C. C. BLAKE.

SOLE PRESSING MACHINE.

APPLICATION FILED AUG. 8, 1916. RENEWED DEC. 15, 1921.

1,427,940. Patented Sept. 5, 1922.

5 SHEETS—SHEET 1.

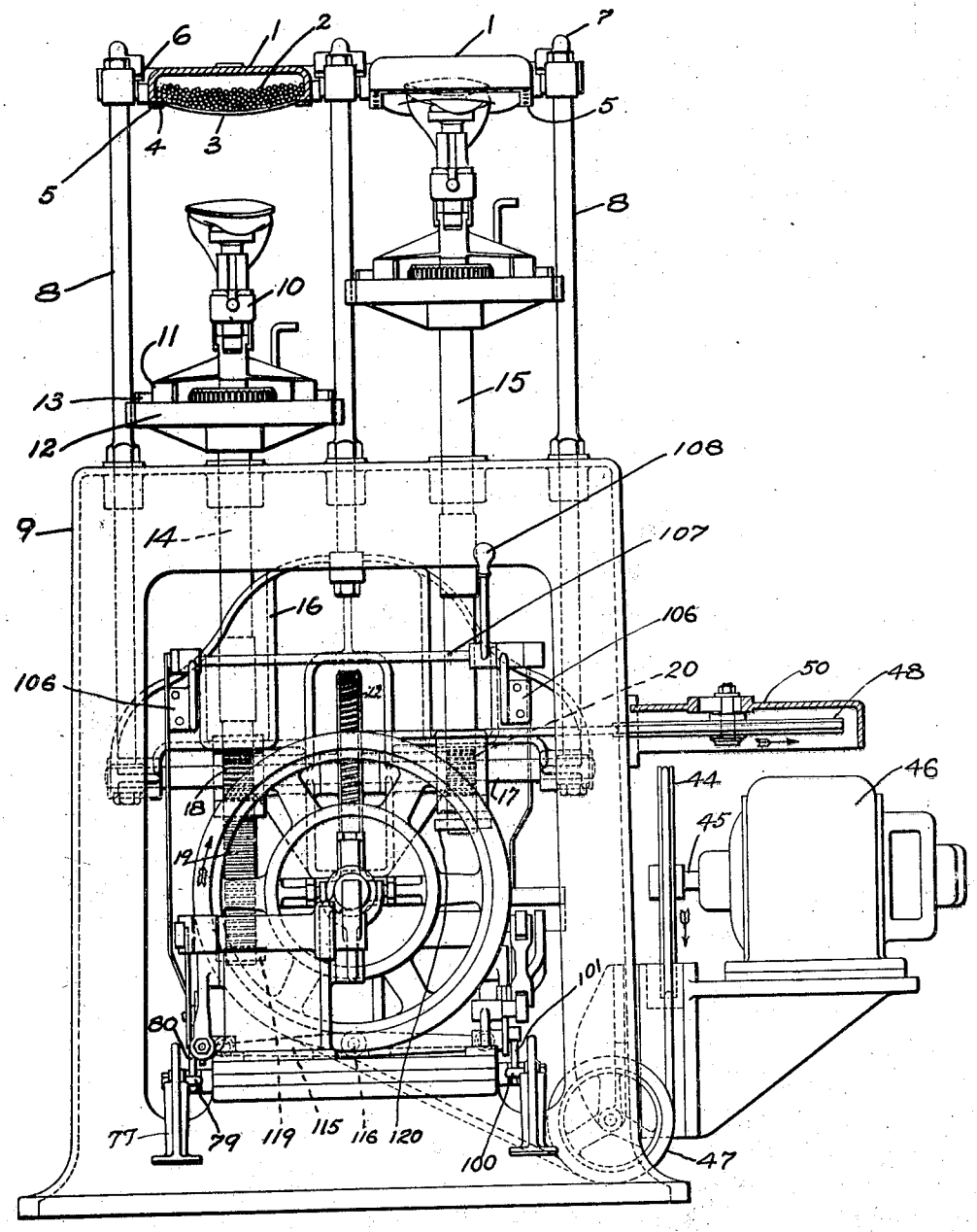


Fig. 1.

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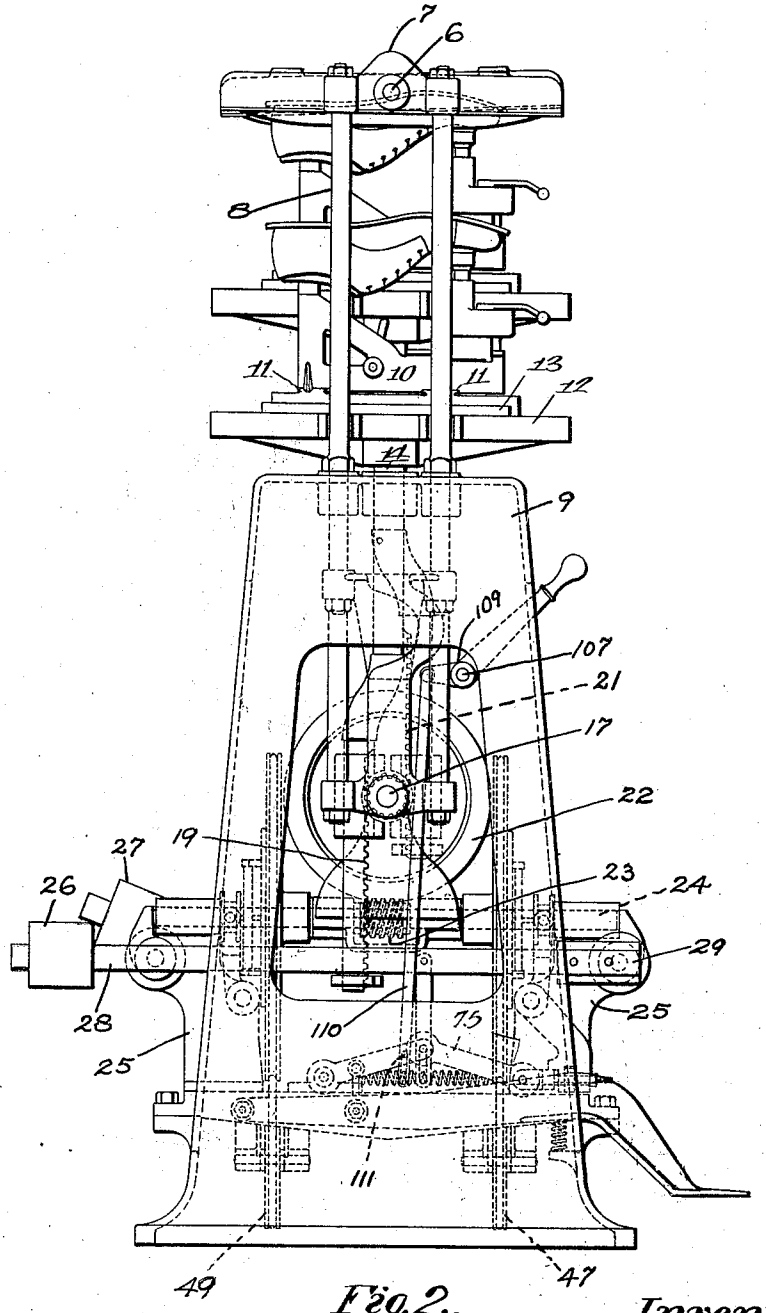


Fig. 2.

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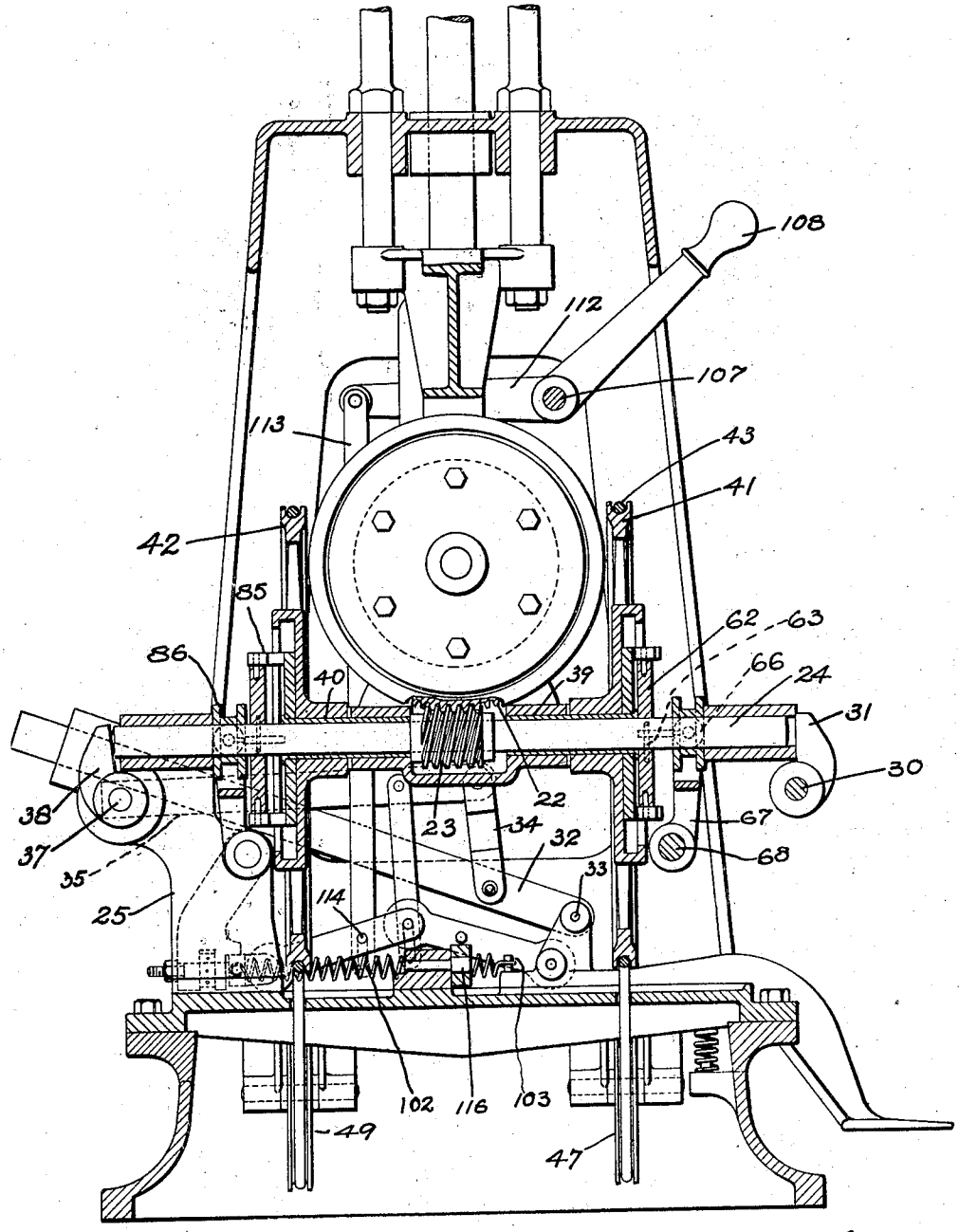


Fig. 3.

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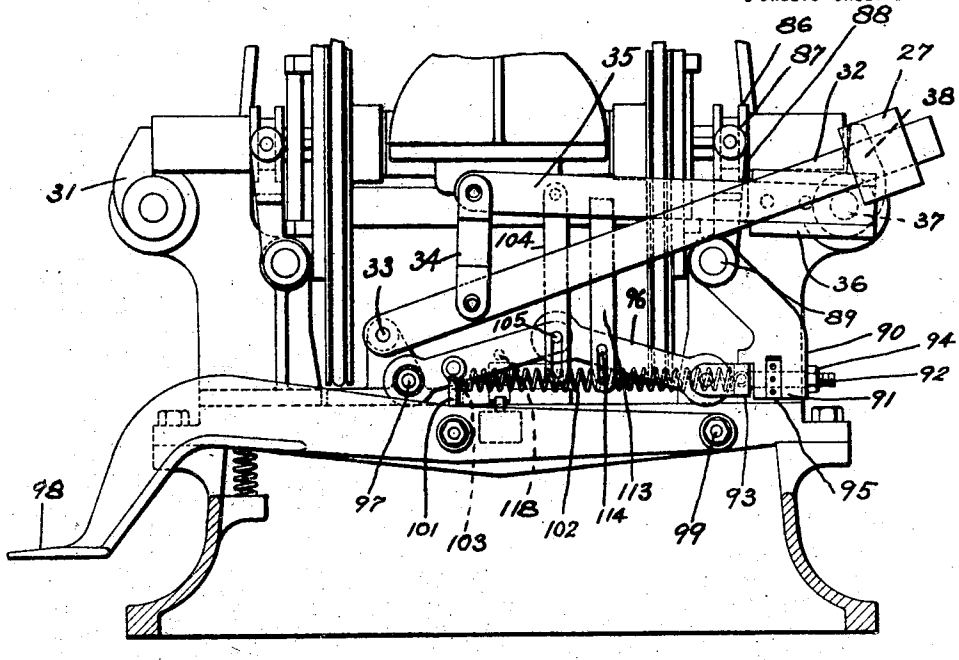


Fig. 4.

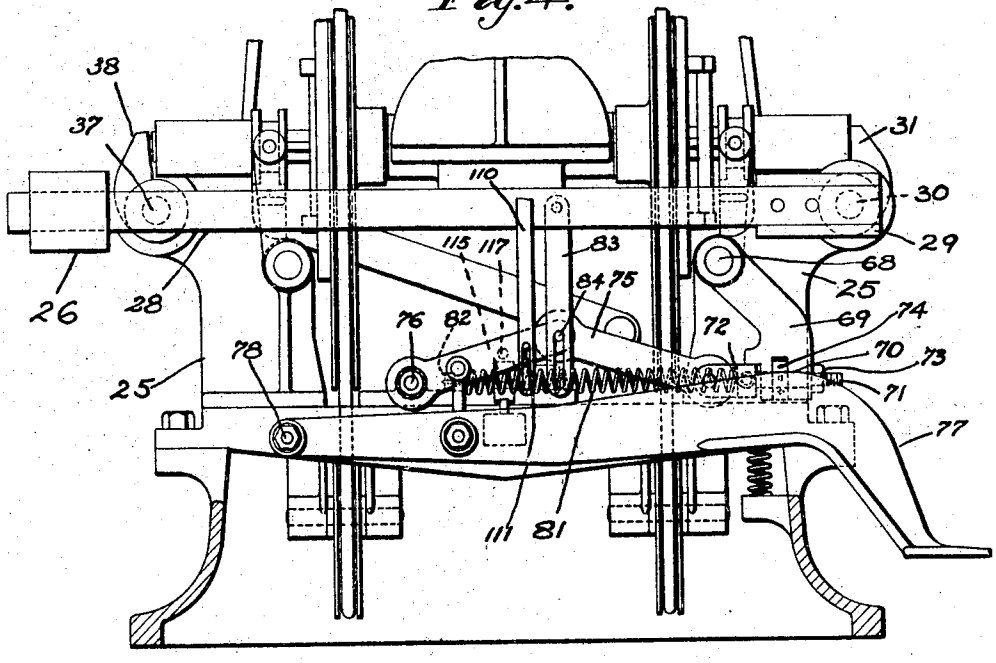


Fig. 5.

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5 SHEETS—SHEET 5.

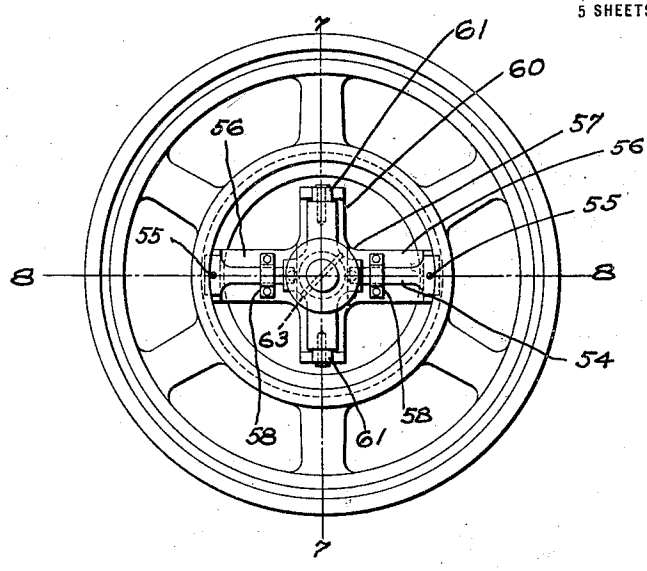


Fig. 6.

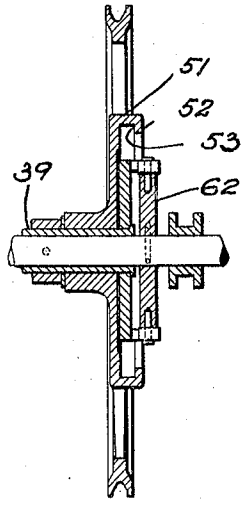


Fig. 7.

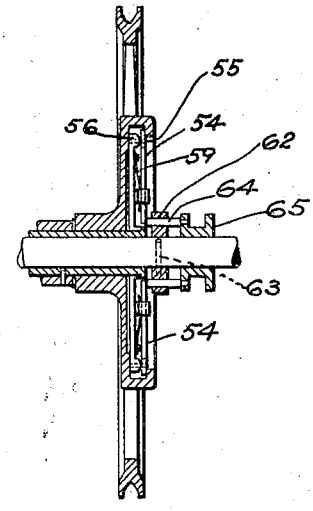


Fig. 8.

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Patented Sept. 5, 1922. 1,427,940

UNITED STATES PATENT OFFICE.

CHARLES C. BLAKE, OF BROOKLINE, MASSACHUSETTS.

SOLE-PRESSING MACHINE.

Application filed August 8, 1916, Serial No. 113,725. Renewed December 15, 1921. Serial No. 522,724.

To all whom it may concern:

Be it known that I, CHARLES C. BLAKE, a citizen of the United States, residing at Brookline, in the county of Norfolk and State of Massachusetts, have invented a new and useful Improvement in Sole-Pressing Machines, of which the following is a specification.

The present invention relates to sole pressing machines different types of which are used in the manufacture of shoes to mold blank soles, to lay outsoles preparatory to the rough rounding operation and to level the shoes after the stitching operation.

The object of the present invention is to produce a sole pressing machine of simplified and improved construction and having an improved mode of operation whereby the sole pressing operation may be performed in a reliable manner without requiring the exercise of skill upon the part of an operative.

To the accomplishment of this object the features of the present invention consist in certain devices, combinations and arrangements of parts fully set forth hereinafter, the advantages of which will be readily understood by those skilled in the art.

The various features of the present invention will be readily understood from an inspection of the accompanying drawings illustrating the best form of the invention at present known to the inventor, in which,

Figure 1 is a front elevation of the machine;

Fig. 2 is a left side elevation;

Fig. 3 is a left side sectional elevation;

Fig. 4 is a detail in right side elevation;

Fig. 5 is a detail in left side elevation;

Fig. 6 is a front elevation of the friction clutch;

Fig. 7 is a sectional elevation on the line 7—7, Fig. 6; and

Fig. 8 is a sectional plan on the line 8—8, Fig. 6.

The machine illustrated in the drawings is a twin machine having two sets of co-operating sole pressing members which are operated alternately in such manner that when one set is in a position of pressure the other set is in a position of clearance convenient for the removal and insertion of the work. The machine is provided with a train of mechanism and a source of power for operating the train of mechanism to elevate the sole into a position of pressure. Upon the attainment of a predetermined pressure a portion of the train of mechanism stops operating and thereafter the source of power is disconnected from the train of mechanism. The train of mechanism includes a worm wheel and a worm forming an irreversible mechanism for holding the sole in a position of pressure.

Each of the sole pressing forms comprises a rectangular box 1 (Fig. 1) containing a mass of shot or steel balls 2 which are supported by a canvas cover 3. The edges of the cover are clamped between a flange 4 on the box and a rectangular frame 5 secured to the flange. In order that the sole pressing forms may tip to adapt themselves to the different slopes on the different shoes operated upon the forms are each provided with a pair of trunnions 6 (Figs. 1 and 2) journaled in plates 7 secured to the upper ends of stationary rods 8. The rods 8, of which there are six, are bolted to a supporting frame 9.

The welted shoe, upon which the outsole is laid by the machine of the drawings, is supported by a jack 10 which is mounted on runners 11. The runners 11 are positioned by the operative upon the upper surface of a table 12 which is provided with guides 13 for guiding the runners into operative position and with a stop for limiting the inward movement of the runners.

The tables 12 are mounted to reciprocate upon the rods 8. To this end the tables are secured, respectively, to the upper ends of rods 14 and 15 which slide vertically in bosses formed in the frame 9 and in an auxiliary frame 16 carried by the rods 8 (Fig. 1). The lower ends of the rods 14 and 15 are arranged upon opposite sides of a horizontal shaft 17 (Fig. 2) journaled in the frame 16. This shaft carries a gear 18 (Fig. 1) which meshes with a rack 19 (Fig. 2) formed on the lower end of the rod 14. The shaft 17 also carries a gear 20 (Fig. 1) which meshes with a rack 21 (Fig. 2) formed on the lower end of the rod 15.

During the operation of the machine the shaft 17 is first rotated in one direction and then in the other direction to bring one of the shoes into a position of pressure and to return the other shoe to a position of clearance. As shown in Fig. 1 the machine is at rest with one shoe in a position of clearance. When the machine is restarted the shoe to be operated upon starts from a position of clearance and moves into a position of pres-

sure while the shoe which has been operated upon returns to a position of clearance. The shoe to be operated upon moves at a constant rate of speed into engagement with the sole pressing form. When the shoe first engages the form the shot or steel balls 2 roll over one another inside the box as they adjust themselves to the size and shape of the shoe. When their limit of adaptability has been reached the balls present substantially a solid metallic surface to the advancing movement of the shoe. As the balls will have more opportunity to lodge around the sides of the box when conforming to the curvature of a small shoe than when conforming to the curvature of a large shoe, it will be apparent that a small shoe will sink a greater distance into the form than a large shoe. Consequently the height at which it will be necessary to elevate the shoe in order to exert the desired pressure thereon will vary with the different sizes of shoes. Notwithstanding this fact it is highly desirable that the same effective sole laying pressure be exerted upon all shoes irrespective of their sizes.

In order to permit the elevation of the shoe through an indeterminate distance and to stop it upon the attainment of a predetermined pressure upon the work the shaft 17 is provided with a worm wheel 22 (Figs. 1 and 3) which meshes with a worm 23 (Figs. 2, 3 and 4) secured to a shaft 24 journaled in bearings formed in brackets 25 supported from the base 9. The shaft 24 is free to move endwise in its bearings. Normally this endwise movement under the thrust of the worm is resisted by weights 26 and 27 (Fig. 2) which are operatively connected to press on the opposite ends of the shaft 24, respectively, and maintain it in a normal central position. To this end the weight 26 is carried upon one end of an arm 28 (Figs. 1, 2 and 5) which is connected at its other end to an arm 29 projecting from a rock shaft 30 (Fig. 3) journaled in the front bracket 25. The rock shaft 30 carries a vertical arm 31 arranged to normally engage one end of the shaft 24. The weight 27 is carried upon one end of an arm 32 (Figs. 3 and 4) which is pivoted at 33 on a bracket supported from the base 9. A short link 34 connects the pivoted arm 32 to an arm 35 connected to a short arm 36 projecting from a rock shaft 37 (Figs. 3 and 4) journaled in the rear bracket 25. The rock shaft 37 carries a vertical arm 38 arranged to engage the end of the shaft 24 opposite the end engaged by the arm 31. The weights 26 and 27 are adjustable on their arms and are arranged side by side at the rear of the machine so that they will be convenient for the operative who may desire to vary the position of the weights on their arms while the machine is in operation.

When the shoe, for instance, the shoe on the rod 14, in its advancing movement engages the form the balls therein quickly adapt themselves to the curvature of the sole and soon present a solid front to the advancement of the shoe. After the form is seated on the shoe the continued advance of the shoe develops pressure which is transmitted back through the worm wheel 22 to the worm 23. When this pressure exceeds the power of the weight 26 the worm wheel stops and the worm 23, instead of driving the worm wheel 22, acts as a rack on the stationary worm wheel and carries the shaft 24 to the right (Fig. 3) into engagement with the arm 31 thus rocking the shaft 30. Advantage of this rocking of the shaft 30 is taken to disconnect the train of mechanism for elevating the shoe from its source of power. It will be apparent that the source of power is disconnected from the train of mechanism subsequently to the stopping of the sole in its position of pressure and that the worm wheel and worm operate as an irreversible mechanism to cause a dwell of the sole in its position of pressure.

The shaft 24 is driven in opposite directions to alternately elevate the rods 14 and 15 and thus bring the work supported thereby into a position of pressure. To this end the shaft 24 carries bearing sleeves 39 and 40 (Fig. 3) upon which belt pulleys 41 and 42 are loosely mounted, respectively. The pulleys 41 and 42 are driven by a belt 43, passing over the pulleys, which is driven by a pulley 44 (Fig. 1) on a driving shaft 45 of an electric motor 46. The belt 43 leaves the pulley 44 in the direction of the arrow (Fig. 1), passes beneath an idler 47, over the pulley 41, (Figs. 1 and 3), around a horizontal idler 48, (Fig. 1) over the pulley 42, beneath an idler 49 (Fig. 3) and then returning to the pulley 44. To vary the tension of the belt 43 the idler 48 (Fig. 1) is adjustably mounted in a bracket 50 on the base 9.

In order to clutch the shaft 24 to the pulley 41 and thus drive the shaft in a direction to elevate the rod 14 the pulley is provided with a circular hub 51 (Figs. 6, 7 and 8) having a peripheral shoulder 52 the internal face 53 of which comprises one member of a friction clutch. The other member of the friction clutch comprises a pair of spring arms 54 adapted to be jammed against the internal face 53 and be rotated thereby during the rotation of the pulley 41. The spring arms 54 are secured by screws 55 to the opposite arms 56 of a spider 57 loosely mounted on the bearing sleeve 39. As shown in Fig. 8 the supporting ends of the arms 56 are rounded so that the spring arms 54 may be slightly rocked thereon to press the ends of the spring arms 54 firmly against the internal face 53. The spring

arms 54 are normally held out of engagement with the internal face 53 and in engagement with a pair of bridges 58, which loosely embrace the spring arms 54, by a pair of leaf springs 59 having their ends secured to the arms 56 and engaged with the spring arms, respectively. The spider 57 is also provided with a pair of arms 60 the free ends of which are slotted to embrace a pair of rolls 61 mounted on a collar 62 secured by a pin 63 to the shaft 24.

In order to rock the spring arms 54 on the rounded ends of the supporting arms 56 of the spider 57 and thus jam the arms against the face 53 the collar 62 loosely receives a pair of pins 64 (Fig. 8) projecting from a collar 65 loosely mounted on the shaft 24. The free ends of the pins 64 engage the ends of the spring arms 54 opposite the ends adjacent the internal face 53. With this construction when the collar 65 is moved towards the collar 62 the pins 64 engage the ends of the spring arms 54 and rock the opposite ends of the spring arms into binding engagement with the internal face 53 thus clutching the shaft 24 to the pulley 41.

In order to shift the collar 65 on the shaft 24 to engage the pins 64 with the spring arms 54 the collar 65 is slotted to receive a pair of rolls 66 (Fig. 3) mounted in the bifurcated end of an arm 67 projecting from a rock shaft 68 journaled in the front bracket 25. A second arm 69, (Fig. 5) depending from the rock shaft 68, has a yoke 70 formed thereon the arms of which loosely receive a threaded rod 71 one end of which is connected to a block 72 and the other end of which is provided with a nut 73 for holding the rod in place. Between the arms of the yoke 70 the rod 71 carries a nut 74 having a series of holes formed therein which may be engaged by a suitable tool for adjusting the rod 71 in the arm 69. The block 72 is pivoted to one link of a toggle 75 the other link of which is pivoted at 76 to the base 9. The links of the toggle are straightened to rock the shaft 68 and thus bring the pins 64 into engagement with the spring arms 54 by a treadle 77 pivoted at 78 on the base 9. The treadle 77 carries a lug 79 (Fig. 1) which loosely receives the shank of a headed bolt 80 pivoted to one of the links of the toggle 75. When the treadle is actuated the lug 79 engages the head on the bolt 80 and thus depresses the toggle links and makes the toggle. The toggle links are held locked in their made position by a spring 81 (Fig. 5) one end of which is connected to a pin 82 on the base 9 and the other end of which is connected to the block 72.

With this construction depression of the treadle 77 throws in the friction clutch to rotate the shaft 24 in a direction to elevate the rod 14 and thus bring the work supported thereby into a position of pressure. When the pressure exceeds the power of the weight 26 the worm wheel 23 stops and the worm 22 moves endwise and carries the shaft 24 into engagement with the arm 31 which rocks the shaft 30 clockwise thus elevating the arm 28 and the weight 26. The arm 28 is connected to one end of a link 83 (Fig. 5) the other end of which is slotted to embrace the floating pin 84 of the toggle 75. When the toggle is made the pin 84 is transferred to the bottom of the slot in the link 83. When the arm 28 is lifted by the rocking of the shaft 30 under the overload the link 83 elevates the pin 84 thus breaking the toggle. Upon the breaking of the toggle the spring 81 rocks the shaft 68 in a direction to withdraw the pins 64 from the spring arms 54. The leaf springs 59 then operate to withdraw the spring arms 54 from clutching engagement with the internal face 53.

It will be apparent to those skilled in the art that while the rod 14 is elevated through the driving of the worm wheel 23 by the worm 22 the rod 14 may not be depressed through the driving of the worm 22 by the worm wheel 23. Consequently the worm wheel and worm constitute an irreversible mechanism for locking the work in its position of pressure. As the centrifugal force of the spring arms 54 is slight no brakes are needed for preventing the over travel of the shaft 24 when the friction clutch is thrown out of operation.

The shaft 24 is rotated in the reverse direction to elevate the rod 15 and depress the rod 14 to bring the shoes into the position of Figure 1 by the pulley 42 which is clutched to the shaft 24 by a friction clutch 85 (Fig. 3) having the same construction and mode of operation as the friction clutch hereinbefore described for clutching the pulley 41 to the shaft 24. The clutch 85 is thrown into operation by a pin collar 86 (Figs. 3 and 4) corresponding to the collar 65, loosely mounted on the shaft 24. The collar 86 is slotted to receive a pair of rolls 87, mounted in the bifurcated end of an arm 88 projecting from a rock shaft 89 journaled in the rear bracket 25. A second arm 90, depending from the rock shaft 89, has a yoke 91 formed thereon the arms of which loosely receive a threaded bolt 92 one end of which is connected to a block 93 and the other end of which is provided with a nut 94 for holding the rod in place. Between the arms of the yoke 91 the rod 92 carries a nut 95 having a series of holes formed therein which may be engaged by a suitable tool for adjusting the rod 92 in the arm 90. The block 93 is pivoted to one link of a toggle 96 the other link 7 of which is pivoted at 97 to the base 9. The links of the toggle 96 are straightened to rock the shaft 89 and thus throw in

the friction clutch 85 by a treadle 98 pivoted at 99 on the base 9. The treadle 98 carries a lug 100 (Fig. 1) which loosely receives the shank of a headed bolt 101 pivoted to one of the links of the toggle 96. When the treadle is depressed the lug 100 engages the head on the bolt 101 and thus depresses the links and makes the toggle 96. The toggle links are held in their made position by a spring 102 (Figs. 3 and 4) one end of which is connected to a pin 103 on the base 9 and the other end of which is connected to the block 93.

The toggle 96 is broken when the pressure developed by the contact of the shoe carried by the rod 15 with the sole pressing form co-operating therewith exceeds the power of the weight 27 at which time the worm 22 travels to the right (Fig. 4). The shaft 24, having moved endwise, rocks the shaft 37 clockwise through the arm 38 thus elevating the arm 35 and the weight 27. When this occurs a link 104, having one end connected to the arm 35 and having its other end slotted to embrace the floating pivot pin 105 of the toggle 96, elevates the toggle links and breaks the toggle 96. The spring 102 thereupon acts to rock the shaft 89 in a direction to disengage the members of the friction clutch 85.

It is desirable that in addition to the automatic mechanism described for stopping the machine a manually operated stopping mechanism be provided. To this end the frame 16 carries a pair of brackets 106 which supports a horizontal rock shaft 107 provided with an operating handle 108. One end of the shaft 107 is provided with an arm 109 (Fig. 2) which is connected to a link 110, the lower end of which is slotted to embrace a pin 111 (Figs. 2 and 5) carried by one of the links of the toggle 75. The other end of the rock shaft 107 is provided with an arm 112 (Fig. 3) which is connected to a link 113 (Figs. 1 and 4) the lower end of which is slotted to embrace a pin 114 carried by one of the links of the toggle 96. With this construction depression of the handle 108 will elevate the links 110 and 113. Whichever toggle is made will consequently be broken by the contact of the slotted end of the links with one of the pins 111 and 114 on the toggle.

In order to prevent the simultaneous making of the toggles 75 and 96 the machine is provided with a floating beam 115 (Fig. 1) centrally pivoted at 116 (Figs. 1 and 4) on the base 9. The ends of the beam 115 are arranged to be engaged by pins 117 (Fig. 5) and 118 (Fig. 4) on the toggles 75 and 96, respectively. When one of the toggles is made, for instance the toggle 75, the left hand end of the beam is depressed through contact with the pin 117. The other end of the beam is elevated so that if the treadle 98 is depressed to make the toggle 96 the right hand end of the beam 115 will be depressed thus elevating the other end of the beam 115 and breaking the toggle 75 through contact of the beam 115 with the pin 117.

In order to prevent the racks 19 and 21 from running out of mesh with the gears 18 and 20 in the event that the machine is thrown into operation with no work on the tables 12 the lower ends of the rods 14 and 15 are provided with collars 119 and 120, respectively, (Fig. 1). One of these collars engages the frame 16, when the machine is thrown into operation without work on the tables 12, and develops the overload for moving the shaft 24 endwise. This endwise movement of the shaft 24 stops the machine in the manner hereinbefore described.

While the invention has been illustrated and described in connection with a machine for laying the outsole upon a welted shoe it will be apparent to those skilled in the art that certain features of the invention are applicable to machines for molding blank soles and for levelling shoes after the stitching operation.

It will be apparent to those skilled in this class of machines that changes may be made in the details of structure the described and illustrated embodiment thereof being intended as an exploitation of its underlying essentials the features whereof will be definitely stated in their true scope in the claims hereto appended.

What is claimed as new, is:—

1. A sole pressing machine, having, in combination, co-operating sole pressing members; a source of power, and a train of mechanism connecting one of said pressing members and said source of power, having a definite limit of extent of movement, for moving one of said members toward the other including a worm wheel operating to stop upon the attainment of a predetermined pressure upon the work and devices operated by the endwise movement of the worm under an overload for disconnecting the train of mechanism from its source of power.

2. A sole pressing machine, having, in combination, co-operating sole pressing members; mechanism, including a worm wheel, for moving one of said members toward the other; a longitudinally movable shaft; a worm carried thereby and engaged with the worm wheel; a source of power for the shaft; and devices operated by the endwise movement of the shaft under an overload for disconnecting the shaft from its source of power.

3. A sole pressing machine, having, in combination, co-operating sole pressing members; a source of power; a train of mechanism connecting one of said pressing members and said source of power for mov-

ing one of said members toward the other; manually operated means for connecting the train of mechanism and its source of power, and independent devices operated automatically and manually, respectively, for disconnecting the train of mechanism from its source of power.

4. A sole pressing machine, having, in combination, co-operating sole pressing members; a source of power; a train of mechanism connecting one of said pressing members and said source of power for moving one of said members toward the other; manually operated means for connecting the train of mechanism comprising a toggle and a treadle for making the toggle, and independent devices operated automatically and manually, respectively, for breaking the toggle to disconnect the train of mechanism from its source of power.

5. A sole pressing machine, having, in combination, co-operating sole pressing forms, means having a definite limit of extent of movement for moving one of said forms towards the other, actuating mechanism therefor, devices for throwing out the actuating mechanism when said means reaches its limit of extent of movement, and devices for throwing out the actuating mechanism short of its limit of extent of movement after a predetermined amount of pressure has been placed upon the work, substantially as described.

6. A sole pressing machine, having, in combination, a sole pressing form, a support for the sole of a shoe, mechanism including a worm wheel for relatively actuating the support and form to exert pressure upon the sole, a shaft, a worm carried thereby and engaged with the worm wheel, mechanism for actuating the shaft, a device adjustable during the operation of the machine for resisting the end thrust of the worm, and devices operated by the endwise movement of the worm under an overload for throwing out the shaft actuating mechanism, substantially as described.

7. A sole pressing machine, having, in combination, a driving shaft, a driven shaft, means for driving the driven shaft first in one direction and then in the other direction, a worm carried by the driven shaft, a third shaft, a worm wheel carried thereby and engaged with the worm, a pair of gears on the third shaft, a rack engaged with each of the gears so that they move in opposite directions upon the rotation of the third shaft, a sole pressing member carried by each of the racks, a co-operating sole pressing member therefor, and devices operated by the endwise movement of the worm under an overload for stopping the driven shaft, substantially as described.

8. A sole pressing machine, having, in combination, a sole pressing form, a support for the sole of a shoe, mechanism including a worm wheel for relatively actuating the support and form to exert pressure upon the sole, a longitudinally movable shaft, a worm carried thereby and engaged with the worm wheel, a source of power for actuating the shaft, a clutch for clutching the source of power to the shaft, and devices operated by the endwise movement of the shaft under an overload for throwing out the clutch, substantially as described.

9. A sole pressing machine, having, in combination, a sole pressing form, a support for the sole of a shoe, mechanism including a worm wheel for relatively actuating the support and form to exert pressure upon the sole, a longitudinally movable shaft, a worm carried thereby and engaged with the worm wheel, a source of power for actuating the shaft, a clutch for clutching the source of power to the shaft, means for throwing in the clutch comprising a toggle and a treadle for making the toggle, and devices operated by the endwise movement of the shaft under an overload for breaking the toggle to throw out the clutch, substantially as described.

10. A sole pressing machine, having, in combination, a sole pressing form, a support for the sole of a shoe, means having a definite limit of extent of movement for moving one of said members towards the other, and devices for interrupting the advance of the moving member short of its limit of extent of movement after a predetermined amount of pressure has been placed upon the work, including an irreversible mechanism for preventing retrograde movement of the moving member when the advance of the moving member is interrupted with the sole under pressure, substantially as described.

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