No. 776,787. PATENTED DEC. 6, 1904.

S. D. LELAND.

HEEL COMPRESSING MACHINE.

APPLICATION FILED AUG. 29, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

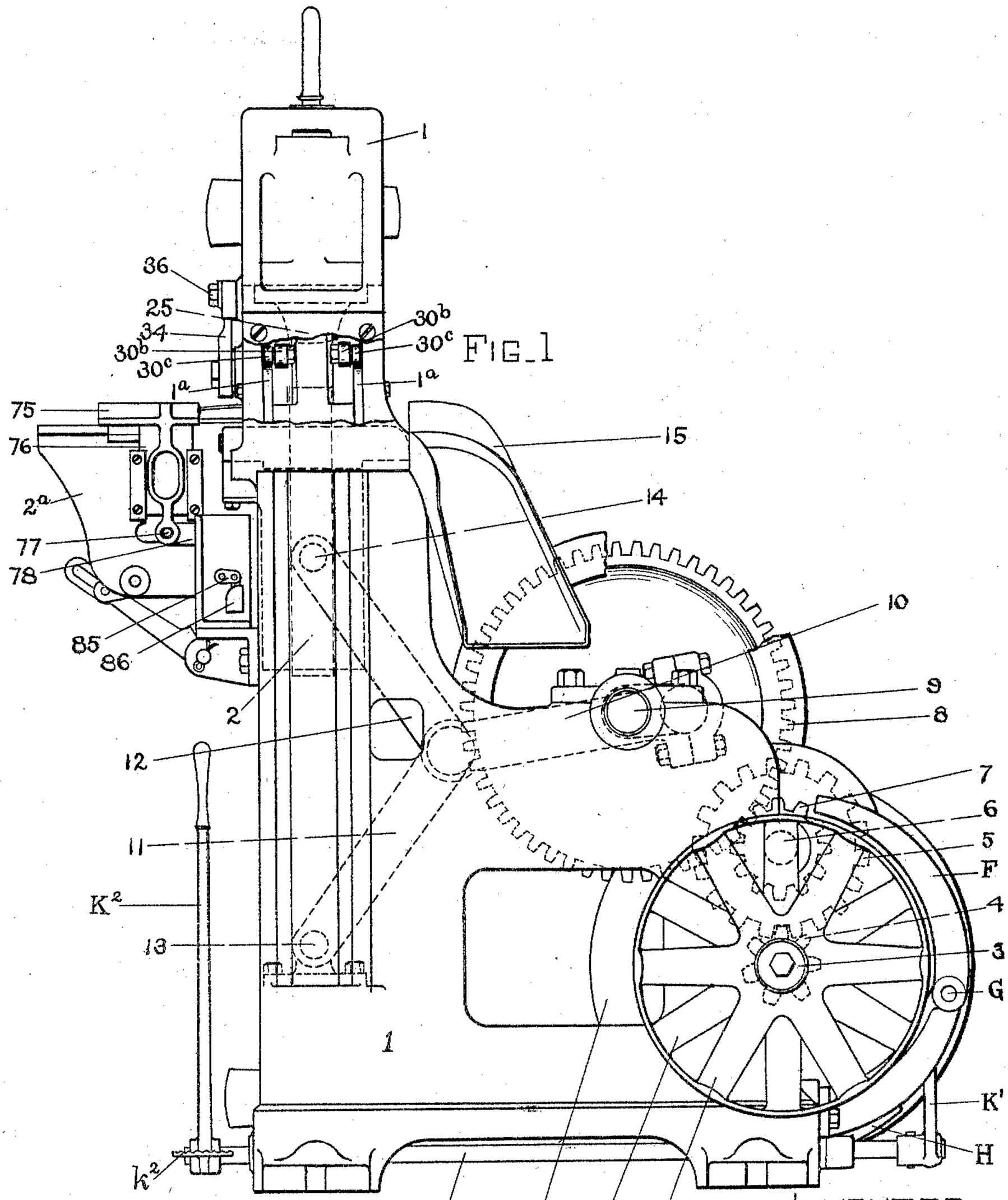

FIG. 1

WITNESSES.

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NO MODEL.

4 SHEETS—SHEET 2.

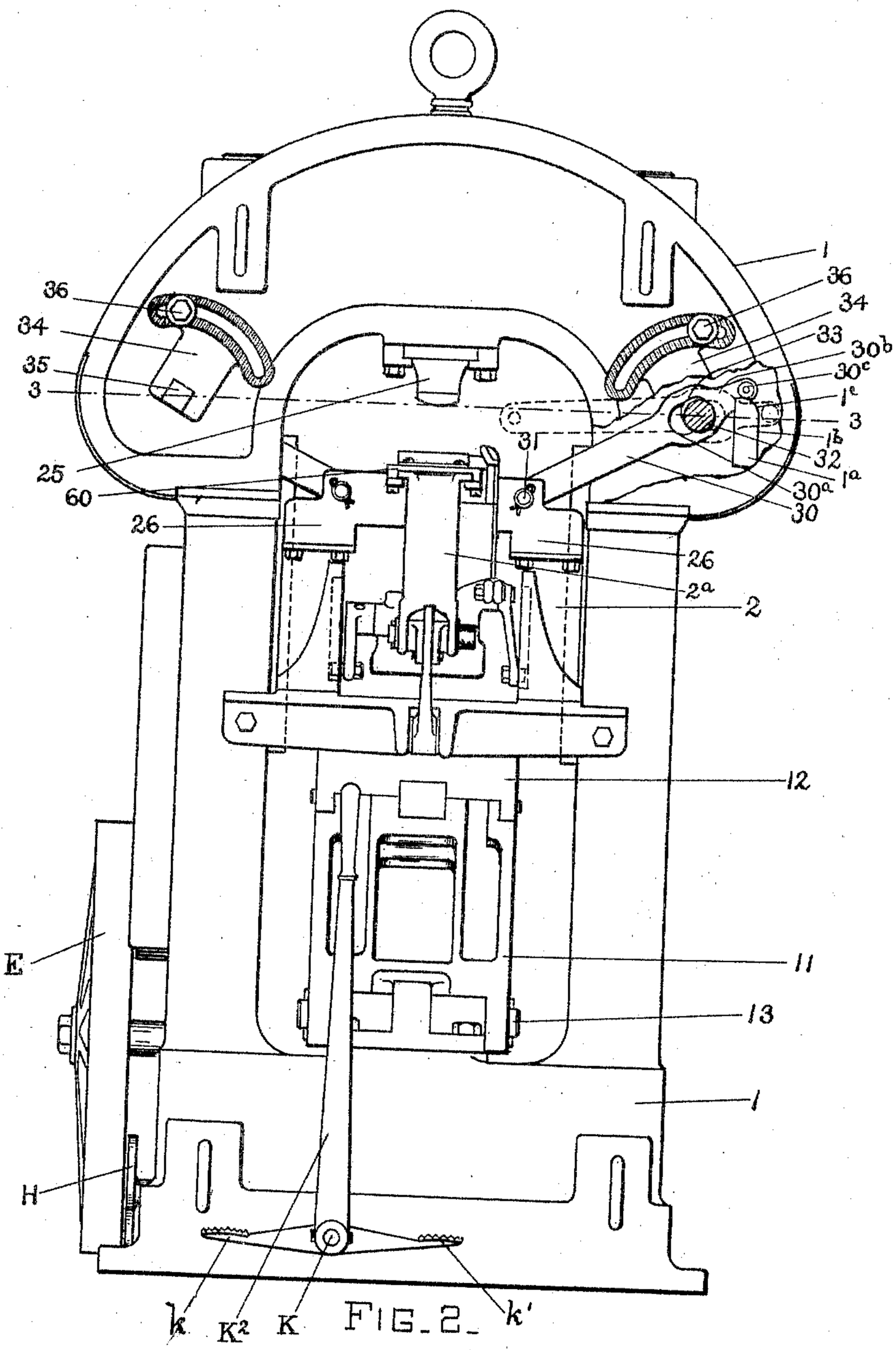

FIG. 2.

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NO MODEL.

4 SHEETS—SHEET 3.

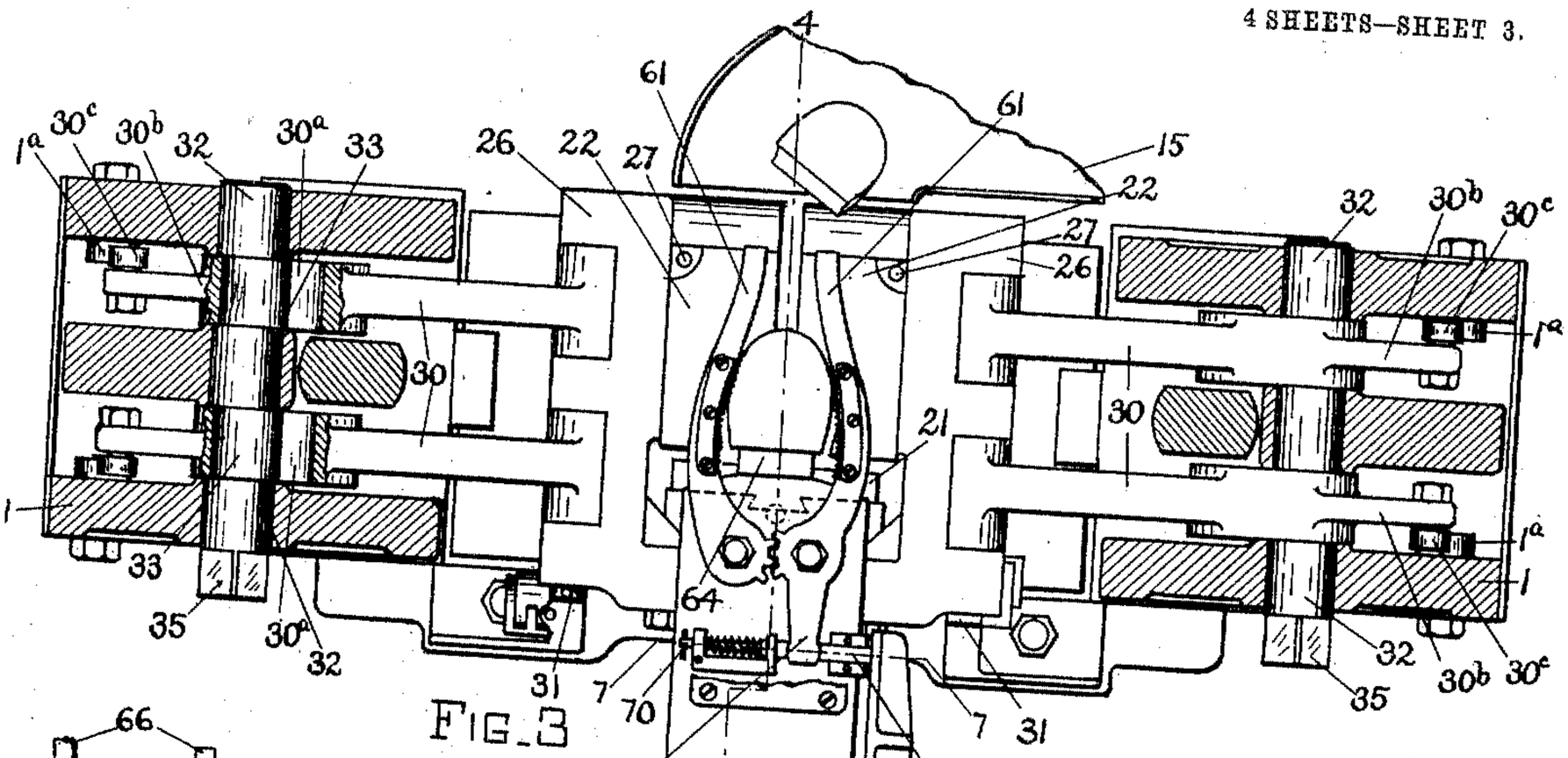

FIG. 3

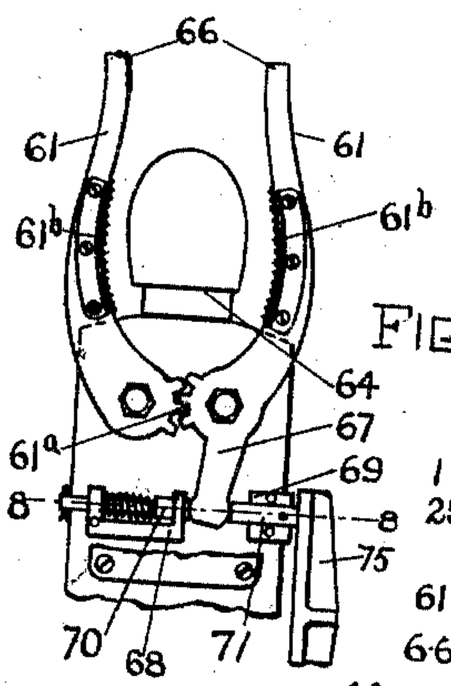

FIG. 6

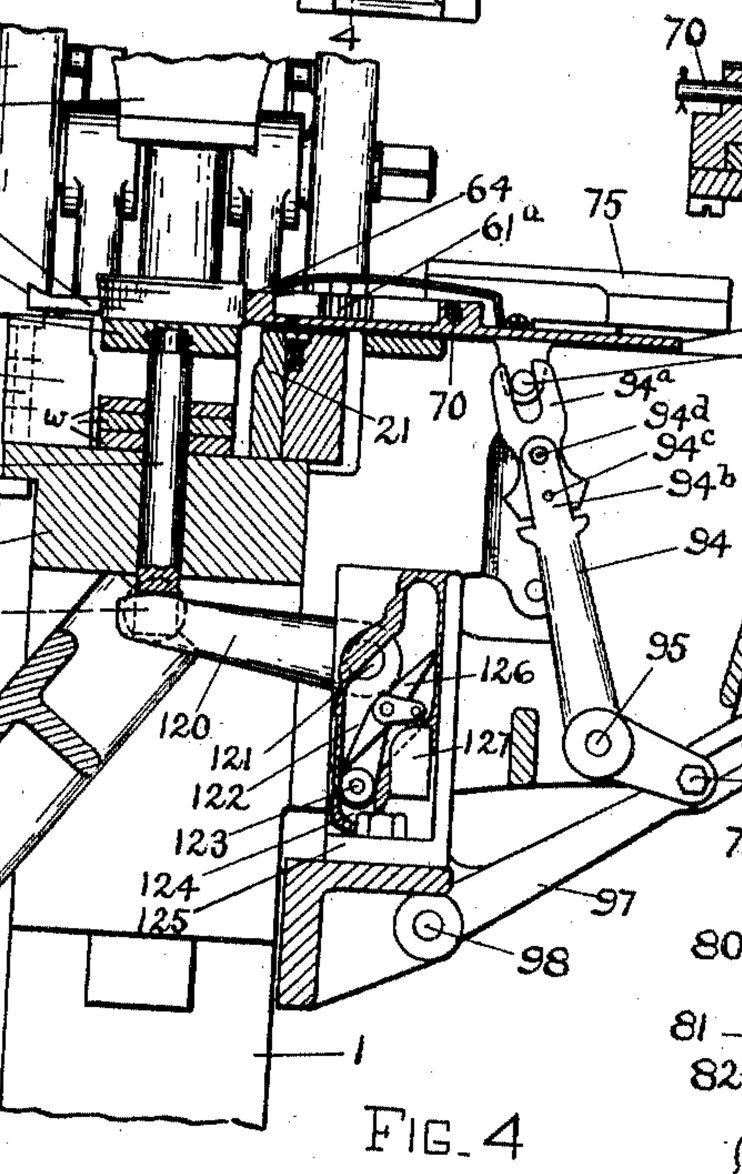

FIG. 4

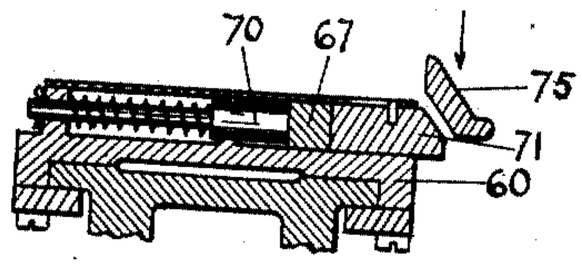

FIG. 7

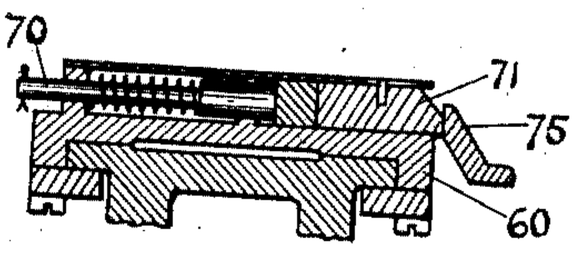

FIG. 8

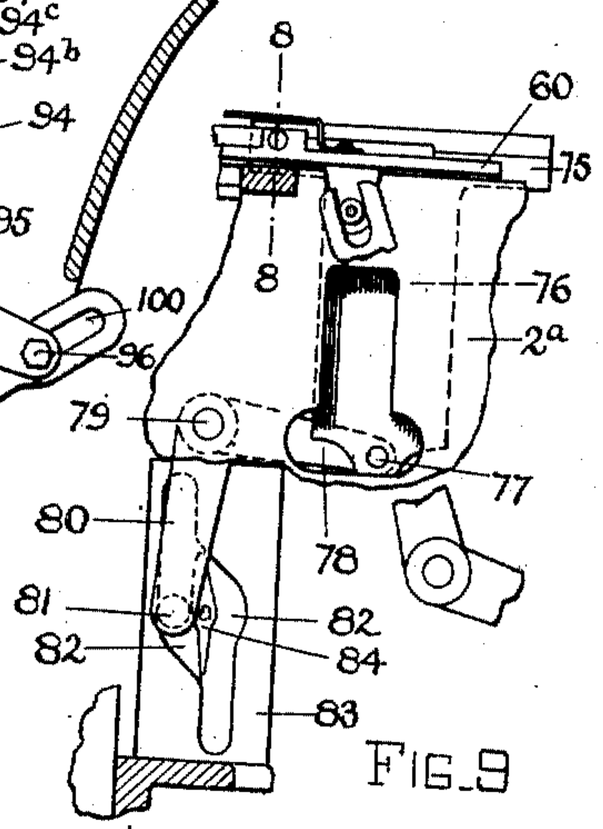

FIG. 9

WITNESSES.

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No. 776,787. PATENTED DEC. 6, 1904.

S. D. LELAND.

HEEL COMPRESSING MACHINE.

APPLICATION FILED AUG. 29, 1902.

NO MODEL. 4 SHEETS—SHEET 4.

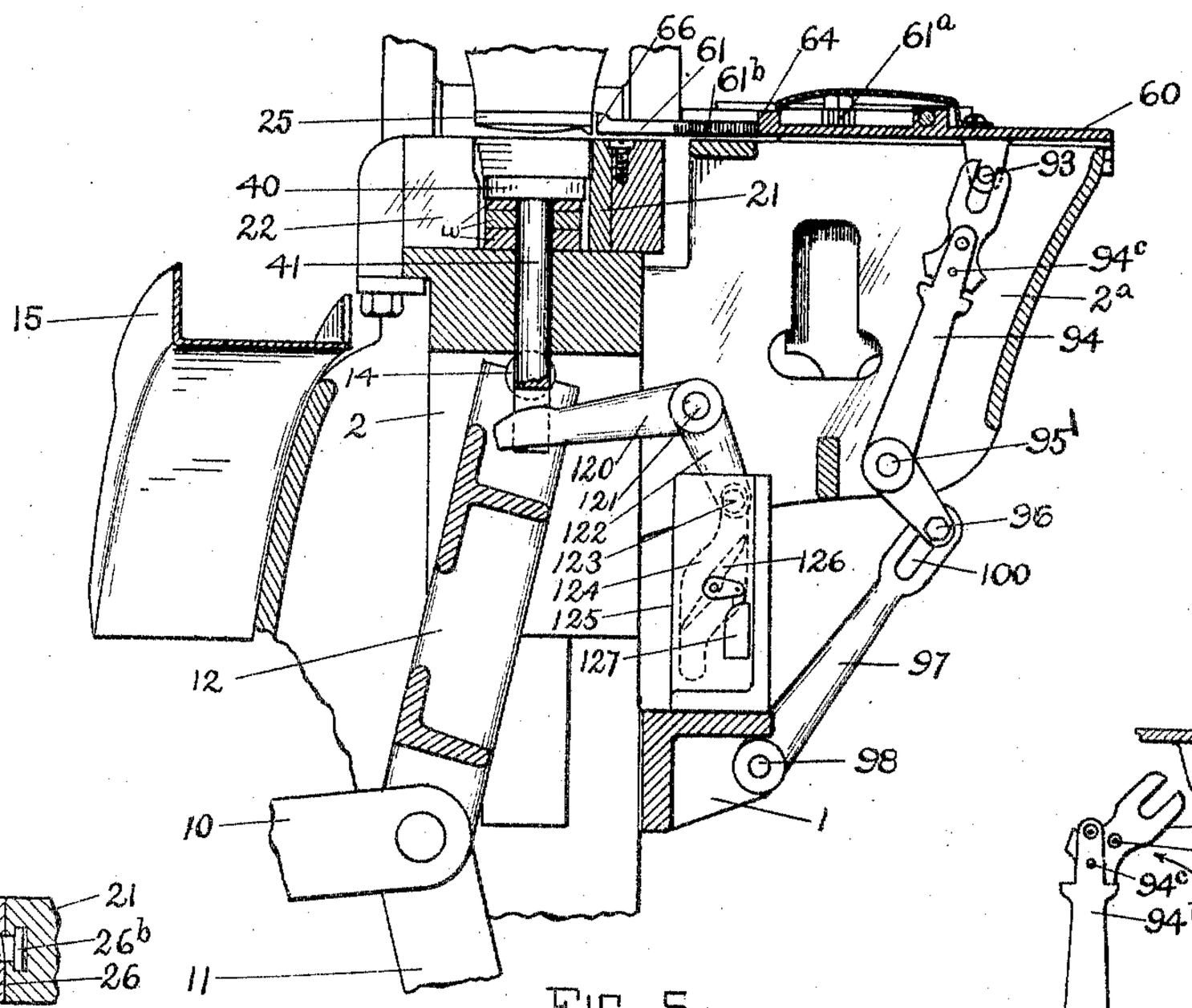

FIG. 5

FIG. 12

FIG. 13

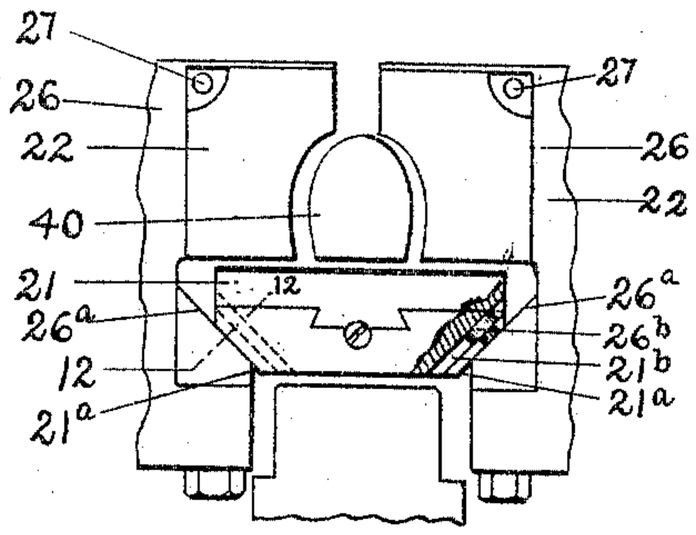

FIG. 11

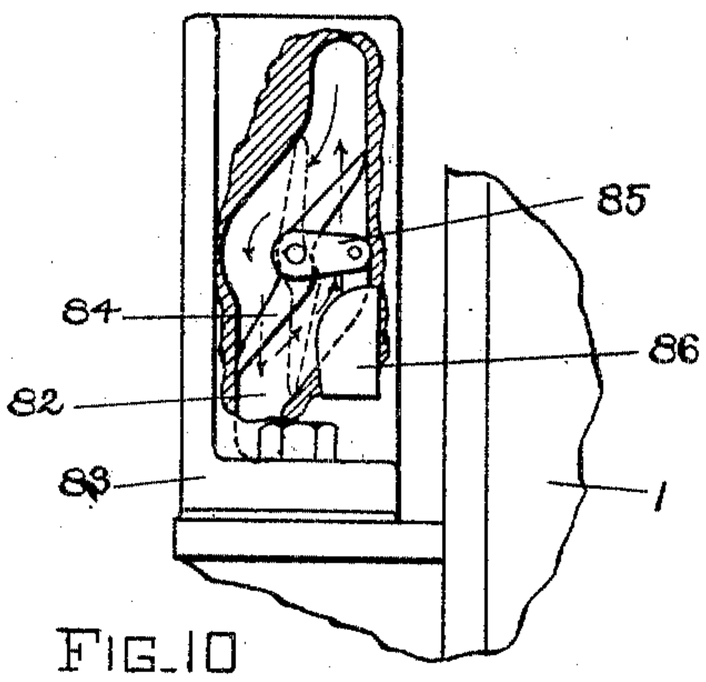

FIG. 10

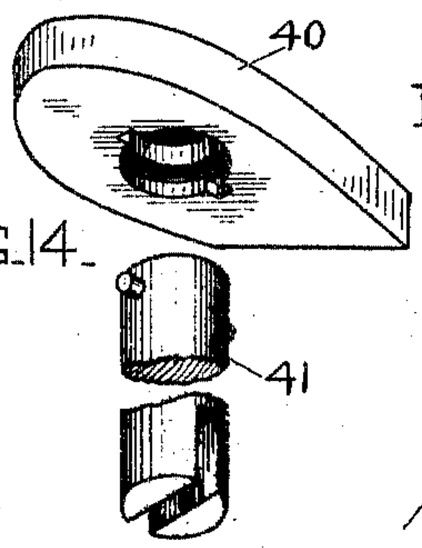

FIG. 14.

WITNESSES.

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No. 776,787. Patented December 6, 1904.

UNITED STATES PATENT OFFICE.

SANFORD D. LELAND, OF WINCHESTER, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

HEEL-COMPRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 776,787, dated December 6, 1904.

Application filed August 29, 1902. Serial No. 121,473. (No model.)

To all whom it may concern:

Be it known that I, SANFORD D. LELAND, 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 provide an improved machine of this class.

An important feature of the invention consists in the combined feeding and ejecting mechanism. In the machine herein shown this mechanism is actuated to clamp a heel-blank, carry the blank into position to be compressed, and simultaneously to push the heel that was last operated upon out of the machine and then to unclamp the infed blank and leave it in position to be compressed.

Another feature of the invention consists in providing a compressing-mold comprising a breastplate and means to move said breastplate in the horizontal plane in which the heel is supported to cause it to coöperate with the usual side compressing-dies to compress the heel from front to rear as well as from side to side.

A further feature of the invention consists in so connecting the several operating mechanisms with a single reciprocating table or head which supports one of the dies that said mechanisms are actuated by the movable head. The several mechanisms are preferably each so connected to the reciprocating head that its movement will be retarded or it will remain at rest during certain portions of the movement of the head, and its movement will be accelerated or caused to take place during other portions of the movement of the head, so that said mechanisms will operate in suitable sequence and at predetermined periods in the cycle of operation of the machine.

Still other features of the invention relate to the plate which normally forms the bottom of the mold, to the means for supporting it and securing it in position, and to the actuating means for causing it to move with relation to the mold. Said actuating means is preferably arranged to cause the plate to descend into the mold while the mold is open wide enough to receive freely a blank carried by the plate and also to cause the plate to rise promptly when the mold is opened, thereby affording ample time for removal of a compressed blank and for placing properly in position a blank to be operated upon.

Other features of the invention will be hereinafter described, and claimed at the end of this specification.

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

Figure 1 is a side elevation of the machine. Fig. 2 is a front elevation of the machine. Fig. 3 is a horizontal section on line 3 3 of Fig. 2, showing the heel-blank holder closed. 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 similar view showing the relative position of the parts at a time when the reciprocating head has nearly completed its ascent. Fig. 6 is a detail view of the heel-blank holder, showing the holder open. Fig. 7 is a sectional view on line 7 7 of Fig. 3. Fig. 8 is a sectional view on line 8 8 of Fig. 6 and shows the same parts as are shown in Fig. 7, but in the position which they occupy when the heel-blank holder has been opened to release a blank. Fig. 9 is a detail view showing the controlling mechanism for the heel-blank holder as seen when looking toward the right-hand side of the machine. Fig. 10 is an enlarged detail view of the controller-cam shown in Fig. 9 as it appears when seen from the right-hand side of the machine. Fig. 11 is a detail view showing the connection between the breastplate and its actuator. Fig. 12 is a sectional view on dotted line 12 12, Fig. 11. Fig. 13 is a detail of the feeding-slide-actuating mechanism, and Fig. 14 a detail of the top-lift plate.

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 countershaft 6. The countershaft 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 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 21^b, while the faces 26^a are provided with ribs or lugs 26^b, shaped to be guided in the grooves 21^b, 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 and open the mold to compress the heel laterally and thereafter to release the compressed heel 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 1. (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 toward a horizontal position, and in moving toward 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, comprises 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 molds 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.

The lost-motion connection between the links and frame allows the closing of the mold to be deferred until the latter portion of the rise of the head, and it is also desirable that the mold be opened to release the compressed heel during the first portion of the descent of the reciprocating head in order that as long a period as possible may be provided in which to remove the compressed heel and to feed in an uncompressed blank, as will hereinafter be more fully described, and for this purpose the slotted links 30 are provided with extensions 30^b, (see Figs. 2 and 3,) on which are mounted rolls 30^c, and the frame 1 is provided with projections or cams 1^a, having approximately plane faces 1^b and curved faces 1^c. The cams are engaged by the said rolls 30^c as the links are rocked by the head 2 and control the longitudinal movement or lost motion of the links with relation to the pins 32. During the first portion of the rise of the head the slotted links move outwardly on their pivot-pins 32 the length of the slots 30^a and are simultaneously rocked on said pivot-pins, so that the rolls 30^c pass over the curved face 1^c of the cam, and as the upward movement of the head is completed the rolls are carried downwardly outside of the cams 1^a. At the end of the rise of the head when the mold has been closed the links 30 are in the position shown in dotted lines in Fig. 2. When the head begins to descend, the rolls are retained behind the cams 1^a, moving over the plane faces 1^b of the cams and preventing the slotted links 30 from moving inwardly with relation to the

pivot-pins 32 until a sufficient portion of the descent of the head has taken place to have caused the mold to be opened. At that time the links will have been rocked far enough from the dotted-line position shown in Fig. 2 to bring the rolls 30[c] opposite the curved faces of the cams 1[a], and in the further descent of the head the rolls move over the faces 1[c], and the slotted links 30 are permitted to slide with relation to the pivot-pins 32 without further opening the mold, and the machine will come to rest with the parts in the full-line positions shown in Figs. 2 and 3. This mechanism for governing the time at which the lost motion may take place insures that the mold shall be opened during the first portion of the descent of the head and shall be closed during the last portion of the rise of the head by causing the lost motion to take place during a period of the downward reciprocating movement of the head different from the period of the upward movement during which it occurs.

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 is provided for the purpose of permitting the parts of the mold to be separated less than the full throw of the links. The outward movement of the parts of the mold may be limited by the contact of the slides 26 with the sides of the frame 1, as shown in Fig. 2. 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.

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 permit the removal of a compressed heel and the insertion of a blank.

The top-lift plate 40 is connected with a post 41 by a bayonet-joint and may be detached from the post by raising it above the side compressing-dies and then turning it until it extends at right angles to its normal position. The post preferably is forked at its lower end and rests upon the end of a lever 120, (see Figs. 4 and 5,) which prevents the post from rotating and therefore from becoming detached from the top-lift plate. It is found to be unnecessary to connect the lever to the depending post 41, because the top-lift plate and post are of such weight that they ordinarily descend readily by gravity, and it is moreover found in practice to be advantageous to omit any positive connection between the lever and depending post, because it is the practice to vary the vertical position of the top-lift plate by means of washers *w* to adapt the machine for compressing blanks of different thicknesses. The lever 120 is a bell-crank lever mounted on a rock-shaft 121, which is journaled in the reciprocating head, and the second arm 122 of the lever is provided with a roll 123, standing in a cam-path 124, formed in the side of the plate 125, supported on the machine-frame. A pivoted latch 126 extends obliquely across the cam-path and is held in this position by a weight 127, acting on the pivot which carries the latch. The latch divides the path 124 into two courses, the left-hand one of which, viewing Figs. 4 and 5, is followed by the roll 123 as said roll moves downwardly with the head 2. This left-hand course, as will be seen from the drawings, comprises a short upper portion through which the roll moves while the head and mold descend a distance sufficient to withdraw the compressed heel from contact with the heel-seat die and to permit the side compressing-dies to open slightly for relieving the pressure on the sides of the heel, as shown in Fig. 5. The roll then engages the upper portion of the latch and is deflected into the inclined portion of the left-hand course, thereby effecting a turning of the lever during the first portion of the descent of the head. This turning movement takes place in the direction for raising the top-lift plate relatively to the side compressing-dies, while the head and dies descend until the compressed heel on the top-lift plate is discharged from between the side compressing-dies and occupies a position above the upper face of said dies, as shown in Fig. 4. The course followed by the roll during the last part of the descent of the head is straight and permits the top-lift plate to move in unison with the head and the mold. Near the end of this latter part of the descent of the head the roll 123 comes into contact with the lower portion of the latch, which is pushed aside as the roll passes it and then is rocked back to its normal position by the weight 127. When the reciprocating head begins to rise, the roll preferably travels first for a very short distance through a straight portion at the bot-

tom of the cam-path to permit of the opening of the clamp of the feeding and ejecting mechanism which has been actuated to remove a compressed heel from the top-lift plate and to bring a blank into position thereon. Thereafter the roll is deflected to the right by the lower portion of the latch and while passing through the inclined portion of the right-hand course of the cam-path effects a turning of the lever 120 in the direction for restoring the top-lift plate to its normal position (shown in Fig. 5) below the surface of the side compressing-dies. It is to be noted that the relative upward movement of the top-lift plate during the first portion of the descent of the side compressing-dies discharges the compressed heel promptly into position to be ejected from the machine and that the relative downward movement of the top-lift plate during the first portion of the rise of the head enables the blank to be lowered into position to be compressed by the movable side compressing-dies while said dies are yet open wide to receive the blank. In the machine herein shown as embodying the invention there is a lost-motion connection between the side compressing-dies and their actuating mechanism, so that the dies open only far enough to receive the blank readily and the dies remain open to their full extent while the top-lift plate is lowered to its normal position at the bottom of the mold. In that type of machine in which the dies open very wide many of the advantages of this invention, however, would be obtained by lowering the top-lift plate to normal position during the first portion of the closing of the dies and while they were yet open wide enough to receive the blank readily. Therefore by the expression "open approximately to their full extent" I mean open wide enough to receive the blank freely.

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, which comprises among its parts the slide 60, movable on suitable guides on the table. Heel-blank-grasping arms 61 61 are pivotally mounted on the slide 60 and are provided with roughened faces 61^b by which to engage the blank.

64 indicates an abutment on the front end of the slide 60, which is adapted to engage the breast of the heel-blank. The arms 61 61 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 free ends of the arms 61 are provided with abutments 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 from the position shown in Fig. 5 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 together for clamping a heel-blank. The lug 69 is formed with a channel extending parallel with the spring-pressed bolt 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 Figs. 3 and 6 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. 1.) The slide 76 is supported by a pivotal connection at 77 with one arm, 78, of a bell-crank lever fulcrumed at 79 on the reciprocating head 2. (See Fig. 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. 10, but permits the latch to be moved into the position shown in dotted lines in said figure.

The movable latch 84 divides the cam-groove 82 into two paths, which are indicated by the arrows in Fig. 10. 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, Fig. 10, 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 therefor. This cam-groove therefore 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 downward with relation to the dies, as above described, as soon as the head begins to rise and actuates the sliding block 71 to open the clamp and release a heel-blank, which has been fed into position to be compressed, and thereafter said cam-plate moving with the reciprocating head holds the clamp open during the retraction of the feed-

ing-slide 60 to position for receiving another blank. The acting face of the cam-plate 75 extends 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. 7 and 8.) The plate is moved with relation to the feeding-slide 60 from the position shown in Fig. 7 to the position shown in Fig. 8 to engage the sliding block 71 and open the clamp. This movement takes place while the feeding-slide is in the advanced position shown in Figs. 3 and 6. 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 is provided on its lower side with ears supporting a roll 93.

94 indicates a bell-crank lever pivoted at 95 in the table or extension 2^a of the head 2. The upper arm of the lever 94 comprises two parts 94^a and 94^b, pivotally connected together at 94^c. The two parts 94^a and 94^b are held normally rigid by a shear-pin 94^d, and the upper part 94^a is forked to engage the roll 93 on the slide 60. If, however, the feeding-slide meets an obstruction which prevents its normal movement taking place, the shear-pin 94^d will be severed and the parts 94^a and 94^b will flex, as shown in Fig. 13, and prevent breaking the machine.

The lower arm of the lever 94 is provided with the roll 96. (See Fig. 4.)

97 indicates a link pivotally connected to the frame 1 at 98 and slotted at its upper end at 100 to receive the roll 96. The slot 100 forms a lost-motion connection between the link 97 and the lever 94. During the first part of the rise of the reciprocating head the roll 96 travels in the slot 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, 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 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 the lever 94 is actuated to move the feeding-slide 60 forward to present the blank to the compressing-dies.

The driving-shaft 3 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 foot-treadles $k\,k'$, by means of which it can be actuated in either direction to start or stop the machine by the foot of the operator. These parts constitute a very effective starting and stopping mechanism, which renders the machine completely under the control of the operator at all times.

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 immediately opened to release the heel-blank by the cam-plate 75, which for this purpose is held approximately stationary with relation to the machine-frame by the cam 82, while the head rises. When the clamp has been opened sufficiently to release the heel-blank, the cam 124 becomes operative for holding the top-lift plate approximately stationary with relation to the frame of the machine, while the side compressing-dies and breastplate, which at this time are drawn back, 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 further 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. As the links are moved outward with relation to their pivots 32 the rolls 30^c are carried back of the cams 1^a, as indicated in dotted lines, Fig. 2. 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 drawn apart by the links 30, acted upon by the cams 1^a, and the breastplate is also moved back by its connection with the slides 26. As soon as the dies have been sep-

arated sufficiently to relieve pressure upon the heel the arm 120 of the rock-shaft 121 is actuated by the cam 124 to raise the top-lift plate with relation to the side compressing-dies, or, in other words, to hold the top-lift plate approximately stationary with relation to the frame of the machine while the side compressing-dies descend, whereby the compressed heel comes to occupy a position above the side compressing-dies, from whence it may 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 has been put into the clamp by the workman after the retraction of the feeding-slide. During the latter part of the descent of the head the feeding-slide 60 is moved forward, carries the blank held in the clamp into position over the top-lift plate, and simultaneously with the feeding in of the new blank the abutments 66 on the arms 61 strike against and push off from the top-lift plate the heel which has been compressed, the compressed heel falling into the chute 15.

Having fully described the nature of my invention and the construction and operation of a preferred form of machine embodying the same, I wish to state that I do not regard my invention as limited to the specific embodiment herein shown and described; but

I desire to secure by Letters Patent of the United States—

1. In a heel-compressing machine, means to compress a heel, said means including a reciprocating head, a mold comprising movable members mounted on said head, and actuating-links therefor, each connected at one end to said members, the other end of said links being engaged by a cam, which is formed to cause said links to open or close the mold during predetermined portions of each upward and downward movement of the reciprocating head.

2. In a heel-compressing machine, means for compressing a heel, said means including a reciprocating head, a mold comprising movable members mounted on said head, actuating-links therefor, each connected at one end to said members and having its other end connected to a fixed part of the machine, one of said connections permitting a limited amount of lost motion, and means for preventing said lost motion during the first portion of the descent of the head, whereby said mold is opened.

3. In a heel-compressing machine, means for compressing a heel, said means including a reciprocating head, a mold comprising movable members mounted on said head, actuating-links therefor, each connected at one end to said members and having its other end connected to a fixed part of the machine, one of said connections permitting a limited amount of lost motion, and means for controlling the period when said lost motion may take place, whereby the mold is opened during the first portion of the descent of the reciprocating head and remains open until the last portion of the rise of the head.

4. In a heel-compressing machine, means for compressing a heel, said means including a reciprocating head, a mold comprising movable members mounted on said head, actuating-links therefor, each connected at one end to said members and having its other end connected to a fixed part of the machine, one of said connections permitting a limited amount of lost motion, said links having extensions beyond said lost-motion connections, and cams engaged by said extensions to prevent lost motion during the first portion of the descent of the reciprocating head.

5. In a heel-compressing machine, feeding and ejecting means comprising arms having clamping portions for holding the heel-blank to be fed, and abutments for engaging the heel to be ejected.

6. A heel-compressing machine comprising mechanism for ejecting a compressed heel and simultaneously feeding to position the heel-blank next to be compressed, said mechanism comprising pivoted arms having means to engage the heel to be ejected, and having means to hold the blank to be fed.

7. A heel-compressing machine comprising a reciprocating feeding and ejecting mechanism comprising pivoted arms provided between their ends with heel-blank-holding means and provided at their ends with abutments to engage the heel to be ejected, and means to operate said mechanism to eject a compressed heel, feed a heel-blank and release the heel-blank after it has been fed into position to be compressed.

8. In a heel-compressing machine, a feeding and ejecting mechanism comprising relatively movable arms provided with heel-blank-holding means and with means to engage the heel to be ejected, an operative connection between said arms to cause them to move together, an extension of one of said arms, and means to engage said extension to move said arms to clamp or release the heel-blank.

9. In a heel-compressing machine, compressing-dies, and means to operate them, heel-blank-feeding mechanism comprising a carrier and a clamp, and means to operate said feeding mechanism, first to actuate the clamp to clamp the blank, then to move it into position to be compressed, then to actuate the clamp to unclamp the blank, and then to remove the compressed heel.

10. In a heel-compressing machine, heel-compressing dies, a reciprocating head carrying one of said dies, a heel-blank-feeding slide also carried by said reciprocating head, a lever pivoted on said head and having one arm connected to said feeding-slide, and means connecting the other arm of said lever to a fixed

part of the machine, whereby the feeding-slide is automatically actuated by the reciprocation of the head.

11. In a heel-compressing machine, heel-compressing dies, a reciprocating head carrying one of said dies, a heel-blank-feeding slide also carried by said reciprocating head, a lever pivoted on said head and having one arm connected to said feeding-slide, and means connecting the other arm of said lever to a fixed part of the machine, whereby the feeding-slide is automatically actuated by the reciprocating head, in combination with an element connecting two parts of said actuating mechanism and adapted to give way under excessive resistance to the movement of the feeding-slide.

12. In a heel-compressing machine, heel-compressing dies, a reciprocating head carrying one of said dies, a heel-blank-feeding slide also carried by said reciprocating head, a lever pivoted on said head and having one arm connected to said feeding-slide, said arm comprising two parts normally secured rigidly together by a shear-pin, and means connecting the other arm of said lever to a fixed part of the machine, whereby the feeding-slide will be actuated by the reciprocating head, said shear-pin being adapted to give way under excessive strain and prevent the machine being broken.

13. In a heel-compressing machine, heel-compressing dies, a reciprocating head carrying one of said dies, a heel-blank-feeding slide also carried by said head, and operating means for said feeding-slide comprising a lever supported on said head, and having one arm thereof connected to said slide, the other arm of said lever having a lost-motion connection with a fixed part of the machine, whereby said lever is actuated to cause the slide to feed the blank into position between the compressing-dies during the last portion of the descent of the reciprocating head.

14. In a machine of the class described, heel-compressing dies, a reciprocating head carrying one of said dies, a blank-feeding slide, actuating mechanism for said slide connected with said head for reciprocating the slide during predetermined periods, a heel-blank holder carried by the slide, and independent actuating mechanism also connected with said head for opening the holder.

15. In a heel-compressing machine, heel-compressing dies, a reciprocating head carrying one of said dies, a heel-blank holder, and actuating mechanism for said holder, said actuating mechanism being connected with said reciprocating head for opening said holder during the movement of the head.

16. In a heel-compressing machine, heel-compressing dies, a reciprocating head carrying one of said dies, a heel-blank holder, means carried by said head for opening said holder, and controlling means for causing said holder to be opened at one stage of the upward movement of the head, and to be closed at a different stage of the downward movement of the head.

17. In a heel-compressing machine, heel-compressing dies, a reciprocating head carrying one of said dies, a feeding-slide also carried by said head, means to actuate said slide, a heel-blank holder on said slide, means carried by said head for opening said holder, and controlling means for causing said holder to be opened at one stage of the upward movement of the head, and to be closed at a different stage of the downward movement of the head.

18. In a heel-compressing machine, means to compress a heel, said means including a reciprocating head, a divided heel-mold, blank feeding and ejecting mechanism comprising a movable feeding-slide and a heel-blank clamp carried thereby, and connections between the said mechanisms and the reciprocating head whereby said mechanisms are operated by said head.

19. In a heel-compressing machine, means to compress a heel, said means including a reciprocating head, a divided heel-mold, blank feeding and ejecting mechanism comprising a movable feeding-slide and a heel-blank clamp carried thereby, and connections between the said mechanism and the reciprocating head whereby said mechanism is operated by said head, said connections comprising means for accelerating and retarding the movements of said blank feeding and ejecting mechanism to cause it to operate during predetermined periods in the cycle of the machine's operations.

20. In a compressing-machine, a mold comprising means for compressing the edge of a blank and a top-lift plate normally held against rotative movement by said means and forming the bottom of the mold, a supporting-post for said top-lift plate, and a connection between said post and said plate adapted to unlock by relative rotary movement of said top-lift plate and post, combined with means independent of said connection for normally preventing rotative movement of the post.

21. In a machine of the class described, compressing-dies, a reciprocating head carrying one of said dies, a heel-blank holder comprising clamping members and an actuator therefor also carried by said reciprocating head for movement therewith, and controlling means for said actuator to cause it to engage and disengage the holder at predetermined times to clamp and release the heel.

22. In a machine of the class described, compressing-dies, a reciprocating head carrying one of said dies, a heel-blank holder comprising relatively movable members and an actuator therefor also carried by said reciprocating head for movement therewith, and means

for giving said actuator independent movements to accelerate the opening and closing of the holder.

23. In a heel-compressing machine, heel-compressing dies, a reciprocating head supporting one of said dies, a feeding-clamp carried by said reciprocating head and movable thereacross, a cam-plate also guided in said reciprocating head, and means to render said cam-plate operative to open the clamp during a portion of each reciprocation of the head.

24. In a heel-compressing machine, compressing-dies, a reciprocating head supporting one of said dies, a blank-holder comprising relatively movable members also supported by said head, means to open and close said holder, said means including a cam-plate guided in said reciprocating head and adapted to open the holder and maintain it open while in contact therewith, and means to move said cam-plate into and out of contact with said holder at predetermined times in the reciprocation of the head.

25. A heel-compressing machine provided with a heel-mold comprising side compressing-dies and a breastplate connected together to permit a limited movement for closing and opening the mold, and means to move said members in the same plane for the purpose described.

26. In a machine of the class described, heel-compressing dies, one of said dies consisting of a mold comprising relatively movable side compressing members, and a breastplate connected to said side compressing members to be moved simultaneously therewith, and means for moving the side compressing members and the breastplate relatively to close the mold.

27. In a machine of the class described, heel-compressing dies, one of said dies consisting of a mold comprising side compressing members and a breastplate to engage the breast of the heel being compressed, interlocking means connecting said side compressing members and breastplate and adapted to permit a relative movement thereof, and means for moving said side compressing members and breastplate together in the same plane to open and close the mold.

28. In a machine of the class described, heel-compressing dies, one of said dies consisting of a mold which comprises relatively movable side compressing members and a breastplate to engage the breast of the heel being compressed, means to actuate the said members, and a connection between said side members and said breastplate, whereby the breastplate is moved with the side members to compress the heel on its several sides simultaneously.

29. In a heel-compressing machine, a mold comprising side members and a breastplate, slides carrying the side members and means to actuate the slides, beveled faces formed on the breastplate and corresponding faces formed on the adjacent portions of the slides, and means connecting said beveled faces of the slides with the breastplate, whereby said breastplate is moved by the slides in opening and closing the mold.

30. In a heel-compressing machine, a mold comprising side members and a breastplate, slides carrying the side members and means to actuate the slides, beveled faces formed on the breastplate and corresponding faces formed on the adjacent portions of the slides, a beveled face of one of said parts being provided with an undercut groove and the coöperating face of said other part being provided with a cooperating rib, whereby said breastplate is moved by the slides in opening and closing the mold.

31. A compressing-machine, comprising a mold and a coöperating die, said mold being relatively movable toward and from said die, a plate normally forming the bottom of said mold but movable relatively to said mold, and means for causing said plate to rise relatively to the mold during the first part of the movement of the mold away from said die and to descend relatively to the mold during the first part of the movement of the mold toward said die.

32. In a machine of the class described, the combination with a mold comprising side dies arranged to open to receive a blank and then to close for compressing the blank, and a vertically-movable top-lift plate normally forming the bottom of the mold, of means for actuating said dies, and actuating mechanism for said top-lift plate arranged to cause the plate to be lowered quickly to normal position while the side dies are open approximately to their full extent.

33. A compressing-machine, comprising a heel-seat die and a head, means for relatively moving said head and said heel-seat die, a top-lift plate for sustaining a blank, dies carried by said head for engaging the sides of the blank, means for closing and opening the dies, and means for causing the top-lift plate to be raised during the movement of the head away from the heel-seat die and for causing said plate to be lowered during the first portion of the movement of the head toward the heel-seat die.

34. A compressing-machine, comprising a reciprocating head, a top-lift plate for sustaining a blank, dies carried by said head for engaging the sides of the blank, means for causing the dies to be closed during the rise of the head and for causing the dies to be opened during the descent of the head, combined with means for causing the top-lift plate to be raised during the first portion of the descent of the head and for causing said plate to be lowered during the first portion of the rise of the head.

35. A compressing-machine, comprising a mold and a coöperating die, means for rela-

tively moving said mold and die, and an independently-movable plate normally forming the bottom of the mold, combined with means for actuating said plate to cause a compressed blank to be discharged from the mold during the first portion of the movement of the mold away from the die and for causing said plate to return to normal position during the first portion of the movement of the mold toward the die.

36. A compressing-machine comprising a mold and a coöperating die, means for relatively moving said mold and die, and an independently-movable plate normally forming the bottom of the mold, combined with means for causing said plate first to move with said mold toward the die and then to descend relatively to the mold during the first part of the movement of the mold toward the die and then to move again with the mold relatively toward the die.

37. A compressing-machine comprising a mold and a coöperating die, means for relatively moving said mold and die, and an independently-movable plate normally forming the bottom of the mold, combined with actuating means for causing the plate to move with the mold and then to move independently of the mold during the first portion of the movement of the mold toward said die and to move with the mold and then to move independently of the mold during the first portion of the movement of the mold away from the die.

38. In a compressing-machine, a reciprocating head, a mold carried by said head, a top-lift plate also carried by said head and provided with a depending part, a lever also carried by said head and extending under said depending part of the top-lift plate, said top-lift plate and said lever having capacity for independent relative movement, and means for operating said lever to cause it to engage said depending part and raise the top-lift plate with relation to the mold when the lever is moved in one direction and to permit the top-lift plate to descend when the lever is moved in the opposite direction.

39. In a compressing-machine, a reciprocating head, a mold carried by said head, a top-lift plate also carried by said head and provided with a depending part forked at its lower end, a lever also carried by said head and extending freely through the forked end of said depending part for supporting and guiding the top-lift plate, said top-lift plate and said lever having capacity for independent relative movement, and means for operating said lever to actuate the top-lift plate with relation to the reciprocating head.

40. In a compressing-machine, a mold, an independently-movable top-lift plate normally forming the bottom of the mold, a lever for moving said top-lift plate, a vertically-reciprocating head carrying said parts, and a cam for controlling said lever, said cam being constructed to impart to the plate a movement independent of the head during the first portion of the rise and the first portion of the descent of the head.

41. A compressing-machine, comprising a mold and a coöperating die, said mold being relatively movable toward and from said die, a plate normally forming the bottom of said mold but movable relatively to said mold, a lever for actuating said plate, and a fixed cam provided with a movable latch arranged to rock said lever for moving the plate in one direction during the movement of the mold and die relatively toward each other and to rock said lever for moving the plate in the opposite direction during the movement of the mold and die relatively from each other.

42. A compressing-machine comprising a mold and a coöperating die, means for relatively moving said mold and die, and an independently-movable plate normally forming the bottom of the mold, combined with means for moving said plate to cause a compressed heel to be discharged from the mold during the first portion of the movement of the mold away from the die and for causing said plate to return to normal position during the first portion of the movement of the mold toward the die.

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

SANFORD D. LELAND.

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