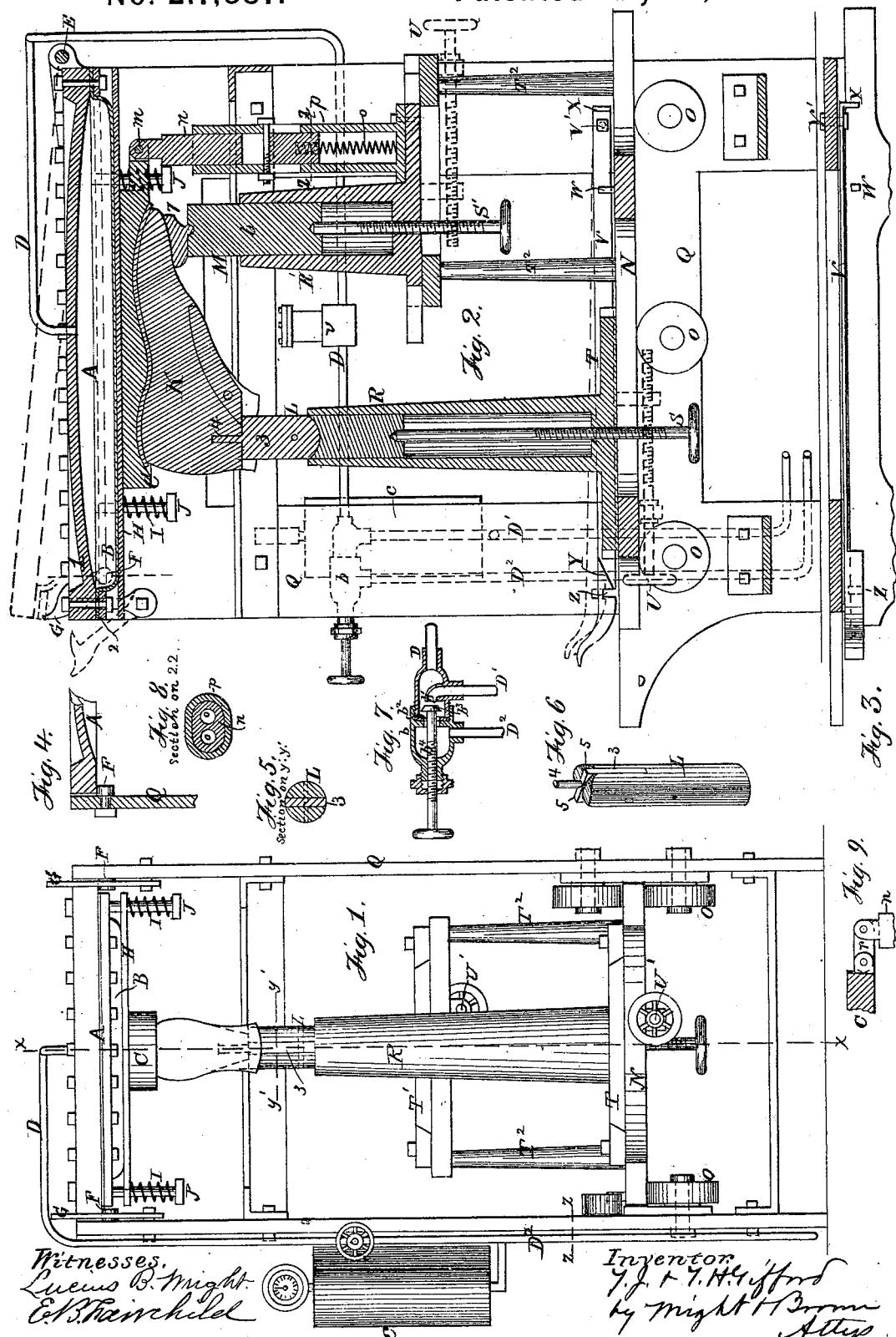


T. J. & T. H. GIFFORD.
 Sole-Pressing Machine for Boots and Shoes.
 No. 217,687. Patented July 22, 1879.



UNITED STATES PATENT OFFICE.

THOMAS J. GIFFORD AND THOMAS H. GIFFORD, OF SALEM, MASS.

IMPROVEMENT IN SOLE-PRESSING MACHINES FOR BOOTS AND SHOES.

Specification forming part of Letters Patent No. **217,687**, dated July 22, 1879; application filed December 4, 1878.

To all whom it may concern:

Be it known that we, THOMAS J. GIFFORD and THOMAS H. GIFFORD, of Salem, in the county of Essex and State of Massachusetts, have invented certain Improvements in Boot and Shoe Pressing Machines, of which the following is a specification.

This invention has for its chief object to enable the die or platen of a beating-out machine to be forced against the sole of a rigidly supported boot or shoe by the pressure of water or other fluid exerted on a movable piston or diaphragm.

The invention also has for its object to provide certain improvements in the sole-supporting and other devices of a beating-out machine, and to provide other improvements applicable to hydraulic pressing mechanism.

To these ends the invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a front elevation of a beating-out machine embodying my invention. Fig. 2 represents a section on line *x x*, Fig. 1. Figs. 3, 4, 5, 6, 7, and 8 represent views of parts in detail. Fig. 9 represents a detail view of a modification.

Similar letters of reference refer to like parts in all the figures.

In carrying out my invention I construct a tank or inclosure, A, provided with means for the admission and escape of water, and with a movable part, B, adapted to be displaced by fluid entering the tank or inclosure. The part B is a flexible diaphragm, as shown in Figs. 1 and 2, and when it is displaced by the pressure of the fluid it acts through suitable intervening mechanism upon the rigid die or platen C and presses the latter against a suitably-supported sole.

The machine illustrated in Sheet 1 is a good and practical embodiment of my invention, and I will now describe it in detail.

The tank or inclosure A is composed of a stout metallic top plate, 1, preferably arched or concavo-convex and of rectangular outline, and a flexible diaphragm or movable part, B, which is securely clamped to the under side of the plate 1 by a marginal frame, 2, which is bolted to the plate 1, the edges of the dia-

phragm being interposed between the plate 1 and frame 2. The inclosure is provided with a pipe, D, for the admission and escape of water, as hereinafter described.

The diaphragm is composed of any suitable strong flexible water-proof material, such as sheet-rubber, with or without cloth or water-proofed canvas. The inclosure or tank thus constructed is supported at any suitable height in a frame, Q, to which it is preferably connected by hinges E at one end, so that it can be raised, as shown in dotted lines, its other end resting on suitable stops F, and being held down when in place by hooks G.

H represents a flat metallic plate, which is of sufficient size to cover the diaphragm B. This plate is placed under the diaphragm and receives the pressure of the latter, and transmits said pressure to the die or platen C. The plate H is held with a yielding pressure against the diaphragm by governing mechanism, which causes the plate to raise or return the diaphragm to place, when the fluid which displaced the diaphragm is allowed to escape from the tank or inclosure. Said governing mechanism consists preferably of a number of springs, I, arranged on headed bolts J, which are attached to the tank or inclosure and pass through openings in or near the margin of the plate H, the springs being interposed between the plate and the heads of the bolts and supporting the plate. The combined force of the springs is such that they will not resist the depression or displacement of the diaphragm and plate by water entering the tank under pressure, but will raise the plate or diaphragm and eject a portion of the water from the tank when the pressure of the water is interrupted by shutting it off from the source of supply.

The die or platen C consists of a block of metal having a flat upper surface, and formed on its under surface to press the sole of a boot or shoe closely against the bottom of a last or former, as usual. The die or platen is preferably placed loosely against the plate H and not connected thereto, the flat surfaces of the plate and die enabling the latter to be moved about freely and bear against any part of the plate. If desired, however, the die or platen may be detachably or otherwise connected to the plate.

The parts thus far described constitute the pressing mechanism, and under it is located the sole-supporting mechanism, consisting of a last, K, a jack or heel-support, L, and a toe-support, M. These supports are located on a carriage, N, which rests and is movable horizontally on rollers O, which are journaled to the frame Q of the machine.

The jack L consists of a body which is slotted in its upper portion and rounded at its upper end on each side of the slots and a plate, 3, which is pivoted in the slotted body, and is provided at its upper end with a spindle, 4, and shoulders 5 5. The spindle is adapted to enter the usual orifice in the rear portion of a last, and a plate on which the spindle is located is adapted to be inclined to any desired extent to accommodate the spindle to the inclination of the last. The shoulders 5 5 furnish a bearing for the last at the back and front of the spindle, and the rounded ends of the body of the jack furnish bearings on both sides of the spindle, whether the latter be inclined or vertical.

The toe-support consists of a body, 6, having on its upper end a block, 7, which is suitably formed on its upper surface to afford a seat for the toe portion of a last, and is provided with a rib on which it is adapted to rock, said rib resting in a groove in the body 6. Hence the block can adapt itself to the inclination of the portion of the last which bears on it.

The supports L M are located in hollow standards R R', and are adjustable vertically therein, their height being regulated by screws S S'. The standards R R' are also adjustable horizontally independently of the carriage N, being located on slides T T', which are movable in guides on the carriage, and are operated by screws U U'. The slide T' is preferably elevated above the carriage on standards T².

The object of the carriage N is to enable the supporting mechanism to be moved rapidly in and out to present a sole to and remove it from the pressing mechanism.

To prevent the carriage from being moved too far in either direction, I provide the frame of the machine with a lever, V, pivoted thereto at V', and the carriage N with a stop-pin or stud, W. The lever is provided at one end with a lug or shoulder, X, adapted to abut against the pin W when the carriage is moved in one direction, and with an incline, Y, and slot Z, so arranged that when the carriage has reached the limit of its movement in the opposite direction the pin W will bear against the incline Y and raise the lever, as shown in dotted lines in Fig. 2, until the slot Z comes over the pin W, when the lever will drop, and the slot will receive the pin W, the carriage being thus locked, so that it will not move in either direction.

If the lever be held up in the position shown in dotted lines, the carriage can be entirely removed from the machine. The pipe D,

through which water enters and escapes from the tank, is connected to a double-acting faucet, b, which is connected to an inlet-pipe, D¹, leading from the source of supply, (which may be a force-pump or a reservoir,) and an outlet-pipe, D², adapted to conduct away the water from the tank, as hereinafter described. The pipes D¹ D² terminate within the casing of the faucet in ends or valve-seats b¹ b², adapted to be closed alternately by a single valve, b³, which works back and forth between the seats, and is operated by a screw-stem, b⁴, all as shown in Fig. 7.

When the outlet-pipe D² is closed by the valve the inlet-pipe D¹ is open, and water entering through the inlet-pipe must pass to the tank through the pipe D.

When the inlet D¹ is closed the outlet D² is open, and (the entering water being shut off) the water from the tank escapes through the pipe D and outlet D². Thus the pipe D is enabled to serve in two capacities, and the expense of separate supply and discharge pipes connected directly with the tank and faucets for the same is avoided.

To obviate excessive strain or pressure on the tank when fluid under heavy pressure is admitted into it, I provide an air-chamber, c, connected with the inlet-pipe D¹. This chamber is so arranged that the air contained in it will act as a cushion against the pressure of the water, said air being compressed by the pressure and relieving the strain on the tank. When the air-chamber is of sufficient capacity its air, when suitably compressed, will have sufficient power to force the water into the tank and afford the desired pressure on the diaphragm, so that when the pressure is produced by a force-pump the tank may be refilled at least once by the action of the air-chamber without operating the pump. The air-chamber may serve for a series of tanks having a common source of supply, and it is applicable to the shoe-pressing apparatus described in the patent granted to us September 4, 1877, No. 194,866. The double-acting faucet and the arrangement of pipes above described are also applicable to the apparatus described in said patent.

It will be seen that the area of the diaphragm B and the rigid plate H is considerably greater than that of the die or platen C; consequently when water or other fluid at a pressure of, say, fifty pounds (more or less) to the square inch, is introduced into the tank, the entire pressure received by the diaphragm and plate is concentrated, as it were, upon the die or platen, and the latter is pressed with great power against the sole without material exertion on the part of the operator or attendant of the machine.

Operation: The attendant draws the carriage out from under the pressing mechanism, takes a boot or shoe, places it on a common iron-bottomed last, and places the last on the jack L and toe-support M, and places the die

or platen upon the sole if said die is disconnected from the plate H, as is preferable, in which case we prefer to hinge the die or platen at *m* to a standard, *n*, which is supported on the carriage and moves therewith, so that the die or platen becomes an attachment of the carriage. The connection of the die or platen to the carriage must, however, be such as to allow the die or platen some independent vertical movement; and to this end the portion of the standard *n* to which the die or platen is pivoted may be supported on springs in a hollow post or standard, as shown in Fig. 2, so that it can rise and fall; or the standard may be rigidly connected to its support and connected to the die or platen by a link, *r*, which is pivoted to both the die or platen and standard, as shown in Fig. 9. After the last and die or platen are adjusted the carriage is moved back under the pressing mechanism, and water or other fluid is admitted into the tank and forces the diaphragm and plate H down against the die or platen C, causing the latter to press the sole of the boot or shoe closely against the bottom of the last. When the requisite pressure has been exerted the water is shut off and the governing mechanism lifts the plate and diaphragm, so that the die or platen can be removed from the sole. By the employment of devices adapted to support a detachable last of ordinary construction we are enabled to support the boot or shoe on the same last that it was made on, or one exactly similar to it in form, and by making the die or platen loose or detachable from the pressing mechanism we are enabled to provide a separate die for each size of last employed, so that the die or platen can be conformed perfectly to the shape and size of the bottom of the last, and the perfect co-operation of the last and die or platen in beating out soles of all sizes can be obtained.

We prefer to attach a safety-valve of any suitable construction to the inlet-pipe to prevent excessive pressure of fluid on the tank or inclosure.

The machine shown in Figs. 1 and 2 may be used without the plate H and die or platen C for pressing the sole of a "compo" shoe against a lasted upper, the last being supported by the jack L and toe-support M, and the diaphragm bearing directly against the sole and pressing it closely against the bottom of a last of any desired size and shape. In this case it might be necessary to raise the tank on its hinges, as shown in dotted lines in Fig. 2, while inserting and removing the shoe, on account of the sagging of the diaphragm.

We claim as our invention—

1. As a means for pressing a die or platen against a supported sole in a sole-pressing machine, a tank or inclosure, A, one side of which is composed of a flexible diaphragm, B, and a movable plate, H, of rigid material, bearing against and adapted to be moved by the diaphragm B, as set forth.

2. In a sole-pressing machine, a tank or inclosure, A, one side of which is composed of a flexible diaphragm, B, combined with a movable plate, H, and means, substantially as described, whereby said plate is held with a yielding pressure against said diaphragm, as set forth.

3. In a sole-pressing machine, the combination of a tank or inclosure, A, one side of which is composed of a flexible diaphragm, B, a movable plate, H, bearing against said diaphragm, a die or platen, C, adapted to bear against the plate H, and means, substantially as described, for supporting a lasted sole under the die or platen, all arranged and operating as set forth.

4. In a boot and shoe pressing machine, a horizontally-movable carriage supporting horizontally and vertically adjustable heel and toe supports for a last, as set forth.

5. In a boot and shoe pressing machine, the combination of pressing mechanism having a broad flat bearing surface or plate, H, a horizontally-movable carriage located under said pressing mechanism and provided with sole-supporting devices, and a die or platen having a flat upper surface hinged to a support or standard on said carriage, as set forth.

6. The heel-support or jack consisting of the slotted body L, having rounded upper ends, and the plate 3, pivoted to said body and provided with shoulders 5 5 and spindle 4, as set forth.

7. The toe-support consisting of the vertically-adjustable body 6 and the rocking-block 7, as set forth.

8. In combination with the last-supporting carriage, the locking-lever V and stop W, adapted to limit the movements of the carriage, as set forth.

9. In a sole-pressing machine, the tank or inclosure A, one side of which is composed of a flexible diaphragm, B, combined with a pipe, D, connected to said tank, a double-acting faucet, constructed as described, connected to the pipe D, and inlet and outlet pipes D¹ D², connected to the faucet, as set forth.

10. In a sole-pressing machine, a double-acting faucet, consisting of a casing, b, provided with a pipe, D, connected to the tank A, and with pipes D¹ D², valve-seats v v', and double-acting valve w, as set forth.

11. In a sole-pressing machine, the combination, with the tank or inclosure A, provided with an inlet-pipe and a flexible diaphragm, B, of an air-chamber connected to the inlet-pipe, as and for the purpose set forth.

12. In a sole-pressing machine, the combination, with the tank or inclosure A, provided with an inlet-pipe and with a flexible diaphragm, B, of a safety-valve connected to the inlet-pipe, as and for the purpose set forth.

13. In a sole-pressing machine, the tank A, hinged or pivoted to swing vertically, and having its under portion composed of a flexible diaphragm, B, combined with movable hooks

or detents G G, to hold said tank down, and suitable last-supporting devices located under said diaphragm, as and for the purpose set forth.

14. In a sole-pressing machine, the tank A, hinged to the supporting-frame, combined with stops F, hooks G, plate H, die or platen C, and sole-supporting devices, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

THOMAS J. GIFFORD.
THOMAS H. GIFFORD.

Witnesses:

GEO. W. PIERCE,
C. F. BROWN.