

inches wide. There will be 3 inches lap on the steam side and 1½ on the exhaust side of the valve.

THE SCREW.

The propelling wheel is fixed in its place and can only be disconnected from the engines by a clutch coupling inside the ship. The thrust is taken by a large bearing, having a number of collars, and there is also a roller bearing in addition; this latter consists of a number of steel balls working between two grooved couplings or disks. The diameter of the propeller is 18 feet, and the pitch is expanding, having a mean of 25 feet. The wheel is four-bladed, and has no out-board bearing on the extreme after-end.

THE BOILERS.

There are no less than 8 main boilers in each of these ships, having one smoke-pipe serving for two boilers, or four in all. The pipes are 56 feet high from the uptake, 7 feet 8 inches diameter for the large boilers, and 6 feet 6 inches for the two forward boilers, which are smaller than the others. The safety-valves are 8 inches diameter of opening, and each boiler has one. The boilers are of Martin's patent with a total water-heating surface of 28,300 feet, and a grate area of 1,128 square feet. There are 16,082 vertical tubes, and 744 horizontal tubes in all the boilers, also 7 furnaces in each one. Steam is to be used superheated in these engines, and there are four superheating boilers next the engines, having a heating surface of 2,848 feet. All the boilers are to be tested at a hydrostatic pressure of 65 pounds to the square inch. By an act of Congress, the working pressure of steam boilers may be three-fourths the tested pressure; these engines can, therefore, have, in round numbers, 50 pounds of boiler pressure per square inch applied to them, provided the boilers stand the test. It is hardly necessary to say that this enormous pressure has never yet been applied to engines of a similar size. The boilers and engines are all to be of the best materials, and the cylinders and valve faces as hard as tools can work them. All bolt-holes are to be rimmed, and the workmanship otherwise according to the most approved principles of modern engineering practice.

THE BRITISH IRON-CLAD FRIGATE BELLEROPHON.

The London *Times*, in describing the progress which the British Admiralty is making towards the construction of a fleet of iron-clads, gives the following description of the frigate *Bellerophon*, now being built at the works of Messrs. Penn.

"This vessel is in point of strength intended to be a monster among these monsters, to be in fact, as terrible an assailant to iron-clads as an iron-clad would be to wooden ships. The object with which this vessel is designed is, in case of another great naval war, to avoid a repetition of the long dreary work of blockading an enemy's fleet by wearisome and dangerous cruising of the mouth of harbors. The *Bellerophon* is to be a vessel of such strength and speed and tremendous weight of guns as, in case of an enemy's iron fleet running into port, she can follow them with impunity, and at long range fight them at their moorings, till she either drives them ashore or forces them out to sea. Specially built for the discharge of such duties, it is almost needless to say how carefully every point in her equipment has been considered; and as Mr. Penn undertakes that her speed shall equal her strength, there seems to be very little doubt but that, with her impenetrable sides and her armament of ten 300-pounders and two 600-pounders, she will be the most formidable sea-going frigate the world has yet seen. The length of this vessel is to be 300 feet, and her breadth 50 feet; her tonnage will be 4,246 tons, her displacement 7,053 tons; and though carrying the heaviest armor and armament ever sent afloat, her draft will be only 21 feet forward and 26 feet aft—less than the draft of ordinary two-deckers. The height of her lowest portsill from the water will be 9½ feet, the distance between the guns 15 feet, and the height between decks 7 feet. Her midship section is smaller than that of the *Warrior*, and to that extent, therefore, she will be easier to steam and sail. She is to have four masts—only the first square-rigged, the three others carrying immense fore-and-aft sails, a rig from which the French have got such admirable results with their iron frigates

under canvas. In the engines of the *Bellerophon* it is hoped to effect a great improvement as regards the consumption of coal. The *Black Prince*, which is now the fastest ocean steamer afloat, burns at the rate of 4½ pounds of coal per indicated horse-power per hour, and on her trial trip, with her screw going 54 revolutions, she did 15½ knots an hour, and can be depended on, at sea, to average as high as 13. In the *Bellerophon*, however, it is hoped, by working with superheated steam, condensation and expansion, to reduce the consumption of coal to 2½ pounds per indicated horse-power per hour. If this great result be effected, she will carry 16 days fuel, instead of nine; and if, as is expected, Mr. Penn can get 65 or more revolutions out of her engines, she can be depended on at sea to average 15 knots, or nearly 18 miles an hour.

"The ribs and framing of the *Bellerophon* will be much the same as those of other iron frigates, with the exception that the stringer plates and diagonal bracings will all be of steel—that is to say, of less than half the weight, and more than four times the strength, of the present system of wrought-iron fastenings. Wherever steel can be used with advantage, in point of strength and lightness, it will be adopted in the frame of this new frigate and Mr. Reed estimates that by this method, and while making the hull infinitely stronger, he will save in weight two or three hundred tons, which can be infinitely better bestowed in increasing the thickness of the armor plating. It is the first time that steel has ever been used in these vessels, and Mr. Reed deserves every credit for adopting it, though it was not difficult to foresee that it must soon have been extensively used.

"The armor of the *Bellerophon* is to be no less than 16 inches thick, and this is to rest on 10 inches of solid teak beams. This outer protection is quite formidable enough, but what it protects is of its kind quite as strong in proportion. The inner skin consists of two plates, each of ¾-inch thickness, with a stout layer of painted canvas between to deaden concussion. Outside the skin come single-iron stringers of the tough steel. These angle-iron stringers in any metal would be of immense strength, and project from the inner skin 9½ inches and 10 inches alternately. Thus they form so many longitudinal shelves, of the depth mentioned, which run from stem to stern of the ship, two under each row of plates, and in these the teak beams are laid, the longitudinal layers of the angle-irons keeping the beams up to their work and preventing their lateral splintering, while they also support the plates with their edges and prevent their bending in unfairly on the teak. The *Bellerophon* is not thus coated from end to end and over all with this tremendous armor. In the centre and for 90 feet of her broadside she is thus protected, from 5 feet below the water line to the level of the upper deck. In this space are her guns, five 300-pounders, with one 600-pounder at each side. For the rest of her length there is only a belt of this massive armor, which goes to the same depth beneath the sea to six feet above it, so that she cannot be hit in any part where the water could enter."

[We have no broadside iron-clads building in this country that can compare with this frigate.—Eds.]

HOW TO DISCOVER SMALL-POX.—The *Eclectic Journal* says concerning this matter:—"Now we offer this secret to the profession—as soon as the eruptions appear, and by pressure with the point of the finger may distinctly be felt the small, hard substance, precisely as if a small, fine shot had been placed under the cuticle of the skin. This peculiar appearance belongs to no other eruptive disease. We have applied the term *secret*, here, for whilst it is, and has been known to a few physicians, it is not mentioned in any of the standard authorities; nor does the writer claim the credit of the discovery. After this all works upon practice will add this unfailing diagnostic symptom."

NEW GREEN COLORS.—At the recent annual meeting of the Academy of Sciences, in France, a prize of two thousand five hundred francs (\$500) was awarded to M. Guignet for the preparation of a non-injurious green for printing on tissues, and another of one thousand five hundred francs (\$300) to M. Bouffe for having discovered a substitute for an arsenical green in the manufacture of artificial flowers.

REGENT AMERICAN PATENTS.

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

Device for amalgamating Gold and Silver.—This invention relates to a method of amalgamating gold and silver with quicksilver. It is well known that a strong affinity exists between quicksilver and the precious metals above mentioned; but chemical affinities take place at insensible distances; that is, upon contact of the two or more substances proposed to be united. To amalgamate gold or silver with quicksilver, therefore, in a manner so thorough as to extract all of those precious metals from the quartz or other earthy and mineral substances with which they are materially combined or mixed, it is necessary that every particle of the said precious metals should be brought into actual contact with an equivalent portion of the quicksilver employed for this purpose. This absolutely necessary condition of perfect amalgamation, it is believed, has never hitherto been effected; and hence it is that the said metals have never been fully extracted from the earthy and mineral combinations with which they are found in nature. This invention consists in pulverizing the quartz or metalliciferous substances to an impalpable powder, and exposing this dust, either in a calcined or otherwise prepared condition, as it may be necessary sometimes to do, in order to isolate the said metallic particles from their sulphurous or other foreign combinations; or in an uncalcined state, as it may at other times be best to do, when unmixed with foreign bodies which hinder contact with the quicksilver, in a dry, sifted and finely-divided state, in a falling, moving or floating condition, in a close chamber or passage-way, to the hot vapor of distilled quicksilver, by which the two substances, namely, the hot vapor of distilled quicksilver and the pulverized quartz aforesaid, shall mingle together and interpenetrate each other, that every particle of the said precious metals contained in the said pulverized quartz must come into actual and direct contact with the finely divided particles of the quicksilver-vapor and effect a perfect amalgamation. Henry W. Adams, of New York city, and W. S. Worthington, of Newtown, N. Y., are the inventors of this device.

Firebox for Stoves and Furnaces.—The object of this invention is to facilitate the burning of fine coal in stoves and furnaces. The improvement relates to a novel construction of the fire-grate, whereby a large grate surface is obtained and a great circulation of air allowed through the fuel, thereby insuring a more perfect combustion of the fuel. The invention consists in constructing the fire-grate in horizontal and vertical sections so as to form horizontal, elevated and low portions connected by vertical portions, and using in connection with the grate, thus constructed, a series of perforated air-tubes or vent-ducts, whereby a perfect combustion of the fuel is obtained. William Bickel, of Pottsville, Pa., is the inventor of this improvement.

Steam Engine.—In all reciprocating steam engines heretofore constructed the movement of the piston has produced a concussion or shaking of the bed or foundation upon which the engine has been supported, and a tendency to tear the engine away from said bed or foundation, in many cases to the great detriment of the structure in which the engine is contained. This action has been especially injurious in the case of horizontal engines arranged transversely to the keels of vessels for driving screw propellers, and has been the great obstacle to the running of such engines at sufficiently high speeds to drive the propeller without the intervention of gearing or its equivalent between the crank shaft and propeller shaft. In such engines the weight of the piston and its attached piston rods and cross-head is frequently many thousand pounds, and the inertia of this mass, in the starting of the piston, re-acts against one end of the cylinder and tends to move the cylinder and bed of the engine toward one side of the vessel, and the force required to arrest the piston as it completes its stroke, after having acquired a great momentum, re-acts upon the framing and bed of the engine in the opposite direction to the re-action first mentioned, and tends to move the bed of the engine toward the other side of the vessel. In this way two distinct concus-

sions are produced upon the vessel in a lateral direction during every stroke of the engine or in every stroke of each piston when more than one engine or an engine with more than one cylinder is used. The object of this invention is to counteract the above-mentioned effect or tendency of the movements of the piston of an engine; and to this end it consists in the connection with such piston, of a weight which has a corresponding reciprocating motion, but always moves in an opposite direction to the piston, such weight being equal or nearly equal to the weight of the piston and its rod or rods and their connections with the crank, and moving the same distance or being heavier and moving a correspondingly less distance, or lighter and moving a correspondingly greater distance. John Ericsson, of New York city, is the inventor of this improvement.

Time-piece.—This invention consists in the employment, in place of the ordinary hands of a clock or watch, of dials containing the names of different localities, arranged in such relative position toward each other that, by the motion of the disk-shaped hands or hand-disks on the dial of the clock or watch the local times of all the places marked on the disks can be observed at any moment; also in the application of two or more sets of hands marked with the names of different localities and moving on one and the same arbor, in combination with the dial of a clock or watch, in such a manner that the local time of each of the places marked on the hands, and the difference of time between said places can be observed at a glance whenever desired. Finally, in the arrangement of adjustable indices or local hands inserted into or attached to the edges of the hand-disks in such a manner that the same indicate the local time of that place where the watch or clock is to be used. A. W. Hall, of Chicago, Ill., is the inventor of this improvement.

CATTLE VALUATION.—According to published statistics, it appears that the wholesale cost of live animals brought to New York for slaughter last year, exceeded \$30,000,000, and that more than half our beef comes from the single State of Illinois.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing \$1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1833, to accompany the claim, on receipt of \$2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII., to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office. No. 37 Park Row, New York.

Back Numbers and Volumes of the "Scientific American."

VOLUMES I., III., IV., VII., VIII. AND IX., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, \$2 25 per volume, by mail, \$3— which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOLS. X., V. and VI. are out of print and cannot be supplied. We are unable to supply any of the first six numbers of the current volume. Therefore all new subscriptions will begin hereafter with the time the money is received.



ISSUED FROM THE UNITED STATES PATENT-OFFICE FOR THE WEEK ENDING FEBRUARY 16, 1864. Reported Officially for the Scientific American.

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

41,588.—Amalgamating and collecting Gold and Silver.—Henry W. Adams, New York City, and W. S. Worthington, Newton, N. Y. Antedated Feb. 12, 1864:

We claim, first, The precipitating or discharging of the pulverized quartz in a shower into an atmosphere of hot vapor of quicksilver, substantially in the manner herein shown and described.

Second, The cylinder, C, provided with a screen, D, and arranged and operated as shown for the purpose specified.

Third, The stirrer, N, and pan, M, either or both; having a rotary motion in combination with the cylinder, B, rotary screen cylinder, C, and furnace or still, J, as and for the purpose specified.

Fourth, Operating the stirrer, N, or the pan, M, from the shaft, I, when said shaft is arranged as shown and provided with a wiper-wheel, H, to operate the screen cylinder, C.

Fifth, The means employed for preventing the escape of the vapor of quicksilver from the cylinder, B, to-wit: the annular water chamber, a, into which the lower end of the screen cylinder, C, is fitted and the funnel, L, at the lower end of the cylinder, B, extending into the pan, M, and below the surface of the water contained therein, substantially as set forth.

41,589.—Stuffing for Mattresses, &c.—Henry A. Alden, Matteawan, N. Y.:

I claim as a new manufacture the production of mattresses, chair-seatings and other articles of furniture, bedding, &c., in which the stuffing is composed of sponge prepared in the manner substantially as herein set forth.

41,590.—Metallic Cartridge.—Enos G. Allen, Boston, Mass.:

I claim forming a metallic flanged cartridge case, imperforate and charged with the fulminate at its flanged end, and at its outer end swayed over the equator of the ball or lead cap, so as to hold it close, and tapering so as to give certainty to the entry of this end into the barrel without obstruction, and secure a close fit to the chamber to prevent the escape of the gases therein; the said cartridge case containing buck, or other shot in its anterior portion, and powder in its posterior, the two to be separated by a wad of sufficient capacity and fitting with sufficient accuracy to prevent the escape of the explosive gas against the shot; all arranged precisely and specifically as described in the specification and drawing.

41,591.—Feed-water Heater for Locomotives.—Samuel F. Allen, Chicago, Ill.:

I claim the combination of the compound pipes, R, the exhaust pipes, T, the regulating valve, A, the directing tongues, e, the yokes, X, and the heater, G, substantially as herein set forth.

41,592.—Stove Pipe Thimble.—Thomas K. Anderson, Hornellsville, N. Y.:

I claim the tin or zinc cylinder, D, having a bright surface, and indented throughout its surface with protuberances in the manner as and for the purposes herein described.

41,593.—Harvester.—Samuel Augsburg, Trenton, Ohio:

I claim a detachable elevating device for lodged or tangled grain, mounted rigidly upon and supported by the fingers, C, and consisting of a horizontal arm, D, and inclined arm, F, occupying the same vertical plane, the latter being attached by its intermediate part to the front of the horizontal arm, D, and projecting in front, below and beyond the same, all as herein shown and described and for the purposes specified.

41,594.—Iron Bridge.—James J. Beard, Columbus, Ohio:

I claim the arrangement and combination of the segments, A, A, having bosses, a, a, on both sides with which to connect the bolts, c, c, and the pillars, d, d, for securing the beams or string-pieces, D, D, and supporting the structure in the manner as and for the purposes specified.

41,595.—Wagon Brake.—Erasmus Bennett, Clarksville, N. Y.:

I claim the sliding rods and pole, when used in connection with the arms, M, N, and rods, Q, R, connected with the rubbers, T, U, and eye, bolt, or pin, Z, all arranged and combined as set forth and for the purposes specified.

41,596.—Stove.—Wm. Bickel, Pottsville, Pa.:

I claim, first, A barred or perforated grate consisting of upper horizontal plates, a, a, vertical plates, b, b, lower horizontal plates, c, c, sliding in and out through apertures, e, all as herein shown and described and for the purposes specified.

Second, I claim the pipes, C, C, extending completely through the fire above the grate, B, open at both ends, and provided with a series of apertures, a, a, to provide a more free and full supply of air to the fuel when used in combination with registers to open or close either end of all the pipes, simultaneously as explained.

41,597.—Handle for Stamps.—Matthew C. Borgia, Philadelphia, Pa.:

I claim the gum-elastic tube or block, B, fitted to the die as set forth when the said tube or block is of such a size and shape as to form the entire handle of the stamp for the purpose specified.

41,598.—Draft Regulator for Stoves and Furnaces.—John Briggs, Roxbury, Mass.:

I claim the improved draft regulator consisting of the expansion drum, F, its lever, H, the valve, M, and the adjustable stop, I, and spring, c, the whole being applied to a furnace or heating apparatus, and constructed in manner and so as to operate substantially as described.

41,599.—Gas Regulator.—F. W. Brocksieper, Bridgeport, Conn.:

I claim the arrangement and application of the slotted adjusting screw, A, or its equivalent to the aperture in the valve, D, or in the valve seat along side of the same, in the manner and for the purpose substantially as herein set forth and described.

41,600.—Hames.—Robert D. Brown, Covington, Ind.:

I claim the cap, C, provided with the screw, D, in combination with the bow, A, provided with the plate, E, substantially as described.

41,601.—Neck Yoke.—Stillman P. Campbell, Rochester, Minn.:

I claim, first, The ferrule, C, provided with the projections, c, c, in combination with a ring, D, provided with a cross-plate and breast-strap rings as at d, substantially as described.

Second, The martingale ring, e, in combination with the ring, D, and ferrule, c, substantially as described.

41,602.—Combination of a Wash-stand and Water-closet.—Wm. Campbell, Waterloo, Pa.:

I claim, first, A wash-stand constructed with a movable or sliding

top, G, a seat, e, and chamber compartment, A, arranged substantially as described.

Second, So applying the movable top, G, to the body of the cabinet, that it can be made to serve as a support or desk for a person sitting in the seat, substantially as described.

Third, A combined convertible wash-stand and privy-chair, constructed substantially as described.

41,603.—Plow.—Orman Coe, Port Washington, Wis.:

I claim, first, The curved tined pulverizer, arranged and supported in rear of the plow beam, A, in a plane obliquely to the line of draught, in combination with the plate, b, which forms a wide channel in the ground to allow the tines to enter freely, substantially as and for the purposes described.

Second, Although I do not claim broadly a revolving pulverizer having teeth on its edge, I do claim such having flattened and curved teeth, substantially as shown and described.

Third, Arranging in rear of the coiler standard of a subsoil plow, the revolving curved toothed pulverizer, substantially as described.

41,604.—Dumping Cart or Wagon.—Isaiah B. Conklyn, Pemberton, N. J.:

I claim the bar, F, pivoted to the shafts, C, and controlled by springs, f, and staples, G, when used in combination with the hooks, H, H, rigidly attached to the cart body, A, all as herein shown and described and for the purposes specified.

41,605.—Pocket Calendar.—D. E. Crosby, Brooklyn, N. Y.:

I claim the employment or use of a spring, c, or its equivalent in combination with the dial, B, and disk, A, as and for the purposes specified.

[The object of this invention is to produce a perpetual calendar which can be conveniently carried in the pocket and which, when once set, is not liable to shift spontaneously.]

41,606.—Soap-dish.—John Cundy, Philadelphia, Pa.:

I claim the wooden bowl, A, having an inclined ledge, d, and two compartments separated from each other by a movable or detachable perforated plate, B, of metal, all as set forth.

41,607.—Uterine Supporter.—D. M. Drake & S. L. Hockert, Pittsburg, Pa.:

We claim the arrangement of the curved wires, A, A, passing through vertical holes in the front brace, B, and held in position by means of set screws, P, P, when used in combination with the inular or pubic pads, N, N, having a lateral or adjusting motion in the long slots, n, n, and with the central hole, L, and tightening screw, for holding different instruments in the manner and for the purposes herein set forth.

41,608.—Bottle-filling Machine.—Wm. F. Davidson, Cincinnati, Ohio:

I claim, first, The provision of the valve guarded inlet, K, L, and flexible or other suction pipe, M, in the described combination with a bottle-filling syringe, substantially as set forth.

Second, The provision of a stopper or valve, C, at the ventage of a bottle-filling syringe said valve being made to close and open automatically, in conjunction with the action of the piston, substantially as set forth.

41,609.—Grain-cleaner.—Wm. S. Deisher, Hamburg, Pa.:

I claim the employment of the scattering teeth, l, l, l, within the blast spout and at the edge of the curb opening, g, in the manner and for the purpose herein shown and described.

I also claim the employment of the adjustable angular guiding slides, o, when arranged to operate in conjunction with the blast spout, F, and tubes, I, in the manner herein shown and described.

I also claim the combination of the circular double-acting valve, L, with the discharge spouts, k, k', all arranged in the manner herein shown and described; so that the fan may be rotated in either direction and so that the blast of air through the spout, F, may be always readily controlled, as set forth.

[This invention consists in a novel dress for the stones as herein after described, whereby the grain is acted upon in a more thorough manner than hitherto, and more perfectly cleaned and scoured. The invention also consists in a novel and improved grain separating device and fan attachment, whereby it is believed that several advantages are obtained over the ordinary means employed for that purpose.]

41,610.—Tool for making Buckles.—Robert Durning, Lawrenceville, Pa.:

I claim the employment or use, in the manufacture of harness and other similar buckles, of a series of tools constructed substantially as shown, for the purpose of opening the eyes of the tongues of the buckles, and closing the same in the buckles and for forming the tubular friction rollers and also adjusting them on the buckles as herein set forth.

[This invention relates to an improvement in the manner or process of manufacturing buckles, such as are made with wrought-iron tongues and provided with friction rollers and are employed for harnesses and for similar purposes. The invention consists in the employment or use of certain means or tools which may be used separately, by hand or so arranged as to be operated by mechanical means with any suitable power, and so constructed as to respectively open the eye of the tongue and close the same on the bar of the buckle, to form the tubular friction roller, and to adjust the same on the roller bar of the buckle, whereby buckles of the class specified may be manufactured much cheaper than at present, and in a superior manner.]

41,611.—Operating Ordnance.—James B. Eads, St. Louis, Mo.:

I claim, first, The raising or lowering of the gun slides or frame on which the gun carriage moves in a line so as to keep the axis of the gun in a line parallel therewith, and in such manner that the breech and trunnions of the gun are moved up or down whilst the muzzle of the gun is kept at nearly a fixed point, for the purpose of giving the necessary vertical range or aim of the gun, and thus obviating the use of a port-hole larger than the muzzle of the gun, substantially as described.

Second, I also claim the pivoting of the platform, A, that carries the gun or guns, and the mechanism for operating it or them on a hollow pin or pivot, for the purpose of admitting, or of admitting and discharging the steam, air, water, or other element for operating the mechanism that raises or lowers, or moves the gun to or from the port, substantially as described.

41,612.—Steam Engine.—John Ericsson, New York City:

I claim the employment of a reciprocating weight so connected with the piston of a steam or other engine as to move always in the opposite direction to the motion of the piston, and so proportioned as to operate substantially as herein specified.

41,613.—Horse Rake.—Levi W. Fredrick, Ray, Ind.:

I claim the thills constructed of the parts, D D F, arranged as shown, when used in combination with and applied to the revolving rake, substantially as herein described.

[This invention relates to certain improvements in what are generally known as revolving horse-rakes. The invention consists in mounting the rake on wheels and arranging it in such a manner that it may be manipulated by the driver or attendant with the greatest facility, in order to discharge the load and also to enable the rake to pass over obstructions which may be in its path. The invention further consists in a novel construction and arrangement of the thills, whereby the revolving movement of the rake in discharging its load is greatly facilitated, the implement preserved from much wear and tear, and the labor of the horse materially diminished.]

41,614.—Cultivator.—Wilkinson Furnas, Ononwa, Iowa:

I claim the arrangement of the treadles, I, I, frame, b, beams, D, and guards, G, with the frame, A, levers, H, and serrated bars, m, all constructed and operating together in the manner herein shown and described.

[This invention relates to those parts which serve to adjust the plows to the width of different rows, to give to them a lateral motion