(No Model.)

2 Sheets—Sheet 1.

C. E. HOLLAND.

SOLE LAYING MACHINE.

No. 362,447. Patented May 3, 1887.

Fig. 1.

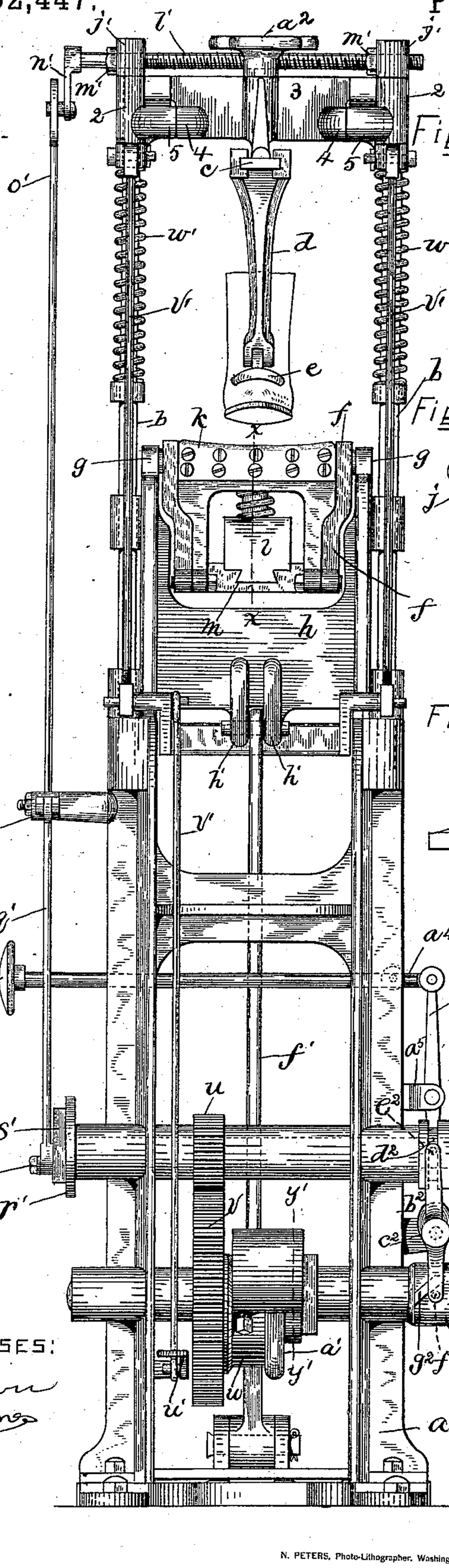


Fig. 2.

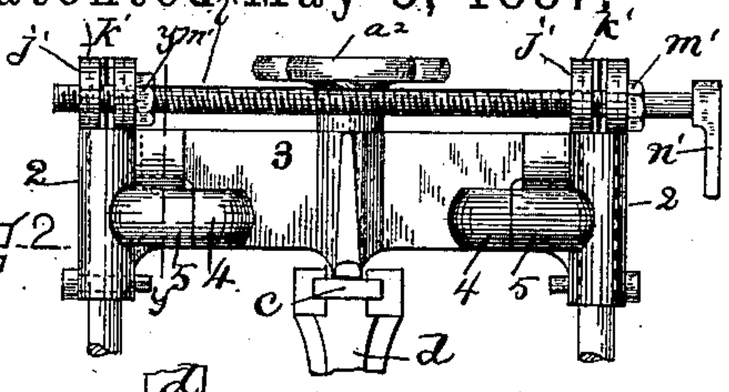
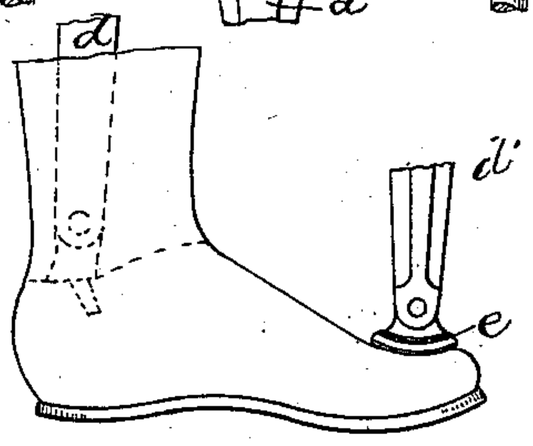


Fig. 3.



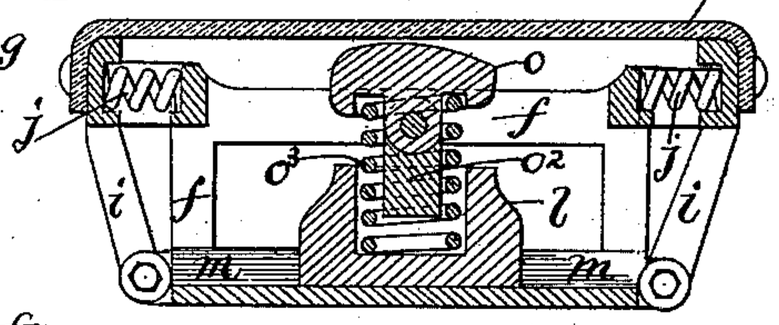
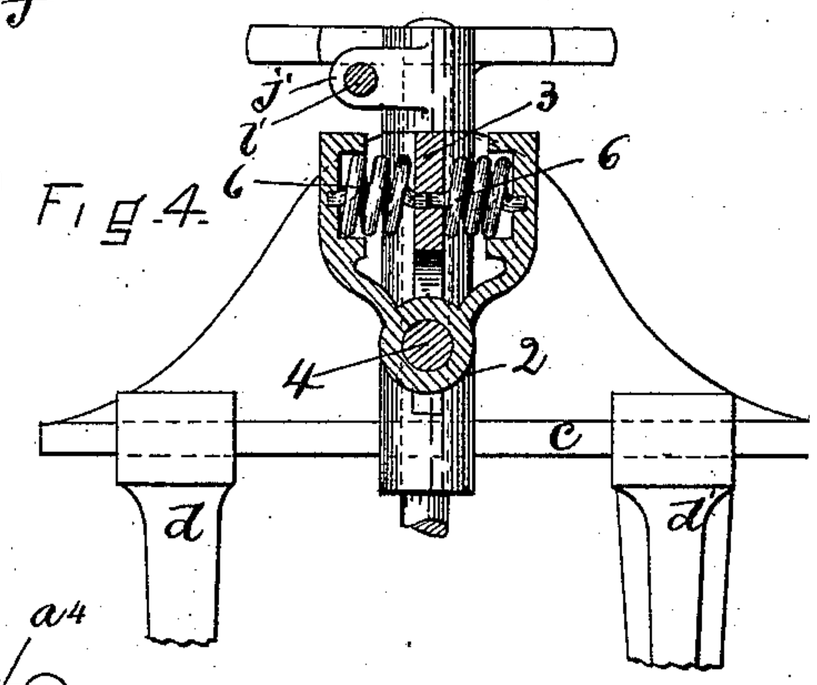


Fig. 4.



WITNESSES:

H. Brown

Richd. H. Jones

INVENTOR:

C. E. Holland

by Wright, Brown & Crosby

Attys.

(No Model.) 2 Sheets—Sheet 2.

C. E. HOLLAND.

SOLE LAYING MACHINE.

No. 362,447. Patented May 3, 1887.

Fig. 5.

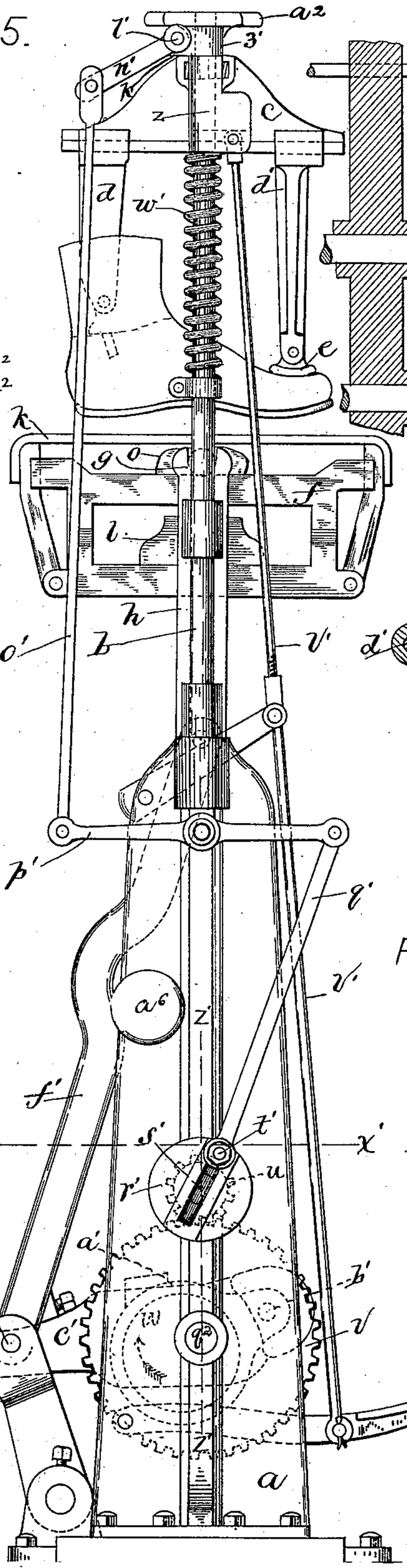


Fig. 6.

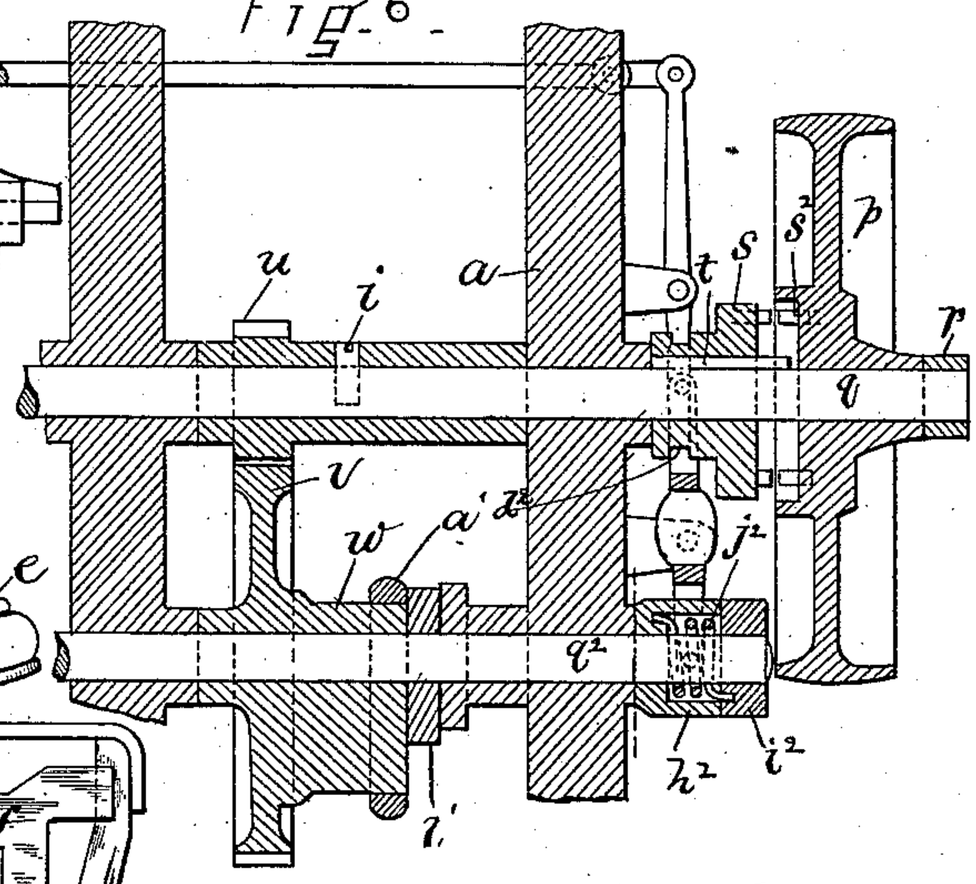


Fig. 9.

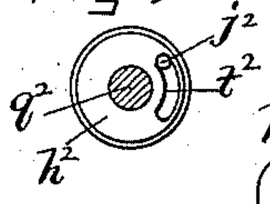


Fig. 7.

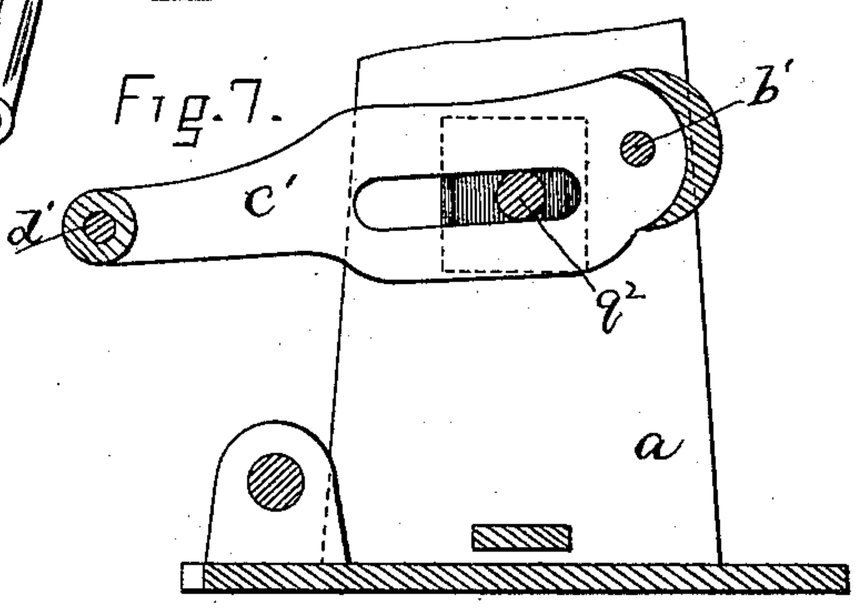
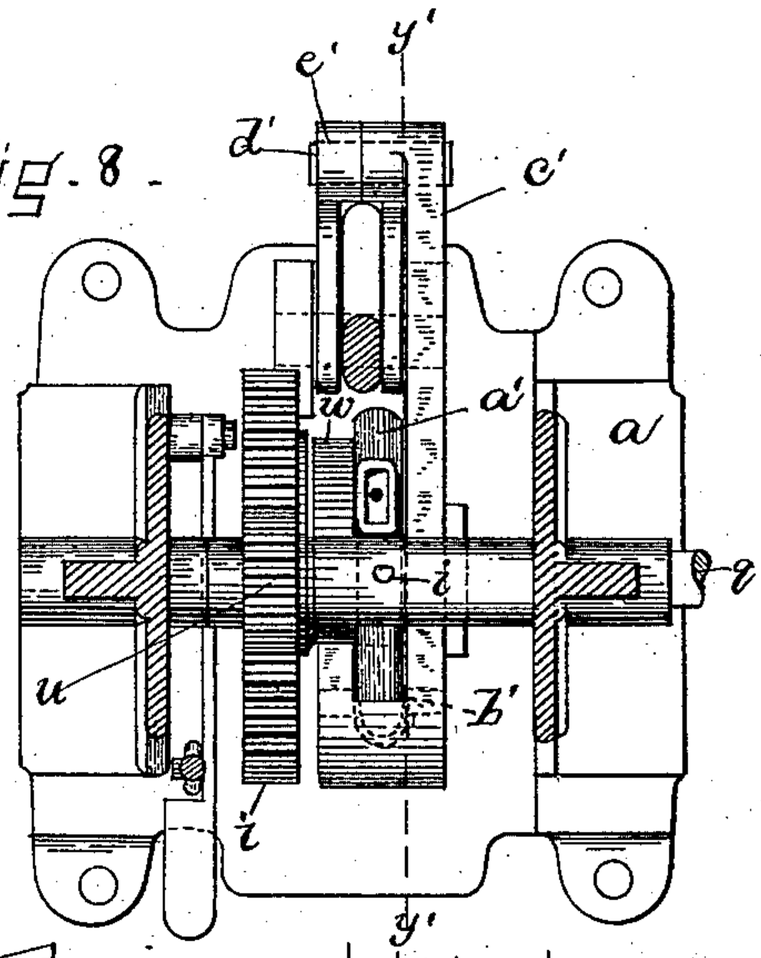


Fig. 8.



WITNESSES:
H Brown
Richd H Jones

INVENTOR:
C. E. Holland
by Wright Brown Quinby & Coale
Attys.

UNITED STATES PATENT OFFICE.

CHARLES E. HOLLAND, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE BOOT AND SHOE SOLE LAYING COMPANY, OF SAME PLACE.

SOLE-LAYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 362,447, dated May 3, 1887.

Application filed February 8, 1887. Serial No. 226,917. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HOLLAND, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Sole-Laying Machines, of which the following is a specification.

This invention relates to machines for pressing soles against lasted uppers of boots and shoes, while the cement which temporarily secures said soles and uppers together is setting or hardening. In machines of this class the last on which the upper is placed is supported by a jack, and the sole is placed on an elastic bed, which is forced toward the bottom of the last, and by its elasticity molds or conforms the sole to the shape of the bottom of the last.

My invention has for its object to provide certain improvements relating to the sole supporting and molding bed, the means for raising and depressing the same and holding it raised and depressed, and to the jack and its supporting and operating devices; and to these ends my invention consists in the several 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 sole-molding machine embodying my invention. Fig. 2 represents a rear elevation of the jack-supporting cross-head. Fig. 3 represents a section on line *x x*, Fig. 1. Fig. 4 represents an enlarged section on line *y y*, Fig. 2. Fig. 5 represents a side elevation of the machine. Fig. 6 represents a section on line *z' z'*, Fig. 5. Fig. 7 represents a section on line *y' y'*, Figs. 1 and 8. Fig. 8 represents a section on line *x' x'*, Fig. 5. Fig. 9 represents a detail view.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents the supporting frame or base, to which are rigidly attached vertical guide-rods *b b*, on which the last-supporting jack and the holder or carrier for the sole pressing and molding pad or bed are adapted to slide. The jack is composed of two end pieces, 2 2, having sockets adapted to slide on the rods *b b*, a central piece, 3, having trunnions 4 4, journaled in sockets 5 5 on the end pieces, 2 2, and also having a guide or rib, *c*, extending from front to back of the machine, and two standards, *d d'*, the former having a spindle to enter the socket in the rear end of the last, and the latter a rest, *e*, pivotally connected to its lower portion to support the shoe while the same is being operated upon.

The molding pad or bed is composed of a strip of rubber or other flexible material supported by a holder or frame, *f*, preferably of cast-iron, having trunnions *g g* journaled in sockets in the sliding carrier *h*. Arms or levers *i i* are pivoted to the holder *f*, and to their swinging ends are attached the ends of the pad *k*. Said levers have sockets at their top for the reception of springs *j j*. In the center of the frame is a sliding support for the shank-pressing portion of the pad. Said support consists of a base, *l*, adapted to be moved in a dovetail groove, *m*, to secure proper adjustment as to position. The base *l* is provided with a socket adapted to receive a spring, o^3, supporting a block or pad, *o*, Figs. 3 and 5, conforming to the curvature of the shank of the lasted shoe, so that when the pressure is applied to mold the sole to the shoe said pad can readily be adjusted to different sizes of shoes.

The block or pad *o* is made of metal, and has a smooth surface in contact with the pad *k*, so that it can slip freely on the latter. Said block is jointed to its shank o^2, so that it can tip freely toward the front or back of the pad *k*, and said shank is supported only by the spring o^3, so that the block has a considerable freedom of movement in all directions, whereby it is enabled to conform to different shapes and sizes of shank-bottoms.

The yielding molding-pad *k* may be composed of rubber, felt, or any other suitable yielding material, and is normally kept taut by springs *j j*, interposed between the ends of the frame and the levers *i i*. It will be seen that when pressure is applied by the pad to the sole the levers *i i* will yield or be drawn inwardly sufficiently to allow the elastic top to conform to the shape of the bottom of the last and will mold the sole thereto, while the resistance of the springs *j j*, developed by this movement, will exert sufficient tension on the

elastic pad to mold the sole to the form of the bottom of the last. At the same time the shank-pressing block gives the pad the requisite pressure against the shank portion of the sole.

The means for reciprocating the sliding frame constitute an important feature of my invention, and the construction and arrangement of the several parts having this object in view will next be described.

p represents a driving-pulley loosely journaled on a shaft, *q*, Figs. 1 and 6, and adapted to be rotated by any suitable means. Said pulley is secured on said shaft by a split collar, *r*, on the outer end of the shaft. A clutch, *s*, on shaft *q* is rotated therewith by means of a feather and groove, *t*, Fig. 6, and is adapted to be thrown into or out of connection with a like clutch, s^2, on the driving-pulley *p*. Said clutches, when thrown into gear, serve to rotate the main shaft *q*, which operates the sole-pressing devices and the jack, as hereinafter described.

A gear-wheel, *u*, on main shaft *q* meshes with a larger gear-wheel, *v*, on the second shaft, q^2. The gear-wheel *v* is provided with an eccentric, *w*, Fig. 6. Said eccentric is surrounded by an eccentric-strap, *a'*, which strap is connected at *b'*, Figs. 7 and 8, to an arm, *c'*, which arm is connected at *d'* to a lever, *e'*, journaled in bearings at its lower end on the base *a* of the machine. A lever, *f'*, is connected at *g'* to lever *e'*, and extends upwardly, and is pivoted to ears *h' h'* on the lower edge of the sliding frame *h*, supporting the pad-holder.

It will be seen that the levers *e' f'* form the members of a toggle-joint, and the rotation of the eccentric *w* reciprocates the arm *c'*, and through it the levers *e' f'* are caused to move the sliding frame the required distance. The construction just described is best shown in Figs. 5, 6, and 8.

The rotation of the driving-shaft causes the eccentric *w* to alternately raise and lower the frame *h*, and the pad-holder and pad supported thereby, by alternately moving the levers *e' f'* into and out of alignment, said frame and pad-holder being depressed when said levers are thrown out of line with each other, as shown in Fig. 5, and raised by the movement of said levers into line with each other.

By reference to Fig. 5 it will be observed that when the sliding frame *h* is depressed, or in the position to begin its upward movement, the position of the eccentric *w* (shown in dotted lines) is such that its rotation will not move the levers *e' f'* until it has passed the center of rotation, and while passing said "center" the mechanism remains stationary, thus giving the operator time to "unjack" the shoe and place another thereon. The same conditions exist when the eccentric is on the opposite center and the sliding frame is raised to its highest point, the mechanism remaining stationary while the cement on the sole is "setting."

The pulley *p* and gear *v* are loosely fitted to the shafts *q* q^2, while the gear-wheel *u* is fastened to the main shaft by a pin, *i*, and the clutch *s* is constructed to rotate with the shaft and slide thereon into and out of engagement with pulley *p*, the pulley *p* and gear *u* being caused to rotate with the shafts by the engagement of the clutch *s* with the pulley *p*, and made loose by the separation of said clutch and pulley.

In machines of this class it is usual to give the jack a limited vertical movement on the guide-rods *b b*, said jack being depressed and locked in its lowest position before the sole-pressing pad is raised, and released and raised after the pressing operation, a wider opening between the jack and pad being afforded than there would be if the jack were not thus movable. Heretofore it has been the practice to secure the jack in its depressed position by means of spring-pressed pawls engaging with ratchet-teeth on the front sides of the standards *b b*. This construction renders it necessary for the operator to release the jack (when pressure has been applied) by hand. This construction not only requires time needed for other purposes, but makes the construction more expensive, as the ratchet-teeth require to be hardened to obviate rapid wear from frictional contact of the pawls with them, it being necessary to form the ratchet-teeth on pieces separate from the upright standards and fit said pieces into the uprights after the teeth are hardened. To obviate this objection, I construct split collars *j' j'*, provided with ears *k' k'*, Figs. 2 and 5. Said collars are adapted to closely fit the upright standards *b b*, and a screw-threaded rod, *l'*, is passed through the ears *k' k'*, and nuts *m' m'* screwed tightly on said rod to engage the ears closely and form shoulders therefor, the section of each ear adjoining said nuts having the hole large enough to slip onto the rod, and the other section of each ear being screw-threaded, so that when rod *l'* is rotated in one direction the movement will cause said collars to grip the standards tightly, and when rotated in the opposite direction the collars will be loosened sufficiently to slide freely up and down on the standards *b b*.

An arm or lever, *n'*, is attached to one end of rod *l'*, and to said arm is attached a rod, *o'*, Figs. 1 and 5, extending downwardly, and connecting with a horizontal arm, *p'*, pivoted at its center to the frame of the machine, and engaging with another rod, *q'*, adjustably connected at its lower end with a disk, *r'*, attached to the main driving-shaft *q*. Said disk is provided with a slot, *s'*, by which means the throw of its wrist-pin *t'* can be regulated and the mechanism properly adjusted.

By the means just described the jack is automatically secured when drawn down to receive the pressure of the molding-pad *k*, the movement of drawing down said cross-head by means of treadle *u'* and rods *v' v'* causing the arm *n'* to be elevated, the connections thereof remaining stationary, the movement

of elevating said arm n' rotates rod l and closes collars j' sufficiently to hold the jack in its depressed position, and the rotation of disk r', after the machine has been started by "throwing" into gear of clutches s s^2, causes rod l' to be turned still farther in the direction necessary to tighten the collars on the standards b b sufficiently to hold the jack in the position required until the disk r' has rotated past its center, which rotation causes the arm n' to rotate in the opposite direction, thereby unscrewing rod l' and loosening ears k' k', allowing springs w' to raise the jack from the pad.

The ears k' k' are so arranged in relation to the jack and cross-head that when the latter is drawn downwardly said ears follow down through the instrumentality of the head a^2, which bears on the center portion of the rod and forces it down therewith.

The above-described mechanism is so timed with relation to the sole-molding mechanism that when the pressure on the sole has been completed the collars are loosened, and not before. The means just described for holding down the jack and then releasing the same are a great advantage and saving both in the operation and construction of the machine and constitute an important feature of my invention.

I have found that in the operation of machines of this class better results could be obtained if the jack could be adjustably connected to the cross-head—that is, if it were adapted to oscillate to a slight extent, so that the last thereon can swing in the direction of its length, the boot or shoe would more readily adapt itself to different conditions when receiving the pressure of the molding-pad. In molding soles to different styles of lasts it is an advantage to have the jack conform to a limited extent to the pressure. To these ends I have shown the jack provided with a central piece, 3, having trunnions 4 4 journaled in sockets 5 5 on the end pieces, 2 2, and having springs 6 6, adapted to hold said central piece in a central position when pressure is not exerted upon the jack, but allowing it to oscillate against the pressure of said springs when necessary, the oscillatory movement which is thus afforded being in the direction of the length of the boot or shoe.

In case it is desirable to stop the rotation of the driving-shaft automatically when the sole-pressing pad is at each extreme of its movement, the means next described may be employed for automatically throwing the clutch s out of engagement with the clutch s^2 on the driving-pulley p once during each rotation of the driving-shaft and during the above-described periods of rest of the sole-pressing pad, so that said periods can be continued indefinitely, and will be terminated only at the will of the operator; or, if preferred, the clutch s may be thrown out of engagement when the jack is at one extreme only of its movement—*i. e.*, when the sole is being pressed against the last and while the cement is hardening.

b^2 represents a "shipper," pivoted to a lug, c^2, on the frame of the machine. Said shipper is provided with arms partially encircling the clutch s. Said arms are provided with pins e^2, engaging with a groove, d^2, formed in said clutch. The lower portion of the shipper is provided with a like pin, f^2, (shown in dotted lines in Fig. 1,) adapted to engage with an angular or cam-shaped lug, g^2, on a collar, h^2, on shaft q^2. Said collar has a spring, j^2, one end of which is secured to a collar, i^2, rigidly affixed to shaft q^2, and the other end to the collar h^2. The collar h^2 is loosely fitted to the shaft, and is provided with a slot, 12, (see Fig. 9,) in which is located a pin, j^4, rigidly inserted in the frame a, which pin holds said collar in the position shown in Fig. 1. The machine being started by the throwing into gear of the clutch s with pulley p, the collar h^2 moves round by the tension exerted thereon by collar i^2 against spring j^2, the lug g^2 causes the lower end of shipper b^2 to be forced outwardly until said clutch has been disengaged from engagement with pulley p, and at the same moment pin f^2 passes over lug g^2, when the force of spring j^2 throws collar h^2 back to the position shown in Figs. 1 and 9. Clutch s is adapted to be engaged with clutch s^2 by means of a lever, a^3, pivoted to an ear, a^5, on the frame a. Said lever is pivoted at its lower end to one of the arms of the shipper c^2 on the rear side of clutch s, and at its upper end to a rod, a^4, suitably secured in bearings on the frame a, and provided with a knob, a^6, on its outer end, and is adapted to be moved longitudinally in its bearings by the operator to throw clutch s into gear with clutch s^2 on pulley p.

I claim—

1. In a sole-laying machine, the combination of the frame or holder having levers i i pivoted thereto, springs pressing the free ends of said levers in opposite directions, and a flexible pad attached to the free ends of said levers, and put under tension by said springs, as set forth.

2. The combination of the flexible pad, its holder, the shank-pressing block under said pad, and the spring supporting said block and adapted to sway laterally, and thereby enable said block to tip and conform to the shank of a shoe, as set forth.

3. The combination of the holder, the levers pivoted thereto, springs pressing the free ends of said levers in opposite directions, the pad attached to the free ends of said levers, the spring-supported shank-pressing block arranged to bear on the pad between its ends, and the base l, holding the block-supporting spring and adapted to slide on the holder, as set forth.

4. In a sole-laying machine, the combination of the sole-pressing pad and its holding devices, the power-driven eccentric, and the

toggle-joint operated by said eccentric and operating said pad, constructed and arranged, substantially as described, so that the pad is at its highest and lowest points of movement when the eccentric is on the center, whereby the pad is held at rest at said points, as set forth.

5. The combination of the sole-pressing pad and its holding devices, the power-driven eccentric, and the toggle-joint operated by said eccentric and operating said pad, automatic mechanism constructed and arranged substantially as described, whereby the pad-operating mechanism is made inoperative when the pad is at one or both extremes of its movement, and devices whereby said mechanism may be again made operative, as set forth.

6. The combination of the last-holding jack, the sole-pressing pad and its supporting devices, the driving-shaft, the loose driving-pulley thereon having a clutch, s^2, the clutch s, adapted to slide on said shaft, the eccentric mounted on a shaft, q^2, which is geared to the driving-shaft, the devices through which said eccentric communicates motion to the sole-pressing pad, means, substantially as described, whereby the clutch s is automatically disconnected from the driving-pulley at intervals, and devices whereby said clutch may be afterward re-engaged with said driving-pulley.

7. The combination of the vertically-movable jack, the guide-rods, clamps moving with said jack upon the guide-rods, and devices, substantially as described, for depressing and raising said jack, and automatic means, substantially as described, for compressing said clamps upon the guide-rods to hold the jack in its depressed position and for loosening said clamps to release the jack, as set forth.

8. The combination of the guide-rods, the jack sliding thereon, the clamps movable with said jack on the guide-rods, the screws whereby said clamps may be tightened and loosened on the guide-rods, and automatic mechanism, substantially as described, for rotating said screws.

9. In a jack, the combination of the end pieces, 2 2, the central piece, 3, connected by trunnions to the end pieces, and provided with the last-holding devices, said trunnions being arranged to give the last an oscillating movement in the direction of its length, as set forth.

10. The combination of the end pieces, 2 2, the central piece, 3, connected by trunnions to the end pieces, and provided with last-holding devices, and springs 6 6, interposed between the central piece and the end pieces, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 26th day of January, 1887.

CHAS. E. HOLLAND.

Witnesses:
C. F. BROWN,
ARTHUR W. CROSSLEY.