No. 776,823. PATENTED DEC. 6, 1904.

C. L. ALLEN.

HEEL COMPRESSING MACHINE.

APPLICATION FILED NOV. 12, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

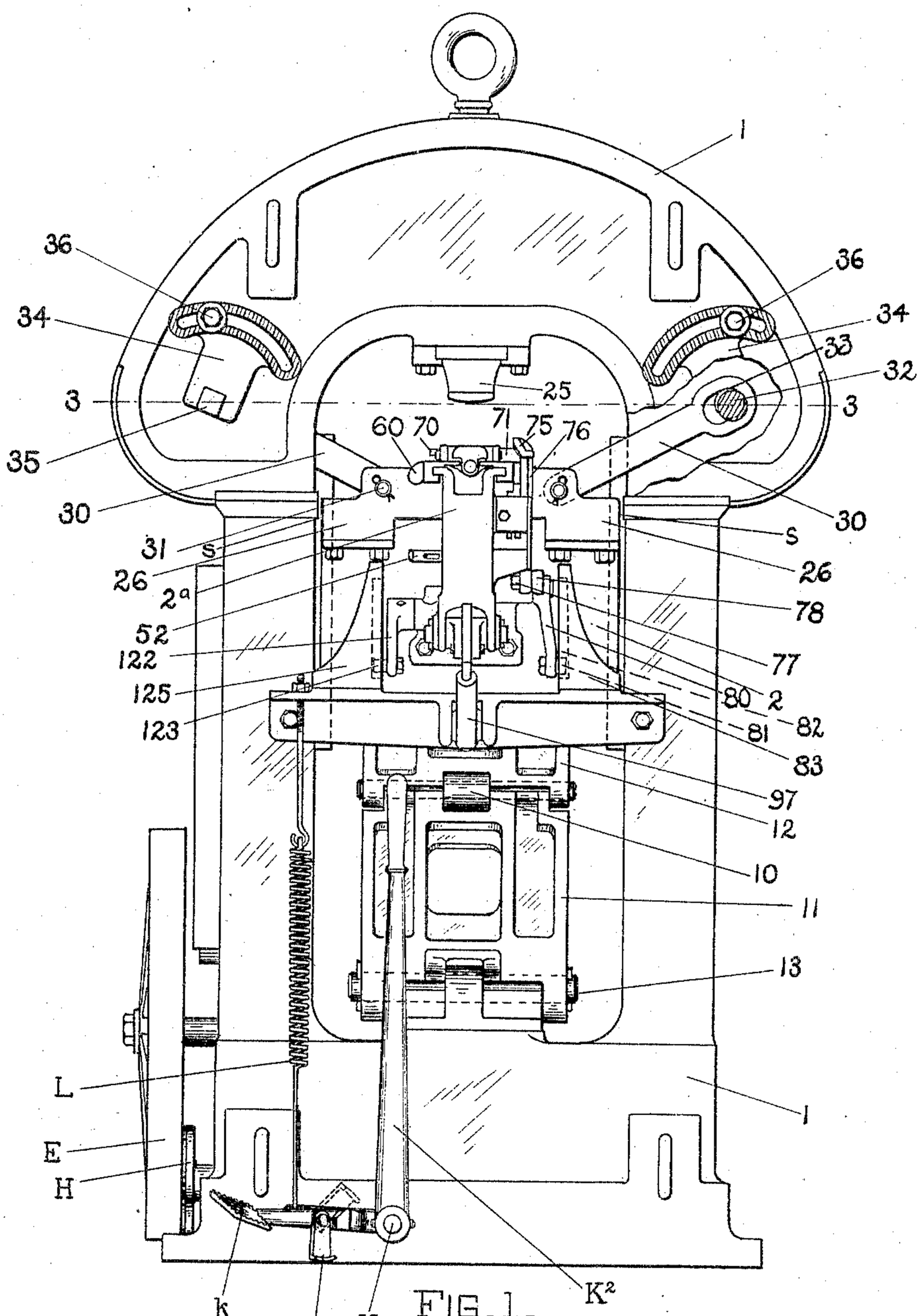


FIG. 1.

WITNESSES.

Arthur L. Russell

Edward H. Palmer.

INVENTOR.

Charles Levi Allen

by his Attorney

Nelson W. Conrad

No. 776,823. PATENTED DEC. 6, 1904.

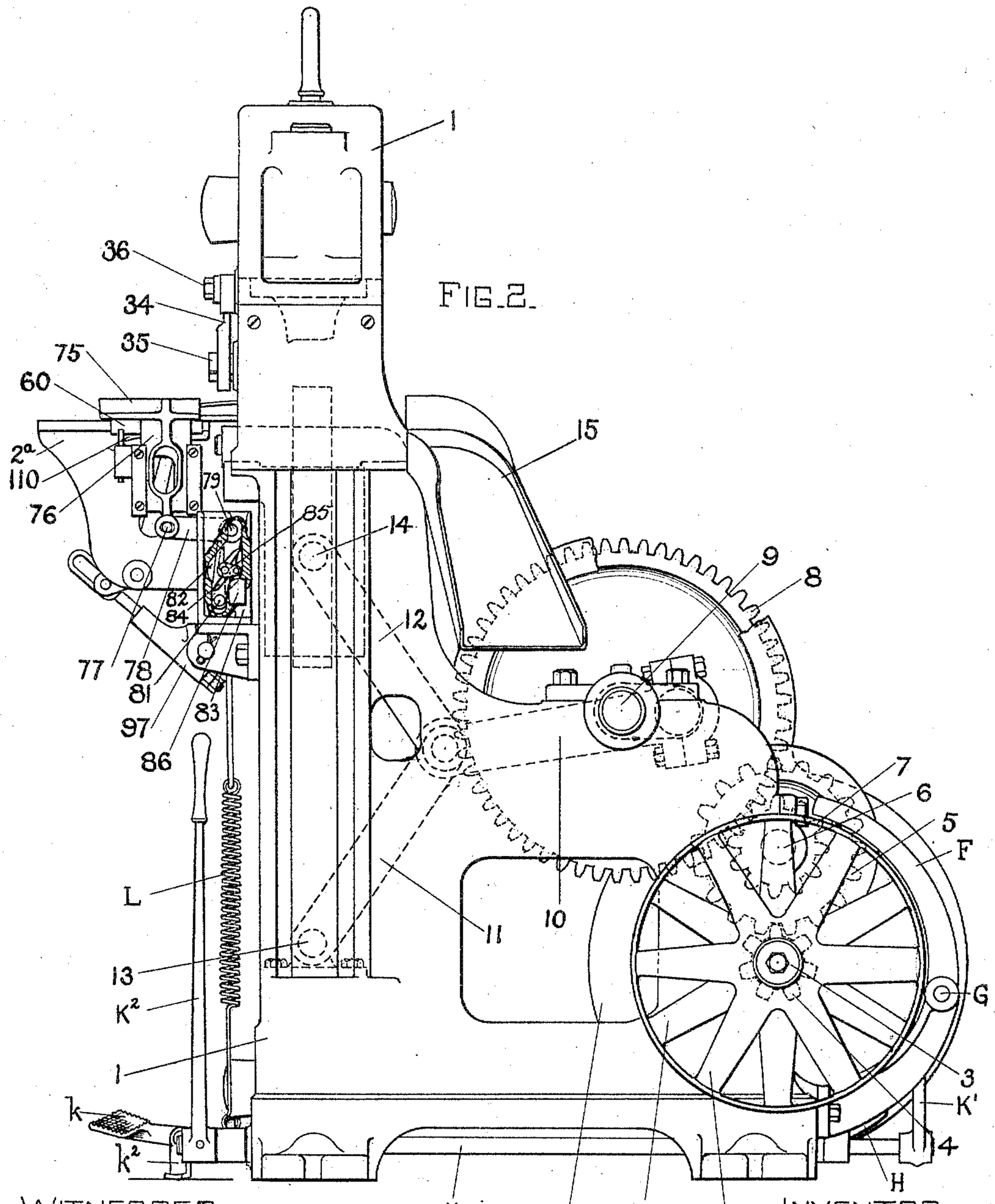
C. L. ALLEN.

HEEL COMPRESSING MACHINE.

APPLICATION FILED NOV. 12, 1902.

NO MODEL. 4 SHEETS—SHEET 2.

FIG. 2.



WITNESSES.

Arthur L. Russell

Edward H. Palmer.

INVENTOR.

Charles Levi Allen

by his Attorney,

Nelson W. Howard

No. 776,823. PATENTED DEC. 6, 1904.

C. L. ALLEN.

HEEL COMPRESSING MACHINE.

APPLICATION FILED NOV. 12, 1902.

NO MODEL. 4 SHEETS—SHEET 3.

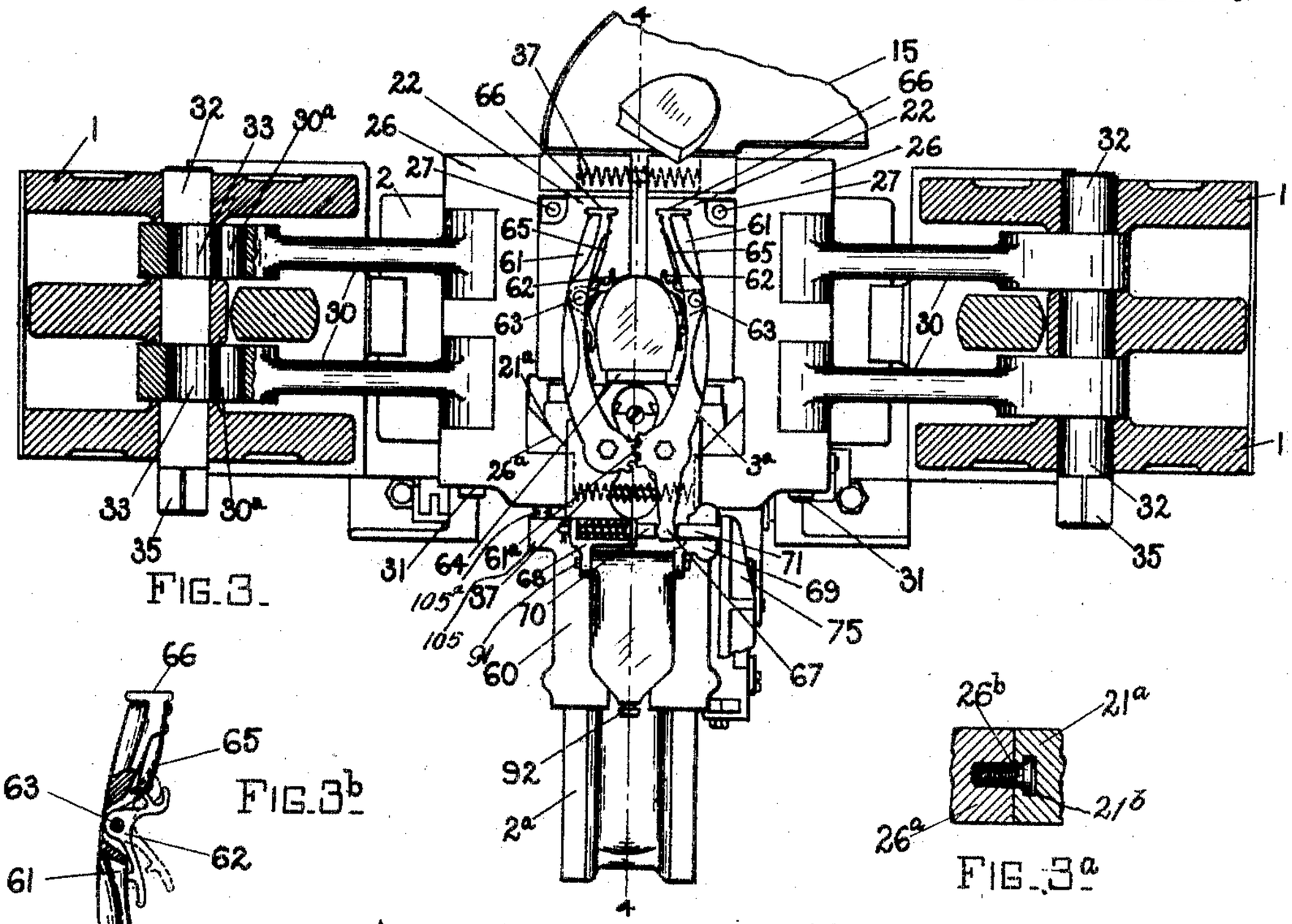


FIG. 3.

FIG. 3b.

FIG. 3a.

FIG. 4.

WITNESSES.

Arthur L. Russell.

Edward H. Palmer.

INVENTOR.

Charles Lori Allen

by his Attorney

Nelson W. Howard

No. 776,823. PATENTED DEC. 6, 1904.

C. L. ALLEN.

HEEL COMPRESSING MACHINE.

APPLICATION FILED NOV. 12, 1902.

NO MODEL. 4 SHEETS—SHEET 4.

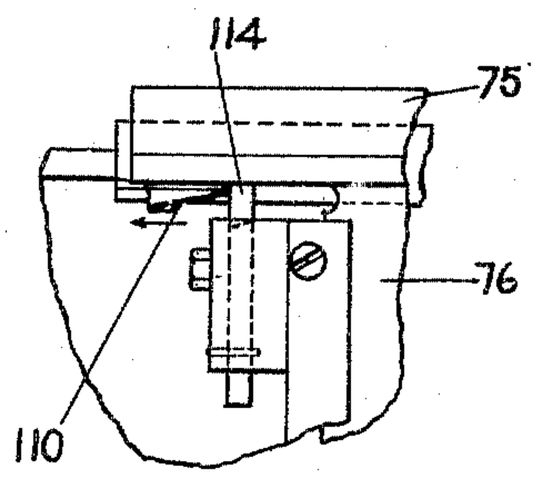


FIG. 7.

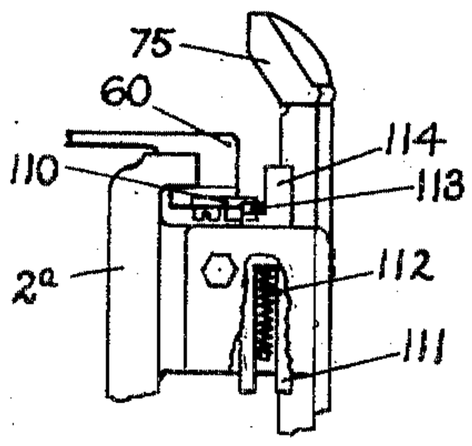


FIG. 6.

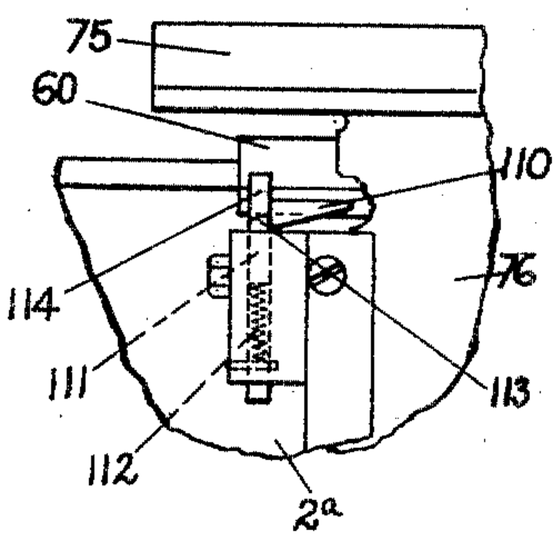


FIG. 5.

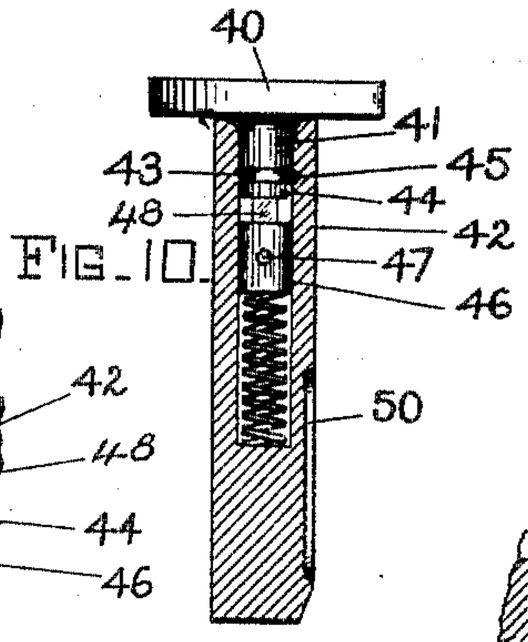


FIG. 10.

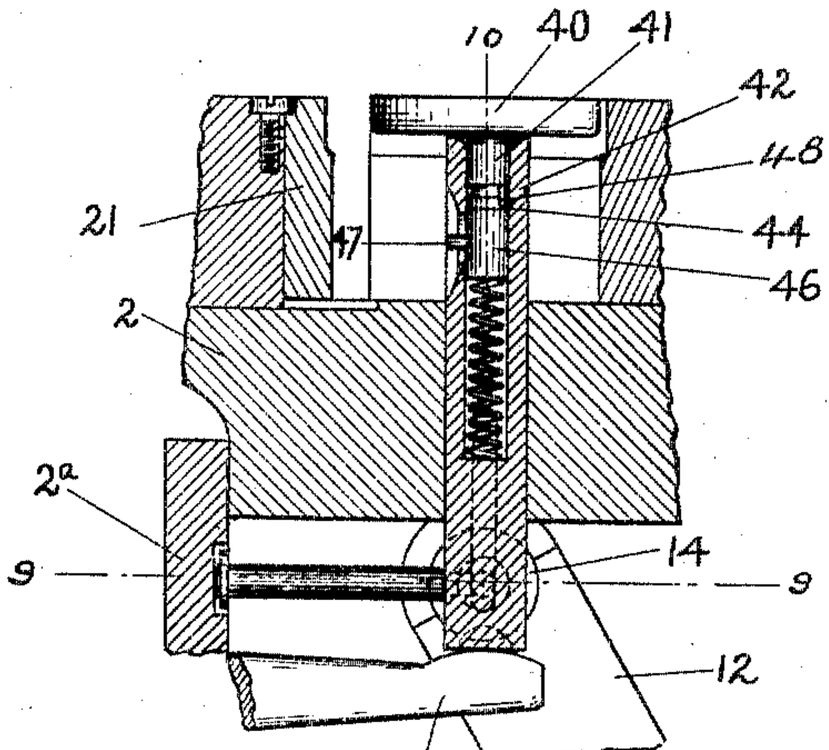


FIG. 8

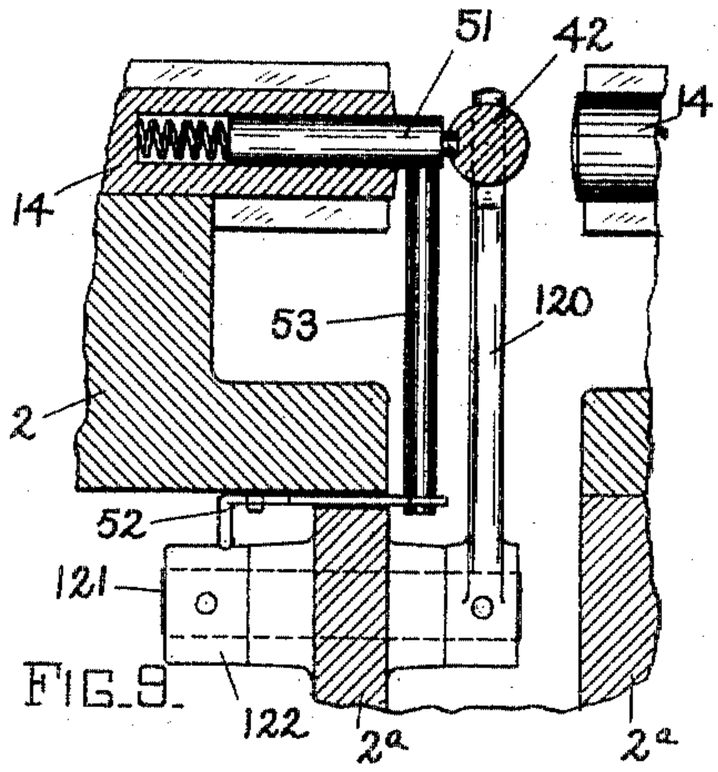


FIG. 9.

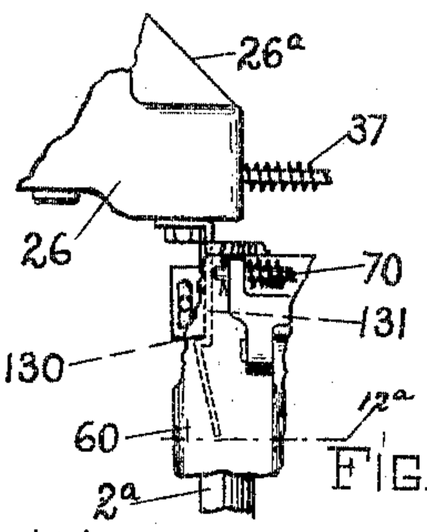


FIG. 12.

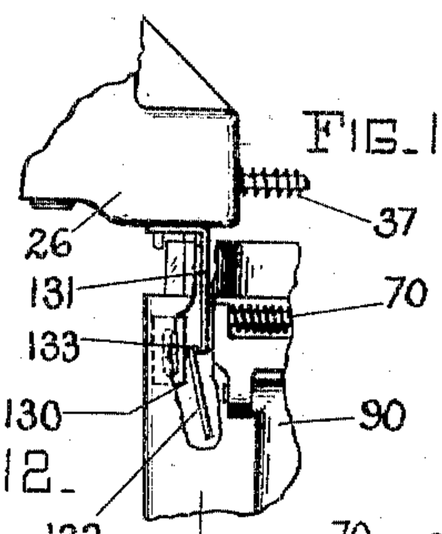


FIG. 13.

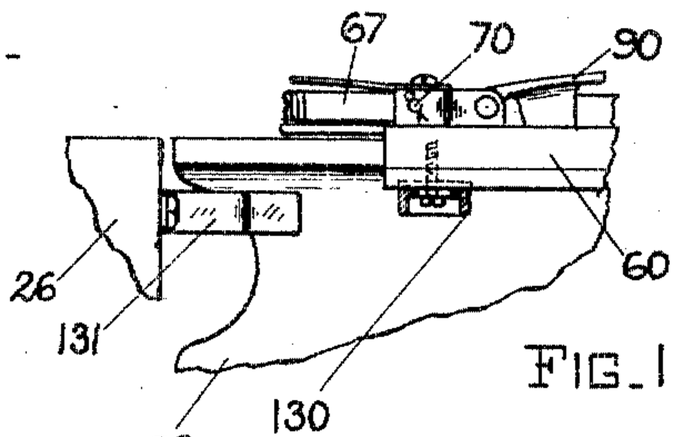


FIG. 11.

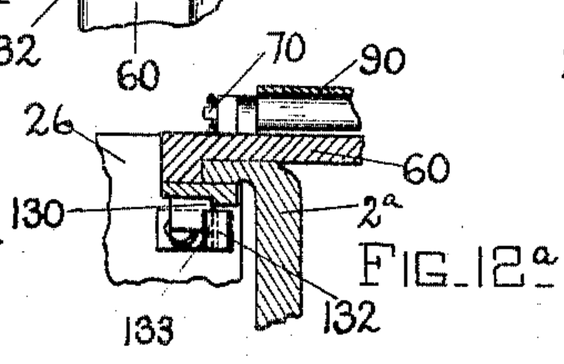


FIG. 12a.

WITNESSES.

Arthur L. Russell.
Edward H. Palmer.

INVENTOR.

Charles Levi Allen,
by his Attorney
Nelson W. Howard

No. 776,823. Patented December 6, 1904.

UNITED STATES PATENT OFFICE.

CHARLES LEVI ALLEN, OF WINCHESTER, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, AND BOSTON, MASSACHUSETTS, A CORPORATION OF NEW JERSEY.

HEEL-COMPRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 776,823, dated December 6, 1904.

Application filed November 12, 1902. Serial No. 131,017. (No model.)

To all whom it may concern:

Be it known that I, CHARLES LEVI ALLEN, a citizen of the United States, residing at Winchester, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Heel-Compressing Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to heel-compressing machines; and its object is to improve and perfect machines of this class.

An important feature of the invention consists in novel means for automatically opening the heel-compressing mold as soon as the compressing force is discontinued. In the machine herein shown the mold is carried on a reciprocating head and is actuated to compress the heel laterally by a link connection between the parts of the mold and the frame, whereby the parts of the mold are forced together as the head ascends and are permitted to separate as the head descends. It has been found objectionable to have the parts of the mold moved apart as far as they would be if the opening and closing movements took place during the entire ascent and descent of the head, and therefore the links are attached at one end to their coöperating member by a lost-motion connection, which renders them operative to close the mold during the last portion of the upward movement of the head and to separate the parts of the mold during the last portion of the downward movement. It is desirable, however, to have the parts of the mold separated to release the heel during the first portion of the descent of the head in order to allow a longer period in the cycle of the machine's operations for the removal of the compressed heel and the insertion of the next heel-blank to be operated upon. It has been proposed to employ a cam to coöperate with the links and cause them to open the mold during the first portion of the descent of the reciprocating head; but this construction was an expensive one and occasioned frequent breakage of the machine. I have therefore interposed between the parts of the mold expansible springs which are compressed when the mold is closed and which will open the mold during the first portion of the descent of the head. In connection with the springs I have so arranged the links that they will positively separate the parts of the mold during the latter half of the descent of the head if for any reason—such, for instance, as a slight obstruction or unusual resistance—the springs fail to open the mold during the first portion of the descent of the head.

Another feature of my invention consists in providing movably-mounted spring-actuated fingers for the clamping members of the mechanism for feeding heel-blanks to the mold. Heel-blanks for the different sizes and styles of shoes vary greatly in size and shape, and for the best results it is desirable that provision be made for adapting the feeding mechanism to the different sizes and shapes of blanks to be fed, so that each blank will be securely grasped while being carried to the mold. I have therefore provided the clamping members of the feeding mechanism with movably-mounted fingers or heel-blank-engaging devices and have provided springs for holding the fingers yieldingly in position to grasp the smallest heel-blank for which the fingers are adapted, but which permit the fingers to be further separated to receive larger sizes of blanks. In connection with this feature of my invention I have also mounted the said fingers so that they can be readily removed and replaced by others which are adapted for other sizes of heel-blanks.

Another feature of the invention consists in providing means for limiting the movement of the top-lift plate and preventing said plate becoming displaced. The machine comprises mechanism for producing a relative vertical movement between the top-lift plate and the side compressing-dies of the mold after the mold is opened to bring the compressed heel, which is supported on the top-lift plate, above the walls of the mold, so that it can be ejected from the machine by a lateral movement. It might sometimes happen

that the top-lift plate would be accidentally raised above the walls of the mold and become displaced, so that it would not return to its normal position before the mold closed again, and breakage of the machine would be liable to be caused. I have provided a locking device for limiting the extent of the movement of the top-lift plate, whereby it is prevented from rising above the walls of the mold and its proper return to operative position is insured. Said limiting means also preferably serves to prevent the top-lift plate from rotary movement. Means is provided by which the workman may withdraw the locking device to permit the top-lift plate to be removed when desired. The top-lift plate is also removably connected to its supporting block or post, and means is provided for locking said parts against accidental disconnection.

A further feature of my invention consists in a braking device for checking the forward movement of the feeding and ejecting mechanism at the end of its feeding stroke, so as to reduce the jarring of the machine. In the machine herein shown the feeding and ejecting mechanism is moved rapidly forward to carry a heel-blank into position to be compressed and simultaneously to impart to the compressed heel a quick blow, which is sufficient to force it off from the top-lift plate and out of the machine. I have provided a braking device which becomes operative after the ejecting devices have struck the heel and which checks the movement of the feeding and ejecting mechanism and reduces the jar occasioned when the mechanism is brought to rest at the end of its feeding stroke. In the preferred form of the invention the braking device is arranged to act as a stop or locking device to prevent rebound of the feeding and ejecting mechanism after it reaches the end of its advance movement.

A preferred form of the present invention is illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the machine. Fig. 2 is a side elevation of the machine. Fig. 3 is a horizontal section on line 3 3 of Fig. 1, showing the heel-blank holder closed. Fig. 3[a] is a detail view on section-line 3[a], Fig. 3. Fig. 3[b] is a detail view of one of the feeding-arms. Fig. 4 is a vertical section on line 4 4 of Fig. 3 and shows the relative position of the several parts when the reciprocating head is depressed. Fig. 5 is a right-hand side elevation of a portion of the reciprocating head and the feeding-slide to show the combined braking and locking device for the feeding-slide. Fig. 6 is a front view of the same parts. Fig. 7 is a view similar to Fig. 5, showing the parts in the position occupied when the cam has been depressed and the slide is moving in the direction indicated by the arrow. Fig. 8 is an enlarged detail view of the top-lift plate and its supporting and locking devices. Fig. 9 is a sectional view on line 9 9 of Fig. 8. Fig. 10 is a sectional view on line 10 10 of Fig. 8, showing the position of the top-lift plate when it is being locked. Figs. 11, 12, 12[a], and 13 show in plan, rear and side elevations a modified form of braking and locking mechanism for the feeding-slide.

1 indicates the rigid framework of the machine, which supports the actuating mechanism.

2 indicates a head which is adapted to be vertically reciprocated in suitable guideways formed in the sides of the rigid frame and hereinafter referred to as the "head" or the "reciprocating head" of the machine.

3 indicates the driving-shaft, mounted in bearings in the rear portion of the frame of the machine and provided with suitable fast and loose pulleys. The driving-shaft carries a pinion 4, which engages with a gear 5 on a counter-shaft 6. The counter-shaft 6 carries a pinion 7, which engages with a gear 8 on the crank-shaft 9. A link 10 is connected to the crank-shaft 9 and also to a toggle composed of members 11 and 12. The toggle member 11 is pivoted at 13 to a rigid portion of the frame near its base. The other toggle member, 12, is pivoted at 14 to the reciprocating head 2.

15 indicates a chute attached to the frame of the machine and adapted to conduct away the compressed heels as they are ejected from the compressing mechanism.

The reciprocating head supports a heel-mold which comprises a top-lift plate 40, a breastplate 21, and laterally-movable side compressing-dies 22 22.

25 indicates a heel-seat die or follower removably supported in the upper portion of the frame 1 in alinement with and in position to coöperate with the mold carried by the reciprocating head 2.

The side compressing-dies 22 22 are removably supported in slides 26 26 and are held in place in said slides by pins 27 27, passed through interlocking ears in the side compressing-dies and the slides 26 26. The slides 26 are provided with beveled faces 26[a], and the breastplate 21 is provided with beveled faces 21[a], coöperating with the similar faces on the slides 26. The faces 21[a] are provided with undercut grooves, while the faces 26[a] are provided with ribs or lugs 26[b], shaped to be guided in the grooves 21[b], (see Fig. 3[a],) whereby when the slides 26 are moved to open or close the sides of the mold the breastplate 21 will also be moved to open or close the front of the mold. This arrangement insures that the members 21 22 22 of the mold shall be actuated simultaneously.

The side compressing-dies and breastplate are actuated to close the mold and compress the heel laterally by links 30, pivotally connected at their inner ends by pins 31 with the

slides 26 and connected at their outer ends by pivot-pins 32 32 with a fixed portion of the frame. (See Figs. 2 and 3.) The arrangement is such that when the reciprocating head 2 is in its lower position the links extend obliquely from their pivotal connection with the frame to their connection with the slides 26, and as the head 2 rises the links are turned into an approximately horizontal position, and in moving to this position the links move the slides 26 and force the breastplate 21 and the side compressing-dies 22 22 together to close the mold. The links 30 are slotted at 30[a] at their connection with the pivot-pins 32 to permit the links to slide with relation to said pivot-pins and allow for lost motion, so that the slides 26 are moved toward and from each other during a portion only of each reciprocation of the head 2. The pivot-pins 32 are provided with eccentric portions 33 where they pass through the slots 30[a] in the links 30. Said pivot-pins are adapted to be turned to adjust said eccentric portions in the slots to vary the amount of lost motion. The means shown for adjusting the pivot-pins 32, which project through to the front face of the machine-frame, consists in crank-arms 34, mounted on the squared ends 35 of the pivot-pins. The crank-arms 34 are adapted to be held in adjusted position by means of clamping-nuts 36. (See Fig. 2.) The direct and positive connection which is provided between the links 30 and the slides 26 requires a minimum of parts and avoids the loose movement between these parts which has been an objectionable feature of prior constructions in which dust and pieces of leather were liable to accumulate between the members and interfere with the accurate closing of the mold.

It is desirable to have the mold opened during the first portion of the descent of the reciprocating head to release the compressed heel, and inasmuch as the lost-motion connections between the links 30 and the machine-frame prevent said links operating for this purpose compressed springs 37 are interposed between the slides. The springs have their ends inclosed in sockets 38 in the adjacent faces of the slides 26. (See Figs. 3 and 4.) These springs separate the slides during the first portion of the descent of the head, being strong enough to move the slides 26 with the dies 22 and the breastplate 21 and links 30 for opening the mold. It is undesirable that the parts of the mold be separated by the full throw of the links, because that would open the mold wider than is necessary for the removal of the compressed heel and the insertion of the blank next to be operated upon, so that the blank would be liable to get out of position before being inclosed by the mold. Such extra movement would also occasion unnecessary wear on the parts. In the present machine the lost-motion connection between the upper ends of the links 30 and the pivot-pins 32 in the frame permits the parts of the mold to be separated less than the full throw of the links. The movement of the parts of the mold is limited by the contact of the slides 26 with the sides of the frame 1, as shown at *s s* in Fig. 1. After the dies have reached the limit of their opening movement the slotted links slide with relation to their pivot-pins 32 during the remaining portion of the descent of the head, said lost-motion connection permitting the parts of the mold to remain at rest. This construction provides positively-actuated means for insuring that the molds shall be completely opened during the descent of the head even if for any reason the springs fail to operate properly. When the reciprocating head 2 is rising, the lost-motion connection of the links 30 to the pivot-pins 32 permits the links to slide with relation to the said pivot-pins, leaving the parts of the mold separated during the first portion of the rise of the head. After the lost motion has been exhausted the links are actuated during the remainder of the rise of the head and move the slides 26 to close the mold. It will thus be seen that the closing and opening movements of the mold take place, respectively, during the last portion of the rise of the head and the first portion of its descent, so that the mold remains open between its compressing operations during a considerable portion of the cycle of the machine's operations to facilitate the removal of a compressed heel and the insertion of a blank.

The top-lift plate 40 is provided with a stem 41, by means of which it is connected to a supporting-block 42. (See Figs. 8 and 10.) The stem 41 of the top-lift plate is provided with an annular groove 43, and on one side it is planed off, as at 44, from the end of the stem to the groove to a depth equal to the depth of the groove. The supporting-block 42 is chambered out to receive the stem of the top-lift plate, and in said chamber is provided a lug or shoulder 45. The stem of the top-lift plate is adapted to be inserted into the chamber of the supporting-block with the planed-off side 44 in alinement with the lug 45, and after the stem has been inserted the top-lift plate may be turned part-way round, so that the lug 45 will be in the groove 43 and out of alinement with the planed side 44. This connection between the stem of the top-lift plate and the supporting-block is a form of bayonet-joint. Preferably means is provided for locking the plate and block against relative rotary movement, and to this end a spring-pressed bolt 46 is located in the lower portion of the chamber of the block 42 and is provided with an operating-pin 47, projecting out through a slot and into a depression in the wall of the supporting-block 42. The bolt 46 has on its end an upwardly-projecting lip 48, which is adapted to be forced into the space between

the planed side 44 of the stem 41 and the wall of the chamber when the top-lift plate 40 is in the proper position, and said lip holds the top-lift plate from rotation with relation to the block 42, and therefore prevents it from being turned into such position with relation to said block as to permit the stem to be withdrawn from the supporting-block.

The supporting-block 42 is provided on one side with a longitudinal groove 50, and a spring-pressed pin or bolt 51 is mounted for horizontal movement in the bolt 14, which has bearing in the head 2. The inner end of the bolt 51 extends into the groove 50 of the supporting-block 42 to prevent the supporting-block 42 from being accidentally expelled from its socket in the reciprocating head 2 and also to prevent rotary movement of said block. The locking-bolt 51 may be withdrawn by means of an operating device 52 53 (see Figs. 1 and 9) to permit the removal of the supporting-block and the top-lift plate. The groove 50 in the supporting-block 42 is of considerable length in order to permit the supporting-block and top-lift plate to be raised with relation to the reciprocating head 2 to carry the heel above the walls of the mold, as shown in Fig. 4.

The reciprocating head 2 has a forward extension 2^a, (seen in Figs. 1, 2, and 3,) which constitutes a table or support for a feeding and ejecting mechanism. The feeding and ejecting mechanism comprises among its parts the slide 60, movable on suitable guides on the table. Heel-blank-clamping arms 61 61 are pivotally mounted on the slide 60. Grasping-fingers 62 62 are pivotally connected to the arms 61 at 63 63 and are adapted to be readily removed and replaced by others of a different size, according to the size of the heel-blanks to be fed.

64 indicates an abutment on the front end of the slide 60, which is adapted to engage the breast of the heel-blank.

65 65 indicate springs secured to the arms 61 61 and acting on the clamping-fingers 62 62 to turn them toward the abutment 64. The spring-pressed fingers 62 62 and the abutment 64 constitute a clamp for embracing and holding a heel-blank (see Fig. 3) while it is being fed into position on the top-lift plate 40 and beneath the heel-seat die 25. The clamp thus formed is adapted to hold heels varying somewhat in size, and it may be adapted to other sizes of heels by removing the fingers 62 and substituting others of the size required.

The free ends of the arms 61 are provided with enlargements or shoulders 66 66 to contact with and push a compressed heel off from the top-lift plate and out of the machine when the slide is moved forward to the position shown in Fig. 4 to feed an uncompressed heel-blank into position to be compressed. The adjacent faces of the arms 61 61 opposite their pivotal connections to the slide 60 are formed as interlocking segmental gears 61^a. One of said arms has an extension 67, the end of which lies between two lugs 68 and 69 on the slide 60. The lug 68 is socketed and receives a spring-pressed bolt 70, which acts to hold the extension 67 normally against the lug 69 and the arms 61 closed toward each other in position to clamp and hold a heel-blank. The lug 69 is provided with a guideway to receive a sliding block 71, which is adapted to be moved to force the extension 67 of the arm 61 to the left in Fig. 3 to separate the arms 61 and release a heel-blank.

75 indicates a cam-plate supported on a slide 76, vertically movable in suitable ways formed in the side of the table or extension 2^a of the reciprocating head 2. (See Fig. 2.) The slide 76 is supported by a pivotal connection at 77 to one arm, 78, of a bell-crank lever which is fulcrumed at 79 on the reciprocating head 2. (See Figs. 4 and 9.) The other arm, 80, of the bell-crank lever is provided with a roll 81, which is received in a cam-groove 82 in a plate 83, attached to the frame of the machine. The plate 83 is provided with a movable latch 84, located in the cam-groove 82. The latch 84 is fast on a rock-shaft having an arm 85, to which is attached a weight 86. The weight 86 normally holds the rock-shaft in such position that the latch 84 extends across the cam-groove in the position shown in full lines in Fig. 2, but permits the latch to be moved into position shown in dotted lines in said figure. The movable latch 84 divides the cam-groove 82 into two paths, as shown in Fig. 2, and when the reciprocating head 2 is rising the roll on the arm 80 of the bell-crank lever moves in the path indicated by the arrows in the right-hand portion of the groove 82, and when the head is descending the roll moves in the path indicated by the arrows in the left-hand portion of the cam-groove. This cam-groove causes the bell-crank lever, pivoted at 79 to the reciprocating head, to impart to the cam-plate 75 a movement independent of the movement of the head 2 during the first portion of the rise of said head and again during the first portion of the descent of said head, while permitting the cam-plate 75 to move in unison with the head 2 during the latter parts of the upward and the downward movements of the head. The cam-plate 75 is moved into contact with the sliding block 71 to open the clamp and release a heel-blank after it has been fed into position to be compressed, and it also holds the clamp open during the retraction of the feeding-slide 60 to position for receiving another blank. The plate has a face extending parallel with the feeding-slide 60 and of a length somewhat greater than the extent of movement of the slide. The said face of the cam-plate comprises a lower beveled portion and an upper vertical portion. (Shown best

in Figs. 1 and 6.) The plate is moved downwardly with relation to the feeding-slide 60 from the position shown in Figs. 1, 3, and 4 to engage the sliding block 71 for opening the clamp. This movement takes place while the feeding-slide is in the advanced position shown in Figs. 3 and 4. The slide is thereafter retracted to bring the clamp into receiving position and the vertical face of the plate 75 remains in engagement with the corresponding face of the block 71 during the retraction of the slide and holds the clamp open ready to receive the heel-blank next to be fed.

The slide 60 has a tailpiece 90 pivotally connected to it at 91 and provided on its rear end with a latch-bolt 92 to lock it in normal position, as shown in full lines in Fig. 4. The tailpiece 90 is provided on its lower side with ears suporting a roll 93.

94 indicates a bell-crank lever pivoted at 95 in the table or extension 2^a of the head 2. The lever 94 is forked at its upper end to engage the roll 93 on the pivoted tailpiece, thereby forming a detachable connection between the feeding-slide 60 and the lever 94, which permits the slide to be removed from the machine when the tailpiece 90 is unlocked and turned into the dotted-line position shown in Fig. 4. The lower arm of the lever 94 is provided with a roll 96. (See Fig. 4.)

97 indicates an arm pivotally connected to the frame 1 at 98.

99 is a link or rod slotted at its upper end at 100 to receive the roll 96 and having its lower end portion extended through the arm 97.

101 indicates a spring inclosed within the arm 97. The spring surrounds the rod 99 and has bearing against a stop 99^a on the rod, so that it normally holds said rod in its uppermost position, as shown in Fig. 4, but permits it to be depressed.

The slot 100 forms a lost-motion connection between the rod 99 and the lever 94. During the first part of the rise of the reciprocating head the roll 96 travels in the slot 100 and the lever 94 is not actuated to move the feeding-slide 60. During the latter part of the rise of the head 2 the roll comes to the end of the slot 100, and thereafter the lever 94 is actuated to move the slide in the direction to retract the blank-holder from the mold. When the head 2 begins to descend, the roll 96 again travels the length of the slot 100 without actuating the lever 94 or causing the slide 60 to be moved, giving ample time for the workman to insert a heel-blank into the clamp; but after the roll reaches the lower end of the slot 100 the lever 94 is actuated to move the feeding-slide 60 forward to present the blank to the compressing-dies and to eject the heel last compressed. If for any reason the forward movement of the slide for feeding a blank to the dies should be obstructed or interrupted, the spring 101 in the arm 97 will permit the rod 99 to be depressed, so that the lever 94 is not actuated and the feeding-slide 60 remains at rest, thus preventing the breaking of the machine.

The slide 60 is provided on its left-hand side with a projection 105, supporting a buffer-block 105^a, adapted to strike one of the slides 26 when the feeding-slide reaches the limit of its feeding movement, and on its right-hand side the slide 60 is provided with an adjustable laterally-projecting lug 110, having an inclined lower face. (See Figs. 2, 5, 6, and 7.)

111 indicates a plunger which is mounted in the side of the table or extension of the reciprocating head. The plunger 111 is normally pressed upward by a spring 112. (See Figs. 5, 6, and 7.) The plunger 111 has a face 113, located in the path of the lug 110, carried by the feeding-slide, and the plunger is held normally in such a position that the lug 110 contacts with the face 113 of the plunger and depresses it as the feeding-slide approaches the end of its forward movement in feeding a blank. The plunger acts as a drag or brake to check the forward movement of the slide 60 after the abutments 66 have struck the compressed heel for ejecting it. The slide in completing its movement carries the lug 110 just beyond the plunger 111, which then rises behind the lug 110 and acts as a lock to prevent rebound of the feeding-slide. The plunger 111 has a projection 114, which stands in the path of the vertically-movable cam-plate 75, which when said cam-plate descends contacts with the projection 114 to depress the plunger out of the path of the lug 110 before the feeding-slide 60 is retracted.

In Figs. 11, 12, and 13 I have shown a modified form of braking and locking mechanism. 130 indicates a lug adjustably secured to the feeding-slide 60 and corresponding in function to the lug 110, above described. 131 indicates a spring-plate secured to one of the transversely-movable mold-carrying slides 26 in position to be engaged by the lug 130 as the feeding-slide approaches the end of its feeding movement. The spring-plate corresponds in function to the plunger 111, before described. The plate has a face 132 inclined to the path of travel of the lug 130 and adapted to be frictionally engaged by said lug. The plate has also a shoulder 133, which engages behind the lug 130, as shown in Fig. 12, when the feeding-slide reaches the end of its feeding movement and which locks the feeding-slide against rebound. It is to be understood that the feeding-slide advances to feed a heel-blank after the slides 26 have been drawn back to open the mold, the spring-plate 131 then being in the relation shown in Fig. 12 to the path of movement of the feeding-slide. The feeding-slide remains in its advanced position until the mold-carrying slides 26 have begun to move toward each other, in which

movement the spring-plate is carried laterally out of the path of the lug 130 on the feeding-slide, and said slide is then free to be retracted, as shown in Fig. 13.

120 indicates an arm of a bell-crank lever fulcrumed on a rock-shaft 121, journaled in the reciprocating head 2. 122 indicates another arm of said lever, and this arm is provided with a cam-roll 123, adapted to move in a cam-groove 124 in a plate 125, supported on the frame of the machine. 126 indicates a movable latch, and 127 a weight for actuating said latch. The plate 125 and the cam-groove 124 and also the movable latch 126 and weight 127 are similar in all essential respects to the plate 83, provided with the cam-groove 82, latch 84, and weight 86, heretofore described. The free end of the arm 120 is directly beneath the lower end of the top-lift-plate-supporting block 42, and the movement imparted to said arm 120 by the cam-groove 124 causes said arm to raise the said supporting-block 42 during the first portion of the descent of the reciprocating head or to hold the said block against descent with the said head, whereby a relative movement is produced between the top-lift plate, which constitutes the bottom of the mold, and the side compressing-dies, which constitute the side walls of the mold. This relative movement is sufficient to bring the upper surface of the top-lift plate level with the upper surface of the side compressing-dies. This raises the compressed heel, which is supported on the top-lift plate, into the path of the shoulders 66 of the feeding and ejecting mechanism heretofore described, by means of which the heel is ejected from the machine. The groove 50 in the supporting-block 42 and the guide-pin 51, normally located in said groove, permit the movement of the top-lift plate, but limit its extent, so that the top-lift plate cannot be accidentally thrown out of place. During the rise of the head the cam-groove 124 causes the top-lift plate to move with the head, mold, and feeding-slide until the cam-plate 75 has opened the clamp to release the blank which has been fed onto the top-lift plate. The cam-groove then causes the lever 120 to be rocked in the direction to lower the top-lift plate into its normal position at the bottom of the mold, and thereafter the top-lift plate is permitted to move with the mold while the side compressing-dies are being closed and the blank forced against the heel-seat die.

The driving-shaft is provided with fast and loose pulleys C and D and with a fly-wheel E.

F indicates a belt-shifter carried on a lengthwise-movable rod G, upon which is also carried a brake H in position to engage the fly-wheel and stop the machine when the belt is shifted onto the loose pulley. The rod G is actuated by a rock-shaft K, having one arm, K′, engaged therewith and the other arm, K^2, provided with a handle within convenient reach of the operator. The rock-shaft K is also provided with a foot-treadle *k*, by means of which it may be turned to cause the machine to be started, while a returning-spring L moves the rock-shaft to cause the machine to be stopped. These parts constitute a very effective starting and stopping mechanism which renders the machine completely under the control of the operator at all times. A foot k^2, pivotally connected to the treadle, may be turned into the position shown in full lines in Figs. 1 and 2 to secure the treadle against being accidentally depressed to start the machine at times when it is desired to insure that the machine shall remain inoperative—as, for instance, when it is being adjusted. The foot k^2 may be turned into the dotted-line position shown in Fig. 1 when it is not wanted for use.

The operation of the machine is as follows: When the reciprocating head 2 is in its lower position, the several parts of the mechanism occupy the position shown in Figs. 1, 2, 3, and 4, a heel-blank having been fed onto the top-lift plate, as indicated in Figs. 3 and 4, and being still held in the grasp of the clamp. When the machine is started, the head 2 begins to rise. The clamp is first opened to release the heel-blank by the cam-plate 75, which for this purpose is held approximately stationary by the cam 82 while the head rises. The top-lift plate is also held approximately stationary by the cam 124 as the head rises. This causes the side compressing-dies and breastplate, which at this time are drawn back, to rise around the heel-blank, which is supported on the top-lift plate. In the continued rise of the head 2 the arms 61 of the feeding and ejecting mechanism are farther separated by the continued movement of the cam-plate 75 to present a clear space between the mold and the heel-seat die 25, and said arms are held in this separated position during the first portion of the rise of the head 2 and during the subsequent retraction of the feeding and ejecting mechanism. The links 30 for actuating the slides 26 move with relation to their pivot-pins 32, and this lost motion permits the side compressing-dies and breastplate to remain separated until said parts have risen and surrounded the heel. During the last half of the rise of the reciprocating head 2 the side compressing-dies and breastplate are moved to close the mold, and the heel which is in the mold between the top-lift plate and the heel-seat die is compressed both laterally and vertically. The feeding and ejecting mechanism is also retracted into position to have a new heel-blank put into the heel-clamp during the last half of the rise of the head. During the first part of the descent of the reciprocating head 2 the side compressing-dies are forced apart by the springs 37 acting on the slides 26, and the breastplate is also

moved back by its connection with the slides 26. The arm 120 of the rock-shaft 121 is actuated to raise the top-lift plate with relation to the side compressing-dies to lift the compressed heel into position to be ejected. The cam-plate 75 is held stationary while the head descends to permit the arms 61 to close the clamp around the new heel-blank which by this time has been put into the clamp by the workman. During the latter part of the descent of the head the feeding-slide 60 is moved forward. When near the end of its travel, the abutments 66 of the arms 61 strike the heel last compressed and knock it out of the machine, where it falls into the chute 15, and thereafter the movement of the slide is checked by the combined brake and locking device. As the slide reaches the end of its travel the buffer 105ª strikes against the slide 26 and the feeding-slide is simultaneously locked against rebound. This movement of the feeding-slide carries the blank held in the clamp into position on the top-lift plate.

I am aware of the improvements in heel-compressing machines claimed in the application of Sanford D. Leland, Serial No. 121,473, filed August 29, 1902, and I do not claim anything claimed therein, as said improvements are not of my invention; but

What I do claim, and desire to secure by Letters Patent in the United States, is—

1. In a heel-compressing machine, means for compressing a heel, said means including a reciprocating head and a divided mold comprising movable members, means for closing the mold, a spring interposed between said members for separating them to open the mold, said closing means having provision for positively opening the mold in case the spring fails to act properly.

2. In a heel-compressing machine, means for compressing a heel, said means including a reciprocating head, a divided mold comprising movable members mounted on said head, links each attached at one end to said members and having its other end attached by a lost-motion connection with a fixed part of the machine, and springs interposed between the members of the mold and normally acting to separate said members during the first part of the descent of the reciprocating head.

3. In a heel-compressing machine, means for compressing a heel, said means including a reciprocating head, a divided mold comprising movable members, links attached to said members and each having a lost-motion connection with a fixed part of the machine, means for adjusting the extent of the lost motion, and springs mounted in sockets in adjacent faces of said members for separating them, said parts being so arranged and timed that the links close the mold during the last portion of the rise of the reciprocating head and the springs open the mold during the first part of the descent of said head.

4. In a heel-compressing machine, a heel-blank-feeding mechanism provided with a holder comprising an abutment for the breast of the heel, pivoted arms and spring-actuated devices movably mounted on said arms and arranged to exert pressure upon the opposite faces of a heel-blank for pressing the heel-blanks toward the breast-abutment, substantially as described.

5. In a heel-compressing machine, heel-blank-feeding mechanism having a holder comprising an abutment for the breast of the heel and arms provided with movably-mounted spring-actuated devices arranged to engage the oppositely-curved surfaces at the rear of the heel to force it toward the abutment, substantially as described.

6. In a heel-compressing machine, a heel-blank-feeding mechanism provided with blank-holding means comprising a relatively fixed abutment, pivoted clamping-arms, and spring-actuated devices pivotally mounted on said arms in position to engage the oppositely-curved faces of the rear edge of the heel to press it toward the abutment and adapted to coöperate with said abutment to clamp heel-blanks of varying sizes.

7. In a heel-compressing machine, a reciprocatory feeding and ejecting mechanism comprising pivoted arms provided between their ends with movably-mounted spring-actuated heel-blank-holding devices and provided at their ends with means for engaging the heel to be ejected, means for actuating said mechanism to clamp a heel-blank, eject a compressed heel, feed the heel-blank into position to be compressed, and then release said heel-blank.

8. In a heel-compressing machine, a feeding and ejecting mechanism comprising relatively movable arms provided with means for engaging the heel to be ejected, and with pivotally-mounted spring-actuated blank-holding devices, an operative connection between said arms for causing them to move together, an extension on one of said arms, and means for engaging said extension to actuate said arms to clamp or release the heel-blank.

9. In a machine of the class described, a reciprocatory feeding-slide and means for actuating it, in combination with a friction-brake for checking the slide near the end of its feeding movement.

10. In a machine of the class described, a reciprocatory feeding-slide and means for actuating it, in combination with a friction-brake for checking the slide near the end of its feeding movement, and means for rendering the brake inoperative during the return movement of the slide.

11. In a machine of the class described, the combination of a reciprocatory feeding-slide and means for actuating it, and a combined brake and locking device for checking the slide near the end of its feeding movement and locking said slide against rebound.

12. In a machine of the class described, the combination of a reciprocatory feeding-slide and means for actuating it, a combined brake and locking device for checking the slide near the end of its feeding movement and locking said slide against rebound, and automatically-operating means for withdrawing said locking device from the path of the slide prior to its return movement.

13. In a machine of the class described, a reciprocating slide provided with means for striking and ejecting a heel, actuating mechanism for said slide, and a friction-brake arranged to check the movement of said slide after it has ejected the heel.

14. In a machine of the class described, heel-compressing dies, a top-lift plate comprising part of one of said dies, means for giving said top-lift plate an independent relative movement, and means movable into and out of operative position for limiting the extent of independent movement of said top-lift plate.

15. In a machine of the class described, heel-compressing dies comprising a top-lift plate, means for actuating the compressing-dies, means for imparting an independent movement to the top-lift plate, means for retaining said plate in place and limiting the extent of its independent movement, and mechanism under the control of the workman for rendering said limiting means inoperative to permit the plate to be withdrawn.

16. In a machine of the class described, a top-lift plate and a supporting-block therefor, means detachably connecting the plate with the block, and means for locking the plate and block against relative movement.

17. In a machine of the class described, a top-lift plate having a stem and a supporting-block recessed to receive said stem, a bayonet-joint connection between said parts, and a locking device coöperating with said connection for holding said parts from relative rotary movement, said locking device comprising a spring-pressed bolt carried in the block and taking into a recess in the stem of the top-lift plate.

18. A compressing-machine, comprising laterally-movable side compressing-dies, a feeding-slide, means to advance said slide when the side compressing-dies are opened and to retract the slide when said dies are closed, combined with means for checking the advance movement of said feeding-slide and locking it against rebound, said checking and locking means comprising a stop carried by said slide and a yielding friction-plate connected with the side compressing-dies and moved thereby toward and from position to be engaged by said stop.

19. In a compressing-machine, a mold, a plate normally located in the bottom of the mold, means for raising the plate relatively to the mold to discharge a heel from the mold, and means for limiting upward movement of the plate, said limiting means comprising a part depending from the plate, and a manually-controlled stop for engaging said part.

20. In a compressing-machine, a mold comprising a top-lift plate normally located in the bottom of the mold, means for raising the plate relatively to the mold to discharge a heel from the mold, and means for limiting upward movement of the plate, said limiting means comprising a part depending from the top-lift plate and provided with a reduced portion, a stop for engaging said reduced portion, and means under control of the operator for withdrawing said stop to permit the removal of the top-lift plate.

21. In a compressing-machine, a mold comprising a top-lift plate normally forming the bottom of the mold, a supporting member, provided with a longitudinal groove, locking means connecting said top-lift plate and supporting member and adapted to unlock by relative rotary movement of said plate and supporting member, means for raising said plate relatively to the mold to discharge a heel, and means adapted to hold said supporting member against rotation, said last-mentioned means comprising a manually-controlled bolt arranged to engage normally the longitudinal groove in the supporting member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES LEVI ALLEN.

Witnesses:
NELSON W. HOWARD,
ARTHUR L. RUSSELL.