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Improved Oscillating Engine.

The oscillating engine has long been deservedly popular since it was first invented by the Messrs. Penn, of England. From that time until the present day constant effort has been made to simplify and improve it, although, from its nature, it would seem to be the most direct application of steam conceivable, and capable of very little modification.

The engravings here published represent designs for oscillating engines, and also an improved method and arrangement of the steam valve, which is intended to be free from the objections which attach to other plans wherein the oscillation of the cylinder is made the agent or means to control the action of the piston. The first engraving represents a new and highly ornate elevation of an oscillating engine on the plan described below.

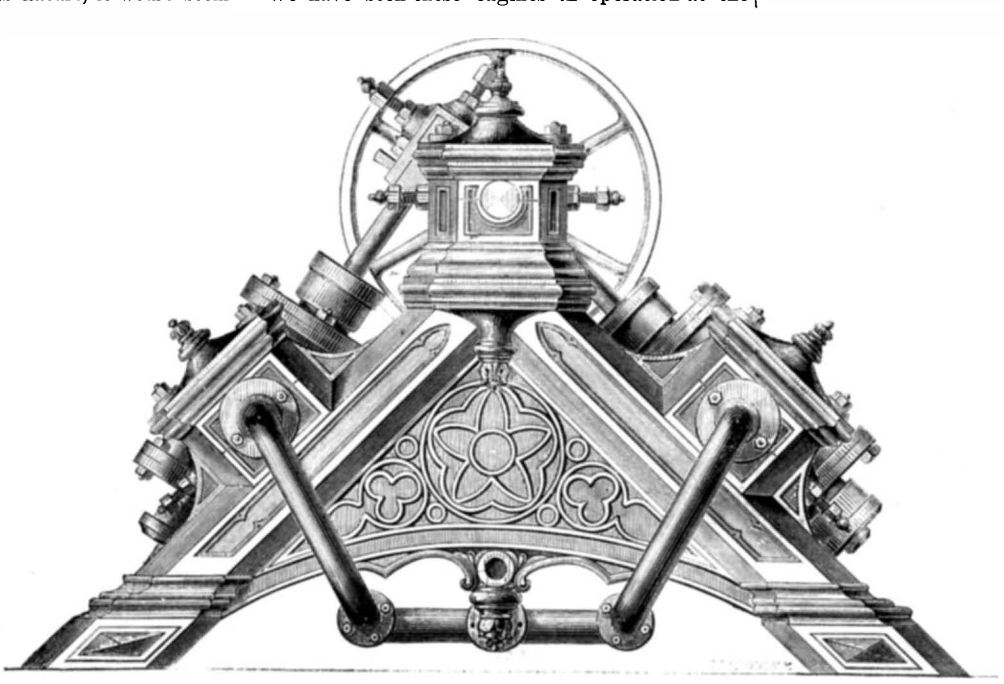
In Figs. 1 and 2 (see next page) may be seen a side elevation of another engine, wherein the valve and its attachments are all below the cylinder, out of sight. The cylinder is fitted with a steam chest, as usual, and a flat valve, A, the lower half of which sets on an elastic support, adjustable by screws, and is attached to the journals, B. This valve has bearngs, to which the rod, C, connects, the other end of the rod being secured to the bed-plate by a bolt and nut. Steam enters through the trunnions of the main cylinder, as usual, to the lower half of the valve; the piston then begins to move, and, by the oscillation of the cylinder with the upper half of the valve, causes the same to travel over the lower half, thus admitting live steam at the right time for a new stroke, and allowing the exhaust to open. By this novel method of letting in steam the ordinary valve chest is dispensed with, and the friction, and consequent loss of power, caused by the pressure of the steam on the slide valves in the ordinary steam engine, is entirely avoided; besides, the supply valve resting on an adjustable support, as before described, it can be set, according to the pressure of the steam used, sufficient to make it steam-tight, and no more. The construction and arrangement of this valve also allows the stroke of these engines to be made of any length. Another advantage is that the valve and face are plane surfaces, and can be readily made and kept in order by any mechanic. This is a matter of decided importance in mining countries, or other places where skilled labor and special tools are not to be had.

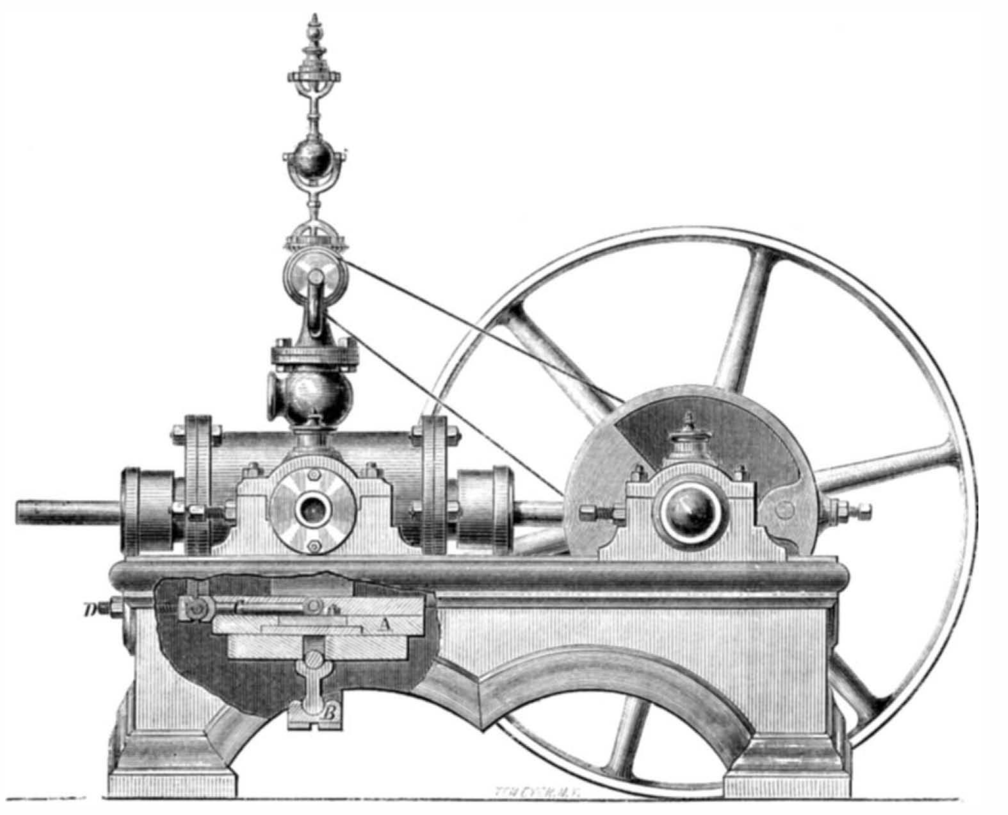
We have seen these engines in operation at the Fair, and they perform well. The system seems to be a valuable one where complexity is undesirable. The centers are passed easily and without any jar or pounding, and the engines work with great regularity.

The governor on the engine is the invention of Mr. Augustus Brown. By a simple and effective arrangement it can be set in such a manner that in case the belt breaks or flies off, the engine will stop entirely, or receive just sufficient steam to keep it moving, and no more, and prevent in this way the many and serious accidents which have so often occurred for want of such a contrivance. The advantage of this regulator, which may in reality be called a safety governor, is so apparent to all who use the steam engine, that it needs no further comment.

The patent for the steam engine was applied for by Felix Brown, for the firm of A. & F. Brown & Co. The patent for the governor was applied for by Augustus Brown.

For further information address Messrs. A. & F. Brown & Co., Nos. 57, 59 and 61 Lewis street, Progress Machine Works, New York City.





MESSRS. BROWN'S OSCILLATING ENGINE.

English vs. French Iron-clads.

The London *Times* says in exceptional instances of speed the English ships undoubtedly beat those of France, but in collective steaming power the latter have a decided preponderance. On the whole, looking upon the iron-clads of both countries as two machines for war, every part of which in each case should act in perfect harmony with the other, as with the slides and pistons of a steam engine, we are compelled to award the palm of superiority to the ships of France over those of England, premising, however, that only those of our own ships have been taken into consideration which have been equipped to their load draught and afterward put through their trial at the measured mile. In our *Minotaur*, *Agincourt* and *Northumberland* we certainly have, and in the *Pallas*, *Bellerophon*, *Lord Warden* and *Lord Clyde*, we hope to have, ships with 12-knot sea-going qualifications. All these vessels will probably have completed their deep-draught trials within the next six months, and if they should then realize the estimates formed of their speeds, the English iron-clad fleet may be considered fully on a par with that of our Gallic allies, but until then the latter will continue to occupy the foremost place in the race of the iron navies of the world.

THE vapor of tar ignites at 200 deg.

THE BESSEMER PROCESS IN AMERICA.

One of the most important improvements in the mechanic arts that has been made in this country is the Bessemer process of making steel. Iron is our most abundant and valuable metal; it performs an essential part in all the arts and in nearly all the operations of life, and if we were deprived of it the numbers and condition of mankind upon this earth would be materially changed. When the Bessemer process was first announced it seemed to us that so radical a reform in the methods of working iron was destined to produce great results, and we have taken pains to spread before our readers full accounts of every step in the progress of the invention, with illustrations of the apparatus employed.

It will be remembered that on a trial of interference at our Patent Office, between Mr. Bessemer and William Kelly, of Eddyville, Ky., it was decided that Mr. Kelly was the prior inventor, and a patent was accordingly issued to him on the 20th of January, 1857. Subsequently, on the 12th of July, 1859, a patent was granted to Christian Shunk, of Canton, Ohio, who claims to be the very first inventor of the Bessemer process in the world. Mr. Shunk has obtained several reissues, and, when we last saw him, seemed full of determination to enforce his claims.

A wealthy firm of iron manufacturers in Troy, N. Y., Messrs. Winslow, Griswold & Holley, have obtained rights under Mr. Bessemer's patents in this country, and have commenced the manuacture. Mr. Holley, an educated and able civil engineer, visited England, and learned the process from Mr. Bessemer. At the last meeting of the Polytechnic Association, Mr. Holley read a long paper on the Bessemer process, giving the same statements that have already appeared at length in our columns. He, however, presented one fact that is new and interesting. In erecting the works at Troy, several minor improvements were made, and one of considerable importance; that is, the use of a cupola furnace in place of a reverberatory for melting the iron. As one pound of coal will melt two pounds of iron in a reverberatory furnace, while it will melt from eight to thirteen pounds in a cupola, the change effects a material economy in the manufacture.

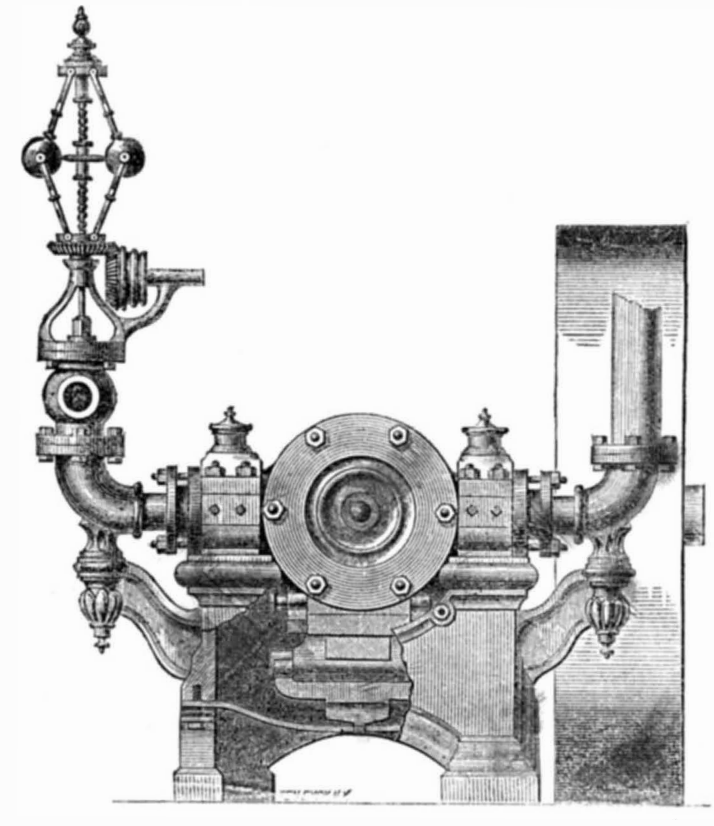
This prompt effort to effect improvements in the process and apparatus, suggests the long series of inventions which are, doubtless, destined to accompany the development of this great manufacture in this country. We hope that in this development our American inventors—those who have already secured patents, and those who hereafter may secure them—will receive the full share of profits to which they are justly entitled.

EXHIBITION OF GRAIN DRYERS AND SEPARATORS.—TO MERCHANTS.

On the 13th inst. several machines for drying and separating grain were exhibited at the Produce Exchange building, in this city

R. Heneage's Patent Grain Dryer, made by W. H. King, of Buffalo, N. Y., was among the number, and is an ingenious machine. An octagonal tower has in its axis a vertical rotating shaft, which carries a series of horizontal, circular, metallic disks, perforated with small holes. The grain is poured gradually upon the center of the upper disk, when it is carried by centrifugal force to the edge, and thrown off; it is caught by a tunnel of wire gauze, which conducts it to the center of the disk next below, when the process is repeated, each disk being provided with its tunnel. The grain is thus separated and exposed freely to the current of air which ascends perpetually through the tower.

Bodge's Grain and Seed Separator was also shown in operation. This compact and efficient machine was illustrated and described on page 278 of our last volume. A few quarts of mixed grain and seed were poured into the hopper, and the handle was turned two or three minutes, when the seed was found completely separated, each kind in its proper receptacle—oats in one vessel, hay seed in another, peas and corn in another, large wheat in another, small wheat in another, and, finally, the refuse wheat and chess in another. The separator was very perfect in its operation, and the machine attracted much attention from the large crowd of grain dealers present.



MESSRS. BROWN'S ENGINE.---SEE FIRST PAGE.

MISCELLANEOUS SUMMARY.

The engines of the *Bellerophon* English iron-clad were guaranteed to make 70 revolutions per minute, with a pitch on the screw of 22 or 23 feet. With all the boiler power it was impossible to get more than 58 revolutions, but at this velocity it was stated that the "drag" of the screw was so great the contract could not be complied with. It is, therefore, proposed to put in "another screw," which means a finer pitch, we suppose, when the required velocity will be had.

A Manufacturer Fined for Making False Returns.—The Gloucester *Telegraph* states that a manufacturer in Manchester, Mass., has been heavily mulcted for making false returns of the amount of his business. An investigation showed conclusively that some eleven monthly returns did not show a true statement of his business, and he was assessed $1,200 extra, to cover the deficiencies, and fined $1,200 for making fraudulent returns.

The operations of the Naval Academy at Annapolis have been resumed, under the superintendence of Rear Admiral D. D. Porter, assisted by a large number of young naval professors. There has also been added to the professorships a Professor of Steam Engineering, in the person of Chief Engineer W. W. Wood, United States Navy, under whose instructions the naval cadets are to be taught steam engineering.

The New England States pay about fifty millions a year to the Government in internal revenue taxes. Of this amount Massachusetts pays nearly thirty millions, which shows the wonderful prosperity of that State.

"Harpers' Weekly," of Oct. 14th, contains a picture entitled, "The attempted escape of Doctor Mudd from the Dry Tortugas," sketched by a passenger on board the steamer. In this engraving the Doctor is represented as having crawled into a rifled gun, and is detected therein by his heels sticking out. There are no rifles in existence a man can crawl into, so the passenger on board has taken some liberties with the fact.

Buffon combined plane glass mirrors only 6 inches by 8 inches, and with 40 set on fire a tarred beech plank, 66 feet distant; with 98 at 126 feet, with 112 at 138 feet, with 168 at 200 feet; and he melted metals at 30 or 40 feet.

The middle of the center arch of Southwark Bridge rises one inch in the heat of summer, and the effect of a gleam of sunshine on the Britannia Bridge is immediately perceptible.

The resistance of the air to a cannon ball of 2 pounds weight, with a velocity of 2,000 feet per second, is more than sixty times the weight of the ball.

Feet Wash.—The feet of some persons naturally evolve a disagreeable odor. Wash them in warm water, to which a little hydrochloric acid or chloride of lime has been added.

In dry air at 32° sound travels 1,090 feet per second, and one foot more for every degree of the thermometer.

A fiber of silk a mile long weighs but 12 grains, so that there are 583 miles of fiber in a pound avoirdupois.

The magnesium light is found to be sufficiently active to determine the combination of hydrogen and chlorine.

Silver can be beaten into plates of which 110,000 make an inch, and drawn into wire of the 13th of an inch, sustaining 137 pounds.

Vegetable ivory may be colored almost any shade of purple by the more or less prolonged action of concentrated sulphuric acid.

M. Aupin has determined the presence of silver in the water of the Dead Sea; a tun of the saline residue contains seven grains of the precious metal.

It is reported that Lieut. M. F. Maury, who ran away from the National Observatory at Washington in 1861, has migrated to Mexico.

A plain glass miror reflects ·5,352 of 1,000 rays—the quicksilver reflects two-thirds.

Five thousand men (infantry) in two ranks, and formed in line, extend a little over one mile.

Spent tan is sometimes substituted, with excellent results, for charcoal in blasting powder.

The disease which has been attacking the cattle of England has appeared also among the sheep.

The trial between the *Winooski* and *Algonquin* was renewed on Tuesday the 17th inst.

It is said there will be no transit of Venus till December 8, 1874, and no other till 2004.

The part of the spectrum where the greatest heat prevails is found to be the center of the yellow.

Dr. Richardson states that catarrh is induced by ozone.

A platinum wire of the 13th of an inch will suspend 274 pounds.

A cubic inch of mercury at 62·30 degrees weighs 3,425·35 grains.

Water heated in a strong closed vessel has melted lead at 612 degrees.

Sea water is both salt and bitter at the surface, but only salt in its depth.

The organ was invented by one Ctesibius, a barber, of Alexandria, about 100 years B.C.

A convex lens burns at 25 feet under the surface of the sea in a diving bell.

Tin wire, the thirteenth of an inch in thickness, sustains 34·7 lbs.; a lead wire but 28 lbs.

Solid carbonic acid sinks the spirit thermometer to 162° Fah. below zero in two minutes.

The ascending power of a balloon with hydrogen gas to one filled with coal gas is as 15 to 11 nearly.

Negative Slip.

This peculiar action of the screw has been noticed to a great extent in the trial of the New English iron-clad ship *Bellerophon*, and the *Times* thus speaks of the phenomenon:—

The trials of the *Bellerophon* have resulted in one of the most extraordinary phenomena ever developed since the introduction of steam. For three days in succession this ponderous ship has been steaming about at the entrance to the Thames and Medway under circumstances for which all the science of the day vainly attempts to account, and which baffles those who have designed, built, and put engines into the ship, no less than the nautical gentlemen who had charge of her during her trials. In technical language, the phenomenon in question is denominated "negative slip," but in common parlance it is spoken of as a case of the ship overrunning the screw, which, in this instance, has occurred to an altogether unexampled degree. We may state the case in the simplest manner to the general reader by saying shortly that, although throughout the trials of this ship, while the screw propeller which drives her has been itself advancing with a speed barely, if at all, exceeding 12¼ knots per hour, the ship herself has been speeding through the water at a rate of 13¾ knots. If a phenomenon of this nature had occurred with a light vessel, constructed with exclusive regard to fleetness, it would obviously have been a singular circumstance, but for it to happen with an iron ship of war of the stoutest construction, covered with the most ponderous armor ever yet applied to a sea-going ship, is a most unexpected and unaccountable circumstance. The engines put into her are designed expressly to revolve rapidly, and the ship was taken down the river on trial with the understanding that the screw would have turned round about 70 times per minute, thus developing 6,000 indicated horse-power. Instead of this, to the astonishment and disappointment of everybody on board, and of no one more than the engine-makers themselves, the drag of the four-bladed screw was found to be so great that not even 60 revolutions could be secured, even when all idea of using the steam expansively was abandoned, and it was allowed to rush with full force into and through the cylinders. A great waste of steam was thus, of course, occasioned, and, consequently, scarcely 5,000 horse-power, instead of 6,000, was developed. The wonder is that under such circumstances the high speed of 13¾ knots was attained, and the fact that it was is the best possible guaranty that a speed of more than 14 knots will be secured in this remarkable ship when the full power of her engines has been developed with a different screw. The peculiarity of the screw at present applied to the ship is not limited to the number of its blades. Each of these four blades is formed with two surfaces standing at an angle of inclination to each other, in order that each half of it may impart a different velocity to the water, somewhat upon the principle of the differential screw propeller invented many years ago by Professor Bennett Woodcroft, of the Great Seal Patent-office. The *Bellerophon's* screw really has eight blades, in fact, arranged in four pairs, and as the diameter of the whole is no less than 23 feet 6 inches, the drag which it puts upon the engines must be truly enormous.

Mr. T. Moy writes to the *Mechanics' Magazine* as follows:—

The recent trials of the *Bellerophon* have proved that this vessel, with a four-bladed screw, has what is called negative slip. While the screw advances at a speed of 12¼ knots, the vessel goes at the rate of 13¾ knots; and, as this phenomenon remains unexplained, I will venture to offer an explanation which I have long believed to be the true one. It is quite certain that no paddle-wheel steamer ever went even so fast as the wheels revolved, and therefore all slip with paddle-wheel vessels is positive. This being the case, negative slip can only arise from some peculiarity in the propeller. The four-bladed screw of the *Bellerophon* acts as an ordinary screw is supposed to do in driving the vessel forward, and a cylinder of water is driven aft by its action as a screw; but it acts also as a fan, driving outward a quantity of water by its centrifugal action; and, the vessel being in motion, this extra quantity of water comes from forward of the screw, and entering near the center is driven outward at right angles to the screw shaft. The more blades the propeller has, the more fanlike is its action, and *vice versa*. I think that an ordinary fan worked like a screw propeller would produce some motion on a vessel; it would at least be an interesting experiment.

Referring to the negative slip of the *Bellerophon*, "X," in the *Times*, says that he has experienced it considerably in large steamers with four bladed screws, and the reason he assigns for it is that the screw propels a larger body of water from it than is required to overcome the resistance of the vessel in passing through the water at the same speed as the screw, and that the vessel must therefore pass through a greater space of water than is due to the travel of the screw to supply the superabundance of water thrown backward by it. This, of course, involves an increase of speed of the vessel in proportion to the increased quantity of water required to supply the screw.

Manufacturing Items.

American Thread.—Willimantic is thoroughly busy just now, in common with all manufacturing places. The Linen Company, whose threads are of world-wide reputation, employ 1,200 hands, putting up four thousand dozen of spools a day. They have just built a new mill 250 feet long and five stories high, and sub-let several small factories to tributary manufactures. Mr. A. B. Burlesson is superintendent. The Duck Co. employ 50 hands, make 30,000 yards of warp a week, and pay $900 tax per month. The Dunham Co. make 11,000 pounds of thread a week for the Linen Co., employing 50 hands and paying $900 a month as tax. The Hop River Warp Co. do business on the same scale. Mr. W. C. Jillson is agent for these three concerns.

Cotton Manufactures.—There are five cotton mills at Holyoke, Mass., including a spool cotton mill of 18,432 spindles. The number of cotton spindles is 78,240; the quantity of cotton consumed, 1,275,582 pounds; value of stock used, $1,569,238; number of yards of cotton cloth made, 5,049,141; capital invested, $1,740,000; number of hands employed, 945. In the spool cotton mill 315 hands are employed, and 457,706 dozen spools made, worth $503,476; capital employed, $600,000. The Holyoke Machine Works employ 60 hands, and make $50,000 worth of work on a capital of $30,000. The four paper mills use 1,966 tuns of stock, worth $491,655, and make 55,284 reams of writing paper and 1,073 tuns of other kinds, employing 330 hands and a capital of $290,000.

Wire Cloth.—The Clinton (Conn.) Wire Cloth Company, under the management of C. H. Waters, Esq., are now making, by patent power looms and the latest improved weaving machinery, wire cloths of every kind, finish and mesh, and far superior to any made by hand looms. Their patterns are of all textures, from the delicate wire gauze, to the galvanized fence, protecting our houses from musketoes and our gardens from intrusion. Wire fencing is made a specialty by them, being coated with a thick wash of zinc. In all their manufactures the wire is subjected to so great a strain in weaving, that all stretch is taken from it, and a perfect mesh is formed, in connection with a level surface. Their cloths, which are of standard worth, are furnished to the trade at less prices than when produced by the old methods.

Rag Boilers.—At the Fort Pitt Boiler Works, there are in process of construction two rotary cylinders, for the use of the Pittsburgh Paper Manufacturing Company, whose mills are to be located at Brighton. These cylinders are each 6 feet in diameter, and 22 feet long, and are being made of iron three-eighths of an inch thick, joined with three-quarter inch rivets. They are to be the receptacles of rags, and as they revolve receive a constant volume of steam, which, with the motion, converts the rags into pulp, which is discharged into another vessel preparatory to being made into paper. The iron of which these cylinders are being built was subjected to a tensile test of 60,000 pounds to the square inch.

A new steam machine has been introduced into the steam saw-mills in Chatham dock-yard, and has been fixed in the millwright's shop, for the present, on trial. It is the patent of Mr. Zarnacott, engineer, Leeds, and is termed a saw-sharpening machine. It is fitted with two patent grinding wheels, suitable for sharpening circular saws up to five feet in diameter, and web saws of any length, without having the teeth to finish or top with files. The machine seems, from its present working, likely to be adopted by the Government.

The shoe business is reported more active than at any known period. During the past year 3,248,560 pairs of boots and shoes have been made in the town of Haverhill, Mass. The gross value of stock used was $2,496,260; value of boots and shoes manufactured, $4,002,787; capital invested, $704,700. About four thousand hands were employed.

Percussion Caps.—The American Flask and Cap Co., at Waterbury, Conn., employs 200 hands, and pay a yearly revenue tax of $25,000. They make 2,500,000 percussion caps per day, which is more than is made by any other manufactory in the country.

A New Car for Carrying Oil.

We were shown recently, at the boiler yard of W. W. Wallace, on Locust street, in the Ninth Ward, a new car, the invention of J. F. Keeler, Esq., for the purpose of transporting bulk oil, which bids fair to become a popular institution when introduced. The car is twenty-five feet in length, by eight in width, and resembles very much in appearance an ordinary box car, with the exception that the bottom or tank is rounded, having the shape of a U. It is constructed of three-eighth-inch wrought-iron plates, firmly riveted together, and well stayed and braced by means of angle irons. The capacity of the tank is eighty barrels. Within two inches of the top plates is a half-inch board roof or top, fastened to the braces by means of bolts, which is so firmly joined together as to prevent, when the car is filled and in motion, the surging of the oil, but which permits it to expand, and thus reduces the quantity of gas, which otherwise would be formed. The tank is filled from the top, by means of two cast-iron pipes, one on each side, and is drawn off from the bottom through two valves, one in each end. The upper portion of the car is of sheet iron, and is intended to be used for the transportation of light packages. The floor of the car rests on sleepers, about an inch in thickness, and is so arranged that the air can pass freely under it in any direction. This will permit the escape of any gases which may penetrate through the iron covering of the tank, and prevent the damage of the goods in the box above. The car will rest on ordinary spring trucks, and when completed will not exceed in weight the box freight cars now in use.—*Pittsburgh Chronicle.*

Balanced Rudders.

The largest iron-clad ship in England has a balanced rudder, and its performance is thus spoken of by the London *Times*:—

The adoption of the balanced rudder on board a vessel of the *Bellerophon* class was, at first, considered to be a doubtful experiment, but the results of the trials made were, in the highest degree, satisfactory. With the helm at port, and the angle of the rudder 32 deg., the helm was put over in four turns by eight men in 23 seconds, and the complete circle accomplished in 4 minutes 30 seconds, and the half circle in 1 minute 50 seconds, with the helm to starboard the rudder was brought to an angle of 37 deg. by eight men in 25 seconds. The value of the balanced rudder in a vessel of the *Bellerophon* class, which is required to steer readily to enable her broadside battery guns to be worked with advantage, will be apparent when, in the case of the *Warrior*, the average time in making the circle is eight minutes. At the close of the experiments with the steering gear, it was decided to abandon the further trials till the following day.

Largest Vineyard in the World.—It is said that the Buena Vista Vineyard, in Sonoma County, California, is the largest in the world. It consists of 6,000 acres, with 272,000 vines planted previous to 1865, and 700,000 planted or to be planted this year. Last year the yield was 42,500 gallons of still wine, 60,000 bottles of sparkling wine, and 12,500 gallons of brandy. One hundred men are constantly employed, and double that number during the vintage. There are 8,000 fruit trees, and large varieties of grapes.

If we are ever dependent on America for coal, it would require about 1,200 colliers of the size of the *Great Eastern* to maintain our present supplies only. —*London Engineer.*

PEAT AS FUEL.

There are thousands of acres in the country covered with peat bog to the depth of several feet, and in some parts of the country this article has been in use for fuel at least fifty years. It is cut with sharp shovels into blocks somewhat in the form of bricks and about twice the size, and piled in rows to drain and dry, when it is ready for the fire. It is especially convenient for keeping fire over night, as a block of it placed upon the fire at bed time is found to be a mass of live coal in the morning.

The present high price of coal and wood has caused more attention to be directed to peat as a substitute, and extensive experiments have been made in this country and England with this fuel for various uses in the arts, especially for driving locomotives. At the recent meeting of the British Association at Birmingham, D. K. Clark, C. E., author of the able and learned work on the locomotive, read a paper on the use of peat, from which we take the following extracts:—

"Peat, it is well known, possesses many most valuable properties as a raw material for fuel, but the attempts hitherto made to utilize peat on a large scale have proved failures, owing to the difficulty of dealing with a substance exceedingly bulky, very loose, and holding from 75 to 85 per cent of water.

"To separate the water and to condense and mold the peat into convenient sizes at a cost sufficiently low to render it commercially available as fuel, is a problem which has baffled the efforts of many operators.

"At Horwich the problem has been carefully studied, and the difficulties appear to have been successfully overcome. Until a mode of artificially drying peat rapidly and economically had been worked out, air-drying was necessarily resorted to; and where limited quantities of fuel—say about 100 tuns a year—only are required to be made, air-drying may suffice, but for large quantities it would be, in our fickle climate, too uncertain a process to be dependent on, and for seven months in the year it would not be available at all.

"According to the system matured and established at Horwich the peat, as it comes from the bog, is thrown into a mill expressly constructed, by which it is reduced to a homogeneous pulpy consistency. The pulp is conveyed, by means of an endless band, to the molding machine, in which, while it travels, it is formed into a slab and cut into blocks of any required size. The blocks are delivered by a self-acting process on a band, which conveys them into the drying chamber, through which they travel forward and backward on a series of endless bands at a fixed rate of speed, exposed all the time to the action of a current of heated air. The traveling bands are so arranged that the blocks of peat are delivered from one to the other consecutively, and are by the same movement turned over in order to expose fresh surfaces at regular intervals to the action of the drying currents, so that they emerge from the chamber dry, hard, and dense. To the peat substance thus treated the name of 'torbite' has been given, from the Latin *torbo*, by which name peat is constantly mentioned in ancient charters.

"The next stage in the process is the treatment of the torbite in close ovens, when it may either be converted into charcoal for smelting purposes, or may be only partially charred for use as fuel for generating steam, or in the puddling furnace.

"The charcoal made from torbite is extremely dense and pure; its heating and resisting powers have been amply and severely tested, and with the most satisfactory results. At the Horwich works pig iron has been readily melted in a cupola. About 80 tuns of superior iron have been made with it in a small blast furnace measuring only 6 feet in the boshes, and about 26 feet high. The ore smelted was partly red hematite and partly Staffordshire, and the quantity of charcoal consumed was 1 tun 11 cwt. to the tun of iron made, but in a larger and better-constructed furnace considerably less charcoal will be required. It has also been tried in puddling and air furnaces with equally good results, considerably improving the quality of the iron melted. For this purpose the fuel was only partially charred, in order not to deprive it of its flame, which is considerably longer than that om coal. Some of the pig iron made at Horwich was then converted into bars, which were afterward bent completely double, when cold, without exhibiting a single flaw. Messrs. Brown & Lennox, in testing this iron for chain cables, have reported that its strength was proved to be considerably above the average strength of the best brands.

"For the generation of steam the fuel made at Horwich has also been well tested, and its superiority over coal practically demonstrated both in locomotives and stationary engines. On the Northern Counties Railway, of Ireland, a train was driven with it from Belfast to Port-rush, a distance of seventy miles. The result at the end of the journey showed a saving, as regards weight consumed, of 25 to 30 per cent over the average of three months working with coal on the same journey. There was an excess of steam throughout the run, though the fire-door was constantly open and the damper down. At starting the pressure was 100 pounds, but during the trip, and while ascending a steep incline, it rose to 110 pounds, and afterward to 120 pounds, with the fire-door open. While running there was no smoke, and very little when standing still.

"At the Horwich works the fuel was tested against coal under the boiler there. This was done on two consecutive days, the fire having on each occasion been raked out the night previous.

"The following results were obtained:—Coal got up steam to 10 pounds pressure in 2 hours 25 minutes, and to 25 pounds pressure in 3 hours; peat fuel got up steam to 10 pounds in 1 hour and 10 minutes, and to 25 pounds in 1 hour and 32 minutes; 21 cwt. of coal maintained steam at 30 pounds pressure for $9\frac{3}{4}$ hours; $11\frac{1}{4}$ cwt. of peat fuel maintained steam at the same pressure for 8 hours.

"But in addition to this a large economy is effected by the use of peat fuel for the generation of steam in the saving of boilers and fire-bars from the destruction caused by the sulphur in coal, from which peat is free. In Bavaria, peat fuel has been used on the railways for several years past, and the economy effected by its use in the wear and tear of the engines is stated by the officials in their reports to be very considerable."

The Ancient Wreck.

A correspondent of the Boston *Advertiser* writes to that journal as follows:—The remains of an old ship supposed to be identical with the one described by Governor Bradford (Plymouth Plantation, pages 217–251), which was wrecked "before a small blind harbor, that lies about the middle of Manamoyake Bay, to the southward of Cape Cod," in the beginning of the winter of 1626–27, is now on exhibition upon Boston Common, and is attracting considerable attention.

The wreck was discovered about two years since, on "Nauset Beach," imbedded in the sands, and Mr. Amos Otis, of Yarmouth Point, prepared a paper upon it, which is published in the January number of the *Genealogical Register*, 1864. The wreck has recently been removed to Boston, and the parts put together in proper order by Messrs. Dolliver & Sleeper, experienced ship builders, so that persons curious in such matters may be enabled to pass their judgment upon the question whether these are the actual remains of the old ship described by Bradford, as wrecked 239 years ago.

That these relics bear the impress of great age, no one who has seen them can doubt. But the appearance of age is, of course, not all that is wanted to prove, or to render probable, that they are parts of the old ship referred to.

While visiting the wreck the other day I listened to some adverse criticisms upon it—from an apparently intelligent source—like the following, viz.:—That it indicated a vessel of not over forty tuns burden—too small to have made the passage of the Atlantic with many passengers "and sundry goods"—as related by Bradford. That the timbers (ribs) are made of saplings, many of the sticks unhewn, and put in just as they were cut; quite unlike the way in which a vessel would be built in England, even at that day; but just the way we should suppose a small vessel would be built upon the coast of New England at an early date. That treenails (trunnels), which had been extensively used in building this vessel, were not used in England at that early period—iron spikes being used instead.

The value of some of these criticisms can probably be better appreciated by others than by myself. As to the size of the vessel, I suppose it is somewhat difficult to determine this with precision from these few remains. A model has been prepared by Mr. Lawler, a naval architect, which has the approbation of Messrs. Dolliver & Sleeper, and which indicates a vessel of about seventy tuns, large enough to navigate the Atlantic. As to the small timbers, may they not have been the limbs of full-grown trees rather than saplings, which, it was said, the English would not have cut.

As to the use of treenails at that time in England, I will refer to Captain John Smith's "Sea Grammar," published at London in 1627—the year after the incident of the wreck—which tells us all about the building, rigging and manning of ships. In describing the planking of a ship, he says:—"Now all those planks under water, as they rise and are joined one end to another, the fore end is called the butt end in all ships; but in great ships they are commonly most carefully bolted, for if one of those ends should spring or give way, it would be a great, troublesome danger to stop such a leak; the other parts of those planks are made fast with good treenails and trunnions of well-seasoned timber, through the timbers or ribs" (pp. 3 and 4). A little further on he says:—A "drive bolt is a long piece of iron to drive out a treenail, or any such thing; beside divers others so useful that without them and long iron spikes and nails, nothing can be well done; yet I have known a ship built, hath sailed to and again over the main ocean; which had not so much as a nail of iron in her, but only one bolt in her keel" (pp. 5 and 6). This settles the question about the "treenails."

I incline to the opinion that the place where this wreck was found may answer Bradford's description of the whereabouts of the vessel which he visited in distress; though Bradford does not say that this was Potanumaquut Harbor, as he is made to say, on page 25 of the pamphlet issued on "The Ancient Wreck." Neither is there any good authority for the name which is given to Bradford's lost ship, viz., the *Sparrow Hawk*, which is set forth on the title page of this pamphlet. Bradford gives no name; neither does Morton, nor indeed any of the old chroniclers. Mr. Otis says that there is a tradition, "uncertain and unreliable," that this was the name of the "old ship." The avidity with which this name is caught up by the exhibitors of this old wreck has a tendency to cast doubts on many other statements in the pamphlet, which, doubtless, have a good foundation. There is no propriety, either, in calling this the "Pilgrim Ship." She was bound to Virginia, whither her passengers—many of them "untoward people"—went as soon as they could find means of transportation; and there, doubtless, are their decendants among the "chivalry" of the "Old Dominion."

I think there is a good reason to believe this wreck to be the veritable remains of the "ship" described by Bradford, and I hope all will go and see it.

To Apply French Polish.

The wood must be placed level, and sand-papered until it is quite smooth, otherwise it will not polish. Then provide a rubber of cloth, list, or sponge, wrap it in a soft rag, so as to leave a handle at the back for your hand, shake the bottle against the rubber, and in the middle of the varnish on the rag place with your finger a little raw linseed oil. Now commence rubbing, in small circular strokes, and continue until the pores are filled, charging the rubber with varnish and oil as required, until the whole wood has had one coat. When dry repeat the process once or twice until the surface appears even and fine, between each coat using fine sand-paper to smooth down all irregularities. Lastly, use a clean rubber with a little strong alcohol only, which will remove the oil and the cloudiness it causes, when the work will be complete.

THE brown color on guns and iron generally is produced by superficial oxydation, either by repeated dipping in dilute nitric acid or by applying the following mixture:—Two parts chloride of iron (U. S. Ph.), two parts strongest solution of chloride of antimony, one part of gallic acid, four or five parts of water. Linseed oil or wax are put on lastly as protection.—*Druggists' Circular.*

HOW ENGLISH LOCOMOTIVES ARE MADE.

The works at Crewe consist principally of a rolling mill for the manufacture of permanent way rails, and engine works for the manufacture and repair of the locomotive stock of the line. The latter, first opened in the year 1843, in connection with the then Grand Junction line, have been extended from time to time to meet the requirements of the traffic, until, with the rolling mill, they now cover upward of seventeen acres of ground, not less than 30,000 square yards of this being taken up by covered or workshop area alone.

At the *forge* connected with the engine works, the engine tires, axles, and heavier forgings, such as wheel spokes, rim pieces, coupling and connecting rods, together with fire-box roof stays and portions of the motion, are forged ready for the smith to finish.

The method of welding the wheel-spokes—required for the solid wrought-iron wheels—to the rim pieces is this: the spoke, already hammered to shape, and the outer end heated to a welding heat, is dropped between a pair of dies placed under the hammer in lieu of the usual anvil block, and held in a vertical position, with the heated end projecting about an inch past the face of the dies. On this, the rim piece, also heated, is laid, the two being welded firmly together, and dressed on the edges and rim in a few blows. Of the grate bars used in the locomotive fire-boxes, about 800 tuns are used per annum; and for rolling this and the smaller sections of bar iron there is a ten-inch train rolling mill, driven by a double cylinder horizontal engine, built locomotive fashion, with longitudinal frames of cast iron carrying the crank shaft, and between which the cylinders are bolted, the whole resting on a stone foundation.

Passing on to the *smithy*, visitors may see the method of forging the solid wrought-iron wheels. The spokes with their attached portion of the rim, are here welded together at the but ends to form the boss, in such a manner as will form a segment of the intended wheels. These segments are then laid together, a hoop passed round the rim, the whole tightened up, and the welding of the boss center completed, thus forming one solid mass, independent of any further operation. The boss, which, from the ridge shape of the but end of the spokes, is dished on each side, is then heated and laid on the anvil of a steam hammer. A disk, or boss-plate, also heated, being laid on the boss, is first struck by the hammer (the head of which is of small diameter), on the center, so as to curl up the edges, and allow the scoriæ to be driven out, and then hammered round the edge by a number of rapid blows, the wheel being turned round on the anvil for that purpose, the operation being repeated for the other face of the boss; the whole is then dressed ready for the lathe.

The arrangement of the hammer, specially adapted for the pupose of "bossing," consists of a pair of cast-iron girders, between which the steam cylinder is bolted. These girders, are carried by cast-iron columns at the ends, and are of sufficient span to allow the space round the anvil block for manipulating the wheel. The hammer weighs about 10 cwt., and is double acting.

A similar arrangement is used for welding the plates required for the locomotive frames. The circular hearths, used for bossing and heating the frame plates, are placed under the girder so that the wheel or plate can be lifted direct from the fire to the anvil. To the framing fire has been fitted a deflector, which can be raised or lowered at pleasure, consisting of a plate bent down the middle of its length to about a right angle, and lined with fire bricks. The ends of the plate to be welded are laid four inches apart in the fire and the deflector lowered; the flame rising from the fire strikes the incline sides of the deflector, and is thrown back on the top surface of the framing plate, which is free from fuel producing a welding heat in a very short time.

The forge and *smithy* have an area of about 5,000 square yards. There are, altogether, fifteen steam hammers, varying from six to fifty cwt., and over 100 smiths' hearths, about twenty of which are employed in wheel making alone. Some idea of the amount of work done may be gathered from the fact that at present over 4,000 tuns of scrap iron, in addition to the ordinary merchant bars, are worked up annually.

The *boiler shop*, contiguous to the smithy and forge, consists of a main building down the sides of which the boilers in course of erection, and the bending rolls, punching, shearing, and other machines, are arranged, the whole being traversed from end to end overhead by a traveling crane. The smiths' hearths, steam riveting machine, and the tender-tank shop occupy wings at each end, while in the adjoining yard are placed the plate-heating furnace and bending blocks, and in addition to the manufacture of tender tanks, ordinary repairs, and other work, over 120 locomotive boilers are turned out per annum from this department.

The traveling crane consists of transverse hollow or box girders of plate iron, at the ends of which are fixed the carrying wheels. The longitudinal roadway is made of the ordinary permanent way rail, carried by cast-iron brackets bolted to the side walls, the crab running on rails riveted on the top web of the transverse girders. The method of driving is an arrangement of Mr. Ramsbottom's, first adopted in this crane, but which he has since carried out to a greater extent in other parts of the works. It consists of an endless cotton cord of small diameter, and very light, driven at a high velocity, and running down the ship on grooved slippers or guides, pulleys being dispensed with. From this cord, which in its course is carried across the traverser, all the motions are taken. Attached to the crab, and under the control of the attendant, is a sliding bar carrying two pulleys, between which the cord runs; by this means he is enabled to deflect the cord, and press it into grooves cut in the edge of a horizontal wheel, the motion thus communicated being afterward reduced through a train of worm and spur wheels to the chain barrel. The reverse movement is obtained when the cord is applied on the opposite side of the wheel, and a second, or quick speed, by means of another groove of less diameter cut in the same wheel. The cross and longitudinal motions are worked in a similar manner. This crane lifts a weight of six tuns at the rate of 4 feet 6 inches while moving across and down the shop, at the rate of 50 feet per minute.

In the *fitting* and *turning* shop, the various details of locomotive work may be seen in process of manufacture, from the forged to the finished state, there being nearly 200 machines of all descriptions, from the small bolt lathe or nut-cutting engine to the cylinder boring mill. The engine cylinders are here bored in pairs, the different machines being so arranged as to be within the range of a wrought-iron jib crane placed near them. After planing, the cylinders are removed to a template, consisting of a base plate carrying cast-iron standards, between which the cylinders are dropped, the bolt holes in the cylinder flanches being marked by corresponding holes in the standards, such accuracy of work being thus obtained as to allow of damaged cylinders being replaced by others in a finished state, without additional fitting, and which has been done in several instances. After the bolt holes have been marked and drilled, the cylinders are fitted with steam-chest covers, glands, etc., and bolted together. The lifting and moving about of the cylinders in this stage of the work is effected by means of a long shaft overhead, from which chains are suspended at the different points required, the cylinder or other object being raised or lowered by the revolution of the shaft, which can be started or stopped at pleasure. This is a good example of a cheap and serviceable crane, where power is applied at different points.

This shop is also fitted with a number of auxiliary tools, specially designed by Mr. Ramsbottom for these works; among others, is a machine for squaring bolt holes in cylinder covers, pipe flanches, glands, etc. This machine, which is simple in arrangement, consists merely of an upright girder, to which is bolted a long socket. In this socket slides a vertical forcing ram, with the end recessed to receive the point of a taper-toothed drift, the entering end of which fits the hole to be squared. The cover, or other object, is carried by a table bolted to the upright. The machine is driven in the usual way, and forces the drift through at one stroke of the ram.

[This seems to be a little behind the times. When such bolts were made with square shoulders on, to screw them in by, this might have been desirable; but we make our stud bolts round in this country and screw them in either with a nut made on purpose or two nuts jammed face to face on the thread.—Eds. Sci. Am.]

The short copper bolts used to stay together the inner and outer shells of locomotive fire-boxes, after being cut to length in the boiler shop, are here straightened and centered at each end. The tool used for this purpose consists of three rollers, one of which is movable on an eccentric spindle, so as to allow of the bolt being dropped in between them, when the movable roller forces it into contact with the other two, while a pair of square centers are simultaneously brought to bear on the ends. The stay, thus straightened and centered, is dropped out underneath, and is found sufficiently true to allow of its being chased in the lathe without further preparation.

The *spring smithy* is fitted with furnace and machinery for the manufacture of the locomotive engine and other springs used by this department. The steel from which the engine springs are made is received in long bars, which are first cut by a small shearing machine into plates of required length. The center of the plate being then heated, is indented by a conically-pointed punch fitted to the same machine, a nipple or projection being thus formed on the other side; the ends are then heated and passed between eccentric rolls, which at each revolution strike the plate and taper it down. The ragged ends are afterward cut off. The nipple referred to, dropping into an adjustable stop, attached to the machine, serves as a guide for the length. The plates are then bent to shape, hardened, and tempered down in the usual manner, built up into the complete spring, and the buckle shrunk on, the plates being prevented from moving endways by the nipple of one plate fitting into the corresponding recess of the one below it, which thus dispenses with a center bolt and the consequent weakening of the plates. To supply the new engines and keep up the repairs during twelve months, about 10,000 springs of all kinds have to be manufactured.

This shop has been fitted with several portable tools designed by Mr. Ramsbottom, for the purpose of boring cylinders, dressing the steam port faces, and axle box girders, when worn. These machines are driven by cords off the line of shafting moving down the center of the shop, and are so arranged that all the operations may be performed without moving the engine from its berth, or in any way disturbing the parts to be acted on.

The cylinder boring machine consists of the ordinary boring bar, to which the boring head is keyed fast and driven by worm wheels. The driving pulleys are made in two halves, so as to be applied at any point in the length of the line of shafting.

The *erecting and preparing shops* turn out per annum about 100 new engines, and keep in repair the greater part of the stock, which at present exceeds 11,000 engines, the average number of those under treatment amounting to 100.

The tender, joiner, and pattern shops, are situated in another part of the works.

In order more effectually to knit together these works, which spread over a great surface, a tramway has been laid down at 1' 6" gage.

The tramway is now about three-eighths of a mile long, and is worked by a small locomotive engine named *Tiney*. In its course it traverses curves of 15 feet radius each, no difficulty being found in going round these curves with loads of twelve to fifteen tuns, or in taking 7' 6" wheel forgings or tires on edge, by means of trucks specially adapted for the purpose. This engine has four wheels coupled, inside cylinders $4\frac{1}{4}$ diameter, and 6" in stroke; the wheels are 15 inches in diameter on a base of 3 feet. The total heating surface is about forty-two square feet; the boiler is fitted with a No. 2 Giffard's injector, and carries a saddle tank capable of holding twenty-eight gallons. The total weight, in working order, is $2\frac{1}{2}$ tuns. The line is in most cases parallel to the ordinary rails in the works, and the engine is used to fly-shunt the large wagons in all cases where it can be brought to bear.

The *Pell*, of similar construction to the *Tiney*, has been constructed for the use of the steel works.

The total number of hands emb'oyed upon the Crewe establishment is about 4,000, of which number about 3,300 are employed in the locomotive works.

The London and Northwestern Company disburse weekly the sum of £3,500 in wages to the mechanics and others engaged on these works. The following items, from the account of materials issued from the stores at Crewe, for the twelve months ending May, 1863, will convey some idea of the magnitude of the operations:—Finished brass, 67 tuns; rough brass, 234 tuns; brass tubes, 331 tuns; sheet, bar, and other copper, 244 tuns; iron rails, 13,849 tuns; steel rails, 2,206 tuns; sheet iron, 1,986 tuns; bar iron, 1,272 tuns; oak timber, 85,241 feet; various timber, 1,220,-607 feet. The shops connected with the locomotive department cover a space of 26,336 square yards; and the rail works, including the yard, occupy 13,302 square yards. The extensive consumption of water at the works and the neighboring station is met by the conveyance, from Whitmore, a distance of eleven miles, of the produce of a well sunk in the red sandstone. This water is remarkable for purity, containing only about five grains per gallon of foreign substances, and no organic matter, which renders it specially applicable to engineering purposes. The total consumption amounts to between 600,000 and 700,000 gallons per day. In the neighborhood of the main works is an establishment for the manufacture of the peculiar yellow grease whose appearance is familiar to all railway travelers, the whole requirement of the London and Northwestern Railway Company in this article being furnished by the Crewe Works.—*Ryland's Trade Circular.*

Correspondence.

Sandpaper Finish.

MESSRS. EDITORS:—I could not repress a smile as I read in my SCIENTIFIC of September 30 the description of E. J. W. of his "solder chuck." The sticking point, viz., how to remove the soft solder from the disk of sheet metal, he passes over rough-shod and in the most unworkmanlike manner. What would a good workman think of doing a fine job and "finishing" with sand paper? His "solder chuck" would undoubtedly hold true, but he must devise some better way than the use of sandpaper for finishing. He cannot do it in the lathe, for he has no means of holding it.

I have heard English mechanics "slur" American work, styling it "deep scratches and high polish." It is certainly humiliating to an American to hear one who is admitted to the columns of our great scientific journal advise the use of sandpaper as a finisher. M. L. B.

Kane Co., Ill., Oct. 1.

[If our correspondent will try the effect of 0-sandpaper covered with chalk on any metal that has been well finished previously, we think he will not be disappointed with the result. English mechanics have good reason to complain of some American work on account of the "Buffalo finish," as it is sometimes called; but we noticed, on examining the *Great Eastern* engines that, for some cause or other, great patches of scale or hammer marks had been left in the principal finished parts, which certainly did not improve their appearance.—EDS.

Melting Wrought Iron.

MESSRS EDITORS:—In the SCIENTIFIC AMERICAN of October 7th, you state, in reply to your correspondent, A. P. W., of Wisconsin, "That when the carbon is all burned out of cast iron by the Bessemer process, the metal is brought to a state of pure wrought iron in a molten condition."

I have been a close observer of the manufacture of wrought iron in this place, for a number of years, and have never yet seen "wrought iron in a molten condition," and do not think it possible for it to exist in that shape. I have been informed by practical manufacturers of wrought iron, that when cast iron has been sufficiently decarbonized to become wrought iron, it ceases to be a fluid, and then, by adding sufficient carbon to make it fluid, it becomes cast steel. I am aware that in the Bessemer process of making steel they burn out of the cast iron as much of the carbon it contains as possible, and, by adding a percentage of molten cast iron containing a proper amount of carbon, the mass in the converter becomes molten cast steel, and, as such, is poured into ingots. But that the mass obtained by decarbonizing cast iron in the open converter of Bessemer, is wrought iron in a molten state, I cannot yet understand; for if so, why not dispense altogether with the present style of puddling furnaces and manufacture wrought iron by the pneumatic process? It would be cheaper, require less labor, and be quicker done than puddling—the present way of obtaining wrought from cast iron. If wrought iron could exist in a molten condition, could not molds be filled with it, and in that way produce wrought-iron machinery without the labor of forging?

I once tried to melt wrought iron in the following manner:—I filled a black-lead crucible with small pieces of wrought iron, and, making the lid on it as near air-tight as possible, I subjected it to an intense heat for several hours; I then made a small hole in the lid for the purpose of pouring out the molten iron, when a stream of flame burned intensely from it for a few moments, and then ceased. I removed the lid and found my crucible filled with cinder.

I was told by a scientific gentleman that the oxygen of the air, which the hole permitted to enter, combined with the iron, burning it up, leaving nothing but the oxide; if that is so, then wrought iron cannot exist in a molten condition to be of any practical use, as contact with the air would immediately destroy it. J. E. F.

Johnstown, Pa., Oct. 9, 1865.

[We have seen a rod of wrought iron, under the action of a powerful galvanic battery, grow first red at the end and then white, and finally fall in liquid drops apparently as fluid as water. The melting point of pure iron is stated by Booth and other authorities at 2,850° Fah., but as in the case of many other substances, the melting can be effected only when the metal is sheltered from the atmosphere, for even at a red heat the affinity of iron for oxygen is so great that the two substances instantly combine when brought in contact, forming oxide of iron. There is no pyrometer that will measure temperatures so high as 2,850°, and the real fusing point of pure iron must be regarded as undetermined; some authorities estimate it as high as 6,000° or 7,000°.—EDS.

THE HOOSAC TUNNEL.

The progress on this work appears to be somewhat delayed, it does not drag its slow length along at all, and public attention has lately been directed to the causes. Mr. F. W. Bird writes a long article to the Boston *Advertiser*, wherein he foots up a long array of errors, etc., against those having the work in charge. We make such extracts from this paper as our space will allow:—

"The materials near the surface of the ground, and for a short distance in the shallowest part of the open excavation, are common earth and hard pan. These gradually change into a substance that is neither earth nor rock, in any common acceptation of those terms. The most appropriate name I heard it called by was 'demoralized rock.' In its normal condition it is tough and hard, like rock, but when exposed to the combined influences of air and water, it runs away like quicksand; or, if pent up, it becomes 'porridge.' It abounds in seams, or crevices, from which issue numerous springs and little streams of water. The one hundred and ten feet of heading accomplished at the west end required a stout framework, or lining of heavy timbers and planks, to be set up as fast as the excavation was made, in order to resist the pressure and weight of the surrounding material. At first the progress here was fair. This favorable state of things continued for a few days, when the quantity of water began to increase, 'demoralizing' the rock, and converting it into an unmanageable fluid, which could neither be drained, nor shoveled, nor pumped. Pouring down from the top, rushing in from the sides, boiling up from the bottom, in a few days it had let daylight through the forty feet of roofing. Owing to the peculiarity of this material before referred to, it will stand vertically at almost any height so long as it is dry; whereas, as soon as the water touches it, it is disintegrated or worse, if possible, than the worst quicksand.

"The nature of the difficulty may be inferred from the fact that this bad material was struck in December last, nine months ago, and since then the whole progress made, with indefatigable labor by as many men as could work in the cramped quarters, inclusive of the advance of three or four feet a day at first, has been one hundred and twenty-five feet! The managers are at their wits' ends. Indeed, despondency broods over the whole western side, relieved only by the forlorn hope that 'something will turn up' in the shape of a feasible contrivance for confining the slippery material. It is, as one of the workmen said, 'Be jabers, ye might as well try to shovel a cart load of live eels!'

"As a last resource, it was decided to continue the open cutting on a level passing above the top of the tunnel, until the point directly above the largest spring was passed. A stout timber frame work, some twenty feet long (similar in construction to the cribs used in deep-water foundations for masonry,) having the sides and forward end planked, but open at the bottom, was then placed over the spring and forced down into the fluid mass until it came to the bottom line of the tunnel. A plank flooring was next added to the crib, and a timber roof is now being constructed to make the finish of this portion of the 'heading' correspond with the part which was really made by horizontal excavations.

"Having groped along thus far in the solution of the ugly problem, the next question seems to be how to remove the plank and timbers from the forward end of the crib, and yet stay the rush of 'porridge' from all directions into the opening. When the crib was put in, the planks at the forward end were hard up against the rock. Since then it has been found by boring through this planking, that the rock has become 'demoralized,' and that there are three or four feet of 'porridge' between the planks and the face of the rock. How to get that 'porridge' out nobody knows; and how, in case they can dip out the 'porridge' already formed, they can extend the crib forward, and make tight joints on the sides, top and bottom, against the rock that is yet hard, is a still more difficult problem; and this accomplished, there remains the incalculably greater difficulty of keeping the face of the rock open for work without the rush of 'porridge,' which all experience has hitherto shown will instantly form upon the exposure of the surface of the rock to air and water. Engineering resources may, and perhaps will, prove a match for the emergency; but common men, and some uncommon men, too, look upon these difficulties as insuperable. The prevailing opinion is that our State treasury is bottomless, and, therefore, that, somehow or other, in some time or other, if money enough is forthcoming, science, skill, and perseverance will triumph.

"It will at once be asked, How far does this material extend? About half a mile from the west face is the West Shaft. This shaft was sunk by Mr. Haupt, and he excavated some forty or fifty feet of tunnel in each direction. When the heading had advanced two hundred and eighty feet westerly, the workmen struck a material similar to that at the west face, accompanied, as there, with water. Finding the water increasing very nearly to the full capacity of the pump, and finding also the same tendency to 'porridge,' and confident that the water would speedily become greater than their means of pumping, and thus stop the work on the eastern face of the shaft, it was decided, as a matter of expediency, to discontinue the work on the west face in the shaft. Between this point and the west end of the tunnel, (that is, where the crib is), the distance is twenty-three hundred feet! Artesian borings have been made at different points on the way, all showing the same material. These facts give the data of the problem. They have been nine months advancing one hundred and twenty-five feet under a bank some forty to sixty feet high; and they have got along so far only by removing substantially the whole mass, and making an open cut. How long, at this rate, will it take to advance 2,300 feet, especially if they have to make an open cut running rapidly from sixty up to three hundred feet? And what will it cost, either to tunnel that material, or to make an open cut, with slopes that will stand?"

PNEUMATIC DRILLS.

"But whenever exception is taken to the slowness of the progress, we are told, 'Oh, wait till we get the penumatic drills at work! then you'll see the chips fly!' Well, we have waited quite patiently. Nearly two years ago the money was sent abroad to purchase drills of the kind used at the Mont Cenis Tunnel; but though the money went, the drills did not come, and, it is understood, will not. One reason given for their not coming is, that the French engineers, or the Italian engineers, or some 'cussed furriner,' would not sell a drill to a Yankee; another is, that the drills would not work in the Mont Cenis rock; the third is, that though they might work in that rock, they would not in the Hoosac rock. The 'dem'd total' is, that the Mont Cenis drill calculation has gone to the tomb of the other 'great expectations,' which illustrate the history of the Hoosac Tunnel.

"In their first report the Commissioners handle the matter of machine drills, or boring machines, very gingerly. Haupt had failed, and they seemed to fear to rush hastily in where his genius had been foiled. But between that time and last December they had acquired confidence. In their last report, December 20, 1864, they say: 'Drilling machines will not be likely to be in operation at this place (the east end) before next midsummer.' That is cautious and safe. Of the central shaft, they say: 'We hope by the latter part of winter to get some automatic drills at work in the shaft, etc.' Of the west shaft they say: 'Machine drills are not likely to be used here before next spring, and perhaps not till early summer.' Well, 'the latter part of winter,' 'the next spring,' 'early summer,' 'midsummer,'—all have gone; and nothing appears of the automatic drills but the *disjecta membra* of all the contrivances hitherto tried. 'These are our failures,' Beau Brummell's valet used to say; but he could point to the one cravat-tie which was a success. The truth is, no intelligent man puts the slighest confidence in the successful working of any borer or drill in the rock of the Hoosac Mountain, unless operated by hand. In a strictly homogeneous rock machine drills or borers might work—even then, as the Commissioners admit, saving only time, but not money—but in a rock like the Hoosac, where the drills, working generally in a comparatively soft material, are liable at any moment to strike nodules, or veins of quartz, and where a part of the hole will be in the slate and the rest in the quartz, no machine-drill or borer has yet been found to stand. What science and perseverance may achieve no man can say; to-day the path to success has not been found. I shall not be charged with partiality to Haupt; but it cannot be denied that the big hole bored by Haupt & Co., at the eastern face, shows a greater result and promised more success if it had been followed up with adequate means, than every thing Mr. Brooks has accomplished with the treasury of the Commonwealth subjected to his draft."

WHAT IS TO BE DONE.

"A year ago the State could have wound up the concern and got out with a loss of about $600,000. The advances with interest to July, 1864, had amounted to about $1,000,000. We had on hand nearly 3,000 tons of railroad iron, which was worth last year $110 per ton. This might have been sold for $330,000. There was other saleable property on hand belonging to the State which would have brought enough to reduce the deficit to $600,000. Even upon the assumption that the State was surely to complete the tunnel, it would have been the best policy to sell this iron at the enormous price of last year, and hereafter buy other iron at less than half that price, in season to finish the road before the tunnel could be opened.

"Mr. Brooks was urged to do this by gentlemen whose judgment is as good as that of any men in the State. But no; it must be kept, and for no earthly business reason except that the Fitchburg Railroad Company and the Vermont and Massachusetts Railroad Company had offered to pay, for rent of the road for six years after it shall be finished, $129,000 —an average of $21,500 per year, for the use of a road which could not be put in proper running order for a million of dollars (including, of course, the cost of the iron); while at the end of six years the road would be thrown back upon the State, to lie dead till the tunnel is finished, or to be run with a traffic which would not half pay running expenses.

"What is to be done? To-day we can get out by pocketing a loss, say, of $1,800,000. Every day's work only increases the sum, which will be a total loss in the end. One of two things the State will do --either abandon the enterprise, sell off, and close up a bad job, or else find some responsible parties who will agree to take the whole thing off her hands and complete it. If it cannot be got rid of on better terms, a gift of a million or two of money with it to any parties that will relieve the State of the disreputable business would be better than for the State to continue the work."

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Knitting Machine.—This invention relates more particularly to that class of knitting machines represented in the Letters Patent granted to the inventor Sept. 15, 1863, having two rows of needles; and also to machines having straight frames and only one row of needles. One part of the invention relates to the construction of the cams for operating the needles and to the manner of operating such cams. Another part relates to the manner of regulating the length of the loops; another relates to the manner of supporting the sliding carriage; another relates to the manner of constructing the jacks; another relates to the manner of driving the sliding carriage; another relates to the construction and operation of the yarn guide or carrier and to means for doing it; another relates to a novel construction of latch openers; another relates to the means for connecting suitable weights to the work. I. W. Lamb, of Rochester, N. Y., is the inventor.

Distilling Apparatus.—This invention relates to an apparatus which is to be used for distilling alcohol and other liquids, but which is particularly intended for refining petroleum, and which is so constructed that the process of distillation can be continued without interruption, and the oils of different specific gravity or density can be separated while the process of distillation is carried on. Furthermore, the apparatus is so constructed that the naphtha and lamp oil, or the light constituents of the petroleum, are evaporated by the heat of the vapors of the heavy oil, and only the heavy constituents have to be distilled by direct heat. By this arrangement a great saving of fuel is effected. A. Kreusler, of New Lebanon, N. Y., is the inventor.

Rifling Barrels of Fire-arms.—This invention relates to rifle grooves, the transverse section of which is not rectangular but getting gradually smaller toward the outside—their form being dependent upon the kind and size of the fire-arms. The depth of these grooves decreases for a certain distance, and, together with the depth, the width decreases, so that the advantages of the wedge-shaped grooves are obtained, and where the depth does not alter, the width remains unchanged. The production of these grooves is much simpler and more correct than that of the wedge-shaped grooves, because the cutters used for cutting the same have to move only in a radial direction in the proper proportion in order to produce the desired result. In the same manner the operation of polishing the improved grooves, which is difficult with wedge-shaped grooves, is easily accomplished and can be effected simply by radially expanding polishing jaws. As previously remarked, the depth and length of these grooves gradually decrease from the chamber up to a certain point, and then they continue to the muzzle without diminution. A. Trauth, of Chemnitz, Saxony, is the inventor.

Paddle Wheel.—The object of this invention is to obtain a paddle wheel by which the lift and plunge now occasioned by the entrance and emerging of the floats of the ordinary wheels into and out of the water, will be avoided, and a great saving of power effected, as well as an avoidance of the jars and concussions attending the operation of the ordinary paddle wheels. William Choate, of Newburyport, Mass., is the inventor.

Exploding and Opening Oil and Other Wells.—This invention has for its object to open the veins and seams of oil and other deep wells by exploding powder or other substances therein. It is also applicable to clearing away paraffine and other obstructing matters from the sides of such wells and from the seams in the rock. It consists in constructing it of such material as to enable the operator to withdraw it, after the explosion, without difficulty, and also in so constructing it that it shall be exploded by its own weight after it has nearly reached the point to be acted on. A. T. Ballantine, of Morristown, N. J., is the inventor.

Steam Valve.—This invention relates to the valves of steam engines. Its character makes it especially suitable for use in propellers, but it is applicable to all kinds of steam engines. The valve is a rotating slide valve counterbalanced or supported at its center of rotation, and is fitted with a graduated cut-off, which is so constructed and applied that the steam is cut off by the motion of the main valve itself. The cut-off may, however, be applied so as to work also independently of the motion of the main valve. Ethan Rogers, of No. 127 Warren street, New York, is the inventor, who has assigned one half of it to Wm. P. Williams.

Gas Burner.—The object of this invention is to produce a gas burner by which, with a comparatively small expenditure of gas, a good light is obtained. The invention consists in a gas burner forming a hearth or grate below and a chimney above. The grate in the lower inside parts of the burner, consists of a perforated bottom surmounted by a system of wire work, which equalizes the pressure of the gas and regulates the quantity which is permitted to reach the flame. The chimney consists of an inclosure rising somewhat above and surrounding the jets of gas emanating from the burner in such a manner that the draught of the atmospheric air to the flame is increased, and, at the same time, the heat of the flame is concentrated, and by this combined action the carbon is readily raised to a bright white heat and a brilliant flame is obtained with a comparatively small expenditure of fuel. Dr. V. Dubourg, of Frankfort-on-the-Main, Germany, is the inventor.

Improved Suspender.—The object of this invention is to improve the suspenders by which pantaloons are held upon the person of the wearer, the particular features of the improvement being as follows:—To combine with the suspenders the quality and office of a shoulder brace; to simplify the construction of the suspenders; to make them in such a manner that each side of a pair of pantaloons is suspended independently of the other; and, lastly, attaching the several straps of which the suspender is composed, to their buckles or links, in such a way as that they will pull squarely thereon, and so preserve the evenness of the straps. B. J. Greely, of No. 540 Broadway, New York, is the inventor.

Enormous Stock Business.

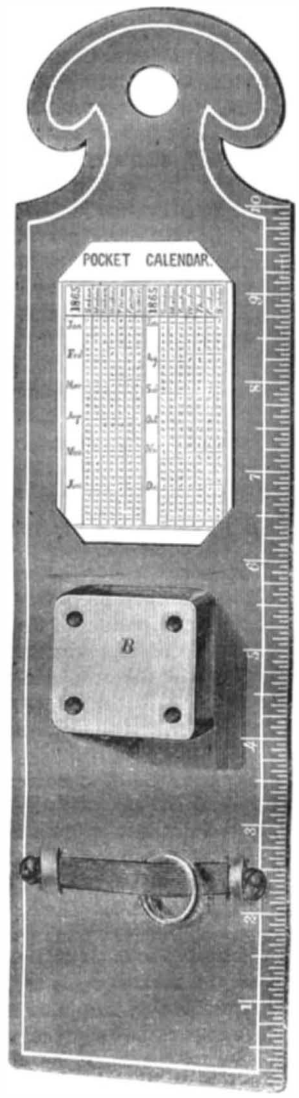
According to the returns made to the Internal Revenue offices, of this city, it appears that the stock and gold brokers return their aggregate sales for one year at the enormous sum of six thousand and seventy-three millions seven hundred and eight thousand eight hundred and eighteen dollars. Quite a number of the firms have only made returns for one, two, three and five months. If the list included a full statement of all the houses for the entire year the amount of sales would exceed three times our national debt. Computing the tax on the basis fixed for the transactions in stocks we find that the brokers contributed to the revenue of the Government three million thirty-six thousand eight hundred and fifty-four dollars. One firm sold stocks and gold to the amount of $169,232,939. These figures appear incredible, but they are no doubt substantially correct, as brokers do not like to be overtaxed.

PROF. W. A. MILLER recently stated before the British Association that an extensive branch of industry was now springing up in the improved methods of voltaic deposition of the metals. Weil had, by the use of an alkaline solution of tartrate of copper, contrived to coat iron and steel with a tough closely adherent sheathing of copper, by simply suspending the articles to be coated by means of a wire of zinc in a metallic bath. No battery was required. Lead and tin might in a similar manner be deposited on copper, iron, or steel, if the oxide of tin or of lead was dissolved in a bath of strong solution of caustic soda.

A NEW MACHINE.—From the *Commercial Bulletin* we learn that there are at the fair in Boston "two bars, exhibited, one with a 4½-inch hole punched in a bar, 1¼ inches in diameter." We deem this a praiseworthy style of thing.

BOSWELL'S IMPROVED PAPER TIN.

This engraving represents an improved paper cutter, whereby it is made capable of other uses than those it is generally applied to. It can be employed as a ruler for making parallel lines, as a measure of distances in feet or inches, as a letter file, as a complete calendar for the year, and as a receptacle for letters. The letter file is simply an elastic band, A; the penholder consists of a block, B, perforated with holes, and the calendar is placed above it. The rest of the utensil needs no description.



It is claimed that by the combination of these articles, used about a counting room, into so small a space a useful article is produced.

A patent is now pending on it, through the Scientific American Patent Agency, by E. H. Boswell, of Philadelphia, Pa.; for further information address him corner of Eighth and Walnut streets. State rights for sale.

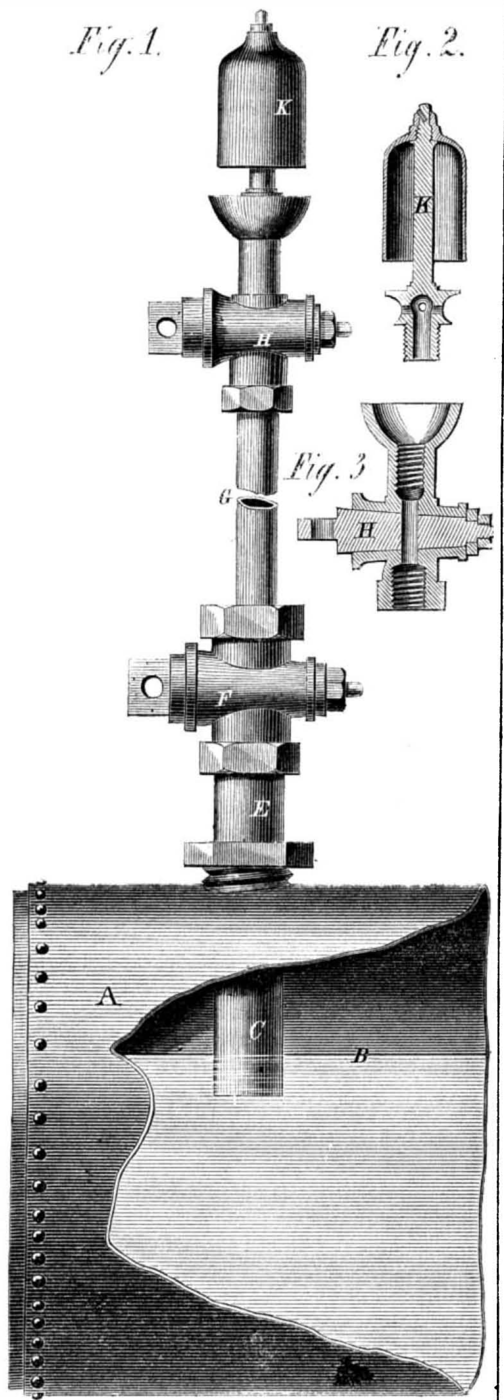
NON-EXPLOSIVE GUNPOWDER.

We published some time since a plan suggested in England for making gunpowder non-explosive, in order that it might be stored in large quantities with safety. On the 27th ult., Mr. Handel Cossham, from England, gave an exhibition with the prepared gunpowder, at Jersey City, N. J., which showed that the plan is effectual. About an eighth of a pound of powder was mixed with three times its weight of very finely pulverized glass, and the end of a red-hot iron was thrust into the mass. A few grains of powder, that came in contact with the iron, flashed off, one at a time, but the principal mass remained unburned. The glass was then sifted from out the powder, when, on applying the hot iron the powder, of course, burned with explosive suddenness.

The plan manifestly would not answer for fixed ammunition, or for magazines that must be kept ready for action; but where very large masses of powder are to be stored for long periods, it would seem to be a reasonable precaution to have it thus protected from all danger of explosion.

SHAW & JUSTICE'S LOW-WATER SIGNAL.

This engraving represents a novel instrument whereby the water in steam boilers is prevented from falling below a certain level, by giving notice to those in charge that the quantity has diminished and is already below the point of safety. This notice is



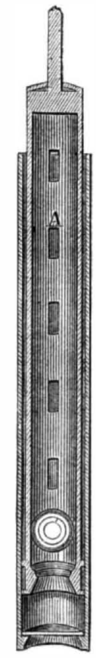
given by a steam whistle, and the method by which it is made to operate is quite ingenious. The proprietors say of it:—

"This efficient and simple instrument is offered in the belief that it will, to a great extent, do away with the objections which imperfect arrangements for a similar end have been open to. Fig. 1 shows a broken section of a boiler, A, with the water pipe, C, of the signal adjusted to the safe water line, B, below which the water should not fall, and which will keep the pipe of the signal filled with water to the upper cock, H. When the water line falls below the end of the tube, C, steam will of course take the place in the pipe, C E G. Fig. 3 is a vertical section of the cock, H. To prevent the water from being blown out through the key when opened to whistle, K, the bowl aperture of this cock is filled with molten resin, and the whistle, of which a vertical section is shown, Fig. 2, is at the same moment screwed down into the bowl socket of the cock.

"The resin not being affected so as to melt with a heat of less than 180°, remains, while hard, as a permanent barrier to the water, which is always cold at the cock, H, but when, by reason of the water line, B, falling to an unsafe point, and steam taking the place of the water in the tube, the resin melts, it is almost immediately blown out from the bowl aperture of the cock, and the whistle gives notice of the danger from low water in the boiler. F, in Fig. 1, is a cock attached to a section of pipe and nut, to enable the signal to be removed at any time when necessary to recharge it, without the necessity of lowering the steam in the boiler. In many months of trial it has never failed in giving notice to the engineer when the water was allowed to run too low in the boiler."

It was patented on July 11, 1865, by Thomas Shaw, and is manufactured by Philip S. Justice, No. 14 Fifth street, Philadelphia, Pa., and No. 42 Cliff street, New York, where all orders must be addressed.

GODDARD'S PUMP ROD.



This engraving represents a simple improvement in pump rods for oil wells where the great weight is a serious objection. The weight is unavoidable except by this device, for the length of tubing employed for such rods must be used if the well is pumped. This improvement consists in perforating the rod with oblong openings, taking out the weight of metal represented by the opening, and reducing it to that extent. This reduction in no wise affects the strength of the tube for the duty it has to undergo, and is a manifest advantage in deep wells where the weight of the rod is great. This reduction lessens the labor on the pump gear, as also the machinery by which the same is operated, and will have a tendency to lessen the cost and frequency of repairs, which is sometimes a serious item.

It was patented through the Scientific American Patent Agency, on April 11, 1865, by Kingston Goddard, D. D., Philadelphia, Pa.

Machinery Wanted at the South.

We still continue to receive a large number of letters from parties residing in the Southern States, requesting information about machinery. The following are samples of many of a similar character:—

Wm. T. Hart, Engineer of the Virginia and Tennessee Railroad, Lynchburgh, Virginia, wishes to purchase steam fire engines, stationary and portable engines, saw and grist mills, gas works, and brick machines.

Frank Taft, Memphis, Tennessee, wants the best portable steam cross-cut saw.

Mrs. L. A. Benjamin, Baton Rouge, La., wishes to purchase a steam washing machine.

Letters of this character are so numerous that we cannot answer them by mail, and must refer our correspondents to the advertising columns of our paper.

Refining Petroleum.

For purifying and refining crude paraffine, some new processes have been proposed, viz.:—Melt the article and stir in 10 per cent of dry powdered chloride of lime (bleaching powder); then pour the mixture into diluted muriatic acid and boil until all the paraffine swims clear on the surface, and when cool it must be drawn off; 2d, Crude paraffine is boiled with ten times its bulk of fusil oil, and the hot fluid filtered in order to separate the insoluble tarry impurities. After cooling, particles of pure paraffine will fall down from the solution, and the heavy oils remain dissolved in the solution. The crystallized paraffine should be separated from the mother liquor by filtering and pressing. The cake of paraffine must be mixed again once or twice with cold fusil oil, when, after washing and pressing, the final melting will produce a perfectly white and pure article.

MESSRS. GUINNESS & Co. employ in their brewery about 300 men, through whose hands no less than 500,000 gallons of water, either in its crude form or manufactured state, pass daily. Thirty tuns of coal per day is the average consumption of fuel, and this, with the water, is used to extract the virtue from, in round numbers, 1,500 cwt. of grain per day. The "pieces" in which the manufactured article is stored number sixty-five, besides twenty others in course of erection, and these contain from 1,500 to 2,000 hogsheads of 52 gallons each.

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MUNN & COMPANY, Editors & Proprietors.

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

VOL. XIII. NO. 17...[NEW SERIES.]... *Twentieth Year.*

NEW YORK, SATURDAY, OCTOBER 21, 1865.

Contents:

(Illustrations are indicated by an asterisk.)

THE COASTING TRADE BEING DONE BY STEAMERS.

On the 7th of September twenty-one ocean steamships cleared the port of New York, and only three of them were for foreign ports—two for Europe and one for Havana—the remaining eighteen being for ports on our coast, distributed from Maine to Texas. This fact marks the progress which has been made in superseding sailing vessels by steamers in our coasting trade. It has been found where the amount of freight is sufficient to keep steamers fully employed, the higher rates that can be obtained in consequence of the quick passages, and the larger quantity that a vessel of given size can carry in a season in consequence of her more numerous trips, more than compensate for the greater expense of running a steamer. On all the principal routes they have been very profitable. The first line for freight between this city and Providence, made the stockholders rich, and when the more recent Neptune line was established, a whole fleet of ships, of 1,300 tuns burden each, were ordered to be constructed. The vessels of this line are provided with fine cabins and state-rooms for passengers, and are a popular line of travel with passengers going east from New York.

Nearly all the coast steamers are driven by screw propellers, compactness of machinery being very desirable in vessels designed mainly for freight. Indeed, it is said that the President of the Cunard line has expressed the opinion that screws will ultimately supersede paddle wheels in all ocean steamers.

Though these coast steamers will, to some extent, drive off sailing vessels from lines on which they run, they will not put the sailing vessels out of employment. There are hundreds of places where steamers cannot be profitably employed, but where sailing vessels can be, and to these routes the displaced sailers will be diverted. When the construction of railroads was commenced, many farmers argued that doing away with the service of so many horses, must lower the price of hay; but, after the construction of 30,000 miles of railroads, it was found that the demand for horses was greater, and the price of hay was higher than ever before. We know several persons who would like to have a good sailing vessel or a good horse, but who do not get one, for the reason that they are not able to pay for it. The desire for capital is boundless, but the commercial demand for any article is limited by the ability to purchase. The community's ability to purchase is increased by whatever augments the product of wealth, hence the demand for horses and sailing vessels is increased by the construction of railroads and steamships.

THE CATTLE PLAGUE.

The disease which has been prevailing among horned cattle in Europe was, at last accounts, unchecked, and so great were its ravages that in some quarters of Germany not an animal is to be seen. The disease spreads rapidly when an infected animal appears in any district, and is liable to be spread by persons carrying the infection in their clothes. It has not yet appeared in this country, and it is to be hoped will not. The symptoms of the malady, as yet unnamed, are a general lassitude of demeanor, a discharge of mucus from the eyes, twitchings of the muscles about the neck and shoulders, trembling of the whole body, and a free discharge of matter from the nostrils. Diarrhea is also present, and in course of time dysentery appears. The average duration of the disease, from its commencement till death supervenes, is three days; and fat animals, or those which have been well cared for, suffer the most. Almost every beast attacked dies—the average deaths being 90 per cent.

As it is by no means impossible that this malady may be introduced into this country by accident, carelessness, or design, the Agricultural Report (official) suggests that the greatest care be exercised with regard to imported cattle, and that a quarantine for such beasts be established at certain points, so that they could remain in confinement until it was positively ascertained that they were not infected.

As this disease is contagious, and affects every part of the animal—hides, hoofs and horns—it will be seen that stringent measures are necessary to prevent the cupidity of some from endangering the interests of many. In Germany the hides are so cut as to be useless, the bones are crushed and buried, and the horns and hoofs burned, or otherwise disposed of, so as to prevent any possible chance of their ever being made use of. In addition to this, a strong military force is drawn about the infected spots, and communication with them entirely cut off, the commissary receiving such supplies as he may need at the end of a long pole. The disease, as we have said, has extended to England from communicating with Russia, and numbers of cattle have already died. Whether the same caution as regards the hoofs, etc., is observed there as in Germany, we do not know, but we hope that our Government is sufficiently alive to its interests to take the most stringent measures to prevent the plague from reaching these shores.

EXPERIMENTS WITH CAST-IRON RIFLED GUNS.

It is not generally known that the Government tried some experiments recently with cast-iron rifled guns of heavy caliber. These guns were of the 15-inch pattern, bored 12 inches, and were fired with a charge of 35 pounds of powder and a projectile of 600 pounds. At the 27th round, unhappily, one of the guns burst; but for this occurrence the experiment would have been continued. Another gun of the same size bore, but cast on the Rodman plan, failed at the 16th round.

After a few rounds had been fired from these immense rifles, the grooves became so filled with the residuum that it was extremely difficult to get the shot home. The Rodman gun did not burst, but failed; that is to say, it would have burst if the firing had been continued longer. It is believed, from these experiments, that cast-iron *rifles*, 12 inches in the bore, are not desirable additions to our ordnance.

A CURIOUS SLOTTING MACHINE.

The last number of the London *Artizan* contains an engraving and description of a new slotting machine for working out wrought-iron locomotive wheels on the inside of the rim. This tool produces very beautiful work, and is as novel as it is simple in design.

A right-angled lever vibrating on a center is the principal part. One arm of this lever is vertical and the other horizontal. From the vertical arm depends the tool, and vibration is imparted by a crank pin working in a slot of the horizontal arm. It will thus be seen that the path of the tool point will be a curved line, precisely the shape of a section of the wheel rim inside. The tool point or cutting edge and the center of the main lever are both in line, and the cutter works equidistant from the center, rising and falling vertically, so that the inside of the rim will be a true curve.

If the reader will take a pair of scissors, hold one blade vertical and move the other up and down, he will have a clear illustration of the way the tool works. It should be remembered that the tool depends vertically from the vertical blade of the scissors, being slightly offset therefrom to reach over the rim.

The rest of the machine is not peculiar. The wheel is simply bolted to a platen constructed with rotary feed, as all slotting machines are, and has a roller set under the rim to catch the down thrust of the tool and relieve the friction of working round. When the operator comes to an arm in the wheel, he lifts the tool, and runs it over the arm by the hand screw, as usual. It is stated that this machine accomplishes a great saving in time, to say nothing of the superior quality of the work and the advantages arising from having the wheels truly balanced.

The machine was devised by Mr. Webb, chief assistant at the railway shops, Crewe, England, and is a valuable aid to machinists.

UTILIZING STEAM IN EVAPORATING.

MESSRS. EDITORS:—A year since I spent some time at the salt works of Saganaw, Michigan, and was pleased to observe that many of the companies were combining the sawing of lumber with making salt advantageously, using the exhaust steam for evaporating the water. I asked one of the superintendents to inform me how much difference he had observed in the evaporating power of the steam direct from the boilers over that which had passed through the cylinders and propelled the saw-mill. To my surprise, he stated that he thought the same steam would evaporate more water after propelling the mill than it would if passed to the evaporating vats direct from the boilers. I cannot doubt his answer resulted from a want of careful observation. I did suppose that every pound of force exerted by the steam was at the expense of a given definite amount of caloric. Am I right? It is certainly an interesting subject there, where this combination of the use of steam is growing in favor, and many are actually making steam for the sole purpose of evaporating the water. J. D. CATON.

Ottawa, Ill., Sept. 30, 1865.

Careless observation is so general that we are prepared to encounter it to almost any extent, but it may not be responsible for the apparent anomaly in this instance. If the passages under the salt-water pans were large and short, perhaps the high-pressure steam might sweep through, while that of lower pressure, moving with less velocity, might be condensed to water, giving up its 966° heat of evaporation, and thus imparting more heat to the water than high-pressure steam. But if the arrangements were so made as to condense the steam in both cases, then steam of high pressure would be slightly more efficient in evaporating the salt water than steam of low pressure, though only slightly, for the sum of the latent and sensible heat of steam is nearly the same at all pressures. The temperature of saturated steam at 15 pounds pressure to the square inch is 212°, while that of steam at 101 pounds is 339°; but in converting water into steam at 15 pounds pressure 966·6° of heat are absorbed, while in converting it into steam at 101 pounds pressure only 877·3° of heat are absorbed. Therefore, in reducing steam of 15 pounds pressure to boiling water 1,178·6° of heat would be given up, while in reducing that of 101 pounds pressure 1,216·8° of heat would be evolved. Regnault announces as the most probable conclusion of his long series of observations and experiments that the power exerted by expanding steam is in direct proportion to its loss of heat. It is, therefore, impossible to employ steam in driving a steam engine without impairing its efficiency for the purpose of evaporation, provided that the conditions are such as to utilize all its evaporating power in either case.

Most furnaces are so constructed as to waste a very large proportion of the heat, but the furnaces on which most effort has been bestowed are those of steam boilers. In some of these the arrangements for burning the fuel and economizing the heat may possibly be so good that they may be employed profitably for generating steam to be used in evaporating water in procuring salt. It is manifest that even if the steam is all condensed, the heat required to raise the temperature of the water in the steam boiler to the boiling point must be lost, and the superiority of the steam boiler furnace over the furnace that would be constructed under the salt pans must be sufficient to compensate for this loss in order to make the arrangement economical.

THE FAIR OF THE AMERICAN INSTITUTE.

We continue our notices of objects of interest:—

HOWE'S FIRST SEWING MACHINE.

Under a glass case is exhibited the first sewing machine invented and constructed by Elias Howe, Jr. It is a very neat working model, made to turn by hand, and quite different in general construction from those at present in use. It contains, however, that essential improvement—a device for passing a second thread through a loop in the first—which stops the thread from unraveling—the idea that made mechanical sewing a practical art.

CENTRIFUGAL PULVERIZERS.

The idea of crushing stones and other substances by dashing them violently against an unyielding surface, instead of letting a heavy body fall upon them, was suggested and tried some years since, and, though successful in their operation, the machines were found to wear out so rapidly that they went out of use. By employing Franklinite iron, however, they may be constructed to endure, it is said, longer than any other kind of pulverizer. The Boston Milling and Manufacturing Company have on exhibition a mill constructed of this material, with samples of bone flour pulverized by it from unburned bones. A short iron cylinder has a shaft passing through its axis, the shaft carrying arms, which, in their rapid revolutions, strike the pieces of bone, knocking them against the sides of the cylinder; the bone is repeatedly beaten till it is reduced to a fine powder.

ELECTRIC PACKAGE EXPRESS.

Dr. D. D. Parmalee, of this city, has one of his package carriages running constantly round a circular railway. The carriage is driven by an electro-magnetic machine, the electricity being generated by a stationary battery, and conducted along the rail. We shall soon publish an illustration of this curious affair.

EXPANSION SADDLE ENGINE.

Messrs. J. Wyatt Reid & Co., No. 7 Old Slip, this city, have running a portable engine designed for oil wells, with the bed plate so bolted to the boiler as to make ample allowance for the unequal expansion of the boiler and bed plate in firing up. The bed plate rests upon three saddles, but is bolted to the middle one only, the ends resting upon the other two, and being held down by set screws under which they may slide. As an engine will last much longer than a boiler, it is desirable to have a bed plate even in the case of a portable engine.

ROTARY FAN BLOWER.

Charles C. Overton, No. 163 Maiden lane, has in operation a blower for furnaces, made by two fans inclosed in a case, and running in opposite directions, each blade of one fan coming between two blades of the other; gears upon the shafts keep the two fans in a constant position in relation to each other. This blower creates a powerful blast.

WOOD ENGRAVING.

In a case containing samples of wood engraving, we noticed some beautiful specimens of mechanical work by Richard Ten Eyck, Jr. Mr. Ten Eyck has worked on illustrations for the SCIENTIFIC AMERICAN during the last fifteen years, and has been pronounced by other artists to be the best engraver of machinery upon wood, in the world. His samples at the Fair are "proofs" from cuts engraved for this paper.

Interesting to Every One.

At the recent trial of breech-loading rifles, held by Government at Springfield, Mass., there were some forty different varieties presented. A photograph of these guns has been executed by Messrs. Milton, Bradley & Co., of Springfield, Mass., which shows very clearly the external parts of each one. The actual size of the plate is 12x17 inches, and it is mounted on a sheet 16x21, the names of the inventors being set opposite their weapons. This photograph is a very beautiful specimen of the art, and would be an ornament to any room.

As an evidence of the rapidity with which commerce in the South is reconstructing itself, we see it stated that the St. Louis and New Orleans tunnage—now over 40,000 tuns—is 33 per cent in excess of the tunnage of 1859. The Ohio River tunnage has increased 50 per cent and the Missouri River 50 per cent since that time.

ISSUED FROM THE UNITED STATES PATENT-OFFICE FOR THE WEEK ENDING OCTOBER 10, 1865.

Reported Officially for the Scientific American

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

50,320.—Cut-off Valve.—James M. Albertson, New London, Conn. Antedated Sept. 27, 1865:

First, I claim the placing of a valve below the valve-seat of a steam cylinder, and in the ports or passages leading to the interior of the cylinder, in combination with the auxiliary exhaust ports, C C, for the purposes substantially as described.

Second, The auxiliary parts, C C, when used only as an exhaust part, and connected with the passage into the cylinder which contains the valve herein described, and when used in combination with this valve, substantially as set forth.

50,321.—Window-sash Lock.—Alonzo C. Arnold, Norwalk, Conn.:

I claim the construction and arrangement of a window-sash lock, in the manner and for the purpose substantially as herein set forth and described.

50,322.—Machine for Kneading Dough.—George R. Baker, Brooklyn, N. Y.:

First, I claim the machine for kneading dough, constructed and operating substantially as herein described.

Second, I also claim the combination of the shaft, a, with its pivoted arm, a', the slot, e, and spring, f, arranged and operating substantially as and for the purpose herein described.

50,323.—Dryer Felts for Paper-making Machines.—Seth W. Baker, Providence, R. I. Patented in England May 9, 1863:

I claim the use of the peculiar fabric, hereinbefore described, for a dryer felt in paper-making machines, the ends being united so as to make an endless belt or band, as set forth.

50,324.—Torpedo for Oil Wells, Etc.—A. T. Ballantine, Morristown, N. J.:

First, I claim an apparatus to be exploded in oil or other deep wells, constructed and operated substantially as above described.

Second, I also claim securing a friction primer within a cylinder for holding powder or other explosive substance by means of a loose slotted bar placed in such cylinder, substantially as shown.

50,325.—Shears for Cutting Metal.—Henry Barth, Cincinnati, Ohio:

I claim the combination of the many-sided nuts, F F', with the stationary and movable jaws, substantially as and for the purposes described.

[This invention consists in the employment or use in shears for cutting metal or other materials of many-sided cutters, the edges of which are grooved or hollowed out in such a manner that each edge presents two cutting edges, and if one of the cutting edges has become dull, the cutter can be turned or reversed, and a new cutting edge can be brought into play without loss of time.]

50,326.—Ore-crushing Stamp.—Henry J. Behrens, New York City:

I claim giving to the cross-bar, D, an eccentric motion to the motion of the pulley and its noze by means of the levers, G, which carry said cross-bar, D, and whose centers of motion are placed some distance from the center of motion of the driving shaft or pulley, and operating in the manner and for the purpose substantially as described.

50,327.—Grate Bar for Steam Generators.—E. G. Blakslee and A. Manser, Sing Sing, N. Y.:

We claim the tubular water heaters, g, in combination with the pipes, k and m, and feed-water pipe, e, arranged and operating substantially as specified.

50,328.—Screw Driver.—Wm. G. A. Bomvill, Dover, Del. Antedated Aug. 27, 1865:

I claim combining a countersink or other tool which can be operated by a straight handle, with a screw driver, by means of a socket, D, and a sliding joint, substantially as and for the purpose above described.

[This invention consists in combining with a screw driver any other tools which are commonly used in connection therewith, such as a countersink, gimlet, reamer, etc., by means of a sliding socket and joint, the socket being made removable or fixed.]

50,329.—Centering Chuck.—Thomas Brooks, Middletown, Conn.:

I claim the pivoted levers, d, with the sliding jaws, e, and conical screw spindle, c i b, all constructed substantially as and for the purpose described.

50,330.—Bistoury.—Charles C. Brown, Washington, D. C.:

I claim the construction of the director, A, provided with a groove, for the reception of a ligature, C, as and for the purpose herein set forth.

50,331.—Slide Valve.—Alexander Buchanan, New York City. Antedated Sept. 30, 1865:

First, I claim the attachment of the flexible valve cover to the inflexible cover of the steam chest by standing bolts G G, and flanged nuts, H H, which are fitted to form steam tight bearings on seats, m m, outside of the latter cover, substantially as herein specified.

Second, The clamping pieces, I I, and bolts, J J, in combination with the flanged nuts, H H, standing bolts G G, valve-chest cover, B, and flexible valve cover, substantially as and for the purpose herein specified.

Third, The guard bolts, K K, and jam nuts, U U, in combination with the inflexible valve-chest cover and flexible valve cover, substantially as and for the purpose herein specified.

Fourth, The longitudinally adjusting stop bars, L L, applied at the ends of the valve chest, and adjustable from the exterior thereof, in combination with the flexible valve cover, substantially as and for the purpose herein specified.

Fifth, The nuts, r r, and elastic washers, s s, in combination with the standing bolts, G G, and adjusting nuts, H H, substantially as and for the purpose herein specified.

50,332.—Sash Supporter.—Edward A. Campbell, Williams Bridge, N. Y:

I claim the sash supporter formed with a hooked end to act against the outside of the sash, and with a thumb piece or projecting end to be let into the window casing and protrude therefrom as and for the purposes set forth.

50,333.—Machine for Pressing Brick.—Morgan Chittenden, Danbury, Conn. Antedated Sept. 25, 1865.

First, I claim in combination with the transversely sliding mold box, and horizontally reciprocating pressing plungers arranged at one end of the machine, the toggle, B B, connected with the said plungers, and with a fixed bearing or fulcrum at the other end of the machine, and operated by a crank or eccentric wrist, substantially as herein described.

Second, I claim the combination of the transversely sliding mold box containing two sets of molds, the single set of reciprocating pressing plungers, and the two sets of discharging plungers, substantially as and for the purpose herein specified.

Third, I claim the semi-rotating receiving table J, in combination with the transversely sliding mold box, containing two sets of molds, and the two sets of discharging plungers, substantially as and for the purpose herein specified.

Fourth, I claim so combining the semi-rotating receiving table, J, with the transversely sliding mold box, that the movement of the said box is obtained through the movement of the said table, substantially as herein specified.

Fifth, I claim operating the discharging plungers by means of the tripping cam, V, p, m, the notched rod D, and the springs, e e, the whole combined and operating substantially as herein set forth.

50,334.—Breech-loading Fire-arm.—Nathan S. Clement, New York City. Antedated April 29, 1865:

First, I claim the spring, P, arranged relatively to the cartridge and to the retracting hook, N, or its equivalent, substantially in the manner and for the purposes herein set forth.

Second, I claim so arranging the locking bolt, G, relatively to the breech piece, F, and the tumbler, B, that the hammer cannot strike and discharge the cartridge except when the breech piece, F, is finally locked, substantially as herein set forth.

Third, I claim the thumb piece, H, as arranged relatively to the breech piece, F, and locking bolt, G, for the purposes herein set forth.

Fourth, I claim the back bolt, I, arranged to operate in the same plane as the locking bolt, G, for the purpose herein set forth.

Fifth, I claim, in combination with the sliding breech piece, F, the within-described arrangement of a single spring, K, connecting lever, J, and bolts, G and I, for the purposes herein set forth.

50,335.—Manufacture of Aniline Red.—Charles Clemm, Philadelphia, Pa., and August Clemm, Manheim, Germany:

What we claim is the treatment of salts of aniline and its homologues by the arseniates of the alkalies, substantially as above described, for the production of aniline red.

50,336.—Manufacture of Detergents.—Samuel Coburn, Stamford, Conn. Antedated Sept. 30, 1865:

I claim the combination, for the purpose aforesaid, of soda with ammonia, by the means and in the manner substantially above stated.

50,337.—Buckle.—A. H. Cole, Sylvania, Ohio.

I claim the combination with the buckle frame, a, of the wedge-shaped piece or tongue, i, arranged together and operating substantially in the manner described.

[This invention relates more particularly to buckles used for securing the tugs or trace-straps to the hames of harnesses for horses and consists in a novel construction of them, whereby the tugs can be buckled and unbuckled with great readiness, and, besides, it is not necessary to bend the straps in order to pass them through the buckles.]

50,338.—Feathering Paddle Wheel.—M. Grier Collins, Cumberland, Md.

I claim the combination of the projections on the paddle stem with the stationary double cam, by means of which the paddles in their revolutions are feathered as they enter and leave the water, substantially as described.

50,339.—Cooking Stove.—J. D. Conner, Bloomington, Illinois.

First, I claim the pillar, C, with its forked arms, V V, for supporting the grate, in combination with a dumping grate, substantially as described.

Second, I also claim the perforated throat, E, inclosed within an air chamber, F, substantially as described.

Third, I also claim the combination of the perforated throat, E, with the gas-combustion chamber, G, into which it discharges the masses of mixed gases and air, and with the lateral air passages, O, which deliver air into both from below the grate, substantially as described.

Fourth, I also claim the method, as above described, of securing to the closets the slats, R, to wit, by angular projections fitting into angular recesses made in the corners of the closet.

Fifth, I also claim the method herein described of making the closet, A, to wit, forming an open frame or skeleton by casting, or otherwise, and securing the back and top and bottom plates or walls to the frame by means of bolts or equivalent devices, substantially as described.

Sixth, I also claim making the bottom and tube of the water reservoir in one piece, by casting or otherwise securing the top of the reservoir to the edges of the bottom, I, through bolt holes made therein for that purpose, substantially as described.

[This invention consists in a novel construction of a parlor or heating stove, intended especially for burning bituminous coal, although any kind of fuel can be used therein. The upper part of the fire chamber has provision for admitting air to the hot gases above the fuel, and above all is a gas-combustion chamber. The descending flue has a spiral course opening into an ash or soot receptacle from which the exit pipe ascends.]

50,340.—Casting Skeins of Wagon Boxes.—Thomas Considine, Chicago, Ill.:

First, I claim the screw, C, connected with a platform, F, and placed in a suitable framing, A, in connection with the rotary block, a, in the platform, F, all arranged substantially as shown, for raising and lowering and for rotating the pattern for the purpose specified.

Second, The mold, K, for the core of the skein and socket having a pattern, a', to form the mold for the inner end of the exterior of the socket, J, when used in combination with match board or box, K, and flask, L, as described.

50,341.—Box for Packing Eggs.—Eden M. Coombs, Memphis, Ind.

I claim the use of pads or cushions, C, applied to the bottom of the cases or shelves, for the purposes herein specified.

[In transporting eggs the breakage of the same is almost always caused by the weight of the layers of eggs, one upon another. The object, therefore, of this invention is to provide a packing box whose internal arrangement shall be such as to separate the several layers so that each layer shall be independent of the next; and to effect this a series of cases or shelves are arranged within a suitable box, at a sufficient distance apart to receive a layer of eggs, and the under side of said case or shelf (as well as the lid) are padded in by suitable material, so as to lie softly upon the eggs and prevent their jostling.]

50,342.—Ore-crushing Stamps.—Edward Dart, New York City:

First, I claim the arrangement of the pulley, C, with flanges, a a partly cut away to form a nose, n, in the manner and for the purpose described.

Second, In combination with the above described pulley, C, the cross bar, D, working loosely on said pulley, when constructed, arranged and operated in the manner and for the purpose set forth.

Third, I claim in combination with the pulley, C, the frame, G constructed as specified, and operating on the cross bar, D, in the manner and for the purpose substantially as set forth.

Fourth, I claim the guard rods, N, in combination with the pulley, C, frame, G, and cross bar, D, arranged in the manner and for the purpose described.

50,343.—Pipes or Tubes for Wells.—Thomas Dutton and Thomas Maguire, Port Jervis, N. J.:

We claim the well pipe or tube composed of the interior non-perforated and the exterior perforated tubes, constructed and connected together substantially as described and herein set forth.

50,344.—Sheet-metal Can.—John C. Eiben, New York City:

I claim the head of the pail or can, composed of a ring, A, united with the sides by a double seam joint, b, and having a turned-in edge, a, and the removable lid, C, with its depressions, c, and flange, d, soldered into and around the opening of the said ring, substantially as herein described.

50,345.—Shoe Buckle.—James Elleman, Providence, R. I.:

claim as a new article of manufacture a buckle or shoe fastening, made substantially as shown and described.

This invention provides a very simple and cheap buckle for fastening shoes, skate straps, etc., and it can be manufactured at very little cost.]

50,346.—Steam Superheater.—L. V. Fichet, New York City:

I claim an apparatus for superheating steam, composed of a box, B, provided with a series of horizontal pipes, b, and a series of vertical heating tubes, c, in combination with the furnace, C, substantially as herein set forth.

[This invention relates to an apparatus in which the steam from a steam generator is passed through a series of horizontal pipes, which are arranged in a box that is placed over a furnace, and provided with a series of vertical heating tubes, in such a manner that by the heat passing up through said vertical heating tubes the steam passing through the horizontal pipes is highly heated without exposing the pipes containing the steam to the direct action of the fire.]

50,347.—Whiffletree.—Isaac D. Flanagin, Ceresco, Mich.:

I claim the employment of crossed traces connected to a short adjustable equalizer, E, when used in combination with the equalizing whiffletrees, B B, and double tree, A, and constructed and arranged substantially as and for the purposes herein described and set forth,

50,348.—Tank for Storing Petroleum.—J. Fraser and James Calkins, Buffalo, N. Y.:

We claim a hermetically constructed metallic tank or store-house, A, provided with a safety gas vent and fuse, F c e, for preserving petroleum and other hydro-carbon fluids, substantially as described.

Second, We also claim the combination of a receiving, separating and gaging tank, B, with the hermetical tank, A, arranged in the manner and for the purpose set forth.

Third, We also claim, in combination with the hermetical tank, A, an equalizing delivery chamber, G, when the same are connected by a series of valves, i i, arranged at different altitudes, each independent of the others, for the purpose of drawing oil of different gravities from the amount in store, substantially as set forth.

Fourth, We also claim the agitator, H, in combination with the chamber, G, and store tank, A, for the purpose of combining and equalizing the oil in G before delivery, when different grades are taken from A at one time, substantially as described.

Fifth, We also claim constructing the supporting columns, g g, of tubular form, with one or more openings at the base, for utilizing the space in tank, A, substantially as set forth.

Sixth, We claim, in combination with the tanks, A B, the arrangement of the receiving pipe, d, entering through the roof and descending to the floor of A, whereby the fresh oil is always introduced first in contact with the heavier stratum of oil and paraffine deposited on the bottom, and is discharged with a force acquired by its descent from the top of tank, A, substantially in the manner and for the purposes set forth.

Seventh, We claim, in combination with the hermetical tank, A, and delivery chamber, G, the heating coil, r r, arranged and operating as and for the purpose shown and described.

Eighth, We also claim the metallic safety fuse, e, in combination with a hermetical incombustible reservoir, A, for hydro-carbon oils for preventing the burning of the escaping gas from igniting the contents of the reservoir, substantially as set forth.

Ninth, We also claim the combination and arrangement of the hermetical store-house, A, with the receiving, gaging and separating tank, B, equalizing delivery chambers, G, and agitator, H, operating conjointly, and constructed as described.

50,349.—Churn.—John B. Ghormley, Bellefontaine, Ohio:

I claim the arrangement of the circular corrugated dasher, B, and dasher, B', or their equivalents, in combination with the corrugated center, e, tub, A', and hollow shaft, a, when operating in the manner and for the purpose set forth.

50,350.—Cane Stripper.—Wm. Gladden and Richard F. Bishop, Chrome Hill, Md.:

We claim, First, The knife, F, attached to the standard, in convenient position for the operation, whereby the top of the cane is struck off preparatory to stripping off its blades.

Second, We claim the pendant gate, E, for enlarging the opening between the cutting knives, C C C' C', for the introduction of the first stalk, substantially as described.

50,351.—Suspenders.—B. J. Greely, New York City:

First, I claim the suspenders above shown, consisting of a band encircling each shoulder, and held adjustably behind, and a strap descending from it at the side, the whole constructed and applied substantially as above described.

Second, I also claim, in combination therewith, the buckle, F, having a double inclination of its back bar, substantially as and for the purpose above set forth.

Third, I claim the arrangement, with braces and pantaloons, of a spring hook and ring, or the equivalent thereof, substantially as shown and described.

50,352.—Broom and Mop Head.—E. J. Green, Valparaiso, Ind.:

I claim a metallic broom or mop head, composed of two sections, and each section having a semi-screw shank upon it, so that when the jaws or clamps of the sections are brought together the semi-screw shanks will also be brought up against each other and form a whole screw shank, upon which a handle is screwed to hold everything tight and firm, substantially as described.

50,353.—Ice Creeper.—D. Green, Troy, N. Y.:

I claim the combination of the elastic serrated bow, m n, and attachment, g h l, when constructed as shown and described, and adapted for application to a common boot without projecting horizontally beyond the area of the latter.

[This invention consists in so attaching to the heel of a boot or shoe, an ice creeper, to prevent the slipping of the feet on icy sidewalks, so that when it is not desired to use the same it can be readily removed from the treading surface of the foot, without detaching it from the boot.]

50,354.—Heater.—C. C. Hare, Louisville, Ky.:

I claim, First, The warm-air tubes or cylinders, A, passing through the drum, in combination with the smoke pipes, B, and with a drum whose bottom is convex, and has a soot pipe at its center, substantially as described.

Second, I also claim so connecting the fire chamber to the drum that the latter can be elevated to varying hights, substantially as described, for the purpose of increasing or decreasing the extent of radiating surface.

[This invention has for its object an improvement in heaters for household use, and it consists in a novel arrangement of flues and air tubes and passages, by means whereof great economy is attained in the use of the articles, and the cost of construction is much diminished.]

50,355.—Composition for Welding.—George Harpst, New Hamburgh, Pa.:

I claim the within-described composition, made substantially as set forth, for the purpose specified.

[This invention relates to composition which can be used with great advantage for welding iron and steel, or steel and steel, or iron and iron together; it is used particularly for welding steel to iron. It can also be used to aid the operation of uniting copper and brass or other metals.]

50,356.—Chimney Top.—B. A. Henriksen, San Francisco, Cal.:

I claim, in combination with the cylindrical chimney, D, the upwardly tapering jacket, A, provided with supporting hooks, a a, lateral openings, B B, and partitions, C C, and so applied that while projecting slightly above the top of the chimney, D, nearly its entire length, will surround said chimney, all as herein described.

50,357.—Packing Projectiles for Rifled Ordnance.—B. Hotchkiss, New York City:

First, I claim the bridges or posts, A', extending across the packing, flush with the surface of the main casting, A, and adapted to allow windage at those points, substantially as and for the purposes herein set forth.

Second, I claim prolonging the legs or posts, A', in the rear of the packing, C, so as to protect the latter in handling and transportation, substantially in the manner and for the purposes herein set forth

50,358.—Breech-loading Fire-arm.—Charles Howard, New York City:

I claim constructing the breech pin in the manner described, so as to unite in one piece the breech pin and spindle of the lock, in combination with a cylinder hammer surrounding the said spindle, and inclosing within itself a spiral main spring, and the whole constructed and arranged to operate substantially as described, so as to compress the spring within the hammer by the forward movement of the breech pin in closing the breech of the arm, substantially as herein set forth.

50,359.—Billiard Ball.—John W. Hyatt, Jr., Albany, N. Y. Antedated Sept. 27, 1865:

First, I claim constructing balls of layers of fibrous and adhesive solid material, in such a manner, that the surface of said balls shall only present the edges of said layers for the purpose as herein described.

Second, I claim riveting the balls inside, as described, or in an equivalent manner, for the purpose specified.

50,360.—Machine for Cutting Boot and Shoe Uppers.—Pickmore Jackson, Saugus, Mass:

First, I claim the indicators T T, or their equivalents, in combination with the cutting dies, substantially as set forth and for the purpose described.

Second, A double die for gaiter boot fronts, havng a single blade to cut the tops of two patterns, substantially as and for the purpose described.

50,361.—Claw Bar.—Henry Jeffrey, Vincennes, Ind.:

I claim the semi-circular rolling fulcrum, A, in connection with the handle or lever, C, and hinged bars, D, and either with or without the plate, B, all arranged substantially as and for the purpose specified.

[This invention relates to a new and improved device for drawing spikes and bolts, and is designed for general use, having for its object the drawing of the spikes or bolts without bending them, so that they may be used again after being drawn.]

50,362.—Mold for Casting Railroad Bars.—Henry Jenkins, Brooklyn, N. Y. Antedated Sept. 27, 1865:

I claim, First, a series of metallic sections connected together in substantially the manner specified, so as to form a continuous mold that will allow for expansion and contraction, without changing the shape or accuracy of the molds, as set forth.

Second, I claim the spring, c, or its equivalent at the ends of the frame, to press the section closely together, and permit the longitudinal expansion of the molds or sections while in use, substantially as specified.

Third, I claim the bars, h, connecting the sections, f or z, and fitted with springs, to press said molds together, substantially as specified.

Fourth, I claim the clamping bars, p q r, applied in the manner specified to press the sections of the mold together with uniform force, as specified.

Fifth, I claim the movable plates, w, applied to the faces of the pouring holes or sprues as specified.

Sixth, I claim the metal coil studs, 7 7, sustained by the wires, 8, and forming the spike or screw holes in the cast railroad bar, as specified.

50,363.—Horse Rake.—William H. Johnston, Northboro, Mass.:

I claim the combination and arrangement of the treadles, T M, the arms, H K, and their connecting links, L N, with the rake heads, the thills and the mechanism as described, for connecting the seat with the thills and the rake head, and for enabling the weight of the driver to be employed for pressing the rake downward, as and for the purpose set forth.

I also claim the combination and arrangement of the lever, A, and its link, M, with the above-described mechanism, for so connecting the seat with the rake head and the latter with the thills as to enable the rake head to be raised or depressed, and receive the weight of the driver, in manner substantially as herein before explained.

50,364.—Wrench.—Lucius Jordan and Leander E. Smith, Southington, Conn.:

We claim, First, The step, E when held in place upon the bar, substantially as and for the purpose herein set forth.

Second, The nut, F, fitted to screw upon the bar, A, so that one of its sides or faces will rest against the step, E, and the other recessed to receive the upper end of the handle, substantially as described.

Third, The combination of the step, F, screw rod, C, nut, D, and nut F, substantially, as herein shown and described.

50,365.—Aerial Car.—F. Just and A. Koellener, Buffalo, N. Y.:

First, A balloon constructed in two sections, and constructed as described, for the purposes set forth.

Second, The balloon constructed in two sections in combination with the car, A, as herein set forth.

Third, The car, A, balloon, B B', the connection, D, as arranged with the engine when constructed, as herein shown and described.

Fourth, The wings, H H, the frame, C, in combination with the car, A, all constructed and arranged as herein described.

50,366.—Straw Cutter.—Daniel S. Kahler, Elkhart, Ind.:

I claim the compress sash, A, in combination with the knife sash, C, constructed and operated in the manner and for the purpose above set forth.

I also claim the straw gage, E, and spring gage, F, for the purposes above specifind.

50,367.—Beehive.—A. K. King, N. H. King and F. S. Walker, Nevada, Ohio:

I claim, First, The comb frames, D, provided with the upper and lower bars, o p, constructed and arranged substantially as and for the purposes described.

Second, The lower bar, p, of the comb frames, beveled so as to form the comb guide, r, for the purpose of securing straight combs, and provided with the double projections, g, to keep the frames at a proper distance from each other and from the walls of the hives.

50,368.—Apparatus for Distilling Petroleum.—A. Kreusler, New Lebanon, N. Y.:

I claim, First, The combination of an evaporator, B, and separator, E, constructed and operating substantially as and for the purpose set forth.

Second, The corrugated plates, b, with spiral grooves, in combination with the induction pipe, e, pipes, f, vapor pipes, c, and caps, d, constructed and operating substantially as and for the purpose specified.

Third, The compartment, D, arranged one above the other, in combination with pipe, j, branch pipes, g, stand pipe, h, and escape pipe, i, constructed and operating substantially as and for the purpose described.

Fourth, The condensing chambers, m, arranged in the interior of the compartments l, of the separator, in combination with the pipes, p and v, partitions, o, and holes, q, and with the pipe, t, and connecting pipes, u, constructed and operating substantially as and for the purpose set forth.

Fifth, The use of a series of adjoining condensing chambers, arranged substantially as herein described, for the purpose of separating the condensed liquids of different specific gravity.

50,369.—Knitting Machine.—Isaac W. Lamb, Rochester, N. Y.:

First, I claim the employment in a knitting machine having two rows of needles operating alternately, of shifters, p p, having suitable bearings, and one or more oblique slots, p2 p2, in combination with the pins, r2, and transverse slots, q', in the cam box, for the purpose of shifting the V-shaped cams to produce the alternation in the operation of the two rows of needles, substantially as herein destcribed.

Second, The combination of the shifters, p p, having projections, p p', with suitable stops, H, to effect the movement of the shifters, as needed, in order to change the V-shaped cams, substantially as herein set forth.

Third, The adjustable stops, H, so secured as to allow of their being placed either in position to combine with the projections, p' of the shifters, and thus change the V-shaped cams, or in position to allow the shifters to pass them without chanaing them, so as to permit of changes in the machine simply by the change of the stops, substantially as described.

Fourth I claim the outside cam pieces, r' r', when they are made either one or both adjustable in the line of the side of the V-shaped cam, so that when either of the outside cams shall be adjusted to regulate the length of the loops, the parallelism between the sides of the V-shaped cam, V, and the inside surfaces of both outside cams, r' r', shall always be preserved by the change of the shifters, as described.

Fifth, I claim the manner of regulating the length of the loops by means of the link, n, slot, m, and the thumb screws, substantially as described.

Sixth, I claim the friction sprinn, S, to prevent the changing of the shifters before they come against the stops, H, as described.

Seventh, I claim the plate, U U, over the needles, when the same perform the double office of retaining the needles in their grooves, and also from the lower rests or bearings for the sliding frame, as described.

Eighth, I claim the manner of fastening the plates, U U, in place, by means of pins, g' g', and holes, g2 g2, whether the pins are stationary in the foundation or in the plates, so long as the plates are held down on the needles, by the sliding frame, so as to make the needles to be readily removed, by simply loosening the bearings or gibbs, D', to allow the sliding frame to be raised, substantially as herein described.

Ninth, I claim making the inner edge of the plates, U, which plates perform functions stated in clause seventh of the claim, beveling or sharp, on the upper side, as described, for the purpose of turning over the needle latches, when the needlse are drawn down to be out of working position.

Tenth, I claim having the lower ends of the wire jacks, G, all firmly attached to the plates, E, in combination with the small rods, U, passing through the eyes in the upper portions of the jacks, substantially as described.

Eleventh, I claim making the jack plate, E, adjustable, out and in, so as to have the opening between the two rows of jacks wide or narrow, as described.

Twelfth, I claim the attachment of the crank, C2, by suitable shaft and bearings, to the foundation of the machine, by means of a connecting rod, C', attached at one end to the crank, and at the other end to the sliding frame, substantially as described, whether the machine be in all respects similar to this or otherwise, so long as there be a sliding frame moving over two alternately operating rows of needles, substantially as herein described.

Thirteenth, I claim a detached yarn carrier, having an adjustable movement to conform to any desired width of fabric to be knit, in combination with a sliding frame, having a uniform distance of movement, substantially as described.

Fourteenth, I claim operating the yarn guide or carrier by means of the driving spring, K, on the sliding frame, working on the inclined surfaces and stops of the yarn carrier, in combination with the friction spring, g, substantially as herein described, for the purpose of taking hold and letting go of the yarn carrier, as described.

Fifteenth, I claim a knife or sharp edged latch opener or guard that takes the latches from the tops of the hooks of the needles, whether the edge of such latch opener is nearly straight, and the movement of the needles opens the latches, or whether the needles are stationary while an inclined knife edge opens the latches.

Sixteenth, I claim the combination of the two latch openers, constructed as shown, with the yarn carrier, when the same are so arranged as to permit the yarn carrier to pass between the latch openers, as described.

Seventeenth, I claim the bent wire, Q, or its equivalent, to drop down on the yarn in setting up work on the machine, so as to permit a weight to be attached to the same under the machine by means of the bent wire, Q', or other suitable connection, substantially as deecribed.

50,370.—Composition Friction Matches.—Louis Lanszweert, San Francisco, Cal.:

I claim the within-described match compound, made of the ingredients above set forth, free from phosphorus and sulphur, substantially as specified.

[This invention relates to a match compound which is not liable to be injured by the influence of moisture, and which will produce a match that ignites on a peculiarly prepared friction surface.]

50,371.—Flour Bolt.—S. Lewis, Tiffin, Ohio:

I claim, First, Applying and actuating hammers or rappers, which are arranged within the reel of a bolting mill, in such a manner that the force of the blows of said hammers can be increased or dimiuished at pleasure, whether the reel be in motion or at rest, substantially as described.

Second, The employment of springs applied to hammers, which are arranged within the reel of a bolting mill, for the purpose of increasing the force of the blows of said hammers, substantially as described.

Third, The combination of spring hammers with a bolting reel, and a device which is arranged outside of said reel, for regulating the force of the blows of the hammers, as well as stopping their operation, substantially as described.

50,372.—Lightning-rod Joints.—J. B. Lyon, Cleveland, Ohio:

I claim uniting the sections of tubular lightning rods by means of the short tubes, B, the grooves, c c' and c'', and the point, d, as herein set forth and described.

50,373.—Tool for Manufacture of Glass.—Geo. Matthewman, Williamsburgh, N. Y.:

I claim the employment of a shank holder, having a raised partition, b, substantially as described in combination with a female disk adapted to said projecting portion, b, the whole constructed to operate in the manner and for the purpose set forth.

50,374.—Holding Shanks of Molds for Glass Buttons.—George Matthewman, Williamsburgh, N. Y.:

I claim the movable plates, A A', having cavities in their adjacent edges to match and form shank holding receptacles, in combination with a retaining bar, B, or its equivalent, the whole arranged to operate substantially as described, for the purpose set forth.

50,375.—Apparatus for Moving Buildings.—John S. McIntire, Chicago, Ill.:

First, I claim the chair, E, or its equivalent, of a balance frame in house-moving apparatus, so constructed as to be moved either way from the actual center, and operate as a central support of such balance frame.

Second, The combination of a cross timber, constructed of two or more pieces and supported by a frame or joint, with one or more balance frames, in a house-moving apparatus.

Third, The shoes, C, when constructed and attached to the shoes or runners, B, substantially as and for the purposes specified.

Fourth, The roller guide, K, when attached to a house-moving apparatus.

Fifth, The combination of a flexible cross timber, composed of two or more pieces, c c, connected together, with a balance frame, runners, B, and self-adjusting short shoes or runners, C', each of said parts and combinations being constructed and operating substantially as set forth and specified.

50,376.—Safety Valve for Steam Generators.—Robert Mood, Indianapolis, Ind.:

I claim the arrangement of the valves, lever, spring and cross-bar with the eccentric, substantially as set forth.

50,377.—Carding Engine.—H. L. Moulton, Camden, N. J.:

First, I claim the revolving drum or cylinder, with the combs, h, and the springs, m, or their equivalent, in combination with the stationary cams, F F, and doffing cylinder, B, the whole constructed, arranged and operating substantially as and for the purpose herein set forth.

Second, The combination of the tube, H, a stripping cylinder, having combs operating substantially as described, and the doffing cylinder, B.

50,378.—Bench Plane.—George Mullear, San Francisco, Cal.:

I claim, First, The screw, I, traversing blocks, M and N, and cap, H, for clamping and holding the bit, and turning the shoving cut, substantially as described, whether the cap is made adjustable, horizontal or otherwise.

I claim making the cap, H, adjustable higher or lower on the cutting bit, by means of the brackets, O, grooves, P, and screws, F and G G.

50,379.—Tackle Block.—Joseph W. Norcross, Middletown, Conn.:

I claim the metal frame, A f, in combination with the inclosed wooden cheeks, substantially as and for the purpose described.

[This invention consists in the use of a metal frame, having three spaces, the middle to take the sheave, and the outer ones to take the wooden cheeks of a tackle block, said frame being cast or otherwise produced by metal in such a manner that the cheeks can be readily introduced in the spaces intended for them, and by driving a suitable wedge in the middle space the frame is made to clamp said cheeks tight. Said frame is also provided with a small metal seat to receive a rope becket, so as not to wear it, which is unavoidable with the ordinary eye or rings.]

50,380.—Salinometer.—Patrick B. O'Neil, St. Mary's Villa, Great Britain:

I claim the salinometer formed with an outer tube and a flexible diaphragm, upon which diaphragm rests a weighted tube, balancing a given column of fluid of a known density, so as to indicate varying pressures of the saline column, substantially as specified.

Second, In combination with the salinometer, fitted and acting as specified, I claim the hydrometer, applied and acting as set forth.

50,381.—Musical Instrument.—Francis Peabody, Salem, Mass.:

I claim the combination of one or more fly wheels, cranked shafts and pedals, with the automatic mechanism which in such instrument may be used for actuating those parts of it by which its musical sounds are produced, such fly wheels or wheel, cranked shaft or shafts, and pedal or pedals being used, substantially in manner as hereinbefore explained.

Second, I also claim the arrangement of the exhausting bellows, b, the exhaust or vacuum bellows, a, and the shaft, M.

Third, I also claim the improvement, as described, for operating the exhausting bellows, the same consisting in the expansive spring of the bellows, the contractile strap, c, the pulley, d, the pedal, its rod, Y, and the cranked shaft, T, provided with a fly wheel, as specified.

Fourth, I also claim the combination of ungearing mechanism, viz., the slide, O, the levers, P Q', and rods, Q Q2, with the mechanism for revolving the dent plate and its supporting gear.

Fifth, I also claim the combination of the separate adjustable mandibles, F F, with the dent plate, M, and the two series of base and treble levers, D, thereof.

50,382.—Railroad Signal.—Alfred Pell, New York City:

I claim a signal, constructed and operated substantially as described, for railroad or other purposes, so as to be kept in motion by mechanical power.

[The object of this invention is to provide an apparatus for signaling railroad trains, and it consists in combining a signal or flag with mechanism to keep the signal in motion without requiring attention or labor on the part of the signal man.]

50,383.—Waterproof Blacking.—D. L. Pickard, Rochester, N. Y.:

I claim the compounding of the several ingredients, as specified, so as to produce a composition substantially such as herein described.

50,384.—Composition for Filling the Pores of Wood, Etc.—Elbridge S. Pixley, Great Barrington, Mass.:

I claim the use of acetic acid to destroy the adhesive property of the glue, and the combination of the various ingredients named, in such way as to secure the object desired.

50,385.—Manufacture of Illuminating Gas.—E. A. Pond, Rutland, Vt.

I claim a new illuminating gas, the same consisting of carbureted hydrogen gas mixed or combined with atmospheric air, charged with the vapor of hydro-carbon fluid.

Second, The manner herein described of mixing the two gases at the works generating the two or in the tube supplying the burner, or at the burner, substantially as set forth.

50,386.—Buckle.—Nathan Post, East Cleveland, Ohio:

I claim the body, A, the cross bar, W, the tongue bar, H, and the loop bars E G, constructed, arranged and operating as and for the purpose set forth.

50,387.—Safety Coal Trap.—T. Willis Pratt, Boston, Mass.:

I claim a coal trap consisting of two lids, C D, hinged to the frame, A, in combination with a flap, a, which extends under one of them when closed, and forms a support for both lids when open, substantially as and for the purpose set forth.

50,388.—Harvester Rake.—John M. Randle, Brighton, Ill.:

I claim the derrick, G, in combination with the pitman, c,' and connecting rod, c, the pitman m, and sliding head, i,' and guide n,' the bent lever, J, and rake rods, H,' and H," when such parts are constructed and operated as described and set forth.

50,389.—Valve for Steam Engines.—Ethan Rogers, New York City:

I claim, First, In valves for steam engines which have a constant onward movement around their center, constructing them with several steam openings, so arranged that the engine shall make a plurality of revolutions while the valve makes one, and that they communicate with two, three or more of the ports of the cylinder simultaneously, in constant succession, substantially as described.

Second, I also claim, in valves which have a constant motion around their center, giving to them a speed less than the speed of the engine shaft in the propotrion of the number of their steam openings, so that one entire revolution of the engine shall move the main valve only the distance from one of its steam openings to the next steam opening, substantially as described.

Third, I also claim supporting or counterbalancing the main valve by means of, or upon, one or more rings, s, at the center of said valve, substantially as described.

Fourth, I also claim the graduated cut-off valve, H, on the back of the main valve, so constructed and applied, substantially as shown, that the steam is cut off by the motion of the main valve.

Fifth, I also claim the exhaust passages, Q, made and arranged in the main valve intermediate of the steam passages, substantially as described.

Sixth, I also claim in combination the main valve, N, and the cut-off, H, when constructed and arranged substantially as described.

Seventh, I also claim the arrangement of the steam and exhaust ports, U and L, in combination with the main valve, N, substantially as shown.

50,390.—Dry Dock.—Joseph Ryan, St. Louis, Mo.:

First, I claim connecting the entire series of chambers, G', in the hold of the vessel, A, of my improved dry dock, with the two pump wells, G ", thereof, by means of a main pipe, D, branch pipes, D", and controlling gates, D', so that their pumps may be used singly in connection with all of said chambers or compartments, substantially in the manner herein specified.

Second, I claim the scuttle doors, a, and the scuttle valves, a'" and E, constructed and operating as described.

Third, I claim the separation of each of the ballast chambers, A' and A", into two compartments, by means of the partition, K, and connecting the chambers, A' and A", together, by means of the pipe, I, and the sleeves, e and e".

Fourth, I claim the wrist, C, the rollers, P and P", in connection with the frame, P'", and the clutches, d'" and d"", in connection with the levers, o, and connecting bar, N", all constructed and operating substantially as described.

Fifth, I claim, in combination with the center pump, F'"", in either well, G'", of my improved dry dock, a double plunger, operated by the working beams, d, substantially in the manner and for the purpose herein set forth.

Sixth, I claim, in combination with an improved dry dock, constructed substantially as described, the bent valve rod, L', in connection with the arm, L", the rock shaft, L'", and the lever, L"", constructed and operating substantially as set forth.

Seventh, I claim the movable cradle beam, B, in connection with the cam wheel, H, the endless screw, I", the cog wheel, x, and rack, x", and the tracks, x' and r, substantially as described.

Eighth, I claim, in combination with and as a part of my improved dry dock, constructed as herein set forth, the hinged staging, A'", constructed and arranged substantially as described.

50,391.—Horse Rake.—Andrew V. Ryder, Germans, Ohio:

I claim the particular arrangement and combination of the levers, G and F, with the swinging bars, L, clearing bar, J, and rake head, D', substantially as and for the purpose set forth.

50,392.—Spool for Winding Yarn for Beaming.—Benjamin Saunders, Nashua, N. H.:

First, claim connecting the bearings, i i, of the spools of a spooler with treadles, substantially as and for the purpose herein specified.

Second, The spool frames, E E', sliding in guides, d d, in combination with the levers, F F', or their equivalents, and treadles, G G', substantially as and for the purpose herein described.

Third, The adjusting screws, h h', in combination with the levers, F F', and treadles, G G', substantially as and for the purpose herein set forth.

50,393.—Window Frame and Sash.—Cyrus B. Shaw, Brooklyn, N. Y.:

I claim the construction of sash and window frames, herein described, for the purpose specified.

[This invention consists in forming the joints of the sashes of a window with each other and with the sides of the window-frame or casing, in such a manner that the window can be tightly closed.]

50,394.—Cone Valve.—George Shield, Cincinnati, Ohio.

I claim a hollow cone valve with a tubular stem, a, and perforated with apertures, c, substantially as and for the purpose described.

[In cone valves of the ordinary construction used in steam and water works or engines, the fluid or liquid discharges between the valve and its seat, whenever the valve opens, and both the face of the valve and the seat are liable to be cut so that the same have to be refitted at short intervals. This difficulty is obviated by the valve which forms the subject matter of this present invention, and which is made hollow, with apertures passing through its face. When the valve is raised, the fluid or liquid discharges through the hollow body of the valve and through the apertures in its face, without producing any injurious influence on either the seat or face of the valve, and a valve is obtained which works tight for a long time.]

50,395.—Bolt Cutter.—Reuben Sischs, Tuscola, Ill.:

What I claim is the employment of frame, A, bits, B and C, rod, D, and bar, E, arranged and used as and for the purpose herein specified.

50,396.—Guides for Sewing Machines.—Albert M. Smith, Brooklyn, N. Y. Antedated Sept. 27, 1865:

I claim a single springing plate, with one or more corrugations or ridges, and a piece, A, with lips, b, second to it back of the line of sewing; said plate, when attached to a sewing machine, forming the clamping and guiding surface, and the bed plate the supporting surface of the cloth, substantially as herein described.

50,397.—Sofa or Lounge.—Ernst Smith, New York City:

I claim, First, The segmental plate, E, arranged to operate substantially in the manner and for the purpose specified.

Second, The device consisting of the parts, e f g, in combination with the segmental plate, E, substantially as and for the purpose specified.

Third, I claim so stuffing the arm of the lounge or sofa that a protuberance will be made at the lower part thereof, for the purpose herein specified.

[This invention consists in the employment or use of a segmental plate to be attached to the arm of a lounge or sofa, the said plate having a slot cut in it and provided with suitable teeth into which is fitted to work a strip which is connected to a sliding rod by which the inclination of the arm of the sofa can be regulated as desired; it also consists in the insertion of a roll of extra stuffing at the lower part of the arm where it joins the sofa, whereby is made a better joint, so to speak, between the arm and sofa, whether the arm be in a vertical or inclined position; and the arm can be made separate from the lounge or sofa and subsequently pivoted thereto.]

50,398.—Lightning-rod Joint.—N. E. Smith, Cleveland, Ohio:

I claim connecting the sections of lightning rods, as herein specified.

50,399.—Mode of Cooling Water in Wells.—Daniel E. Somes, Washington, D. C.:

I claim constructing curbing or walls for wells, substantially as described.

50,400.—Comb.—Israel H. Southworth, Essex, Conn.:

I claim as an improvement in the manufacture of fine-tooth combs the grooved holder, b, into which are fitted the halves or pieces, a, substantially as described.

50,401.—Washing and Wringing Machine.—Ezra Springer, Davis, Ill.:

I claim, First, The adjustable roller frame B, provided with two springs, G G', arranged in such a manner that one or both may be made to act upon the lower or adjustable roller, F, as required.

Second, The chamber, I, at the bottom of the suds box, A, when used in connected with the roller frame, B, substantially as and for the purpose specified.

Third, The bed, N, connected with the adjustable frame, B, in the manner as shown, or in any equivalent way, so that it will be adjusted automatically by the movement of said frame, substantially as described.

[This invention consists in a novel arrangement of pressure rollers, an endless apron with an adjustable roller frame and hinged bed, whereby an exceedingly simple and useful machine for the purpose specified is obtained.]

50,402.—Caster for Sewing Machines.—Nesbitt D. Stoops, Newark, N. J.

I claim attaching a caster, constructed substantially as described, to the leg of a skeleton frame sewing machine, in substantially the manner and for the purposes described.

50,403.—Cultivator.—R. Thayer and J. McClelland, Pittsb rgh, Ind.

We claim the herein-described arrangement and combination of the beam, A, standards, B B', handles, C C', braces, D D', and bolts, a d h i, as and for the purpose specified.

50,404.—Combination of Blotter, Paper Weight, Rule, Cutter and Square.—A. Homer Trego, Trenton, N. J.:

I claim, First, The plates, A and B, in combination with each other, so arranged that a piece of blotting paper, may be clamped over a level surface, as shown and described.

Second, The metallic strips, D, in combination with the plate, B, substantially as and for the purposes herein mentioned.

Third, The spring plate, E, for clamping a sponge or other substance on which to wipe the pen, in combination with the plate, A.

Fourth, The receptacle, C, in combination with the plate, A, and screw rod, a, for the purpose mentioned.

Fifth, The combination and arrangement of the several parts, as herein shown and described.

50,405.—Cord for Window Sash.—Sigourney Wales, Boston, Mass.

I claim as my invention the arrangement and combination of the wire helix, A, with the sash-weight cord, c, and its knot, b, substantially as described

I also claim the wire helix, A, as made with the arch or bend, c, to span the cord above its knot, when applied thereto as specified.

50,406.—Polish for Glass.—John M. Warren, Boston, Mass. Antedated Sept. 28, 1865.

I claim the compound for polishing glass and other substances, as herein described.

50,407.—Valve Gear of Steam Hammer.—James Watt, Buffalo, N. Y. Antedated Sept. 25, 1865:

I claim First, The arrangement of the cams, T U, (with their connection so that they may be placed and used in such position, as to insure the taking and cutting off steam instantly, at any part of the movements of the hammer, substantially as set forth.

Second, I claim the exhaust port R R,' so arranged that the exhaust steam may be had directly from the steam chest over the piston head, and thereby increase the force of the blow given by the hammer, substantially as described.

50,408.—Stove.—A. O. Willcox, Port Richmond, N. Y.:

I claim the combination with a stove of a pan or drawer, for holding a supply for fuel, said pan being placed beneath the ash pan substantially as and for the purpose above set forth.

[This improvement in stoves consists in providing a drawer beneath the ash pan, to receive a quantity of fresh coals, so as to dispense with a coal hod and yet have coals at hand to renew the fire.]

59,409.—Leverage.—William W. Wills, Janesville, Wis.:

I clame the adjustable sliding bar, d, and roller e, in combination with the counteracting levers, c' c, when arranged substantially as described, and operated in the manner specified.

50,410.—Machine for Pressing Sheet-metal Pans.—F. M. Woods, York, Ill.:

First, I claim the arrangement of wings, a, in the corners of the punch, in combination with corresponding grooves in the corners of the die, substantially as and for the purpose described.

Second, Making the die, H, in sections, substantially as and for the purpose described.

Third, The adjustable brackets, b, in combination with the die, H, constructed and operating substantially as and for the purpose set forth.

Fourth, The combination of movable frames, J, with the die H, substantially as and for the purpose specified.

[This invention relates to a machine for pressing sheet iron intended to form the four sides of a pan at one time, and also to turn the roove on the edge of the pan to receive the wire. This operation is effected by the use of a punch and die. The punch is made of the proper size to correspond to the pan to be pressed, and it is provided with wings projecting from its corners, in such a manner that by its action all four corners are depressed uniformly, and the sides of the pan are prevented from getting wrinkled. The sides of the die are made in sections, and they are held in position by adjustable brackets in such a manner that by taking a greater or smaller number of sections for the die, said die can be adjusted for pans of different sizes. The depth of the die is adjusted by placing under the die one or more thin frames, whereby said pans can be accommodated to pans of different depth.]

50,411.—Hinge.—Henry Young and Martin Stachelin, Port Chester, N. Y.:

We claim the hollow spindle, D, bar, E, and plugs, F G, in combination with the two wings of a hinge, subtantially as and for the pnrpose set forth.

[This invention relates to a hinge, the two wings of which swing, on a hollow spindle, through which a bar of steel or other suitable material passes, the ends of which are secured in plugs, one of which is fastened to one and the other to the other of the wings of the hinge, in such a manner that the hinge swings freely in either direction, and, at the same time, by the torsional power of the steel rod, said hinge is always brought back to its original position of rest, and, consequently, if a door is hung on a pair of these hinges, it will open in either direction, and be self-closing.]

50,412.—Apparatus for Making Coffee.—Heinrich A. Zopff, Milwaukee, Wis.:

First, I claim the general arrangement of the apparatus for making coffee, herein described, the same consisting of the water receptacle or steam generator, a perforated coffee receptacle a,' provided with or not as may be desired, an outer covering or casing, q, and steam tube, o, connected together, and operating substantially in the manner specified.

Second, The conical-shaped end or nozzle to the steam pipe, o, substantially as and for the purpose specified.

[This invention relates to that class of coffee pots in which steam is employed for decocting the coffee, and consists in a novel construction of the pots, whereby a coffee decoction is obtained possessing the full flavor of the berry.]

50,413.—Valve Gear for Steam Engines.—John S. Barden (assignor to New England But Company), Providence, R. I.:

I claim the combination and arrangement of the cylinder i,' the slider, t, and the guides, m m, with a slide valve, A, and rocker lever, h, the whole being substantially as and to operate as herein before explained.

I also claim the combination of the ball governor with the slide valve of a steam-engine cylinder, by means as described, or the equivalent thereof, whereby such slide valve shall be controlled in its movements by the ball governor in manner as specified.

50,414.—Fruit-drying House.—Jasper Billings (assignor to himself, Thomas D. Mitchell and A. Kuhns), Dayton, Ohio:

First, I claim constructing a fruit-drying house, with a furnace chamber, A, and an upper-drying chamber, D, having an arched roof, G, escape, flanges, d d, and a covering roof, H, substantially as described.

Second, Arranging the furnace, B, and its flues, c1 c2, within the furnace chamber, A, or a drying house, substantially as described.

Third, The elevated open bottom furnace chamber, A, and inclined furnace, B, in combination with the upper drying chamber, D, having outlets, d d, with valves or dampers applied to them substantially as herein described.

Fourth, The manner herein described of constructing the drying chamber with the arched curved roof, G, covering roof, H, and valved passages, all for the purpose set forth.

50,415.—Car Spring.—Horatio A. Black (assignor to himself, Wm. L. Boyer and Henry K. Boyer), Philadelphia, Pa.:

I claim a metallic spring for railroad cars, consisting of the box, A B, piston, C D, plain plates, E E, and the corrugated plates, F F, arranged combined and operating together, substantially as described and set forth,

50,416.—Cutting and Punching Spade Steps.—Samuel Chesnut (assignor to himself and Thomas Jones), Philadelphia, Pa.:

I claim the reciprocating crosshead, E, with its projections, f h and i, in combination with the block, H, and its edges, x and y, the whole being arranged for joint action, substantially as and for the purpose herein set forth.

50,417.—Paddle Wheel.—William Choate (assignor to himself, Wm. Teel, John Whitmore and O. W. Clark), Newburyport, Mass.:

I claim a paddle wheel constructed with three sets of arms, with floats attached to them, so as to have a diagonal curved position, substantially as herein shown and described.

50,418.—Suspended.

50,419.—Process for Treating Hemp, Flax, Etc., for the Manufacture of Paper Pulp.—Mark Anthony Cushing, Glenns Falls, N. Y., assignor to the Glenns Falls Paper Company:

First, I claim the aforesaid method or process of preparing my boiling liquor by the use of the ingredients before named, in the manner before described, substantially and for the purposes therein described.

Second, I claim the use of the above-described boiling liquor in the reduction of flax, hemp, swingling tow and other woody and fibrous substances, in the manner substantially and for the purposes therein described.

Third, I claim the use of the material thus treated, as flax, hemp, tow and other woody and fibrous substances, in the manufacture of fine paper, whether in mixture with straw and other paper stock in any proportions, or unmixed.

Fourth, I claim the use of crude or other petroleum, kerosene, benzine or other oleagenous substances, in the manner substantially and for the purposes above described.

50,420.—Flat Wire Springs.—Henry Kellogg, New Haven, Conn., assignor to himself and Wallace & Sons, Derby, Conn.:

I claim the herein described spring as a new article of manufacture.

50,421.—Apparatus for Dessicating Eggs.—Charles A. Lamont, New York City, assignor to himself and David A. Burr, Washington, D. C.:

First, I claim the within-described mode of dessicating eggs, by the use, in combination with a dipping trough or vat, H, of one or more drying plates, s s, secured upon a central revolving shaft, D, substantially in the manner herein set forth.

Second, The use of one or more scraping blades, c c, in combination with the revolving plates of an egg-dessicating apparatus, substantially as and for the purpose set forth.

Third, Supporting the movable supplying trough, H, of my improved egg-dessicating apparatus upon adjustable ways, r r, so arranged as to operate substantially in the manner and for the purpose herein set forth.

50,422.—Water-heating Apparatus.—John McCloskey (assignor to Henry McGuekin), New York City:

First, I claim the water-heating apparatus above set forth, whereby different floors or apartments of a house or hotel may each have its own system of water-heaters, substantially as above described.

Second, I also claim operating the water spaces of the inner and outer cylinders by means of an air space, substantially as and for the purpose above described.

[This invention consists in an arrangement of water-heating apparatus for ranges and stoves, whereby the water for use in the kitchen and lower stories of a house is heated in, and supplied from, a boiler or heater, independent of that in which water is heated for the higher stories.]

50,423.—Hinge.—J. M. Riley (assignor to himself and W. A. Schmidt), Newark, N. J.:

First, I claim constructing a continuous door hinge, in the manner and for the objects herein described and represented.

Second, I also claim the key, D, of the spring rod, and its pins, h, in combination with the slot, V, of the tube, E, substantially as above described.

Third, I also claim the combination of the semi-circular plate, J, of the but, c3, with the key, D, of the spring rod, substantially as described.

[This invention consists of a spring door hinge, which closes the door by automatic action. It is of a length about equal to the door, and it is so made as to conceal the spring and the parts which actuate it, and are actuated by it, so that they are protected from the weather.]

50,424.—Sorghum Evaporator.—E. W. Skinner (assignor to himself and O. S. Willey), Madison, Wis.:

First, I claim the ledge, c, extending from one side nearly to the other of a pan of the construction specified, so as to form a contracted channel, C, for the introduction of the juice, and an outlet, d, to bring it in sudden contact with the boiling sirup, all as herein explained, and for the purpose stated.

Second, I claim the combination of the transverse cold-air ducts, D D, with the wooden partitions, a a, as and for the purpose specified.

Third, I claim the combination of the hot-air chamber, E, damper, F, cold-air duct, D, and chamber, b'', all arranged as described.

50,425.—Wheel.—Joseph Stoliker (assignor to himself and J. H. McKenzie), Pine Run, Mich.:

I claim a metallic wheel for vehicles and for other purposes, provided with spokes arranged or applied to the rim or tire, so as to pass through a flange of the same, and connected at their inner ends to adjustable nuts or bosses on the hub, arranged in such a manner that the spokes may be strained or brought to a proper state of tension by spreading apart the nuts or braces, substantially as described.

I also claim the crossing of the wires forming the spokes, and the securing of the inner ends of the same to rings, E, on the nuts, D D, in the manner substantially as set forth.

I further claim the combination of the rim or tire, A, spokes, B, hub, C, nuts, D D, rings, E, and plates, F, with the nuts, G G, all arranged substantially as and for the purpose specified.

50,426.—Machine for Folding Paper Collars.—Emil Vossnack (assignor to himself and G. A. Goldsmith & Co.), New York City:

First, I claim the employment in a folding machine of the knife, B, and hard bed, A, with the shallow and rounded groove, a, so combined at to form the fold in the material, C, and condense the material on the exterior of the fold against the hard bed, substantially in the manner and for the purpose herein set forth.

Second, The combination of the freely falling knife, B, with the elevating and holding cams, e e, and with a grooved bed, A a, or its equivalent, adapted to compress and round the bend or fold in a paper collar or analogous weak material, all operating together substantially in the manner and for the purpose herein set forth.

50,427.—Pedestal for Railroad Cars.—I. P. Wendell and Stephen Ustick (assignors to I. P. Wendell), Philadelphia, Pa.:

First, We claim the extension plates, B and B, constructed and arranged in relation to the arms, a a, of the pedestal, and the journal box between the same, for the purpose of taking up the wear occasioned by the sliding of the said box, substantially in the manner hereinbefore described.

Second, Combining the adjusting conically pointed screws, C C, with the arms, a, of the pedestal, and the extension plates, B and B', in conjunction with the screw, D, they being arranged and operating substantially in the manner and for the purpose set forth.

Third, The combination of the cushion straps, E, with the arms, a, of the pedestal, and the extension plate, B and B', substantially as described and for the purpose specified.

50,428.—Self-feeding Plugging Tool for Dentists.—Maximilian Burchardt, Berlin, Prussia:

I claim a self-feeding plugging tool for dentists, made substantially as herein shown and described.

Also, the cavity, a, extending throughout the entire length of the tool, and operating in combination with the tongue, l, and with the plugging material, substantially as and for the purpose set forth.

50,429.—Gas Burner.—V. Dubourg, Paris, residing in the city of Frankfort-on-the-Main, Germany:

First, I claim the combination of the tube or chimney, a, of clay or analogous non-conducting material, and the upwardly projecting metal rim, f, arranged and operating as described.

Second, While disclaiming the general idea of applying a grate to a gas burner to equalize the pressure, I claim the particular combination of the perforated and reticulated diaphragms, constructed and operating as specified.

50,430.—Perpetual Almanac.—William Gibson, Lanark, Scotland, assignor to Henry Baxter and John A. Fitch, Highgate, Vt.:

I claim the combination and arrangement of the perforated and unperforated disks, the ring and the slider, the whole being applied to a supporting standard or frame, and being made and marked substantially as described.

And in combination with the disks, the ring-supporting frame and slider, I claim the detachable piece, H, carrying the said box and the slider, the whole being substantially as and for the purpose specified.

50,431.—Gas Burner.—Ferdinand Kup, Frankfort-on-the-Main, Germany:

I claim an adjustable jacket or casing applied to a gas burner, substantially as and for the purpose set forth.

[The object of this invention is to arrange a gas burner so that it allows of regulating at will the supply of atmospheric air required for imparting to the flame the greatest possible illuminating power.]

50,432.—Breech-loading Fire-arm.—Westley Richards, Birmingham, England. Patented in England Sept. 11, 1862:

First, I claim the self-acting spring catch mounted on the tang of the breech-plate or on the top of the stock, and taking into a notch in a projection from the upper part of the barrels, or into a notch in the upper part of the barrels themselves, in substantially as described and independently of the position of the thump-piece or ever which actuates the said catch.

Second, The thump-piece, mounted on the tang of the breech plate or on the top of the stock, and actuating a spring catch, substantially as described, and independent of the position of the said catch, whether it be over or under the barrel.

Third, The self-acting spring catch, in combination with the thumb-piece, both mounted on the tang of the breech-plate, substantially as described.

Fourth, The inclined projection from the upper part of the barrels, entering a corresponding inclined recess in the breech-plate, so as to hold the two firing together, substantially as described.

Fifth, The making the axes on which the barrels turn in one solid piece with the body, substantially as described.

50,433.—Rifling Fire-arm.—A. Trauth, Chemnitz, Saxony:

I claim the production of rifle grooves with a trapezoidal cross section, and extending through the chamber of the barrel in a parallel direction, thence diminishing in depth and width to about the middle of the length of the barrel, more or less, and finally passing on with uniform depth and width to the muzzle, substantially as and for the purpose described.

50,434.—Ventilating Apparatus for Steam Vessels, Etc.—John G. Woodward, St. John, N. B.:

First, I claim a ventilating casing around or contiguous to the smoke-pipe funnel, substantially as set forth, so that the ventilating current of air may be induced by the heat of the smoke-pipe, as set forth.

Second, I claim extending the ventilating casing above the top of the smoke-pipe or funnel to increase the radidity of the escape of the products of combustion from said smoke-pipe, as set forth.

Third, I claim a partition or hood extending down in front of the furnace, at a short distance from the same, in combination with the ventilating casing around the smoke-pipe, as specified.

Fourth, I claim inclosing the boiler in a casing made of sheet metal a short distance from said boiler, leaving an air space, as set forth, said casing being removable in sections, as specified.

50,435.—Apparatus for Receiving and Distributing Mails on Railroad Cars.—Augustus Jordan, Washington, D. C.:

I claim, First, The shutter, B, opening and closing upon a horizontal axis, parallel with the direction of the car's movement, substantially as described.

Second, In combination with the shutter, B, the shelf, H, and partition, I, substantially as and for the purpose set forth.

Third, In combination with the shutter, B, the pinion, C, and rack, D, substantially as described.

Fourth, In combination with the partition, I, the set nut J, substantially as described and for the purpose set forth.

Fifth, Giving an automatic movement to the part or parts by which mails or packages are received into or delivered from railroad cars when in motion, by the stationary cam or camber rail, G, placed beside the railroad track rail, as described, in combination with the rod, E, and roller, F.

REISSUES.

2,083.—Corn Sheller.—Thomas D. Burrall, Geneva, N. Y. Patented Dec. 6, 1845. Extended:

I claim, First, The opening, d, in combination with the plate or disk, c, and the sheller, substantially as and for the purpose described.

Second, The open space between the lower edge of the sheller and the plate or disk, c, in combination with said plate or disk, and the sheller, substantially as and for the purpose described.

2,084.—Forming and Punching Articles of Irregular Form.—Levi Dodge, Waterford, N. Y. Patented March 12, 1851.

I claim as my improvement in the manufacture of axes and other articles of iron, punching the same when the part to be punched is inclosed in conforming dies made to open and close in the manner herein set forth.

Second, I claim the combination of a punch with swinging matrices constructed and arranged relatively to each other substantially as herein shown and described.

Third, In combination with a punch and movable dies for punching and shaping articles of iron by their simultaneous action or pressure on the sides of said articles as described, I claim the employment of cams, or the equivalents thereof, to actuate automatically, the dies to open and close, substantially in the manner and for the purpose set forth.

2,085.—Tobacco Pipe.—Abijah Fessenden, Boston, Mass. Patented Nov. 29, 1864:

I claim dividing the bowl of the tobacco pipe into three or more chambers, substantially as and for the purposes described,

2,086.—Obtaining Fibers from Waste Felted Fabrics.—American Water-proof Cloth Company, assignee by mesne assignments of J. F. Greene. Patented April 12, 1859:

I claim subjecting the felts to be disintegrated to the successive and combined action of steam and picking, substantially as described, the steam having the effect either to unfelt or so loosen the hold which the fibers have on each other in felted fabrics that they can be drawn apart of sufficient length to be advantageously employed in the manufacture of felts or other fabrics.

Second, Also subjecting the felts which are to be disintegrated to the action of steam, for the purpose of loosening the fibers preparatory to the action of the machinery, as hereinbefore described.

Third, Also the application of salsoda or other equivalent chemical agent, in solution with heat, for the purpose of extracting the glue, mastic cement, or gums from the felts, in the manner hereinbefore described.

2,087.—Stone-cutting Machine.—George J. Wardwell, Rutland, Vt., assignor to the Steam Stone-cutter Company, New York City. Patented Nov. 10, 1865:

First, I claim a stone-cutting channeling machine, which is constructed to move upon a track and provided with reciprocating cutters, which are supported in standards arranged on the outside of the frame and outside of the said track, substantially as described.

Second, The combination of two or more cutters, in gangs connected together by means of head and foot clamps, which are adapted to slide freely between standard guides, R R, that are supported on one side of the frame of the machine, substantially as described.

Third, Providing for reversing the removable cutters, S, by hinging the outside standard, R, so that it can be opened or closed at pleasure, substantially as described.

Fourth, The combination of the vibrating beam, M, and reciprocating cutters, S, connected in such manner that the said beam operates upon the cutters in its ascending stroke, as well as in its descending stroke, substantially as described.

Fifth, The combination of a spring, w, vibrating beam, M, and reciprocating cutters, S, substantially as described.

Sixth, The serrated cutter stems, in combination with the serrated head clamp, T, substantially in the manner described.

Seventh, The application of packing blocks, c', to the head and foot clasps, T U, substantially as described.

Eighth, The standards, R, arranged on the outside of a portable frame, A, substantially as and for the purposes specified.

2,088.—Stone-cutting Machine.—George J. Wardwell, Rutland, Vt., assignor to the Steam Stone-cutter Company of New York. Patented Nov. 10, 1863:

First, I claim giving a forward or backward movement to the stone-cutting machine at pleasure, and simultaneously with the upward stroke of the reciprocating cutters, S, and confining said machine positively in position upon its track during the descending stroke of the said cutters, substantially in the manner described.

Second, The double-acting feed arm, g', connecting rod, u', vibrating lever, r', combined and operating substantially in the manner described.

Third, Accelerating the descent of the cutters, S, by means of a spring, W, applied to the beam, M, substantially as described.

Fourth, Connecting the cutters, S, to the beam, M, or its equivalent, by means of straps, g f, substantially in the manner described.

Fifth, The clamps, T U, constructed and applied to the cutters, S, substantially as described, and adapted to receive the guides on the standards, R, substantially as set forth.

Sixth, Securing the cutters together rigidly by means of clamps or clasps, which receive teeth or projections formed on said cutters, substantially as described.

DESIGNS.

2,177, 2,178.—Hat.—D. K. Albright, Philadelphia, Pa., and L. H. DeLange, Bordentown, N. J. (Two cases.)

2,179.—Trade Mark.—John Ames, Lansingburgh, N. Y.

2,180.—Frame of a Sewing Machine.—Joseph W. Bartlett, New York City.

2,181.—Trade Mark.—James P. Baxter, Portland, Me.

2,182.—Sun Dial.—N. Carroll, Philadelphia, Pa.

2,183.—Stock of a Cistern or Well Pump.—Leonard Egleston (assignor to Rumsey & Co.), Seneca Falls, N. Y.

2,184.—Copying Press.—Robert Hoe, Jr., New York City.

2,185, 2,186.—Cook Stove.—Henry S. Hubbell and Alfred S. Hubbell, Buffalo, N. Y. (Two cases.)

2,187, 2,188.—Parlor Stove.—Henry S. Hubbell and Alfred S. Hubbell, Buffalo, N. Y.

2,189.—Movement Frame of a Clock.—Laporte Hubbell, Bristol, Conn.

2,190.—Clock Front.—G. S. Lovell, Philadelphia, Pa.

2,191.—Trade Mark.—Augustus C. Mueller, St. Louis, Mo., assignor to Heller & Teibrock, Mascoutah, Ill.

2,192.—Carpet Pattern.—Francis J. Peirce (assignor to the Roxbury Carpet Company, Roxbury, Mass.

2,193.—Floor Oil-cloth.—Albert E. Powers, Lansingburgh, N. Y.

2,194.—Bust of Gen. Grant.—Louis Rebisso, Buffalo, N. Y.

2,195.—Group of Statuary.—John Rogers, New York City.

2,196.—Plates of a Cook Stove.—Isaac A. Sheppard, Philadelphia, Pa.

2,197.—Reed Organ Case.—J. L. Treat (assignor to Treat, Lindsley & Co.), New Haven, Conn.

2,198.—Cook Stove.—Nicholas S. Vedder, Troy, N. Y., assignor to Tibbals, Shirk & Whitehead, Chicago, Ill.

2,199.—Trade Mark.—A. H. Wirz, Philadelphia, Pa.

2,200.—Coach Lamp.—Chas. B. Wood, New York City.

shortest time by sending a sketch and description of the invention, the Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

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W. G., of Mass.—There are several patents for station indicators operating as you state.

E. T. H., of Pa.—We have written you two letters, addressed to the Philadelphia Post-office. You omitted to give us the street and number.

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C. E. K., of Conn.—All clocks run while being wound up, so far as we know. We wind one every night, but never noticed that it stopped during the operation. There would, therefore, not be much use in applying the spring as you propose.

C. A. B., of Pa.—By referring to the numbers of the SCIENTIFIC AMERICAN within the past six months you will find that the subjects of steam plowing and cotton cultivation have been discussed.

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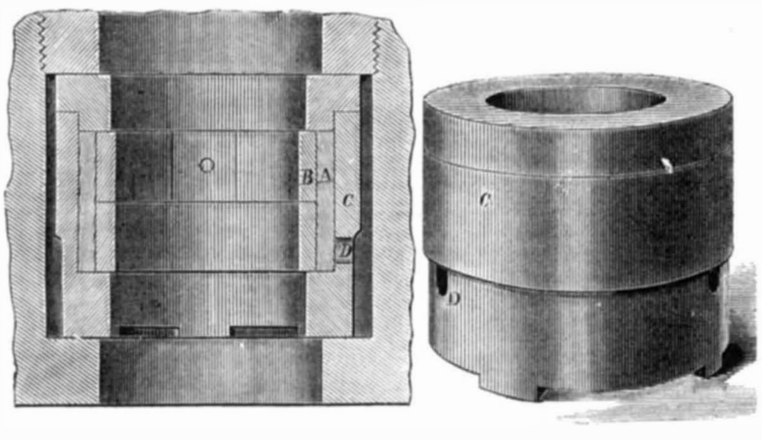
Improved Piston-rod Packing.

It is very annoying to an engineer to have the piston and valve rods leaking steam, and where the pressure is high and the motion rapid, as on the locomotive, it causes a great deal of trouble to keep the details adverted to in good working order. There is also a continual waste of steam occurring where stuffing boxes leak, which entails a needless expense. On low-pressure engines the leakage of the piston rod vitiates the vacuum, and is therefore to be guarded against. All these things are well known to engineers, and any thing which promises to obviate the trouble will be welcomed by them as well as by the proprietors.



CONWELL'S PISTON-ROD PACKING.

In the engraving we have shown a new kind of self-acting packing, which is claimed to be the thing long sought. It is, in construction, two sets of rings—the outer one, A, of brass, and the two inner ones, B, of Babbitt metal; these rings break joint with each other as usual. They are fitted to the rod they are intended to work on, and have pins set in them so that they cannot change position.

These rings are contained in a shell, C (see perspective view), which is pierced with holes, D. The whole affair fits in any common stuffing box. The bottom of the shell, C, has recesses which allow the steam to blow through to the stuffing box. When this occurs it also enters the holes, D, and presses the outside ring together, thus causing it to clasp the Babbitt metal packing closely about the rings, and maintain a tight but easily-worked joint.

This invention was patented through the Scientific American Patent Agency on Sept. 5, 1865, by W. C. Conwell, of Scranton, Pa.; for further information address him at that place.

Can Poison Occur and Poison Disappear?

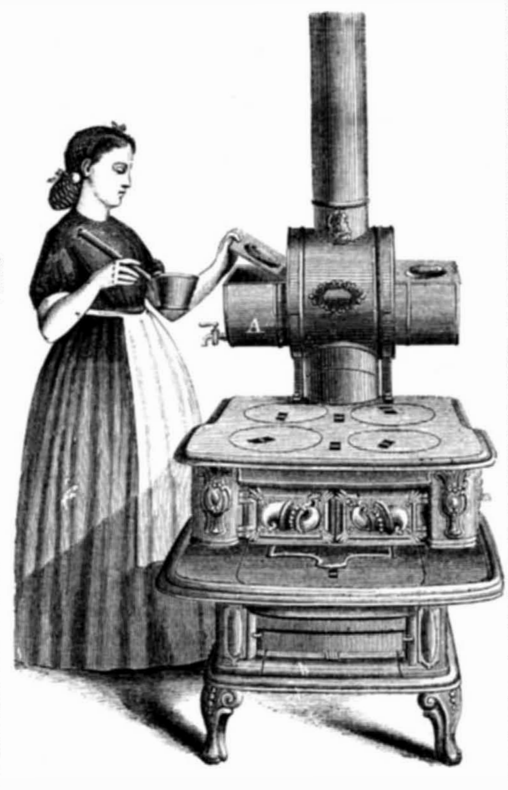
M. Tardieu is of opinion that a poison, almost in its totality, may be vomited and expelled the organism; but it is very rare, and nearly impossible, if the patient live, for a certain portion of the poison not to be absorbed and excreted so as to be detected by analysis in the excretions; it is also rare, if the patient die, for no portion of the poison to be detected in the various organs into which it would be carried by the circulation. The true question consists in asking: do traces of poison remain in the living body for a determinate period, or does the poison remain indefinitely in the dead body? On this last point the author states that mineral substances resist indefinitely, but they do not escape transformation; some are fixed in such stable combination that chemistry will always detect their presence. Others, on the contrary, by being rendered soluble, are exposed to the possibility of being carried away from the debris of the body in the process of decomposition. Ammonia, which is produced in putrefaction, is the basis of these combinations; but the slowness with which the combinations form, and the still longer time they require for their complete dissolution, under the ordinary conditions of burial, leave room to say that even after several years, and so long as any part of the body remains, chemistry can find the traces of mineral poisons in exhumed remains. Organic substances, or at least the greater part of those used as poisonous agents, notably the vegetable alkaloids, resist with remarkable fixity and for a very long period. At the same time science cannot say that the organic series are as fixed as the inorganic.—*Brit. and For. Med. Chir. Review.*

A NEW toy has been lately invented in France which bids fair to supplant the roseate balloons so eagerly acquired by children. It consists of a serpent composed of quicksilver, sulphur, etc., which, lighted by means of a common lucifer match and projected into the air, performs a series of marvelous evolutions. But against the glittering fascinations of this tempting toy, the children of France are warned by an article in the *Courrier de la Moselle*, in which they are informed that while this flaming serpent whirls and meanders in the air it emits mercurial vapor of the most pernicious nature.

BAUMEISTER'S WATER HEATER.

Housekeepers know full well the convenience of having an ample supply of hot water at all times. They know also that the range or stove is sometimes needed for other purposes—such as cooking or ironing—and that there is no room to spare for heating water. In such emergencies the heater here shown will form a valuable auxiliary. By it hot water can be had at all times when there is any fire in the stove.

The arrangement consists in applying a vessel, A, to the stovepipe in such a way that the smoke and hot gases pass around it, thereby heating the water rapidly and without any waste of fuel; for the heat that is here utilized would otherwise escape without any benefit being derived from it. The stove is therefore available for any purpose whatever, as may



readily be seen. A faucet is provided at the lower side to draw off water in pails or other things too heavy to lift high.

This improvement can be applied to stoves now in use by sending dimensions to the inventor, John Baumeister, No. 278 Gratiot street, Detroit, Mich., by whom it was patented through the Scientific American Patent Agency on June 20, 1865.

IN the engraving of Bett's branch-beam hilling plow, illustrated on page 246 of the current volume of the SCIENTIFIC AMERICAN, a round should have been shown between the two handles; the plows are not made without this round, and the omission of it was an oversight.

FROM THE STEAM PRESS OF JOHN A GRAY AND GREEN.