, o o, in combination with the fixed pins, k k, and removable pins, m m, whereby the rake is made convertible for the purpose of raking stalks or hay, in the manner described.

68,694.—DOOR FOR GRAIN CARS.—S. E. Bright, Elkhorn, Wis.

I claim the sliding door for grain cars, put on the outside or inside of a car, consisting of two sections, B and C, in combination with tracks, t t', said sections constructed and operating substantially as herein described and specified.

68,695.—MACHINE FOR WEAVING BASKETS.—F. H. Brown, Chicago, Ill., assignor to himself, Edward F. Peugeot and Lemuel H. Flershiem. Antedated March 10, 1867.

I claim, 1st, The coil spring, O, in combination with the shaft, C, nut, P, and spring, Y, or their equivalents, for the purpose of moving the form, D, backward regularly and for adjustment substantially as set forth.

2d, The oscillating frame, A, in combination with the basket form, D, and weaving devices, substantially as and for the purpose set forth.

3d, The yoke, B, in combination with the shafts, C C', for the purpose of holding or clamping the form, D, as specified.

4th, The feed bar, M, in combination with the separator, I I', substantially as described and set forth.

5th, The guide, H H' H'', substantially as and for the purpose specified.

6th, The fork, I I', as and for the purpose specified.

7th, The weaving wheel, L, in combination with the separator, I I', when constructed to separate and keep the uprights, E E etc., in position to receive the filling, Y, as set forth.

8th, The controlling band, F, constructed as described as and for the purpose set forth.

9th, The peculiar construction of the shank, 7 and 8, forming the opening, K, as and for the purposes set forth.

10th, The frame, U, carrying the weaving devices, and pivoted so as to turn about a center, as and for the purposes set forth.

68,696.—MILK AND OYSTER CAN.—John Buckley, Baltimore, Md., assignor to Thomas J. Logan, Washington, D. C.

I claim the tube, F, resting on the concave bottom, B, of the can, A, and extending to the top of the can, being held in position by means of the pressure of the cover, D, and prevented from moving laterally by means of the downward extending rim, E, on the cover, D, substantially as described.

68,697.—DITCHING PLOW.—W. R. Clark, Indianola, Ill.

I claim the foot piece, B, having its forward end made forked to incline the dirt and other obstruction toward the center, in combination with the brace bars, E F C and D, side elevators, G H, and side wings, J K, substantially as described for the purpose specified.

68,698.—MACHINE FOR GRINDING LATHE ARBORS.—Charles Coester, Jr., and A. R. Lawther, Bridgeport, Conn.

We claim the extension plate, I, and supporting plate, I, pivoted together in combination with the adjustable supports, S C, and spring, V, tool holder, A, grooved bed, D, having shank, B, sliding carriage, E, friction pulleys, L H F, and grinding wheel, R, whereby the angle at which the grinding wheel is applied to the mandrel is adjusted, substantially as described for the purpose specified.

68,699.—DRAFT NECK-YOKE.—Ambrose B. Coleman, Lyndville, N. Y.

I claim the whole of the improved draft neck-yoke as herein described in this specification as and for the purpose set forth.

68,700.—CAR BRAKE.—Thomas B. Comins, Jr., Lowell, Mass.

I claim the eccentrics, G, attached to the ends of the shoe bars, substantially in the manner and for the purpose herein shown and described, the said eccentrics being free to turn on their pivots and weighted substantially as and for the purpose herein shown and described.

3d, The spring, F, in combination with the shoe bars, E E', and eccentrics, G, all made and operated substantially as and for the purpose herein shown and described.

68,701.—CAR BRAKE.—Thomas B. Comins, Jr., Lowell, Mass.

1st, I claim the eccentric, G, when secured to the ends of the shoes, F, substantially as herein shown and described.

2d, The construction and arrangement of the vertical springs, s, supporting the shoe bar, E, horizontal bar, e e, lever, d, and spring, g, between the outer head of the bolt, f, and shoe bar, E, as herein set forth for the purpose specified.

68,702.—APPARATUS FOR VAPORIZING AND BURNING LIQUID HYDRO CARBONS.—Frederic Cook, New York City.

1st, I claim the steam and oil pipes, L and N, having the connecting valve, V, for the purpose specified.

2d, A combination chamber for burning liquid hydrocarbons, made of fire clay or its equivalent, in sections or staves, in the manner and for the purpose as shown and described.

3d, The inverted chamber or hood, k, when arranged for the purpose and in the manner shown.

4th, In the apparatus for burning liquid hydrocarbons, the arrangement respectively of the steam pipe, L, and oil pipe, n, for the purpose of volatilizing the lighter portions of the oil by the heat of steam.

68,703.—VAPORIZING AND BURNING LIQUID HYDROCARBON.—Frederic Cook, New York City.

1st, I claim a retort or vaporizing chamber for oil burning furnaces the upright portions of which are made of water legs or pipes communicating with the boiler, and the bottom of iron fire clay or other suitable material as a vaporizing surface, substantially as shown and described.

2d, In an apparatus for vaporizing and burning hydrocarbon liquids, I claim a retort or chamber having a removable bottom plate as set forth.

3d, The retort or vaporizing chamber suspended from the boilers substantially in the manner specified and shown.

68,704.—APPARATUS FOR BURNING PETROLEUM AND FLUID MADE THEREFROM.—Frederic Cook, New York City.

I claim the use of plates and deflectors or either of them within the retort thereby forming compartments therein for the purpose of retarding the flame and producing a more perfect combustion.

The use of retorts having perforations for the admission of air in combination with the flats or compartments substantially as described for the purposes set forth.

I claim the construction and arrangement of the oil supply pipe, H, with its connections. The cooler, H', and the regulating valves, J Y, substantially as described.

I claim protecting the oil feeding pipes and apparatus from the heat of the furnace by the fire clay tile or other suitable material substantially as described.

I claim the general construction of the apparatus described and shown.

68,705.—METHOD OF USING LIQUID HYDROCARBON AS FUEL.—Frederic Cook, New York City.

1st, I claim producing the requisite pressure in the oil tank by means of the steam pressure in the boiler substantially as described.

2d, In an apparatus for burning petroleum or other inflammable oils, I claim forcing the oil into the furnace by means of artificial pressure in a supply tank substantially such as is herein described, said pressure being created in any of the modes herein mentioned.

68,706.—APPARATUS FOR BURNING PETROLEUM AS FUEL.—Frederic Cook, New York City.

1st, I claim in a furnace for burning petroleum or other liquid hydrocarbons as fuel the feeding apparatus connected with, and arranged as a part of the furnace door.

2d, The employment of a cutter or cleaner for the purpose of cleaning the oil pipe substantially as set forth.

3d, The arrangement of the deflecting till, W, when used for the purpose and in the manner substantially as described and shown.

4th, The air distributing tiles when perforated and arranged substantially in the manner as described.

68,707.—METHOD OF BURNING HYDROCARBON OILS AS FUEL.—Frederic Cook, New York City.

1st, I claim the arrangement substantially as described by which water is applied and evaporated by the plates, Q Q, or other equivalents when used for this purpose substantially as set forth.

2d, The cap, M, arranged within the cup, G, and perforated as described so that air may be forced through it for the purpose and in the manner specified.

3d, The pipe, N, arranged as and for the purpose described, in combination with its two connections one with the steam space, and the other with the water space of the boiler.

4th, In combination with the air chamber, J, I claim the air pipes, K, through the water legs of the boiler for the purpose of introducing air into the furnace substantially as described.

68,708.—PROCESS OF VAPORIZING AND DECOMPOSING HYDROCARBON LIQUIDS IN THE PRESENCE OF STEAM.—Frederic Cook, New York City, and John A. Bassett, Salem, Mass.

1st, We claim in an apparatus for decomposing hydrocarbon oils with steam the arrangement and construction of the apparatus shown having the several parts or their equivalents arranged and operating together in the manner and for the purpose specified.

2d, The process herein described whereby hydrocarbon oils and steam are decomposed simultaneously into gases, and used in the production of heat as set forth.

68,709.—MACHINE FOR MAKING CHAINS.—Josiah Copley, Jr., Allegheny City, Pa. Antedated Aug. 12, 1867.

1st, I claim an improved machine for forming links for chains that shall grasp the iron supplied to it from the link, cut the scarf, and give the desired overlap for welding, and continue to feed up the iron until it is entirely expended in forming links constructed, arranged and operating substantially in the manner herein described and set forth,

2d, The combination of the collar, a, mandrel, c, rib, s, constructed, arranged and operating substantially as herein described and for the purpose set forth.

Also the support, y, or its equivalent when used for supporting the mandrel operated by means and in the manner substantially as herein described and set forth.

Also the combination and arrangement of the springs, B1 and B2, rod, w, spring clamp, J, feed guide, x, and piece, k, constructed, arranged, combined and operating substantially in the manner herein described and for the purpose set forth.

Also the combination of the shronds, C', cross piece, J', and latch, R2, when used in connection with the wheels, D and D', as herein described and for the purpose set forth.

68,710.—SNAP HOOK.—Enoch Covert, Farmer Village, N. Y.

I claim the spring, C, applied to the top of the closing bar, B, and secured in position by means of the lips, b, whereby the introduction of dirt beneath the spring is prevented and said spring adapted to be removed from the hook, A, without removing the closing bar as herein shown and described.

68,711.—WATER ELEVATOR.—J. W. Crannell. Yorkville. Mich.

I claim the combination of the loose flanged drum, D, and attached rope and bucket with the crank shaft, S, clutches, o o, shifting brake lever, L, pivot stud, G, and hook, H, arranged, constructed and operated, substantially as and for the purpose herein specified.

68,712.—EXPANSIBLE HOSE NOZZLE.—Chas. Crook, Yonkers, N. Y. Antedated Sept. 4, 1867.

I claim the comoination of the duplex inner tube with the split nozzle, substantially as shown and described.

Also in combination therewith the means of adjustment substantially as shown and described.

68,713—STEAM ENGINE SLIDE VALVE.—Wayne CurryS, pringfield, Mass.

I claim the valve, D, having the vertical ports, F F', in combination with the valve case, A, the packing ports, a and a, and a spring, n, all constructed and operating substantially as described and for the purposes herein specified.

68,714.—CHAIN CLASP FOR HANDLING HOGS IN SLAUGHTERING.—P. W. Dalton, Jersey City, N. J.

I claim the slotted plate, A, the key, B, the rings, f g, and the chain, c, constructed and arranged substantially as herein shown and described for the purpose specified.

68,715.—LINING OR "FIX" FOR PUDDLING AND BOILING FURNACE—Samuel Danks, Cincinnati, Ohio.

I claim the use of puddlers or boilers tapping cinder, squeeser, cinder or hammer cinder, and pulverized iron ore when mixed with an alkali, or alkalies such as lime, common salt, soda or potash separately or combined for lining or fixing puddling or boiling furnaces.

68,716.—KILN FOR BURNING CLAY PIPES.—John Dimelow, (assignor to himself T. P. Stuard, and J. Stuard, Philadelphia, Pa.

1st, I claim a kiln having fire places, a, a chimney, C, and rings, l, or their equivalents, the whole being so arranged that the products of combustion in their passage from the fire places to the chimney must pass both through and around the pipes, m, resting on the said rings for the purpose specified.

2d, The ribs, h h, rings, l l, and bridge, f, arranged within a kiln in respect to the fire places and chimney substantially as and for the purpose set forth.

68,717.—SHIFTING RAIL FOR BUGGY SEAT.—Caspar Disser, West Union, Ohio.

I claim the combination of a carriage seat and rail when constructed and provided with hooks and catches substantially as and for the purpose specified.

68,718.—RIDING ATTACHMENT FOR PLOWS.—Lorenzo Doming, Ottawa, Ill.

I claim the attaching of the plow to the draft pole, A, of the riding attachment through the medium of the bell crank, J, rods, l B, and lever, M, or their equivalents for raising the front end of the beam in connection with the suspended rack, R, and the bar, P, jointed or hinged to the draft pole, A, and connected with the plow beam by the stirrup, O, substantially as and for the purpose specified.

2d, The cam, S, on the axis or fulcrum pin of the lever, L, in combination with the suspended rack, R, and fixed pawl, b, all arranged substantially as and for the purpose set forth.

3d, The axles, B B', projecting from opposite sides of the draft pole, A, at different points and braced by the diagonal bar, C, when said parts are used as a riding attachment for a tillage plow, substantially as and for the purpose specified.

68,719.—STEAM ENGINE LUBRICATOR.—C. W. Doten, East Boston, Mass.

I claim the valve stem, B, with its valves, C and d, the tubular spindle, C, with its apertures, o and h, connected with the valve stem as shown the whole constructed arranged and operating substantially as set forth in combination with the shell, A.

68,720.—CEMENT COMPOUND.—John Fairchild, Eagleville, O.

I claim the composition herein described, compounded in the manner and for the purpose set forth.

68,721.—STEAM ENGINE.—John Fairclough, St. Joseph, Mo.

I claim the valve, B, constructed as described and operated by means of the cylinder heads through the rods, D, as herein set forth for the purpose specified.

2d, The steam chest, C, and the steam and exhaust ports, a a and h, within the piston, substantially as described.

3d, The piston, A, having the slide valve steam chest and steam ports arranged within it substantially as described in combination with a steam cylinder, substantially as and for the purposes set forth.

68,722.—FRUIT SAFE.—H. T. Field, Worcester, Mass.

I claim the fruit safe composed of the peculiarly constructed trays in connection with the cases as shown, the whole constructed and operating in the manner and for the purposes as above set forth and described.

68,723.—SIDE BOARD AND REFRIGERATOR.—J. B. M. Fifield, Philadelphia, Pa.

I claim a side board having a refrigerator or water cooler or bath combined with it substantially as and for the purpose specified.

I also claim the combination of a side board, refrigerator and table as herein shown and described.

68,724.—VALVE GEAR FOR STEAM ENGINE.—J. R. Fish, Fort Wayne, Ind.

I claim the guide, A, placed in an upright position and perpendicular to the line of motion from the driving shaft upon which guide the link is raised and lowered substantially as shown and described.

2d, I claim the combination and arrangement of the guide, A, horizontal guide, C, and blocks, B D, substantially as described for the purpose specified.

68,725.—MACHINE FOR LINING PERCUSSION CAPS.—Andrew J. French, Waterbury, Ct., assignor to Waterbury Brass Company.

1st, I claim the reversible worm, G, with its sleeve, e, working upon the grooved shaft, D, and provided with an oscillating dog, g, substantially as set forth.

2d, The device for feeding the frame, F, consisting of the sleeve, e, worm, G, ratchet bar, f, shaft, D, all made and operating substantially as herein shown and described.

3d, The sliding toothed bar, f, in combination with the reversible worm, G, and stops, o o', for the purpose of retaining the punch in position, so as to line the first cap in a new row, all as set forth.

4th, The device for feeding the plate, B, consisting of the recessed disk, L, on shaft, M, and of the pawl, r, on swinging-frame, I, all made and operating substantially as herein shown and described.

68,726.—GATE.—Daniel Fuller, Oakwood, Mich.

I claim the levers, D and F, and H I, with their cords, E G and J K, when arranged with the gate posts and their pulleys, and the gate with its slats pivoted to the rear post, the whole operating as and for the purpose specified.

68,727.—FOUNTAIN PEN HOLDER.—P. Gabriel, Seymour Ct.

1st, I claim the float, M, constructed as described, sliding nearly the entire length of the case, A, and arranged in relation with the plug, B, as herein set forth for the purpose specified.

2d, The construction of the stopper, C D E, substantially, as herein described, and so as to be used for the purpose, and so be susceptible of the adjustments herein specified.

68,728.—WEIGHING SCALE.—C. E. Gage, Fond du Lac, Wis.

1st, I claim arranging a bag holder, D, in connection with the suspension rods of the scale, as and for the purpose specified.

2d, Balancing the scale with an adjustable weight, d, in a verticle mortise in the rear of the beam as described.

68,729.—EVENER FOR WHIFFLETREES—Merrit Gally, Marion, N.Y., assignor to Orris Potter and Frederick Grandin, of Walworth, N.Y.

I claim the curved projections of the body of the evener (E' E'), the pivoted clevises for the attachment of straps or chains, in combination with the lever projections (C C), and constructed as herein set forth.

68,730.—FRAME FOR MIRRORS.—O. L. Gardner, N. Y. city.

1st, I claim a frame for mirrors, etc., in which the side-pieces are arranged to be adjusted with regard to each other, substantially as, and for the purposes described.

2d, I also claim the groove or rabbet, s, having beveled side pieces arranged for adjustment of a frame for mirrors, etc., substantially as and for the purpose described.

68,731.—COAL STOVE.—F. Gilman, Minneapolis, Minn.

1st, I claim constructing the side and end plates of a stove, in two parts each, in such a manner that when the parts are put together, air tubes or apertures shall be found between them substantially as herein described.

2d, The construction and arrangement of the perforated top and bottom plates, and channeled or corrugated side plates as herein set forth for the purpose specified.

3d, I also claim the sunken ash-pit and the grate, in combination with a heating stove, constructed and arranged substantially as shown and described.

68,732.—CLOTHES WRINGER.—F. A. Gleason, Brooklyn, N.Y.

I claim the particular construction and operation of the cranks (a a), and their couplings (b b), as connected with the perpendicular bar (c), and in combination therewith the lever, C, and its cam, D; all substantially as herein specified.

68,733.—STEAM ENGINE VALVE.—G. L. Grant, Rockville, Ct.

I claim the arrangement of the lugs, a and b, when the same are made and operating substantially as and for the purpose herein shown and described.

68,734.—ICE CREAM FREEZER.—J. Gray, Milwaukee, Wis.

1st, I claim the combination with the rotating cylinder, B, and outer box or case, containing frigorific mixture, of a roller, E, arranged for operation within the cylinder substantially as and for the purpose herein set forth.

2d, Suspending the roller, F, in a free or adjustable manner by a socketed support of the same for adjustment of the latter retatively to the interior of the rotating cylinder, B, essentially as specified.

3d, The combination of the roller, F, and its frame, with the bar, H, supported by a spring, the tension of which may be regulated by a screw for operation in connection with a rotating freezing cylinder, substantially as herein set forth.

4th, The gatherer, L, constructed and applied for action within the cylinder, B, by means of outside guides on or down which said gatherer is allowed to freely slide, essentially as and for the purpose specified.

68,735.—CLOTHES DRYER.—James Greenhalgh, Jun., Glendale, R.I.

I claim making the horizontal bars, B, of the drying frames in two pieces, hinged at the centre, and hinged at their ends to the central post, A, and vertical bars, C, of the said frames, substantially as herein shown and described, and for the purpose set forth.

68,736.—BREECH LOADING FIRE-ARMS.—Edwin F. Gunn, Charleston, S.C.

I claim the lever, F, and sliding retractor, d, arranged in combination with the laterally swinging chambered breech block, D, all constructed and operating substantially as herein described for the purpose set forth.

68,737.—COCK EYES.—John Haggerty, East Springfield, Pa.

1st, I claim the spring bolt, B, set in the bed, A, and in combination with it in manner, and for the purposes as above set forth and described.

2d, The bed, A, bolt, B, spring, b, and plate, C, or its equivalent, forming together a spring cock-eye, all substantially and for the purposes above set forth and described.

68,738.—DAMPER FOR STOVE-PIPES.—W. Hailes and P. Finkle (assignors to Peter Finkle), Albany, N. Y.

We claim the construction and application of a damper in the form of a wind-wheel, with oblique wings fitted to revolve within the pipe flue or chimney of a stove or furnace, substantially as described and for the purposes set forth.

68,739.—MUSKETO GUARD.—Horace Harris, Newark, N. J.

I claim frame, A, made of wire or other equivalent material secured to the top of the head by the strings, B, B, or otherwise, and the projection, C, in front in combination with the netting, D, substantially in the manner and for the purpose specified.

68,740.—POWER HAMMER.—Thomas B. Harrison, Maquoketa, Iowa.

1st, I claim the cut-off valve, D, consisting of the plug, H, shell, U, and casing, J, in combination with the air cylinder, Y, arranged and operating as described.

2d, The combination of the spring-box, S, spiral springs, piston, T, and rubber springs, C C, arranged and operating as described.

3d, The combination of the fixed air cylinder, Y, with the piston rod, A, spring-box, S, forked connecting rod and crank, P, constructed and operated substantially as described.

68,741.—FEED REGULATOR FOR SPINNING MACHINES.—Christopher Herrschaft, Brooklyn, N.Y.

1st, I claim the combination, with a clutch or other mechanism, controlled by the drawing rolls, and serving to throw in or out of gear with the driving shaft, C, wheels or pinions, F F,' of the secondary or gill bar operating shaft, H, having gear, G G,' the one of which is connected with its shaft by pawl and ratchet, L K, for operation in connection with the gear of the driving shaft, C, to give a fast or slow motion to the gill bars, substantially as specified.

2d, The combination of the fast wheel, G, and loose wheel, G', with its pawl and ratchet, L K, loose wheel and pinion, F F', with their clutches E E', D D', and clutch arms, or levers, I I', so arranged and operated by mechanism connected with the drawing rolls, as that the one lever may be acted upon in advance of the other, or both, simultaneously, essentially as herein set forth.

68,742.—WASHER FOR BOLT.—Gibbons G. Hickman, Coatesville, Pa. Antedated Sept. 10, 1867.

I claim the washer, B, provided with a spring recessed in its face, and operating substantially as described.

I claim a metal washer, made in two separate pieces, the lower one provided with a spring as described, and the upper one turning with the nut and retained by the spring as described and represented.

68,743.—SHEEP SHEARS.—G. Hilgar, Brownington, Pa.

I claim the manner herein shown and described of attaching the central cutter, I, to and connecting it with the ordinary cutters, D and E, by means of the pin, d, lever, G, and stud, F, or its equivalent, all made as set forth.

68,744.—J. P. Hoagland, and George E. Moser, Centralia, Pa.

We claim, 1st, The sheller formed by the combination and arrangement of the stationary sheller plate, I, sheller wheel, H, and hopper or shute, J, with each other, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the sheller wheel, H, shaft, F, fly wheel, G, cog wheel, E, cog wheel, D, shaft, B, drive or crank wheel, A, band, P, pulley, R, and fan shaft, S, with each other, for the purpose of operating the sheller and fan by the same power, substantially as herein shown and described.

68,745.—VALVE FOR STEAM ENGINE.—George W. and Elisha Hopkins, Brooklyn, N. Y.

We claim, 1st, The combination with a shifter, F, operated as described, of a valve, H, in gear with the shifter for controlling the throw of the main valve or valves, as herein set forth.

2d, The shifter, F, driven as specified, valve, H, operated thereby, piston, J, or its equivalent and independent main valves, K K', with their several ports or passages, all for operation together, essentially as described.

68,746.—LIQUID AND FLUID METER, AND METHOD OF OPERATING VALVES.—J. C. Horton, New York city, and S. K. Hawkins, Lansingburgh, N. Y.

We claim, 1st, In combination with a measuring cylinder and reciprocating piston, the hollow oscillating valves so constructed as to operate alternately as induction and eduction valves, substantially as described.

2d, We claim the reciprocating grooved plate, F, in combination with the oscillating valve, arms, J, bar, K, stud, K', and the levers and spring by which said stud is thrown from one groove to the other, substantially as described.

3d, We claim the reciprocating grooved plate, F, in combination with the stud, K', and the levers and spring by which said stud is thrown from one groove to the other, substantially as described, as a means of operating oscillating valves.

4th, We claim the hollow oscillating valve, V, with its single port, V', so constructed as to operate alternately as an induction or eduction valve, to regulate the flow of any kind of liquids or fluids, substantially as described.

68,747.—STEAM ENGINE.—S. W. Hudson, Packer Tw'p, Pa.

I claim, 1st, The cylinder provided with tapering steam openings, for the purpose and substantially as described.

2d, The cylinder provided with the depression in the side opposite to the triangular steam opening, substantially as and for the purpose described.

3d, The piston, provided with the rings, F, having flanges imbedded in grooves of the piston head, and with their peripheries extending to the ends of the piston, as and for the purpose described.

68,748.—STEAM ENGINE.—S.W. Hudson, Beaver Meadow, Pa.

I claim, 1st, The narrow steam openings, E E, arranged lengthwise, on the interior surface of the cylinder, so as to be gradually uncovered by the motion of the steam piston, as herein described.

2d, A vertically oblique wall, or side, e, to the steam port, to adapt the steam passage, to enlarge in an increasing ratio as said passage is opened by the piston for the admission of steam to the cylinder, substantially as described.

68,749.—CORN STALK CUTTER.—Almon Hunt, Macomb, Ill.

I claim, 1st, The frame, A, provided with the plate, H, arranged substantially as described, for the purpose of cutting, breaking, or bending down the stalks as set forth.

2d, I claim the combination of the stationary curved hooks, or blades, E, with the movable blades, a, the latter being operated by the motion of the machine, said parts being constructed and arranged for joint operation, substantially as described.

68,750.—LIFTING JACK.—Albert Jackson, Clifton Springs, Ill.

I claim a lifting jack, composed of the uprights, A A, base piece, B, slide, E, and the lever, C, provided with the eccentric, D, all being combined and arranged to operate in the manner substantially as and for the purpose set forth.

68,751.—WINDOW SHADE.—T. B. James, Muscatine City, Ia.

I claim constructing window shades with quadrilateral prismatic sticks, A, arranged and woven together, substantially as set forth.

68,752.—GATE FASTENING.—W. Kimble, Salem, Ohio.

I claim the arrangement of the long latch, b, in combination with the handles, c c, and the spring, h, for fastening a gate by catching in the hook, g, placed on the heel post, B, substantially as herein described.

68,753.—WATER ELEVATOR.—A. H. Knapp, Newton, Center, Mass.

1st, I claim the two sprocket wheel, or wheels, or pairs of sprocket wheels, C D, situated on different shafts at equal hights, and at sufficient distance apart to allow the water to be discharged between them into the reservoir or spout beneath, when arranged in relation to the buckets or cups in clusters, substantially as and for the purpose herein specified.

2d, I also claim the arrangement of the buckets or cups, in two clusters or groups, on opposite parts of the chain, the remaining portions of the chain being without buckets, or cups, substantially as and for the purpose herein set forth.

3d, I also claim the arrangement of side gearing, p r s t, at the main shaft, E, in combination with the coupling, n, and shifting device, l m, or the equivalents thereof, for the purpose herein set forth.

4th, I also claim the chain guides, j k o, separately, or together as arranged, in relation to the chain and buckets, or cups, substantially as and for the purposes herein specified.

5th, I also claim the chain, A, the wheels, C D, and the cross bars of the links extending across, and resting in notches, v v, of the wheels, all arranged as set forth.

6th, I also claim the buckets or cups held by the bent links, c c, and so arranged that their centers are nearly opposite to the points between the links, substantially as and for the purpose herein specified.

7th, I also claim the buckets or cups, with notches or indentations in the bottoms, in combination with the bent links, for the purpose set forth.

8th, I also claim the guide wires, or rods, g g, which pass around and wire one-half of the edges of the several buckets or cups, and clasp the middles of the supporting links, the links being bent at the joints therewith, substantially as and for the purpose herein set forth.

9th, I also claim the open spaces, w w, in the edges of the wheels, intermediate between the chain-bearing notches, v v, for the purpose herein set forth.

10th, I also claim the suspended buckets or cups, with flattened inner edges, as arranged upon the wheel or wheels, substantially as and for the purpose herein set forth.

68,754.—MECHANICAL MOVEMENT, OR SUBSTITUTE FOR COG WHEEL.—George H. Knight, Cincinnati, Ohio.

1st, I claim the mode of producing corresponding opposite rotations of two shafts, pistons, or rollers, by equal connection, to a stud or link restricted to a rectilinear path, substantially as set forth.

Second, Securing corresponding opposite rotation of two shafts or other objects by eccentric wrists, B B', connected by pitmen, L L', I I', to studs, H h, guided to vertical paths by links, G g, and arms, C C' c c', substantially as set forth.

68,755.—PLOW POINT.—Hinrick Kniphals, Davenport, Iowa.

1st, I claim the application of a hollow iron or steel point, C, to a plow from which the point is worn away by use, to restore the proper form, and

2d, The hollow point, C, applied to a plow which is broken or breaking apart at the point not only to restore its true form, but also to bind the parts together firmly, at the same time covering the break, and presenting a smooth surface to the earth, which slides over it.

68,756.—TRACE BUCKLE.—E. F. Lacy (assignor to himself and S. D. Thompson), Danville, Ill.

I claim the clasp, in combination with the wedge having a tongue, substantially as and for the purpose described.

I also claim the spring or its equivalent in combination with the above, substantially as and for the purpose specified.

68,757.—THILL COUPLING.—Cook C. Lawrence, Homer, Mich.

I claim the plates, g g', provided with disk segments, e e', in combination with the slotted clip plate, b, constructed and operating substantially as herein described.

68,758.—ARTIFICIAL LEG.—Leonhard Legran, Alleghany City, Pa.

I claim the arrangement of the toe-springs, l m and n, hinge, 14, elastic bands 5 and 6, cords, w and y, cross pieces, 8 and 9, and check cord, 11, when used in connection with the leg, A, and foot, C, the whole being constructed, arranged and operating substantially as herein described and for the purpose specified.

68,759.—BEE HIVE.—Volney Leonard, Springfield, Pa.

I claim a trap for catching queen bees during the time of swarming, composed of a shallow box provided with the slides and a glass in the top, all arranged substantially as herein set forth.

68,760.—CORN DROPPER.—Charles E. Lipe, Fort Plain, N. Y.

I claim the strap, H, and roller, I, in combination with the handle, F, and seed slide, B, all being arranged and applied to a box or seed receptacle, A, provided with a cut-off brush, D, or its equivalent, to operate in the manner substantially as and for the purpose set forth.

68,761.—GRAIN MEASURE.—N. M. Lurton, Newbern, Ill.

1st, I claim the receiving box or hopper, A, and the measuring box, B, arranged substantially as described in combination with the revolving wheel, C, the pointer, f, and the screen, E, when used for the purposes specified.

2d, I claim the indicating wheel, C, and pointer, f, as and for the purposes described in combination with the boxes, A and B.

68,762.—MACHINE FOR ROLLING WHIPS.—Justus P. Luther, Berlin, Wis.

1st, I claim the application of a pitman driver by steam or other power to a block for rolling whip lashes moving at right angles with the lash, substantially as specified.

2d, The application of inclined planes at each end of the block for rolling whip lashes to the elevating rollers, n n, or any equivalent device so as to lift the block and allow the lashes to slide substantially as specified.

3d, The combination of the pitman, v, and rolling block, m, rollers, n n, driving post, p, main lever, u, hand bar, i, hands, x x, ratchet wheels, s s, and small pulleys, e e, so as to roll the lashes and slide them under the rolling block.

68,763.—FOG ALARM.—J. C. Lyons, New York City.

I claim in combination with an air pump and whistle, as set forth, a flexible and elastic air chamber or reservoir for the purposes set forth.

The reservoir constructed with the head blocks, F G, rods, H H, and covering, C, in combination with the whistle, A, and pump, B, substantially as set forth.

Covering the flexible tube connection with short sections of metallic tubing as and for the purpose set forth.

68,764.—HOES.—Charles Maham, Grand Island, Cal.

I claim a hoe constructed as herein described as a new article of manufacture.

68,765.—EAVES TROUGH BRACKET.—John Marshall, Hartland, Mich.

I claim the brackets, D and E, combination with the strap, H, and the strap, K, folding over the trough and in securing it to the roof substantially as and for the purpose described.

68,766.—CONVERTIBLE WAGON SEAT.—Chelton Matheny, Greensburg, Ind.

I claim the wagon seat convertible into a manger or into a tail-board, substantially as set forth.

68,767.—FLOOD GATE.—C. B. McKinney, Houston, Ohio.

I claim a flood gate having the float, d, composed of the flat platform, d', and the inclined side piece, d", firmly fixed to each other, and the float thus constructed being firmly bolted to the bottom of the gate, substantially as and for the purpose specified.

68,768.—SHAFT COUPLING.—W. S. McKinney, Cincinnati, O.

I claim the combination of the screw threaded and lipped sleeve, D, with the screw threaded clutch, B, and plain clutch, C, as and for the purpose herein described and represented.

68,769.—WASHING MACHINE.—J. F. Melcher, Bloomington, Ill.

1st, I claim the double spurred wheel, D, constructed with arched spokes for receiving the pinion, G, and also with radical arms or handles, D', substantially as described.

2d, The combination of the batten, C, provided with holes, a a1 a2, with the cover, B, and with double spurred master wheel, D, pinion, G, and a vertical rotary rubbing device, substantially as described.

3d, The construction of the rotary rubbing device of bars, d d, blades, g g, and a U shaped device, J, substantially as described.

68,770.—COMPOSITION FOR ELASTIC HAND STAMP.—George H. Mellen, Alexandria, Va.

1st, I claim the combination of the above named ingredients to form, when boiled, a new and useful composition of matter for the purpose above specified, substantially as described.

2d, The method of casting said composition when boiled, substantially as described.

68,771.—WARDROBE TRUNK.—Charles Memmert, Georgetown, D. C.

1st, I claim the pieces, D and E, in combination with a trunk, applied and operating substantially as described.

2d, The wardrobe trunk consisting of the body, A, lid, B, rim, C, pieces, D E, tray, f, and cover, g, all applied and operating substantially as described.

3d, In combination with the above the metal rim, C, forming the bearing for the pieces, D E, and doors, f g, substantially as described.

68,772.—EXTENSION BED FOR FARM WAGON.—Samuel W. Meredith and David Mulligan, Greensburg, Ind.

I claim in combination with a wagon bed, A, a folding tail piece, C, permanently attached thereto by hinges, C', and the side boards, D, hinged to the tail piece, C, substantially as and for the purpose set forth.

2d, The combination and arrangement of the bed, A, hinged tail-piece, C, with sides, D, hinged thereto, segment, E, and staples, F, substantially as and for the purposes set forth.

3d, The combination and arrangement of the tail-piece with hinged sides, the wagon bed and the spring catches, I, substantially as and for the purpose set forth.

68,773.—MACHINE FOR DRIVING SPOKES IN WAGON WHEELS.—G. W. Miles, (assignor to Hosler, Miles & Co.,) Michigan City, Ind.

I claim the combination of the rotating shaft, P, having the hammer attached thereto, with the vibrating frame, N, eccentric, Q, and post, T, or its equivalent, when arranged to operate substantially as described.

68,774.—ATTACHMENT FOR BREAST COLLAR.—R. E. Miles, Louisville, Ky.

I claim a plate provided with the loops and applied to a breast collar substantially in the manner and for the purpose set forth.

68,775.—HARVESTER.—C. G. Miller, Springfield, Ohio.

I claim the combination of the plate, M, block, S, and, arm, Q, substantially as and for the purpose set forth.

Mounting the cutters crank shaft and driving pinion upon the coupling plate, M, as and for the purpose set forth.

The carriage, p, in combination with the rod, K, bar, I, and endless chains, L, all constructed as set forth.

The combination of the rake arm, o, shifter, q, weighted lever, r, and latch, a, to change the connection from one part of of the chain, I, to the opposite and thereby reverse the motion of the rake substantially as set forth.

The combination of the rake arm, o, with the curved arm, r, the notched bar, I, rod, K, carriage, p, and the spring bar, w, all constructed as and for the purpose set forth.

The open head reel, N, constructed with jointed arms and adjustable jointed blades in the manner set forth so as to permit the attachment to expand the same for the purpose of making it sweep nearer to or further from the platform and cutters as set forth.

The movable head, h, connected to the reel arms by short arms, l, and moved back and forth by the pinion, k, and rack, l, as and for the purpose set forth.

The bolt, e', with the nut, g', in combination with the hinged tongue, C, and pin, h', substantially as and for the purpose set forth.

Making the nut g', with an angular portion and a cylindrical portion so that the wrench, k', may be shifted theron without removing it entirely from the nut.

68,776.—DEVICE FOR SETTING ANIMAL TRAPS.—Israel Miller, Bryan, Ohio.

1st, I claim the shaft, A, furnished with the flange, a, or its equivalent in combination with the baiting rod, B, substantially as described.

2d, The cap, D, in combination with a flanged shaft, A, or its equivalent, substantially as shown and described.

68,777.—CARRIAGE PLOW.—Horatio Minuse, Milan, Ohio.

I claim the special arrangement and combination of the herein described plow and carriage, when operated in the manner and for the purpose substantially as set forth.

68,778.—SHAFT COUPLING.—Foster Nevergold, & David Brosey, Pittsburg, Pa.

1st, We claim the combination of boxes, C C', when both are constructed and arranged as and for the purpose set forth.

2d, The combination of sliding block, d, with lever, h k, substantially in the manner set forth.

3d, the lever, k, in combination with coupling block, C', as and for the purpose described.

4th, Coupling box, C C', sliding block, d, levers, h k and f, all combined as and for the purpose specified.

68,779.—TOTAL INSULATION OF TELEGRAPH LINES AND APPARATUS.—G. W. Nichols, Chicago, Ill.

1st, I claim surrounding or covering the various parts of telegraph apparatus as specified and set forth with an insulating substance as and for the purpose specified.

2d, The insulation of the interior of the battery cup, A, substantially as described and set forth.

3d, The covering of the outer surface of the battery, when not made of an insulating material.

4th, The total insulation of the entire telegraph circuit for the purposes specified and set forth.

5th, The insulation of the relay magnet substantially in the manner specified.

68,780.—CARRIAGE JOINT.—Richard Nickson, Akron, Ohio.

1st, I claim the combination of the spring friction block, C, with the joint, substantially as and for the purpose specified.

2d, The hinged piece, a, and spring catch, b, in combination with the spring friction block, C, and the fixed friction piece, B, and the bar, A, substantially as and for the purpose specified.

68,781.—SNAP HOOK.—H. S. North, (assignor to himself and W. and B. Douglas, Middletown, Conn.

1st, I claim a snap hook having the rear end of the movable jaw extended beyond the axis or joint in combination with a bolt substantially as and for the purpose described.

2d, In snap hooks a movable jaw so constructed as to form a bearing for a spring arranged within the fixed jaw substantially as described and for the purpose specified.

3d, A snap hook provided with a bolt for locking its movable arm or jaw when such hook is so constructed and a spring is so arranged as to both throw said bolt and to close the movable jaw.

4th, A bolt so arranged in combination with so constructing a snap hook that it can be either secured in a position out of action or fastened when locked in the movable jaw or both, substantially as described.

68,782.—SLIDE FOR EXTENSION TABLE.—H. Olds, Syracuse, N. Y.

1st, I claim the combination of the stay pins, C, the cross shaped slides, A, and slide bars, B, substantially as and for the purpose specified.

2d, The combination of the stop bolt, D, coiled spring, E, and inclined groove or grooves, F, with the sliding bars, B, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the key, G, with the stop bolt, D, coiled spring, E, and groove, F, substantially as herein shown and described, and for the purpose set forth.

68,783.—VALVE FOR STEAM ENGINE.—C. R. and N. P. Otis, Yonkers, N. Y.

We claim the valves and passages essentially as herein shown and described consisting of the main piston valves, F F', with their passages, f f' e h l, and induction and eduction passages, a and b, within the valve chest, D, in combination with an outside reversing valve, H, arranged for operation together, substantially as specified.

68,784.—CULTIVATOR.—Ira A. Palmer, Monmouth, Ill.

1st, I claim the construction of the frame, A D C B, substantially as described and for the purpose set forth.

2d, The adjustable hook, z, as arranged and for the purpose described.

3d, The jaws, P P, knuckle, r" p," adjustable pin, a" l," and plates, T, constructed and arranged as described and for the purpose set forth.

68,785.—"CIGAR GAGE" AND "BUT CUTTER."—Henry Peterson, Chicago, Ill.

1st, I claim the double knife, H, arranged and constructed as described in combination with the lever, G, standards, E and K, and spring, L, the whole arranged and operating substantially as and in the manner herein set forth.

2d, The combination of the double knife, H, with the slotted trough, C, and the slide, D, the whole arranged substantially as and in the manner herein described and for the purpose specified.

68,786.—BREECH-LOADING FIRE-ARM.—Martial Pidault and G. Elleze dit Lagleze (assignors to themselves and J. F. Gevelot), Paris, France. Patented in France Sept. 26, 1866.

1st, We claim the combination and arrangement of the stationary socket, D, sliding chamber, A, with pin, a, and the hinged lever, E, substantially as described for the purpose specified.

2d, The stationary tube or socket, D, arranged within the sliding chamber A, to serve as a breech piece, substantially as herein shown and described.

3d, The combination of the hammer, G, with the catch, H, on the trigger and with the springs, R and R', all made and operating substantially as herein shown and described.

4th, The combination and arrangement of the slotted sliding rod, K, pin l, socket, D, and sliding chamber, A, substantially as described for the purpose specified.

68,787.—WRENCH.—C. T. Poulton, Danboro, Pa.

I claim the combination of the wrench, E, revolving sleeve, D, spindle, A, all constructed and arranged substantially as and for the purposes set forth.

68,788.—APPARATUS FOR AERATING LIQUIDS.—E. L. Pratt, Boston, Mass.

I claim, in combination with the concave plunger and the convex bottom, the apertures through the vessel, arranged and operating as air passages substantially as described.

68,789.—FLYING APPARATUS.—W. F. Quimby, Wilmington, Del.

I claim, 1st, The lateral or side and dorsal wings applied to the person in such a manner as to admit of said wings being operated by the combined action of the arms and legs, substantially as shown anh described.

2d, The means of connecting the lateral or side wings to the person consisting of the frames and joints, constructed and arranged substantially as shown and described.

68,790.—FENCE.—Thomas D. Read, Aberdeen, Ind.

I claim the pins, D D, which connect the panels, A A, at the top, as described, used in combination with the bed pieces, B, with their wedges, C, in the manner set forth.

68,791.—MORTISING MACHINE.—John Richards and Wm. H. Doane (assignors to J. A. Fay & Co.), Cincinnati, Ohio.

1st, I claim the pawl, w, for adjusting the treadle, arranged and operating substantially as described.

2d, The yoke, d, and devices, g m r and i, for reversing the chisel, as herein set forth and described.

3d, The roller, K, for feeding the stuff to the chisel, operating in the manner and for the purpose described.

68,792.—WINCH.—R. D. Rogers, Cape Elizabeth, Me.

I claim, 1st, The combination and arrangement of the shaft, f, pawl, p, ratchet, g, ratchet, h, lever, k, truck, j, pawl, m, and gear, i, with the gear, c, shaft, b, and barrel, a, all as and designed to operate in the manner and for the purposes hereinbefore set forth.

2d, In combination with the shaft, f, the latch, n, and its groove on the said shaft, as and for the purposes set forth.

3d, In combination with the shaft, b, and groove, e, the latch, d, as and for the purposes set forth.

4th, The combination of the arms, r s, head, t, and adjustable bolt, w, as and for the purposes specified.

68,793.—MILK STRAINER.—W. F. Rossman, Hudson, N. Y.

I claim a strainer of cloth, wire gauze or any other material attached to an adjustble band, A, with breast piece, B, and spout, C, and all constructed and combined substantially in the manner and for the purpose herein set forth.

68,794.—HOISTING APPARATUS.—William Rung, N. Y. City.

1st, I claim so arranging the hoisting chain and the device for operating it that two loops are suspended from the latter in one of which the hook pulley is arranged, the arms of this loop being laid over pulleys on two shafts, D and F, which are both revolved with exactly equal velocity and in the same direction, as set forth.

2d, The worm, I, and worm wheel, J, in combination with the shafts, D E and F, and gear wheels, k l and m, all made and operating substantially as herein shown and described.

3d, Providing the case, A, with folding lids, c and d, substantially as and for the purpose herein shown and described.

4th, The guards, r and s, in combination with the grooved pulleys, h and n o, respectively for the purpose herein shown and described.

5th, The projecting lugs, L L, when arranged on the case, A, of a hoisting apparatus, substantially as and for the purpose herein shown and described.

68,795.—HARNESS MOTION FOR LOOMS.—Charles Schilling, Auburn, N. Y.

I claim the combination and arrangement of the sliding plate, g, adjusting screws, f, cranks, a a', adjustable pitman rods, b b', piston rods, c c', and standard, C, substantially as described for the purpose specified.

68,796.—TRACE BUCKLE.—C. Schwaner, Keokuk, Iowa.

I claim the manner substantially as herein described and shown of constructing and arranging the two covered hinged frames constituting the buckle, in combination with clamp, g, and holding tongue, e.

68,797.—POWER HAMMER.—Thomas Scott, Madison Mills, and John Clarridge, Pancoastburg, Ohio.

1st, We claim the combination, substantially as shown and described, of the clevis, f, disk, c, spring, g, and sleeve, d, whereby the hammer may be reversed, substantially in the manner set forth.

2d, The arrangement of the several devices for producing the downward and upward stroke and the lateral movement, substantially as herein shown and described.

68,798.—CHURN.—Lewis W. Shaeffer, West Milton, Ohio.

I claim the arrangement of the several wings, B and C, on the arms, r and s, with reference to the vessel, A, in the manner substantially as and for the purpose specified.

68,799.—MILL GEARING.—Joseph Shickel, Harrisonburg, Va.

I claim the combination of the stationary master wheel, E, the pinions, D D D D and F, the spur wheels, B B C C, the arms, H H, and the whole substantially as above described, for the purpose of increasing the speed of the trundle head in mills, and the velocity of burrs.

68,800.—HORSESHOE.—Wm. H. Shurtleff, Providence, R. I.

I claim the the combination with a socket in the shoe body, of a removable calk, the parts being joined respectively so that the said calk shall lap over and protect the said socket, substantially in the manner herein shown and specified.

68,801.—GATE.—Sylvester Smith, Rockford, Ill., and A. Persels, Beloit, Wis.

We claim the gate, D, lever, E with bearing, e, spring, s, strip, o, yoke, h, pulley, l, chain, k, ropes, l, pulleys, b', and handles, m, when constructed and arranged as described.

68,802.—DRESSING CASE AND BATH TUB.—Caroline A. Staples, Boston, Mass.

I claim a dressing case and bath tub combined, constructed substantially as set forth.

68,803.—CULTIVATOR.—Mordecai Sweet, Richland, Ind.

I claim the arrangement of the shanks, K, with the shaft, F, with its arms, handle, and connecting rods, and with the levers, M M, substantially as and for the purpose set forth.

68,804.—GATE.—John M. Swift, Shelbyville, Ill.

I claim, 1st, A combination of road boards, 1, 1', cross tie, 7, bed pieces, 3, 3, wheel guides, 5, 5', 6, 6', ground boards, 2, 2', which I have called passover combination.

2d, The combination with the slide, 11, 11, the posts, 8, 9, and 10, the upper and lower channel guide boars, the channel in which the slide moves, and the upper surface of the cross tie, 7, which I have called the slide and channel combination.

3d, A combination of the two short and two long bulk posts with the two sliding bars, 21, 21, and the blocks, E f E t, which form the orifice for end of slide, which I have called the bulk combination.

4th, I claim the combination of the cord, 15, the tie knots, 16, the cord bed, C C, the cord pins, d d', the cord block, 13, the two eyelets, 14, 14, the ground posts, 17, 17', the tie blocks with the slips, 20, 20'.

5th, I claim and desire letters patent for the gate combined and constructed as set forth in the specification, description, and drawing.

68,805.—CHURN.—John G. Taylor, East Bethlehem, Pa.

I claim in a churn the combination of the adjustable frame, K, and movable bar, A, with the detachable dasher, E G, having the screw and nut, L, at the foot of the shaft, the whole being constructed and arranged as herein described.

68,806.—BRAKE FOR HORSE POWERS.—A. D. Tingley, Adrian, Mich.

I claim, 1st, Operating the brakes by a shaft passing down through the center of the drive wheel, substantially as herein shown and described.

2d, The combination of one or more shoes, C, arms or levers, D, ropes or chains, E, and shaft, F, with each other and with the drive wheel, B, substantially as herein shown and described and for the purpose set forth.

68,807.—VENTILATING DEVICE FOR CEILINGS AND WALLS.—O. S. Trexler, Naperville, Ill.

I claim, 1st, The cone, B, in combination with the tube, A, arranged substantially as shown and described, for the purpose set forth.

2d, The adjustable door, C, in combination with the tube, A, and cone, B substantially as and for the purpose specified.

68,808.—WAGON HUB.—W.C. Tucker, Richmond Switch, R.I.

1st, I claim the cup flanges, c e, on the back and front ends of the wagon hub, B, upon which are fitted the corresponding flanges, a, on the axle, A, and n, on the nut, d, as herein shown and described.

2d, In combination with the above I claim the stationary collar, m, and the adjustable collar, m', on the hub, B, combined and arranged as and for the purpose specified.

68,809.—PAPERING PINS.—G. L. Turney, London, Eng., assignor to S. A. Harshaw, New York city.

I claim as a new article of manufacture a pin book constructed as described, consisting of the separate leaves, B, secured together at one edge, C, their outer edges bent over to receive the pins, all inclosed in the cover, D, as herein set forth, for the purpose specified.

68,810.—PUMP.—Hiram Tyler, Gaines, N. Y.

I claim, 1st, The construction and arrangement of the receptacle, Q2, having separate openings, R S, supported upon the chamber, D, by the tube, P, the double bent valve plate, V, swinging upon the support, V2, and connected by the wire, X, passing through the tube, P, with the operating knob, W, as herein set forth, for the purpose specified.

2d, The plunger, E, constructed as described, consisting of the central elastic packing, G, clamped between the prong-shaped plate, H, and the perforated disk, F, as herein set forth, for the purpose specified.

68,811.—SKID AND FRICTION ROLLER.—Francis Vandoren, Adrian, Mich.

I claim, as an improved article of manufacture, a combined skid and friction roller, made and operating substantially as herein shown and described.

68,812.—PRESS.—C. Philip Wagner, New York city.

I claim, 1st, The combination of the screw, H, toothed segments, I I, toggle joints, J J1, and platens, K K, all being arranged for operation together essentially as herein set forth.

2d, The inner pressing board or plate, f, arranged adjustable with relation to the body of the platen, substantially as and for the purpose set forth.

68,813.—FLEXIBLE RAMMER FOR TURRET GUNS.—J. B. Walker, Elizabeth, Pa.

I claim, 1st, Constructing a rammer with a flexible rod or staff, D, when the same is formed and operates substantially as described.

2d, I claim the combination of the tube, B, curved grooved plates, C C, and rammer rod or staff, D, when the same are costructed and combined substantially as above set set forth and for the purpose specified.

3d, I claim the tube, B, curved grooved plates, C C, and rollers, e e, when the same are combined and arranged substantially as set forth for the purpose specified.

4th, I claim the method shown of operating the rammer rod or staff, whether the same be accomplished by means of hand and pulley wheels, roller and chain or screw, spur and pinion wheels and crank, substantially as described and for the purposes set forth.

5th, I claim hinging the rammer to the turret, substantially as described and for the purposes specified.

6th, I claim uniting the sections for the rammer rod at the point, d1, by a ball and socket joint, substantially as described and for the purposes set forth.

68,814.—WATCH.—N. B. Wallace, Fond du Lac, Wis.

I claim the two-part cup, F, for the winding post or other axis of a watch movement, substantially as and for the purpose described.

68,815.—MACHINE FOR CUTTING FILES.—Samuel Walton, Ballardvale, Mass.

1st, I claim the head block, A, constructed as shown and described, with one or more sockets, 9 9, and grooves, 37 and 3, arranged in the manner and for the purpose set forth.

2d, I claim the half-hemisphere ball or balls, H, or the equivalent thereof, in combination with the head block, A, substantially in the manner and for the purpose set forth.

3d, I claim the shield, G, constructed as shown and described, and applied to the carriage, and arranged to slide in the groove made in the half ball, H, as and for the purpose specified.

4th, I claim the adjustable gibbed inclines, S, in combination with and applied to the top of the front stand, M, in the manner and for the purpose substantially as described.

5th, In combination with the adjustable gibbed inclines, as above described I claim the hammer, k, and cutter, e, constructed and arranged to operate for the purpose and substantially as described.

6th, I claim the combination of the shaft, 35, and arms, 34, the short rod, 33, the adjusting devices, E4 and E2, with the lever, v, and the former, W, all arranged to operate substantially as and for the purpose specified.

7th, In combination with the parts last above claimed, I claim the cam, Y, or a series of like or similar cams acting against the springs, J, in the manner substantially as described for the purposes specified.

8th, In combination with the movable carriage, A, and applied to the lever, v, I claim the former, W, and the guide plate, x x, on the moving carriage, arranged substantially as described.

9th, In connection with the head block, A, I claim the tongs, E, and the eccentric shaft, y1, constructed and arranged for operation, substantially as and for the purpose set forth.

10th, In combination with the tongs and eccentric shaft, I claim the parallel bars, f, and the elastic or spring substance, d, the nuts, g, and rods, 9, arranged for operation substantially as and for the purpose specified.

11th, In combination with the parts last above claimed, I claim the double face plate, F, in the manner and for the purpose described.

12th, I claim the springs, C, bed, B, plate, F, and rods, 9, when combined and arranged as and for the purpose set forth.

13th, I claim the combination of all the operative parts specified, arranged to operate substantially as and for the purpose or purposes shown and described.

68,816.—LOCK AND ALARM ATTACHMENT FOR MONEY DRAWERS.—J. H. Weaver, Columbus, Ohio.

I claim, 1st, the lock, consisting of the spring, b, lever, d, string, f and K, and handle, l, all made and operating substantially as herein shown and described.

2d, The combination of the lock, when made as herein shown and described with the bell, C, or other alarm, substantially as set forth.

3d, The swinging lid, l, and catches, n and o, in combination with the aforesaid lock, and made and operating substantially as herein shown and described.

68,817.—WASHING MACHINE.—M. D. Webber, Woodbury, Vt.

I claim the combination of the lever, D, connecting bars, E, and pivoted beaters, F, with each other and with the box or tub, A, substantially as herein shown and described and for the purposes set forth.

68,818.—SPRING BED BOTTOM.—Dexter P. Webster, Upper Gilmanton, N. H., and Hermon W. Ladd, Philadelphia, Pa.

We claim, 1st, the hooks, C, separate and independent, provided with flaring mouths, in combination with the coils of the springs, substantially as and for the purpose described.

2d, The springs with an auxiliary fastening formed by turning up one end of the spring so as to pierce the slat, when otherwise secured by the single wire clamp, a, substantially as described.

3d, The mode of packing by interlocking the springs and slats as herein represented and described.

68,819.—MACHINES FOR MAKING LEAD PENCILS.—Edward Weissenborn, Hudson City, N. J., assignor to American Lead Pencil Company, New York City.

I claim, 1st, the sliding bars, D, carrying the pivoted catches, E, arranged in relation with the frame, a, guides, C, and cutters, substantially as herein set forth for the purpose specified.

2d, The sliding bars, D, pivoted cutters, E, and levers, F, combined with suitable cams, H, and spring retractors, l, operating substantially as herein set forth for the purpose specified.

3d, The arrangement of the two cutter heads, N and T, and their blank supporting beds, with reference to each other and to the feeding devices, so that one cutter shall first groove the whole length of one side of the blank, and then the other, the whole length of the other side to separate it into pencils as described.

4th, The cutters, C', constructed with a flat portion, a2, and curved or semi-circular portion, b2, and applied to the cutter head, substantially as herein set forth for the purpose specified.

68,820.—WHEELS AND AXLE CONNECTION.—John F. Welch, Hingham, Mass.

I claim the above described device for locking a carriage wheel to its axle, consisting of the plate, l, with its screw, j, the nut, b, and the jaw bars, a a a, combined together, and operating in connection with the ring, c, applied to the axle, substantially as shown and explained.

68,821.—EVAPORATING PAN.—N. Willey, South Windsor, Ct.

I claim an evaporating pan, whose transverse partitions, formed from its bottom, meets at an angle at their bottom, substantially as described.

I claim, in combination with a bottom so constructed, the inclined sides as and for the purpose described.

I claim the combination of such a bottom and inclined sides, with side troughs, substantially as set forth.

68,822.—OVER SOLE FOR BOOTS AND SHOES.—Edmund W. Woodruff (assignor to himself and B. H. Camp), Washington, D. C.

I claim making the rear end of an over sole of elastic rubber, to which is attached a spring clasp, operating substantially in the manner and for the purposes specified.

68,823.—STAND FOR SUPPORTING WAGON AND OTHER WHEELS WHEN BEING PAINTED.—John N. Woodward (assignor to himself and Walter Scott), Aurora, Ill.

I claim the adjustable plate, C, supporting the spindle, D, in combination with the standard, B, and a suitable detent, F F', for retaining the spindle in any required position, substantially in the manner and for the purpose set forth.

I claim the adjustable plate, C, supporting the spindle, D, in combination with the revolving standard, B, plate, A, and detent, F F', for retaining the spindle and wheel placed thereon in any required position, substantially in the manner and for the purpose set forth.

68,824.—HORSE SHOE NAIL MACHINE.—C. D. Wrightington, Fairhaven, B. P Rider, Chelsea, Mass.

1st, We claim the combination of the four hammers, D D', attached to or forming a part of the pistons of steam cylinders, with the gears, E, arranged substantially as described, whereby the forward motion of the two opposing hammers, D D, actuated by the direct action of the steam, will operate, to retract the opposing hammers, D' D', substantially as described.

2d, I claim the arrangement of the hammers, D D', on the inclined sides of the bed plate, A, as and for the purpose described.

68,825.—THRASHING MACHINE.—Benjamin Yeakel, Allentown, Pa.

I claim the detaining apparatus, consisting of the boards, e and f, when the same are arranged and operating substantially as and for the purpose herein shown and described.

2d, The springs, c, on the frame, B, in combination with the bars, d, and shaking table, F, all made and operating substantially as herein shown and described.

68,826.—HANGER FOR SHAFTING.—James Yocom, Jr., Philadelphia, Pa.

I claim a hanger which is constructed of cast metal with wrought metal screw tapped nuts, for receiving the adjusting screws, the cast metal being made to surround the wrought nuts, substantially as described.

68,827.—DRILL.—E. S. Young, Worcester, Mass., and A. Whipple, Whitingsville, Mass., assignors to Edward S. Young, Worcester, Mass.

We claim the combination as well as the arrangement of the slider, G, the cylindrical tubular shaft, H, and the clamp screws, c d, with the cylindrical standard, A, the head, I, and the drill driving and feeding mechanism substantially as described, the standard, A, being provided with the screw, a', the jaws, B C, and their operative mechanism, or their equivalent.

68,828.—MECHANISM FOR SEWING OVAL SEAMS.—Agur Judson, Newark, N. J.

1st, I claim the combination with devices for stitching oval or elliptic forms of an apparatus for cutting the material into similar forms.

2d, The frame or bed piece, A, with its adjustable devices for describing ovals or ellipsis when so applied to a sewing machine table that it may present the fabric either to the needle or to the cutters.

3d, The revolving plate, r, constructed and operating substantially as described.

4th, The radially slotted disk, s, applied and operating as and for the purpose set forth.

5th, The combination of plate, r, and slotted disk, s, for joint action, substantially as set forth.

6th, The combination of the adjustable slide, V, with the disk, s, as and for the purpose set forth.

7th, The plate, B, provided with sockets for the reception of cork or other substance, for the purpose set forth.

8th, The combination of plate, B, constructed as described, with the top plate or piece, D, as and for the purrose set forth.

9th, The combination with frame, A, of a scale for indicating the size of the oval to be described.

10th, The combination with such frame of a scale for indicating the change in the form of the oval to be described.

REISSUES.

2,762.—KNIFE SHARPENER.—James Meyer, Jr., New York city. Patented May 14, 1867.

1st, I claim the cutting plates, E E', provided with longitudinal rounded edges, and connected together by a sliding joint, substantially in the manner as and for the purpose set forth.

2d, The combination of the handle, A, with the two pairs of cutters, E E', F F', the clamp at one end of the handle, and the recesses in the same to receive the cutters with or without the strap, C, substantially as and for the purpose specified.

3d, The cutters, E E', when placed in the same plane, and connected together by means of the sliding joint, or its equivalent, substantially as described, for the purpose specified.

2,763.—PUMP PISTON.—David S. Wood, Delaware, Wis. Patented July 10, 1866.

I claim the expansible loose packing, D, arranged on a piston which is provided with a channel wider and deeper than the packing for the reception of the same, substantially as and for the purpose herein shown and described.

2,764.—GATE.—Elijah Kemper, Thorn Township, Ohio. Patented June 24, 1862.

I claim a gate arranged so as to have both a sliding and swinging movement to open and close it, substantially as and for the purpose herein specified.

I also claim a gate so arranged that it may slide till it is supported centrally and then swing, balanced on its support, substantially as herein set forth.

I also claim, in combination with a sliding and swinging gate, a guide or guides, which shall serve both to direct the sliding of the gate and to support it for, and allow its swinging, substantially as herein specified.

I also claim the combination of a sliding latch with a sliding and swinging gate substantially as and for the purpose herein set forth.

DESIGNS.

2,775.—TRADE MARK.—Peter Behr, St. Louis, Mo.

2,776, 2,777, 2,778.—CLOCK CASE.—John H. Bellamy, Charlestown, Mass. Three patents.

2,779.—SPOON HANDLE.—James Bingham, Jr., Philadelphia, Pa.

2,780.—SPOON HANDLE.—Alonzo Hebbard, (assignor to Edward Corning and J. W. Dominick,) New York City.

2,781.—PARLOR STOVE.—Jasper Van Wormer and Michael McGarvey, Albany, N. Y.

## PENDING APPLICATIONS FOR REISSUES.

*Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address* MUNN & CO., *37 Park Row, N. Y.*

64,659.—FIRE-PROOF CEILING AND ROOF.—Joseph Gilbert, Philadelphia, Pa. Dated May 14, 1867. Application for reissue received and filed Aug. 29, 1867.

I claim, 1st, A ceiling composed of girders, corrugated plates, and socket bearers adapted to the said plates, and supported by the girders, all substantially as described.

2d, In combination with the above, I claim the bricks or blocks, X X, applied substantially in the manner and for the purpose described.

737.—HAND TRUCK.—P. H. Humes, Watson's Salt Creek, Ill., assignee of W. C. Rentgen, Keokuk, Iowa. Dated March 19, 1861. Application for reissue received and filed Sept. 2, 1867.

I claim the curved parts or ends, a a, of the truck, with or without the auxiliary wheels, b b, in combination with the curved adjustable holding and hop bar, D, one or more, substantially as and for the purpose set forth.

53,534.—CLEANSING ANIMAL CHARCOAL.—Philo S. Shelton, President of the Union Sugar Refining Company (assignee of Gustavus A. Jasper), Charlestown, Mass. Dated March 27, 1866. Application for reissue received and filed Aug. 30, 1867.

I claim as the invention of the said Jasper the new or improved process, substantially as hereinbefore described, for treating charcoal either after or before its use in a filter for the cleansing of a saccharine or other liquid, the same consisting in boiling the charcoal in an acid solution and washing it, the whole being essentially as specified.

I also claim as the invention of the said Jasper, for removal from the charcoal of the gummy and other matter except the lime or alkaline matter, the treatment or process of treating the charcoal without the use of acid, the same consisting in boiling the charcoal in water, or so boiling it and washing it, the charcoal being subsequently dried as set forth.

15,738.—MACHINE FOR CUTTING PAPER.—Hervey Law, Chatham, N. J. Dated Sept. 16, 1856. Reissue No. 2,670, dated July 9, 1867. Application for reissue received and filed Sept. 2, 1867.

I claim the combination of the rising and falling platform, C, and clamp frame, E, operating to clamp the paper or book as the platform rises, and to unclamp the same as the platform descends, by means of single or double cams or toggles, F F, having cranks, G G, connected with them, the pintles of which work in curved grooves or otherwise, actuated by any well known mechanical device, substantially as and for the purpose herein shown and described.

9,939.—SOCKET FOR AUGER HANDLES AND BRACES.—L. J. Gunn and C. H. Amidon, Greenfield, Mass., assignees of A. H. McKinley, Higginsport, Ohio. Dated Aug. 16, 1853. Application for reissue received and filed Sept. 2, 1867.

We claim as the invention of said McKinley, 1st, The employment in combination with the socket which holds the tool, of a movable cap or locking device which projects inwardly over the socket, and when the tool is inserted is made to close over the shoulders of the shank to retain it within the socket, and recede from said shoulders to enable the tool to be removed, substantially as described.

2d, Connecting that part of the cap or locking device that projects inwardly over the shoulders of the shank with the socket by means of a sleeve which surrounds the socket and is so secured thereto as to permit it to turn upon the socket to fasten and release the tool, and prevent the said locking device from being drawn from the socket, substantially as described.

3d, The combination of the detachable socket as described, with the auger handle or brace by which the tool is operated, substantially as described.

54,431.—HORSE HAY FORK.—Ariel B. Sprout, Picture Rocks, Pa. Dated May 1, 1866. Application for reissue received and filed Aug. 23, 1867.

I claim, 1st, Combining in one machine a hay elevator and hay cutter which will cut its way into the hay, and jut or turn out any part of said elevator or cutter for the purpose of catching, lifting, or elevating the hay, and then releases the hold of said jutting or turned-out part, for the purpose of discharging the hay and releasing the elevator and cutter.

2d, The bars, A and B, when pivoted at e, and used in combination with the levers, n and w, constructed, arranged, and operating substantially as herein described and for the purpose set forth.

9,387.—MODE OF THROWING SHUTTLES IN LOOMS.—Stephen C. Mendenhall, Richmond, Ind. Dated Nov. 9, 1852. Extended Nov. 9 1866. Application for reissue received and filed Sept. 4, 1867.

I claim, 1st, The combination of the picker spring, k, pickers, l l, inclined cams, j j, triggers, f f', cords, h h, treadles, 1, 2, 3, 4, and batten or lay, B, so that the forward motion of the batten shall set the pickers, and the backward motion of the batten shall release them alternately, by means of the cords and treadles, and thus drive the shuttle back and forth through the warp, substantially as and for the purpose set forth.

2d, I claim the picker spring, k, in combination with the pickers, l l.

3d, I claim the pickers, l l, in combination with the inclined cams, j j.

4th, I claim the pickers, l l, inclined cams, j j, in combination with the triggers, f f'.

5th, I claim the pickers, l l, in combination with the triggers, f f'.

6th, I claim the combination of the triggers, f f', cords, h h, and treadles, 1, 2, 3, 4.

7th, I claim the spring triggers, f f', in combination with the batten, B, when the same are used for retaining the pickers, l l.

8th, I claim alternately releasing the pickers, l l, when the same is effected by the regular successive depression of the treadles, 1, 2, 3, 4.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application to* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

## Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,098.—CARTRIDGE POUCHES OR CARRIERS.—Clarence Blake, Boston, Mass July 17, 1867.

2,196.—APPARATUS FOR BURNING PETROLEUM AND OTHER HYDROCARBON LIQUIDS FOR THE PRODUCTION OF HEAT AND LIGHT.—Simon Stevens, New York city.

2,213.—PROCESSES AND APPARATUS FOR THE MANUFACTURE OF SUGAR, AND FORMING THE SAME INTO CUBES FOR USE.—George Gordon, San Francisco, Cal. July 31, 1867.

2,216.—FIRE-ARM.—Azel S. Lyman, New York city. July 31, 1867.

2,242.—BRAKE FOR COTTON LAPPERS OR SCUTCHERS.—Richard Kitson, Lowell, Mass. Aug. 2, 1867.

2,252.—LOCKET AND MINIATURE CASE.—Wm. H. Halsey, Hoboken, N. J. Aug. 3, 1867.

2,256.—LAMP.—Wm. Porter, Belleville, N. J. Aug. 5, 1867.


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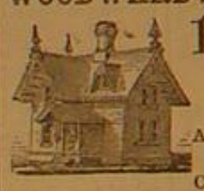
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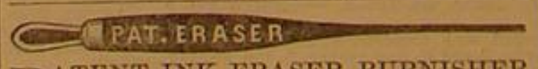
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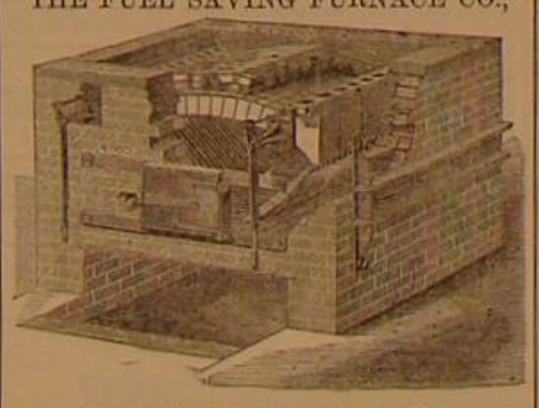
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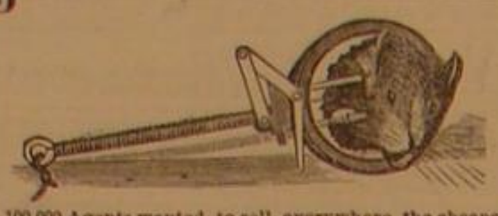
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# SCIENTIFIC AMERICAN

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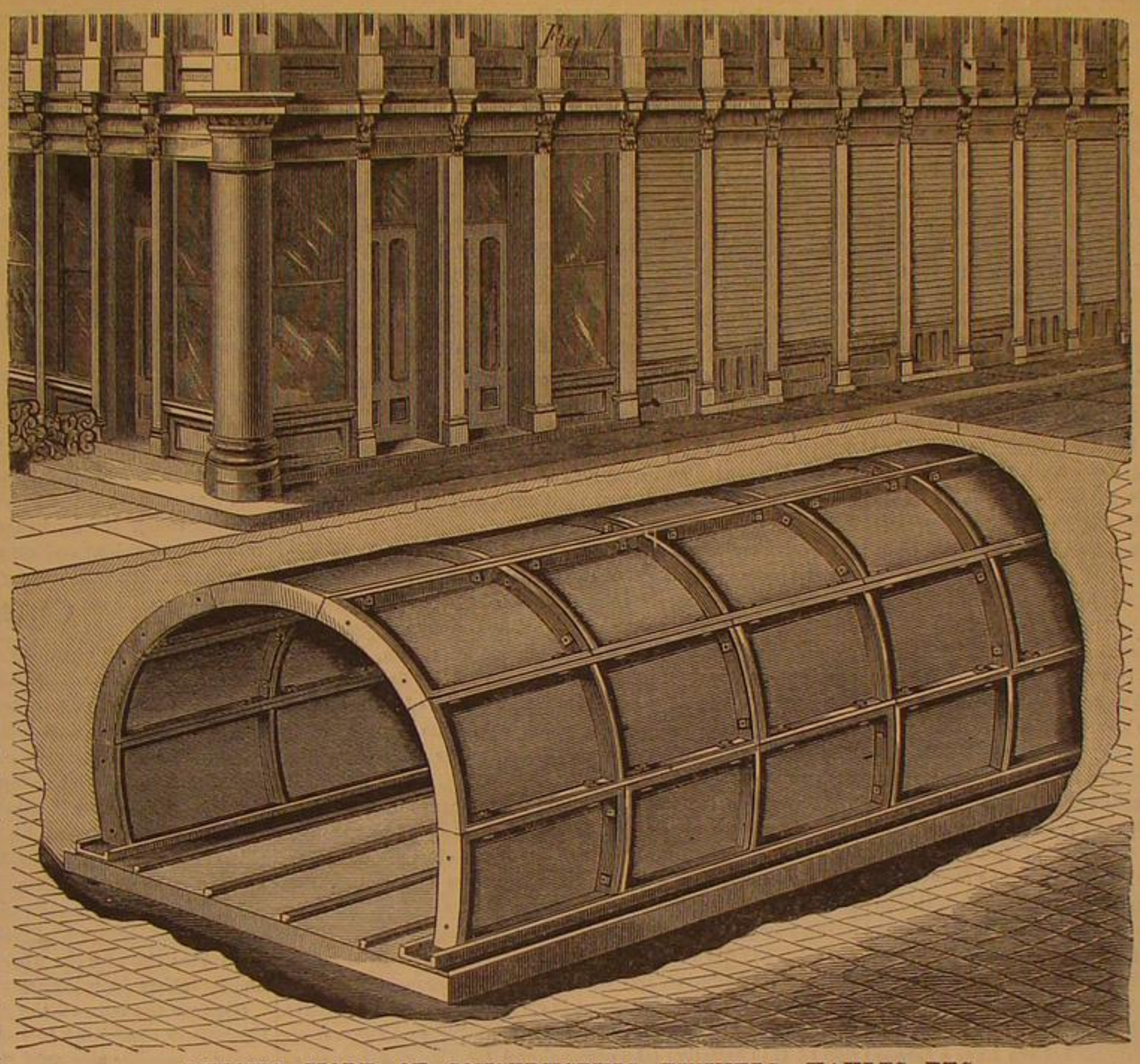
Vol. XVII.--No. 14. [NEW SERIES.] NEW YORK, OCTOBER 5, 1867. $3 per Annum. [IN ADVANCE.]


### Method of Constructing Tunnels, Vaults, Etc.

The problem how to relieve the city of its over-crowded population, how to extend its cramped proportions to the upper end of the island of Manhattan, how to connect it by rapid and low-priced means of communication with the neighboring shores of Long Island and New Jersey, and how to provide comfortable and cheap homes in its vicinity for its myriad sons of toil, who labor ceaselessly to enrich grasping landlords, and who pass their hours of rest in dwellings which are a disgrace to a civilized age, is one which interests every humanitarian, every capitalist, and every lover of the city's prosperity, almost as deeply as the numerous class which is more immediately benefited by its solution.

Railroads—aerial, pneumatic, and underground—to supersede the tedious horse cars, and bridges as a substitute for ferryboats have been proposed. A commission, consisting of three Senators, the Mayor of the city, the State Engineer, and the Engineer of the Croton Aqueduct Board was appointed to sit during the recess of 1866, and inquire into the best means of affording the much-needed rapid transportation. They advertised largely and received a great number of plans and suggestions embracing every description of railroad. After giving the matter a thorough investigation they reported to the Legislature last January recommending, unanimously, the underground railroad as superior to all other methods for this island. Notwithstanding this report and the numerous petitions of owners and lessees of property in favor of the measure, the Legislature refused to grant a charter to any of the numerous applicants owing to dissensions among the parties applying—the only measure of relief (?) granted was the authority given to construct two bridges across the East River, which cannot be completed in several years. The time, however, will come when public opinion will demand the adoption of all the methods that can be made available and then the plan recently patented by Mr. Joseph Dixon, and illustrated in the accompanying engravings, will undoubtedly meet with the success its simplicity, economy, and adaptability for the underground and pneumatic systems deserve.

In applying Mr. Dixon's method to underground railways the excavation is made as usual with the exception that a much narrower trench will be needed to accommodate the iron plates forming the sides in place of stone or brickwork. A foundation of stone is then placed to which the side plates are bolted, and the plates forming the arch are first placed on a movable framework and bolted to each other. The framework being made so as to be raised or lowered by means of a screw jack, will be raised slightly above the sides while the flanges of the arch plates are being bolted together, and when ready the framework will be lowered till the arch rests in its place on the sides. A section is now complete, the center plate acting as the key, and every joint answering as a powerful strengthening rib, and being tongued and grooved and packed with cast iron or other cement, will be perfectly watertight. The means of ventilation will be through iron air shafts rising in the form of an obelisk or column of open lattice work and surmounted by lamps to be used in place of the present street lamps.



DIXON'S MODE OF CONSTRUCTING TUNNELS, VAULTS, ETC.

For constructing the pneumatic railway Mr. Dixon's method will equally well apply where the tube is of sufficient diameter to contain the carriages and in which they are propelled by the direct expansion of the air, the ease with which the parts are put together, their comparative cheapness in cost, the facility with which they may be handled and transported to the place required, render it incomparably superior to every other method of tubing hitherto employed.

For a submarine tunnel this method stands pre-eminent. As before remarked, the bridges about to be constructed across the East River will take several years to complete, one of them at an estimated cost of $8,000,000; for this sum several tunnels, each affording as much facility for traffic as a bridge, could be laid across the East and North Rivers, and not one of them need occupy over a year in constructing.

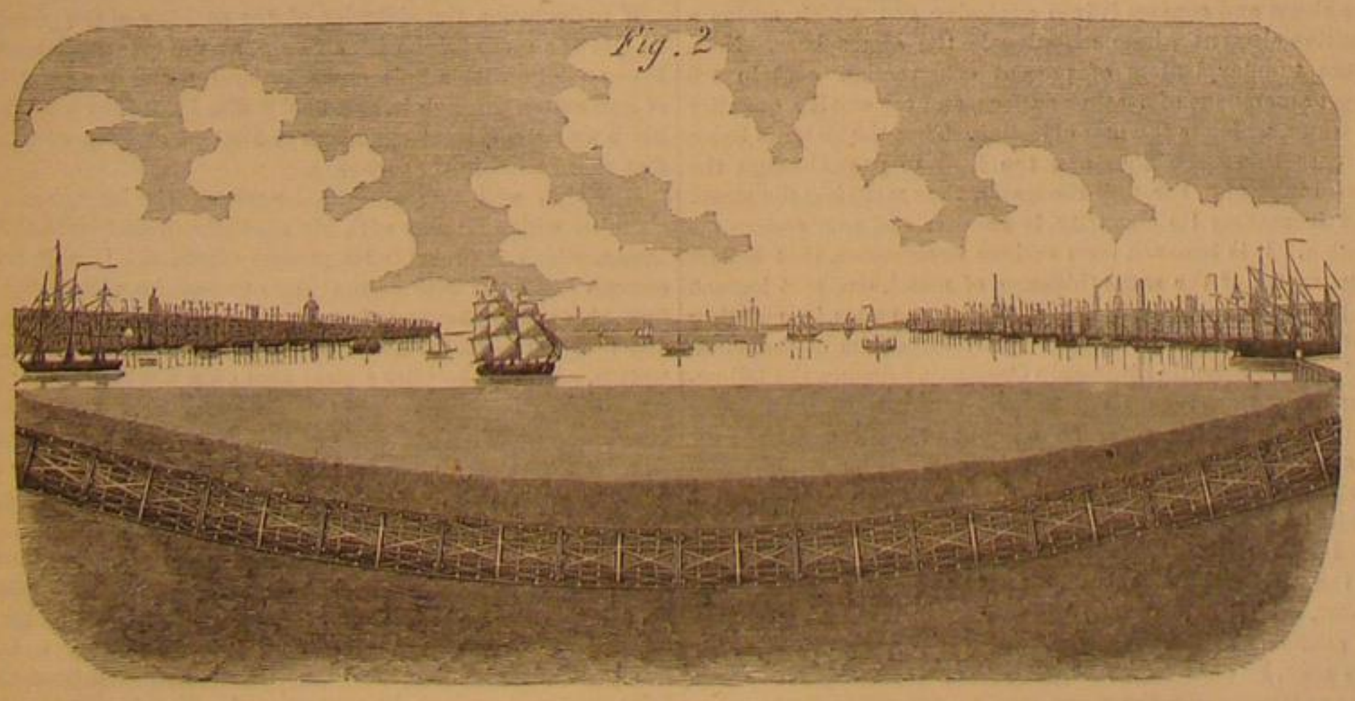


Fig. 2

For vaults under sidewalks, such as are used by the large newspaper establishments, and by dry-goods stores, breweries, etc., this system can be advantageously applied and the size of the vaults largely increased by substituting the iron plates for the thick stonework and brickwork generally used

In the construction of tunnels where the engineer is forced to drift through a loose soil, the advantages of arches formed of these iron plates with the joint inside, are too apparent to require any thing more than a mere mention.

This device was patented August 20, 1867, through the SCIENTIFIC AMERICAN office, by Joseph Dixon, 119 Broadway (Rooms 34 and 35), who will give further information.

### Quinine.

Among the many remedial agents which organic chemistry has afforded us, quinine occupies the first place, chloroform the second. Without quinine, large tracts, indeed whole countries, would be simply uninhabitable for Europeans. To the backwoodsman a supply of quinine is as important as gunpowder. The "quinine famine" in the Mauritius demonstrated to thousands how small a thing even gold itself might become in comparison with this life-saving salt.

If the search for artificial quinine has been as unsuccessful as that for the Philosopher's Stone, it has at least resulted also in some great discoveries. It does not appear to be generally known that the first of the analine colors was discovered during a search for artificial quinine! But, tired of waiting for that which did not come, finding that chemists could not produce quinine, it struck certain minds that it would be a surer plan to assist Nature a little, and Nature, as she always does when properly called upon, responded liberally. In effect, owing to the wasteful and ignorant manner in which bark was collected in its old habitat, it was, especially in the finer and richer varieties, getting scarcer. This circumstance has induced certain enterprising men to cause the cinchonas to be introduced into India, and it has not only been found that the change of habitat does not prevent the developement of quinine, but the valuable discovery has been made by McIvor, and confirmed by DeVrij, that covering the bark during its growth with moss increases the percentage of alkaloids. The cinchona plantations in India are now so flourishing that there need be no apprehension of the supply of quinine ever failing, and if the discovery of artificial quinine should ever now be made, it would have to depend upon its cheapness for its value. We are aware that the discovery of artificial quinine has more than once been announced, but up to the present time such announcements have never been supported by positive evidence.—*Chemical News.*

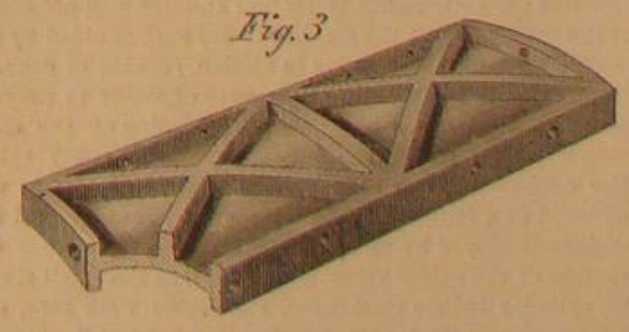


Fig. 3

### Lead Floating on Molten Iron.

Some experiments have been made in Germany which seem to show that molten lead when dropped upon liquid iron remains floating on the surface of the latter. As the specific gravity of lead (11.5) is more than one half greater than that of cast iron (7), there arose some discussion on this subject which has been recently closed in a very satisfactory manner

by the researches of Professor Karmarsch, of Hanover. An ironmaster in the vicinity of that town had sent to the professor some samples of such drops of lead lying imbedded in the surface of a cast-iron block, and which had been produced in the manner above described. Professor Karmarsch found, upon close examination, that these drops of lead, instead of being solid globules, as was supposed at first sight, were all hollow, forming bubbles composed of a metallic skin, and apparently empty in the center, so far as his observation has been carried. He explains the whole by supposing that the molten lead, at the temperature to which it is raised by the contact with liquid iron, forms an incipient vapor of lead, which is prevented from escaping by the skin of solidifying metal which forms on the top. The lead vapor, according to this explantion, keeps the lead resting upon the surface of the iron. It seems that in large quantities the result is different, since it is known that lead is occasionally tapped from the bottom of blast furnaces, which smelt certain classes of ores containing lead, and in these cases the lead is found below the liquid iron, according to its greater specific gravity. —*Engineering.*

## CAUSES OF STEAM BOILER EXPLOSIONS. UNSAFE CHARACTER OF TUBULAR BOILERS.

A correspondent of the Lancaster (Pa.) *Express* writes to that paper as follows:

"I have read the published testimony taken before the coroner's jury, and have been waiting anxiously to hear something said in regard to the recent explosions and disasters on our western rivers. No person seems to know or to remember that the Atlantic and Mississippi Steamship Company lost six of the finest Mississippi steamers that floated on those waters, by explosion, last spring (1866), all of which blew up in succession within a space of about three months; that this company caused an investigation into the cause of these almost simultaneous explosions. I have not seen any official report of the company's investigating corp of engineers; but I have talked with some of their captains and engineers on the subject. I talked with the captain of the steamer *Missouri*, a few hours after it blew up, six miles above Evansville, Ind., on the Ohio river; I have conversed at different times with their engineers and others posted in the investigations, and I have learned that the following is the substance of their investigations; although I would recommend that the coroner make an effort to get an official copy of their report:

"'That the tubular boilers are condemned as an unsafe and dangerous arrangement. That the tubular boilers are made with a view to economy in the saving of fuel, which is the real cause of their introduction; but the damage done by explosion is in no way equaled by the economy, say nothing of the loss of life; that steam is the decomposition of water, by being brought in contact with heat; that steam, if brought in contact with fire, is itself converted into an explosive gas, which no known substance can confine. That it requires a certain and fixed quantity of water to a given amount and intensity of heat, and a certain capacity of fire surface to prevent such a heat on the steam in the boilers as to produce this explosive gas. That it is impossible for a sound boiler to explode from the mere pressure of steam. That when the heat becomes so intense as to produce explosive gas, the water in the boiler is inadequate to prevent the accumulation of gas. That mere steam will not explode a sound boiler; that when a boiler is pressed by heat beyond its capacity, explosive gas is generated. That tubular boilers have a larger amount of fire surface, proportioned to the quantity of water they contain, than any other boilers; the amount of heating surface is too great to insure safety. That if the water by accident, negligence, or by being drawn from one boiler to another, falls below one or more tier of tubing, and a hot current of flame passes through the upper tubes, the steam is rapidly converted into gas, and if an explosion does not follow, it is because the process of generating gas is arrested by increasing the water, or cooling down the fire before a quantity of gas is generated to make a breach in the iron. During the last year, upward of thirty explosions have taken place, which were spontaneous explosions, and all of them that were heard from were tubular boilers, and in the same time in the United States, every locomotive boiler which has exploded spontaneously, was of the tubular arrangement. Locomotives having only a single boiler, the theory that the water was drawn from one boiler into another, will not apply. But the theory is that the amount of fire surface aided by the powerful draft of a locomotive in motion, capable of converting steam into gas exceeding the power of water to prevent generating such gas, will cause an explosion on the same principle. That before the invention of the safety valve, boiler explosions were so numerous that steam power was denounced as a failure, prohibited in some countries, and the machines destroyed by mobs in some places. But after the invention of the safety valve, and as long as the small single tube, cylinder boilers were used, explosions were rare, and unaccountable explosions seldom known; most of them could be traced to some neglect, carelessness, ignorance, inattention, incapacity, drunkenness, or design on the part of those having charge of an engine.'

"The same causes which exploded boilers in the early age of steam explode them now, for nature is always the same; no law has changed. But here in America, on water and land, are a succession of explosions falling fast one upon another during a single year, with a destruction of property amounting to millions, and a loss of thousands of human lives, and in no instance has it been shown that any of the duties of the engineer were neglected, or any of the ordinary causes in any way were connected with these mysterious explosions.

"The question here arises, what is the cause? If no law of nature has changed, if the law of explosion is the same now that it was when the small, single tube, cylinder boilers were in use, for a third of a century, what is the cause of this recent accumulation of explosions? Manifestly if no change has taken place in nature, then the change must be in the changed construction of boilers.

"After the invention of the safety valve, the intelligent and cautious engineer trusted with confidence in the familiar sound of steam escaping from the safety valve to warn him of danger. But now the safety valve is unreliable, and even the water gage is treacherous. On the *Missouri*, which blew up in April, 1866, the engineer tried the water not five minutes before the explosion, and found it all right. All the ordinary means of guarding against explosions and assuring safety in the use of steam power, which for a quarter of a century or more were as reliable and safe as any means used to guard against accidents in the employment of any other dangerous and useful element have recently become uncertain, treacherous, and unreliable. Again we repeat the question, Why is this? and what is the cause?

"If we were to answer, we should say that mechanics, in the effort to construct a boiler to do the greatest amount of work with the least cost of fuel, have sacrificed safety to economy. When steam power was introduced the country abounded with wood, the best fuel for making steam; but as wood became scarce and high, fuel-saving machines were largely in demand. But no saving of fuel in generating steam can be accomplished except by increasing the fire surface in or around the boiler, with parallel flues through which a current of flame or heat passes several times over the water surface, thus retaining longer around the boiler the heat generated; while combustion is more perfect and the inflammable gas, the product of combustion, being longer retained within the reach of a flame, ignites and burns, where in a single flue it would pass unignited, without heating, out of the chimney. Even smoke is inflammable gas, and if this gas is all ignited, no smoke, nothing but a current of heated air would pass through the chimney.

"This principle of saving fuel, and still generating the required amount of heat, has proved a grand success in this country in stoves and heating furnaces. But it has proved a success in the generating of heat only, and not in generating steam.

"Boiler makers, when they applied this principle in generating steam, lost sight of the fact that when they increased the heating surface, the intensity and quantity of heat around a boiler, that they ought also to increase in an adequate proportion the quantity of water; instead of which, however, they have actually increased the power of the fiery element, and lessened the only power, water, capable of holding this fiery monster in subjection, which would be equivalent to running an ordinary one flue cylinder boiler on half water, with full heat.

"This, then, we conceive to be the true cause of the recent explosions in this country. Let it be understood by mechanics, that throughout all nature, in every element or living substance, organic or inorganic, a positive and a negative principle exists. That the positive is the active, moving, living power, while the negative is the passive power acted upon. That fire is a positive element, and water in a boiler becomes its negative, but when the water becomes sufficiently decomposed, a new element is created, which is a positive principle, and the atmosphere is its negative, and the attraction of this negative (the atmosphere) for the positive principle in the boiler when it becomes positive by decomposition of water, is so great, that no substance can hold it from escaping. The atmosphere cannot go into the boiler; if it could there would be no explosion, so the contents of the boiler seek the atmosphere.

"Hence it follows that there is always safety in the use of steam, provided that that only element of safety, *water*, shall exceed the heating power, *fire*, so as always to predominate, and that no fire shall pass over a steam surface to decompose the steam and convert it into explosive gas, which means a positive element whose negative is the atmosphere. Now, these tubular boilers of present construction contain too great an amount of heating surface, and too small a quantity of water, which is the first objection. That the water is liable to pass below the flues and the heat to pass through the steam instead of through the water, thus rarifying the steam and increasing its elasticity, is another and very serious objection. It is believed from various experiences, that boilers constructed of the same thickness of metal, one foot instead of four in diameter, will exceed the large boiler in resisting power fifty per cent. From the investigations of the Mississippi and Atlantic Steamship Company, I deduce the following conclusions: That the present arrangement of tubular boilers affords too great an amount of heating surface for their capacity for water; that by accident or neglect the water is liable to sink below the upper tier of tube flues, in which case the flues become hotter than they would if covered with water, and decompose or rarify the steam creating, if the tubes get hot enough and continue long enough out of water, and an explosive power, not steam, that iron is unable to confine. It is impossible to avoid explosions while the fire may, by accident or neglect, or by emptying one boiler into another, reach the steam surface, and rarify the steam.

"In making boilers, the engineer should enter into a mathematical calculation, ascertaining by experiment on a small scale the quantity of water to a given amount of heating surface, and intensity of heat necessary to prevent explosion; then when heating surface is increased by any arrangement of parallel flues, let the capacity for water be increased in a corresponding ratio. Let the boiler be so arranged as to render it absolutely impossible for the fire surface to reach the steam surface. With such an arrangement, with the steam gage, the water cock and safety valve, with sound and well-constructed boilers, with proper care and attention, it is the opinion of some of the most intelligent and best educated engineers in America, that there need be no explosions, at least spontaneous explosions.

No ship-builder on southwestern rivers will touch a tubular boiler any more, and insurance companies charge higher rates for insuring boats containing them. The object aimed at in tubular boilers being economy in fuel, and retention of heat around the boiler, need not be abandoned. I saw in the West a set of boilers, six in number, placed upright, twelve inches in diameter, and ten feet high, placed three on either side of a hollow fire chamber. The fire was allowed to pass to the hight of low water in the boilers, then down and under and up on the opposite side of the boilers, to the hight of low water, and out into the chimney flue. Through the hollow casing, around the fire chamber, a current of cold air was admitted at the bottom, and passing to the rear, and up into a jacket around the upper portion of the boilers, and then into the chimney. The object of the current of cold air is to prevent the destruction of the casing around the fire, and to keep the cold air from the boilers. There was no connection between the boilers by which steam or water could pass from one boiler to another; each boiler was supplied with water through a separate pipe. This arrangement has been in operation for two years, and the owner said he could make three times as much power with the same quantity of fuel as with his old style boilers. Abating something for zeal and confidence in one's own invention, I considered his machine a very economical one. He told me he had no patent; if the world wanted it, let them have it.

In 1853, when the question of saving fuel in making steam was being experimented upon, the chief engineer of the Collins' Steamship Line, in a conversation with me, remarked, "If they increase the heating surface and power without a corresponding increase of water, they will blow their machines to the *devil*." He was a rough-spoken Englishman, about fifty, and had helped to build the first locomotive ever made in England."

[The tubular boiler in this section is deemed as safe, if not safer, than any other. The cause of its failure on the Western waters is, that the tubes fill with mud so solid that water cannot touch them; hence they burn, collapse, and play other inconvenient and uncomfortable tricks.—Eds.]

# Correspondence.

*The Editors are not responsible for the opinions expressed by their correspondents.*

### The Acceleration of Shot.

Messrs. Editors:—In your paper (Sept. 14th), Seth Boyden refers to a mode of starting shot from a fowling piece, by having a long, narrow chamber in the breech of the gun, and lighting the powder in this chamber at the top, next to the shot, and remarks that he thinks for an accelerating cannon this mode would be preferable to having the powder chambers along the bore of the gun.

I tried the long narrow chambers as accelerators for a cannon eleven years ago. The bore of the cannon was 2½ inches diameter; the two chambers of steel each 1½ inches diameter and 30 inches deep. They were a complete failure.

Suppose the bore of the gun is six inches in diameter and the narrow chamber 3 inches, it must be four feet deep to hold as much powder as would fill the bore of the gun one foot deep, which is less than the Whitworth gun uses safely. If we fire this charge at the top, it will burn down perhaps two feet, and ram the rest of the column into a cake as solid as any rocket is packed and into which the fire can not enter. It burns only on its end, and most of it after the shot has left the gun. It will be found that instead of burning six or eight times as much powder as a Whitworth gun of the same bore and giving six or eight times as much power, it has not given half so much power.

If to overcome the difficulty of the packing of the powder, he leaves a space filled with air only, at the breech, or makes his cartridge with a hole down its center, and puts a string of gun cotton through it, as I finally did, I think he will blow his long narrow steel chambers to flinders, as I did with the first shot I tried in that manner.

If Mr. B. will increase the length of the long, narrow chamber which he uses with his shot gun, from two to three inches, which is probably its present depth, till it will hold enough to fill the bore of the gun one foot, he will probably find his chamber several feet in length. He will certainly find that the narrower his chamber the less will be his penetration. Now if he tries a steel shot on a wrought-iron target, he may throw his shot through one quarter inch, possibly through three eighths of an inch, but never through one sixteenth as much iron as can be penetrated, or one eighth as much as has been penetrated by a shot from a barrel of half-inch bore with accelerators placed under it.

H. S. Whitfield also in the same number says he "has concluded that this thing of acceleration could be accomplished in another way much more simple and quite as effective by a cartridge with partitions, each partition containing a full charge of powder, and so divided that when fired from the front they will explode in succession." If this cartridge is made of the strongest metal, and so heavy that the valves will not give way backward from the explosion of the first charge, it would require a cartridge ten or twelve feet long to hold sufficient powder to fill the bore of a six-inch cannon even four feet deep. The accelerator 18 feet long must then be increased to 28 or 30 feet long. But the valves would probably leak and all the charges be lighted at once and his gun blown to fragments. If it did not, this long, heavy cartridge would

be so swedged in that it would not be removed the same day the gun was fired.

The objections most frequently urged against the accelerators under the bore of the cannon are; First, "They can not be cleaned." Ans.—It is found that even the small accelerators of the hunting rifles that had been fired five hundred or one thousand times during two or three years without being cleaned, on examination appear as clean as when they have been fired but five times, and as no shot ever slide along their surfaces, they do not need cleaning. Still even these accelerators under the bore of the cannon can and have been cleaned, dried, and oiled in a few minutes with a very simple apparatus.

Second objection—"The powder used in them is not in cartridges, and the exposure of such quantities of loose powder to the open air is dangerous." Ans.—The powder is in strong tin canisters, each containing the charge of, and numbered for, its particular accelerator, and so arranged that it is turned in without exposing a particle of it to the open air.

It would require no extra hands to load half a dozen accelerators for a large gun. The ordinary gun's crew required to move and aim it are sufficient. One of these men to each chamber charges it in half the time occupied by those engaged in loading the breech.

Several articles have appeared on the subject of a vacuum in the barrel for increasing the force; the last by Mr. Whitfield. In May, 1851, you filed a caveat for me in the Patent Office for a vacuum in front of the charge. I had tested it before, but the patent was not applied for till five years after, with the accelerator. The vacuum in front of the charge is the second claim. A. S. LYMAN.

No. 212 Second avenue, New York city.

### The Inutility of Levees on the Mississippi.

MESSRS. EDITORS:—The subject of controlling or directing the waters of the Mississippi, which has been repeatedly treated in your journal is one of the gravest importance both on account of the interests involved and the immense sums of money and amount of labor expended on the levee system in the past, and because of the recommendations and attempts now being made to involve the Federal Goverement in the system, which, if successful will cause millions of dollars to flow from the treasury.

I have known the Mississippi for over thirty years, have lived on its banks, and now own lands washed annually and inundated by its overflows, and would greatly rejoice to see some effective system adopted by which its overflows and the caving of its banks could be prevented; but I unhesitatingly pronounce the levee system in the past, and however much improved upon in the future, inadequate to the task; that it is both radically wrong, and unphilosophical in principle; that, even if successful for a series of years, in the course of time it would become the greatest and most alarming curse; for notwithstanding it is a law of all flowing waters to cut out a channel deep and broad enough to contain their volume of waters (which law, in a state of nature, that is, before its water-shed is denuded of its flora, is more certain and less subject to be broken in upon by heavy rains and snows than in a contrary condition), yet these channels are liable to be filled or choked up by the sand, gravel, and dirt brought down by the streams. This filling or choking up and consequent overflows and changes of beds, is less when their water-sheds are covered with their natural flora than when denuded by man or otherwise, because the detrition of the earth's surface is in a great measure prevented by the shade, stems, boughs leaves, and roots, standing or fallen, of the flora of the water-shed drained by the stream; but when the water-shed of the stream is cleared of its natural flora, and subjected to cultivation, especially to our superficial cultivation of 6 or 8 inches, greater quantities of sand, gravel, and dirt are detached from their sites, swelling the volume of the stream, and increasing the quantity of deposition of these materials upon the bottom of the channel; for as they are specifically heavier than the water they are constantly seeking a lodgment and rest; and as in all large and deep streams like the Mississippi River, the current near the bed is more sluggish (owing, I suppose, to the greater friction and possibly of the superincumbent weight of waters, etc.), than the surface current, this deposition upon its bed takes place, gradually filling it up, and causing it periodically to overflow its banks. Now I have before said that, even if the levee system could be made successful for a series of years (and it could only with the greatest outlay of money be made so for a few years at a time), it would in the course of time become the greatest and most alarming curse. Now why do I say so? Because if my views be correct, and if I am not misinformed, the levee system in Europe and elsewhere demonstrates the fact that the dirt must be piled up and the levees raised higher and higher every year, with the raising of the bed of the river, until in the course of time the levees will become several hundred feet higher than the original banks of the river, and the bed of the stream also higher than the banks; the levee, liable at any moment to give way, and the mad waters carrying havoc and destruction in their course. Who can estimate the destruction of life and property in such a catastrophe? Even under the system as it existed before the war the thoughtful citizens living behind the levees as they then existed, rarely exceeding twenty feet in hight, during the time of high water lived in constant dread of such a catastrophe, and such did often then occur. But who can estimate the cost and labor required to build and keep up such a system for a hundred years or so?

But is there no remedy for this great evil of annual overflows? I answer that I know of none, but I think it may be greatly mitigated, and perhaps eventually prevented, by opening all outlets to the ocean and to the interior; widening and deepening their channels, and intersecting the whole valley with wide and deep canals, instead of railroads whenever and wherever needed for commerce, etc.; diffusion and shorter passages to the ocean, and deep cultivation, say to the depth of two or three feet, which is to my mind the only lasting and philosophical remedy; thus, when the whole water-shed drained by the Mississippi River and its tributaries is cleared and brought into a high state of cultivation, absorption, use, and evaporation will consume the excess of waters, and the now uncontrollable force of the Mississippi River will be measurably if not entirely brought under man's control. Until then we had better endure the ills we cannot avert than increase the evil and be met with constant and inevitable failures. THOS. Y. BERRY.

Port Gibson, Miss.

[We hardly agree with our correspondent in his deprecation of the government devoting its money and energies to the great improvement mentioned. It is as much a subject of national importance as many other projects which have received the aid and been taken under the control of the National Government. But his suggestions relative to canals which might be available for purposes of irrigation and intercommunication, seem to be worthy attention.—EDS.

### The Compensation Balance.

MESSRS. EDITORS:—I am prepared to make the following favorable statement concerning the compensation balance, as a principle. I have found that since I could remove the variation consequent upon variable resistances to the balance of a watch, that the compensation balance has fewer of those eccentricities so generally attributed to this principle by the best chronometer makers. The effect of variable temperature on the very best oil, seems to have a large share in the trouble. I say this in justice to the principle in question. The compensation balance may be defective from one band being thinner than the other, and have more action; but the material does not necessarily lose its elasticity. The smaller the scale consistent with perfection in the bands, the harder and tougher (the best word I have) is the material, in effect (I say, in effect, because the forces which are perpetually at work reduce with the scale of construction); I never could make a good compensation balance on the usual marine chronometer scale and always blamed myself for the failure.

J. MUMA.

Hanover, Pa.

P. S.—My challenge—page 147, current volume—has not yet been taken, as I told you it would not be. I have not received one letter concerning it. The world has been humbugged with the watch long enough. I make no allusion to low-priced watches; they are, as a general thing, a prodigy of production for the price. J. M.

### Fish Culture--A Good Suggestion.

MESSRS. EDITORS:—On page 114 of No. 8, Vol. XVII of the SCIENTIFIC AMERICAN, I find a very interesting article on fish culture, and it seems to me an important subject. I have closely observed the habits of many of the fishes that inhabit our Southern streams, and among others the trout. Here they are migratory, or at least they leave the small streams in October, and return to them in March. They spawn in April, and the young brood are hatched out in a few days. Now my object in writing this is to suggest that the eggs of the trout and other fishes might be protected in their natural bed where deposited by the mother, by placing over it a frame of fine wire net or cloth. But little attention is needed to find the nest of the trout or other fish; then as soon as the eggs are all deposited you have only to put the wire net over the nest and it will keep off nearly all of the fish and insects that prey on the eggs. In this way I think you may be sure of 75 per cent of the eggs producing young trout, and as these remain near the nest till old enough to escape from most of the dangers of their infant state, the wire net will save nearly all of them. A. C. STEEDE.

Americus, Miss., Sept., 1867.

### Nitro Glycerin.

MESSRS. EDITORS:—In your issue of the 7th Sept., you insert on page 153 an article, not very friendly to this new agency in the useful arts. The sad accidents that occurred at San Francisco, Aspinwall, Sidney and the Wyoming hotel will never cease to be lamented by any one having the least concern for humanity. Similar calamities are not likely to occur again.

Nitro glycerin is less dangerous than gun powder, and no more intelligence is required to employ the former for blasting purposes, than the latter. Upwards of ten thousand blasts have been made under my directions, and I have handled thousands of pounds, and there never has been on my works a life lost. At Oswego, between five and six thousands of blasts have been made and no accident. Besides these, many gentlemen in different parts of the country have been using large quantities for blasting and no accidents have transpired. We hear of the explosions of gun powder mills, of the killing of people by premature explosions and however sad the destruction may be, it creates no especial wonder!

Practically there has been found considerable difficulty to explode nitro glycerin. An ordinary fuse that will ignite gun powder, will not explode nitro glycerin. I have discharged tin cartridges loaded with 2 ozs. of powder in a pint of nitro glycerin and failed to explode it. This and similar experiments I have made many times. I have ignited a pint of it and seen it burn with a red blaze until the whole was consumed, and no explosion. I have carried it in a wagon, on several occasions, over rough roads and at a speed of four miles per hour, and I am still alive.

For blasting purposes nitro glycerin has excelled all other explosive substances. At the Hoosac tunnel, on the Baltimore and Ohio Railroad, at Oswego and many other places it has proved to surpass gun powder for disrupting rock. It is being rapidly appreciated throughout the country and many thousands of pounds are required to supply the demand. In the copper, iron and other mineral regions the demand is greater than the facilities to supply. It fragmentizes rock, rends assunder cast and wrought iron, and upheaves the sunken wrecks and strong barriers in harbors.

The gases of nitro glycerin are sufficient to give an explosive force of 169,000 lbs. per cubic inch, and the whole of this is effective as the detonation is sufficiently rapid to produce a complete explosion. Not so with gun powder. Its explosive force is about 13,000 lbs. per cubic inch, but of this only 32 parts out of 100 explode, the remainder, 68 parts, burns or is wasted.

All explosive substances are more or less dangerous. Gun powder, gun cotton, nitrated sawdust, gambia, bark, pulp, etc., are all to be handled with care. When these are compounded with chlorate of potassa the hazard becomes vastly increased

You have styled nitro glycerin a "demon," which means the devil. If you are correct I have had a curious associate, nevertheless I admire his or its potency. The Christian is cursed by the Mahomedan. The Jews, who despised the Christians for centuries, are not even now permitted to shelter in Christian Moscow. As the light of intelligence dispels the darkness of ignorance, prejudice passes away. Truth will prevail and science will command admiration!

T. P. SHAFFNER.

New York, Sept. 1867.

### The Light of Comets.

MESSRS. EDITORS.—In some recent communications for your columns from Prof. Ramsey, and Prof. Wilhelm, concerning the tails of comets I have been much interested. But in the discussion the question has arisen to my mind "how are we able to see these tails, admitting the theory of either of the gentlemen to be correct?" *i. e.* whether they be composed of reflected light as supposed by the one, or of refracted light as by the other, in either case it is light only that forms the tail so far as their explanations indicate. Now it is certain that in vacuity light is never originated or detected; that mere space can neither become luminous nor be illuminated. Light, either as a cause or an effect must be connected with matter. The light then whether reflected from, or refracted by the nuclues of the comet must fall upon some material substance that it may become visible to us. What is this substance which must be there in order to reflect to us the solar rays? Dr. R. would perhaps think to solve the problem by saying that this light is not simple but "electrified" by impringement and reflection from the opaque nucleus. Electricity however cannot pass through a vacuum; does he say that these two forces which singly are unable to traverse a void are yet able to make the trip in company? *Credat Judaeus non ego!*" I believe that the most interesting point in this investigation will prove to be the establishment of the existence of the heretofore hypothetical interstellar medium, the "all-pervading ether" of the physicists which is a *sine qua non* of the undulation theory of transmission, and which is doubtless the "resisting medium" by which Encke accounted for the secular acceleration of his comet. This medium, illuminated gives to our vision that most remarkable of heavenly phenomena the comet's tail. H. S. FULLERTON, M. D.

### How far a Suction Pump can Lift Water. The Egyptian Lotus.

MESSRS. EDITORS.—In answer to your correspondent, A. T., of Kansas, page 167, current volume, who proposes to raise water 31 feet by setting his pump "eight feet below the surface of the ground which gives it *twenty-three feet to suck the water* and eight feet to lift it to the heater," you say, "The plan will not work." Surely this is an error. A pump in such a situation even if 1,800 feet above the ocean level will suck water considerably more than twenty-three feet, while it will lift it any distance according to the strength of the pipe and the power applied.

I notice, also a slight error in what is said of the "Egyptian Lotus on page 166 of the same paper. The flower referred to is of the same family (*Nelumbium*) with the Egyptian lotus, but of a different species and though a very magnificent plant is by no means so uncommon as would be inferred from your article. It is found in the Southern and Western states where it is known as the Water Chinquepin and in the Delaware below Philadelphia. How it got into the Connecticut is a mystery. Mr. Gray suggests that it was introduced by the Indians. The roots and seeds are both said to be nutritious.

The roots can be easily obtained at low water and said to grow readily when transplanted. A large number have been taken up this year by various gentlemen with the hope of introducing it into new localities. WM. EDWARDS.

Middletown, Sept., 1867.

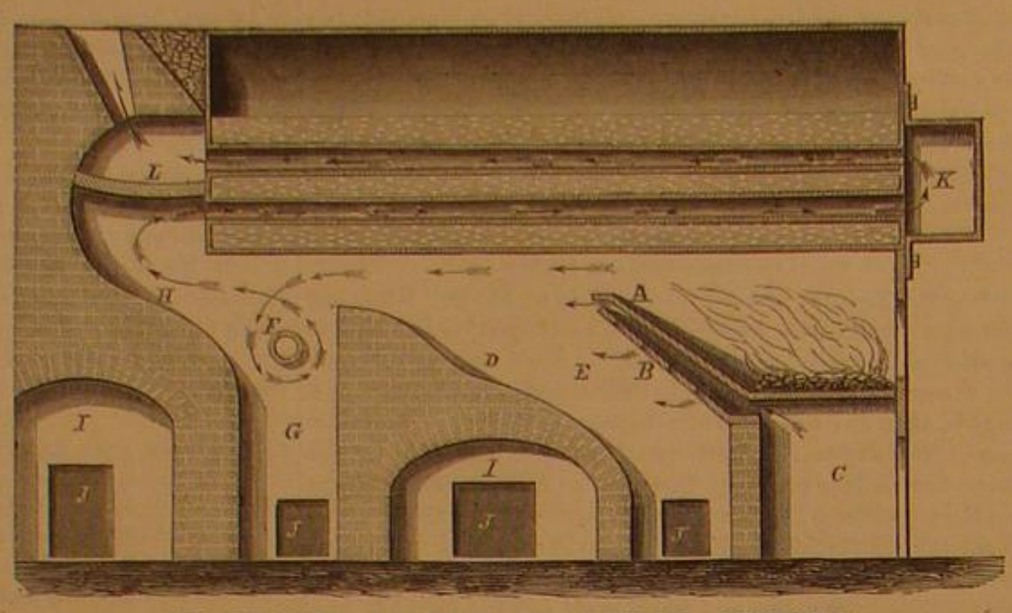
[We are still quite content with our answer to A. T., of Kansas, and find in it no error. Will Mr. Edwards please read it again and observe that he does not fairly represent it in his criticism.—EDS.

FLEXIBLE SANDSTONE.—Dr. C. M. Wetherell, of Philadelphia, has recently investigated this singular mineral substance known as Itacolumite, so called from Itacolumi, a mountain of Brazil. It is of particular interest from its almost universal occurrence in gold regions where diamonds are found. Its peculiar flexibility, whereby without breaking, sheets of it can be bent back and forth through a considerable curve, this gentleman has found to be due to small and innumerable ball and socket joints existing through the mass of the stone, each joint permitting a slight degree of motion.

### Another Mode of Setting Boilers.

Messrs. Editors:—In your issue No. 9, Vol. XVII., front page, is an article, with an illustration, from Mr. F.W. Bacon, for the setting of steam boilers, which contains many excellent suggestions. Having given this subject much study, I here present a diagram of the result thereof, merely stating that it had been my intention to apply for a patent therefor, but now, if it is worthy of any merit, it is freely given to the public for the general benefit.

The main features of this invention consist: 1st, In a metallic fire wall, A, luted or covered with fire-clay cement, and set at an angle of 45°. 2d, A perforated plate, B, running nearly parallel with the former, leaving an air space between the two about two inches at the upper edge, and three inches at the lower. This air space to be the full area—both longitudinal and cross section—of the fire wall, A, and to communicate with the heated air in the ash pit, C. 3d, The fire wall, D, of the gas chamber, E, extends to three-fourths the length of the boiler, with a waved incline to admit of the natural circular sweep of the incoming gas, the precipitation of ashes, dust, etc., the easy outgo of the flames, and the direct radiation of the heat to the surface of the boiler. 4th, An air pipe, F, in the gas space, G, regulated by a damper, to allow of a full admixture of air, and consequent combustion of any gas that may have escaped the chamber, E. 5th, The rounded sweep for the flames by arch, H, and the continued widening of all the flue spaces from first arch at A, to final entrance to chimney proper, which should also be of greater area than the combined flues. 6th, The drying oven, I I, for timber and fuel. J J represent the doors of the ash pits and the drying kilns, K the connecting bonnet between the flues at their return end, and L the division or partition between the flues.




CHAPMAN'S SYSTEM OF BOILER SETTING.

The action is thus:—The flames, passing over the metallic fire wall, heat it red hot, which heats up the air passing in the air space, E. This heated air, passing through the perforations of plate, B, mixes with the gases eliminated by the fire, and without reducing their temperature, causes them to ignite with rapidity, while the peculiar form of the bed of the gas chamber allows them to mix freely and have an easy egress. The old-fashioned, square-walled chambers and fire back cannot help impeding, fearfully, the beneficial working of any boiler fire; a side look into any furnace thus constructed will show the great loss thereby occasioned, and the wonder is that any draft at all is obtained. The incline in the fire walls and those of the gas chamber are natural deductions, and work as well in practice as they appear in theory. The air pipe, F, supplies any deficiency of air necessary to consume all the remaining gases at the entrance to the boiler flues, and is easily regulated by a damper. The flue spaces, also, are steadily enlarged as the length increases, so as to insure a powerful draft and perfect combustion. Advantage is taken of the peculiar gas chamber bridges to build ovens for the convenience of drying fuel, as in saw mills, or for other purposes.

Thus it will be seen that the flames have a continuous, unchecked roll and sweep, that the gases are mixed with an air as hot as themselves, igniting and mixing easily, and that all the reflecting facets have their right angles to the boiler, no heat or hot gases are lost, and the dust and ashes are well under control. The plan presented represents a three-flue boiler, but it applies to any other.

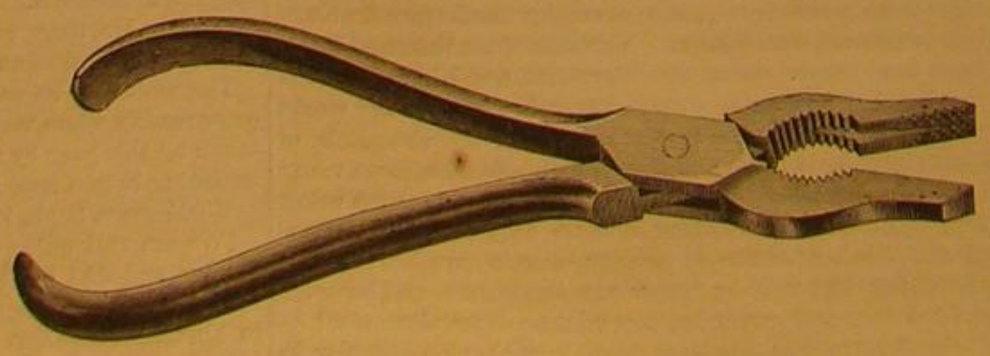
Penrose Chapman.

Brunswick, Me.

The inclined and perforated bridge wall and back appears to be a very desirable improvement. The sweep of the after walls is also a good idea, but it seems to us that the air-pipe, F, is introduced too far from the fire to insure heat enough to properly consume the carbonized gases.—[Eds.

### Improvement in Hand Pliers.

The engraving presents a perspective view of a pair of improved pliers, patented in the United States January 8, 1867, and for which patents are now pending in Europe. The only change from the ordinary pliers is the form and adaptability of the jaws. It will be seen that the end portion of the jaws are adapted to all the uses for which the ordinary flat pliers are intended. The bent portion of the jaws are toothed, as seen, and are intended for turning gas burners, holding round rods or bolts while removing rusty nuts, for the use of druggists for compressing corks, and also as an ordinary nut cracker. The tapering groove in the straight part of the jaws is intended for holding wire, rivets, or screws for fitting by the file, thus serving the purpose of a hand vise. No more particular reference to parts is necessary, as the illustration is plain enough for any one to understand. The improvements appear to be capable of being turned to good account and we think they are really valuable.



WALKER'S COMBINATION PLIERS.

The patentee, Sylvanus Walker, may be addressed at 59 East Chester Park, Boston, Mass. He is willing to sell the whole right for the United States or to make arrangements for the manufacture of the pliers on a royalty.

### Trials of Breech-Loading Rifles. Competition, 1867.

We had hoped before this to have placed before our readers engravings and detail particulars of the nine rifles which have been selected for future trial from the 112 sent in to Woolwich for competition. Circumstances, however, beyond our control have delayed the matter, so we purpose now to give a general description of these selected arms, hoping in a short time to furnish full details. In order to avoid any appearance of invidious distinction, we will take the names of the competitors in alphabetical order. The weapons, then, are—the Albini and Braendlin, the Burton (two systems), the Fosbery, the Henry, the Joslyn, the Martini, the Peabody, and the Remington rifles. The Albini and Braendlin rifle is a small bore, ·462 of an inch caliber, having the breech-block hinged on to the rear end of the barrel. It is opened by a small knob on the right hand side of the block, which, when open, rests on the barrel. The cartridge is inserted in the breech-chamber, and the breech-block returned, by which the chamber is closed. As the hammer descends, it acts upon a bolt which secures the breech-block, and at the same time transmits a blow to a piston enclosed in the breech-block, and by which the cartridge—central-fire—is ignited. On opening the breech again an extractor, working on each side of the barrel, removes the cartridge case. We believe that the Albini system, firing the Boxer cartridge, has been adopted in the conversion of the rifles of the Belgian army. The first of Mr. Burton's two systems is a central-fire, large bore, ·577 of an inch diameter. The breech-block is hinged under the barrel, and is opened downwards and towards the muzzle by a small lever in front of the trigger guard, which it somewhat resembles. The piston is carried in the breech-block, and its return after firing is effected by the lowering of the block, which also extracts the cartridge shell. Mr. Burton's second system is of the same caliber, but on the plunger principle, after the fashion of the Prussian needle-gun, which in outward appearance it somewhat resembles. The great distinction between the two, however, is that the needle-gun, as our readers are aware, consumes its own cartridge case, whilst the Burton gun is adapted for the Boxer cartridge. The plunger is locked by a small boss formed on its upper side, and which takes into a slot in the shoe on the plunger being pushed forward by a knob similar to that on the Prussian gun. The front end of the plunger carries an extractor by which the cartridge case is withdrawn after firing.

The Fosbery rifle has a ·568-inch bore, and a breech-block hinged and opening over the barrel in the same way as the Albini rifle. The breech-block is opened by the sliding motion of a knob, fixed on the right side of the arm just below the breech-block. This knob acts on a curved lever and on a wedge-piece, the arrangement allowing the breech to be rapidly opened and closed, the extractor being worked from the same action. The Boxer service cartridge is used, and is exploded by a piston passing through the breech-block, the block being locked by a bolt acted on by the tumbler. The fifth system is that of Mr. Henry, and is a small-bore rifle, ·455-inch caliber, using the Boxer cartridge. Here the breech-block has a vertical sliding motion, which is obtained from a lever fitting closely under the trigger guard. The piston takes a diagonal direction through the breech-block, which is provided with an extractor. The next arm for notice is the Joslyn rifle, which has a very neat and simple breech arrangement, and is adapted for the rim-fire copper cartridge, although it may be used for either rim or central-fire. The breech-block—or, rather, breech-cap—is hinged on the left side of the barrel, and is opened by a small knob acting on a spring catch on the right side, which has to be withdrawn and not pressed inwards, so that opening from accidental pressure is impossible. The rear end of the barrel is encircled by a raised metal rib or projection, fitting into a corresponding recess in the breech-piece. This secures the block against any back action in firing, whilst it is locked by the spring catch already noticed. For further security the nose of the hammer fits into a cupped recess on the rear of the breech-block, and into which the head of the plunger protrudes. Thus, were the hinge and catch to be removed—as, in fact, they have been in some private trials—the breech-block would be securely held in position during the discharge of the piece. The extractor is worked by a wedge cam attached to the hinge and joint of the breech-cap, and by which the cartridge case is ejected with ease and certainty.

The Martini rifle next demands our attention. It is a small-bore arm, of ·433-inch caliber, and in which the ordinary lock is replaced by a spiral spring and piston, no hammer being visible. The rear of the breech-block is hinged to the breech-frame, and the depressing of a lever behind the trigger guard opens the chamber for the insertion of the cartridge. As the breech is opened, the empty cartridge case is extracted, and the piece cocked. This arm is adapted for the copper rim-fire cartridge. Our readers may probably remember the next arm, the Peabody rifle, which we described last year. This rifle has a bore of ·5-inch, and is of somewhat similar construction to the Martini rifle. It, however, has a lock and hammer, but otherwise is designed for the copper-cased rim fire cartridge. The rear of the breech-block is hinged to the frame whilst the fore part is depressed by the action of the trigger guard, which forms a lever, as in the well-known Spencer repeating rifle. The top of the breech-block is grooved and acts as a guide for the cartridge, whilst it allows of a very small depression only of the block. The cartridge case is quickly extracted by a lever acted upon by the breech-block. The Remington rifle is of the same caliber as the Peabody, and is fired with the Boxer small-bore cartridge. The breech end of the barrel is closed by a stop, which works on a pivot centered below the barrel. The breach end of the barrel is strengthened by a metal hoop or band, against the rear edge of which the stop takes its bearing. The stop is held in position by the action of the lock, and the objection which we once raised to this arm—that the locking arrangement was not thoroughly reliable—appears to be removed in the present example. It would be manifestly unfair and illiberal on our part to enter upon a discussion of the comparative merits of these weapons without having had an opportunity of practically testing them, or, at any rate, of manipulating them. Some we have tried, whilst others we have not handled, which would render discussion on our part still more unfair. We trust, however, that we shall shortly be able to place the matter fully before our readers with all its interesting details. Before concluding, however, we may give the results of the firing at the official trials in the following tabulated form, and we now place the weapons in order of merit for rapidity, to which arrangement they are fairly entitled:—

| | | | | |
|---|---|---|---|---|
| Joslyn | 12 | shots in | 47 | seconds. |
| Martini | 13 | " | 48 | " |
| Fosbery | 12 | " | 50 | " |
| Remington | 12 | " | 50 | " |
| Burton No. 1 | 12 | " | 57 | " |
| Henry | 12 | " | 57 | " |
| Albini and Braendlin | 12 | " | 61 | " |
| Burton No. 2 | 12 | " | 62 | " |
| Peabody | 12 | " | 63 | " |

It will thus be seen that the Joslyn rifle heads the list, while the Peabody is last, and then the 12 shots include three miss-fires. Fosbery and Remington are ties, as also are Burton (No. 1) and Henry. In justice to some of these arms we must say we have seen quicker practice with several of them in private grounds, and apart from the disturbing influences of an important public competition. The Joslyn rifle, for instance, only attained a rapidity of fifteen rounds or so per minute, which we know to have been far exceeded on other occasions. And the same of one or two other weapons. The Joslyn rifle gave some very good results at the late Wimbledon meeting, and is a recognized military arm in the United States. The Remington rifle has been largely tried in America, France, and Austria. The present position of the competition is this: The nine selected competitive systems are now awaiting the further and exhaustive trial which may be expected to take place about four months hence. To this end each of the accepted competitors has to furnish six rifles and 6,000 rounds of ammunition. When this has been consumed, we shall, no doubt, know what will be the English small-arm of the future.—*London Mechanics' Magazine.*

### Single-Cylinder Marine Engines.

The American engineers have generally insisted that their single-cylinder marine engines seldom or never stop on the center. But we see in the *Scientific American* an illustration and description of a hydraulic jack for getting the cranks off their centers. It is patented by the superintending engineer of the Pacific Mail Steamship Company, Mr. W. H. Vanderbilt, a near relative, we believe, of the well-known "Commodore" Vanderbilt, one of the very largest owners of steam shipping property in America. We conclude, therefore, that Mr. Vanderbilt *has* had his single engines sticking on their centers.—*Engineering.*

[The main reason why our single-cylinder engines do not stop on the center is that the engineer is so skillful and the engine valves are so completely under his control that the drag of the wheels can rarely affect the engines in carrying the crank too far. The invention alluded to is intended only for infrequent contingencies.—Eds.]

### A. S. LYMAN'S PATENT ACCELERATING RIFLE.

Fig. 1 is a longitudinal section of the breech of an accelerating hunting or target rifle.

Fig. 2 is a cross section through the accelerator.

A is the initial charge chamber; C C is the accelerating chamber; S is the shot.

This rifle is loaded at the muzzle when standing nearly vertical. The powder first fills the center tube, A, which holds twenty grains, then runs over into the accelerating chamber, C C, which surrounds it, and is upward of ten times as large as the center or initial charge chamber. A wad, W, of leather (made by cutting a piece from sole or harness leather with a punch) is next pushed down upon the end of the initial charge chamber. This cuts off all connection between it and the accelerating chamber. The barrel may then be wiped out if desirable, and the shot sent home.

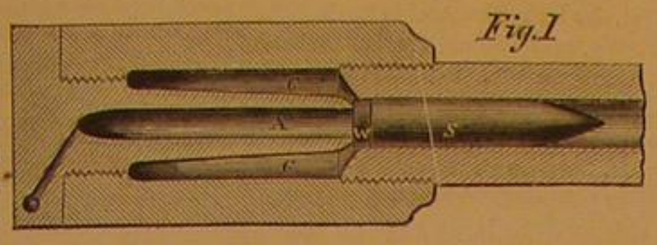
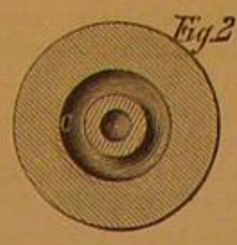


Fig. 1

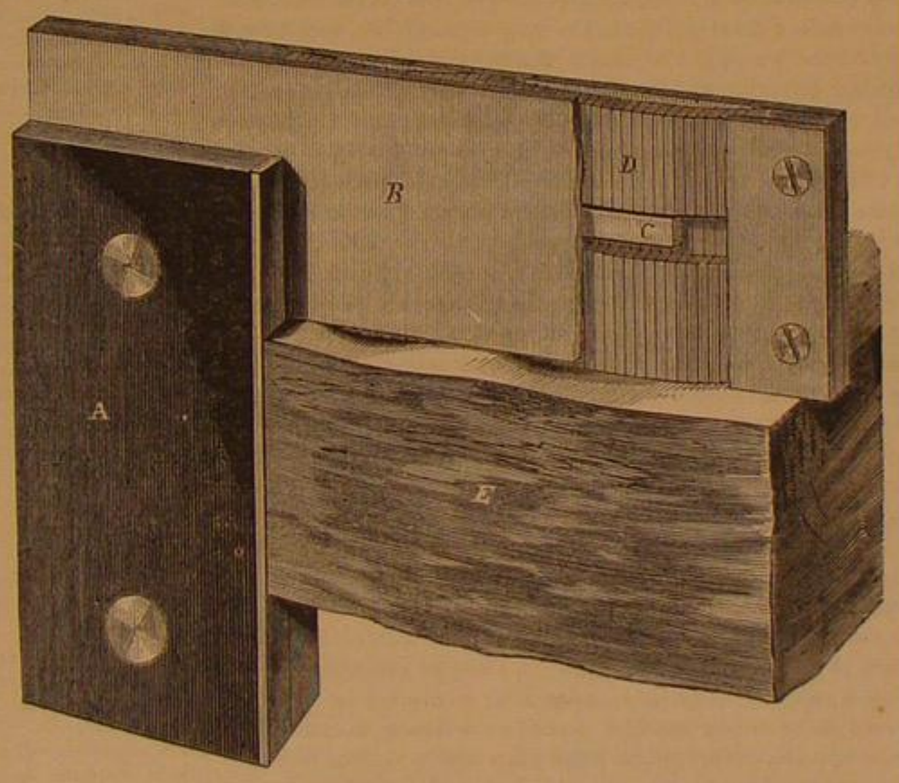

Fig. 2

The range of this little rifle but ⅝ inch diameter of bore, and weighing, with its telescope, less than 15 pounds, using half an ounce of powder and one ounce shot 2¼ inches or six calibers long, is 1,000 yards with 1° 28′ elevation, and 1,300 yards with 1° 58′ elevation. It will be seen that this is a greater range than is obtained by any known cannon at the same elevation except the Accelerator, and more than twice as great as that of the Whitworth or any other rifle known of the same caliber.

This great range and horizontality gives it a vast advantage for hunting and other purposes where the exact distance is not known, as explained in description of Accelerating Cannon in SCIENTIFIC AMERICAN of Aug. 3d.

### Improvement in Try-Squares.

In the use of the ordinary try-square for trueing up stock it is necessary either to stoop repeatedly in order to look under the blade of the square, or to raise the piece being operated upon to permit the light to show between the blade's edge and the work. Of course, this, if long continued, is a wearisome labor, especially if the piece being trued is heavy or bulky. The object of the improvement in the square shown in the engraving is to obviate this necessity by permitting the eye to note the progress of the work by a glance at the top of the blade. How this is effected may be seen by the following description:—A is the handle or stock of the try-square and B, the blade. This latter is hollow or double, composed of two longitudinal blades secured, as seen, a little distance apart. Running lengthwise through the center of the space between these blades is a square bar, C, on which hang cross pieces, D, with a mortise in each sufficiently long to permit a slight vertical movement on the central bar. These drops are about one-sixteenth of an inch in width, made of steel, and fitting nicely one to another. The central bar permits these uprights to drop below the level of the lower edge of the blade but only flush with the top edge. Thus it will be seen that when the piece which is being planed becomes true, all those uprights which bear on its surface will be exactly level with the top edge of the blade. The block of wood, E, is purposely shown to be very uneven to exhibit the working of the square, a portion of one side of the blade and a part of the central bar being broken away to expose the parts.



BURGUM'S IMPROVED TRY-SQUARES.

This invention was made at the suggestion of a correspondent in the SCIENTIFIC AMERICAN a few weeks ago and it appears to meet a want long experienced. For further particulars address John Burgum, Concord, N. H. Patent pending through this office.

### A QUARTETTE OF MATHEMATICAL GYMNASTS.

The errors which have lately been made in calculating the power of projectiles, the resistance of armor plates, and the force of steam vessels when used as rams, seem to indicate that a knowledge of first principles is more necessary for a correct appreciation of mechanical problems than any amount of abstract mathematical skill.

The scientific gentlemen whose errors on the subjects alluded to, it is intended at this time to point out, are Captain Noble; Professor Daniel Treadwell, late of Harvard University; one of the Shoeyburyness scientific reporters, and Rear Admiral Louis M. Goldsborough, of the U. S. Navy.

The curious blunder of Captain Noble, of her Britannic Majesty's Service, the famous artillery calculator, in computing the dynamic force of the fifteen-inch shot, has a parallel, in point of inaccuracy, in a late error (which will presently be referred to) of another Shoeburyness mathematician in calculating the resistance of a certain iron-clad target, and also in the blunders committed by Professor Treadwell in his calculation on the fifteen-inch gun. Captain Noble, it will be remembered, made the following error in his calculation of the power of the fifteen-inch shot. Referring to page 30 of his report, the result of his calculations is stated as follows, viz.: That with a "50-pound charge and a 484-pound shot an initial velocity of 1,070 feet per second will be the result." This is equivalent to a force represented by 8,658,760 pounds raised one foot high, which divided by 50 gives only 173,175 foot-pounds as the energy exerted by each pound of powder.

On June 27, 1867, Captain Noble fired the fifteen-inch gun at Shoeburyness with the following result: Charge 50 pounds, weight of shot 450 pounds, velocity 1,214 feet per second, dynamic force of the shot 10,328,400 foot-pounds, or divided by 50 gives 206,570 foot-pounds for each pound of powder. Thus Captain Noble was no less than 1,569,634 foot-pounds out of the way, and he himself practically demonstrated the fallacy of his calculations, together with his want of knowledge of the weapon he had condemned on the results of blundering computation. And more unfortunate still for the reputation of this officer, he asserted that 50 pounds "is as heavy a charge as it will stand." Now these guns have been fired frequently, some of them for 100 rounds, with 100-pound charges of mammoth powder=83 pounds of such powder as Noble's calculations are based upon. Consequently the energy produced represented by 83×206,570 (the force of one pound)= 17,145,310 foot-pounds, or about double the power this ordnance officer asserted it was possible for the fifteen-inch gun to exert!

We are sorry to say that Professor Treadwell has blundered still more than Captain Noble in his speculations on the capacity of the fifteen-inch American gun. In Vol. VII. of the Proceedings of the American Academy of Arts and Sciences, we find the following statement in a communication from Professor Treadwell, read by Professor Winlock, viz., that the fifteen-inch gun with a projectile of "315 pounds" weight and a charge of "50 pounds" of powder an "initial velocity of 1,118 feet per second" is obtained, which is equal to a "force in pounds raised one foot high, 6,057,950."

Referring to the results of trials before alluded to, it will be remembered that 50 pounds of powder projected a 450-pound shot with no less a velocity than 1,214 feet per second, which is equal to 10,328,400 foot-pounds, or 4,276,450 more foot-pounds, or nearly double the *vis viva* stated by the Professor. And in order to show still further to what extent he has underrated the real power of the gun, it is only necessary to repeat that with a proper charge the gun imparts an energy to its shot of no less than 17,145,310 foot-pounds, as tested by more than a hundred discharges from one single gun, as before stated.

In the same communication we find the following put down as the performance of the Armstrong wrought-iron coil gun: "Weight of shot 600 pounds," "charge of powder 100 pounds," "initial velocity 1,400 feet," "force" of shot "in pounds raised one foot high, 18,375,000." According to these statements a pound of powder in the 15-inch only exerts a force of 123,039 foot-pounds, while the late Shoeburyness trials show that this piece actually exerts a force of 206,567 foot-pounds; thus the Professor underrates the American gun to the enormous extent of 83,537 foot-pounds for each pound of powder employed, a degree of blundering quite inexcusable in one who undertakes to teach the American Academy of Arts and Sciences. The enormous friction of the rifle shot and the absence of friction in the 15-inch shot, should have suggested to the Professor that his calculations must be erroneous.

Again, the 100 pounds which he puts as the charge in the Armstrong gun has only been used on one or two occasions; 70 pounds was called the service charge, and even that ruined the gun in a very short time, and the last one tested burst at the sixth fire with but 70 pounds. In a word, the English themselves admit this gun to be a dead failure. But with this charge, *i. e.* 70 pounds, and a 511-pound projectile, an initial velocity of only 1,250 is obtained; hence the force of the shot is equal to 12,500,000 foot-pounds, or only 178,528 foot-pounds against nearly 207,000 for the 15-inch.

While Professor Treadwell has overstated the power of the abortive 13·2-inch English wrought-iron coil gun, he has as we have shown understated the power of the American 15-inch cast-iron gun in the ratio of 6,051,950 foot-pounds to 17,145,310 foot-pounds, that is, he has underestimated its capacity *nearly three-fold!*

In looking through Professor Treadwell's paper, an explanation which seems to account for these astounding blunders may be found in the fact that the document in question is intended as an argument in favor of the coil system of constructing cannon, his patent system. On this point it will be enough to say that the Armstrong coil system, which the Professor crowns with unearned laurels, is utterly unable to meet the strains put on heavy ordnance; in short, it is a complete failure, and is so acknowledged in England by the fact of its abandonment for a simpler system. The Armstrong system is now admitted to be founded on erroneous mechanical principles.

Much more remains to be said on this point, but we pass on to the next candidate, the Shoeyburyness scientific reporter. And with respect to the blunder made by this official in his calculations on the resisting power of an iron target, we cannot do better than quote from the London *Army and Navy Gazette* of August 24th. The *Gazette*, after giving its views of the self-satisfied air of the Shoeyburyness ordnance and select committee men, says: "There is, we see by the pages of the leading journal, a recent and rather remarkable illustration of the utter fallaciousness of the calculations at Shoeburyness, which the scientific officers would have done better to have kept to themselves. It was considered desirable to test the power of the American system of laminated plates as compared with that of solid plates. One target was composed of a solid 7-inch plate, one of two 3½-inch plates, and one of three 2½-inch plates, bolted together."

We are told that "the ratios of resistance under the 'empirical rule' ought to have been 49, 24, and 16 respectively. The result was ludicrously at variance with the empirical rule, and is represented in the proportion of 61, 57, and 52 respectively." It is not likely that any comments can add to the force of the teachings of such a result.

The blunder to which we now call attention, in point of ignorance of principles, is entitled to cap the monument of blunders whose base and shaft is formed by the others which we have already mentioned. It is the extraordinary hallucination of no less a mathematician than Admiral Goldsborough with regard to the smashing or punching power of rams. The Admiral's fallacious reasoning deserves to be pointed out at the present time, from the fact that he still clings to an error which, if he has any conception of the subject, he must have seen long since.

In his report to the Secretary of the Navy in 1864, the Admiral strongly advocates the employment of rams for the protection of harbors, unprovided with guns, which he says "are detrimental to unity of purpose." This view he attempts to sustain by the absurd statement that a ram weighing 10,080,000 pounds, moving at the rate of 15 knots an hour or 25 feet per second, "is equal in point of shock" to a ball of iron weighing 252,000 pounds striking with a velocity of 1,000 feet per second. This ball is 10 feet 2¾ inches in diameter. The striking force of the ram is measured by its equivalent of a little over 100,000,000 of foot-pounds, while the striking force of the 10 feet 2¾ inches ball is measured by no less than 3,906,000,000 foot-pounds. In other words, the Admiral, by not understanding the fact that the comparative "shocks" of the impact of moving masses are measured, not directly as the impact of moving masses are measured, not directly as theirvelocities, but as the squares of their velocities, has committed the ludicrous blunder of exaggerating the power of his ram nearly forty fold.

The Admiral's ramming theories appear to have been conceived while he was in command of the naval force in Hampton Roads opposed to the *Merrimac*, and while that iron-clad was nightly haunting his dreams. The official delivery of these theories was formally announced with the ceremony due to a royal birth, in the report to the Secretary referred to.

We have a few other mathematical acrobats on our list, but as their summersaults were turned on another stage, we will not mention them at the present time, but we hope before long to place them before the readers of the SCIENTIFIC AMERICAN. We will briefly observe, however, that one of them is not a thousand miles from the Navy Department, and he is still, we believe, accumulating figures with extraordinary cunning and industry.

### GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The meetings of this Society were resumed, after the summer intermission, on Thursday evening, Sept. 19th. The attendance was small, and the exercises were of a somewhat miscellaneous character, being chiefly confined to discussions and comments upon a budget of scientific items collected by the Chairman, Prof. Tillman, during the summer months.

#### FACTS CONCERNING DEAFNESS.

Following the reading of a note upon the causes of deaf-dumbness Dr. Richardson remarked upon some prevalent but false notions, respecting the use of aids to hearing and to sight. Persons having but a slight impairment of their auditory apparatus, are loth to have recourse to speaking trumpets fearing that thereby permanent deafness will ensue. But this is a mistaken idea, for the use of this aid is in effect a kind of invigorator, bringing the organs of hearing into full play, and thereby developing rather than paralyzing them.

In supporting similar views in relation to the organs of hearing and sight, Dr. Richardson recounted the observations made by Dr. H. R. Smith, of Chicago, during a recent visit of scientific research to the Mammoth Cave. The fish of these subterranean lakes are not only without eyes or even traces of an orbit, but so far as he could ascertain by careful and

indefatigable investigation, are destitute of the sense of hearing; these facts going to prove the truth that the functions of the auditory and optic nerves become impaired by the partial or total deprivation of their natural stimuli, sound and light.

But on the other hand, excessive use of these nerves tends to their paralyzation. The case of three boiler makers of this city made permanently deaf by hearing incessant hammering, was mentioned; also many cases of loss of hearing by artillerymen. In this connection it was incidentally mentioned, that the noise made by brass cannon affected the auditory nerves more painfully than that made by iron ordnance.

CONCERNING TEETH.

A note upon late experiments, relative to the readiness of digestion of varieties of food, brought up Mr. Fisher, who advocated the more thorough comminution of food on the score of health and economy. In the rambling discussion which ensued, one speaker presented the testimony of a late French *savan*, who maintains that the superiority of an Indian's teeth, for example, is due to the fact that, from insufficient cooking of their food, they are obliged to make great use of them; that the dentist's occupation was a sign and concomitant of excessive civilization. The dentists present denied the charge, affirming that rudimentary teeth of both sets were formed before the birth of the child; that the mastication of food in no way entered into the question, excepting perhaps in the case of the mother; and that the Indian had better teeth simply because the constitution of the generality of their females was better than that of the civilized woman.

Some other topics of minor note occupied the controversial powers of the members during the remainder of the evening, and the Society adjourned at a late hour.

### Birkhols' Metal.

We see it stated in the papers that A. Birkhols, formerly of Colt's factory in Hartford, the inventor of a metallic composition resembling brass, for the manufacture of which a company has been formed in Providence, R. I., with a capital of $300,000, has sold his patent to them for $40,000 of the stock, three cents duty on every pound manufactured, and a salary of $4,000 for superintending the manufacture.

The following is a copy of the patent:—

Be it known that I, Alexander Birkhols, of the city and county of Hartford and state of Connecticut, have invented or discovered certain new and useful improvements in the composition of cast metal, by means of which greater strength is acquired, and I do hereby declare that the same is described in the following specifications.

So as to enable a person skilled to make the same, I will therefore proceed to describe its component parts, the essential ingredient of which is cast iron. To make one hundred pounds of this composition, I first take two pounds of cast iron, two ounces of charcoal, put into a crucible and heat to a white heat. I then add thereto sixty pounds of copper. Heat till both are melted together, then add four ounces of borax and thirty-eight pounds of zinc.

The mode of proceeding during the melting is much the same as with all other metals melted in crucibles. When melted it may be poured into molds or bars suitable for the forge or rolling mill. Its strength is estimated to be eight thousand pounds greater to the square inch than the best wrought iron, rendering it far more valuable for various purposes.

The proportion of parts may be varied, which will only change proportionably the desired effect, viz., greater amount of strength and solidity; but I believe that the proportions about as described will be best for all practicable purposes. I have described its component parts and the mode of proceeding to produce my improved composition, so as to enable a person skilled to make the same.

What I claim, therefore, and desire to secure by letters patent, is the introduction of cast iron into a composition composed of copper and zinc in about the proportion, substantially in the manner as described.

Alexander Birkhols.

### The Uchatius Process.

Many of our readers will still recollect an interesting invention made by M. Uchatius, an officer in the Austrian service, and which was first brought under public notice at the Paris Exhibition of 1855. It is a direct method of steel manufacture by mixing granulated cast iron and iron ore, in proper proportions, in a crucible, and by these means forming the exact combination required for any given quality of steel. In 1856, at the same time when Mr. Bessemer's invention had been pronounced to be a failure, this process was at the hight of its renown, and experiments were made in France and in England on a more or less large scale, although not in anything like commercial practice, to test its value. A company was formed in France, and, we believe, under the auspices of the Government, for the working of M. Uchatius's patents, and everything then believed to be necessary for steel manufacture on a large scale was provided. The causes of failure in this instance are now perfectly intelligible, since the advancement of what may be called the science of steel manufacture has, since that date, enabled us to judge of the importance and value of certain details which were then unknown or overlooked, and the absence of which caused the practical failure of a process which in principle was perfectly correct, and would have in time become of considerable importance, had it not been surpassed by the progress of a still more glorious and revolutionizing invention, viz., the Bessemer process. The Uchatius process, however, has been commercially introduced at one place, and the steel works has continued its operations now for about ten years, and so far as can be judged from the excellent quality of its products, and from the continuance of this mode of manufacture with perfect success. The steel works referred to is at Wykmanshyttan, in Sweden. In 1862, this concern sent Uchatius steel to London, which was remarkable for its tenacity and uniformity of grain, and now in the Paris Exhibition we find the same works represented by another excellent collection of the Uchatius steel. We understand that the Uchatius steel of Wykmanshyttan is used exclusively by the royal mint at Stockholm for dies of coining presses, polished rolls, and other similar articles requiring steel of great strength and closeness and uniformity of grain. The reason why this process succeeded in Sweden and failed in France and in England is the same which made the Bessemer process first succeed in that country, viz., the purity of the Swedish ores. The ore employed for the Uchatius process at Wykmanshyttan is that of the Bisberg mines, which can be seen in its natural state at the Paris Exhibition, forming part of the large trophy of ironstone and iron erected in the Swedish machinery gallery. It ranks among the purest and richest magnetic ores to be found anywhere. From this ore and from granulated pig iron made of the same ore, probably mixed with iron containing manganese, if the original granulated iron does not contain a sufficient dose of this latter metal, the Uchatius steel is made. The production is not inconsiderable, and the article finds a market at Gefle, principally in the form of a bar steel of small dimensions, at a price of 30s. to 35s. per cwt. Uchatius' process would have become a practical success in England, had it not been swept away by Mr. Bessemer's invention before it had time to establish itself in practice. The steel manufacturers of this country and the public at large have all reason to be satisfied with the historical coincidence of the two inventions, since there would otherwise, and had Bessemer followed behind Uchatius, have been two revolutions to be passed through instead of the one which has taken place. We should have had to change from the old mode of steel conversion to the Uchatius process, and ultimately again from that to the Bessemer process.—*Engineering*.

### Animal Grafts.

Plastic surgery recognizes life in a part and grafts one portion of the body on another, or replaces a portion of a nose or a finger when lopped off, and witnesses its continued growth. In lower animals this principle is more astonishingly developed. Cut a polyp into a dozen pieces and each fragment will develope itself into an independent and perfect type of the species. A French naturalist, M. Vulpian, cut off the tails of tadpoles, and saw them not only live but grow for ten days, indifferent to all theories of nervous centers, digestive apparatus, or circulatory systems. But the member that seems to have the strongest dose of the "vital principle," is the tail of a rat. This is the very ideal of life, and here, if anywhere, we ought to locate the seat of vitality. The following experiment was made by Mr. Bert. He dried a rat's tail under the bell of an air pump, and in immediate proximity to concentrated sulphuric acid, so as gradually to deprive it of all moisture. Then he placed it in a hermetically sealed glass tube for five days. At the end of this time he subjected it for a number of hours to a temperature of 98° Cent. in a stove, and subsequently sealed it a second time in his tube. Four days more having elapsed, he united this tail by its cut extremity, to the freshly cut stump of a living healthy rat, and quietly awaited the result. His success was as complete as it was marvellous. It commenced to expand and perform the natural duties of a tail, and three months afterward he demonstrated by a second amputation, and a careful injection, that it was furnished with proper vessels and was a living part of the second rat!

What rich lessons practical surgery may learn from such experiments, can be imagined. A careful anatomist has transplanted a fragment of bone from the skull of one rabbit to the skull of another, and found it form adhesions and replace the lost portion perfectly. A piece of periosteum taken from a rabbit twenty-four hours after death, grew and produced bone when grafted neatly on a living animal of the same species. Nerves also have been removed from one body to another with success, and some very singular results noticed where a portion of a motor was excised and supplied by a fragment of a sensory filament. The diseases to which grafted members are subject, after they have been exposed to certain re-agents, are also full of hints for the pathologist and the physician.—*Medical and Surgical Reporter*.

## MANUFACTURING, MINING, AND RAILROAD ITEMS.

The East India telegraph is progressing through China.

There is only about a quarter of the shipping tunnage building in Maine at present compared with last year.

England uses 850 million postage stamps annually, France 450 and the United States 350 millions.

The efforts of the French Emperor to increase the extraction of coal in France, have been so far successful that from 13,000,000 to 14,000,000 tuns will probably be mined this year. Rather an insignificant amount compared with the coal production of America or England.

The cities of Bombay and Singapore, India, have for two years past been lighted with gas made from coal brought from Australia. This coal besides being cheaper, is quite free from sulphur, so that the gas is easily purified, and a larger supply of coal may be stored without deterioration or danger from heating.

The ties for the Kansas Pacific Railroad will cost a dollar each. The coal must be transported 200 miles.

The Prussian King has accepted the present by Krupp of his monster gun now in the Paris Exposition, and its ultimate destination will be some coast battery.

A California paper says that the company engaged in taking out borax in Lake county, will soon be in condition to extract five tuns of this article per day from the Borax Lake.

Gold dust to the value of $800,000, arrived at St. Louis, from Montana, on the 9th inst., the largest consignment received at one time.

Maine claimed recently to possess the oldest locomotive in America. It was broken up the other day at a Bangor machine shop. This locomotive was the "Pioneer," a ten ton engine, and was one of the early machines built in England by Stephenson, the inventor of the locomotive. It was built at Newcastle-upon-Tyne, in 1835, and ran its first trip November 6, 1835. Its last work was done August 15, 1867.

Diamonds have been found in the Cape colony, in the neighborhood of the Orange river, by some Amsterdam prospectors; one of the gems is valued at $5,000.

It appears from quarterly returns made by the various manufacturers of sewing machines in this country, that during the year ending June 30, 1867 there were manufactured and sold 151,185 double-thread, and 18,970 single-thread machines.

The first paper mill built in the United States was erected at Roxborough, Pa. 1690. The second mill was built at Elizabeth, N. J., in 1738, during which year the first mill in Massachusetts was built in Boston. In the year 1860 the number of paper manufactories in the United States was 555, their total product, being valued at $21,216,802. Of these manufactories New England had 204; the Middle States 273; the Western States 54: the South 24. The increase since that year has been very large.

The American Fishhook company of New Haven, Conn., turn out from each machine, one hundred fishhooks per minute.

The Boston Hartford and Erie railroad by the first of next month will have their road in operation to Mechanicsville, Ct., where a junction will be made with the Norwich and Worcester railroad.

The largest journal turbine wheel ever built in the country, is being constructed for the Fairmount water-works of Philadelphia. Its diameter is ten feet three inches: weight, including gearing etc., about 200,000 pounds.

Some of the Lowell cotton mills which have been slacking up for a few months past, are again pushing business.

The amount of capital expended on the Suez canal, last year was $10,000,000. The estimated amount still required to be expended before the work will be completed, is said to be $20,000,000.

For improving the navigation of the Mississippi river, Government has authorized the construction of a canal seven and a half miles in length, around the Keokuk rapids. The contract for the removal of obstructions in the rapids just above Rock Island, has been awarded, and among the novel means for rock excavation, is an immense drill weighing over four tuns, which with a fall of thirty feet, it is reported, plows into the solid rock more than four feet at a single stroke. It would interest us to be informed of the structure of the rock where such extraordinary results could be attained.

Work on the Manassas Gap railway, is progressing very rapidly about three hundred hands being employed. The rails are now being laid between Piedmont and Markham, and the track graded and readjusted to the summit of the Blue Ridge.

The production of coal this year has not reached that of 1866 but the great falling off in the demand for manufacturing purposes has caused a great reduction in rates. Prices are now so low that the mines are not making any money, and it is predicted that many small companies formed during the past two or three years, must succumb to the general stagnation.

The first sample of pig-iron ever made on the Pacific coast is on exhibition in San Francisco.

The contract for building the mountain section of the Pacific railway, some six hundred miles in length, has been awarded to Mr. Oakes Ames, who is to receive therefor over $47,000,000. This is the largest railway contract ever made in this country.

The California gold mines are said to be yielding more freely than ever before. As a specimen; near Smartsville upwards of $1,000,000 of gold have been taken from one claim of 100 acres, since March 1864. "It takes a mine to work a mine" says an old Spanish proverb, and to open the mine under notice, took nine years of incessant labor, and an enormous expenditure of money. It has four miles of sluices, three rods wide and three feet deep, in which is distributed three tuns of quicksilver to catch the gold. The water used in washing costs $25,000 per annum, and 125,000 pounds of powder are expended annually in blasting.

## Recent American and Foreign Patents.

*Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.*

Attachment for Grain Clipper or Header.—Samuel Manning, San Francisco, Cal.—This invention relates to a new machine to be attached to the ordinary clipper or header, for the saving of grain, which is fallen or blown down, commonly termed "lodged grain."

Carriage Spring.—Thomas De Witt, Detroit, Mich.—This invention consists in the application of fixed studs to a carriage spring, composed of two parts connected together and arranged in such a manner that a spring superior to the ordinary elliptic spring is obtained.

Lounges, Sofas, Bed Bottoms, Chairs, etc.—Casper Martino, Trenton, N. J.—This invention has for its object to furnish a neat, convenient, secure, and reliable means of securing coiled wire springs, in a position in lounges, sofas, chairs, bed bottoms, etc, and for raising and lowering a movable part of such articles.

Device for Hitching Horses.—J. B. Thornton, Madison, Wis.—This invention relates to a device to be attached to the inside end of carriage wheel hubs by means of which, if the horse or horses harnessed in and to the carriage be hitched to such device, upon any attempt to move forward the wheel is turned sufficiently to draw in the rein, and thus to stop them; while if they move backward, the devise is free to slip around the wheel hub, and no harm thus occasioned.

Spade.—W. H. Miller, Brandenburg, Kentucky.—This invention consists principally in a novel attachment of the handle for operating the tines constituting the rake, to throw them into position for use as a rake or as a spade.

Railroad Station Indicator.—George T. Lape, Summit, N. Y.—This invention relates to a new and useful mode of constructing apparatus for indicating to passengers in the railroad car the names of stations as they approach or pass them, in the distance, between them and the termini of the road.

Device for Mixing Fluids.—George Watkins, Brooklyn, N. Y.—This invention relates to a new and improved device for mixing and agitating fluids, and it consists in a novel means employed for operating the revolving beaters whereby the latter have two motions, a rotary one on their own axis, and another in a circle, around the tub or receptacle in which the fluid to be mixed is placed.

Petroleum Steam Heater.—Lewis R. Wiggin, Farmington, N. H.—This invention which relates to device for heating tar, wax, glue, blacking, oil, and other articles used for chemical and mechanical purposes, consists of a double bottomed tank or receptacle for the substance to be heated, and of a standard through which water is conveyed between the two bottoms, and rising into a steam generator, from the top of which passes a worm coiled in the tank. A chimney passes through the steam generator, at base whereof a petroleum or kerosene lamp or other source of heat is placed.

Setter for Saw Mill.—Titus Whitmore, Dubuque, Iowa.—The object of this invention is to provide a device by which the logs may be set automatically to a circular mill saw for manufacturing lumber, and consists in providing an index plate made in the form of a disk with a cam, and a crank lever located upon a shaft, for the purpose of throwing off the set of the log to the saw, when it has gained the point designed for the thickness of lumber.

Ladder.—B. F. Turner, Bridgeton, N. J.—This invention consists in the application of hooks to one of the sections or lengths of the ladder, whereby the uppermost section or length may be adjusted to reduce the length of the whole ladder, as may be required. The improvement further consists in the application of a base whereby the ladder may be held firmly in an upright or slightly inclined position, without leaving it against any support. The improvement consists, lastly, in an adjustable or reversible platform, whereby the device may be used as a slip ladder.

Securing Knobs to the Arbor of Locks.—D. B. Cobb, Jersey City, N. J.—This invention relates to a new and improved means for securing knobs to the arbors of locks, whereby a very strong and durable connection of the aforesaid parts is obtained, and one which admits of a very ornamental and chaste appearance being given the knob.

DEVISE FOR BENDING OR SWAGING SHEET METAL PLATES FOR COVERING SASHES FOR GREEN HOUSES, SKYLIGHTS, ETC.—John N. Woodward, Aurora, Ill.—This invention relates to a new and improved devise for bending or swaging sheet metal plates for covering the exterior portions of sashes for green houses, skylights, etc. The object of the invention is to obtain a device for the purpose specified, which will be simple in construction, capable of being manipulated with facility, and which will admit of the work being performed with rapidity and in a perfect manner.

HYDRO-CARBON VAPOR MACHINE.—James T. Spence, Brooklyn, N. Y.—This invention relates to a new and improved machine or apparatus for vaporizing volatile hydro-carbons for illuminating purposes, and consists in a novel and improved means for creating a draught of atmospheric air through the chambers containing the material to be vaporized, such for instance as the light grades of coal oil, naptha, gasoline, etc., and also in improved valves for checking the draft whenever the apparatus ceases its operation. The invention finally consists in the use of a combination of heavy hydro-carbons, or those which vaporize at quite a high temperature with that of a lighter grade, whereby all danger of explosion is avoided. The invention has for its object the production of a steady light, a large vaporizing surface within a limited space, and safety from explosion in using the apparatus.

CULTIVATOR.—Isaac B. Mahon, Dunkirk, Ohio.—This invention relates to a new and improved cultivator for cultivating crops which are grown in hills drills, and it consists in a novel construction of the device whereby a very durable implement, for the purpose specified is obtained.

TRUSS.—Frederick W. Neubert, Pittsburgh, Pa.—This invention relates to a hernia truss which is so arranged that it can be applied for ruptures on either side, or even for double ruptures, and can be adjusted on bodies of different size.

MANGER, FEED BOX, ETC.—Friedrich Denzler and Jacob Miller, Brooklyn, E. D., N. Y.—This invention relates to such a connection of mangers, feed boxes, or feed troughs, with ordinary clockwork, that the same can be automatically opened at the necessary time, not requiring any attention after the boxes or troughs have been filled, closed, and the clockwork arranged. The object is to economize time and labor, especially in large dairies, studs, and stables, and to provide regularity in the time of feeding, the apparatus being so arranged that any desired number of troughs or boxes will be simultaneously opened from or by means of one clockwork, with which they are connected.

ICE-CREAM FREEZER.—Francis H. Duc, Charleston, S C.—This invention relates to a new device for freezing ice cream, and consists in the use of a revolving cylinder in which the cream is held, said cylinder being fitted around a stationary shaft which carries a wing for feeling or indicating the state of the contents.

HOSE COUPLING.—John Kerns, New York city.—This invention relates to a hose coupling of such construction that two pieces of hose can be secured to each other by its use, without a wrench, or even without turning a ring or a nut for the purpose. All that is required to connect two ends of hose is to hold them together, and push one toward the other, and the connection will be complete, safe, and strong.

GARDEN TILE FOR BORDERING.—Francis B. Fancher, Lansingburgh, N. Y.—This invention relates to an improvement in the construction of tiles for the edges of walks, flower beds, and grass plots, in gardens and other ornamental grounds, and consists in forming the tile with a right-angled wing or wings, on one or both sides, and locking the tiles together with lap joints, or tongue and groove, in such a manner that they may be set in the ground with one edge projecting above the surface to divide a flower bed or grass plot from a walk, or to enclose a border on both sides.

MODE OF SECURING FELLY JOINTS.—James W. Lawrence, New York city.—The nature of this invention consists in securing the ends of fellies in a in a wheel by means of a bolt through the joint and the felly-plate in such manner that the ends will not split or crack when the tire is set up, nor work loose and uneven laterally and radially from service, but will form a tight joint of great strength and durability.

THREE WHEELED VEHICLES.—John W. Minor and David P. Ward, New Bedford, Mass.—This invention relates to improvements in wheeled vehicles, and it has more particular reference to those vehicles which are used for the transportation of heavy burdens, as trucks or drays, and it consists in the peculiar arrangement of a third or guiding wheel to the forward end of the said vehicles.

DISTANCE INDICATOR FOR VEHICLES.—James C. Spencer, Phelps, N. Y.—This invention relates to an improvement in the construction of an Odometer, or distance indicator, for vehicles, and consists in a spur wheel placed in a box to be attached to an axle of any vehicle which is revolved by means of a screw or worm that receives motion by means of a pawl and ratchet, with every revolution of the wheel.

TRACE AND PAD BUCKLE COMBINED.—E. B. Winslow, Chatham, Ill.—The object of this invention is to fasten the trace and pad strap with a buckle, serving the purpose of two buckles, usually employed, making a large saving of strap leather in the harness, while the pad is lighter, stronger, and neater, and cheaper than any in use.

HARVESTING MACHINE.—J. M. Peters, Jr., Ganville, Ohio.—This invention relates to a new and improved harvesting machine, designed for general purposes, to wit, the cutting of grass and grain and standing corn stalks, and it consists in a novel construction of the frame of the machine, arrangement of the driver's seat, cutting device, etc., whereby the device is rendered capable of operating perfectly in cutting all standing crops.

WATER AND GAS METER.—Joshua Mason, Paterson, N. J.—This invention relates to a new and improved water and gas meter, and consists in a novel construction and arrangement of parts whereby water or gas may be measured in the most accurate manner and by a means not liable to get out of repair or become deranged by use.

CULTIVATOR.—Elijah Stafford, Decatur, Ill.—This invention relates to a new and improved cultivator of that class which is designed for cultivating crops grown in hills or drills, and consists in a novel arrangement of crank axles whereby the plows may be adjusted higher or lower, so as to plow more or less deep, as required, and all the plows of the machine graduated so as to plow an equal depth. The invention further consists in a novel arrangement of the plow standards and in a peculiar shape of the plows, whereby the latter are prevented from clogging or choking.

MODE OF COVERING STEEL WITH COPPER.—E. T. Ligon, Demopolis, Ala.—This invention relates to the covering of steel with copper.

PISTON.—Nathan Hunt, Salem, Ohio.—This invention consists in so forming and arranging the parts that no holes, valves, or springs are required, while the piston is self packing, the rings being expanded by the pressure of the steam.

SUBMARINE PLOW.—Edwin T. Ligon, Demopolis, Ala.—This invention consists in attaching to the side of a steamboat or other vessel a submarine plow which by its action on the bottom of rivers and other waters displaces the sand, mud, and other loose material, and thereby excavates a channel and deepens the water for purposes of navigation or for other purposes.

ADJUSTABLE MEASURE FOR PACKING LIQUIDS.—Joseph L. Abbott, North Providence, R. I.—This invention relates to a new and improved measure whereby liquids may be drawn from a tank or reservoir in certain limited quantities very expeditiously. The invention is more especially designed for the drawing off of coal oil and turpentine from large tanks or reservoirs in specific quantities for canning, and has for its object the varying of the capacity of the can to suit the variation of measurement peculiar to different countries, as the gallon, for instance, which varies materially, an "imperial" gallon being larger than the gallon United States measurement. The invention has further for its object the ready admission of the oil or other liquid into the measure by providing a free escape for the air therefrom during the process of filling; and finally the invention has for its object a speedy withdrawal of the contents of the measure without loss by leakage or drip in adjusting the cans to or removing them from the discharge faucet of the measure.

ROLLING MACHINE.—Hugh Baines, Manchester, England.—This invention relates more particularly to a rolling machine invented and secured by Letters Patent of the United States bearing date Dec. 11, 1860.

TUBE EXPANDERS.—E. J. Moore, East Boston, Mass.—This invention consists in arranging a stock with a number of rollers placed therein with heads formed on them, which rollers are so adjusted in the stock that they can be pressed outward by a tapering pin which passes through the stock and operates upon the rollers.

COMBINED HOE AND RAKE.—Isaac Cook, Haynesville, Mo.—This invention relates to an improvement in the construction of a combined hoe and rake, and consists in a device for securing them to the handle together or separately.

WINDOW SASH.—Robert Thomas, Parkersburgh, West Va.—This invention has for its object the fitting of the sashes within the frame of the window in such a manner that the sashes may be removed from the window frame and fitted therein with the greatest facility, and without removing or detaching stops, parting heads, and other parts pertaining to a window frame, as is now necessarily required.

BALING PRESS.—S. J. Austin, Freeport, Me.—This invention consists in novel means employed for operating the platen and the expanding side of the press box, and also in a peculiar construction of the platen and head block, and other features, whereby a very simple, efficient, and durable press is obtained, and one which may be operated or manipulated with the greatest facility.

CHURN DASHER.—J. W. Pettingill, Rockford, Ill.—This dasher for churns in fact embraces two in one it working to crush or mash the cream without a rubbing or grinding movement, which as is well known, has a tendency to leave the butter soft and salvy while it mashed or crushed it is rendered hard and brittle.

WEATHER STRIP FOR DOORS.—J. H. Miller, Milwaukee City, Wis.—This invention consists in so hanging and arranging the weather strip that when the door is closed it will be brought down and upon the sill of the same in proper position for preventing the passage of air, dust, etc., under the door, while as the door is opened it will so swing or turn as to pass freely over the sill and offer no obstruction to the movement of the door.

CART.—N. W. Godfrey, Locust Valley, N. Y.—This invention principally relates to the construction of the bottom of a cart whereby, when so desired, it can be simultaneously opened at various points of its length and width for dumping the material contained in it upon the ground or any other desired place and in the most easy, convenient and ready manner.

DOUBLE-ACTING FORCE PUMP.—John C. King, New York City.—This invention relates to a steam pump in which the circumference or rim of the cylinders is connected with, attached to, and moving with the piston, between the stationary heads, thereby doing away with piston rods and piston packings. The ports pass through the stationary heads, and the water or steam is acted upon by the motion of the piston in the same manner as in ordinary cylinder engines.

PORTABLE SHEEP SHED.—Wilson M. Baker and John Hisner, Urbana, Ohio.—This invention has for its object to furnish an improved portable sheep shed so constructed and arranged that it may easily be transported from place to place, and that the sheep may be protected from the weather and easily and conveniently fed.

BOLT.—A. H. Sherwood, Southport, Conn.—This invention consists in the combination with two bolts which are connected together by a toggle, the one for securing the top of the door, and the other the bottom, and of a catch so arranged as to automatically catch upon a hook or the like secured to the siding of the house or building for holding the door open.

HORSE-POWER.—S. Coin, Cazenovia, N. Y.—This invention relates to that class of horse-powers in which an endless platform is employed on which the horse travels and thus imparts power, and it consists more particularly in a novel construction of the link pieces for the several sections of the platform in their application and attachment to the platform sections, the iron tie rods heretofore used are dispensed with, and the machine not only much simplified but made lighter, and its cost of construction diminished.

FRUIT BOX.—Israel F. Brown, New London, Conn.—The objects of this invention are first, to construct a fruit box in such manner as to avoid all shrinkage of the wood of which the box is made, and second, to obtain a simple, cheap and efficient fastening device or devices for the bottom to the sides or other portions of the box.

BELTING FOR MACHINERY.—M. A. Strouvelle, St. Louis, Mo.—This invention or discovery relates to a new and improved mode of making belting for machinery and consists in preparing and curing hides without tannin.

CARRIAGE JACK.—Joseph F. Emmert, Quincy, Pa.—This invention relates to a new and improved carriage jack which is operated by a lever to raise a sliding rack. It is made wholly of cast iron and is both cheap and convenient.

PRESERVING MEATS, GAME, ETC.—Edward de la Granja, Boston, Mass.—This invention is designed for the preservation of all kinds of meat, game, poultry, etc., used for human food, and when the process is properly followed it will preserve such meats, etc., in a perfectly sweet and edible condition with but a trifling expense.

SHIFTING RAIL FOR CARRIAGE TOPS.—Patrick G. Clancy, Augusta, Me.—In this invention the carriage top is fixed to a rail which can be easily attached to or detached from the seat. The means for attaching and detaching it are short hooked projections on the rail catching in eyes in plates attached to the seat and held in position in the eyes by shortening the rail. The rail is made extensible by means of an independent piece screwed into its center, by right and left screws.

HERNIA TRUSSES, ETC.—William Pomeroy, Brooklyn, N. Y.—This invention has for its object to so improve the construction of hernia trusses, abdominal supporters, etc., that the tension of the body spring and the position of the pressure pad may be adjusted at pleasure.

CLOTHES DRYER.—D. B. Randall, and A. A. Williams, Glover, Vt.—This invention has for its object to furnish an improved clothes dryer, simple in construction easily and conveniently used and operated and which will occupy little space in the room in which it is placed.

CHURNING MACHINE.—M. V. B. Rowley, Worcester, N. Y.—This invention has for its object to furnish an improved machine by means of which a churn may be operated at any desired speed, steadily and regularly, bringing the butter in a very short time.

FENCE.—Daniel Kaufman, Boiling Springs, Pa.—This invention has for its object to furnish an improved fence so constructed and arranged that the posts will be no more liable to decay than the boards or rails, which may be easily set up and taken down and conveniently moved from place to place.

FOLDING CHAIR.—E. W. Vaill, Worcester, Mass.—This invention relates to that class of folding chairs in which the seat is supported on crossed legs which fold together; and consists in a new method of constructing and hinging the arms and back of such chairs, by which the whole chair is more neatly and compactly folded together, the back folding forward over the seat, and hanging in front of the legs.

FOLDING CHAIR.—E. W. Vaill, Worcester, Mass.—In this invention a new method of pivoting the arms to the front part of the seat is employed, by which the chair is more neatly and compactly folded together.

ROUNDING FLY NET STRAPS.—Cornelius K. Burkholder, and Henry Lerew, York Springs, Pa.—This machine has two jaws, one movable; to these are attached guides whose apertures correspond with the square shape of the strap as it is fed into the machine, and knives whose semi-circular notches give the required rounded form to the passing strap.

GRINDING MACHINE.—Menno A. Diedrichs and J. H. Diedrichs, Baltimore, Md.—This invention relates to an automatic arrangement for holding and feeding the article to be ground in relation to the stone, and in the means for adjusting the different parts to suit different sizes of tools etc.

VEGETABLE PLOW.—Wm. Richardson, Hookstown, Md.—In this invention of the three plow points, the forward one is removable and the two rear ones are adjustable both laterally and vertically. The object of constructing a plow in this manner is to adapt it to plowing between rows of different distances apart, and to adjust it either to surface or subsoil plowing, as may be desired. It also pulverizes the ground more thoroughly than the common plow.

INVALID SPITTOON.—John M. Cayce, Franklin, Tenn.—In this invention the cover of the spittoon is raised by the act of lifting the instrument and falls by its own weight when the spittoon is set down again.

WASHING MACHINE.—Albert Dennison, Stillwater, N. Y.—This invention relates to that class of washing machines in which the clothes are placed in a revolving box, together with loose balls, and cleaned by the action of the balls, in connection with the water. The invention consists in making the box a polygonal prism, instead of a cylinder and in the peculiar construction and attachment of the journals and journal boxes.

IMITATION WOOD.—Henry Carter, Taunton, Mass.—This invention relates to a new composition for making imitation wood from the dust of those kinds of wood which it is desired to imitate, and to a new process of ornamenting such imitation wood by means of metal shavings.

PIN.—A. R. P. Walker, Richmond, Me.—This invention relates to an improved pin for brooches, shawls and like purposes, and consists in dispensing with the rivet and hinge as ordinarily used by bending the pin itself through the eye.

PUNCH.—Edward Shindler and Charles H. Metzger, Easton, Pa.—The object of this invention is to construct a tool for punching leather or any other material of a similar nature in an accurate and expeditious manner.

FURNACE FOR SMELTING ORES.—A. H. Richardson, Denver, Colorado.—This invention, which relates to an improvement in furnaces for smelting silver, consists in directing a blast upon the treated ores with charcoal in a furnace having three apertures at different levels for the separation of the slag silver and lead by gravitation.

COMBINED CHAIR, LOUNGE AND STEP LADDER.—Joseph Gerdon, Jr., West Albany, N. Y.—This invention relates to a new and useful device which will be of great use in stores and magazines of all descriptions and which is so arranged that it can be set up as a chair, step ladder or lounge, as may be desired.

TRACE ATTACHMENT.—Andrew Thompson, Ottumwa, Iowa.—The nature of this invention consists in attaching to a harness trace a metal point or end having ratchet teeth or a series of projections on the upper side which catch a clamp for fastening the trace.

STEAM ENGINE.—Thomas Adams and George John Parson, Adelphi, Eng.—This invention consists in certain improvements in slide valves, which are also applicable to pistons and glands. The object is so to construct a valve that the effect of the steam, acting on the back of the valve shall be equal to the effect of the steam acting on the face of the valve; but should the surfaces acted on by the steam not be opposite each other, then the areas of such surfaces, multiplied by the distance of their centers of action from the center of the valve (being the leverage with which the steam acts) should be made equal.

## Answers to Correspondents.

*CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.*

*SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."*

☞ *All reference to back numbers should be by volume and page.*

N. U. A., of Mass., asks if we can inform him of any cement for steam pipes which dries quickly and is durable? We know of no better cement than that ordinarily used, composed of red and white lead mixed with linseed oil. It sets readily, especially when subject to compression. Our correspondent is, of course, aware of the constituents of the permanent joint made of iron borings, sal-ammoniac, sulphur, and water. The proportions of both the above we have published several times. Rubber makes an instantaneous joint without cement.

E. V. R., of Mich.—The molds or matrices for casting glass bottles having raised letters or other devices on their exterior surfaces, are made of iron or brass and produced by casting from a wooden pattern, then finished up and fitted with the proper hinges or connections. The process is as simple as any other job in pattern making, molding, and finishing.

S. J. T., of Ga., desires a recipe for making the plaster of Paris stick to mill stones. Much of his work in this line puffs up and soon comes off. We know of no mystery in this operation. The requisites are fresh plaster and a clean stone.

C. R. C., of Ill. has a twenty-four inch gum belt which slips on the pulleys, one of which is of iron and the other of wood. He is told that tallow will spoil rubber belts, has used rosin, but it seems to glaze the belt and make it worse than before. Ans. Animal oil will not do for rubber belts. If the belt slips it should be lightly moistened on the side next the pulley with boiled linseed oil—cold—and repeated if one dose does not answer.

J. H. S., of Ohio asks how he can harden and temper the boards for cultivator plows, which have to be heated and pressed to form, without danger of their springing. We know of no certain way of tempering curved sheets of steel without springing except hammering to shape after the tempering is done.

J. S. L., of Pa.—For producing the different grades of brass, etc., we refer you to the "Tinman's Manual," published by I. R. Butts & Co., Boston, Mass. We have published the recipes several times.

E. W. D., of Conn.—In our statement on page 121, current Vol., that we "did not know of any dynamometer to be applied to the shaft which is entirely reliable," we intended no injury to any inventor of dynamometers. If the machine you speak of is so entirely reliable under all circumstances the fact has escaped our notice, although we are tolerably well acquainted with the machine. Its superior merits ought to procure its general introduction and obviate the necessity for a better measurer of power.

L. M. C., of Iowa.—In 1663, the magnetic and geographical meridian of the city of Paris coincided. From this time forward the declination proceeded westward till it reached its maximum in 1814 when it was 22°, 34′, W. Since 1814 the declination has receded. In 1860 it was 19° 32′ W. In London it was at 0° in 1663, reached its maximum west declination of 24°, 41′, in 1818, and was 20°, 25′ W in 1866. The line of no variation is an irregular line, and at present cuts the east of South America, passing east of the West Indies, enters North America near Philadelphia and traverses Hudson's Bay, thence it passes through the North Pole, entering the Old World east of the White Sea, traverses the Caspian, cuts the east of Arabia, turns then toward Australia, and passes through the South Pole to join itself again. No satisfactory explanation has ever been given of the variation of the needle.

## Business and Personal.

*The charge for insertion under this head is 50 cents a line.*

Iron Manufacturers and Capitalists—Examine the Model Rolls at the American Institute. Patent for sale. P. Bright, Philadelphia.

For Sale—A small Metal-working Shop—Tools in good order. Also, two patents. Terms easy. Address G. Strong, care H. N. Meyers, 218 Fulton street, New York. 11 & 15

Wanted—Address of Makers of Toy Steamboats with small working engine.—W. C., Box 104 Mount Vernon, N. Y.

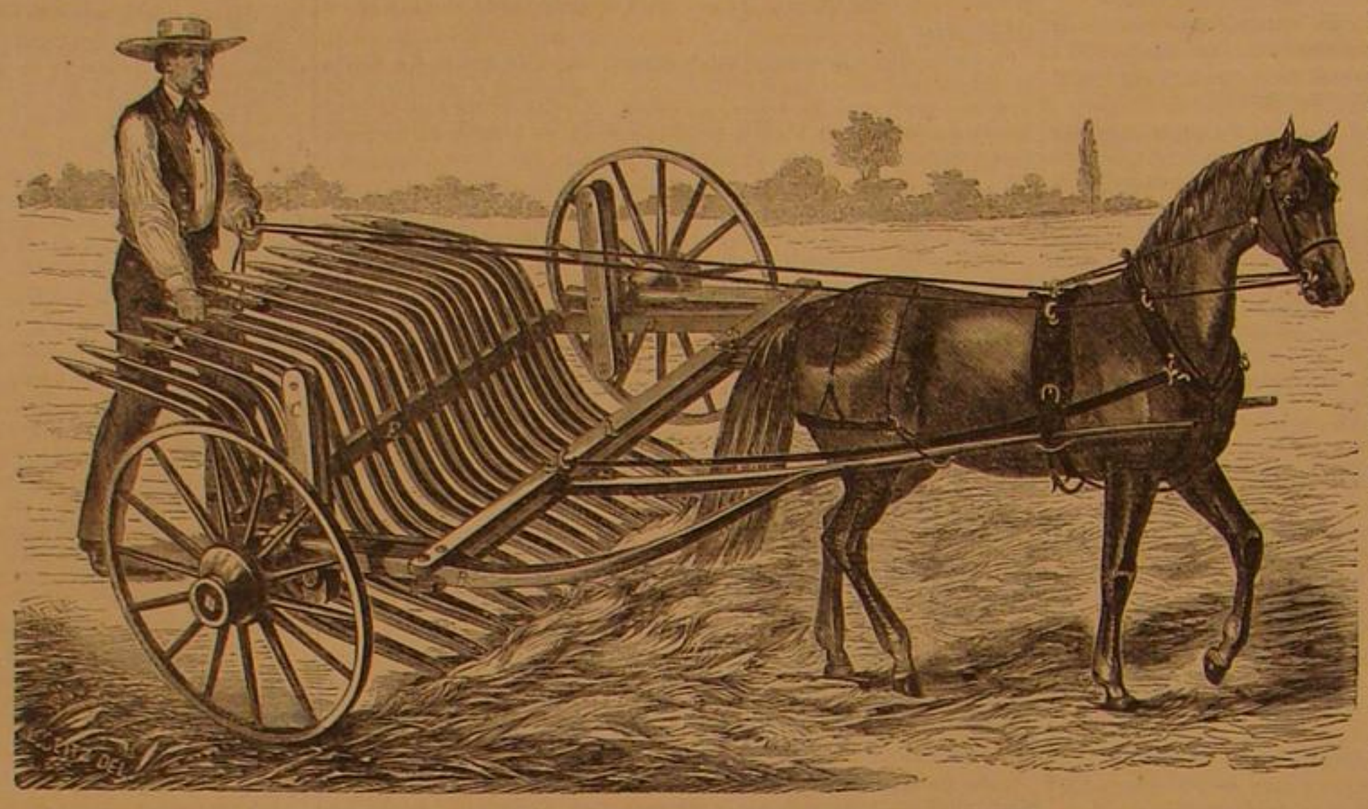
Gould's Bottle Stopper.—The Patentee states that his invention, which was illustrated on page 190, is better adapted for cider, ale, and porter, than for soda or other aerated waters.

### Improved Horse Hay Rake.

The rake represented in the engraving has taken a premium wherever exhibited and tested. In the Indiana State Fair of 1866 it received the first prize over all others, including one which carried off the first premium at the Auburn, N. Y., trial. It is uncommonly light, very strong, and handy in operation. With it there is no necessity of shocking the hay previous to stacking it, as it will carry an ordinary sized shock to any part of the field. It works well on very uneven ground. It was contrived to answer a call for a more perfect rake published in the Scientific American, Vol. XIII., No. 12, page 176.

The thills are bolted to a double cross bar, A, to the ends of which are also bolted the curved hounds, B, the forward ends of which are securely united to the thills, thus strongly bracing the structure. These hounds extend back of the crossbar and have their rear ends made cylindrical and quite large to receive the rings of the short axletrees or journals on which the wheels turn. These axles are of metal and may be adjusted on the hounds to bring the wheels further forward or back, as may be desired, to properly balance the rake, and are held in position by set screws. Firmly secured to flanges on the inner end of the axles are upright guides, C, in which play the draft bars, D, which are pivoted to the hounds just in the rear of the crossbar, A, and at their rear ends support the rake head, E. This is pivoted to the draft bars by headed journals which allow the rake to be revolved.

The rake head is square and the teeth are double or made of two curved pieces of wood, which are seated in mortises on opposite sides of the head and are bolted through. At their ends the two parts of the tooth are brought together and held by rivets or screws, and strengthened and protected by shoes of malleable iron. This method of construction makes a very strong and at the same time a very light tooth.



FREDERICK'S PATENT REVOLVING RAKE.

In operation, the driver guides the horse with one hand and manages the rake with the other, as seen. He can easily, by depressing the rear ends of the teeth, elevate the forward ends to avoid obstructions or to accommodate the rake to unevenness of surface, while the guides, C, permit the draft bars to rise and fall. The rake head may be set higher or lower by means of adjustable blocks in the lower part of the guides, C. The rake will revolve for unloading in the usual way by removing the pressure of the hand.

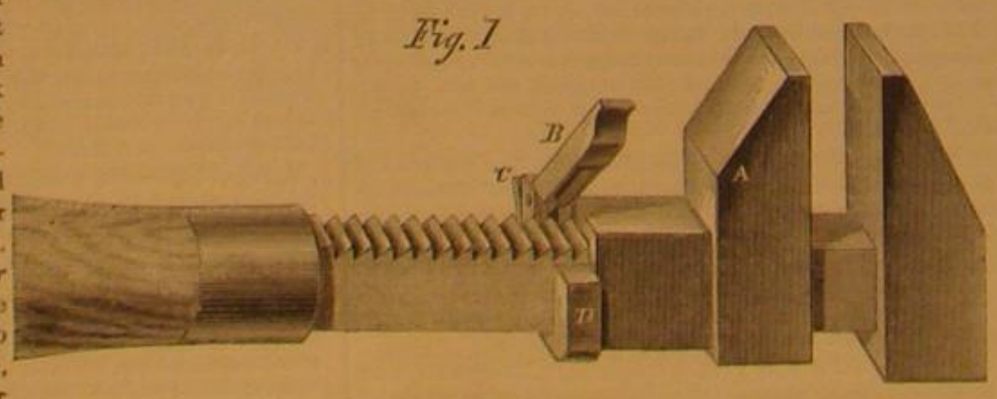
This rake was patented through the Scientific American Patent Ageney, Aug. 6, 1867, by Levi W. Frederick, who may be addressed for rights to vend and manufacture, or for other information, at Gosport, Owen county, Ind.

### Improvement in Screw and Ratchet Wrenches.

Two views of an improved wrench are shown in the accompanying engravings. The object is to relieve the screw (if one is used) from the whole strain exerted in setting up a nut or bolt by introducing a stop-catch with teeth which engages with a rack or ratchet cut on the shank of the wrench. It is, in one form, a combination of the screw wrench and the ratchet wrench, and in another form, is a simple ratchet wrench.

Fig. 1 is the ratchet wrench, *per se*. The movable jaw, A, can be slipped to position by the thumb and finger, and held by the catch, B, which engages, on its under side, with two of the teeth of the ratchet rack, when shut to place, where it is held by the spring, C, that acts like the spring of a pocket knife. The plate, D, is a permanent portion of the jaw and thimble, A, and, of course, moves with it.

Fig. 1




CHRISTOPHER'S IMPROVED WRENCH.

Fig. 2 represents the combined screw and ratchet wrench, E, being the screw, and F the spring of the catch-bar, which in this case is connected with the movable sleeve. The jaw may be adjusted by the screw, E, and then held by the catch-bar, or it may be operated by the screw alone by raising the catch-bar.

Letters patent were issued for this invention through the Scientific American Patent Agency, Aug. 27, 1867, to Theodore D. Christopher, who may be addressed at Madison, Ind. The patentee desires to arrange for the manufacture of his wrench on a royalty.

### A Deep Coal Mine, with a Description of its Pumps, Winding Engine, etc.

A very correct idea may be obtained of the deep English coal mines from the following extracts from a paper read by Mr. Higginbotton before the Manchester Geological Society, on the Astley Deep Pit, said to be the deepest coal mine in England.

The new pit, which has been sunk to the Black Mine on the Dunkenfield estate, near Manchester, is no less than 696½ yards deep from the surface of the ground. The usual diameter of this pit is 12 feet, with the exception of a short distance in the middle of its length, where it is widened to 12 feet and 6 inches to facilitate the passing of the chairs, and also excepting a short distance of the bottom of the pit, where it is gradually increased to 19 feet 20 inches. 320,931 cubic feet of materials have been taken out in sinking this pit, and 10,584 cubic feet in addition for mouthings. Out of the total depth of the pit 211 yards have been sunk through rock; 443½ feet through shale; and the remaining 32 through seam coal.

With respect to the coal seams, there are 26 of more than one foot in thickness, of which 15, with an aggregate thickness of 58½ feet, have been worked at different places in the neighborhood and may, therefore, be considered to have a present commercial value. The shaft with the exception of 42 yards where it is tubed with cast-iron segments, is walled with a nine-inch wall of arch bricks, stiffened at intervals by stone wings, 18 inches thick, of which there are 80. Altogether, 7,308 cubic feet of stone, and 750,000 bricks have been used in the shaft exclusive of those employed in the mouthings, etc.

In sinking, water was met at the following depths: At 481 yards from the surface 40 gallons per minute; at 240 yards, 35 gallons; at 358 yards, 52 gallons; at 413 yards, 33 gallons; at 590 yards, 5 gallons, making a total of 165 gallons per minute.

This water is raised to the surface by seven lifts of plunger pumps; of these, the four upper are 12 inches in diameter, and the three lower 9, 7, and 6 inches diameter; they have all a stroke of eight feet.

The four heavy lifts average above 90 yards in length each, and are arranged alternately on opposites of the pump rods; each stroke of the pump raises 39 gallons, and consequently the engine has to run at an average speed of four and a quarter strokes per minute for twenty-four hours. At full speed the engine would make from eight to nine strokes per minute. The pump trees are thirteen inches internal diameter, and are for the most part of wrought iron, the plates of which they are made to increase somewhat in strength toward the bottom of the lifts. The total weight of the pumping rods, joint plates, clamps, bolts, plunger poles, etc., is 85 tuns; of this weight, 40 tuns are balanced at the pit top, leaving 45 tuns to overcome the weight of the column of water and the friction of the plunger poles, etc. The pumping apparatus occupies in the pit an area of twenty-nine square feet, leaving eighty-four square feet for winding.

The conducting rods are of pitch pine, attached to beams of the same wood, which are supported on cast-iron boxes set into the walling of the pit.

The horse trees are also for the most part of pitch pine, as are the pump rods, which are fifteen inches square at the top and diminish gradually downward to ten inches. The total amount of timber used in the pit is 5,882 feet.

The pumps are worked by a side lever Cornish engine, with a seventy-inch cylinder eight feet stroke. The steam is supplied by three boilers, thirty-four feet long six feet 6 inches in diameter, with an ordinary working pressure of twelve lbs. to the square inch. The winding-engine cylinder is sixty inches diameter by seven feet stroke. The winding drums are twenty four feet two and a half inches in diameter, and the whole weight of crank, crank axle, and drums, is fifty-three tuns.

To one of the winding drums a brake drum is attached which is acted on by a steam brake of great power. Beside the winding drums, there is on the main shaft a balance weight drum 6 ft. 8 in. in diameter, to which is attached a balance weight of 5 tuns. The engine is capable of making 25 strokes per minute, thus raising the load in the pit about 21 miles an hour. Allowing for the time lost in hooking on and taking off, the engine is able to raise 600 tun of coal in 10 hours.

The winding ropes are of wire 4½ inches broad by 1¼ inches thick at the top tapering down to 3¼ inches broad by ⅞ inch thick. They weigh 4½ tuns each, and the breaking strain at the thin end is 30 tuns; the actual working load is 3¼ tuns, which is made up as follows: The chair, which is constructed to carry four double tubs, weighs 16 cwt., four tubs which weigh 17 cwt., and the coal weighing 32 cwt., making in all 65 cwt. The winding ropes pass over pulleys 15 feet in diameter, which are supported by the head gear at a hight of 50 feet above the landing stage. Besides the engines described, which were erected by Messrs. Fairbrain of Manchester, there is on the ground a high-pressure capstan engine of 30-horse power by Messrs. Garforth, of Dunkenfield. There are now eleven boilers actually in use, and room in the boiler house for two more.

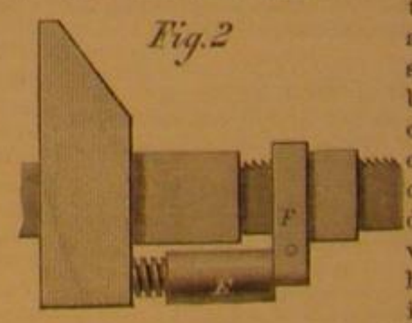
There are seven lifts in the pit, all being rams, the largest lift being 158 yards. There is also a small low-pressure engine which drives a circular saw and drilling and punching machines, and supplies generally the power required in the workshops. The workings are aired by the assistance of a dumb drift, which is driven up from a counter level to No. 2 shaft, rising two feet to the yard. The dumb drift is ten feet diameter, which forms an area of 78½ square feet, and enters the upcast shaft at 600 yards from the surface; the furnace drift is 25 yards from the pit bottom, being 61½ yards below the dumb drift.

Careful observations made during the sinking of the pit have shown that the temperature of the strata, increases with tolerable regularity from 57° at a depth of six yards to 75¼° at a depth of 686½ yards. The temperature on the pit top, May 28, 1867, at 11 A. M., was 58°; at the pit bottom 64°; variation 6°: in the return air roads, when the air passes round the workings, and has done all its work previous to making its exit into the dumb drift, is 71°; variation from pit bottom 7°. There is now an incline at work at the bottom of the Astley pit, which is 250 yards down, lying at an angle of one foot to the yard, making the total perpendicular depth from the surface to the lowest point 770 yards.

### Fair of the American Institute.

This exhibition, which is of a national character, has entered upon its second week, and is now in a presentable shape. We had hoped that before the issue of this present number of our paper we could have begun a report of the exhibition, taking the departments and their individual divisions *seriatim*. This has, however, been rendered impossible from the great extent and comprehensiveness of the exhibition, and from the fact that in one of the prominent departments—that of machinery—the power for its propulsion has been inadequate. This trouble will, however, be immediately remedied. Additional steam boilers are being daily added, and before our next issue the machinery department will be a hive of humming industry.

Fig. 2




We might, even now, make some notice of particular portions of the exhibition, but we wait until we can give a view which shall not only be agreeable to our readers, but just to the exhibitors. In the meantime we advise all who can, to make a visit to this exposition of art and industry, and they will not fail to be greatly interested and benefited. One of the novelties which will attract attention is the pneumatic tube, in actual operation, by which passengers are shot through space as is a cannon ball; and another the letter delivery tube, by which letters and parcels are sent almost instantly from one point to another.

Music every evening and the brilliancy of the gas lights make the scene one of unusual beauty. The pictures and statuettes in the art department are seen to as good advantage in the evening as during the day, and the machinery performs its evolutions as satisfactorily. This is the period which seems to be the favorite one with the mass of visitors.

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## MECHANICAL POSSIBILITIES AND IMPOSSIBILITIES.

Our readers are aware that we have latterly—after having, time and again, discussed such subjects—refused to occupy our columns with conjectures on such mechanical improbabilities as perpetual motion *et id omne genus*. This course has subjected us frequently to adverse criticism and indignant protests from those who believe their own theories rather than well-established facts and natural laws. We have now before us two well written letters which charge us with proscription and old fogyism, pursuing a dog-in-the-manger policy, etc., because we refuse to ventilate ideas which even a superficial knowledge of natural laws would show to be erroneous. It is our interest as well as our intent to note, discuss, and, so far as may be, encourage all well-directed attempts at new discoveries and improvements; but it is no less our duty to refuse to promulgate error.

That progress has been made in a direction which from our ignorance of natural laws seemed to have been closed is undeniable, but that progress was rendered possible only by the necessary addition to our knowledge of those laws. Again, the capabilities of mechanism have been underrated and this has compelled such men as Dr. Lardner to deny the possibility of crossing the Atlantic by steam, and to ridicule other attempts which have proved successful. These mistakes and misjudgments are simply consequences of our ignorance of powers we had no adequate means of estimating.

But when an attempt is made to nullify and render inoperative the plainest and best established laws of mechanics, it would ill become those who profess to make those laws their study to encourage efforts which can end only in failure. There are certain laws which not only regulate and direct, but govern the action of bodies. The attempt to abrogate the laws governing gravitation, inertia, friction, resistance of media, etc., must necessarily prove futile. Some of their effects may be neutralized or modified by bringing other forces into action, but inventions which depend for success on overcoming the action of natural mechanical laws are useless and the time spent on them is wasted.

As our knowledge of these laws is extended and our conception of their relations developed undoubtedly many attempts now unsuccessful may become accomplished facts. Aerial navigation, now apparently impossible, may be in the future *un fait accompli*. There appears to be nothing thoroughly hostile to its accomplishment in natural laws; we lack only the proper apparatus for sustaining, propelling, and guiding a ponderable mass in and through the ærial ocean.

That a motive power may be discovered much cheaper, less cumbersome and dangerous, and still as capable of use under all circumstances as the steam engine is not impossible. Nothing in nature's laws would seem to contravene this result, but as yet we have failed even to approach it. All efforts toward these or other ends which are conducted in accordance with well-known laws, and all efforts to further ascertain the relations of those laws are legitimate subjects for endeavor and encouragement; but misguided attempts to contravene the plain laws of nature ought not to be sustained by those who really desire the well being and advancement of their race.

## ARE OUR FEET PROPERLY CLOTHED?

It is somewhat surprising that, with all our boasted improvements, we have not as yet produced a proper covering for the feet. Barbarous people, if their climate admits, go with bare feet, or wear sandals covering only the sole, or slippers with just enough of upper to retain the sole on the feet. We, however, encase the whole foot, and a portion of the leg, in a material almost impervious to air and moisture, and generally uncomfortably hard and rigid. The color and polish of our boots are directly calculated to attract the sun's rays; and the enamel on patent leather, and the blacking on ordinary calf skin, tends to harden and solidify the substance, closing the pores and making air-tight cases for a portion of the body, which exudes more perspiration than any other, and is subjected to greater strain.

Our boots in summer parboil our feet in a warm bath, and in winter freeze them in an icy envelope. It is doubtful if wet feet are, in themselves, very conducive to disease, some medical men to the contrary notwithstanding; but cramped confinement of the feet, in an icy cold envelope, generated by perspiration and chilled by the external atmosphere, thus shutting the prisoned feet up almost air-tight, is as unhealthy as it is uncomfortable.

For hot weather there is hardly any shoe so agreeable as that introduced within the past three or four years, known as the army shoe, and extensively used by base-ball players. It is of heavy canvas and unblacked leather. It is cool and remarkably easy to the feet. The texture of the canvas allows the escape of the perspiration, and the color of the shoe does not attract the heat of the sun.

It would seem that the plan of covering other portions of our bodies with material pervious to air might advantageously be extended to our feet. There is no natural reason why our feet should be so much less sensitive than our hands. They become indurated and deprived of their natural activity by long, close confinement. The people of warm climates, who use their toes as we do our fingers, and the bare-footed school-boy, who picks up and throws pebbles with his feet, show that the foot of the civilized adult in our climate is a much abused member.

A more flexible and porous material for our boots and shoes might save us from many of those terrible annoyances, which, in the form of corns and bunions, make our pilgrimage one of pain.

## THE SWEDISH COAST DEFENSE MONITORS.---A NOVEL CRAFT.

It will not require much thought for any one to see that for a nation with the resources and requirements of Sweden to expend its means in constructing huge, deep-draft and unwieldy iron-clads like the *Warrior*, *Bellerophon*, or *Magenta*, would be to fritter away its energies without adding materially to its means of defense.

The first and, indeed, the only essential wants in the naval line of a country situated like Sweden, are the means of defense from invasion—the means, in other words, of maintaining its independence. When this want has been supplied it will be time to expend money in building naval yachts and broadside iron-clads.

In solving a problem of this character, the first thing indicated is to put the most powerful guns attainable afloat in vessels of small size and light draft, so that they can be maneuvered with ease and safety among the numerous islands and inlets which characterize the peculiar coast of that country. Accordingly, such has been the ideal of Capt. Ericsson in designing the Swedish 15-inch monitor gunboats.

Those of the readers of the SCIENTIFIC AMERICAN versed in naval architecture will, without doubt, agree with us that an iron-clad of only 140 tuns burthen, mounting a 20-tun 15-inch gun, and carrying ammunitions and stores is neither more nor less than a floating gun carriage. Hence a steam motor applied to such an iron-clad must not only be of small power, but must also be an auxiliary for special occasions.

In view of this, as well also as the fact that, in time of war, Sweden cannot depend on a supply of coal, Captain Ericsson has adopted the novel expedient of fitting these pocket monitors with an arrangement whereby the steam engine may be disconnected from the propeller shaft so that the propeller can be turned by manual power.

The hull of these monitors is made of iron and is 85 feet in length, 18 feet wide, and 7 feet deep; the deck as well as the sides of this hull is composed of iron; or, in other words, it is a complete water-tight box. On top of this hull so constructed, a deck of thick solid timber, which, in fact, may be called a raft, is attached without the use of the objectionable through bolts. This deck or raft is 103 feet in length, 20 feet wide, and 2 feet deep, and it is pointed at both ends. The forward end is protected by five inches of solid iron. As will have been perceived by the description, this deck projects some nine feet at each end over the iron hull; this projection at the bow, besides protecting the anchors, as in the *Passaic* class of monitors, is also fitted with a small feathering wheel paddle, the use of which is to trim the gun, the turret being stationary. Of course, as the turret is stationary, these small monitors are intended to fight bow on and to expose the least possible area to the enemy's fire. The turret is oval in form, and is twelve feet wide by nineteen feet long in the direction of the length of the boat. As the turrets are stationary it is not necessary that the pilot house should be placed in the center; accordingly it is placed at the after end of the turret, which position not only allows ample space for hatchways but also places the steersman and commander directly in the rear of the 15-inch gun, and hence he can, by means of the aiming wheel and also with the assistance of the balanced rudder, if the propeller is in operation, aim the enormous weapon accurately, and give the order to fire, or, if need be, pull the lock string himself. The port is quite wide enough to admit the muzzle of the gun and high enough to allow for 10° elevation. It will be closed by a huge wrought-iron port closer, the same as those used in our monitors.

The most marked features in this Liliputian iron-clad are, we think, the aiming wheel and the mechanism for applying the power of the men to the propulsion of the vessel.

The aiming wheel is placed in an opening four feet, three and a-half inches square, cut in the forward projection. The shaft of this wheel is parallel with the keel, and it is a few inches above the water line. It is clear that by turning this wheel the bow of the vessel will be moved sideways. The resistance which it will offer to the motion of the vessel forward will amount to nothing, as the wheel is made without rims and the buckets are of plate iron only a quarter of an inch thick. As the wheel cavity will be sometimes filled with water, the paddles at the upper part of the circumference would counteract those below were it not that the wheel is fitted with an eccentric feathering movement which keeps the upper paddles horizontal while the lower ones are vertical. This wheel is rotated by men within the vessel by means of winches conveniently placed. This novel instrument has not been adopted without careful experiment.

A full-sized aiming wheel was applied to a raft the same as the raft which forms the deck of the gunboat, and fitted up precisely as it will be in practice, and was operated by the same number of men as will be when devoted to that duty. The efficiency of the apparatus was tested both by the side motion of the raft and also by lifting weights attached to a line which passed over a pulley and was made fast to the raft. The training power was found to be in excess of the force necessary to quickly aim the gun.

With respect to the man-propelling mechanism, we witnessed a trial with it last week at the Delamater Iron Works, Messrs. Mulford & Ripley. We found in the erecting shop at these works the steam machinery of one of these gunboats, erected complete and attached to the propeller shaft, to which a friction brake was attached. This steam machinery was very compact, neat, and elegant in design, beautifully finished, and above all, devoid of anything in the way of "gimcracks." It has the capacity to develop about 40 indicated horse power.

The man-power mechanism is arranged as follows; On each side of the center line of the vessel, and forward of the engines, a row of seats, running transversely, each large enough to accommodate two men, are placed. It is arranged for 30 men.

On each side of the center, between each seat, is placed a vertical lever, pivoted at the lower end; at the upper end an eye is formed through which passes a hickory handle or brake—each vertical lever is therefore pulled by two men. These vertical levers are connected together at their upper ends by light iron rods, and also to cranks (placed opposite to each other) on a transverse shaft, which is attached to the propeller shaft by conical gearing. Thus one half the men pull at a time. The brakes were manned by a party of splendid-looking Scandanavian sailors from the Swedish corvette *Norrkoping* (which is to carry the whole of this new machinery to Stockholm). It was found by the friction brake that they could run off seven and a half net horse-power, and that they could maintain five and a half for many hours. The force is amply sufficient for the purpose intended, which is not for making a long voyage, but for maneuvering in positions which they may be assigned to defend, and as the boats carry sixty days' stores, it will be readily seen that they can maintain their position for that time. The gunboats carry coal for one hundred hours steaming, or sufficient to propel them five hundred nautical miles.

Captain Ericsson has constructed the whole of this machinery at his own cost and presented it to his native country as a pattern to be strictly followed in the building of its defensive fleet of 15-inch monitor gunboats.

## THE PARIS SAFE TRIAL. A FARCE.

Since our publication of the report of the safe trial between Herring and Chatwood, copied from *Engineering*, we have received several communications evidently intended to show—what is not apparent by the trial—the great superiority of the American safe over its English rival. Perhaps this superiority was established at the trial, or if not, possibly it can be so established, and nobody would rejoice more than we at such a triumph of American mechanical skill; but the various reports do not seem to differ in any essential particular from the facts reported in *Engineering*. On the Chatwood safe were used a heavy sledge, slung by brawny arms, large wedges, and crowbars, and on the Herring safe the hand hammers, serrated wedges, and jointed levers of the burglar. The sledge hammer was used on the Herring safe only in opening his internal box in which was placed the block, the object sought, which in Chatwood's safe was contained in the outer case only.

Yet we cannot see what bearing this trial has, after all, on the relative value of either of these safes as offering resistance to the attempts of burglars. Burglars do not come with sledge hammers, and bang and rap away for two or three hours to reduce a structure of mechanical proportions to a mass of old junk. The whole trial was a farce—nothing less—and it was the hight of folly in the commission under whose auspices the experiments were conducted that they did not define the nature of the implements to be used, only allowing each competitor to furnish as expert an operator as he could find.

A test conducted by scientific burglars with the ingenious implements ordinarily used by them, would have been an interesting exhibition, and the result would have been of practical importance to the business community.

As an advertising dodge, which, probably, both exhibitors intended, it may answer their purpose, but the practical result deducible from the trial is not apparent.

The nonsense of allowing three men to bang, and chisel, and hammer for hours to open a safe, is too ridiculous to merit serious consideration.

## RETURN OF COMMISSIONER WELLS.

Hon. David A. Wells, U. S. Commissioner of Revenues, who sailed for Europe last May on business connected with the Revenue Department, returned on the 16th Sept. in the *City of London.*

Mr. Wells was cordially received by the large manufacturers in England and on the Continent, and has returned with valuable information pertaining to foreign manufacturers and industries, which will be laid before Congress at its next session.

It is seldom that Congress exhibits as much wisdom in selecting officers for special service as it did in choosing Mr. Wells for his commission. Mr. Wells is not a politician, but an intelligent, practical, industrious gentleman, educated to scientific pursuits, author of several standard school and other books, and as a statistician, has few equals, as his last report to Congress, through the Secretary of the Treasury evinces. His next report will be looked for with greater interest than his first, containing, as it probably will, many practical suggestions as to changes in the tariff.

### Amusing Typographical Blunders.

The *Evening Gazette* of this city, one of the best edited papers published in the country, and for correctness of its statements and typographical neatness excels most of its older cotemporaries, thus apologizes for one of its compositor's amusing blunders:

"A 'bewildered reader' wants to know what Sala means by saying that the French call the English "a nation of grasshoppers." To tell the truth, our compositor did Sala a great injustice. We wrote—what everybody is familiar with—"a nation of shop-keepers;" but the printer preferred the word grasshoppers and the proof-reader agreed with him. In fact, the misprint in question was one of the most amusing in the history of typographical errors."

### Justifying Type by Machinery.

Mr. Charles W. Felt, of Salem, Mass., has been engaged for several years upon a composing machine that shall not only compose and distribute type, but also justify the matter. He has recently exhibited, in this city, a little justifying machine about fourteen inches long, which can be adapted to any of the other type-composing machines quite as well as Mr. Felt's. He purposes to commence manufacturing these justifying machines and attaching them to such composing machines as are in use, and at some future time will introduce his own composing machine for competition with the others.

The Mechanics' Fair at Lowell, Mass., began on Tuesday, and will continue one month probably. There are one thousand three hundred exhibitors, and the articles on view are very numerous. The halls thrown open cover nearly an acre of ground.

# OFFICIAL REPORT OF PATENTS AND CLAIMS

## Issued by the United States Patent Office,

FOR THE WEEK ENDING SEPTEMBER 17, 1867.

*Reported Officially for the Scientific American*

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

| | |
|---|---|
| On filing each Caveat | $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. Residents of Canada and Nova Scotia pay $500 on application.

☞ *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.*

68,829.—Portable Horse-power.—Hiram Aldridge, Goshen, Ind.

1st, I claim the movable hounds or braces, O P, applied to the front and rear ends of a portable horse-power in such manner as to secure these ends down to the ground upon their wheels, substantially as described.

2d, The combination of diagonal braces or ties, R R, with the inclined braces, O P, and a portable horse-power which is mounted upon four wheels, substantially as described.

3d, Locking devices applied to the transporting wheels of a four-wheel horse-power, substantially as and for the purposes described.

4th, Locking devices applied to the front axle of a four-wheel portable horse-power, substantially as described.

5th, The construction of the cast-iron ring, E, for the purposes and substantially as described.

6th, The arrangement of the coupling shaft, J, or its equivalent, so as to admit of the attachment of tumbling shafts to both ends of it, substantially as described.

7th, The auxiliary removable, supporting frame, S, applied to the portable horse-power frame, substantially in the manner and for the purpose described.

8th, Combining sweep or lever horse-powers with a permanent four-wheel carriage for transporting the same and which is arranged with means that will admit of the locking of its wheels and the securing of the machine down upon the ground upon its wheels for operation, substantially as described.

9th, The permanent hound or braces, O P, applied to the front axle of a portable horse-power in such manner as to prevent said axle from moving right or left on its wheels when said power is operated, substantially as described.

10th, The diagonal braces or ties, R R, applied to a portable horse-power which is mounted upon and adapted for being operated upon four wheels, substantially as described.

68,830.—Liquid Meters.—Richard H. Atwell, Baltimore, Md.

1st, I claim the valve, K, constructed and operating in combination with the wheels, D, substantially as described for the purpose set forth.

2d, The helix, H, in combination with the shaft, C, water wheels, D, and registering device, substantially as and for the purpose specified.

3d, The arrangement of the rims or partitions, a a', water wheels, D, and valve, K, substantially as described.

68,831.—Reel.—F. A. Balch, Hingham, Wis.

1st, I claim the parallel bars, C D, to connect the head, B, and winding blade, E, of a reel, substantially as and for the purpose set forth.

2d, The head, B, and blade, E, connected by the parallel bars, C and D, substantially as set forth in combination with the sliding head, F, and connecting rods, G, for the purpose of retaining the winding blades more or less distended as desired.

68,832.—Machine for Dressing Weavers' Harness.—A. E. Bigelow, Lawrence, Mass., assignor to John and J. H. Kendrick, Providence, R. I.

1st, I claim the combination of an endless tenter-hook belt, C C', with the revolving brushes, F F, substantially as described for the purposes specified.

2d, The combination in one machine of the endless tenter-hook belts, C C', or equivalent means for supporting and conveying the harnesses an apparatus for sizing and an apparatus for varnishing a weaver's harness, substantially as described for the purposes specified.

3d, The reciprocating brushes, k k', when arranged to act upon the harness, in the manner and by the means substantially as described.

4th, The combination of the endless tenter-hook belts with the reciprocating brushes, k k', substantially as described.

68,833.—Canal Lock.—Martin Bishop, Putnam, Ohio.

1st, I claim the construction of the gate operating on its shaft, L, with its arms, M, fitting between the divisions, N, and having bracing, P P, and resting below the bottom of the canal in the correspondingly shaped chamber, R, as herein described and for the purpose set forth.

2d, I also claim the chamber, R, constructed as described with subdivisions, N N, located beneath the bottom of the canal, as herein described and for the purpose set forth.

3d, I also claim, in combination with such chamber and gate, the adjustable wickets, operated as described and for the purpose set forth.

4th, I also claim, in combination with the gate, the movable device or apparatus, S, as herein described and for the purpose set forth.

68,834.—Preserving Eggs.—L. H. Boole, New York City.

1st, I claim the process of preserving eggs by desiccation and compression substantially as herein described.

2d, As an article of manufacture eggs desiccated without heat, substantially as described.

3d, As an article of manufacture eggs desiccated and compressed, substantially as herein described.

68,835.—Sewing Machine.—C. F. Bosworth, Milford, Conn.

1st, I claim the combination of the slot, I, in the one plate and the slot, H, in the other with a connecting rod, K, constructed with its two bearings, a and b, so as to operate substantially in the manner herein set forth.

2d, The arrangement of the positive take-up, Q, with its cam, S, formed relatively to the movement of the needle and in combination with the third eye, d', on the needle slide, so as to operate in the manner specified.

3d, The arrangement of the tongue, m, upon the shuttle carrier in the position relative to the return tongue, l, so as to operate as described.

68,836.—Ladder.—Margaret D. Boyd, Buffalo, N. Y.

I claim the employment of the sockets, B, for the reception of the ends of sections when so arranged that the bolt which fastens them and the sections together acts at the same time as a step or round for the ladder.

68,837.—Lifting Jack.—A. C. Brincer, Middletown, Pa.

I claim the square reversible link, H, with its rope, J, when arranged and combined with the movable lever, E, and post, B, with its stationary pins or rivetted bolts, C, as herein described and for the purposes set forth.

68,838.—Telegraph Apparatus.—J. M. Brown, Auburn, N. Y.

I claim the combination and arrangement of the electro magnets, B B, excited by the current of the main line with the electro magnets, A A, excited by a local current traversing the armature lever, D, contact point, E, and pillar, I, as and for the purpose set forth.

68,839.—Sewing Machine.—Lewis Budd Bruen (assignor to the Bruen Manufacturing Company), New York City.

1st, I claim the combination of eye-pointed needle, b, thread carrier, M, cam, C, feed bar, H, and rotating hook, L, operating together to form seams, as described.

2d, The combination of eye-pointed needle, b, thread carrier, M, cam, C, feed bar, H, rotating hook, L, and bobbin, Y, operating together to form seams, as described.

3d, Cam, C, pin, S, and thread carrier, M, acting in combination, substantially as and for the purposes explained.

4th, Cam, C, slide, [illegible], and thread carrier, M, acting in combination, substantially as and for the purposes explained.

5th, Spool guard, O, removable or permanent and with or without spool holder, P, and tension, N.

68,840.—Process of Producing Gas for Fuel.—John H. Burgin (assignor to himself, George H. Burgin, Jr., Charles F. Burgin and William M. Burgin), Philadelphia, Pa.

1st, I claim introducing steam into gas producing ovens in quantity sufficient to prevent the rapid combustion of the fuel although the fuel is exposed to a full supply of atmospheric air by maintaining the larger, to wit: the upper portion of the fuel at a dull cherry-red heat while the lower portion is kept in a state of incandescence, in the manner and for the purpose substantially as set forth.

2d, Introducing steam into gas-producing ovens above the grate bars or bottom thereof directly into the body of incandescent fuel in fine jets or in a continuous thin sheet or in several such sheets in quantity aforesaid and for the purpose aforesaid.

3d, Introducing steam into said ovens below the grate bars or bottom thereof through the body of incandescent fuel in the quantity and for the purpose aforesaid.

4th, Introducing steam into gas-producing ovens above the grate bars or bottom thereof directly into the body of incandescent fuel in quantity aforesaid in combination with an artificial blast of air below the body of fuel.

5th, I claim the employment of anthracite coal as a fuel in gas-producing ovens in combination with an artificial blast of air and with steam, the air and steam being admitted in quantity sufficient to maintain the lower portion of the fuel in a state of incandescence and the upper and larger portion of the fuel at or about a dull cherry-red heat, substantially as set forth.

6th, The pipe, H, constructed and arranged substantially as described for introducing steam into the oven.

7th, The pipe, H, constructed and arranged substantially as described in combination with the aperture, E, and pipe, F, or other device for producing an artificial blast of air, substantially as shown and described.

8th, The pipe, F, or other device for producing an artificial blast in combination with the pipe, H, and valve, R, in the exit flue of a gas-producing oven, substantially as shown and described.

68,841.—Corn Planter.—Robert and Joseph L. Cassady, Hardingsville, N. J.

1st, I claim the boxes, F F, hoppers, K K, bars, G G, cross piece, H, and arm, I, in combination with the ratchet wheel, d, and the levers, J K, or their equivalents, the whole being constructed and operating substantially as and for the purpose described.

2d, The frame, S, with its arms, t, and plates, w, hung to the frame, A, substantially as specified.

3d, The adjustable bars, P P, and their plates, f, in combination with the shaft, R, and its pinions, i, or their equivalents, the whole being arranged on the frame, substantially as and for the purpose set forth.

68,842.—Truss.—Robert H. Champlin, Colchester, Conn.

I claim the herein-described truss consisting of the band, A, straps, C C and E, and pad, D, all constructed and arranged as specified.

68,843.—Shifting Rail for Carriage Tops.—Patrick G. Clancy, Augusta, Me.

I claim the arms, b b', having the gain, C, decreasing in width from its outer to its inner side, and having the short shoulder, x', and the rounded or beveled corner, s, substantially as and for the purposes specified.

2d, The wedge-shaped socket plates, a a', substantially as and for the purpose specified.

3d, The combination of the bent arms, b2 b2, with the notched arms, b b', substantially as and for the purpose specified.

68,844.—Thill Coupling.—L. C. Clark, Davenport, Iowa.

I claim the thill iron, B, constructed as described, in combination with the clip, A, having the packing, a, arranged between the ears, A''', on the plate, A', all arranged to operate as and for the purpose set forth.

68,845.—Snow Plow for Railroads.—Henry H. Clemons, Oshkosh, Wis.

I claim a snow plow for railroads, composed of an inclined platform, A, a plow, B, and the cutters, C, constructed, arranged, and operating, substantially as herein set forth and described.

68,846.—Harness Buckle.—W. H. Cocks, Richmond, Ind.

I claim the loop or slide, C, spring, P, and one or both of the pins, d and e, in combination with the strap, A and B, all arranged and operated substantially as set forth, and for the purpose described.

68,847.—Water Elevator.—Pearce K. Curll, Elkridge Landing, Md.

I claim a water elevator, consisting of a series of buckets, E, having journals attached as described, and connected by the detachable links, l, with the flanged rollers, n, applied to the journals, the whole mounted in a suitable frame, having tracks, A and B, for guiding and supporting the series of buckets, all constructed and arranged to operate substantially as described.

68,848.—Cultivator.—Elliott Davies, Jr., Carthage, Ill.

1st, I claim the lever, S, in combination with the sliding cross head, M, mounted on side pieces, C C, and bearing pieces, O O, connected by stay rods, P P, to main axle, A, and bearing the two inside plows, R R', all substantially as specified.

2d, The stationary back plows, F F, connected to the cross piece, D, in combination with the side pieces, C C', the sliding cross head, M, with its plows, R R', the wheels, B B', seat, K, and the tongue, H, hinged to ends of pieces, C C', all substantially as specified.

68,849.—Steam Gage.—George M. Davis, Chicago, Ill.

I claim the diaphragm, A, arranged to support the devices, D B C H, and having rims, P P, for clamping plate, N, to projection, M M, on back, K, substantially as and for the purposes set forth.

68,850.—Mode of Preserving Meats, etc.—E. de la Granja (assignor to himself and Herman Susmann), Boston, Mass.

I claim the process of preserving meats, by applying the injection or saturating mixture above described, in combination with the impermeable covering, substantially as and for the purpose set forth.

68,851.—Washing Machine.—A. Denison, Stillwater, N. Y.

I claim the revolving box, B, constructed of wooden bars or slabs, h, and end pieces, D, in the form of a polygonal prism, with a hinged section extending its entire length, and having journals attached to it as described, in combination with the journals, E E', journal boxes, F F', and balls, l, open tank, A, when arranged to operate in the manner and for the purpose specified.

68,852.—Pump Piston.—Wm. E. Derrick (assignor to himself and Aaron Peck), Jordan, N. Y.

I claim the pump piston, having two sets of induction and eduction ports, E and F, and a valve, G, with two flat wings, connected together by a shank which is held in position by the solid pivot, a, upon the lower half, D, of the piston head, all the parts being constructed and arranged in the manner shown and described, and for the purposes set forth.

68,853.—Steam Engine.—E. N. Dickenson, N. Y. city.

1st, I claim the combination of the two lifters, on the same lifting rod, one being fixed to it, and the other sliding upon it, for the purpose of effecting the reduction of the initial motion of opening steam valves, substantially as described.

2d, I claim the combination of the lever for opening the steam valve gradually, with the fixed and movable lifters, the one being moved by the motion of the lifting rod, and the other supporting a separate disengaging apparatus, substantially as described.

3d, I claim a lever, one end of which is raised by the fixed lifter or the lifting rod, and by which the steam valve is pried open gradually, so arranged that it can be adjusted to vary the speed of lifting, without changing the position of the point on the lifter, relatively to the valve stem, to which the lifting power is applied, substantially as described.

4th, I claim the vibrating tripper, centered upon the lifter itself, which opens the valve, as distinguished from a tripper which is centered, or some other part of the machine, substantially as described.

5th, I claim the vibrating die for engaging and disengaging the valve stem to effect a cut-off, so arranged that it will vibrate in an arc whose concave side is presented to the valve stem, substantially as described.

6th, I claim the collar which surrounds the valve stem, having one or more radial ribs upon it, for the purpose of cooperating with a movable die to effect a cut-off, substantially as described.

7th, I claim a "dash pot," whose plunger is composed of two cylinders of unequal diameters, the smaller of which is the arresting plunger, forming the bottom of the larger one, and whose exterior chamber is composed of a cup or secondary reservoir, to receive the arresting plunger, and above it a confining vessel to guide the larger cylinder of the plunger, and to exclude the air, substantially as described.

8th, I claim the combination in a rock shaft of one false exhaust toe, and one fixed one by which it is supported, with a stud or prop between them, so arranged that it can be dropped or elevated at pleasure, substantially as described.

68,854.—Grinding and Polishing Metals.—Menno Albertus Diedrichs, and Johann Henricus Diedricus, Baltimore, Md.

1st, The sliding frame, m, in combination with flanges or tracks, N N1 N2, adjustable strip, N3, set screw, N4, when constructed and operating in the manner and for the purpose set forth.

2d, The pivoted frame, J, in combination with the weighted lever, L, slotted cross piece, V, dogs, W W', curved notched arm, Y, and spring plate, c, constructed and operating as and for the purpose set forth.

3d, The adjustable stop pins, f, heads, f, and rib, M', in combination with the lever, S, and pivoted frame, J, constructed and operating as and for the purpose set forth.

4th, The lever, L, provided with hook, b, in combination with the hinged dogs, W W', arm, Z Z', and chain, a, constructed and operating as and for the purpose specified.

5th, The frame, O, provided with arms, O' O', in combination with the slotted adjustable bed plate, i, and bolts, i i', constructed and operating as and for the purpose set forth.

6th, The combination of the adjustable racks, g g', having set screws, g2, screw shaft, i, pinion, o, pawl, n, fixed ratchet, m, upright arm, j, pivoted box, k, and pivoted frame, O, substantially as described, for the purpose specified.

68,855.—Hay Loader.—Martin A. Dilly, Mendon, Mich.

1st, The arrangement and combination of the hinged tilting bars, A a B b, and guide rod, I, with the hay fork, and with its lifting bar, L, automatic stop, k, and derrick frame, substantially in the manner described.

2d, Connecting the fork lines, t, to the head bar, J, by threaded bifurcated ends, e, short clamps, c, and nuts, n, substantially as set forth.

3d, The driver's seat, W, placed over the driving wheel, the axle of which carries a winding drum, N, in combination with an oscillating foot treadle, V, connected and arranged so that the driver with his foot may control the ascent and descent of the fork in the manner substantially as herein specified.

4th, The guard points, P, in combination with the fork tines, t, substantially as and for the purpose herein described.

68,856.—Barrel Head Machine.—John B. Dougherty, Rochester, N. Y.

I claim, 1st, an automatic barrel head, turning machine, when the automatic movements or adjustments are produced by suitable cams, P C', and C'', and their necessary connecting rods, substantially as herein shown and described.

2d, In combination with the sliding or clamping shaft, Y, the feathered pinion, P'', spheral springs, J, collar, c''', lever, L', and cam, C', they being arranged and operating conjointly in the manner and for the purposes shown and described.

3d, The arrangement of the set screw, k, pivoted nut, n, and the lever, L, in connection with the clamping heads, M and N, substantially as shown and described, and for the purposes set forth.

68,857.—Burglar Alarm.—Charles A. Eaton, Minneapolis, Minn.

I claim, 1st, The combination of the perforated plate, e, with the cock, C, as and for the purpose specified.

2d, The combination of cock and trigger, C D, with block holder and slide, A B F, substantially as and for the purpose described.

68,858.—Thread Pointer.—Elijah Eaton, Hartford, Ct.

I claim a thread pointer, consisting of the hinged plates, A and D, the ends of which are provided with projections, B F, the faces of which are corrugated, serrated, or provided with a file surface, substantially as and for the purpose specified.

68,859.—Cotton Bale Tie.—N. T. Edson, New Orleans, La.

I claim so constructing and providing with sharp projecting points the bar, A, that it will grasp and hold the hoop, substantially as and for the purposes specified.

Also, so constructing and providing with sharp projecting points the bars, B, substantially as and for the purposes specified.

68,860.—Apparatus for Distilling, Evaporating, and Refining Oils and other Liquids.—John Ellis, New York city, and E. C. Kattell, Binghamton, N. Y.

We claim, 1st, The above described process for desiccating or evaporating saccharine saline alkaline, or other aqueous solutions by the use of superheated steam, as described.

2d, The construction of a retort, or a part of a retort, of a pipe or pipes, so arranged that when either steam or superheated steam and oil, or other liquids are passed or forced through it or them in the same or in opposite directions, the fluid will, naturally, from its superior gravity repeatedly pass through the current of steam, thus thoroughly mixing it with the steam in a comparatively confined space, heating it uniformly and vaporizing it, as occurs in the tubular portion of our apparatus, and as will result if a spiral pipe is placed in a horizontal position, or approaching that position, and steam and oil passed through it.

3d, The forcing or driving of petroleum, or other liquids, by the use of steam or superheated steam, applied directly to the liquid, either in a pipe or a retort upward, either vertically or at any inclination, or in any direction, upwards, in such a manner that the same oil or fluid will not return to pass through the same part of the pipe or retort again, until it leaves the retort.

4th, The constructing of a retort, or a part of a retort, either of a single pipe or of pipes, so bent or connected by return bends that portions lie parallel, or nearly so, with each other, as shown in the drawings and described in the specifications.

5th, A horizontal flat-bottomed chamber, connecting with a vertical chamber, and receiving the lower end of a pipe from a tubular retort.

6th, So constructing a retort, where either steam or superheated steam is to be used in direct contact with the oil or other fluids, that there shall be no chance for water from condensed steam to collect in the retort, owing to the escape pipe for the unvaporized portion of the oil or fluid being either on a level or lower, better lower than the lowest part of the retort, which is so far free from pressure as not to be forcibly cleared by the current of steam or vapor.

7th, The forcing of oil through a rase into a retort, into contact with a current of superheated steam.

8th, The water pipe, K, passing back and forth, in combination with a horizontal condensor, substantially as represented in the drawings.

68,861.—Tannery.—Lewis C. England, Philadelphia, Pa.

1st, I claim hanging bars, 13, with center and end lugs constructed and operating in the manner herein set forth and described.

2d, The arrangement of conveying off the weak or spent liquors from the tan vats either by a hollow beam, H B, with openings, 1' 2' 3' 4' 5' 6', placed near the top and running through the center or on the side of the vats or any other arrangement substantially the same to accomplish the desired purpose.

3d, Troughs, T T' and T'', supply tubes, S f, perforated distributing tubes, D T, tube, R T, junk No. 1, with pump junk No. 2, and connecting tube, C T, all constructed and combined in the manner and for the purpose above set forth and described.

4th, A tannery constructed and arranged in the manner herein described.

68,862.—Brick Mold.—John Evans, Davenport, Iowa.

I claim a brick mold having sliding bottoms, A, and side bars, B, the movements of which are regulated by guides, C, and grooves, D, substantially as described.

68,863.—Hydraulic Engine.—Mahlon Everett, (assignor to himself and Henry F. Cock,) Kalamazoo, Mich.

I claim the valves, P and P', the valve arms, L L, and the arms, H1 H2 H3 H4, in combination with the arm rods, G G, and piston rod, M, all arranged and operated as and for the purposes herein set forth.

68,864.—Trace Buckle.—Oscar Finch, Owego, N. Y.

I claim a trace buckle with a curved lever pressing the trace outward against two cross bars, thereby preventing the trace from tearing or breaking, and preventing injury to the horse as set forth.

68,865.—Balancing Mill Stones.—John Foley, Cleveland, Ohio.

I claim the employment of the solid and chambered weights, o g, with their respective devices for adjusted them applied externally to the loop, F, the whole arranged and operating in the manner and for the purpose described.

68,866.—Hame Fastener.—A. J. Foster, Lake Mills, Wis.

I claim in combination with the hames, A, the metallic strap or bar, B, provided with teeth or corrugations, b b, and the link, c, arranged and operating substantially as and for the purposes specified.

68,867.—Compound for Destroying Insects.—Samuel Galbraith, Pine Grove Plantation, La.

I claim the composition above described, when compounded and used in the manner and for the purpose specified.

68,868.—Window Pulleys.—O. S. Garretson, Buffalo, N. Y.

I claim dividing the box or cap, C, into equal or nearly equal parts, by the segmental line, m, when the convex portions, b, form a part of the outer plate, g, and enclose the axle bearings, t, substantially as and for the purposes set forth.

68,869.—Malt Kilns.—Joseph Geemen, Chicago, Ill.

1st, I claim constructing the perforated floors in separate sections, b, arranged and operating substantially in the manner and for the purposes set forth.

2d, I claim in combination with the series of floors in a malt kiln the arrangement of the space, R, provided with one or more openings, e f, substantially in the manner and for the purposes described.

68,870.—Tool Holder for Turning Lathes.—Samuel Gissinger, Lawrenceville, Pa.

I claim the pivoted leaf, B, when used in combination with the nuts, y, screws, e, armed with wheels, m, said wheels, screws and nuts being operated through the medium of the endless-screw, n, the whole being arranged combined and operating substantially in the manner and for the purpose herein described and set forth.

68,871.—Device for Hatching the Spawn of Fishes.—Seth Green, Rochester, N. Y.

I claim the employment use of the fish propagator, or spawn hatcher, constructed and arranged substantially in the manner and for the purposes herein shown and described.

68,872.—Spinning Machine.—J. Hart, S. Hart and J. Reesman, Farmington, Iowa.

1st, We claim the arrangement of the combined clutch and drum, r, for controling the motion of the carriage with the spindle driving shaft and its pulleys.

2d, The tripping lever, T, cord, w', lever, P, latch pin, t, and spring rod, M, carrying arms, s s, in combination with a drum, r, which is provided with a clutching device, all being arranged and constructed in such manner that when the carriage presses against the lever, T, the drum, r, will be made loose upon its shaft and this carriage caused to stop further backward movement.

3d, The roping clamp, K, constructed of plates, I I, and an intermediate sliding plate, m, notched and perforated, substantially as described.

4th. Providing for unwinding the roping from its spool, G, during a portion of the backward movement of the carriage, E, by means of a friction roller, F, and vertically and end wise movable bars, J J, which latter are actuated by the arms, J', on the carriage, substantially as described.

68,873.—HORSE HAY FORK.—Levi Haverstick, Mannor Township, Pa.

I claim the arrangement of the hoisting arm, A, with its eye, a, pulley, L, with or without the spur tooth, B, together with the elbowed latch, C D, and notched click, F, in combination with the tine or tines, G, and ratcheted terminons and eye, g, held together by rivets, and operated substantially in the manner and for the purpose specified.

68,874.—ELEVATING BLOCK.—Wm. H. Hawley, Utica, N. Y.

1st, I claim the arrangement of the pulleys, B and B and D, in the same plane, with the two first above the other, substantially as described.

2d, The mode substantially as herein described of governing the motion of the apparatus and the draft robe by means of the stops, C and F.

3d, The track rope pulleys, B and B', and the stop, C, in combination substantially as described and for the uses and purposes mentioned.

4th, The draft rope stop, F, and pulley, D, in combination substantially as described and for the uses and purposes mentioned.

68,875.—CAR BRAKE AND STARTER.—Robert Heneage, Buffalo, N. Y.

1st, I claim the brake wheels, E E', in combination with the coiled spring, J, gearing, j k k' s, levers, H H, I I' and connecting bars, m m', arranged and operating substantially in the manner and for the purpose set forth.

2d, I also claim in combination therewith the spring, s g, arranged and operating substantially as specified.

3d, I also claim the standards, F, with their lower ends attached to and resting upon the axle, D, while their upper ends are held by guides, G, secured to the bottom of the car which slide up and down thereon with the springing of the latter, arranged and operating substantially in the manner and for the purpose set forth.

68,876.—HANGING GRINDSTONES.—David B. Herrinton, Detroit, Mich.

I claim the arrangement and combination of the plates, D D and C, and the set screws, C C and c, with the grindstone or pulley, A, and the shaft, B, or any other device, substantially the same, for the purpose designed.

68,877.—VEGETABLE SLICER AND GRATER.—T. G. Hofer, St. Louis, Mo.

I claim the outside conical cylinder, A, the revolving conical cylinder, E, the adjustable knives, p p' p'' p''', the movable rim, R, with its eccentric and regular slots, the grating cone, L, and the vise, V, all in combination, when constructed and arranged substantially as shown and described.

68,878.—CANT HOOKS.—Joel A. Howe, Bangor, Me.

I claim the lip, l, in combination with dog, d, substantially as set forth.

68,879.—STEAM ENGINE SLIDE VALVE.—Samuel W. Hudson, Beaver Meadow, Pa.

1st, I claim the wing, B', projecting from a slide valve to move it by the action of steam substantially as described.

2d, The arrangement of the steam passages, b b1 b2 b3, substantially as and for the purpose specified.

68,880.—CARRIAGE CURTAIN FASTENER.—Abel Hunt and Spencer Mero, Jr., Camden, Maine.

We claim the construction, arrangement and combination of the parts, B C D F G and H, as represented in the several figures on the drawing.

68,881.—SHOE SPIKE.—Robert Hutchison, Newark, N. J.

I claim a screw spike formed with a point, 2, a screw portion, 1, and a polygonal base, 3, for the reception of the key, f, in combination with the metallic socket secured to the sole of the boot or shoe as and for the purposes set forth.

68,882.—BRICK MACHINE.—George W. Ives, (assignor to himself and Alfred Ives,) North Haven, Conn.

I claim the arrangement of the lever, F, in combination with the lever, E, and crank or cam, C, so as to operate substantially in the manner herein set forth.

68,883.—CANT HOOK.—Edward Jewett, Rindge, N. H.

I claim the combination in a cant hook of the hook, B, and serrated plate D, constructed and operating substantially as and for the purpose set forth.

68,884.—BUILDING.—Job Johnson and Elijah D. Davis, Brooklyn, N. Y.

We claim the buttons or plates to secure the edges but allow the boards to expand or contract, in combination with a strip of metal or similar material secured to the edges and covering the joints substantially as set forth.

68,885.—MANUFACTURE OF MINERAL KNOBS.—Josiah Jones, Brooklyn, N. Y. assignor to Thomas Kennedy, Branford, Conn.

I claim the process herein described for the manufacture of mineral knobs.

68,886.—CLAMPING DEVICE.—Edwin King, Fredonia, N. Y.

I claim the improved clamp, A, provided with the return edges, D D, knife edge projection, F, slot, B, bolt-hole, C, and bolt, D', in combination with fence posts and trellis poles, so as to operate in the manner substantially as herein specified and for the purpose set forth.

68,887.—HAY RAKER AND LOADER.—N. S. Kinyon and B. F. Smith, Chenango Forks, N. Y.

We claim the inclined guide teeth, L L, and the wire guards, R R, in combination with the rake and elevating teeth and the endless carrier all being constructed and arranged substantially as set forth.

68,888.—OPERATING DRILL.—E. G. Lamson, Shelburne Falls, Mass.

1st, I claim the air spring substantially as and for the purpose described.

2d, The device whereby I regulate at pleasure the momentum of the blow struck by regulating the speed of the driving machinery, the greater the speed the harder the blow substantially as and for the purposes described.

3d, The device whereby I cause the piston head carrying the striking mechanism to operate in a different direction from the piston head attached to the driving mechanism, substantially as described.

4th, The mechanism for swinging out the drills longitudinally substantially as and for the purpose described.

5th, The mechanism for swinging out the drills laterally substantially as and for the purposes described.

6th, The mechanism for confining the drills in gangs substantially as and for the purposes described.

7th, The form and disposition of the cutting edges of the drills substantially as and for the purpose described.

68,889.—LAMP BURNER.—J. C. Love (assignor to W. H. Love) Philadelphia, Pa.

1st, I claim the wick tubes, B B, arranged adjacent to each other, in combination with a casing and with a dome or plate having a single opening through which the flames from both wick may pass and the edges of which are parallel to the sides of the wick tubes the whole being constructed and arranged as and for the purpose described.

2d, The case, C, with its partitions, a a, in combination with the tubes, B B, and dome, d, the whole being arranged substantially as and for the purpose specified.

3d, The combination of the above and the plate, c, and its lips, l l, arranged in respect to the openings, e, substantially as set forth.

68,890.—FAN.—Wm. Lucas, (assignor to Oliver Downing), New Haven, Conn.

I claim the two edges, D, slotted and pivoted between the plates, B, and arranged so as to operate substantially in the manner herein set forth.

68,891.—LIFTING JACK.—E. L. Marsh, Greenwich, Ohio.

I claim the lever, E, check yoke, G, and trapeze or swing, D, when constructed and arranged in combination with the standards, B, and base, A, in the manner as and for the purpose set forth.

68,892.—INVALID BEDSTEAD.—John Massey (assignor to himself and Peter M. Stagg), New York City. Antedated Sept. 7, 1867.

1st, I claim the combination with a bedstead of swinging arms or slugs, G, provided with stirrups or rests, m, for operation substantially as specified.

2d, The hinged portion, F, of the foot board constructed as described to form a table to the bedstead substantially as set forth.

68,893.—CLOTHES WRINGER.—G. M McMaster, Rochester, N. Y

1st, I claim the employment or use of the friction or traction pulleys either with or without a roughened periphery, arranged and operating substantially in the manner and for the purposes herein shown and described.

2d, The adjustable shaft, S, arranged and operating in connection with the driving shaft, G, and rollers, R and R', and coupling, h and d, substantially as and for the purpose set forth.

3d, The relative arrangement of the two separate side clamps, C, provided with a suitable dowel, p, and suspending strap, q, and when they are so made as to have each two separate bearings horizontally as and for the purposes specified.

68,894.—BRICK MACHINE.—J. M. Moyer, Pittsburgh, Pa.

I claim the sickle or shear spuds, F, and lower knife or drag, H, in hopper, A, in combination with the raised bowl constructed arranged and operated in manner set forth.

I claim the knife, L, and plunger, M, constructed and applied in manner and form substantially as described.

I claim the brick wheel, N, with slots and grooves to admit molds operated substantially as set forth.

I claim the arrangement of the slop cam, U, in connection with knife, s, and arm, R, arranged and operating in manner described

I claim the mold with hinged base constructed and used as described, to and for the purpose intended.

68,895.—ATTACHING THILL TO CARRIAGES.—A. Odell N. Y. City, assignor to himself and David Granger Collinsville, Conn.

I claim the combination of a shaft iron made as herein before described with an aperture, E, in it with the non-movable jaws of a jack substantially as described, and for the purposes hereinbefore set forth.

68,896.—BRICK PRESS.—C. D. Page, Rochester, N. Y.

1st, I claim the combination with the hopper, G, of the rack, e c c, and stamp, H, for filling the molds and giving the initial pressure, operating substantially in the manner and for the purpose specified.

2d, The thin passage, K, leading from the pug mill, combined with the roller, K, in the manner and for the purpose herein set forth.

3d, Giving the followers an upward pressure under the pug mill, as and for the purpose specified.

68,897.—STEAM TRAP.—B. F. Perkins, Holyoke, Mass.

1st, I claim a steam trap operated by two or more compound plates so arranged that the expansion or contraction of one is conveyed to the second and of those two, to the third, and last and valve, D, as represented at Fig., 1 and 2 E 1 2 3 4.

2d, Also the spindle, G, and nuts, E and H, the whole arranged and combined as herein described and for the purpose specified.

68,898.—COOKING STOVE.—Gustavus Perkins, Burlington, Vt.

1st I claim the elevated oven, d, and boiler, g, when arranged as described in combination with yoke, y, substantially as set forth.

2d, The hot air chamber, I, formed by the bevel of the two fire pots, H H, register, V, and aperture, W, substantially as and for the purpose set forth.

3d, The supplementary pan, L, for cleaning the flues of a cooking stove substantially as shown and described.

4th, A cooking stove consisting of fire pots, H H, ovens, E f and d, boiler, g, connected with d, by yoke, y, flue, J, dampers, M N O P Q R, all arranged and combined as herein set forth and described.

68,899.—HAT.—W. H. Plumb, (assignor to Henry de Tavala,) New York City. Antedated Sept. 4, 1867.

I claim a locking obstruction applied to the interior of the hat, operating till unlocked and displaced or removed, to impede or prevent the wearing of the hat, substantially as specified.

68,900.—REVERSE LEVER PITMAN.—James and Wheelock W. Porter, Wauconda, Ill.

We claim the combination of a wheel, A, provided with pins, H, or their equivalents, levers, F, and pitman, E, arranged and operating substantially as and for the purposes specified.

68,901.—PLOW.—Wm. Richardson, Hookstown, Md.

1st, I claim the boxes, E E, substantially as and for the purpose described.

2d, The graduated beam, C, for the purpose specified.

3d, The graduated plow shanks, or plow standards, G' G', for the purpose specified.

4th, The arrangement of the removable plow, E, with the adjustable and removable plows, G G, substantially as and for the purpose specified.

5th, The combination of the plow shanks, G' G', the boxes, F F, the set screws, H H, and the cross beam, C, substantially as and for the purpose specified.

68,902.—FENCE POST PEDESTAL.—Jos. Robbins, Amherst, Ohio.

I claim the herein described pedestal when constructed with standards, B, ribs, D, and pin, E, in combination with the post, G, in the manner as and for the purpose set forth.

68,903.—SPADE FOR DIGGING POSTHOLES.—Matthew L. Roberts, Smithville, Canada. Antedated Sept. 8, 1867.

I claim the construction and arrangement of the blades, A A, hinged together at their upper ends by means of the ring segments, C C, and having the handles, B B, united to them at points equidistant from the joints thereof, substantially in the manner and for the purposes herein specified.

68,904.—CARRIAGE.—James Rock, Hastings, Eng.

I claim the employment of springs or weights, substantially as hereinbefore described, to counterbalance the movable parts of folding carriage or wagon heads or coverings, in order to raise or close, or to assist in raising or closing such heads or coverings.

I also claim the combination as well as the arrangement of the bent levers, b b1, the connecting rods, d d, and the springs, a a1, also, their combination with the jointed prop bars, l l, the carriage body and the movable back or part, e, hinged thereto.

I also claim, in combination with the carriage body, its joint bars, l l, movable back, e e1, and top piece, f f1, a means or mechanism, substantially as described, or the equivalent thereof, for effecting the movement of the joint bars so as to close their joints by turning the part, f f1, down into a horizontal position, such means being the angular teeth or feather, k k, of the prop pin, and the elongated eye of the upper joint rod, l, the whole being as shown in figs. 4 and 5, and as hereinbefore specified, the prop pin, g1, being fixed or applied to the part, f f1, so as to turn or be movable therewith.

68,905.—MACHINE FOR CLEANING HEMP, RAMIE, ETC.—R. Roezl, Santo-Comapam, Mexico.

1st, I claim the alternate concave and convex metallic curved table edges, B and C, constructed and applied substantially as and for the purposes set forth.

2d, The manner of securing the removable table edges, B and C, whereby they are made rigid or immovable when the machine is in operation.

3d, The revolving cylinder, A, armed with knives projecting from its perimeter for breaking up and extracting the wood, etc., from the fiber of ramie and other like plants, in combination with the removable table edges, applied and operating substantially as described.

4th, The method or process, herein described, of extracting the fiber from ramie and other like plants, consisting in first subjecting the plants to the action of the machine herein described, then soaking them in water, again subjecting them to the action of the machine, and finally placing them in a hot solution, as described.

68,906.—ANIMAL TETHER.—Walter S. Sargent and Frederick Flanders, Franklin, N. H.

We claim the combination of the cylinder, E, and piston, d, with the base block, A, standard, B, socket, C, and tethering pole, D, substantially as described.

68,907.—BRICK MACHINE.—Henry C. Sargeant, Columbus, O.

1st, I claim raising the follower so as to press a portion of the clay in the mold, and the expelling of the surplus from the mold, in the manner and for the purpose specified.

2d, I claim regulating the pressure by means of the sliding plate, as shown and described.

3d, I claim regulating the thickness of the brick by raising or lowering a section of a continuous track by means of wedges and screw, or their equivalents, as shown and described.

4th, I claim the construction of a propeller that the receiving and the discharging edges will operate on the clay, as shown and described and for the purpose specified.

68,908.—MANUFACTURE OF ICE, ETC. — Daniel E. Somes, Washington, D. C.

1st, I claim cooling and refrigerating and warming, substantially as herein described.

2d, The process of cooling and warming, as herein described, consisting in forcing or drawing spray into a vacuum, or partial vacuum, substantially as set forth.

3d, Cooling, condensing, heating, and refrigerating by means of the apparatus, substantially as described.

4th, The apparatus, herein described, constituting a vacuum, and devices for producing spray, substantially as set forth.

5th, A fly wheel, or balance wheel, revolving in a vacuum or partial vacuum.

68,909.—DERRICK.—A. B. Sprout, Picture Rocks, Pa.

First, I claim a derrick provided with a pivoted shaft, F, made operative through the medium of the rope, n, substantially as herein described, and for the purpose set forth.

2d, In combination with the above, the pulleys, P and l, and guide, g, constructed, arranged, and operating substantially as herein described and for the purpose set forth.

3d, The combination of the weight, m, pulley, E, and rope, X, with the pivoted shaft, F, constructed, arranged, and operating substantially in the manner herein described, and for the purpose set forth.

68,910.—CULTIVATOR.—Eliza Stafford, Decatur, Ill., administratrix of the estate of D. S. Stafford, deceased, assignor to herself, Sullivan Burgess, and Joseph Stafford. Antedated Aug. 29, 1867.

I claim the pivoted curved plow standards, H, connected by the chains, J, substantially as and for the purpose specified.

68,911.—INSTRUMENT FOR MEASURING LUMBER.—Thomas B. Stevenson, Dayton, Ohio.

1st, I claim registering the quantity of material measured by a traversing rotary wheel, upon rotary and fixed dials, by an organization of mechanism, substantially as described.

2d, The combination of the shipping mechanism with an adjustable series of different sized pinions for changing speed, substantially as specified.

3d, The combination of the adjusting screw, H, arm, K, retracting spring, 14, and segmental notched plate, N, or their equivalents, operating conjointly in the manner and for the purpose described.

4th, The measuring wheel, A, in combination with the thumb spring, m, and detent, q, operating in the manner and for the purpose specified.

5th, The disk, S, in combination with arm, a, and rotary dials, R T I' I'', for recording the quantity measured, substantially as described.

6th, The shipping and adjustable mechanism represented in figures 6 and 7, in combination with the recording mechanism represented in figures 2 and 3, operating in the manner substantially as and for the purpose specified.

68,912.—BED BOTTOM.—W. Stickney, Lockport, assignor to Sarah E. Stickney, Waterville, N. Y.

I claim a bed bottom consisting of slats, A A, rigidly secured to the hinged sections, B B, in combination with the spiral springs, d d, and vertical guides c c, arranged and operating substantially in the manner described.

68,913. — MEASURING CAN. — David H. Sumner, South Boston, Mass.

I claim the duplex measuring can, composed of the two vessels, A B, the orifice, d, and the partitions, f g, arranged substantially as described, such can being provided with discharging spouts and a handle, as set forth, when such may be essential or necessary thereto.

68,914.—PISTON-PACKING RING.—S. Tucker, Worcester, Mass.

I claim the improved piston ring section as turcated and recessed at and near one end and with recesses a tongue, E, and a lapping piece, F, at and near its end, the whole being in manner, substantially as represented in the accompanying drawings and as hereinbefore described.

68,915.—COOLING AND PURIFYING ANIMAL CHARCOAL.—D. H. Turner, New York city.

1st, I claim the process, substantially as herein described, of cooling and purifying animal charcoal, by agitating or giving it a series of successive or repeated lifts as it is passed through or along a reticulated cylinder or vessel through which a current of cold or cooling air is made to ascend, essentially as herein set forth.

2d, The combination for the purpose or purposes specified, of a revolving reticulated cylinder or vessel provided with lifting strips or otherwise equivalently constructed, upper trunk or flue for escape of the noxious gases and finer dust, serving also for the establishment of the draft, and suitable delivery shutes or devices for separate discharge of the coal and coarser dust, substantially as described.

68,916.—SPITTOON FOR RAILROAD CARS.—Benj. Van Deusen, Troy, N. Y.

I claim the combination of a tunnel or open-ended cup, B, with an open-ended spittoon or spout, A, as provided with a movable or swinging cover, and arranged and secured to and in the car floor in convenient positions to the seats thereof, substantially as and for the purposes herein set forth.

68,917.—DRIVEN PUMPS.—S. Waite, New Bedford, Mass.

1st, I claim the within described perforated drill-shaped point or shoe, b, applied to a perforated tube, a, and arranged in connection with a pump, substantially as and for the purposes set forth.

2d, The within described arrangement and combination of the rotating apparatus, the perforated shoe, b, and perforated tube, a, when applied to a pump, all being constructed and operated substantially as and for the purposes set forth.

68,918.—HAND LOOM.—Chas. Wandel, Milton, Iowa. Antedated Sept. 4, 1867.

I claim the construction and arrangement of the shaft, L, drum, K, arms or pins, J M, ratchet wheel, K2, pawl, R, arm or lever, N, spring, P, treadles, H, and lathe, E, as herein set forth, for the purpose specified.

68,919.—DEVICE FOR HITCHING HORSES.—W. G. Ward, Steuben County, N. Y.

I claim the combination of the handles, A and B, with the holes, H H, and the bridge, E, all being constructed and arranged substantially as and for the purposes set forth.

68,920.—ROTARY STEAM ENGINE.—John Q. Welch, Oswego, Oregon.

I claim the arrangement of the oblong circle, C, slot, P, in the shaft, S, slide, D, spring, W, aperture, y, and the escape at g, substantially upon the principle and in the manner as herein set forth.

68,921.—WASHING MACHINE.—J. W. Wetmore, Erie, Pa. Antedated Sept. 7, 1867.

1st, I claim the slats, 1 j, faced with flexible strips, k l, and the movable slats, m n, fig. 3, constructed and operated as described.

2d, The combination in the pounder, B, of the slats faced with strips, k l, movable slats, m n, hook, w, fig. 3, weigat box, g' f'', lever, R, and springs, p r, fig. 2, arranged as and for the purposes set forth.

3d, The combination of the separator, l m, fig. 2, with the pounder, B, as and for the purposes described.

68,922.—PERMUTATION LOCK.—Seth Wheeler, Albany, N. Y.

1st, I claim the application to a sliding bolt of the toothed and notched wheels, C D, having suitable indices applied to their shafts so that said wheels and indices shall move with this bolt, substantially as described.

2d, Providing a concentric slot in the toothed wheel or wheels within which the lugs, b b1 may be received for the purpose of allowing said wheels to be turned when the bolt is unlocked, substantially as described.

3d, The adjustable toothed spiders, F G, or their equivalents, applied to the toothed and slotted wheels, C D, in combination with the lugs, b b1, and devices for indicating the positions of the said slots, l l1, in said wheels when in line with said lugs, substantially as described.

68,923.—MODE OF LIGHTING FACTORIES AND OTHER BUILDINGS.—A. J. White, Ballston Spa, N. Y.

I claim, in combination with an air-tight reservoir and a series of conductors therefrom, with burners attached, the cocks, h and i, to operate substantially as and for the purpose described.

68,924.—CARRIAGE SHACKLE.—Levi Wilkinson (assignor to Oliver F. Case), New Haven, Conn.

I claim the combination of the detachable block, c, and the bar, b, when the said block itself forms a part of the bearing of the coupling, and when the whole is constructed and arranged so as to operate substantially as and for the purpose specified.

68,925.—CARRIAGE-CURTAIN FASTENER.—Amandus Woeber, Davenport, Iowa.

1st, I claim providing a rubber flap, with eyelet hole attached outside and over metallic eyelet, substantially in the manner and for the purpose as herein described.

2d, The rubber flap, with hole, as attached and arranged, in combination with metallic eyelet and curtain knob or button, substantially in the manner and for the purpose as herein described.

68,926.—SELF-ACTING WAGON BRAKE.—Jas. F. Wood, 2d, Cohocton, N. Y.

1st, I claim the forked right-angle lever, A, as constructed, and connected, with the tongue, or pole, D, and the rod, Q, to operate the brake bar, N, substantially as and for the purposes set forth.

2d, I claim the slotted metal plate, F, as constructed and attached to the pole, D, by the pin or bolt, C, to prevent the lateral movement of the pole while it allows it to move freely endways.

68,927.—HAMMOCK.—Arthur Woods, Liverpool, Eng.

I claim the hammock, herein described, having the body, a b, of a rectangular section sustained transversely by the cross-pieces, f, or their equivalents, and supported by the jib ends, c, so as to receive the several strains, and hold in shape the contents of the hammock, all substantially as and for the purpose set forth.

68,928.—KNITTING-MACHINE REGISTER.—B. F. Wyman, Lancaster, and B. H. Hartshorn, Ashland, Mass.

We claim the combination and arrangement of the shaft, f, the worm, l, the dial, r, the hand, s, and the stand, p, substantially as and for the purpose set forth.

68,929.—FILE.—Hiram Young, Carey, Ohio.

I claim a single-cut right-and-left file with the lines of its teeth on both sides of the blade, all inclining in the same direction, substantially in the manner and for the purpose described.

68,930.—WAGON STEP.—William Youngblood, N. Y. city.

1st, I claim the employment of a step or steps, secured upon the axle out side of the wheel or wheels of a wagon, and located immediately over the hub or hubs of said wheels, substantially as and for the purpose herein described.

2d, The construction and arrangement of the step, D, with the nut, C, and guard, E, substantially as and for the purpose set forth.

68,931.—MEASURE FOR LIQUIDS.—J. L. Abbott, North Providence, R. I., assignor to Chas. Pratt, Brooklyn, N. Y.

I claim the arrangement of the measure, A, pipe, I, two-way cocks, J, tube, K, adjustable bar, D, valve, H, and chamber, G, as and for the purpose specified.

68,932.—SLIDE VALVE.—Thos. Adams and Geo. J. Parsons, No. 5 Duke st., Adelphi, Eng. Patented in England Feb. 15, 1866.

I claim the slide valve, constructed in such a manner that, by the aid of a ring or rings, H, provided with a fillet, N, and recess, O, the pressure of the steam on the different parts of the surfaces, will be balanced, all being made and operating as herein shown and described.

68,933.—WINDOW-SASH STOP. — Jacob K. Andrews, New Providence, Pa.

I claim window stops, when made in two parts, and arranged, connected, and operated substantially as described and for the purpose specified.

68,934.—STEAM GENERATOR.—P. Atherton, Philadelphia, Pa.

I claim the arrangement of the bell-mounted flues, B C D E F, bearing wall, H, and chambers, J L M, having openings, N O, for the purpose of creating an increased amount of heating surface, as herein shown and described.

68,935.—BALING PRESS.—S. J. Austin, Freeport, Me.

1st, I claim the operating of the side, C, through the medium of the arms, E, applied at one end to the side, C, and having their opposite ends fitted in or between suitable guides with cords or chains, F, attached, which are connected to a shaft or windlas, G, substantially as shown and described.

2d, Providing one of the journals, o, of the shaft, N, with an external screw thread, p, to work in an internal screw in its bearings, or with an equivalent device to give the shaft, N, a longitudinal movement while being rotated, and thereby keep the chains or cords, m, in line with the arms K K K', substantially as set forth.

3d, The lips, l l' l', on the bevel block, J, and platform, I, substantially as and for the purpose herein set forth.

4th, The securing of the head block, J, in the framing B, by means of the dovetail cleat, k, on the framing, fitting in the dovetail groove, j, in the upper surface of the head block, substantially as set forth.

5th, The metal apron, P, attached to the platen, I, substantially as and for the purpose specified.

6th, The door, O, in the side of the press box, A, when used in combination with the sliding or expanding side, C, and the platen, I, arranged substantially as shown and described.

68,936.—APPARATUS FOR ROLLING RAILS.—Hugh Baines, Manchester, Eng.

I claim the rollers, P Q R and S, in combination with each other, when constructed and arranged together substantially as and for the purpose described.

68,937.—PORTABLE SHEEP SHED.—Wilson M. Baker and John Hisner, Urbana, Ohio.

1st, I claim the combination of the overlapping boards, G G G, and catches g2 g3, arranged as described and forming a detachable roof for a portable sheep shed, as set forth.

2d, The arrangement in a portable sheep shed of the pivoted side boards R, and closing bars, S, as and for the purpose explained.

3d, The rack, H, constructed as herein described, and extending longitudinally through the central part of the shed, in combination with the shed substantially as and for the purpose herein set forth.

4th, The combination of the arms, L, cords, M, and shafts, N, with each other and with the feeding troughs, K, and frame of the shed, substantially as herein shown and described, for the purpose set forth.

68,938.—STEAM ENGINE.—Wm. H. Bancroft and Wm. L. Ward, Portland, Wis.

We claim the combination of the first cylinder, B, having a central partition, B', and the main cylinder, C, with the r respective pistons, said cylinders being constructed as to their ports, and arranged in relation to one another and to said pistons substantially as described.

68,939.—TWEER FOR FURNACES.—John Bayliss, N. Y. City.

I claim the chambered tweer, A, in combination with a water reservoir and air chamber and and suitable water and blast pipes, all constructed and arranged substantially as described.

68,940.—FIRE EXTINGUISHER.—J. F. Boynton, Syracuse, N. Y.

1st, I claim the method herein described of charging portable vessels with saline water and compressed air or gas, for use in extinguishing fires, substantially as set forth.

2d, I also claim the portable vessel, B, charged with saline water and compressed air or gas, substantially as described, for the purpose of extinguishing fires, as set forth.

3d, I also claim, in combination with the cylinder, A, portable receiver, B, the connecting pipes, C and D, cocks, 1, 2, 3, and 4, and any suitable pump for charging said cylinder, A, with compressed air or gas, all constructed and arranged substantially as described.

68,941.—CORN SHELLER.—C. H. Brady, Mount Joy, Pa., assignor to himself and Wm. Brady. Antedated Sept. 10, 1867.

I claim the combination of the revolving frame, B, as constructed and provided with the spring plates, H H, with the stationary case, A, provided with spout, a, and projection, b, as and for the purpose set forth.

68,942.—LUBRICATING OIL.—E. L. Brady, New Orleans, La.

I claim a combination of the various substances, to wit, oil, water, spirits of ammonia, carbonate of soda, quick lime, and sulphur, used to make the compound clarified and saponified lubricating oil known as Brady's oil.

68,943.—FRUIT BOX.—Israel F. Brown (assignor to E. F. Brown), New London, Conn.

1st, I claim the fastening, B, in combination with the bottom, G, and sides, H, as herein set forth, for the purpose specified.

2d, The bottom, G, to the box, applied thereto substantially as and for the purpose described.

68,944.—FOOT WARMER.—N. H. Bruce, Forge Village, Westford, Mass.

I claim the construction and arrangement of the perforated case, A, having the socket, B, lamp, C, hinged casing, D, inclined covered plate, F, with central opening, H, in which are secured the sheet metal plates, I, as herein shown and described, for the purpose specified.

68,945.—WATER WHEEL.—James D. Bryson, Newcastle, Pa.

1st, I claim the combination in a turbine water wheel of the adjustable gates or shutes, D, and adjustable buckets or issues, B', whereby the area of the issues may be varied to correspond with the regulated capacity of the inlets or shutes.

2d, In combination with the above, the slotted adjusting arms, I I, applied so as to open the gates simultaneously and permit them to close independently, so as to prevent the obstruction of one or more gates from interfering with the operation of the remainder.

3d, The combination with the adjustable buckets, B', of the adjusting staff or screw, L L', and swivel, l, applied and operating substantially as described.

4th, The combination of the staff or screw, L L', and swivel, l, to follow slotted spindle, E, jointed arms, N, and ring or collar, M, arranged as described and operating so as to permit the buckets to be adjusted while the wheel is in motion, as set forth.

68,946.—FILE CUTTING MACHINE.—Edwin Bucklin, Jr., North Providence, R. I., assignor to Frederick A. Soule, Dixon, Ohio.

1st, I claim the combination of the bent arm, D, hammer, G, and set screw, F, arranged substantially as described.

2d, The combination of the bent hammer, G, provided with downwardly bent arms, G1 G2, spring, H, bent arm, I, set screw, H1, having a handle, H, with the bent arm, D, secured on the adjustable plate, C, substantially as described.

3d, The adjustable hollow block, J, provided with a metal cap, J2, on one side, forming the bearing for the chisel stock, K, and holder, K1, substantially as described.

4th, The chisel stock, K, with a round top post, k, a shoulder, k2, and hollow three-sided part, k1, in combination with the holding device, K1, substantially as described.

5th, The combination of devices substantially as herein described, by which the chisel is elevated and brought down upon the file blank previous to the descent of the hammer upon the end of the chisel stock.

6th, The device for elevating and releasing the chisel and for holding the blank upon its bed, consisting of the toothed wheels, L1 M1 and M2, lever, l, shoulder, k2, on the chisel stock, K, and springs, n1 and h, and holder, K1, substantially as described.

7th, The device for operating the feed screw, consisting of the tappet, O2, adjustable slide, a, projection, a1, on the square rod, a2, pin, b1, inclined slot, b2, in the loose plate, b3, pawl, c2 and c3, and ratchet wheel, c1, secured to the shaft, c, substantially as described.

8th, The device for moving the file bed, consisting of the handle, e2, on shaft, d, provided with the square part, e1, set screw, e3, lugs, t1, pivoted arm, f, one end of which is provided with a cap, f2, having a female screw thread on its inner face, the other end being forked and holding the pivoted swinging piece, f3, substantially as described.

## 68,947.—Door and Blind Fastening.—Daniel Bull, Amboy, Ill.

1st, I claim the construction of the spring door fastening for the purpose described, with the self-adjusting latching nose, having a lip or locking projection formed on it, substantially as described.

2d, The spring door fastening for double doors, which, when both doors are shut, will be locked and held firmly in place by one of the doors, substantially as described.

## 68,948.—Table Attachment for Bedsteads.—Daniel Bull, Amboy, Ill.

1st, I claim the combination of an adjustable table, B, with a swinging support, A, constructed and adapted to operate substantially as and for the purposes described.

2d, Pivoting the table, B, to the bar, c, of the support, A, so that said table can be adjusted and set in a horizontal plane, and also inclined at pleasure, substantially as described.

3d, In combination with the support, A, constructed as described, I claim the pivoting of the table, B, to a pivoted bar, g, at one end, and to the curved portion, b, at the other end, substantially as described.

## 68,949.—Machine for Rounding Fly Net Straps.—C. K. Burkholder and Henry Lerew, York Springs, Pa.

We claim the combination of the notched knives, D J, and guides, E I, arranged and operating substantially as described.

## 68,950.—Horse Rake.—George E. Burt, Harvard, Mass.

1st, I claim in combination with the teeth, m, axle, O, and arm, J, a toggle joint formed by the levers C and B, acted upon by the weight of the driver riding upon a seat resting upon the joint in such manner that as the teeth are drawn back the toggle joint shall be straightened and the weight of the driver be made to act upon the teeth, a correspondingly increased downward pressure, substantially as set forth.

2d, The combination of the shafts, D, arm, F, levers, H E B and C, arm, J, and axle, O, substantially as set forth.

3d, The combination of the teeth, m, the axle, O, and clamp, I, when respectively constructed and arranged substantially as set forth.

4th, The combination of the shafts, D, arm, F, axle, O, and teeth, m, substantially as set forth.

5th, The arm, J, on one side of the axle, in combination with the arm, F, on the other side thereof, when connected with the shafts, D, one directly and the other through intermediate levers, H and E, or C and B, so arranged that the draft upon one and pressure against the other arm shall unite to turn the axle toward and hold down the teeth, substantially as set forth.

## 68,951.—Carriage Attachment.—George J. Capewell, West Cheshire, Conn.

I claim, 1st, A holder or plate, B, for the fender rollers, A, made of such a form as to act as a step to the wagon or other vehicle, substantially as described.

2d, Securing the fender roller holders, B, to the vehicle, in such manner that the rollers can be adjusted without detaching the holders, substantially as described, for the prpose specified.

3d, The washers, F, at the ends of the rollers, A, for the purpose described.

## 68,952.—Composition for Imitation Wood.—Henry Carter, Taunton, Mass.

I claim, 1st, Making imitation wood by combining saw dust and glue, substantially as herein shown and described.

2d, The above in combination with metal dust and shavings, substantially as herein shown and described.

## 68,953.—Invalid Spittoon.—John M. Cayce, Franklin, Tenn.

I claim a spitton having the lid, B, in combination with the lever, D, working in the handle, C, and operated by the button, d, substantially as and for the purpose specified.

## 68,954.—Bed Pan.—Edwin M. Chaffee, Providence, R. I.

I claim the pipe, A, with supplemental chamber, a, outlet pipe, B, tube, C, with mouth piece and valve, g, when arranged and operating in the manner substantially as and for the purposes specified.

## 68,955.—Manufacture of Magnesium.—John O. Christian, Manchester, Eng., and John and Henry Charlton, Strangeways, Eng. Antedated Sept. 15, 1866.

We claim, 1st, Producing sulphate of magnesia or other salts of magnesia during the process of generating carbonic acid gas, or of distilling tar water, or of manufacturing ammonia or its salts, substantially as herein set forth.

2d, Treating Dolomite or other magnesian compounds with sulphureted hydrogen, substantially as and for the purpose described.

## 68,956.—Attaching Door Knobs.—D. B. Cobb, Jersey City, N. J.

I claim the metallic shank, B, provided with the socket, C, in connection with the nut, E, or its equivalent, and the knob, D, all arranged substantially in the manner as and for the purpose set forth.

## 68,957.—Horse Power.—S. Coin, Cazenovia, N. Y.

I claim the flange, C, to the horn wheel, A, substantially as and for the purpose described.

I also claim the links, F, constructed substantially as and for the purpose described.

## 68,958.—Combined Hoe and Rake.—Isaac Cook, Haynesville, Mo.

I claim the cap, a, secured by the screw bolt, b, to the handle, A, through the side strips, a' a', for attaching a hoe and rake together or separately with the screw bolt, c', and the pins, d d, substantially as herein described.

## 68,959.—Adjustable Track for Conveying Loads by Gravity Only.—A. W. Cramer (assignor to himself and Wm. D. Brooks), Bethany, Pa.

I claim, 1st, the track, H, in combination with the track, B, formed by a wire or rope adjustably suspended at one end, that its inclination may be reversed, substantially in the manner set forth.

2d, The combination of the track, B, formed by a wire or rope, the sheave, C, axle, D, eye, F, and cord, a, arranged to reverse the inclination of the track, substantially as described.

## 68,960.—Priming Metallic Cartridges.—James F. Cranston, Springfield, Mass.

I claim a centerfice cartridge in which the anvil is constructed with a square face, A, and spring braces, C C', fastened in by the flange or groove, e e, and bridging over the cavity, b, in such a manner as to form the openings a f g h, substantially as set forth,

## 68,961.—Adjustable Spirit Level.—L. L. Davis, Springfield, Mass.

1st, I claim the semi-circular bubble case, c, when constructed or cast in one piece, and having the aperture or space, l, for the insertion of the bubble glass, c, and the space, c', substantially as herein described and set forth.

2d, The ring, C, having a dovetail flange around its periphery and working in the dovetail socket, A', when made substantially as herein described and set forth.

3d, The ring, C, in combination with the dovetail socket, A', the set screw, g, the friction screw, g', and the bubble case, c, when made substantially as herein described and set forth.

4th, The elevating screw, j, and index, i, in combination with the base, A, socket, A', ring, C, and bubble case, c, when made substantially as herein described and set forth.

## 68,962.—Sheet Metal Pan Former.—W. H. Davis and R. H. Wagon, Dowagiac, Mich.

1st, We claim the lever, H, brace, D, shaft, I, former, F, and guide rods, P P, in combination with the box, A, as described and for the purposes set forth.

2d, The arms, M M, rod, L, and spring, a, in combination with the box, A as described and for the purposes specified.

## 68,963.—Balancing Mill Stones.—Ephraim and Zedakiah Dawson and Brice Hilton, Brunersburg, Ohio.

We claim the above described arrangement of the balances, B, and, D, and the horizontal and perpendicular adjustment thereof as and for the purposes herein set forth.

## 68,964.—Boiler Feeder.—Henry O. Demarest, N. Y. City.

1st, I claim the arrangement of the lever, D, heads, E E', and washer, e', substantially upon the principle and in the manner herein set forth.

2d, The arrangement of the chambers, A and A', lever, D, heads, E E' and E'', nut, e, screws and washer, e', discharge pipe steam pipe, C, and the injection pipe, B, constructed and combined substantially as herein above set forth.

## 68,965.—Manger.—Frederick Dengler, and Jacob Miller, Brooklyn, N. Y.

1st, We claim connecting the trap doors of mangers, feed boxes or troughs with clock-work in such a manner that the said doors can be simultaneously opened at any desired time substantially as and for the purpose herein shown and described.

2d, The disk, i, on the arbor of the clock-work, C, in combination with the lever, D k l and F, the latter being connected with the door or doors of the mangers, troughs or feed boxes substantially in the manner herein shown and described.

3d, The hinged bottom, r, of the feed box, H, in combination with the catch s, and swinging hook, t, the latter being connected with the clock-work, C, substantially as herein shown and described.

4th, The weighted cover, s, of the trough or manger, A, in combination with the catch lever, B, which is connected with the clock-work, C, substantially as and for the purpose herein shown and described.

## 68,966.—Carriage Springs.—Thomas DeWitt, Detroit, Mich.

I claim a carriage spring composed of the parts, B B C, connected together and used in connection with the studs, d d, arranged in relation with said parts substantially as herein shown and described.

## 68,967.—Spring for Fastening Blind Slats.—George H. Dimond, Bridgeport, Conn.

I claim a slotted concave-convex disecidal shaped spring, constructed substantially as described for the purpose of locking turning slats in position as set forth.

## 68,968.—Ice Cream Freezer.—Francis H. Duc, Charleston, S. C.

1st, I claim the revolving cylinder, D, when provided with the removable head, E, shaft, F, and wing, G, on the latter, the said shaft and wing serving as an indicator for ascertaining the state of the contents, substantially as herein shown and described.

2d, The above in combination with the box, A, having a hinged cover, C, in which another central cover, K, is arranged, substantially as and for the purpose herein shown and described.

## 68,969.—Hand Looms.—Thomas A. Dugdale, Richmond, Ind.

Antedated Sept. 7th, 1867.

1st, I claim the wheel, K, for operating the picking and harness mechanism the said wheel being formed of the flanges, U U V V, and ratchets, T.

2d, The combination of the wheel, K, hook, L, and pieces, M M, with the lay, B.

3d, The combination of the wheel, K, and sliding pieces, P P, and shafts, A2 and A5, and springs, S S, when arranged constructed and operated substantially as and for the purposes described.

## 68,970.—Carriage Jack.—Joseph F. Emmert, Quincy, Pa.

I claim the construction and arrangement of the slotted stand, A, in which the toothed sliding lift bar, B, provided with the slide piece, D, works the lever, C, pivoted to the lug, h, at the bottom of the standard, A, and to the lower end of the link, d, whose upper end is pivoted to the lug, e, of the left bar, B, working in the slot, g, of standard, A, substantially as described for the purpose specified.

## 68,971.—Garden Tile for Bordering.—F. B. Fancher, Lansingburg, N. Y.

I claim constructing garden tile for borders with right angled wings united by lap joints or tongue and groove substantially as and for the purpose herein shown and described.

## 68,972.—Device for Rounding Lines.—L. B. Gates, Bane Center, N. Y.

I claim the spring, H H, in the frame, A, for securing the swinging frame, D, when constructed with its rollers, G and J, and combined with the roller, E, the whole operating in the manner and for the purposes specified.

## 68,973.—Chair Lounge and Step Ladder.—Joseph Gerdon, Jr., West Albany, N. Y.

I claim, in the chair and step ladder combined as described, the arrangement of the additional piece, h', with its leg, h'', forming a lounge, and the fastening wires, l l, substantially as described, for the purpose specified.

## 68,974.—Still for Refining and Distilling Oils.—Samuel Gibbons, Binghampton, N. Y.

I claim, 1st, The still or retort, A, in combination with the chambers, B B, constructed and arranged in the manner and for the purpose set forth.

2d, The use of the pipe, C, provided with a series of cross pipes or their equivalents in combination with the still A, as and for the purpose set forth.

3d, The arrangement of the pipe, D, chambers, B B, and still, A, with the steam pipe constructed and used as and for the purpose specified.

## 68,975.—Ditching Machine.—Alford Gifford and Isaac Seright, Milroy, Ind.

We claim the arrangement of the knife, K, wheel, C, its circular knife scraper, b, and horizontal adjustable frame, regulated by the screws, g g, and provided with the plate, D, when used in the manner and for the purposes herein specified.

## 68,976.—Portable Field Fence.—E. C. Goddard (assignor to himself and A. Bailey), Unionville, Ohio.

I claim the herein described construction and arrangement of fence to form water locking sections, straight and irregular lines and gate ways, by the combination of the oblique slats, C C, with interlocking panels, A' B', and posts, conjointly.

## 68,977.—Dumping Cart.—N. W. Godfrey, Locust Val., N. Y.

I claim a cart or wagon having its bottom made in sections, and hung thereto with the rod or equivalent, to which each section is connected, in combination with the screen, e frame, when all constructed and arranged together, substantially as and for the purpose described.

## 68,978.—Ore Concentrator.—Lewis Goodwin, and S. A. West, San Francisco, Cal.

1st, I claim the concave rotary pan, A A, with circular riffles, g g g g g g g, having an elevation toward the periphery of the pan, substantially as and for the purposes described.

2d, The discharge box, E, receiving the discharge at the periphery, and discharging toward the center, having teeth or agitators attached to it for operating in the riffles and movable bar, L, to act on the pulp, and water, and the gate, F, for cutting off the discharge, substantially as described.

3d, The plow, O, valve, 4, spring, 5, cams, K and J, or their equivalents, substantially as described, for the purpose set forth.

4th, The stationary circular troughs, R, for receiving the sand and debris, and G, for receiving the sulphurets and the scrapers, N, attached to the rotary pan, and working within the troughs, R and G, substantially as described.

5th, We claim the above described parts, when employed separately or in combination, for the purposes specified.

## 68,979.—Barometric Vacuum Exhauster.—James Gordon, and John Archbald, San Francisco, Cal.

We claim the combination of the closed water-purifying and supply cistern, H, with one or more expanding chambers, A A, which are combined with one or more tubes or barometric columns, B B, all substantially in the manner herein represented and described.

## 68,980.—Construction of Carriage Bodies.—Simon P. Graham, Richland Center, Ind.

I claim a carriage body made of sheet metal, formed in parts or sections connected together in the manner shown and described, as a new article of manufacture.

## 68,981.—Washing Machine.—D. Hanna, Hornellsville, N. Y.

I claim the cylinder, B, covered with slats, e e e e, constructed in the manner described, when combined with a movable head, or follower, D, and an adjustable screw, F, nut journal, F, thumb screw, f, and operated by a crank, c, in the manner herein described, for the purposes set forth.

## 68,982.—Shovel Plow.—W. R. Harmon, Union Port, Ohio.

1st, I claim the combination of the shoe, E, and shovel, F, when the same are so arranged that the shoe, E, presents its entire face to the ground, and projects sufficiently far beyond the point of the shovel, not only to protect and guard the same, but also to free the shovel from all labor and strain in opening the furrow, substantially as shown.

2d, I claim the combination of the rods, C C, guide plate, D, and bolt, c, for regulating the depth of cut of shoe, substantially as described.

3d, I claim the arrangement of the rods, C C, guide plate, D, and bolt, C, so that the same can be applied to a single or double plow, substantially as described.

4th, I claim the combination of the curved beam, A, shoe, E, and shovel, F, when the same are constructed and arranged substantially as described.

5th, I claim the combination of the beam, A, shoe, E, shovel, F, rods, C C, and guide plate, D, when the same are arranged and operated substantially as described, and for the purpose set forth.

6th, I claim the self-adjusting clevis, C, curved to the rods, C C, substantially as described, and for the purpose set forth.

## 68,983.—Wagon.—L. D. Harvey, Harvey, Mich.

I claim making the tongue hounds, A A, with the cross bar, a, and tubular head, b, all out of one solid piece, substantially as and for the purpose described.

## 68,984.—Egg Cup and Tongs.—C. Hellen, Washington, D.C.

I claim the adjustable metallic egg cup, A, with its spring point, B, and base, C, combined with the tongs, D, as herein described, and for the purposes set forth.

## 68,985.—Cupping Apparatus.—W. D. Hooper, Liberty, Va.

1st, I claim cupping device, having a series of tubular blades arranged to operate substantially as shown and described.

2d, In combination with the cup, A, I claim the detachable mouthpiece, E, having holes for the blades to operate through as set forth.

3d, The combination of the mouthpiece, E, plate, D, having the blades, f, attached thereto, and screw, b, when arranged for joint operation as described.

## 68,986.—Brick and Tile Machine.—James Hotchkiss, and Ezra Buss, Springfield, Ohio.

We claim the extension of the pug-mill shaft, C, down through the plunger box, and providing it with a crank, G, or its equivalent, below, so as to drive the plunger thereof, substantially as herein specified.

We also claim solid division strip, Q, separating the plunger box into two compartments, M M, and in connection therewith, the division of the plunger, L, into two parts, striding the said division strip, and the pug-mill shaft, substantially as herein set forth.

We also claim the extended plunger beam, I, and connecting rod, H, pivoted to the outer end of the said plunger beam, arranged and operating together substantially as and for the purpose herein specified.

## 68,987.—Apparatus for Heating Water and Generating Steam.—Henry Howard, Springfield, Mass.

1st, I claim an apparatus for heating water or generating steam, consisting of one or more double tubes, A and B, constructed as described, and combined with a water reservoir, substantially as and for the purpose set forth.

2d, Arranging these tubes in such a manner as to form a grate and fire box, and flues, for the passage of the flames and heated air.

## 68,988.—Rein Holder.—T. A. Huffer, Indianapolis, Ind.

I claim the combination of the plate, A, interlocking springs, a a a a, or their equivalent, and the screws, b b, in the manner substantially as and for the purpose herein set forth.

## 68,989.—Engine Piston.—Nathan Hunt, Salem, Ohio.

I claim the construction and arrangement of the L-shaped packing rings, D, whose inner projections rest against each other, and are inserted in the space between the piston head, A, and follower, C, holding the packing rings, E, in position, said piston head and follower provided with inclined presses, e, upon their peripheries, to admit the steam behind the rings, B and E, alternately, at each upward and downward stroke of the piston, as herein shown and described.

## 68,990.—Check Hook.—J. H. Jones, Williamsport, Pa.

I claim the smooth, concave roller, C, placed upon the hook, A, with its screw, B, in the manner herein described, and for the purposes set forth.

## 68,991.—Fence.—Daniel Kaufman, Boiling Springs, Pa.

I claim the shoes, D, constructed substantially as herein shown and described, in combination with the lower ends of the inclined braces or supports, B, as and for the purpose set forth.

## 68,992.—Hoisting Apparatus.—G. B. Keeler, Port Chester, N. Y.

I claim the combination of the shafts, D and F, having drums, pulleys, and pinions, and constructed substantially as and for the purpose described.

## 68,993.—Hose Coupling.—John Kerns, N. Y. city.

1st, I claim the combination of the tube, A, jaws, a a, with hooks, b b, springs, d, tube, B, with shoulders, c, as and for the purpose specified.

2d, The jaws, a a, on the tube, A, provided with hooks, b b, fitting into a groove in the tube, D, and forced together by a spring or springs, d, arranged between the jaws, a a, and tube, A, as herein shown and described.

## 68,994.—Mechanism for Operating the Valves of Force Pumps.—John C. King, (assignor to himself and George M. Woodward), New York city.

I claim the rods, J J, by which the cylinders, H H', are connected, in combination with the cross bar, K, rock shaft, M, oscillating bar, L, box, g h i, and crank shaft, N, all made and operating substantially as and for the purpose herein shown and described.

## 68,995.—Injector for Insect Powder.—M. Koppe, N. Y. c'y.

I claim an injector for insect powder, composed of a vessel, A, with elastic diaphragm, c, spout, b, spring, d, and thumb piece, e, substantially as and for the purposes set forth.

## 68,996.—Grain Drill.—Elijah Lake, Davisburg, Mich.

1st, I claim providing the drill teeth, L, with wings, P, substantially as and for the purpose set forth.

2d, The use of a series of rollers, C C, in combination with the winged drill teeth for packing the earth after the wings, substantially as set forth.

3d, The arrangement of the collar, R, upon the shaft, B, with the wheel, D, and lever, q, whereby the seed shafts are thrown in and out of gear, as and for the purpose set forth.

## 68,997.—Railroad Station Indicator.—George T. Lape, Summit, N. Y., assignor to himself and Jepthah Leathe, New York city.

1st, I claim the slides, d d, attached to the india rubber springs, e e, in combination with the apron, B, arranged and operating substantially as and for the purpose specified.

2d, The arrangement of the polygonal disk, C, spiral springs, s s', tubes, p p', chains, q q, rock wheel, E, cam, L, and apron, B, as and for the purpose specified.

## 68,998.—Chuck for Watchmakers' Lathes.—S. S. Lavey, Plymouth, Ind.

I claim the combination of the movable chuck, H, with its slides, J J, disc, F, and hollow head, composed of cups, C and D, and spring, e, constructed and used as herein set forth.

## 68,999.—Mode of Securing Felly Joints.—James W. Lawrence (assignor to Brewster & Co.), New York city.

I claim the T-headed bolt, e, constructed as described, for securing felloe joints, laterally and radially substantially as and for the purposes herein described.

## 69,000.—Submarine Plow.—E. T. Ligon, Demopolis, Ala.

I claim a submarine plow, constructed and operating substantially as shown and described.

## 69,001.—Uniting Steel or Iron with Copper.—E. T. Ligon, Demopolis, Ala.

I claim uniting steel or iron, and copper, substantially as described.

## 69,002.—Spinning Machine.—John Lazier, Bellville, Canada.

1st, I claim mounting the carriage, M, on three wheels, arranged to run on the rails, C and C', substantially as shown and described.

2d, I claim providing the spinning frame with a register for determining the number of twists when said register is arranged to re-set itself automatically as the carriage is run forward, substantially as set forth.

3d, I claim arranging the mechanism herein described that feeds the roving or sliver in combination with the carriage in such a manner that as the latter is run back the former will be automatically thrown out of operation, substantially as described.

4th, I claim so arranging the devices herein described for throwing the feeding mechanism out of gear that they may be adjusted to stop the feeding sooner or later, substantially as described.

5th, The spiral springs, e, arranged to operate upon the pressure rolls, b, as described.

6th, I claim providing the feeding frame with the reel, G, and the two series of eyes, m and n, when arranged for joint action, substantially as described.

7th, I claim operating the feeding mechanism by means of its being so connected with the carriage that the moving of the carriage shall set it in motion, by the unwinding of the cord, p, from the pulleys, R, said pulleys being rotated in the opposite direction by means of the weight, l, or its equivalent, when the carriage is returned, substantially as described.

## 69,003.—Cultivator.—I. B. Mahon, Dunkirk, Ohio.

1st, I claim constructing the metallic frame of the machine in two parts, C C', connected together and braced, in the manner substantially as shown and described.

2d, Suspending the frame to the axle, A, by clips, D, arranged in connection with the braces, E, and the pendants, j, to which the outer plow beams are attached, all being arranged substantially as and for the purpose specified.

3d, The doubletree, U, pivoted to the draft pole, T, in connection with the whiffletrees, V V, pivoted to the frame of the machine and connected to the ends of the doubletree by links, r, all arranged substantially as set forth.

4th, The attaching of the inner plow beams, J J, to the front of the frame by means of universal joints, e e, substantially as described.

5th, The fender bars, L L, connected with the inner plow beams, J J, and universal joints, e e, and arranged in the manner shown so that the fenders, M, may be set at any desired hight and at a greater or less distance from the plows and have an independent up and down motion and at the same time retain their relative position with the plows, substantially as shown and described.

6th, The open or skeleton fenders, M, when applied to the fender bars, L L, so as to admit of being adjusted further forward or backward on said bars, substantially as and for the purpose specified.

7th, The pulleys or segments, c, on the shaft, I, connected by chains, d, to the plow beams, J J K K, in combination with the lever, S, connected by a chain, n, with a pulley, o, on shaft, I, all being arranged substantially as and for the purpose specified.

8th, The guides, G G, on the shaft, F, in connection with the uprights, N, passing through said guides and the stirrups, O, attached to said uprights, all arranged to operate substantially as described.

9th, The fixed guides, R, attached to the frame of the machine with the uprights, Q, of the outer beams, K, passing through the same, substantially as and for the purpose set forth.

## 69,004.—Fingers for Lifting Lodged Grain.—Samuel Manning, San José, Cal.

I claim the spring, A, bars, C and G, with the joint, D, and link, B, all arranged and applied to operate in the manner substantially as and for the purpose herein set forth.

## 69,005.—Potato Digger.—Albert Marcellus, Pittsford, N. Y.

1st, I claim the arrangement of the nose plate, P, with its dividing lines vertical or nearly so and rounded, substantially in the manner and for the purposes herein shown and described.

2d, The arrangement of the wings, w and w', in combination with the uprights, S, to which they are connected suitably, as and for the purposes herein specified.

3d, The detachable mold boards, B B', in combination with the nose plate, P, and the wings, w and w', when the said boards are arranged with their faces or flat sides vertical or nearly so, as shown.

4th, Hinging the shakers, G and G', to the mold boards, substantially as described and vibrating them vertically, for the purposes set forth.

5th, The arrangement of the toothed upright, S, and toothed headed lever, T, with the friction roller, r, ratchet d, and its lever, f, substantially as shown and described for the purpose of gaging and adjusting the elevation of the plow.

6th, The detachable point, p, constructed and connected substantially in the manner and for the purposes herein shown and described.

## 69,006.—Sofa and Bed Bottom.—Casper Martino, Trenton, N. J.

1st, I claim securing one or both the ends of the spiral springs, B, in proper position by metallic straps, C, having loops struck up out of their solid bodies for the reception of the end coil of the springs, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the ratchets, F, pawls, E, rod, G, and spring, H, with the movable part, D, and with the frame, A, substantially as herein shown and described and for the purpose set forth.

3d, Securing the back, I, to the movable part, D, and to the frame, A, substantially in the manner herein shown and described.

## 69,007.—Liquid and Gas Meters.—Joshua Mason, Paterson, N. J.

1st, I claim the sliding valve, E, composed of the circular disks, b b', and the perforated plate, F, and fitted within the circular chamber, D, provided with ports, d d' d'', extending circumferentially all around the interior of the chamber and placed or arranged in relation with the supply and discharge pipes, G I, passage, H, extension chamber, C, and cylinder, A, to operate in the manner substantially as and for the purpose ses forth.

2d, The operating of the valve, E, from the plunger, B, through the medium of the rods, K, plates, L, rod, M, segment, N, pinion, O, and spring, S, connected with the crank, k, of the shaft of the pinion, O, all arranged substantially as shown and described.

3d, The combination and arrangement of the rods, K, screw nut, g, plates, L, rod, M, and bar, J, as herein described for the purpose specified.

4th, The combination and arrangement of the clutch consisting of the fixed pin, a*, in the shaft of the pinion, O, and the slot, b*, in said pinion with the crank, h, spring, S, slotted segment, N, and plunger, B, as herein described for the purpose specified.

## 69,008.—Brush.—Francis McLaughlin, Boston, Mass.

I claim a brush made with a ferrule of vulcanized rubber or its compounds, substanslially as described.

## 69,009.—Mechanical Movement.—Wm. S. Mead, N. Y. City.

I claim the combination and arrangement of the wheel, C, frame, A, handles, D, rocking arms, G, fly wheel, or other equivalent body, I, links, b, pitman rods, d, pendulum frame, J, and saws, K, all constructed and operating substantially as and for the purpose described.

## 69,010.—Weather Strip for Doors.—J. H. Miller, Milwaukee, Wis.

I claim the combination of the weather strip, D, hung to a swinging door plate, H, spring hinge, E, and projecting plate, L, of the door jamb, substantially as and for the purpose described.

## 69,011.—Combined Rake and Spade.—W. H. Miller, Brandenburg, Ky.

1st, I claim the handle fastened to frame, E, carrying tines, substantially as described.

2d, I also claim the triangular tines, A, in cross section, substantially as and for the purpose specified.

## 69,012.—Three Wheeled Vehicle.—John W. Minor and David P. Ward, New Bedford, Mass.

1st, We claim the sections of cylinders, C and E, one revolving within the other, substantially as and for the purposes herein shown and described.

2d, We claim the flange, D, projecting from the rim of the cylinder for fastening on the outside and forming a lip on its inner side, substantially as described.

3d, We claim the wheel, F, attached to a three-wheeled vehicle when the said wheel is attached to a horizontal section of a cylinder which has free horizontal motion, substantially as described.

## 69,013.—Apparatus for Drawing and Preserving Malt Liquors.—Henry Mittendorf, York, Pa.

1st, I claim the herein-described mode of drawing and preserving malt liquors, cider, etc., by means of an air reservoir, substantially as set forth.

2d, The apparatus for drawing and preserving malt liquors, cider, etc., consisting of the air reservoir, B, air pump, C, pipes, a b and d, provided with stopcocks, c and e, substantially as described.

## 69,014.—Tube Expander.—E. J. Moore, East Boston, Mass.

I claim the construction of the expanding rollers, C, provided with beads

surrounding their peripheries the lower one of less diameter than the upper substantially as described for the purpose specified.

69,015.—TRUSS.—F. W. Neubert, Pittsburg, Pa.

1st, I claim the pad, C, when made in the shape herein shown and described and for the purposes set forth.

2d, The truss straps, D and E, when covered with india-rubber cloth, substantially as described for the purpose specified.

3d, In combination with the truss strap, E, covered with india-rubber cloth, I claim the elastic portion, g, substantially as described for the purpose specified.

4th, The double straps, D and e, at the end of A, in combination with the knob, a, on pad, C, and with the knob, l, on spring, A, as set forth.

5th, The strap, E, in combination with the loops, h h, and knob, a, on the pad, C, all made and operating substantially as herein shown and described.

69,016.—CURRY COMBS.—E. M. Noyes, Binghamton, N. Y.

I claim the construction and use of the non-metallic teeth, A A, attached to the metallic casing, B, in combination with the curry comb on back, C, substantially as and for the purpose herein set forth.

69,017.—COFFEE POT.—Philander Perry, Charlestown, Mass.

I claim the combination and arrangement in a coffee pot of the movable perforated tank, G, and the tunnel, H H*, with the close concave radiator or diaphragm support, J, when the latter is removable, all substantially as and for the purpose described.

69,018.—HARVESTER.—G. M. Peters, Jr., Granville, Ohio.

I claim the combination of the two endless aprons or carriers, I J, constructed and operating as described, frames, H C, axle, A, and sickle, O, with or without the guides, P, all arranged to operate substantially as and for the purpose set forth.

69,019.—CONDUCTORS' TICKET PUNCH.—William J. Phelps, Springfield, Mass.

1st, I claim the combination of the lever, B, and die spindle, h, pivoted thereto, with the slotted lever, A, guide, p, and female die, m, the whole arranged and operating substantially as set forth.

2d, The arrangement of the slotted lever, A, and female die, m, lever, B, and male die, h, in combination with the spiral spring, C, substantially as described.

69,020.—TRUSS.—Wm. Pomeroy, Brooklyn, N. Y.

1st, I claim the block or shoulder, D, and eccentric, E, constructed as described for the purpose specified.

2d, The rotating arm or slide, I, attached to one end of the body spring, A, and secured in position, when adjusted, by a set screw constructed and operating substantially as and for the purpeses herein described.

3d, The sloted end of the rotating arm, I, used in connection with a pad spring and a screw, K, substantially as herein shown and described, and for purpose set forth.

69,021.—CLOTHES HOOK.—S. S. Putnam, Dorchester, Mass.

I claim the bracket, A, in combination with the hook, C, constructed and operating substantially as described for the purpose set forth.

69,022.—STALL FOR ANIMALS.—S. S. Putnam, Dorchester, Mass.

I claim the bar, B, or its equivalent in combination with the stall, A, the bar being so constructed and applied that it will yield in an upward direction and drop to its original position when released, substantially as and for the purpose described.

69,023.—CLOTHES DRYER.—D. B. Randall, and A. A. Williams, Glover, Vt.

1st, We claim the combination of the guideway, B, or its equivalent, guide, C, and frame, D, with each other substantially as herein shown and described and for the purpose set forth.

2d, The jointed central bar of the frame, D, in combination with the guide, C, and guideway, B, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the adjustable brace bar, E, with the guide, C, and central bar, d' of the frame, D, substantially as herein shown and described and for the pursose set forth.

69,924.—GATE.—Edwin Reynolds, Metomen, Wis.

I claim the combination of fence panel, A, with gate, B, when the same are provided with an elongated bar or upright, a, adjustable pieces, h m, and pulleys, e g, all constructed, arranged and operated in the manner and for the purpose set forth and described.

69,025.—FURNACE FOR SMELTING ORES OF SILVER.—A. H. Richardson, Denver, Colorado.

I claim a smelting furnace having the blast supplied upon the ores in a furnace box provided with an apron in manner as above set forth and furnished with three apertures at different levels, in manner and for the purposes substantially as above set forth and described.

69,026.—RACK FOR BROOMS, BILLIARD CUES, ETC.—E Richmond, Brooklyn, N. Y.

1st, I claim in a rack for holding or suspending brooms, cues and other articles as described, the slits, lined or provided with a suitable elastic or binding device, and formed in the side or edge of the rack so as to communicate with the perforations or recesses in the said rack as and for the purposes set forth.

2d, The combination with a rack in which articles are held or suspended by means of rubber or equivalent elastic body, of a plate or equivalent means for supporting the buts or lower ends of said articles, as set forth.

69,027.—HITCHING POST.—D. C. Robie, (assignor to himself and Moses Goldthwaite), Springfield, Mass.

I claim the hitching post constructed of a closed top and an opening, e, on its side communicated with the annular space, a, for the purpose and in the manner substantially as described.

69,028.—TRUSS.—John L. Rowe, New York City.

I claim the springs, c, connected with and extending from the springs, a, in the manner specified in combination with the pad plate, g, to which they are united by one bolt in the manner and for the purposes set forth.

69,029.—CHURN.—M. V. B. Rowley, Worcester, N. Y.

1st, I claim the working beam, L, securely attached to the pendulum rod, O, whereby the pitman, K, is carried past its center as herein set forth for the purpose specified.

2d, The combination of the working lever, L, pendulum and rod, O P, pitman, K, and crank wheel, J, substantially as described for the purpose specified.

69,030.—APPARATUS FOR WASHING ORES.—Newell S. Ryder, Greenland, Mich.

1st, I claim a buddle, A, so suspended and operated that while it has a lateral rocking motion, it shall at the same time have a longitudinal oscillation substantially as and for the purpose set forth.

2d, A buddle when constructed and arranged so that the floor is higher at the tail than at the head so suspending it that in rocking laterally the axis of oscillation shall be higher at one end than at the other substantially in the manner set forth.

3d, I claim the arrangement of the seive, B, box, A, and pipes, I and K, substantially as set forth.

69,031.—PUNCH.—Edward Schindler and Charles H. Metzger, Easton, Pa.

1st, I claim the levers, C D, when connected by the straps, b, the former provided with the set screw, K, the latter provided with the removable punches, k, arranged in relation with the longitudinal adjusting plates, E F, substantially as described for the purpose specified.

2d, The adjusting plates, E F, when provided with flanges upon their upper ends whereby the leather is taken from the punches when the latter are raised as herein shown and described.

3d, The gage, h, when arranged in relation with the bed plate, g, whereby the distance apart of the holes to be punched is governed substantially as described for the purpose specified.

4th, The arrangement of the flanged adjustable guides, E F, gage, h, plate g, and punches, k, substantially as described for the purpose specified.

69,032.—COAT AND HAT HOOK.—William Schmitt, N. Y. City.

I claim the hinged hook jaws, B C, in combination with a spring latch or other locking device constructed and operating substantially as and for the purpose described.

2d, In combination with the hook jaws, B C, the elastic tips, d, substantially as and for the purpose described.

3d, The clamp, F, in combination with the hook jaws, B C, and with a suitable locking device constructed and operating substantially as and for the purpose described.

69,033.—DOOR BOLT.—Arthur H. Sherwood, Southport, Conn.

Antedated Sept. 7th, 1867.

I claim the above catch, G, in combination with the bolt, D E F, substantially as and for the purpose specified.

69,034.—BOW IRONS FOR VEHICLES.—George W. Slater, New Haven, Conn.

1st, I claim the bed plate, A, constructed of one piece as and for the purpose set forth.

2d, The slats, g, so formed as to be attached to the bed plate, A, by means of knuckles, d, in the manner herein described.

3d, The cars, s, on slats, g, used in forming thimbles to receive the bows as herein set forth.

4th, The bed plate, A, in combination with slats, g, and bows, c, the whole constructed and operating suostantially as herein set forth.

69,035.—WAGON BRAKE.—A. P. Smith, Greensburgh, Pa.

I claim the combination with the running gear of the wagon, of the sliding bed, the friction rollers, the inclined slots, the draw bars, the rock-shaft and the brake lever, the whole being constructed, arranged and operating as described.

69,036.—HORSE RAKE.—G. W. Snyder, Kalamazoo, Mich., assignor to himself and James Aiken, Mendota, Ill.

1st, I claim the arrangement of the rake, C, with its plates, g g, pawl, m, bar, l, shield, l, and lever, e, with the swinging frame, G, in the manner and for the purposes specified.

2d, The combination of the axle, A, with its wheels and thalls, A', provided with shaft, b, with lever and ratchet rake shaft, c, with teeth, a a, frame, G chains, H H, and pawl, m, with lever, e, all arranged and used in the manner set forth.

69,037.—HYDROCARBON VAPOR MACHINE.—James F. Spence, Brooklyn, N. Y.

1st, I claim the combination and arrangement of the three chambers, B C E, with the reservoirs, D D, and supply pipes, d d r, substantially as and for the purpose set forth.

2d, The two rotating drums, H, provided with chambers, e, in combination with the tubes, o, substantially as and for the purpose specified.

3d, In a hydro-carbon vapor machine, the employment or use of a plurality of hydrocarbons of different grades placed in one or more chambers of the machine, substantially as and for the purpose set forth.

4th, The valves, F, constructed of cork or other similar light material when used in connection with a hydrocarbon vapor machine substantially as and for the purpose set forth.

69,038.—ODOMETER.—James C. Spencer, (assignor to himself and Archibald B. Vandermark,) Phelps, N. Y.

I claim the combination of the cog wheels, D and E, in the box, C, the worm gear, a, the ratchet wheel, c, operated by the spring pawl, d, on the rock shaft, e, and the hub, A, provided with the pin, h, for giving motion to the rock shaft by the arms, g g, arranged and operating substantially as herein described.

69,039.—FIRE ALARM TELEGRAPH.—Joseph B. Stearns, Boston, Mass.

1st, I claim the employment of reverse currents for operating the bell striking mechanism in the manner and for the purpose specified.

2d, I claim successively engaging and disengaging the arms, b b', of a bent lever attached to the weighted shaft of the bell striking mechanism by the movement of a magnetized armature which by means of reverse currents, is caused to oscillate between two electro-magnets in the manner set forth.

69,040.—PEGGING MACHINE.—Henry C. Stone (assignor to himself and John C. Gibbs), Brookfield, Mass.

1st, I claim the combination with the peg-wood carriage or table, B, having two or more grooves, a a1, or their equivalents, of a switch, J, substantially as and for the purposes set forth.

2d, The combination of the switch, J, with the peg-wood carriage, B, and peg guides, E E1, substantially as and for the purposes set forth.

3d, The combination with the peg guide, E, of the adjustable guide, o, substantially as and for the purposes set forth.

4th, The combination of the lever, H, with the switch, J, substantially as and for the purposes set forth.

5th, The combination with bar, G, and pawls, l and g, of the connections, h and i, and slotted lever, H, substantially as and for the purposes set forth.

6th, The combination, in a pegging machine, of mechanism, substantially such as above described, whereby the operator can change from one length of peg to another without stopping the machine, as stated.

69,041.—HANGER.—Joseph M. Stone (assignor to Davis & Furber), North Andover, Mass.

I claim, in a hanger so constructed and arranged as to allow free motion of the shaft-supporting box automatically on both of two axes, provision for hanging the box by adjustable entering pivots within a frame, which frame is also held or suspended by adjustable entering pivots.

Also, the construction of the hanger in two parts, arranged with respect to each other and to the shaft-bearing box, substantially as described.

Also, the combination of the shaft box with the pivoted hoop, substantially as described.

69,042.—BELTING FOR DRIVING MACHINERY.—M. A. Strouvelle, St. Louis, Mo.

I claim raw hide belting for machinery, as a new article of manufacture, prepared substantially as herein described.

69,043.—DISINFECTING COMPOUND.—Ernst Suvern, Halle, Prussia.

I claim a disinfecting compound, composed of the ingredients herein described, and mixed together substantially as and about in the proportion set forth.

69,044.—SHAFT COUPLING.—J. W. Taylor, Oshkosh, Wis.

I claim the hollow cylinder, a, provided with friction rollers, e e, substantially as described, when used in combination with the dual pronged head, c, as and for the purposes set forth.

68,045.—HAY SHOCKER.—Clark M. Terrell, Oskaloosa, Iowa.

1st, I claim the mode of retracting the teeth, F, by means of the crank shafts, H, in combination with the cam, I, substantially as set forth.

2d, In combination with the cylindrical shell, A, and teeth, F, a receiving platform for sustaining the operator in forming a shock upon the hinged platform, K, substantially as set forth.

3d, In combination with a hay-elevating cylinder, A, and receiving platform, G, arranged to operate substantially as described.

4th, The platform, K, hinged to the machine, and supported by a spring so arranged as to discharge the shock by the action of gravity merely, substantially as set forth.

5th, The combination of the hinged platform, K, with curved teeth, K1, and the supporting spring, N, substantially as and for the purpose set forth.

6th, In combination with the revolving cylindrical shell, A, the band, O, arranged to operate substantially in the manner and for the purpose set forth.

7, So attaching the platforms, G and K, that they may be detached, and the machine may be converted into a tedder, substantially as set forth.

69,046.—WINDOW SASH.—Robert Thomas, Parkersburgh, West Va.

I claim the short bars, E, hinged to the bars, E1, of the lower sash, adapted to catch into notched plates, F, secured in the window frame, whereby the bars, C C1, are held in position so that they will not be drawn up by the weight when the sash, D, is removed, substantially as described for the purpose specified.

2d, The sash, D, when provided upon one side, with the hooks, d, fitting into notches of plate, f, upon the short bars, C, and upon the opposite side with reversed hooks, g, fitting into the notched plate, i, upon the long bars, C1, as herein set forth for the purpose specified.

69,047.—HAND LOOM.—T. G. Thompson, Richmond, Ind., and A. F. Fox, Greensboro, Ind., assignors to Thompson, Ballard & Co., Richmond, Ind.

1st, We claim the sliding latch bar, C, having projections, q and p, in combination with the posts, a, of the batten, B, and the ratchet cam, s, arranged and operating in the manner set forth.

2d, The combination and arrangement of the spring, l, constructed as described, with the lay triggers and their operating straps, as and for the purpose described.

3d, The handle, H, combined with the batten top, in the manner described and for the purpose specified.

69,048.—DEVICE FOR HITCHING HORSES.—J. B. Thornton, Madison, Wis.

I claim a device for hitching horses, constructed and applied to wheel hubs, substantially as and for the purpose described.

69,049.—FRUIT LADDER.—Benj. F. Turner, Bridgeton, N. J.

1st, I claim the hooks, E, when applied to or used in combination with an extension ladder, substantially in the manner as and for the purpose herein set forth.

2d, The base, G, constructed with the pivoted braces, h h, when applied to or used in combination with an extension ladder, substantially as and for the purpose specified.

3d, In combination with the above, I claim the adjustable platform, H*, as herein set forth for the purpose specified.

69,050.—FOLDING CHAIR.—E. W. Vaill, Worcester, Mass.

1st, I claim the blocks, G G1, hinged to the legs and arms of the folding chair, and constructed and operating substantially as and for the purpose described.

2d, The folding chair, above described, consisting of the standards, A A1, legs, B B1, traverses, T T, cross bars, C C1, pivots, a a1, rounds, R R, curved slotted arms, D D1, and hinged blocks, G G1, all constructed, combined, and operating substantially as and for the purposes specified.

69,051.—BOOT HEEL.—Robert Vandervort, Pittsburgh, Pa.

I claim the metallic heel, C, with the front projecting lip, n, and internal recess or shoulder, i, held in place by means of the plate, A, secured firmly to the sole, and screws, b and e, as herein set forth.

68,052.—FASTENING FOR BREASTPINS.—A. R. P. Walker, Richmond, Me.

I claim the pin, A, constructed as described, consisting of the head, a, twisted through the undivided eye, b, of the plate, B, and provided with the lateral turn, C, the end of the head, a, resting upon the plate, all operating as described for the purpose specified.

69,053.—REGULATING DEVICE FOR WATCHES.—Andrew Warren, Waltham, Mass.

I claim in combination with the indicating regulating lever or wheel having a spiral formation and arranged to both hold and move said lever, substantially as described.

Also in the said combination I claim the employment of two or more pins in the lever and gearing into the spiral, when the relation between the spiral and the pins is substantially that specified.

69,054.—DEVICE FOR MIXING LIQUIDS.—George Watkins, Brooklyn, N. Y.

I claim the adjustable beaters, C C, connected with the shaft, E, and suspended from the adjustable cross bar, c', all constructed, arranged and operating as herein shown and described.

69,055.—HEAD BLOCK FOR SAW MILLS.—Titus Whitmore, Dubuque, Iowa.

I claim the combination and arrangement of the index wheel, T, having cam, W, spring, a2, slotted arm, n, carrying pin, y, spring pawl lever, c2, arm, V, dog, a2, upon shaft, I, pinion, K, clutch, L, gear wheel, O, and band wheel, O, and feed screw, S, whereby the log is set to the saw as herein set forth for the purpose specified.

69,056.—DEVICE FOR SEWING MACHINES.—Lewis R. Wiggin, Farmington, N. H.

I claim the tank, A, water chamber, B, and steam worm or tube, D, combined and arranged substantially as and for the purposes above set forth and described.

2d, The supplementary tank, A', and prolongation, D', of the worm or steam tube, D, and rubber presser, I, in combination with the tank, A, steam generator, C, and worm, D, substantially as and for the purpose above set forth and described.

69,057.—STEAM PRESSURE GAGE.—C. A. Wilson, Cincinnati, Ohio.

I claim the arrangement of the three vertical tubes, B C D, horizontal duct, E, and four way cock, I, with passages, F and G, and ventage, H, substantially as and for the purpose described.

69,058.—TRACE AND PAD BUCKLE.—E. B. Winslow, Chatham, Ill.

I claim a combination trace and pad buckle formed of the sides, a a, connected by the bars, b b' m and q, and having a trace tongue, n, attached to a swivel bar, p, constructed, arranged and operating substantially as herein described.

69,059.—WASHING MACHINE.—J. W. Woodruff, Watson, Ill.

I claim the sliding handles, B B, box, A, spring, s, and beater, E, all being combined and operated as and for the purpose set forth.

69,060.—BENDING MACHINE.—J. N. Woodward, Aurora, Ill.

I claim, 1st, The rib, C, on the bed plate, A, in combination with the cap, D, and adjustable bars, a a, said parts being arranged to operate substantially in the manner as and for the purpose set forth.

2d, The springs, F E, respectively in bed plates, A, and cap, D, arranged in connection with the rib, C, and adjustable bars, a a, to insure the ready removal of the swaged sheet-metal strip, substantially as described.

3d, The combination of the cap, D, provided with the adjustable bars, a a, and placed on the rods, B B, having springs, e, upon them, the rib, C, on the bed plate, A, and the lever, G, all arranged for joint operation substantially as and for the purpose set forth.

## REISSUES.

2,765.—LANTERN.—Wm. Westlake and James F. Dane, New York city, assignees of Conrad Gersten. Patented Jan. 25, 1859.

1st, We claim the deflector, q, constructed and operating substantially as and for the purposes specified.

2d, The mode of controlling the current of air which feeds the flame by causing it to pass down in a narrow annular space or passage to the aperture leading to the burner, in combination with a deflector, substantially as specified.

3d, Combining with the burner and the oil reservoir, and interposed between the two, an air chamber for preventing the oil from being overheated, as described.

2,766.—LANTERN.—Wm. Westlake and James F. Dane, New York city, assignees of Conrad Gersten. Patented Jan. 25, 1859.

1st, We claim extending the spindle for operating the wick ratchet through the outer casing of a lantern, substantially as and for the purposes specified.

2d, A spindle extending through the outer casing of a lantern, so combined with a toothed wheel or rotating device and wick tube, so that the wick may be adjusted without removing or changing the lamp.

3d, The spindle, k i, button, m, and tube, l, in combination with the ratchet and wick tube of a lantern, substantially as specified.

NOTE.—In the above list of patents, FIFTY-SEVEN were obtained through the office of the SCIENTIFIC AMERICAN.—EDS.

## PENDING APPLICATIONS FOR REISSUES.

*Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address* MUNN & Co., *37 Park Row, N. Y.*

20,534.—APPARATUS FOR MANUFACTURING GAS.—John Absterdam, New York city. Dated June 15, 1858. Application for reissue received and filed Sept. 6, 1867. Division A.

I claim passing atmospheric air through channels or chambers, the walls of which are wholly or partially lined with or composed of cloth or other porous and absorbent material, which elevates by absorption or capillary attraction the fluid in the chamber or channel, allowing sufficient space for the passage of the air, substantially as and for the purpose described.

20,534.—APPARATUS FOR MANUFACTURING GAS.—John Absterdam, New York city. Dated June 15, 1858. Application for reissue received and filed Sept. 6, 1867. Division B.

I claim passing illuminating gas through channels or chambers, the walls of which are wholly or partially lined with or composed of cloth or other porous and absorbent material, which elevates by absorption or capillary attraction the fluid in the chamber or channel, allowing sufficient space for the passage of the gas, substantially as and for the purpose described.

56,879.—TWEER.—John Bayliss, New York city. Dated Aug. 7, 1866. Application for reissue received and filed Sept. 7, 1867.

I claim a tweer, A, having a water chamber, B, provided with connecting water and steam pipes, D and E, in combination with the air pipe, H, air chamber, I, and air pipe, J, arranged together and operating substantially as and for the purpose represented and described.

61,396.—HAND STAMP.—E. D. Chamberlain, Westfield, N. J., and Charles H. Brown, New York city, assignees of Dexter H. Chamberlain, West Roxbury, Mass. Dated Jan. 22, 1867. Application for reissue received and filed Sept. 9, 1867.

1st, I claim the combination of any number of type wheels with a stamping lever, substantially as and for the purpose described and shown.

2d, The combination of a stamping lever with type wheels and inking ribbon, substantially as and for the purposes hereinbefore shown and described.

3d, The die holder, E, constructed and combined with the lever, c', substantially as and for the purpose shown and described.

4th, Making the type wheels, a b c, of different diameter, rotating upon separate and distinct axes, a' b' c', substantially as and for the purpose shown and described.

5th, The combination of the inking ribbon with the type wheels, substantially as herein described, so as to present a double fold of the ribbon under the type wheels, all as set forth.

6th, Having the type wheels provided with recesses for the reception of pawls or detent pins, substantially as described, for the purpose of securing the wheels, and permitting the convenient change of said wheels, all as set forth, in combination with the lever.

7th, The ribbon box formed in and making a part of the lever, substantially as and for the purpose shown and described.

8th, The employment of type wheels of different diameters, in combination with a lever hand stamp, substantially as and for the purposes herein shown and described.

2,725, whole No. 33,729.—MEANS OF SEALING PRESERVE CANS.—Henry S. Fisher, Newburgh, Pa. Dated Nov. 12, 1861. Application for reissue received and filed Sept. 7, 1867.

1st, I claim a self-adhesive seal which is prepared either in the form of a sheet, ring, disk, or piece of any required size or shape, and composed of paper which is thoroughly saturated and coated on its surface with a cement composed of the within described substances or the respective equivalents thereof, substantially as described and for the purpose specified.

2d, A self-adhesive seal which is composed of paper thoroughly saturated and coated with a resin cement, and afterward subjected to considerable pressure, so as to adapt the seal for hermetically closing preserving vessels, substantially as described.

3d, A seal which is composed of paper and cement, in combination with a compressing and retaining device, C, or its equivalent, substantially as and for the purposes described.

9,387.—MODE OF THROWING SHUTTLES IN LOOMS.—Stephen C. Mendenhall, Richmond, Ind. Dated Nov. 9, 1852. Application for reissue received and filed Sept. 4, 1867.

1st, I claim the combination of the picker spring, k, pickers, i i, inclined cams, j j, triggers, f f', cords, h h, treadles, 1, 2, 3, 4, and batten or lay, B, so that the forward motion of the batten shall set the pickers, and the backward motion of the batten shall release them alternately, by means of the cords and treadles, and thus drive the shuttle back and forth through the warp, substantially as and for the purpose set forth.

2d, I claim the picker spring, k, in combination with the pickers, i i.

3d, I claim the pickers, i i, in combination with the inclined cams, j j.

4th, I claim the pickers, i i, inclined cams, j j, in combination with the triggers, f f'.

5th, I claim the pickers, i i, in combination with the triggers, f f'.

6th, I claim the combination of the triggers, f f', cords, h h, and treadles, 1, 2, 3, 4.

7th, I claim the spring triggers, f f', in combination with the batten, B, when the same are used for retaining the pickers, i i.

8th, I claim alternately releasing the pickers, i i, when the same is effected by the regular successive depression of the treadles, 1, 2, 3, 4.

65,963.—SLEEPING CAR.—John Swan, Baltimore, Md. Dated June 18, 1867. Application for reissue received and filed Sept. 5, 1867.

1st, I claim a series of state rooms made crosswise of the car and provided with a side passage and independent ventilation, substantially as and for the purposes set forth.

2d, The reservoir, F, pipes, H H, and basins, J J, for supplying water to the state rooms, substantially as specified.

3d, The side passage, C, when used in combination with a series of cross berths or state rooms, as and for the purpose set forth.

61,956.—COOKING STOVE.—J. J. Savage, Troy, N. Y. Dated Feb. 12, 1867. Application for reissue received and filed Sept. 6, 1867.

1st, I claim the location of the fuel doorway or feed mouth, B, of stove furnaces, substantially below and forward of the combustion or flame chamber, C, thereof, in such intermediate or contiguous position to the fire box, A Y, thereof, as to admit of fresh fuel being fed thereinto, in manner substantially as hereinbefore described, for the purposes set forth.

2d, I claim the extension of the fire box, A, forward of the combustion or flame chamber, C, of stove furnaces, and immediately under or contiguous to the aforesaid located fuel doorway, B, thereof, in manner substantially as herein described, for the purposes set forth.

3d, I claim a level feeder, F, substantially as described, when operated in combination with or through said located feed doorway, B, of stove furnaces, in manner substantially and for the purposes as herein set forth.

4th, I claim providing a feed lever, E, with a fulcrum hook, c, or an equivalent therefor, when used in combination with a fulcrum, ridge, or bearing, d, arranged on the edge of the aforesaid located fuel doorway, B, of stove furnaces, substantially as and for the purposes set forth.

5th, I claim in combination with the front plate, D, of stove furnaces, a fire or guard plate, F, when arranged in position above the aforesaid located fuel doorway, B, of the fire box thereof, and about opposite the combustion or flame chamber, C, substantially as and for the purposes set forth.

6th, I claim the arrangement of the front plate, D, of stove furnaces, in an inclined or slanting position, in combination with the aforesaid located fuel doorway, B, such as to overhang the combustion or flame chamber, C, and fire box thereof, substantially as and for the purposes set forth.

7th, I claim the combination of the aforesaid located fuel doorway, B, the fire box, A Y, the combustion or flame chamber, C, and the lever feeder, F, as applied to stoves, to operate in manner substantially as and for the purposes herein described.

8th, I claim the peculiar manner or method of feeding or introducing fresh fuel directly into the fire box of stove furnaces, by forming for its reception clear vacant room or places in, below, and between ignited fuel or live coke therein, by the conjoint means substantially of a feed aperture or doorway, B, located as described, and of a feed lever, F, or equivalents therefor, operating substantially as herein set forth, for the aforesaid purposes.

45,061.—HARVESTING MACHINE.—David J. Marvin, Stockton, Cal. Dated Nov. 15, 1864. Application for reissue received and filed Sept. 9, 1867.

1st, In a combined header and thrasher, I claim so pivoting or hinging the cutter frame upon the main axle, a, that it can be moved longitudinally, and also raised or lowered at pleasure, substantially as and for the purpose specified.

2d, In a combined header and thrasher, having its cutter frame mounted or hinged as above described, I claim the combination and arrangement of the bar, a', posts, b' b', pulley, d', cord, e', and crank rod, N, substantially as and for the purpose herein set forth.

3d, In a combined header and thrasher, I claim the arrangement of the cutter bar and apron, 2, running crosswise of the machine, in combination with the arrangement of the thrashing and winnowing apparatus running lengthwise of the machine, for the purpose of greater convenience and compactness, and in the manner substantially as shown.

4th, In a combined header and thrasher, I claim elongating the axle, a, so as to place the wheel, O, at a considerable distance from the main frame of the machine, to afford room for the attachment of the header frame between said wheel and main frame.

5th, I claim the combination of the levers, l and 1, with the sliding header frame and the gear wheels, c and b, for the purpose of throwing the header apparatus into and out of gear, substantially as shown and described.

6th, I claim the swinging axle, a, in combination with the gear wheel, b', pinion, Q, and lever, A, for throwing the thrashing apparatus into and out of gear, substantially as described.

9,653.—WEAVING CORDED FABRICS.—William Smith, New York city. Dated April 5, 1853. Extended April 5, 1867. Reissue No. 2,656, dated June 18, 1867. Application for reissue received and filed Sept. 10, 1867. Division A.

I claim the process herein specified of weaving, consisting in the use of stationary warps in combination with moving warps and filling that incloses such stationary warps, substantially as set forth.

9,653.—WEAVING CORDED FABRICS.—Wm. Smith, New York city. Dated April 5, 1853. Extended April 5, 1867. Reissue No. 2,656 dated June 18, 1867. Application for reissue received and filed Sept. 10 1867. Division B.

I claim the fabric specified, the same being formed with center warps, inclosed by the weft threads that are held upon the surface of the center warp

by the interlocking of the movable warps between the center warps, thereby causing the weft threads to be pressed tightly upon the center warp.

9,653.—Weaving Corded Fabrics.—Wm. Smith, New York city. Dated April 5, 1853. Extended April 5, 1867. Reissue No. 2,656 dated June 18, 1867. Application for reissue received and filed Sept. 10, 1867. Division C.

I claim the heddle or its equivalent for supporting the stationary central warps, in combination with mechanism substantially as set forth, for performing the weaving.

64,761.—Eyeleting Machine.—Wm. N. Ely, Stratford, Ct., assignee by mesne assignments of Luther Hall, Boston, Mass. Dated May 14, 1867. Application for reissue received and filed Sept. 9, 1867. Division A.

1st, I claim a movable head or carrier, in combination with the punch and set, or either of them, constructed, arranged, and operating substantially as described.

2d, A head or carrier so constructed and operated as to allow the punch and set to be alternately depressed by the same lever, substantially as described.

3d, So constructing the mechanism that the punching table and setting bed shall reciprocate laterally and alternately occupy the same place, substantially as and for the purposes described.

4th, The reciprocating punching bed in combination with a stationary work supporting table, when constructed and arranged so as to be moved to and from the punch, and under the material, substantially as described.

5th, Adjusting the length of the set or punch, or both, substantially as described.

6th, The striking lever, so constructed and arranged as to cause the set to pick up the eyelet while the punch is making the hole for its reception, substantially as described.

7th, The setting die, so constructed and operating as to pick up the eyelets from the chute, and present them to the place of insertion, substantially as described.

8th, The reciprocating solid and solid-pointed setting bed, constructed, arranged, and operated automatically, substantially as described.

9th, Feeding the material forward by means of the setting bed or holding point, substantially as described.

10th, Providing the set with spring pistons, substantially as described.

11th, The hopper for holding the eyelets, constructed and arranged substantially as described.

12th, The combination of parts by which the setting bed and the feeding point are operated and controlled substantially as described.

64,761.—Eyeleting Machine.—Wm. N. Ely, Stratford, Ct., assignee by mesne assignments of Luther Hall, Boston, Mass. Dated May 14, 1867. Application for reissue received and filed Sept. 9, 1867. Division B.

1st, I claim a feeding instrument which engages with the work, feeds forward, and disengages, in combination with a punch or set, or both, substantially as described.

2d, A presser foot for holding the work to the table, in combination with a punch or set, or both, substantially as described.

3d, The spring presser foot, in combination with the feeding mechanism, arranged and operating with an eyeleting mechanism substantially as described.

4th, An adjustable work feeding mechanism, in combination with the mechanism for punching and eyeleting, substantially as described.

5th, Punching the holes, supplying, inserting, and setting the eyelets, spacing the distances, holding and feeding forward the work automatically, substantially as described.

64,761.—Eyeleting Machine.—Wm. N. Ely, Stratford, Ct., assignee by mesne assignments of Luther Hall, Boston, Mass. Dated May 14, 1867. Application for reissue received and filed Sept. 9, 1867. Division C.

1st, I claim a hopper for holding the eyelets, constructed with lateral openings for the same, substantially as described.

2d, A chute for receiving the eyelets from the hopper and delivering them to the setting mechanism, substantially as described.

3d, Making the chute adjustable to eyelets of different sizes, substantially as described.

4th, The hopper and chute in combination with the set, when constructed and arranged substantially as described.

5th, Constructing the set so as to adapt it to eyelets of different sizes, substantially as described.

64,761.—Eyeleting Machine.—Wm. N. Ely, Stratford, Ct., assignee by mesne assignments of Luther Hall, Boston, Mass. Dated May 14, 1867. Application for reissue received and filed Sept. 9, 1867. Division D.

1st, I claim the combination of carrier, D, with punch, E, and set, F, or either of them, constructed, arranged, and operating substantially as described.

2d, The combination of carrier, D, with both punch, E, and set, F, or either of them with lever, K, constructed, arranged, and operating substantially as described.

3d, The combination of carrier, D, with both punch, E, and set, F, or either of them, lever, K, and cam, L, constructed, arranged, and operating substantially as described.

4th, The combination of carrier, D, set, F, and setting bed, S, substantially as described.

5th, The combination of carrier, D, punch, E, and sliding plate, Q, substantially as described.

6th, The combination of carrier, D, punch, E, set, F, sliding plate, Q, and bed, S, substantially as described.

7th, The carrier, D, constructed, arranged, and operated substantially as described.

8th, The lever, K, constructed and operating substantially as described.

9th, The set, F, constructed substantially as described.

10th, The combination of levers, V and T, and pin, S, substantially as and for the purposes described.

11th, The combination of plates, Q and R, arranged and operated substantially as described.

12th, The combination of levers, V and T, pin, S, and screw, w, substantially as and for the purpose described.

13th, The combination of set, F, pins, a and b, and spring, d', substantially as described.

14th, The combination of lever, T, block, U, lever, V, and eccentric wheel, W, constructed, arranged, and operating substantially as described.

15th, The combination of hopper, B', agitator, c, and chute, A', constructed and arranged substantially as described.

16th, The combination of hopper, B', chute, A', groove, g', hole, h', and bottom, S', substantially as described.

17th, The combination of hopper, B', chute, A', dish, h', and set, F, substantially as described.

18th, The combination of sliding plates, Q and R, or either of them, with stationary table, A substantially as and for the purpoaes described.

19th, The combination of presser foot, N, spring, O, with both punch, E, and set, F, or either of them, and table, A, substantially as described.

20th, The combination of presser foot, N, and pin, S, arranged and operating substantially as described.

68,238.—Hoop Skirt.—William Ryerson, Philadelphia, Pa. Dated Aug. 27, 1867. Application for reissue received and filed Sept. 10, 1867.

I claim an adjustment applied substantially as set forth to the tapes or vertical connections of a skirt, for the purposes set forth.

66,131.—Frame for Stretching Wet Leather.—Ichabod W. Dawson, Newark, N. J. Dated June 25, 1867. Application for reissue received and filed Sept. 11, 1867. Division A.

1st, I claim the combination of means for supporting the center of the hide, with means for stretching the same breadthwise over the said support, substantially as described.

2d, The combination of means for supporting the center of the hide with means for stretching the same breadthwise and lengthwise over the said support, substantially as described.

66,131.—Frame for Stretching Wet Leather.—Ichabod W. Dawson, Newark, N. J. Dated June 25, 1867. Application for reissue received and filed Sept. 11, 1867. Division B.

I claim the process substantially as herein described of stretching leather or hides.

☞ *Note.—The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application to MUNN & CO., Solicitors of Patents, 37 Park Row, N. Y.*

## Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,224.—Blowers for Furnaces, etc.—Benj. F. Sturtevant, West Roxbury, Mass. Aug. 13, 1867.

2,699.—Brush.—Henry Rosenthal, New York city. July 16, 1867.

2,237.—Method of and Apparatus for Clarifying Sugar, etc.—Benjamin Lawrence and Phineas Lawrence, New York city. Aug. 3, 1867.

2,251.—Harrow.—Halsey H. Monroe, Rockland, Me. Aug. 3, 1867.

2,255.—Felting Machine.—James S. Taylor, Danbury, Conn. Aug. 3, 1867

2,290.—Printing Press.—Edwin Allen, Norwich, Conn. Aug. 8, 1867.

2,293.—Case or Box for Holding Twine or Cord.—Frederick J. Seymour, New York city. Aug. 9, 1867.

2,295.—Knife and Fork.—Wm. J. Miller, New York city, and Frederick J. Miller, Brooklyn, N. Y. Aug. 9, 1867.

2,296.—Machinery for the Manufacture of Cut Nails.—John H. Geary, Fairhaven, Mass. Aug. 9, 1867.

2,308.—Process for Removing Sulphur, Phosphorus, and other Impurities from Iron, Steel, and Other Metals.—John F. Bennett, Pittsburg, Pa. Aug. 13, 1867.

2,345.—Machine for Cleaning Barrels or Casks.—Jonathan Peacock, Rockford, Ill.—Aug. 15, 1867.

2,376.—Eyelet and Paper Fastener Combined.—Edward Boynton, New York City. Aug. 7, 1867.

2,319.—Centrifugal Apparatus for Washing Sugar.—George E. Evans, Boston, Mass. Aug. 15, 1867.

2,335.—Fastening for Securing Bayonets of Fire-arms.—Paul A. Oliver, New York city. Aug. 14, 1867.

2,353.—Cotton Bale Tie.—John W. Hedenberg, Chicago, Ill. Aug. 14, 1867.

2,368.—Construction of Molds for Casting Aluminum Plates for Artificial Teeth, also Method of Casting said Plates, Securing the Teeth Therein, etc.—James B. Bean, Baltimore, Md. Aug 17, 1867.

2,420.—Manufacture of Iron and Steel, and Apparatus Employed Therein.—Virgil W. Blanchard, Bridport, Vt. Aug. 23, 1867.

2,421.—Construction of Concussion Fuzes for the Explosion of Projectiles.—Edward A. Dans, Brookline, Mass. Aug. 23, 1867.

## EXTENSION NOTICES.

Mathew Stewart, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 3d day of January, 1854, for an improvement in floor plates of malt kilns, for seven years from the expiration of said patent, which takes place on the 3d day of January, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 16th day of December, 1867.

R. P. Walker, of New York city, having petitioned for the extension of a patent granted to him the 20th day of December, 1853, for an improvement in machine for hulling and scouring coffee, for seven years from the expiration of said patent, which takes place on the 20th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of December next.


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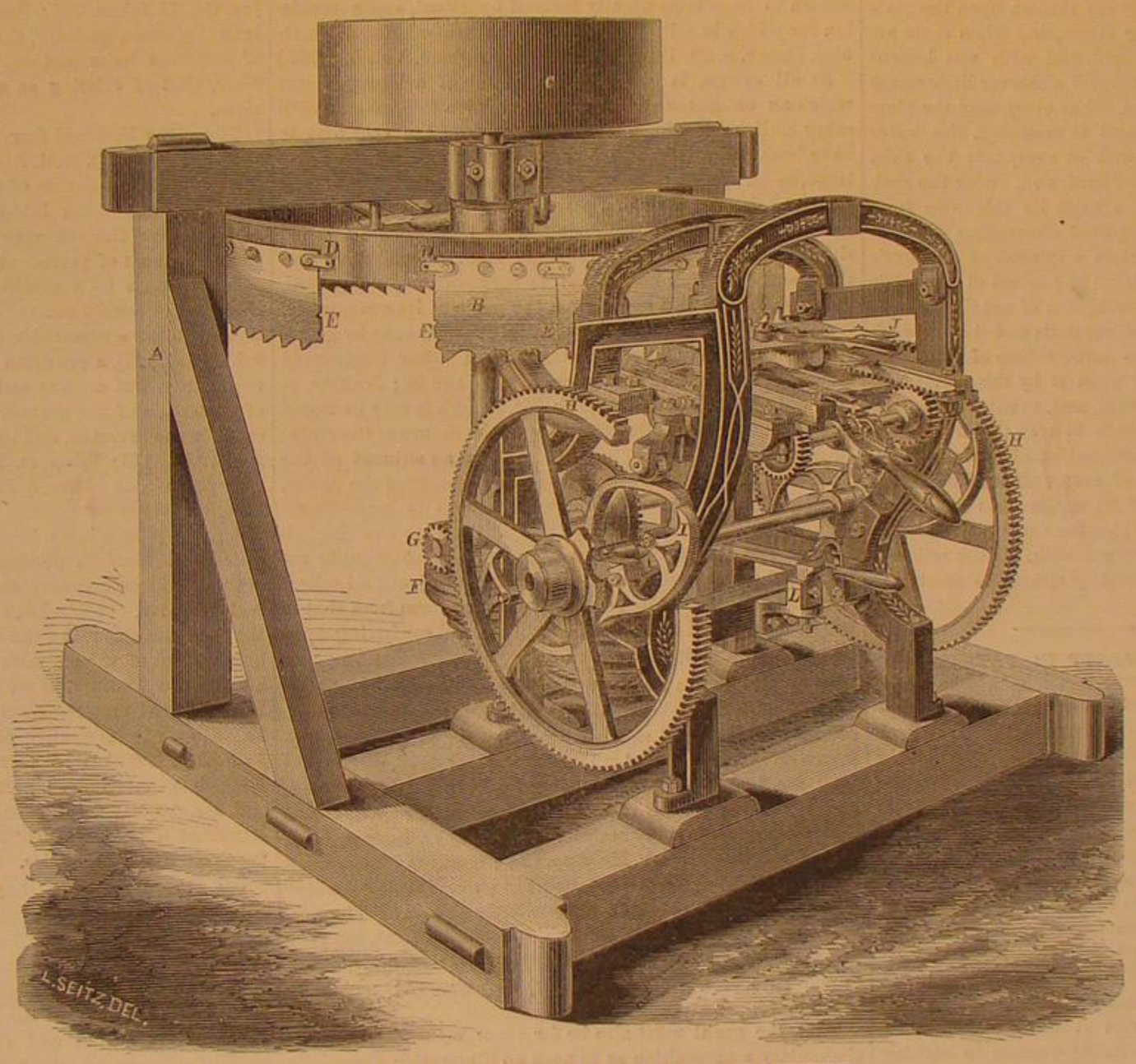
# SCIENTIFIC AMERICAN

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### Improvement in Machines for Sawing Staves.

The engraving gives a perspective view of a machine for sawing barrel staves invented by Charles Murdock of Ellenville, N. Y., and patented through the Scientific American Patent Agency, June 19, 1866. The machine has been in successful operation for some time, and from a specimen of its work now before us it is evident that its products are very superior. The object of the machine is to cut staves directly from the block or bolt, giving them the requisite curvilinear form from end to end and the proper transverse convexity, and finishing them in such a manner that they require no further dressing. These results are perfectly attained and the cost of manufacturing barrels greatly reduced. The products—staves—of this machine have been and still are largely used in this city for the manufacture of tight barrels.




MURDOCK'S AUTOMATIC STAVE MACHINE.

The frame, A, which may be of any proper and convenient form and of either timber or iron, supports a vertical shaft which carries an annular, convex saw, B, driven by power applied to the pulley, C. The saw is made in sections, as seen —one being removed in the engraving—which are bolted to a disk or spider, and joined one the other by straps, D, and stiffened by rivets passing through holes in the edges of the sections, as seen at E, the holes being formed by the semi-circular appertures in the alternate edges of the sections. The disk is also made in sections for facility in transportation.

These sections of saw plate are not only bent to fit the periphery of the disk, but curved across from edge to back to suit the convexity of the cask. The diameter of the saw nearly corresponds with the sweep of the circle of which the ordinary barrel forms a segment from end to end, allowing for the spring of the stave. The saw is intended to receive adjustable teeth so that it will always preserve its depth, which is sufficient to saw the widest stave.

The vertical shaft which carries the saw has on its lower end a cone pulley, F, which drives the feed machinery. A belt connects this with a similar cone on an upright shaft that carries a bevel gear on its upper end, driving one on a horizontal shaft. This shaft carries on each end a pinion—one shown at G—which drives a horizontal shaft by means of the gears, H. On the same shaft are double cams, marked on one side, I, which raise a table the arms of which are pivoted to a portion of the iron frame extending under the front of the saw; the swing of this table being adjusted to the transverse convexity of the saw, or of the stave. The table supports a carriage, which works in slides and is moved back and forth by means of racks and pinions attached to the outer edge of the table. On the saw side of this carriage are dogs for holding the bolt to be sawed, which are moved to or receded from each other by the usual means of a pinion worked by a lever—seen at J—and parallel racks.

The pinions seen on the outside of the table and which move the carriage forward to the saw are operated automatically by the movement of the ratchet lever, K, which as the free end of the table and carriage come down after the stave has been sawed are lifted by striking against the adjustable stop, L, and thus move the carriage and bolt forward sufficiently far to present the thickness of another stave to the saw. This thickness may be adjusted to any required degree by changing the ratchet and moving the adjustable stop, L.

The lever seen near L is for throwing the feed in or out of gear. The carriage carrying the bolt may be moved forward by hand as well as automatically and by raising the ratchet lever and pressing upon the spring stop the carriage can be be easily drawn back to receive a new bolt.

With this machine all the various kinds of soft, and otherwise unavailable woods, as buttonwood, cypress, pepperidge, etc., may be cut into staves suitable for barrels for holding molasses, sirups, etc., while the hardest woods may be readily sawed, and the loss in splitting up stave bolts and dressing them be almost wholly avoided. In the upper surface of the periphery of the disk to which the saw is secured, are placed plane irons for jointing the staves and giving them the taper to form the bilge of the cask. The staves are placed in a light frame which receives the ends, and the center of the stave is sprung outward by a cam lever, when one end of the frame is rested upon hooks on the cross beam of the framing, A, so placed as to present the edge of the stave to the cutters at the proper angle for jointing. The operation is very expeditious and effective. This part of the work, however, may be performed on a machine especially for the purpose. It is obvious that several carriage or block frames may be used with the same saw at the same time, greatly increasing the effectiveness of the machine, each carriage being capable of turning out 10,000 staves per day. Further information regarding this invention may be obtained by addressing J. B. Bartlett, 289 Greenwich street, New York city.

### ROLLING A FIFTEEN-INCH ARMOR PLATE.

The plate was not quite ready at the time appointed, and during the short interval of delay the works were inspected. It is almost impossible to describe the aspect of Cyclopean activity which they presented. The huge space of lofty workshops, covering more than twenty-three acres of ground, were, above, all dim with smoke, below, all dazzling with the blinding glare and heat of furnaces. Everywhere ponderous flywheels were spinning round with a loud hum through the gloom, everywhere steam hammers were falling with a shock upon the solid earth that made the walls vibrate, and people near them jump under the tremendous concussion. No place seemed free from steam or flame or melted iron. The dark nooks would suddenly become bright as furnace doors were lifted and emitted their long light-looking flames of dazzing white vapor, and disgorged a mass of seething metal, which men, almost clad in light steel armor, wheeled away and shot under the steam hammers, the first stroke of which sent jets of melted iron rushing in trains of fire like meteors in all directions. Sometimes one came on groups of men who were saturating in water the rough bands of sacking in which they were enveloped before going to wrestle with some white-heat forging, sometimes on men nearly naked, with the perspiration pouring from them, who had come to rest for a moment from the puddling furnaces, and to take a long drink of the thick oatmeal and water, which is all that they venture on during their labor, and which long experience has proved to be the most sustaining of all drinks under the tremendous heats to which they are subjected. On every side the glare, the smoke, the din, and steam are alike deafening and blinding. On every side are masses of melted iron running down troughs, or great blocks of it heated to a glow that is almost melting being welded and knocked away into myriads of sparks and jets of refuse under the blows of the hammers. Most uncomfortable of all are the slabs of armor plate and blocks of steel ingots which, half cooled, and of a dull slate color, lie about everywhere. From those in a bright, red glow the visitor can guard himself, for he sees them; but from those which are partly cooled, but yet hot enough to scorch the flesh from the bones when closely approached, there is little safeguard, as one hurries out of the way of seething puddle blooms or open furnaces, which diffuse such an intense general heat around that little extra warning is given by the treacherous masses of half-cooled slabs till the danger is almost too near to be avoided. After seeing and suffering under seeing such scenes, the visitors were conducted to the armor rolling mill, where the monster plate was to be drawn. The process of drawing it is simple, but peculiar. The plate, when laid in the furnace, rests upon little stacks of fire bricks, so that the flame and heat play equally round it, till all is glowing white, and the successive layers have settled down into one dense mass. A great deal of the success depends upon the time at which the plate is drawn and the amount and length of time to which it is to be heated. All this is regulated by the chief roller and chief furnace-man, who are paid wages which many eminent professional men might envy—wages amounting from £1,200 to sometimes £2,000 a year. On Friday, as the time for "drawing" approached, these officials opened the furnace doors, and approaching close to them with only the shelter of a lump of wet rag held loosely before their arms and faces, peered into the blinding glare from time to time with as much care and apparently as much indifference as if they were looking into the tube of a telescope. Suddenly, at a signal from the furnace-man, the bands of workmen, to the number of about sixty, arranged themselves on each side of the furnace, as near to it as they could bear the heat. Then the doors were opened to their fullest, and what had been a glare before and what had been a heat were quite eclipsed by the intense light and fervency with which the long tongues of flame leapt forth. In the midst of this great light lay a mass even whiter than the rest. To this some half a dozen men drew near. They were all attired in thin steel leggings, aprons of steel, and a thin curtain of steel wirework dropping over their faces like a large long visor. All the rest of their bodies were muffled in thick wet sacking. Thus protected they managed, with the aid of a gigantic pair of forceps slung from a crane above, to work as it were amid the flames for a few seconds, and to nip the huge plate with the forceps. The signal was then given, and the whole mass of iron, fizzing, sparkling, and shooting out jets of lambent flame, was by the main force of chains attached to the steam rollers, drawn forth from the furnace on to a long wrought iron car. The heat and light which it then diffused were almost unbearable in any part of the huge mill, but the men seemed to vie with each other to approach and detach the colossal pinchers which had drawn the iron forth. More than a dozen attempts were made on Friday before this was effected, and more than a dozen of the best and most skillful workmen were driven back one after another by the tremendous heat and glare.

At last all was made clear. The forceps, then red hot from their grip of the plate, were drawn away, the chains cleared from the rollers, and, with a great hurrah, the other workmen seized the chains attached to the iron truck, and drew it to the incline by main force, where it was left by its own weight to run into the jaws of the rolling mill. It was then *sauve qui peut* among the workmen, who rushed for shelter in all directions as the mass was nipped between the rollers, and wound rapidly in amid quick reports like those of dull musketry, as the melted iron was squeezed by the tremendous pressure out of the mass, and flew out in jets of liquid fire on all sides. In spite of all the care and all the skill which the best workmen can use on these occasions, they cannot always escape the splashes of melted iron, and the burns inflicted are numerous and often severe. The turning of the rollers crushes the plate through to the other side, where it rests for a minute on a wrought-iron truck similar to that on which it was brought from the furnace. The action of the rollers is then reversed after they have been by the action of screw levers brought closer together by about an inch. These again nip the plate and drag it back in an opposite direction, and again and again does the mass go forward and backward, each time passing between a smaller space between the rollers, till, as on Friday, the whole of the huge thickness was reduced to a compact mass fifteen inches thick, in less than a quarter of an hour. During every stage of the process, quantities of fine sand are thrown upon the plate, and this literally takes fire as it touches the flaming surface, and covers it as it melts with a coat of silica, or with a glaze like that of earthenware. After every discharge of sand, and these go on almost incessantly, buckets of water are thrown upon the plate and explode in clouds of scalding steam, and when these are partly dissipated men rush forward, and with wet besoms with handles twenty feet long sweep off whatever little scraps of oxydation may have taken place. Thus every time the plate passes through the mill the sand is scattered, the water thrown, and the surface swept, and at every roll the chief roller of the establishment runs forward, and, under the shelter of wet cloths, measures with a gage its thickness from end to end. On Friday the required dimensions were obtained, as we have said, by less than a quarter of an hour's rolling, and a plate 15 inches thick, the product of the labor of nearly 200 men and of the consumption of nearly 250 tuns of coal, was shot out by the rolling mills and left to cool. When this had been effected two large rollers of iron, each weighing 15 tuns, were placed upon it by the cranes, and moved slowly backward and forward, and, eventually, as the plate cooled, were left upon its ends to keep the whole perfectly level. Nothing further now remained in order to complete it as the finest specimen of armor plate manufacture ever attempted, but to plane off its rough ends and edges. The flat surfaces on either side, which form what is called the skin of the plate, are never interfered with, for the action of the steel rollers leaves them literally almost as smooth as plate glass.—*London Times.*

## ON THE NATURE OF PROPERTY IN PATENTS.

As we investigate the history of patents, perhaps no question at once so elementary and so embarrassing presents itself as that concerning the nature of the property acquired by the holder of a patent. Its solution might furnish analogies which would turn the scale of many a well-balanced case, and the want of a ready answer has been often palpably felt and deprecated. And yet, notwithstanding the importance which seems to gather around the subject, few seem to have groped into the apparent darkness, while conjectures, often contradictory and evidently founded upon first impressions or general principles, have (when the subject has not been carefully shunned), been lightly hazarded. While one eminent jurist in this section of the country confidently asserts that a "patent is a compact, and an executory one at that, rather than a deed of property," and that "its vitality consists in making good by the patentee certain provisions which are of the character of conditions subsequent," (Betts, J., in Smith *vs.* Higgins, N. Y., 1857,) another almost at the same time and in an opposite section declares that "a patent may be consid- in the light of a deed from the government," conferring vested rights and present privileges. (Wilkins, J., in Page vs. Ferry, Mich. 1857). While one distinguished commentator affirms that "a patent is of a metaphysical nature, and exists merely in idea and abstract contemplation, and is in fact a naked right, which if the patent itself did not make it assignable, would be inseparable from the person of the grantee, and that it may properly be defined as an incorporeal chattel, impressed with the character of personal estate," (Hindmarch on Patents, 233,) a second learned writer on the same subject scrupulously avoids committal on this point.

We shall briefly endeavor, by tracing the rise and embodyment of property in patents, and by observing the most approved divisions of property according to its nature, to locate this seemingly wandering Pleiad in that group which its essence and incidents point out, and thus indicate some of the most obvious and generally interesting consequences which flow from its position.

The fundamental idea of a patent, aside from the incidents which the policy of wise governments have grafted upon it, is *a grant by government of the exclusive privilege of enjoyment of a new and useful manufacture.* The right to confer this privilege seems from a very early period to have been an acknowledged prerogative of the English crown. Thus in a case reported in the Year Books of Edward III., A. D. 1328, it is said that "arts and sciences, which are for the public good are greatly favored by the law, and that the King, as chief guardian of the common weal, has power and authority by his prerogative to grant many privileges for the sake of the public good, though *prima facie* they appear to be clearly against public right." (Year Book, part IV., 40 Edw. III., fol. 17 and 18.) And in the celebrated case of Monopolies arising in the reign of Elizabeth (Darcy *vs.* Allen, Noy. R., 182), it is recited that "In the time of Edward the Third some alchymists persuaded the King that a philosopher's stone might be made, and the King granted a commission to two 'fryers' and two aldermen to inquire if it were feasible, who certified that it was, and the King granted to two aldermen a patent of privilege, that they and their assigns should have the sole making of the philosopher's stone."

In the case of Darcy *vs.* Allen (supra), it was also said that "When any man, by his own charge or industry, or by his own wit or invention, doth bring any new trade into the realm, or any engine tending to the furtherance of a trade never before used and that for the good of the realm, that in such cases the king may grant to him a *monopoly patent* for some reasonable time." (See also Bacon's Abr., Title Prerogative.) From these cases and some others which could be cited, and all of which occurred anterior to the earliest English statute on the subject (21 Jac., I. c. 3), it is evident that this power of the Crown was recognized by the common law as existing prior to and aside from any statutory provision.

It is extremely probable that the exercise of this important branch of the prerogative took its rise from the farsighted policy of the Saxon Alfred, in days when the wisdom of a monarch was more potent than the venal partisanship of the "*wittena-gemote*" or Parliament, and was perhaps earliest applied, at the then low ebb of invention, to the encouragement of the importation of foreign arts and sciences, which is known to have been greatly favored by Alfred, and a provision for which is still preserved in the present English statutes. (Asser. p. 20. Hume's History of England, Vol. I., p. 767.)

At all events, it was no mere stretch of arbitrary power which an enlightened age has toned down to harmony with other civil regulations, but appears from the very first to have been designed as well for the benefit of the people at large, as for the emolument of the inventor. Taking a brief review of the definition of a patent, we find that a patent for an invention is a *grant* conferring upon its possessor a vested right of property, as distinguished from an executory contract, and of which he can not be constitutionally deprived. It is also said to be a grant from the mode of its conveyance, it being possible to convey incorporeal property only by grant. It is a grant too *by government*, under a power inseperably annexed to it (3 Shep. Abr. Prerog., p. 67 and 59; Jenkins, p. 304; Skin, 606; 1 Hawk. P. C., c. 70), though it may be vested in different departments according to the nature of the state; thus in England, as we have seen, it is an adjunct of the Crown, as the supreme executive and originator of the power, while under our own constitution Congress is made its repository, as the successor in this particular to the English kings. But it is also a government grant of an *exclusive* nature, of the character of a monopoly, shutting out all others from participation in its benefits, excluding them from that to which they would otherwise be entitled, and conferring upon its possessor appropriate remedies.

It is also in its nature a *privilege*, as distinguished from something demandable of right, and is only conferred in answer to petition, and as a matter of grace and favor, (Hindmarch on Patents, p. 4; Act 1792, sec. 1; Act 1793, sec. 1; Act 1800, sec. 1; Act 1836, sec. 6), though now invariably granted, and compellable from the Commissioner of Patents, whose duties are prescribed by statute. (Whitney *vs.* Emmet, Bald. 318; Hildreth *vs.* Heath, Ms. App. Cas.; Grant *vs.* Raymond, 6 Pet. 241.) This government grant of an exclusive privilege is also one, in general, of unrestricted *enjoyment*. The possessor is confined to no one mode of employment, but may use, make, or vend his invention without restriction, or (except in the case of a foreign inventor) may confine it wholly to himself.

That the grant must also be for a *new* manufacture, is so elementary a proposition as to need no illustration, though its full explanation may be properly reserved for the text book, and the quality of *utility* is an equally necessary and obvious ingredient, though its amount may be small (Morgan *vs.* Seward, 1 Webs. 172, 186), and ideas of its nature have been greatly modified since the early history of the grant of patents, when Lord Coke in his Third Institute of the Laws of England, recites with evident approval, "that there was a new invention found out heretofore that bonnets and caps might be thickened in a fulling mill, by which means more might be thickened in one day than by the labors of fourscore men who got their living by it, and it was ordained that bonnets and caps should be thickened and fulled by the strength of men and not in the fulling mill, for it was held inconvenient to turn so many laboring men to idleness." A decision a trace of whose spirit even at our day we see, fostered by ignorance, and cropping out at the suggestion of demagogues. To complete the brevity of the definition, the word "*manufacture*" has been held to include all of the various terms used in our patent law. (Curtis on Patents, §69.)

After this survey of the nature of the patent grant, we shall be more ready to recognize its similitude to other branches of property, and assign to it its proper station if discoverable.

All property is divided principally into two great classes, real and personal, and a third and much smaller division, partaking of the nature of both, called "mixed" property. Real property is said by the most approved text writer to consist of lands, tenements, and hereditaments; and hereditaments are further separated into corporeal and incorporeal hereditaments. The definition of real property by the word hereditament is, however, incorrect, for so far from being a part or subdivision of, or even a synonym for, real property, it is in fact a word of far wider signification, being nearly, as is said by Chancellor Kent (but with perhaps too great latitude), as comprehensive as the word property. (3 Kent Com. Lect. LII.) It however includes whatsoever may be inherited, real or personal, or mixed (1 Co. Inct. 6; 3 Kent Lect. LII.; 2 Blacks, p. 17), and as such may be applied to a mere movable chattel, such as an heir-loom. (3 Rep. 2, Norris *vs.* La Neve, 3 Atk, 82. But see New York Code of Procedure, sec. 462.)

After separating hereditaments into those of a corporeal and those of an incorporeal nature, our authorities further distribute incorporeal hereditaments, which are defined to be rights issuing out of or annexed to things corporate, into classes, among which we find "commons, ways, offices, franchises, pensions, annuities, and rents." Of these subdivisions, it is submitted that that of "*franchises*" includes our subject matter, and if its essential qualities appear the same, must of necessity carry with it by analogy its incidents and liabilities.

As we trace the adjudged qualities of a franchise, we meet at every step the characteristics of our modern Letters Patent, as we have heretofore traced their nature. "A franchise or freedom," says Sir William Blackstone, "is a royal privilege, or branch of the king's prerogative, subsisting in the hands of a subject" (2 Blacks. 37; Finch 38, 164-6; 3 Cruise, Dig. 278, tit. 27, sec. 1; People *vs.* Utica Ins. Co., 15 Johns. 386), and must arise by grant from the Crown. (*Id.*) This quality we have already traced in the rise and progress of patents. (To be a corporation is a franchise, as is also to have treasure trove, deodands, or the right to take tolls, etc.) It seems, too, that the words "Royal privilege" are to be used in an objective as well as a subjective signification, and to include not only that which the Crown can alone primarily enjoy, but also that which the Crown alone can grant. (People *vs.* Utica Ins. Co., 15 Johns. 386; Burrill Dic. Tit. Franchise). And it is in this sense, perhaps, that the patent right as well as one of the most important and common of royal grants of privilege, that of existing as a corporation, is said to be a franchise.

The same identical franchise can not be granted to more than one person (2 Roll. Abr. 191, Keilw. 196), and herein we see the exclusive nature of the patent. (But see case of Chas. R. Bridge *vs.* Warren Bridge, 11 Pet. 420, a decision which seems rather the offspring of modern necessities than the strict adherent of precedent. See opinion of Story, J.)

There must be a consideration for the grant of a franchise in the benefit conferred on the public or otherwise, for unless it has a reasonable commencement it is illegal and void (2 Inst. 22), a provision evidently corresponding to the requirements of novelty and utility in a patent. The mode of protection of the grantee of a franchise is by action on the case for the invasion, and by injunction (22 Henry II., 146; 2 Roll. Abr. 146; Tripp *vs.* Frank, 4 T. R. 666; Newburgh Turnpike Co. *vs.* Miller, 5 Johns. Ch. R. 111), the well-known safeguards of a patentee.

A patent, though an incorporeal hereditament, is however strictly on principle personal property, having none of the attributes of permanency and immobility which characterize real property. (2 Blacks., ch. II., p. 15.) Nor does the fact that our statutes make the rights conveyed decensible to the heir instead of the executor (Act of 1836, sec. 5) render this any the less true, for, as we have already seen, an incorporeal hereditament may issue out of or be annexed to chattels, and be real only in its quality of descent. (3 Rep. 2; 1 Co. Inst. 6; 3 Kent Lect. LII.; 2 Blacks. 17; but see code, §462.) The English grants indeed name the executors, administrators, and assigns of the inventor, but this seems to have been an engrafted quality, for the "inventor" alone is mentioned in the Statute of Monopolies. (21 Jac. 1, c. 3, sec. 6.)

We submit, therefore, that the property acquired by letters patent for an invention, in this country at least, may be defined to be an incorporeal hereditament, called a franchise, of a personal nature, for it consists of rights issuing out of and annexed to the corporeal letters patent or grant of the government, decensible to the heir, and joining to the origin, consideration, nature, and exclusiveness of a franchise, the mobility of personal estate, and we therefore proceed to trace some analogies between it and kindred branches of property.

Shares in the franchise of an incorporated company are incorporeal hereditaments, each shareholder being said to hold a franchise (2 Blacks., p. 37), and, like the patent privilege, some of these have been held to pass to the heir, and in that particular partake of the character of land. (Dryeutter *vs.* Bartholemew, 2 P. Wms. 127; Buckridge *vs.* Ingraham, 2 Ves. Jr. 651; Price *vs.* Price, 6 Dana, 107.) Yet it is perhaps better to consider them as of the nature of a transmissible and assignable franchise of the personal kind. (Judge Sharswood, Notes to Blackstone, Bk. 2, p. 15, n. 1.) As a general thing, however, in established companies they superadd the character of evidences of debt, which is not to be confounded with their primary nature.

Perhaps the most striking parallel to the conjunction of the inheritable characteristic of real property with personal property is to be found in the case of an annuity granted to a man and his heirs, but chargable only on the person of the grantor, and in the analogous English property in a "corody." An inheritable annuity (not charged on lands) is said by Lord Coke to be a fee simple *personal* (Co. Litt. 2 a.), and though it is forfeitable for treason as a hereditament (7 Rep. 34 b), yet it is not a hereditament within the statute of mortmain (7 Edw. I. st. 2; Co. Litt. 2), and is not entailable. (Case of the Earl of Stafford *vs.* Buckley, 2 Ves. Lr. 170.)

The right to take tolls, another incorporeal hereditament, may be likewise mentioned as an analogous class of property, especially in the mode of its enjoyment (Vose *vs.* Singer, 4 Allen, 226), for as patents are often made profitable by the imposition of a royalty, this royalty is in the nature of a toll for the use of the patent.

There is perhaps some faint analogy, too, between a patent right and a right of way, for it is an exclusive right of way

in the region of invention secured to one for a limited period as a compensation for having first discovered it, (Vose *vs.* Singer, supra), something in the spirit with which Spanish arrogance once interdicted traffic with the new-found world

It would be impossible, however, within the scope of this article to do more than locate in its proper family this species of property, leaving to the keen decision of practical test the determination of the names and nearness of its kindred. If we have at all resolved intricacies pertaining to the subject, and at least pointed out the paths to further illustration, our immediate object will have been attained, and we shall leave to ampler time the consideration of the numerous incidental questions to which the main interrogatory has given birth.

## Correspondence.

*The Editors are not responsible for the opinions expressed by their correspondents.*

### The Galvanic Battery.

MESSRS. EDITORS:—I have been shown a back number of your journal containing a letter from Mr. M. G. Farmer in which he ably and clearly shows that the cheapest source of powerful electric currents of large quantity and intensity is mechanical force, in other words, coal or solar force.

In his letter he makes the following remark: "It is well known that a galvanic battery will perform its maximum work when the external resistance which it encounters is equal to the internal resistance of the battery."

This statement is approximately correct and would be strictly—mathematically—correct did the electromotive force of the battery remain constant. Unfortunately many students draw a wholly wrong conclusion from the above statement which is derived from Ohim's "Theory of Electricity."

I have found when in conversation with many on both sides of the Atlantic that a very general impression prevails that for telegraphic and almost all other purposes the best and most economical results are obtained when the internal and external resistances are equal. That this is not the case will be evident by referring to Ohim's law, viz., "If the electromotive force of the battery be E, the resistance of the battery be B equal internal resistance; the resistance of the circuit, R equal external resistance; the quantity of electricity in motion through the battery and circuit equal Q, then the value of Q will be $\frac{E}{B+R}$

Now if B equal R it is evident that half the work of the battery is expended in overcoming the resistance of the battery itself, producing useless heat, the other half only being available for actual work. If now the question be put "how can a given quantity of zinc and acid be made to produce the maximum amount of external—that is useful work?" it will at once become evident that could the resistance of the battery equal B be reduced to nothing the whole work would be expended in R; in other words could the resistance of the battery be got rid of entirely the whole, that is twice the amount of external work would be produced from the same amount of zinc that was possible when the external and internal resistances were equal. Therefore, in all cases, the resistance of the battery itself should be but a small fraction of the total resistance of the circuit in order to work economically.

There is, however, another reason why the latter should be the case. When a battery works hard the solution near the negative plate is reduced in strength by the decomposition going on and the result is a decrease of electromotive force so that E ceases to be a constant quantity in the above equation.

The variation of E is different in different batteries and the result is that with a Daniel's battery 50 cups whose total resistance is one-twentieth part that of the circuit will produce as much current as 100 cups whose total resistance is equal to that of the circuit. In the former case the consumption of zinc and sulphate of copper will be just one-half that in the latter (local action or waste being excepted.)

The resistance of a telegraphic circuit is varying continually by defective insulation and change of weather, consequently in wet weather when the greatest current is wanted the resistance of the line or circuit is at its minimum and therefore if the battery's resistance be a large fraction of that of the circuit at the very time when the most power is wanted a larger portion than usual of the battery's force is expended in itself. Hence great variability of currents in the circuit.

In conclusion the best, most regular, and most economical results are obtained when the internal resistance of the battery is very small compared to that of the external resistance.

CROMWELL F. VARLEY.

Chicago, Sept. 20, 1867.

### Case Hardened Iron as Steel.

MESSRS. EDITORS:—Is there any invention or process patented by which iron, by the simple process of case hardening, can be made to answer all the advantages that steel has over iron in a mechanical sense?

I claim to take a piece of good iron and case harden it, and it shall work under the smith's hammer the same as steel, and shall bear annealing, working, and hardening, the same as steel, and do all that steel can do in the form of taps, chisels, hammers, punches, files or any other article that steel is used for.

F. C. CURIE.

Lancaster, Pa.

May not our correspondent use the term case hardening for that of converting or cementation? Case hardening, in its results, is, chemically and practically, the same as the ordinary method of converting iron into steel, only not carried so far. The outer portion of the iron, in case hardening, becomes steel, frequently to a measurable depth. If by a quick process of case hardening or converting our correspondent can make good steel from good iron, it ought to be valuable. It is well known that a thin piece of iron, or a small iron wire, can be converted by the process known as cementation. It is quite common among machinists to make large taps of wrought iron, and after they are finished, to case harden them, when, if properly done, they work well.—[EDS.

### Lightning Conductors.

MESSRS. EDITORS:—Not having been able to be more than an occasional reader of the SCIENTIFIC AMERICAN, since the collapse of our cause, my attention has not been heretofore called to your article on "Lightning Conductors," in Vol. 16, No. 20, May 18, 1867. As it inculcates an error which is of some practical importance, I beg leave to make the correction.

Speaking of metals, you remark: "The conducting power lies in the surface; a tube is as efficient as a solid rod of the same diameter, and a strip or ribbon, which presents the same amount of surface, is equal in power."

Now, the opinion that the conducting power of metals for electricity is proportional to the extent of surface, is a common popular error. The numerous itinerant lightning-rod men, who perambulate the "area of freedom," are always fortified with certificates perpetuating this physical error. I cannot imagine how such a mistake originated, unless the law of distribution of statical electricity on conductors has been confounded with their conducting power.

No law of electricity is better established, or rests on a more secure experimental basis, than that, for any given metal, the conducting power varies directly as the area of a cross section, and inversely as the length; or, otherwise, conducting power varies as $\frac{\text{Area of cross section.}}{\text{Length.}}$

For the experimental proofs of this law I refer to any of the standard treatises on electricity, as De la Rive's or Becquerel's.

The same law is true, as might have been expected, for Voltaic electricity. In fact, Ohm's law, and the formula which is founded on it, express the same truth. In this form, the accuracy of the law has been tested in the most rigorous manner.

The practical bearing of this law is obvious, as well as important. The "ribbon form" of conductor, which you recommend, will not answer; for the amount of metal, or area of cross section, would not be sufficient. Even your "copper ribon" would, probably, be fused and dissipated under an ordinary stroke of lightning. The rod must have metal enough to carry the electricity; we gain nothing by spreading it out, or otherwise augmenting its surface.

I was glad to see that you exposed the popular fallacy in relation to "insulating the conductor from the building." These glass and horn insulators are totally useless. Those who may be disposed to reject this opinion, will, nevertheless, appreciate the fact, that, when such insulators become wet, they are conductors, and are practically inoperative.

The influence of length on the conducting power, as indicated in the law above given, shows the importance of having the rod as straight as possible; for any increase of length diminishes its conducting power, and, consequently, its efficacy. For the same reason, very long rods should be larger than short ones.

ELECTRON.

## Science Familiarly Illustrated.

### THE ART OF BALANCING.

The feats of skill performed in the circus, which in our boyhood excited our wonder and caused us to regard the actors as beings of a superior order, in after years may be legitimate subjects of study to the thinking mind. Look at the balancing performances. They appear wonderful. One of the "artists" gives a plate a twirl by the hand, throws it whirling into the air, catches it on the point of a sharpened stick, places the other end of the stick on his chin and balances it; then taking up another he repeats the process until he has perhaps six or seven spinning and balancing on head, face, and hands. Another climbs a pole and suspending himself on the top, his body horizontal, another carrying the pole and performer about, accurately keeping the equilibrium of both. Another performer walks erect on a tightened rope or wire, controlling his perpendicular and governing his progress by means of a long pole carried transversely across his body, thus sustaining himself on his narrow base by what is termed the equilibrium of forces. The "flying trapeze" is another exemplification of the art of balancing. The performer requires some judgment, a quick mechanical eye, but mostly constant practice.

Now all these public performances of professionals are equaled, if not surpassed by the successful efforts of the infant just learned to walk. A child of one year old who can just "toddle" about the room, unaided by chairs or the hands of its parents, gives a performance not in any way inferior to that for which people pay their money to witness. Think for a moment what practice—the exercise of judgment and the teachings of instinct can hardly be predicated here—is required to balance a top-heavy weight elevated so high—proportionally—from the base and that so small, and not only this, but to change from one base, or foot, to another rapidly, preserving meanwhile the center of gravity! It is as though a tall tower should be balanced alternately by its base on one side and then the other; and more than that, it has to adapt itself to inequalities of surface and move from one point to another. The slightest excess of momentum by the push or thrust of one point of support, would, according to the laws of mechanics, topple the whole structure over, and the line of gravity, passing beyond the base it would inevitably come disastrously to the earth. Yet in the case of the infant just beginning to walk—of course entirely ignorant of the laws of gravitation—the slight practice to which it has been subjected proves sufficient for it to rival the performances of those who "astonish the natives" in public entertainments.

With all our knowledge of mechanical contrivances, we have never yet succeeded in reproducing this alternate balancing in mechanism. The walking doll is a very clumsy imitation, or simulated attempt at the ordinary process of walking, so common that we do not notice it. When machinery, built of rigid metal, can be made to imitate, successfully, the ordinary movements of the animal organism, we may consider a new door opened to mechanical inventors, but it is doubtful if we shall ever arrive at such a stage of mechanical perfection as this.

### Concerning Man.

Wonders at home by familiarity cease to excite astonishment; but thence it happens that many know but little about the "house we live in"—the human body. We look upon a house from the outside, just as a whole or unit, never thinking of the many rooms the curious passages, and the ingenious internal arrangements of the house, or of the wonderful structure of the man, the harmony and adaptation of all his parts.

In the human skeleton, about the time of maturity, are 185 bones.

The muscles are about 500 in number.

The length of the alimentary canal is about 32 feet.

The amount of blood in an adult averages 30 pounds, or full one-fifth of the entire weight.

The heart is six inches in length and four inches in diameter, and beats seventy times per minute, 4,200 times per hour, 100,800 per day, 36,772,000 times per year, 2,565,440,000 in three score and ten, and at each beat two and a half ounces of blood are thrown out of it, one hundred and seventy-five ounces per minute, six hundred and fifty-six pounds per hour seven and three-fourths tuns per day. All the blood in the body passes through the heart in three minutes. This little organ by its ceaseless industry.

In the allotted span
The Psalmist gave to man,

lifts the enormous weight of 370,700,200 tuns.

The lungs will contain about one gallon of air, at their usual degree of inflation. We breathe on an average 1,200 times per hour, inhale 600 gallons of air or 24,400 gallons per day. The aggregate surface of the air cells of the lungs exceeds 20,000 square inches, an area very nearly equal to the the floor of a room twelve feet square.

The average weight of the brain of an adult male is three pounds and eight ounces, of a female two pounds and four ounces. The nerves are all connected with it, directly or by the spinal marrow. These nerves, together with their branches and minute ramifications, probably exceed 10,000,000 in number, forming a "body guard" outnumbering by far the greatest army ever marshaled!

The skin is composed of three layers, and varies from one-fourth to one eighth of an inch in thickness. Its average area in an adult is estimated to be 2,000 square inches. The atmospheric pressure being about fourteen pounds to the square inch, a person of medium size is subjected to a pressure of 40,000 pounds! Pretty tight hug.

Each square inch of skin contains 3,500 sweating tubes, or perspiratory pores, each of which may be likened to a little drain-tile one-fourth of an inch long, making an aggregate length of the entire surface of the body of 201,166 feet or a tile ditch for draining the body almost forty miles long.

Man is made marvelously. Who is eager to investigate the curious, to witness the wonderful works of Omnipotent Wisdom, let him not wander the wide world round to seek them, but examine himself. "The proper study of mankind is man."—*Cin. Journal of Commerce.*

### Burns.

In regard to the treatment of burns there is a great diversity of opinion, scarcely any two surgeons agreeing as to the remedies. All of them are doubtless valuable, but there is one which has a great reputation, carron oil, limewater, and linseed oil. The great objection to it is its offensive odor, rendering an entire ward disagreeable. When the burn is very superficial, simply inflaming or vesicating the part, covering it up with flour, and then placing a layer of cotton over it so as to exclude the air, makes a very comfortable dressing. Another method consists in applying cold water, and another warm water covered with oiled silk and a bandage. Lard, deprived of salt, and simple cerate make pleasant applications. The profession is indebted to Prof. Gross for the introduction of white lead and linseed oil in the treatment of burns. It is one of the very best applications which can be used, effectually excluding the air, and being always grateful to the patient. In all cases, no matter whether merely the skin or the deeper structures are involved, white lead rubbed up with linseed oil to the consistence of paste or paint, and placed on with a brush, will be found productive of great relief. There does not appear to be any risk from the constitutional influence of the lead, though it has been suggested, to counteract any tendency of this kind, that the patient should take occasionally a little sulphate of magnesia.—*Medical and Surgical Reporter.*

EXTRAORDINARY COINCIDENCES.—The diameter of the earth multiplied by 108 gives the diameter of the sun; the diameter of the sun multipled by 108 gives the mean distance of the earth from the sun; and the diameter of the moon multiplied by 108 gives the mean distance of the moon from the earth.

### Hand Pump for Dwellings, Manufactories, etc.

The peculiarity of form of this pump is noticeable; its simplicity of construction and directness of action are not less conspicuous. Fig. 1, of the accompanying engravings, shows the outward appearance of the pump as ready for use; and Fig. 2 is a vertical, longitudinal section, exhibiting the working parts. A is a cylinder open at both ends, having on two sides chambers, B and C, also open at both ends, all cast in one piece, and having heavy projecting flanges, as seen plainly in Fig. 1, to which are bolted the heads, D. Between the flanges of the heads and cylinder are introduced glands of thick rubber, which serve as packings. At the openings between the chambers and the heads, this rubber is cut on three sides, leaving the upper side uncut, thus forming flap-valves which are weighted with metal plates attached in the induction set, E, at the bottom, on sides opposite to those of the delivery valves, F, at the upper side of the cylinder. G, Fig. 2, is the inlet pipe; and H, both figures, is the pipe leading to the air chamber, I, from which the delivery pipe, J, is conducted. The upright lever, K, is used to work the piston. The stuffing-box, L, through which the piston rod moves, is provided with a lubricating receptacle to insure ease of working. The arrows, Fig. 2, show the direction of the current, and sufficiently explain the operation of the pump.

*Fig. 1*

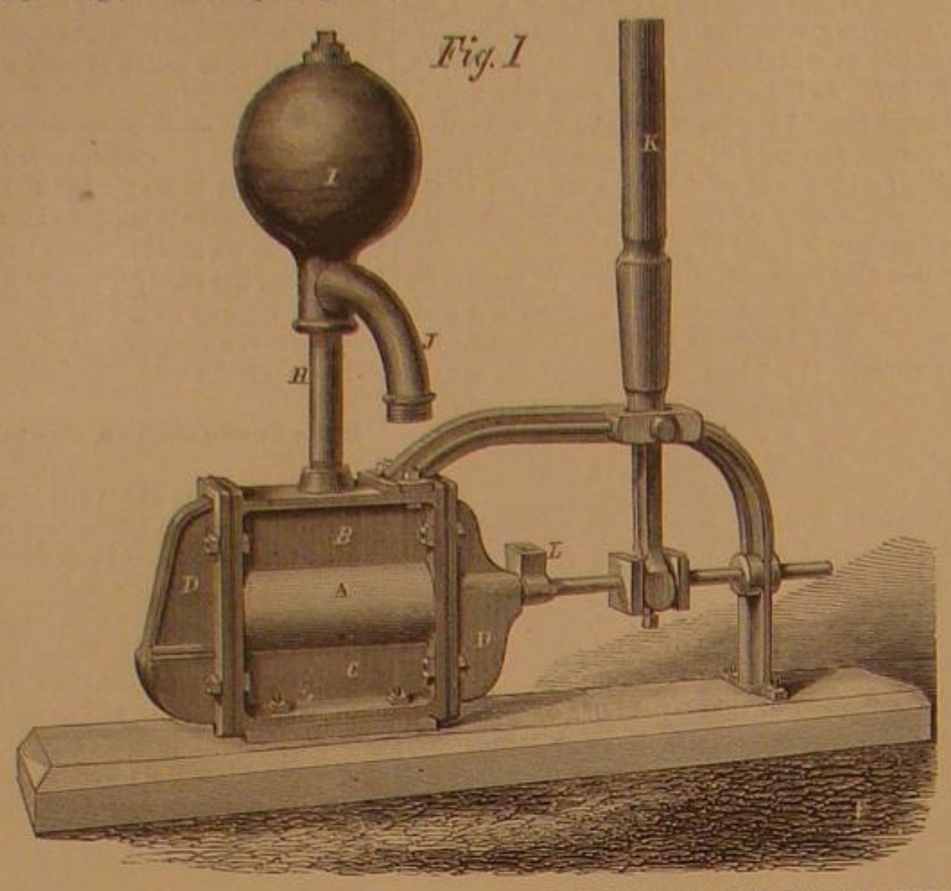
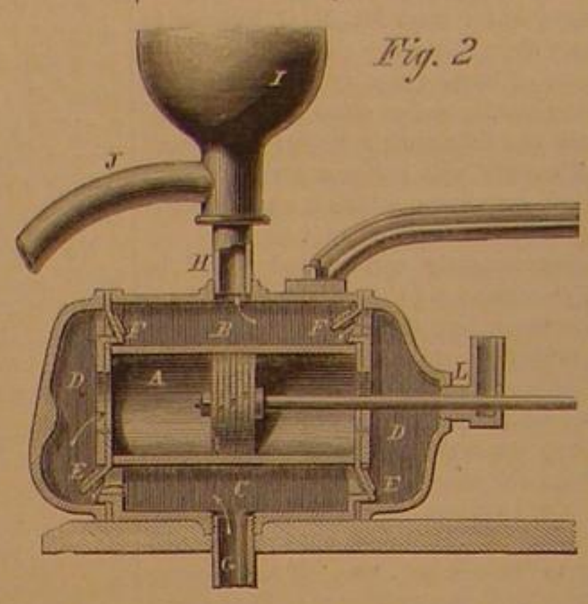



*Fig. 2*



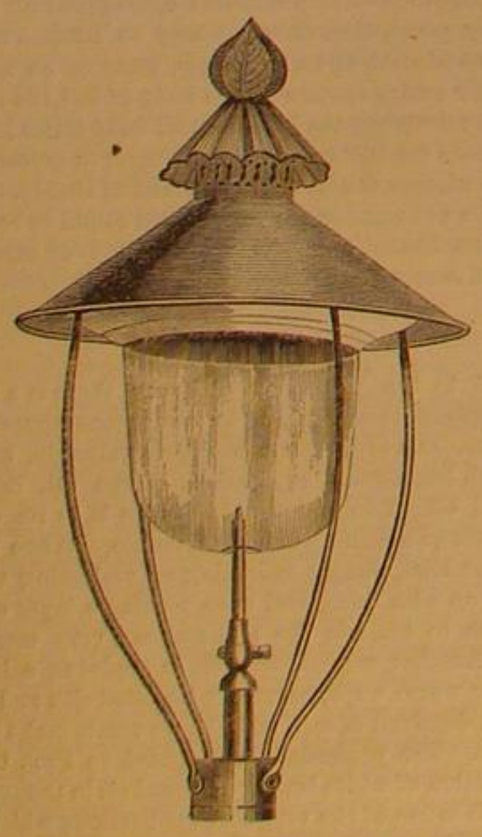

VERNIAUD & LUCIE'S PUMP.

It is in use in dwellings and manufactories with satisfactory results. The inventor says that a hotel in Quincy, Ill., is using it, and the water is raised from cisterns and forced to the fifth story to be distributed over the house. It throws water seventy-five feet, easily, and is thus valuable as a means of putting out an incipient fire. It is evident, from its plan of construction, that it is easily worked, and is efficient in operation.

This pump was patented through the Scientific American Patent agency, August 20, 1867, by C. Verniaud, & D. J. Lucie, of Quincy, Ill., where they may be addressed for the sale of the right for the United States, excepting Illinois and Missouri, or for rights to manufacture and sell.

### Miner's Patent Street Lamp.

It is singular that while so much attention has been given to new designs for chandeliers, pendants, brackets, etc., to be used indoors, but few attempts have been made to improve the appearance or increase the usefulness of our street lamps.



The pattern now used is the same employed ever since the first introduction of gas. The engraving, however, presents a view of an improved lamp for this purpose. Its beauty of form is apparent at a glance, and its superiority in other respects to the old style can be easily demonstrated.

It has a metallic dome of ornamental form, capped by a handsome chimney, the whole supported on four small rods of iron by which it is secured to the lamp post. The glass is made with an outward projecting flange at its top by which it is suspended in the dome. The dome projects beyond the glass to protect it from rain and snow, and the under side of this projection is painted or enameled white to better reflect the rays of light. The gas burner passes slightly through an aperture in the bottom of the glass and the gas is lighted through this hole. The dome is hinged on one side so that it may be turned over, exposing the glass for purposes of cleaning, etc.

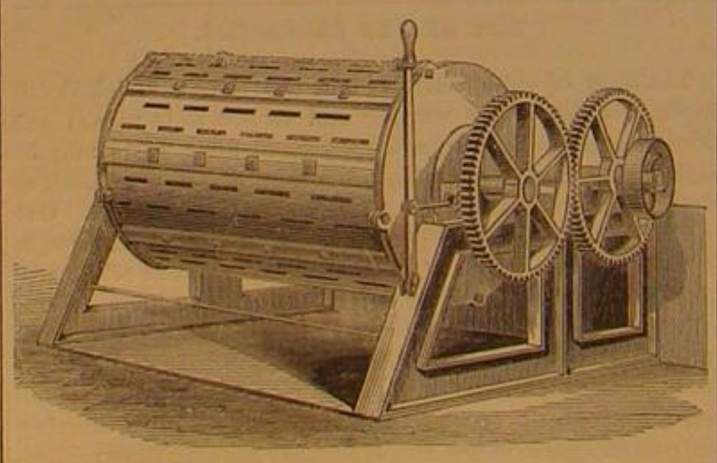
It is evident that this form of glass is stronger and is less liable to be broken by a blow than a flat pane, and it being globular will assist in dispersing the rays of light. No obstruction is offered the light except the slight rods which support the lamp. We should judge it might be furnished considerably cheaper than the lantern-like boxes now in use. Specimens may be seen lighting the entrances to the American Institute Fair, Fourteenth street, every evening, and they are to be on the Prospect Park in Brooklyn.

The lamps and State and County rights may be obtained of the inventor and manufacturer, J. G. Miner, Morrisania, Westchester Co., N. Y.

### Horton's Improved Founder's Mill.

Founders, or molders, know what a trouble it is to separate the *debris* of the furnace, or, rather, the cupola; that is to separate the unfused portions of the metal from the fuel. For this purpose tumbling machines, or rotating cylinders, are used. Usually they are made of heads and staves, both of iron, and the apertures for delivering the unconsumed products of combustion are formed by openings made by cutting away in casting, a portion of the stave at what are judged proper distances, allowing these openings, which are made on the edges of the staves, to gradually enlarge. In mills so constructed, after using a short time, the staves become loose, the openings become wider, and, before long, "washing" has to be resorted to.

In the machine shown in the engraving the apertures for the escape of the dust—the *detritus*—are made through the staves themselves, and are contracted from the outside to the



inside of the staves, so that if the outside of the apertures are of sufficient area, the *detritus* may pass through them for a long time before the inside will be worn sufficiently large to necessitate a repair in the mill. This mill is built wholly of iron, and heavily geared, so that but little power is required to drive it. It was patented September 11, 1866, and gives excellent satisfaction wherever used. It is built by the Peekskill Manufacturing Company, who may be addressed at Peekskill, N. Y.

### A New and Brilliant Light.

Some months ago Professor Frankland gave a particularly interesting series of lectures "On Coal Gas," at the Royal Institution, in the course of which he made some very important statements which, if corroborated by the results of future experiments, will revolutionize existing ideas as to the source of light in ordinary flames. Some of Dr Frankland's experiments are of the deepest interest, and deserve our attentive consideration as photographers.

In the course of his lectures Dr. Frankland soon falls foul of the generally received explanation of the source of light in the combustion of an ordinary gas flame. We all know that the prevailing idea is that the luminosity of the flame of common coal gas is altogether due to the liberation of solid particles of carbon in the flame and their subsequent ignition. The light, then, is the result of the incandescence of *solid* matter, and not of a gas. On the contrary, Dr. Frankland asserts that the luminosity of these flames is due to the ignition of *gaseous* and not solid matter. This novel view is supported by a number of very striking and important experiments, into the details of which we shall not now enter; suffice it to say that the learned Professor's object was in every case to obtain a highly luminous flame, which could not, by any possibility contain solid matter in a state of intense ignition. In pursuing this search he has been most successful, and found not only what he wanted, but has drawn attention to a method of producing a flame of high photographic power. This we have experimented with, and will now describe the method which we have found most suitable and convenient for its production.

When bisulphide of carbon is warmed so that it freely gives off vapor, and then is ignited, it burns with a pale blue flame, giving but very little light. If now a jet of the gas, which we obtain by the action of nitric acid on copper filings, be allowed to play through the burning vapor, a brilliant and intense bluish light is obtained, almost rivaling the magnesium light in power, but much more bearable by the eyes than the latter. We need scarcely remind our readers that the gas above alluded to is the peroxide of nitrogen, which is very easily made and preserved. We may now mention a method which we have found very useful for the production of the light on a very small scale.

A light bottle is taken, of about a pint capacity; it is fitted with a cork through which passes a glass tube. The latter is bent to a right angle a little above the cork, the free end is drawn out so as to form a tolerably fine jet, and this extremity of the tube for about four or five inches from the end is bent like the letter U, the jet looking directly upwards. The only other essential vessel is a test-tube or narrow beaker, into which the U-tube can easily dip. When we wish to procure the light, fragments of copper—either plate or wire—are placed in the bottle, and a mixture of one part strong nitric acid and two of water, poured in; the cork carrying the glass tube is then replaced, and the bent portion of the latter is allowed to dip into the little beaker, which has previously been placed in a vessel of warm water. As soon as gas comes off freely through the jet, some bisulphide of carbon is poured into the beaker. The hot water with which the latter is surrounded quickly vaporizes the bisulphide; when set fire to, this burns at the mouth of the beaker with its usual blue lambent flame, but from the gas jet, upwards, for an inch or more, according to the pressure, a brilliant cone of light arises, which is possessed not only of great illuminating power, but also of very considerable chemical energy. Of course this flame can be kept up until the gas ceases to be evolved from the copper and nitric acid, or until the bisulphide of carbon has been used up. It is necessary to observe that the current of gas should always be tolerably rapid, and the bisulphide well heated in order that the best effects may be obtained.

Bisulphide of carbon, when burning, gives off abundance of fumes of sulphurous acid, and it is advisable to have the vapors from the jet carried away by a little extemporized chimney. With this precaution there need be no trouble experienced.—*British Journal of Photography.*

### Intensifying Negatives by Chloride of Gold.

Use a collodion with a good body; let the bath be perfectly free from organic matter, and make the iron developer with—

| | |
|---|---|
| Sulphate of iron | 20 grains. |
| Malt vinegar | 60 minims. |
| Distilled water | 1 ounce. |
| Alchohol | *quant. suf.* |

I prefer malt vinegar to acetic acid, as by its use in the developer the latent image is brought out gradually, and with much greater intensity than with the usual formula.

If the above conditions be complied with, and the proper exposure given, a vigorous negative will in most cases be the result, requiring only a little intensification to fit it for the production of prints.

To make the gold solution, dissolve one grain of chloride of gold in a pint of distilled water, and keep this as a stock solution, from which pour a small portion into a small wide-mouthed bottle for use. After fixing and thoroughly washing the negative, allow it to drain for a few seconds; then, with a steady sweep, pour on sufficient of the gold solution to cover the plate. The color of the deposit will be observed to change from the grayish white of the iron-reduced silver to a slate color, increasing in intensity as the operation is prolonged. If great density be required, as in copying prints, etc., the solution may be used stronger. The same quantity may be used again and again, till its strength is exhausted.

If photographers will give this method a fair trial, pyro. and silver, bichloride of mercury, and the troublesome ferro-gelatine will soon be looked upon with but little favor, and the two former be reserved for extreme cases only. Among

the many useful qualities of this intensifier there is one particularly deserving a few words of comment.

It is confessedly a great drawback in negative portraiture that neither the artist nor the sitter can judge exactly to what extent a portrait is successful, or pleasing—which is much the same thing—until a print has been taken. Viewed by reflected light, a properly exposed negative is a very ghastly affair, with nearly all the shadows and half tones that constitute a picture absent; and, seen by transmitted light, little else than its technical qualities can be judged of.

It often happens that the sitter will insist on seeing his or her portrait in its embryo condition; and, if the sitter be a lady, the general exclamation will be, "What a fright!" expressed in various terms, according to the habits or education of the individual; while the more timid will inquire, with the deepest anxiety visible on their countenances—"Why, what have you done with my eyes, nose, mouth," etc.? The artist, of course, explains that everything will be found in its proper place in the finished picture; but an incredulous shake of the head is often the only reply.

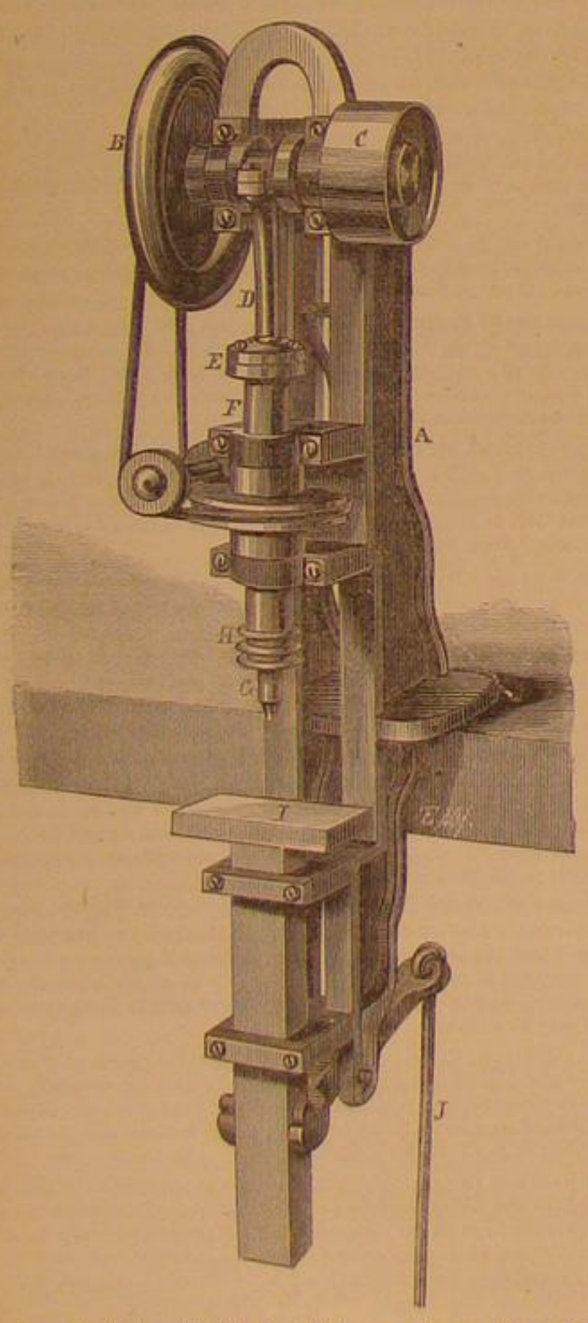
Now, by using the gold intensifier, these features can be rendered perfectly visible in the negative with the minutest details, and the most delicate half tones rendered with a distinctness equal to that in a properly exposed position.

To obtain this result, it is only necessary to watch the back of the negative, as the intensification proceeds, till the desired clearness be produced. At this point it may be stopped, if it be considered desirable to show the negative to the sitter.

In many cases, where the person is leaving the place, and a second sitting is impossible, it will be a great advantge to submit the picture for approval, and, if very favorable, a large order may be the probable result. I am certain that many of the annoyances that the poor photographer has quietly to endure may be avoided by using this process; and of this I am certain, that it needs only a fair trial to become a general favorite.—GORDON RAMSAY.—*Br. Jour. Phot.*

## ADT'S ROTARY RIVETING MACHINE.

The art of using the hammer is one that takes nearly if not quite as long to acquire as that of handling the file. In




"chipping" with cold chisel, striking on the anvil, and riveting at the block or vise, long practice, combined with good judgment are necessary to successful performance. In this last operation the operator with the hand hammer meets with frequent difficulties. If the rivet end is in a recess of the work much skill is required in using the riveting hammer and adjusting the work to the successive blows.

The object of the little machine represented in the annexed engraving is to provide an efficient riveting hammer worked by power and adjustable to all descriptions of jobs. It gives not only powerful blows, but the hammer is made to rotate so that without moving the work the hammer may consecutively strike every portion of the rivet end. A brief explanation will render these statements perfectly clear.

The frame, A, is of cast iron securely bolted to a bench. At the top is a horizontal shaft carrying at one end a fly wheel, B, and at the other end a driven pulley, C. In the center, between the bearings, is a crank of short stroke, to which is attached a pitman, D, connecting at its lower end by a ball and socket joint in the gland, E, with a vertical reciprocating tube, F. Inside this tube is a rod, the lower end seen projecting at G, which is the hammer proper. Between its upper end and the closed top of the tube is a stiff spiral spring, and at its lower end a similar spring, but weaker, which bears at one of its ends on a shoulder on the hammer rod and at the other on the nut, H, which confines the rod inside the tube. This rod at its lower end is either squared or flattened to fit to a corresponding opening in the tube, F, that it may turn with the tube. Surrounding the tube, F, between its bearings, is a sleeve carrying a grooved pulley. This sleeve has a longitudinal, vertical slot on its inner surface or bore, in which plays a feather belonging to the tube, F. A belt leads from the grooved pulley over guiding pulleys to a small grooved pulley on the horizontal shaft carrying the two wheels, B and C. It is evident that as this shaft is rotated the tube, F, will rise and fall, and at the same time, through the medium of the pulleys, belt, and the sleeve, the tube and hammer rod will be rotated, so that each repeated blow of the hammer will strike in a different position relative to the work.

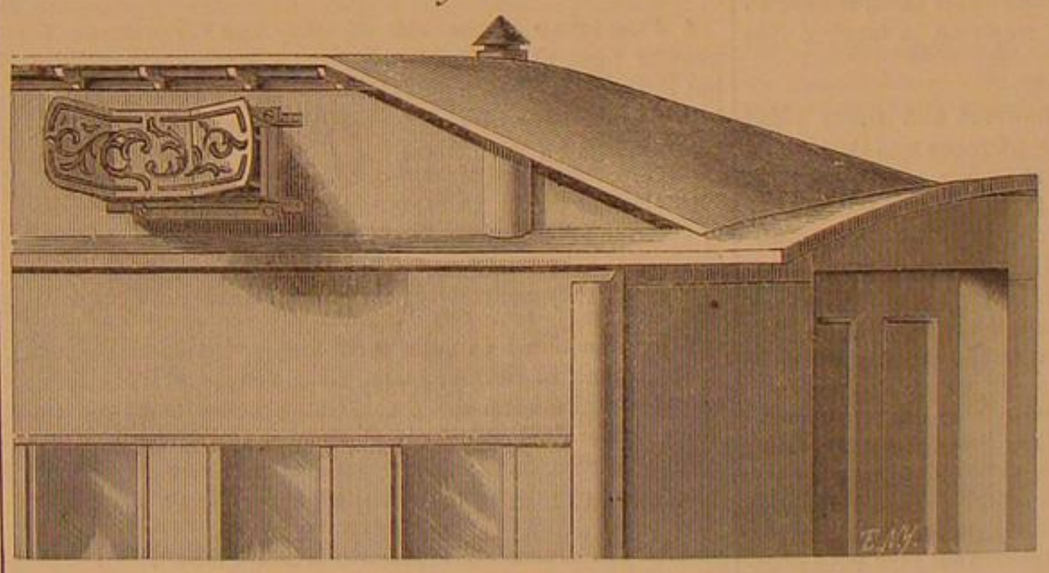
The table, I, moves in guides attached to that portion of the frame extending below the level of the bench and is elevated or depressed by means of a treadle connected to the rod, J. On this table—which may be of any form to suit the work—the job to be riveted is placed, and the power applied to the pulley, C, when the foot guides the table, I, by means of the treadle, and the blow is thus graduated. The springs inside the tube govern the action of the hammer and produce a springing blow, while the hammer slowly rotates around the point to be riveted. This device can easily be adaptad to be used horizontally as may be readily seen by the practical workman.

For this device letters patent were issued through the Scientific American Patent Agency May 22, 1866, to John Adt. Inquiries relative to the invention may be made of J. Adt and Karrman Machine Company, Wolcottville, Conn.

## Apparatus for Ventilating Railway Carriages.

Among the annoyances—if not belonging to the dangers—of railway travel, is the inefficient or rather the improper ventilation of the carriages. The plan represented in the accompanying engravings may be said to be partly automatic in its action and partly arbitrary. It can be easily regulated and is entirely under control. Fig. 1 shows the side of a car of the "monitor" or raised roof style, with the ventilator attached to the side of the raised portion. Fig. 2 is an exterior enlarged view of the ventilator with the guard, seen in Fig. 1. removed. Fig. 3 is a view of the ventilator, taken from

*Fig. 1.*

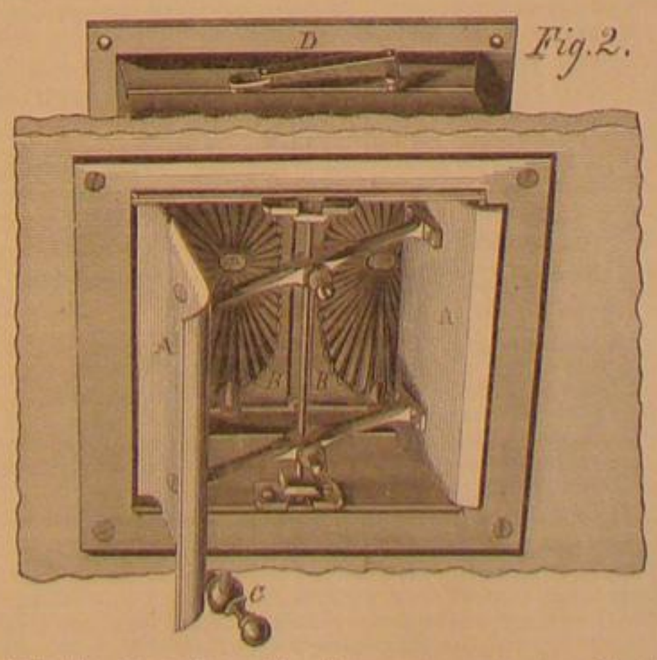


HARDY'S PATENT CAR VENTILATOR.

the inside of the car, showing the register, the two leaves of which are opened or closed at will by a handle.

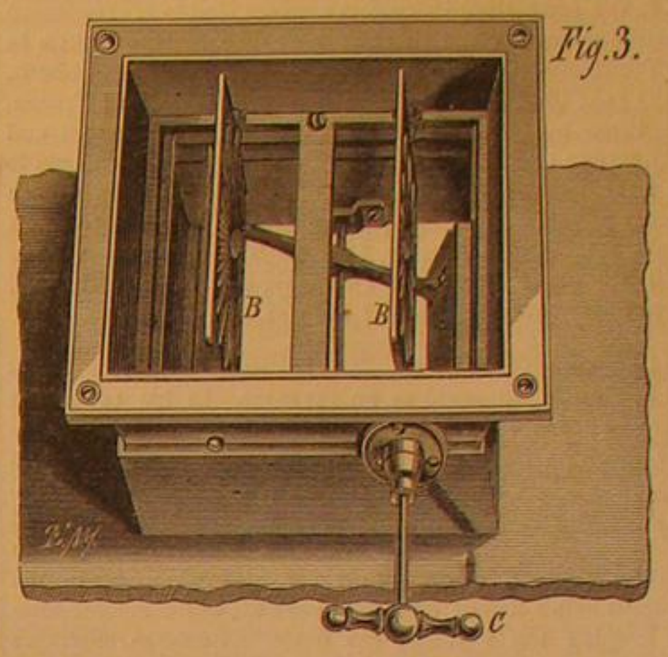
The guard or outer case is of such a form as to present to the atmosphere, in whichever direction the car may be moving, a wide and somewhat funnel-shaped mouth, through

*Fig. 2.*




which the air rushes with a force commensurate with the velocity with which the car is moving. But such a draft, if allowed to rush into the interior of the car, would speedily in a cool day, make the vicinity of the ventilator unbearable. But the ventor or deflector seen in Fig. 2 throws the current of external air against the outside of the case or guard on the side opposite to the incoming air. If then the register leaves are turned to open a passage to the interior of the car, the draft will speedily discharge the vitiated air in the car and keep it pure. A, Fig. 2 are the vanes of the deflector, and B, same figure, the leaves of the register on the inside of the car. The register is governed in the usual manner by the handle, C. Similar letters refer to corresponding parts in Fig. 3. The cranks and connecting bar between the two leaves of the register are seen at D in Fig. 2. The vanes of the deflector are balanced and so arranged that when either mouth of the guard may be presented to the wind coming from the direc-

*Fig. 3.*




tion in which the car is moving, the current will close one of the vanes and thus force the other out into the guard. They will thus be held in position, and so long as the car is moving in one direction, induce a current from the interior of the car in the other direction. If no ventilation is desired the register may be kept closed.

For sleeping cars such a ventilator is very desirable, as it provides for purity of atmosphere in the car while all incoming drafts are prevented. For this device letters patent were granted May 20, 1866, to George Hardy, 43 Turnpike street, of South Lawrence, Mass., who may be addressed relative thereto by those interested in building or running cars, whether steam railway or street railway.

## Electric-Distance Meter.

The collection of articles sent to the Paris Exhibition by the Austrian War Office contains an ingenious apparatus, invented by M. C. Cocziczka, captain in the corps of engineers, for measuring the distances and indicating the movements of distant objects. This apparatus requires two points of observation placed at a certain measured distance from each other, and connected by a telegraph wire. At each of these stations a telescope is used for observing the object in view, and below the telescope a small table is placed in one of the stations, representing the map of the space in front of the observer. At one fixed point upon the table exactly below the axis of the telescope there is a long thin needle balanced upon a point, and connected to the telescope, so as to follow all movements of the latter and to be always parallel to its line of sight.

Beside this, a second needle, which turns round a point which represents the second point of observation upon the small map, is placed upon the table, and this second needle is connected with the telescope of the other station by an electric arrangement. The movement of the distant telescope is made to cause this needle to turn to an equal angle with itself, in a somewhat similar manner to the magnetic needles of the electric telegraph. The distance between the centers of the two needles on the paper being made to scale, so as to represent the measured distance of the two places of observation, it follows that the position of the two needles will indicate the two lines of sight of the two telescopes both fixed upon the same distant object, and the point where the two needles cross each other (one of the needles being slightly below the other) will correspond to the exact position of the distant object. If the latter is in motion, and the two observers follow its movements so as to keep it constantly in sight, the two needles will constantly change their position, and their point of intersection will make the same movements upon the map, on a small scale, as the distant object makes in reality; the movements of the object and those of the point of intersection of the two needles being simultaneous. For purposes of warfare there are several applications of this instrument, which will readily suggest themselves; but similar instruments may be used with advantage for purposes of general surveys of land, and for similar operations where they are not unlikely to effect some considerable saving of time, if properly employed.—*Engineering.*

A GERMAN writer estimates that an acre of good buckwheat will yield fourteen pounds of honey daily.

## Editorial Summary.

Density of Population.—Even in our most populous cities much more space is allotted to each individual than is ordinarily believed. Over-crowded London allows one square acre of land to every forty of its inhabitants. New York averages fifty-six persons per square acre, Philadelphia only seven. Boston, previous to its late enlargement, was the most crowded city in the United States, but every fifty-nine of its inhabitants, possessed on an average one square acre of land. Taking the area of all the states and apportioning it out to the population thereof, it appears that every seventeen inhabitants have one square mile at their disposal, while in the Territories there are four square miles to each inhabitant. In the year 1865, Belgium, England and Wales, and France, had three hundred and ninety-seven; three hundred and sixty-seven; and one hundred and seventy-six inhabitants to the square mile respectively. If the United States was as densely populated as the former of these three countries, its inhabitants would number, 1,195,000,000, which is a little difference of one hundred and eleven millions of people, above the entire population of the world.

Napoleon's Needle Gun.—The Emperor, author, and architect has again appeared as an inventor. In his ostensible desire to prepare his nation for the maintainance of a vigorous peace, he has contrived a new gun concerning which nothing is really known, but reports affirm, is the most terrible weapon yet invented, a single discharge being expected to destroy a battalion. The workmen who are engaged in manufacturing this arm, are never allowed to leave the premises being locked up night and day, the Emperor himself keeping the key. In the trials, the cannon, carriages and ammunition are brought in leather valises, and the firing takes place behind a screen of boards. It is known that at 8,200 feet, the balls pierce an iron plate eight-tenth inches thick. Each cannon fires twenty shots in a minute and two men suffice for the transporting of the field piece with its carriage, ammunition, etc. Says a French notice of a late trial, "a clump of trees five thousand feet distant, were mowed down in a few minutes, like a grain field by a steam mover. It was positively frightful."

Iron Sand.—One of our exchanges lately noticed the discovery of finely divided particles of ferruginous sand in unlimited quantities upon the seashore of New Zealand, and in a very non-commital style adds, "it is announced that a process has been discovered, by which this sand may be converted into use." Wherein the novelty of this discovery lies we have failed to discover. The existence of this iron sand, is nothing new, and the direct manner of smelting it, is simple enough, and has been practiced for years. Iron ore, finely comminuted and probably resembling this sand, is used in its natural state without previous smelting, in forging iron faggots.

Tenacity of Life.—A large flowered and fleshy plant which flourishes in British, Columbia, Oregon and California, possesses a most astonishing tenacity for life. Botanists have great difficulty with the plant for it will revive after being dried pressed and lain in a herbarium for several years. Dr. Lyall once immersed a species of the plant in boiling water to stop its growing propensity, yet more than a year and a half afterwards it showed symptoms of vitality, and in May 1863, produced its beautiful flowers in the Royal Gardens at Kew.

An India-rubber Tongue.—A Paris coachman having lost his tongue by amputation—considered necessary because of a cancer thereon—a surgeon of the Hotel Dieu replaced it with with one made of India-rubber. Although, like old dog Tray, "he cannot speak," he tastes and smokes his pipe with apparent enjoyment. After eating he takes out his tongue, cleans it, and carefully lays it away in his pocket until it is again called into requisition.

Photoperipatetigraph.—This is a contrivance which is bound to bring itself into notice on the strength simply of its name, and independent of any merit it may or may not possess. A Missourian photographer is the originator of this abreviated cognomen, and the contrivance is a dark closet mounted on wheels and containing all the apparatus required for out-door photography.

Bottles Hermetically Sealed.—Gelatin mixed with glycerin yields a compound, liquid when hot, but becoming solid by cooling, at the same time retaining much elasticity. Bottles may be hermetically sealed by dipping their necks into the liquid mixture, and repeating the operation until the cap attains any thickness required.

A new French coin.—In carrying out the project of making a unification of gold coins of different nations, the French government propose soon to issue a new coin of the value of twenty-five francs, which will nearly correspond with ten Austrian florins, the English sovereign, and the American five-dollar gold piece.

New Postage Stamps of four different styles are being prepared in Paris for the Egyptian government. The first denomination has on its face an engraving of the pyramids; the second, a representation of Cleopatra's needle; the third, a picture of Pompey's pillar; and the fourth, a vignette of the Sphinx. Stamp collectors will take notice accordingly.

In Ceylon there is a fig tree 2,155 years old, having been planted 288 B. C. Its history from that date is preserved by both documentary and traditional evidence.

Aerial Perspective.—The appreciation of distance and magnitude of objects is entirely a matter of training or education. From greater practice, most people can better judge of objects on a plane than of aerial magnitudes. Thus, to one observer the full moon appears many feet in diameter, while to another it seems but a few inches across. We are reminded of this fact, in connection with the testimony concerning the late boiler explosion in this city. No two witnesses of its aerial flight agree as to its apparent size while in the air, but indulge in such wide comparisons as likening it to a hat, a hogshead, a nail or a barrel. With such vague testimony, an interesting point as to how high the boiler was thrown, it seems can never be determined.

New Application of Photography.—Corridi has ingeniously contrived an apparatus by which a ship's course is accurately registered during the entire voyage. In place of the symbol on the card of the vessel's compass indicating north, a hole is punctured and a small lens inserted. Through this the light passes, and acts upon a roll of sensitized paper, made to move with a regulated speed by clockwork. The paper continually changes its position with the ship, but the lens is ever maintained in the magnetic meridian; hence the deviation of the vessel therefrom is recorded.

Fly Paper.—In consequence of the sometimes fatal effects caused by the use of paper prepared for the destruction of flies, a cotemporary suggests a substitute which is devoid of danger, and though effective in its working, shows mercy to the entrapped. It is formed by moistening blotting paper with a concentrated solution of quassia. The prepared paper is moistened with water, the unsuspecting victims being attracted to it in great numbers for the purpose of quenching their thirst, but soon appear to be struck dead, and may be easily destroyed before the effects of the anesthæsia has passed off.

Cranial Capacities of Man and Monkeys.—Dr. Bischoff, of Munich, has just published a series of lithographic plates, comparing the skulls of the gorilla, chimpanzee, and orang-outang. From a measurement of thirty-five crania, he found the maximum internal capacities to be of the gorilla, 28·37 cubic inches; chimpanzee, 28·07 cubic inches; orang-outang, 35·07 cubic inches. The last is said to be the largest monkey skull ever brought to Europe. The human skull has rarely, if ever, a capacity of less than 65· inches, and attains its maximum in 114 inches cubical capacity.

Fossil Ivory.—From New Siberia, about forty thousand pounds of fossil ivory, or the tusks of at least one hundred mammoths, are annuully procured. Notwithstanding the enormous amount already carried away, the stores of fossil ivory do not appear to diminish.

A Fire-proof Dress.—Mr. Champy has invented an ingenious form of fire-proof dress. The clothes are woolen, but the waist belt is in connection with the fire engine, and being provided with a stop cock, the wearer can instantly saturate himself with water.

Change of State and Conducting Power.—Common salt, or chloride of lead, in a state of igneous fusion, are excellent conductors of electricity; when allowed to cool after being thus fused, they completely prevent the passage of electricity.

We are indebted to John A. Whipple, the distinguished photographer of Boston, Mass., for a couple of very large and beautiful marine views, containing portraits of the Cunard steamer *Java* and the U. S steamer *Guerriere*.

## MANUFACTURING, MINING, AND RAILROAD ITEMS.

There are 341 manufacturers of false teeth in the city of Paris

By the 1st of November the Union Pacific railroad will be completed as far as Cheyenne City, Dekota Territory, at the base of the Rocky mountains. This is the point of intersection of the Denver branch railroad—from which place it is distant one hundred and twelve miles—the distributing point for Colorado mines, and the general depot for all parts on the Fort Laramie, Fort Reno and Montana roads.

The sugar product of Brazil, according to the report of the English Consul, Mr. Morgan, though formerly almost entirely the product of slave labor, does not appear to have suffered from the abolition of slave traffic. Last year's exports amounted to 48,000 tuns, while the average of the preceeding twenty-five years was only about 41,000 tuns.

The aggregate production of gold in the world for eighteen years past, is $3,341,500,000, of which the Pacific States and Territories yielded nearly one third, while Australia and New Zealand produced nearly one fourth.

Sixty-one trains are run daily between London and Manchester, one half being run in excess of the requirements of the traffic. The excess of train miles is upward of two millions and the cost of running them over £235,000 a year.

Steel Pen Manufacturers in Birmingham employ 339 men and 2,000 women and girls; 96,000 gross of pens are turned out weekly, in which ten tuns o steel, worth $15,000 are used. Thirty years ago these pens sold at 5s. per gross, they now bring only 1½d. to 1¾d.

The manganese mine at Red Rock, in San Francisco bay yields ore in sufficient purity to warrant its working, a fortune which has attended the working of no other manganese mine in the country. In three weeks five miners extracted upward of sixty tuns of first-class ore the market price of which is $30 per tun. The ore is extracted by contract at $10 per tun, the contractor agreeing to pay all expenses, from the raising of the ore to its delivery at San Francisco.

An oil bearing stratum three hundred miles square, has been discovered not far from the city of Pekin, China.

The sulphur mines of Italy are producing 300,000 tuns per annum, representing in a crude state, a value of $6,000,000. The greater part of this supply comes from Sicily. The separation of the sulphur from the gangue is always affected by liquidation, the necessary heat for the fusion being obtained by burning a portion of the ore; by this method only ten of the 30 parts of sulphur is obtained pure.

Mr. Ransome has made many grindstones, from the artificial stone that bears his name, and they are found to be of a perfectly uniform quality, but wear faster than ordinary stones. By increasing the proportion of silicate o soda, and by some other unimportant changes in his process this fault has been partially remedied.

A train on the Northwestern Railroad, in the western part of Iowa, was a few days since delayed one hour and a quarter by grasshoppers, which covered the track so thick that the engine drivers slipped on the rails.

The London underground railroad has carried in six months' time over 12,000,000 passengers, or about three times the population of London. The actual number transported over the line since its opening in January 1863, is about 70,000,000. The line is only three and three quarter miles long; and was constructed at an enormous cost, but makes annual returns in dividends of from twelve to fifteen per cent.

Since the year 1812 when the first load of anthracite coal was taken back to Philadelphia and given away, the production consequent upon an extended demand has increased with great regularity, and now it reaches from ten to twelve million tuns a year. It is estimated that in ten years it will have reached the enormous annual production of twenty million tuns.

It is stated on good authority that there are some 3,000 pianos rented to parties in this city. One firm alone hires out one thousand which yield them an income of $80,000 yearly.

A Chicago firm advertised certain agricultural implements in a Buenos Ayres paper as an experiment. The result was an order from that country for $35,000 worth of the goods.

A coach car built upon the English plan, will soon be put upon the New London and Worcester railroad to run in connection with the old Norwich steamboat line between Boston and New York. The car contains seven compartments, which are finished in sumptuous style, and cost $18,000.

The city of Waterbury, Conn., has manufactories for making cutlery, clocks, iron and steel rollers and machinery, jewelry and its rolls, hosiery, hardware, pins, percussion caps, flasks, brass goods of all kinds, lamps and trimmings, buttons, buckles, hinges, books, paper, boots and shoes, brooms boxes, cartridges, fire-arms, curtain fixtures, mattresses, yarns, thread, bats carriage trimmings and hardware, oil burners, coffins, confections, cigars soaps, crackers, daguerreotype plates, mats and preservers, springs, rails, collars, eyelets, escutcheons, furniture gas burners and pipes, silver ware, hair-pins, hooks and eyes, leather, locomotive tubes and flues, lamps, medals, military ornaments, cloths, nails, reticules, shears, suspenders, wires, carriages, whips and thimbles. We know of no place which produces a greater variety of manufactures.

## Recent American and Foreign Patents.

*Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.*

Stretcher for Drying Hose.—Sylvester J. Wright, Ellsworth, N. Y.—This invention has for its object to furnish an improved instrument by means of which hose may not only be kept from shrinking while drying after being washed but may also be shaped to the foot or leg.

Device for Holding Sheep while being Shorn.—Webster Ellyson, West Branch, Iowa.—This invention is designed to furnish an improved apparatus for holding sheep while being shorn and it is formed by the combination of the platform having hinged ends, hinged adjustable side boards, supporting racks, straps, loops lever pawls, catches and boxes so constructed and arranged that the sheep may be securely held and its position easily and quickly changed as required for shearing each part conveniently.

Animal Trap.—Silas Ward, Richmond, Ill.—This invention has for its object to furnish an improved trap for catching rats, mice, ground squirrels, quails, etc., which shall be cheap, simple in construction, not liable to get out of order, and which shall be self setting.

Cultivator.—J. H. Barley, Sedalia, Mo.—This invention has for its object to improve the construction of cultivator patented by the same inventor Sept. 4, 1866, so as to make it more convenient in use and more effective in operation.

Wagon Tongue Support.—O. Lapham, El Paso, Ill.—This invention has for its object to furnish an improved means for supporting the tongue so as to relieve the horses from supporting its entire weight.

Window Shade Fixture.—William Campbell, New York City.—This invention has for its object to furnish an improved device by means of which the spring roller of a window shade may be made to hold the shade stationary at any desired elevation and yet allow the shade to be drawn down or ru up without obstruction or stoppage as far as may be desired.

Manufacturing Hay Forks, Manure Forks, Etc.—George B. Ely,—St Johnsbury, N. Y.—This invention has for its object to furnish an improved machine by means of which the proper form may be given to hay and manure fork tines by drawing them out by the action of rolls having grooves the necessary shape formed in them.

Land Rollers.—George R. Burt, Perry, N. Y.—This invention has for i object to so improve the construction of land rollers as to make them mo convenient and effective in operation.

Cultivator.—J. W. Connely, Charleston, Ill.—This invention has for it object to improve the construction of the cultivator patented by the sam inventor Februsay 19, 1867, and numbered 62,185, so as to make it more satisfactary and effective in operation.

Car and Omnibus Fare Box.—John B. Slawson, New York City.—Th invention relates to a fare box for cars and omnibuses, which is so arrang that the lamp is altogetner out of the way of the fare box, so as not to struct the inspection of the contents of the box, and so that by the la sufficient light is thrown into the fare box and upon the money trap to com pletely illuminate the same.

Machine for Pouncing the Brims of Hats.—P. W. Vail, Newark, N. J —This invention consists in so arranging the brackets and pouncing roller between which the brim of the hat body is fed, that both sides of the same may be pounced at once. The feed rollers as well as the pouncing rollers are adjustable up and down, so as to expose the brim to more or less pressure, as may be desired.

Thill Coupling.—Lyman Derby, New York city.—This invention relates to a new and improved mode of securing thills to axles, whereby the former may readily applied to and detached from the latter, and at the same time a secure connection be obtained—one that will not admit of a casual detachment of the thills from the axle.

Head Rest for Chairs.—Henry Snowden, Baltimore, Md.—In this invention the head rest is supported on a universal pivot, and is fixed upon sliding adjustable rods, to as to be capable not only of turning in every direction, but also of being extended forward, backward, latera'ly, or vertically, and instantly clamped in the required position by a single movement of one set screw.

Horseshoe.—Albert S. Wilkinson, Pawtucket, R. I.—The subject of this invention is a horseshoe constructed with a continuous sole of india rubbe or similar elastic material, serving to relieve the horse or other animal from danger of slipping and from injurious and uncomfortable concussion of the feet when traveling upon hard roads.

Fire Extinguisher for Vessels.—Daniel Spooner, Lowell, Ohio.—The object of the invention is to draw water from beneath a vessel and elevate it to any part of the ship, for the purpose of extinguishing fires, by means o the direct action of steam.

Window Blind.—C. K. Marshall, Vicksburg, Miss.—This invention relates to a new article of manufacture, and consists in the construction of window blinds with metallic slats.

City Car or Omnibus Money Box.—John Blackadder, New Orleans, La.—This invention consists in arranging reflectors in a city car money box in such a manner that the fare deposited can be seen by the passengers and by the driver, and also in arranging a wheel so that the fare deposited can be deposited in a drawer by the driver.

Attachment for Cook Stoves.—Jeannette Garrison, New York City.—This invention consists in applying a screen to the upper part of the fire chamber of a cook stove between the fire chamber and the top flue in such a manner that coal, cinders, etc., will not be allowed to pass into said top flue and pass down into the diving flue and choke up the same, a contingency of very frequent occurrence and which occasions a great deal of inconvenience

PUMPING STEAM ENGINES.—Robert Allison, Port Carbon, Pa.—This invention relates to a new and improved method of operating the valve of a steam engine when the same is used for pumping water from mines and other purposes.

WATER REGULATOR FOR STEAM BOILERS.—R. J. Jordan, Elkhart, Ind.—This invention relates to a new and improved method of regulating the quantity of water which is discharged into a steam boiler by the force pump.

WASHING MACHINE.—J. H. Quackenbush, East Saginaw, Mich.—The object of this invention is to provide a simple and effective machine for cleansing linen and other articles of domestic use, and it consists in subjecting the article to be washed to both a squeezing and a rubbing process at the same time, by means of corrugated rollers.

STEAM ENGINE.—Joseph McConnell, Iowa City, Iowa.—This invention relates to a new and improved valve motion in the steam engine, the principal novelty consists in opening and closing the ports of the engine cylinder by operating two cylinder valves at each end of the engine cylinder (one within the other), the inner valve being a cut off valve.

DOOR HOLDER.—Wm. A. Messler, Eureka, Ill.—This invention relates to an improved method of holding doors open, and consists of a spring latch attached to the wall against which the door opens, the door latch slipping into the latch.

MACHINERY FOR FINISHING SEWING THREAD OR YARN.—Samuel Barbour, Belfast, Ireland.—This invention relates to an improvement in machinery for finishing sewing thread and yarn, by which a high polish is put upon the surface and the thread is made very smooth and level.

DISH AND VEGETABLE WASHER.- J. N. Paddock, Oswego, N. Y.—This invention relates to an article of domestic utility, and consists in a contrivance for rapidly and effectually washing and drying a number of plates and dishes or for washing vegetables.

CAN.—Andrew D. Armstrong, Pittsburgh, Pa.—This invention relates to an improvement in cans, and is specially serviceable for cans used to contain white lead and similar substances. It consists in providing a second or internal rim to the can, making the lid sit perfectly tight.

MARKET BOX.—Frederick Gearing, Pittsburgh, Pa.—This invention relates to a new and useful improvement in the construction of boxes for market gardeners. The invention consists in constructing the boxes in such a manner that they may be readily taken apart and put together, whereby the boxes, when their contents are sold or disposed of, may be taken apart and packed in a very small compass and empty boxes, therefore, transported at a very small expense.

COMBINED FILTER AND COOLER.—H. W. Fisher, Philadelphia, Pa.—This invention consists in combining a water filter and a cooler in such a manner that a very portable device is obtained for household purposes and one which will operate perfectly with but a moderate consumption of ice.

SPRING FOR VEHICLES.—W. H. English, Macon, Ga.—This invention has for its object the obtaining of a spring for vehicles which will be light or composed of a small weight of metal and still be strong and durable and far less expensive to manufacture than the ordinary springs in use.

CORN PLOW.—M. C. Buffington, La Harpe, Ill.—This invention relates to a new and improved corn plow or cultivator and consists in a novel construction of the same, whereby the draft pole is elevated above the corn so as to prevent the same being broken down and injured and a draft obtained which will admit of the draft pole being balanced so as to avoid any undue pressure on the necks of the draft animals, while the plows are rendered capable of adjustment as circumstances may require.

MODE OF CREATING DRAFT IN STEAM BOILER FURNACES.—William H. Squires, New York City. This invention consists in introducing into the lower part of the smoke stack, or into the chamber with which the lower part of the smoke stack communicates, a conical chamber into the lower part of which a steam tube communicating with the boiler is inserted. The steam tube is provided with a stop cock and all arranged in such a manner that steam may be allowed to pass from the boiler into the lower part of the smoke stack and create the necessary draft.

HAND SEEDER.—Thomas Bradley, Preble, N. Y.—The object of this invention is to furnish a cheap and convenient hand seeder or planter adapted to seeds of different kinds and to be connected with a hoe to be operated by hand to discharge the seeds.

CULTIVATOR.—Henry W. Ostrom, Grand Rapids, Mich.—This invention relates to a new and improved cultivator or harrow and consists in attaching a series of ordinary cultivator teeth to the ends of a set of slats or bars which are hung upon a frame in such a manner that the teeth can rise and fall to adapt themselves to the inequalities of the surface of the ground.

HAND SPINNING MACHINE.—John Blackwood and Theodore C. Wilson, Cincinnati, Ohio.—This invention relates to a new and useful improvement in the construction of hand spinning machines for wool and other fiber and consists in the arrangement of mechanism for operating with a crank upon two or more spindles set in the arc of a circle with one pulley band which dispenses with inetrmediate tightening pulleys, and in connection therewith a reciprocating feed carriage. The advantages of these improvements are cheapness in the construction of the machine, simplicity of the machinery which performs good work without liability to get out of order, while it is easily managed and requires but little power to operate it.

TUNING ATTACHMENT FOR GUITARS, BANJOS, AND SIMILAR STRING INSTRUMENTS.—H. Seehausen, Memphis, Tenn,—The object of this invention is to obtain a very simple means whereby the strings of a guitar, banjo, or other similar string instrument may, after being used, be relaxed with greater facility than hitherto, and, when required for use, be more readily tightened and tuned.

CULTIVATOR.—John Schröder, Kickapoo, Ill.—This invention relates to new device for regulating the draft of horses, and for equalizing the same; also for making the plow beams flexible, so that they can be turned in every direction.

CHUCK.—Wm. T. Cole, New York city.—This invention relates to a new self-acting chuck, which is so arranged that it will be set the tighter the more pressure is applied to the article held by it, so that the strain is in exact proportion to the work to be done. As soon as the work stops, the luck relaxes its hold, but resumes it again, as the work is recommenced.

MACHINE FOR RENOVATING AND CLEANING FEATHERS.—Ossian C. Monroe, Poultney, Vt.—This invention relates to a new machine for cleaning feathers, which is so arranged that the feathers can be easily cleaned by the application of steam, without receiving any of the products of condensation, and can be dried, when cleaned, by the nearer walls of the vessel in which they are held.

WAGON SPRING.—C. P. Hawley, Mosherville, N. Y.—This invention relates to a new manner of arranging the springs on all sorts of vehicles, sofas, railroad cars, and for other purposes, and consists in having two frames made of wood or other suitable material, hinged to lugs projecting from the underside of the wagon box or other article.

MACHINE FOR TAPERING LEATHER.—Wm. Mannheim, New York city.—This invention relates to a machine in which the edges of leather straps can be bevelled or tapered, and also the ends of the same, but in which, when desired, the leather can also be scraped or shaved, so as to be reduced in thickness to an equal degree throughout.

WATER WHEEL.—Legrand D. Wynkoop.—Owasso, Mich.—This improvement consists in a modification of the upper part of the wheel, whereby a case for the same is dispensed with, and the wheels simplified and rendered more efficient and desirable than hitherto.

COMBINED GAGE, PRESSER, HEMMER, ETC., FOR SEWING MACHINES.—Joseph P. White, Savannah, Ga.—This invention relates to a new attachment for sewing machines, by which the cloth is held down, gaged, tucked or hemmed and if desired marked for further tucks.

FIRE ESCAPE BLINDER FOR HORSES AND CATTLE.—Smith Ferris, New York City.—This invention consists in the use of a cap which when laid on the horse's head, covers his eyes, and thus permits that he be led out of danger in case of fire. This cap is so arranged, that it can be placed at once on the animal's head, and be fastened thereto by means of hooks and straps.

FASTENING BUTTONS ON GARMENTS.—Ezra J. Warner, Newark, N. J.—The object of this invention is to fasten buttons to garments with tubular shanks or eyelets, at a single operation, and it consists in a press provided with an adjustable die through which passes a spring slide bar for holding the tubular shank upon the die, to be pressed thereon, and thus fasten the button on a garment, and which also holds a piercing needle for making a hole in the cloth to receive the tubular shank.

HARROW TEETH.—F. R. Willson, Columbus, O.—This invention relates to an improvement in the construction of harrow teeth, and consists in a tooth with two cultivator rings, placed one ahead of the other, made of a single steel plate, of a lozenge form, by splitting the plate partly across, and turning out the split parts in opposite directions, right and left, leaving the upper side of the plate solid, to be fastened to the harrow frame by screw bolts, which may be secured to top of the plate with a cast iron head upon it, or in any other suitable manner.

FAGOT FOR BEAMS.—Wyatt W. Miller, Safe Harbor, Pa.—This invention relates to a new manner of forming piles or fagots for large double flange beams for buildings, bridges, and other structures, and consists in composing the whole fagot of flat plates, and connecting the same by means of bolts, so that the fagot when thus made will represent as nearly as possible the shape of the finished beam.

PUMP.—Gilbert M. Cole, Folsom city, Cal.—This invention relates to a new double-acting pump, which is provided with double pistons, sliding in a cylinder, the valves being arranged stationary in the cylinders between the pistons, and the suction and discharge pipes being arranged on the sides of the cylinder in such a manner that the water or other liquid to be pumped enters the cylinder between the valves, and, passing in a straight, or nearly nearly straight line, through the cylinder, is discharged.

BOTTLE.—H. S. Carley, Cambridgeport, Mass.—This invention relates to a new manner of arranging the necks of bottles containing soda-water or any other liquid charged with carbonic acid, with a view of retaining the cork or stopper, so that the same cannot be lost or mislaid, although the bottle can be opened or closed at will.

MANNER OF RETAINING HAT BODIES ON BLOCKS.—Jas B. Brown, Middletown, N. J.—This invention relates to a hat block, which is so made and arranged that the inconvenience of hooking or otherwise securing the hat body to the same may be overcome.

RAILROAD CAR BRAKE.—Walter S. Shotwell, Paterson, N. J.—This invention relates to a new and improved railroad car brake of that class which are operated or applied by the movement of the car after the engineer cuts off the steam. The object of the invention is to obtain a car brake of the class specified which will be simple in construction, capable of being adapted or applied to the ordinary hand brakes now in use and still admit of the brakes of each car being applied by hand whenever it is necessary to detach a car from a train and switch it off from the main track.

COTTON BALE TIE OR HOOP LOCK.—James W. Truman, Macon, Ga.—This invention relates to a new and improved tie or lock for connecting together and securing the ends of metallic hoops for cotton bales. The invention consists in constructing the tie or lock of a single piece of wire or rod bent or swaged in the form of a quadrangle or square, the ends of which, composing one side of the square, extend entirely across the whole width of the device, said ends being disconnected but forming a side composed of the thicknesses of the wire, whereby a tie or lock is obtained which may be very readily applied to the hoops, and which will form a very strong and secure fastening.

FODDER CUTTER.—D. A. Smith, Pomeroy, Ohio.—This invention relates to a new and improved fodder cutter of that class which have the cutters or knives attached to a wheel which serves the office of a fly as well as that of a cutter wheel. The invention consists in a novel construction and arrangement of the parts, whereby a very superior machine of the kind specified is obtained.

GRINDING MILL.—Jabez Burns, New York City.—The object of this invention is to construct a mill for grinding coffee and other substances, whereby the same will be granulated and not ground to dust or pulverized as is done by the mills now in general use, and whereby the article to be ground is moved by centripetal and not by centrifugal force, and is gradually crushed or broken to small lumps, so that for the actual grinding process but little power and surfaces are required.

## Answers to Correspondents.

*CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.*

*SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at 50 cents a line, under the head of "Business and Personal."*

☞ *All reference to back numbers should be by volume and page.*

H. W. P., of Vt., asks if coal tar applied to the outside of wooden water logs will preserve them from decay. Probably nothing so cheap and effectual can be found. Kyanizing the wood might be better, but it would cost much more. The coal tar will be found to be a sufficient protection.

S. W. H., of C. E.—We do not understand the processes of preparing calf skins beyond what is generally known. As to the oils used for "scenting" the skin we never heard of that process. For "stuffing" the skin menhaden and other fish oils, neats-foot oil, and tallow are used.

G. W. P., of Mass.—Many of the old pictures were painted on "panels" of wood. Some of the most valuable of paintings were on wood. In time the wood, unless carefully preserved, becomes worm eaten or decayed threatening the destruction of the picture. These are "restored" by being transferred to a canvas backing. The process is an interesting one. The painting is secured, face down, to a table, and the wood gradually planed and scraped away until all its substance is removed, leaving only the paint attached to the table. Then this is cemented to a canvas and the picture is restored. Of course, it is a work of time demanding patience and great skill. It is unsafe for a novice in the art to attempt it.

J. B. B., of Mass.—We know nothing of the locomotive performance you speak of. It may be possible to run 150 miles in 90 minutes. Whether the engine and tender could carry water and fuel enough would depend on their construction, the load, the grade of the road, direction of the wind, etc. The quick express trains of England do run nearly 60 miles per hour including stoppages. During the past summer a train made a run on the Hudson River Railroad of 10 miles at the rate of 78 miles in 60 minutes, carrying the board of directors.

A. P., of N. Y.—The mineral you inclose as found in quartz rock is an ore of copper containing carbonate and sulphide of copper.

J. W. R., of Mich.—The word "amorphous" as applied to phosphorus, or indeed, any other substance, means simply shapeless or without regular proportions.

J. D., of Mass.—We cannot tell you of any special book teaching the art of "putting up machinery, hanging shafting, etc." The best teacher we know is experience combined with observation, common sense, and good judgment, and the instruments to be used are the plumb, level, square, and measuring rule. With these we never failed to hang shafting or locate machines properly. You can no more learn to hang shafting from books than you can learn how to draw a file.

E. V. R., of Mich., asks how many kinds of geographical projections there are as applied to map making, who were their inventors, and what is the principle of laying out parallels of latitude and meridians of longitude. These questions are all answered in any good treatise on geography. Get "Davies' Navigation" or "Bowditch's Navigator." The various kinds of projections may be considered under the heads authographic, stereographic, gnomic, globular, and the developement, for definitions of which terms we refer you as above.

F. S., of N. Y., desires to know if a young man who has been through a course on naval architecture by private instruction would be debarred from practice for this reason, and if there is in New York city a college for such studies. We reply that the first element of success is merit or talent. In this country it does not matter whether one's knowledge was acquired through private instruction or whether he gained it by a regular course in some educational institution. If you are competent you can be successful. We know of no institution where naval architecture is taught. This is learned in the engineer's office and the ship yard.

E. B. H., of Vt., says he put up a pair of mill stones in North Carolina which were grinding well the first of July last, but since that the lower end of the spindle and step heats, both being composed of hardened and polished steel and running in oil. Our correspondent has probably committed a very common error. Where great weight combined with rotation comes upon a comparatively small surface the two rubbing surfaces should be of different materials. No amount of hardness or polish will prevent wear under other circumstances. If the end of the spindle is steel the step should be of much softer material. Even cast iron is better than steel for the step, and Babbitt metal or hard wood with the end of the grain presented would be better still. Oil is of no use as a lubricant unless it is permitted to get between the bearing surfaces. Probably the spindle bearing is too small for the weight to be sustained Much could be written on the subject of the relative areas of bearing surfaces for journals.

C. E. S., of Md., wants a cement for uniting brass or steel to paper or pasteboard. Try shellac.

G. S., of Miss., asks if india-rubber will make good inking rollers and wants the proportions and method of combination of the constituents. In reply we can only say that the attempt has been repeatedly made to construct a good inking roller of india rubber, but without success. Printers prefer the roller composed of molasses and glue to those of any other materials. Glycerin and glue in proper proportions make a good roller, but it fails in such wet weather as we have had this last summer.

W. P. B., of Pa.—Glass for lenses, after being ground to shape, is polished successively by emery, rottenstone, pumice stone, and the oxide of iron known as rouge.

W. T., of Conn.—If there is any new method of electro-plating of German silver or Brittania metal different from that ordinarily used on other metals, we are not aware of it. The usual process can be learned from treatises on this subject.

E. J., of N. Y.—The velocipede mentioned in our Notes of the Paris Exposition is very novel but simple in its construction. We have made arrangements for drawings of it to publish in a few weeks.

J. W. M., of Mo.—The regulations of the Metropolitan Fire Department of this city do not allow the steam fire engines to carry more than 80 pounds of steam, but this limit is often passed, the pressure frequently running as high as 140 or even 160 pounds. We are informed that the boilers of every Amoskeag engine built is tested to 200 pounds steam pressure.

W. R. S., of Ind.—When it is 9 A. M. in New York it is 9 P. M. of the same day at the Antipodes.

F. M. P., of O.—The explanations of the fact of the refraction of light are theoretical and therefore unsatisfactory. . . . The spark produced by the striking of flint and steel results from the conversion of ordinary mechanical force into heat.

J. A. S., of Pa., suggests that the electricity of belts is sometimes the occasion of the accidents in factories when the dresses of women become entangled in the machinery. According to his theory the skirt of the dress is drawn to the belt by the electrical attraction.

R. F., of Conn., describes a basswood tree growing with considerable vigor from a stump and roots which are apparently dead. If the stump and roots were really dead the case would probably be unprecedented.

R. V., of Mass.—Plumbago was formerly, but improperly called carburet of iron. When pure it contains no iron, and the iron which often is associated with it, is never in chemical combination with the carbon.

C. B. T., of Texas.—The first clause of section 5th, of the Act of 1842, provides that a person shall not affix upon a thing not patented by him the name of another who has obtained a patent upon the same thing, without the consent of such patentee; the second clause, that a person shall not affix the word "patent," or "letters patent," or "patentee," or any word or words of like import with intent of imitating a patentee's device on an *unpatented article, or in other words, on an article not covered by any patent whatever*, for the purpose of deceiving the public.

## Business and Personal.

*The charge for insertion under this head is 50 cents a line.*

Iron Manufacturers and Capitalists—Examine the Model Rolls at the American Institute. Patent for sale. P. Bright, Philadelphia.

For Sale—A small Metal-working Shop—Tools in good order. Also, two patents. Terms easy. Address G. Strong, care H. N. Meyers, 218 Fulton street, New York. 14 & 15

J. C. J., of Estillville, Scott county, Va., desires the address of parties who make a business of boring wells.

Bolt-Heading Machines Wanted. Address National Iron Co., Danville, Montour county, Pa.

Wanted, for a foreign correspondent, a first-class Rice Hulling and a Rice Polishing Machine. Address Munn & Co., 37 Park Row sending full description, price, and weight.

Black Walnut Lumber, first-class, green or dry, can be furnished by D. Auld, Jr., Iberia, Ohio. Write to him.

Railroad Companies wishing a Good Snow Plow and other track-obstruction removers, are recommended to address or consult Mr. Sheridan, whose advertisement is to be found in another column.

## NEW PUBLICATIONS.

THE BROADWAY for October.

The second number of this new monthly has made its appearance. It is full of original illustrations, and bears evidence of success. Published at 418 Broome street, N. Y. Price 25 cents a number.

THE NEW DOMINION for October.

This is another new literary monthly, published by John Dougall & Son, Montreal, Canada. The first number (October) is very creditable in execution, contains 64 pages, and is sold at the low price of 10 cents a copy.

HERALD OF HEALTH for October.

This is an old magazine and always good. It is devoted to physical culture, and its teachings are of incalculable value in the household. Miller, Wood & Co., publishers, 13 Laight street, N. Y. Terms $2 per annum, 20 cents per single copy.

## EXTENSION NOTICE.

L. Otto P. Meyer, of Newtown, Conn., having petitioned for the extension of a patent granted to him the 20th day of December, 1853, for an improvement in processes for vulcanizing caoutchouc compounds, for seven years from the expiration of said patent, which takes place on the 20th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 2d day of December next.

### Device for Marking and Furrowing Land for Corn.

The inventor of this device claims that it does its work easier and more effectually than others; that it does not harden the soil, and thus hinder the germination of the seed; that it can be driven within a few feet feet of the fence, and be easily turned; and that it is cheap, being manufactured at a cost so low as to bring it within the reach of all.

As seen, it is in form very like a boy's sled, the runners being three and a half or four feet apart, according to the width of the rows. The runners are shod with iron, two inches wide, by one thick. At the rear of these runners, on the outside, is atfached a mold board, or share of cast iron, for making the furrows. Pivoted to the center of the front cross-piece of the sled is an arm, projecting from the side of the sled, and carrying a bar and pointed marker for determining the line of the furrow next to be formed. The depth of this mark may be controlled by the driver's foot. His seat is so arranged that, by sitting further forward or back, he may, by thus elevating or depressing the back end of the sled, regulate the depth of the furrows plowed by the shares. Farmers will readily understand the operation of this implement without further description.

It was patented February 13, 1866, by Joseph Plumb, who may be addressed relative thereto at Flemington, N. J.



PLUMB'S PATENT FURROWING SLED.

### Discoveries in Palestine.

The secretary of the Palestine Exploration Fund writes to the London *Times*:—

"When the committee of the Palestine Exploration Fund sent out their second exploring party to the Holy Land in January last, under the charge of Lieutenant Charles Warren, Royal Engineers, they gave him a general instruction to make Jerusalem his head quarters, and to excavate, and investigate about the city as much as possible, especially in the sacred enclosure of the Haram esh-Sherif. The result is that outside the walls of the enclosure he has made a discovery, which is almost, if not quite, as important as any that has ever been made in or about Jerusalem, and which cannot fail to be the fruitful parent of many more. He has found that the south wall of the Haram, which rears its venerable face to a height of eighty feet above the soil, descends to no less a depth than fifty-three feet below it—the solid rock of Mount Moriah, on which it is founded, being covered with that immense thickness of debris. Thus this wall must originally have stood at a height of one hundred and thirty feet above its foundations, fully justifying the expressions of Josephus, who says concerning it that 'if any one looked down from the top of the battlements into the valley he would be giddy, while the sight could not reach to such an immense depth.'

"The foundation and unworn masonry of the buried portion may be expected to disclose many a secret affecting these venerable walls, secrets which Lieutenant Warren is now diligently occupied in revealing. But this is not all. He found two other things. He found first, that the eastern wall was prolonged beyond the southern face, and continues in the general direction of Siloam, with all the solidity and antiquity, which characterize its known portions. How far it continues, or what are its exact direction and extent, I expect to hear shortly from Lieutenant Warren. He found, secondly, that below the debris a second south wall exists twenty feet distant from the known one, and of slighter workmanship. How far this wall goes, what its purpose may have been, its relations to the 'triple gateway' and the staircase which M. de Saulcy believed that he had discovered to descend from the triple gateway, how this discovery may affect the piers of the arches below the southeast corner of the enclosure, are questions which I await further information to be able to answer.

"Our operations are threefold:

"1. Exploration—On which I have only to add that we have already materials for almost an entire, complete, and accurate map of the country and photographs of more than three hundred spots and objects, large numbers of which have never before been taken.

"2. Geology—for this our desire is to send out a party, under the charge of Mr. Prestwich, F. G. S., the eminent geologis, who has most kindly offered his services.

"3. Botany and Zoology—for which in like manner we hope to avail ourselves of the services of the Rev. H. B. Tristram, well tried and well known already in the same field, and anxious like an old hunter, to be off on his final chase."

### Condition of the Oil Regions.

A correspondent of the Boston *Transcript* thus describes the oil operations in Pennsylvania:—

"At Petroleum Center about one well in six is in operation. From the high hill west of the town you can see half a dozen villages and more than two thousand wells, some new, but many more utterly abandoned. On the top of this hill there is a fine flowing well which yields fifty barrels in a day—the only flowing well in all the region. The pumping wells yield from eight to thirty barrels in the day. A well that yields less than eight barrels will not pay for the working, even at the present advanced prices. The business has now passed entirely out of the hands of speculators, and is conducted in an orderly way, by 'solid' and intelligent men, and with improved methods.

"A very intelligent owner of some of the wells explained and illustrated to me all the process of getting the oil—from the first experiment with the auger to the final refining of the crude product; the boring through the various strata, the sand pumps, the seed bag, the casing, the rods which clear out the tube, the gas furnaces—the whole very interesting, but which it would be impossible to explain in the limits of a letter. Hardly any wood is consumed now for fuel. Some of the furnaces are fed by the escaping gas, but more by benzine, of which an ordinary engine furnace burns about a barrel in twenty-four hours. The sparks from a chimney would be dangerous in so explosive an atmosphere. Smoking is strictly prohibited in the neighborhood of the wells. But, as it is, fires are very frequent—hardly a week passes without them.

"The present high price of the oil is stimulating new enterprises, and the owners of wells are encouraged. You see the derricks rising on the tops of the hills, more than three hundred feet above the level of the railway. The gas is carried up the slopes in pipes for half a mile to make fuel for boring these new wells. Not one in three will strike oil at all, and not half of those who strike it will get it in profitable quantity. But the production is still very large, never, on the whole, greater than now. It is said that the famous Noble well, which has now done its work, yielded, before it expired, not less than four hundred and fifty thousand barrels of oil. It was sold for half a million of dollars."

### KIDDER'S EUREKA TRAP FISH HOOK.

"Fisherman's luck" is merely a synonym for "just no luck at all." It is bad enough to have a provoking nibble, with no earnest and honest bite, but to have your bait taken repeatedly, and not secure your fish, requires some philosophy to bear with equanimity. The design of the hook represented in the accompanying engraving is to save the angler from these vexations, by surely securing the fish which has temerity enough to receive the barbs of this hook.

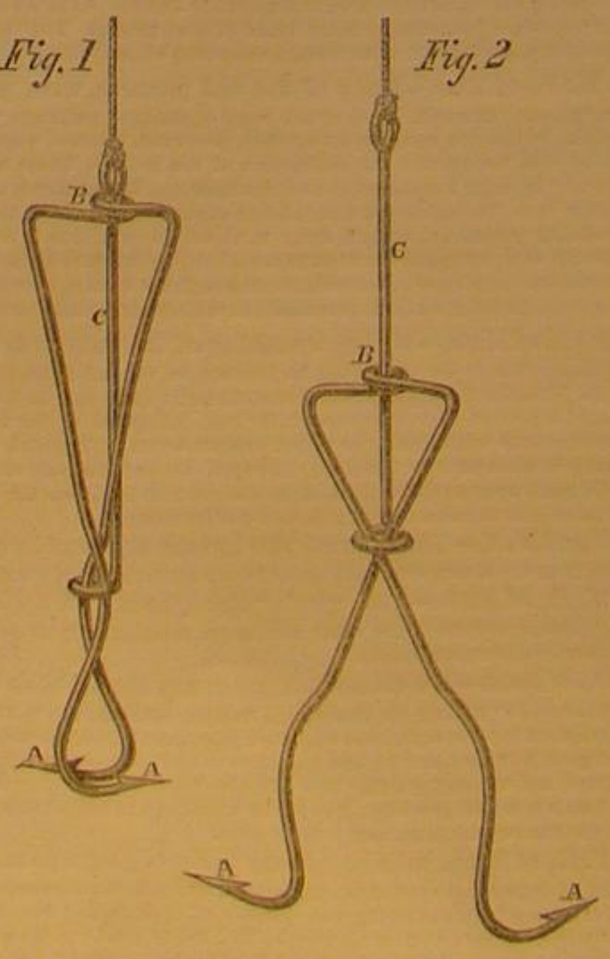



Fig. 1 shows the hook set or closed, and Fig. 2 the same sprung or open. The hook is a steel wire, the ends formed into points and barbs, A, and the center of the wire bent into an eye, B. Near the points the two arms of the wire are bowed outward, and, when sprung, as in Fig. 1, they cross or overlap. In this position they are held by a ring-clasp, C, to the upper end of which the line is attached. It is evident that a slight pull on the points, A, will slide the hook through the clasp, and allow its two sides to spring apart; of course, if the barbs are in the fish's mouth, this action will transfix the game, and hold it securely. It can be set instantly, by pushing down the clasp, and in the same manner it can be easily removed from the mouth of the fish. Its operation is readily comprehended from the foregoing.

Patented through the Scientific American Patent Agency, by Daniel Kidder, who may be addressed for the sale of the right at Franklin, N. H.

### American Guns and English Armor.

If I have hitherto refrained from exposing the hollowness of the ground of self-gratulation in which some of our artillerists have been indulging, in consequence of the alleged failure of the American 15-inch gun to pierce an 8-inch plate although that plate had previously been pierced by some of our guns not of the largest size, it is because I expected that some communications from America would deal with the question in a more authoritive manner than any English spectator could do. I send you herewith an extract from the New York *Army and Navy* journal, of the 10th inst., which perhaps you may think it useful to lay before your readers, and meanwhile permit me to express my conviction that the theories so precipitately adopted with reference to the supposed inability of the 15-inch gun to pierce 8-inch plates are wholly erroneous, and must be abandoned by all who wish to preserve any reputation for a sound acquaintance with such subjects. The so-called American Mammoth powder is not the powder used in the American navy, and why was not the common 60-lbs. charge of American navy powder employed? The powder used in the American navy is somewhat stronger than the English powder, and as much as 100 lbs. of Mammoth powder has been burnt in the 15-inch gun without damaging the gun at all. Why then were such small charges of powder used in the English experiments, and why were not chilled shot tried? One would almost imagine that the main purpose of the experimentalists was self deception. Let chilled shot be used in the 15-inch gun with heavy charges of good powder, and it will be found that the shot will be projected with ease through a target representing the side of the strongest ironclad we have, whether built or building.—Vindicator in *Engineering*.

[We should add, however, that "mammoth-grain" powder has lately been adopted in the navy for the 15 inch and 20-inch guns. It is thought by some ordnance officers that the service charge will, before long, be increased enough to give 1600 feet velocity to the 15-inch shot.

We have published several articles intended to show that the trials of the American 15-inch gun at Shoeburyness were inadequate to prove its power, and we have before us now a letter from one of our ordnance officers which sustains the assertion of *Vindicator*. Our authority says: "We never now use in the 15-inch gun less than 100 lbs. mammoth powder. We get with that charge over 1,500 feet velocity." Comment is unnecessary. Since writing the above, a cable telegram informs us that, with 100 lbs. of powder, the 15-inch shot passed entirely through the 8-inch target.—Eds. Sci. Am.]

### Errors in Scientific Journals.

We notice in *Engineering* of September 13 a set of valuable tables on steamship performance. Referring to the steamship *La Plata*—mate to Cunard's *Arabia*—in three tables we find her length put down as 284 feet; we may be wrong, but we supposed she was some 100 feet longer than this.

Again, the weight of each of her wheels is set down at 37·5 tuns each. Is this correct, and, if not, how many more mistakes are there in these tables?

We allude to this because we have been annoyed to find errors, owing to negligent reading of proof, in the late editions of Mr. Bourne's books.

Sand Paper.—We notice in the Fair a variety of samples of sand paper of a superior quality, made by Jones & Cromwell, of Brooklyn, N. Y. The grain is very uniform, sharp, and the paper tenacious. We understand that these makers are using new and peculiar mechanism, which improves the production and facilitates the manufacture.

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## THE CREATIVE PRIDE OF THE MECHANIC.

If any form of pride is justifiable and proper it is that of production, or calling into existence. The author feels a pride in his successful book, the writer in the influence of his articles, the business man in the enterprise he has awakened, the wealthy man in the fortune he has accumulated. Each and all feel an honorable pride in their own agency in achieving success. But none of them can feel the thrill of satisfaction which belongs to the mechanic or the inventor.

The author and writer have used only the means already prepared and needing only arrangement. This arrangement of words, phrases, and sentences, is their "style," and rarely can they justly claim the enunciation of original ideas. The human mind, in some age, has evolved them, in some form, before they reproduced them. They may, by giving them a new dress, or presenting them from a new point of view, add to the force or intensify the effect, but rarely is the writer a creator.

The same is true of the successful business man, and the accumulator of fortunes. They simply use the means provided at their hands, means in most cases already prepared and needing only the directing power of judgment and the controlling power of will.

But the mechanic, from misshapen materials constructs the noble edifice the storm-defying ship, and the thousand machines which become co-laborers with him in aiding the progress of the race. He, from crude matter, eliminates the moving, acting, almost intelligent machine, which performs the labor of hundreds of human hands in a better manner than those hands could do even aided by brains. He has the advantage of the thinker or writer in seeing, in palpable form, the result of his labor in beholding its action, and estimating its value. No producer could have enjoyed a higher degree of satisfaction than Fulton when his first steamboat successfully stemmed the current of the Hudson. What could have equaled the pride of Watt when his engine was fairly at work doing the labor of a hundred horses?

The author waits sometimes years for an evidence of the public's appreciation of his labors. He is open to criticism. Envious or prejudiced cynics charge him with plagiarism or pirating, or with lack of originality or talent Often no return of material profit succeeds his labor. He may be assured in his own mind that his production is meritorious, but he may find it difficult to convince others of the fact. He is compelled to appeal to the tastes and prejudices of others or to their appreciation of the truth; and possibly he is so far ahead of the demands of his time that he must wait for his utterances to do the work of educators before he will be understood and rewarded, and that reward may never come to him in this life.

The journalist is in a worse condition. A caterer to the present wants and changing caprices of the whimsical public, he may be unduly flattered on the one hand, or unjustly blamed on the other, or he may be tempted to use his position and prostitute his talents to the work of sustaining a rotten project or assisting in the designs of unprincipled and ambitious schemers. His work is constant and mainly secret and unknown. Few give him credit for aiding in some measure of public advantage or social reform, but rather claim for themselves the origination of the movement or the credit of giving practical form to his suggestions. He seldom knows whether his labor has been of effect or not and if he does ascertain that it was the moving power he is seldom personally benefited.

But the mechanic appeals directly to a powerful element, the material needs of the race. He constructs a machine which saves labor and gives those who introduce and use it the means of wealth. The crude material, shapeless and inert, becomes, under his hand and by the exercise of his skill, formed, finished, and endowed with life. It is a portion of himself and obeys his will. Even if envious detractors seek to rob him of the credit of his invention or skill his success contrasted with their failure is a sufficient refutation of the slander, and he can rejoice in the consciousness that others acknowledge his merits and appreciate his labors. Beside he has the gratification of seeing his creation grow day by day under his hands and in witnessing the ultimate full success of his endeavor. We doubt if any pursuit is more generous in its returns than that of the mechanic, not only in its material returns, but in the satisfaction its success offers to the workman.

## PHYSIOLOGY OF INVENTION.

It is a suggestive thought that the mind is more constitutionally adapted to the power of invention than it is to any other characteristic of being. The child is always inquiring, the youth, imitating, and the man, inventing. The vocation of life does not seem to alter these conditions. An active, energized mind habituated to thought, in its abnormal state, is capable of original conceptions. We have seen in dreams what we could not conceive while awake, and no principle appears to be more strongly marked as a propensity of the mind than its ever wakefulness to new thoughts and ideas. The deeper study which involves the walks of science, culling here and there a beautiful flower, is attended with fixed physiological principles worthy to be observed. One of these is the economy of the blood in its relation to the brain. The brain is always in motion. When an effort of memory is required there are conditions to be filled before it can be made to serve. The slightest thing we perfectly remember is away from us in a moment, if we are interested in viewing something else, hence we say "wait a moment," and presto! it is there. What is the cause or the servant that brings up this memory? It is the blood which by an effort of the will replenishes the organs necessary for service. A student of theology could not tell his age on being suddenly asked the question. One of two gentlemen called to see a lady of uncommon personal attractions who came herself to the door she asking the former gentleman his name entirely unlooked for by him, he turned to his friend very much agitated "what in the devil is it?" But the ability of the mind to serve in this respect is more apparent to us when we ask for time to recall an almost obliterated impression, and that may be the work of several hours. It is then that the long laborious process of revocation begins, which gives the brain the full benefit of all the blood it can command. It does appear that the same law governs the exercise of our other faculties. It is necessary to be in undisturbed quiet. The sacred injunction to devotion was when you have gone into the closet, "shut the door." It is indeed an indispensible condition that the whole mind be diverted from all other objects, and its concentration upon this one for moments or hours until the whole system is wrought up to the acme it is desirable to obtain. A single effort of this kind is worth more than a thousand hours amid the occupations of life eating and drinking and thinking at the same time while the poor stomach at the loss of the blood to the brain becomes dyspeptic, or the brain for use of the nervous power without sufficient blood, giving headache, and the body itself wreaking under the general disorder, makes the whole man sick and faint. When a man eats he wants the blood to help digestion. When he sleeps he wants it to be at comparative rest, and as it is the steam which works the engine of the mind give it its time and its place.

## THE COMBUSTION OF PETROLEUM BY THE RETORT SYSTEM.

We notice, in the columns of a cotemporary, a letter on the combustion of petroleum by the retort system, criticising the views of its editor on the same subject.

The chemistry of the writer of this letter is quite novel, and perhaps our readers may be interested as well as instructed by a glance at this unique view of the combustion of hydro-carbons.

The writer says, "I will describe the process: As the oil flows out of the pipe it falls upon the red hot bottom of the retort, and is vaporized. This vapor, which, it will be remembered, is a chemical combination of oxygen and hydrogen, at a temperature which renders it easily decomposed if brought in contact with chemical substances for which either of its constituents have much affinity. In this case, the oxygen has a stronger affinity for the carbon of the vapor, to an extent sufficient to form carbonic oxide, than it has for the hydrogen of the superheated steam; and, similarly, the carbon has a stronger affinity for the oxygen, than it has for the hydrogen of the oil vapor; they consequently unite forming carbonic oxide, each setting free the hydrogen with which it had been previously combined."

Thus, it is assumed, that enough steam is put into the retort, if decomposed, to form the combinations, which this writer not only asserts are made, but which it appears was the problem he propounded to himself at the outset.

Of course, the decomposition of the steam blown into the retort is simply imaginary, there is no evidence given to prove that such is the fact; but, on the contrary, if the statement of the temperature given is correct, and we assume it to be so, no such decomposition takes place, and this decomposing and recomposing theory falls to the ground. The statement that the oxygen (from the decomposed (?) steam) has an affinity for the carbon of the vapor, which he says is composed of "oxygen and hydrogen, to an extent sufficient to form carbonic oxide," is mere chemical *hocus pocus*. The reason that carbon, under any circumstances, combines with oxygen in the proportion to form carbonic oxide, is due to the existence of a proper temperature and the presence of a proper qnantity of oxygen; and the statement that "the carbon, which is part of the oil vapor, has stronger affinity for the oxygen than it has for the hydrogen of the oil vapor," renders his views still more foggy.

In short, after imagining the decomposition of the hydrocarbon and the steam, in a closed retort, instead of readjusting themselves back again into the combinations they had just been decomposed from, the carbon combines with the oxygen and sets free the hydrogen from both. That is his "theory."

This writer remarks: "The process just described is a cooling one, a great deal of heat being rendered latent (how much?) by the decomposition(?) of the steam, and *none gained* by the union of the oxygen and the carbon, in the formation of carbonic oxide."

As a matter of fact, a great deal of heat is generated when carbon and oxygen unite in the proportions to form carbonic oxide; the original discovery that "no heat is gained," exhibits still more plainly the extraordinary nature of the imaginary *hocus pocus* asserted to be going on inside of this mysterious retort.

The contents of the retort having been adjusted, as per hypothesis, "the proper quantity of air to convert this carbonic oxide into carbonic acid, and the hydrogen into water, is now admitted; and as the mixture of the air and the two gases issue from the burners, it is ignited by the heat of the flame, and the combustion is complete."

But in a few lines before this writer had declared that, in the union of carbon and oxygen, in the formation of carbonic oxide, "no heat is gained;" now he asserts that, by the combination of the carbonic oxide with another equivalent of oxygen, "the combustion is complete," which of course means the highest attainable heat with a given quantity of combustible matter.

So, according to his conception of combustion, while the formation of C. O2. (carbonic acid) is perfect combustion, and produces intense heat, partial combustion, or the formation of C. O. (carbonic oxide), produces no heat at all!

## FAIR OF THE AMERICAN INSTITUTE.

This exhibition is now in very successful operation. When the visitor first enters, especially if he be a stranger, the effect of the scene is bewildering. Along the whole northern side of the principal hall are lines of shafting driving a crowd of machines of almost every conceivable description. The whirr, the hum, and the bustle is confusing, but to the practical man is very pleasing. It is gratifying to see the interest manifested by ladies in this department, and to the engineer, machinist, and manufacturer, the exhibition is a school of pleasing instruction.

In the annex adjoining the machine department are the boilers which furnish steam for the engines. Several of them are somewhat unique. The Root boiler is a series of wrought iron pipes cut to the length of the boiler desired, and placed in parallel rows, both vertically and horizontally. On each end of each pipe is screwed a square block, and, as their edges fit to adjoining blocks, together they form the ends of the boiler when completed. Each of these blocks has sockets which receive return bends that connect each pipe with the one below and above. A cross pipe (steam space), connects the sections at the top of the front end and a similar pipe (water space,) connects them at the bottom back end. The boiler is set at a downward inclination from front to rear of about three inches to the foot. John B. Root, 500 Second ave., corner 28th street this city is the patentee, and he claims for this boiler "absolute safety from explosion; economy in fuel, weight, room, and cost, accessibility for repairs and facility for enlarging when the necessities of business require." He affirms that there can be neither foaming nor priming. The boiler is evidently a rapid generator of steam.

There are several of Davis' Patent Super-heating Boilers in the exhibition. These boilers are very simple in construction and lay claim to peculiar excellence mainly for their superheating arrangements. They are upright tubular boilers the tubes being arranged in concentric circles. The tops of those nearest the center are partially closed by caps with a small central hole while the outer ones are open to the smoke box. The object of this arrangement is to throw the heat outward against the greatest body of water, which is contained in the space between the tubes and the shell. Above the top tube sheet is a central steam dome surrounded by a circle of cast iron hollow spheres connected to one another by pipes, except two, one of which receives the steam from the dome and the other discharges it to the engine. The steam after leaving the dome makes the circuit of the spheres thus becoming somewhat superheated, as claimed by the manufacturers one hundred degrees above the ordinary temperature and increasing its expansive force fully one-third. It is an easy working boiler and quite a favorite.

Perhaps no boiler attracts more attention than the "Gerner boiler." It is quite a curiosity. The shell contains a cone shaped cylinder, the small end over the grate, and inclined so that the top longitudinal line is level. This incloses a similarly-formed tube or cone of a diameter sufficient to leave a space of three inches all around its outer surface. The exterior cone is not entire, but has a longitudinal opening on its top, the two sides of the apperture being connected by straps.

The inner cone is the steam chamber and the space between the two contains water up to a certain hight. Communication between the two is by means of one or more double pipes which lead the steam made in the water space into the

inner cone or steam cylinder from whence it is drawn to the engine. The circulation of water in this boiler appears to be as near perfection as possible, and its evaporating power is evident from the great fact that twelve and a half pounds of water has been evaporated by one of coal. We shall have occasion again to refer to this generator.

Two large engines, one in each corner of the room, furnish most of the power to drive the machinery, although there are a number of smaller engines on exhibition. The engine in the eastern corner is from the Washington Iron Works, Newburg, N. Y., and has Wright's patent variable cut-off, which is worked by the governor. The engine is finely finished and performs its work noiselessly. The valves are poppet valves, operated by trippers. Except their working, the machine is almost perfectly noiseless. We have not yet seen any cards taken from the engine. It is to be soon indicated.

At the other end of this division is an engine from the Hope Iron Works, Providence, R. I., called the Babcock & Wilcox Engine, that runs the western half of the machinery section. It is externally very simple in appearance, and the valve motions are governed by the regulator, as in the other machine. Slide valves instead of poppet valves are used in this engine, a circumstance which may commend this engine to many mechanics. It is certain that the engine performs its work with great smoothness and perfect regularity, a statement that is worthy notice when the circumstances of its work are taken into consideration.

We have not time further to particularize the objects exhibited, only to advise those whose time will admit of a detailed examination, to visit this exposition of the arts, and those who cannot spare that necessary time, to take at least a leisurely walk through the immense building.

## SALT IN THE ANIMAL SYSTEM.

In No. 13, current volume, we copied a brief paragraph from a medical journal which denounced the use of salt as a condiment, stating that it was "never useful; always injurious." The following will show that "doctors disagree:"

Herr Schultz, a chemist of Berlin, claims, after long and patient researches to have found the cause of electricity in human bodies. He attributes it to the presence of chloride of sodium, or common salt, in the system. In his experiments he asserts that the amount of electricity was always in direct proportion to the quantity of chloride of sodium found in the tissues. He would advise, therefore, all invalids suffering for electricity in the system to use salt liberally with their food, and to avail themselves freely of the benefits of ocean breezes and baths.

There can be no reasonable doubt of the benefit of salt to the human body. It would seem as superfluous to discuss the propriety of using common salt with our food as to argue the healthfulness of water or bread, as salt has been almost universally used by both men and animals since the creation of the world. "Salt," says the *Encyclopædia Britannica*, "forms an essential constituent of the blood, the loss of saline particles therefrom by the secretions, the tears, the bile, etc., being repaired by the use of common salt as a condiment." And further, "The gastric juice of the stomach contains free hydro-chloric acid, which is doubtless derived from salt taken with food." In *Brande's Encyclopædia* is the following statement: "Salt is next to bread the most important necessary of life." *Stockhardt's Chemistry* says: "We find common salt everywhere in nature, because it is indispensable to the life of animals and plants." In fact and in short, digestion and even life itself would cease were it not for the presence of salt in the human system.

### Indestructible Railway Sleepers.

Numerous attempts have been made to render the timber sleepers on railways more durable by enabling them to resist the destructive action of damp and moisture. Experience has shown, however, that the results produced have not been proportionate to the extra cost incurred. The average length of prepared sleepers has been found to be about five years, or, considering the additional cost, showing but a slight increase of longevity over the timber in its natural state. Some of our railway managers have accordingly decided upon abandoning the use of prepared sleepers on their lines. A process of indurating has, however, been brought under our notice during the last week which promises results of a most satisfactory character, and which is well deserving the attention of managers of our railways. The inventor of the process is Colonel Szerelemy, whose name is well known in connection with the preservation of portions of the stone of the new Houses of Parliament. The material employed possesses, we are informed, qualities in many respects identical with that which has so remarkable an effect upon the surfaces of stone. Applied to timber the preservative effects are very remarkable, as instanced in the specimens which were submitted to the inspection of a number of scientific gentlemen last week. They were treated by the process in 1851, and were shown in the exhibition of that year.

Like many other germs of great inventions, which were passed over unnoticed at that time, these prepared sleepers did not attract the attention which they deserved. Besides, being but newly treated, the inventor, though perfectly convinced of the completeness of the induration which he had effected, could not appeal to that test of experience which is considered alone sufficient to satisfy the minds of practical men. When the sleepers were removed from the exhibition building they were buried in the ground, and, if not wholly forgotten, they have been, at least, undisturbed, until the recurrence of the exhibition at Paris has directed anew the attention of Colonel Szerelemy to the existence of those sleepers of sixteen years ago. The timbers were accordingly unearthed, and to the surprise of many, though certainly not of the inventor himself, the timber is as sound as on the day when it first came into his hand. The sleepers thus prepared are now on view at the Albion Works, Battersea, and managers of railways and of other public works, who really desire to keep down working expenses, would do well to pay a visit to the place, and ascertain for themselves the value of this mode of treatment. We believe that some astute Americans, who have profitted by their visit to the Paris exhibition, have within the last week purchased the rights of the inventor for the United States.—*London Railway News.*

### Art and Science.

The Jaquard loom and the lace weaving machines of Nottingham, together with the numerous inventions for weaving or knitting stockinett—the machines with which our carpets are wrought, demand our admiration, and we feel proud that our social institutions have led to results so satisfactory. The recent improvements in the manufacturing of dyes, yielding colors so pleasing to the eye, from substances formerly considered waste, is surprising to all of us, even though we know the various steps by which the discoveries have been made. But with all our boasted progress it is doubtful if we have in all respects surpassed some of those nations which we regard as half civilized. M. Huc speaks of seeing in Central China, some thirty years ago, a cast iron figure of one of their Grand Lamas, weighing at least 25 tuns, so nicely cast, that although in about 80 pieces, yet it had the appearance of a solid casting. And it is well known that in architecture, some of the cities of Northern India are not surpassed by anything European. The beautiful light fabrics made from the fibrous blades of the pineapple, by the unaided fingers of the Persians, are well imitated by Europeans, but not surpassed in lightness and evenness of texture. To rival the famous shawls of Cashmere, they have produced articles worthy of admiration, but they fall short of the productions of the original makers. The amount of labor the finer shawls of Cashmere represent, makes it impossible for Europeans to compete with Asiatics, even if the patience and skill were equal. The Vale of Cashmere will stand unrivalled in this particular line of production until laber become so cheap in other countries, or society there receives some impulse which shall raise the price of labor to an equality with the rest of the world. There has been many efforts to produce the material in other countries, but the quality quickly deteriorates when the animal is removed from the peculiar clime of its native vale. Even a short distance changes the quality of the fibre, so much, that to prevent imposition the Maharajah has taken the inspection of the shawls into his own hands, so that now the inferior goods of the adjacent districts cannot be sold under the well earned reputation of real Cashmere. There is a capacity to take colors in the real Cashmere that is a distinct mark to those acquainted with the goods, and the success of the dyers must also be due to some cause not yet fully understood outside of the craft. The pride in which we are apt to wrap ourselves, upon contemplation of the vast progress everywhere visible over Europe, grows thin upon comparing the effective grouping of colors so exquisite in their individual shades, and the perfection of workmanship upon a fine Cashmere, with the product of our looms; and we wonder how a people whom we consider so low in our scale of civilizution, can be so high in the arts which constitute our especial pride.—*London American.*

### Tempering Steel Springs.

When it is required to harden small spiral springs which are made of steel wire, or springs for locks, or any of the other kinds of slight springs, they will require to be uniformly heated to a cherry-red heat, and then immersed in cold oil (not oil which has been long in use and become thick), and entirely quenched. Springs of a medium thickness will be the better for being cooled in water, the water being previously heated to about 60° of heat, and the surface of which should be covered with a film of oil. The thickest kinds of springs will be the better for being cooled in pure water heated to about 70° of heat. Springs require to have the greatest amount of elasticity given to them; consequently, they will, after they are hardened, require to be tempered. They may be tempered separately by smearing them over with oil or tallow and then holding them over a clear fire, or in a hollow fire, or in the inside of a piece of large iron pipe inserted in the midst of the ignited fuel of an open fire, and uniformly heating them until a white flame burns upon them, or, in other words, until the grease burns off with a blaze. If it is a spiral spring (or any other kind of spring which is not thicker at the ends than at the central part) which is being tempered, and which is shorter in its length than the length of the fire, it will be very apt to become heated at the extreme ends first; consequently, as soon as the two ends arrive at the proper temperature (which is known by the grease taking fire) the spring must be immersed in oil: it must not be entirely quenched, but must be taken out of the oil again immediately, and then again exposed to heat. If the oil upon the ends take fire again sooner than the oil upon the middle part of the spring, it must then be immersed again in oil, and then again exposed to heat, and so on until the oil burns uniformly upon all parts; otherwise the spring cannot acquire a uniform temper. After the spring has become uniformly heated to the proper temperature, and the oil burns uniformly upon it, it must then be again immersed in oil, then taken out again immediately and allowed to become cool in the air of its own accord. It will then be fit for use. All kinds of springs, whatever their shape or whatever their size, may be tempered perfectly by this method. It must be borne in mind that there is but one certain temper which gives to steel its greatest amount of elasticity; consequently, the stiffness or pliability of springs must be regulated by the substance and shape of the steel from which they are made. A very convenient way of tempering a large quantity of small springs at once (they must of course, be previously hardened), and of heating them uniformly, no matter how irregular their shape, provided the heat is not too suddenly applied, is to bind a quantity of them together with a piece of iron binding-wire and then to put them into a suitable vessel with as much oil or tallow as will cover them. Then place them over a small clear fire, and slowly heat the whole. Just as the oil begins to boil the springs must be lifted out, when a white flame will burn uniformly upon the whole of them: they must then be immersed in cold oil,—they need not be entirely quenched, but they may be taken out of the oil again immediately and allowed to become cool in the air of their own accord, and when cool, they will be like those which have been blazed off separately over the fire, and fit for use. A separate spring may be attached to a separate piece of wire, which may be lifted out of the oil occasionally, to ascertain when the whole is at the proper heat, which is known by the white color of the flame upon the spring.

Large springs may be tempered by this method, but the time saved with large springs will not be sufficient to compensate for the waste of oil; consequently, it will be more economical to temper the largest springs by blazing over the fire.

It would be well for those who are not accustomed to the operation, before attempting to boil a large quantity of springs, to boil a single one in a small quantity of oil, and so make themselves acquainted with the proper temperature of the oil and the proper temper of the spring.—*Ede on Steel.*

### The Mont Cenis Summit Railroad.

We have already noticed the completion of this great work of engineering, and the success of a trial trip made over the line a few weeks since. An English exchange furnishes us with the following interesting particulars additional to the brief cable announcement we previously published:

"A train, composed of an engine and two carriages, left the St. Michel station at 6:30 A. M., on the 21st of August. The morning was admirably adapted for the trip, the sun shining with great brilliancy upon the Alpine peaks and the numerous glaciers which are visible in different parts of the route.

"After leaving the deep valley in which St. Michel is situated, the line passes by a gradient of one in thirty to the Pont de la Denise, where an iron bridge spans the river Arcq, near the site of that which was carried away by the inundations of last year. As the little train passed the village of Fourneau, the workmen of the Grand Tunnel of the Alps turned out *en masse*, and, as at all other parts of the route, they were observed stooping down, and even endangering their lives for the purpose of inspecting the unusual mechanism of the engine for working on the central rail. The first very steep gradient, of one in twelve, was seen in passing Modane, and, foreshortened to the view, appeared on the approach as if impossible to surmount; but the engine, the second constructed on this system, had already proved equal to the task on the experimental line, and, clutching the central rail between its horizontal wheels it glided quickly up, under a pressure of steam not more than eighty pounds to the square inch, without apparent effort

"The progress was purposely slow, because no engine or carriage had previously passed over the line, and also to give opportunity for examining the works. The damages to the road on which the line was chiefly laid were found to be substantiall repaired by the French government. The magnificent scenery around, and the waterfall near Fort Sessaillon, were much admired, as the sharp curves afforded different views, while passing on the edges of the deep ravines. The train entered Lauslebourg Station under a triumphal arch, having accomplished twenty-four miles of distance, and attained an elevation of two thousand one hundred feet above St. Michel, From this point the zigzags of ascent commence, and the gradients over a distance of four miles were for the most part one in twelve. Looking down from the train near the summit, as if from a balloon, four of the zigzags were visible at the same instant to a depth of two thousand feet. The power of the engine was satisfactorily tested in this ascent, and the summit was reached under salvos of artillery from an improvised battery, and amid the cheers of French and Italians who had gathered to welcome the English on the frontier.

"The engine came to a stand under a triumphal arch, at an elevation of 6,700 feet above the sea. Flags of the three nations, and a silk flag specially presented by Signor Ginaoli to Mr. Fell, waved over a sumptuous breakfast, also provided by that gentleman. The hospice, the lake, and the plateau of the summit, surrounded by snow-clad peaks and glaciers, rising to an elevation of from 10,000 feet to 13,000 feet were passed, and the portion of the descent commenced from the Grand Croix. The railway here follows the old Napoleon Road, which was abandoned long since for diligence traffic on account of the dangers from avalanches. Masonry-covered ways of extraordinary strength had here been speedily provided for the railway. The descent to Susa was a series of the sharpest curves and steepest gradients, on which the central rail had been continuously laid. The valley of the Dora, with Susa and the convent of San Michel, and even the Superga above Turin, visible for thirty miles in the distance, presented a magnificent panorama as the train wound through a clear atmosphere round the mountain side. The confidence of the party was manifested by their crowding round all parts of the engine, and they thoroughly enjoyed the ever changing scenes as they passed round the edges of the precipices Susa was entered amid the acclamations of multitudes of spectators. Thus was completed a journey unexampled in its character, both as respects the steepness of gradients, the elevation of the summit level, and the difficulty with which the curves and precipices were overcome."

# OFFICIAL REPORT OF PATENTS AND CLAIMS

## Issued by the United States Patent Office,

FOR THE WEEK ENDING SEPTEMBER 24, 1867.

*Reported Officially for the Scientific American*

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each Caveat.....$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. Residents of Canada and Nova Scotia pay $500 on application.

☞ *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.*

69,061.—WASHING MACHINE.—Arthur Adair, Buffalo, N. Y.

1st, I claim the false ends, B B, combined with the pounder, P, through the connecting chords, s s, and operating substantially as herein specified.

2d, I claim the false ends, B B, combined with the rubber springs, r r, and operating substantially as herein set forth.

69,062.—BOOK COVER PROTECTOR.—Charles L. Alexander and Victoria A. Osborn, Washington, D. C.

1st, We claim the elastic bands or straps, a a, etc., to form an expansible connection for the two halves of the cover protector, substantially as described.

2d, The elastic bands or straps, b b, etc., in combination with the flap, c c, of center piece, C, and the folds, D D and G G, substantially as described and for the purpose set forth.

3d, Such a book cover protector or mode of covering bound books as by reason of its expansibility and extensibility may be adjusted to books of various sizes, substantially as described.

69,063.—BOSHES OF HEATING AND PUDDLING FURNACES.—William Batty, Lawrenceburg, Pa.

1st, I claim the bosh of a puddling or heating furnace cast upon a wrought metal water circulating tube or tubes, substantially as and for the purpose described.

2d, The water chamber of a puddling or heating furnace arranged on rails or ledges under the bottom of the puddling or heating chamber, substantially as and for the purpose described.

3d, The removable front plate of the bosh connected by tongues and grooves to the bosh, substantially in the manner and for the purpose described.

4th, The removable fire plate, D, fitted in a recess in the top of the front plate and held in place by tongues and grooves, substantially as and for the purpose described.

69,064.—METAL SLEIGH KNEE.—William D. Baughn, Milford, Mich.

I claim the tenon, D, with the slot, F, through which passes the bolt, above described.

69,065.—CHURN.—Samuel and Marion Bear, Versailles, Ohio.

We claim the slats or uprights placed substantially in the churn as shown in combination with the curved dasher, as set forth in the specification.

69,066.—BOOT SHANK LASTER.—C. W. Bliss and O. M. Adams, Milford, Mass.

We claim as our invention the said boot shank laster composed of the cam, A, the handle, B, and the shanked claw, C, arranged and applied together, as specified.

69,067.—EXTENSION NOZZLE AND VENTILATING OIL CAN.—William Bonner (assignor to H. M Bayless), St. Louis, Mo.

I claim the lip, b, slide, c, and tube, d, when constructed and arranged substantially as shown and specified.

69,068.—DRAWER FOR FURNITURE.—Charles Brada, Newton, Mass.

1st, I claim the combination of the bearing, d e, in the frame or casing and the projecting, g, on the drawer, as and for the purpose specified.

2d, I claim the strip, f, as and for the purpose set forth.

69,069.—BOAT-DETACHING TACKLE.—J. M. Brooke, Lexington, Va.

1st, I claim the hook, A, with a curved slot, b, substantially as and for the purpose described.

2d, The combination of the slotted loaded hook, A b, stand bolt, G, of a boat, and tackle block strap, k, constructed substantially as herein described.

69,070.—SLUICE GATE FOR DAMS OR LOCKS.—Felix R. Brunot, Allegheny, Pa.

1st, I claim in a sluice way in a dam, dock, lock or other hydraulic structures a hollow sluice gate furnished with a valve or valves for the admission or exit of water and so placed in a chamber or recess in the sluiceway, lock, or other structure furnished with apparatus for admitting the head of water into the chamber under the gate or emptying the chamber of water as to raise or lower the gate at pleasure, substantially as and for the purposes hereinbefore described.

2d, The standing pipe open at any required hight for the admission of water into the sluice gate in combination with the hollow sluice gate or float into which the pipe opens, constructed and operating substantially as described, for the purpose of closing or lowering the sluice gate automatically at the required stage of water, as hereinbefore set forth.

3d, The gates for sluices, docks, locks, and other hydraulic structures in combination with hollow floats so constructed with valves for the admission or exit of water as to raise and lower or open and close the gates at pleasure in the manner substantially as hereinbefore described and for the purposes set forth.

69,071.—CORN PLOW.—M. C. Buffington, La Harpe, Ill.

1st, I claim the bent axle, A, with the wheel arms, C, and draft pole, B, attached as shown in connection with the pulleys, d d e, and draft chain or cord, E, all combined and arranged to operate in the manner substantially as and for the purpose set forth.

2d, The attaching of the plow beams, F, to the axle, A, by means of the tubes, h g, the latter being fitted on rods, f, attached to the parts, c, of the axle and the former secured by pins, j, between plates, i i, at the front ends of the plow beams.

3d, The brace rods or bars, k, connected with the ends of the rods, f, and the rear end of the draft pole, B, substantially as and for the purpose specified.

4th, The combination of the axle, A, draft pole, B, brace rods or bars, k, and the universal joints which connect the plow beams with the axle, all being arranged substantially as and for the purpose specified.

69,072.—REIN SNAP.—P. L. Butler, Utica, N. Y.

I claim a rein snap having two springs, c d, or their respective equivalents, applied to it, so as to operate substantially as specified.

69,073.—MACHINE FOR CHOPPING MEAT.—Hiram Chamberlain, Calais, Me.

I claim the combination as well as the arrangement of the slicing and mincing or chopping mechanisms substantially as specified, the slicing mechanism consisting of the rotary wheel with its slicing and cross-cut knives, the hopper and the wheel case, and the means of revolving the wheel and the mincing mechanism consisting of the rotary mincing tub, its reciprocating knife and mechanism for operating the two, as specified.

I also claim the combination of the adjustable shoe, K, with the hopper and the slicing wheel provided with the slicing and cross-cut knives, as described.

I also claim the combination and arrangement of the studs, g g, and the retainer or arched bar, s, with the frame, A, and the slicing wheel case, C, made in two parts and applied to the slicing wheel, as specified.

I also claim the combination and arrangement of the slider, u, and its guides, v v, with the mincing mechanism when connected with a slicing mechanism and so as to operate therewith, as set forth.

69,074.—NECK YOKE.—W. B. Chapman, Waukau, Wis.

1st, I claim the hinged metallic clasp, Fig. 2, when used in combination with the leather or other filling, b', substantially as and for the purposes set forth.

2d, The use of the hinged metallic clasps, C and D, or either, as and for the purposes set forth.

3d, The use of the clasps, B C and D, in combination with the neck yoke, A, as described for the purposes set forth.

69,075.—DUMPING WAGON BOX.—Geo. R. Clark, Livonia, N. Y.

I claim the construction and relative arrangement of the several parts, a a a f h and D, constituting a dumping wagon box, substantially in the manner and for the purposes herein shown and described.

69,076.—SEED PLANTER.—Nicholas Clute, Schenectady, N. Y., and Oliver W. Marshall, Columbus, Ohio.

1st, We claim a seed planter so constructed that when applied to the leg of a person the vibration of the leg or the bending of the knee in the act of walking will work the lever and operate the segment slides or valves and deliver the seed to be planted.

2d, We claim a hollow lever working on a pivot and carrying a perforated segment or slide to receive and deliver the seed into and through the lever, substantially as described.

3d, And in combination with the segment above claimed, we claim the perforated loose segment, P, between the segment, L, and the box.

4th, In combination with the delivering segment, L, we claim the stationary segment, Q, substantially as described.

5th, Also in combination with delivering segment, L, we claim the sliding segment, S retaining and holding the seed when it is desirable to stop planting.

69,077.—BALANCED "HEAVE-UP" FOR ROLLING IRON.—Josiah Copley, Jr. (assignor to Josiah Copley, Sen.), Allegheny City, Pa. Antedated AUG. 17, 1867.

1st, I claim, combined with rolls for rolling iron, an improved balanced "heave-up," constructed and counterpoised substantially as herein described and for the purpose set forth.

2d, The combination of the platforms, C and C', frames, D, levers, I, arms, and counterpoise, h, with rolls for rolling iron, substantially as herein described and for the purpose set forth.

69,078.—SELF-ACTING VENT FOR CANS.—E. M. Crandel (assignor to Lorette M. Crandel and E. T. Hollister), Alton, Ill.

I claim the vent or air duct, C, when applied to the can, A, in the manner and for the purpose described and shown.

69,079.—DRIVING BIT.—E. S. Dawson, Syracuse, N. Y.

I claim a bit having a stiff mouth piece constructed of twisted wire with a soft rubber covering, as herein represented and described as an article of manufacture.

69,080.—FORGING APPARATUS.—T. B. De Forest, Birmingham, Conn.

1st, I claim the hammer, E and E', projected from the pistons and operated through the medium of the steam cylinders, C and D, arranged as described in combination with a vibrating or receding anvil, constructed and arranged so as to present a face to each hammer, substantially in the manner herein set forth.

2d, The arrangement described for operating the cut-off valve rods, H2 and H3, so as adjust the operation of the hammer or hammers, substantially as set forth.

3d, The bar, J, in combination with and carrying the feeding and cutting-off apparatus described, hinged to the frame so as to be turned from the anvil, I, substantially as herein set forth.

4th, The gage, L2, in combination with the feeding device, all constructed and operated substantially as and for the purpose specified.

5th, In combination with the slide, L, and clamping lever, L', I claim the gage, L2, arranged so as to be operated by the movement of the lever, L1, substantially as described.

6th, The combination of the two cutter heads, P1 and P2, with the slide, R', and the stud, R2, and cam, R, constructed and arranged so as to operate substantially as set forth.

69,081.—CULTIVATOR.—E. F. Dehnst, Swan Creek, Ill.

1st, I claim the frame, A B G F, beams, D D D D, cross piece, M, rods, o o s s, connecting bar, r", and levers, v" v," constructed as described and for the purpose set forth.

2d, The levers, n" n," in combination with the main frame and beams, D, substantially as described and for the purpose set forth.

3d, The cross piece, M, in combination with the rods, s s o o, and beams, D, substantially as described and for the purpose set forth.

69,082.—BOOT AND SHOE TIPS.—A. B. Ely, Newton, Mass.

I claim a molded shoe tip made of rubber mixed with groundings or other suitable fibrous material, substantially as described.

69,083.—PLOW.—J. D. Evans, Pleasant Hill, Ga.

I claim as my invention and desire to secure by Letter Patent the foot, A, and regulator, B, as pivoted with bolts at C, and clamped on both sides of the beam, D, at E and E', when arranged and combined as herein described and for the purposes set forth.

69,084.—HORSE HAY FORK.—Owen Evans, Alliance, Ohio.

I claim the lip, I, link, E, and T-shaped lever, F E', as arranged in combination with the shaft, D, provided with notch or mortise, H, and foot, C, for the purpose and in the manner as set forth.

69,085.—ROLLING APPARATUS FOR ROLLING CHAIRS FOR RAILROADS.—David Eynon (assignor to Tredegar Company), Richmond, Va.

1st, I claim the rolls grooved as described and shown in the drawings.

2d, I also claim the flattening rollers arranged in rear of the fifth groove, as described for the purpose set forth.

69,086.—BRACE FOR BORING BITS.—James B. Fellows, Concord, N. H., assignor to C. C. Jones, Portland, Me.

I claim the combination of the hook, B, bolt and nut, d, when the bolt is set vertically in the part, A, of a bit stock and the hook, B, rigidly attached to the said bolt, d, is employed to embrace and hold the borer, c, in the part, A, or release it therefrom, substantially as herein set forth and described.

69,087.—SNAP HOOK.—Kasson Frazer, Syracuse, N. Y.

I claim the constructing of a snap by a combination of the parts, A B C and D, or their equivalents, substantially as and for the purpose described.

69,088.—CHURN.—Jacob W. Gault, Pleasant Township, Ohio.

I claim the combination and arrangement of the balance wheel, treadle, adjustable connecting rod, churn body and dasher, when the several parts are constructed and operated as herein set forth.

69,089.—ANIMAL TRAP.—Joseph Haddleton (assignor to himself and John Snow), Rochester, N. Y.

I claim the hinged scrap or bail, b, in combination with the door, D, of animal traps for the purpose of automatically locking the same when closed, in the manner herein shown and described.

69,090.—MACHINE FOR FORMING THE EYES OF PICKS, ETC.—H. M. Hamilton, New York City.

1st, I claim the arrangement of the block, K, lever, K1, and bolt, K2, with the frame, H2, and cam, J, operating substantially as described.

2d, I claim the follower, R, acting upon the lower surface of the blank, in opposition to the descending punch and operated by the weighted lever, substantially as described.

3d, I claim the detaching and detaining devices for the lever, D', consisting of connecting rods, O O2, and lever, M2, which unclutch the chain drum and a pawl or latch, N, acting as a detaining trigger.

69,091.—LAMP.—Henry L. Hanson, Portland, Me.

I claim the arrangement of the removable metallic cone of the glass cylinder in the manner and for the purposes set forth.

69,092.—PUMP.—H. A. M. Harris, Philadelphia, Pa.

1st, I claim a double acting piston constructed substantially in the manner described, whereby I produce a continuous current through the piston by its reciprocation.

2d, The combination of the double acting piston constructed substantially in the manner described with the tubular piston rod the pump cylinder and air chamber for the purposes set forth.

3d, The combination substantially in the manner described of the double acting piston head, with the tubular piston rods and cylinder for the purpose set forth.

69,093.—ROTARY CHURN.—John Harwood, Cobleskill, N. Y., assignor to himself and C. L. G. Blessing, Albany, N. Y.

1st, I claim the employment of a weighted box, B, in combination with a rotary churn dash as shown and described.

2d, The combination of weighted box, B, with a churn dash in combination with the adjustable frame, W, substantially as and for the purpose shown and described.

69,094.—WAGON SPRING.—B. Hershey, Erie, Pa.

I claim the use of the tortion spring with its attachments above described as applied to freight wagons or carriages of whatever kind to which they may be properly attached.

69,095.—HEMMING-GUIDE FOR SEWING MACHINE.—C. J. Holcomb, Macon, Mo.

I claim the combination and arrangement of the slotted adjustable plate, A, tongue, B, set screws, C, folder, D D', hemmer, E, slide, F, and screw, G, all constructed and operating in the manner and for the purpose set forth.

69,096.—PREVENTING INCRUSTATION OF STEAM BOILERS.—J. L. Husband, Philadelphia Pa.

I claim the affixing absorbing or magnetic points and bars into and through the boiler shells with insulated cap, all as herein before described and substantially set forth.

69,097.—HOLDER FOR WHITE-WASH BRUSHES.—Anthony Iske, (assignor to himself and C. J. Walser,) Lancaster, Pa.

I claim the combination of the disk, A, provided with stationary pin, P, the notched or perforated disk, B, and the tightening screw, C, when constructed applied and operating substantially as described.

69,098.—MODE OF DYEING AND EMBOSSING TABLE AND PIANO COVERS.—Alexander Jack, (assignor to himself and Edward Brierly) Milton, N. H.

I claim my improvement in the manufacture of printed table cloths or other articles of like character the same consisting in the combination of the process of dyeing by frames as described with that of embossing or printing the material so dyed or those of embossing or printing at one and the same time as set forth.

Also the combination and arrangement of medallion or separate color resisting blocks, b b b, with the common plaid or stripe dyeing frames, a a, as described whereby the stripe or plaid dye frames may be used as occasion may require for dying cloth with grounds having undyed medallions, as set forth.

69,099.—SUB-SOIL PLOW.—M. R. Jones, Bradford, Wis

1st, I claim a sub-soil plow combined with a common plow so that the bottom of the preceding burrow may be plowed by the sub-soil plow immediately forward of the burrow slice that is being turned by the common plow substantially as and for the purposes described.

2d, Sub-soil plow, I, shank, K, with countersinks therein substantially as described, thumb screw, p, bar, L, draft rod, C, and beam, H, when the whole are constructed together and used substantially as and for the purposes described.

3d, Beams, C and H, in combination with the devices, L k, and u and M d and e, and the equalizing bar, G, for the purpose of adjusting the distance between, C and H, substantially as and for the purposes described.

4th, A general arrangement and combination of the parts, F D G H K C I M and O, when the whole are connected together and used substantially as and for the purposes described.

69,100.—CURRY COMB.—Wm. P. Kellogg, Lansingburg, and Miles Sweet, Troy, N. Y.

We claim in a curry comb, a series of single comb-strips, A, having a base, b, turned on only one side of each comb-strip, when the bases of the comb-strips are arranged with their longitudinal edges, e f, close together and fastened by rivets, c, to a back plate, D, substantially as herein set forth.

We also claim, in a curry comb a series of comb-strips having bases fastened by rivets, c, to a back plate formed with corrugations, k, along the longitudinal edges of the bases of the comb-strips substantially as herein set forth.

69,101.—MEANS FOR WINDING OR DELIVERING YARN FROM SPOOLS.—Robert Kershaw, Norristown, Pa.

I claim the combination of the cap, D, with a conical headed stationary spool as and for the purposes described.

69,102.—SEAT FOR CARRIAGES.—Charles P. Kimball, Portland, Me.

1st, I claim supporting a jump seat such as is shown at d, when the same is in use, as the forward seat of a vehicle, by adjustable stops attached to the seat itself, the carriage body and operating against the posts of a carriage body and operating against the posts of a carriage, the supports of the seat, substantially as herein set forth and described.

2d, In combination with the pivoted supports, e, of the carriage seat and the adjustable stops, as described, I claim shortening the seat, d, so that it is capable of being placed in either of the three positions shown in fig. 1, substantially as described.

69,103.—WATCH KEY.—E. M. Kimball, Toledo, Ohio.

I claim a watch key constructed with a sharp edge or blade, b', substantially as herein set forth for the purpose specified.

69,104.—CAST IRON KNEE FOR SLEIGHS.—Benjamin Knapp, Bloomville, Ohio.

I claim the knee or brace, D, of cast or wrought metal secured to and combined with the frame and runner of a sled or sleigh by means of clips or bolts fitting in grooves along each side of the knee substantially as set forth.

69,105.—WHIFFLETREE.—John W. Larmore, Harrison, Ohio.

I claim the arrangement of the perforated stretcher, A a a', hooked rod, B b b', adjustable loop or hook, C c, and set screw, D, for the purpose set forth.

69,106.—SAFETY BRIDLE.—Elias W. Lindeman, (assignor to himself and M. S. and H. H. Harnish, Manor Township, Pa.

I claim the arrangement and combination of the washer, D D', on the sliding loop, E, when formed out of the continuous strap, C C', forming the head stall and martingale of the bridle and passing through the same ring, A, of the bit all applied in the manner shown and for the purpose specified.

69,107.—ELEVATING AND CONVEYING DEVICE.—William Louden, Fairfield, Iowa.

1st, I claim an elevated track or railway, a, when suspended by means of ropes, chains, or other similar fastenings in combination with the travelling pulley, D, and hoisting tackle, H, all arranged to operate substantially in the manner shown and described.

2d, The arrangement of the uprights, B B, in combination with the bar, a, and ropes or chains, C C, substantially in the manner as and for the purpose set forth.

3d, Locating the pulley, M, independently of the track or railway, A, in a position elevated to such an extent that the counterpoise weight, W, will act as a support to the track substantially as set forth and described.

4th, The stop, S, on the rope, I, substantially for the purpose set forth.

5th, Attaching the pulley block, E, to the bar, A, in the manner shown and described and for the purpose set forth.

6th, The stop or block, L, having its inner end concaved, placed upon the bar, A, and used for the purpose specified.

69,108.—GATE.—H. Mansfield, Warsaw, Ind.

I claim the cam, D, having sharp projections, P P, for carrying a gate shut, and the short curves, K K, for holding it closed in combination with conical rollers, E E, arranged to turn in the projections, I I, substantially as set forth.

69,109.—CORN PLOW.—John Marsh, Seneca, Ill.

1st, I claim the slotted timbers, F F, with their holes, I I I I, and their trunnions, G G, substantially as and for the purpose described in the foregoing specification

The iron straps or loops, H H, at the ends of the plow beams, E E, in combination with the frame, A, substantially as and for the purpose described

3d, The shovels, K K K K, with their upwardly projecting tail ends, substantially as and for the purpose described in the foregoing specification.

69,110.—SYRINGE.—Morris Mattson, New York City. Antedated Sept. 6, 1867

I claim the combination and use in syringes, consisting of an elastic bulb and discharge pipe merely without the combination of valves to regulate the admission and discharge of any fluid, of a flexible tube between the elastic bulb and discharge pipe substantially as and for the purposes set forth.

69,111.—HOUSEHOLD UTENSIL.—W. C. McGill, Cincinnati, O.

1st, I claim the curved cross plate or hilt, E, in combination with the knife A, and handle, D, made and constructed substantially as and for the purpose of a can opener and plate or pan lifter, as herein set forth.

2d, The corossed steel plates, G G, in combination with knife, A, hilt, E, and handle, D, the whole forming a combined can opener, plate lifter and knife sharpener as herein stated.

69,112.—BOOT-JACK AND BLACKING BRUSH.—H. J. Miller, Nashua, N. H. Antedated Sept. 5th, 1867.

I claim the metallic frames composed of the arms, A A, sides, D D, flanges B B, and handles, C C, constructed and hinged together as herein represented when used in combination with the brushes, F and F, as and for the purpose specified.

69,113.—COTTON BALE TIE.—J. F. Milligan, (assignor to himself and J. W. Branch,) St Louis, Mo.

I claim the tie piece formed of the parts, A and A', having the mortices, a and a', respectively, and being joined by a central rail, a2, in the manner set forth when combined with and acting upon the band ends, B and B', substantially as and for the purpose described.

69,114.—MACHINE FOR RENOVATING AND CLEANING FEATHERS.—Ossian C. Monroe, Poultney, Vt.

1st, I claim the vessels, A B and C, when arranged concentric with each other and when provided with the tubes D, and steam pipes, e and f, all made and operating substantially as and for the purpose herein shown and described.

2d, The manner herein shown and described of arranging the tubes, D, to prevent the water from an inner revolving vessel into an outer vessel, by extending the inner end of the tubes to or near to the axis of the inner vessel, by arranging a tube, h, within its outer end, and by closing the outer end around the tube, h, as set forth.

3d, The arrangement of the tubes, e and f, hollow axles, d, and faucet or valve, g, all being made so that the steam can be at will conducted to, or discharged from the vessels, B or C, substantially as set forth for the purpose herein shown and described.

69,115.—TRUNK LOCK.—Niles Nard, Havre De Grace, Md.

1st, I claim the vibrating dog or piece, c, pivoted or hinged to the bolt plate for the purpose of retracting the same substantially as described.

2d, The combination of the vibrating dog or piece, c, spring catch, m, and spring lever, d, substantially as and operating in the manner set forth.

3d, The combination of the pipe stem, h, with the spring, G, carrying the stud, m, and dog, c, substantially as and for the purposes specified.

69,116.—FENCE.—A. M. Nichol, Granville, Ohio.

I claim the locking and supporting the pannels as shown in position, by means of the base block, C, together with the post, F, brace, E, and clamps, D and L, substantially as described.

69,117.—PLOW.—William D. Nichols and Nelson W. Clark, Chicago, Ill.

1st, We claim attaching the sub-soil plow, C, to the land-side and beam of a plow, as described.

2d, The colter, D, as described.

69,118.—TREATING BONE BLACK FOR FILTERING SUGAR.—Chas. B. Orvis (assignor to John B. Davidson), St. Louis, Mo. Antedated Sept. 13, 1867.

I claim the defecating composition, prepared substantially as herein set forth.

69,119.—CARRIAGE TOP.—Peter Owens, Chicago, Ill.

1st, I claim the bow iron of a carriage top and seat-iron, B, when constructed substantially as described, and connected or jointed together by means of the strap, C, and screws, D, substantially as and for the purposes set forth.

2d, I claim providing the bow iron, A, with the piece, F, when constructed and operating substantially as and for the purposes described.

69,120.—COTTON-BALE TIE.—Clinton J. Paine, Painesville, O.

I claim the device, fig. 1, constructed with the wedge-shaped projection, C, and wedge shaped aperture, B, substantially as shown, and employed as a tie by using two of such devices inverted and reversed to each other, as explained, in combination with the hoop or band, D, as and for the purpose specified.

69,121.—MODE OF PRODUCING BLACK IN DYEING AND PRINTING.—Alfred Paraf, New York city.

I claim the process of producing black in dyeing and printing operations, by means of asphaltum and albumen, substantially as before described.

69,122.—SAWMILL HEAD BLOCK.—Darius Parkhurst, St. Louis, Mo.

1st, I claim the combination of the levers, E E1, pawls, h h1, spur gearings, G G1, shafts, D2, bevel gearings, D D1, and head blocks, C C, arranged in the manner described.

2d, I claim the lever, L, the cam, L1, with its crank, l1, and the wheel, G, when combined and arranged in the manner and for the purpose set forth.

69,123.—CAR COUPLING.—H. C. Payson, Haydenville, Mass.

I claim the shackle, S, having three or more hooks, a a a, and operated by the lever, D, in combination with the bunter, A, having the corresponding entrances, c c c, arranged substantially as and for the purpose described.

69,124.—FAUCET.—John Phelps, Owego, N. Y.

1st, I claim the recessed chamber, A, strainer, B, and openings, C C, all constructed and arranged as and for the purpose specified.

2d, In combination with the elements of the first claim, I claim the air chamber, D, as and for the purpose set forth.

69,125.—SPRING FOR VEHICLES.—E. J. Post, Vienna, N. J.

I claim constructing elliptic steel springs by twisting the leaves or blades right and left so that the center portion is at an angle with the plane of the ends, thereby obtaining greater strength and elasticity, substantially as herein described.

I claim the metal seat or spring blocks, d d, constructed as and for the purposes specified.

I claim so securing the ends of duplex contra twist springs together as to prevent them from spreading apart under the pressure of a load, as herein described.

I claim connecting the joints at the ends of double springs, so that they may be adjusted to bear more or less weight, and also may be made to be more or less elastic by apparatus constructed and operating substantially in the manner herein described.

69,126.—PEN AND PENCIL HOLDER.—John T. Price, Arrow Rock, Mo.

I claim an improved mode of adjusting pens and pencils to their holders by means of the spring represented in fig. 3, by the letter x, and an improved mode of adjusting holders on the fore-finger by means of steel or gutta-percha castings, with grooves and notches, for the pens and pencils, represented in fig. 2, by the letter y, and with sectional springs represented in fig. 1, by the letter o, to clasp the finger, as also to permit two holders to be firmly united together as in figure B.

69,127.—FAN ATTACHMENT TO CHILDREN'S CARRIAGES.—J. Reinach, New York city.

I claim the combination, with a child's carriage, of a fan so connected to the running gear of the carriage that the required motion will be imparted to it during the progressive motion of the carriage, substantially as herein specified.

69,128.—MAGNETIC METAL SEPARATOR.—Peter Righter, Newark, N. J.

I claim the cylinder, A, helices, b, magnets, a, segments, c, connecting plates, g and h, springs, j, when combined, arranged, and operated substantially in the manner and for the purposes set forth and shown.

69,129.—MEASURING FUNNEL.—Wm. H. Rodgers, Brooklyn, N. Y.

I claim the cover and clamp, to attach to a faucet, in combination with the measure and funnel, provided with a valve, as and for the purpose specified.

In combination with said measure and valve, I claim the lever, K, connected to the cock for raising the valve, as set forth.

69,130.—SEED PLANTER.—John B. Seymour, Pittsburgh, Pa. Antedated Sept. 7, 1867.

I claim a seed planter consisting of the boxes, A and B, plunger, a, rod, b spring, g, and cut-off, d, all made and operating substantially as herein shown and described.

69,131.—BLOTTER HOLDER.—N. M. Shafer, New York city. Antedated Sept. 12, 1867.

1st, I claim the mode of securing a blotter to a frame and the latter to a book, substantially as and for the purpose herein set forth.

2d, The combination of beam plate, A, plate, B, hole, C, wire, F, hook, D, and bend, E, substantially as and for the purpose set forth.

3d, The employment of the elastic cord, H, or its equivalent, substantially as and for the purpose herein set forth.

69,132.—Swing.—John W. Sheaffer, Lockport, Ill.

I claim the adjustable handle, I, with its connecting bars, J J, when used in combination with the swing bars, C C C1 C1, and the seat, E, as and for the purpose set forth.

69,133.—Feed Cutter.—George Small, Clayton, Mich., assignor to Harvey Williams, Otsego, N. Y.

I claim the combination of the several parts comprising this machine, when arranged as described and set forth for the purpose specified

69,134.—Circular Grate for Furnaces.—Geo. L. Smith, Brooklyn, N. Y.

1st, I claim the construction of a circular grate of a series of segments or sections, B, surrounding a central section, A, substantially as described.

2d, The construction of the segments, B, with concentric and arched cross bars, B2, substantially as described.

3d, An independent central support for the section, A, and segments, B, or a circular grate, constructed substantially as described.

69,135.—Head Rest for Chairs.—Henry Snowden, Baltimore, Md.

I claim the head rest, above described, composed of the rods, A and E, frame, C, movable block, D, and set screw, F, having the cushion supported by the arms, B B, all constructed and arranged substantially as and for the purpose specified.

69,136.—Potato Digger.—Simon Soules, Cresco, Iowa.

1st, I claim the combination with the vibrating shovel-carrying beams, D D, and the devices, G G1 f and G2, of a screen and revolving separator, the latter receiving its motion from the driving and transporting wheels, substantially as described.

2d, The construction of the screen, F F1, in combination with curved separating arms, e e, applied to a revolving shaft, C, said screen and shaft being supported upon a vibrating shovel-carrying frame, substantially as described.

3d, Adapting the grooved drum, C, carrying arms, e, to serve as a support for, and a means of keeping in place the rods composing the screen, substantially as described.

4th, Arranging the drum, C, with its curved arms, e, in such manner that these arms serve as elevators for transferring the potatoes from the front to the rear portions of the screen, F, and at the same time serve as separators for freeing the potatoes from earth, substantially as described.

69,137.—Shovel Plow.—M. E. Stanger, Wheeling, Ill.

I claim a shovel plow having wings, C C, jointed to it and arranged by means of a series of holes, 1 2 3 4, etc., for turning a wide or narrow furrow, substantially as set forth.

69,138.—Farm Gate.—G. W. States and A. W. Lutts, Norwalk, Ohio.

We claim the means of applying a lever in combination with self-adjusting dog, to raise farm gates with greater ease, and the device of the notch, F, and the hinges, C, whereby we secure greater strength and durability.

69,139.—Rock Drill.—John S. Stockham, Red Dog, Cal.

I claim the drill constructed with the drill rod, E, the tappet, F, spring, G, and cam, I, operating within the swinging frame, D, supported by standard, B, for giving universal motion, substantially as described.

69,140.—Corset.—Wesley H. Stroup, Pittsburgh, Pa.

I claim a corset fastening, the female part of which is provided with a movable guard, k, actuated by cords, C, the whole constructed and operating substantially as described, in combination with a corset provided with a detachable fastening, as hereinbefore described.

2d, I claim the button attachment, B, arranged to operate substantially as set forth.

69,141.—Washing Machine.—H. Thompson, Wyocena, Wis.

I claim the combination of lever, C, cross bar, G, blocks, H H, and toothed lining, L, arranged, constructed, and operating in the manner substantially as shown and described and for the purpose set forth.

69,142.—Pipe Coupling.—Nathan Thompson, St. John's Wood, Eng. Patented in Eng. March 15, 1867.

1st, I claim the general combination and arrangement of parts for connecting together the ends of pipes or tubes, substantially as herein shown and described.

2d, I claim the application of cams, eccentrics, or locking pieces, e e, or equivalents therefor, substantially as and for the purpose herein shown, and described, and

3d, I claim the mode, herein shown and described, of operating upon such cams, eccentrics, or locking pieces, e e, by means of levers, f, substantially as and for the purpose herein shown and described.

69,143.—Mode of Closing the Mouths of Bottles.—Nathan Thompson, St. John's Wood, Eng. Patented in Eng. March 28, 1867.

I claim, 1st, the combination and arrangement of means or apparatus for closing the mouths of bottles, jars, and other vessels, substantially in the manner herein shown and described, and

2d, I claim the employment of cams, eccentrics, or pressing pieces, d, acting to press the stopper, c, firmly to the neck of the bottle, jar, or other vessel, so as to close the mouth thereof, substantially in the manner herein shown.

69,144.—Fruit Picker.—Ibrook Tower, Milford, Mich.

1st, I claim the cushioned arm, N, or its equivalent for the purpose designed.

2d, The combination and arrangement of the cushioned arm, N, with the other parts of a fruit picker, arranged substantially as described for the purpose designed.

69,145.—Folding Chair.—E. W. Vaill, Worcester, Mass.

1st, I claim the curved hinge, H H1, in combination with the legs, B B1, arms, E E1, and the standards, S S, of a folding chair, substantially as and for the purpose described.

2d, The chair above described, consisting of the curved legs, A A1 B B1, rounds, R R R1, curved and slotted arms, E E1, curved hinges, H H1, cross bars, C C1, traverses, T1 T1, and standards, S S, all constructed, combined, arranged, and operated substantially in the manner and for the purposes specified.

69,146.—Horseshoe.—Albert S. Wilkinson, Pawtucket, R. I.

1st, I claim the combination of the metallic plate, a, either jointed or otherwise, with a casing, B, of elastic material, extending continuously around it, substantially as and for the purpose set forth.

2d, I claim the secondary plate, A, in combination with the plate, a, and casing, B, substantially as specified.

3d, I claim the combination of the metallic toe piece, c, with the plate, a or A, and rubber sole, B, substantially as and for the purposes set forth.

69,147.—Axle for Vehicles.—J. B. Wilson (assignor to Eleanor Wilson and Allen T. Wilson), May's Landing, N. J.

1st, I claim an axle consisting of a central wooden shaft, A, and metal ends, B B, having hollow arms, c, constructed for the reception of the ends of the said shaft, substantially as described.

2d, The metal end, B, consisting of a hollow journal, a, collar, b, and an arm, c, when the said parts are constructed and arranged in respect to each other, substantially as and for the purpose set forth.

69,148.—Ladies' Work Table.—John Wood, Lowell, Mass.

I claim a work table with tray, c, and box, d, arranged substantially as described and for the purpose fully set forth.

69,149.—Jack Spinning Machine.—A. B. Woodbury, Ashuelot, N. H.

I claim, in combination with the jack carriage and the faller, or wire, mechanism, substantially as described, for intermittently raising the faller or wire in order to regulate the laying of the yarns upon the bobbins, while the carriage is being run in from time to time.

I also claim the combination, substantially as described, applied to the jack carriage, faller, or wire and frame, for regulating the laying of the yarn upon the bobbins, such consisting of the lifter, c1, the spur gear and ratchet, the lever and its pawl or pawls, and the tripper, the whole being applied together and to the carriage and frame, and with respect to the faller or wire, as hereinbefore explained.

69,150.—Nutmeg Grater.—C. Worden, Binghamton, N. Y.

I claim the construction and arrangement of the frame, A, grater, B, slotted plate, G, slide holder H, spring and follower, J, substantially as described and represented for the purpose set forth.

69,151.—Jug Top.—Homer Wright, Pittsburgh, Pa.

I claim, 1st, Combining the hinge and knob of a jug top in one piece, as substantially specified.

2d, The opening, H, in the lid, when used in combination with the hinge and knob piece, as set forth.

3d, The convex bulge, P, on the lid, when used in combination with the hinge and knob piece, and opening, H, in the lid, as substantially set forth.

69,152.—Carpet Cleaner.—Geo. W. Young (assignor to G. W. Smith), San Francisco, Cal.

I claim the whips in combination with the beaters, as shown and set forth.

I also claim the combination of the combination of the combined whip beaters with the brushes, D D, according to arrangements above described, and for the purposes above specified.

69,153.—Steam Engine.—Robert Allison, Port Carbon, Pa.

1st, I claim the supplementary cylinder, B, with its piston, F, and valve, o, the rod, N, the bar, G, and the rods, J and K, arranged and operating substantially as shown and described for the purpose set forth.

2d, In combination with the supplementary cylinder, I claim the sliding block, a, and the stop plate, c, substantially as and for the purposes set forth.

69,154.—Can.—Andrew D. Armstrong, Pittsburgh, Pa.

I claim the can, A, provided with the internal rim, B, in manner and for the purpose substantially as set forth and described.

69,155.—Hydrant.—John W. Baker, Parkersburg, W. Va.

1st, I claim the arrangement, as described, of the shut-off cock and waste way immediately at the main, for the purpose set forth.

2d, The combination, substantially as described, of the shut-off cock and waste-way, at the main, with the hand lever and connecting rod, for the purpose set forth.

3d, The combination, with the inclined supply pipe, of the shut-off cock and waste ways, i i, immediately at the main, for the purpose set forth.

69,156.—Fire Plug.—John W. Baker, Parkersburg, W. Va.

I claim the combination, substantially as described, of a shut-off valve or stop cock and waste-way, immediately at the main, with a train of gearing operated from the plug.

69,157.—Cutlery.—Jonathan Baldwin, Northampton, Mass.

1st, I claim the method of attaching the scales of a knife handle to the tang, by means of dovetailed grooves cut into the former, into which metal is run through the tang, substantially as herein described.

2d, The method, herein described, of attaching the shoulders, F F, to the tang, by means of the dovetailed grooves, a a, and metal cast in, substantially as shown.

69,158.—Spike.—James Balmer (assignor to the himself and Wm. Greenleaf), Brooklyn, N. Y.

I claim a spike, split or divided longitudinally, and having its split parts so beveled or inclined that, when driven into the wood, the portions on opposite sides of the split or cleft will diverge in opposite directions, parallel with the split or cleft, substantially as herein described.

69,159.—Machine for Finishing Thread.—Samuel Barbour, Lisburn, Ireland. Patented in England, May 14, 1866.

1st, I claim the bottom hooks, b, revolving upon their axles each adjoining pair connected by toothed wheels, b3 to equalize the tensional strain on the hanks as herein shown and described.

2d, The combination of the hooks, b, ratchet wheel, e1, catch, e2, spindle, e4, weighted lever, e5, and weighted cord, e6, all operating as described to equalize the finish on the thread as herein set forth.

3d, The weights, i1, levers f, pulleys, f2, and ropes or chains, g g1, in combination with the bar, h, and its hooks, b, for regulating the tension on all the hanks simultaneously as herein shown and described.

69,160.—Axle Box.—Silas Barker, Hartford, Conn.

I claim the combination of the bushing, d, with the axle box, C, when constructed so as to be replaced substantially in the manner herein set forth.

69,161.—Cane Stripper.—J. H. Barley, Sedalia, Mo.

I claim the implement, A, consisting of blade, B, and jaws, C and F, constructed together substantially as and for the purpose specified.

69,162.—Cultivator.—J. H. Barley, Sedalia, Mo.

1st, I claim the combination and arrangement of the loop or bent hook, J, bent lever, I, connecting rod or chain, K, and lever pawl, L, with each other and with the frames, D and E, of the cultivator substantially as herein shown and described and for the purpose set forth.

2d, The combination of the rack, M, with the standard of the frame, E, and with the lever pawl, L, to operate in connection with the loop or bent hook, J, and bent lever, I, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the pivoted seat bars, N, and adjustable holders, O, with the side bars of the cultivator frame, C, substantially as herein shown and described and for the purpose set forth.

4th, The shield, F, constructed with flanges, f1, and wings, f2, and connected to the frames, E and D, by the bar G, and chains, H, substantially as herein shown and described and for the purpose set forth.

69,163.—Rubber Boot Heels.—J. F. Barrett, Concord, Mass.

I claim the employment of a clinching plate, of metal or other material, for the purpose of turning the points of nails used in securing elastic parts to the surfaces to which they are to be attached, substantially as set forth.

69,164.—Sheep Shed and Rack.—Geo. Beatty, Carrollton, Ohio.

I claim the vibrating feed trough, E, and rack, D a b b1 c, arranged and operating substantially as described, in combination with a sheep shed as set forth.

69,165.—Composition for Filling the Pores of Wood.—J. F. Bernard, Leominster, Mass.

I claim the within described composition made of the ingredients set forth, and mixed together substantially in the manner and for the purpose specified.

69,166.—City Car and Omnibus Fare Box.—J. Blackadder, New Orleans, La.

I claim the reflectors, C, combined with a money receiving box of a car or carriage, arranged substantially as and for the purposes set forth or so that the deposited ticket or money or a representation thereof can be seen by both driver and passenger.

2d, In combination with the above I claim the glass windows, B, glass guides, D and D1, and the wheel, C1, arranged as described for the purpose specified.

69,167.—Hand Spinning Machine.—John Blackwood, and T. C. Wilson, Cincinnati, Ohio.

1st, We claim the loose pulleys, s s' on the shaft, h, in combination with the slotted lever, p, the long lever, C, the pulleys, u u, bands, w w, and the carriage, B, arranged and operating substantially as and for the purposes described.

2d, The combination of the feed rolls, b b', the pinion, c, the rack, d, the slotted lever, p, the pulleys, s s', and the carriage, B, arranged and operating substantially as set forth.

69,168.—Painters Scaffold.—Johan Blomgren, and Carle Andersen, Galesburg, Ill.

We claim the extension scaffold above described, composed of frames, 1 2 3, etc., containing the floors, I I I", and the ladders, e e' e", elevated or lowered by the rollers, D and M, and the cords, K, K', and stopped by the pawls, p p1 p2, all constructed and operated substantially as and for the purpose specified.

69,169.—Water Wheel.—L. W. and R. A. Blood. Springfield, N. H.

We claim the star pointed bucket, E, formed by the intersections of the sides, f g, as shown and described in combination with the air or vent holes, i, the whole constructed substantially as set forth.

We also claim in combination with the above the pieces, h, substantially as and for the purpose set forth.

69,170.—Hand Seeders.—Thomas Bradley, Preble, N. Y.

I claim the arrangement with the hoe of the roller, C, with the cavities, c c, operated by the cord, g, in conjunction with the elastic spring, D, to receive the seeds from the box, B, through the holes, a a, in the plank piece, A, and discharge them through the holes, b b, substantially as described.

69,171.—Dryer for Scoured Clothes.—Jos. Braun, Bridgewater, Pa.

I claim the use of a hollow metallic core the form of which corresponds to the form of the human body and its wearing apparel, said metallic core being used with steam substantially as herein described and for the purpose set forth.

69,172.—Hat Block.—J. B. Brown, Middletown, N. Y. (assignor to himself and Joshua Draper).

I claim as an article of manufacture an emery or sand covered cone for the purpose described substantially as specified.

69,173.—Nut Fastener.—Chas. Buckley Jr., Rochester N. Y.

I claim the combination of the concentric shoulder, c c', of the fixed washer, C, with the key, d, nut, B, and bott, A, arranged and operating substantially as and for the purposes set forth.

69,174.—Grinding Mill.—J. Burns, New York City.

I claim the construction of the crusher, d, the same being provided with spiral tapering shoulders, d', which are made and operating substantially as herein shown and described.

69,175.—Land Roller.—G. R. Burt, Perry, N. Y.

1st, I claim the rollers, C, when provided with the flanges or bands, D, upon the inner ones of which the brakes, J, bear as herein set forth for the purpose specified.

2d, The castor roller, E, in combination with the roller, C, flanges or pins, D, and brakes, J, as herein shown and described.

3d, The combination of the spring brake, H I J, with the seat frame, F, and cylinders, C, substantially as herein shown and described and for the purpose set forth.

4th, The rollers, C C, when suspended from the same shaft, B, beneath the frame, A, constructed as herein described.

69,176.—Window Shade Fixture.—Wm. Campbell, New York City.

I claim the combination of the loose or sliding pins or bolts, F, having heads formed upon them with the flattened or notched shaft, D, substantially as herein shown and described, and for the purpose set forth.

69,177.—Bottle.—H. S. Carley, Cambridgeport, Mass.

I claim a bottle provided with a shoulder, C, on the inside of its neck, near to its mouth, substantially as and for the purpose herein shown and described.

69,178.—Machine for Making Clouded Yarn.—Joseph Chase, Worcester, Mass.

1st, I claim the combination in a machine as described with the yarn feed rolls of the roving feed rolls or their equivalents in such manner that while the yarn or main thread is fed forward with a continuous motion the feed of the roving to the said thread shall be intermittent as and for the purpose specified.

2d, The combination of the yarn feed rolls with the rolls for producing the intermittent feed of the roving arranged and mounted in the machine relatively to the said yarn feed rolls as and for the purposes herein described.

3d, The combination with the feed rolls, G G' and F F', of the yarn guide, H, whereby the yarn as fed down upon the back of the roll, G, while the end of the roving is left in close proximity to the latter as shown and described.

4th, The combination with a machine for winding and twisting threads of yarn of an intermittent roving feeding mechanism, for clouding the yarn substantially as set forth.

69,179.—Mode of Teaching Music.—J. C. Clime, Philadelphia, Pa.

1st, I claim a diagram consisting of the representation of a key board, and a series of lines so arranged as to form spaces opposite to the keys represented in the key board, the said space containing signs or marks indicating the keys to be struck together all substantially as and for the purpose described.

2d, A diagram representing a key board in which a mark or sign is placed on each black key to be struck as set forth.

69,180.—Coat.—Phllip Cohen, St. Joseph, Mo.

I claim a coat, the skirt portion of which is made adjustable in size, substantially as and for the purpose specified.

69,181.—Buckle.—Ezra Cole, Fairfield, Mich.

I claim the buckle constructed as described, consisting of the curved frame, A, having at one end the plate, C, provided with a downward projection or lug, D, in combination with the bail, E, whose pins, F, rest and slide upon the upper edges of the curved frame, A, as herein described, as and for the purpose specified.

69,182.—Buckle.—Ezra Cole, Fairfield, Mich.

I claim a buckle, consisting of the plate, B, and frame, F, having swivelled tongue plate, E, when all constructed substantially as and for the purpose described.

69,183.—Pump.—Gilbert M. Cole, Folsom city, Cal.

I claim the combination of the valves, a b c d, valve seats, I pistons, C D, bar, H, chamber, E, and cylinder, A, substantially as described, for the purpose specified.

69,184.—Chuck.—William T. Cole (assignor to himself and Jacob F. Hunter, and Peter P. Keller), New York city.

I claim the combination of the pawls, B, oscillating plate, C, and revolving box, A, all constructed and operating substantially as herein shown and described.

69,185.—Metallic Paint.—Henry E. Colton (assignor to himself and C. T. Reynolds & Co.), New York city.

I claim the use of the oxide of zinc, and the oxide of lead, etc., combined with mineral and animal oils, in a paint or pigment for covering the bottoms of iron vessels and other iron surfaces, substantially as described.

69,186.—Cultivator.—E. W. Connely, Charleston, Ill.

1st, I claim the slotted adjustable crank spindles, B, in combination with the axle, A, and wheels, C, substantially as herein shown and described, and for the purpose set forth.

2d, Pivoting the forward ends of the beams, K, to the longitudinal bars, B, by means of bent or elbow bolts, S, substantially as herein shown and described.

3d, Pivoting the forward ends of the beams, K, to the tongue, G, by means of the bent or elbow bolts, U, substantially as herein shown and described.

4th, Pivoting the forward ends of the beams, K, to the front cross bar, E, by means of elbow or bent swinging bolts, T, substantially as herein shown and described.

5th, Pivoting forward ends of the beams, K, to the front cross bar E, by means of the strap or band, X, passing around the said cross bar, E, and secured to the ends of the said beams, K, substantially as herein shown and described.

69,187.—Hay Raker and Loader.—L. D. Copeland, Chenango Forks, N. Y.

1st, I claim the movable and adjustable bearing of the driving wheel shaft for adapting the machine to the different kinds of work, and for allowing the machine to be moved when not at work as recited.

2d, The toothed wheel, y, and pinion, z, with the pawl, x1, for operating and controlling the pitcher, or the equivalents of those means for that purpose.

69,188.—Self-acting Mule.—H. Crossman (assignor to himself and Albert Briggs), Providence, R. I.

1st, I claim connecting the faller locking mechanism with the relief lever in a self-acting mule, by an intermediate lever connection, operating substantially as described, for the purposes specified.

2d, Imparting a slow movement to the delivery rollers, in a self acting mule during the time that the carriage is running in, by the means substantially as described.

3d, The combination and arrangement of the catch wheel, I, holding dog, l, and lever, L, with the mule carriage, substantially as described, for the purpose specified.

4th, Combining the main cam shaft in a self-acting mule, with a chain gear, as arranged and shown, to give motion to the same, substantially as described.

5th, The combination of the escapement plate, P, whose periphery is formed with ratchet teeth as shown, with a spring brake and stop, Q, substantially as described.

6th, Combining a mule carriage with its source of motion, by means of the peculiar friction clutch, R, substantially as described.

69,189.—Curtain Fixture.—Jacob David, New York city.

1st, I claim the arm or detent, K, arranged upon the roller in such a manner that it moves toward and away from the center or axis of the roller, a by the action of gravity and centrifugal force, substantially as described.

2d, The combination and arrangement at the same end of a shade roller of the spring, e, rod, d, and arm or detent, k, or their mechanical equivalents, substantially as described.

69,190.—Thill Coupling.—Lyman Derby, New York city.

I claim the curved thill iron, E, in combination with the roller, C, covered with india rubber or other suitable material, and fitted between lugs or ears, a a, at the front side of the clip, B, and the bottom plate, a, of the lugs or ears curved at its upper surface, substantially as shown and described.

69,191.—Fence.—Benjamin K. Dorwart, Lancaster, Pa.

We claim the brace board, A, with its notches, a a, cut out in the manner shown, with its attached central cross piece, C, slotted, in combination with the wedge or key, W, arranged in all its parts, and applied in the manner and for the purpose specified.

69,192.—Apparatus for Filtering Petroleum.—Richard B. Douglas, Cleveland, Ohio. Antedated Sept. 12, 1867.

I claim the drum filter, E, in combination with the cylinder, A, the inlet and eduction cocks, C K, and dirt discharge, P, substantially as described.

69,193.—Bed Bottom.—Julius Dreusike, Cincinnati, Ohio.

I claim the bed bottom having the interlocked spiral wires, B, secured to the grooved head and foot rails by the devices, C D d E, substantially as and for the purpose set forth.

69,194.—Turning Plate for Carriage.—T. A. Edmison, Lakeport, Mich.

I claim the plate, C, with its rollers, in combination with the turning plate or ring of a vehicle, substantially as and for the purpose described.

69,195.—Sheep Shearing Table.—Webster Ellyson, West Branch, Iowa.

1st, I claim an improved device for holding sheep while being shorn, formed by the combination of the platform, A, having hinged ends, hinged adjustable side boards, C, adjustable supporting racks, E, straps, D and E, lever pawls, G, catches, H, and brace blocks, J, with each other, substantially as herein shown and described.

69,196.—Manufacture of Hay and other Forks.—George B. Ely, St. Johnsbury, Vt.

1st, I claim the combination of the dies, E, wheels, D, shafts, B, plates, F, all constructed and arranged substantially as described, and for the purpose specified.

2d, The dies, E, shaft, B, having plate, F, and set screws, G, wheels, D, with the groove and tongue gear wheels, C, and standards, A, all constructed and arranged as described, whereby hay and manure fork tines are drawn and bent, substantially as described, for the purpose specified.

69,197.—Carriage Spring.—W. H. English, Macon, Ga.

I claim an elliptic or semi-elliptic spring for vehicles, constructed of curved elastic steel plates with a narrow or thin rib of steel, applied to their exterior surfaces, substantially as shown and described.

69,198.—Spring Bed Bottom.—Elisha E. Everitt, Phil. Pa.

1st, I claim the transverse bars, D, having one or more grooves, in combination with the pin, E, arranged to receive the coils of the spring, and to fit the said groove, all substantially as set forth.

2d, The within-described spring, having ends, fitting into the transverse bars, D, and being bent and arranged for the reception of the slats and pins, I I, substantialy as set forth.

3d, The slats connected at one end to the within-described springs, on the transverse bar, D, and resting at the opposite end on the transverse bar, D', to which it is confined by a pin, y, all as set forth.

69,199.—Horse Blinder.—Smith Ferris, New York city.

I claim, as a new article of manufacture, a fire blinder for horses and cattle, constructed as described, consisting of the cap, A, to be placed over the eyes and the space between the eyes, having the elastic strips, a a, connected by loops, b b, the metal bars, B C, hooks, d d, and strips, e, substantially as described, for the purpose specified.

69,200.—Cooler and Filterer.—H. W. Fisher, Phila. Pa.

I claim the case, A, formed with three compartments, a b c, and a filtering medium, e, in combination with the ice chamber, F, and pipe, C, E, all arranged substantially in the manner as and for the purpose set forth.

69,201.—Mode of Attaching Calks to Horseshoes.—James Forbes, Plainville, Mich.

I claim attaching the calks to horseshoes, by means of the hook or beak, c, and screw, f, in the manner and for the purpose set forth.

69,202.—Sawing Machine.—H. C. Freeman, Lewisville, Ind.

1st, I claim the semi circular saws, H, attached to the shaft, K, in such manner that while one is fixed in position, the other may be adjusted according to the length into which the wood is to be cut, arranged to operate substantially as set forth.

2d, So arranging the shaft, K, and frame, L, that the semi-circular saws, I I, may be attached either to the two frame pieces, L, one fixed and the other adjustable, or one of them only, be attached to the intermediate piece, L', and the frame be actuated directly by hand, substantially as and for the purpose set forth.

3d, So arranging the beam, Q, as to act upon the oscillating frame, L, when raised by the rods, N, substantially as set forth.

69,203.—Attachment for Cook Stove.—Jeannette Garrison, New York city.

I claim a screen applied to a cook stove at the top of the fire chamber between it and the top flue, substantially as and for the purpose herein set forth.

69,204.—Market Box.—F. Gearing (assignor to himself and Henry Millingar), Pittsburgh, Pa.

I claim a market box, having its sides connected or secured together by means of the eyes, d e, rods, D, and battens, b, substantially as and for the purpose specified.

69,205.—Condensing Tube for Carding Machines.—William Germain, Rockbottom, Mass.

I claim a condensing tube, in wool carding machine, formed with a conoidal or cup-shaped head, c, substantially in the manner and for the purpose specified.

69,206.—Fulminating Compound.—J. Goldmark, B'lyn, N. Y.

I claim a fulminating compound, in which the sulphocyanite of a metal or other base is employed, in combination with chlorate of potash, either with or without other substances, substantially as herein specified.

69,207.—Seed Dropper.—C. A. Harper, and John A. Partridge, Rahway, N. J.

1st, I claim the case, A, when constructed with an internal cylinder, B, and a curved spout, C, acting in combination with the oscillating wheel, D, to deposit the grain in the hill, substantially as set forth.

2d, The oscillating wheel, D, when constructed with a plurality of chambers, D1 D2, and so arranged that either chamber may be used, substantially as set forth.

3d, In combination with the wheel, D, having a plurality of chambers, the adjustable spring, H, eyes, F and F', and rods, I and I', substantially as set forth.

69,208.—Wagon Spring.—C. P. Hawley, Mosherville, N. Y.

1st, I claim the arrangement and combination of the frames, E E, with the lugs, b, pins, a, staples, c, links, d, or their respective equivalents, with the springs, x, all made and operating substantially as herein shown and described.

2d, The slotted hinged frames, E, when so arranged that the bearings will be brought nearer to the axles the heavier the load, as set forth.

69,209.—Stump Extractor.—Isaac D. Hazen, and Jonathan Hitchcock, Grand, Rapids, Mich.

1st, I claim the arrangement of shaft, E, and collar, J', with its pulleys and box, with the rim wheel, I, and its rollers, ball, H, box, G, and cord, d, as and for the purpose set forth.

2d, The arrangement of the frame, K, with its pulleys and block and tackle, with the main frame, for canting or removing the stump after it has been pulled, substantially as set forth.

69,210.—Burning Fluid.—J. G. Hester, Raleigh, N. C.

I claim the improved burning fluid prepared of the materials substantially as herein described.

69,211.—Spinning Machine.—George Hoover and Artemus N. Hadley, Richmond, Ind.

1st, We claim the adjustable inclined bearing arms, G G', for use with roving spools of diverse lengths and diameters, in the described combination with the roving delivery cylinder, E, and gravitating doffer roller, L.

2d, In the described combination, the roving delivery belts or cords, F, having permanent connection with said cylinder and intermittent connection with said sash, substantially as and for the purposes set forth.

3d, The roving cord clasp, S, combined in one sash with the clove, and being closed and opened by the opposite actions of the latter, whereby an amount of roving is automatically delivered, exactly corresponding to that required for the ensuing stretch, whether the same be more or less.

4th, The loop or cord clasp, S, whose stem, s, is drawn through the friction pad, R, and operated by the movable jaw, M, of the clove, in manner substantially as set forth.

5th, The arrangement of vertically guided and balanced clove sash whose movable and self-closing jaw, M, has a tongue, W, which impinging against a tappet, X, is made to engage behind a notch, o, or devices substantially equivalent in the described combination with an adjustable releasing pin

X', for the automatic opening and closure of the clove for any desired length or stretch of roving, as set forth.

6th. The provision on a vertically balanced and reciprocating clove sash, of the rearwardly and upwardly curved finger, T, for retraction of the faller wire, in the manner explained.

7th, In the described combination, the vibrating faller wire, 6, adjustable retracting spring, 8, spur, 11, spring dent, 13, and releasing mechanism, 14, 15, 16, whereby said faller wire is automatically operated by the ascent and descent of the of the above sash, in the manner explained.

8th. The spiral spring, 8, and arm, 7*, applied so as to impart a downward movement to the faller wire and adapted to exert the greatest leverage when the faller wire is in its depressed position, as described.

9th. The arrangement of the adjustable driving pulley, 1, band, W, spindles, Y, whorls, y, and intermediate pressure pulleys or rollers, 5, as and for the purpose herein described.

10th. The provision in the plane of the spindles of the driving pulley, 4, armed with rundles, 32, and journaled at rear in the swiveled bearing, 29, and at front in the open bearing, 30, for convenient winding off and removal of the hanks, in the manner explained.

### 69,212.—HITCHING RING.—James P. Howell, N. Y. City.

1st, I claim a ring so constructed and combined with a suitable screw shank that when such shank is placed at one portion of the ring it will be rigidly fixed thereon, and when placed at other portions thereof will permit the said ring to hang loosely, substantially as herein set forth, for the purpose specified.

2d. The construction of the ring, A, with an enlarged portion, a, wedge shaped in its cross section and operating in connection with the eye, b, of corresponding shape, formed in the head of the screw shank, substantially as herein set forth, for the purpose specified.

### 69,213.—CHURN.—Henry W. Howland, Calhoun, Ill.

1st, I claim the holes, h, flaring caps, h1, valves or slides, h2, and discharge pipe, h4, in combination with a rotating churn, substantially as and for the purpose set forth.

2d, The dasher, L, constructed with oblique perforations, l, and double oblique serrated periphery, l1, in combination with the revolving vessel, H, substantially as and for the purpose specified.

3d, The arrangement of the upright shafts, B F I, crank wheel, C, pulleys, D F i J, belts or bands, E K, and vessel, H, substantially as described.

4th, The dovetailed slide, h5, in combination with the dovetailed slitted lid, H1, and vessel, H, substantially as and for the purpose set forth.

### 69,214.—PORTABLE FENCE.—Joseph C. Hughes, Robinson, Ill.

I claim the combination of the straight panels, B, and triangular supporting frame, A, when respectively constructed substantially as set forth, with the combination of the corner panels, D, and supporting frame, C, when respectively constructed substantially as set forth.

### 69,215.—STEAM GENERATOR.—Geo. G. Hunt, Bridgeport, Ct.

1st, I claim the reverberating chamber, R, and ascending flues, T, within the water space of a steam boiler, when said chamber and pipes communicate directly with the fire chamber, A, and are so arranged as to cause the gases which accumulate above the coal in said chamber, R, to descend and pass through or over the incandescent coal below pipes, T, substantially as described.

2d. I claim the arrangement of the reverberating chamber, R, and ascending flues, T, directly over a grate surface, G, which extends beneath the said chamber and flues, and allows of a direct upward draft through it at points below the lower ends of the flues, substantially as described.

3d, I claim the gas reverberating chamber, R, arranged within the water space, in combination with a fire chamber, A, and the flues, T, arranged so as to effect the combustion of the gases, which are caused to escape from chamber, R, at points below the level of the coal in this latter chamber, substantially as described.

### 69,216.—VEST.—S. W. Huntingdon, Augusta, Me.

I claim a vest provided on one or both sides with an elastic goring or strip which partially encircles or surrounds the arm holes of said vest, substantially as and for the purpose set forth.

### 69,217.—BRICK DRYER.—James J. Johnston, Allegheny City,

Pa., assignor to the People's Brick Machine Co., Pittsburgh, Pa.

I claim, 1st, The coniformed dry house, in combination with the car, (when viewed in cross section) provided with flues connected with the boiler furnace and its stack, substantially as herein described and set forth.

2d, The car or truck for bearing off the brick, when constructed as herein described and represented and used for the purpose set forth.

3d, The combination of the pipes, h i m and n, with boiler furnace and the flues, f g, constructed, arranged, and operating substantially as herein described and for the purpose set forth.

4th, The use of a fan in combination with the pipes, h i m and n, for forcing heated air into and through the dry house, in the manner and for the purpose set forth.

### 69,218.—BOILER WATER REGULATOR.—R. J. Jordan (assignor to himself and E. Darling), Elkhart, Ind.

I claim, 1st, The arrangement of the reservoir, B, float, C, rod, a, valve, g, levers, d b, with reference to the steam generator, substantially as shown and described.

2d, The combination of the reservoir, B, with the turret, K, and wire coil, substantially as described.

### 69,219.—MACHINE FOR REDUCING ROLLER LEATHER TO A UNIFORM THICKNESS.—Wm. C. Joslin, West Thompson, Conn.

1st, I claim the combination in a machine for reducing calf skins, sheep skins, and lamb skins to a uniform thickness, the reducing cylinder, D, receiving and delivering rolls, B B C C, and adjustable bed, F, substantially as and for the purpose set forth.

2d, A machine for stretching and reducing leather to a uniform thickness, the parts of which are constructed and arranged for joint operation as and for the purpose herein set forth.

### 69,220.—BOAT LOWERING OR DETACHING APPARATUS.—

Maurice Joyce, Washington, D. C.

I claim, 1st, The combination of frames, b b, spools or windlasses, d, shaft, c, frame, G, Wheels, H and I, or their equivalents, and worm, i, arranged, constructed, and operating in the manner substantially as shown and described and for the purpose set forth.

2d, The combination of brake, n, wheels, I and H, shaft, c, worm, i, and cam lever, l, arranged, constructed, and operating in the manner substantially as shown and described and for the purpose set forth.

3d, The combination of frames, b, having the ears, e e, with shaft, f, and bifurcated arms, D D, arranged, constructed, and operating in the manner substantially as shown and described and for the purpose set forth.

### 69,221.—SPRING FISHHOOK.—Daniel Kidder, Franklin, N. H.

I claim the fishhook constructed as described, consisting of the single piece of wire, B, bent at its center to form the eye, D, sliding upon the stem, G, its bent shanks, E, provided at each end with the hooks, C, crossing each other and held in position by means of the clasp, F, upon the end of the stem, G, all operating as herein set forth, the purpose specified.

### 69,222.—SKIRT ELEVATOR.—Blanchard V. Kirk (assignor to himself and H. A. Musselman), Philadelphia, Pa. Antedated Sept. 11, 1867.

I claim the combination of the india rubber tube, A, covered with a woven fabric, m, provided with tubular clasps, C C' having openings, h h, through which pass the cords, K, the whole constructed and operating substantially as described.

### 69,223.—REFRIGERATOR CAR.—Le Grand Kniffen, Worcester, Mass.

I claim, 2st, A refrigerator car, constructed substantially in the manner described, for the purpose of transporting meats and other perishable articles.

2d, Lining an ordinary box car with fibrous or textile nonconducting material, for the purpose set forth.

3d, Converting an ordinary freight car into a refrigerator by lining it with successive sheets or layers of thick paper, substantially in the manner described.

4th, The combination, substantially in the manner described, with a box car of removable sections or linings of nonconducting material, whereby I can in a few moments convert an ordinary car into a refrigerator.

5th, Lining a box car with elastic nonconducting material which will yield to the working of the car or even allow it to be broken without rupturing the nonconducting envelope.

6th, The arrangement in a refrigerator car of both the articles to be kept cool and the ice, or refrigerating apparatus inside the non-conducting envelope, whereby I protect the refrigerating apparatus from the external heat without additional protection.

7th, The arrangement as described of the hinged door in the lining with the sliding door of the car, whereby direct access can be had to the refrigerating chamber.

8th, The arrangement as described of removable ice racks with the lining sections nearest the doors, or those in which the doors are placed, whereby the ice is placed in last, and is thus more convenient of access and space economized.

9th, In combination with a refrigerator car, a removable ice rack which can be taken out when not required and its room occupied by other things.

10th, The arrangement in a refrigerator car of a refrigerating apparatus to produce cold without using ice, when desired.

11th, The arrangement within a refrigerator car of quick lime or other absorbent of moisture, to maintain a dry as well as a cold atmosphere.

12th, The arrangement as described of the removable side props and top beams whereby the sections are held in place and the distance between the beams can be varied to suit carcasses of different sizes.

13th, The arrangement as described on the top or cross beams of the sliding swiveling hooks, whereby the spaces between the holes can be varied and the carcasses conveniently swung.

### 69,224.—ADJUSTABLE RAILING FOR VEHICLES.—Chas. Krebs, Springfield, Mass.

I claim an adjustable railing for the seats of vehicles which is attached by means of the notched pieces, a a and b b, on the rail, and the pieces, f f, having the latches, l l, upon the seat, the parts being arranged substantially as and for the purpose described.

### 69,225.—AXLE BOX.—B. P. Lamason, Milton, Pa.

I claim the car axle box lid, A, provided with the clamp, b, in combination with the car, d, applied to the car axle box.

### 69,226.—BRAKE BLOCK AND SHOE FOR RAILROAD CARS.—

B. P. Lamason and S. W. Murray, Milton, Pa.

We claim, 1st, The brake shoe, E, provided with circular lug, A, with flanges, o o, in combination with the shoe, D, with its opening B, of construction corresponding to the lug, the shoe and block being arranged to turn and to be held in place by pin, f, as and for the purpose set forth.

2d, The lug, A', with its flanges, o' o', in combination with the block, D', and pin, E, all constructed and operating as described and for the purpose set forth.

### 69,227.—WAGON TONGUE SUPPORT.—O. Lapham, El Paso, Ill.

I claim the combination of the spring, E, with the rear end of the tongue, D, and with the hounds, C, substantially as herein shown and described and for the purpose set forth.

### 69,228.—VEGETABLE SLICER.—Herrmann Liebmann, Mascoutah, Ill.

I claim a vegetable slicer having fixed lateral knives, and vertical knives that may be removed, attached to a revolving horizontal disk, when constructed and arranged substantially as shown and specified.

### 69,229.—MACHINE FOR TAPERING LEATHER.—William Mannheim, New York City.

1st, I claim a machine in which leather straps can be shaved or bevelled or their ends tapered, which is arranged so as to be adapted to every width and thickness of leather, and which will operate substantially in the manner herein shown and described.

2d, The jointed and hinged knife or cutter, C, when arranged on the stationary frame so as to be adjusted in position by the screw, D, substantially as and for the purpose herein shown and described.

3d, The removable rod, I, when provided with the adjustable sliding block, J, in combination with the roller, G, and cutter, C, all made and operating substantially as herein shown and described.

4th, The sliding frame, L, when provided with a handle, p, in combination with the frame, r, set screws, s, frames, E and F, roller, G, and cutter, S, all made and operating substantially as herein shown and described.

5th, The hinged jointed cutter, C, in combination with the roller, G, all made and operating substantially as set forth.

### 69,230.—MACHINE FOR CAPPING SCREW HEADS.—E. J. Manville, Waterbury, and E. M. Judd, Wolcotville, Conn.

1st, We claim the combination of a series of progressively moving dies for holding the screw, dies for pressing a cap of sheet metal over the head, and mechanism for nicking the sheet metal cap to correspond with the previously cut nick in the screw head all constructed and operating substantially as set forth.

2d, The combination of mechanism substantially as specified for effecting the following successive operations, viz: first placing the nicked screw head in the proper position, second, holding the same, third, pressing a sheet metal cap in a position to correspond with the previously nicked head, fourth, nicking the sheet metal cap in a position to correspond with the previously nicked head.

### 69,231.—WINDOW BLIND.—C. K. Marshall, Vicksburg, Miss.

1st, I claim as a new article of manufacture, window blinds formed of slats of metal set in a metallic frame in manner and for the purposes substantially as described.

2d, The hollow metal frame, A, having the wooded blocks, C, to receive the screws, d, securing the hinges, D, in manner and for the purposes substantially as herein shown and described.

### 69,232.—VALVE FOR STEAM ENGINES.—Joseph McConnell, Iowa City, Iowa.

1st, I claim the combination and arrangement of the arm, u, secured to the end of the rock shaft, T, between the cylinders, H, and in the slots of which the wrist pin, x, work connecting the arm, u, to the valves, p, the position of said pins, x, in the slots being controlled by means of the governor whereby the throw of the valves, p, is regulated as herein shown and described.

2d, The valves, p, constructed as described, formed in a semi-circle with the pressure of steam applied upon one side, as and for the purpose specified.

3d, The arrangement of the cylinders, H, main valves and cut off, p, transverse shaft T, slotted arm, u, connecting arms, v, and cranks, s, as and for the purpose specified.

### 69,233.—CARRIAGE CIRCLE.—Joseph R. McGuire, Warren, O.

1st, I claim the dowel pin, D, and groove, F, when constructed and arranged in relation to each other in the manner and for the purpose substantially as described.

2d, Section, C, when constructed with clips, H, in combination with section B, constructed with clips, J O, in the manner as and for the purpose substantially as set forth.

3d, The reach, M, when constructed with stays, N, in combination with the cross rail, I, and king bolt, L, when constructed and arranged in the manner and for the purpose set forth.

### 69,234.—CLAMP STRAP FOR SCHOOL BOOKS.—J. W. McKee, Brooklyn, N. Y.

1st, I claim two longitudinally adjustable side pieces, A, in combination with the straps, B, substantially as and for the purpose herein set forth.

2d, The combination of the suspending cord, C, with the longitudinally adjustable side pieces, A, and straps, B, substantially as and for the purpose herein set forth.

3d, The stems, c, in combination with the slotted lips, d, of the side pieces, A, and the straps, B, substantially as and for the purpose herein set forth.

4th, The supplemental knobs, a*, in combination with the longitudinally adjustable side pieces, A, and the straps, B, substantially as and for the purpose herein set forth.

### 69,235.—DOOR HOLDER.—W. A. Messler, Eureka, Ill.

I claim the catch, B, constructed substantially as described, attached to a wall or other suitable place, in combination with the lock, A, on door, D, in manner and for the purposes as herein set forth and described.

### 69,236.—BURGLAR PROOF WINDOW AND DOOR GRATES.—G. N. Miller and H. Mund, Chicago, Ill.

We claim in combination with the window or door, the grate, A, plates, F F, lock, E, latch, D, the whole arranged substantially as and for the purpose set forth.

### 69,237.—FAGOT FOR BEAMS.—W. W. Miller, Safe Harbor, Pa.

I claim the pile constructed as described and shown consisting of the bars, a, having flanges, b, bars, d, having flanges, d', hooked bolts, e, and the flat bars, c, as and for the purpose specified.

### 69,238.—COFFIN.—I. D. Nietscke, Somerset, Ohio.

I claim the apparatus for filling the coffin with gas, consisting of the tube, G, having the perforations, k, in combination with the tube, I, having the perforation, l, and with the collars, h h', and the cap, O, substantially as and for the purpose specified.

### 69,239.—HARROW CULTIVATOR.—Henry W. Ostram, Grand Rapids, Mich.

I claim the combination of the frame, A, mounted on guide wheels, B B, the bars, a a, suspended on the cross rod, b, the movable cross bar, d, and the cross bar, m, attached to the handles, k k, arranged and operating as and for the purpose herein described.

### 69,240.—DISH AND VEGETABLE WASHER.—I. N. Paddack, Oswego, New York.

I claim the dish and vegetable washer consisting of the tub or cylinder, A, and elastic grating, E, fixed therein, journalled in appropriate bearings and operated in manner and for the purposes substantially as described.

2d, The hinged plate, D, in combination with the standard, B, tub or cylinder, A, in manner substantially as and for the purposes above set forth and described.

3d, The spur lever, F, engaging in and in combination with the hook, f, and a lid or door, A', in manner substantially as herein shown and described.

### 69,241.—JOINT OF RAILROAD RAILS.—George Palmer, Littlestown, Pa.

I claim the connecting bar, H, constructed as described with the bottom of the recesses, m m, parallel to the inclined faces of the connecting bar, in combination with the rails and diagonal bolts, v v. When the bolts are at right angles to such inclined faces as herein described for the purposes set forth. In combination with the above, I claim the chair, B, provided with a slotted base, as and for the purposes specified.

### 69,242.—COAL STOVE.—Calvin Pepper, Norfolk, Va., assignor to Sidney Smith.

I claim the use of the finely perforated diaphragm, D, placed at a distance above, and covering the fire substantially as shown and described for the purpose and effect set forth. As a new article of manufacture a cap or cover for a heating stove constructed with a diaphragm, D, to be applied to stones already constructed and in use.

### 69,243.—WHEEL FOR CHAIN HORSE POWER.—Stuart Perry, Newport N. Y.

I claim as new and desire to secure by letters patent, a chain wheel having sliding or yielding cogs or teeth, so that a chain made up of links of unequal lengths can be run thereon, and some of the links always find a tooth or cog that will receive and hold, and those not so receiving and holding are moved out of the way, as and for the purpose substantially as described.

### 69,244.—SUGAR CANE MILL.—D. J. Powers, Madison, Wis., and Henry B. Stevens, Buffalo, N. Y., assignors to Buffalo Agricultural Machine Works.

I claim, 1st, Locating the driving wheel, A, beneath the bridge tree, L, and between the housings or side frames, M M, substantially as and for the purpose herein specified.

2d, In combination with the location of the driving wheel under the bridge tree, as above, we also claim the location of the pinion, B, outside of the housing or side frame, M, for the purpose set forth.

3d, The arrangement of the wedges, T T, and saddle pieces, U U, for adjusting the springs, Q Q, and bearings or journal boxes, R R, of the lower or minor rollers, substantially as herein set forth.

4th, The scraper or turn plate, V, constructed and arranged so as to self-adjust itself to the position or positions of the lower feed roll, H, substantially as herein specified.

### 69,245.—COAL BARGE.—Julius A. Preston, New Haven, Ct.

I claim, 1st, The combination in a coal barge or other similar vessel with a freight receptacle or compartment having an inclined or sloping bottom, as described, of a well and suitable means for opening and closing the same, substantially as and for the purposes herein set forth.

2d, The combination in a compartment as described, of the well or opening with its surrounding frame, and valves or gates for regulating the flow of the coal or other freight into the said well, substantially as herein shown and specified.

3d, The combination with the freight compartment or receptacle and its inclined bottom, of one or more channels for drawing off the water said compartment, substantially as herein set forth.

4th, A barge for transporting coal and other freight, in which the compartment for receiving such freight is combined with the body or hull of the barge, substantially as herein shown and for the purposes set forth.

### 69,246.—WASHING MACHINE.—J. H. Quackenbush, East Saginaw, Mich.

I claim, 1st, The roller, E, having a longitudinal motion substantially as described, in combination with rollers or other moving portion of a washing machine, for the purposes set forth.

2d, The rollers, D D, operated substantially as described, in combination with the roller, E.

### 69,247.—TWEER.—J. B. Raines and W. S. Owen, Oskaloosa, Iowa.

We claim the combination and arrangemant of the box provided with the tube as constructed with water space around it, chamber, A, bottom slide, H, and damper, D, when formed in the manner herein set forth and for the purposes specified.

### 69,248.—CHURN DASHER.—Franklin Ransom, Buffalo, N. Y.

I claim, 1st, Forming the dasher with a series of wings in the form of spouts or troughs with the sides converging outward, in the manner and for the purpose set forth, said wings being capable of standing in different angles, as described.

2d, The combination and arrangement with wings thus formed of the tubular rod with the outlets, f f, opening directly in the rear of wings, as herein set forth.

### 69,249.—MANUFACTURE OF SUGAR.—J. W. Reid, N. Y. City.

I claim, 1st, The process substantially as herein described of effecting the crystalization of sugar by subjecting it to the action of beaters or stirrers within a receiver having a stream or streams of cold water or air made to play on or around it and between it and an outer jacket, or its equivalent, substantially as and for the purposes or purposes specified.

2d, The combination with a sugar-mixing apparatus consisting of a receiver, A, stirrers, B, and jacket, E, of the cold air or water pipe, F, arranged below and upper opposite discharge pipes, G, both connecting with the interior of the jacket, substantially as herein set forth.

### 69,250.—PUMP.—Andrew J. Reynolds, Sturgis, Mich.

I claim, 1st, The arrangement in a hollow piston of the valve, O, and guide pin, N, as and for the purpose set forth.

2d, The construction of the upper cylinder head with the induction port, e, and valve seat, G g g', as and for the purpose specified.

3d, The arrangement in a submerged pump of the ports, b e M, valves, F I O, and hollow piston and rod, L K, as herein described and represented.

### 69,251.—ATTACHING YOKES TO POLES FOR CARRIAGES.—Uel Reynolds, New York City.

I claim the eye, c, and notch, d, upon the socket, b, in combination with the yoke, f, and stop horns, h and i, substantially as and for the purposes set forth.

### 69,252.—MEDICAL COMPOUND.—A. Rullman, N. Y. City.

I claim the medical compound herein described, made of the ingredients and in the proportions herein specified.

### 69,253.—APPARATUS FOR BURNING CRUDE PETROLEUM.—Charles Saffray, M. D., New York City.

1st, I claim the use of hollow grate bars divided in three superposed compartments, the middle compartment containing petroleum and the two others receiving, by means of the arrangement of stop cocks above described, either steam alone or hot air alone, or a mixture of both, said grate bars being perforated as represented in the drawing, so as to allow either steam alone or hot air alone, or a mixture of both, to escape inside or outside of the flame.

2d, The use of the safety pipe above described.

### 69,254.—CANDLE HOLDER.—M. Schall, New York City.

I claim the combination with the socket, B, or its equivalent, of a sharp pointed needle or pin, substantially as and for the purpose described.

### 69,255.—CULTIVATOR.—John Schroder, Kickapoo, Ill.

1st, I claim the manner herein shown and described of securing the plow beams to the frame, A, by means of pendants, G, and a movable cross bar, F, the latter being pivoted to the tongue, D, substantially as set forth.

2d, The above in combination with the swinging draft bars, N, made as described.

### 69,256.—NUT MACHINE.—Adam Schwebel, New Haven, Ct.

1st, I claim the combination of the two series of cutting dies, c c, with the moving frames, D D, when arranged and made to operate as described.

2d, I claim the combination of the two cutting dies, the series of punches, and the semi-rotating shafts, arranged as described, with any suitable means for rotating said shafts, in the manner and for the purposes set forth.

3d, I claim the combination of the sliding frame, D, semi-rotating shaft, E, and series of punches, arranged and operating substantially as described.

4th, I claim the combination of the series of punches, d d, with the series of spindles, f f, and means substantially as herein described, for transferring the nuts from the punches to the spindles.

5th, I claim the combination of the crowning die plate, F, made as described, with recesses in its upper edges for the reception of the punches for the sliding frame, K, and spindles, f f, substantially as set forth.

6th, I claim the combination of the rock shaft, V, and frame, y y, with the rest, a, and means for causing said frame, y y, to descend, and hold the bar from which the nuts are to be cut, substantially as described.

7th, I claim the combination of the oscillating and vertically sliding plates, R R', operated substantially as described, with the series of spindles, f f, as and for the purposes set forth.

8th, I claim the combination of the cam rock shaft, converting bar, u, loose cams, w w, pulleys, v v, and chains, V V, or cords, with the semi-rotating shafts, E E, for operating the same, alternately by right and left, in the manner herein described, for the purposes specified.

### 69,257.—HOISTING APPARATUS.—E. U. Scoville, Manlius, and W. L. Scoville, West Bloomfield, N. Y.

1st, We claim the frame, b, attached to the platform, a, so that it can be turned around, in combination with the legs, e e1, and beam, g, sustaining the hoisting apparatus, substantially as set forth.

2d, The hook, m, and rope or chain, h, in combination with the pulley, h1, and rope, n, as and for the purpose set forth.

3d, The latch, n1, applied to the rope, n, in combination with the notches, y, of the pulley, h1, and the disengaging levers, o, as and for the purposes set forth.

4th, The disengaging frame, o1, attached to the rope, h, in combination with the levers, o, and pulley, h1, for the purposes and as specified.

5th, The barrel, r, clutch and shaft, l0, in combination with the beam or lever, t, and inclines, t1, as and for the purposes set forth.

6th, The lever, w, upon the beam, t, in combination with the link fulcrum, w1, and stationary ring, t2, to operate the brake to the barrel, r, as and for the purposes set forth.

### 69,258.—CORN HUSKER.—Joseph Sechrist, Connellsville, Pa.

I claim the combination of the gloves, A, and tubular claws, B, for husking corn, arranged to operate substantially as set forth.

### 69,259.—TUNING ATTACHMENT FOR GUITAR.—H. Seehausen, Memphis, Tenn.

I claim the ordinary turning mechanism of a guitar, banjo, or other similar string instrument, in an adjustable frame, B, fitted in the head of the instrument, and all arranged substantially in the manner as and for the purpose set forth.

### 69,260.—IMPREGNATING WOOD WITH OLEAGENOUS AND SALINE MATTERS.—Charles A. Seely, New York city.

1st, I claim the process of impregnating wood, substantially as described.

2d, I claim the use, in conjunction, of the hot and the cold baths, for the purpose describe i.

### 69,261.—WASHING MACHINE.—Henry F. Sehnders (assignor to himself and Barbora Wacherman), Buffalo, N. Y.

1st, I claim the combination of the reciprocating rubber, C, stationary board, B, springs, c, with the connecting rod, I, rock shaft and arm, J b, arranged and operated substantially in the manner and for the purpose set forth.

2d, I claim the receptacle, s, provided with stop cock, q, and flexible pipe, p, in combination with rubber, C, substantially as and for the purpose described.

3d, I claim the feed rollers, D E, in combination with the ratchet wheel, k, double acting pawl, m, arm, l, and pitman, n, operating in the manner and for the purpose set forth.

4th, I claim the cams, K K, connected by rod, f, in combination with the hook, l, spiral springs, c, and rubber, C, for elevating the latter, arranged and operating substantially as specified.

### 69,262.—CAR BRAKE.—Walter S. Shotwell, Paterson, N. J.

1st, I claim the combination and arrangement of the rods, E E, levers, F, spring rods, H, arms, d and g, rods, h, cranks, l, shaft, I, arm, j, and cords, J, substantially as described, for the purpose specified.

2d, The rods, H, in combination with the cords, J, connected with the bell rope, O, the shafts, I, shafts, e, having arms, d, attached, on which the rods, H, rest, all arranged substantially as shown and described.

3d, In combination with the brake herein described, I claim the bars, L, and lever, M, substantially as and for the purpose specified.

### 69,263.—CAR AND OMNIBUS FARE BOX.—John B. Lawson, New Orleans, La.

I claim the apartment, E, when provided with an opening for the passage of light toward the fare box, and with a reflector, I, on the opposite wall, the lamp, H, being arranged between, substantially as described.

2d, Providing the apartment, E, with openings, F and G, for allowing the passage of light toward the fare box, and toward the front or rear, substantially as and for the purpose herein shown and described.

### 69,264.—STRAW CUTTER.—D. A. Smith, Pomeroy, Ohio.

I claim the wheel, C, provided with the knives or cutters, D, in combination with the feed roller, J, fitted within sliding uprights, I I, in the feed box, A, and operated from the cutter wheel shaft, B, through the medium of the gearing, E F e G, and K, all arranged substantially in the manner as and for the purpose set forth.

### 69,265.—PEG CUTTER.—Levi S. Smith (assignor to himself and Joseph V. Winemiller), Gorsuch's Mills, Md.

I claim making the cutting teeth of a peg cutter on two or more plates, to permit of filing or sharpening the teeth when made at different angles on the different plates, substantially as described.

I claim the lugs on the plates, in combination with the plate constructed and arranged substantially as described. I claim making the flouts or cutting edges to incline backward from the sides toward the center, so as to cut the pegs with a drawing cut, and crowd the cutter toward the side of the shoe.

### 69,266.—CAR COUPLING.—S. H. Smith, Venice Center, N. Y.

I claim the lock piece, C, the weight pieces, F F, and the crank shaft, D, arranged and combined substantially as described, in combination with the link, B, and the draw head of a railroad car, for the purposes set forth.

### 69,267.—MEANS FOR EXTINGUISHING FIRE ON STEAMSHIPS.—D. Spooner, Lowell, Ohio.

I claim the steam fire extinguisher above described consisting of the pipe, A, having several outlet cocks, a e f g, the steam drum, C, the throttle valve, H, and the short pipe, B, when used for the purpose and constructed in the manner specified.

### 69,268.—STEAM GENERATOR BLOWER.—William H. Squires, New York City.

I claim the arrangement of the boiler, A, furnace, B, chamber, C, steam pipe, D, stop cock, G, and conical chamber, E, as herein set forth for the purpose specified.

### 69,269.—SAFETY REIN.—Ira Stanbery, St. Louis, Mo.

I claim, 1st, The attaching of my safety reins to the Kimball Jackson overhead check or any other check back of the top of the horses' head and forward of the water hook as represented for the use and purpose as herein specified and set forth.

2d, The passing of the lines or safety reins as attached through my elevated turret or dee on my double harness and through the subdivisions of the "turrets" or "dees" on my single harness, for the use and purpose as specified and herein set forth.

3d, The small "turret" or "dee" elevated above the water hook with or without division post, o, and the subdivisions, e e, in the dees, F F, for lines or single harness all for my safety reins or any other safety reins, for the use and purpose as specified and herein set forth.

4th, The combination of my attachment of my safety reins to the checks at B and E, passing them through elevated turret, H, or subdivided turrets, F F, to the driver's hands by inclosing them within the driving reins, thus using "the line within a line" for the use and purpose as specified and herein set forth.

### 69,270.—THIRD SEAT FOR CARRIAGES.—Austin E. Thayer, Plymouth, Conn., assignor to M. B. Bryant, Brooklyn, N. Y.

I claim the seat, B, provided with a hinged leg, C, and hinged to the seat, A, and constructed in the manner described so as to be folded beneath the seat, A, as herein set forth.

### 69,271.—MACHINE FOR NICKING SCREW CAPS.—C. E. Thompson and William Walker, New Haven, Conn.

We claim the combination of the revolving center, a b, and spring, c, with the sliding center, B, and punch, i, when they are constructed, arranged and fitted to pronuce the result, substantially as herein described and set forth.

### 69,272.—LUNCH BOX.—James S. Tibbals, Milford, Conn.

I claim the vessels, A and D, constructed and arranged the one within the other, the pail, D, being suspended by the hooks, d, and trunnions, f, and provided with a cover so as to form a space entirely around the inner vessel and so that the said inner vessel may be removed as described and the outer vessel provided with a bail, B, the whole constructed and arranged in the manner described.

69,273.—Method of Attaching Horses to Carriages.—William H. Townsend, Camden, Ohio.

1st, I claim the clasp, d, in combination with framework, h, and pin, e, substantially as and for the purpose described.

2d, The clasp, d, provided at its outer end with strap, m, and at its inner end with back bands, k, in manner and for purpose set forth.

69,274.—Cotton Bale Tie.—James W. Truman, Macon, Ga.

I claim the flexible tie, A, constructed as described its ends, a a, extending the entire width of one side over lapping each other and forming a side of double thickness, their points, a, turned at right angles with the sides, a, the latter adapted to be pressed together by the strap, B, as herein shown and described for the purpose specified.

69,275.—Apparatus for Aging and Refining Wines and Liquors.—Reuben D. Turner, New York City.

1st, I claim the process substantially as herein described of treating wine or other liquor in vacuo and under the influence of heat by agitating it in a distributed form so as to convert it into spray, and afterward circulating the same in a more compact or liquid state in thin layers or streams, essentially as and for the purpose or purposes herein set forth.

2d, The combination with the vacuum chamber, C, of one or more perforated vessels, B, having perforated receiving distributors at or near their top and agitators operating within them, substantially as specified.

3d, In combination with the vacuum chamber, C, and vessel or vessels, B, having agitators operating within them, of a series of reversely inclined trays or surface distributors arranged for operation in connection with the agitators, essentially as herein set forth.

69,276.—Folding Chair.—Charles S. Twitchell (assignor to James G. English and Edwin F. Mersick), New Haven, Conn.

I claim a folding chair in which the back is hinged to the front legs, as described and connected with the front part of the chair by a band, which whether it constitute the seat or not forms the means whereby the back is maintained upright when the chair is unfolded.

69,277.—Machine for Pouncing Hats.—P. W. Vail, Newark, N. J.

I claim the arrangement of the pouncing rollers, G and G', supporting beds, H H', and feed rollers, I I, all being made adjustable, substantially as and for the purpose specified.

69,278.—Refrigerators.—Peter A. Vogt, Buffalo, N. Y.

What I claim as my invention is the refrigerating air chamber, D, provided with eduction apertures, g g, when so arranged under the ice box and combined with the drip and induction air pipe, F, and final escape passage, it that the air entering the refrigerator will pass directly into the said air chamber through the drip pipe and thence into the food compartment, without coming in contact with the ice, substantially in the manner and for the purposes set forth.

69,279.—Animal Trap.—Silas Ward, Richmond, Ill.

I claim the combination of the pivoted platforms, B, connecting bars, D, pivoted doors, C, connecting rod, G, lever, E, connecting rod, H, and weight, J, with each other and with the compartments of the trap substantially as herein shown and described.

69,280.—Machine for Making Needles.—C. P. S. Wardwell, Lake Village, N. H.

1st, I claim the reciprocating table, H, constructed as described, operating with other mechanism to feed the wire forward to punch the eyes of the needles, to slab the ends, to determine the forms of the barbs, and to cut the needles from the wires, substantially as herein specified.

2d, I also claim the wedge clamp, Y, constructed arranged and operated substantially as and for the purpose herein specified.

3d, I also claim the guide or guides, 16, on the top of the bed block, N, operating substantially as and for the purpose herein specified.

4th, I also claim the spring presser plate or plates, r r, arranged and operating in combination with the cutting off blades, and eye punches substantially as and for the purposes herein specified.

5th, I also claim the deflector, or deflectors, 15, operating in combination with the reciprocating bed block, N, and eye punch or punches arranged substantially as and for the purpose herein set forth.

6th, I also claim the combined arrangement of the bed block, N, adjusted obliquely to the line of its motion reciprocating table, H, and cutters, s s, adjustable toward and from the table substantially as and for the purpose herein specified.

7th, I also claim the mechanism substantially as herein specified for raising the cutters out of action and returning and retaining them in position for action substantially as herein set forth.

69,281.—Machinery for Making Needles.—C. P. S. Wardwell, Lake Village, N. H.

I claim the mechanism herein described, arranged and operating substantially as set forth for the purpose of raising the cutters out of action, and returning and retaining them in action, successively as herein specified.

69,282.—Machine for Quarrying Stone.—G. J. Wardwell, Rutland, Vt.

I claim arranging the steam boiler, the steam engine, the feeding mechanism, and the channeling devices, all upon a single carriage, B, substantially as described.

69,283.—Machine for Quarrying Stone.—G. J. Wardwell, Rutland, Vt.

1st, I claim the toothed rails, a al, and the spur wheels, a2 arranged outside of the carriage, B, in combination with devices which control the feed and operate the chisels, substantially as described and shown.

2d, The combination of the chisel carrying stocks, I, feed shaft, C, and engine shaft, E, substantially in the manner and for the purpose described.

3d, The combination reversible pawl, h, vibrating arm, g1, feed wheel, g, friction brake, chisel carrying stocks, I, racks, a al, and pinions, a2, substantially in the manner and for the purpose described.

4th, The adjustable weight, S, applied to the brake rod, S1, in combination with the feeding mechanism and with the chisel carrying stocks, substantially as and for the purpose described.

5th, The chisel carrying stocks, either sectional or solid, stepped on their lower ends and constructed so as to receive removable chisels, substantially as described and shown.

6th, The friction brake applied to a stone channelling machine, in the manner substantially as described.

7th, Communicating a rectilinear reciprocating motion to a chisel stock of a stone channeling machine by means of vibrating segmental levers, H, cams f f, and flexible connections, c' c,' substantially as described.

8th, The combination of reversible standard guides, J J,' with yoke, K3, hinged bar, K4, and the oscillating box, K2, substantially as described.

9th, The arrangement of the balance wheel, F, upon the crank shaft, E, on the inside of the carriage, B, substantially as described.

10th, The arrangement of the engine shaft, E, and feed shaft, C, upon the carriage, B, at intermediate points between the fire box, G,' and the standard guides, J J,' substantially as described.

69,284.—Eyeleting Machine for Attaching Buttons to Garments.—Ezra J. Warner, Newark, N. J.

I claim the combination of the sliding bar, h, the die, n, the sliding guide, d, and the plunger, C, all arranged and operating substantially as and for the purposes herein described.

69,285.—Clamp for School Books.—W. C. Watson, Paterson, N. J.

I claim the combination of the tightening nut, c, and screw, b', with the roller handle, B, frame, A, and binding cord, C, substantially as and for the purpose specified.

69,286.—Machine for Making Wagon Wheels.—Francis J. Weber, Carey, Ohio.

I clrim the combination of perforated rod, c, and key, r, with the staff, n, and its gage pin, t, substantially in the manner and for the purposes described.

69,287.—Reversible Butt Hinge.—W. S. Weed, Auburn, N. Y.

I claim the combination of the convertible stock pieces, A and A', with the joint pieces, B and C, and wing pieces, E and D, when all are constructed, operated and used substantially in the manner and for the purpose above specified.

69,288.—Clothes Pin.—W. H. Wells and Joseph Hawse, Newport Center, Vt.

We claim the clothes pin constructed as described having its ends, b, bent at right angles to the body, to receive the rollers, C, which press against each other beneath the clothes line, the latter being placed at D, between the arms, a a, as herein shown and described.

69,289.—Marker, Hemmer, etc., for Sewing Machines.—Joseph P. White, Savannah, Ga.

1st, I claim the combination of the adjustable gage, B B', with the adjustable presser, C, both made and operating substantially as herein shown and described.

2d, The gage, B B', and presser, C, in combination with the adjustable plate, d, and marker, E, all made and operating substantially as and for the purpose herein shown and described.

3d, The above in combination with the adjustable hammer, F, when made as described.

69,290.—Harrow Teeth.—F. R. Willson, Columbas, Ohio.

I claim making a harrow tooth of a single steel plate split part of the way across with independent wings, a a, placed one ahead of the other, substantially as shown and described.

69,291.—Securing Whip Sockets to Carriages.—Frederick Wood, Bridgeport, Conn.

I claim the herein-described clasp for securing whip sockets constructed so as to be attached and united in the manner set forth, as an improved article of manufacture.

69,292.—Caliper and Divider.—Edward Wright, Worcester, Mass.

1st, I claim the combination with the arms or legs or a pair of calipers or dividers of the spring, B, substantially as and for the purposes set forth.

2d, The combination with the arms or legs of a pair of calipers or dividers of the swiveled eyes, C C', thumb screw, D, and spring, B, substantially as and for the purposes set forth.

69,293.—Stretcher for Hosiery.—Sylvester J. Wright, Ellsworth, N. Y.

I claim an improved stretcher for drying hose, formed by the combination of the parts, A B and C, with each other, substantially in the manner herein shown and described.

69,294.—Water Wheel.—L. D. Wynkoop, Owasso, Mich.

I claim the upper wheel, D, consisting of a hollow cylinder, a, provided with buckets, f, at its inner side and bottom, in combination with the chute, C, and lower wheel, F, all arranged to operate in the manner substantially as and for the purpose set forth.

69,295.—Bag Fastener.—Wm. Zeller, Lebanon County, and R. Lechner, Berks County, Pa. Antedated Sept 18, 1867.

We claim the conical-threaded button, C, when used in combination with the tapering strap, A, in the manner and for the purposes set forth.

69,296.—Corn Planter.—Edwin L. Bergstresser, Hublersburgh, Pa.

1st, I claim the feed wheel provided with sectional feeders, each giving a different number of grains and a quantity of plaster corresponding to the amount of corn dropped, constructed and operated substantially as described.

2d, The shifting sections provided with circular rises or ribs fitting into corresponding grooves in the bottom of the box.

3d, The circular grooved lid or top incasing the sections and to which the hopper is attached, constructed and applied substantially as described.

4th, The slotted lever having uprights in the bar operated by means of the movable pin, so that it can be used for each section, substantially as described.

5th, The slotted or perforated arms or ears on each section, for shifting the sections and affording an attachment for the end of the pitman, as described.

6th, The V-shaped bottom or division under the sections, in connection with the slide or cut-off, operating as described.

69,297.—Pavement.—C. W. Stafford, Saybrook, Conn. Antedated May 16, 1867.

1st, I claim wooden paving blocks secured together in sections by double dovetailed strips or double headed keys, B, inserted in their sides, substantially as set forth.

2d, I claim the stringers, F, arranged transversely of the street, in combination with sectional paving blocks, substantially as and for the purpose set forth.

3d, I claim wooden paving blocks connected in sections and grooved transversely, as described and for the purposes set forth.

## DESIGNS.

2,782.—Soldiers' Memorial.—John T. Harrison, Canton, O.

2,783, 2,787, 2,788, and 2,789.—Carpet Pattern.—Chas. T. Meyer, Bergen, N. J., assignor to Edward C. Sampson, New York city. Four Patents.

2,784.—Trade Mark.—Francis Whittaker, St. Louis, Mo.

2,785.—Carpet Pattern.—Robert Hoskin.—Brooklyn, N.Y.

2,786.—Trade Mark.—J. G. Mackintosh, New York city.

2,790.—Stove Plate.—Isaac A. Sheppard, Philadelphia, Pa.

2,791.—Printing Type.—Richard Smith, Philadelphia, Pa., assignor to McKellar Smith and Jordan.

Note.—The above list contains Fifty-Nine Patents obtained through the Home Office of the Scientific American, exclusive of a large number through our Washington Branch.—Eds.

## PENDING APPLICATIONS FOR REISSUES.

*Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address* Munn & Co., *37 Park Row, N. Y.*

67,530.—Tube Cutter.—Henry Getty, Brooklyn, N. Y. Dated Aug. 6, 1867. Application for reissue received and filed Sept. 16, 1867. Div. A.

I claim a tube cutter in which the cutting edge employed is inclined or angular, substantially as and for the purposes specified.

67,530.—Tube Cutter.—Henry Getty, Brooklyn, N. Y. Dated Aug. 6, 1867. Application for reissue received and filed Sept. 16, 1867. Div. B.

1st, I claim a tube cutter in which two rollers are employed to sustain the pipe in the groove between them while being operated upon by a cutter substantially as set forth.

2d, I claim the head, A, with its block, d, that passes between the slides, C, and is operated upon by the screw, D, substantially as and for the purposes set forth

3d, I claim the V-shaped cutter, B, in combination with a pair of cylindrical rollers, E E, substantially as and for the purposes set forth.

4th, I claim the V-shaped cutter, B, in combination with a pair of cylindrical rollers, E E, block, d, slide, C, and screw, D, substantially as set forth.

40,409.—Heel Stiffener or Counter for Boots and Shoes.—John Ashton Green, Brooklyn, N. Y., assignee by mesne assignments of Daniel E. Hayward. Dated Oct. 27, 1863. Application for reissue received and filed Feb. 12, 1867. Div. A.

As a new article of manufacture I claim a heel stiffener or counter of india-rubber and its compounds which is shaped and vulcanized in the mold in which it is formed and made as set forth, for the purpose described.

2d, As a new article of manufacture I claim for the heels of boots and shoes a stiffening made of india-rubber mixed with ground rags or other suitable fibrous material in molds, substantially as set forth and for the purpose described.

40,409.—Heel Stiffener or Counter for Boots and Shoes.—John Ashton Green, Brooklyn, N. Y., assignee by mesne assignments of Daniel E. Hayward. Dated Oct. 27, 1863. Application for reissue received and filed Sept. 16, 1867. Div. B.

What is claimed as the invention of the said Hayward as a new article of manufacture is a heel stiffener or counter of india-rubber and its compounds which is shaped and vulcanized in the mold in which it is formed and made as set forth, for the purpose described.

63,057.—Brick Machine.—Peter H. Kells, Adrain, Mich. Dated March 19, 1867. Application for reissue received and filed Sept. 14, 1867.

1st, I claim the combination of the annular mold bed, B, and the central hub or support, C, substantially as described and represented.

2d, The wedge-shaped cut-off, d, arranged and employed in the manner and for the purpose explained.

3d, The arrangement upon the mold wheel of the two pug mills on opposite portions, substantially as described.

4th, An annular mold wheel provided with cogs or gear teeth upon its periphery and mounted upon a central hub or support, substantially as and for the purpose set forth.

62,678.—Die for Making Bells.—Andrew Patterson, Birmingham, Pa. Dated March 5, 1867. Application for reissue received and filed Sept. 12, 1867.

1st, I claim making seamless concave bells of single sheets of wrought or rolled steel by forming or shaping the metal between dies while sufficiently heated to give an increasing thickness of metal at or toward the mouth of the bell, substantially as above described.

2d, Wrought steel seamless concave bells, as a new article of manufacture.

25,680.—Oyster Dredge.—Thomas P. Sink, Fairton, N. J. Dated Oct 4, 1859. Application for reissue received and filed Sept. 16, 1867.

1st, I claim a horizontal roller, E, arranged to turn in bearings on the gunwale of a vessel in combination with a chock, or its equivalent, for retaining the hauling rope on or near the roller, all substantially as set forth.

2d, The combination of the horizontal roller, F, and a vertical roller or a compound chock, A, substantially as set forth.

3d, The arrangement and combination substantially as described of the chock or block, A, its pulleys, B, and the roller, E, for the purpose specified.


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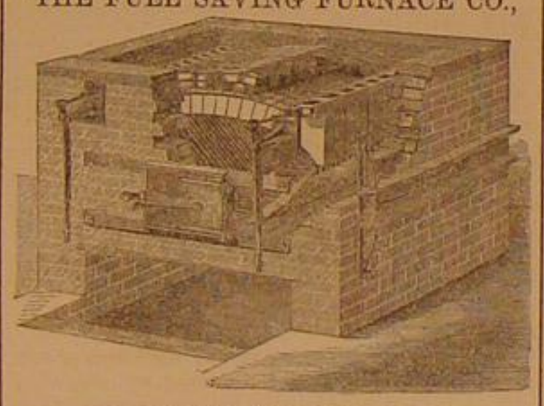
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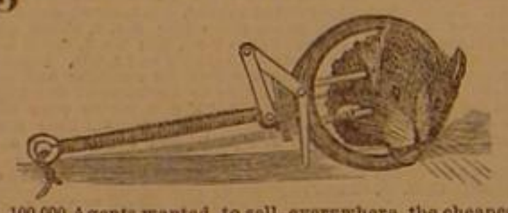
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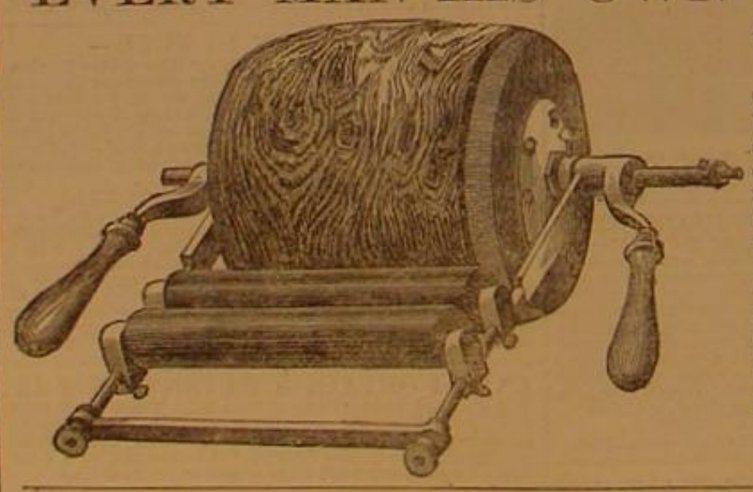
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