

(No Model.)

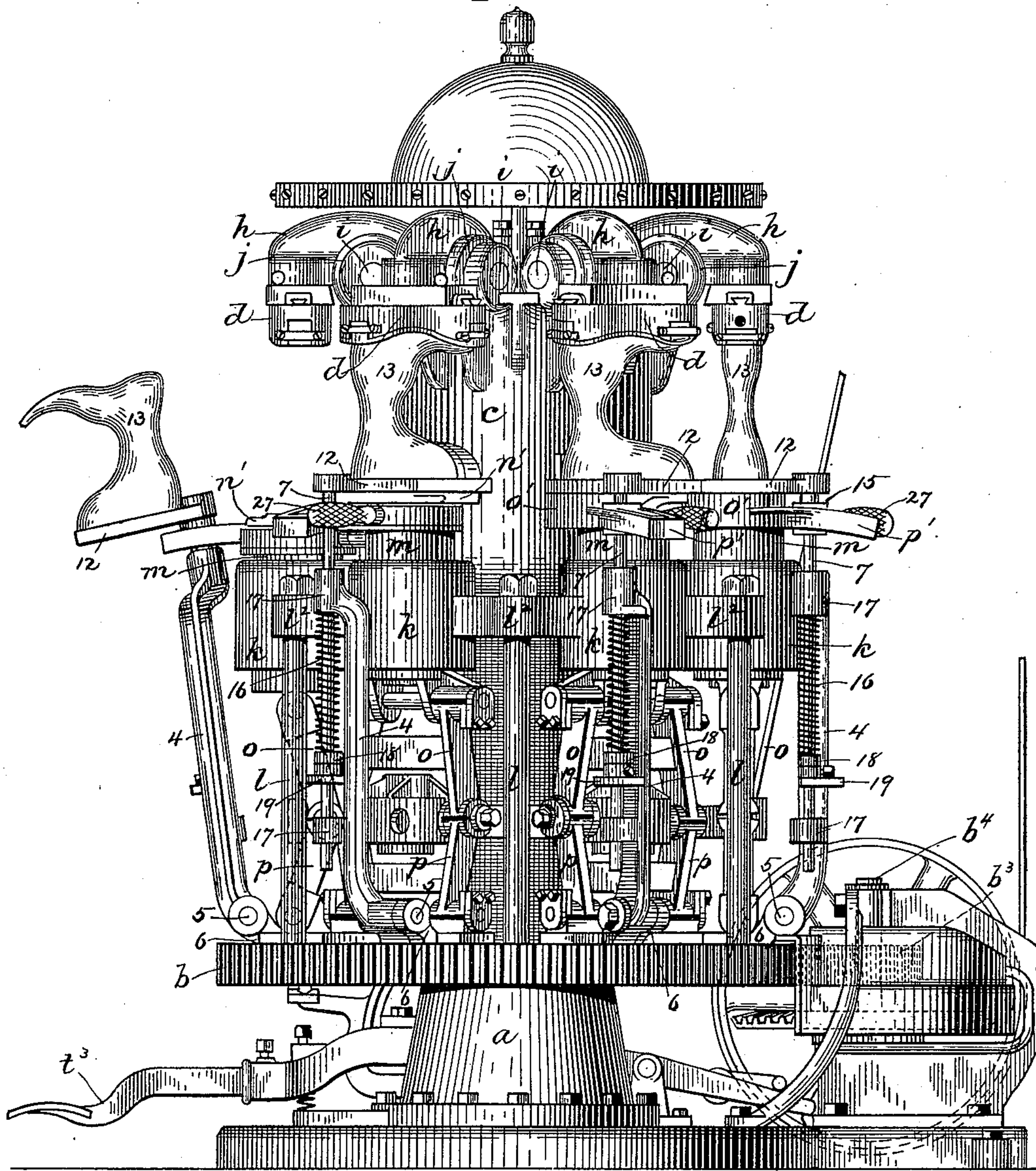
4 Sheets—Sheet 1.

F. W. COY & A. C. PAUL.
SOLE PRESSING MACHINE.

No. 436,034.

Patented Sept. 9, 1890.

Fig. 1.



WITNESSES.

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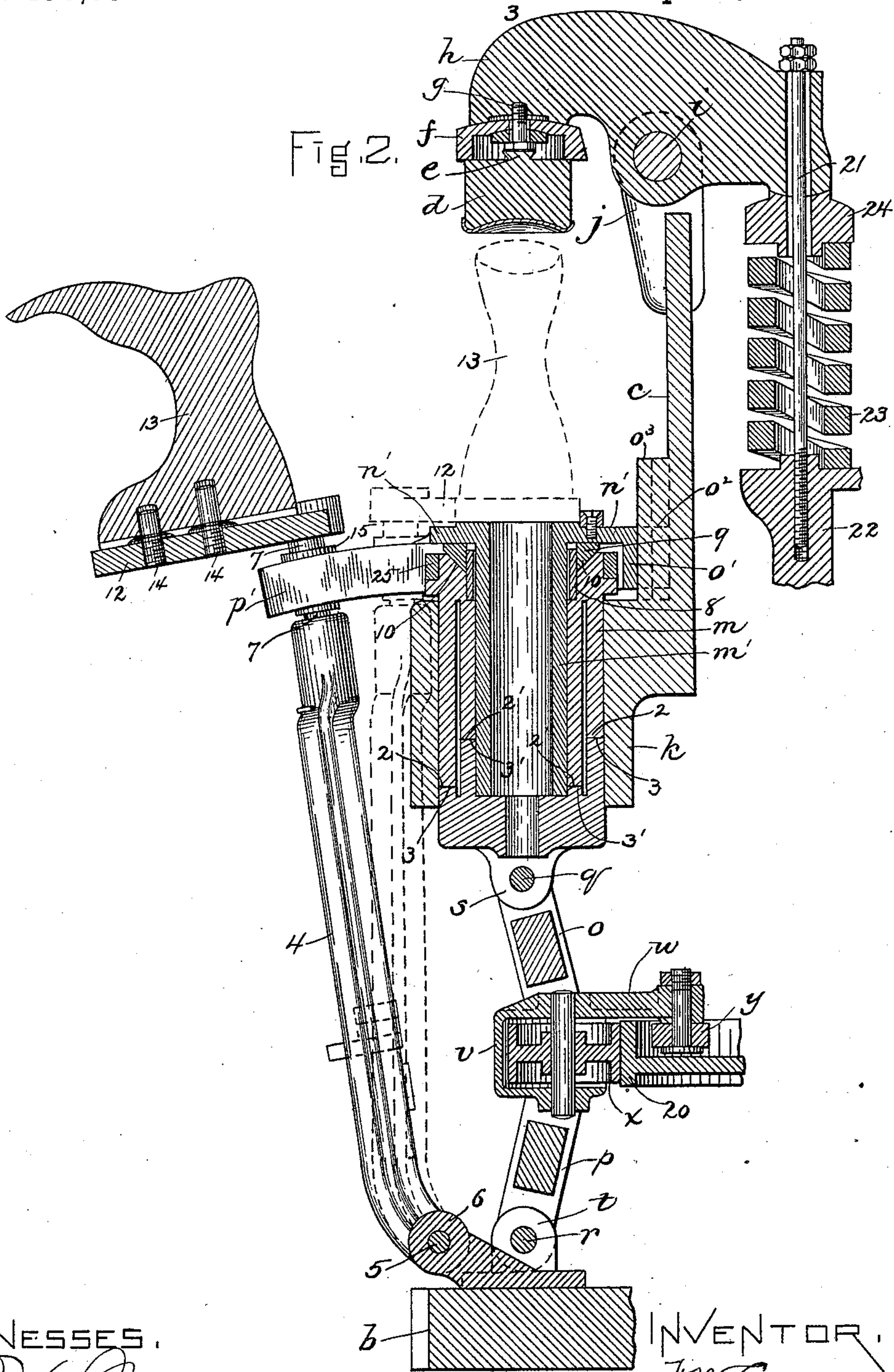
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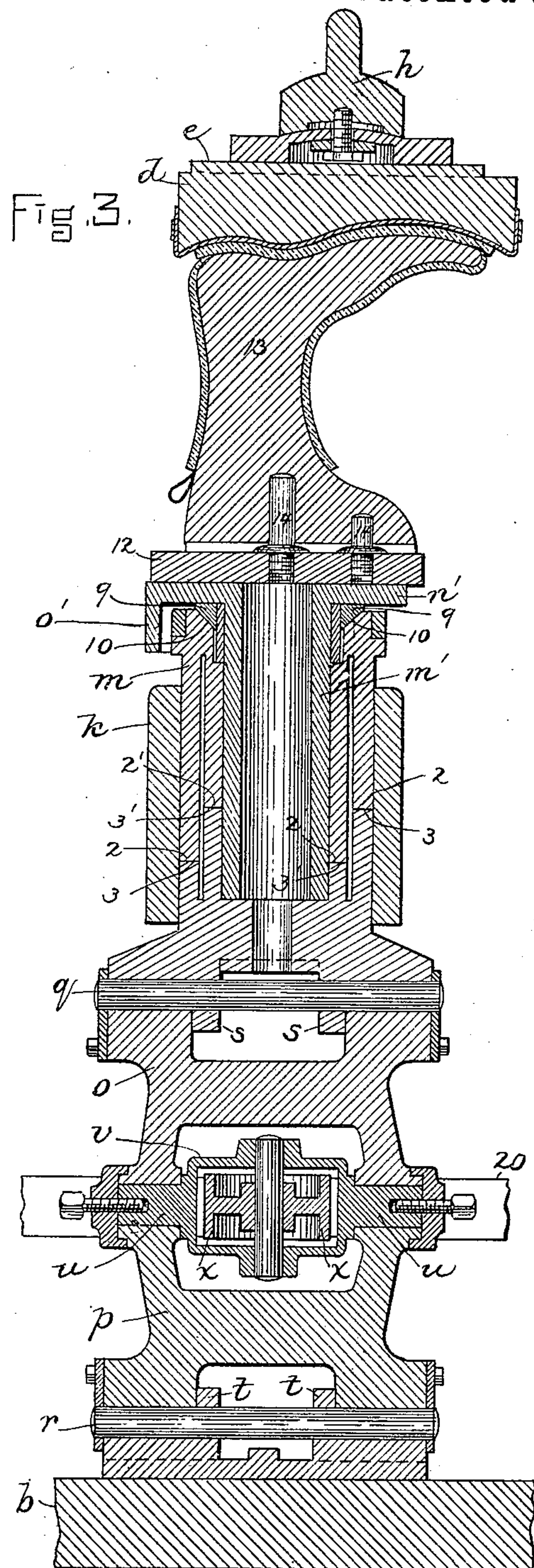
(No Model.)

4 Sheets—Sheet 3.

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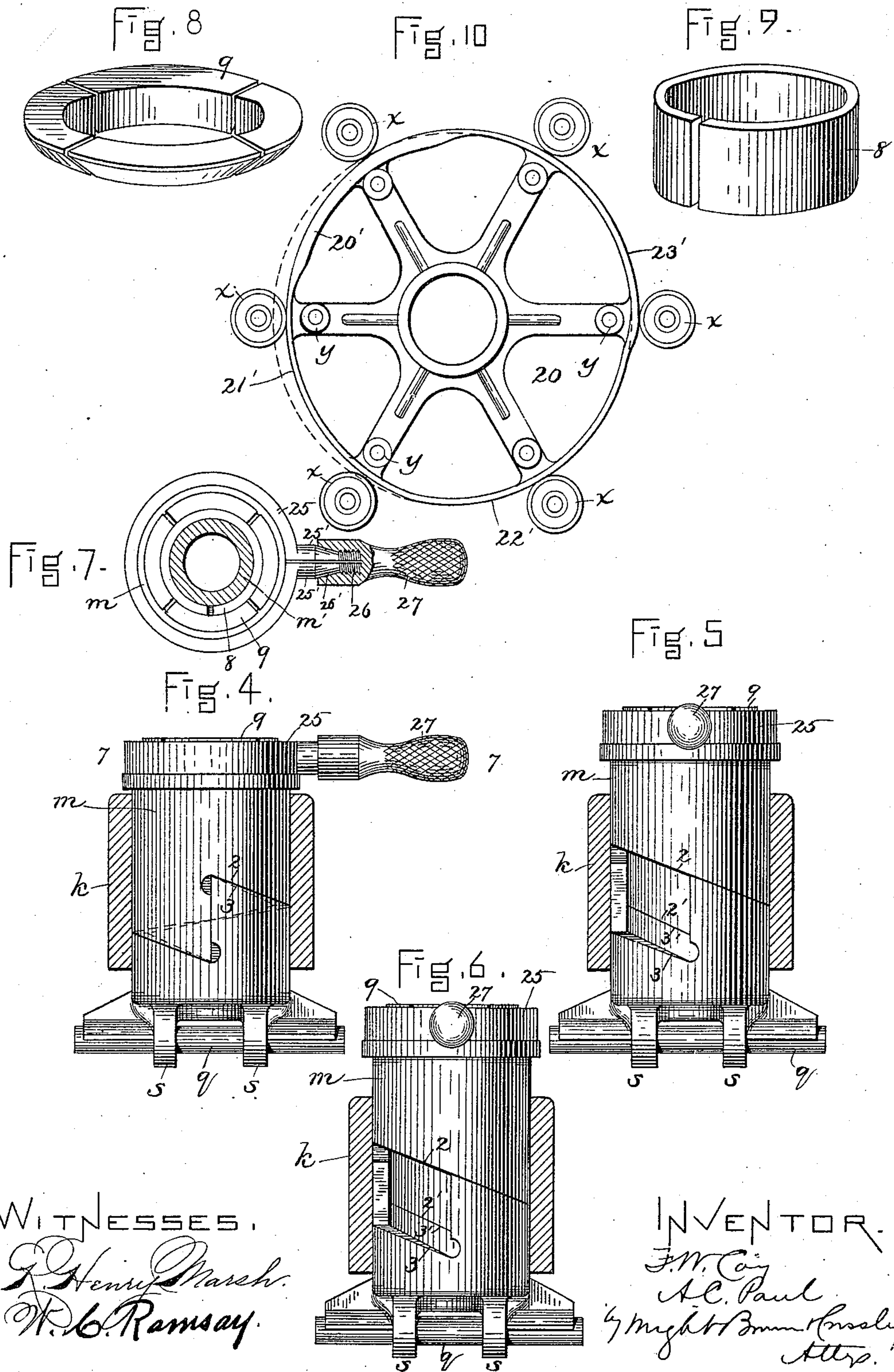
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UNITED STATES PATENT OFFICE.

FREDERICK W. COY, OF BOSTON, AND ABNER C. PAUL, OF LYNN, ASSIGNORS
TO ARTHUR FULLER AND E. C. JUDD, OF BOSTON, MASSACHUSETTS.

SOLE-PRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 436,034, dated September 9, 1890.

Application filed December 21, 1889. Serial No. 334,483. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK W. COY, of Boston, in the county of Suffolk, and ABNER C. PAUL, of Lynn, in the county of Essex, both in the State of Massachusetts, have invented certain new and useful Improvements in Machines for Beating Out or Pressing Soles, of which the following is a specification.

This invention relates principally to machines for beating out boot and shoe soles after they have been attached to the uppers; and it relates to that class of machines in which a series of jacks and a series of molds or dies are supported by a rotary frame, which rotates on a vertical axis, the jacks being provided with lasts which co-operate with the molds or dies in pressing the soles of boots or shoes placed on said lasts, the jacks being movable, so that the lasts thereon may be placed under the molds or dies and pressed upwardly against the latter by power mechanism, with which the machine is provided.

The invention has for its object to provide an improved construction and arrangement of the jacks, whereby the operation of jacking and unjacking boots and shoes may be facilitated, and also to provide improved means whereby the operator after jacking a boot or shoe and moving it to position under the corresponding mold or die may raise the jack by hand-power to bring the sole of the boot or shoe to a bearing on the mold or die prior to the application of the power applied by the mechanism with which the machine is provided.

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

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of an organized machine for beating out boot and shoe soles embodying our invention. Fig. 2 represents a sectional view of a portion of the machine, showing one of the jacks, one of the molds or formers, and the means for pressing the last on the jack against the mold or former. Fig. 3 represents a section on the plane of line 3-3, Fig. 2. Fig. 4 represents a side elevation of the devices

whereby the operator raises the last by hand prior to the power pressing operation. Fig. 5 represents a similar view, one of the parts being in a different position from that shown in Fig. 4. Fig. 6 represents a view similar to Fig. 5, but showing the devices in the position they occupy after the power-pressure has been applied. Fig. 7 represents a section on line 7-7, Fig. 4. Figs. 8 and 9 represent views of parts detached. Fig. 10 represents a plan view of the horizontal cam forming a part of the mechanism for applying the power of the machine to the lasts and pressing the same upwardly against the molds or formers.

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

In the drawings forming a part of this specification, *a* represents a standard or pedestal, which is provided with a suitable base to rest upon the floor or other support. Upon said standard is mounted a rotary frame, which is adapted to rotate horizontally upon the standard, and is composed of a base *b*, which is a horizontal gear-wheel mounted to rotate horizontally on a bearing formed for it on the standard *a*, and a vertical cylindrical casting or shell *c*, connected with the base *b* by vertical rods or standards *l*, attached at their lower ends to the gear *b* and at their upper ends to ears *l'* on the shell *c*, so as to rotate therewith.

On the upper end of the shell *c* are formed a series of ears *j*, in which are bearings for trunnions or pivots *i*, formed on short levers *h*, which are arranged radially and are adapted to oscillate slightly on their bearings in the ears *j*.

To the outer ends of the levers *h* are connected a series of molds or formers *d*, the bottom surfaces of which are formed to give the desired shape to the bottom of a boot or shoe sole. Said formers *d* have dovetail ribs *e* on their upper surfaces, which are inserted in dovetail slots formed in blocks or holders *f*. Said blocks *f* have convex upper surfaces, which are fitted upon concave seats formed on the levers *h*, studs or bolts *g*, passing through slots in the blocks *f* into the levers *h*, connecting the molds or formers *d* to the levers, the convex surfaces of the blocks *f*

and the concave seats on the levers h permitting the blocks and the molds or formers to slide slightly in any desired direction, so that the molds or formers are permitted to tip sufficiently to accommodate themselves to the bottom of the sole which is pressed against them, thereby giving a uniform pressure to all parts of said bottom. The molds or formers d are permitted to yield slightly to upward pressure against them by means of springs 23, interposed between collars 24, bearing against the inner ends of the levers h , and a support 22, which is affixed to and forms a part of the rotary supporting-frame. A rod 21, affixed to the support 22, passes through the spring 23 and through enlarged orifices formed in lever h and collar 24, said rod having a nut or enlargement above the lever h and preventing the lever from swinging downwardly at its outer end beyond a certain limit. The spring 23 is sufficiently powerful to prevent the lever h and mold or former d from yielding too freely, said mold yielding only to extreme pressure, such as would be caused by variations in the thickness of the soles being pressed.

On the shell or casting c , between the upper and lower ends thereof, are formed a series of tubular bosses or sockets k , in which are fitted vertically a series of cylindrical plungers m , which are adapted, as hereinafter described, to impart upward movement to the lasts supporting the boots or shoes to be treated and press the soles of the boots or shoes on said lasts against the molds or formers d . Each plunger has at its lower end ears s , which receive a rod or pivot q , forming a bearing for the upper end of a link o , which constitutes one member of a vertical toggle-joint, the other member of which is a link p , bearing upon a rod or pivot r , supported by ears t , affixed to the gear b , constituting the base of the rotary frame. The meeting ends of the links o p are fitted upon trunnions u , which are formed upon a casting or holder v , in which is journaled upon a vertical axis a wheel or roller x . Said wheel or roller bears upon the perimeter of a horizontal cam 20, which is rigidly supported, so that it does not rotate with the frame above described. The casting or holder v is provided with a horizontal arm w , in which is journaled a vertical stud supporting a wheel or roller y , arranged to act upon the inner perimeter of the cam 20, as shown in Figs. 2 and 10. Said cam has at a given point on its inner perimeter an inwardly-projecting or thickened portion 20', which acts upon rollers y when they are brought in contact with said portion and draws back the holder or casting v and the meeting ends of the toggle-links o p , thus throwing said links out of alignment, as shown in Fig. 2, and causing the depression of the plunger m to its lowest point. The cam 20 is formed at 21' to permit the wheels or rollers x to move inwardly or toward the center of the cam, and thereby enable the links of the

toggle-joint to assume the position last described. The cam is formed at 22' to throw the holder or casting v outwardly, and thereby move the toggle-links into line with each other, or approximately so, for the purpose of raising the plunger m , and thereby causing it to press a last against the mold or former d above said plunger, as hereinafter described. The cam 20 has another peripheral enlargement 23', which gives an additional movement to the toggle-links, and thereby increases the upward pressure of the last against the mold or former d . The rollers y and the internal projection 20' constitute a positive means for drawing back the meeting ends of the toggle-links, and are substitutes for a spring which might be arranged to act on the meeting ends of the links to draw the same backwardly when the contour of the perimeter of the cam 20 permits.

It will be seen from the forgoing that when the rotary frame carrying the series of plungers and molds or formers is rotated the fixed cam alternately raises and lowers the plungers by its action on the toggle-joints supporting said plungers, so that each plunger is depressed upon reaching a given point of the frame and raised after passing said point. Rotary motion is imparted to the frame by means of a pinion b^3 upon a vertical shaft b^4 , which is rotated by a suitable connection with a driving-shaft, the pinion b^3 meshing with the gear b , as shown in Fig. 1.

In connection with the mechanism above described we employ a series of jacks, each of which is of telescopic construction, so that it can be extended and contracted vertically, and carries at its upper end a last 13, and is pivoted at its lower end, at 5, to ears 6, rigidly affixed to the base or gear wheel b . The telescopic construction of the jack is secured by making it in two parts or sections—namely, the lower section 4, which is pivoted to the ears 6, and the upper or sliding section 7, which is a cylindrical rod adapted to rotate in bosses or bearings 17 17, formed on the section 4, and also to move lengthwise in said bearings. To the upper end of the vertically movable and rotatable section 7 is attached a plate 12, having studs 14 14, which are engaged with sockets formed in the shank of the last 13, and secure said last to the plate 12.

p' represents a guide attached to or formed on the plunger m . In said guide is a collar 15, having a flange at its upper end projecting over the upper edges of the guide p' , said collar being rigidly attached to the section 7 of the jack, so that as the plunger m rises and falls it will by its engagement with the collar 15 raise and lower with it the upper section 7 of the jack and the last 13, carried thereby.

From the foregoing it will be seen that the last is capable of the following motions while engaged with the jack, namely: It can be swung from the position shown in full lines in Fig. 2 to the position shown in dotted lines in said figure by a movement of the entire jack

upon its pivot 5 and by a partial rotation of the upper section 7 in the bearings formed for it on the lower section 4, these two movements—namely, the inward swinging movement of the entire jack and the partial rotation of the upper section thereof—bringing the plate 12 over the corresponding plunger *m* and bringing the last into position to co-operate with the corresponding mold or former *d*; secondly, an upward movement with the plunger *m*, said movement being partaken of by the last, the plate 12, and the upper section 7 of the jack, independently of the lower or pivoted section, the latter having no upward movement. The last is thus brought into such position that a slight upward movement will bring the outer surface of the sole of the boot or shoe thereon into contact with the mold or former *d*, the arrangement of the parts being such that when the plunger *m* is in its normal position there is room between its upper end and the corresponding mold or former to swing the last and the boot or shoe thereon freely to place under the mold or former without contact between the sole and the pressing-surface of the mold or former.

Means are provided for giving the plunger an upward movement by muscular power exerted by the operator, so as to bring the upper surface of the sole to a bearing on the under surface of the mold or former, so that when the power-pressure is applied said pressure will be the same whether the sole be thicker or thinner. The said hand pressing means are as follows: The plunger *m* is made in two sections, one of which includes the lower end of the plunger and the ears *s s* thereon, while the other includes the upper end of the plunger, upon which the jack-plate 12 bears. The upper section bears upon the lower and is adapted to be rotated independently, the meeting ends of the two sections being made spiral, the upper section having a spiral lower end 2, while the lower section has a spiral upper end 3, as shown in Figs. 4, 5, and 6. It will be seen, therefore, that by rotating the upper section upon the lower, the latter being incapable of rotating, the upper section will be either raised or lowered by the movement of one spiral end upon the other, accordingly as the upper section is rotated in one direction or the other, the rotation of said upper section in one direction causing it to rise, while a rotation in the opposite direction causes it to fall in the socket *k*. The upper section is provided with a handle 27, whereby it may be rotated for the purpose described. The handle is here shown as applied to a split ring 25', encircling the upper end of the plunger, and having lugs or ears, which together form a cylindrical shank having a screw-threaded portion at its outer end engaged with an internally-threaded socket in the handle 27 and a conical or wedge-shaped portion 26', on which bears a correspondingly-shaped internal surface in the handle 27, the arrangement being such that when the handle 27 is

turned to screw onto the threaded portion 26 its wedge-shaped inner surface will compress the shank 25' and the ring 25, thereby causing the latter to bind upon the plunger *m* and lock said ring and the handle thereon to the plunger, with the handle projecting in any desired horizontal direction, so that the handle may be moved back to take a new hold.

Within the plunger *m* is a sleeve *m'*, the upper end of which has a horizontal flange *n'*, which has a downwardly-projecting lug or rib *o'*, on which are formed ears *o''*, which bestride a vertical rib or guide *o'''*, formed on the exterior of the shell or casting *c*, the sleeve *m'* being prevented from rotating by the engagement of the lugs or ears *o''* with the said rib *o'''*. The sleeve *m'* therefore rises and falls with the upper section of the plunger when the latter is rotated, but does not rotate with said upper section.

8 represents a split ring fitted in an annular socket between the upper portion of the plunger and the sleeve *m'*, said ring encircling the sleeve and being adapted to be compressed thereon. 9 represents a ring composed of several segments having beveled outer surfaces bearing on a beveled seat 10, formed in the upper portion of the plunger *m*, as shown in Fig. 2. The flange *n'* of the sleeve *m'* rests upon the ring 9, and by its downward pressure on said ring causes the segments thereof to slide inwardly down the inclined seat 10, and thus exert an inward pressure on the split ring 8, whereby said ring is contracted and caused to bear against the periphery of the sleeve *m'*, the result being the locking together of the plunger and the sleeve *m'* whenever the last is pressed against the mold or former *d* with sufficient pressure to depress and hold the wedge-shaped segments of the ring 9 in position to compress the ring 8. It will be seen, therefore, that when the operator has raised the last by a partial rotation of the upper section of the plunger, and has thereby brought the upper surface of the sole to a bearing on the mold or former *d*, the downward pressure exerted upon the wedge-shaped sections of the ring 9 by the contact of the sole with the mold or former will compress the ring 8, and thereby lock the upper section of the plunger to the non-rotating sleeve *m'*, thereby preventing the upper section of the plunger from rotating backwardly and being thereby depressed. The last is therefore held automatically at the point to which it is raised by the rotation of the upper section of the plunger until the pressure of the mold or former is removed from the sole, the removal of said pressure releasing the wedge-shaped sections of the ring 9 and permitting the split ring 8 to expand sufficiently to release its hold upon the sleeve *m'*, whereupon the upper section of the plunger is free to rotate, and is partially rotated by gravitation back to its depressed or starting point, the incline 2 being formed

to slide automatically down the incline 3, and thus carry the upper section of the plunger downwardly.

The operation of the machine is as follows:
 5 The operator stands at that portion of the machine corresponding to the part 21 of the cam 20, where the pressure is removed from the lasts. As each jack reaches said point the links of the toggle-joint supporting the plunger
 10 accompanying said jack are thrown out of alignment, thus depressing the plunger and removing the bottom of the boot or shoe from the mold or former with which it was in contact, the released jack being thus permitted to
 15 swing outwardly on its pivot 5, as indicated at the left of Fig. 1 and in full lines in Fig. 2. The jack in swinging outwardly assumes an inclined position, so that the last and its supporting-plate 12, which are located, mainly, at
 20 one side of the upper section 7 of the jack, turn automatically or by gravitation to a position substantially at right angles with the position they occupy when the sole is under pressure, the last being thus brought to the
 25 position shown in Fig. 2, with its toe projecting away from the machine, so that the operator can conveniently remove the boot or shoe therefrom and apply another. After the application of another boot or shoe to the released jack the operator swings said jack inwardly and partially rotates the upper section to bring the last into line with the corresponding mold or former, and then by a partial rotation of the upper section of the plunger
 35 raises the last until the sole thereon comes to a bearing on the mold or former above it. The operator then by depressing a treadle t^3 sets the driving mechanism in motion and causes the supporting-frame to rotate until
 40 the roller α , connected with the toggle-joint supporting the plunger corresponding with the jack under consideration, reaches the portion 22' of the cam 20, and is thereby straightened and caused to raise the said plunger by
 45 the power of the machine, and thereby subject the sole on the last supported by said plunger to the power-pressure. The same rotation of the supporting-frame brings another jack to the point where its supporting-plunger is released, as above described, and when the last-mentioned jack reaches said position the rotation of the supporting-frame is automatically stopped by any suitably-organized stop-motion, which need not be necessarily described here. The operator removes the completed boot or shoe, as before, and applies another, and replaces the last of the jack under its mold or former and upon its plunger and again starts the supporting-frame in motion,
 60 and soon, each last being released upon reaching the part 21' and pressed upwardly upon reaching the part 22'. The upward pressure is increased by the part 23' of the cam 20, and the increased pressure is maintained until the
 65 part 21' of the cam commences to act in releasing the pressure. The upper section 7 of each jack has a collar 18, to which is attached

the lower end of a spring 16, interposed between said collar and the upper bearing 17, the upper end of said spring being engaged 70 with said bearing on the lower section 4 of the jack. Said spring facilitates the partial rotation of the upper section of the jack when the upward pressure exerted on the last is removed.

19 represents a flange or collar attached to collar 18, having one side flat, said flat side bearing upon one side of the lower section 4 of the jack and preventing the collar 18 from rotating. 80

We prefer to make each section of the plunger m double—that is to say, with an inner and an outer shell, the inner shell of the rotatable upper section having a spiral end 2', while the inner shell of the lower section 85 has a corresponding spiral end 3', as shown in Fig. 2. The highest portion of the spiral end 3' is at the opposite side of the plunger from the highest portion of the spiral end 3, so that when the upper section of the 90 plunger has been rotated so that the lower portions of its spiral ends 2 2' rest on the higher portions of the spiral ends 3 3' said section will be supported at opposite sides of its center, so that it will not have a tendency 95 to tip to one side.

The two-part plunger here described may be variously modified in construction without departing from the spirit of our invention. For example, the lower section of the plunger 100 may be formed as a nut and the upper section as a screw adapted to engage said nut, the internal non-rotating sleeve m' and the automatic locking devices to prevent the backward rotation of the upper section of the 105 plunger being substantially the same as above described. By making the cam 20 in steps, as 22' 23', so as to increase the pressure from point to point, we are enabled to do better work than if the cam were formed to apply the maximum pressure at once. There may be any desired number of said steps, as two or more. 110

We claim—

1. In a sole-pressing machine, the combination of a rotary supporting-frame, mechanism carried thereby to co-operate with a last in pressing a sole, and an elongated telescopic jack carrying the said last at its upper end and pivoted at its lower end to the supporting-frame below and independently of the pressing mechanism, the pivotal connection of the jack to the frame enabling the jack to swing the last toward and from the pressing mechanism, while the telescopic construction 125 of the jack enables the last to be moved to effect the sole-pressing operation while engaged with the jack, as set forth.

2. In a sole-pressing machine, a rotary supporting-frame, pressing mechanism carried 130 thereby, said mechanism comprising a mold or former secured to the frame, a plunger or carrier which is movable toward and from said mold in a guide on the frame, and

mechanism for reciprocating said plunger, combined with an elongated telescopic jack carrying a last at its upper end and pivoted at its lower end to the supporting-frame, said pivotal connection being below and independent of the pressing mechanism, whereby the last may be moved by the jack to a position between the said mold and plunger for pressing purposes and away therefrom for jacking and unjacking purposes, the telescopic construction of the jack enabling the last to be raised and lowered by the plunger while engaged with the jack, as set forth.

3. In a sole-pressing machine, the combination of a rotary supporting-frame, mechanism carried thereby to co-operate with a last in pressing a sole, said mechanism comprising a mold or former connected with the frame, a plunger movable toward and from the mold in a guide on the frame, mechanism for reciprocating said plunger, a jack composed of an elongated section 4, connected at its lower end to the supporting-frame by a pivot which is below and independent of the pressing mechanism, a section 7, fitted both to move vertically and to rotate in bearings on the section 4, a last-support on the section 7, and a guide affixed to the plunger and engaged with the section 7, whereby the vertical movements of the plunger are imparted to said section, as set forth.

4. In a sole-pressing machine, the combination of a rotary supporting-frame, a sole-pressing mold or former, a jack composed of a section 4, pivoted at its lower end to said frame, a section 7, fitted to slide and rotate in bearings on the section 4 and provided with a last-support 12, a plunger *m*, adapted to press the last on said support against the mold or former, and a spring engaged at one end with the jack-section 4 and at the other end with a collar affixed to the section 7, whereby the last-named section and the last supported thereby are partly rotated to throw the toe of the last outwardly, as set forth.

5. In a sole-pressing machine, the combination of a rotary supporting-frame, a series of molds or formers carried by said frame, a series of plungers under said molds or formers, toggle-joints connecting said plungers with the frame, a fixed cam engaged with said toggle-joints and formed to depress each plunger at a given point in its revolving movement and hold it elevated during the remainder of said movement, and a series of elongated telescopic jacks connected to the lower portion of the frame by pivots located below and independent of said toggle-joints and having last-supports arranged to be placed upon the plungers by the inward swinging movement of the jacks, as set forth.

6. In a sole-pressing machine, the combination of the rotary frame, the series of telescopic jacks pivoted at their lower ends to the lower part of said frame, the plungers mounted in vertical guides on said frame,

mechanism for raising and depressing said plungers and the last-holding portions of the jacks, the molds or formers arranged above said plungers, and the series of pivoted levers *h* and their backing-springs 23, whereby the molds are yieldingly supported against the upward pressure of the plungers, as set forth.

7. In a sole-pressing machine, the combination of a supporting-frame having a vertical hollow boss or guide, as *k*, a plunger vertically movable in said guide and composed of an upper and a lower section, the former being independently rotatable, said sections having reciprocal spiral bearing-surfaces, whereby the rotation of the upper section raises it in the guide, a toggle-joint connected with the lower section, whereby the two sections may be raised in unison, a non-rotating but vertically-movable sleeve *m'*, passing through the upper section, and automatic means for locking the upper section of the plunger to said sleeve at any position to which it may be raised by its rotary movement, as set forth.

8. In a sole-pressing machine, the combination of a supporting-frame having a vertical boss or guide, as *k*, a plunger vertically movable in said guide and composed of two sections having reciprocal spiral bearing-surfaces, the upper section being independently rotatable and vertically movable in the guide, a toggle-joint connected with the lower section of the plunger, a sleeve *m'* within the plunger, said sleeve being vertically movable with the upper section, means for preventing the rotation of said sleeve, a compressible ring 8, surrounding said sleeve, and a series of segments or wedges 9, bearing on a seat on the upper section of the plunger and arranged to be pressed downwardly by a flange on the sleeve *m'*, the downward pressure forcing the wedges inwardly and causing them to compress the ring 8, as set forth.

9. In a sole-pressing machine, the combination, with the plunger, of the split ring 25, having the tapered shank 25', and the internally-tapered handle secured upon said shanks and adapted to compress the ring 25, as set forth.

10. The combination of the rotary frame, the series of molds or formers, the series of plungers under the molds, the swinging telescopic jacks pivoted at their lower ends to the frame, and having the lasts at their upper ends arranged to be interposed between the molds and plungers by a swinging movement of the jacks, the toggle-joints supporting the plungers and provided with the rollers *x* and *y*, and the fixed cam 20, formed to act on said rollers, and thereby alternately raise and depress each plunger, as set forth.

11. The combination of the rotary frame, the series of molds or formers, the series of plungers under the molds, the swinging telescopic jacks having lasts at their upper ends arranged to be interposed between the molds

and plungers, the toggle-joints supporting the plungers, and the fixed cam 20, supporting the meeting ends of the toggle-joints and provided with a series of steps whereby a series of pressures are applied to the work, as set forth.

5 In testimony whereof we have signed our names to this specification, in the presence of

two subscribing witnesses, this 17th day of December, A. D. 1889.

FREDERICK W. COY.
ABNER C. PAUL.

Witnesses:

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A. D. HARRISON.