A. A. BALL, JR.

SOLE PRESSING MACHINE.

APPLICATION FILED NOV. 14, 1908.

1,003,970. **Patented Sept. 26, 1911.**

3 SHEETS—SHEET 1.

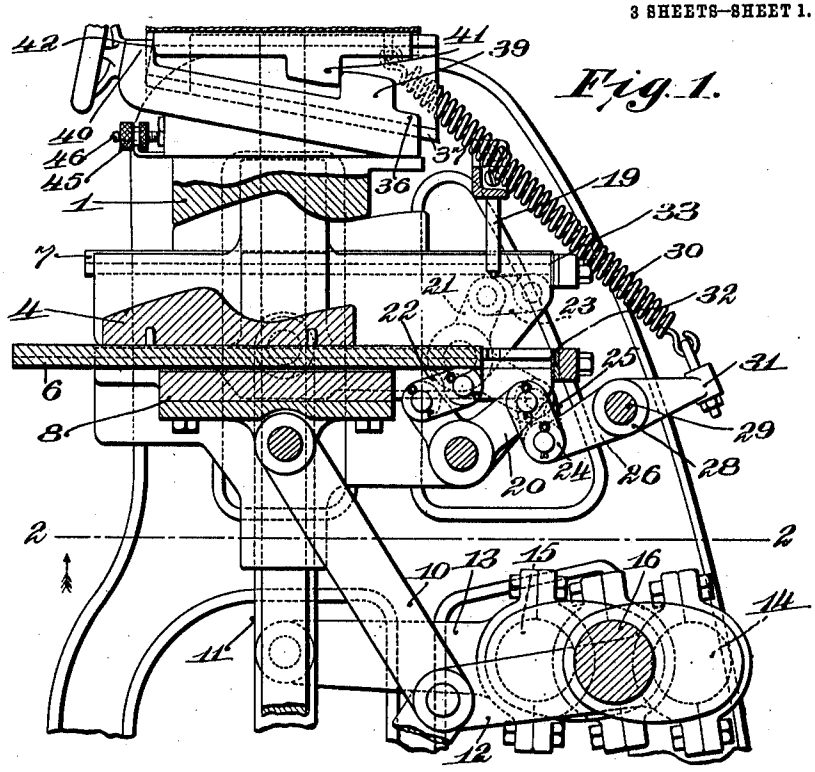

Fig. 1.

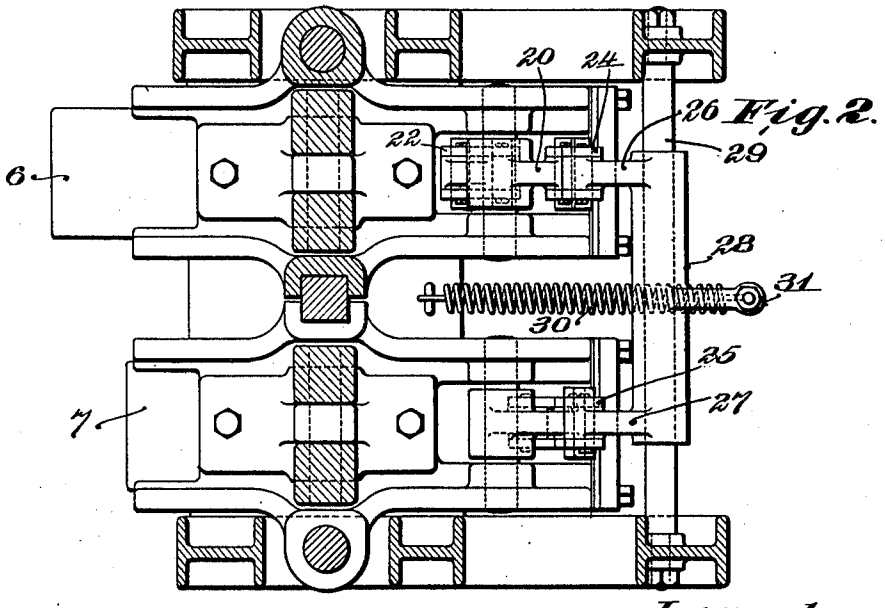

Fig. 2.

Witnesses:

E. C. Durdeman

M. L. Gilman

Inventor:

Augustus A. Ball Jr.

by his Attorneys

Phillips Van Everen & Fish

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3 SHEETS—SHEET 2.

Fig. 3.

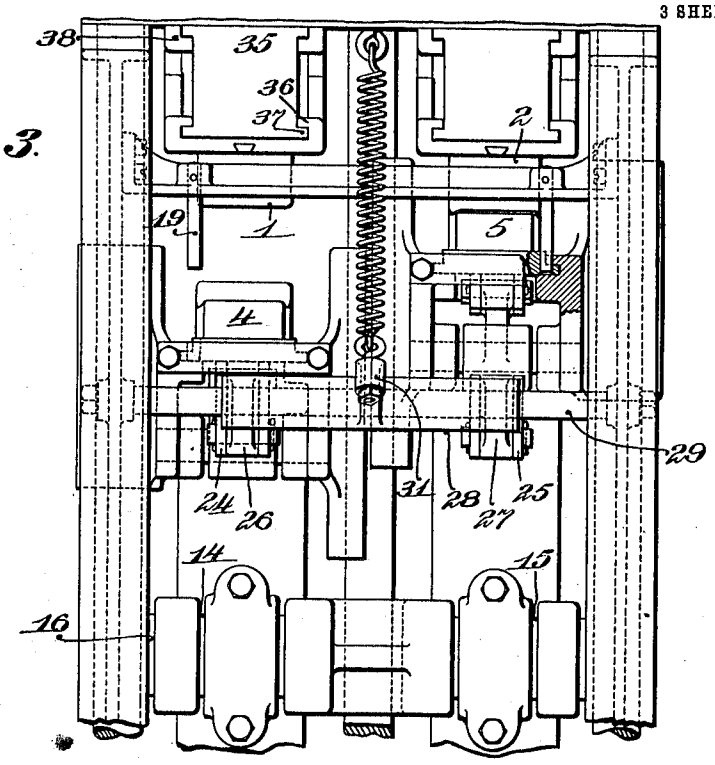
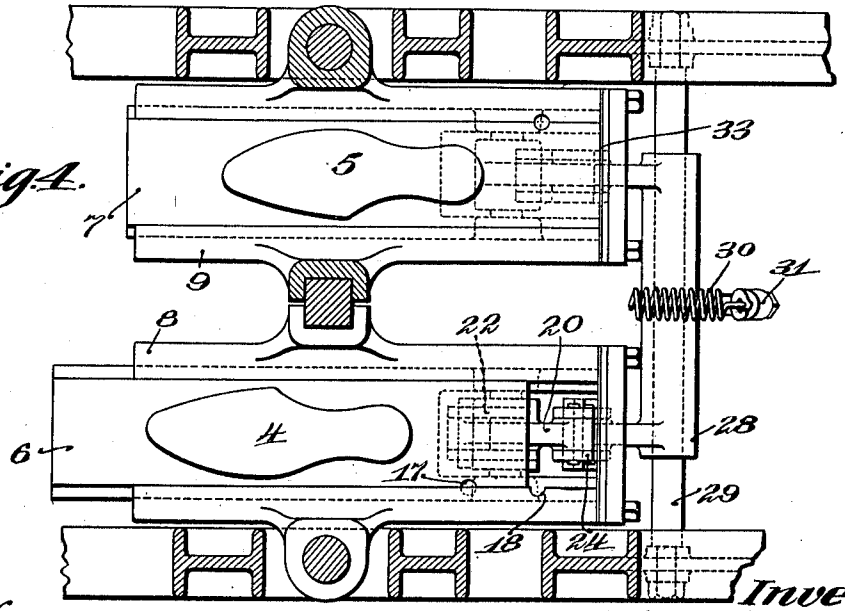


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

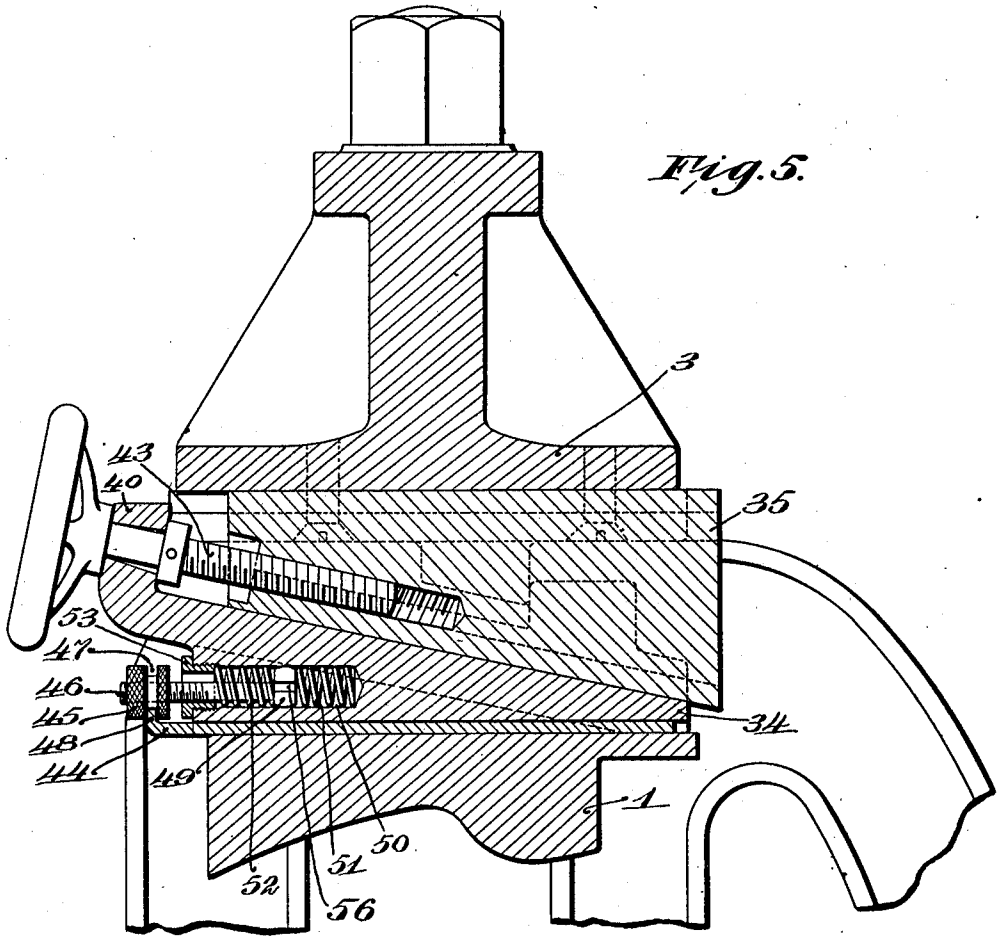
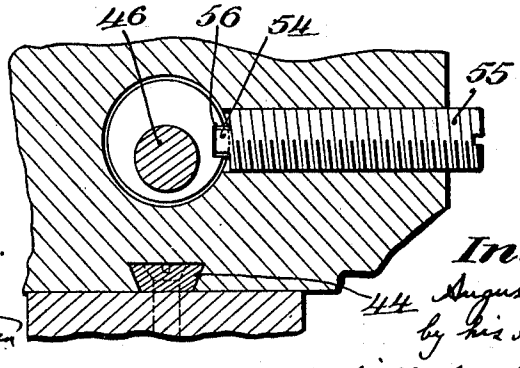


Fig. 6.



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E. C. Wurdeman

M. L. Gilman.

Inventor:

Augustus A. Ball Jr.

by his Attorneys

Phillips Van Everen & Fish

UNITED STATES PATENT OFFICE.

AUGUSTUS A. BALL, JR., OF LYNN, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

SOLE-PRESSING MACHINE.

1,003,970. Specification of Letters Patent. Patented Sept. 26, 1911.

Application filed November 14, 1908. Serial No. 462,663.

To all whom it may concern:

Be it known that I, AUGUSTUS A. BALL, Jr., 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-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 invention relates to that class of sole pressing or shaping machines, such as sole molding or sole laying machines, in which the coöperating pressing molds are relatively reciprocated to move the molds toward and away from each other, and are also given a relative transverse movement to bring the molds into and out of alinement with each other.

The object of the invention is to provide a sole pressing machine of this type having its parts constructed and arranged in an improved and simplified manner, and having an improved mode of operation whereby the pressing and shaping of the soles upon which the machine is designed to operate may be effected in a rapid and reliable manner.

To these ends one feature of the invention contemplates the provision of devices which are actuated by the relative reciprocation of the molds toward and away from each other to effect the relative transverse movements of the molds to bring them into and out of alinement as they are brought together or separated. This feature may be embodied in machines in which a single set of molds is employed, or in machines in which two sets of molds are employed, the molds being so actuated that one set of molds is being brought together while the other set of molds is being separated.

A further feature of the invention contemplates the provision in a machine provided with two sets of molds which are relatively reciprocated to bring the molds of one set together, while the molds of the other set are being separated, of devices connecting the molds in the two sets in such manner that the reciprocation of the molds in the two sets toward and from each other in reverse directions causes relative transverse movements of the molds in the two sets in opposite directions. In accordance with this feature of the invention in its broader aspects, the transverse movements of the molds in each set may be effected by their relative movements toward and from each other, or by the relative movement of the molds in the other set toward and from each other. It is preferred, however, to so construct and arrange the connections between the molds in the two sets that the transverse movement of the molds in each set will be effected by the movements of the molds in both sets toward and from each other. It is also preferred to so construct and arrange the mold carrying devices and connections that the relative transverse movements of the molds in each set will be controlled by a mold in the other set, and thus the movement of each mold into proper alinement with the coöperating mold will be insured.

A further feature of the invention contemplates the provision of improved means for locking a transversely movable mold in position on the head which carries it during the final movement of the head which brings the molds together. In accordance with this feature of the invention, means is provided for locking the transversely movable mold to the head when it is in alinement with the complementary mold. In the preferred embodiment of this feature of the invention, the transversely movable mold is carried upon a slide mounted upon a reciprocating head, and the slide is firmly locked in position upon the head during the final upward movement of the head by a fixed pin arranged to enter two locking recesses, one of which is formed in the head and the other of which is formed in the slide, and which are brought into register by the transverse movement of the slide, and are engaged with the pin by the upward movement of the head after the recesses have been brought into register.

A further feature of the invention contemplates the provision of improved means for adjusting and supporting the molds with which the reciprocating and transversely movable molds coöperate.

The features of the invention above indicated, as well as the further features of invention which will be more particularly pointed out in the claims, will be readily understood from an inspection of the accompanying drawings, in which a machine embodying the various features of the in-

vention in their preferred forms, and especially designed for molding soles, and provided with two sets of molds, is shown.

In these drawings Figure 1 is a sectional elevation of so much of a sole pressing or molding machine as is necessary to show the invention; Fig. 2 is a sectional view on line 2—2, Fig. 1, looking upward; Fig. 3 is a rear elevation of the parts shown in Fig. 1; Fig. 4 is a sectional plan view; Fig. 5 is an enlarged sectional detail view showing the means for mounting and adjusting the fixed mold; and Fig. 6 is an enlarged sectional detail of the parts shown in Fig. 5.

The machine shown in the drawings is designed for molding or shaping soles, and is provided with two sets of molds, each comprising a fixed mold and a transversely movable mold which is carried by a mold carrier mounted upon a reciprocating cross-head. The cross-heads are reversely reciprocated to bring one set of molds together while the other set is being separated, and the mold carriers are moved forward and back during the reciprocation of the cross-heads to advance the lower molds when the cross-head is in its retracted position, and to return the mold into alinement with the upper mold during the advance movement of the cross-head, the transverse movement of the mold into alinement with the upper mold being completed before the cross-head completes its upward or advance movement, so that the final upward movement of the mold is unaccompanied by any lateral movements.

As shown in the drawings, the two fixed molds 1 and 2 are supported upon the under side of a cross-bar 3, and the two movable molds 4 and 5 are carried upon slides 6 and 7, which are mounted for transverse movement in the vertically reciprocating cross-heads 8 and 9. The cross-heads are reversely reciprocated through toggles 10 and 11, which are connected by means of links 12 and 13 with cranks 14 and 15 on the shaft 16. The cranks are arranged at an angle of 180°, so that the cross-heads 8 and 9 carrying the molds 4 and 5 are reversely reciprocated to bring the two molds of one set together, while the molds of the other set are being separated.

When the cross-head 8 is in its lower or retracted position, the cross-head 9 is in its upper or advance position, and the mold carrying slide 6 is in its outer position, with the mold 4 in convenient position for the removal of the molded sole and the insertion of a new sole, while the mold carrying slide 7 is in its inner position, with the mold 5 in alinement with the mold 2 and in position to coöperate therewith in shaping and pressing a sole held between the molds. As the cross-head 8 moves upward and advances, and the cross-head 9 moves downward and retracts, the mold carrying slide 6 is moved inward to bring the mold 4 into alinement with the mold 1, the inward movement of the mold carrying slide being completed before the cross-head has completed its upward movement, and before the molds have begun to act on the sole, so that the sole is pressed between the molds by a direct upward movement of the mold 4. During the first part of the downward movement of the cross-head 9, the mold carrying slide 7 remains in its inner position, so that the initial separation of the molds is effected by a vertical movement of the mold 5. After the mold 5 has moved downward far enough to clear the mold 2, it is moved outward during the completion of the downward movement of the cross-head into a position corresponding to the position of the mold 4 shown in Fig. 1. In order that each mold carrying slide may be firmly held in position upon the cross-head during the completion of the upward movement of the cross-head, and during the first part of its downward movement, each slide is provided with a recess 17 arranged to register with a recess 18 in the head when the slide is in its retracted position with the mold carried thereby in alinement with the coöperating fixed mold. The recess 18 is so arranged that it is engaged by a fixed locking pin 19 by the upward movement of the cross-head, so that the pin acts by engagement with the recesses 17 and 18 to firmly and rigidly unite the mold carrying slide and cross-head during the last part of the upward movement of the cross-head, and during the initial part of its downward movement.

Transverse movements are imparted to the mold carrying slides 6 and 7 during the reciprocation of the cross-heads through bell crank levers 20 and 21 mounted upon the cross-heads and connected through links 22 and 23 with the slides. The bell crank levers are connected by links 24 and 25 with the arms 26 and 27 of a lever 28, which is pivotally mounted upon a fixed rod 29. The levers and links connecting the mold carrying slides are yieldingly forced in a direction to move the mold carrying slides inward by the action of a spring 30, one end of which is connected to the rearwardly extending arm 31 of the lever 28, and the other end of which is secured to a fixed part of the frame. The inward movement of the mold carrying slide 6 is limited by the engagement of the rear end of the slide with a stop shoulder 32 formed on the cross-head, and the inward movement of the mold carrying slide 7 is limited by a similar stop shoulder 33 on the cross-head 9.

Assuming that the parts are in the position indicated in Fig. 1, the mode of operation is as follows: During the first part of the upward movement of the cross-head 8, and

of the downward movement of the cross-head 9, the mold carrying slide 6 is free to move inward, while the mold carrying slide 7 is retained in position upon the cross-head 9 by the locking pin 19, in case such pin is present, or by the stop 33 and spring 30, the stop acting to prevent the inward movement of the slide, and the spring acting through the levers 28 and 21 to resist outward movement of the slide. The upward movement of the cross-head 8 will carry the fulcrum of the bell crank lever 20 upward, and this upward movement of the bell crank lever will tend to move the arm 26 of the lever 28 upward. At this time upward movement of the arm 26 is prevented, however, by the connections between the lever 28 and the mold carrying slide 7. Upward movement of the arm 26 is also resisted by the spring 30, which would act to retain the end of the slide 7 against the stop 33 if the pin 19 were not present. The upward movement of the cross-head 8, therefore, causes a relative movement between the fulcrum of the bell crank lever 20 and the arm 26 which rocks the bell crank lever 20 in a direction to move the mold carrying slide 6 inward, and this movement continues until the end of the slide engages the stop 32, when further rocking of the bell crank lever 20 is prevented. After the inward movement of the slide 6 is arrested, and the mold 4 brought into alinement with the mold 1, the continued upward movement of the cross-head 8 carries the mold 4 vertically upward against the mold 1 without any lateral movement of the mold. During this latter part of the upward movement of the cross-head, the arm 26 of the lever 28 is moved upward with the bell crank lever 20, the mold carrying slide 7 at this time being free to move forward, and the spring 30 yielding to allow the upward movement of the arm 26. While the cross-head 8 has been moving upward, the cross-head 9 has been moving downward. The downward movement of the cross-head 9 carries the fulcrum of the bell crank lever 21 downward, and by reason of the connection of the bell crank lever 21 with the arm 26 of the lever 28, this downward movement of the bell crank lever tends to move the arm 27 of the lever 28 downward, or to rock the bell crank lever 21 in a direction to move the mold carrying slide 7 outward. Outward movement of the slide 7 is prevented during the first part of the downward movement of the cross-head 9 by the locking pin 19, or is resisted by the tension of the spring 30. During the first part of the downward movement of the cross-head 9, therefore, the arms 27 and 26 of the lever 28 move downward with the bell crank lever 21 and cross-head 9. This downward movement of the arm 26 acts to rock the bell crank lever 20, and to impart an inward movement to the mold carrying slide 6, so that the inward movement of the slide is effected both by the upward movement of the head 8 and the downward movement of the head 6. When the inward movement of the mold carrying slide 6 is arrested by the engagement of the slide with the stop 32, the stop acts to prevent further downward movement of the arms 26 and 27 of the lever 28, thus acting as a stop for limiting the movement of the lever 28 during the retracting or downward movement of the head 9. When the downward movement of the arms 26 and 27 of the lever 28 is thus arrested by the engagement of the slide 6 with the stop 32, the cross-head 8 has moved down sufficiently to disengage the pin 19, so that the mold carrying slide 7 is free to move forward, and the cross-head 8 has been raised into position where further upward movement of the cross-head will engage one of the pins 19 with the locking recesses in the slide 6 and head 8. During the further downward movement of the cross-head 9, the fulcrum of the bell crank lever 21 will be moved downward with relation to the connection between the lever and the arm 27, thus rocking the bell crank lever 21 in a direction to move the mold carrying slide 7 outward. The continued upward movement of the cross-head 8 will also move the arm 26 and arm 27 of the lever 28 upward, this also acting to rock the bell crank lever 21 in a direction to move the mold carrying slide outward. The outward movement of the slide 7 will thereafter be effected by both the upward movement of the head 8 and the downward movement of the head 9. During the reverse movements of the cross-heads 8 and 9, the connections between the mold carrying slides operate in the same manner to first move the mold carrying slide 7 inward until its inward movement is arrested, and to thereafter move the mold carrying slide 6 outward into the position indicated in Fig. 1.

Each of the fixed forms or molds 1 and 2 are so mounted and supported upon the cross-bar 3 that they may be adjusted vertically to bring them into proper vertical relation to the molds or forms 4 and 5, and are also so mounted and supported that they may be adjusted longitudinally into proper relation to the molds 4 and 5, and so that they may yield in either direction longitudinally of the form to compensate for inaccuracies in adjustment, or irregularities in the work being operated upon. As shown, each form 1 and 2 is mounted upon a form carrier 34. The form carrier 34 is supported against the inclined lower face of a wedge block 35 by means of flanges 36 formed on the carrier, and engaging ribs 37 formed on the wedge block. The wedge block is mounted and supported

in horizontal ways 38 on the under side of the cross-bar 3. The form carrier is held from movement horizontally by lugs 39 and 40 which engage fixed shoulders 41 and 42. The wedge block is adjusted to effect the vertical adjustment of the form carrier by means of an adjustable screw 43 which passes through the lug 40 and is threaded into the block. The mold or form 1 is provided on its upper face with a dove-tail rib 44 in the form of a bar, to which the mold form is secured, and this rib is arranged to engage a dove-tail groove formed in the under face of the form carrier 34. The form is adjusted on the form carrier by means of a nut 45 which is mounted upon a bolt 46, and is provided with an annular groove 47 arranged to be engaged by a projection or lug 48 on the bar 44. The bolt is provided with an eccentric head 49 arranged to fit within a recess 50 in the form carrier 34, and held in position between two springs 51 and 52. The spring 51 is interposed between the head 49 and the bottom of the recess 50, and the spring 52 is interposed between the head 49 and a sleeve 53 which is screwed into the outer end of the recess, and is provided with a central opening somewhat larger in diameter than the diameter of the bolt 46. The bolt is held from rotation by means of a key 54 formed on the inner end of a screw 55, and arranged to engage a slot 56 in the head of the bolt, and forming a stop for the springs. The form of the head of the bolt and the key is such that the outer end of the bolt may be readily swung upward to disengage the nut 45 from the lug on the mold form, and thus enable the form to be readily removed, or to enable the form to be readily placed in position and then engaged with the adjusting device. The springs act to hold the bolt and nut normally in the position indicated in Fig. 5. By providing the bolt with an eccentric head, the parts may be compactly arranged, while allowing the maximum movement of the bolt and nut. By this construction the form may be readily adjusted upon the form carrier to bring it into proper relation with the coöperating form, and when adjusted it will be held in position in such manner that it may yield in either direction longitudinally of the sole being operated upon to automatically adjust itself for any variations in different soles, or to compensate for any slight inaccuracies of adjustment.

While it is preferred to so construct and arrange the connections between the mold carriers that a reciprocation of each cross-head imparts lateral movements to the carrier carried by the other cross-head, as well as to the carrier carried by it, it will be understood that this is not essential, and that in accordance with the broader features of the invention, as set forth in the claims, the lateral movements may be imparted to the mold carriers by the reciprocation of either or both of the cross-heads. It will also be understood that with the construction and arrangement of connecting devices shown and described, the spring 30 may be omitted, and the pins 19 or other means be relied upon to prevent forward movement of the mold, which is in its inner position, until the other mold is moved into its inner position, or that other forms or arrangements of means for yieldingly forcing the molds toward their inner position, might be employed. It will also be understood that any suitable form of means for determining the movement of the lever to which the lever carried by the cross-head is connected, may be employed in embodying substantially the construction and arrangement of devices shown and described in a machine in which a single set of molds is employed, or in which the mold carriers on the two cross-heads act independently of each other. It will also be understood that the specific construction and arrangement of the various parts are not essential to the invention in its broader aspects, and may be varied and modified in embodying the features referred to in the claims in different machines. It will also be understood that the various features of the invention may be embodied in sole laying or other machines in which one of the coöperating molds is in the form of a jack for supporting a shoe, and that the term mold is intended to include such jacks.

Having set forth the nature and object of the invention, and specifically described one form of machine in which it may be embodied, what I claim is:—

1. A sole pressing machine, having, in combination, two molds, mechanism for relatively reciprocating the molds to move them toward and from each other, and devices actuated through the relative reciprocation of the molds to cause relative transverse movements of the molds into and out of alinement with each other, substantially as described.

2. A sole pressing machine, having, in combination, two molds, mechanism for reciprocating one of the molds to move it toward and from the other mold, and devices actuated through the reciprocation of the mold to move it transversely into and out of alinement with the other mold, substantially as described.

3. A sole pressing machine, having, in combination, a head, a mold carrier mounted thereon, mechanism for reciprocating said head, and mechanism operated by the movements of the head to reciprocate the carrier, substantially as described.

4. A sole pressing machine, having, in

combination, a reciprocating head, a mold carrier mounted thereon, and devices mounted on the head connected to be actuated by the movements of the head and to actuate the carrier, substantially as described.

5. A sole pressing machine, having, in combination, a reciprocating head, a mold, a lever mounted on the head for imparting transverse movements to the mold, and a device connected with the lever to actuate it by the relative movement between the head and device produced in the reciprocation of the head, substantially as described.

6. A sole pressing machine, having, in combination, a frame, a fixed mold mounted thereon, a reciprocating head, a mold carrying slide mounted thereon, a lever on the head connected to move the slide, a lever mounted on the frame and connected with the lever on the head to advance the slide as the head is retracted, means for limiting the movement of the latter lever during the retracting of the head, and means for limiting the transverse movement of the slide during the advance of the head, substantially as described.

7. A sole pressing machine, having, in combination, two sets of molds, mechanism for relatively reciprocating the molds to bring the molds of one set together while the molds of the other set are being separated, and devices connecting the molds and operated through the reciprocation of the molds to cause relative transverse movements of the molds in the two sets in opposite directions, substantially as described.

8. A sole pressing machine, having, in combination, two fixed molds, two movable molds, mechanism for reciprocating the movable molds to bring the molds of one set together while the molds of the other set are being separated, and connections between the molds through which the movable molds are moved transversely in opposite directions by the reciprocatory movements of the molds toward and from their complementary molds, substantially as described.

9. A sole pressing machine, having, in combination, two fixed molds, two coöperating movable molds, actuating mechanism operating to move the molds toward and away from the complementary molds, connections actuated by the movement of one mold toward and the other away from the complementary mold to move the former mold into alinement with and the latter mold out of alinement with its complementary mold, substantially as described.

10. A sole pressing machine, having, in combination, two fixed molds, two movable molds, actuating mechanism operating to move the latter molds in opposite directions toward and away from the complementary molds, devices actuated by the reciprocatory movements of the molds to move the advancing mold into alinement with and the retracting mold out of alinement with its complementary mold, and means for retaining the retracted mold in alinement with the complementary mold until the advancing mold is brought into alinement with its complementary mold, substantially as described.

11. A sole pressing machine, having, in combination, two fixed molds, two movable molds, actuating mechanism operating to move the latter molds in opposite directions toward and away from the complementary molds, devices actuated by the reciprocatory movements of the molds to move the advancing mold into alinement with and the retracted mold out of alinement with its complementary mold, and means for retaining each mold in alinement with its complementary mold during its final movement toward and its initial movement away from its complementary molds, substantially as described.

12. A sole pressing machine, having, in combination, two fixed molds, two coöperating movable molds, mechanism for reciprocating the latter molds to bring two complemental molds together while the other two are being separated, and devices for moving each of the reciprocating molds transversely by the reciprocation of the other reciprocating mold, substantially as described.

13. A sole pressing machine, having, in combination, two molds, two coöperating reciprocating molds arranged to move in opposite directions toward and away from the complementary molds, and devices connecting the reciprocating molds arranged to move each mold transversely into alinement with its complementary mold during its movement toward said mold and out of alinement during its movement away from the complementary mold, substantially as described.

14. A sole pressing machine, having, in combination, two mold carrying heads, mold carrying slides mounted for transverse movements thereon, actuating mechanism operating to reversely reciprocate the heads, devices mounted on the heads for transmitting transverse movements to the slides, and connections between said devices for alternately actuating them during the reciprocation of the heads, substantially as described.

15. A sole pressing machine, having, in combination, two mold carrying heads, mold carrying slides mounted for transverse movement thereon, actuating mechanism operating to reversely reciprocate the heads, and devices connecting the two slides actuated by the reciprocation of the heads to alternately advance and retract the slides, substantially as described.

16. A sole pressing machine, having, in combination, two mold carrying heads, mold

carrying slides mounted for transverse movement thereon, actuating mechanism acting to reversely reciprocate the heads, levers mounted on the heads and connected to move the slides, and devices connecting said levers to alternately actuate them by the relative movements between the levers and connecting devices produced by the reciprocation of the heads, substantially as described.

17. A sole pressing machine, having, in combination, two mold carrying heads, molds mounted thereon for transverse movement, actuating mechanism operating to reversely reciprocate the heads, and means for controlling the transverse movement of each mold by the other mold, substantially as described.

18. A sole pressing machine, having, in combination, two molds, a reciprocating head carrying one of the molds, means for moving the mold on the head into and out of alinement with the other mold, and means for locking the mold to the head when in alinement with the other mold, substantially as described.

19. A sole pressing machine, having, in combination, two sole pressing molds, a reciprocating head carrying one of the molds, mechanism for moving the mold on the head into and out of alinement with the other mold, and a locking device for locking the mold to the head during the pressing of the sole, substantially as described.

20. A sole pressing machine, having, in combination, a fixed mold, a reciprocating head, a mold carrying slide, mechanism for reciprocating the slide on the head, recesses in the slide and head arranged to register when the molds are in alinement, and a fixed pin engaged with the registering devices by the advance movement of the head, substantially as described.

21. A sole pressing machine, having, in combination, a frame, a fixed mold mounted thereon, a reciprocating head, a mold carrying slide mounted thereon, a lever mounted on the frame, connections between the lever and slide to advance the slide as the head is retracted and retract the slide as the head is advanced, means for limiting the movement of the lever during the retracting of the head, and means for limiting the transverse movement of the slide during the advance of the head, substantially as described.

22. A sole pressing machine, having, in combination, a frame, a fixed mold mounted thereon, a reciprocating head, a mold carrying slide mounted thereon, a lever mounted on the head and connected to advance and retract the slide, and a device mounted on the frame to yield during the advance of the head and connected to operate the lever to advance the slide as the head is retracted, substantially as described.

23. A sole pressing machine, having, in combination, a reciprocating head, a mold carrying slide mounted thereon, a lever 20 mounted on the head and connected to advance and retract the slide, a lever 26 connected with the lever on the head, and a spring tending to move the lever 26 in a direction to retract the slide, substantially as described.

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

AUGUSTUS A. BALL, Jr.

Witnesses:
Fred O. Fish,
M. L. Gilman.