No. 859,887. PATENTED JULY 9, 1907.

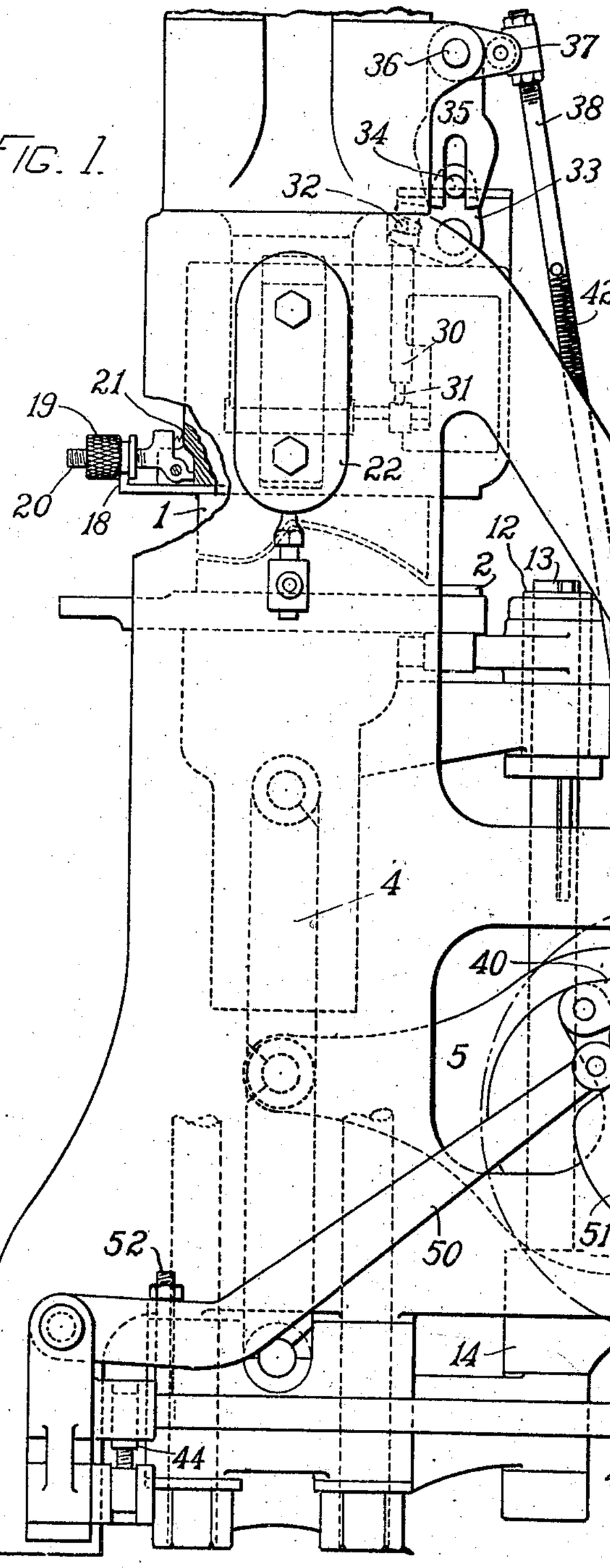
B. F. MAYO.

SOLE PRESSING MACHINE.

APPLICATION FILED MAY 31, 1906.

3 SHEETS—SHEET 1.

FIG. 1.



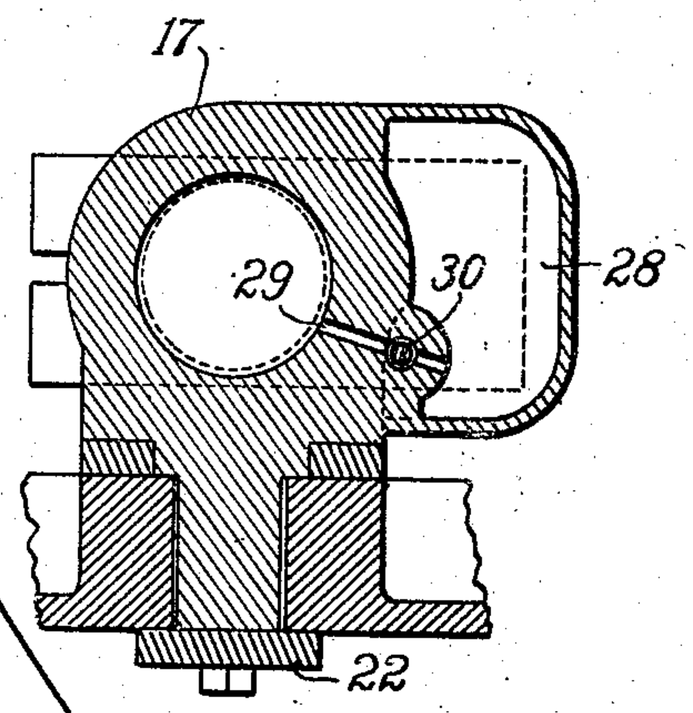


FIG. 2.

WITNESSES

Alfred N. Hildreth

Norman F. Dorsey

INVENTOR

Benjamin F. Mayo.

by his Attorneys

Phillips Van Eeuwen & Fish

No. 859,887. PATENTED JULY 9, 1907.

B. F. MAYO.

SOLE PRESSING MACHINE.

APPLICATION FILED MAY 31, 1906.

3 SHEETS—SHEET 2.

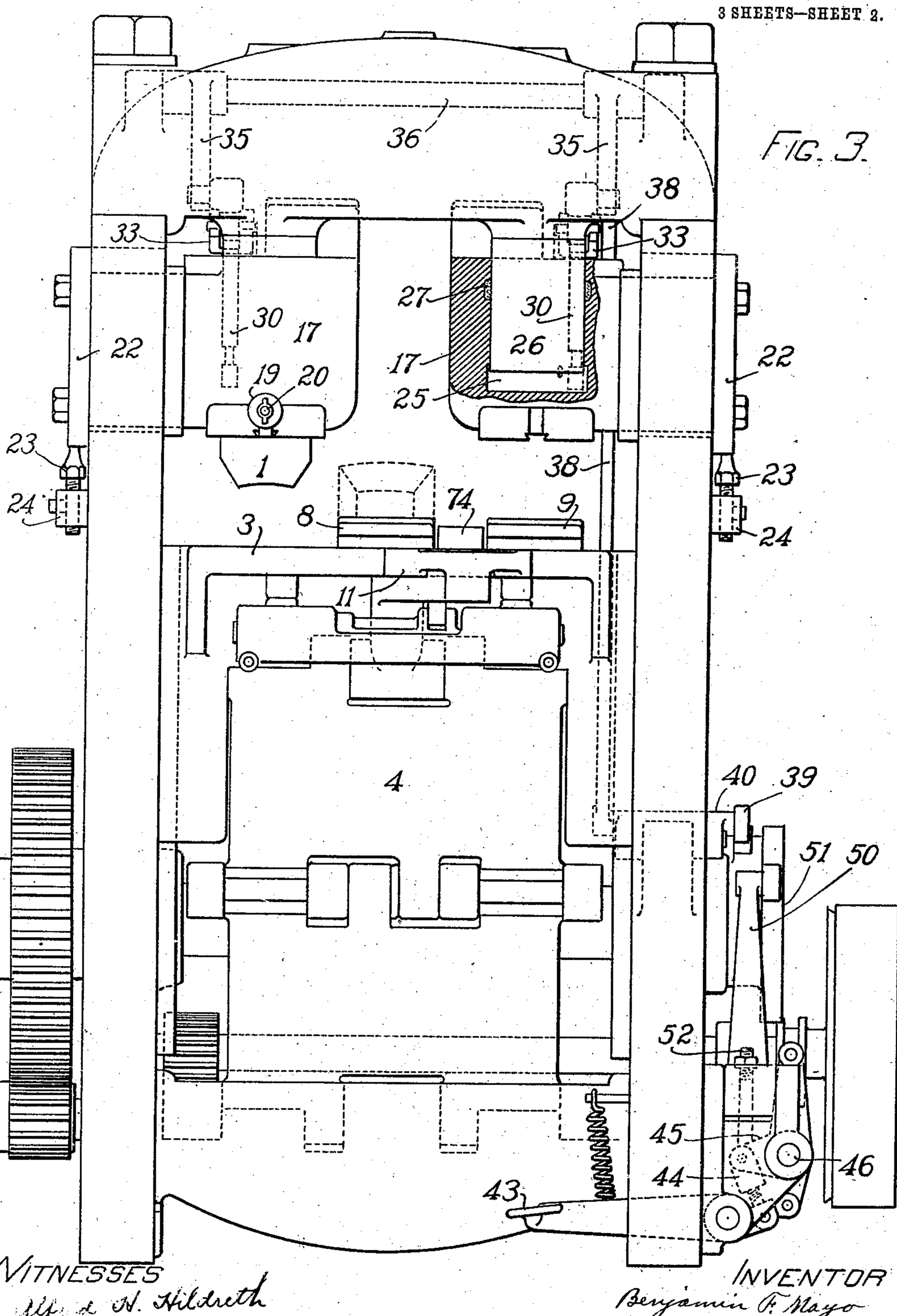


FIG. 3.

WITNESSES

W. E. N. Hildreth

Parmum F. Dorsey

INVENTOR

Benjamin F. Mayo

by his Attorneys

Phillips Van Emeren & Fish

No. 859,887. PATENTED JULY 9, 1907.

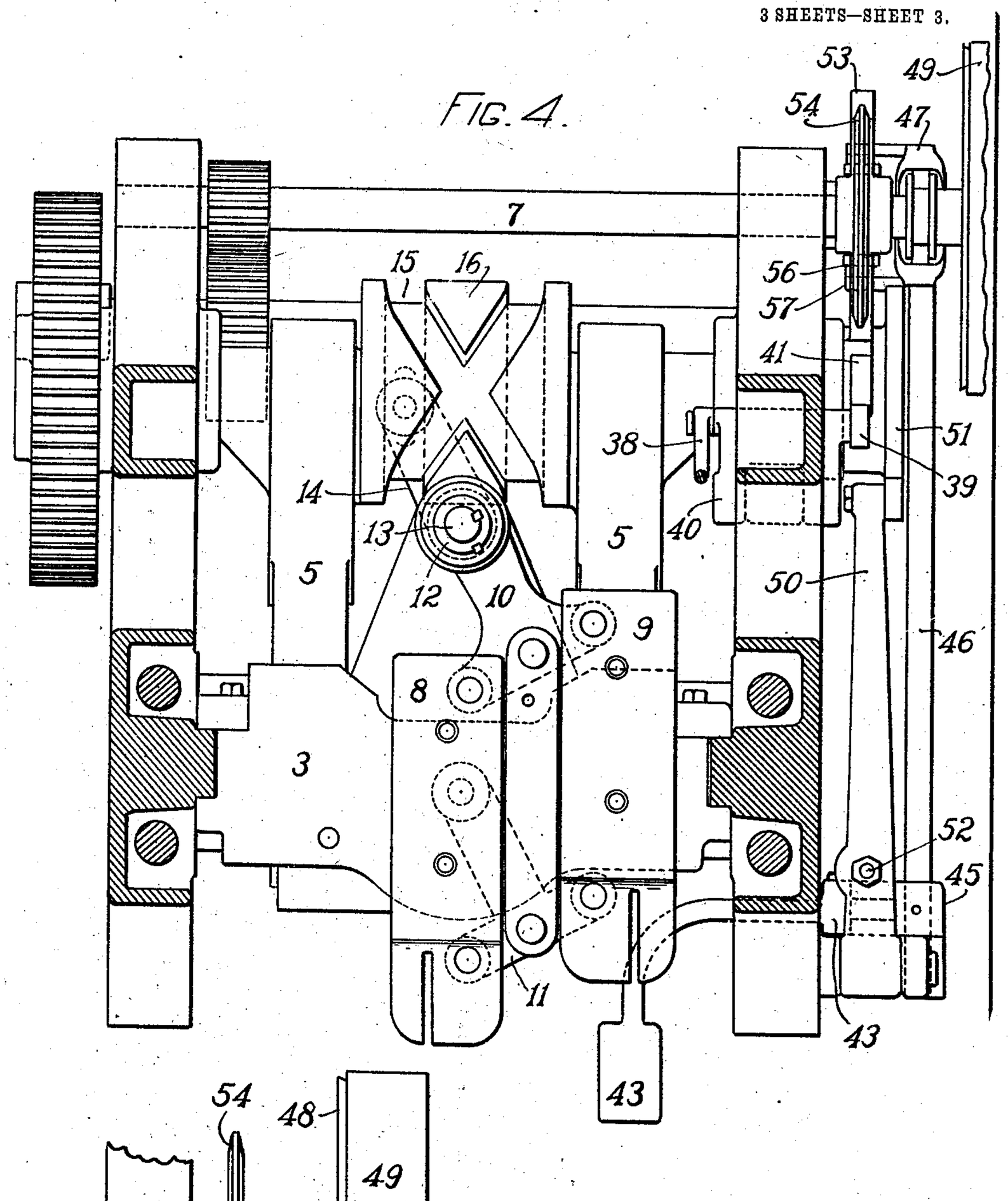
B. F. MAYO.

SOLE PRESSING MACHINE.

APPLICATION FILED MAY 31, 1906.

3 SHEETS—SHEET 3.

FIG. 4.



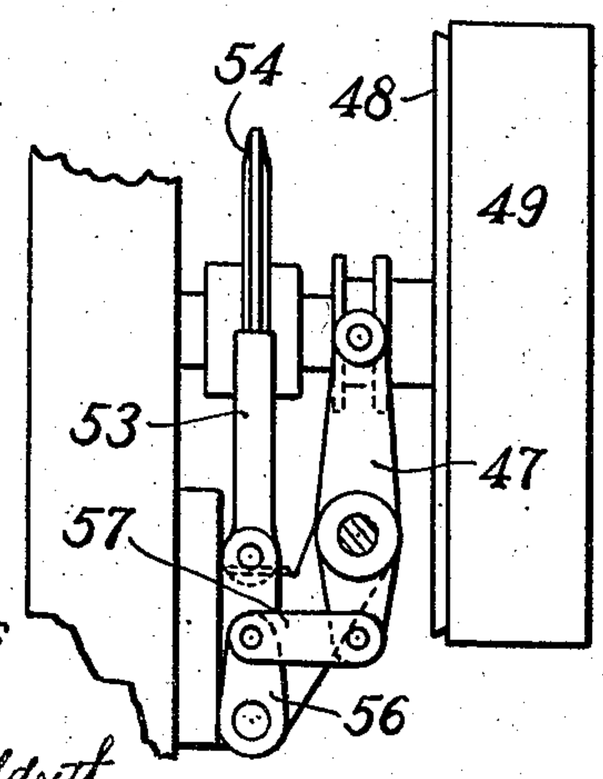


FIG. 5.

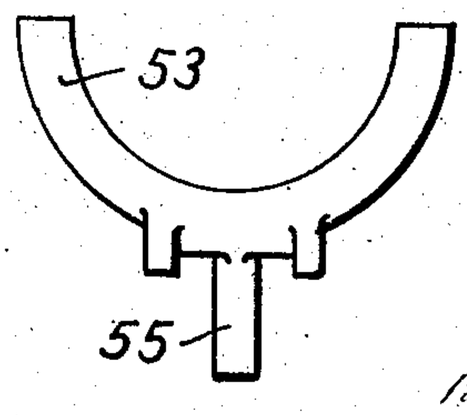


FIG. 6.

WITNESSES

Alfred W. Hildreth

Sherman F. Dorsey

INVENTOR

Benjamin F. Mayo

by his Attorneys

Phillips Van Everen & Fish

UNITED STATES PATENT OFFICE.

BENJAMIN F. MAYO, OF SALEM, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SOLE-PRESSING MACHINE.

No. 859,887. Specification of Letters Patent. Patented July 9, 1907.

Application filed May 31, 1906. Serial No. 319,439.

To all whom it may concern:

Be it known that I, BENJAMIN F. MAYO, a citizen of the United States, residing at Salem, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Sole-Pressing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to sole pressing machines, and is intended primarily for use in sole pressing machines which are adapted to mold flat soles before they are incorporated in a shoe. Certain features of the invention, however, are not limited to use in machines for molding flat soles, but may also be used to advantage in sole laying and sole leveling machines, and also in other machines adapted to exert pressure upon the sole or heel of a shoe.

Machines for molding flat soles as heretofore constructed have been provided with hand-operated means for relatively adjusting the molds towards and from each other to regulate the amount of pressure applied to the sole, such adjustment being necessary to adapt the machines for operation upon soles of different thickness.

The principal object of the present invention is to provide a sole molding machine in which the amount of pressure applied to the sole during the molding operation is automatically regulated, whereby the machine is adapted for operation upon soles of different thickness without intervention on the part of the operator.

Another object of the present invention is to provide an improved and simplified pressure regulating mechanism adapted for use in machines for pressing the soles or heels of boots and shoes to regulate the amount of final pressure exerted by the molds, forms, or dies of the machines.

With these objects in view a feature of the present invention contemplates the provision in a sole molding machine provided with rigid male and female molds adapted to mold a flat sole, of means for actuating the molds to exert a sufficient preliminary pressure upon a sole to cause the sole to conform to the shape of the molds, and thereafter a sufficient final pressure to mold the sole, and means acting automatically to regulate the amount of such final pressure for soles of different thickness.

The applicant is aware that sole leveling and sole laying machines have heretofore been devised in which means are provided for regulating the amount of the final pressure exerted upon the sole in accordance with the thickness of the sole. He is also aware that heel nailing machines have heretofore been devised in which means are provided for regulating the pressure applied to the heel. In these machines, however, the pressing forms, or dies, act upon the sole or heel after it has been incorporated in the shoe, and the pressure exerted by the forms or dies is insignificant as compared with the pressure required to mold a flat sole, the construction and arrangement of the mechanism for actuating the forms or dies being such as to be incapable of producing the amount of pressure necessary to properly mold a flat sole. The applicant believes himself to be the first in the art to provide means whereby the final pressure exerted upon a flat sole in a sole molding machine can be automatically regulated so that the required amount of pressure can be applied to either a thick or a thin sole without intervention on the part of the operator, and therefore considers this feature of the invention to be broad and generic in character and to contemplate the provision of any suitable means for actuating the rigid molds of a sole molding machine to exert a preliminary and a final pressure, and any means for regulating the amount of the final pressure in accordance with the thickness of the sole being operated upon. It is desirable, however, if not absolutely essential, in machines adapted to mold flat soles, that the final pressure be positive, and in the preferred form of the invention means for actuating the molds is provided which is constructed and arranged to exert a preliminary yielding pressure upon the sole until the sole conforms to the shape of the molds, and thereafter a final positive pressure to mold the sole. In the specific embodiment of the invention hereinafter described, the preliminary yielding and the final positive pressures are secured by permitting one of the molds to yield while the preliminary pressure is being applied and by locking the yielding mold against movement while the final pressure is being applied.

Those features of the present invention which relate to an improved pressure regulating mechanism adapted for use in sole or heel pressing machines contemplate the provision in a machine provided with pressing forms which are actuated to exert first a preliminary and then a final pressure, of a fluid pressure mechanism which acts automatically to vary the movement permitted to one of the forms and thereby regulate the amount of the final pressure. These feature of the invention, broadly considered, contemplates any suitable means for actuating the forms and any suitable construction and arrangement of fluid pressure mechanism which will act to stop one of the forms in different positions, or lock the form against movement in different positions, depending on the thickness of the sole being operated upon. Preferably, however, one of the forms is yieldingly mounted and the form which coöperates therewith is moved toward the yieldingly mounted form to produce both the preliminary and

final pressure, the fluid pressure mechanism being arranged to stop the movement of the yieldingly mounted form in different positions depending upon the thickness of the sole being operated upon so as to regulate the amount of the final pressure. In the preferred form of the invention hereinafter described the fluid pressure mechanism comprises a pressure chamber or cylinder and a piston associated with one of the forms and arranged to control the movement of the form, a passage way leading from the pressure chamber, a valve for opening and closing the passage way and means for actuating the valve to close the passage way after the preliminary pressure has been exerted on the sole. This construction of fluid pressure mechanism is extremely simple and has given perfectly satisfactory results in actual practice. The passage way leading from the pressure chamber allows the fluid in the pressure chamber to escape while the preliminary pressure is being applied and the piston and pressure chamber to move relatively to each other varying distances according to the thickness of the sole, and the relative movement of the pressure chamber and piston is stopped as soon as the passage way is closed so that the required final pressure is exerted upon the sole.

The several features of the present invention will be clearly understood from an inspection of the accompanying drawings in which—

Figure 1 is a view in side elevation of a sole molding machine embodying the same in their preferred form. Fig. 2 is a detail sectional plan view taken on the line 2—2 of Fig. 1. Fig. 3 is a view in front elevation, partly in section, of the machine with one of the upper forms and both of the lower forms removed from the machine, and the position of one of the lower forms indicated in dotted lines. Fig. 4 is a sectional plan view of the machine taken on a line passing between the upper and lower forms with the lower forms removed from their carriers. Fig. 5 is a detail view illustrating the construction of a brake mechanism, and Fig. 6 is a detail view of a brake shoe forming a part of the brake mechanism illustrated in Fig. 5.

Except for the pressure regulating mechanism which constitutes the illustrated embodiment of the essential feature of the present invention, the machine illustrated in the drawings is quite similar in construction and mode of operation to the machine disclosed in applicant's prior application, Serial No. 197,752, filed March 12, 1904, being provided with two upper sole pressing forms, two lower coöperating sole pressing forms, means for moving the lower forms simultaneously toward and from the upper forms, and means for moving the lower forms alternately to a position of presentation in front of and between the upper forms.

In Fig. 1 an upper form is indicated at 1 and a lower form at 2, the forms being adapted to receive a flat sole between them and to mold the sole into the desired shape, and the male form being below and the female form above. The lower forms are supported upon a vertically reciprocating cross-head 3 which is reciprocated in guideways in the frame of the machine by means of a toggle lever 4, eccentric straps and links 5, an eccentric on a shaft 6 journaled in the rear portion of the machine frame and driven through a series of gears from the power shaft 7. The lower forms are supported on the cross-head 3 by means of form carriers 8 and 9 which rest upon the flat upper surface of the cross-head. The rear ends of the form carriers are pivotally connected to a T-shaped arm 10 pivotally mounted in a rearward extension of the cross-head 3 and the forward ends of the form carriers are pivotally connected to a T-shaped arm 11 pivoted to the cross-head, the arm 10 being located at the rear end of the table forming the upper portion of the cross-head and the arm 11 extending beneath the table. To swing the arms 10 and 11 a swinging movement is imparted to the arm 10, and to this end the arm is keyed to a sleeve 12 mounted to turn in the rearward extension from the cross-head 3 and the sleeve 12 is provided with a slot engaged by a spline on a vertical shaft 13 which passes through the sleeve and upon which the sleeve is adapted to slide vertically. Near its lower end the shaft 13 is provided with a rearwardly extending arm 14, on which is pivotally mounted a block which engages a cam groove 15 in a cam 16 secured to the shaft 6. This cam groove is shaped as indicated in Fig. 4, and during one rotation of the shaft 6 acts to swing the arm 10 in one direction, and during the next rotation of the shaft to swing the arm in the opposite direction. The lower forms are thus brought alternately into alinement with their coöperating forms and during each reciprocation of the cross-head one of the lower forms is in alinement with its coöperating form while the other lower form is in a position of presentation in front of and between the two upper forms.

Each upper form is mounted in carrier 17 and is removably secured thereto by means of a dove-tail strap 18 secured to the form and received in a slot in the lower surface of the carrier. The form is held in position after being placed on the carrier by means of a nut 19 provided with a groove which engages an upturned flange at the front end of the strap 18 and having a screw-threaded engagement with a rod 20 projecting from an arm pivotally mounted upon the carrier 17 and acted upon by a coil spring 21, the screw-threaded engagement of the nut 19 with the rod 20 permitting a longitudinal adjustment of the upper form to bring it into the proper position with relation to its coöperating lower form. The carriers 17 for the two upper forms are mounted independently of each other in vertical guideways in the sides of the machine frame and are held in said guides by means of plates 22 secured to the carriers and engaging the outer surfaces of the sides of the machine frame. Beneath the plates 22 adjustable stop bolts 23 are provided, mounted in projections 24 from the machine frame, and adapetd to limit the downward movement of the form carriers. By adjusting these stop bolts the form carriers can be raised so that the lower forms do not come in contact with the upper forms when the cross-head carrying the lower forms is at the limit of its upward movement. The upper and lower forms can thus be kept out of engagement with each other while the machine is idle and injury to the forms or to the other parts of the machine avoided.

In molding a sole, one of the lower forms is moved toward its coöperating upper form to exert first a preliminary pressure upon the sole sufficient in amount to cause the sole to conform to the shape of the forms and thereafter a final pressure sufficient in amount to mold the sole. While the preliminary pressure is be-

ing applied, the form carrier 17 moves upwardly and while the final pressure is being applied the form carrier 17 is locked against movement. To enable the proper amount of pressure to be exerted upon the sole regardless of its thickness, a fluid pressure mechanism is provided which acts to permit the form carrier 17 to move upwardly varying the distances depending upon the thickness of the sole and which then locks the form carrier against movement. This fluid pressure mechanism as illustrated in the drawings comprises a pressure chamber or cylinder 25 formed in the form carrier, a piston 26 secured to the stationary cross-head forming the upper portion of the machine frame and extending into the cylinder, a packing 27 between the wall of the pressure chamber and the piston, an overflow chamber or reservoir 28 formed in the form carrier, a passage way 29 connecting the pressure chamber and the reservoir, and a valve rod 30 provided with a reduced portion 31, adapted to open and close the passage way. The pressure chamber 25 and reservoir 28 are provided with oil or other suitable fluid which flows through the passage way 29 while the passage way remains open and permits the form carrier 17 to be raised and lowered. During the greater portion of the upward movement of the lower form the passage way 29 remains open and thus the upper form is allowed to yield when the sole on the lower form is brought into contact therewith, a sufficient pressure, however, being exerted upon the sole, before the form carrier 17 begins to move upwardly, to cause the sole to conform to the shape of the forms. At a predetermined point in the upward movement of the lower form the valve rod 30 is actuated to close the passage way 29 and thus the fluid which remains in the pressure chamber 25 is prevented from escaping and the upward movement of the form carrier 17 is stopped. It will be evident that the extent of the upward movement of the upper form will vary with the thickness of the sole and that the upward movement of the lower form after the upper form is locked in position will remain constant so that the same amount of pressure will be exerted upon soles of different thickness. The preliminary pressure exerted upon the sole before the passage way 29 is closed, remains substantially uniform throughout the upward movement of the form carrier 17 and the various parts of the fluid pressure mechanism are so proportioned that a sufficient preliminary pressure is secured to insure the seating of the sole against the surfaces of the forms. Since the preliminary pressure is sufficient to seat the sole against the surfaces of the forms and the upward movement of the lower form after the upper form is locked in position is constant, the sole can be molded without any liability of an insufficient pressure being exerted upon a thin sole or an excessive pressure being exerted upon a thick sole.

Each valve rod 30 is actuated from the cam shaft 6 at the proper time during the operation of the machine, as follows:—At its upper end, each valve rod is provided with a laterally projecting pin 32 which engages a slot in the horizontal arm of a bell crank 33. The vertical arms of the bell cranks 33 are provided with laterally extending pins 34 which engage slots in arms 35 secured to a shaft 36 journaled in the upper rear portion of the machine frame. From the shaft 36 an arm 37 extends rearwardly and is pivotally connected to the upper end of a rod 38. The lower end of the rod 38 is pivotally connected to an arm 40, pivoted in the frame of the machine, and at the pivotal connection of the rod 38 and arm 40 a roll 39 is provided which is arranged in the path of movement of a cam projection secured to a cam disk 41 upon the shaft 6. The projection of the cam 41 acts to raise the rod 38 and through the connections above described raises both valve rods 30 to close the passage ways 29. The bell crank levers 33 are mounted upon the form carriers 17 and as the form carriers are raised and lowered the pins 34 on the bell cranks traverse the slots in the arms 35. When the valve rods are in their raised positions the pins 34 and the slots in the arms 35 are in line with the axis of the shaft 36 and the pivots of the bell cranks 33 as is clearly shown in Fig. 1 and thus the valve rods are actuated at a predetermined time in the operation of the machine irrespective of the positions of the form carriers. A spring 42 connected to the rod 38 acts to hold the roll 39 in contact with the cam disk 41.

Sole pressing machines which comprise two sets of sole pressing forms which are actuated alternately to press the soles of shoes are usually provided with means under the control of the operator for throwing the machine into operation and with an automatic stop mechanism which acts to throw the machine out of operation as each set of forms is brought into a position of pressure. The machine illustrated in the drawings is provided with a simple mechanism for accomplishing these results which is constructed and arranged as follows:—A foot treadle 43 is connected by a link 44 to an arm 45 projecting from a shaft 46 to which is secured an arm 47. The arm 47 extends upwardly and at its upper end engages the grooved collar of a friction clutch 48 by which the power shaft 7 can be clutched to the driving pulley 49, the pulley 49 being mounted to rotate loosely on the shaft 7 and the clutch 48 being mounted to rotate with the shaft but being capable of moving longitudinally thereon. The connections above described between the treadle 43 and the clutch 48 are such that when the treadle is depressed the clutch throws the machine into operation. To hold the clutch 48 in engagement with the pulley 49 after the treadle 43 is released a lever 50 is pivoted to the frame of the machine and is provided at its free end with a roll which engages a cam disk 51 on the shaft 6. A rod 52 extends from the arm 45 on the shaft 46 through the lever 50 and is provided above the lever with a nut with which the lever contacts when raised by the cam disk 51. The cam disk 51 is provided with a notch in its periphery in which the roll on the free end of the lever 50 rests when the machine is out of operation. When the machine is thrown into operation by the depression of the foot treadle 43 the rod 52 is raised and as the shaft 6 revolves the lever 50 is raised by the cam disk 51 and by engaging nut on the rod 52 holds the clutch 48 in engagement with the pulley 49 until the shaft 6 has made one complete revolution, when the roll on the free end of the lever 50 drops into the notch on the disk 51 and the clutch 48 is allowed to move out of engagement with the pulley 49, thus throwing the machine out of operation. The notch on the disk 51 is so located that the machine is thrown out of operation when one of the lower forms is in aline-

ment with its coöperating upper form and at the limit of its upward movement and the other form is in its position of presentation.

The machine illustrated in the drawings is also provided with a brake mechanism for stopping the movement of the various parts as soon as the clutch 48 is moved out of engagement with the pulley 49. This brake mechanism is best illustrated in Figs. 5 and 6, and comprises a brake shoe 53 mounted to move toward and from a friction disk 54 secured to the shaft 7. The brake shoe is mounted to move vertically and is guided in its movement by means of a projection 55 which is received in a guideway in the frame of the machine. The brake shoe is actuated from the arm 47 of the clutch actuating mechanism by means of toggle levers 56 and links 57 connecting downwardly extending portions of the arm 47 to the toggle levers.

The operation of the machine above described has been indicated in connection with the description of the construction and arrangement of its various parts and will be readily understood by those skilled in the art.

The nature and scope of the present invention having been indicated and a machine embodying the various features thereof in their preferred form having been specifically described, what is claimed is:—

1. A sole molding machine, having, in combination, rigid male and female molds adapted to mold a flat sole placed between them, means for actuating said molds to exert a preliminary pressure upon a sole to cause the sole to conform to the shape of the molds and thereafter a final pressure to mold the sole, and means acting automatically to regulate the amount of such final pressure for soles of different thickness.

2. A sole molding machine, having, in combination, rigid male and female molds adapted to mold a flat sole placed between them, means for actuating said molds to exert a yielding preliminary pressure upon a sole to cause the sole to conform to the shape of the molds and thereafter a final positive pressure to mold the sole, and means acting automatically to regulate the amount of such final pressure for soles of different thickness.

3. A sole molding machine, having, in combination, a yieldingly mounted rigid mold, a rigid mold coöperating therewith to mold a flat sole, means for moving said coöperating mold towards the yieldingly mounted mold to exert a preliminary pressure upon a sole until the sole conforms to the shape of the mold and thereafter a final pressure to mold the sole, and means acting automatically to vary the movement permitted to the yieldingly mounted mold when the sole is conformed to the shape of the molds to regulate the amount of such final pressure for soles of different thickness.

4. A sole molding machine, having in combination, rigid male and female molds adapted to mold a flat sole placed between them, means for actuating said molds to exert a preliminary pressure upon the sole until the sole conforms to the shape of the molds, and thereafter a final pressure to mold the sole, and means acting automatically to vary the movement permitted to one of the molds when the sole is conformed to the shape of the molds to regulate the amount of pressure for soles of different thickness.

5. A sole pressing machine, having, in combination, coöperating sole pressing forms, means for actuating said forms to exert a preliminary pressure upon a sole and thereafter a final pressure, and fluid pressure mechanism acting automatically to vary the movement permitted to one of said forms to regulate the amount of such final pressure for soles of different thickness.

6. A sole pressing machine, having, in combination, coöperating sole pressing forms, means for actuating said forms to exert a preliminary pressure upon a sole, and thereafter a final pressure, and fluid pressure mechanism acting to lock one of said forms against movement while the final pressure is being exerted upon the sole.

7. A sole pressing machine, having, in combination, a yieldingly mounted form, a coöperating form, means for moving the coöperating form towards the yieldingly mounted form to exert a preliminary pressure upon a sole and thereafter a final pressure, and fluid pressure mechanism for controlling the movement of the yieldingly mounted form acting to stop the movement of said form at a predetermined point in the movement of the coöperating form after a preliminary pressure has been exerted on the sole.

8. A sole pressing machine, having, in combination, coöperating sole pressing forms, means for actuating said forms to exert a preliminary pressure upon a sole and thereafter a final pressure, a pressure chamber and piston associated with one of said forms arranged to control the movement of said form, a passage way leading from the pressure chamber, a valve for opening and closing said passage way, and means for actuating the valve to close the passage way, after a preliminary pressure has been exerted on the sole.

9. A sole pressing machine, having, in combination, a yieldingly mounted form, a coöperating form, means for mounted form to exert a preliminary pressure upon a sole moving the coöperating form toward the yieldingly and thereafter a final pressure, a pressure chamber and piston associated with the yieldingly mounted form arranged to control the movement of said form, a passage way leading from the pressure chamber, a valve for opening and closing said passage way, and means for actuating the valve to close the passage way at a predetermined point in the movement of the coöperating form after a preliminary pressure has been exerted on the sole.

In testimony whereof I affix my signature, in presence of two witnesses.

BENJAMIN F. MAYO.

Witnesses:
FRED O. FISH,
FARNUM F. DORSEY.