No. 628,513. Patented July 11, 1899.

W. J. YOUNG.

HEEL COMPRESSING MACHINE.

(Application filed Dec. 27, 1898.)

(No Model.) 3 Sheets—Sheet 1.

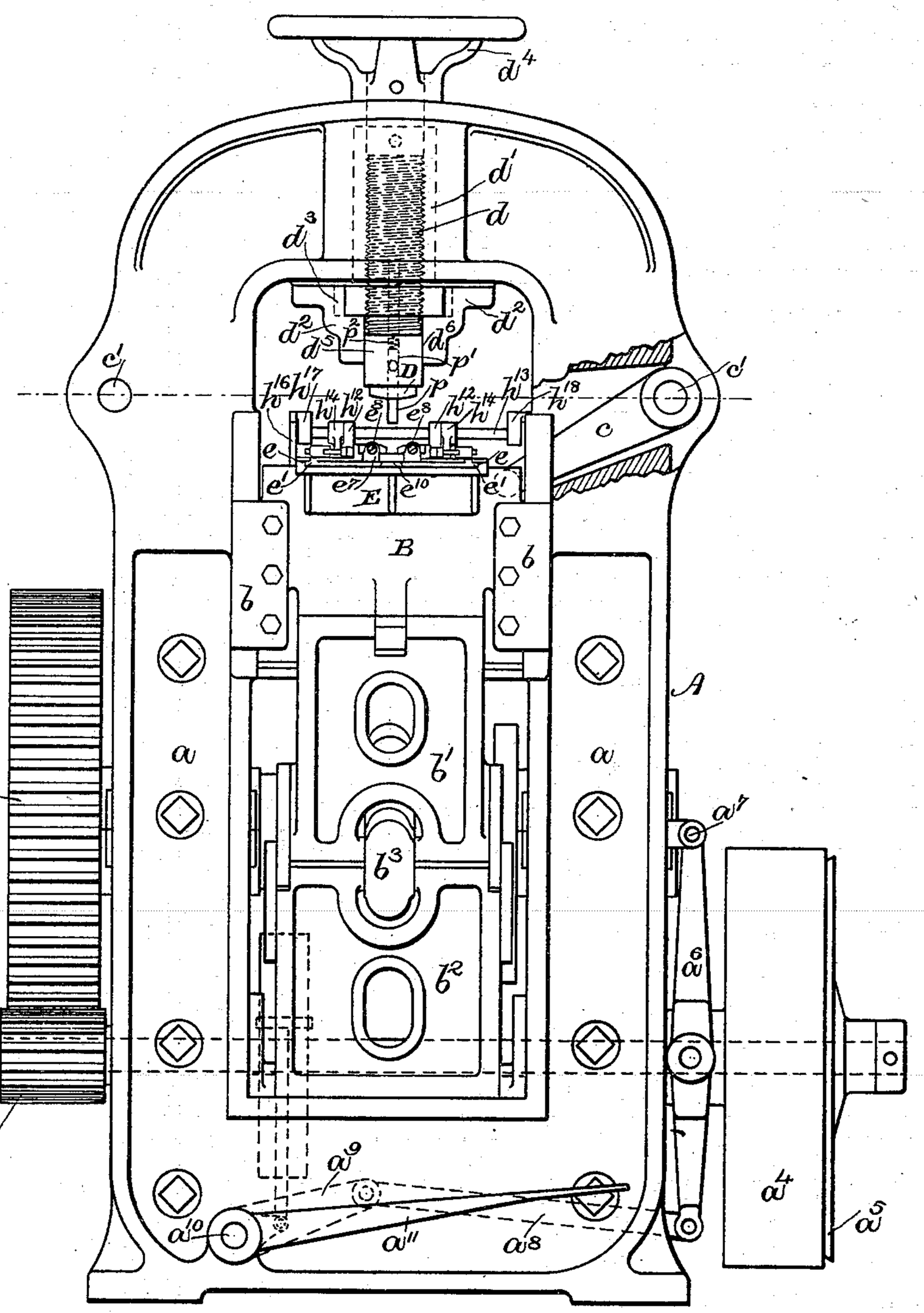

FIG. 1.

WITNESSES.

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(No Model.) 3 Sheets—Sheet 2.

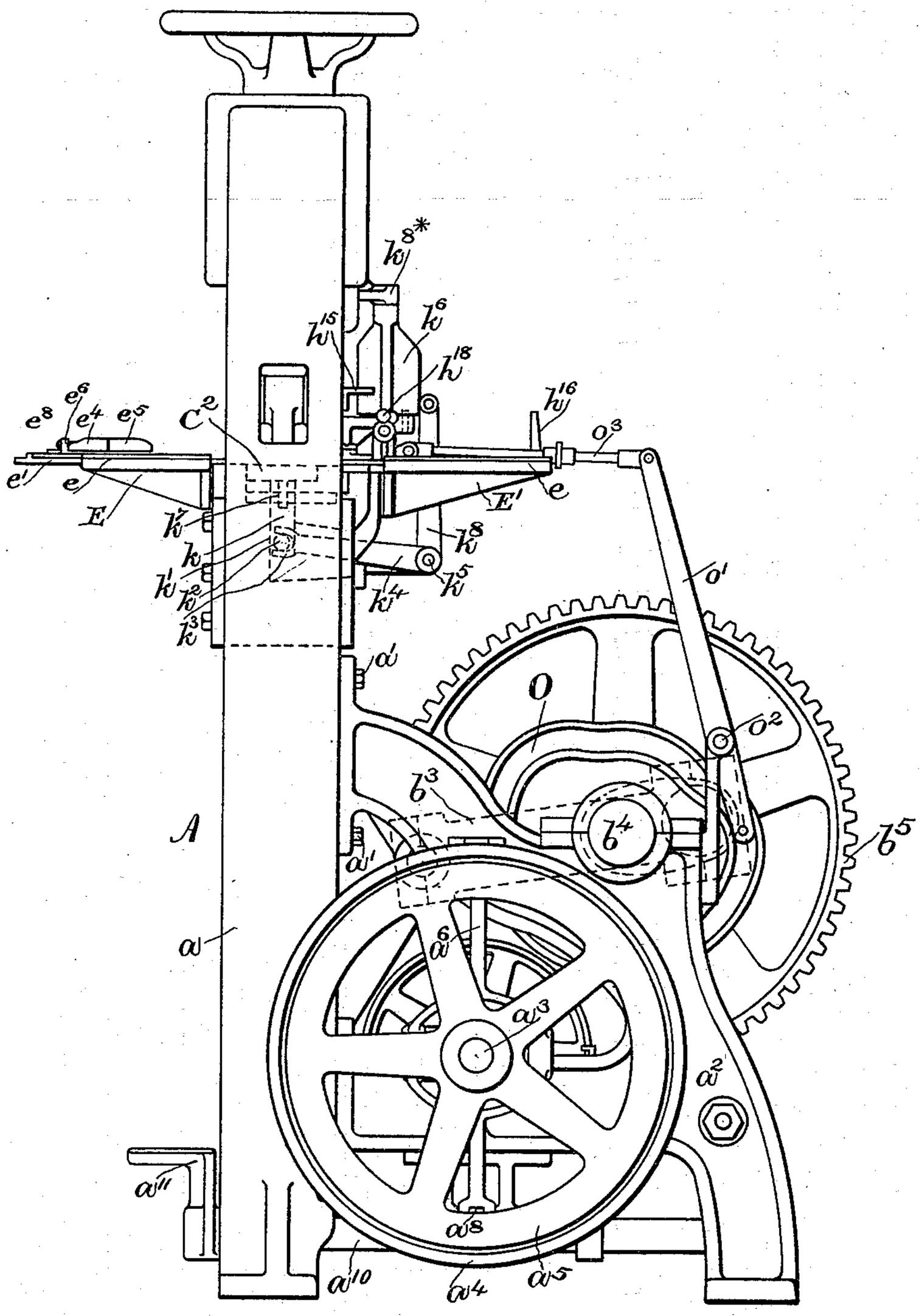

FIG. 2.

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No. 628,513. Patented July 11, 1899.

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HEEL COMPRESSING MACHINE.

(Application filed Dec. 27, 1898.)

(No Model.) 3 Sheets—Sheet 3.

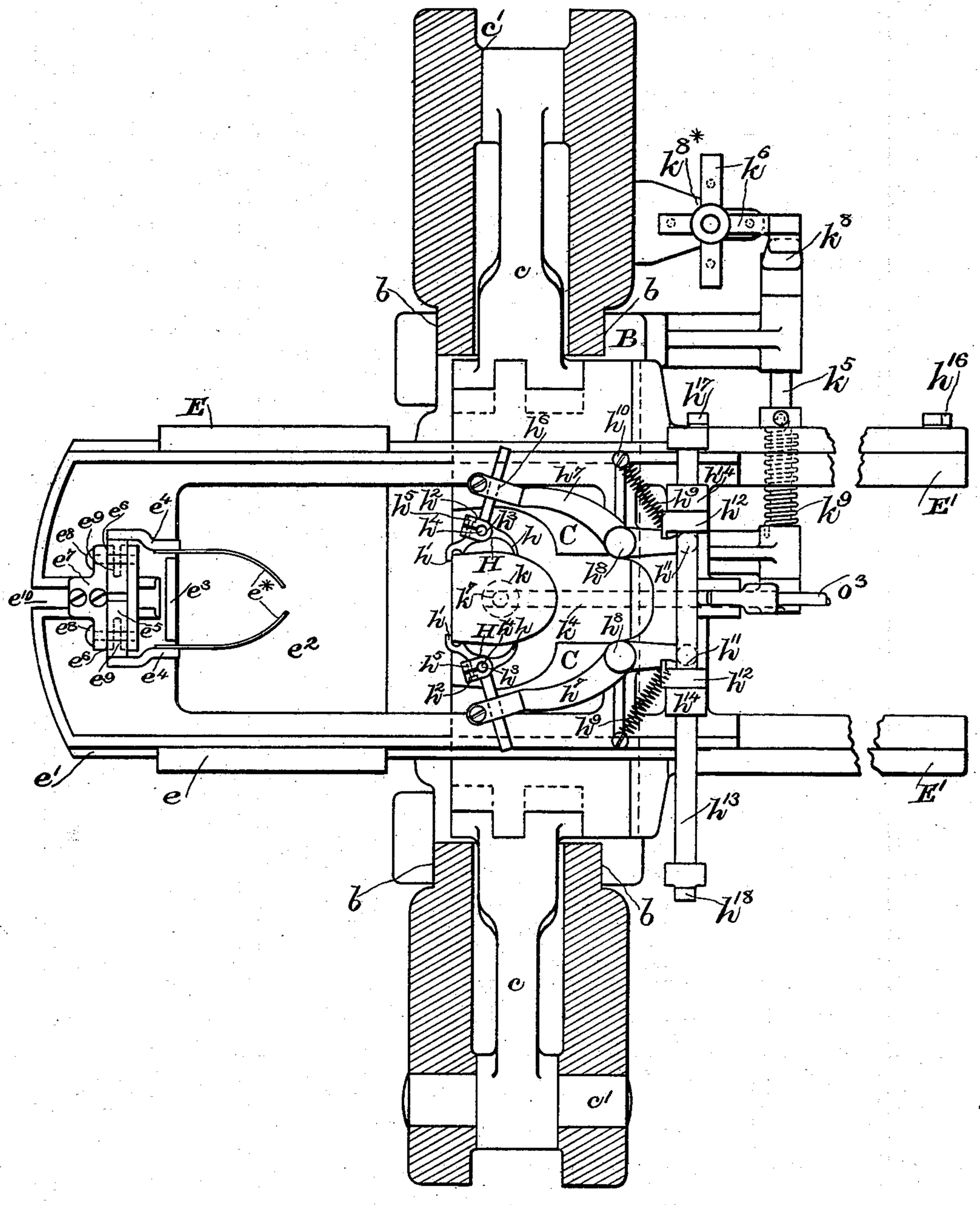

FIG. 3.

WITNESSES.

E. Ketchum.

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UNITED STATES PATENT OFFICE.

WILLIAM J. YOUNG, OF LYNN, MASSACHUSETTS.

HEEL-COMPRESSING MACHINE.

SPECIFICATION forming part of Letters Patent No. 628,513, dated July 11, 1899.

Application filed December 27, 1898. Serial No. 700,428. (No model.)

To all whom it may concern:

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

The present invention relates to heel-compressing machines, and more particularly to an improved heel-feeding and heel-removing device constructed and arranged to feed the heel-blank to the heel-compressing dies and simultaneously to remove a compressed heel-blank from between the dies.

The object of the present invention is to so construct the heel-feeding and heel-removing device that in its operation it will positively and with certainty feed an uncompressed heel-blank between the heel-compressing dies and remove therefrom a heel-blank which has been acted upon by the said dies, and, further, to so organize the mechanism that there shall be no liability of the operator having his fingers or hands caught in the mechanism and greatly do away with the liability of danger which has heretofore accompanied the operation of these machines.

A further object of the present invention is to produce a heel-blank feeding and removing mechanism so arranged and combined with the heel-compressing mechanism that the heel-blank from the time the operator places it in position to be fed between the heel-compressing dies until the compressed heel is removed from the machine will be always held and positioned by some element of the machine, and thereby render certain the proper guidance and presentation of the heel-blank to the dies.

To the above end the present invention consists of the devices and combination of devices, which will be hereinafter described, and particularly pointed out in the claims.

The present invention is illustrated in the accompanying drawings, in which—

Figure 1 shows in front elevation a heel-compressing machine embodying the same with a portion of the frame broken away to show the manner of operating the side-compressing dies. Fig. 2 shows a side elevation of the machine. Fig. 3 shows in plan a portion of the machine, illustrating the construction of the heel-blank feeding and removing mechanism.

Similar letters of reference will be used to designate corresponding parts throughout the specification and drawings.

In the drawings, A represents the main frame, which may be of any usual or preferred construction, but which for strength is preferably formed of a front section a, formed in a single integral casting, to the back of which are secured, as by bolts a', the rear frames a^2, (one only of which is shown in Fig. 2 of the drawings.) In suitable bearings in the rear frames a^2 is arranged the main shaft a^3, to which power is communicated by a belt-pulley a^4, which is splined to said shaft and capable of a limited movement thereon for the purpose of being connected to and disconnected from a conical disk a^5, fixedly secured to the shaft a^3. The pulley a^4 is arranged to be moved toward and from the disk a^5 by means of a lever a^6, fulcrumed at a^7 and connected at its lower end by a link a^8 with an arm a^9, fixedly secured to the rear end of a shaft a^{10}, to the front end of which is secured a treadle a^{11}. The side-compressing dies C are mounted upon a vertically-reciprocating bed or table B, arranged to reciprocate along suitable guides b on the main frame a of the machine, which table or bed B is reciprocated vertically by means of toggles b' and b^2, which at one end are connected to the table B and at the other end to the lower portion of the main frame a. The toggles b' and b^2 are alternately bent and straightened by means of a link b^3, (see dotted lines, Fig. 2,) which at one end is connected to the joint of the toggles b' and b^2 and at its opposite end to a crank on the crank-shaft b^4, which is arranged to rotate in suitable bearings in the rear frames a^2, the crank-shaft b^4 being rotated from the main shaft a^3 by means of a gear b^5, which meshes with and is driven by a pinion b^6 on the main shaft a^3.

The side-compressing dies C are arranged upon the upper surface of the bed or table B to have a lateral sidewise-sliding movement toward and from each other, they being moved

toward each other as the table B rises by means of pivoted arms *c*, which are fulcrumed at *c'* in recesses in the sides of the frame *a* and the lower ends of which are connected to the die-carriers which carry the side-compressing dies C, whereby as the bed or table rises and falls the dies C will move toward and away from each other.

Coöperating with the side-compressing dies is a heel-seat die D, which is connected by any suitable adjustable means to the cross-head of the main frame *a*. As shown in the drawings, the heel-seat die D is connected to the lower end of a threaded stem *d*, which is tapped into a threaded bearing in a sleeve *d'*, which sleeve is supported by means of a suitable brace d^2, provided with a bearing d^3, in which the enlarged head of the sleeve *d'* is received, and said sleeve *d'* is connected at its upper end to a suitable hand-wheel d^4, whereby it may be rotated and by means of the threaded connection between it and the stem *d* vertically adjust the heel-seat D with relation to the table B and the side-compression dies C. The lower end of the stem *d* is preferably square or polygonal in section, as shown at d^5, and engages a similarly-shaped opening d^6 in the brace d^2, whereby the stem *d* will be prevented from turning with the sleeve *d'*.

The machine as so far described is substantially the same in its construction, organization, and mode of operation as the machine disclosed in my pending application for Letters Patent of the United States filed January 11, 1898, Serial No. 666,356, and while I have illustrated my present improvements in connection with the machine therein disclosed the selection of such machine has been for the purpose of illustration only, and such parts of the heel-compressing mechanism as have been hereinbefore described have been incorporated herein in order that the operation of my improved heel feeding and removing mechanism may be clearly understood, and I desire it to be understood that in so far as the heel-compressing instrumentalities of the machine are concerned the present invention is not limited thereto, but that the present invention is equally applicable to other known forms of heel-compressing devices, as well as to the machine which has been briefly described.

Secured to the bed B and tables E and E', which have their upper surfaces in substantially the same horizontal plane and which are secured to the cross-head in such a position that their upper surfaces will be in substantially the same horizontal plane as the upper surfaces of the side-compressing dies C when the dies are in their lowermost position. The tables E and E' are provided with suitable guides *e*, in which is arranged to reciprocate the carrier *e'*, said carrier being open or cut out at its central portion, as shown at e^2, and provided at its forward end with a heel-blank-feeding device and at its rear end with a heel-blank-removing device.

The heel-blank-feeding device consists of two resilient spring-jaws, made of some suitable sheet spring material, which are arranged to receive the heel-blank with its heel-seat uppermost and its tread-face resting upon the upper surface of the table E when the carrier *e'* is in its forward position, the spring-jaws e^* being preferably curved at their free ends, as shown in Fig. 3 of the drawings, and arranged to embrace the back of the heel, the breast of the heel being positioned against a suitable projection e^3, which is carried by the carrier *e'*. The spring-jaws e^* are preferably so constructed that they may be adjusted toward and from each other in order to accommodate heels of various widths, and they are also preferably mounted to have an adjustment longitudinally, so as to move their curved free ends toward and from the projection e^3, and for this purpose they are preferably arranged as follows: Each arm e^* is secured at its rear end to an arm e^4, which at its inner end is provided with a laterally-projecting shank e^5, which shank is received in a slot or groove e^6 of a carrier e^7, the shanks e^5 being free to move along the slot e^6 in order to adjust the spring-jaws e^* toward and from each other. The shanks e^5 are held in their adjusted position in the slot e^6 by means of set-screws e^8, which are tapped into the side walls of the slot e^6 and by means of which the side walls of the slot e^6 are compressed against the shanks e^5. To facilitate such compression, the base of the carrier e^7 may be slotted or divided by short slots e^9, (see dotted lines, Fig. 3,) projecting inwardly toward each other from each end of the slot e^6. In order to provide for a longitudinal adjustment of the spring-arms e^* for heels of different lengths from their rear portion to their breast portion, the carrier e^7 is adjustably secured on the carrier *e'*, which is slotted at its forward end, as shown at e^{10}, by means of a set-screw which passes through said slot and is tapped into a threaded bearing in the carrier e^7. By the above-described construction the spring-arms e^* may be adjusted toward and from each other or in a longitudinal direction in order to adjust their curved free ends toward and from the projection e^3.

The carrier *e'* is reciprocated along the guideway *e* of the tables E and E' by means of a cam O, which is mounted on the crank-shaft b^4, and the lever *o'*, fulcrumed at o^2, which at its lower end carries a suitable roll (not shown) which engages a cam-path in the cam O and which at its upper end is connected by means of an adjustable rod o^3 to the carrier *e'*, the arrangement being such that the carrier *e'* has imparted to it one complete reciprocation during each cycle of movement of the machine.

In feeding the heel-blank to the heel-compressing dies C the operator places the blank

between the spring-arms e^* with the tread-face of the heel-blank resting on the upper surface of the table E while the parts are in the position shown in the drawings—that is, with the bed B lowered and the side-compressing dies C open—and as the bed B begins its upward movement the carrier e' is drawn backward in order to place the heel-blank upon the tread-plate in line with the heel-seat die. At the opposite end of the carrier e' is the heel-blank-removing device, which comprises two jaws mounted in swinging levers, which levers are automatically opened and closed by the reciprocations of the carrier e', they being opened as the carrier is moved backward and closed as the carrier reaches its forward position, at which time the jaws will be positioned to engage the sides of the heel-blank when they shall have been closed.

The gripping-jaws are shown at H, and they are preferably constructed with angularly-arranged fingers h and h', the fingers h being arranged to engage the curved side of the heel-blank at a point removed from the breast of the heel and the fingers h' to engage the breast of the heel. The jaws are adjustably mounted in suitable carriers h^2, each carrier having a clamping-eye h^3, which receives a stud h^4 of the jaws H, the stud h^4 being clamped in the eye h^3 by means of a screw h^5, engaging lugs projecting from the eye h^3, whereby the jaws H may be adjusted in their carriers h^2. The carriers h^2 are each provided with a stem or shank, which is adjustably mounted in bearings h^6 of the forward ends of the levers h^7. The levers h^7 are fulcrumed at h^8 upon the carrier e' and arranged to be rocked in order to open and close the jaws H. For the purpose of rocking the levers h^7 they are extended beyond their fulcrums h^8, and at their rear ends are connected by means of suitable springs h^9 with screws or studs h^{10} upon the carrier e', whereby the levers h^7 will be rocked upon their fulcrum to cause the jaws H to engage the heel-blank. For the purpose of opening the jaws H to release the heel-blank and to place the jaws in position to engage another blank the rear ends of the levers h^7 are provided with cam-rolls h^{11}, which are arranged to be engaged by suitable cams h^{12}, carried by a rock-shaft h^{13}, which is mounted in suitable bearings h^{14} on the carrier e', the rock-shaft being rocked in one direction to cause the cams h^{12} to engage the cam-rolls h^{11} and move them toward each other against the tension of the springs h^9 to open the jaws H as the carrier e' reaches its backward position and to be rocked in the opposite direction to permit the springs h^9 to draw the rear ends of the levers h^7 outwardly away from each other to close the jaws H as the carrier e' reaches its forward position.

Any suitable mechanism may be provided for the purpose of rocking the rock-shaft h^{13}, and, as shown in the drawings, I have arranged suitable trips h^{15} and h^{16}, the trip h^{15} being arranged upon the rear face of the frame a and the trip h^{16} projecting upwardly from the upper surface of the table E'. These trips are positioned to engage suitable arms or lugs h^{17} and h^{18}, carried by the opposite ends of the rock-shaft h^{13}, the trip h^{16} being arranged to engage the arm h^{17} as the carrier e' is retracted and rock the shaft h^{13} to throw the cams h^{12} to cause them to move the rear ends of the levers h^7 toward each other to open the jaws H to release the heel, and the cams h^{12} remain in contact with the rolls h^{11} and hold the jaws open while the carrier e' is being advanced and until the bed B descends, and upon the descent of the bed B the arm h^{18} of the shaft h^{13} will be engaged by the trip h^{15} to thus rock the shaft h^{13} to remove the cams h^{12} and permit the springs to close the jaw H against the heel.

In order to insure the accurate presentation of the heel to the heel-compressing dies and the positive removal of the heel-blank which has been acted upon by the dies and to insure the heel against any displacement during its feeding movement, I have so arranged the heel-blank feeding and removing mechanism and the heel-compressing mechanism that the heel-blank as it is passing through the machine will always be held or retained by some instrumentality and will at no time be left free and liable to shift and become displaced with relation to the heel-compressing mechanism—that is, as the heel-blank is placed in position to be fed it will be engaged by the resilient arms e^* of the heel-blank-feeding device, which carries the blank in line with the heel-compressing dies, and before the resilient arms e^* are retracted to release the heel-blank suitable means, which will be more fully described hereinafter, engage the heel-blank and maintain it in proper position before the heel-compressing dies act thereupon, and before the heel-blank is released by the dies after having been compressed the jaws H of the heel-blank-removing device are closed and grip the heel-blank.

I secure the above-suggested result in the machine of the drawings by providing a yielding pin p, which is arranged to have a vertical movement through the heel-seat die D and in a bearing p' in the stem d, the said pin being acted upon by a coiled spring p^2 in the bearing p', whereby said pin p when the bed B is moved downward will be normally projected below the face of the heel-seat die D, suitable means being provided to prevent the pin p from dropping out of its bearing. It will thus be noted that as the bed B moves upward the pin p will come in contact with the heel-seat of the heel-blank and exert a clamping action on the heel-blank and hold it against the tread-plate C^2, and the carrier e' will not be moved forward to release the heel-blank from the spring-jaws e^* until the heel-blank is held between the pin p and the tread-plate C^2, it being understood that as the bed B continues its upward movement in order to

cause the heel-compressing dies to act on the heel-blank the pin p will be moved upward in its bearing p' against the tension of the spring p^2, and will thus not interfere with the action of the heel-seat die D, and it will be further noted that as the bed B commences to descend the heel-blank will be held between the pin p and the tread-plate C^2 until the trip h^{15} has engaged the arm h^{18} and rocked the shaft h^{13} to permit the springs to close the jaws H on the heel.

In order to insure the gripping action of the pin p and the tread-plate C^2 upon the heel-blank and, further, to insure that the heel-blank will be fed into proper position upon the tread-plate and not dropped within the opening between the dies C, I have arranged the tread-plate C^2 to be vertically movable in the bed B in order that its upper surface may be brought into substantial horizontal alinement with the upper surface of the tables E and E' when the bed B is in its lowermost position, to secure which result the tread-plate is carried by a vertically-reciprocating block k, which is arranged to have a reciprocating movement in the bearing k' and which at its lower end carries a stud k^2, engaged by the forked end k^3 of the lever k^4, which is carried by one end of a shaft k^5, mounted in bearings in brackets upon the rear face of the bed B, and the shaft k^5 at its opposite end carries a lever k^8, which engages a cam k^6, mounted upon the rear face of the frame. A coiled spring k^9, surrounding the shaft k^5, acts to hold the lever k^8 in contact with the cam k^6 and to rock the shaft k^5 and lower the tread-plate when the bed B rises. The above arrangement is such that the tread-plate C^2 will be raised and lowered as the bed B rises and falls, the cam k^6 being so constructed that it will maintain the tread-plate C^2 in its elevated position for a considerable portion of the stroke of the bed B. It will thus be seen that in feeding a heel-blank to the heel-compressing dies and removing it therefrom the heel-blank moves over a surface which is practically an unbroken plane.

In order to accommodate the dies for different thicknesses of heels and also to insure that the tread-plate C^2 will have its upper surface, when the bed B is in its lowermost position, in substantially the plane of the tables E and E' and the upper surfaces of the side-compressing dies C, I propose to provide for the use of various thicknesses of tread-plate—that is, in operating upon a high heel a comparatively thin tread-plate will be used and in operating upon a low or thin heel a relatively thicker tread-plate will be used.

As shown in the drawings, the tread-plate C^2 is provided with a depending stem k^7, which is received in a bearing in the upper end of the block k, and in order to adjust the throw of the block k for various thicknesses of tread-plate I have provided the cam k^6 with radial cam-surfaces, there being four such cam-surfaces illustrated in the drawings, and said cam k^6 is arranged to turn in suitable bearings k^{8*}, formed in brackets projecting from the rear face of the frame a, whereby said cam may be turned to bring into operative position the particular cam-surface which it is designed to operate with any particular thickness of tread-plate, any suitable means being provided to maintain the cam k^6 in position with any particular cam-surface in operative position.

The operation of the machine of the drawings is as follows: With the parts in the position shown in Figs. 1 and 3 of the drawings—that is, with the heel-feeding device projected toward the front end of the table E and the tread-plate C^2 in its elevated position, assuming that the machine has acted upon and compressed a heel—the jaws H will be closed on the compressed heel. Upon a rotation of the main shaft the bed B will be elevated, and simultaneously with the upward movement of the bed B the carrier e' will be moved backward to bring the heel-blank in the heel-blank-feeding device in line with the heel-seat die and the tread-plate. At the same time the jaws H will remove the compressed heel from the tread-plate, and as the bed B continues to rise the heel-seat of the heel-blank which has been fed into position will be gripped between the pin p and the tread-plate, and as the carrier e' arrives at its rearmost position or in a position to place the heel-blank which was placed between the jaws of the heel-feeding device in line with the heel-seat die and the tread-plate the trip h^{16} engages the arm h^{17} and rocks the shaft h^{13}, thus releasing the heel-blank which has been acted upon by the heel-compressing dies, permitting it to drop into a suitable chute or other device which may be provided to convey the compressed heel-blank from the machine into a suitable receptacle placed to receive the same. As the bed B continues to rise and carries the heel-blank toward the heel-seat die the bell-crank lever k^8 will ride off of the high part of the cam k^6, and thus permit the tread-plate C^2 to be depressed, thus forcing the heel-blank downward between the side-compressing dies C, which as the bed B reaches its uppermost position will be moved inward to compress the sides of the heel-blank, and during this upward movement, as before explained, the carrier e' has been moved forward or toward the left, as shown in Fig. 2 of the drawings, thus placing the open jaws H in position to engage the compressed heel-blank upon the downward movement of the bed B and placing the heel-feeding device in position to receive an uncompressed blank.

Having described the construction and mode of operation of my invention, I claim as new and desire to secure by Letters Patent of the United States—

1. In a heel-compressing machine, the combination with suitable compressing-dies, of mechanism arranged to feed a heel-blank into position to be acted upon by said dies, and to

remove the compressed heel-blank therefrom, and means coöperating with the heel-blank feeding and removing mechanism, arranged to engage the heel before it is released by the heel-feeding device, and remain in engagement therewith until said heel is engaged by the heel-removing device, substantially as described.

2. In a heel-compressing machine, the combination with heel-compressing dies, comprising a heel-seat die and a tread-plate, of a heel-blank-feeding device and a heel-blank-removing device and mechanism for alternately advancing and retracting said heel-blank feeding and removing devices in opposite directions toward and from a position in line with said heel-seat die and tread-plate, substantially as described.

3. In a heel-compressing machine, the combination with suitable heel-compressing dies, comprising a heel-seat die, a tread-plate and side-compressing dies, of a heel-blank-feeding device and a heel-blank-removing device movable in a plane parallel with the upper surface of the side-compressing dies and alternately in opposite directions toward and from a position in line with the heel-seat die and tread-plate, means to raise the tread-plate to place it in substantially the same plane as the plane of movement of the heel-blank feeding and removing devices during the operation of such devices, substantially as described.

4. In a heel-compressing machine, the combination with a heel-feeding device comprising resilient spring-arms, of heel-compressing dies, and means carried by the heel-seat die to engage the heel when placed in alinement with the heel-compressing dies, to remove the heel from the heel-feeding device, substantially as described.

5. In a heel-compressing machine, the combination with the heel-compressing dies, of a heel-blank-removing device comprising suitable gripping-jaws, means to move said jaws toward and from the heel-compressing dies, means to close the jaws while in position to grip the heel-blank, and means to open the jaws to release the heel as the jaws are retracted, substantially as described.

6. In a heel-compressing machine, the combination with a heel-seat die and a tread-plate, of a reciprocating slide, a heel-feeding device arranged upon one end of the slide and a heel-removing device arranged at the opposite end of the slide, and mechanism to alternately place the heel-feeding device and the heel-removing device in line with the heel-seat die and tread-plate, substantially as described.

7. In a heel-compressing machine, the combination with a vertically-reciprocating bed or table, of a slide arranged for horizontal reciprocation on said bed or table, gripping-jaws carried by said slide, yielding devices arranged to close said jaws, of a rock-shaft carrying suitable cams arranged to open said jaws and suitable tripping mechanism arranged to actuate the rock-shaft as the bed or table moves up or down, substantially as described.

8. In a heel-compressing machine, the combination with a slide provided with an abutment against which the breast of the heel is adapted to be placed, of yielding spring-arms, arranged to embrace the sides of the heel, means for adjusting the spring-arms toward and from each other and an adjustable carrier arranged to adjust the spring-arms with relation to the abutment, substantially as described.

9. In a heel-compressing machine, the combination with a heel-seat die, of heel-blank-feeding and heel-blank-removing mechanism, said heel-seat die having means to engage the heel before it is released by the heel-feeding mechanism and to remain in engagement with the heel until after it has been engaged by the heel-removing mechanism, substantially as described.

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

WILLIAM J. YOUNG.

Witnesses:

T. HART ANDERSON,

A. E. WHYTE.