W. GORDON & L. E. TOPHAM.

MACHINE FOR STAMPING BOOTS AND SHOES.

APPLICATION FILED DEC. 23, 1903.

1,028,567.

Patented June 4, 1912.

4 SHEETS—SHEET 1.

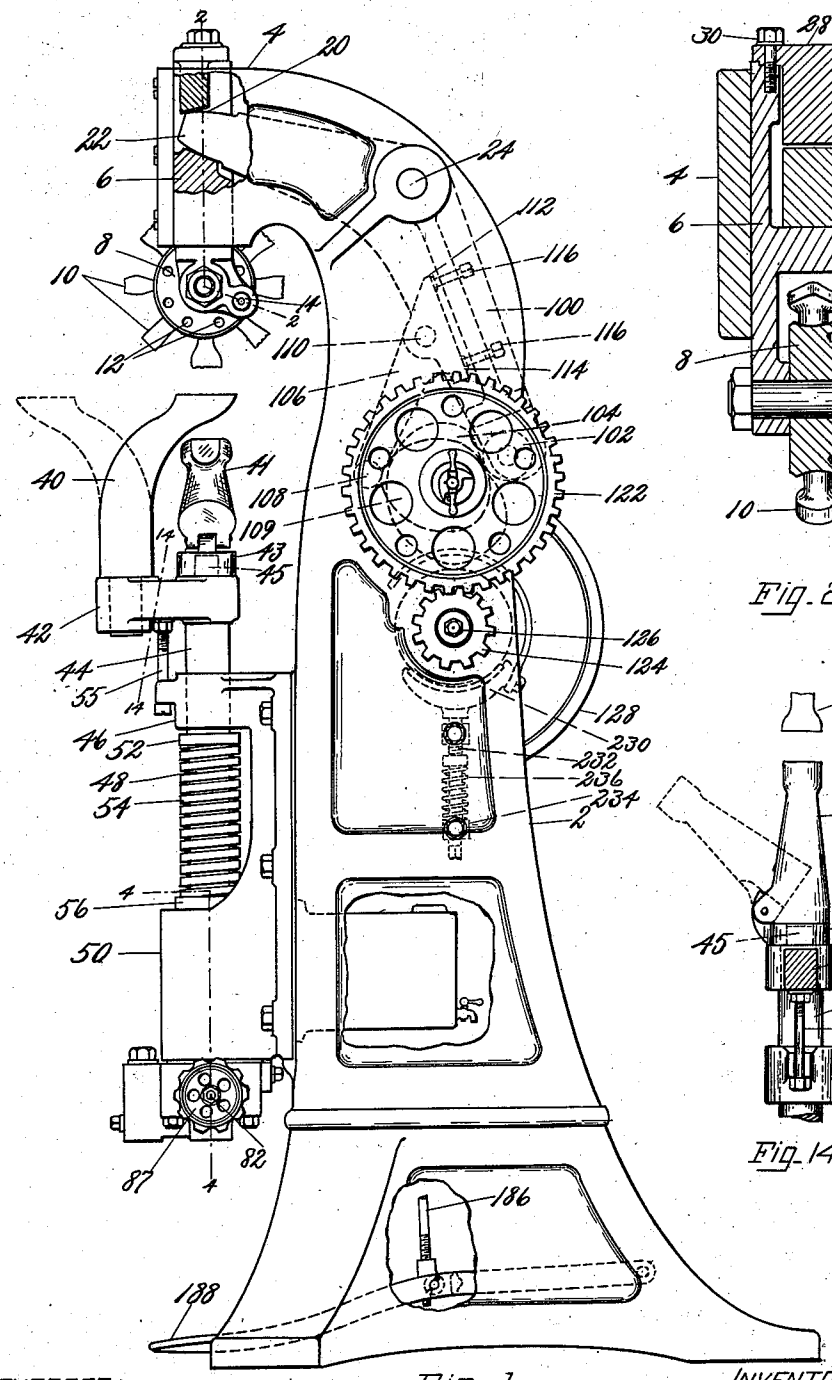

Fig. 1.

Fig. 2.

Fig. 14.

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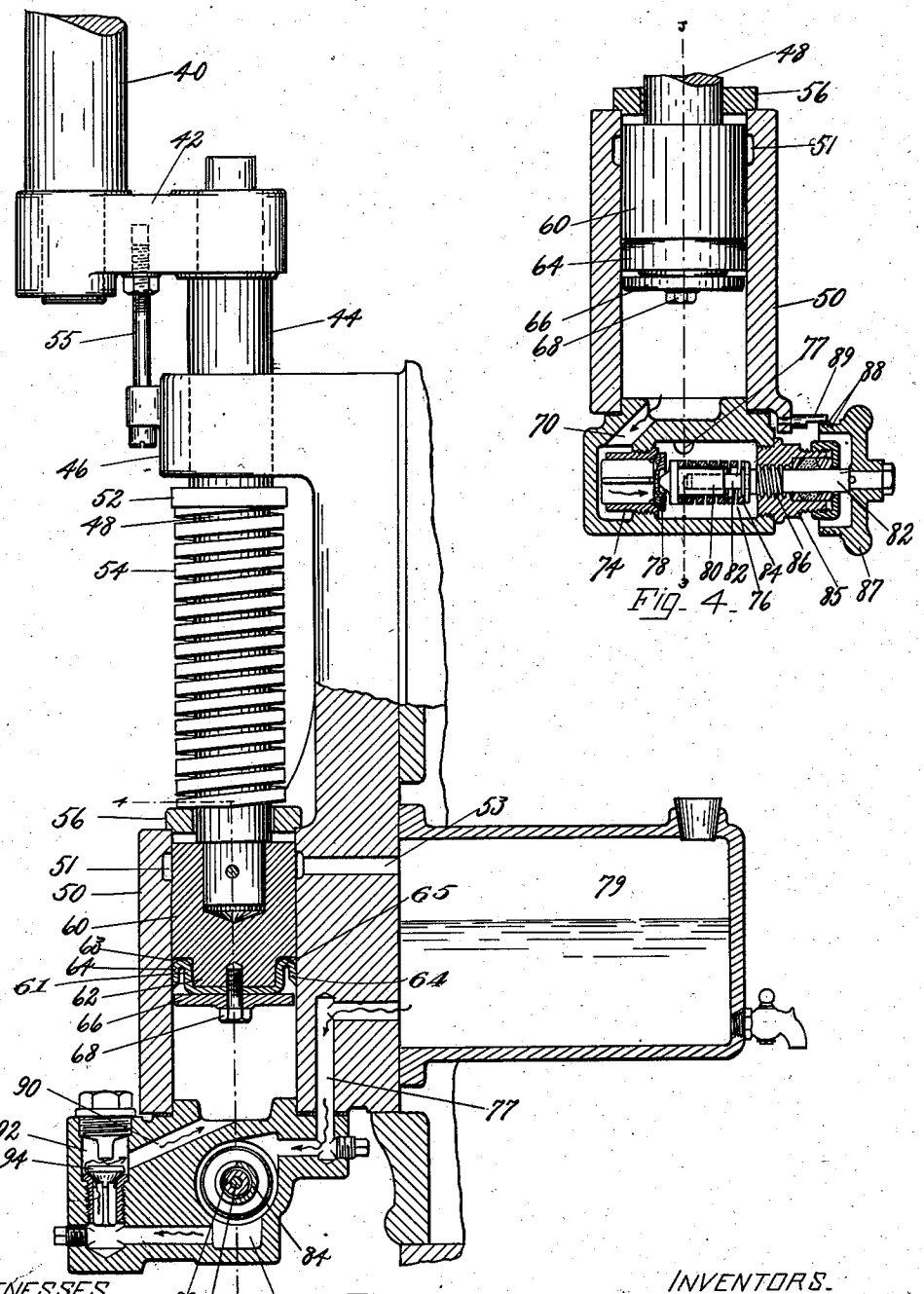

Fig. 4.

Fig. 3.

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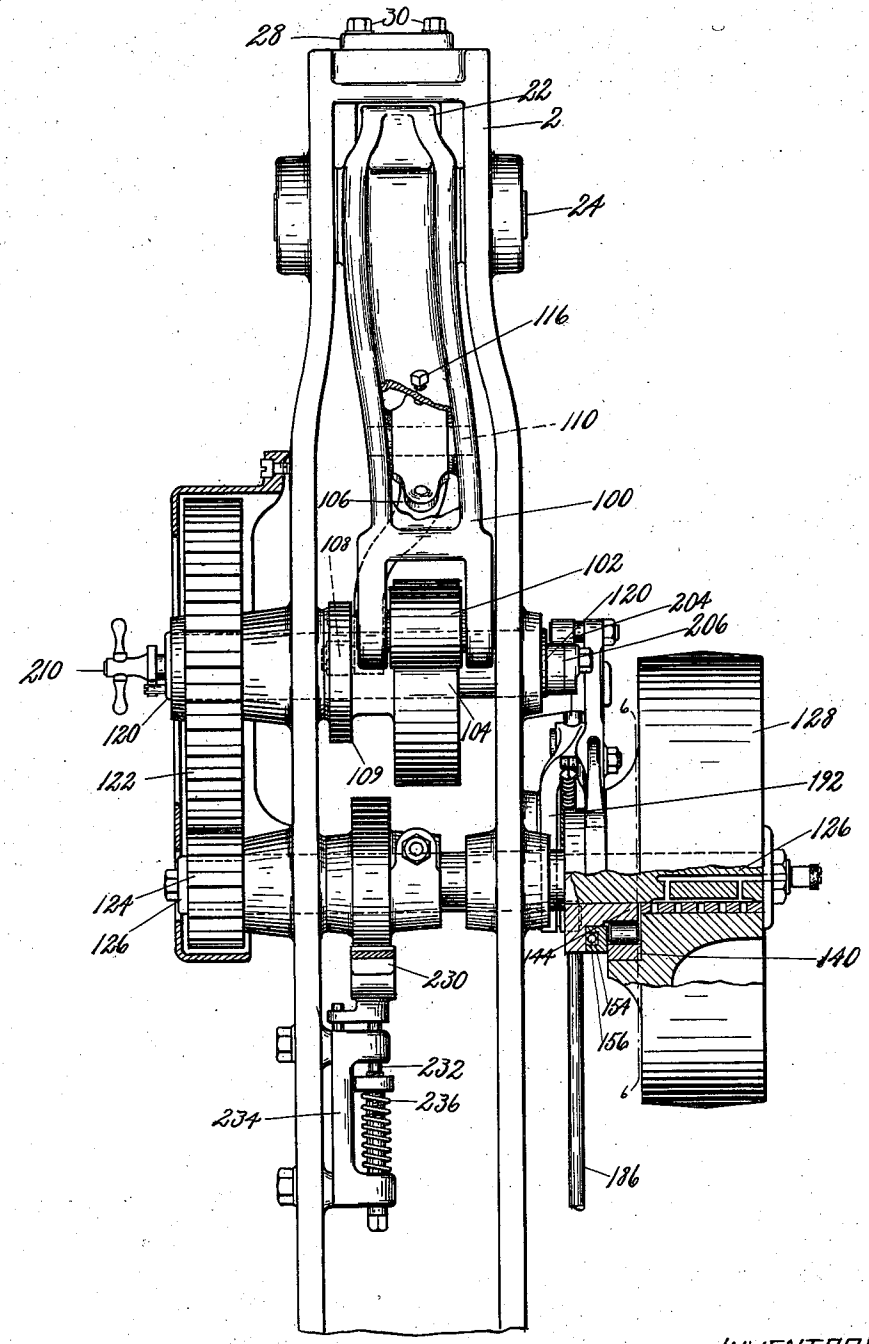

Fig. 5.

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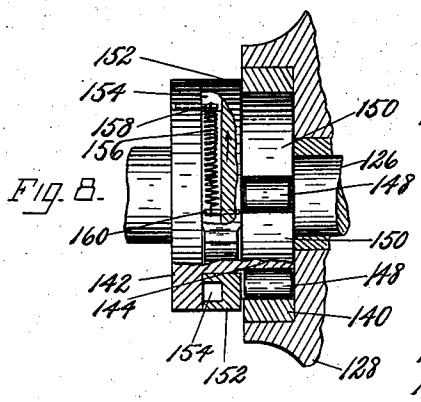


Fig. 8.

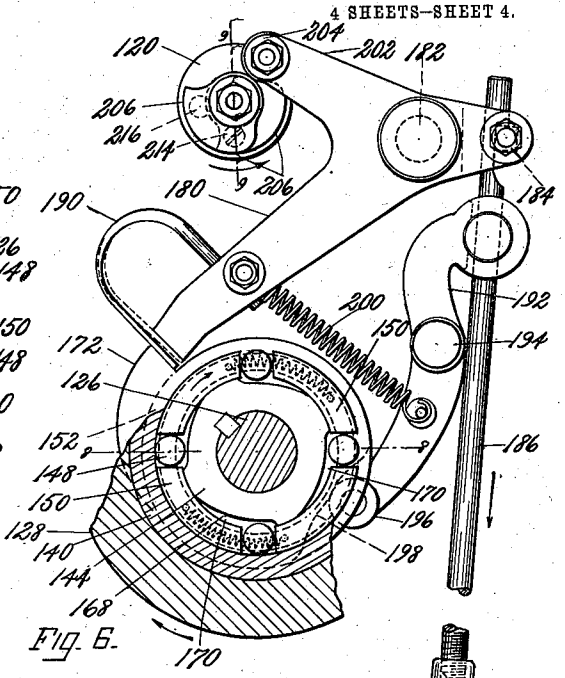


Fig. 6.

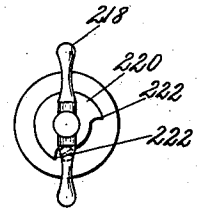


Fig. 11.

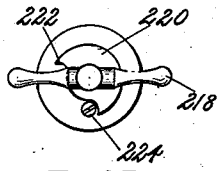
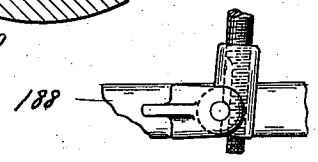


Fig. 12.



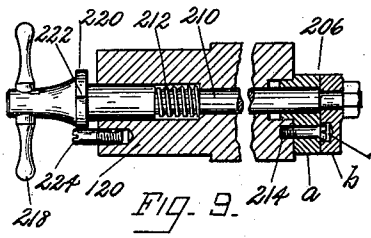


Fig. 9.

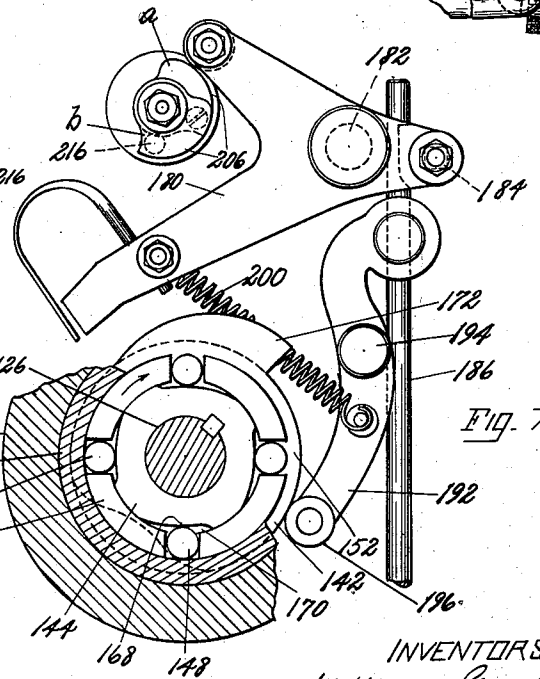


Fig. 7.

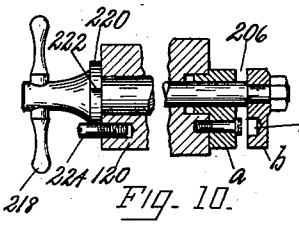


Fig. 10.

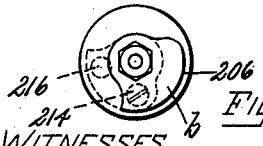


Fig. 13.

WITNESSES.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR STAMPING BOOTS AND SHOES.

1,028,567. Specification of Letters Patent. Patented June 4, 1912.

Application filed December 23, 1903. Serial No. 186,368.

To all whom it may concern:

Be it known that we, WILLIAM GORDON and LAURENCE E. TOPHAM, citizens of the United States, and residents, respectively, of Boston, in the county of Suffolk and Commonwealth of Massachusetts, and of Somerville, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Stamping Boots and Shoes, 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 stamping machines and particularly to stamping machines adapted for impressing upon the bottoms of boots and shoes monograms, trade-marks, price-marks, or other marks or designs, although some features of the invention are applicable to other classes of machines than stamping machines.

The object of the invention is to provide an improved machine which shall be certain and reliable in its operation and which will act with uniform pressure upon the stock regardless of the thickness of the stock.

In a power operated machine employed for stamping the bottoms of boots and shoes it is essential, in order to produce uniform work, that provision be made to enable the machine to adapt itself automatically to different thicknesses of stock, because even shoes of the same style and grade vary so much in the thickness of the bottom stock that an adjustment which is right for one shoe will produce too light or too heavy an impression on another shoe. In shoes of different styles and grades the differences in the thickness of the bottom stock are greater. The machine of the present invention is so constructed as to act with entire uniformity upon the stock whatever its thickness.

An important feature of this invention consists in providing a work-support and stamping mechanism, in combination with actuating means for relatively moving said members for stamping the work, and means for sustaining one of said members until the pressure upon the work exceeds a predetermined amount, and thereafter permitting said member to yield, so that no greater pressure is applied during the remainder of the stroke of the actuating means. In the preferred embodiment of this feature of the invention the stamping die is connected with the actuating means and has imparted to it thereby a uniform stroke toward and from the work-support. The work-support is sustained by a confined volume of liquid, the containing cylinder for which is provided with a relief valve adapted to permit escape of the liquid when the pressure transmitted thereto through the work-support becomes excessive. Adjustable means is provided for controlling the relief valve so that the pressure which will be sustained before the valve will open may be determined at the will of the operator. By this arrangement the work-support will be rigidly sustained against the action of the stamping die, until, during the descent of said die, a pressure has been applied to the work exceeding that for which the relief valve is adjusted, and then the relief valve will be opened automatically to permit the work-support to move with the stamping die during the remainder of the stroke of said die and its actuator. By permitting the liquid to escape freely whenever and so long as the pressure is exceeded for which the relief valve is adjusted the work-support moves freely with the stamping die, maintaining the predetermined pressure upon the work during the remainder of the downward stroke of the die. Means is provided for returning the work-support to its normal position during the reverse stroke of the stamping die and the containing cylinder for the liquid is provided with an inlet valve which is opened during the rise of the work-support to permit the cylinder to be refilled to compensate for the liquid forced out through the relief valve during the descent of the work-support.

Provision is made for regulating the height to which the work-support is elevated and thereby determining its initial position according to whether a thick or a thin class

of stock is to be operated upon. The regulating means may be so adjusted, if desired, that the work-support will be elevated to a height such that it will, with a given thickness of stock, be depressed for a considerable distance during each stamping operation. By this means the time during which the stock will be under pressure of the stamping die may be increased to permit the die to imprint itself more thoroughly upon the stock.

The pressure which will be applied to the work by the stamping die before the work-support is released may be regulated by adjustment of the relief valve according to the requirements of the stock and according to the size and character of the die, greater pressure being required for producing a proper impression from a large die than from a small one.

The machine is provided with operating mechanism of improved construction by which the stamping die is given a relatively slow downward movement, particularly during the latter part of its descent, to allow it to impress itself thoroughly upon the stock and then is given a relatively rapid upward movement. By this arrangement the machine may be operated rapidly and yet cause the stamping die to act upon the work by pressure instead of by impact.

The machine is provided with starting and stopping mechanism by which it is normally caused to make one complete reciprocation of the stamping die and then come to rest. In some classes of work where great care is required for obtaining distinct impressions of the stamping die, as in stamping sample shoes or in stamping stock upon which it is difficult to get a good impression, it is sometimes desirable to allow the die to remain in pressing contact with the work for a longer period than provided for in the regular operation of the machine.

A feature of the present invention consists in constructing the operating mechanism so that, if desired, the machine may be caused to stop automatically with the die at the lowest point in its descent, whereby the die may remain in pressing contact with the work until the machine is restarted.

These and other features of the invention, including details of construction and combinations of parts, will be fully explained in the following description and pointed out in the claims.

Figure 1 is a side elevation of the machine, a portion of the upper part of the frame being broken away. Fig. 2 is a sectional view on the line 2—2 of Fig. 1. Fig. 3 is a detail of the work-support and shows in section the preferred form of sustaining means therefor. Fig. 4 is a view on the line 4—4 of Figs. 1 and 3, being a section at right angles to the section shown in Fig. 3. Fig. 5 is a rear elevation of the machine, with certain parts in section. Fig. 6 is a view of the clutch which we prefer to use, as seen by looking to the left from the dotted line 6—6 of Fig. 5. Fig. 7 is a view similar to Fig. 6 with the parts in different positions. Fig. 8 is a sectional view on line 8—8 of Fig. 6. Fig. 9 is a sectional view on the line 9—9 of Fig. 6, and shows the means employed for adjusting a controlling cam shown in Fig. 6 and hereinafter described. Fig. 10 is a view similar to Fig. 9, showing the parts in positions which they assume while being adjusted. Figs. 11 and 12 are left-hand end views of the parts shown in Figs. 9 and 10, respectively. Fig. 13 is a right-hand end view of the parts shown in Fig. 10, this view showing the position of the controlling cam alternative to that shown in Fig. 6. Fig. 14 is a sectional view on line 14—14 of Fig. 1.

The frame of the machine is indicated at 2 and is suitably shaped to stand upon the floor, being of a height to bring the stamping mechanism within convenient reach of the workman. In an overhanging arm 4 at the upper end of the frame is mounted a plunger 6 supporting at its lower end a turret 8 which carries, preferably, a plurality of stamping dies. The stamping dies may be provided with suitably shaped faces for impressing upon the work, such as the bottom of a boot or shoe, any desired trademarks or other marks. The turret is provided with shallow recesses 12 in its side and the plunger 6 supports a spring-pressed locking pin 14 adapted to take into one or another of the recesses 12 for locking the turret in adjusted position with the desired stamping die in position to act upon the work. The plunger is forked near its upper end, as at 20, to receive the end 22 of an elbow-lever pivoted at 24. The elbow-lever is actuated for reciprocating the plunger by mechanism hereinafter described in detail. The plunger is provided with a cap-piece 28 secured to the upper ends of its forks by bolts 30 and the cap-piece has a depending portion to be engaged by the upper face of the elbow-lever 22 for raising the plunger.

Work-supporting means is provided for supporting the work against the action of the plunger and its stamping dies. As herein shown, the work-supporting means comprises two horns 40 and 41, either of which may be used as desired. The horn 40 is a crooked or bent horn of the shape usually employed for supporting a shoe while the forepart thereof is being operated upon. This horn is swiveled to turn in an arm 42 which extends laterally from the head of the spindle 44. This mounting permits said horn to be turned into position to facilitate the application of the work thereto and

then into position to put the work under the stamping dies, as will be readily understood from Fig. 1 of the drawings. The horn 41 is a straight horn adapted to be removably applied directly to the head of the spindle 44 and comprises besides the upper section or horn proper a base piece or cap 43 adapted to fit over a stud 45 on the head of the spindle 44. The upper section is hinged to the base piece to permit it to be tipped to allow the work to be applied conveniently thereto. The horn 41 is particularly adapted for supporting the rear portion of a shoe while the heel is being stamped. When the horn 41 is to be used the horn 40 may be turned out of the way, as shown in dotted lines in Fig. 1. When the horn 40 is to be used the horn 41 may be lifted from the stud 45 and removed from the machine or it may be tipped to one side, as shown in Fig. 1, in which position it is out of the way of the horn 40.

The spindle 44 of the work-supporting means is guided through the upper arm of a bracket 46 secured to the machine frame 2 and extends at its lower end into a cylindrical bearing 50 formed in said bracket. The lower portion 48 of the spindle 44 is slightly reduced in diameter forming a shoulder located a short distance below said arm of the bracket 46. A collar 52 rests against the said shoulder and constitutes an abutment for a spring 54. The lower end of the spring rests upon a collar 56 which surrounds loosely the lower portion of the spindle and rests upon the upper end of the cylindrical bearing. The spring 54 serves to restore the work-support to its normal position after it has been forced downward by excessive pressure, as hereinafter explained. The normal elevation to which the work-support is lifted by the spring 54 is determined by a stop-rod 55 having bearing in the bracket 46 and screw-threaded engagement with the arm 42. The initial or normal position of the work-support may be varied to suit thick or thin classes of work by adjustment of the stop rod. The stop-rod 55 also constitutes means for preventing the bracket 42 from turning on the spindle 44.

In the preferred form of the invention herein disclosed the work-support is sustained by a confined volume of liquid. To this end the bearing 50 is a cylinder normally closed at its lower end and filled with liquid and the spindle 44 has secured to its lower end a piston-head 60 fitting the cylinder closely. As shown in the drawings, the lower end of the piston-head 60 is reduced in diameter, as at 62, whereby an annular recess 63 is formed between the lower portion of the piston-head and the walls of the cylinder and a suitable packing 61 is secured to the lower end of the piston-head by suitable means such as a clamping plate 66 and screw bolt 68. The packing 61 consists of a body portion and a marginal portion, the latter portion being folded outwardly to form the part 65, and then backwardly with relation to the body portion to form the part 64. As shown the packing extends over the lower end of the piston, but this is not essential. The packing extends into the annular recess 63 with the part 65 at the upper side of said recess. When pressure is exerted on the liquid, the packing is forced firmly into contact with the wall of the cylinder and leakage between the piston and the cylinder reduced to a minimum. Any suitable liquid may be employed in the cylinder, although we prefer to use oil for this purpose. The liquid in the cylinder serves to sustain the work-support with rigidity against the action of the dies in pressing upon the work with the necessary pressure for stamping the work.

In order to adapt the machine for stamping varying thicknesses of work uniformly without special adjustment the means now to be described is provided for releasing the work-support and allowing it to descend whenever a predetermined pressure, such as that required for properly stamping the work, is exceeded. The cylinder has connection through a channel 70, see Fig. 4, with a relief valve, which comprises the plate 78 held against the outer end of the sleeve 74, in the throat of the chamber 76, by the head 80 of a valve rod 82. A spring 84 is mounted between a flange on the head 80 and a coöperating flange on the valve rod 82. The shank of the valve rod has a screw-threaded portion 86 engaging with coöperating threads in the outer wall or cap 85 of the chamber 76. The valve rod 82 has on its outer end a hand-wheel 87 by which it may be turned in the cap 85 to adjust the tension of the spring 84 and thereby vary the pressure which the work-support and its piston 60 will sustain before the relief valve will be opened to allow the escape of the liquid. The hand-wheel has a flange provided with graduations 88 and a lug 89 projects from the cylinder 50 over said flange in order to enable an operator to gage the extent of adjustment of the valve rod by observing the relative position of said graduations and the end of the lug. The chamber 76 communicates through a channel 77 with a tank 79 containing a supply of the liquid with which the cylinder is supplied. By this construction the work-support and the work thereon will be rigidly sustained against the action of the stamping dies until a predetermined pressure is exceeded, such pressure being determined by the adjustment of the spring 84. Whenever the said prede-

termined pressure is exceeded, as when the stock being stamped is thicker than that for which the work-support is adjusted so that the predetermined pressure of the die upon the work is secured before the die-carrying plunger 6 completes its downward stroke, then the relief valve will be opened and the work-support will move freely downward with the plunger during the remainder of its downward stroke so that no greater pressure will be applied to the work, no matter what the thickness of the stock may be. That is to say, if the machine is adjusted to receive stock of a given thickness and stock is inserted which is of greater thickness, the stamping die will meet the thicker stock earlier in its descent than it would have met the thinner stock and will press upon it until the pressure is reached for which the relief valve is adjusted, after which the valve will be forced open against the tension of the spring 84 and allow the liquid to escape so that the work-support may move down freely with the plunger 6 during the remainder of the descent of the plunger, whereby the thick stock is stamped with the same pressure that would have been applied to thinner stock. By this means of sustaining the work-support the machine automatically adapts itself to the thickness of the stock, and thick stock is acted upon with the same pressure as thin stock. It is also to be noted that the work remains under the predetermined pressure while the work-support is moving downwardly. By this arrangement the time during which the stamping die remains in pressing contact with the work may be varied, if desired, by varying the initial position of the work-support so that it will be forced down a greater or less distance at each stamping operation.

In the event that the work presented to the machine is thicker than that for which the work-support is adjusted so that the pressure during the downward stroke of the stamping plunger exceeds the pressure for which the spring of the relief valve is adjusted and a portion of the liquid is forced out of the cylinder by the descent of the work-support and the piston-head 60, the spring 54 will, upon the upstroke of the plunger, elevate the work-support and the piston-head. In order to permit the cylinder to be refilled with the liquid said cylinder has connection, by means of a channel 90, see Fig. 3, with a well 92 in which is situated a valve 94 which permits the liquid, as the piston rises, to be drawn back into the cylinder by suction from the chamber 76 and tank 79, as indicated by arrows in Fig. 3. The cylinder 50 is provided near its upper end with an annular groove 51 having connection through a channel 53 with the tank 79. The groove 51 will receive any liquid which leaks around the piston and will allow it to escape into the tank.

For actuating the die-carrying plunger 6 the elbow-lever, which is pivoted at 24 to the machine frame, carries on its lower arm 100 a roll 102 arranged to engage a cam 104, see Figs. 1 and 5. The said lower arm 100 has also a branch 106 provided at its lower end with a roll 108 for engaging the cam 109 mounted adjacent to the cam 104 and shaped, with relation to said cam 104, so that the points of contact of the rolls 102 and 108 with said two cams will be always the same distance apart, whereby the said elbow-lever is swung in both directions by the said cams without any lost motion. The branch 106 is pivotally connected to the arm 100 of the lever at 110 and has lugs 112 and 114 located respectively above and below said pivotal connection and arranged to be engaged by adjusting screws 116 by means of which said branch may be turned about its pivot to adjust its lower end to compensate for wear of the cams.

The cams 104 and 109 are mounted upon a shaft 120 having bearing in the frame of the machine and provided at one end with a gear 122 which meshes with a pinion 124 on the driving shaft 126. The driving shaft is mounted in bearings in the machine frame below the shaft 120 and carries at its end opposite the pinion 124 a driving pulley 128 mounted to rotate freely thereon. The driving pulley 128 is arranged to be connected with the driving shaft by means of a clutch of the type known as the "Horton clutch". The clutch as herein shown, comprises a hardened steel ring 140 secured in a recess in the left-hand face of the pulley hub, see Figs. 5 and 8, and forming for the purposes of this description a portion of the pulley. The pulley, together with the said ring, will be herein referred to as the "loose clutch member". The fast clutch member 142 comprises a sleeve keyed to the shaft and having a reduced portion 144 extending into the loose clutch member. The external diameter of said reduced portion is less than the internal diameter of the ring of the loose clutch member, and in the space between these two parts are arranged a plurality of rolls 148 and also a corresponding number of segmental lugs 150 projecting from one face of a sleeve 152. The sleeve 152 is loosely mounted on the reduced portion of the sleeve 142 (as shown most clearly in Fig. 8), and has in its face opposite that from which the lugs 150 project an annular groove 154, see full lines in Figs. 5 and 8 and dotted lines in Fig. 6. In the groove 154 are arranged springs 156 each secured at one end to pins 158 projecting from the fast clutch member 142 and attached at their other ends to pins 160 extending from the

sleeve 152, the tension of the springs acting to turn the sleeve 152 with its segmental lugs 150 in the direction of the arrow in Figs. 6, 7, and 8. The reduced portion 144 of the sleeve 142, which projects into the loose clutch member, has upon its periphery cam faces 168, see Fig. 6, corresponding in number to the number of rolls employed. The spaces between the cam faces 168 and the inner face of the loose clutch member are tapering in width, being at their larger ends wider than the diameter of the rolls 148 and at their smaller ends of less width than the diameter of the rolls. This arrangement is such that when the rolls are in the wider portion of the recesses 170 the loose clutch member may rotate freely with relation to the fast clutch member, but when the rolls are moved into the narrower portion of the recess, they will be wedged between the converging faces of the recess,—that is, between the cam faces 168 of the fast clutch member 142 and the inner face of the hardened ring of the loose clutch member 128,—thereby locking said loose and fast clutch members together so that the latter together with the driving shaft shall be rotated. The springs 156 above described tend to turn the sleeve 152 in the direction (indicated by the arrows) to cause the segmental lugs 150 to force the rolls into the narrow part of the recesses 170.

The sleeve 152 is provided with a lug or shoulder 172 adapted to be engaged by a stop device, hereinafter described, for turning said sleeve and thereby moving the segmental lugs to force the rolls 148 out of wedging contact with the faces of the fast and loose clutch members and into the wide portion of the recesses 170, as shown in Fig. 6, whereby to disengage the said clutch members and permit the driving shaft to come to rest. When the stop device is withdrawn from the shoulder 172 to release the sleeve 152, the springs 156 immediately rotate the sleeve in the direction of the arrow in Fig. 7 to force the rolls into the narrow portion of the recesses 170 for connecting the two clutch members and starting the driving shaft.

The stop for engaging the shoulder 172 on the sleeve 152 comprises a lever 180 mounted on a fixed pivot 182. The lever is provided on its short arm with a lug 184, see dotted lines in Figs. 6 and 7, adapted to be engaged by a hook on a rod 186 which is connected with a foot treadle 188, see Fig. 6 and Fig. 1. By depressing the foot treadle the rod 186 and the short arm of the lever 180 are drawn down to lift the end which acts as a stop out of the path of the shoulder 172 on the sleeve 152 and permit the springs 156 to rotate said sleeve for causing the fast and loose clutch members to be locked together. For preventing excessive jar when the shoulder 172 meets the lever 180 for causing the machine to be unclutched the lever is provided with a yoke-shaped spring 190, the free end of which extends down in front of the end of the lever in position to be engaged by the shoulder 172 and check the momentum of the moving parts before the shoulder brings up rigidly against the end of the lever.

It is desirable to insure that the machine shall come to rest after one complete reciprocation of the die-carrying plunger 6 in order to avoid the possibility of the work being injured by a second impression of the die upon it. To this end provision is made for disconnecting the treadle-rod 186 from the stop-lever 180 immediately after the lever has been lifted to allow the clutch members to be connected, and for holding said treadle-rod out of operative engagement with the stop-lever until a complete operation of the machine has taken place. This insures that if the operator accidentally depresses the treadle during the operation of the machine he will not lift the stop-lever 180 at a time which would permit the shoulder 172 to pass it and allow the machine to make a second operation.

For effecting the disengagement of the rod 186 from the lever 180 the rod is guided through a controlling lever 192 mounted on a fixed pivot 194. The controlling lever is provided with a roll 196 arranged to engage an edge cam 198. The roll 196 is held against the cam by a spring 200 which connects the levers 180 and 192. The cam 198 is so shaped that after the machine has been started the treadle-rod is forced out of connection with the stop-lever and held out until a rotation of the shaft has been proximately completed, thus reducing the danger that the operator, by accidentally stepping on the treadle, may lift the stop-lever and permit the machine to make a second impression on the work.

The relative sizes of the gear 122 and the pinion 124, carried respectively by the cam shaft and the driving shaft, are such that three revolutions of the driving shaft and pinion are required to produce one complete rotation of the gear 122 and cam shaft 120 for causing one complete reciprocation of the die-carrying plunger 6. Provision is, therefore, made for automatically lifting and holding the stop-lever 180 out of the path of the shoulder 172 of the clutch sleeve while said shoulder is passing the stop-lever during the first and second revolutions of the driving shaft. To this end the lever 180 has a third arm 202 provided with a cam roll 204 arranged to engage a cam 206. The cam 206 is shown as carried by the cam shaft 120 and shaped and positioned to lift

the lever 180 out of the path of the shoulder 172 when said shoulder is passing said lever, and in the normal operation of the machine to hold said stop-lever 180 elevated until the shoulder has passed it a second time and then to allow said lever to descend and stand in the path of the shoulder for causing the machine to be stopped at the end of the third rotation of the main shaft, at which time a full reciprocation of the die-carrying plunger will have been completed.

The main cam 104, carried by the cam shaft and from which the die-carrying plunger is operated, is preferably so shaped as to cause the plunger to be slowly depressed until it reaches the limit of its downward movement for pressing the stamping die against the work and then to hold the die approximately at rest in position of pressure to allow time for the die to impress thoroughly its imprint upon the work. Thereafter the plunger is rapidly elevated to its position of clearance for releasing the work and permitting its removal. In some classes of work where great care is required to obtain distinct impressions of the stamping die it is sometimes desirable to allow the die to remain longer in pressing contact with the work. In order to adapt the machine for such work the cam 206 for holding the lever 180 out of the path of the shoulder 172 is made in two parts, *a* and *b*, and means is provided for relatively adjusting the two parts *a* and *b* from the position shown in Fig. 7 to the position shown in full lines in Fig. 13. When the portions *a* and *b* are adjusted to form a long acting face, as shown in Figs. 6 and 7, the stop-lever 180 will be held up while the shoulder 172 passes it twice. When, however, the parts *a* and *b* of the cam are adjusted as shown in Fig. 13 to present a short bearing surface the stop-lever will be lifted while the shoulder passes it once and then will be allowed to descend into the path of the lever and will engage the shoulder and unclutch the machine at the end of the second revolution of the driving shaft. This stoppage of the machine will take place when the plunger carrying the stamping dies is at the limit of its downward movement and the work is under pressure. The machine will then remain at rest until the operator again starts it, when the main shaft will make one revolution for elevating the die-carrying plunger 6 to position of clearance and then automatically come to rest. This permits the stamping die to remain in position of pressure upon the work as long as the workman may desire.

The cam shaft 120 is bored longitudinally to receive a spindle 210 which is normally pressed outward, or to the left in Figs. 9 and 10, by a spring 212. The fixed portion *a* of the cam 206 is loosely mounted on said spindle, being held in rigid position relative to the shaft 120 by a screw 214 which enters the shaft. The spindle is reduced at its right-hand end, as shown in Figs. 9 and 10, and on said reduced end is firmly secured the movable portion *b* of the cam 206. The head of the screw 214 forms a shoulder on the face of the member *a* and the member *b* is provided with two recesses 216, either one of which is adapted to receive the head of said screw for locking the member *b* of the cam in adjusted position. By forcing the spindle to the right, in Figs. 9 and 10, the movable member *b* may be pushed away from the member *a* to put it out of contact with the head of the screw 214 and then said spindle may be turned by means of a handle 218 to adjust the member *b* with relation to the fixed member *a* of the cam. When the spindle is released the spring 212 will cause the movable member *b* to be drawn toward the member *a* to engage one of the recesses 216 with the head of the screw 214 and thereby lock the member *b* in adjusted position. For the purpose of limiting the turning movement of the spindle for adjusting the member *b* the spindle is provided with a collar 220 having shoulders 222 arranged to engage a stop 224 when the spindle has been turned to bring the movable cam member *b* in position to be locked by the engagement of a recessed portion with the head of the screw 214.

In operation the work is applied to one of the work-supports 40 or 41 and properly adjusted thereon to bring the portion to be stamped, namely, the forepart, shank, or heel, under the plunger. The turret carrying the stamping dies is turned to bring the proper die into operative position and is secured by the locking bolt 14. The operator then depresses the treadle 188, which, acting through the rod 186, withdraws the stop-lever 180 from the path of the shoulder 172 of the sleeve 152. When the stop-lever is withdrawn the springs 156 promptly turn the sleeve 152, and, through the segmental lugs 150, force the rolls 148 into locking engagement with the adjacent faces of the fast and loose clutch members, thereby connecting said members together, whereupon the fast clutch member and the main shaft will be rotated. As soon as the main shaft has rotated far enough to carry the low portion of the cam 198 away from the roll 196 of the controlling lever 192 said lever will withdraw the rod 186 from operative connection with the stop-lever 180 and hold it withdrawn during the remainder of the rotation of the shaft or until the shoulder 172 nearly reaches the stop-lever, at which time the roll 196 enters the low part of the cam

and the rod 186 is reëngaged with the stop-lever. This disengagement and reëngagement of the rod with the stop-lever is effected at each rotation of the main shaft, the rod being held out of engagement with the stop-lever during the major portion of each rotation to prevent the stop-lever from being accidentally lifted. The stop-lever is, however, acted upon by the cam 206 to hold it out of the path of the shoulder 172 during the first and, normally, during the second rotation of the driving shaft and only permitted to stand in the path of said shoulder during the third rotation of said shaft. The rotation of the main shaft is communicated to the cam shaft and the elbow-lever is actuated for forcing the die-carrying plunger 6 downwardly onto the work upon the work-support. The work-support sustains the work with absolute rigidity during the descent of the die-carrying plunger until the operative die carried by said plunger, having contacted with the work, is pressed against it with a pressure sufficient to imprint upon the work clearly and distinctly the design on the face of the die. If the stock is unusually hard and dense so that the die is not forced into it as far as the downward stroke of the plunger requires it to be or if the stock on the work-support is of greater thickness than that for which the machine is adjusted so that the plunger in descending applies to the stock a greater pressure than the relief valve is adjusted to withstand, then, in either case, as soon as the pressure exceeds that which the relief valve is adjusted to withstand, the valve will be opened and will allow the escape of the liquid from the cylinder 50 and the work-support will freely descend so long as the pressure applied to the work continues greater than that for which the valve spring is adjusted. This will prevent all danger of the work being injured by excessive pressure applied to it and will prevent undue straining of the machine. If the cam 206 is adjusted as shown in Figs. 6 and 7, the die-carrying plunger will be elevated after a brief dwell of the stamp upon the work and the machine will then come to rest with the plunger in position of clearance. If, however, the cam 206 is adjusted as shown in full lines in Fig. 13, then the stop-lever 180 will be dropped into the path of the shoulder 172 so as to stop the machine at the end of the second rotation of the main shaft, at which time the die-carrying plunger is in position of pressure at the limit of its downward stroke. The plunger will then be held down with the die pressing upon the work until the operator restarts the machine, whereupon the plunger will be elevated and the work may then be removed from the work-support.

If in any stamping operation the pressure for which the relief valve is adjusted has been exceeded so that the work-support has been depressed and liquid forced out of the cylinder 50, the work-support will be elevated by the spring 54 as soon as the plunger rises to relieve the excessive pressure. As the work-support is elevated by said spring the piston-head 60, rising in the cylinder, will draw in through the valve 94 liquid from the tank 79 to refill the cylinder so that the liquid in the cylinder will thereafter rigidly sustain the work-support in its elevated position until in a subsequent operation the pressure applied to the stock exceeds that for which the relief valve spring is adjusted.

It is to be understood that the work-support might be connected with an actuating lever and the stamping die with the fluid-containing cylinder if desired, or that the fluid-containing cylinder might be interposed between the actuating mechanism and the die or the work-support, in which case the actuated member would come to rest when the predetermined pressure was exceeded and the actuating mechanism complete its stroke by forcing fluid out of the cylinder. We prefer, however, the embodiment of the invention herein specifically described and shown in the drawings.

Having set forth the nature and scope of our invention and having specifically described a machine embodying the various features thereof in their preferred form, we claim as new and desire to secure by Letters Patent of the United States:—

1. In a machine of the class described, a work-support, stamping mechanism, and means for moving said stamping mechanism and work-support relatively for pressing the work, in combination with means for rigidly sustaining one of said members until a predetermined pressure is exceeded, and additional means readily accessible to the operator for adjusting said sustaining means to vary the amount of predetermined pressure.

2. A machine of the class described, comprising a work-support, a stamping die, and positively driven actuating mechanism for relatively moving said members at a slow speed from position of clearance to position of pressure, and then at a greater speed from position of pressure to position of clearance.

3. In a machine for stamping the bottoms of shoes, the combination with a work-support, a stamping die, and actuating mechanism for relatively moving said support and die from position of clearance to position of pressure and from position of pressure to position of clearance, said actuating mechanism comprising an operating lever, independent cams for actuating said lever in op-

posite directions, and means for relatively adjusting said lever and cams.

4. In a machine for stamping the bottoms of shoes, the combination with a work-support, a stamping die, and actuating mechanism for moving said die toward and from the work-support for stamping and releasing the stock, said actuating mechanism comprising an operating lever, a cam for actuating said lever to move the die toward the work-support, an arm adjustably mounted on said lever, and a second cam engaging said arm for actuating said lever to move the die away from the work-support.

5. A stamping machine having, in combination, a work-support, a stamping die, a driving shaft, an intermediate shaft driven by the driving shaft at a different rate of speed from the driving shaft, actuating mechanism interposed between the intermediate shaft and the stamping die for moving the die toward and from the work-support, and manually controlled means acting automatically to regulate the extent of the continuous rotation imparted to the intermediate shaft, whereby the stamping die may either be brought to rest in engagement with work on the work-support or automatically returned to its initial position remote from the work-support after having momentarily impressed the work.

6. A machine of the class described, comprising a work-support, a stamping die, and mechanism operating to bring the work-support and die into position of pressure, and stop the machine with the work-support and die in position of pressure, said mechanism also operating when the machine is restarted to return the work-support and die to position of clearance.

7. A machine of the class described, comprising a work-support, a stamping die, actuating mechanism for relatively moving said members to position of pressure and then to position of clearance, and means adapted to be adjusted for causing the machine to be stopped with the members in position of pressure or clearance, as desired.

8. A machine of the class described, comprising a work-support, a stamping die, actuating mechanism for relatively moving said members to position of pressure and then to position of clearance, a stop device and adjustable means for controlling said stop device to cause the machine to be stopped with the members in position of pressure or clearance, as desired.

9. In a machine of the class described, a work-support, stamping mechanism, and means for moving said stamping mechanism and work-support relatively for pressing the work, in combination with sustaining means for one of said members, said sustaining means comprising a confined volume of liquid, a relief valve, a spring controlling the relief valve, and means for adjusting the spring, said machine having provision for indicating the extent of adjustment of said spring.

10. In a stamping machine, the combination with a work-support, of a plunger and mechanism for actuating the plunger toward the work, said mechanism comprising a controlling device adapted to be adjusted for causing the plunger to be retracted automatically or to remain in pressing contact with the work.

11. A machine of the class described, comprising a work-support, stamping mechanism, means for sustaining said members, and means for moving said members relatively for acting upon the work until a predetermined pressure is obtained and then releasing one of said members and moving the two members together while maintaining the predetermined pressure, said machine having provision for returning said released member to initial position with relation to its sustaining means, combined with adjustable means for determining said initial relative position.

12. A machine of the class described, comprising a work-support, stamping mechanism, means for rigidly sustaining one of said members, means to move said members relatively for acting upon the work until a predetermined pressure is obtained and then releasing the rigidly sustained member and moving the two members together while maintaining the predetermined pressure, in combination with means for returning said rigidly sustained member to initial position with relation to its sustaining means and said other member, and other means for varying the initial position of the rigidly sustained member with relation to its sustaining means, whereby the time during which the work is under pressure may be increased or diminished.

13. A stamping machine comprising a work-support, a die, and means for moving the die relatively to the work-support for stamping the work, in combination with means including a confined volume of liquid and an automatic relief valve, for sustaining the work-support until a predetermined pressure is exceeded and then allowing the work-support to yield freely, means for thereafter automatically raising the work-support to initial position, and means for adjustably determining the extent of said last-mentioned movement of the work-support.

14. In a machine for stamping the bottoms of shoes, the combination with stamping mechanism and actuating means therefor, of shoe-supporting means comprising a member for supporting the forepart of a

shoe and a member for supporting the rear-part of a shoe, said supporting means being constructed and arranged to permit either of said members to be employed for presenting the portion of a shoe which it is adapted to sustain in operative relation to the stamping mechanism, and means for permitting relative yielding movement of said stamping mechanism and said supporting means when a predetermined pressure is exceeded, whereby excessive pressure on the work is prevented.

15. In a machine for stamping the bottoms of shoes, the combination with stamping mechanism and actuating means therefor, of shoe-supporting means comprising a head, a bent horn swiveled on the head and arranged to support a shoe in position for the forepart to be stamped and a straight horn hinged to the head and adapted to support a shoe in position for the heel to be acted upon by the stamping mechanism.

16. In a machine of the class described, the combination with stamping mechanism, of a work-support having two members for supporting different parts of the work under the stamping mechanism, said members being constructed and arranged for relative movement to permit either to be employed for presenting the part of the work which it is adapted to support in operative relation to the stamping mechanism, and means for permitting relative yielding movement of said stamping mechanism and said work-support when a predetermined pressure is exceeded, whereby excessive pressure on the work is prevented.

17. In a machine of the class described, the combination with a stamping die, of a work-support, means for moving said members relatively for pressing the work, a confined volume of liquid for sustaining one of said members; and mechanism for permitting the escape of a portion of said liquid when a predetermined pressure is exceeded, said mechanism consisting of a valve-seat, a valve-chamber, a valve in said valve-chamber, a head arranged to hold said valve upon said valve-seat, a rod upon which said head is slidably mounted, flanges on said rod and head, a spring interposed between said flanges, screw-threads upon said rod cooperating with screw-threads in the outer wall of said valve-chamber, and a hand-wheel on said rod by which it may be turned to vary the tension of said spring.

18. In a machine of the class described, the combination with a stamping die, of a work-support, means for moving said members relatively for pressing the work, a confined volume of liquid for sustaining one of said members, and mechanism for permitting the escape of a portion of said liquid when a predetermined pressure is exceeded, said mechanism consisting of a valve-seat, a valve-chamber, a valve in said chamber, a spring to hold said valve yieldingly on its seat, a movable member outside of the valve-chamber, and connections between said movable member and said spring whereby the tension of the latter may be varied.

19. In a machine of the class described, the combination with a stamping die, of a work-support, means for moving said members relatively for pressing the work, a piston connected with one of said members, a cylinder for containing liquid and in which said piston fits, a supply tank, an outlet passage leading from said cylinder to said tank, a relief valve in said passage, an inlet passage connecting said tank to said cylinder, and a check-valve in said inlet passage.

20. In a machine of the class described, the combination with a stamping die, of a work-support, means for moving said members relatively for pressing the work, a piston connected with one of said members, a cylinder for containing liquid and in which said piston fits, a supply tank, a groove between said cylinder and piston to receive leakage around the piston, and a channel leading from said groove to said tank.

21. In a machine of the class described, the combination with a stamping die, of a work-support, means for moving said members relatively for pressing the work, a piston connected with one of said members, a cylinder for containing liquid and in which said piston fits, said piston having an annular recess, a packing in said recess having its marginal portion folded outwardly and backwardly with relation to the body portion whereby when pressure is exerted on the liquid the packing is forced firmly into contact with the wall of the cylinder.

22. In a machine of the class described, the combination with a stamping die, of means for operating said die, a stop device by which the machine may be stopped with the die in different positions, and a controlling mechanism therefor, said controlling mechanism including a shaft, a two-part cam, one of said parts being secured to said shaft, and adjustable means to which the other part of the cam is connected for movement to vary the length of the active face of the cam, said mechanism having provision for retaining the parts of the cam in adjusted position.

23. In a machine of the class described, the combination with a stamping die, of means for operating said die, a stop device, and controlling mechanism therefor, said controlling mechanism including a two-part device arranged to be automatically actuated, a direct connection between one part of said controlling mechanism and the actu-

ating mechanism, and an adjustable device connecting the other part of the controlling mechanism to the actuating mechanism, said controlling mechanism having provision whereby the parts are retained in adjusted position.

24. In a machine for stamping parts of boots and shoes, the combination with a work support, of a stamping head comprising an adjustable turret and dies secured therein, a lever mounted for oscillation about a fixed axis and connected with said turret for moving the same, and actuating mechanism for said lever comprising an arm pivotally mounted on said lever and having adjusting means whereby its position on said lever may be regulated, and a driven shaft having operative connection with said arm for moving said lever and turret.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM GORDON.
LAURENCE E. TOPHAM.

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