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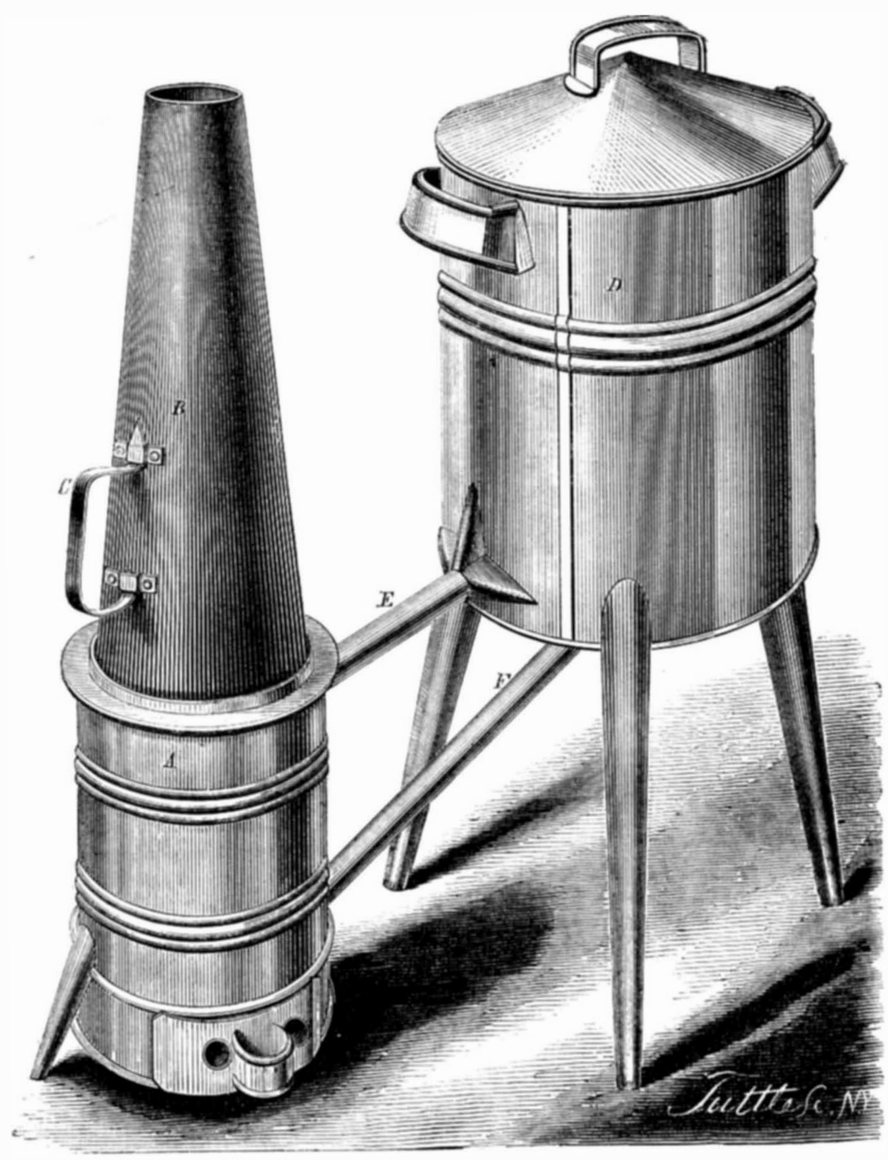
Portable Distilling and Steaming Apparatus.

This is a cheap, handy, and portable apparatus for household purposes, capable of being modified to meet all the ordinary exigencies of domestic cookery, except baking. For steaming vegetables, etc., it seems to be specially adapted and also for any process of inspissation as the preparation of sirups, jams, preserves, etc., or the extraction of the volatile essences from vegetable or animal substances. It would seem, also, as though it could be easily adapted for purposes of distillation, a fact that might be taken advantage of to the detriment of the Internal Revenue Department.

The chamber, A, is double, having an inner receptacle—a furnace—for charcoal, resting on a grate at the bottom, and surrounded by an annular water chamber. At the top of this chamber is a funnel, B, which is removable by means of the handle, C, and can be continued to a chimney, if desirable, to conduct away the smoke. The boiler, D, is partially filled with water, or any other fluid desired, to a point above the opening of the pipe, E, which, of course, fills the annular space surrounding the furnace in the chamber, A. A second pipe, F, leads from the center of the bottom of the boiler, D, back to the annular space surrounding the furnace, returning the cooler water back to the bottom of the furnace, thus keeping up a continuous circulation. If the apparatus is to be used as a still, a pipe can be affixed to the upper portion of the boiler and conducted through a cooling medium to a reservoir for the reception of the products of combustion. It can be used for steaming food for stock or for the family, boiling water for tea or coffee, and, by an addition to the furnace, for heating sad irons, etc.

Patented May 7, 1867. For state and county rights address C. Daubert Louisville, Ky.



DAUBERT'S PORTABLE STILL AND WATER-HEATER.

A Veteran Soldier's Elixir.

We were requested to step down stairs to the street door, the other day, to confer with an old man who sent word he was too infirm to come up into our office. We found our visitor to be a tall keen-eyed healthy-looking man, robust and soldierly in appearance, by name A. Rullman, residence 643 Fourth avenue, New York city, by birth a Frenchman. He stated that he was 84 years of age and had served fifteen years in the French army under the first Napoleon, having been in the celebrated campaigns of Spain, Italy, and Russia. His health, he said, was capital; but his legs gave him some trouble. His hand writing is excellent. This old veteran has applied for a patent for a medical compound discovered by him many years ago, which he states is a specific for all troubles of the stomach. He expects that his elixir will keep him alive for a generation more, at least; and, to judge from his looks, he is not far out of the way in his calculations.

SETTING BOILERS---HOW TO SET A HORIZONTAL STATIONARY BOILER.

The subject of boiler setting has not received the attention it deserves from engineers and mechanics, the method in which the work is performed and sometimes its plan, being left mostly, if not entirely, to the bricklayers. We give herewith an illustration and a description, by Mr. F. W. Bacon, 84 John street, New York city—an engineer of large experience—which will be found valuable by many of our readers and will answer repeated requests for such information, although some engineers may differ from him in some of the proportions and details.

The objects to be attained in properly setting a boiler are, economy of fuel, durability of the furnace and boiler, and an immunity from burning, bursting, or exploding the boiler. The cardinal points are:

1st, A good and sufficient chimney located out of the influence of counter currents caused by higher buildings or hills in the immediate vicinity; 2d, The boiler, if flue or tubular, to have sufficient vent as compared with the grate surface; 3d, The boiler so set that there shall be sufficient vent over the bridgewalls to admit of a free draft; 4th, That the furnace shall be so arranged as to burn the gases and arrest the sparks and dust before they enter the flues or tubes. The chimney for the boiler we shall adopt for our illustration, should have 16 feet of grate surface, should be 18 inches square inside, or if round not less than 20 inches diameter, smooth inside, and should be plastered. Its hight not less than 40 feet. If more than 60 feet high it should be larger. It should be carried above the surrounding buildings, at any rate.

If there should be a duct from the boiler to the chimney it should be larger than the chimney. Should there be angles in the duct they should be made circular and larger than the straight line. The vent of the boiler, supposing it to be tubular, should have tubes 3 inches diameter by 10 feet long: they should not be less in diameter nor longer to insure a good draft. These tubes should collectively have an area of 320 square inches, which will give 20 square inches to each square foot of grate. The vent or aperture between the bridgewalls, A. B. C. and boiler should be for the first, 400 square inches, the second, 350 square inches; the third, 320 square inches.

The faces of the bridgewalls should be made on an angle as represented in the engraving for the purpose of distributing the concentrated heat over a larger surface of the boiler, also that the heat radiated from them shall go to the boiler instead of being thrown forward against the furnace front and doors. The spaces, D, serve to give room for the products of combustion to expand, thereby moving slower, giving an opportunity for the particles of unconsumed fuel to fall and not pass into the tubes or flues, also when they strike the bridgewall to be rotated and mixed, the hotter with the cooler. E are doors to clear the deposits collected in D.

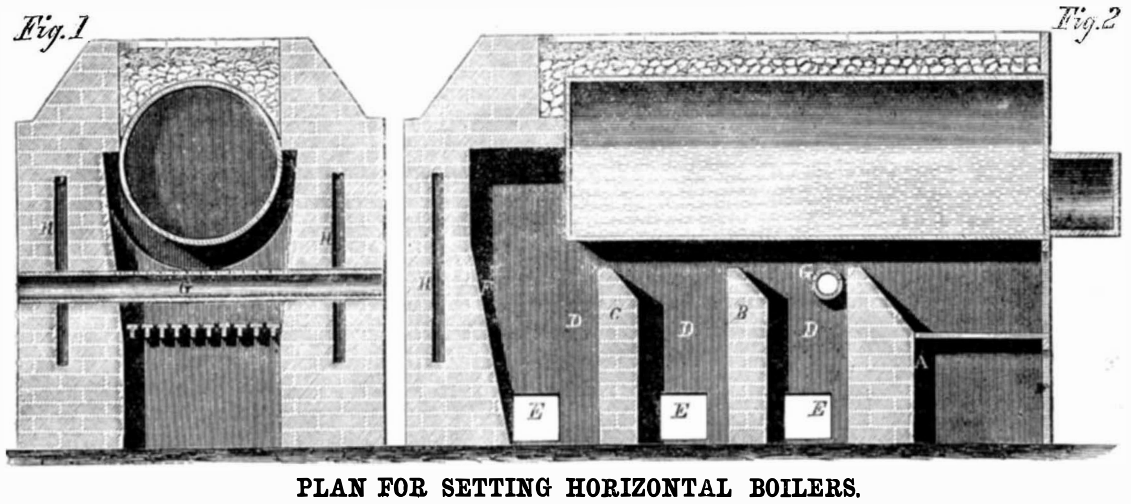
The rear wall, F, should also have an inclined face for the same purpose, and to facilitate the change of the current. This space should be large, not short of 18 inches, better, where there there is room for it, 24 inches, to give ample room for turning the direction of the current and that the heat may not be so concentrated as to injure the angle of the boiler. The furnace we have said should have about 16 square feet of grate, say its width is 3 feet 6 inches by 4 feet 6 inches long. The object of making it narrower than the diameter of the boiler is to make its sides inclined. Every practised engineer knows that when the walls of his furnace are vertical the action of the intense heat induces the fire bricks to fall in long before they are worn out. Now it will be seen that by giving an outward inclination to these walls they cannot fall in and will stay in their places until worn out. This, though an important consideration, is not the greatest advantage gained by it. It is a well known law that heat is radiated at right angles to the radiating surface—hence if the walls of the furnace are perpendicular the heat is thrown on the opposite wall, "each increasing each," until they are destroyed. Incline the walls and the radiated heat strikes the boiler and is utilized. In laying up these walls the bricks should not be "battered back" but laid on the proper inclination to give a plane surface.

To burn the gases is an important consideration, and can be accomplished with but little expense and great economy. All smoke issuing from a furnace is fuel wasted; it can be consumed, thereby relieving the neighborhood of a nuisance and saving fuel. This can be accomplished by properly admitting air at the bridgewall where the products of combustion are yet at a sufficient temperature to ignite. The mode we have practiced is, to put a cast-iron pipe G, of 6 inches diameter across directly behind the first bridgewall perforated with holes 3-16 of an inch in diameter whose united area shall be equal to $1\frac{1}{2}$ square inches to each square foot of grate surface. This pipe to be open at each end to the air. The object of the small holes is the same as that of the argand burner to insure an intimate mixture of atmospheric air with the gases, that they may be consumed. In case that the boiler should be of the class known as the fire box kind, the pipe cannot be inserted without difficulty. In this case the air can be admitted through apertures in the furnace door into a box fastened to the door perforated as above.

It will be found that the above fixture will be of great advantage particularly where bituminous coal, wood, or shavings and saw dust are burned. Air spaces should be left, as at H, in the side and rear walls the entire length, and sealed tight.

It will be noticed that the side and rear walls are carried above the top of the boiler. This is to hold ashes or some other non-conducting material to protect the otherwise exposed surface from condensation. It is known that owing to the difference in expansion between the boiler and brick-work large spaces will soon show themselves, thereby letting in air where it is not wanted, cooling the products of combustion and reducing the draft.

Fig. 1 Fig. 2



PLAN FOR SETTING HORIZONTAL BOILERS.

Now if we deposit a few pebbles along the line where the cracks will show themselves, and then fill in above with ashes, we will have, under any circumstances, tight joints.

The use of the pebbles is to prevent the ashes from going through the cracks. It will be seen that we have taken as an example the cylinder tubular boiler ; the same rules apply to the two or more flue or cylinder boilers.

In case the duct from the boiler to the chimney is carried under the ground, great care should be used to have it so arranged as to be easy of access for clearing, the upright part and in the angles large, and that the duct be either square or round, not a parallelogram, in order that as little surface as possible may be presented to the passing current.

These under ground ducts have sometimes given trouble in certain localities, in sugar houses, distilleries, breweries, and other places where fermentation is going on, liberating large quantities of carbonic acid gas, which being heavier than air fill the lower spaces and render it impossible for the products of combustion to pass to the chimney until the gas is removed. We have done this by exploding a few ounces of gunpowder by means of a slow match in the duct, taking care to have the breeching closed so that the gas be blown up chimney.

The above difficulty only occurs when the boiler is newly set, or has been standing cold for some time.

EDITORIAL CORRESPONDENCE.

Who is Prussia?—The Question Answered but not Settled—The German Spirit and its Characteristics—The King—His Habits—Bismarck, the Iron Man—The Habits of the People.

Berlin, July 23, 1867.

In the show window of one of the numerous shops in the beautiful street called "Unter den Linden," is a characteristic double picture. One represents a solitary mounted figure clothed in the splendid uniform of an Austrian Huszar. Underneath are the words, "Who is Prussia?" The other represents two mounted cavaliers—one an Austrian, the other a Prussian. The latter answers laconically "Here is Prussia," having, in the mean time, drawn his sword and knocked off the Austrian's cap in the coolest manner possible.

Such, at this moment, is the situation of the two nations which the group represents. Austria seeking to control the destinies of the German Confederation, finds in Prussia a power to dispute her claims, and in the seven weeks' war of 1866, the former inquires "Where is Prussia?" One year ago, on the sanguinary fields of Konniggratz and Sadowa, the question was answered, "Here is Prussia."

Germany has always puzzled me a good deal—and when the question has been asked, "Where is Germany?" the answer has been: Austria, Bohemia, Bavaria, Westphalia, Wurtemburg, Saxony, Prussia, Hanover, Hesse Cassel, Saxa-Coburg, Saxa Weimar, besides a score of other petty Duke-doms—a sort of mosaic work of little states—so that a traveler is fairly bewildered by their number. At one time the provinces of Renish Prussia could not be reached from Berlin, in a direct route, without passing through territories governed by other rulers. The success of Prussia in war has altered this state of things, and now she has a free pass to go in a straight line. The King of Hanover has voluntarily exiled himself rather than to yield his regal rights, but his Queen refuses to go, and is compelled to submit to the authority of of the King of Prussia, who, it is said, appoints her household servants. The Duke of Nassau, for the same reason, takes up his abode in the mountains of Switzerland, and reminds his people that for six years his father was wrongfully deprived of his ducal rights, and if need be, he can stay away as long. It must not be supposed that the success of Prussia in war has made a homogeneous people. On the contrary, while the population on the lower Rhine shout lustily, "God save the King and Bismark," up the Rhine, and much nearer to this capitol, there is a sulien bitterness of feeling which often vents itself in language of unmistakable disapprobation, and the presence of the most loya troops are required to secure obedience.

Military surveillance, however, is not so rigidly exercised over the people in Prussia as it is in France. The Germans are a brave and well educated people, and it would not be safe to undertake to reduce them to a position of military vassalage such as exists in Russia, Austria, and, to a great extent, in France, where the masses are unlearned, and by long habit have bowed the neck to the most grevious burdens.

It is said that every soldier in the Prussia army is able to read and write. By law all the children, male and female, between the ages of six and fourteen, are compelled to attend school. They are taught reading, writing, and the elementary studies generally, to which is also added singing and religious instruction. It is not at all strange, therefore, that in time of war an army so composed should be strong and reliable—a band of Spartans who fight for "God and Fatherland." The whole population is trained for war, but not for the army, so that when the war-cry is sounded the people drop their implements of peace and seize the musket, to the use of which they are thoroughly well skilled. Two years ago King William and Bismark were very unpopular, but the events of 1866 have rendered them both objects of mingled pride and popularity. Had they failed, a fearful retribution would have covered them with oblivion and contempt.

King William is in one sense an accidental Sovereign, for although of the royal family, he succeeded to the throne in 1861 upon the death of his brother, who left no heirs. The shop windows of Berlin testify to the general admiration in which the King is now held by the people The photographic art seems to have exhausted itself in presenting him in almost every posture that befits his position, and the chisel is now being employed to mold the kingly features into comely form, though it must be confessed that His Majesty is by no means a poor subject. He has a somewhat commanding figure, a bright blue eye, with a smiling open countenance, which reveals a great deal of the *bon homme*, while his habits are very simple and correct. At his summer residence of Babelsberg, in Potsdam, either himself or some one else has shown a great deal of excellent taste and good judgment. It is not exactly a palace ; on the contrary, it has the outward air and style of a fine place upon our own romantic Hudson. The gardens are very beautiful and well kept, and but for a knowledge of the fact beforehand, nothing inside would indicate to the visitor that it might not be the residence of some private gentleman who had plenty of money to purchase fine pictures and other rare and beautiful objects of art and *vertu* The bed-chamber of the King is a curiosity, for instead of finding richly carved furniture, garnished over with tinselry, the visitor sees a small plain cottage bedstead made of maple wood, and provided with a blue cotton chintz curtain and a leather pillow, while upon the walls of the room there are no ornaments other than some neatly framed steel engravings, chiefly of battle scenes. The sitting room adjoining is also quite simple, and with the exception of many beautiful small articles, it is less elaborate, and much more sensibly furnished than would satisfy some of our would-be nabobs who ape the manners and customs of aristocratic wealth. The King was at one time excessively fond of the chase, and the halls of Babelsberg, in the number of mounted stag and deers' heads, abundantly testify to the skill of the royal hand.

Bismark is the power behind the throne—"an iron man"—who destitute of that magnetic influence which draws the multitude—insensible to fear, and courting not the eclat of popular applause—furnishes the State with cold, calculating brains. Gen. Moltke, a name but little known in our country, is regarded by the Prussians as entitled, more than any one else, to the credit of the military plans of the campaign of last year. The Royal family, in the persons of the Crown Prince and Prince Frederick Charles, distinguished themselves as commanding generals. They both exhibited the characteristics of Frederick the Great, who could play the flute, write poetry, and fight a battle.

To speculate upon the future of this nation is useless ; but certain it is, that the people so suddenly expanded are by no means free from apprehension that in some way a new war is appreaching : but I trust that human sacrifice to elevate and maintain Kings and Emperors, who seem to be a great set of commercial and political robbers, may finally come to an end in the universal peace and brotherhood of nations. I cannot, however, dismiss this subject without expressing a word of commiseration in behalf of the present King of Saxony. He was just stupid enough to sympathise with Austria. The result has been, that though occupying his royal palace at Dresden, he has really none of the attributes of a King. His army is commanded by the King of Prussia, and he has not even the poor privilege of controlling his own telegraphs, post-offices, and railways, and even his custom house appears to have disappeared, as no examination of baggage took place on the Saxon frontier. The Saxons say he is still king ; but ask them how, and with a shrug and a grunt they answer, "we don't know."

The soil of Prussia is generally poor, but by patient industry and careful tillage it has been made to yield an abundance of grain, grass, and fruits, besides horses, cattle, swine, and geese, which seem to abound in the more northern sections, Her natural productions of iron, lead, copper, silver, salt, coal, marble, and granite are very abundant, while the mountains and forests afford a generous supply of wood and timber. The Germans are a steady, industrious, and externally moral people. A very rigid pietist would exclaim that they are an irreligious people. To some minds of peculiar caste this might easily be made to appear, but a somewhat careful observation satisfies me that such a charge would be in a great degree unfounded. Throughout the large cities and towns there is much less external vice than appears either in our own Country or in Great Britain. They all love their wine and beer, but gin, rum, and whiskey are not used, therefore drunkenness in the public streets is rarely ever seen. In the city of Leipsic, which contains 85,000 inhabitants, there were only thirty arrests made for drunkenness in three months. Can the same be said of any city in the United States of one half the size of Leipsic? The Germans go to church on Sunday. Their churches are generally well filled, and as for their congregational singing, it cannot be beaten. At nearly all their churches, both Protestant and Catholic, the choirs are made up of the whole body of worshippers who pour out their music in most rapturous strains. It is impossible that this land of philosophy, science, literature, and song—which gave birth, also, to the great Reformation, should be essentially immoral or irreligious. The Germans, it is said, resort to the beer garden on Sunday. That is true ; but no one can fail to notice that the most perfect decorum is always observed, and without the presence of the police. I think, however, that the universal habit of swilling beer by all classes, old and young, which obtains throughout all Germany, is a bad practice, and tends very materially to destroy those finer physical developments which are more common among the rural population of our country. The people, however, are amused in very simple ways, and seem to be happy. They are provided with parks, museums, open air or suburban gardens for beer drinking, concerts, and plays, all of which suit their gregarious habits. Therefore, as regards the habits and moral character of the people, I do not see that in the aggregate we have any superiority to boast of.

Berlin is a fine city. The public buildings and palaces are numerous and usually very fine specimens of architecture, and by no means wanting in taste in the interior adornments. The museums and picture galleries are rich in ancient and modern curiosities, sculptures, and paintings. I was particularly pleased with the very superb collection of Egyptian antiquities, which is said to be one of the most curious in Europe. Such museums constitute great educational establishments which instruct the whole people. The streets and public places of Berlin abound also in fine memorials to the great men of the nation, but owing to the flatness of the ground in and around the city, for miles in every direction, much of the fine architectural effect is lost. The weather has been miserable. I have never before experienced such cold weather in mid-summer. On the 20th of July, wrapped in an overcoat and dressed in winter clothing, I was stirring about the streets of Berlin in search of health and curiosities.

S. H. W.

Special Correspondence of the Scientific American.

MARINE ENGINES AT THE EXPOSITION.

Paris, July 23, 1867.

The number of large marine engines in the Exhibition is not great, there being not much over half a dozen, and of these but one is in motion under steam. There is, however, a tolerably large collection of models, many of them executed at great expense and showing perfectly well the design and construction of other forms of engines. In the French annex, the engines for the *Friedland* have been erected, with the line shaft and screw propeller in place, and are to be supplied with steam from two of the eight boilers which the engine will require when in actual service. In another building, devoted entirely to the objects from the works of Messrs. Schneider & Co., Creusot, are two marine engines, one a three cylinder back-acting, and the other having but two cylinders of smaller diameter. In the Swiss annex is a paddle engine with two inclined cylinders, and lastly, in the English building, is an engine built by Messrs. John Penn & Son, and of their usual type of trunk engine. Beginning with the last mentioned, there is nothing strikingly new in design to notice, but it is remarkable for the beauty of the workmanship throughout, from the smoothness of the castings to the finish of the rods and bearings. The main pillow blocks are formed in well ribbed castings projecting from the face of the cylinder, and on the other side of the shaft are placed the condensers and air pumps, connected with the cylinders and framing only by the sole plate. The air pumps are placed quite low down, so that this connection comes very near the line in which the strain of the pumps will act, and is ample for sustaining this. The pumps are worked by rods, directly from the pistons of the engines. The exhaust passes from the cylinders through copper pipes over the shaft. The momentum of the reciprocating parts is counterbalanced by weights secured to the back of each crank cheek by a wrought iron strap passing around the latter, an arrangement which brings the counterweight just where it should be, while the straps are finished in such a manner as not to disfigure the crank shaft. The link motion is used for reversing, in combination with another valve placed above the steam chest for cutting off at any point from one third to one fifth There is, of course, the objection to this arrangement, of the large space beneath the cut-off valve. The engine has surface condensers, the tubes being arranged in a vertical, cylindrical casting above the air pumps, and covered at the top with a large bonnet. The condensing water is supplied by a pair of centrifugal pumps placed back of the condensers and driven by a very neat pair of vertical engines, with the cylinders above. These, though constructed entirely separate from the main engine, are placed so as to be within reach of the engineer standing on the platform, for starting the engines. This first pair of engines is kept in motion by a portable engine connected by gearing to its shaft coupling. Messrs. Penn & Son have also on exhibition a set of twin screw engines with boiler, such as they make for ships' launches, and intended to work at a high speed. The boiler is of the locomotive type, and the cylinders are bolted to the sides of the fire box and the shaft bearings also lower down, but the strain between the two is sustained by a strong bolt passing directly from one to the other. In the same room is a working model of one quarter size of a pair of vertical screw engines by Wm. Denny, of Dumbarton, kept in operation by steam from the boiler of the portable engine already referred to. The central space of the engines is occupied by the surface condensers, the cylinders being placed above these, and having their guides formed on the sides of the condensers. These engines are said to be very much liked where in use. Messrs. Humphreys & Tennant also exhibit two beautifully executed models of their styles of engines, on a scale of one twelfth full size. One represents a form of engine which has been advocated for some years by this firm, in which the required economy of room athwart ships is obtained neither by back action nor the use of a trunk, but by employing a very short connecting rod. The makers argue that the amount of friction caused by the great inclination of the rod, is after all not excessive, and preferable to the evils attending the other modes of construction. Their other model, however, is of the more usual back-acting type. Four piston rods transmit the motion of each piston to its cross head, and the air pumps are also worked directly from the pistons. These makers have established a reputation for the construction of very economical engines.

The rest of this annex is chiefly devoted to models of ships, both of the navy and those constructed by the principal British builders for the merchant service, at home and abroad. The former comprises a collection of half models of all the screw vessels constructed for the navy since the introduction of the propeller. The changes that have taken place in the forms of vessels in the last quarter of a century, are very strikingly shown by these models, and of these changes, the most remarkable are those which have occurred since the adoption of iron plating, and rams.

The larger Creusot engine is intended for the iron-clad *l'Ocean*, and is of 950 nominal horse-power, but will work up to 3,800 actual horse-power. It is quite similar in its most important features to the Indret engines for the *Friedland*, and a description of the former will suffice for both. As already stated, there are three cylinders side by side, acting on cranks placed at angles of 120° with each other. The middle cylinder alone receives its steam directly from the boiler and is unjacketed, while the outer ones are jacketed and receive their steam from the exhaust of the middle cylinder, forming together the equivalent of the low-pressure cylinder in engines on Woolf's plan, so common in Europe. It will be seen that with this arrangement with three cylinders, it becomes necessary to commence the release of steam from the high-pressure cylinder at about three-quarters the stroke, but it is not necessary on that account to cease admitting fresh steam to the cylinder, since that which passes out of this, acts on the piston of the adjoining cylinder, which is just commencing its stroke, though if a higher degree of expansion is required, the steam may be suppressed at any portion of the stroke. One important point, however, which has been attempted in the construction of these engines has been to make as many of the parts as possible interchangeable, and with this object the valves for all three of the cylinders are made exactly alike, and are set so as to open and close at the same relative point in each case. This latter condition involves the suppression of the steam at about three fourths the stroke, and introduces some anomalies in the distribution, which do not exist in the ordinary arrangement with two cylinders. Tracing out the distribution of steam to each cylinder, it will be seen that we have, first, three fourths the stroke of the high-pressure cylinder with full boiler pressure steam; then, admission to the second cylinder, and expansion in both till the latter has made three fourths of this stroke or the first crank two thirds of a revolution; then suppression in the second, and at the same time the piston of the first being at about one fourth of its return stroke, opening of the valve to the third cylinder and expansion between that and the first until the completion of the revolution. The valves are of the D-shape, and the steam is admitted beneath and released above them, the valve faces being placed on the top of the cylinders. The valves are worked from cranks in a revolving shaft connected with the main shaft by gearing; and with an arrangement of internal gears by which the advance of this secondary crank shaft may be changed as required for reversing. The exhaust connections are made by means of copper pipes of elliptical section, so made to economise hight, and furnished with stay bolts along their shorter axis. The condensers are of the ordinary kind, and the air pumps are placed below and are worked from arms forged on the piston rods. The pumps are of the ordinary double-acting kind, and, as is too frequently the case with this form of pump, the delivery valves being placed at the top of the water chamber and the foot valves at the bottom, all the air contained in the condensed steam has to pass through the body of water in the pump, which it can not do rapidly, from its finely subdivided state, and accordingly the vacuum obtainable in the pump is very much impaired. The foot valves should be placed at the top of the body of water, the delivery valves being close by, so that the air immediately passes out at the latter without having to percolate through a great mass of water. The shaft of this engine is furnished with a strong universal joint coupling—simply a Hook's joint. The pillow-block brasses are in two pieces, and are set up sideways only, by wedges and nuts above the binders. The framing is very stout and extends directly across from the cylinders to the condensers on the level of the main shaft. The other pair of engines by the same makers are very similar in general construction of details, but are of the ordinary cylinder type, with valves placed at the sides and worked by a link motion. They are of 265 nominal horse-power, being one of a pair of such engines intended for one of the new French vessels.

The design of the engines built by Messrs. Schneider & Co., appears to be the most common for large power in the French marine. As already stated the engine which is in operation, built at the Indret works, is of the same kind, and in addition to this, among the very interesting collection of moving models exhibited by the French admiralty, the design occurs more than once. It will not be necessary to say much more in reference to the Indret engine therefore, except to mention a few points of difference between it and the one already described. One of the most noticable of these differences is in the arrangement of the guides for the main crosshead. In the Creusot engine, these consisted of a pair of top and bottom surfaces on each side of the journal of the connecting rod, and between that and the arms to which the piston rods were attached, as often found in our own engines. The bearing on the crosshead was formed by two blocks of cast iron encircling the wrought iron crosshead, and secured to each other by feathers on their meeting faces. The wearing faces of these castings are recessed and filled with Babbitt metal. In the Indret engine only a single bearing is used directly beneath the connecting rod journal, and this is made very wide so as to give ample surface when running ahead, but the lips which form the upper bearing over the sides of the crosshead block have apparently not half the surface so that the conditions for running backwards are not so favorable, though perhaps there is as much surface as is necessary for the purpose. The condensers are placed at the extreme sides of the engine, outside of the piston rods of the outer cylinders; the space therefore between the three sets of guides and connecting rods is entirely clear. Beneath the guides are pumps worked in some cases by rods from the steam pistons, and in others by lugs projecting downward from the piston rods. The arrangement of valve gear is the same as in the engines already described. These engines are working regularly every day, but one boiler being fired to supply them with steam, and they appear to run very smoothly, requiring but moderate attention. The appearance they present when operating in this manner with the blades of the huge screw beating the air and creating a strong current is novel and imposing. They are so arranged that visitors can walk around every part of them and examine the working of each portion. In the same annex is Meazeline's three cylinder engine of 450 nominal, or 1800 actual horse power. It is very similar to those of the same type already mentioned, and is a very creditable job as regards workmanship. Beside it stands another engine of similar size and type, in which the singular and not disadvantageous plan has been adopted, of omitting in the erection, nearly all the main castings and framing, thereby showing all the details of the moving parts—portions which in the usual course are entirely hidden through their construction. The outer packing ring of the pistons is of cast iron, a single ring, the full width being used. The follower bolts are secured from working loose by portions of a ring of wrought iron, let into a groove turned in the follower just by the side of the square bolt heads. As these rings in their turn are held in by screws, the question is, how much less liable these latter are to work loose than the follower bolts would be with no additional provision. The foot valves are placed at the side of the air pump chamber but in an inclined position, the valves being on the under side. These consist of long rectangular rubbers, giving a long and narrow opening on each side of the guard, by which arrangement it is supposed they will have stiffness enough to close promptly, notwithstanding their downward inclination, while the upper end of the valve, at which most of the air would escape, being close to the delivery valve, the air would have but a small volume of water to pass through before making its exit from the chamber, a circumstance always favorable to the attainment of a good vacuum.

The engine by Messrs. Escher Wyss & Co., in the Swiss annex is a very neat job, but presents no particularly striking novelty in its design. There are a pair of inclined cylinders of about 30 in. diameter by 42 in. stroke placed side by side and connected to the upper frame, containing the main pillow blocks, by the guide bars only in the direction of the strain. These are of wrought iron and made tolerably heavy to resist flexure, but appear rather light from being unsupported throughout their length. The top casting is as usual, supported on turned wrought iron bolts resting on the bed plate below, to the further end of which the cylinder castings are also bolted. The air pump is vertical and single acting, placed directly beneath the crank shaft and worked by a connecting rod and trunk from a crank in the center of the shaft. The exhaust from one cylinder passes through a high arched pipe into the exhaust chamber of the other and thence a horizontal pipe leads along the bed plate to the condenser under the shaft. The valve motion is of the ordinary shifting link kind.

While we are in the Swiss annex we must notice a very good horizontal engine that is placed there, where not half the people who visit the Exposition will see it. It is fitted with a gear for variable expansion which seems to be very well designed and not liable to derangement, though it is not at all new in its general features. The steam chest is placed on the top of the cylinder and the valves, which are balanced poppets, are situated at each end of the former. These are raised by means of revolving cams on a shaft running from a bevel gear wheel at the shaft along the side of the cylinder, and the governor by moving a wedge-shaped piece causes the closing of the valve, under the action of the cam, to take place earlier or later as the case may be. The cut-off gear is in fact almost identical in its operation with that applied to some of Wright's segmental engines. The exhaust is effected by separate valves placed beneath the cylinder. The governor is on Porter's principle, and a very noticable fact is, that this governor has been generally adopted on the Continent since the Exhibition of 1862 when Mr. Porter first brought it before the European public.

Just outside of this building we find in the portion of the grounds allotted to the Russians, a model of an apparatus by which it is proposed to conserve the power usually expended upon the brakes of trains descending steep inclines of railways, and to apply it to trains running up the hill. It consists merely of a frame carrying four wheels on top of which by the intervention of friction gearing is mounted a pair of heavy flywheels. The tractive power of the train in descending is expended in imparting velocity to the flywheels, and this is to be used for assisting the return trains in their ascent. The model incline is about 110 feet long and has a rise of about one in 25. The machine used upon it is very well made and it really appears to reserve and give out a large proportion of the force expended in the descent, but it will at once occur to practical men how many drawbacks there would be to its use in practice. In the first place it would be necessary to apply the reserved power at once, or it would expend itself in internal friction, and if the trains could be so timed as to render this possible the old plan used in coal mines of connecting the loads to the opposite ends of a rope passing over a pulley at the top might better be employed. Then again the inequality of the speed at the top and bottom of the incline, owing to the accumulation and expenditure of momentum would be a disadvantage, besides the great weight of flywheel that would be required to store up any large amount of power, or else the very excessive loss inevitable with high speed. This is doubtless a problem on which very many have exerted their ingenuity, and it is not improbable that we may some day have a practiced solution of it. Certainly the great injury to permanent way from the use of the heavy locomotives necessary at present on steep gradients besides the cost of furnishing power to overcome the force of gravity is an inducement to seek some means of equalizing the tractive force required. The storing up of power in a small space either permanently or temporarily is an exceedingly difficult task, and were we able to do so, great economy of coal would, in many cases, be possible. But as a rule there is no such concentrated essence of power at our command as a lump of coal, and, as yet, we have not been able to recompress it into the same space when once liberated.

SLADE.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Sneering Allusion to the Steam Bureau.

MESSRS. EDITORS:—The sneering remark of one of your daily cotemporaries relative to awarding to Mr. Isherwood, the distinguished chief of the Bureau of Steam Engineering, "a leather medal for his improved armor" is no doubt intended as a blow at the gentleman.

I have no means at hand of ascertaining whether Mr. Isherwood either ordered or planned the armor of the *Onondaga* but I am confident that if he really did either, it was after profound reflection and exhaustive calculation. And knowing the great margin this officer always allows for safety—such as putting a 5-inch piston rod in 20 pairs of 30-inch diameter by 18-inch stroke engines—you may rest assured that if, as has been asserted, 4-inch hammered plates without backing can be pierced by the ordinary naval guns, that Mr. Isherwood has been misinformed in relation to some of the dynamic elements which are germane to this problem, or else he never could have made a mistake on so simple a point. No man understands better than Mr. Isherwood the exact dynamic relations between guns and armor plates. As early as 1862 this important subject had engaged his attention and as a result of his investigations he proposed to build an iron ship of 7,000 tuns, protected by 4½-inch plates without backing. Mr. Isherwood fully appreciated the liability of wood to decay, hence his opposition to the use of such an ephemeral substance.

B.

The Mines of Montana. Better Machinery Needed.

MESSRS. EDITORS:—Montana offers a broad field for scientific research in her immense deposits of mineral wealth, and for mechanical enterprise in the thorough displacement of the old and useless machinery, which has been shipped from the East, and with which we can save but a fraction of the royal metals contained therein. It has ever been the custom to look to the East for light, but in the present case, Messrs. Editors we must look to the West for proper machinery and men to crush, manipulate, and save, with the smallest possible loss, the precious metal contained in the auriferous and argentiferous ores. As a proof of this assertion, I will just cite a case or two in point.

We have here several mills and arrastras constructed; one, with thirty stamps, (fifteen only working), crushes but five tuns per day (of twenty-four hours) while the tailings show a prodigal waste of quicksilver and gold. Another of twelve stamps, obtains but seven dollars per tun, while from the working of a few tuns from the same lode by the common arrastra process, the amount obtained was fifty two dollars and fifty cents per tun. I think, gentlemen, with the light of past experience before us and the proof just adduced, we of Montana and capitalists interested in our Territorial development, would do well to apply to the Golden state for some valuable instruction before investing money in unprofitable machinery. It would relieve many anxious and doubting minds here, it would induce hosts of timid capitalists to invest their superabundant wealth in our mines, and with a branch mint in Helena would usher in a new and glorious era for these rocky mountains and the whole Republic that would help move the moneyed world along.

Hoping soon to see the SCIENTIFIC AMERICAN again, you have the best wishes of your nomadic subscriber and friend.

F. M.

Trout Creek, Montana.

Importance of Good Material in Agricultural Machines.

MESSRS. EDITORS:—Will you in behalf of the farmers, urge that makers of reaping and mowing machinery contend for excellence in the quality of iron used in their implements. There are already a number of patented machines which are each admirably adapted for their work. The serious fault, with many lies in the use of inferior metal for castings, rivets, and cutter-bars.

It may be safely said that the manufacturer who establishes a general confidence in the quality of his iron, will command the bulk of an immense and increasing trade in reapers and mowers. The farmers would cheerfully pay for the assurance of tough, well handled, and honestly made iron work on agricultural machinery.

HAY FARMER.

Frankfort, Ky.

How to Harden Cast Iron.

MESSRS. EDITORS:—Your correspondent N. D. J. of Mass. in your last issue Vol. 17, page 87, inquires for a way to harden small iron castings. The simplest and best way that I know of, is to heat them to a bright red heat and then immerse them in common whale or lard oil. If the scale is taken off the castings, they will case-harden quite deep. I have seen quite a respectable cold chisel made from a piece of common cast iron in this way. The harder the nature of the iron, the better it will harden.

J. W. JOHNSON.

U. S. Armory, Springfield, Mass.

Promoting Fruitfulness of Trees.

MESSRS. EDITORS:—Every one knows that the "sap" which gives life to the leaves is received through the "tap root" and that which brings the fruit to perfection through the "lateral roots" now, where there is a vigorous growth of leaves and no fruit, it is evident that there is some defect in the furnishing quality of the lateral roots, the sap root giving a superabundance of sap. This can be obviated thus: Let the farmer dig a trench (commencing some six or eight feet from the tree in order that the lateral roots may receive no injuries) deep enough to enable him to strike the "tap root" some three or four inches from its junction with the main portion of the tree. Cut this with a saw or sharp knife, fill up the excavation and the good effects will be seen the following season. This should be done before the sap rises.

READER.

Richmond, Va.

Philosophy of Preserving Eggs.

MESSRS. EDITORS.—Cobbet says, "A preserved egg need be run from, than after." The thousand and one recipes given from time to time are in fact as worthless as the mermaid stories or those of the snake monster of the sea. Many who put forth these stories for the million do not know what a fresh egg is; many do it for notoriety, and some ignorantly. No egg is fresh that will shake; this is because it has lost some of its albumen. No egg has ever been preserved over a month that will not shake, except it be air-proofed, which is a term not generally understood, and is a new process. If they are put in solution, no matter what it is, the egg will absorb it; if put up in dry measures the albumen will escape by transpiration through the shell. The egg has been coated with every conceivable composition, even in solid stone, and galvanized, yet the watery material escapes. The philosophy of this is that there is air in the egg before it is treated, and this uniting its oxygen and carbon, produces decomposition by carbonic acid gas, the yellow of the egg first breaking, then follows the destruction. Eggs are naturally designed to last as long as the hen requires to get her brood, and the life germ can be preserved a few weeks—seven or eight—but no longer. The egg itself may be kept in a preserved state for two years by greasing with butter, oil, or lard, but from the time it is thus put up to the end of two years it will daily lose its albumen by transpiration, and while its carbonic acid escapes to a certain extent, the egg meat will be reduced fully two thirds, and will shake. For culinary purposes they will do very well. But we want a whole egg, not a half one, and we want them fresh. Butter and lard and suet have been used for half a century, still nothing has recommended itself over the old liming system in a commercial point of view. The theory always has been, and still is, that to keep an egg fresh the air must be excluded. It is the only philosophical treatment of it that can be made. Eggs are composed of more than half a dozen chemical ingredients, and these components are very volatile; hence the atmosphere with its powerful agencies works quickly upon it. Externally kept from the air, the latter is powerless to do it harm, but the air inside no mortal can prevent, and that alone in time will decompose the egg. AN EGG STUDENT FOR FIFTEEN YEARS.

New York city.

To Make Castings Free from Scoriæ.

MESSRS. EDITORS.—Your correspondent, J. C. W., in No. 6 current series, page 87 speaks of his difficulty in getting sound castings. Has he ever tried a "stodge catcher," which is nothing more than a large sprue set in front of the pouring sprue and gated heavy from one to the other? It should be gated not quite so heavy from under the stodge catcher to the casting in the nowell. Then by pouring fast enough to keep the iron well up in the stodge catcher the scoriæ that goes into the pouring sprue will rise and stay in the catcher.

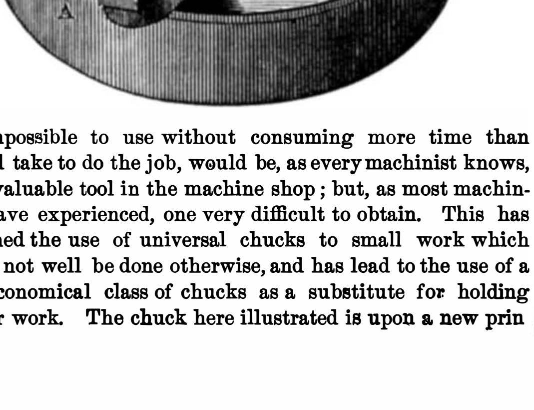
Iron should be poured hot, whether in dry or green sand molds; I consider it a great mistake to let iron cool in the ladle. If the mold is just right the iron can hardly be too hot. When the iron is poured hot the stodge rises, but if it is cooled down to the point many molders prefer, the scoriæ catches on the sides of the mold and make an unsound casting. JOHN K. RICHARDS.

New York.

JOHNSON'S UNIVERSAL LATHE CHUCK.

A good universal lathe chuck, one strong, durable, not easily got out of repair, or so choked up with chips and dirt as to

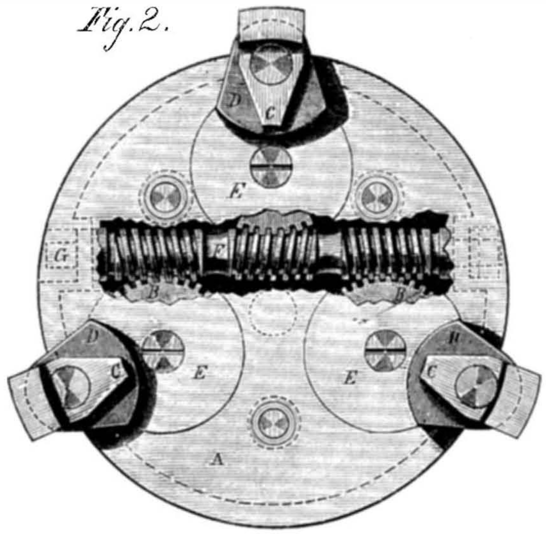
Fig. 1.



be impossible to use without consuming more time than would take to do the job, would be, as every machinist knows, an invaluable tool in the machine shop; but, as most machinists have experienced, one very difficult to obtain. This has confined the use of universal chucks to small work which could not well be done otherwise, and has lead to the use of a less economical class of chucks as a substitute for holding larger work. The chuck here illustrated is upon a new principle. has been most thoroughly and severely tested, and the patentee says, has proved itself perfect to do the work for which it is designed.

A socket wrench applied to the end of the worm shaft revolves the arms carrying the jaws, to and from the center grasping the work with the utmost precision and holding it firmly as in a vise.

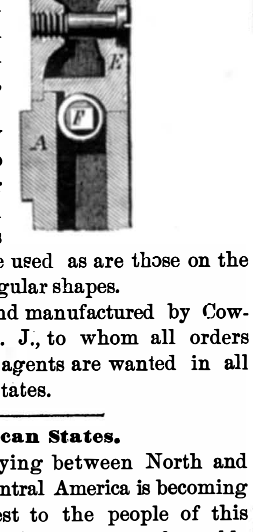
Fig. 2.



The superiority of this chuck consists, briefly, 1st, in its entire freedom from dirt, and impossibility of chips or dirt getting to the working parts of the chuck; 2d, the simplicity of its construction renders it less liable to get out of repair than other; 3d, its accuracy strength and durability; 4th, the jaws, being simple in form, extra jaws for holding odd jobs of peculiar form or shape can be quickly made at a trifling expense.

A brief description and reference to the parts may aid in an understanding of its construction and operation: Fig. 1 is a perspective view of the chuck as ready for use; Fig. 2 is a view with a portion of the face broken away, exposing the right and left hand screw or worm and the worm segments; and Fig. 3 is a cross section through worm segment, chuck, and jaw. A is the body of the chuck; B, segments of worm gears having teeth around about six tenths of their circumferences; C are steel jaws pivoted to the projections, D, on the plates, E, which are rigidly a portion of the worm wheel segments and rotate with them; F is the worm shaft which engages with the gears and is turned by a socket wrench inserted at G, Figs. 1 and 2.

Fig. 3.



As the worm shaft is rotated by the wrench, it revolves the gears so as to bring the jaws either to or from the center. These jaws can be easily adjusted to receive objects of an irregular form, or they can be used as are those on the scroll chuck for the reception of regular shapes.

Patented by William Johnson, and manufactured by Cowin and Johnson, Lambertville, N. J., to whom all orders should be addressed. Responsible agents are wanted in all the principal towns in the United States.

The Central American States.

That portion of the continent lying between North and South America proper, known as Central America is becoming of political and commercial interest to the people of this country, and, because of its presenting the most favorable routes between the two oceans, to the nations of Europe. The following from the Hartford *Courant* will be read with interest:—

The large profits of the Panama railroad revive every now and then certain old projects for the construction of another railroad or the canalization of Central America. There can be no doubt that had the people of the region which lies between Mexico and South America been possessed of ordinary commercial activity, two or three well traveled routes would ere this have been opened from ocean to ocean. But like the inhabitants of other portions of Spanish America, they have been too busy with revolutions and political squabbles to find any time or energy to devote to industry or trade. The five Central American republics all achieved their independence about 1821, and in 1823 formed themselves into a confederation, which lasted until 1839, when it fell to pieces and all the members set themselves up as independent powers. The largest one is Nicaragua, which is about the same size as Georgia; its capital is Managua, with ten thousand inhabitants; its total population is about four hundred thousand, of whom thirty thousand are whites, ten thousand negroes, and the remainder Indians and half-breeds. The next in size is Honduras, having about the same area as Mississippi; its capital, Comayagua. has eighteen thousand inhabitants; its total population is about three hundred and fifty thousand souls. Guatemala is the third of the Central American republics, being a little larger than Ohio; the name of its capital is also Guatemala, with forty thousand inhabitants; the total population is estimated at one million and one hundred thousand, or greater than that of all the isthmian powers together. Costa Rica is the next in size, its area being somewhat more extended than that of West Virginia; its capital, San Jose, contains thirty thousand souls; its total population is one hundred and twenty thousand. The smallest of these powers is San Salvador, which does not cover quite as much ground as Massachusetts; its capital is also styled San Salvador, and its inhabitants number perhaps fifteen thousand; the whole population is believed to reach six hundred thousand. The existing constitution of Nicaragua was adopted in 1858, of Honduras in 1865, and of Guatemala in 1847. The presidents of all the republics serve four years—unless they are overthrown by a revolution—except the executive of Costa Rica, whose term of service is three years. The term Central America is generally considered to include, besides the five republics, the state of Yucatan, in Mexico, and the state of Panama in Colombia.

SHEA'S PATENT BARREL AND TANK.

The demand for kegs, barrels, pipes, and tanks is constantly increasing. They are the most convenient vehicles for the conveyance of liquids and many solid materials from place to place, and upon their proper construction depends largely the amount and the condition of the material they hold upon their arrival at the place of destination. The engravings exhibit a new method of constructing barrels, tanks, etc., patented January 29, 1867. Fig. 1 presents a view of a barrel partly in section; Fig. 2 is an end view of the staves of the barrel, and Fig. 3 is a cross section of the improved head. This improvement consists in forming a V-shaped encircling projection, A, upon the edge of the head, leaving a shoulder above and below. It will be seen that when the head is seated in the barrel it forms shoulders above and below the croze, bearing against the chimes and preventing them from being broken. The incline of the edge of the head also gives additional security, as the greater the internal pressure the closer will be the fit of the head to the staves.

Fig. 2 shows a new method of securing the staves one to the other. B represents metallic dowels, slightly curved, to correspond to the curvature of the cask, and feathered at each

Fig. 1

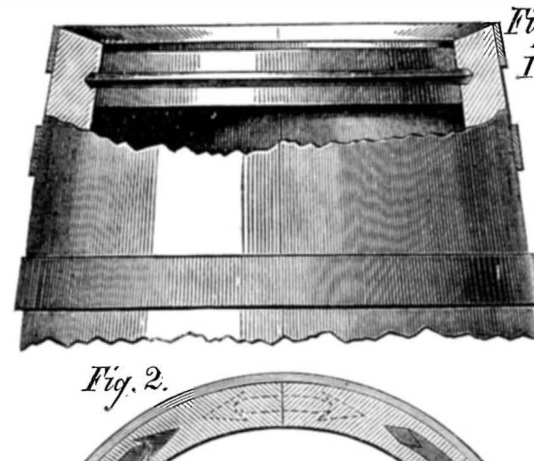
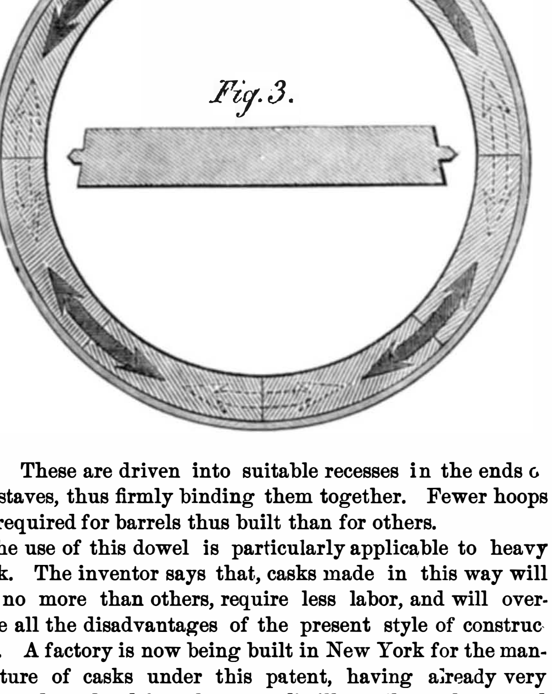


Fig. 2.

Fig. 3.



end. These are driven into suitable recesses in the ends of the staves, thus firmly binding them together. Fewer hoops are required for barrels thus built than for others.

The use of this dowel is particularly applicable to heavy work. The inventor says that, casks made in this way will cost no more than others, require less labor, and will overcome all the disadvantages of the present style of construction. A factory is now being built in New York for the manufacture of casks under this patent, having already very large orders ahead from brewers, distillers, oil merchants, and sugar refiners, who, through their patronage have given substantial evidence of their appreciation of the improvement.

The patentee will sell manufacturing and territorial rights and will furnish the necessary machinery for the manufacture of these improvements, or will alter any now in use at a moderate cost. Address Samuel Shea, Corry, Erie county, Pa., or at Jersey City, N. J., or H. W. Quitzow, 24 South William street, New York city.

SETH GREEN, Holyoke, Mass., writes to the New York Farmer's Club that he is hatching shad by the million, artificially, and he wants to say to everybody that he will give them all the young shad and impregnated ovas that they will come and take away. The day before writing he hatched 5,000,000.

PARISIAN TASTE is rather an indefinable sense. The Chinese have never been accused of over fastidiousness in the selection of their food, but what with horse flesh, frogs, snails, and so on to the end of the chapter, the same may soon be said of this more favored Western nation. The latest delicacy introduced in Paris is whale's flesh, and shark and dolphin steaks.

Adjustable Heads for Gear-Cutting and Slotting on Lathes.

In small shops it is often required that a gear should be cut for some specific purpose where the demand for this sort of work is not sufficient to warrant the purchase of a gear-cutting engine; and if a milling machine or planer cannot be at liberty to be used for fluting reamers, taps, etc., then some convenient attachment to the lathe might be advisable and handy. To fill both these requirements is the object of the inventor of the devices shown in the engravings.

Fig. 1 shows Parker's gear-cutting attachment for engine lathes. It is a standard to be secured to the lathe carriage by a bolt passing through the curved slot in the projection, A, which carries a spindle in the box, B, that supports the bearing, C, and the index wheel and finger, D. Under the platform is a plate secured to the upper part of the lathe carriage by a bolt similar to that used in fastening the ordinary tool post, so that the appendage can be swung around in such a position as to meet all exigencies. The blank to be cut is secured to the arbor, E—shown in blank—in the usual way. The screw, F, elevates or lowers the index wheel and its parts and the set-screw, G, secures them in place. The segmental slot in A allows the attachment to be turned at an angle to the ways of the lathe in order to accommodate itself to the cutting of "slashed" or spiral teeth, and the means of elevation or depression by the screw, F, adjusts the arrangement for different sized gears or ratchets. Every machinist will see how readily it may be adapted to the cutting of the straight, bevel, miter, or spiral gears, from the smallest up to those of ten or twelve inches diameter, with any desired number of teeth. For cutting bevel gears it is only necessary to set the arbor, E, with its connections by means of the nut on the end of the box, B, to give the proper incline to the arbor, and its appurtenances. The arm of the finger, D, has a scale of figures marked on it to designate the number of the holes in each concentric circle on the index. It appears to be a very neat and complete device for the purpose intended.

Fig. 2 is a handy attachment to be affixed to the carriage of a lathe for fluting reamers and taps and splining studs and short shafts. The stationary center, A is furnished with a radial clutch, B, to receive the tail of a dog or any other device for holding the shaft or taps, having a set-screw to prevent "back-lash." On the end of this center, at C, the index plate of the other device can readily be affixed. The other center, D, can be moved from point to point and secured by the set-bolt. The center of this movable part is dressed down to allow the action of a milling tool or cutter to the lowest point. No further explanation is required by the practical workman.

These appliances are the subjects of patents, one issued July 3d, 1866, and have been tested for more than a year and proved to be valuable aids to the machinist. All additional information desired can be obtained by addressing the manufacturers, Warwick Tool Co., Middletown, Conn.

Fig. 1

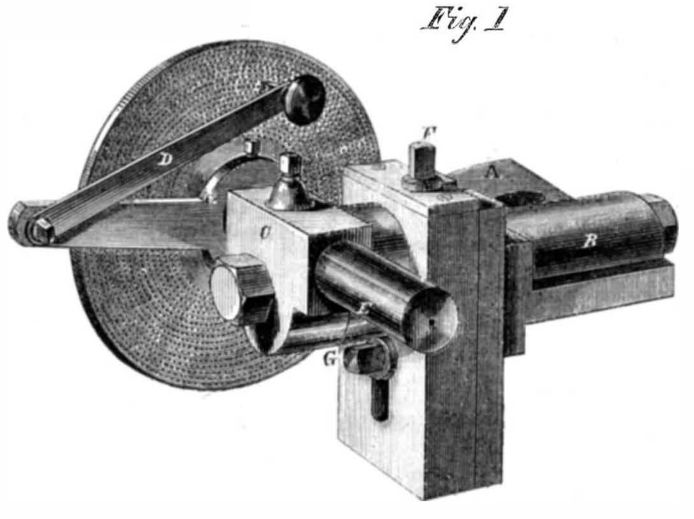
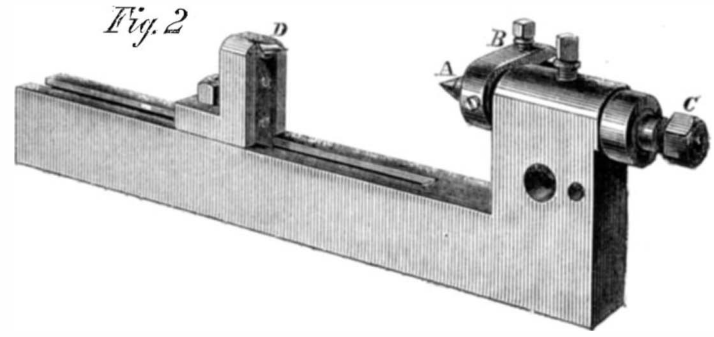


Fig. 2



PARKER'S GEAR-CUTTING ATTACHMENT FOR LATHES.

Science Familiarly Illustrated.

STARCH, ARROWROOT, SAGO, AND TAPIOCA.

All the above are only synonyms for one and the same substance, that of starch, the difference between them being mainly those occasioned by the differing proportions of the constituents and the presence of more or less foreign matters. Starch is a component of many articles of food, all the farinaceous vegetables containing a large proportion. That manufactured variety known as corn starch is prepared from the maize called the "white flint." Before being ground, the corn is soaked in vats, and then is run through the stones with water. The mass is then filtered and the residue is dried in a kiln until all, or most of the water is evaporated, when it is again ground to a dry powder.

Arrowroot is a term loosely applied to the starch extracted from a number of roots and cereal products, as the maranta, mandioc, tacca, arum, potato, etc. That from the maranta of the East and West Indies is the true arrowroot, but much of that in commerce is from other substances. It is a simple food, very nutritious, containing no nitrogen, and well adapted for producing adipose matter or fat.

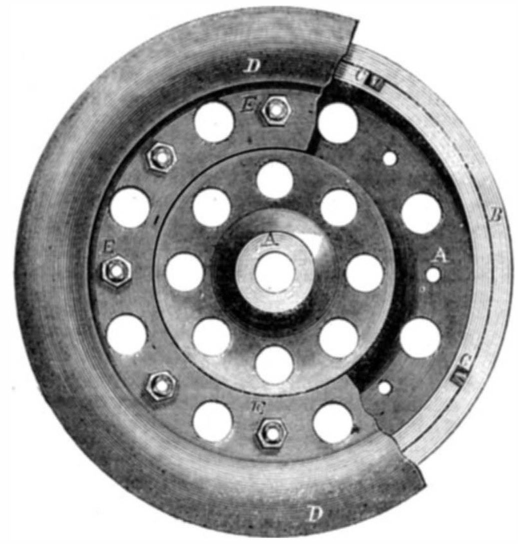
Sago is a farinaceous substance prepared from the pith of a species of palm growing on the islands and main land of the Indian Archipelago. To obtain it the tree is felled and the trunk split. The pith is then removed, macerated with water, and beat with paddles, when the woody fibers separate and float. These being removed, the grains settle and the flour or grain,after being dried,is sifted and then generally bleached with chloride of lime. Pearl sago is prepared from the ordinary sago by being heated on an iron surface. In cold water neither forms of the sago are solvent, but only in hot water, when they form a thick starch-like solution, and make an excellent and very nutritious food.

Tapioca is prepared from the root of the mandioca or cassava, grown in the West Indies, South America, and some parts of Africa. The root grows sometimes to the weight of thirty pounds. It contains, with the starch, a large proportion of a poisonous, milky juice, containing hydrocyanic acid and an acrid bitter substance. The poisonous principle is used by the inhabitants of northern South America to poison thorn arrows thrown from their *pucunas*, or blow guns, for the killing of game. The root is brought from the mandioc patch and then washed and peeled. The peeling is usually performed by the teeth; after that the root is grated, the grater being a wooden slab about three feet long, a foot wide, slightly hollowed, and set in diamond-shaped patterns with sharp pieces of quartz. The grated pulp is then partially dried on a sieve and placed in a long cylindrical basket of elastic fibers. One end of this basket is affixed to the limb of a tree or a stout peg in the wall and a pole passed through a loop on the lower end. One end of the pole is rested under some projection and the Indian woman seats herself on the other end as the power. Her weight draws the sides of the basket together until it assumes the shape of an inverted cone. The milky juice drops into a vessel placed to receive it. The pulp is then removed and dried in a kiln or oven. This pulp is known as *semonilla* and used for a bread. The poisonous liquid deposits the starch known as the tapioca of commerce. This deposit is dried either in the sun or by rude, kilns and granulates, as is seen in that so extensively used for puddings. Sometimes it is denominated Brazilian arrowroot, but under whatever name, it is the product of a root which in its natural state is one of the most virulent of poisons.

It is almost impossible to believe that one of the most nutritious and palatable of the elements of our *cuisine* should be derived from one of the most fatal poisons known in the vegetable kingdom, yet such is the case.

FORREST'S COMBINATION CAR WHEEL.

The engraving presents a double view of a car wheel intended to overcome the objections to the common cast wheel and the wrought wheel used on European roads. It is composed



of three distinct parts, secured together by screw bolts. The hub and body, A, of the wheel is either cast from suitable iron or forged from good wrought iron—which is preferable—to prevent breaking. The tire, B, is a separate piece of chilled iron, or cast steel. It has projections, C, on its inner surface which fit into corresponding recesses in the rim of the body, A, which reach partially across its face. The disk-flange, D, is either of chilled iron or steel, and is made to fit over the central projection of the body, A, and confine the tire in place. The three parts are secured by square shanked bolts, seen at E, which may be of any convenient number. To procure lightness, the webbing of the wheel may have a number of holes of any form made through the parts. The flange of the wheel and the webbing of the wheel outside of the hub is in one piece and when bolted to the mass of the wheel secures the tire place. The tire or tread may be of the hardest metal, as steel or chilled iron, as its position on the wheel rim does not depend upon shrinkage. The advantages of wrought over cast car wheels have never been acknowledged in this country, where chilled cast car wheels have been used to the exclusion of wrought wheels, ever since the first successful running of railroad cars. But in Europe, except Russia, the rule is that car wheels should be of wrought iron or steel tired.

The inventor of this combination wheel believes that its value for durability is far in advance of those generally in use, and that it is cheaply made and easily kept in repair, as the tire can be removed at any time when worn and replaced by a new one; or any other part can be similarly replaced.

This plan was patented through the Scientific American Patent Agency July 23, 1867, by David Forrest assignor to himself and James Eldridge, Jr. For further information address Forrest and Eldridge Eastport, Me.

Railway Bridge Excitement in Hamburg.

Hamburg is in a state of alarm and excitement, as there is some reason to believe that Prussia is seriously contemplating the expediency of constructing the much talked-of railway bridge across the Elbe, at a spot that has hitherto never entered the wildest dreams of the most speculative engineer—namely, below Altona, near the terminus of the Kiel and Altona Railway. There can be no doubt that, as the two banks of the river belong to Prussia, that power has as much right to build a bridge there as over the Rhine at Cologne and Coblentz, where both banks are also Prussian; but should the plan be really executed, Hamburg will be cut off from all direct communication with the sea, and then good-bye to its commercial prosperity. From being fully as much of a sea port as London, at present, it will become as much an inland city as Dresden or Berlin. The trade of Altona will also be totally ruined by the bridge, but as that town is now Prussian, the government has the right to do what it likes with it. As far as regards Hamburg, however, the case is different; and in an international point of view, it is very doubtful whether Prussia has the right to cut off the traffic of an independent state and preclude it from direct commercial intercourse with the rest of the world.

Editorial Summary.

METEORITES.—M. Daubrée, who has been investigating the specimens of meteorites in the Paris collection, divides all meteorites into two primary groups—Siderites and Asiderites—the former being characterized by the presence of metallic iron, and the latter by its absence. The Asiderites contains one group only, which is termed Asideres. The Siderites are divided into two sections: in the first the specimens do not enclose stony particles, and in this we find the group of Holosideres; in the second both iron and stony matter are present. This, then, induces two groups: Syssideres, in which the iron is seen as a continuous mass; and Sporadosideres, in which the iron is present in the form of scattered grains.

SURGERY AMONG THE INCAS.—M. Broca, says the *British Medical Journal*, has presented to the Academy a skull found in the tomb of the Incas four miles from the city of Cuzco, which is chiefly remarkable from bearing marks of having had a surgical operation performed upon it. The skull gives evidence that it underwent a fracture and denudation of the frontal bone, and traces prove that trepanning was performed. A circular white spot is visible which shows an inflammation of a portion of the bone, terminating in death, as is believed, in about fifteen days after the operation. M. Broca thinks that the trepanning was performed with a gouge.

FOSSIL IVORY.—About forty thousand pounds of fossil ivory, that is to say, the tusks of at least one hundred mammoths, are bartered for every year in New Siberia, so that in a period of two hundred years of trade with that country, the tusks of twenty thousand mammoths must have been disposed of—perhaps even twice that number, since only two hundred pounds of ivory is calculated as the average weight produced by a pair of tusks.

IT is said the Indians have an ingenious way of setting fire to houses with their arrows. They wrap with a rag some powder on the heads of their arrows, and on the tip of the arrow head place a percussion cap. When the arrow strikes the object to be fired, the cap is exploded and the powder and rag ignited. The rag burns long enough to set combustibles with which it may come in contact on fire.

THE FRENCH SCIENTIFIC ASSOCIATION promises to take the lead of all the Continental organizations in promoting the cause of science. It has this year appropriated 78,000 francs for investigations and experiments. In future, its *Bulletin* is to be published every week instead of monthly, as heretofore.

SUBSTITUTE FOR COFFEE.—In Germany the seeds of grapes are frequently used in place of the coffee berry. When pressed, they yield a quantity of oil, and afterward when boiled, furnish a very economical, and it is said, a very delicious substitute for the genuine Mocha.

CUTTING GLASS.—Take an old three-cornered file, heat it red hot and suddenly plunge it into a previously prepared mixture of salt and ice, stirring it about so as to cool as rapidly as possible. Now grind the point on a stone preserving the three sides as much as possible, when it is ready for use. The glass to be cut is nicked on the edges, then laid on a perfectly smooth surface, and the point of the file is, with a moderate pressure, drawn over its surface, the direction being guided by a rule. Such an instrument will be found serviceable for cutting glass for windows and all ordinary purposes. So says an exchange.

CHLOROCARBON, the new anaesthetic of Dr. Protheroe Smith, is a tetrachloride, or as it used to be called, bichloride of carbon. Although powerful and rapid in its effects, consciousness is rapidly restored after its use. Its vapor is very agreeable, having a delicate perfume not unlike that of a quince, and when inhaled imparts at first a sensation of coolness to the throat similar to that experienced in drawing in one's breath after taking peppermint, followed by a feeling of warmth on the surface of the body generally. Drowsiness and other sensations similar, but in a less degree, to those experienced from chloroform follow.

IS SWEEDEN A RISING NATION?—Sir Charles Lyell, thirty-two years ago, from an examination of some ancient sea marks on the Sweedish coast, concluded that the peninsular was rising at the rate of three feet a century. The Earl of Selkirk, from a recent examination of the same marks, comes to an opposite conclusion, which he has communicated to the Royal Geographical Society. The change in the position of the marks he attributes to fluctuations in the level of the water, and not to any upward movement of the land.

CARRIER PIGEONS lately traveled the distance between Brussels and Cologne, one hundred and ten miles, in from three to five hours. One bird flew thirty-seven miles, another twenty-two, and others twenty miles per hour. A pigeon race between birds owned in the former city, and others belonging in Hamburg, is soon to take place. The birds are to be thrown up in the Zoological gardens in Cologne and to fly thence to Hamburg, two hundred and thirty miles distant.

BEER VERSUS BREAD.—The amount of nutriment contained in beer is generally greatly over estimated. Liebig asserts that in 1,460 quarts of the best Bavarian beer, there is exactly the nourishment of an ordinary two and a half pound loaf of bread. This beer is about on a par with our best American beer. Instead of being a condensation of the nutriment contained in the grain, in just so far as the liquid has undergone fermentation, the nourishment has disappeared.

THE NIAGARA SUSPENSION BRIDGE.—Ever since the middle of March, 1855, from thirty to forty railway trains have passed over the Niagara Bridge daily. With the exception of the removal of the timber girders, and some other wooden parts which showed signs of decay, no part of the suspended system has ever been disturbed. The work is considered just as strong this day as it was at the time when the first train of cars passed over.

ANOTHER NEW FIBER.—By a late patent, a species of nettle, which grows luxuriantly and spontaneously throughout the Mississippi valley, is employed in the manufacture of cord, rope, cloth, bagging and paper. The stalks, which grow from four to eight feet high, are gathered in the winter, and are ready for the brake without any rotting process. The fiber is said to be exceedingly fine, strong, and susceptible of a high finish by dressing.

FISH BISCUIT.—Professor Rosing, of Asa, France, has invented a process of making flour from a species of sea fish, which he forms into buiscuit, thereby providing a very nutritious and compact article of food. These biscuit are four times as rich in albuminoid substances as beef, four and a half times as fresh codfish, and sixteen times as fresh milk.

LECTURES AT THE PARIS EXHIBITION.—The Imperial Commissioners have made arrangements for the delivery of a course of lectures, at various places within the buildings and grounds, on various subjects, such as caoutchouc, artificial ice, iron smelting, brass founding, and other kindred themes, connected with the mechanical and art displays in the Exposition.

AN INEXHAUSTIBLE ICE HOUSE.—A company has been formed in France for supplying towns in the southern provinces with ice from the sides of Savoy Alps. The glacier ice is loaded on vehicles at the foot of the mountains, transported to Geneva and thence by rail to its destination.

WE are indebted to Mr. H. T. Anthony, 501 Broadway, N. Y., for samples of Lithographic paper, from Paris, which we find excellent for printing photographic pictures. The keeping qualities of this paper render it convenient and valuable.

J. H. HALL, 102 Fourth Avenue New York, cured by his patent process, for one man in Cincinnati last year 11,000 dozen eggs. They were so well preserved that the dealer sold them in February as fresh eggs.

MESSRS. NOTMAN & Co., of Boston, Mass., have sent us some photographic cards which indicate excellent skill in portraiture.

National Academy of Science.

This association held its semi-annular session in Hartford, Conn., during the past week. A report of their proceedings, which we had prepared, is crowded out of this issue by other matter, but will appear next week.

Patent Report for 1867.

We are glad to learn that the contract for engraving the diagrams for the Patent Report for 1867 has been awarded to Messrs. E. R. Jewett & Co., Buffalo, N. Y., whose excellent work has for many years adorned these important volumes. It appears that in the present case Messrs. Jewett had no competitors; at least none who were willing to engage to produce work equal in quality to theirs at the same price. The engravings for the volumes for 1867 are to be finished by July 1868, and then the work for the latter year will be begun, this is quite again in time. Heretofore the publication of the reports has required about two years. The report for 1865 is not yet out.

Distances from San Francisco to New York,

THE CENTRAL PACIFIC RAILROAD ROUTE.

The following complete table of distances and elevations of points on the Central Pacific Railroad of California, and other roads connecting therewith, between San Francisco and New York, is useful for reference.

Names of Places.	Distance from point to point.	Total distance	Elevation in feet.	Names of Places.	Distance from point to point.	Total distance	Elevation in feet.
San Francisco......	....	.....	tide.	Twelve-mile Cañon	5	546	4,825
Goat Island........	1½	.....	tide.	Two mile Cañon...	22	568	4,990
Oakland...........	4½	6	23	South Fork........	9	577	5,052
San Leandro.......	8	14	45	North Fork........	24	601	5,220
Hayward's.........	5	19	73	Bishop's Creek.....	19	620	5,418
Vallejo's Mills......	8	27	121	Humboldt Wells...	15	635	5,650
Kottinger's.........	10	37	885	Nevada State Line.	65	700	4,830
Livermore Pass....	12	49	734	Point on Salt Lake.	75	775	4,290
San Joaquin Ri'r...	20	69	22	Bear River.........	45	820	4,320
Stockton..........	10	79	22	Weber Cañon......	25	845	4,654
Woodbridge........	13	92	83	Echo Cañon........	31	876	5,355
Cosumnes River...	14	106	106	Echo Pass..........	26	902	6,879
Sacramento	18	124	56	Bear River.........	18	920	6,045
Arcade	7	131	76	Reed's Summit.....	30	950	7,567
Antelope	8	139	180	Green River........	75	1,025	6,092
Junction...........	3	142	188	Bitter Creek Sum'it	20	1,045	7,175
Rocklin............	4	146	269	Bitter Creek........	13	1,058	6,315
Pino...............	3	149	420	Bridger's Pass......	97	1,155	7,534
Newcastle..........	6	155	930	North Platte.......	23	1,178	6,695
Auburn............	5	160	1,385	Rattlesnake Pass..	54	1,232	7,560
Clipper Gap........	7	167	1,785	Laramie River.....	35	1,267	7,175
Colfax.............	11	178	2,448	Evans's Pass.......	30	1,297	8,242
Gold Run..........	10	188	3,245	Foot Black Hills...	31	1,328	7,040
Dutch Flat.........	3	191	3,425	Julesburg	149	1,477	3,51[illegible]
Alta...............	2	193	3,625	North Platte J'nc'n.	78	1,555	2,790
Shady Run.........	4	197	4,125	Brady Island.......	22	1,577	2,640
Blue Cañon........	5	202	4,700	Willow Island......	18	1,595	2,514
Emigrant Gap......	6	208	5,300	Plum Creek........	20	1,615	.....
Cisco..............	8	216	5,911	Elm Creek.........	19	1,634	.....
Crest..............	13	229	7,042	Fort Kearney......	21	1,655	2,128
Truckee River.....	14	243	5,866	Wood River.......	19	1,674	.....
Little Truckee.....	8½	251½	5,56[illegible]	Grand Island......	18	1,692	.....
Eagle Gap.........	13½	265	5,000	Lone Tree.........	22	1,714	.....
Hunter's..........	9	274	4,640	Silver Creek.......	22	1,736	.....
Glendale...........	8	282	4,430	Columbus..........	18	1,754	1,458
Big Bend Truckee.	29	311	4,219	Shell Creek........	17	1,771	.....
Humboldt Lake....	41	352	4,047	North Bend........	14	1,785	.....
Oreana............	30	382	4,160	Fremont...........	15	1,800	.....
Mill City..........	35	417	4,250	Elkhorn...........	18	1,818	.....
Big Bend Humboldt	37	454	4,392	Papillon	16	1,834	.....
Iron Point.........	19	473	4,460	Omaha............	12	1,845	968
Reese River........	33	506	4,550	Chicago...........	494	2,340	625
Skull Ranch........	10	513	4 590	Toledo............	244	2,584	585
Shoshone Point....	13	529	4,696	Cleveland.........	113	2,697	585
Be-o-wa-we Gate..	8	537	4,735	Dunkirk	143	2,8[illegible]0	585
Gravelly Ford......	4	511	4,780	New York.........	460	3,300	tide.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The oldest mills in Pennsylvania are in the quaint old town of Bethlehem Pa., built by the Moravians in 1793, and are now in good running order.

A stationary engine of 500 horse power is being built in Newburgh, Cuyahoga Co, Ohio, This, the largest stationary engine in the Western States, is the property of the Cleveland Rolling Mill company who are erecting immense Bessemer steel works in the former place, The engine is horizontal non-condensing, 36 inches bore, and 60-inch stroke. Two blowing cylinders of 50 inches bore and 60 inch stroke furnish an air blast of from 20 to 24 pounds per square inch, a pressure far beyond anything heretofore used in the production of iron. The full capacity of the works when completed, will be from 50 to 60 tuns of steel ingots daily, or 12,000 tuns per annum.

Large importations from Belgium are annually made of rough plate glass, there being hitherto, a lack of suitable apparatus for manufacturing the article in this country A practical glass blower in Birmingham, Pa., has invented an apparatus for making the rough plate and furnishes an article which is pronounced equal to the best imported.

The salt springs of New York produce nearly 7,000,000 bushels of salt per year. The wells are owned and worked by the State, the water being purchased for evaporation by private parties, at a fixed rate per bushel of salt varying from one to twelve and a half cents per bushel. The net revenue to the State, from this source during twenty years, has been $421,582.

The work of changing the North Missouri railroad from a broad to a narrow gage, for a distance of one hundred and seventy miles, to Macon, was furnished in four adys. Quick work.

The Viceroy of Egypt is said to be the owner of more than one hundred steam plows, We would like to get drawings of them for publication.

Ransome's concrete stone, is to be manufactured in this country by a joint stock company of Baltimore. The process of making this artificial stone is simple enough. The sand or chalk is intimately mixed with its proper proportion of a solution of silicate of soda; the plastic material is then pressed into molds or rolled into slabs, and afterwards immersed in a solution of chloride of calcium, when the silica combines with the calcium forming insoluble silicate of lime, firmly cementing the sand particles together, while at the same time chloride of sodium, or common salt is produced, which is subsequently removed by washings.

The Montana people are congratulating themselves over the discovery of genuine sapphires in that territory. The precious stones found on El Dorado Bar, are familiarly known in that locality by the name of "Collin's diamonds" and are said to be quite plenty and easily procured,

The largest dye-house in America is about to commence operations in Paterson, N. J. Its appointments are on a very extensive scale and all its arrangements have been made under the direction of a French gentleman, for many years superintendent of the largest dye-house in Lyons, It is believed that 1,000 or 1,200 pounds of silk can be turned out in one day.

An exceedingly rich bed of cinnabar has been discovered about four miles south of San Jose, Cal. There is a solid ledge about twelve feet wide and eight feet thick, between walls of rock, which grows richer as the excavation proceeds.

A sudden reduction has been made in the working force at the Springfield Armory, in consequence of an order to reduce the production of breech-loaders to two hundred a day.

A train on the New York Central Railroad ran from Spencerport to Rochester, a distance of 10 miles, the other night, in 9 minutes.

The net profits of the Anglo-American Telegraph company for the eleven months ending on the first ult., was more than sufficient to meet the sums of £125'000 and $25,000 payable to the company as a first charge upon the working of the two cables and the lines of the New York Newfoundland and London Telegraph company. After paying a dividend of nearly 23 per cent for the year, the sum of £12,889 0s. 11d. is carried forward to credit of next year's revenue.

Natural soap, it is again announced, has been discovered in Missouri some sixty miles from St. Louis. What has been really found, is probably "fullers earth" a variety of clay which from its unctious touch might easily be mistaken for soap.

The Mount Cenis railway is to be forty-eight miles long. The initial point on the French side is 2,493 feet, and the summit of the pass, 6,322 feet above sea level. For six miles before reaching the summit the ascent must be on an average gradient of 1 in 14. From this point to the Italian terminus of the road there is an uniform gradient of 1 in 12, This latter section of the road was expected to be open for travel by the 1st ult. The French section of the road having suffered severely from inundations last year will not be ready before September, by which time the entire road will be completed. The existing travel across Mount Cenis averages 220 passengers and 120 tuns of goods, daily. The time required is from nine to fourteen hours, but by the railroad the journey will be completed in less than five hours.

The largest iron works in the country are located at Johnstown, Pa. The works are run day and night and give employment to 3,000 hands.

Steel boilers, it is said, are coming into use on French locomotives. Twelve express engines, with steel boilers, are employed on one railway leading out of Paris, fifteen on another, and several on other roads.

The entire tankage capacity of Oil City, nearly 200,000 barrels of oil, is awaiting a rise in the river for transportation to Pittsburg.

The new bridge at Louisville, Ky., is to be 5,220 feet, or nearly one mile in length. The longest span will be 360 feet, thirty-six feet longer than the longest span of the Montreal "Victoria bridge." The lowest projecting point of the long span is ninety feet above low water, while the highest rise ever known in the river was forty four feet, leaving a clear space of fifty two feet.

The Anglo-Indian Telegraph company propose to build a direct telegraph line, via. Egypt and Aden, with subsequent extensions to Singapore, China, Japan and Australia. The direct route from London to Suez will, it is anticipated, be in actual work during the present year and the company have entered into a contract with responsible parties for laying a thoroughly efficient line from Suez to Bombay. The entire line will be completed next year, or at the latest, in the May following.

It is found necessary on some railways having numerous short curves, to have the flanges of the driving wheels of the ordinary 6-wheeled engines turned anew as often as every six weeks.

For the past three years, $4,000,000 worth of boots and shoes have been shipped annually from Worcester, Mass. This business gives employment to 2,000 hands in the city, and as many more in the neighboring villages.

Recent American and Foreign Patents.

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

LATHES.—S. L. Hart, Milwaukie, Wis.—This invention has for its object to furnish an improved device for attachment to lathes for the purpose of cupping the ends of wagon hubs, turning the interior of hollow wooden ware, and for similar uses.

BOB SLEIGH.—G. O. Momeny, Locust Point, Ohio.—This invention has for its object to furnish a bob sleigh, or other sleigh or sled so constructed as to adapt it to all kinds of roads, and to enable the beams and raves of the sleigh to be readily removed from the knees and runners for convenience in storage, making the sleigh limber, strong, and durable.

OX YOKE.—W. A. Thompson, West Winsted, Conn.—This invention has for its object to so improve the construction of ox yokes as to diminish their weight and increase their strength and durability.

BEDSTEAD FASTENING.—L. L. Jackson, Paterson, N. J.—This invention has for its object to furnish an improved bedstead fastening, simple in construction, reliable in operation and which will enable the bedstead to be easily and quickly set up and taken down.

SNAP HOOK.—W. S. Furlow, Geneseo, Ill.—This invention has for its object to furnish an improved snaphook simple in construction, not liable to get out of order, not liable to freeze up in cold weather, and which can be manufactured at a small expense.

AERIAL MACHINE.—J. F. Elston, Elston Station, Mo.—This invention has for its object to furnish an improved machine for navigating the air so constructed and arranged as to be completely under the control of the navigator.

FOUNTAIN PEN HOLDER.—J. S. Charles, Omaha, Nebraska.—This fountain pen holder is made in two parts, arranged to move the one within the other, and relatively so constructed that the ink can be drawn in at one end, and from the other discharged and expelled upon the pen, attached or inserted at such end.

WELL SEED BAGS.—A. D. Griffin, Meriditb, Pa.—This invention relates to a method for closing the bore of an oil, artesian, or other well, and thereby stopping off the surface or other water, during the process of boring or working the said wells.

OX YOKE.—C. H. Post, Guilford, Conn.—This invention consists in attaching a hinged metallic plate to the yoke, the end of which engages with the bow in such a manner that the bow is securely fastened thereby.

OAR COLLARS.—Jackson Robinson, Curwinsville, Pa.—This invention consists in supporting and moving the steering oar on metallic surfaces whereby the friction is greatly lessened, and the management of the steering or rudder oar is rendered much less difficult, and consequently the raft is much more easily managed than by the old method.

RADIATORS.—J. A. Marvin, Red Wing, Minn.—This invention consists in forming the flue through which the products of combustion pass, in such a manner that the heat from the stove is compelled to travel a long distance and be retarded in its course and radiated from the surface of the flues and the casing utilized.

WATCHES.—Thos. Baker, New York City.—This invention relates to that class of watches, which are provided with an arrangement of mechanism, for stopping and setting free the second hand, or the hand for indicating half, quarter, or any other fractional parts of a second.

COMBINED BUREAU AND BEDSTEAD.—John Stark, El Paso, Ill.—The present invention consists in so constructing a bureau, in such a manner, and in parts hinged or hung together, that they can be opened from each other and brought into a horizontal position for use as an ordinary bedstead, while at the same time, it so desired, they can be brought into an upright position and shut the one upon the other, forming a bureau, to all appearances, with the mattresses and other articles constituting the bedding, encased within the same.

SNAP-HOOK.—M. F. Mitchell, Waukau, Wis.—This snap-hook is so constructed as to be most durable and substantial, and most convenient and serviceable.

LUBRICATOR.—R. P. Underwood, Brooklyn, N. Y.—This lubricator is for the spindles and shafts of machinery, and is more especially intended for cotton and spinning machinery.

HOLDER FOR REINS.—Phineas Jones, Newark, N. J.—The object of this invention is to provide a simple device, whereby harness reins may be securely held, and whereby they will effectually be prevented from slipping out of the hand.

SPRING MATTRESSES.—Henry H. Vere, New York City.—The object of this invention is to so arrange and hold spiral springs in mattresses that the durability of the mattress will be increased, and to do away with the wooden frames now generally used in spring mattresses, that the mattresses may be easily handled, and may be reversed and used on both sides.

CALCULATING MACHINE.—A. Mendenhall, Cerro Gordo, Ind.—The object of this invention consists in constructing a machine by which figures of any desired magnitude may be readily added, subtracted, multiplied and divided.

STOP ATTACHMENT FOR REGULATING THE LENGTH OF STITCH IN SEWING MACHINES.—George Robinson, Detroit, Mich.—This invention relates to a new and improved attachment for sewing machines, more especially designed for the Wheeler and Wilson machine, whereby the length of stitch may be regulated or varied as desired, with far greater accuracy and facility than by the ordinary cam attachment now used for that purpose.

BRICK DRYER.—John McDonald, Saratoga Springs, N. Y.—This invention relates to an apparatus in which the heat which is used for burning brick is further utilized for the purpose of drying the same.

WATCH —Arthur Wadsworth, Newark, N. J.—This invention relates to that class of watches for the winding and setting of which no key is required, and in which both operations are performed by simply turning the pendant to the watch case.

REVERSIBLE FEED MECHANISM FOR SEWING MACHINES.—Robert B. Stanton, Oxford, Ohio.—This invention relates to a new and improved feed mechanism for sewing machines, so constructed and arranged as to be capable of being reversed and feed the work either to the right or left on the cloth plate, whereby the removal of the work from the machine and the turning of it around at the end of each seam or row of stitching, is avoided.

GANG PLOW.—H. P. Stafford, Decatur, Ill.—This invention relates to a new and improved gang plow, and consists in a novel plan or mode of attaching the plow beams to the carriage, and also in a novel arrangement of the beams, mode of connecting them together, and in a peculiar application of a lever for moving them laterally and vertically, whereby the driver or operator has full control over the plows, and a very simple and efficient gang plow obtained.

KNOB LATCH.—George H. Palmer, New Bedford, Mass.—This invention relates to a new and improved knob latch for doors, etc., and it consists in a new and improved manner of attaching or connecting the latch to the hub of the door arbor, whereby the latch, in case of the door being closed while the hand of the operator is upon the knob, may be forced back and made to catch into or engage with the nosing, or strike equally as well as if the knob were perfectly free.

ANIMAL TRAP.—Hermann Belmer, Cincinnati, Ohio.—This invention relate to a trap that is stamped or pressed of wire cloth with a wooden or other bottom, and which has but one entrance or opening. The door to this opening is so constructed that a rat or other animal can easily open it from the outside, and so get into the trap, but when once in the trap it will be almost impossible for the captive to open the door from the inside.

BALE TIE.—L. Littlejohn, New York City.—This metal tie is for securing iron hoops on cotton and other bales and packages, and it consists of a stirrup yoke or bale, with an eye at one end and a hook at the other, in the former of which a headed pin is hung that at it its other end is headed, and is engaged with the hook end to the yoke or bale.

PHOTOGRAPHIC CAMERA.—F. E. Wilke, Brooklyn, N. Y.—This invention relates to a new device by which photographic cameras can be set up and down or inclined to any desired gage with great facility.

FULMINATE FOR NEEDLE GUNS.—Büchner & Ebertz, 202 Greenwich st., N. Y. City.—This fulminate is intended for needle guns which are provided with a needle designed to pierce or penetrate the fulminate. It is composed of chloride of potassium, sulphur, charcoal, niter, chlorate of potash, antimony, and mucilage or gum in about equal proportions, the office of the gum being to bind the other ingredients together so that they may be formed into elongated, conical, or other shapes, to insert into the rear of the cartridge. The inventors of this composition claim that it is certain fire, leaves no residuum, and is not affected by moisture.

ROLLER COTTON GIN.—J. W. Kokemuller, Bluffton, S. C.—This invention is an improvement on the old roller cotton gin and is designed to obviate the difficulty attending the springing of the rollers, a contingency due to the necessary small diameter of the latter. This difficulty, in connection with that of gearing the rollers so that they may be readily driven, renders the operation of the old roller gin very slow; it performs its work perfectly though slowly, and has not as yet been superceeded by any gin for thorough work, although other gins have operated more rapidly, but with more or less injury to the stock or fiber. This improvement admits of the rollers being rapidly rotated and without the possibility of their springing and without in the least injuring the fiber or stock.

LUBRICATOR.—Edwin Faull, Maldon, Australia.—The invention has for its object the obtaining a more certain and continuous supply of lubricating matter to the parts of machinery subject to friction and for this purpose I make the reservoir containing the oil or lubricating matter of glass or other transparent material, having a glass or other transparent conduit pipe through which I place a supply cock for the purpose of regulating the supply having a nut at one extremity, for the purpose of permanently adjusting it; below this regulating supply cock another similar one may be placed if desired for the purpose of cutting off the supply when needed, thus dispensing with the necessity of closing and readjusting the first mentioned cock. The coupling between the glass conduit pipe and the metal should be elastic to allow for the unequal expansion of the glass and metal.

HEMMER FOR SEWING MACHINES.—James R. Haggerty, Hillsdale, Mich.—This invention relates to an improved hemmer for sewing machines and consists in a hemmer having hinged edge turners.

BRICK MACHINE.—J. W. Crary, Pensacola, Fla.—This invention possesses a novel arrangement for crushing or pulverizing the clay, consisting of the rollers operating with different degrees of speed, whereby a combined crushing and grinding action is obtained which renders the operation of the rollers very efficient.

MOLD FOR CASTING LEAD.—S. E. Chubbuck, Roxbury, Mass.—This invention consists in suspending the box or mold on pivots and applying gearing to the same in such a manner that the box or mold with the plate it contains may be readily united and the plate discharged with the greatest facility.

SECRETARY BEDSTEAD.—J. F. C. Pickhardt, New York City.—This invention relates to a new and improved bedstead of that class which admits when not required for use, of being adjusted or folded up so as to resemble a secretary or book case, and when required for use, of being turned down and adjusted so as to serve equally as good a purpose as an ordinary bedstead. The invention consists in a peculiar construction and arrangement of parts whereby the bedstead is allowed to fold compactly within a case and still be of ample size even when designed to be occupied by two persons—such as are commonly termed double bedsteads—and the case also besides being ornamental, or chaste and neat, is capable of being made of quite moderate proportions not larger than an ordinary low secretary with book-case on top.

POWER FOR SEWING MACHINES.—L. Curdts, New York City.—This relates to a new and useful adaptation of a clock arrangement, with a spring or weight as a power to the driving of sewing machines. The invention consists in an improved means for controlling the power, a substitute for the pendulum, and also in an improved stop mechanism, and a brake, whereby complete control is obtained over the motion, its stoppings and starting and the regulating of its speed being at the will of the operator.

MILK COOLER.—N. C. Burnap, Argosville, N. Y.—This invention relates to an improved milk cooler and consists in a receptacle inserted in the middle of the milk can to receive ice or cold water. It is intended to be used while the milk is straining which is thus cooled by the time the can is filled.

METHOD OF HANGING SWORDS.—Virgil Price, New York City.—This invention consists in securing the plate by which the scabbard is fastened to the belt, by means of a chain, so as to make a flexible attachment which does away with all the straps used to hang officers' swords; it being as simple as the frog attachment which is generally used for fancy swords by free-masons and others.

RAILROAD SWITCH —Joseph P. White, Savannah, Ga.—This invention relates to a new manner of arranging a self-setting railroad switch, which is so constructed that the engineer on the locomotive can set the switch, while the train is moving at full speed so that it will enter the required track.

VISE.—J. C. Tate, New London, Conn.—The object of the invention is to provide a vise which can be used for general work in the machine shop.

COTTON CULTIVATOR.—Jesse Adams, Clarksville, Texas.—In this invention the hoes are made adjustable on a revolving shaft, bearing on an adjustable frame.

APPARATUS FOR EXTRACTING ESSENCES.—James C. Walker, Waco Village, Texas.—In this invention the extract is made under pressure, and bottled up, the whole process taking place in an air-tight apparatus, by which all the aroma is saved.

COMBINED PLANTER AND CULTIVATOR.—Jesse Adams, Clarksville, Texas.—The object of this invention is to produce a simple, practical, combined planter and corn cultivator, which shall be easily adjusted and operated, and shall be cheap and durable.

RAILROAD CAR HEATERS.—W. G. Kendrick, Wilmington, Del.—This invention consists in a heating apparatus suspended under the center of a car floor, in combination with certain pipes opening into the outer air, and registers to receive the air entering through and under the car doors, for the purpose of heating the same, and diffusing it when heated through the car, as hereinafter fully described.

SHIP VIAMETER.—James C. Walker, Waco Village, Texas —In this invention a tube is attached to the hull of the vessel, at or below the water line, through which a current of water is forced by the motion of the ship. At a convenient point in the tube a wheel is placed so as to be rotated by the current, and an indicator in some part of the ship, connected with the axle of the wheel, records the number of revolutions of the wheel, and in consequence the distance traversed by the ship in any given time.

TAILOR'S MEASURING INSTRUMENT.—J. M. Krider, Madison, Va.—The instrument has an elastic metallic strip and strap, which encircle the body under the arm pits. Upon the bar is a cross piece, which ranges vertically in front of the left arm; a movable stud slips upon the metallic strip, and is adjustable thereon, and a second metallic strip is adjustable on the movable stud. There are four points of departure on the instrument thus arranged from which measures are made and noted; and the instrument being detached and laid upon the cloth, the distances obtained are laid down from the points of departure as before, giving on the plane of the cloth the points by which to scribe and cut to fit the figure.

Answers to Correspondents.

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

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

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

J. E., of N. Y.—You are right in supposing that steam is invisible. What is seen issuing from an exhaust, or above the surface of boiling water, is spray, or water in a finely divided state. There is steam present in both of these cases but it cannot be seen. . . We understand that wood in seasoning contracts in every direction and hence that a seasoned tenon driven int green wood will become loose as the green wood seasons.

A. G., of Wis., would like to be informed how the column of air in front of a bullet can be practically exhausted, so as to secure the advantages claimed by Mr. Pardee on page 67. . . . The percussion powder of metallic cartridges is the same as that used for caps, fulminate of mercury.

T. S., of Idaho, destroys gophers by smoking them out. He takes a length of stove pipe, places near one end of it a grating, and provides the other end with a closely fitting cover with a hole in it to admit the nozzle of a hand bellows. He sets the pipe on the gopher hole banking it round with earth, puts rags and sulphur on the grating, sets them on fire, fits on the cover, and blows with his bellows. Whatever is in the hole never troubles any one afterwards.

N. T., of Pa.—The substance used to give the crystalline appearance on the somewhat fashionable wedding note paper, is sugar of lead. This paper is a good example of the folly of fashion.

H. W., of Pa.—Wood which has become creosoted becomes denser and tougher. The reason is that the resinous matter of the creosote fills the pores of the wood, and cements the fibers more firmly together The unpleasant smell of creosote, however, wonld render the process inapplicable for wood which is to be used in doors.

J. K., of Mich.—Turbines belong to the class of reaction wheels and yield more of the force of falling water than any other kind of water wheels. . . . Rubber cloth is suitable for small bellows and in fact is much used for blowing apparatus. We suggest to you to examine the bellows of accordeons and melodeons.

J. B. W., of N. H.—Most of the silver plating at present is done by the battery, and you will find that process quite suitable for your purpose.

J. H. C., of N. Y.—The Lawrence Scientific School, (Harvard), Sheffield Scientific School (Yale), and the School of Mines (Columbia) and The Polytechnic, Troy, N. Y. are institutions of the highest grade, and of such equal merit, that convenience, expense etc., might be sufficient reasons for choice between them.

R. G. C., of N. Y.—You need have no fear of the aerated bread on acoont of the conspicuous part which carbonic acid plays in its manufacture. The pores of the bread contain some of the acid, but its presence is in no way harmful.

C. E. F., of N. Y.—I think your reply to "W. J. B. of Mich," in No. 6 current volume was enormous; for since one cubic foot of water weighs 62.5 lbs., a column of water of one inch sectional area and one foot high would weigh 0.434 lbs., and one of five square inch sectional area and four feet high would weigh 8·68 lbs., instead of 42 60 lbs. as you state. . . Our intention was to give the weight of a column of water five inches diameter and four feet high. We copied from a manual for mechanics, instead of making the calculation, or of directing the inquirer to the professed authority. Whether they are right or wrong can be easily ascertained by investigation. The full theoretical effect of five square inches of water under four feet head is 0.25 horse power; the practical effect will vary from 30 to 90 per cent according to the kind of wheel used.

P. H., of Pa., wants the difference between one square mile and one mile square demonstrated. What demonstration is needed? A mile square and a square mile are identical; there can be no argument on this question. When you talk about two, three, four, or more square miles or miles square you change the subject entirely. These paltry arithmetical, or rather lingual puzzles are unworthy the time bestowed upon them. Our time and that of our correspondents can be better employed than on their solution or statement.

H. B. B., Jr., of Manchester, Eng., sends a diagram representing a pinion (driver) A, engaging with a gear wheel, on the shaft of which is another pinion, B, engaging with a gear wheel on a third shaft, and asks if it is not necessary that the pinion, A, and its wheel shall be as strong in pitch and width of face as the pinion, B, and its wheel on the third shaft. We reply that the last wheel—on the third shaft—and the pinion which engages with it should be as much stronger as the last wheel moves slower than the first. Example: If A makes forty revolutions and the third wheel ten, then the third wheel should have four times the strength of A, because the strain on it is as four to one.

C. S. W., of N. H. says:—"In your reply to 'R. S. S. of Ga.' in your issue of Aug. 10th referring to a pipe carrying wind from fan to cupola you say that 'when elbows are used they should have four times the sectional area of the straight pipe and asks.' Does this apply to water pipes as attached to force pumps for fire purposes?" The same law applies to your pumps as to the fan blower, if your pump is centrifugal. The angles will impede the current of the water. If your pump is a cylinder and piston the obstruction will be the same, but it is then simply a question of power to overcome the resistance and the strength of the pipes to sustain it.

H. W. H., of N. Y.—We know of no darker colored bronze than Copper, 85; Tin, 10; Zinc, 5.

J. M., of Mich.—We have as yet seen no official list of the awards at the Paris Exposition. Soon as the report is made it will be published.

C. C., of Miss., has a boiler 40 inches diameter, 26 feet long, with two 15-inch flues, chimney 24 feet high and 24 inches diameter. The grate of the furnace is about 18 inches from the boiler, and the passage for the smoke under the boiler is from four to six inches high. The mill is located in a swamp and no good draft can be obtained. Our correspondent asks the reason why, and inquires further for a cement to stop up blow holes in a cylinder. Reply. If you burn wood your grate is too near the boiler. It should be 30 inches from it. The under flue of boiler is of sufficient area, but if it has no pits it will choke. Your chimney should be at least 40 feet high. The boiler flues are sufficient for 18 feet of grate surface. The draft may be further increased by turning the exhaust steam into the smoke stack. Run it into the stack, turn it up and reduce the end aperture of the pipe to say about two inches diameter. We know of no cement for closing blow holes in steam cylinders. Your best way would be to drill and tap in a plug with a cement of red and white lead and linseed oil.

J. S. McC., of Ohio.—F. S. of Me., says that small cores for cast iron made of charcoal are very effective. He has used them three-sixteenths of an inch square and four inches long with success.

EXTENSION NOTICES.

Henry Waterman, of Hudson, N. Y., having petitioned for the extension of a patent granted to him the 15th day of November, 1853, and reissued the 9th day of July, 1867, for an improvement in safety valves for locomotive engines, for seven years from the expiration of said patent, which takes place on the 15th day of November, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 28th day of October next.

Laura S. White, administratrix of Jonathan White, deceased, of Antrim, N. H., having petitioned for the extension of a patent granted to the said Jonathan White, the 15th day of November, 1853, for an improvement in uniting shovel blades to handle straps, for seven years from the expiration of said patent, which takes place on the 15th day of November, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 28th day of October next.

Robert Sinclair, Jr., and Richard F. Maynard, of Baltimore, Md., having petitioned for the extension of a patent granted to them on the 15th day of November, 1853, for an improvement in feed rollers of straw cutters, for seven years from the expiration of said patent, which takes place on the 15th day of November, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 28th day of October next.

William B. Bates, administrator of the estate of George Wellman, deceased, of Mansfield, Mass., having petitioned for the extension of a patent granted to the said George Wellman the 6th day of December, 1853, and reissued the 30th day of July, 1867, for an improvement in stripping top flats for carding machines, for seven years from the expiration of said patent, which takes place on the 6th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 11th day of November next.

William B. Bates, administrator of the estate of George Wellman, deceased, of Mansfield, Mass., having petitioned for the extension of a patent granted to the said George Wellman the 18th day of March, 1856, antedated the 25th day of November, 1853, and reissued the 30th day of July, 1867, for an improvement in stripping top flats in carding machines, for seven years from the expiration of said patent, which takes place on the 25th day of November 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 11th day of November next.

NEW PUBLICATIONS.

A NARRATIVE OF THE CAMPAIGN IN THE SHENANDOAH VALLEY IN 1861, by Robert Patterson, late Major General of Volunteers. Fifth Thousand. Philadelphia: John Campbell.

In this volume General Patterson, while vindicating himself from the aspersions cast upon him for his management of the forces under his command at the time of the first Bull Run battle, has added a very important chapter to the history of our late war. It is a compilation of official reports and testimony, with just sufficient narrative by the author to give coherency and continuity to the account. A very accurate plan of the country covered by the operations of the first campaign of the war accompanies the volume. Gen. Patterson is one of the wealthiest and most extensive manufacturers in Pennsylvania.

A POPULAR TREATISE ON GEMS IN REFERENCE TO THEIR SCIENTIFIC VALUE: A Guide for the Teacher of the Natural Sciences, the Lapidary, Jeweler, and Amateur. By Dr. L. Feuchtwanger. Third Edition. Published by the Author, 55 Cedar street, New York.

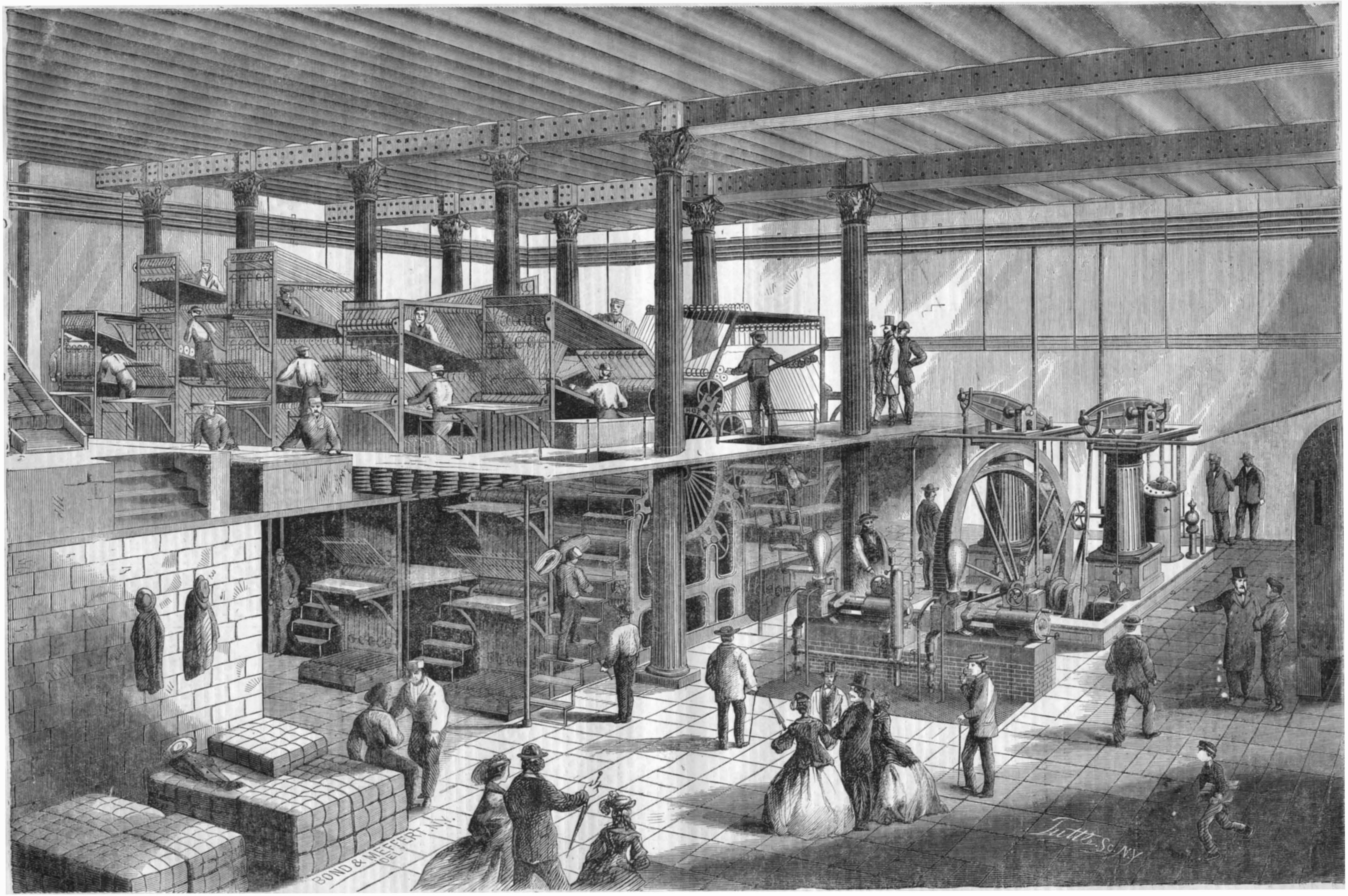
This edition of Dr Feuchtwanger's valuable work is greatly improved by the addition of an Appendix containing a chronological list of works on gems and minerals since the fifteenth century, a table of the characteristics of gems, and the present value of diamonds, precious stones, corals, and pearls. It has also a very life-like engraving of the author and a series of colored plates representing most of the precious stones and ornamental minerals. The treatise is filled with interesting facts.

NED NEVINS, THE NEWSBOY. By Henry Morgan. Fifteenth Thousand. Illustrated. Boston: Lee & Shepard.

This is the story of a Boston newsboy whose checkered career may be a copy of many others. The popularity of the story is sufficiently attested in the fact that it has reached its fifteenth thousand.

ELEMENTS OF CHEMISTRY, THEORETICAL AND PRACTICAL. By William Allen Miller, M. D., LL. D., etc. Part II. Inorganic Chemistry. From Third London Edition, with Additions. New York: John Wiley, 535 Broadway. pp. 805. Price $7.50.

Dr. Miller in this edition of his Chemistry adopts the atomic notation, and presents the most recent views of the leaders of the science. The republication of this great work at the present time is very opportune for American students. We have needed just such an authentic and reliable version of modern chemistry. It is the only large treatise extant which fully and fairly can meet the needs of American science. We understand the third and final volume, on Organic Chemistry, will be published in September.



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NEW YORK, SATURDAY, AUGUST 31, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

PETROLEUM FOR FUEL.

Some of the best inventive talent of the world has recently been employed zealously and hopefully on devices for using petroleum as fuel. Experiments have been conducted on the most liberal scale and the projectors have received the encouragement and applause of the public. Governments also have come to the assistance of private enterprise. In the United States, two independent series of experiments, lasting many months, are going on night and day, quite regardless of cost, under the patronage of the Naval Department. When the authentic records of these labors are brought together and studied, it will be found that the subject has been very thoroughly explored.

We are right, then, in assuming that the practical difficulties pertaining to the construction and management of petroleum furnaces, are fairly met and obviated. We assume that petroleum fuel is safe, that the petroleum furnace may be automatic. For the moment, we admit, all the conveniences fairly claimed for petroleum fuel in order that we may more directly fix attention on a single other consideration which is generally overlooked or misrepresented. We allude to the cost of the heat which petroleum can produce.

The question of the cost of petroleum heat seems to us vital and fundamental. The answer to this modifies every other consideration; it should be the starting point of all our reasoning. When we know precisely what can come out of petroleum, we are ready to discuss, intelligently what may be done with it.

Fortunately the question can have no doubtful answer. The methods of estimating the heat of combustion are constantly subjected to the scrutiny of scientific and practical observers. The figures which are agreed upon are known to be so accurate that no error can ever be discoverable when they are adopted as a guide in practice. The total heating power of petroleum may be variously stated according to the standards of measurement adopted, but for our purpose it is most convenient to reckon it in terms of pounds of water at 212° it can evaporate by its complete combustion. It has been ascertained that the heat from the combustion of one pound of petroleum can evaporate from twenty to twenty-two pounds of water, the water being taken at 212°. The variation of 20 to 22 is due to the fact that the composition of petroleum is not constant; for convenience we take 21 to represent the heating power. For comparison it is necessary to understand that the heating power of pure carbon is the evaporation of fifteen pounds of water at 212°. The heat-values of petroleum and carbon are therefore as 21 is to 15.

The petroleum and coal of commerce are, however, not the pure substances on which the above figures are based. The ratio of 21 to 14 or 3 to 2, probably, very nearly represents the relative heating power of the petroleum and coal which are actually in use. Petroleum then gives fifty per cent more heating power than coal, and taking nothing else into the question, we can afford to give in money fifty per cent more for petroleum than for coal. If we go into the market to-day we find that we can buy crude petroleum for 21 cents per gallon, and coal for $6 per tun. Reducing to cost per pound we find that a pound of petroleum costs three cents and a pound of coal one third of a cent. Weight for weight petroleum costs nine times more than coal; and taking into account that the petroleum has a fifty per cent greater value, we find that the relative costs of the heat of petroleum and coal are as six to one. We repeat: petroleum heat costs six times more than coal heat.

There are objections, however, to such a putting of the case. It is said, for example, that the ratio of 21 to 14 is not shown to be true in actual practice; instead of a pound of coal evaporating fourteen pounds of water, the number of pounds in actual good practice is seven, and with our improved petroleum burners we hope to reach twenty-one. Let the ratio of 21 to 7 or 3 to 1 be assumed as possible, and then at the prices—21 cents per gallon and $6 per tun—petroleum heat would cost three times more than coal heat. But there is no ground for the hope that one pound of petroleum will ever, in practice, evaporate twenty-one pounds of water; in fact, the most authentic experiments thus far indicate that the ratio of 3 to 2 is sufficiently generous towards petroleum. We need more data than are at present at our command to determine precisely the most truthful expression for the ratio of practice; but we are quite willing to believe that it will be somewhat more favorable to petroleum than 3 to 2.

It is objected that our prices are not a criterion for other times and places. It is quite true that the relative prices are often more favorable to petroleum. At the oil wells, petroleum has been sold at a lower rate by weight than coal. If the ratio 3 to 2, representing the relative heat values, be kept in mind, it will be a simple thing to compute any question of cost. For example: If coal cost $6 per tun, what must be the price per gallon of petroleum, to furnish heat at the same rate as the coal? Answer: Three and one-half cents.

It is our purpose in future, taking the above as a starting point, to show where petroleum fuel is economical and practicable.

ORIGINAL INVENTORS AND MECHANICAL IMPROVERS.

Comparing the present style of inventions for which patents are granted, with some of those in the past whose use and reputation are universal, the superficial observer may conclude that either the period for great inventions is gone, or that the race of inventors has deteriorated. A little consideration will probably show that this view of the situation is erroneous; and to arrive at this conclusion it is not necessary to belittle the work of those who have gone before us. In many instances their success seems to have been achieved by inspiration rather than reached by persevering and patient effort.

Take the greatest of Watt's inventions—the steam engine. While it cannot be disputed that many very useful improvements have been made in the tools for its manufacture and in the perfection of its parts, consequently in its value as a motor, the steam engine of Watt is in all essential respects the steam engine of the present day. Indeed, engines of his manufacture are still running in England and doing good service. So with the forming lathe of Blanchard; it has received no really radical improvement since his first successful machine went into operation. Whitney's cotton gin is the gin now built, altered, perhaps, in form, proportion of parts, and rapidity and perfection of execution, but still Whitney's gin in all essential points. The tack and nail-cutting machine of Read remains nearly the same as when first invented. Howe still receives a royalty from the various manufacturers of sewing machines.

But while these facts are incontrovertible, it is no less true that, although the principle of the primary invention may remain the same, improvements have been made in its application which wonderfully enhance the value of the machine to which they are applied. If an inventor improves a machine which, in its crude state, was itself only an improvement on the hand labor it was intended to supersede, and makes it doubly or trebly valuable, shall he not have the credit and reward as well as the original projector? There are cases where the value of these improvements has alone popularized and made remunerative the original invention. Let the machinist of twenty-five years' experience remember the rude lathe with wooden shears and slide rest for screw cutting, and then look upon the perfect specimens of the machine as turned out by the best makers at the present day, and he will be convinced that the inventor of improvements is worthy a place among the discoverers in mechanics. Surely if Sterne's aphorism, "he who makes two blades of grass grow where only one grew before, is a benefactor of his race" is correct, the inventor of improvements can fairly claim that honor.

DO METALS GROW.

It is supposed by some that the metals were formed or deposited in some past age of the world by the agency either of heat or water, during some great convulsions of nature such as have not been witnessed in the period embraced by written history or tradition. There are reasons for doubting the reliability of this opinion. That various mineral substances are now in process of formation or development is certain. For instance, the formation of stone is as apparent as its disintegration. On the beach at Lynn, Mass., may be seen a conglomerate of clay and silicious sand impregnated with ferrous oxide, in all stages, from the separated particles to the layers of hardened rock. These rocks are merely the particles of sand, cohered and agglutinated by means of the clay and the oxide of iron, the salt water acting as a solvent of the softer particles and the sun's rays compacting and baking all together in one mass. So, also, we know that coal is being formed from peat. The intermediate stage is lignite or "brown coal" which in turn becomes coal.

It is morally certain that gold, silver, copper, and some other metals are now in process of formation or deposition. Abandoned silver mines in Peru have been found rich in arborescent deposits of the metal on the walls of galleries unused for many years. A gold-bearing region after having been cleaned of the precious metal gives good results after the lapse of only a few years. So with copper. In the Siberian mines not only the precious carbonate known as malachite but the metal itself, in a state of almost absolute purity is deposited on the walls, roofs, and floors of galleries run under the earth's surface. In some places it appears in masses and in others as tree-like formations, with trunk and branches similar to a delicate moss.

What becomes of all the gold and silver unavoidably wasted in the process of manufacture and the wear of transmission from hand to hand as currency? It is well known that with all the care exercised in the manufacture of these precious metals, and notwithstanding their specific gravity, an appreciable portion of them is utterly wasted; at least so distributed as to be incapable of being collected and used again. Is it annihilated? The teachings of science prove this to be impossible. Nothing is ever wasted. If the particles are thrown into the atmosphere they must in time seek the earth's surface. Are they attracted by some unknown power to certain localities, and if not, why should not the streets of a busy city become in time deposits of the precious metals?

Perhaps, after all, the old alchemists had an inspiration of what may yet become *un fait accompli*. When we understand the wonderful processes of nature's laboratory we may possibly imitate her and grow our own metals as we now do our own vegetables; or we may find the philosopher's stone and actually collect the particles of metals, if we cannot transmute a base mineral into one of the precious metals.

A GREAT NEWSPAPER ESTABLISHMENT.

Although the rich white marble front of the new *Herald* building had towered over Broadway as one of its most striking landmarks for the best part of a year, it was not until about the middle of May, that the machinery of the new establishment commenced turning out newspapers, nor is it even yet at its mature complement.

The top and bottom extremes of this building, devoted to the mechanical departments, are its most extraordinary and interesting parts. Each of these—the basement and the Mansard upper story—is a magnificent hall, twenty-four feet in hight, one hundred feet long, and from fifty to sixty feet wide: the rear end of the upper story, however, being partitioned off for the stereotyping department. Probably there is nothing like this establishment devoted to printing a newspaper, elsewhere in the world. Few princes and great men do their work, such as it is, in halls so lofty, airy, and salubrious as that occupied by the *Herald's* compositors. Both light and air, on that unobstructed hight, far above the city chimneys, have all the freshness and amplitude of open day, yet agreeably tempered to every variation of weather by capacious ventilators in the iron roof and sides, steam coils, lofty windows, and the glass bulls eyes that thickly stud the roof. The stands in use accommodate 70 compositors, and hundreds of gas burners stand ready, with intervals of only a few inches, to illuminate instantly any spot upon which light is wanted. Of course the conveniences for making up the forms, for the accommodation of standing type, etc., are very ample and perfect. In the stereotyping room stand the heavy presses for stamping the type forms into sheets of soft paper; the melting furnace, surrounded by iron flasks in which the paper molds are placed for casting, hung by trunions on iron carriages; and cutting machines that gage and trim the edges of the plates instantly and to a hair. On one side is the minor elevator, with its donkey engine a hundred feet below, by which the plates descend to the press room and return. Near this is the great elevator, with its more powerful engine and machinery in the basement, which a person on any floor of the building may operate by a cord, ascending or descending at will, with the heaviest loads.

The machinery hall in the basement—of which a fine view is presented in the engraving—has its imposing appearance somewhat broken up by a broad gallery running all around and between the printing machines for the accommodation of the pressmen and feeders, and almost dividing it into two stories. Two rows of tall iron columns support the floor above, and massive piers of masonry sustain the walls at the sides on Broadway, Park Row, and Ann street. Beyond these piers, beneath the sidewalks, are arranged the boiler rooms, coal and paper storage, and vats for dampening the huge piles of paper required for every day's edition. The coal chute from the street conducts to a boiler iron reservoir balanced on a platform scale which shows the weight of the load as soon as dumped, and a hinged bottom in the reservoir then opens and drops the fuel at the feet of the fireman below.

The engines, of 60-horse power each, are of the favorite style known as the "beam engine," built by R. Hoe & Co., the builders also of the immense presses, and are models of strength and beauty, combined with simplicity, compactness and good workmanship. They are connected one at either end of the fly-wheel shaft, so that they can be run together if required, although ordinarily run separately. The cylinders are fitted with the simple long-lap slide-valve, arranged to cut off the admission of the steam at two-thirds of the stroke. The governor is of the well-known Judson patent, and regulates the speed to perfection. The shafting consists of a single line placed beneath the floor and runs along by, and drives, each press.

The publication office, on the street floor, is the most sumptuously furnished room we have ever seen opened to the public for business; the counters being composed of fine variegated marble, polished and paneled, and surmounted with desks and railings of carved and inlaid walnut, with plate glass windows and doors for transacting business, in the fashion of first class banking houses.

The editorial establishment is mainly on the second floor, and has its peculiar features of mark, among which may be mentioned the handsome "council chamber" wherein the managing editor daily meets his staff to confer upon the affairs of the day, determine the course to be taken, and assign to each his *rôle* in the next morning's editorial demonstration. Near to this is the manager's private office, and connected with it an inner sanctum where a Wheatstone's telegraph communicates with the senior proprietor's residence on Washington Heights, eight or ten miles distant, by a private line of wires erected expressly for the purpose. The library is a large apartment not yet fitted up, designed for shelves from floor to ceiling, accessible by stairs and balconies, and to contain thousands of books of reference on the innumerable subjects constantly arising in a daily paper. The numerous editors and editorial writers have their separate apartments on this floor, and the reporters' room has accommodations for more than a dozen at once. There is also a reception room furnished with files of the daily papers, and a doorkeeper always in attendance at the entrance, to admit or exclude. The proof-reading room is a good-sized apartment on the floor beneath the compositors', connected with the latter—like the editorial and publication offices—by small hand elevators and pipes. One of the excellent features of the system is the index office, where every event and subject noticed in the paper is indexed daily, and may be referred to in a moment, many years back. For system, completeness, and extent, the now *Herald* establishment, editorial, mechanical, and commercial, is probably without a rival.

For the Scientific American.

THE FIFTEEN-INCH BALL VS. ARMOR PLATES.

The fifteen-inch cast-iron navy smooth bore cast by Alger, of Boston and sent to England for the British ordnance officers and iron plate commissioners to experiment with, underwent its preliminary trials for "velocity, range, and accuracy," at Shoeburyness, on the 27th June last. Fifteen rounds were fired with cast iron balls averaging a little more than 450 pounds each.

The first three rounds were fired with 35 pounds of the "mammoth grain" powder. Elevation 2 degrees; range, 711, 740, 737 yards respectively; velocity of ball averaged 920 feet per second; deviation of shot, $\frac{6}{10}$ of a yard to the right.

Next three rounds with 50 pounds "mammoth grain." Elevation as before; range averaged 987 yards. Velocity of ball, 1,110, 1,120, 1,133 feet per second respectively; deviation from 2 to 3·2 yards to the right.

Next round, 60 pounds of "mammoth grain" powder—elevation the same. Range, 1,138 yards; velocity of ball, 1,210 feet per second; deviation of shot, 1·4 yards.

Next three rounds with 35 pounds of English powder of the following character and composition: Number of grains to an ounce, 500; niter, 75·3 per cent; sulphur, 10·3; charcoal, 14·4; moisture, 1·07; density, 1·74. Elevation the same; average range, 873 (?) yards; velocity, 1,044 feet per second; deviation of shot, ninth round "flew absolutely straight;" greatest deviation of the other two, 1 yard.

Next three rounds with 50 pounds of the same powder—elevation as before. Last round gave a range of 1,140 yards, with a velocity of 1,214 feet per second. Deviation—one round "flew straight to the mark;" last round deviated 2·4 yards.

Two rounds were then fired with 60 pounds of the "mammoth grain" powder, with about the same results as the other rounds with the same powder.

These preliminary trials seem to have astonished the British artillerists not a little, with respect to both velocity, range, and accuracy. *Engineering* remarks: "After Thursday's experiments we trust we shall hear little more of this parrot cry about *low velocity*;" and "As regards accuracy, we fancy the results must have surprised some of the judges not a little." Not only were the British artillerists astonished, but it was shown that one of the most distinguished of this fraternity, Captain Noble, of the Royal Engineers, who wrote the elaborate report to the Ordnance Select Committee, did not understand certain elements which should be regarded in computing the effect of large spherical shot. This officer, in the report alluded to, after extolling the power of the 9-inch wrought-iron Woolwich rifle, the favorite English gun, made a calculation which seemed to prove that the 15-inch American smooth bore was a mighty poor concern. These calculations, together with the termination of the gallant Captain's report, in which he pooh-pooed the American gun, seem to have been extremely gratifying to the British journalists. Ponderous leaders were written, and Lord Elcho was for the time pretty well put down for his Parliamentary attacks on the extravagance and inefficiency of the Ordnance Department of the government. He was for the time looked upon pretty much as our artillerists and engineers regard Mr. Wiard.

On page 30 of his report, Captain Noble sets forth as the result of his calculations on the American smooth bore, that with 50 pounds charge of English powder and a 484-pound spherical shot a velocity of 1,070 feet per second will be the result. This is equivalent to a dynamic force represented by 8,658,760 foot-pounds, and 8,658,760÷50=173,175 foot-pounds to each pound of powder.

Now on the trials for range, velocity, etc., which are given above, it is seen that Captain Noble himself propelled the 450-pound 15-inch ball with 50 pounds of English powder with the velocity of no less than 1,214 feet per second. The dynamic force of this ball was therefore represented by 10,328,400 foot-pounds, or 10,328,400÷50=206,570 foot-pounds to each pound of powder, that is, 206,570—173,175=33,395 foot-pounds *more* energy per pound of powder than stated in his calculation on which he based his erroneous opinion of the power of the gun.

In no case which has fallen under the observation of the writer has a pound of powder in the English 9-inch rifle developed a greater energy than 175,000 foot-pounds; this with a 250-pound cylinder will give a velocity of about 1,400 feet per second.

Having thus shown that Captain Noble made a mistake of 1,569,634 foot-pounds in his calculations based on a charge of but 50 pounds, let us turn to the trials which took place at Shoeburyness in July last with the 15-inch gun against armor. The target was constructed of John Brown's celebrated solid iron slabs, 8 inches thick, laid on a teak backing 18 inches thick, placed on the $\frac{3}{4}$-inch iron skin of the ship, to which were secured "a double number of supporting ribs." It is almost unnecessary to remark that such a cuirass as this is not carried by any French or English iron-clad, and that the *Warrior*, with her 4½-inch plates and 18 inch teak backing, represents the average impregnability of the iron-clads of the powers alluded to; and bearing in mind that the shot-resisting power of solid slabs varies as the square of their thickness, the immense difference between such a protection and the target fired at will be seen.

Against this target three rounds were fired from the 15-inch gun, as follows:

First Round—Range, 70 yards; American cast-iron spherical shot, weight 453 pounds, diameter 14·895 inches; charge 60 pounds of "mammoth grain" powder; velocity, 1,174 feet per second. The effect, according to the London *Mechanics' Magazine*, was as follows:—"The shot struck the target near the horizontal junction of the armor plates, nipping about two inches only of the lower one, and smashing a deep indent of four inches into the plate, rebounded nearly entire—the striking face being flattened and a few largish fragments splintered off—twelve feet back from the front of the target. The armor plates were separated from each other vertically at the left edge about two inches, the space tapering along the whole plate to the right. The buckling from the indent extended over forty-one inches of area, and at the striking point (three feet from the left edge of the target) was inward to the extent of five inches," and the effect on the rear of the target was to bend the six supporting ribs "some inches," and to "slightly crack" them, and six butt-joints of the skin plates were opened along their entire length.

Second Round—Range the same. Pontypool No. 6 cast-iron spherical shot, weight 452·5 pounds, diameter 14·89 inches; charge same as before. According to the same authority, the effect was that the ball "struck about two feet six inches from the right end of the armor plate on the median line. Half the shot stuck in the indent (seven inches), the other half splintering off to a ragged, nearly flat face. Buckle on the vertical line; three inches at the middle of the width of the plate, and on the horizontal line, 1·6 inches, extending over a surface of five feet,"

Third Round—Firth's steel spherical shot, tempered in oil, weight 498 pounds; charge same as before; velocity 1,134 feet per second; it pierced the plate 8·2 inches. The *Mechanics' Magazine* says: "It struck about five feet from the left end and a foot from the top edge of the lower armor plate, and stood out from its front perfectly entire (except six or eight radiating narrow fissures) for about eight inches, the remainder being buried in the indent it had made in the plate."

Now in order that the reader may have a correct idea of the relation between the power of the 15-inch gun and the resisting capability of this tremendous target, it will be enough to state that about 40 per cent less than the real power of the gun was employed in these trials, and as an examination of the results show, a slight increase in the velocity of the big balls would have put them through the target. In short, as a cotemporary remarked, "what the effect of ten pounds more powder would have been, was drearily confessed by all the spectators of the trial." "The *Hercules*," says the *London Herald*, "ought to keep those missiles out; but she is not yet afloat. But it is something essential to know that henceforth no English man-of-war could be laid broadside against an American ship carrying guns of this caliber."

The English journals, both scientific and popular, have made a curious mistake with regard to the strength and quantity of the powder employed by us in the 15-inch gun. They call the "mammoth grain" powder used in these trials "American" powder, in contradistinction to their own, and state that sixty pounds of the "mammoth" is the maximum charge. The following extract from the instructions of the Naval Ordnance Bureau, issued during the war—April 1, 1864—while the experiments for endurance with the 15-inch gun were progressing, will show how very much less than the real power of the piece was used on the late trial: "Sixty pounds may be used for twenty rounds of solid shot. Cannon powder only should be used, as 35 pounds of this kind gives a greater range than 50 pounds mammoth powder."

Thus it is seen that the weight of the charge of "mammoth grain" used on the trial against the English target was equal to less than 42 pounds of such powder as is always used in the 15-inch navy gun, and 60 pounds of our powder gives a velocity of over 1,400 feet, against less than 1,200 obtained on the English trial ground against their target. Remembering that the power varies as the square of the speed, it cannot fail to be seen that the proper charge would have pierced and smashed this tremendous target. Seventy pounds of our cannon powder has been frequently employed on the trial ground, and a few months since a velocity of nearly 1,600 feet per second was achieved with the 15-inch gun with 100 pounds of "mammoth grain."

Perhaps the natural delicacy of John Bull has made him fearful of injuring the Yankee gun, but it is much more likely that his great care of the gun is due to his fear, not of bursting the piece, but of bursting his target and his reputation at the same time. N.

GUNPOWDER---ITS MATERIAL AND MANUFACTURE.

The origin of this composition, which may be considered, next to steam, as the most influential agent in human progress, is involved in hopeless obscurity. It certainly was known to the Chinese and Hindoos at a very early period. The Chinese histories make repeated mention of it at a time when European nations were sunk in semi-barbarism, and Philostratus in his life of Apollonius Tyanæus speaks of the Oxydracæ, a people living between the Hyphasis and the Ganges, whom Alexander declined to attack because "they come not out to fight those who attack them, but those holy men, beloved of the gods, overthrow their enemies with tempests and thunderbolts shot from their walls." Hercules and Bacchus, who from Egypt overran India, were repulsed by these people "with storms of thunderbolts and lightnings hurled from above." The invention of gunpowder has been attributed to a German monk and alchemist of the 14th century, named Schwartz, and also to Roger Bacon, commonly known as Friar Bacon, who lived in the 13th century. But it is certain the latter referred to it as a composition already known as a scientific toy or means of amusement, and if so the claims of Schwartz who lived years afterward are of no value. It is somewhat remarkable that to ministers of the gospel of peace should be attributed the credit of inventing such an agent for the destruction of human life. It is singular, also, that the composition and the proportions of the constituents of gunpowder should remain radically unchanged from the earliest period to the present time.

Gunpowder is composed of niter, charcoal, and sulphur; according to Benton the proportions used by the United States government are niter, 76; charcoal, 14, and sulphur 10. According to the same authority the parts performed by these ingredients are shown by the following table:

COMPOSITION OF GUNPOWDER.

BEFORE COMBUSTION.		AFTER COMBUSTION.
3 parts of carbon,	3 carbon, 6 oxygen,	3 carbonic acid (gas).
1 part of nitrate of potassa,	6 oxygen, 1 nitrogen, 1 potassium,	1 nitrogen (gas).
1 part of sulphur,	1 potassium, 1 sulphur,	1 sulphide of potassium (solid).

A gunpowder can be made of niter and charcoal alone; but it is not so strong as when sulphur is present; beside, the substance of the grain is friable, has considerable affinity for moisture, and rapidly fouls the arms in which it is used. Theoretically, sulphur does not contribute directly to the explosive force of gunpowder by furnishing materials for gas, but by uniting with the niter it affords a large amount of heat, and prevents the carbonic acid from uniting with the nitrate of potassa, or niter, and forming a solid compound, the carbonate of potassa. It is to the heat and carbonic acid thus formed that gunpowder mainly owes its explosive force.

Niter does not absorb moisture from the ordinary atmosphere, a very important quality in the principal ingredient of gunpowder; it is decomposed when strongly heated and oxygen is evolved at first; finally nitrogen is given off, and peroxide of potassium remains. When heated with combustible materials it is completely deprived of its oxygen; this is the part it plays in gunpowder. Charcoal is an absorbent of oxygen and very combustible. In burning, a large amount of carbonic acid is evolved. When first prepared by heating in a closed iron retort, it will, if pulverized, absorb so much of the oxygen of the atmosphere and so rapidly, as sometimes to ignite by spontaneous combustion. The properties of sulphur in gunpowder have been already described.

The explosion of gunpowder is a deflagration in which the combination of the ingredients is completed at once, the whole, or most, passing almost instantly into a gaseous condition by the influence of heat. The gases are combinations of the carbon of the charcoal with the oxygen of the niter; the sulphur serving to decompose the nitrate of potash by combining with its metallic base and thus setting free another atom of oxygen for producing more carbonic acid. The accession of heat thus engendered, also greatly adds to the effect. The sulphur and niter are refined to a point of almost absolute purity, and great care is exercised in the preparation of the charcoal and in the selection of the material from which it is produced. It is usually made from the twigs of the black dogwood, black alder, or the willow, the latter being exclusively used in this country. It is charred in closed retorts of cast iron at a low temperture, as it is found that the lower the heat by which the change is effected the greater the combustibility of the charcoal. Each of the ingredients is ground to impalpable powder and bolted. They are then weighed in proportions and sifted into a trough or cylinder in which are revolving fans which intimately mix the constituents.

They are then taken to a mill similar to that known as the Chilean mill for grinding gold-bearing quartz, which is simply a vertical shaft, having on two projecting horizontal arms immensely heavy rollers of cast iron which revolve on a circular cast iron bed having wooden sides. From forty to fifty pounds are put into the mill, moistened with water, and ground by revolving rollers. It is in this grinding process that those fearful accidents occur which occasionally horrify the public. The mill is isolated and at a distance from others, which are protected by trees or earth traverses. It requires from three to five hours to complete the grinding process. If a particle of grit gets into the mill during the process the result is almost unavoidably an explosion.

When taken out it is dried and presents the appearance of grayish black cakes called mill cake. It is then sprinkled with water and spread on brass plates in a press and subjected to immense pressure. This press is a hydraulic press, as the flying dust of the powder might become ignited by the friction of a screw. It comes out in thin, hard cakes, and is broken and granulated by being passed between fluted rollers, one series after another, being passed from one to the other over sieves which have a reciprocating or shaking motion.

The powder is then assorted by means of other sieves and the dust returned again to the press. The edges or corners of the grains must next be worn off to prevent loss from dust while in transportation. This is done by revolving a quantity in a tumbling box or barrel, in which it is also glazed by having the barrels lined with woolen. Drying on sheets in a heated and ventilated room completes the process.

Missouri Tin.

We believe that the discovery of these mines has not as yet seriously influenced the tin importations or affected the market to any considerable extent. "Prospects" are excellent, and speculators are confident, but results do not seem to justify the extravagant stories so prevalent in the interested regions. Lands in Madison and Iron counties, hitherto considered worthless, have suddenly acquired a fabulous value. Like the mining and oil manias, the tin fever has assumed a contagious form and is now ferociously raging in all the neighborhood around. As to the discoveries of these tin deposits we have seen no statement. A Dr. Farrell, and Dr. A. C. Hoch, are named as rival claimants. Each, our authorities state, some nine or ten years since was impressed with the belief that the ore existed in immense quantities in these regions. The former gentleman regards southeastern Missouri as a vast storehouse of mineral wealth; iron, lead, zinc, cobalt, copper, barytes, kaolin, and nickel being abundant. "The tin most abundant here" writes a correspondent of the Chicago *Republican*, "is the greenish brown, crystalized tinstone, very heavy and hard. However, since a few Cornwall miners have been employed in prospecting, beautiful block tin-crystals have been found in the beds of streams where lodes have been cut across by the washings of mountain streams, and some of these are so similar to the tin-crystals from European mines that they would be said by a casual observer to have come from the same lode or vein.

In the well-defined lodes, no shaft has been sunk more than 12 or 15 feet, and at this depth ore has been obtained from immense deposits, which will, in the opinion of Cornwall miners, yield from ten to 25 per cent. In Cornwall some ores are worked at a profit which yield only two per cent., and the general average of all ores, for which they go from 1,000 to 2,000 feet below the surface, contain from 4 to 15 per cent, and have heretofore been considered the richest of any worked in the world. Besides this, the mineral here crops out in hill-sides, thus greatly lessening the labor and cost of obtaining the mineral, compared with the Cornwall mines.

The "Champion lode," at "Tin Mountain," is between 500 and 600 feet wide, standing nearly perpendicular, with a slight dip toward the west. This deposit or lode runs north and south, 20° east. It is cut across by a small stream fed by three springs, and at the crossing of this stream a branch lode runs north, 5° west, and both the so-called main lode and the branch appear to run through a large porphyry covered hill. On the opposite side of the hill, at about the same elevation, lodes have been discovered of sufficient size and richness to satisfy the company that it is their interest to erect furnaces, and develope the mine without unnecessary delay.

The deposits I have visited (some of which I discovered) are in townships 31 and 33, range 6 east, in Madison County; but from specimens furnished me from other localities, I believe other deposits will be found in Iron and Wayne counties, and that the tin region will embrace an area of 20 or 25 miles. The distance from the localities where tin has thus far been found, in Iron county on the west to Madison in the east, the extreme distance between the remote lodes thus far known (the minerals of which have been tested chemically and practically), is 24 miles.

Men are yet incredulous, and can hardly believe that tin really does exist in Missouri, or elsewhere in the United States. Capitalists go to the tin region, collect specimens, ask scores of questions, and still cannot believe what is told them by Cornishmen there employed. They ascertain the price of the land, and are afraid to buy even at the low price, and "for timber land;" come to the city to have an analysis made, see the tin brought out, and finally return to buy the land, and find it sold for fourfold more than it could have been purchased by them four days before. "Our doubts are traitorous, and make us lose the good we oft might win, by fearing to attempt."

Several thousand acres of land have been purchased in this region by parties who have evidently designed to secure all the tin land, and much of it has been entered at government price; but the probabilities are that still other good lodes will be found outside of the limits thus far explored. This region is generally heavily timbered with pine, oak, hickory, etc., furnishing an abundance for building, fuel, etc., and well watered by cold, spring-fed brooks.

Return of "New Island" Expeditions.

The schooner *Leah* had returned to San Francisco from the search for the island reported discovered in longitude 150 50 W. and latitude 40 40 N. The search, though extending as far west as 160 degrees, and from 39 to 41 north, was unsuccessful, no land being seen. In the immediate vicinity of the reported location of the island a terrific sea was encounted, caused by a southeast gale. During the search a tract of discolored water was found, extending about 250 miles south-east and northwest and about 86 miles wide. Attempts were made to sound, but the sea was so rough that it was not satisfactorily done, and no bottom was found with 150 fathoms line. The water was, however, of a greenish color, similar to that found between the bar and the Farralones off San Francisco, and it was believed that comparatively shallow soundings could be found in searching in calmer weather. Vast numbers of small birds, like sand-pipers, were seen, some of which, as well as several large birds resembling boobies, alighted on the vessel. Immense quantities of "Portugese Men-of-war" were seen, the sea at times being literally covered with them, they resembling a sheet on the water and stilling the violence of the waves. From the discolored water and birds seen, (which latter are not found any great distance from land,) it is believed that an island exists not very remote from the locality visited. Capt. Matthew Turner, who has returned from similar search made in the schooner *Caroline Mills*, says that a tract of discolored water which indicated soundings was found near the reported locality of the land. This tract extended some 200 miles one way by about 60 miles the other. Soundings were attempted, but no bottom was found with 120 fathoms line. Capt. Turner believes that soundings can be had if proper search is made for them, and that in such case good fishing ground will be had. Capt. Turner was three days exploring for the island, but, although he searched diligently from 149 to 151 west, and from 39 to 41 north, found no signs of land.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING AUGUST 13, 1867.

Reported Officially for the Scientific American

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

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

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

67,625.—Spice Box.—Wm. E. Andrews, Cambridge, Mass.
I claim, 1st, As a new article of manufacture, a portable set of spice drawers, made substantially as described and for the purposes set forth.
2d, The combination of the extension, F, of the front of the drawer with the holder, H, for the purpose set forth.
3d, The combination as well as the arrangement of the extension, E, of the piece forming the inner end of the draw with the case or box, A B, when the whole is made substantially as described and for the purpose set forth.

67,626.—Joint Splice for Railroad Rails.—Joseph Anthony, Greenbush, N.Y.
I claim, 1st, The combination of the rails, A A, the splice rail, C, and the open link bolts, E.
2d, The combination of the rails, A A, the splice rail, C, the open-link bolts, E, and the beveled washers, o.
3d, The combination of the rails, A A, the splice rail, C, the open-link bolts, E, and the beveled washers, o, and the fish plates, F.

67,627.—Ointment for Horses.—G. P. Barnum, Marion, Iowa.
I claim the compound consisting of quicksilver, nitric acid, pulverized cantharides, corrosive sublimate, red precipitate, and oil of vitriol, as an ointment to remove blemishes from horses and other animals, substantially as herein set forth and described.

67,628.—Wagon Beds.—Riley Bratton, Oskaloosa, Iowa.
I claim an improvement on ordinary wagon beds, as herein described, consisting of metallic standards with hooked ends fastening in staples, and the peculiar form of standards and location of staples, as my invention, by which a wagon bed may be easily and quickly taken apart and put together.

67,629.—Filling for Safes.—H. H. Bryant, Boston, Mass.
I claim the use of sponge as a filling for a safe, or other structure of a similar nature, or any other porous and absorbent substance that is its substantial equivalent, as and for the purpose herein set forth.

67,630.—Adjustable Rest for Lathes.—J. E. Burdge, Cincinnati, Ohio.
I claim hinging one end of the tool block, F, to the transverse sliding head, C1, by a bolt, c, and raising and lower the other end of the tool block, F, by means of a wedge, D, or an equivalent device, whereby the cutting edge of the tool, H, may be raised or lowered as desired, while the lathe is in motion, or otherwise, and presenting it in a proper position to the material being turned, substantially as described.

67,631.—Carriage Coupling.—John H. Burrell, Jr., Charlestown, Mass.
I claim a coupling made of three parts, A B and C, substantially as described and for the purpose set forth.

67,632.—Brick Cars.—John K. Caldwell, Pittsburgh, Pa.
1st, I claim hinging the shelves of a car for drying brick, fruit, grain, and other articles requiring such treatment, to an upright standard, or to upright standards, being attached to and supported by a truck or car frame, substantially as and for the purposes hereinbefore set forth.
2d, A spring, b, with a bevelled catch, i, attached to a standard, d, in combination with a shelf, or with shelves, f f', which it is designed and adapted to retain in an upright position, substantially in the manner and for the purposes above set forth.

67,633.—Window Fastening.—Benjamin F. Carleton, Nashua, N. H.
I claim the combination of the button, E, with the spring, R, when made and arranged substantially as described and for the purpose set forth.

67,634.—Harrow.—L. Coleman (assignor to Willis S. Coleman), New Orleans, La.
1st, I claim the combination of the two series of revolving disks, B B B and C C C, or their equivalents, when the same are constructed and arranged substantially as described for the purpose set forth.
2d, The two series of revolving disks, B B B and C C C, in combination with the sliding standards, K, lever, E, arm, P, rock shaft, N, handles, F, and frame, J, when the several parts are constructed and arranged with respect to each other and to the clearers, D D D, substantially as described for the purpose set forth.

67,635.—Cloth Plate for Sewing Machine.—E. H. Craige, Brooklyn, N. Y.
1st, I claim, in the Wheeler & Wilson and other sewing machines with raised and movable cloth plate, the combination with the cloth plate, A, of a throat piece, B, that extends on the feeder and furnishes an opening by which the feeder may be removed and the running parts cleaned and oiled without removing the cloth plate, as set forth.
2d, In the Wheeler & Wilson and other sewing machines with a raised and movable cloth plate, any throat piece which is held in place at one part by a lip, a, or its equivalent, and at the opposite part by one or more buttons or catches, b, substantially as and for the purpose shown and described.
3d, The arrangement on the under side of the throat piece, B, of one or more buttons or catches in combination with screws or rivets passing through to the upper surface, by means of which, with a screw driver or key, said buttons can be turned, substantially as and for the purpose set forth.

67,636.—Ladder.—Charles Croley, Dayton, Ohio, assignor to American Ladder Company, Hamilton, Ohio.
I claim the combination of the gudgeons, l, and notched bracket, K K, constructed and arranged as described, in connection with the troughed step, J, and separable or hinged ladders, A B, for the purpose set forth.

67,637.—Steam Generator.—James M. Dillon, Wheeling, West Va.
I claim, 1st, The pipe or pipes, F, in combination with the T-joint, H, hollow plug, J, pipes, E m, and mud drum, M, or their equivalents, substantially as described.
2d, The combination of the boiler, B, pipes, E F m, and mud drum, M, as and for the purpose set forth.
3d, The cock, C, arranged and operating in combination with the pipes, F m, and mud drum, M, in the manner and for the purpose specified.

67,638.—Axle Box and Hanger.—D. H. Dotterer, Philadelphia, Pa.
I claim, 1st, An axle box provided with a detachable bearing, E, a curved projection, m, fitting a recess in an adjustable saddle, and with trunnions, d d, fitted for sliding blocks, b, which are adapted to guides formed in the hanger, all substantially as described.
2d, The combination of the rounded projection, m, on the top of the box, with a saddle, G, adapted to the hanger, and having a cavity for receiving the said projection, all substantially as and for the purpose herein set forth.
3d, The bearing, E, adapted to the journal of the axle and having lugs or projections, n, fitting into recesses in the box, as set forth.
4th, The sliding cover, f, fitted to the top of the box for withdrawal from the same, substantially in manner described.

67,639.—Traveler for the Jib Boom of a Vessel.—Sewall H. Downs, Bangor, Me.
I claim providing the interior of the cap or box of the traveler for the jib boom with two or more rollers above, and two or more rollers below the bar, and affixed, substantially as set forth, to enable the traveler to move surely and easily along the bar without danger of binding and to decrease the friction upon the several parts, for the purposes and in the manner substantially as set forth.

67,640.—Mode of Striking Gongs or Bells.—Thomas G. Estes, Fall River, Mass.
I claim the combination of gong, A1, stand, B3, knob, C1, lever, E3, dog, F3, arm, G2, hammer, H2, and cam, K1, with clock-work, as herein set forth and described.

67,641.—Lock for Prison Doors, etc.—Chas. F. Felton, Buffalo, N.Y.
I claim, 1st, The shell, B, having a hinged cover or door, b1, in combination with a wall lock, substantially as set forth.
2d, Securing the hinged cover, b1, between the iron door frame, G, and shell, B, by means of the screws, g2, in such manner that the screw heads are covered by the door when closed, substantially as described.

67,642.—Washing Machine.—John B. Francis, Barnesville, Ohio.
I claim the combination and arrangement of the adjustable and jointed or hinged concave wash board, x, and application thereof to the cylinder, H, by means of self-adjusting rockshaft, S, cords, weight, and pulley, F, in connection with the adjustable levers, O O and E E substantially as and for the purpose set forth.

67,643.—Mop Head.—O. S. Garretson, Cincinnati, Ohio.
I claim making the collar of the loose jaw in two parts so that the nut, d, may be placed between them, and when connected together the collar surrounds the nut and retains it in position, for the purpose above set forth.

67,644.—Ironing Machine.—G. Gilbert and A. N. Allen, New Haven, Conn.
I claim the segmental bed, C, arranged upon elastic bearings, and in combination with a polishing surface, constructed and arranged so that the said polishing surface may be heated, substantially as and for the purpose specified.

67,645.—Manufacture of Trunk Rollers.—Harvy Gray (assignor to Albert J. Sessions), Bristol, Conn.
I claim, as a new article of manufacture, a trunk roller with the frame, b, cast around the ends of the pivot or wire, c, substantially as described.

67,646.—Reverberatory and Cupola Furnace.—J. Durell Greene, Cambridge, Mass., and John A. Kay, Columbia, S. C.
1st, The combination of an ordinary cupola for melting iron, or other metal, with a reverberatory furnace, substantially as and for the purpose described.
2d, The utilization of waste heat from the cupola to heat the metal prior to its introduction into the cupola, substantially as described.
3d, In combination with the cupola and a reverberatory furnace, a supplemental heating or reverberatory chamber, substantially as described.

67,647.—Bed Bottom.—Benjamin Griffen, Lawrence, Mass.
I claim the cross wire, D, when connected with the concaved bar, for the purpose set forth, and the swinging hooks, when combined with the slat, for the purpose specified.

67,648.—Self-supplying Mucilage Brush.—Chas. Hamilton, New York city. Antedated Aug. 1, 1867.
I claim an attachment to the cap or brush cover, now in use, of a piece of wire running from the center of the cap, inside, to an inch or so beneath its base, the wire passing, when the cap is on the bottle, through the tube or passage in the brush, in the manner and for the purposes herein substantially set forth and described.

67,649.—Beehive.—A. H. Hart, Stockbridge, Wis.
1st, I claim the lathed and plastered walls, H, in combination with the filled space, I, as and for the purpose substantially as set forth.
2d, The special arrangement of the ventilating holes, L L1, and passageway, a, in combination with the honey chamber, B, and body of the hive, A, as and for the purpose described.
3d, The adjustable bee-gage block, O1, provided with the bee doors, f f1, as arranged in combination with the drone trap, P1, for the purpose and in the manner as substantially set forth.

67,650.—Heel Press for Boots, etc.—Chas. H. Helms, Poughkeepsie, N. Y. Antedated April 1, 1867.
1st, I claim the combination of the articulating joint, H, with the plunger, D, and lever, J, arranged and operating as hereinbefore set forth, for compressing the heels of boots and shoes.
2d, I also claim, in combination with the plunger, D, and articulating joint, H, a reacting spring, G, for the purposes hereinbefore set forth.
3d, I also claim the compensating rod, made and operating substantially as hereinbefore set forth, in combination with the lever, J, for the purposes described.

67,651.—Tweer for Blast Furnace.—Benj. H. Hibler, McKeesport, Pa., assignor to Pittsburgh and McKeesport Car Company.
I claim, 1st, A tweer consisting of a pipe, or the prolongation of the blast pipe of a smelting furnace, when such tweer extends into the cupola beyond the inner face of its wall or lining, and to or toward the center of the cupola, substantially in the manner and for the purposes above set forth.
2d, A tweer having an elbowed head with a cap, d, projecting outward so as to cover the apertures, e e, constructed and operating substantially as and for the purposes described.
3d, One or more apertures, c, in the lower side or face of the tweer or tweer pipe of the cupola of a smelting furnace, so as to discharge a portion of the air of the blast against the molten metal in the bottom of the cupola, substantially in the manner and for the purposes above set forth.

67,652.—Feeding Device for Sewing Machines.—James A. and Henry A. House, Bridgeport, Conn., assignors to Wheeler & Wilson Manufacturing Co.
We claim, 1st, The vibrating feed frame, I constructed, arranged, and operated substantially as and for the purpose described.
2d, The combination of the vibrating feed frame with the adjusting lever and cam for the purpose of varying the length of the feed.
3d, The combination of the vibrating feed block with the adjusting lever and set screw for the purpose of adjusting the feed vertically.

67,653.—Tucking Gage for Sewing Machines.—James A. and Henry A. House, Bridgeport, Conn., assignors to Wheeler & Wilson Manufacturing Co.
We claim, 1st, The attachment of the tucking gage to the presser foot of a sewing machine by the hooks and eccentric clamp, for the purpose of readily removing and replacing the gage without disturbing the glass of the presser foot.
2d, The marking blade having a vertical, a longitudinal, and a lateral adjustment in the presser foot, substantially as described.
3d, The combination, substantially in the manner described, of the marking blade and its case spring and set screw.
4th, The combination, substantially in the manner described, of a marking blade having a vertical movement in its case with a buffer pad to deaden the shock of the blade of the needle arm.

67,654.—Dovetail Cutters.—John C. Hursell, Boston, Mass.
I claim a cutting tool constructed and arranged for operation, substantially as and for the purposes herein described.

67,655.—Screw-cutting Machine.—Clark Jillson, Worcester, Mass.
I claim, 1st, In a machine for cutting screws, the combination of the die holder with the mechanism for rotating the same, arranged substantially as and for the purposes herein described.
2d, The combination of the die-holder and gear wheel, O, or equivalent means for rotating the same, with the lever, L, substantially as and for the purposes set forth.
3d, The combination with the lever, L, of the die, P, and tubular shaft or spindle, N, and gear, O, or other suitable means for imparting a rotary motion to the same, substantially as and for the purposes set forth.
4th, The combination of the die holder and its swinging or vibrating lever, with the mechanism for revolving said die-holder in the manner and for the purposes herein described.
5th, The combination of the grooved frame, M, or equivalent means, for supporting and holding the screw under the action of the saw, with the lever, L, and saw, J, substantially as and for the purposes set forth.
6th, The combination of the frame, M, slotted or recessed at p, with the lever, L, and saw, J, as and for the purposes set forth.

67,656.—Seed Planter.—W. D. Johnson, Raleigh, N. C.
I claim the construction of the conical hopper, E, with its stirrers, K, and center wheel, H, when arranged and operated within a plow, D, in front and harrow, M, in the rear as herein described and for the purposes set forth.

67,657.—Medical Compound.—Carlos Judson, Omro, Wis.
I claim the use of a medical compound combining the medicinal properties of the ingredients specified mixed together in about the proportions and substantially as and for the purpose set forth.

67,658.—Cheese Hoop.—O. A. King, Bedford, Ohio.
I claim the lever, C, links, E, and lugs, H, arranged in relation to the hoop substantially as and for the purpose set forth.

67,659.—Air Engine.—Eugen Langen, and N. A. Otto, Cologne, Prussia.
1st, We claim the peculiar mode of communicating the downward and backward motion of the piston under atmospheric pressure only to the engine shaft by means of a clutch apparatus so arranged that the speed of the piston is rendered independent of the speed of the engine shaft.
2d, The cams or eccentrics S2, arranged for controlling the valves or slides for the admission of the combustible gas into and exit of the products of combustion from the cylinder when actuated in such a manner from the engine shaft through the mediation of the eccentric or cam, S1, pawl, H, ratchet wheel, Q, and disengaging catch, w, that such admission and exit of gases and consequently the number of strokes of the piston may be varied independently of the speed of the engine shaft substantially as and for the purpose hereinbefore set forth.
3d, We claim the combination of the several parts, k h P T U Q S1 S2 v' w and x, operating in manner and for the purposes substantially as set forth.

67,660.—Grain Drill Tube.—S. K. Lighter, Thos. Harding Joseph Curtis, Hamilton, Ohio.
1st, We claim the tube, Fig. 1, made with open coils in the manner for the purposes described.
2d, The mode of connecting the tube to the socket on the inside instead of the outside, in the manner substantially and for the purpose set forth.

67,661.—Tag or Label.—E. A. Locke, Boston, Mass.
I claim a tag or lable composed of the metal embossing plate, a, and the inscription or marking plate, b, when these are connected together and to a confining band, d, by an eyelet, c, which at the same time secures the corners of the metal in bent over position, substantially as shown and described.
I also claim the construction of the band, d, with an eyelet, e, integral therewith and formed therefrom, substantially as and for the purpose described.
I also claim protecting the end of the band when the tag is applied, by carrying it between the pieces, a b, substantially as shown and described.
I also claim the lead or soft metal safety eyelet, i, to be used substantially as and for the purpose set forth.

67,662.—Mode of Raising the Grade of Raw Sugar.—Alex. Mackey, N. Y. City, and Eberhardt Müller, Brooklyn, N. Y.
We claim raising the grade of raw sugar by placing it in a dry or comparatively dry state in a centrifugal machine, and therein subjecting it to a washing operation substantially as herein described.

67,663.—CUPPING APPARATUS.—Morris Mattson, N. Y. City.

I claim the combination with any suitable cup or vessel, A, adapted for cupping and similar purposes, of an elastic exhausting bulb, B, provided or fitted with a valvular apparatus constructed substantially as described and on the principle described in letters patent granted to me April 4, 1854.

67,664.—WINDMILL APPLIED TO RAISING WATER.—Ed. Mc Allister, Plainfield, Ill.

1st, I claim governing the action of a windmill by the weight of the water pumped by an organized mechanism substantially in the manner described.

2d, Combining the trough, f, connecting rod, e, circular part, g, rod, x, pulley wheel, s, and rod, q, or their equivalents, substantially as and for the purpose shown.

67,665.—PRESS FOR ATTACHING PAPER FASTENERS.—G. W. McGill, Washington, D. C.

I claim a press with plunger, hammer, and punch constructed, combined and arranged substantially as described.

67,666.—PUMP.—J. W. Merrill, and E. H. Lawrence, Berlin, Mass.

1st, We claim the peculiar construction of the lower valve with its fixed lever or arm, B, when constructed and operating in the manner and for the purposes as above set forth and described.

2d, We claim as arranged in relation to the foregoing the boxes of the two plates, A, bolts, b b b' b', and rubber, D, when constructed and operating in the manner and for the purposes above set forth.

67,667.—LIME KILN.—Lucius Montgomery, Newstead, N. Y.

1st, I claim a fire chamber, G, constructed within the inner half of the walls of a lime kiln, having a solid bottom without grate bars, and having a front bridge or wall, H, with air flue below for the purposes and substantially as described.

2d, The swell or rounding out of the inner wall as shown at b' continued from the line, c d, up to the line, e f, for the purpose and substantially as set forth.

67,668.—APPARATUS FOR DEFECATING AND EVAPORATING SORGHUM JUICE.—D. B. Neal, Mount Gilead, Ohio.

I claim constructing the sides or ends of evaporating pans to incline inwardly.

2d, I claim the overflow defecators, f, with their openings, e e, as shown and described for the purpose specified.

3d, I claim operating a pump by an attachment to the sweep as shown and described or its equivalent, for the purpose specified.

4th, I claim the overflow gravel defecators as shown and described.

5th, I claim the recesses, j j, on the edge of the furnace for the purpose specified.

67,669.—MACHINE FOR MAKING PAPER BOXES.—W. Orr, Jr. and Geo. F. Wright, Clinton, Mass.

1st, We claim the expansive holder, d, made of two or more adjustable sections in the manner and for the purpose specified for round, square or any other shaped box.

2d, The combination of treadle, a', levers, d' m' i' and p', rack, z, and gear, y, when used in connection with the expansive holder, d, in the manner and for the purpose specified.

3d, The swinging frame, n, when used in the manner and for the purpose specified.

4th, The revolving brush, q, or its equivalent, when used in the manner and for the purpose specified.

5th, The pressure rollers, 19 and 21, when used in the manner and for the purpose specified.

6th, The segment brush, 1, when used in the manner and for the purpose specified.

7th, The combination of the treadle, a', the triangular lever, d', the levers, m' p' and i', the rack, z, and pinion, y, and swinging frame, n, the revolving brush, q, expansive holder, d, segment brush, 1, the continuous strip of paper, 10, guide rolls, 12 and 17, paste roll, 14, and rolls, 19 and 21, shears, 25 and 26, arranged and constructed as herein described, and operating substantially as and for the purpose set forth.

67,670.—COOKING STOVE.—Daniel E. Paris, Troy, N. Y.

1st, I claim the hot-air chamber between the back plate of the stove and the front side of the reservoir, in combination with the return flue chamber under the reservoir and the damper or flue plate operating in said chamber.

2d, I claim the open crescent shaped, rearward and upward projecting plate, I, enclosing and forming the return flue chamber under the reservoir, covered by and in combination with the reservoir which rests upon its upper and outer top edges.

67,671.—CARPENTER'S PLANE.—Russell Phillips, (assignor to himself and Nathan Weston), Gardener, Maine.

1st, I claim the reversible cutter shown in Fig. 5, as and for the purposes specified.

2d, The arrangement of the two slides, p p, thumb screw, q, slot, r, plates, s s, graduated scale, x, and plate, t, as and for the purpose set forth.

67,672.—RECEPTACLE FOR HARNESS.—H. E. Pond (assignor to himself and Amos P. Woodward), Franklin, Mass.

I claim as a new article of manufacture a receptacle for harness and other like articles, in which a wooden or other suitable skeleton frame, A, is combined with a water proof covering the body of which is saturated with a non drying oil or compound as herein set forth.

67,673.—HORSE RAKE.—Daniel Prest, Marlboro, N. J.

1st, I claim so suspending a revolving rake from the axle, B, by sliding beams, H, that it may be brought into action by pressure applied directly to the beams raised automatically, on being relieved from pressure, by springs which hold it suspended above the cut grass substantially as set forth.

2d, The combination of the revolving rake head, E, sliding beams, H, springs, R, and foot piece, L, substantially as and for the purpose set forth.

67,674.—SUPPORT FOR SEWING MACHINE OPERATORS.—John Preston (assignor to himself and J. B. Atherton), Bridgeport, Conn.

I claim the combination of the pad, B, and spring, C, constructed so as to be attached to a table and to operate in the manner and for the purpose substantially as described.

67,675.—TRACE SUPPORTING HOOK.—Michael Reilly, Covington, Ky.

I claim the trace supporting hook for harness consisting of parts, A a B and b, substantially as set forth.

67,676.—TURNING LATHE.—John Richards (assignor to J. A. Fay & Co.), Cincinnati, Ohio.

I claim the combination of the taper spindle, g', the adjusting screw, m, and the spring catch, h, or equivalent mechanism for retaining the spindle in the socket, all operating in the manner and for the purposes specified.

67,677.—CAR COUPLING.—J. Ridings, and J. O. Roberts, New Castle, Del.

We claim the combination and arrangement of the box, A, spring, E, coupling, C, and reservoir, M, when constructed substantially as described.

67,678.—STRENGTHENING AND PRESERVING ROPES, CORDAGE AND OTHER FABRICS.—L. S. Robbins, New York City.

I claim the process herein described for preserving rope, cordage, and all textile fabrics from mold and decay by charging and saturating them with hot and oleaginous vapors and compounds, substantially as herein described.

67,679.—MANUFACTURE OF ENAMELED WOOD.—C. L. Robertson (assignor to American Enamel Company, Providence, R. I.

I claim as a new manufacture, articles of use or ornament made of wood and enameled by means of the composition substantially as described in the Letters Patent granted to me April 2d, 1867.

67,680.—BEEHIVE.—George Shesser, Hilsboro, Ohio.

I claim giving such a shape to the removable frames, i j k, that when the same frames are placed side by side upon the inclined bottom, g, of the exterior casing the caps, i 1, and the central bars, k, of said frames will form a horizontal top and bottom to the honey chamber within the same, while there will be formed between the said bars and the inclined bottom, q, of the exterior casing an ample air chamber, all substantially as herein set forth.

I also claim placing the feeding box, F, in the air chamber above the said frames and providing suitable openings for connecting said air chamber directly with the honey chamber, and with the external atmosphere, all substantially as herein set forth.

67,681.—HAME CLASP.—J. H. Snyder, Rockford, Ill.

I claim the tongue, F, pin, H, and spring, I, as arranged in combination with the lugs, J, and straps, A B, in the manner substantially as described.

67,682.—INSERTABLE SAW TOOTH.—J. W. Strange, Bangor, Me.

I claim the curved or rounded bottom to the tooth in combination with the recess in the saw plate, both of the form herein illustrated and described when the same are employed as a method of wedging the tooth in its plate by the collision of the cutting edges of the tooth with the lumber to be sawed.

67,683.—FAGOT FOR RAILS OF RAILROADS.—W. A. Sweet, Syracuse, N. Y.

I claim, 1st, An improved pile, substantially such as herein described.

2d, A railroad rail made of a pile, substantially such as that herein described.

67,684.—BRICK MOLD PISTON.—Lewis Sylvester, Philadelphia, Pa.

I claim, 1st, The expanding plate, C, constructed and operating substantially as described.

2d, I claim a solid piston having a recess, g, filled with composition metal cast in for making a close fitting piston, substantially in the manner described.

3d, I claim the follower, E, surrounded by soft metal, g, and secured to the body, A, in combination with or without the plates, C, as described.

67,685.—VISE.—I. C. Tate, New London, Conn.

I claim the combination of the slots, I and G, and bolts, E F, in a vise, substantially as and for the purpose described.

67,686.—STEERING APPARATUS.—J. P. Teale and W. J. Brassington, Brooklyn, N. Y.

1st, We claim the construction, application and arrangement of the movable bolt, C, in connection with the rudder, B, substantially as and for the purpose set forth.

2d, The sharp edge projection, L, or ice breaker on rudder, B, substantially as and for the purpose set forth.

3d, I claim also the yoke, N, in connection with the crown piece, O, and rudder, M, substantially as described and for the purpose set forth.

67,687.—AUTOMATIC DAMPER.—G. A. Townsend, Hornellsville, N. Y.

I claim the expansive strip or bars of metal, F f, placed in or near the center of the first or second joint of the stove pipe when combined with the levers, a and b, plate damper, E' constructed and operating in the manner substantially as and for the purposes described.

I claim the thumb nut, i, pointer, h, in combination with the plate damper E, compound levers, a b, and expansive bars, F f, as herein described for the purposes specified.

67,688.—HORSE RAKE.—T. J. Turner, Richland, Co., Ill.

1st, I claim the revolving rake frame constructed substantially as herein described and hung in a frame mounted on runners, substantially as herein described.

2d, In combination with a revolving rake frame as herein described, hung in a frame mounted on runners as herein described, I claim the lever, L, with its notch or shoulder, n, and a driver's seat on the rear end of the main frame, all constructed and arranged substantially as herein described.

67,689.—HITCHING DEVICE FOR HORSES.—M. Warue, and W. H. Pearce, Philadelphia, Pa.

1st, We claim a hitching device consisting of a rod or bar, A, to the ends of which are secured straps, C D, or their equivalents, substantially as and for the purpose described.

2d, The hitching device made in two sections, one sliding into the other or one hinged to the other as set forth.

67,690.—CARPET STRETCHER.—I. P. Warner, Marengo, Ill.

I claim the combination of the lever, A, with the points, B, and hinged foot, C, with hooks, D, notches, E, and brace, F, as and for the purpose specified.

67,691.—SHIRT STUD.—G. M. White, New Haven Conn.

I claim the bar, f, in combination with the plates, A and d, constructed and arranged to operate substantially in the manner herein set forth.

67,692.—STEM WINDING AND SETTING WATCHES.—C. V. Woerd, Waltham, Mass.

I claim the slide arranged to operate substantially as set forth

67,693.—APPARATUS FOR TREATING VEGETABLE MINERAL AND ANIMAL MATTERS WITH STEAM.—Henry Wood, Montreal, Canada East, assignor to G. W. Norris.

1st, I claim the fixed boiler, A, with the removable head, a' and with the perforated tube, C, passing through the head, a, and when used for the purposes herein described.

2d, I claim the retainer, B, constructed substantially as described with its friction rolls and internal gear wheel for revolving the same and with its central perforated tube, C, as and for the purposes set forth.

3d, In combination with the retainer, B, I claim the truck, o, as and for the purposes described.

4th, I claim the removable grate when used substantially as and for the purposes herein described.

5th, I claim the arrangement and combination of the whole apparatus as substantially described, for the purposes hereinbefore stated, that is to say for the treatment of ores and minerals by heat or by chemical action, or for the extraction of the metals by heat or chemical action for the treatment of vegetable matter for the manufacture of paper or other purposes or for bleaching purposes, the whole or any part of these processes to be performed either under pressure or in vacuo as may be desired.

67,694.—GAS REGULATOR.—J. S. Wood, Philadelphia, Pa.

1st, I claim the combination of the tank, A, with its chambers, E and E' formed between the two bottoms a1 a2, and the pipes F and G, valve, K, and receiver, C, when constructed and arranged substantially as described.

67,695.—TWEER.—J. R. Woodworth, Nunda, N. Y.

1st, I claim the lever, E, in combination with the bottom, F, and hinge, G, constructed and arranged substantially as described and for the purpose set forth.

2d, I claim the movable smoke pipe, fig. 6, in combination with the open tewel herein described, substantially as and for the purpose herein specified,

67,696.—MANUFACTURE OF CEMENTS, MASTICS, AND JAPANS FROM GRAHAMITE.—Henry Wurtz, New York City.

1st, I claim the conversion of the mineral above specified, called by me grahamite, into compounds suitable for cements, for mastics, for japanning and enameling metallic and other surfaces, and for electrical insulation, by fusion or combination with any material of a tarry, pitchy, asphaltic, resinous or balsamic nature, substantially as above set forth.

2d, The use as cements and mastics, and for japanning, enameling or coating surfaces, and for electric insulators, in any of the special cases above set forth as examples, or in any cases substantially, similar of the mineral grahamite, or any compound made by fusion or combination of grahamite with any material of a tarry, pitchy, asphaltic, resinous, or balsamic nature, all substantially as above set forth.

67,697.—COMPOSITION FROM GRAHAMITE FOR VARNISHING COATING, AND PROTECTING THE SURFACES OF METALS, WOODS, AND FIBROUS MATERIALS.—Henry Wurtz, New York City.

I claim, 1st, The conversion of the mineral from West Virginia, called by me grahamite, into solutions suitable for varnishes and iridescent and other lacquers, and for coating porous and other surfaces, by either of the methods above set forth, or by any others, substantially the same, or furnishing products, substantially similar.

2d, The use for the purpose of varnishing, lacquering, painting, and coating surfaces generally and for stiffening tissues, of liquids or compositions made by dissolving or mixing grahamite in any suitable liquid solvent or vehicle, substantially as set forth.

3d, The use for the purposes of printing inks, of compositions made by dissolving or mixing grahamite in any suitable liquid solvent or vehicle, substantially as set forth.

67,698.—BED BOTTOM.—Edward Yeoman, Waukegan, Ill.

I claim the combination of the braces, D D D D, jointed to frame, A, and arranged to operate on rods, E, supporting coil springs adjusted between lugs, H and C, the whole being arranged to support and prevent a lateral motion of frame, A, substantially as herein specified.

67,699.—HARNESS MOTION FOR LOOMS.—Henry Yount, Dayton, Ohio.

I claim the combination of the arms, C and D, levers, K, cams, G, and frame, A, constructed and arranged as and for the purpose set forth.

67,700.—COTTON CULTIVATOR.—Jesse Adams, Clarksville, Texas.

1st, I claim the series of adjustable hoes, H H, attached to and working on the shafts, E, substantially as and for the purpose described.

2d, The hinged adjustable frame, D, in combination with the revolving shaft, E, and lever, L, substantially as and for the purpose specified.

67,701.—SAFETY BRIDGE AND GATES FOR RAILROAD CARS.—A. K. Allen, Hartford, Conn.

1st, I claim the railroad car bridge constructed as described consisting of the hinged frames, b c d e, riveted to the treads, a, at each end upon which the parts, d e, rest and slide, sliding and swinging gate, h k, removably pivoted to the standards, n, all arranged to operate as described to prevent the coupling and uncoupling of the cars as herein shown and described.

2d, The gates pivoted to the standards, n, by means of the arms, o, and pins, p, in such a manner as to admit of being swung upon the platform of the cars as herein described for the purpose specified.

3d, The combination of the removably pivoted swinging gates with the standards, n, sliding hinged frames, b c d e, and platforms, A B, of the railroad cars as herein set forth for the purpose specified.

67,702.—LOW WATER INDICATOR.—J. O. Alter, St. Louis, Mo.

What I claim is the sharp angular packing edge, e, in combination with a soft metal packing, F, substantially in the manner and for the purpose herein described and set forth.

I also claim the coupling, E3, the spring, G, and the stem, A' combined and operated in the manner herein described and set forth.

67,703.—CAR COUPLING.—R. S. Arnall, Wright City, Mo.

I claim the arrangement of the bar, I, lever, F, secured within the keeper, H, bar, E, connected to the lever, F, as described arm, D, and pivoted draw head, B, all constructed in the manner and for the purposes set forth.

67,704.—STOP WATCHES.—Thomas Baker, New York City.

I claim a connection between the ratchet wheel and the quarter second wheel of a watch which is arranged so as to operate substantially as and for the purpose described.

67,705.—HORSE RAKE.—L. B. Ball, Dayton, Ohio. Antedated Feb. 13, 1867.

I claim, 1st, The housing, D, provided with the slot, o, in combination with the plate, C, provided with projection, d, and bolt, F, substantially as and for the purposes set forth.

2d, Providing the housing, D, with a dovetail base, i, to fit into a corresponding groove, i', in the rocking bar, g, substantially as and for the purposes set forth.

67,706.—LINIMENT.—P. Baumann, Jr., New Athens, Ill., assignor to P. Baumann and Brothers.

I claim the liniment herein described composed of the several ingredients mixed together in about the proportions set forth.

67,707.—COTTON BALE TIE.—G. N. Beard, St. Louis, Mo.

I claim the tie piece, A, having a countersunk cavity, a2, and two diverging mortices, a a' when applied to and combined with the baling band, B B' substantially as described and set forth.

67,708.—REAMER.—W. H. Dechtel W. H. Strahan and Thos. Hardy, Philadelphia, Pa. Antedated Aug. 1, 1867.

We claim, 1st, The three tapering guiding strips, d d and d, and cutting strip, e, in combination with the body, A, of the reamer, all constructed and arranged substantially as described.

2d, The above in combination with the nut, B.

67,709.—ANIMAL TRAP.—Herman Belmer, Cincinnati, O.

I claim, 1st, The doors, C and D, when made as described, and when provided with a handle, b, all made as set forth.

2d, The doors, C and D, in combination with the covered entrance, all made as set forth,

67,710.—STEP LADDER.—Wm. W. Berntheisel, West Hampfield Township, Pa.

1st, I claim the arrangement of the side braces, A A, with their pivot, a, and notch, b, when united with a cross brace, B, in combination with the catch, c, and hinged supports of the step, all combined in the manner shown and described.

2d, In combination with the combined braces, A B A, and steps, I also claim the platform, P, with its clasp hook, h, made in the manner and for the purpose shown and specified.

67,711.—HORSE HAY FORKS.—C. C. Blodgett, Watertown, N. Y.

I claim, 1st, A hay fork having a center bar combined with an inclosing sheath, substantially as herein described, in which the mechanism for holding the claws in position is carried by or contained within the bar or rod by which the said claws are operated or carried.

2d, The combination with the center bar and its inclosing sheath, of the locking bolt and mechanism for operating the same, under such an arrangement that the said bolt and mechanism shall be contained within the center bar, as set forth.

3d, The combination with the bar or rod for operating or carrying the claws, of the locking bolt and its actuating lever and spring, arranged for operation as herein described.

4th, The combination with the locking operating mechanism, of the pulley and rope or cord for the said mechanism, arranged within the handle of the fork, as herein shown and for the purposes set forth.

5th, The method of connecting the slotted center bar with its inclosing sheath, by means of a pin or equivalent device, passing through both sheath and center bar, and forming the means whereby the motion of the center bar within the sheath is limited and stopped, substantially in the manner herein specified.

6th, The combination with the sheath and center bar, of the claws elongated above their pivoted point, so that when the same are projected from the sheath their upper ends shall bear against the sides of the said sheath, substantially as and for the purposes set forth.

7th, The combination with the locking bolt and lever, of a spring arranged within the center bar or handle in such manner that the recoil of the said spring shall force the bolt forward into place, as set forth.

67,712.—MEAT SAFE.—Wm. Brighton (assignor to himself and Noah H. Tilman), Arcanum, Ohio.

I claim the vertical revolving shaft with two or more series of horizontal arms, D D, when said arms are provided with hooks, e e, the whole being arranged within the case, A, in the manner specified.

67,713.—CORN SHELLER.—Jacob Brinkerhoff, Auburn, N. Y.

I claim the ribbed plates, d, in combination with blocks, g, when operating as and for the purpose herein set forth.

67,714.—FULMINATING POWDER FOR NEEDLE GUNS.—Henry Büchner and Frederick Ebertz, New York City.

We claim a fulminate for needle guns composed of the ingredients and about in the proportions as herein specified.

67,715.—Canceled.

67,716.—ROLLING OR WINDING PAPER IN THE MANUFACTURE OF PAPER CAP TUBES.—Silvanus Burgess, Providence, R. I. Antedated Aug. 6, 1867.

I claim moistening the paper to be rolled up, wound substantially as and for the purpose set forth.

67,717.—MILK COOLER.—N. C. Burnap, Argosville, N. Y.

I claim, 1st, The cooler, B, when in position within the can, A, by means of the horizontal radial arms, b, substantially as described for the purpose specified.

2d, The cover, c, supported upon the cooler, B, having the tube, e, extending within such cooler, and with its flanges, a, fitting tightly within the can, substantially as described for the purpose specified.

67,718.—PAINT CAN.—Charles Burnham, Philadelphia, Pa.

I claim wiring or hemming the edge of the can with a flat wire, so as to present a broad surface to the top edge of the cover.

And in combination with the above claimed improvement, I claim a cover with the rim bent double, forming a groove so as to shut against both the inside and outside of the can, at the top edge.

And in combination with the improvements above claimed, I claim the clips to hold on the cover.

I also claim a sunken cover, either corrugated or flat.

67,719.—HYDRAULIC PRESS.—John T. Burr, Brooklyn, N. Y.

I claim the standing pipe packed in the central bore of the ram and connected with the pump, in combination with the pipe connecting the cylinder with any suitable reservoir or head of water, and the weighted valve arranged as shown, in combination with the pump and cylinder, the whole being substantially as and for the purpose set forth.

67,720.—FOUNTAIN PEN.—J. S. Charles, Omaha, Nebraska.

I claim the inner and outer tube, B and C, ink passage or tube, c, in combination with each other, when all constructed so as to operate substantially as and for the purpose specified.

67,721.—APPARATUS FOR MOLDING PLATES OF LEAD.—S. E. Chubbuck (assignor to Joseph H. Chadwick), Roxbury, Mass.

I claim the improved machine herein described, for the purpose set forth.

67,722.—MOP HEAD.—C. B. Clark, Buffalo, N. Y., assignor to himself and Edwin L. Ferguson.

1st, I claim forming the nut in segments, E E, to enable it to be inserted within the collar, D, substantially in the manner and for the purpose set forth.

2d, I also claim the bent or inclined arms, f, in which the ends, g g, of the jaw frame are secured, substantially as and for the purpose specified.

67,723.—FARM GATE.—Thomas Collier, Springfield, O.

1st, I claim the curved and pivoted bar, D, located below the top of the gate, A, and operated by the bail crank, G, and levers, H I, in combination with their connecting rods, substantially as set forth.

2d, The double-acting latch, K, to hold the bar, D, inclined as desired, in combination with the guards, L M, for the purpose set forth.

3d, The counterweight, E, in combination with the hinge bolt, B, and pivoted bar, D, for the purpose of reducing friction upon said hinge bolt when the gate is being elevated, as set forth.

67,724.—SHINGLE MACHINE.—Emory B. Cook, North Billingham, Mass.

I claim my improved shingle-making machine, as composed of the single click, P, the rotary series of ratchets, N, worm wheel, M, racks, t t, and block carriers, arranged together, and with a circular saw and its operative mechanism, and provided with mechanism for supporting and operating them, substantially as specified.

67,725.—WASHING MACHINE.—John Cooper, Dublin, Ind.

I claim a washing machine having the shaft, D, provided with the bows, E, when arranged to operate substantially as described and for the purposes set forth.

67,726.—STENCIL BRUSH.—J. S. Costello, St. Louis, Mo.

I claim the method of forming the handle of a stencil brush in one piece, with a recess so constructed as to cover not only the end of the band and bristles, but also to completely encircle the same, substantially as shown and described.

67,727.—KNITTING MACHINE.—William Cotton, Loughborough, Eng.

I claim the arrangement as well as the combination of the oiling box, ta, and the perforated guide lip, tc, with the horizontal rod, tb, provided with mechanism for operating it, as set forth.

Also, the combination of the guide lip, tc, and its supporting rod, tb, provided with mechanism for operating it as described, with the main needles, their knocking-over comb and presser, and their sinkers, the said guide lip and rod and their operative mechanism being for taking up the slack of the yarn, as and for the purpose hereinbefore set forth.

67,728.—BRICK MACHINE.—J. W. Crary, Pensacola, Fla.

I claim constructing the frame, A, with a semicircular top, a, when said frame is used in connection with a molding wheel, B, arranged concentric with the upper semicircular part of the frame, substantially as and for the purpose set forth.

67,729.—MUSKETO AND FLY NET.—John W. Craw, Norwalk, Conn., and Abel S. Randolph, Plainfield, N. J., assignors to themselves and E. R. Pope, Plainfield, N. J.

I claim the bar, g, in combination with the slides, i k, and spring roller, e, when the ends of the bar, g, are formed to enter and slide in the slides, i k, and said slides, i k, are partially removed at their lower ends to allow the bar, g, to be removed from the pins, 2, for the purposes and as set forth.

67,730.—MECHANISM FOR APPLYING POWER TO MACHINERY.—Louis Curdts, New York City.

I claim, 1st, The arm or counterpoise, b, and arm, b', provided with the curved bar or fork, c', in combination with the pallets, a a', and the clock movement applied to a sewing machine, for the purpose of operating the same, substantially as shown and described.

2d, The stop mechanism composed of the levers, d d', and the link, e, with the arm, g, on the end of the lever, d', all arranged in connection with the pallets, a a', to operate in the manner substantially as and for the purpose set forth.

3d, The brake, F, composed of an elastic or spring bar, arranged in relation with the shaft, I, and connected with the treadle, j, substantially as and for the purpose specified.

67,731.—WASHING MACHINE.—Rolan Daily, Canal Township, Pa.

I claim the box, A A, in combination with the corrugated rollers, 1, 12, the frame, B B, in combination with the rollers, 13, 19, and the wheels, D E, when the same are constructed as described, in the aforesaid combination, for the purposes set forth.

67,732.—HOT-AIR FURNACE.—G. B. Davis (assignor to M. A. Thayer and W. H. Boomer), Chicago, Ill.

We claim, 1st, the round grate, o, in combination with the grate bar, P, and swivel loop, s, all arranged and operating as and for the purpose set forth.

2d, The air tubes, L L, in combination with the shields, l l, arranged and constructed substantially as herein described and for the purpose specified.

3d, The combination of the air chamber, k, with the shielded air tubes, L L, substantially as set forth.

67,733.—COMPOUNDS FOR COATING IRON, WOOD, AND OTHER MATERIALS.—H. E. F. de Brion, London, Eng. Patented in England Feb. 8, 1866.

I claim, 1st, The preparing compositions by compounding vulcanized india rubber rendered liquid by heat with vegetable pitch and resin, either together, or separately, substantially as above described.

2d, I also claim the combining of bisulphide of carbon with compositions such as the above or similar preparations made with mineral pitch, so as to obtain a paint-like composition which can be applied without the aid of heat, substantially as herein described.

3d, Also, the combining with such paint-like compositions, the poisonous ingredients, hereinbefore specified, substantially as herein described.

67,734.—HARDENING AND STRAIGHTENING STEEL BLADES.—Henry Disston, Philadelphia, Pa.

I claim the mode, substantially as herein described, of simultaneously hardening and strengthening saw or other blades of steel, that is to say, subjecting the blades while in a heated state to a gradual pressure between the plates, simultaneously with the dipping of the latter and the blades into a hardening composition or fluid.

67,735.—CORN PLANTER.—Wm. A. Donnell, Greensburg, Ind.

I claim, 1st, The arrangement in a corn planter of the rigid triangular frame, consisting of the tongue, G, lever bar, H, and brace bar, I, in combination with the rack, M m, or its equivalent, for the purpose of raising the shares, F F, from the ground, as stated, and retaining them in that position.

2d, I claim the angle ended plate, V v v, of varying sizes, to simultaneously increase or diminish the size of the seed cavities, t t, as set forth.

3d, In combination with the plate, V v v, I claim the box, Y y, admitting of changing the said plates by merely removing the lid, y, as stated.

4th, I claim the combination of the cam, P, lever, Q q R r, and levers, 1 and 2, substantially as described, to admit of working the seed-dropping apparatus, either by hand or by the rotation of the cam, P, and its accessories.

67,736.—CORN POPPER.—George D. Dudley (assignor to Woods, Sherwood & Co.), Lowell, Mass.

I claim, 1st, The combination of the popper, A, with the parallel rods, b b, and handle, B, constructed and operated substantially as described.

2, The crank, C, connecting rods, c d, in combination with the popper, A, and parallel rods, b b, the whole constructed and operating substantially as described and specified.

67,737.—DEVICE TO ATTACH TO FIRKINS, BARRELS, ETC.—A. T. Dunbar, and A. McNaught, Alba, Penn.

We claim, as a new article of manufacture, the plate herein described, when applied to packages containing butter; kegs or barrels, containing liquids of any or all kinds; and barrels containing flour, salt, and sugar.

67,738.—STUMP EXTRACTOR.—Lewis R. Dye, Cranberry, N. J., assignor to himself and Philip S. Scovel, Bordentown, N. J.

I claim, 1st, The tapering drum, K, in combination with the operating devices herein described, or any equivalent to the same, and with the chain, T, when the latter is attached to the said drum, in the manner and for the purposes specified.

2d, The shaft, I, with its drum, K, and cog wheel, H, in combination with the shaft, C, its pinion, I, ratchet wheels, E and F, and the loose drum, D, the whole being constructed, arranged and operating substantially in the manner described for the purpose herein set forth.

3d, The combination of the shaft, C, its loose drum, D, pawl, f, and the ratchet wheel, E, substantially as and for the purpose described.

4th, The above, in combination with the lever, g, and pin, h, of the ratchet wheel E.

5th, The pulley, q, arranged in respect to the drum, D, substantially as and for the purpose specified.

67,739.—AERIAL MACHINE.—J. A. Elston, Elston Station, Mo.

1st, I claim the combination of one or more pairs of wings, C, connecting-rods, E, sliding block, F, connecting rod, G, and lever, H, with each other, and with the post, B, and frame of the car, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the eye block, J, and ropes, K and L, with the post B, and front and stern posts of the car, for the purpose of changing the level of said car, substantially as herein shown and described.

67,740.—MACHINE FOR RAISING AND DRYING THE NAPS OF HATS.—Mitchel Esselen (assignor to J. D. Guyer & Co.), Roxbury, Mass.

I claim the machine constructed substantially in the manner and for the purpose set forth, that is, as composed not merely of the series of screw spindles, D D, and hat blocks or holders, E E, the wheel, A, and mechanism for revolving the wheel and series of spindles, and hat blocks on holders about a common axis; but also of mechanism for revolving each spindle with its hat block or holder, in the meantime, on the axis thereof.

67,741.—MEANS FOR CASTING ANCHOR.—John Evans, Jr., Milbridge, Me.

I claim the hinged shoe and the eyebolts in position, with the ringed cat and shank stopper, and the sliding rods or bolts, g g, the pin and hole, l, in lever, substantially as and for the purposes set forth.

67,742.—APPARATUS FOR HEATING AND EVAPORATING.—Francis Farquhar and Robert E. Doan, Wilmington, Ohio.

We claim, 1st, An evaporating or heating apparatus, having one or more flues mounted directly over the fire box, substantially as described.

2d, The projecting pan, A', to be heated by one or more flues, substantially in the manner and for the purpose specified.

3d, The combination with the flues, B E E', of the damper, I, substantially as and for the purpose set forth.

4th, The defecating pan, C, in combination with the boiling or evaporating space, b2, and fire box, D, substantially as and for the purpose set forth.

67,743.—LUBRICATOR.—Edwin Faull, Maldon, Australia.

I claim the combination of the transparent reservoir and conduit, B, metal tube, D, elastic washer, e, supply cock, c, and the second cock, d, substantially as described, for the purpose specified.

67,744.—TETHERING STAKE.—B. G. Fitzhugh, Sykesville, Ind.

I claim a tethering stake or post, made in two parts, and united by a piece of rubber, as and for the purpose substantially as herein described and represented.

67,745.—BRUSH.—William H. Forker, Meadville, Pa.

I claim the head, B, with the hollow bead, C, in combination with the screw G H, the cylinder, M M, and the cup, s s, and the rubber band, 2 3, when the same are constructed as described in the aforesaid combination, for the purposes set forth.

67,746.—SNAP HOOK.—Walter S. Furlow, Geneseo, Ills.

I claim an improved snap hook, formed by the combination of the parts, A and B, constructed substantially as herein shown and described, and rubber, or equivalent band, D, with each other, as and for the purpose set forth.

67,747.—BUTT HINGE.—Chauncey Goodrich, Plainville, Conn.

I claim a stop butt, in which I make or cut the central parts or portions of the eye or socket, bevelled or inclined, so as to cause the stopping at the desired angle by the binding of the inclined planes or bevelled surfaces, while I cut or make the portions or parts at the ends parallel to the ends of the leaves, to keep the two leaves in their proper relative positions, when the whole is constructed and fitted to operate substantially as herein described and set forth.

67,748.—RAILROAD TICKET PRINTING PRESS.—Stephen Greene, of Philadelphia, Pa., and Walter H. Forbush, Buffalo, N. Y., assignor to Henry G. Leisenring, Philadelphia, Pa.

I claim, 1st, The spring pusher arm, H2, with its extension beyond the pushing shoulder, hinged to the vibrating lever, H, and operating in the manner and for the purpose set forth.

2d, Making the lever, H', adjustable on its shaft, so that the point reached by the pusher arm in its forward movement may be changed as required for the purpose set forth.

3d, The spring pressure double roller, N, combined with the guides, for the purpose described.

67,749.—PACKING FOR DEEP WELLS.—Anson D. Griffin, Titusville, Pa.

I claim the bag, B, the springs, D, the thimble, E, and the collar, F, and the loose ring, C, constructed and arranged in combination with the casing, A A', substantially as shown and described, for the purposes set forth.

67,750.—COMPOSITION FOR GRANULATING SORGHUM SIRUP.—Seth Griffith, Aurora, Ills.

I claim the application and use of the herein-described ingredients, combined with sorghum sirup, substantially in the manner and for the purpose as herein set forth.

67,751.—MACHINE FOR MANUFACTURING CHAIN CABLE.—W. D. Grimshaw, Newark, N. J.

1st, I claim the combination of the dies, E E, and E' E', arranged for action together or relatively to each, as described, the one set of dies, E' E', being provided with mandrel formations, c c, and the other pair of dies, E E, with grooves, m m', or other equivalent guides to the blank, substantially as specified.

2d, The combination, with the sliding dies, E E, and E' E', of the obliquely operating hammers, m m', for operation together, in the manufacture of chain or chain cable, essentially as herein set forth.

3d, In combination with the sliding dies, E E, and E' E', the eccentrics, F F, and F' F', linked together in pairs, and either pair operated at intervals as described, also the one set of eccentrics being controlled in their action by a spring, h, and drop lever, G, or the equivalents of such devices, substantially as specified.

67,752.—SEWING MACHINE.—Horace W. Hadley (assignor to John G. Folsom) Winchendon, Mass.

1st, I claim the adjustable fulcrum block, N, in combination with the lever, F, and the feeding dog, D, substantially as and for the purpose set forth.

2d, The feeding dog, in combination with, and operated by, the lever, E, and slotted rod, F, eccentric, G, substantially as and for the purpose set forth.

3d, The pivoted oscillating groove cam, S, with the oscillating looper-shaft, Q, and the looper arranged and operating substantially as described.

67,753.—HEMMER FOR SEWING MACHINES.—James R. Hagerty, Hillsdale, Mich.

I claim a hemmer provided with hinged edge turners, substantially as and for the purpose described.

67,754.—FRUIT CAN.—Joel Haines, West Middleburg, Ohio.

1st, I claim corrugating the metal around the mouth of the can, to render the packing tight with small pressure.

2d, I claim a flaring flange, or inverted frustrum, around the mouth of the can, to serve as a tunnel in facilitating the filling of the can, and to hold the cover in place.

3d, I claim the wire around the top of the frustrum, to hold the bar that fastens down the cover.

4th, And in combination with the wire around the top, I claim the bar, H, hinged to the wire at one end, so that it can be slid back and raised to remove the cover, substantially as described.

67,755.—GRAINING MACHINE.—B. M. Hall, South Bend, Ind.

1st, I claim the rollers, C D E, and apron, G, as arranged, in combination with the frame, A, provided with the adjustable ends, I', in the manner and for the purpose substantially as described.

2d, The arrangement of the gearing, B B', and rollers, L, in combination with the rollers, C D E, and apron, G, as and for the purpose set forth.

67,756.—PLOW.—William E. Hardin, Bowling Green, Mo.

I claim the wheel, c, when combined with a plow, A B, in the manner and for the purpose set forth.

67,757.—WOOD TURNING LATHE.—S. L. Hart, Milwaukee, Wis.

I claim the double slide, consisting of the dovetail, longitudinal arm, h1, having bevelled cross head, h2, carrying the adjustable stop, O, and dovetail sliding bar, h3, and operating levers, K and M, when constructed substantially as represented and described.

67,758.—CHAIR AND LOUNGE.—Pierre J. Hardy, N. Y. City.

I claim a folding chair, in which the back can be turned down in combination with a double seat frame hinged at the front end, supported by the arms when turned over to form a lounge, as set forth.

I also claim the padding of the back formed double, at K, so as to be turned over for the pillow, in combination with the folding chair, back and double seat hinged, and fitted as set forth.

67,759.—FOLDING CHAIR.—Pierre J. Hardy, New York City.

I claim the hinges formed as caps for the tops of the legs, as specified and introduced between the folding cross legs and the side rails of the arms, as set forth.

67,760.—COMPOSITION FOR STUFFING LEATHER BELTS.—John Haseltine, Warren, N. H.

I claim the combination of the ingredients above-mentioned, in about the proportions speci ed, using as a base for my composition the first-named ingredient.

67,761.—TRACE COUPLER.—Peter A. Hanse, Catonsville, Md.

1st, I claim the construction of the flat button head, C, upon the bent end, b, of a tongue portion, D, substantially as described and for the purpose explained.

2d, The combination of a staple, B, having an off set or groove, g, formed in it with the button headed connecting device, C D, substantially as and for the purpose described.

67,762.—PROCESS OF CONVERTING CAST IRON INTO BAR IRON AND STEEL.—John Heaton, Langley Mill, Eng.

1st, I claim the use of nitrate of soda or nitrate of potash or chlorate of soda or chlorate of potash to act from the underside upwards upon cast or pig iron when such iron is in a molten state for the purpose of converting the same into steel and into wrought iron, substantially as described for the purpose specified.

2d, The removable chamber containing nitrate of soda or potash or chlorate of soda or potash inserted in recesses of a revolving cylinder containing molten cast or pig iron for the purpose of forming steel or wrought or soft iron, substantially as described for the purpose specified.

3d, The revolving cylinder, a, with a solid or hollow axis, a', and with or without the semicircular end plates made in one piece or two parts, 1 and 2, and adapted to receive the removable perforated chambers, d, substantially as described for the purpose specified.

4th, The converter, A, constructed as described having a lower chamber, A2, containing nitrate of soda and nitrate of potash or chlorate of soda and chlorate of potash covered by a perforted plate upon which molten cast or pig iron is placed, substantially as described for the purpose specified.

5th, A receiver for conveying molten cast or pig iron from the melting furnace to the molds containing nitrate of soda and nitrate of potash or chlorate of soda and chlorate of potash acting from the under side of such molten metal upwards, substantially as described for the purpose specified.

67,763.—MEDICINE FOR CURE OF FEVER.—C. F. Hoeing, (assignor to himself and Daniel Gilcher) Hudson City, N. J.

I claim a composition formed of the ingredients and in the proportions herein described for the puposes set forth.

67,764.—TOILET STAND.—W. S. How, Cincinnati, Ohio.

1st, I claim the arrangement of central stem, A, pivoted legs, B B' B'', stops, E, pegs, H, and hooks, D, and, I, the whole forming a movable stand for the toilet purposes stated in the specification.

2d, In combination with the elements of the preceding clause, I claim the brace or step, F, arranged and attached as set forth.

67,765.—HOG RING.—J. J. Hutson, South Solan, Ohio.

I claim the hog ring d D C B C' D' d' composed of a single piece of wire formed and adapted for application and operation as described and shown.

67,766.—BEDSTEAD FASTENING.—L. L. Jackson, Paterson, N. J., assignor to himself and John Frame, Middletown, N. Y.

I claim fastening a bedstead rail in place by placing its forked ends in slots and forcing them apart by set screws or wedges as and for the purpose specified.

67,767.—CAR COUPLING.—J. H. Jones, Williamsport, Pa.

I claim the drawbeads, A A, having their upper sides open when used in combination with the hooks, B B, bolts, D D, and the curved metallic plates, C C, arranged and operating as and for the purposes set forth.

67,768.—DRIVING REINS.—Phineas Jones, Newark, N. J.

I claim as a new article of manufacture a rein holder consisting of the bar, A, having its ends, b, flattened, its center, a, rounded and the whole covered with leather and inserted in the button hole, c, of the rein, B, substantially as herein shown and described.

67,769.—WARMING APPARATUS FOR FIRE PLACE.—Charles Kalbfuss, New Richmond, Ohio.

1st, I claim the combination substantially as described, of the heating chamber, B, internal flue, C, induction pipe, E, drum, L, branch pipes, M M', and exit pipe, O, the whole being arranged and operating as herein described and set forth.

2d, In combination with the elements, B C E L M M' and O, of the preceding clause, I also claim the diaphragm, F, and the damper, K k, for the purpose specified.

67,770.—RAILROAD CAR HEATER.—W. G. Kendrick, Wilmington, Del.

1st, I claim the registers, l, placed just within the car doors, and suitably connected with the heating apparatus, for the purpose of conducting all the cold air passing in under the doors to the heating apparatus, that it may render the car warmed, instead of spreading over its bottom in a cold stratum, substantially as described.

2d, The casings, K, perforated at their bottom and opening into the outer air at their tops as and for the purposes set forth.

3d, The heating apparatus constructed with an intermediate caseing, B, for the purpose of helping to keep the heat in and the cold out as explained.

67,771.—HAY RAKE AND LOADER.—Henry Kimmel, Waynesburg, Ohio.

1st, I claim the perculiarly constructed hay rake teeth, N, in combination with the rake head, M, lever, P, and head, L, of the covering shield constructed and arranged in the manner and for the purposes herein set forth.

2d, The peculiar arrangement of the tongue, E, with the frame, A, and foot piece, F, with pin, g, therein the several parts being, as and for the purposes before specified.

3d, The spring, Q and Q, with the bends, t, in combination with the upright, z, in the manner and for the purposes specified.

67,772.—PLOW.—James D. Kincaid, Rowling Green, Mo.

1st, I claim the rock shafts or rollers, C C, and their cranks or elbows, c c', the lever, C', and the chains, c3, when combined with the post, D, of the plow as and for the purposes herein set forth and described.

2d, I claim the combination and arrangement of the levers, E, the chains or rods, E', the fulcrum arms, e e, and the spring catch, substantially as described and set forth.

3d, I claim the attachment of the plow beams to the frame, A, by means of the device, d d1 d2, substantially as described and set forth.

67,773.—COTTON GIN.—J. W. Kokemuller, Bluffton, S. C.

1st, I claim the driving rollers, C C, and working or ginning rollers, E E, in combination with the intermediate rollers, D D, or equivalent wheels to serve as bearings for the rollers, E, and to transmit power to the same from the driving rollers, C, substantially as and for the purpose specified.

2d, In combination with the rollers above specified, the belts, G G, applied substantially as and for the purpose set forth.

67,774.—TAILOR'S MEASURING INSTRUMENT.—J. M. Krider, Madison Courthouse, Va.

I claim the measuring upparatus above described consisting of the shoulder spring, M, the breast spring, L, the bar, N, the plate, K, having the grooves and thumb screw described, and the studs, 1 2 3 and 4, all constructed, combined and arranged, substantially in the manner and for the purpose specified.

67,775.—SHIP BLOCK AND WARPING CHOCK.—J. D. Leach, Penobscot, Me.

I claim the concave faced pawl, C, arranged to vibrate upon pivot, a, provided with spring, d, or its equivalent, and the stop pin, b, and lever, e, and combined to operate in conjunction with sheave, B, or its equivalent, in manner substantially as and for the purposes specified.

67,776.—SPRING BED BOTTOM.—Matthew Le Page, Woodhaven, assignor to himself and William Amberman, Jamaca, N. Y.

I claim the arrangement of the elliptic springs, C D, in tiers, in combination with the longitudinal and transverse braces, E F, constructed and operating substantially as shown and described.

67,777.—COTTON BALE TIE.—L. Littlejohn, New York City.

I claim the double headed pin, F, working longitudinally through the eye, D, in the arm, B, of the yoke supported in position to receive the bands by means of the inner lower edge of the eye and its outer upper edge, and adapted to fit into the loop, E, of the yoke as herein set forth for the purpose specified.

67,778.—HORSE RAKE.—John B. Luce, Earlville, Ill.

1st, I claim the pivoted pendant or standard, K, applied to a single handle revolving rake and operated by means of lever, M, and connecting rod, O, substantially as and for the purpose herein set forth.

2d, The lever, M, connection, O, pivoted pendant or standard, K, pawl, J, and steps or projections, Y and L, in combination with a single handle revolving rake, substantially as and for the purpose herein set forth.

67,779.—STOVE PIPE DRUM.—J. A. Marvin, Redwing, Minn.

I claim the arrangement of the flues, B B', connected at top and bottom, and separate within the case, A, so that the products of combustion divide at the neck, C, and pass to, D, through separate channels, as herein set forth for the purpose specified.

67,780.—FOLDING CHAIR.—S. E. Mason and E. Downe, Bangor, Me.

We claim the folding chair and pivoted, legs, C C and C' C', and the hinged back, B B, all arranged to operate relatively to each other, substantially in manner as described and shown.

67,781.—BOTTLE STOPPER.—John Matthews, Jr., N. Y. City.

1st, I claim a bottle stopper operating as described, composed of a stem, C, and valvular cap, D, at its inner end, said stem and cap being made of different materials and the latter being shaped and arranged to act in the threefold capacity of valve proper, buffer and to prevent percolation through or round the stem, substantially as specified.

2d, A bottle stopper having a stem of a rigid character with flexible caps, D and E, to or over its opposite ends, essentially as herein set forth.

67,782.—WAGON SPRING.—E. P. McCarthy, San Francisco, Cal.

I claim the metal cups, B B, for receiving the ball and supporting the spring in combination with the elastic ball, C, suspended or held in place by the rod, D, between the upper and lower portion of the spring, substantially as described.

67,783.—BRICK DRYER.—John McDonald, Saratoga Springs, New York.

I claim the kiln, A, having hollow walls, h, in combination with the dryer chamber, B, substantially as described for the purpose specified.

67,784.—FRAME FOR MUSKETO BARS.—Daniel McHugh, Mainville, Ohio.

I claim the combination of the two hinged half frames, d e e', with the central frame piece, a, to which the fan mechanicism in connected and the serrated post, b, and pawls, f f, when the parts are adjustably connected and arranged to operate in the manner described.

67,785.—CENTER BIT.—W. H. McMillan and Stephen Devoe, New York City.

We claim a center bit or tool constructed and provided with a cutting edge substantially as and for the purpose described.

67,786.—CALCULATING MACHINE.—A. Mendenhall, Cerro Gordo, Ind.

I claim the combination of the box, A, graduated cylinder, b, graduated wheel, c, fixed graduated plate, d, slotted and graduated plate forming the end of the box, a, small grooved wheel, g, pin, h, in the cylinder, b, and the arm, f, all constructed and arranged to operate as herein set forth for the purpose specified.

67,787.—COMBINATION OF BRUSH AND RUBBER.—Alfred S. Miles, Brooklyn, N. Y.

I claim the brush, B, in combination with the block, A, of india rubber, substantially as herein set forth for the purpose specified.

67,788.—MACHINE FOR BENDING TIRES.—Francis Mills, Mount Vernon, Ind.

I claim the arrangement of the adjustable rollers, C C, hung in either one of the fixed bearings, B B', the roller, E, hung in the horizontally sliding head, D, the crank roller, G, hung in the vertically sliding bearings, F, in combination with the lever, H, suspended on the stirrup, d, and provided with the rack, g, to be held in place by the dog, c, the whole mounted on the bench, A, and operating as herein described.

67,789.—SNAP HOOK.—M. F. Mitchel and W. B. Chapman, Waukau, Wis.

We claim a spring or snap hook constructed substantially as described.

67,790.—BOB SLEIGH.—Geo. O. Momeny, Locust Point, O.

1st, I claim attaching the knees, B, to the beams, by means of the slotted braces, G, when constructed and arranged as described, to allow lateral and vertical movement to the runners, enabling them to adapt themselves to the irregularities of the ground, as herein set forth.

2d, The combination of the hook, H, and eye, I, with the forward ends of the raves, D, and runners, A, substantially as herein shown and described.

67,791.—ILLUMINATING DOOR FOR HEATING STOVES.—Geo. R. Moore, Lyons, Iowa.

1st, I claim the doors for stoves and heaters made of three plates, the outer close and the others perforated, substantially as and for the purposes specified.

2d, The stove door composed of perforated plate, C, cast-iron plate, B, with appertures as shown, and close hinged plate, A, constructed and arranged as described.

67,792.—BREECH-LOADING ORDNANCE.—Chas. C. Wolfrum Müller, New Orleans, La.

1st, I claim the breech plug, A, provided with shoulders, o o, leaving an angular neck straddled by the key, C, and receiving the spring plunger, D, and having its inner end grooved, or a shoulder to lock with cartridge plug, D, when constructed and operating substantially as described.

2d, In combination with the above, the key, C, straddling the neck, B, of the plug, A, between its shoulders, o, to the base thereof, and operating substantially as described for the purpose specified.

67,793.—BROOM HEAD.—M. V. Nobles, Elmira, N. Y., and Judson Holcomb, Towanda, Pa., assignors to themselves and John C. Nobles, Rushford, N. Y.

We claim a broom head composed of the straps or plates, and the divided bands, the whole held together by means of the clamping buttons and screws, and adjustable as well as removable and replacable, substantially as herein described and represented.

67,794.—SECURING WHEELS OF VEHICLES ON THEIR AXLES. Christain Oyster, Chambersburg, Pa.

I claim the immovable key and the hinged washer, constructed substantially as described for the purpose specified.

67,795.—MORTISE KNOB LATCH.—George H. Palmer, New Bedford, Mass.

1st, I claim the cylindrical lock case, A, constructed as described, consisting of the longitudinal sections, a, secured together by means of the rings, b, as herein set forth for the purpose specified.

2d, The latch, B, having upon its upper and lower sides the guiding plates, d d, sliding in grooves, e e, of the case, A, arranged in relation with the dovetailed, pivoted link, C, slotted pivoted link, D, springs, j j, upon opposite sides of the link, C, and the slotted hub, E, as herein set forth for the purpose specified.

3d, The latch, B, when provided with the guiding plates, d, sliding in the grooves, e e, of the lock case, A, as and for the purpose specified.

67,796.—PROCESS FOR TREATING PETROLEUM.—John C. Pedrick, Washington, D. C.

I claim treating petroleum or other hydro-carbons by passing through the oil or hydro-carbon a current or currents of steam and air, substantially as and for the purposes herein set forth.

67,797.—WARDROBE BEDSTEAD.—J. F. C. Pickhardt, N. Y. City.

1st, I claim the securing or hinging of the bedstead, B, to a support, C, which is hinged to the base of the case, A, and all arranged in such a manner that the bedstead may be turned or folded up within the case when not required for use, and let down and drawn out from the same when designed to be used, substantially as and for the purpose set forth.

2d, The bearings, m, at the inner sides of the doors, a a, in combination with the hinged bedstead support, C, and bedstead, B, all arranged in connection with the case, A, substantially as and for the purpose specified.

3d, The jointed supplemental foot board, g, and hinged head board, e', applied to the bedstead substantially as and for the purpose set forth.

4th, The combination of the case, A, with doors, a a, bedstead, B, support, C, bearings, m, on the doors, a a, supplemental foot board, g, the hinged head board, e', and the pivoted leg, D, all arranged substantially as and for the purpose specified.

67,798.—OX YOKE.—Charles H. Post, Guilford, Conn.

I claim the metallic plate, C, constructed and operating substantially as shown and described, in combination with the yoke, A, and the bow, B, as and for the purposes set forth.

67,799.—SKATE.—John W. Post, Castile, N. Y.

1st, I claim the foot plate, a, constructed as arranged and shown, with the inclined screw sockets, D, cast on its under side, into which sockets the screw clamps, E, fit, substantially as described.

2d, The eccentric spring latch, F, constructed and operated substantially as described, pivoted to the under side of the plate, A, for the purpose set forth.

3d, The combination with the eccentric spring latch, F, the blunt pin, H, cast in one piece with the plate, A, substantially as and for the purposes described.

67,800—MODE OF HANGING SWORDS.—Virgil Price, N. Y. City.

I claim the chain, B, in combination with the plate, b, for the purpose of suspending swords from belts, substantially as herein shown and described.

67,801.—WASHING MACHINE.—Stephen Rawdon and L. T. Ethridge, Darlington, Wis.

We claim the machine or tub consisting of the semi-circular ends or heads, A, connected together by means of the ties or rubber, B, and bottom, C, and provided with the removable cover, E, and handle or lever, G, in combination with upright frame, H, all arranged and operating in the manner and for the purpose described.

67,802.—WAGON.—Edward Robinson, Greenbush, Wis.

1st, I claim the combination of the segmental rack, F, the catch, c, pivoted with a spiral spring to operate it, the lever, a, the tongue, E, and the axle, B, arranged and operating substantially as and for the purpose herein described.

2d, The detached frame, G, combined with the loop, d, on the lever, a, and the tongue, E, arranged and operating substantially as and for the purpose specified.

67,803.—FEED REGULATOR FOR SEWING MACHINES.—George Robinson, Detroit, Mich.

I claim the combination of the screw, D, on shaft, B, with the worm wheel, E, and cam, F, on the stud, G, all being applied to the cloth plate, A, of a sewing machine to operate in the manner substantially as and for the purpose set forth.

67,804.—OAR COLLAR.—Jackson Robinson, Curwinsville, Pa. (assignor to Reuben Hoover), Boonesboro, Iowa.

I claim the oar collar formed of the parts, A and B, when constructed and applied substantially as herein shown and described for the purposes set forth.

67,805.—STREET SPRINKLING CART.—L. Rodenhausen, Philadelphia, Pa.

1st, I claim a sprinkling cart constructed with the following characteristics viz; a closed body, A, an inclined bottom, b, the hose rack, E, and strainer, D, arranged and operating substantially as described.

2d, I claim in combination with the body, A, the valve, F, placed at the junction of the eduction pipe and sprinkler, substantially as specified.

67,806.—FIRE SHRINKER.—Andross Rogers, Freeport, Ill.

1st, The shear blades, D D, when constructed and operated in the manner herein set forth.

2d. The combination of the lever, C, the side, B', the punch, F, and the shear blades, D D, the whole constructed arranged and operating as herein specified.

67,807.—BREAST STRAP SLIDE.—Isaac Roraback, South Bend, Ind.

I claim the curved slide, A, when provided with its arm, B, jaws, c c, and tongue, d, with its spring as and for the purpose specified.

67,808.—BUCKLE.—Isaac Roraback, South Bend, Ind.

I claim the plate, C, with its upper and lower lugs, w and z, and formed thicker at its rear end when used in combination with the casting, B, having side bars, keepers, D D, and central plate, a, above which is a narrow groove, d, for the sliding plate, C, to operate when constructed and used in the manner and for the purpose herein specified.

67,809.—SOFA AND BED.—Henry Shultz, Chicago, Ill.

I claim the revolving frame upholstered as a sofa cushion on one side and as a bed on the other side, with a folding back as described, the whole constructed and operating substantially in the manner herein described and specified.

67,810.—TURNING LATHE.—Fred. Shaller, Hudson, N. Y.

1st, I claim the chuck, E, with its clamping bars, F F, pivoted and arranged for operation substantially as described.

2d, The combination with the puppet, H, of the gage bar, J, with its tool guide and gage, g, and reversible male and female centering rod, I, essentially as specified.

67,811.—Latch.—Jas. Shepard and Jos. Sigourney, Bristol Ct.

We claim the bolt, a, with its beveled or slanted end, b, and its long or weighted end, a b, pivoted or hung by its arm, c, and operating substantially as set forth.

2d, And in combination with the foregoing, or its equivalent we claim the pull plate, h, the whole constructed and operated substantially as set forth.

67,812.—STEAM PUMP.—Thomas Simons, New York City.

I claim, 1st, The arrangement of cylinder, A, perforated plate, a, and box C, substantially as herein set forth.

3d, The arrangement of the cylinder, A, steam inlet, G, chamber, H, valve I, and lever, J, in the manner and for the purposes set forth.

67,813.—MACHINE FOR CUTTING AND PUNCHING PAPER.—J. F. S. Smith, New York City.

I claim the combination with the continuously revolving cutter, C, constructed to cut only at intervals in each rotation, and stationary cutter, d, with the feeding foot, F, and holder, E, having an intermittently reciprocating action as described, by means of the partial spiral, f, incline or stud, g, and spring, k, with its rod, l, or equivalent of these devices, and regulating screw, m, to the slide, i, of the holder and feeding foot, substantially as and for the purpose or purposes herein set forth.

67,814.—GANG PLOW.—H. P. Stafford (assignor to himself and M. C. Wykel, Decatur, Ill.

I claim, 1st, The attaching of the plow beams to the carriage through the medium of the pendant swivel guide, M, secured to the draft pole, D, and the pins, a, in the sides of the beam, H, between which pins the guide is fitted, substantially as and for the purpose specified.

2d, The attaching of the plow beam, H' to the beam, H, by means of the pivot, b, and the guide, M, substantially as and for the purpose set forth.

3d, In combination with the mode of attaching the plow beams to the carriage as shown, the application of the draft power direct to the plow beams, substantially as set forth as and for the purpose specified.

4th, The lever, P, having its fulcrum pin, f, fitted in a swivel, Q, on the axle, A, and its rear and connected by a link, e, with a grooved roller, d, which works under an oblong loop or staple, O, on beam, H, substantially as and for the purpose specified.

67,815.—REVERSIBLE FEED FOR SEWING MACHINES.—R. B. Stanton, Oxford, Ohio.

I claim, 1st, The two cams, G H, in combination with the cam, D, and the adjustable elastic bar, J, all arranged to operate in connection with the feed plate, E, and toothed bar, F, substantially as and for the purpose specified.

2d, The screw, c, connected with pendant, a' in combination with the revolving socket, I, as and for the purpose set forth.

3d, The beveled hook-shaped plate, L, when used in connection with a reversible feed mechanism, as and for the purpose set forth.

67,816.—BUREAU AND BEDSTEAD.—John Stock, El Paso, Ill.

I claim the combined bureau and bedstead constructed as described consisting of the bottom, B, having raised pieces, D, hinged to the boards, E F, having end pieces, G, and side pieces, I, adapted to form a bedstead when opened, and a bureau when folded up, as herein shown and described.

67,817.—CULTIVATOR.—E. E. Stubbs, West Elkton, Ohio.

I claim the combination of the knives, d, roller, D, and harrow, E' with the levers, q h and s, perforated harrow box and main frame, the parts being arranged, connected and operating together in the manner and for the purpose specified.

67,818.—WRENCH.—G. C. Taft, Worcester, Mass.

I claim a wrench provided with a swivel attached to the end of the rosette and fitted in the stationary jaw, substantially as set forth.

67,819.—OX YOKE.—W. A. Thompson, West Winsted, Conn

I claim the top caps, d' of the neck block, D, sliding longitudinally in the channels formed in the upper sides of the slots of the body, A, in combina tion with the devices as shown when constructed and operating as herein set forth and for the purposes specified.

67,820.—Window Sash.—Horace Tupper, Bay City, Mich.

I claim the head piece, A, when provided with a slot for the admission of the glass in combination with the continuous grooves in the vertical bars and the slots in the horizontal bars, as and for the purpose described.

67,821.—Lubricator for Spindles.—R. P. Underwood, Brooklyn, N. Y.

I claim the oil cup, B, attached to spindle, A, and stationary center plug or core, E, having inlet passages, G, provided with extensions, I, and outlet passages, L, for the oil, substantially as and for the purpose described.

67,822.—Spring Mattress.—Henry Holton Vere (assignor to J. E. Fishley), New York City.

I claim a spring mattress composed of the spiral springs, A, flat steel spring top and bottom, B, and flat steel spring frame, C, and suitable covering, all made and operating substantially as herein shown and described.

67,823.—Stem Winding Watch.—Arthur Wadsworth, Newark, N. J.

I claim, 1st, The bar, J, carrying wheels, I I2, interposed between the pendant and the mainspring, axis and band arbor, respectively, of a watch movement, substantially as and for the purpose described.

2d, The combination of a turning pendant and pusher, when connected together in a watch, substantially as described, for the purpose specified.

3d, The packing ring, s, or its equivalent, between the pendant and pusher of a watch case, substantially as and for the purpose described.

67,824.—Mode of Extracting Essences.—James C. Walker, Waco Village, Texas.

I claim, 1st, The apparatus above described, consisting of the furnace, A, boiler, B, having tube, a, tube, b, with perforated extremity, chamber, c, with perforated bottom, pipe, D, and surrounding tank, E, all combined and arranged substantially as and for the purpose set forth.

2d, The detachable receiver, G, fastened by the air tight joint, g, to the tube, D, and acting in combination with the parts above described, substantially as and for the purpose specified.

67,825.—Drill.—Daniel Warner, Port Clinton, Ohio.

I claim the rod, A, with its grooved sides, B, cutting edges, c', guides, e, bevelled points, x1 x2, and z z1; the manner and for the purposes set forth.

67,826.—Drilling Machine.—Daniel Warner, W. Peiffer, and H. F. Leper, Port Clinton, Ohio.

We claim, 1st, The arrangement of shaft, z z', bevel wheels, D D, and bevel wheel, E, with shaft, F, and box, M, as and for the purpose specified.

2d, In combination with the subject matter of the first claim, we claim the hand wheel, K, pinion, L, rack, J, and box, M, all constructed and arranged substantially as and for the purpose specified.

3d, The lever, R, constructed and used as specified, with the wheel, N, and shaft, I, as and for the purpose set forth.

67,827.—Switch.—Joseph P. White, Savannah, Ga.

I claim, 1st The switch, c, when provided with the levers, D, and when combined with the hinged levers, F and H, bar, G, springs, c c, or their equivalents, bolt, E, and inclined planes, O, all made and operating substantially as herein shown and described.

2d, The above, in combination with the lever, K K, wedges, M M, and lever, N, that are arranged on the engine or car, substantially as and for the purpose herein shown and described.

67,828.—Harvester.—Wm. N. Whitely, Springfield, Ohio.

I claim the construction and arrangement of the coupling arm, M, the brace, O, or its equivalent, in connection with the inner shoe of a harvester, cutting apparatus, and the cutters crank shaft, so that the cutting apparatus may rise and fall upon a center, at the inner or outer end of said coupling-arm or be made rigid as desired, and substantially as described.

2d, The coupling plates, s s, connected together by the cross bars, T U, in combination with the main frame, A, and standard, substantially as and for the purpose set forth.

3d, The driver's seat, W, located upon the cross bar, T, so that the weight of the driver will rest directly upon the bearing wheels, and not upon the main frame, substantially as and for the purpose set forth.

4th, Forming the joint of the pitman and cutter bar, by the use of a loose conic l plug, which is kept in place by guide way, j, or its equivalent for that purpose, and may be removed without the aid of tools where the head of the cutter bar is withdrawn from said guide, substantially as and for the purpose set forth.

5th, The plug, e, set screw, g, and jam nut, h, in combination with the guide way, f, pitman, j, and the sickle eye, substantially as and for the purpose set forth.

6th, The rake arm, F' in combination with the independent guide, w, so that said rake may be raised and held up, during its entire revolution, by the raising of said guide, and without changing the path of the reel arms, substantially as and for the purpose set forth.

7th, The pendent arm, D', with its friction roller, in combination with the rake arm, F, and the independent guide, w, substantially as and for the purpose set forth.

67,829.—Harvester Cutter.—Wm. N. Whitely, Jerome Fassler, and Oliver S. Kelley, Springfield, O.

We claim the nail rod, E, provided with the right-angled flange, F, substantially as and for the purpose set forth.

67,830.—Photographic Camera Stand.—F. E. Wilke, Brooklyn, N. Y.

I claim, 1st, The device for raising and lowering the sliding frame of a camera stand which consists of a vertical screw, G, which is held between the cross heads, E and a, which are part of the stationary and sliding frames, respectively, said screw being operated by means of gear wheels, H and I, and by a handle, b, or a shaft, J, all as set forth.

2d, The device for placing the plate, N, and the camera, which is supported by it, into an inclined position, said device consisting of the arrangement and combination with each other, of the screw, K, sliding nut, L, pivoted arms, M, and hinged plate, N, all made and operating substantially as herein shown and described.

3d, The raising and lowering device of a camera stand, in combination with the device for inclining the camera, when the same are made substantially as herein shown and described, and when operated by means of the screws, G and K, respectively, as set forth.

67,831.—Cotton Plow.—William B. Williams, Warrenton, N. C.

I claim the extension of the wing or wings of the point, also, the curve of the point or points.

67,832.—Eye Cup.—John M. Winslow, Rochester, N. Y.

I claim the instrument, herein described, consisting of two cups, to which rubber tubing is attached, connecting with a mouth piece, having an opening in the tube thereof for the purpose of exhausting the air by means of suction with the mouth, thereby producing a vacuum between the eyes and the cups, in the manner and for the purposes substantially as set forth.

67,833.—Machine for Attaching Labels.—J. F. Zacharias, Leesburg, Va.

I claim, 1st, Knife, D, provided with indentures, a, in combination with the gate, C, provided with the pin, S, as and for the purpose set forth.

2d, The adjustable projecting plate, F, provided with set screws, b b, in combination with the lever, G, link, L, and swinging plate, H, as and for the purpose set forth.

3d, The combination of rollers, L and M, bands, N and O, and supply roller, R, arranged and operating in the manner substantially as shown and described and for the purpose set forth,

67,834.—Check for Trunks.—P. J. Steer, Washington, D. C.

I claim the check, a b, when constructed and applied as and for the purpose set forth.

67,835.—Harrow.—John N. Fordyce, Cambridge, Ohio.

1s, I claim the combination of an adjustable furrower with a harrow, substantially in the manner and for the purposes as herein described.

2d, The arrangement of the rods, g h, roller, i, clasps, d d, staples, e e and o, in combination with the furrowers and with the seat, substantially in the in the manner and for the purposes as herein described.

3d, The jack, D D, operated by lever, F, substantially in the manner and for purposes herein described.

REISSUES.

2,726.—Plow.—T. E. C. Brinly, Louisville, Ky. Patented July, 3, 1866.

1st, I claim constructing a plow with its land side, L, and the standards, C D, connected by the flange, e, and having the ears, d, on the post, C, all cast in a single piece, as described.

2d, The mold board, L, with the point, E, formed in a single piece and having a shoulder or projection, e, formed on its under side, to rest against the front of the land side and assist in holding the mold board in place, substantially as described.

2,727.—Machine for Cleansing and Softening Sheep Skins.—James M. Brown, Boston, Mass. Patented July 2, 1867.

I claim the treatment of the skins by means of a fulling mill and water, substantially as described.

I also claim the treatment of the skins by a fulling mill and water and collecting the waste wool on a screen or its equivalent, as set forth.

I also claim the combination as well as the arrangement of the screen with the fulling mill having a discharging hole in its reservoir, as explained.

2,728.—Method of Securing Cutters to Rotary Disks.—Henry Disston, Philadelphia, Pa., and James E. Atwood, Trenton, N. J., assignees by mesne assignments of Jonah Newton. Patented June 19, 1855.

1st, We claim a rotary cutter consisting of a disk having recesses which represent the segment of a circle, and teeth adapted to and admitting of being adjusted in these recesses, substantially as set forth for the purpose specified.

2d, The tooth or cutter consisting of the segment of a ring having on its convex side a rib adapted to a groove in the above-mentioned recess.

3d, The screw, h, and segmental nut, f, arranged for securing the tooth or cutter to the disk or plate, as set forth.

2,729.—Sugar Evaporator.—Francis Farquhar and Robert E. Doan, Wilmington, O. Patented Sept. 25, 1866.

1st, I claim a sugar evaporator having its fire box and flues arranged so as to be surrounded with the juice to be evaporated, substantially as and for the purpose specified.

2d, We also claim an evaporating or boiling apparatus having a fire chamber, flue, or flues, whose walls are parallel or nearly parallel with the adjacent surfaces, in order that the liquid-containing space or spaces may be adapted for subjecting a given quantity of liquid to the most uniform and effective action of heat, substantially as described.

3d, We claim the arrangement of the flues, C D D and E, substantially as herein set forth.

4th, We claim the evaporating space, S''', between the flues, D D E, and the fire box, as described.

5th, We claim the flue connections, L L, between the fire box, B, and flues, D D, for the purpose set forth.

2,730.—Apparatus for the Manufacture of Paper Pulp.—Joseph B. Palser and Gardner Howland, Fort Edward, N. Y. Patented June 21, 1859. Reissued July 3, 1860.

1st, We claim the employment of two boilers in the reduction of paper stock, so arranged in respect to each other that the steam heat remaining in one after the boiling process has been completed, may be transferred to the other boiler, in which the boiling process is being commenced, in combination with the pipes, or other means by which such steamheat is thus transferred, substantially in the manner and for the purpose above described.

2d, We claim the transferring of the steam heat from a boiler in which paper stock has been boiled, immediately after such boiling has been completed, to another boiler charged with paper stock, for the purpose of utilizing the heat remaining in the first boiler after the completion of the boiling processes therein, substantially in the manner and for the purpose above described.

3d, We claim the arrangement and combination of the boilers, the furnace, A, and the doors, D D' E E' and F F', so as to apply the furnace heat to either or both the boilers at pleasure, substantially in the manner and for the purpose above described.

2,731.—Manufacture of Paper Pulp.—J. B. Palser and Gardner Howland, Fort Edward, N. Y. Patented June 21, 1859. Reissued July 3, 1860.

1st, We claim an internal division of the pipe, b, which passes through the hollow journal of the rotary boilers, by means of a partition so that the steam from the upper portion of the boiler may find exit through one compartment of the pipe, and the liquid contents of the boiler may find an exit through the other compartment thereof in the manner and for the purpose described.

2d, We claim the employment of the perforated diagram, p p' when arranged substantially as described to protect the pipes, h h' s s' and to strain the liquid from the stock, as and for the purposes above described.

2,732.—Harvester Cutter.—Gustavus Stone, Beloit, Wis. Patented Jan. 8, 1856.

I claim making the sections of which the grass cutting blades are usually made of two pieces of steel A and B, with but one cutting edge, D, upon each and so placing them upon the sickle bar, C, that there shall be a wedge-shaped opening, J, between their backs, closed at the points, and widening out towards the bar.

2d, Providing the heel, K, of the sickle bar, C, with the conical or conoidal points, L L, or their equivalents for the purpose shown and described.

2,733.—Machine for Hulling Rice.—Robert Anderson Brooklyn, N. Y. Patented Feb. 21, 1860.

I claim a series of revolving beaters of any suitable flexible material, in combination with a surrounding casing or cylinder the interior surface of which is of rough stone-like character for operation together in pearling or polishing rice, substantially as specified.

2,734.—Hand Stamp.—N. L. Chamberlain, Boston, Mass., assignee of Dexter H. Chamberlin. Patented July 9, 1867.

I claim the type wheel, b, having figures upon its side when the said wheel is arranged between and in combination with the wheels of smaller diameter as and for the purpose set forth.

DESIGNS.

2,742.—Clock Case.—A. F. Atkins, Bristol, Conn.

2,743.—Trade Mark.—J. L. Bates, Boston, Mass.

2,744, 2,745.—Trade Mark.—J. L. Bernecker, St. Louis, Mo.

2,746.—Stove Plate.—David Hathaway (assignor to Fuller Warren & Co., Troy, N. Y.

2,747.—Blacksmith's Drill.—J. L. Haven, Cincinnati, O.

2,748.—Statuette.—J. S. McKaye and H. G. McKay, New York City.

2,749.—Stove Door.—Samuel Sailor, Philadelphia, Pa., assignor to March, Sisler & Co. Limerick Station, Pa.

2,750.—Garden Urn.—George T. Spicer, Providence, R. I.