(No Model.) 5 Sheets—Sheet 1.

J. J. HEYS.

SOLE LEVELING OR BEATING OUT MACHINE.

No. 581,825. Patented May 4, 1897.

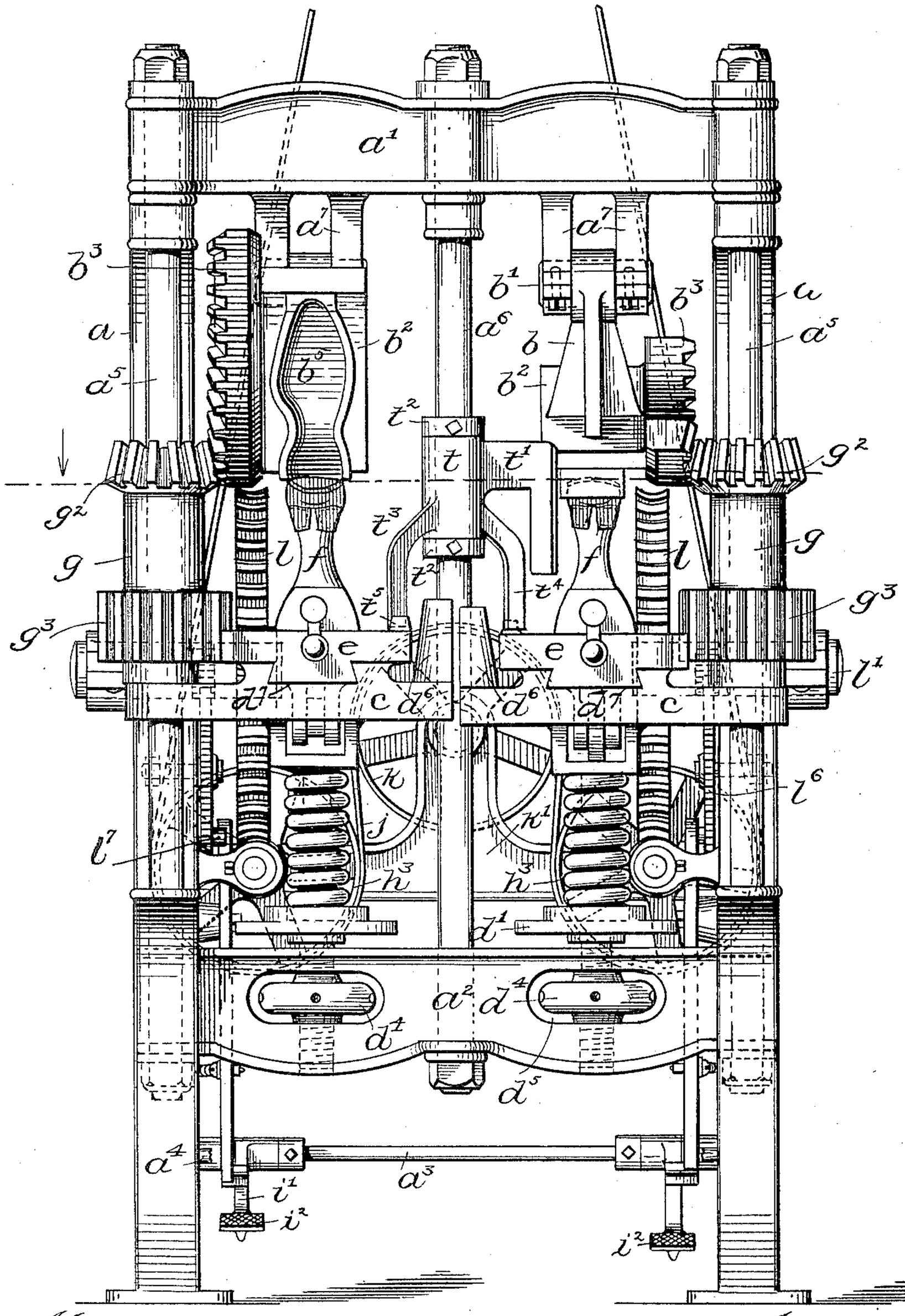

Fig. 1.

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(No Model.) 5 Sheets—Sheet 2.

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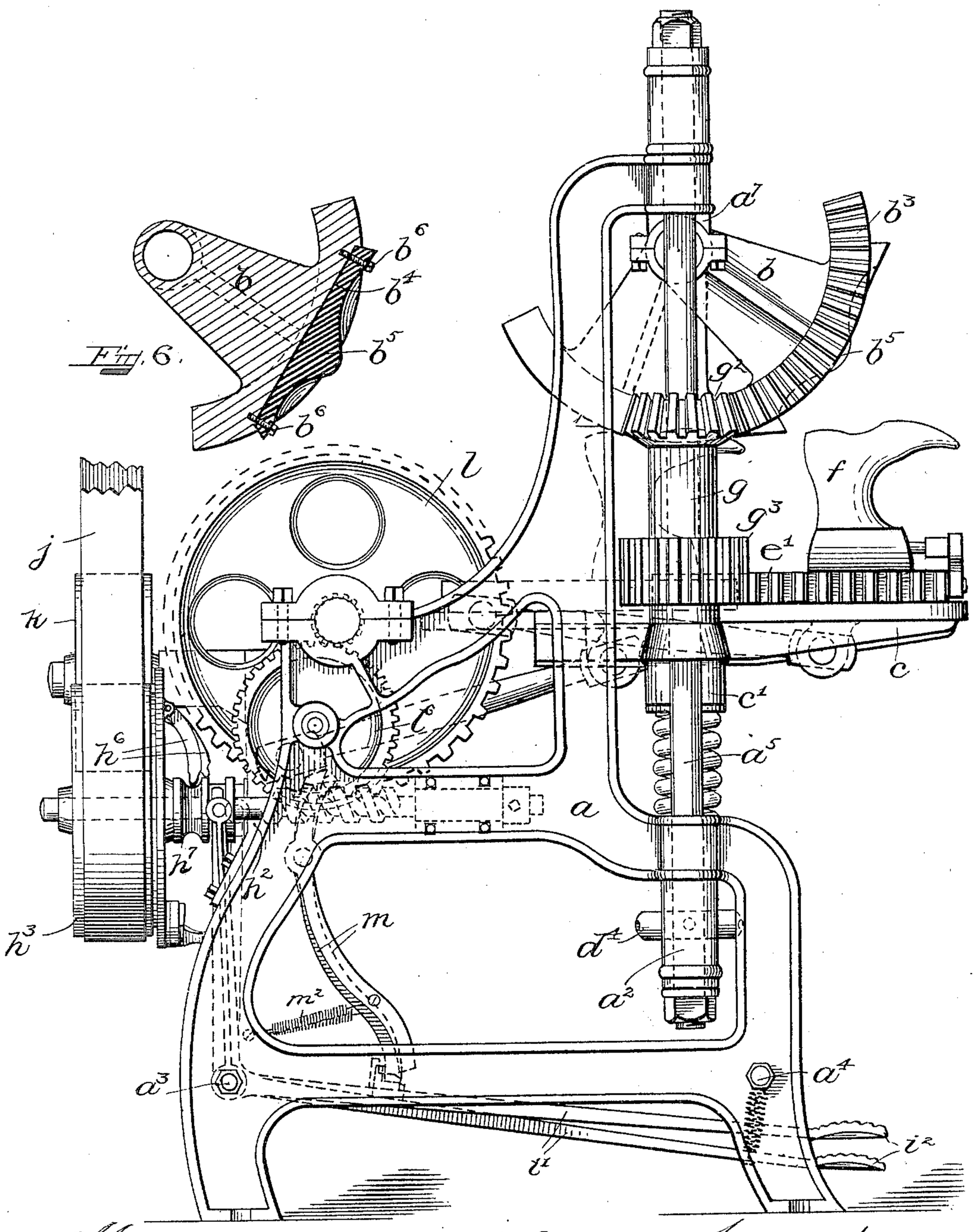

Fig. 2.

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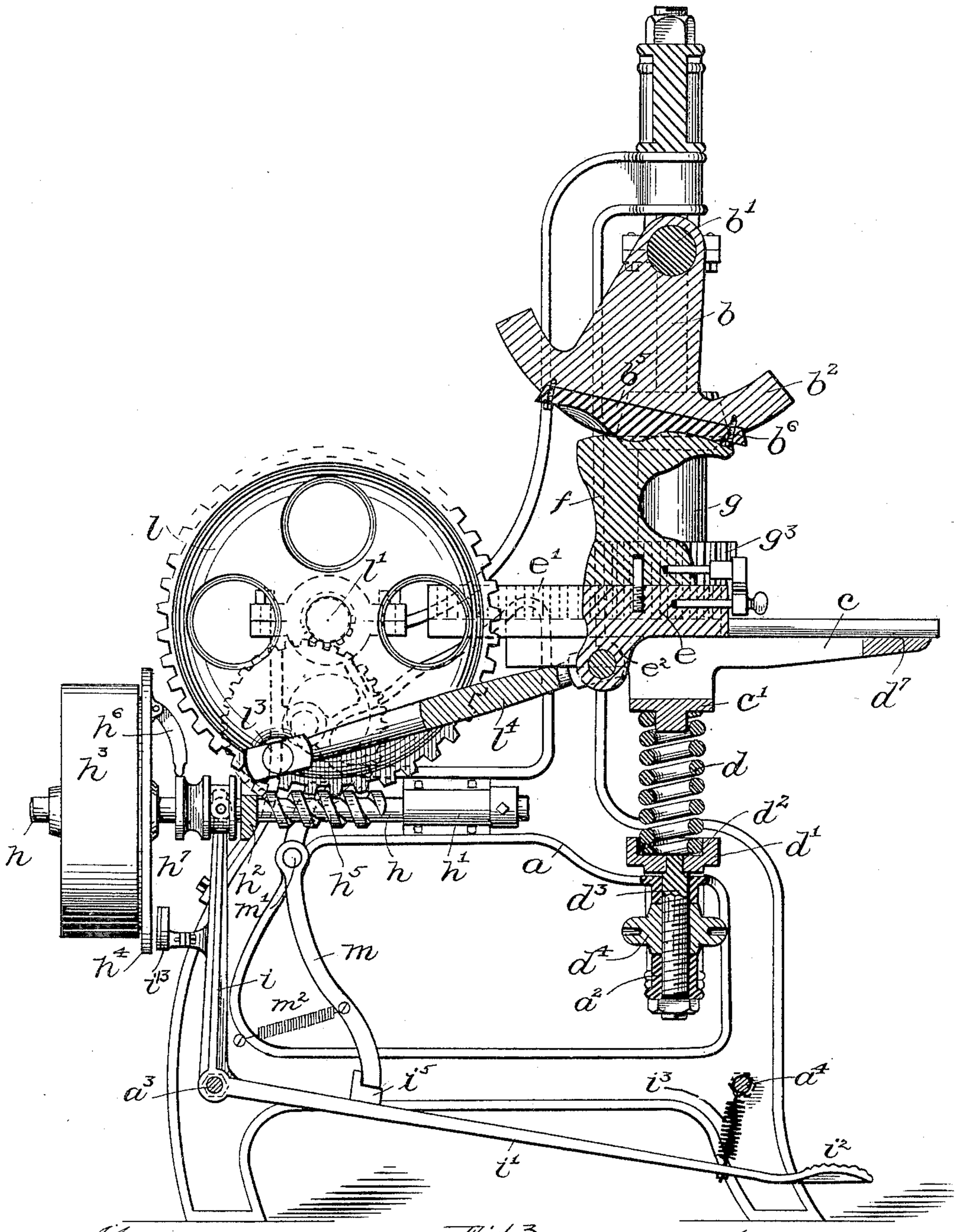

Fig. 3.

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5 Sheets—Sheet 4.

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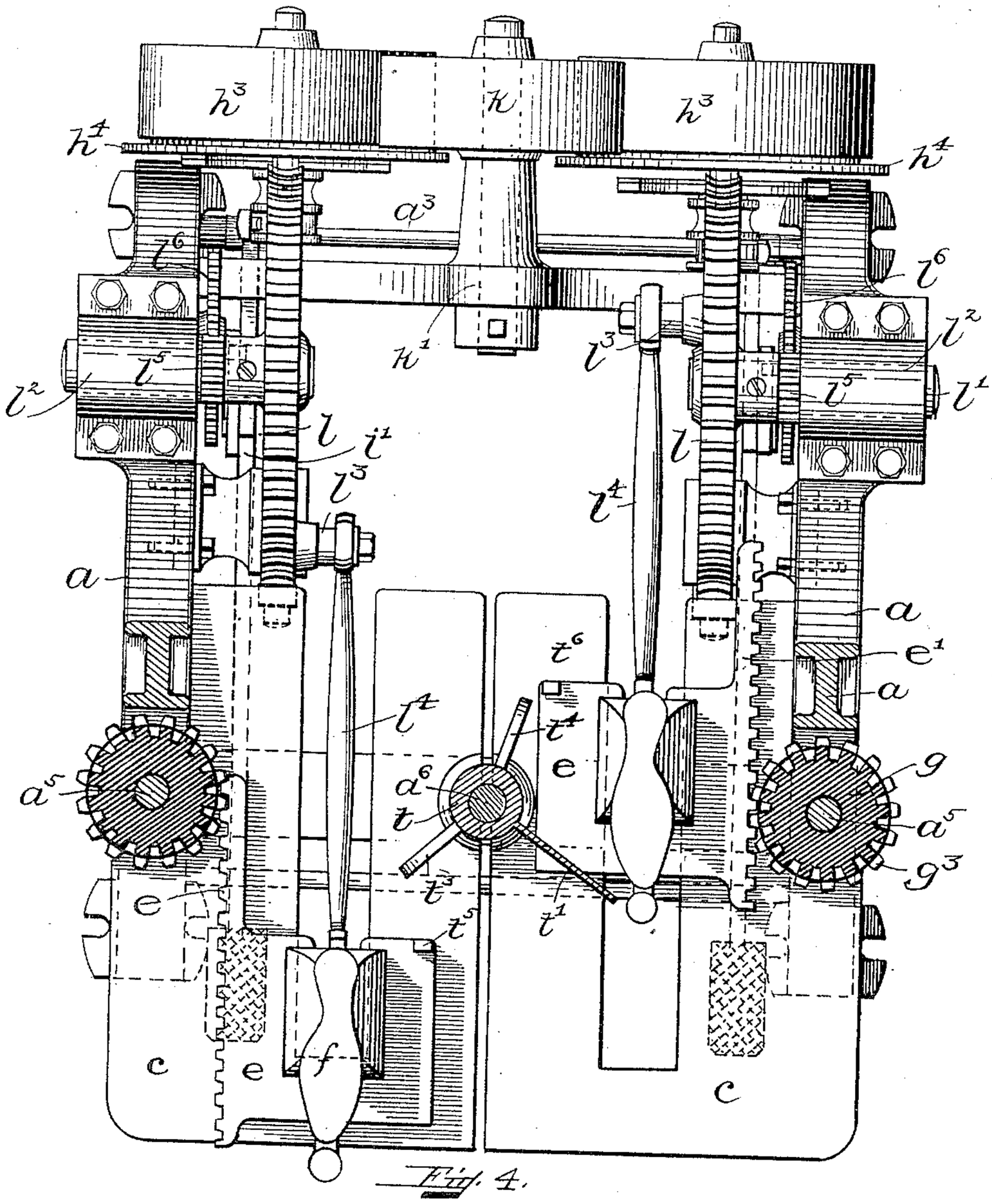

Fig. 4.

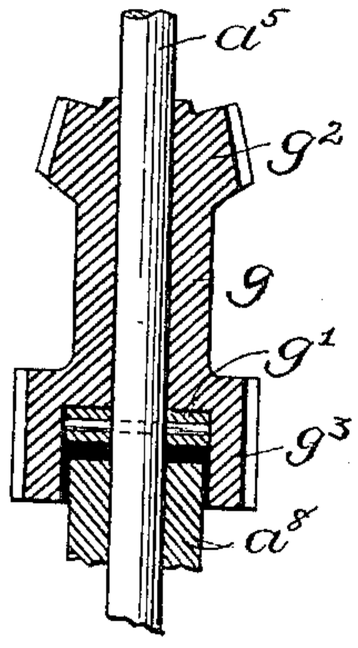

Fig. 5.

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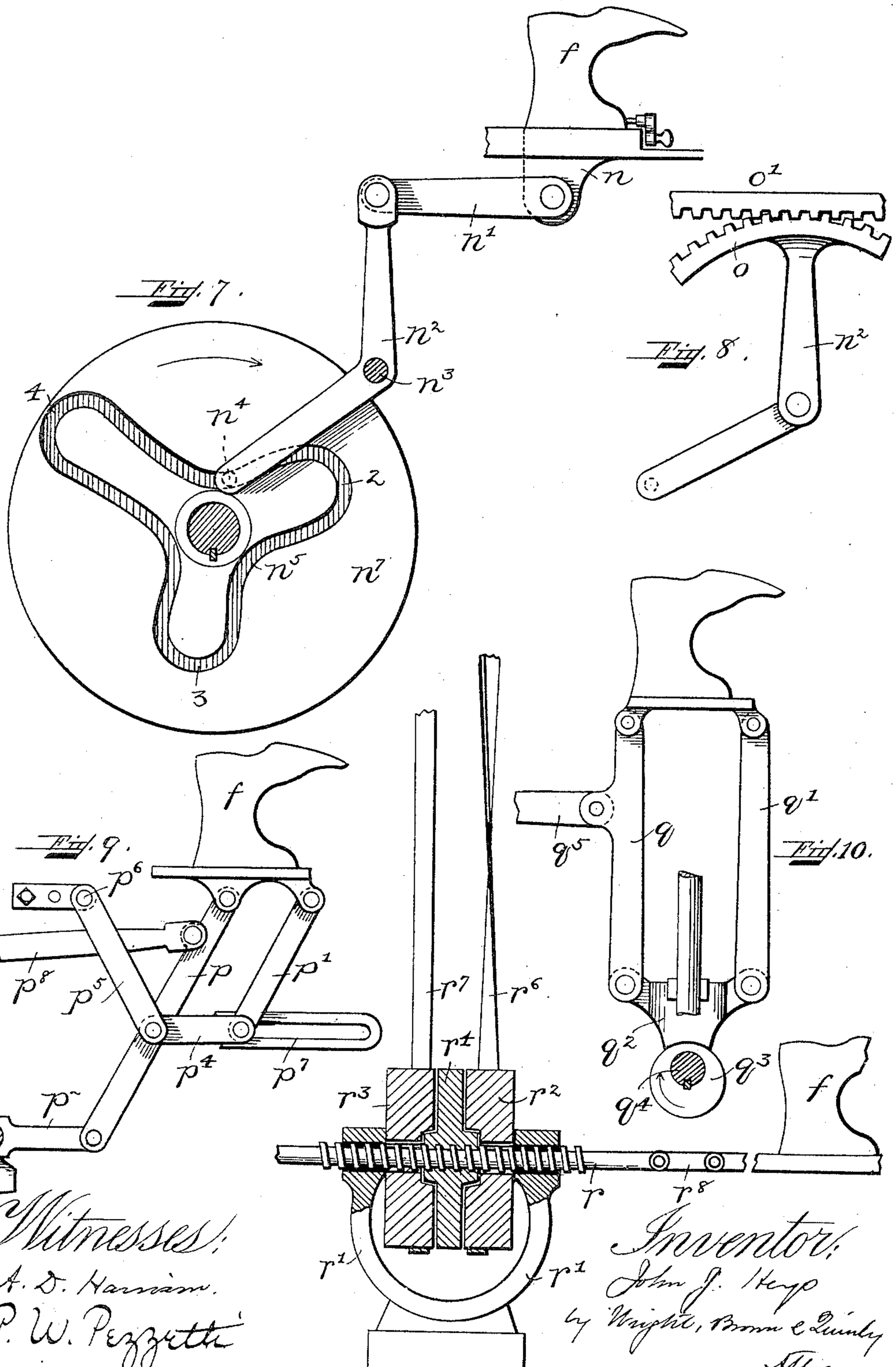

Witnesses:
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P. W. Pezzetti

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UNITED STATES PATENT OFFICE.

JOHN J. HEYS, OF LYNN, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO MAURICE V. BRESNAHAN, OF SAME PLACE.

SOLE LEVELING OR BEATING-OUT MACHINE.

SPECIFICATION forming part of Letters Patent No. 581,825, dated May 4, 1897.

Application filed January 22, 1897. Serial No. 620,217. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. HEYS, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Sole Leveling or Beating-Out Machines, of which the following is a specification.

This invention has relation to machines for leveling or beating out the soles of boots and shoes, and especially to that class of machines in which the last and form are reciprocated to successively press the entire length of the sole. Heretofore machines of this general class have been so constructed that the last and the mold or form were each mounted on an oscillatory arm, to which power was applied to cause them to operate upon the sole placed between them. Such machines, however, were objectionable because of their liability to tear out and break the stitches in a boot or shoe, especially where a comparatively thick sole was being operated upon, because of the fact that the radii of the two circles through arcs of which the molds and surfaces of the soles upon the lasts moved were necessarily variable, so that the surface of the sole would move more rapidly than the surfaces opposing it. Again, it has been found that where a great pressure is suddenly put upon the sole by machines of this class as previously constructed the leather is bruised and discolored and its marketable qualities are decreased and detracted from, whereas by compressing the leather lightly a number of times the sole may be leveled to the shape of the last without causing such discolorations and at the same time giving it the appearance of having been beaten out by hand, besides prolonging its life and thereby enhancing its value.

Hence the object of this invention is to obviate the objectionable features above recited by constructing the machine in such a way as to prevent any tearing out of the stitches and also to prevent the bruising or discoloring of the sole, as above set forth; and to these ends the invention consists in improvements in machines of this character which are illustrated upon the drawings and which I shall now proceed to describe in detail and then point out in the claims.

Reference is to be had to the accompanying drawings, and to the letters and figures marked thereon, forming a part of this specification, the same letters and figures designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 is a front elevation of a machine embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical longitudinal section of the machine, taken through one set of the molds and lasts. Fig. 4 is a plan view of the machine, partially in section, which section is taken on the line 4 4 of Fig. 1. Fig. 5 shows in detail the gear for actuating the mold-carrier and the last-carrying slide and the means for supporting the same, there also being shown a small portion of the table. Fig. 6 represents in section one of the mold-carriers with a form secured thereon. Fig. 7 illustrates another form of my invention, in which the last is reciprocated a predetermined number of times and then brought forward to have the leveled sole replaced by a new one. Fig. 8 illustrates still another form of the invention, to be employed in connection with the wheel having a cam-groove, as shown in Fig. 7. Figs. 9 and 10 illustrate the last as being mounted upon links arranged to insure its moving in a straight line horizontally. Fig. 11 illustrates still another form of my invention, to be employed for reciprocating the last.

In constructing a beating-out or sole-leveling machine of the character hereinbefore referred to it is essential that the mold and the last should press the sole between them with a moderate though yielding pressure for a number of times, and hence one of the said parts must be so mounted as to yield, and, as said before, where two oscillating arms are employed upon which the mold and the last are mounted the varying thicknesses of the soles to be leveled cause the variation of the radii of the arcs through which contiguous surfaces of the sole and the mold move, causing that surface of the sole which is pressed against the surface of the mold to move faster than the last-mentioned surface, with the result that the sole is strained upon the boot or shoe to such an extent as to break the stitches which bind it to the welt or to the insole.

Therefore in my machine I employ, instead of two oscillating arms or carriers for the mold and last, a single oscillating arm with which a rectilinearly acting or reciprocating slide coacts, and I arrange the gearing in such way that the oscillating arm and the slide travel at precisely the same rate of speed in either direction.

The slide is arranged to reciprocate on a yielding table, and hence it will be seen that the operation of the machine will be precisely the same upon soles of different thicknesses, and there will be no tendency to strain the sole longitudinally of the last or the insole, as was found in machines as previously constructed.

Again, in those machines employing two coacting mold and last carriers which oscillate about opposing pivots the placing of a thick sole between the last and mold causes the surface of the sole which is to be pressed against the mold to be projected radially of the pivot of the last-carrier, and therefore throws it away from the vertical lines of the mold to such an extent that when the carriers are oscillated the sole is pressed against the mold in such way that it is slipped along the mold in the longitudinal lines thereof. In other words, the curved face of the mold is falsely placed relatively to the face of the sole to be pressed in all cases where a thicker or thinner sole than the one for which the last and mold were fitted is pressed, whereas in my machine the last is mounted to slide tangentially of the arc of movement of the mold and is depressible only in lines transverse to the said tangential lines, whereby the face of the sole, irrespective of the thickness of the sole or height of the last, is always presented properly and at exactly the same point on the mold, and, moreover, I provide for having the mold and last compress the sole a predetermined number of times with a moderate pressure instead of compressing it by one reciprocation of the carrier under great pressure, since I may thus avoid any discoloration and bruising of the sole caused by violently compressing it.

Referring to the drawings, the frame of the machine consists of two side standards a of the shape shown in Figs. 2 and 3 and suitably connected by cross-heads a' a^2 and tie-rods a^3 a^4. Vertical rods a^5 a^5 and a^6 are secured in the cross-head a' and are secured at their lower ends, the central one a^6 in the cross-head a^2 and the outer ones a^5 in the standards a, as well as in the ends of the cross-head. As the two halves of the machine are alike I shall describe only one of them, but the description may be applied also to the other half.

Depending from the cross-head a' are two brackets a^7, in which is journaled the pivot-shaft b' of the mold-carrier b, which consists of an arm having a segment-plate b^2 at its lower end, which plate is formed at one side with a segmental rack b^3. Preferably the arm, the plate, and the rack are all cast in one piece. The segmental plate is formed with a recess b^4 to receive a mold or form b^5, secured therein by screws b^6, so that the said mold or form may be removed and another of a different shape or different size may be secured in its stead. Below the mold-carrier is the table c, having a bowed portion c', which rests upon a strong yielding spring d, which in turn is supported upon a disk d', having a socket d^2 to receive it. The said disk is swiveled upon a screw d^3, which passes loosely through an aperture in the cross-head a^2, there being a nut d^4 in threaded engagement with said screw and inserted in an aperture d^5 in the cross-head a^2, and by means of which the screw, the spring, and the table may be adjusted vertically.

The table is formed with an annular flange a^8, (see Fig. 5,) through which the rod a^5 passes, and is provided at its opposite sides with a semicylindrical aperture and a guide d^6, coacting with the rod a^6, so that the table is guided in its vertical movements. Its upper face is formed with a groove d^7 to receive the dovetailed tongue of a slide or last-carrier e, upon which the last f is mounted, as shown in Fig. 3.

The slide e is formed on its outer edge into a straight rack e', corresponding in number of teeth to the segmental rack b^3, which is located directly above it.

Mounted loosely upon the vertical rod a^5 is a sleeve g, held in place by a collar g', pinned to the rod, and formed at its ends into bevel-gears g^2 g^3, having the same number of teeth and meshing with the segmental rack b^3 and the straight rack, respectively. Thus it will be seen that if the slide or last-carrier be reciprocated it will cause the simultaneous oscillation of the mold-carrier.

I shall now proceed to describe the mechanism which I employ for reciprocating the slide a predetermined number of times and stopping it when it is in its forward position.

h is a longitudinally-arranged main power-shaft (see Fig. 3) supported in a bearing h' on one of the side standards at its front end and a bracket h^2 at its rear end. Upon the projecting rear end of the shaft is loosely mounted a band-wheel h^3, which is continuously revolving and from which the power may be transferred by clutch mechanism of any suitable kind.

Preferably I employ a disk h^4 and mechanism (not shown) which is operated by a pivoted lever h^6, having its lower end resting upon a grooved collar h^7. The collar is adapted to be shifted by a bell-crank lever having an arm i, with a yoke fitting in a groove therein, and also having an arm i', which is extended to the front of the machine and is provided with a roughened part i^2, which may be depressed by the foot. The lever is pivoted upon the tie-rod a^3 and is normally held upward by a strong spring i^3. When the lever is depressed, as shown in Fig. 3, the collar h^7 lifts the dog

or lever h^6 and connects the band-wheel h^3, through the internal mechanism, (not shown,) with the disk h^4; but when the lever is elevated, as illustrated in Fig. 2, the band-wheel and the shaft are disconnected. The arm i' of the lever is formed with a brake i^3, which when the lever is elevated presses against the disk h^4 and immediately locks it against movement.

The belt j, which is employed for imparting power to the continuously-driven band-wheels h^3, passes around and under one of the said wheels h^3, then up and over an idler-wheel k, journaled upon a bracket k', connected to the side frame and located centrally of the machine, and then passes down under the other band-wheel h^3.

The shaft h is formed with a worm h^5, which meshes with a worm-wheel l, mounted upon a shaft l', journaled in a bearing l^2 in the said frame and having a pitman l^3, which is connected by a pitman-rod l^4 with a depending lug e^2 on the slide e. The said lug e^2 projects down through a slot formed in the table c, which slot extends to a point near the front end thereof.

Now it will be seen that as the shaft h rotates it causes the rotation of worm-wheel l, and the consequent reciprocation of the last-slide or last-carrier, which in turn causes the oscillation of the mold-carrier, so that the mold and last are successively pressed together from the heel end of the last to the toe and back again. The shaft l' of the worm-wheel l is formed into a pinion l^5, the teeth of which intermesh with straight spur gear-wheel l^6, mounted upon a stud-shaft journaled in the frame and which is of such a size that it is revolved once for every three revolutions of the worm-wheel l. The said gear-wheel l^6 is provided with an inwardly-projecting pin l^7, (see Fig. 1,) which will strike against the upper end of a trip-lever m, pivoted at m' on one of the side standards of the machine and disengage the lower end thereof from an ear i^5 on the arm i' of the foot-lever. Normally the trip-lever is held in engagement with the ear by means of a spring m^2, so as to hold the lever depressed and the band-wheel connected with the shaft h, but when the pin l^7 on the gear-wheel i^6 strikes the end of the trip-lever m and throws the said upper end forward it disengages the lower end thereof from the lever and allows it to rise so as to disconnect the band-wheel from the shaft and apply the brake.

The parts are so arranged and timed that when the pin acts on the trip-lever to disconnect the power from the shaft h and stop the movement of the mold and last carriers said last-carrier is at the forward extreme of its movement.

The operation of the machine is as follows: The operator places upon the last, for instance, on the right-hand side of the machine shown in Fig. 1, a boot or shoe the sole of which is to be beaten out or leveled and depresses the foot-lever on that side of the machine. When the said lever is depressed, the trip-lever m engages the lug i^5 thereon and holds the said lever down, and thereby causes the clutch mechanism to connect the band-wheel h^3 with the shaft h. Then the worm-wheel is revolved three times, so as to reciprocate the last and mold carriers the same number of times. As this reciprocation is going on the operator is placing upon the other last on the left-hand side of the machine a boot or shoe the sole of which is to be leveled, and as he is about to depress the lever on the left-hand side to start the mechanism in motion the worm-wheel on the right-hand side of the machine has completed its three revolutions, so as to cause the stop in the pin i^7 to engage the trip-lever and disconnect the power from the shaft h, whereupon the last is stopped at the extreme forward end of its motion. He then removes the boot from the last which has stopped moving and places another one upon it while the last and mold carriers are in this position. Thus it will be seen that the operator will just have sufficient time to place upon one last a boot or shoe while the sole is being leveled by the other last and mold.

While I have found that the sole is best beaten out when the carriers reciprocate the number of times set forth, it will be understood that I do not limit myself to having the mold and last carriers reciprocated three times before they are stopped, as they may be reciprocated any predetermined number of times, since the number of movements may be varied by changing the size of the wheel i^6. Nor do I limit myself to the devices which I have just described for reciprocating the last-carrier rectilinearly or tangentially to the arc of movement of the mold-carrier, as this may be accomplished by a number of devices. In Fig. 7 I have shown mechanism for accomplishing this purpose which I prefer for some classes of work. In this figure the slide n is connected by a rod n' with the upper end of a two-armed lever n^2, pivoted at n^3. The lower end of the lever n^2 is provided with a pin n^4, projecting into a cam-track n^5, which has three rises 2, 3, and 4, respectively, and formed in a disk n^7, the rises 4 being considerably longer radially of the disks than the rises 2 and 3. The disk n^7 takes the place of the worm-wheel, and the mechanism is arranged to stop the radiation of the disk n^7 when the pin n^4 is in the outer end of the rise 4, so that the last is forced at the end of its movement to the extreme forward end of the machine and farther forward than it is during the other parts of its movement. Instead of employing the connecting-rod n' for reciprocating the slide, it may be accomplished by means of a segmental rack o, connected to the slide.

In Fig. 9 the last-carrier is pivoted to two links $p\ p'$, the link p being connected by a pivot to a link p^2, pivoted to a tie-rod p^3, the lower end of the link p' being connected by

links p^4 p^5 with another tie-rod or stationary pivot p^6, and the said lower end is also provided with a roller or pin projecting into a horizontal slotted guide p^7. p^8 indicates the pitman-rod pivoted to the link p^7 and which oscillates the links p p' about their movable pivots, so as to cause the last-carrier to slide back and forth in the same plane.

In Fig. 10 the last-carrier is pivoted upon the upper ends of two links q q', having their lower ends pivoted to the cross-brace q^2, resting upon an eccentric q^3, keyed to the shaft q^4. The links q q' are oscillated by the pitman-rod q^5, and the shaft q^4 is so timed that as the links are oscillated it raises and lowers them to compensate for their variation in the distance between the last-carrier and the cross-piece q, and thereby maintain the last-carrier in the same horizontal plane throughout its reciprocation.

In Fig. 11 the last-carrier is reciprocated by a screw-shaft r, passing loosely through the ends of the arms r r', between which are held two loose pulleys r^2 r^3 and a pulley r^4, internally threaded to receive the threads on the screw-shaft r. The pulleys r^2 r^3 are driven in opposite directions by belts r^6 r^7, respectively, and the said belts are shifted from the loose pulley to the fast pulley by devices operated by one of the movable parts. (Not herein shown.) The front end of the screw-shaft is connected to the last-carrier by a pivoted link r^8, so that the last-carrier may yield downwardly to permit the insertion of a thicker sole between the last and the mold.

In addition to the features pointed out I employ a guard, which is automatically moved adjacent to that set of carriers which is operating, to prevent the operator from getting any part of his person caught between this mold and last. It consists of a sleeve t, having a wing or plate t' and mounted loosely upon the rod a^6 and held between two collars t^2. The sleeve is provided with two arms t^3 t^4, arranged on opposite sides thereof at an angle to each other and each adapted to be struck by a lug t^5 or t^6 on the last-carriers e e.

By examining Fig. 4 it will be seen that when the slide or carrier e on the right-hand side of the machine has struck the arm t^4 and thrown the guard in front of it, the other set of carriers being in a state of rest, the arm t^3 is now in position to be struck by the lug t^5 on the last-carrier on the left-hand side of the machine as soon as it starts to operate, and as in practice one set of carriers comes to a state of rest just before the other set begins its operation the set on the right-hand side of the machine will cease reciprocating before the slide or last-carrier begins its backward movement and swings the guard in front thereof.

Other changes may be made in the construction of the machine without departing from the spirit and scope of this invention, which comprehends a mold-carrier and a coacting last-carrier, one oscillated in an arc of a circle and the other reciprocating rectilinearly at a tangent to said arc, together with means for moving them simultaneously.

Having thus explained the best form of my invention now known to me, without attempting to set forth all the embodiments of the invention, what I claim is—

1. In combination, an oscillatory mold-carrier, a coacting last-carrier and means for causing their actuation to level a sole, said last-carrier being mounted to yield only in parallel lines at right angles to the tangential plane of the arc of movement of the mold-carrier whereby the sole on the last is properly positioned against the mold, irrespective of its thickness.

2. In a sole leveling or beating-out machine, in combination, a mold-carrier, a coacting last-carrier, one of said carriers oscillating through the arc of a circle and the other reciprocating tangentially to said circle, and means for operating them.

3. In a sole leveling or beating-out machine, in combination, a pivoted mold-carrier, and a rectilinearly-reciprocating coacting last-carrier, and means for operating the said carriers simultaneously.

4. In a sole leveling or beating-out machine, in combination, a mold-carrier pivoted to oscillate about a center, a rectilinearly-reciprocating coacting last-carrier, a yielding table upon which said last-carrier is mounted, and means for simultaneously operating the said carriers.

5. In a sole leveling or beating-out machine in combination, a mold-carrier pivoted to oscillate about a center, a rectilinearly-reciprocating coacting last-carrier, a yielding table upon which said last-carrier is mounted, means for simultaneously operating the said carriers, and means for adjusting said table vertically.

6. In a sole leveling or beating-out machine, in combination, a pivoted mold-carrier, and a rectilinearly-reciprocating coacting last-carrier, said last-carrier being yieldingly supported, and means for operating the said carrier.

7. In a sole leveling or beating-out machine in combination, a mold-carrier, consisting of a pivoted oscillatory arm having provisions for the reception of a mold, a coacting rectilinearly-reciprocating last-carrier having provisions to receive a last, each of said carriers having a toothed rack, gearing intermeshing with said racks for causing said carriers to move in unison, and means for imparting power to said carriers to actuate them.

8. In a sole leveling or beating-out machine, in combination, an oscillating mold-carrier having provisions to receive a mold, a coacting rectilinearly-reciprocatory sliding carrier having provisions to receive a last, means for causing said carriers to move in unison, a table on which said sliding carrier is adapted to reciprocate, and means for imparting power to said carriers to actuate them.

9. In a sole leveling or beating-out machine, in combination, an oscillatory mold-carrier having provisions to receive a mold, a coacting rectilinearly-reciprocatory sliding carrier having provisions to receive a last, means for causing said carriers to move in unison, a table on which said sliding carrier is adapted to reciprocate, means for yieldingly supporting said table, and means for actuating said carriers.

10. In a sole leveling or beating-out machine, in combination, an oscillatory mold-carrier having provisions to receive a mold, a coacting rectilinearly-reciprocating sliding carrier having provisions to receive a last, means for causing said carriers to move in unison, a table on which said sliding carrier is adapted to reciprocate, means for yieldingly supporting said table, devices for adjusting the last-said means, and means for actuating the carriers.

11. In a sole leveling or beating-out machine in combination, a mold-carrier having provisions for the reception of a mold, a coacting last-carrier having provisions for the reception of a last, means for causing said carriers to operate in unison, means for operating said carriers, and means for stopping the carriers when they have been operated a predetermined number of times.

12. In a sole leveling or beating-out machine in combination, a mold-carrier having provisions for the reception of a mold, a coacting last-carrier having provisions for the reception of a last, and means for operating said carriers a predetermined number of times and then bringing them to a state of rest.

13. In a sole leveling or beating-out machine in combination, a mold-carrier having provisions for the reception of a mold, a coacting last-carrier having provisions for the reception of a last, means for causing said carriers to operate in unison, means for operating said carriers a predetermined number of times, and bringing said carriers to a state of rest at a position of clearance.

14. In a sole leveling or beating-out machine, in combination, an oscillatory mold-carrier having provisions for the reception of a mold, a coacting rectilinearly-reciprocatory last-carrier having provisions for the reception of a last, means for connecting said carriers whereby they operate in unison, and means for reciprocating said last-carrier a predetermined number of times.

15. In a sole leveling or beating-out machine, in combination, an oscillatory mold-carrier having provisions for the reception of a mold, a coacting rectilinearly reciprocatory last-carrier having provisions for the reception of a last, means for connecting said carriers whereby they operate in unison, means for reciprocating said last-carrier, and means for bringing said carrier to a state of rest after a predetermined number of reciprocations.

16. In a sole leveling or beating-out machine in combination, an oscillatory mold-carrier having provisions to receive a mold, and also provided with a segmental rack, a coacting rectilinearly reciprocatory last-carrier having provisions to receive a last, and also having a straight rack, gearing consisting of a sleeve with teeth intermeshing with the segmental rack and teeth intermeshing with the straight rack for causing the carriers to operate in unison, and means for operating said carriers comprising a wheel having a pitman, and a pitman-rod connected to one of the carriers.

17. In a sole leveling or beating-out machine, in combination, a mold-carrier having provisions to receive a mold, a coacting last-carrier having provisions for receiving a last, continuously-moving power devices, means adapted to be actuated thereby for reciprocating the said carrier longitudinally of the sole of the boot or shoe operated upon, and means for disconnecting the last-said means from the power devices to bring the carriers to a state of rest after said carriers have been operated a predetermined number of times.

18. In a sole leveling or beating-out machine, in combination, a mold-carrier having provision to receive a mold, a coacting last-carrier having provisions for receiving a last, a power-shaft connected with said carriers for operating the latter in planes transverse to the line of pressure, a continuously-rotating wheel loose relatively to said shaft for intermittingly rotating it, clutches interposed between said wheel and said shaft, a lever for operating the clutches, and means for automatically causing said lever to shift the clutches, whereby the shaft and wheel are disconnected after said shaft has made a predetermined number of rotations.

19. In a sole leveling or beating-out machine, in combination, a mold-carrier having provisions to receive a mold, a coacting last-carrier having provisions for receiving a last, a power-shaft connected with said carriers for operating the latter, in planes transverse to the line of pressure, a continuously-rotating wheel loose relatively to the said shaft for imparting motion thereto, a clutch between said wheel and said shaft, and means interposed between the shaft and the clutch for disconnecting them after the carriers have made a predetermined number of movements.

20. In a sole leveling or beating-out machine, in combination, a mold-carrier having provisions to receive a mold, a coacting last-carrier having provisions for receiving a last, a wheel connected to said carriers for operating the latter in planes transverse to the line of pressure, a clutch for imparting power from a continuously-operating power device to the said wheel, means for shifting the said clutch to disconnect said wheel from the power device, a trip for operating the said clutch-shifting means, and mechanism actuated by

said wheel for operating the trip after the said carriers have been operated a predetermined number of times.

21. In a sole leveling or beating-out machine, in combination, a mold-carrier having provisions to receive a mold, a coacting last-carrier having provisions for receiving a last, a wheel connected to said carriers for operating the latter in planes transverse to the line of pressure, a clutch for imparting power from a continuously-operating power device to the said wheel, a foot-lever for shifting said clutch, a trip for holding said lever in position to cause the clutch to connect the said wheel with the power device, and mechanism for actuating the trip after the said carriers have completed a predetermined number of movements.

22. In a sole leveling or beating-out machine, in combination, a mold-carrier having provisions to receive a mold, a last-carrier having provisions to receive a last, means for operating said carriers through a predetermined space for a predetermined number of times, and then moving said carriers through a greater space, to a position of clearance, and means for automatically bringing said carriers to a state of rest.

23. In a sole leveling or beating-out machine, in combination, two sets of mold and last carriers, means for operating said sets, each set consisting of a mold-carrier having provisions to receive a mold and a coacting last-carrier having provisions to receive a last, means for actuating said sets alternately, and a guard moved automatically adjacent the operating set of carriers.

24. In a sole leveling or beating-out machine, in combination, two sets of independently-actuated mold and last carriers, means for actuating said sets, each set consisting of a mold-carrier having provisions to receive a mold and a coacting last-carrier having provisions to receive a last, means for actuating said sets alternately, and a guard operated automatically by each set of carriers alternately for moving it adjacent the operating set.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 14th day of January, A. D. 1897.

JOHN J. HEYS.

Witnesses:
A. D. HARRISON,
P. W. PEZZETTI.