No. 859,862. PATENTED JULY 9, 1907.

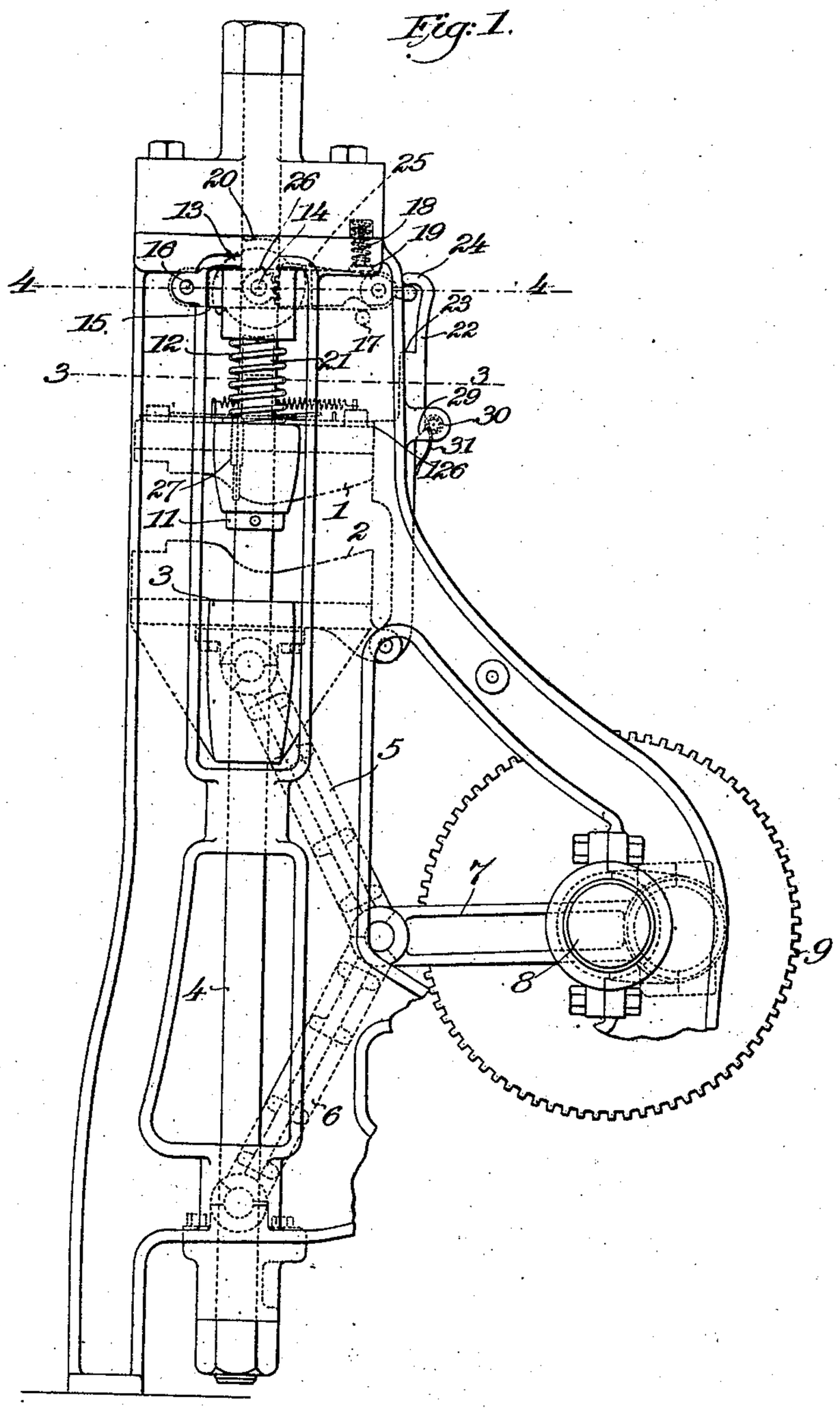
E. E. WINKLEY.

SOLE MOLDING MACHINE.

APPLICATION FILED JUNE 6, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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Inventor:
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by his Attorneys
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3 SHEETS—SHEET 2.

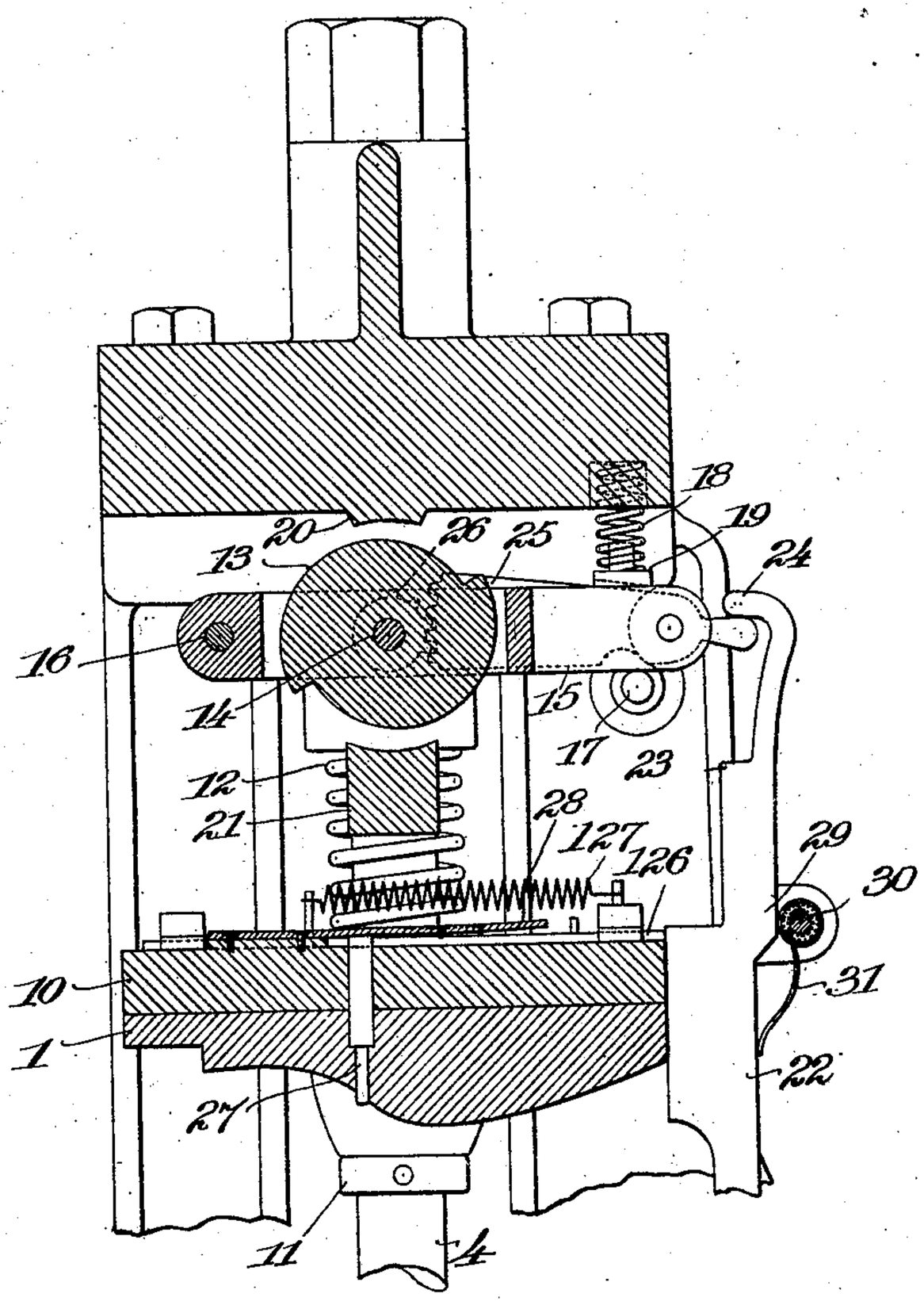

Fig: 2.

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3 SHEETS—SHEET 3.

Fig. 3.

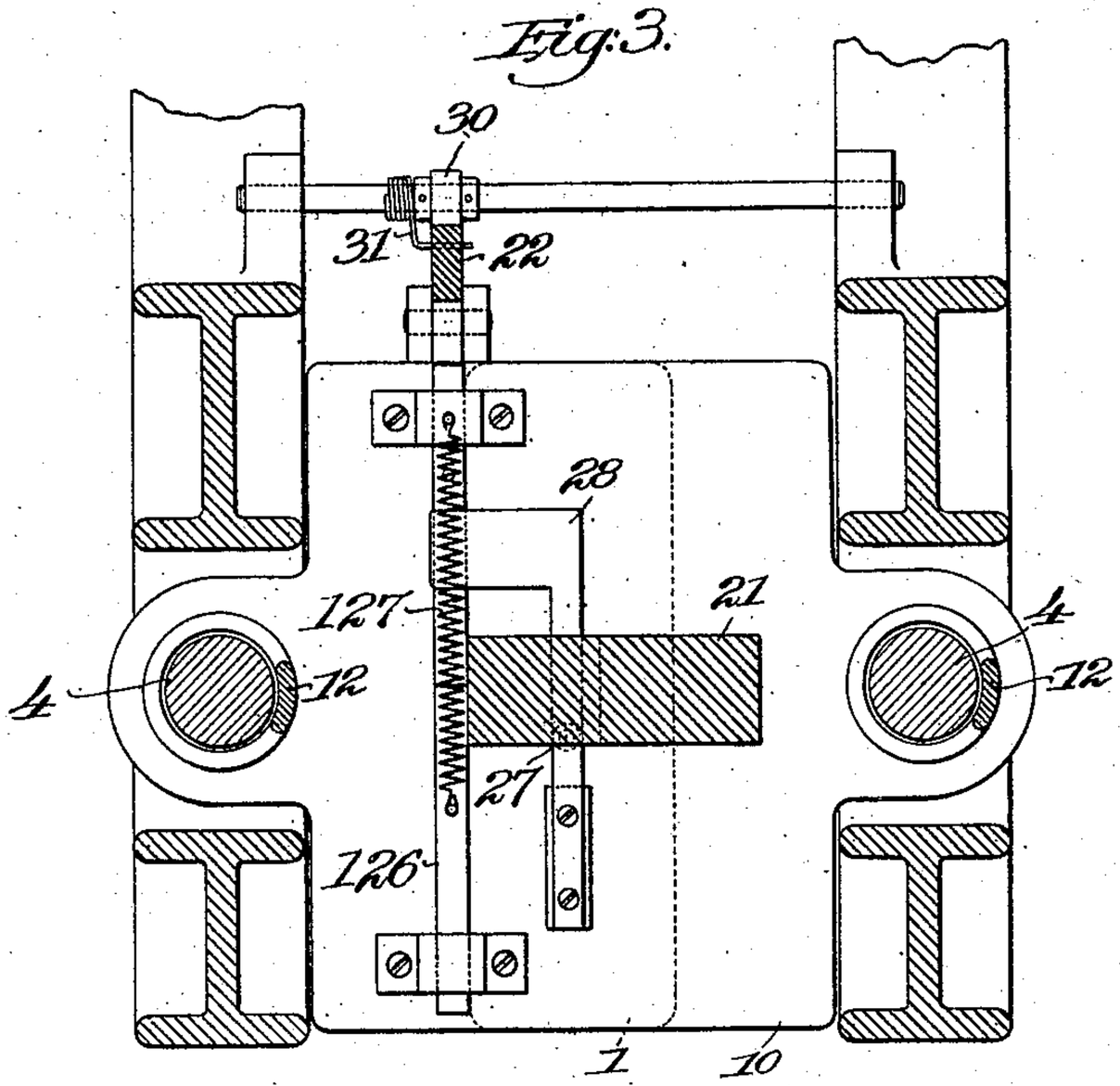
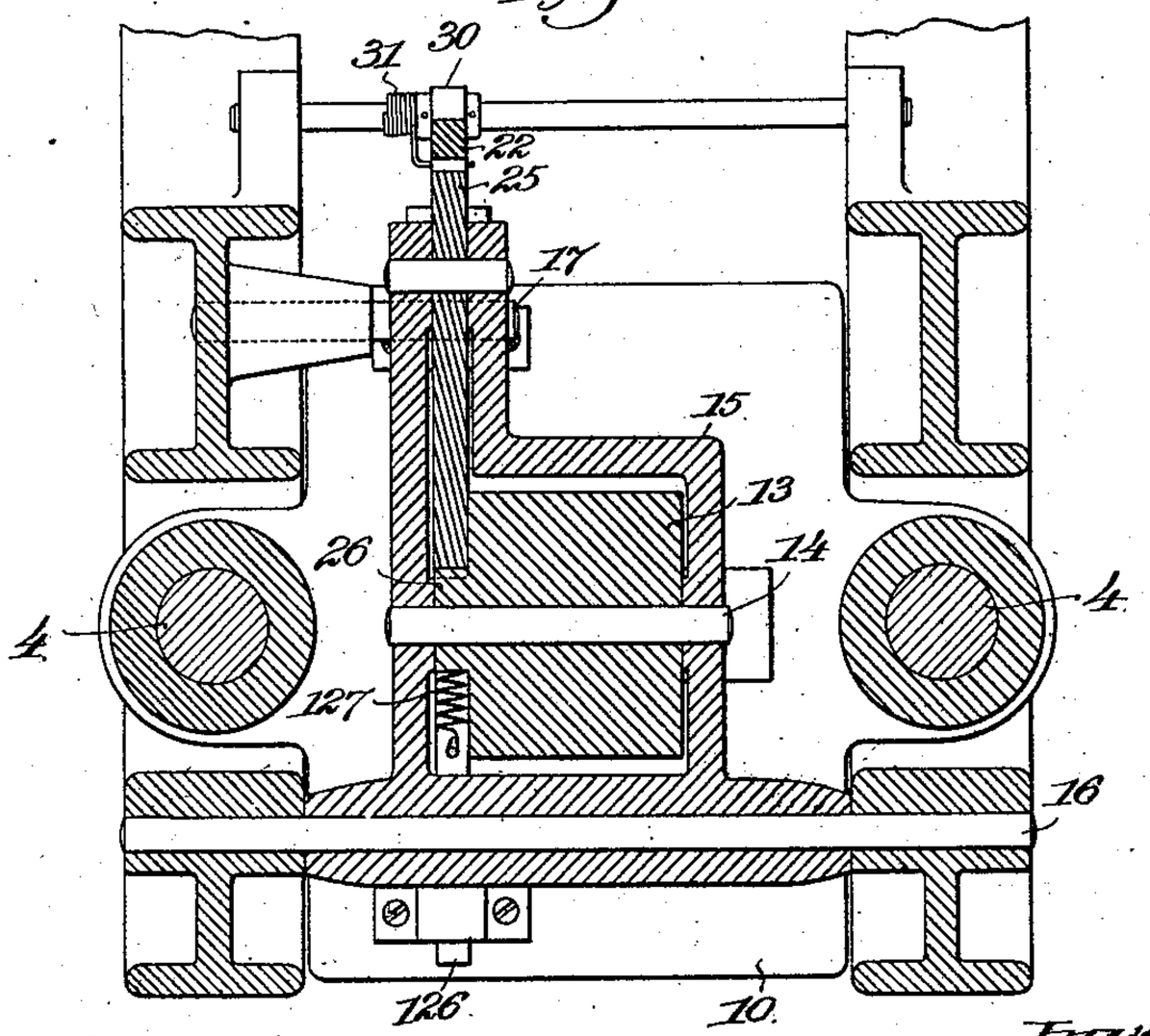


Fig. 4.



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UNITED STATES PATENT OFFICE.

ERASTUS E. WINKLEY, OF LYNN, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SOLE-MOLDING MACHINE.

No. 859,862. Specification of Letters Patent. Patented July 9, 1907.

Application filed June 6, 1904. Serial No. 211,238.

To all whom it may concern:

Be it known that I, ERASTUS E. WINKLEY, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Sole-Molding 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 molding machines which are used in the manufacture of boots and shoes to shape the soles before they are incorporated in the boot or shoe and which comprise coöperating male and female molds.

Sole molding machines 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 in order to adapt the machines for operation upon soles of different thickness.

The 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.

With this object in view the present invention contemplates the provision in a sole molding machine of means for actuating the molds to exert a preliminary pressure upon a sole placed between the molds until the sole conforms to the shape of the molds and thereafter a final pressure to mold the sole and means controlled by the sole when conformed to the shape of the molds for regulating the amount of the final pressure which is applied to the sole. The pressure required to cause the sole to conform to the shape of the molds varies with the thickness, quality and condition of the sole, but is always considerable, as much pressure often being required to perform this operation as is ordinarily exerted in a sole laying or a sole leveling machine to cause the sole to conform to the shape of the last upon which the shoe is supported. By continuing the preliminary pressure until the sole conforms to the shape of the molds and then applying a final pressure to mold the sole, the final pressure can be regulated accurately from the sole, and the machine adapted for automatic operation upon soles of different thickness without liability of an insufficient pressure being exerted upon a thin sole, or an excessive pressure being exerted upon a thick sole, tending to injure the machine or interfere with its operation.

In carrying out the present invention any suitable form of pressure regulating means may be provided and these means may be controlled in any desired manner by the sole when conformed to the shape of the molds, and although in the preferred form of the invention, hereinafter specifically described, the pressure regulating means comprises an adjustable stop for limiting the movement of one mold while the other mold is being moved towards it to mold a sole, and the adjustment of the stop is controlled by a device which directly engages the sole, it is to be understood that except as specifically defined in the claims the invention is not limited thereto, as any suitable means for regulating the pressure may be provided, and these means may be controlled in any suitable manner either directly or indirectly from the sole.

The present invention will be clearly understood from an inspection of the accompanying drawings, in which is illustrated a sole molding machine embodying the invention in its preferred form, which machine in addition to the broad feature of invention hereinbefore referred to, also embodies certain novel constructions and arrangements of parts hereinafter described and claimed, the advantages of which will be obvious to those skilled in the art.

Referring to the drawings, Figure 1 is a view in side elevation of so much of the machine as is necessary to illustrate the present invention; Fig. 2 is a vertical sectional view of the upper portion of the machine illustrating the construction and arrangement of the pressure regulating mechanism, and Figs. 3 and 4 are sectional plan views taken respectively on the lines 3—3 and 4—4 of Fig. 1.

The male and female molds are indicated respectively at 1 and 2, the female mold being mounted upon a cross-head 3 which is reciprocated to move the female mold towards and from the male mold. The cross-head 3 is mounted to slide upon vertical guide rods 4 at the sides of the machine frame and reciprocating movements are imparted to the cross-head, by means of toggle arms 5 and 6 connected by a link 7 to a crank shaft 8 mounted in bearings in the rear portion of the machine frame and driven through suitable gearing (not shown) by a gear wheel 9 secured to the shaft. The male mold is secured to the under side of a cross-head 10 and is arranged above the female mold in position to coöperate therewith in molding a sole during the upward movement of the female mold.

The construction so far described is substantially the same as that which has heretofore been employed in sole molding machines, hand-operated means being provided, however, for adjusting either the male or the female mold towards and from its coöperating mold. In the illustrated embodiment of the present

invention, the cross-head 10 is mounted to slide upon the guide rods 4, and is yieldingly held against stop collars 11 on the guide rods by means of springs 12 coiled around the guide rods and interposed between the cross-head 10 and the rigid upper portion of the machine frame. The tension of the springs 12 is such that during the upward movement of the cross-head 3 the cross-head 10 remains stationary until a preliminary pressure has been exerted upon the sole placed between the molds and the sole has conformed to the shape of the molds. After the sole has conformed to the shape of the molds the continued upward movement of the cross-head 3 forces the cross-head 10 upwardly against the tension of the springs 12.

In order to regulate the final pressure applied to the sole during the continued upward movement of the cross-head 3, means are provided for limiting the upward movement of the cross-head 10, such means as illustrated comprising an adjustable stop in the form of a rotatable cam 13. This cam is mounted upon a shaft 14 mounted in a frame 15. The frame is pivotally supported at its front end upon a shaft 16 mounted in the machine frame below the cross-piece which forms the upper portion of the frame. At its rear end the frame 15 rests against a stop pin 17, which limits the downward movement of the frame. The frame is normally held against its stop pin by means of a coiled spring 18, the upper end of which is seated in a recess in the cross-piece forming the upper portion of the machine frame and the lower end of which is seated upon a block 19 upon the frame 15 provided with a pin projecting upwardly into the spring. The cam 13 is arranged between a projection 20 extending downwardly from the upper portion of the machine frame, and a projection 21 extending upwardly from the cross-head 10, the cam being out of engagement with both projections and being free to turn while the frame 15 is in contact with the stop pin 17. During the upward movement of the cross-head 10 after the sole had been conformed to the shape of the molds, the projection 21 engages the cam 13 and raises the cam and the frame 15 in which it is mounted until the cam is brought into engagement with the projection 20. The upward movement of the cross-head 10 is thus stopped by the cam, the extent of the upward movement and consequently the amount of pressure applied to the sole depending upon the position to which the cam 13 has been adjusted.

It will be evident that if the extent of the movement imparted to the stop cam 13 in adjusting the same is varied as the thickness of the sole being operated upon varies, the proper amount of pressure will always be exerted upon the sole. This result is accomplished in the machine illustrated in the drawings by mechanism actuated from the cross-head 3 upon which the female mold is mounted, arranged to rotate the stop cam while the sole is being conformed to the shape of the molds and to be controlled by the sole when conformed to the shape of the molds. The mechanism illustrated in the drawings for rotating the stop cam comprises a slide 22 pivotally mounted at its lower end upon the cross-head 3 and provided at its upper end with a shoulder 23 arranged to engage the rear end of a lever 25 pivoted in the rear portion of the frame 15 and provided at its forward end with a segmental gear meshing with the teeth of a mutilated pinion 26 formed on or secured to the stop cam 13. The shoulder 23 and the projection 24 are so arranged with relation to the rear end of the lever 25 that the lever is actuated by the engagement of the shoulder 23 therewith to turn the stop cam 13 in one direction during the upward movement of the slide and is actuated by the engagement therewith of the projection 24 to return the stop cam to its original position during the downward movement of the slide. The extent of movement imparted to the stop cam 13 by the slide 22 during its upward movement is varied by moving the slide 22 to disconnect the shoulder 23 from the rear end of the lever 25 the extent of movement imparted to the stop cam depending on the time during the upward movement of the slide at which the shoulder is disconnected from the lever. As illustrated the slide 22 is moved to disconnect the shoulder 23 from the lever 25 by means of a spring-actuated slide 126 which is controlled in its operation by means of a vertically movable pin 27 mounted in the cross-head 10 and male mold 1 and normally projecting below the lower surface of the mold in position to be engaged by the sole when conformed to the shape of the mold. The slide 126 is mounted in guideways on the upper surface of the cross-head 10 with its rear end in position to bear against the side of the slide 22. A coiled spring 127 connected at one end to the slide and at the other end to the cross-head, or to one of the guides for the slide 26 secured thereto, tends to move the slide 126 in a direction to actuate the slide 22 to disengage the projection 23 from the lever 25. The slide 26 is normally held in its retracted position by means of a spring latch 28 secured to the upper surface of the cross-head and arranged to engage a projection on the slide. The upper end of the pin 27 bears against the under surface of the latch 28 so that when the pin 27 is raised by the sole after having conformed to the shape of the molds the latch is actuated to release the slide 126. The rotating movement of the stop cam 13 is thus stopped as soon as the sole conforms to the shape of the molds, so that the cam is accurately adjusted to stop the upward movement of the cross-head 10 at the proper time during the upward movement of the cross-head 3 to give the final pressure requisite to properly mold the sole. In order to return the slide 126 to its normal position during the downward movement of the cross-head 3 and slide 22, the slide 22 is provided with an inclined shoulder 29 which, during the downward movement of the slide, contacts with a fixed stop 30 on the frame of the machine and moves the slide positively in a direction to return the slide 126 to its normal position. During the upward movement of the slide 22 the shoulder 29 passes above the stud 30 so that the slide can be actuated by the slide 126 when released from its latch. A spring 31 secured to the stud 30 and arranged to bear against the side of the slide 22 holds the slide in a position in which its shoulder 23 engages the lever 25 during the upward movement of the slide until the slide 126 is released.

The operation of the machine illustrated in the drawings has been indicated in the description given above of the construction and arrangement of the various parts and will be readily understood by those skilled in the art without a separate description thereof.

The nature and scope of the invention having been indicated and a machine embodying the preferred form thereof 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 until the sole conforms to the shape of the molds, and thereafter a final pressure to mold the sole, and means controlled by the sole when conformed to the shape of the molds for regulating the amount of such final pressure, substantially as described.

2. 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 cooperating mold towards the yieldingly mounted mold to exert a preliminary pressure upon a sole until the sole conforms to the shape of the molds and thereafter a final pressure to mold the sole, and means controlled by the sole when conformed to the shape of the molds for limiting the movement of the yieldingly mounted mold, substantially as described.

3. A sole molding machine, having, in combination, rigid male and female molds adapted to mold a flat sole placed between them, means for supporting and actuating said molds to exert a preliminary pressure upon a sole until the sole conforms to the shape of the molds and thereafter a final pressure to mold the sole, an adjustable stop for one of said molds, and means controlled by the sole when conformed to the shape of the molds for actuating said stop, substantially as described.

4. A sole molding machine, having, in combination, rigid male and female molds adapted to mold a flat sole placed between them, means for moving one of said molds and for supporting the other mold to exert a preliminary pressure upon a sole until the sole conforms to the shape of the molds and thereafter a final pressure to mold the sole, and pressure regulating mechanism for regulating the amount of such final pressure actuated by the movement of the movable mold and controlled by the sole when conformed to the shape of the molds, substantially as described.

5. A sole molding machine, having, in combination, rigid male and female molds adapted to mold a flat sole placed between them, means for moving one of said molds and for supporting the other mold to exert a preliminary pressure upon a sole until the sole conforms to the shape of the molds and thereafter a final pressure to mold the sole, and means controlled by the sole when conformed to the shape of the molds for regulating the amount of such final pressure, substantially as described.

6. A sole molding machine, having, in combination, a yieldingly mounted mold, a coöperating mold, 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 molds and thereafter a final pressure to mold the sole, an adjustable stop for limiting the movement of the yieldingly mounted mold, and means controlled by the sole when conformed to the shape of the molds for actuating said stop, substantially as described.

7. A sole molding machine, having, in combination, a yieldingly mounted mold, a coöperating mold, 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 molds and thereafter a final pressure to mold the sole, an adjustable stop for limiting the movement of the yieldingly mounted mold, and mechanism connected with the coöperating mold and controlled by the sole when conformed to the shape of the molds for actuating said stop, substantially as described.

8. A sole molding machine, having, in combination, male and female molds, means for supporting and actuating said molds to exert a preliminary pressure upon a sole until the sole conforms to the shape of the molds, and thereafter a final pressure to mold the sole, a device directly engaging the sole when conformed to the shape of the molds, and means controlled by said device for regulating the amount of such final pressure, substantially as described.

9. A sole molding machine, having, in combination, a yieldingly mounted mold, a coöperating mold, 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 molds and thereafter a final pressure to mold the sole, an adjustable stop for limiting the movement of the yieldingly mounted mold, a device directly engaging the sole when conformed to the shape of the molds, and means controlled by said device for actuating said stop, substantially as described.

10. A sole molding machine having, in combination, rigid male and female molds adapted to mold a flat sole placed between them, means for supporting and 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, an adjustable stop for one of said molds, and means acting automatically to actuate said stop to regulate the amount of such final pressure for soles of different thickness, substantially as described.

11. 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 cooperating mold towards the yieldingly mounted mold 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, an adjustable stop for limiting the movement of the yieldingly mounted mold, and means acting automatically to actuate the stop to regulate the amount of such final pressure for soles of different thickness.

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

ERASTUS E. WINKLEY.

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