

dawn grows gradually brighter, and on the 20th of March the peaks of ice are gilded with the first level rays of the six-months' day. The bringer of this long day continues to wind his spiral way upward, till he reaches his highest place on the 21st of June, and his annual course is completed.

THE MONITOR SYSTEM.

Mr. John Ericsson has written us a letter in which he positively refutes the statements that have appeared in some of the daily papers, and which have been re-echoed abroad, concerning the inefficiency, cost, and general worthlessness of the monitor system.

Captain Ericsson states truly that we have been able to put a fleet of iron-clad ships afloat without one dollar of expense for experiments. The total cost of the monitor fleet now afloat is very little over \$12,000,000. The English experiments with the Armstrong breech-loader and other ordnance (which by late English advices appear to have been condemned), cost more money than this.

It is also claimed that the latest experience with these vessels at sea completely disproves the assertion that they are unseaworthy. The report that the monitors cannot use their guns in a sea-way, or open their ports is not correct. The mechanical arrangement provided to permit the ports to be opened can only be used on the turreted ships and not on broadside iron-clads. The *Dictator* can carry coal enough to go to St. Petersburg, Russia, if necessary, and with 800 tons of water in her coal-bunkers and ready for steam, her gun-wale is four feet above water.

Captain Ericsson concludes by saying that the European Powers are well aware of the value of the monitor system, and that two fleets of iron-clads, precisely like ours are now being built on the Baltic sea; one on the eastern and the other on the western slope.

WAGES PAID FOR SKILLED LABOR.

Workmen and laborers are now receiving comparatively high wages in this city, or what would have been high had the price of provisions, etc., remained at reasonable figures. As it is, the compensation is small, and we shall doubtless hear of interruptions until the prices are adjusted more equably. Even now there is discontent, and we advise all those workmen who have good steady employment to remain where they are, as there seems to be plenty of men here now in most branches of trade.

Machinists, vice hands, receive on an average \$2.70 per day of ten hours, overtime extra; metal-turners, \$2.80; molders, \$2.80; coppersmiths, \$3; pattern-makers, \$2.80; blacksmiths, \$2.90; painters, \$2.25; carpenters, \$2.50; boiler-makers, \$2.75 to \$3; printers, on daily papers, consider it a poor night's work if they do not make \$5—their work being paid for by the 1000 ems—but the average pay by the week is \$16; conductors on our city cars receive \$2 for twelve hours' work, and there are too many applicants seeking for the places.

These prices, it will be remembered, are not the outside, but the average rates. Very many machinists receive \$3 and upwards, but they are extra good workmen. We have given the prices as they are paid in our large machine-shops.

REBEL IRON-CLADS.

The *World* publishes a long account of what it calls "a formidable rebel iron-clad," said iron-clad, consisting of railroad iron, as usual, laid in tiers one after the other. It has somehow happened that the rebel iron-clads cannot find a favorable opportunity to sink our wooden vessels, and, notwithstanding their tremendous powers of offense, they prefer the certainty of safety in port to the certainty of being sunk if they venture to attack us. A fourth-rate wooden gun-boat (the *Sassacus*) recently drove one of these terrible iron-clads back to her dock, and, although we frequently hear of the existence of more of these dangerous crafts, we fortunately escape being sunk by them.

There are no formidable rebel iron-clads in existence, nor will there ever be, so long as railroad iron is used to plate them with.

THE HECKER AND WATERMAN EXPERIMENTS.

In our last number we published an account of four series of experiments of 30 hours each, the steam being cut off at different points in the stroke. In that account we gave the most important elements in the experiments, but as intelligent engineers may like to know some of the other conditions, we complete this week the history of the experiments by a statement of all the observations which were not given in our last issue, together with the calculations of the fuel and water consumed, and work done per hour and per minute.

The mean revolutions of the fan per minute during each 30-hours run were with—

2/3ths cut-off.....	68.45
1/2ds cut-off.....	68.4
1/3 cut-off.....	68.34
1/4th cut-off.....	68.41

The consumption of fuel per square foot of grate surface per hour was with—

2/3ths cut-off.....	9.000
1/2ds cut-off.....	7.80
1/3 cut-off.....	7.80
1/4th cut-off.....	6.710

The pressure of steam in cylinder at point of cut-off was given last week; the mean pressure in the cylinder at end of stroke was with—

2/3ths cut-off.....	24.042
1/2ds cut-off.....	19.184
1/3 cut-off.....	18.170
1/4th cut-off.....	14.846

The total horse-power developed by the engine per indicator, including overcoming back pressure against piston, was with—

2/3ths cut-off.....	11.752
1/2ds cut-off.....	11.659
1/3 cut-off.....	12.151
1/4th cut-off.....	11.682

The mean back pressure against the piston during its stroke, in pounds, was with—

2/3ths cut-off.....	4.05
1/2ds cut-off.....	4.67
1/3 cut-off.....	3.83
1/4th cut-off.....	3.37

The gross effective horse-power, per indicator, was with—

2/3ths cut-off.....	10.079
1/2ds cut-off.....	9.651
1/3 cut-off.....	10.269
1/4th cut-off.....	10.283

The net horse-power applied to fan was with—

2/3ths cut-off.....	8.839
1/2ds cut-off.....	8.332
1/3 cut-off.....	8.889
1/4th cut-off.....	9.049

The pounds of feed-water consumed per hour, per total indicated horse-power, were with—

2/3ths cut-off.....	47.140
1/2ds cut-off.....	42.904
1/3 cut-off.....	40.063
1/4th cut-off.....	36.691

The pounds of combustible consumed per hour, per total indicated horse-power, were with—

2/3ths cut-off.....	5.525
1/2ds cut-off.....	4.222
1/3 cut-off.....	4.309
1/4th cut-off.....	4.143

Temperature of feed water, with—

2/3ths cut-off.....	108.22
1/2ds cut-off.....	107.15
1/3 cut-off.....	107.15
1/4th cut-off.....	104.42

Temperature of water discharged by the air-pump, with—

2/3ths cut-off.....	111.26
1/2ds cut-off.....	110.03
1/3 cut-off.....	110.07
1/4th cut-off.....	107.56

Vacuum in condenser in inches of mercury, per open gage, with—

2/3ths cut-off.....	26.25
1/2ds cut-off.....	26.67
1/3 cut-off.....	26.33
1/4th cut-off.....	26.01

These facts, with those published last week, will enable the lesson of this series of experiments to be fully understood. Next week we shall give the history in full of another series.

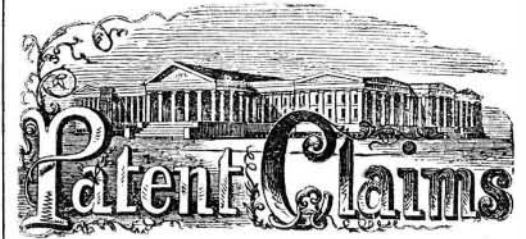
Sailing of the "Fire Queen."

On Saturday, July 9th, the splendid new steamer *Fire Queen*, Capt. Henry W. Johnson, commander, sailed from this port via St. Johns for Shanghai, China. Among the passengers was Mrs. Johnson, the commander's beautiful young wife, who, for a second time, accompanies her husband to the Chinese Empire. The *Fire Queen* is the fifth steamer built by Capt. Johnson for the Chinese trade, and she is a very superior first-class vessel, 300 feet in length. Her arrangements and decorations are superb, and if she reaches her destination in safety—which there is but little doubt under her experienced commander—we think she will astonish the natives of the Celestial Empire somewhat. The best wishes of the many friends of those on board attend them on their long voyage.

It is said that five hundred men are now hard at work on both ends of the Hoosac tunnel.

HOW TO TURN GREENBACKS INTO GOLD.—Send three dollars of them to this office and thus enjoy a year's subscription to the *SCIENTIFIC AMERICAN*. Ten to one that the information you thus obtain will result in bringing into your coffers, before the year is out, a hundred times more money in gold, than the amount of your first investment.

Messrs. Hurd & Houghton, 401 Broadway, New York, have sent us a copy of a neatly-bound pamphlet containing the evidence given in the *Chenango* boiler explosion. Every engineer should send for a copy of the work, as it contains a great deal of information.



ISSUED FROM THE UNITED STATES PATENT-OFFICE FOR THE WEEK ENDING JULY 12, 1864.

Reported Officially for the Scientific American.

33 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.

43,466.—Process for treating Hair.—William Adamson, Philadelphia, Pa.:

I claim simultaneously drying and deodorizing the hair of hogs and other animals by subjecting it to the direct action of the products of combustion of coal or other fuel, substantially in the manner described.

43,467.—Machine for Spinning and Reeling.—George Albright, Oskaloosa, Iowa:

I claim, first, The movable frame, B, carrying a series of spindles, C, in combination with the rising and falling clove-frame, G, reel, I, and with a recess in the top cross-bar, c, c', of the main frame, A, and pins, n, projecting from the front side of said main frame, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, the adjustable clasp, l, in combination with the rising and falling clove-frame, G, and spindle frame, B, constructed and operating in the manner and for the purpose substantially as set forth.

[This invention consists in a movable frame containing a series of spindles so arranged that it can be changed from a horizontal to a vertical position in combination with a vertically sliding clove frame and with a reel in such a manner that when such movable frame is brought in a horizontal position, the spindles are properly situated for spinning, and if the movable frame is brought in a vertical position, the spindles are properly situated for reeling.]

43,468.—Hydraulic Machine for washing Ore.—Joseph M. Allanwood, Timbuctoo, Cal.:

I claim, first, The insertion of the diaphragms or guides, inside of the pipe for preventing the water from forming a spiral column or stream at the instant of discharge;

And secondly, The combination of the parts set forth accompanying this specification, constituting a new and improved machine.

43,469.—Metallic Sole-plate for Boots and Shoes.—Francis W. Bacon, Jersey City, N. J., and Solon Dike, New York City:

We claim a corrugated steel or metal shank and plate with a counter turned up around the heel at any desirable height, and all from the same piece of metal as shown in Figs. 1 and 2.

43,470.—Cultivator.—Frank Barney.—Bloomington, Ill.:

I claim the hand lever, H, with its swivel fulcrum, K, in connection with the crank shaft, G, hinged rear standard, E, and swivel front standards, E', all constructed and operating in the manner and for the purpose substantially as herein specified.

43,471.—Valve Gear for Steam Engines.—Henry and Frederick J. L. Blandy, Zanesville, Ohio:

We claim the method of connecting the valve rod, a, with the eccentric strap, G, by means of the pin-set arm, c, diagonal brace, l, and rod, H, forming a frame which is jointed to the end of the valve rod substantially as described and represented.

[This invention consists in an improved arrangement of the valve chest and valve, and of the connections between the valve rod and eccentric, whereby the power to drive the valve is transmitted in a more direct manner. The invention is applicable with more especial advantage to horizontal engines on which the valves are on the top of the cylinder, in which case it dispenses with the rock shaft commonly used in such engines.]

43,472.—Sorghum Evaporator.—Caleb Bond, Richmond, Ind.:

I claim, first, The combination of the furnace, A, and the flues, D D', E E', one above the other with the dampers, a b c, and d d' d'', by which the heat is thrown at will against both, either, or neither of the pans, or against a smaller or larger portion of the rear pan, and at the same time avoid or infringe upon the forward pan.

Second, The vertically adjustable wooden rail, f, provided with hooks, f', in combination with the pan, G, as described for the purpose of attaching and operating a bag containing some clarifying materials.

[This invention relates to certain improvements in the means for regulating the draught and directing the heat in an apparatus for evaporating saccharine juices in a manner that either of the pans or both can be heated to any desired degree or cooled off at the pleasure of the operator, simply by changing the position of a few dampers, and without increasing or diminishing the fire. It also relates to certain improved means for removing the scum and clarifying the juice.]

43,473.—Musical Demonstrating Board.—Wm. H. and Geo. W. Bowlsby, Monroe, Mich.:

We claim, first, The sliding-bars and scales, B B, with their attachments, c c, and d d, in combination with the enharmonic scale diagram, G.

Second, The movable note-plas, E, for the purpose set forth. Third, The combination of the said device with a book and bound into it, as shown and described.

43,474.—Machine for filling Spools.—Wm. Breitenstein, New York City: I claim the guide or arm, R, arranged as described and operating in the manner, and for the purpose substantially as set forth.

43,475.—Artificial Fuel.—Wm. Budd and J. L. Husband, Philadelphia, Pa.: We claim the impregnating of corn-cobs with oil, as hereinbefore more fully set forth.

43,476.—Steam Boiler.—Wm. Budd and J. E. Husband, Philadelphia, Pa.: We claim the counter-draft combustion chamber, bucket-ports or any opening in the nature thereof as counter-draft air holes to chamber and to connect boiler pipe to form counter-draft combustion chamber as hereinbefore more fully set forth.

43,477.—Turning Lathe for Wood-turning.—John Coleman, Argyle, N. Y.: I claim, first, Arranging the knives, H' and H'', upon the pivoted bed-plates, O and O', as described, when said plates are operated by the hand-levers D and D', and the eccentrics, E.

43,478.—Grain Separator.—Jacob Chum, Shelby, N. Y., and George A. Fisher, Alabama, N. Y.: We claim, first, Cleaning or separating grain by means of two or more endless belts, substantially as shown.

43,479.—Sheet-metal Can.—Hiram A. Cram, Whitestone, N. Y.: I claim the combination of a flat metal disk or ring, A, provided with an annular flange, a, with the bottom, of a sheet metallic can, when the said disk or ring is so combined by means of the binding hoop, C, in the manner and for the purpose herein represented and described.

43,480.—Hay Press.—G. W. D. Culp, Allensville, Ind.: I claim, first, The combination of the beater, D, working in inclined ways, B B, with the rollers, A, in an inclined or horizontal position, substantially as described and represented.

43,481.—Mode of baling Hay and other Materials.—Edward Dorr, Rockford, Ill.: I claim the mode of baling stalks and unmanufactured fibrous materials by winding the material progressively upon itself while under pressure, substantially as set forth.

43,482.—Machine for baling Hay and other Materials.—Edward Dorr, Rockford, Ill.: I claim the combination of a compressing shaft, lateral confining heads, platform and springs, operating to compress hay, cotton, and similar materials into a bundle or bale, substantially as set forth.

43,483.—Washing Machine.—William M. Doty, New York City: I claim the combination of the pivoted oscillating arms, B, inclined dash-board, D, removable hand lever, C, and stationary tub, A, all constructed and operating in the manner and for the purposes herein shown and described.

43,484.—Variable Exhaust for Locomotives.—John Dykeman and John Bolton, Greenbush, N. Y.: I claim the plates, C C C C, etc., fastened at their lower ends to the conical sockets, B, overlapping each other from a point near their attachment, and sufficiently numerous to make them readily approximate the shape of a frustum of a cone, without opening the joints in combination with the copps, E, E, which by depression contract the nozzles, and by elevation admit of their expansion.

43,485.—Fishing-line Reel.—Darwin Ellis, Waterbury, Conn.: I claim the combination of the elbow-shaped lever and its appendages, with the wheel, Fig. 4, and pinion e, when the whole is constructed, combined, and fitted to produce the desired results, substantially as herein described.

43,486.—Heel-fastening for Skates.—H. N. Gallagher, Geneva, N. Y.: I claim the plate, b, provided with one or more clamping screws, s, and plates, a, in combination with the crescent plate, d, when they are constructed, arranged, and operate conjointly in the manner and for the purpose described.

43,487.—Corn Harvester.—B. M. Fowler, Brooklyn, N. Y.: I claim the employment or use of reciprocating scythes, E, in combination with the crank axle, C, wheels, B B', track-clearers, F, and truck, A, constructed and operating in the manner and for the purpose substantially as herein shown and described.

43,488.—Skate-fastening.—H. N. Gallagher, Geneva, N. Y.: I claim, first, Making the side clamps, B and C, self-adjusting, laterally, by pivoting them to the foot-piece, A, as set forth and for the purpose described.

43,489.—Fabric for the Manufacture of Enamelled Collars, Cuffs, etc.—Henry F. Gibson, Camden, N. J.: I claim the material, substantially as set forth, and its exclusive use in the manufacture of enamelled shirt collars and similar articles of dress.

43,490.—Watch Case.—Fayette S. Giles, New York City: I claim the bezel, e, and cap, f, combined with each other and with the case of the watch, by means of the hinges, g h, block, i, and pivot, l, substantially as herein specified.

43,491.—Gas-pipe and Stair Rods.—Mitchel Gould, Newark, N. J.: I claim, as an improved article of manufacture, a tube, constructed in the manner substantially as herein shown and described.

43,492.—Wood-turning Lathe.—Timothy Gray, Lowell, Mass.: I claim the tool stocks, H and M, with cutters attached, a b and e, in combination with the squaring-down and cutting-off cutters, c and f, an adjustable nut, f, on the transverse screw, g, and stop, j, or their equivalents, substantially as described and for the purposes herein set forth.

43,493.—Machine for mining Coal.—Wm. W. Grier and Robert H. Boyd, Hulton, Pa.: We claim, first, One or more series of rotating augers, constructed substantially as described, for the purpose of mining coal.

43,494.—Hoop Lock for Casks.—Thomas Hanvey, Elma, N. Y.: I claim the above-described hooplocks, consisting of the lock casting, A, wooden hoop, B, and wedge, C, when constructed substantially as and for the purposes set forth.

43,495.—Clasp for Hoop Locks.—Thomas Hanvey, Elma, N. Y.: I claim, as an improved article of manufacture, a hoop clasp made of malleable iron, substantially as herein described.

43,496.—Washing Machine.—Giles M. Harris, Conesus Center, N. Y.: I claim the bearings, f f f, in combination with the rubber, D, and bed, C, arranged as shown, and adapted to, or further from, said bed, substantially as herein described.

43,497.—Percussion-cap Box.—Thomas Harvey, Baltimore, Md.: I claim the employment of an annular cap-holder freely moveable within a cylindrical case, and provided on its interior surface with teeth, e, so as to be operated or revolved by an interior pinion, substantially in the manner shown and described.

43,498.—Cooling-tub for Water and Beer.—Anthony Hansetter Philadelphia, Pa.: I claim the combination of the tub, A, the jar, c, and the circular plate, e, arranged substantially in the manner and for the purpose specified.

43,499.—Portable Water-closet.—Enoch Hidden, New York City: I claim, first, Providing a portable water-closet, having a sealing cover, with a hinged seat, substantially as described.

43,500.—Harrow-teeth.—Eben N. Higley, Lake Village, N. H.: I claim making harrow-teeth in sets of two or more teeth attached to the same stock, and pivoting the said stock to the harrow-frame, substantially as and for the purpose herein specified.

43,501.—Lock.—George Hopson, Bridgeport, Conn.: I claim, in combination with the shaft, B, and guard wheels, D, of a dial-lock, the spurs, C' and C'', or either of them, so arranged as to rotate the tumblers thereby, and to retreat or sink into the shaft, substantially in the manner and for the purpose above specified.

43,502.—Pump.—Benjamin J. C. Howe, Syracuse, N. Y.: I claim the valve, d, and apertures, e' c', as described.

43,503.—Window-shade Fixture.—F. J. B. Hubert, New York City: I claim the rack-bar, C, provided with the pulley, E, and the rack, c, the latter having its teeth curved, forming parts of arcs of circles, in combination with the inclined wheel, D, having a coil or volute

thread, d, on its face, to gear into the rack, c, all arranged and applied to the plate, A, and bar, B, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved means for adjusting the lever-pulley over which the roller-cord of the shade passes, whereby said cord may always be kept in a proper state of tension, to ensure the turning of the roller in order to raise and lower the shade.]

43,504.—Safety Escutcheon for Locks.—Henry Hungerford, Brooklyn, N. Y.: I claim supporting and confining the movable blotting-plate, A, on the outer surface of the scutchon-plate by means of the guides and grooves, b b, and thumb-screw, D, or its equivalent, all as set forth.

43,505.—Brick Machine.—Freeman Jacobie, Albany, N. Y.: First, I claim the intermediate chamber, B', forming a vertical continuation of the horizontal or nearly horizontal chamber, B, and also communicating with the press-box, D, substantially in the manner and for the purpose described.

43,506.—Arsenical Soap.—Harry Jennings, Boston, Mass.: I claim a combination of whale-oil soap, or other suitable soap, and arsenious acid, mixed in such proportions as to adapt the compound for the destruction or removal of vermin or impurities upon the skins of living animals.

[This invention consists in a composition of whale-oil soap and arsenical acid mixed together, with or without some coloring matter, such as venetian red, in such a manner that a soap is produced which can be used with advantage for the destruction of fleas and other parasitic insects which infect living animals, and that this soap when mixed with coloring matter can be readily distinguished from ordinary soap.]

43,507.—Amalgamating Barrels.—James B. Johnson, San Francisco, Cal.: I claim, forming the outer shell of the amalgamating barrel or cylinder in several longitudinal sections, so that they may be easily taken apart and relined, substantially as and for the purpose described.

43,508.—Washing Machine.—H. P. Jorns, Davenport, Iowa: I claim a dasher, C, for a washing-machine, which is constructed with a regularly stepped and concave surface, in contradistinction to a flat fluted surface, substantially as described.

43,509.—Apparatus for clarifying Cane-juice.—W. A. Jordan, New Orleans, La.: First, I claim the combination together of the stove, water-tank, purifying-box, and juice-clarifying receptacle, in the manner and for the purpose herein shown and described.

43,510.—Planing the Rim-bases of Guns.—Edward Kaylor, Pittsburgh, Pa.: I claim the mode herein-before described planing irregular curved metallic surfaces by means of a revolving chuck, furnished with one or more cutters capable of adjustment in a straight line towards or from the center of the chuck, and whose cutting-points are caused automatically to move parallel to that portion of the curved surface which it is intended they shall plane, that is to say, towards or from the axis of said body, by means of curved grooves which actuate the chuck arbor, through the instrumentality of the guide-pins adjusted therein, or their equivalents, substantially as described.

[The use of the grooved barrel, guide-pin or pins and adjustable bearer in combination with the revolving cutter, shaft and chuck, for the purpose of communicating the required curved motion to the planer or cutting tool or tools, so as to plane the rim-bases of guns and other irregular curved metallic surfaces, substantially as herein-before described.]

43,511.—Scale-beam.—Joel F. Keeler, Pittsburgh, Va.: First, I claim the wrought-iron weighing-lever, constructed as described.

43,512.—Turning-lathe.—Folbert Kirst, Westfield, Mass. Antedated July 6, 1864: I claim the adjustable center, i, in combination with the jaws, a a', and set screws, m, when used for the purpose and in the manner herein described, and forming a part of a chuck for a turning-lathe.

43,513.—Churn.—Patrick Killon, Mount Healthy, Ohio: I claim making the dasher in two parts, B B, with a separate rod, 3, to each, inclosed by the loose ring, c, so that the two parts may be operated separately, in the manner described, or united and operated as a single dasher, for the purpose herein set forth.

43,514.—Feeding Device for Sewing Machines.—W. A. Mack, Cleveland, Ohio: I claim the slides, E F, and cap, H, in combination with the lever, D, and rimmed wheel, C, when arranged and operating conjointly as and for the purpose set forth.

43,515.—Roller Press for finishing Photographs, &c.—David Marshall, Pittsburg, Pa., and Benjamin Marshall, Marietta, Ohio: I claim, first, The use of a machine for finishing photographic pictures consisting of the combination of an upper roll and a lower roll or segment of a hollow cylinder so constructed as to be easily heated by the flame of a lamp or otherwise, substantially as for the purposes hereinbefore described.

Second, Making either or both of the rolls in machines for finishing photographs slightly higher or of greater diameter at the edges than in the middle, so as to prevent the polished face of the lower roll being struck by the upper roll when the card is discharged, substantially as described.

Third, Chamfering down the edges of the body of the segment roll, so as to allow of the easy insertion of the photographic picture between the rolls, substantially as described.

43,516.—Process for preserving Meats.—W. C. Marshall, New York City: I claim, first, Exposing the meat to be preserved, previous to putting it up in packages, to a heavy pressure, substantially as and for the purpose herein specified.

Second, The press box, C, with its movable screw-top, D, follower, G, and hinged end, I, constructed and operating substantially as and for the purpose herein shown and described.

Without an engraving it would be difficult to describe the invention more fully than the claims set it forth. The improvement appears to be one of value. Its object is to clarify the juice in a better, quicker and cheaper manner than heretofore; and in these points it appears to possess the elements necessary to success.

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Second, The press box, C, with its movable screw-top, D, follower, G, and hinged end, I, constructed and operating substantially as and for the purpose herein shown and described.

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Second, The press box, C, with its movable screw-top, D, follower, G, and hinged end, I, constructed and operating substantially as and for the purpose herein shown and described.

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