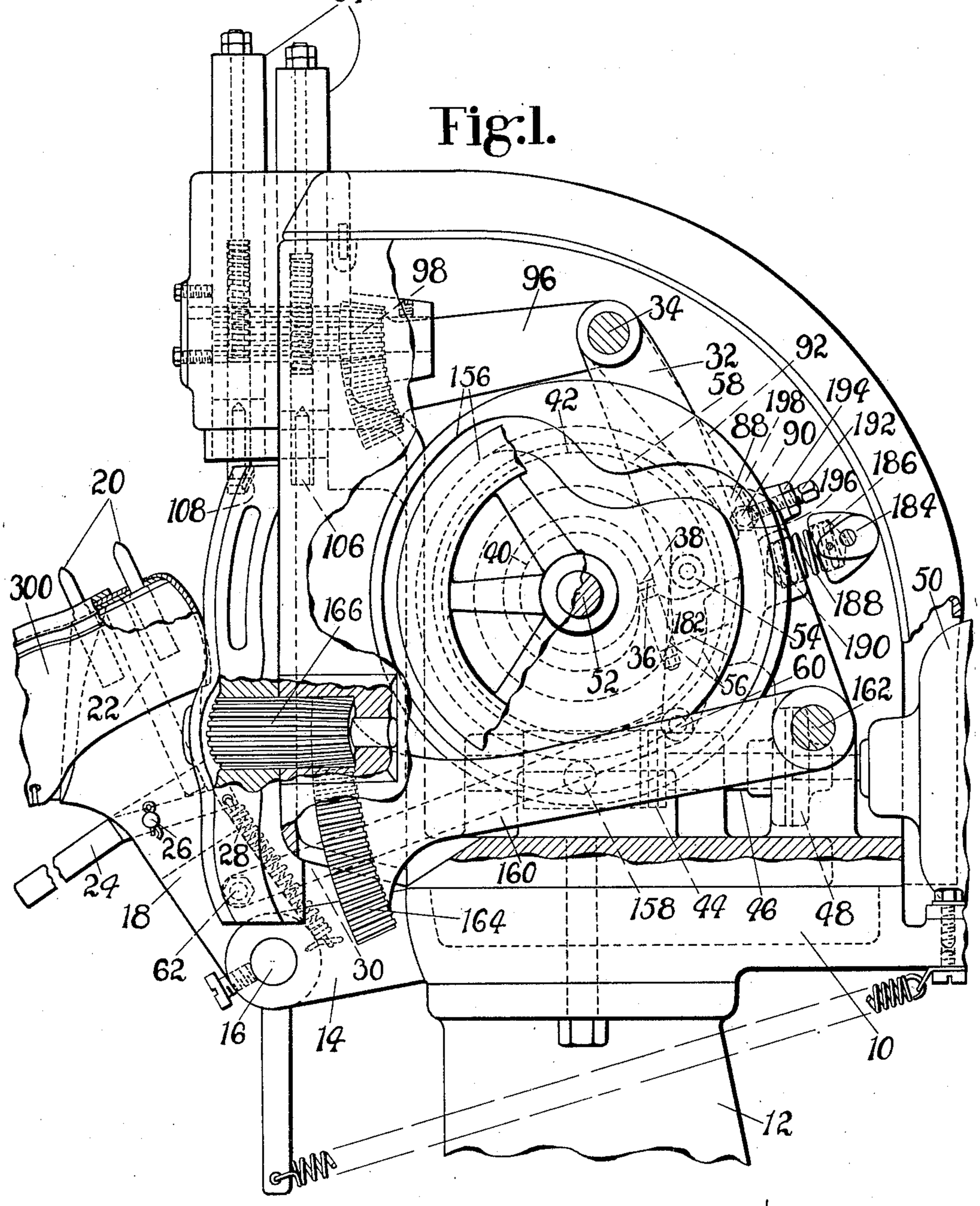
May 9, 1933. R. H. LAWSON 1,907,837

MACHINE FOR USE IN OPERATING UPON THE BOTTOMS OF BOOTS AND SHOES

Filed Sept. 11, 1930 5 Sheets-Sheet 1

64

Fig. 1.



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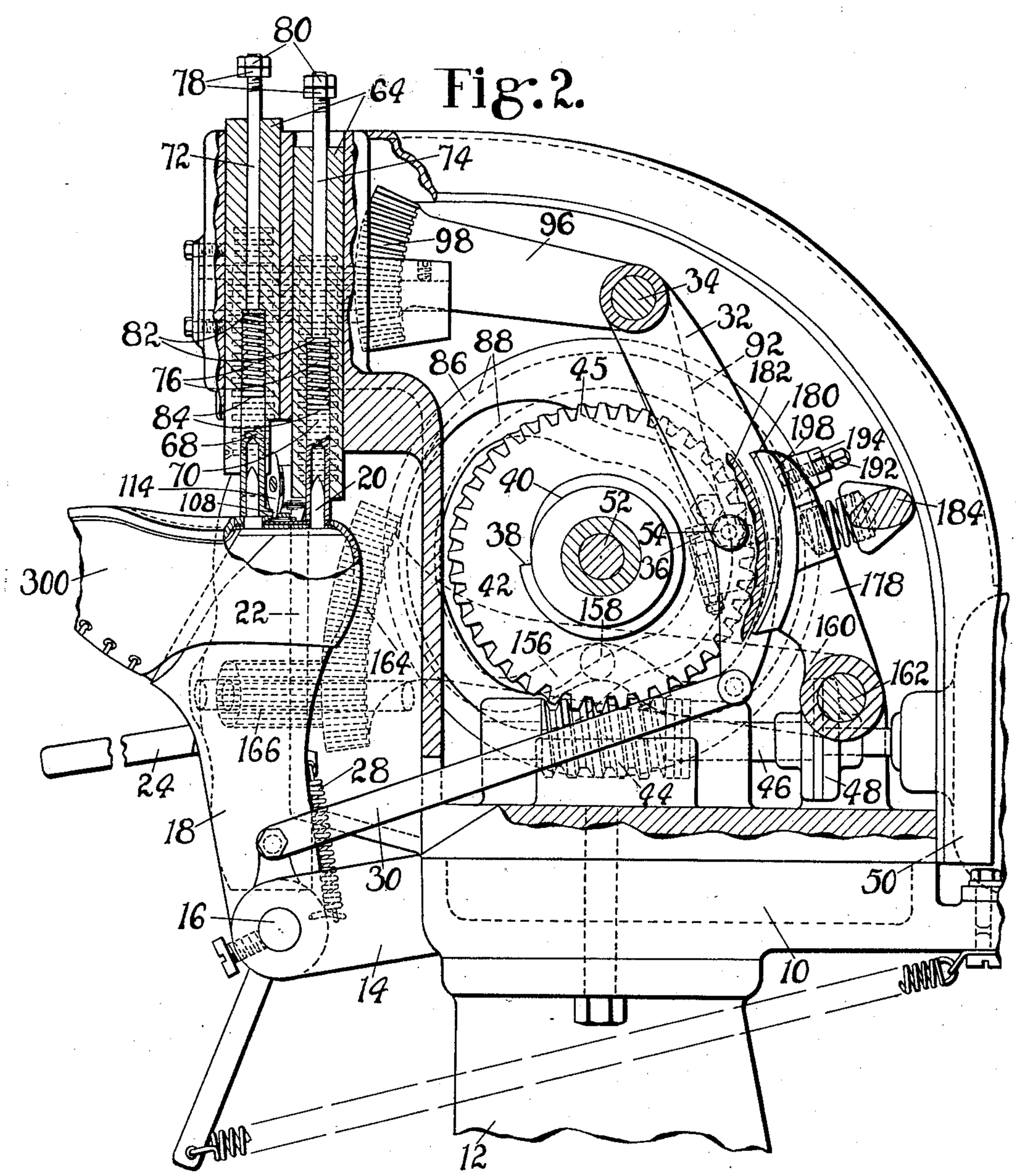
MACHINE FOR USE IN OPERATING UPON THE BOTTOMS OF BOOTS AND SHOES

Filed Sept. 11, 1930 5 Sheets-Sheet 2

Fig. 2.



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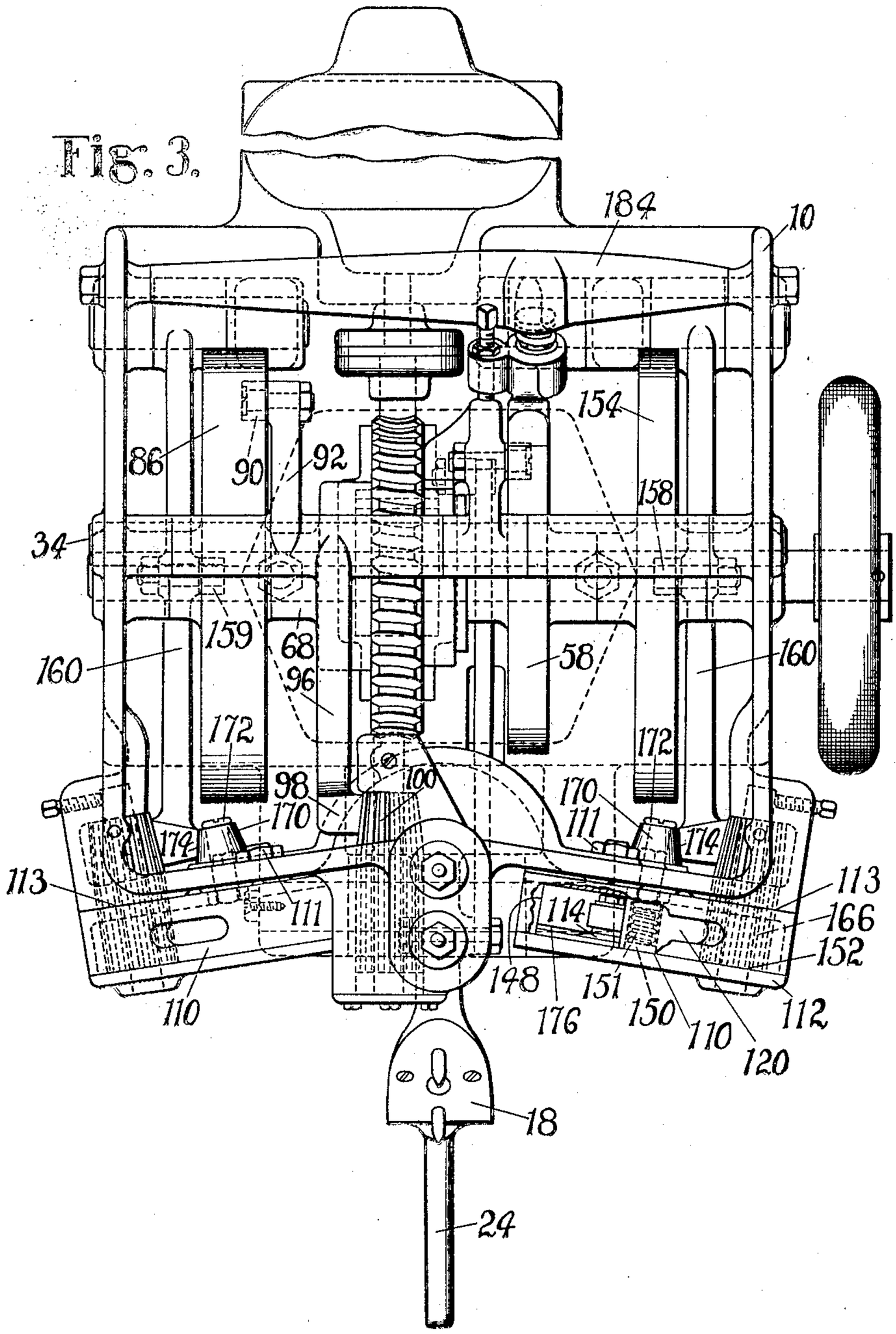
MACHINE FOR USE IN OPERATING UPON THE BOTTOMS OF BOOTS AND SHOES

Filed Sept. 11, 1930 5 Sheets-Sheet 3

Fig. 3.



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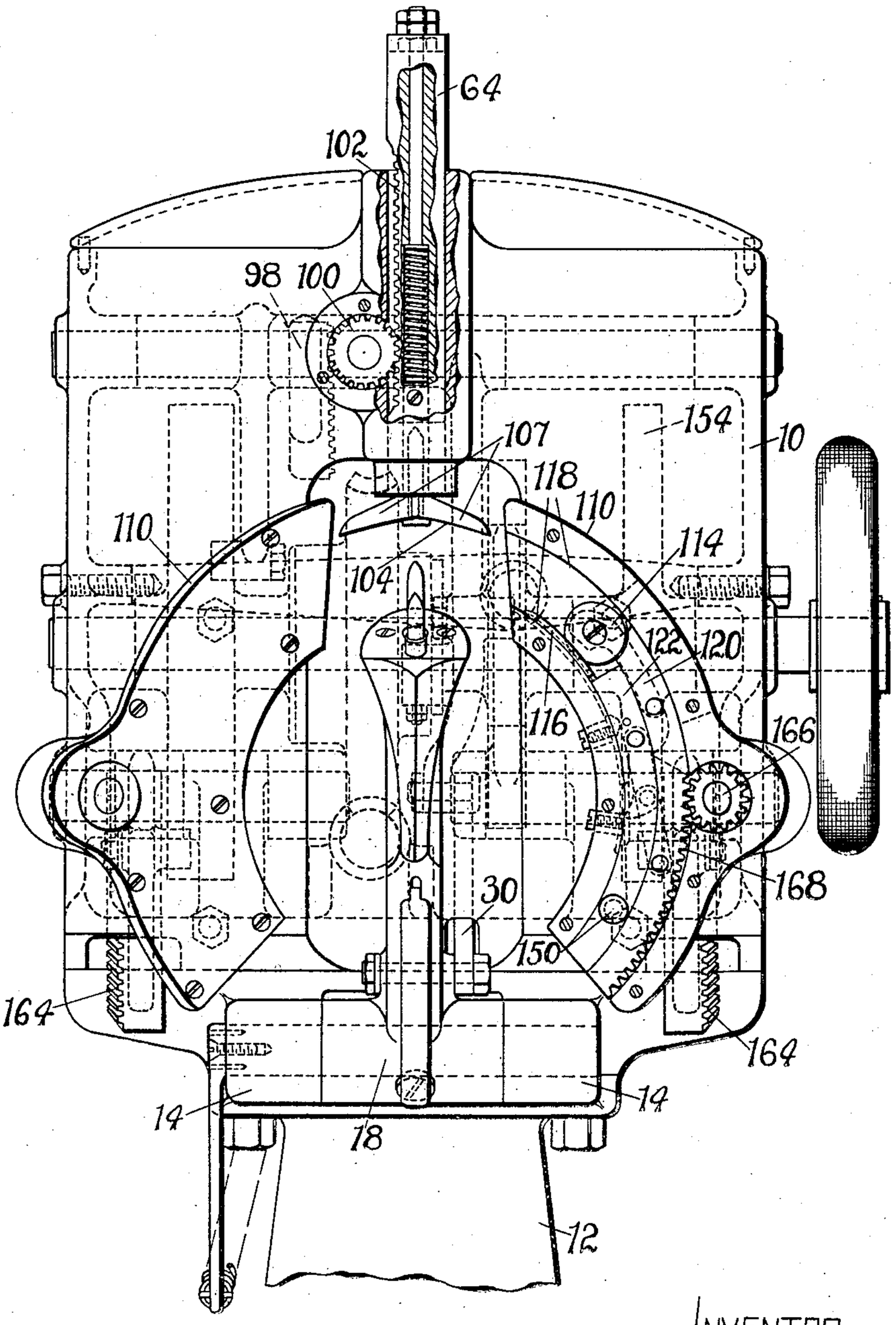
MACHINE FOR USE IN OPERATING UPON THE BOTTOMS OF BOOTS AND SHOES

Filed Sept. 11, 1930 5 Sheets-Sheet 4

Fig. 4.



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MACHINE FOR USE IN OPERATING UPON THE BOTTOMS OF BOOTS AND SHOES

Filed Sept. 11, 1930 5 Sheets-Sheet 5

Fig. 5.

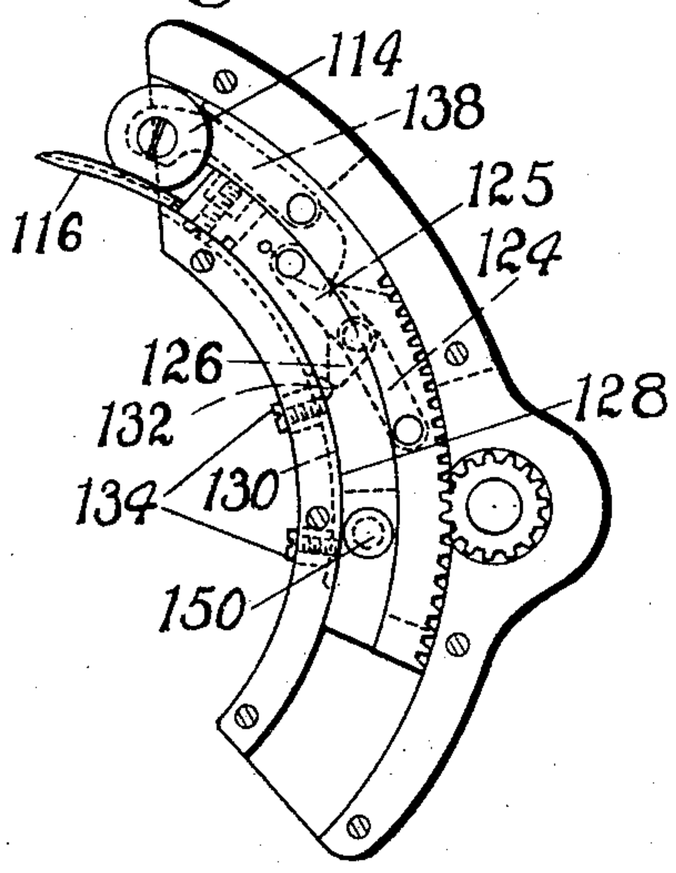


Fig. 7.

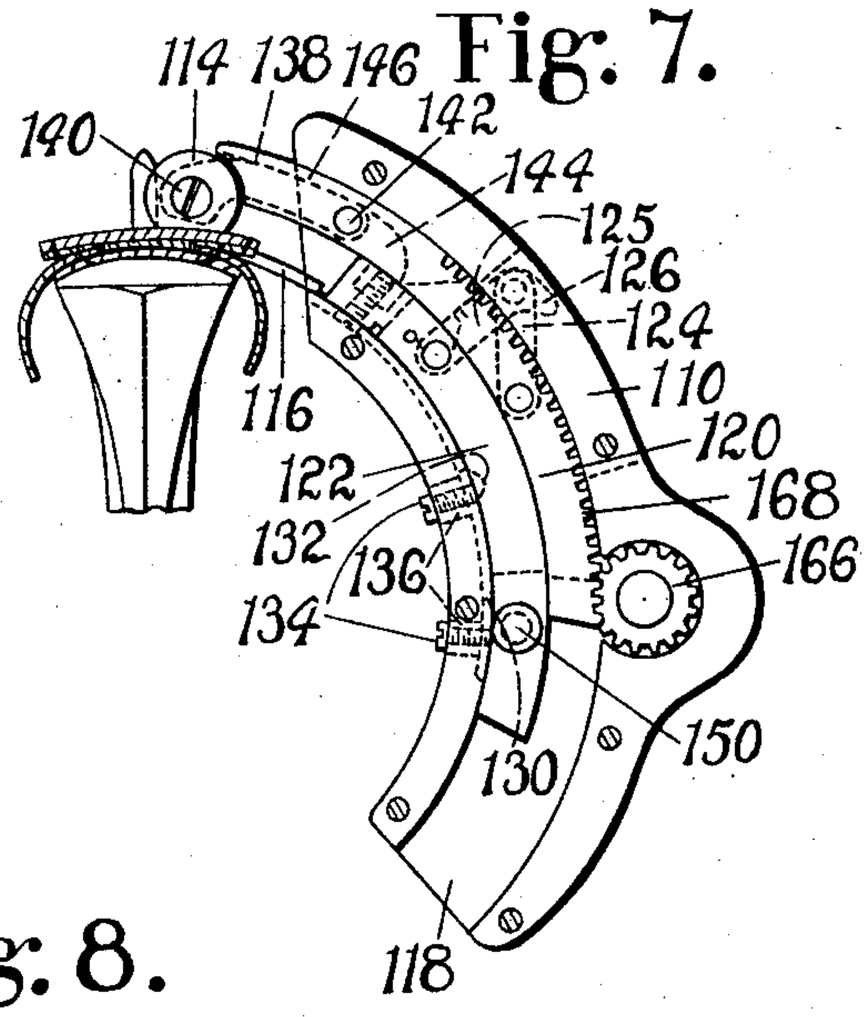


Fig. 8.

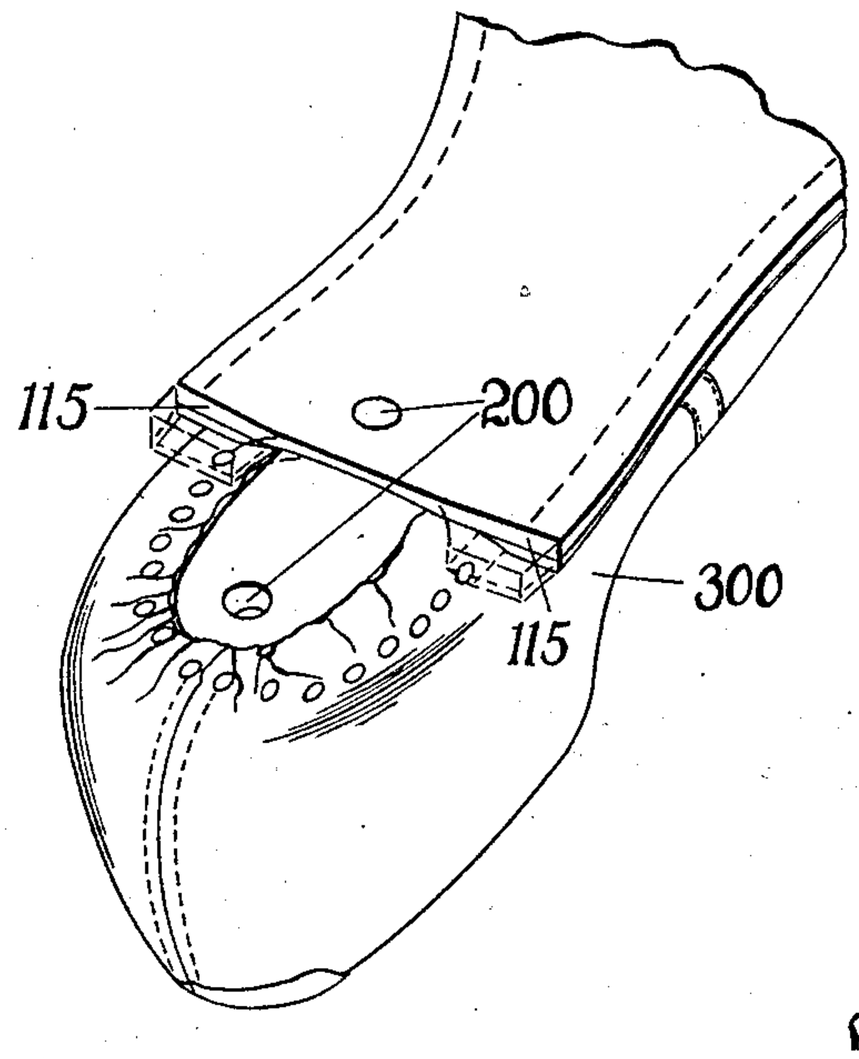
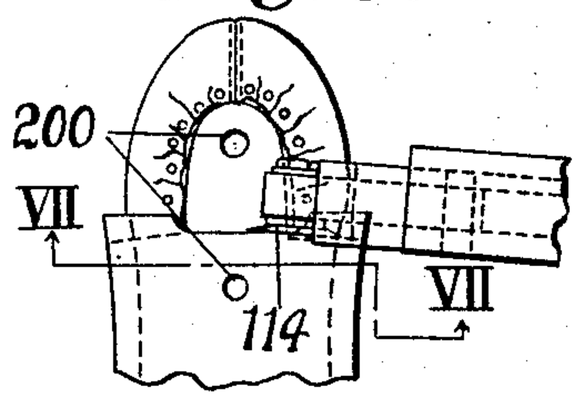


Fig. 6.



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UNITED STATES PATENT OFFICE

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MACHINE FOR USE IN OPERATING UPON THE BOTTOMS OF BOOTS AND SHOES

Application filed September 11, 1930. Serial No. 481,269.

This invention relates to machines for use in operating upon the bottoms of boots and shoes and is illustrated herein as embodied in a machine adapted for removing surplus material from the rear portions of outsoles and also from welts when desired.

Preparatory to the heel attaching operation, in the manufacture of shoes by the practice of the method disclosed in Letters Patent of the United States No. 1,706,504, granted March 26, 1929, on application of George E. Warren, the ends of a short outsole and attached welt at the rear of the heel breast line are trimmed to form two finished surfaces shaped to fit accurately against corresponding finished surfaces of a heel unit.

An object of the present invention is to provide an improved and substantially automatic machine by which cutting operations such as the outsole and welt trimming operation just referred to may be performed quickly and effectively.

In the organization of the illustrated machine, a work support or jack movable into and out of operative relation to the operating instrumentalities of the machine is provided and the construction and arrangement are such that upon initial movement of the support toward the operating instrumentalities the machine is started and operates automatically throughout the cycle, the support being moved into operative position, held there during the operation of the operating instrumentalities, and then returned to its initial position. Preferably and as illustrated, the work support is provided with a plurality of positioning devices such, for example, as jig pins arranged to be received by jig holes formed in the heel-seat portion of the sole to be operated on to locate the shoe in predetermined relation to the support and, after movement of the support into operative position, to assist in locating the shoe in operative relation to the operating instrumentalities. As illustrated, the machine is provided with means to engage the jig pins and adjacent portions of the sole to locate the support and clamp the shoe thereon.

The operating instrumentalities of the illustrated machine include knives movable transversely of the rear portion of the sole and welt, if the shoe is a welt shoe, to remove surplus material therefrom, and the illustrated clamping means for holding the shoe on the support is provided with surfaces formed thereon to guide the knives during their cutting operation. As illustrated, the knives are freely rotatable disk knives. To support the projecting lateral marginal portions of the sole and welt during the action of the knives, crease plates are provided which engage the shoe in the welt crease adjacent to the knives, the crease plates preferably having edges which act to sever the inseam stitches which hold the welt, shoe upper and insole thereby freeing the severed portion of the sole and welt from the shoe upper. In the illustrated machine, the knives and crease plates are arranged to move in paths curved to correspond substantially to the transverse curvature of the shoe bottom in proximity to the breast line, the axes of said paths being beneath the shoe and extending generally lengthwise of the shoe. In operating upon the soles of shoes where it is desired to form heel-breast receiving shoulders which are inclined at a small angle to the longitudinal median line of the soles in order that the shoulders will be complemental to the breasts of heels, which breasts are curved transversely of the heels, these axes which are generally lengthwise of the median plane of the shoe may be inclined slightly relatively to said plane. Also, as illustrated, means is provided for imparting to the crease plates and knives a conjoint movement in the paths indicated, with means for interrupting the movement of the crease plates, after the crease plates have been moved into engagement with the shoe, and permitting the knives to move beyond them to make the required cut upon the end portion of the sole and welt. Preferably means is provided for maintaining the crease plates in engagement with the shoe after their movement with the knives has ceased.

Although the invention is described as being embodied in a sole and welt cutting machine, it is recognized that the invention is

not restricted in its applicability to such a machine.

With the above and other objects and features in view, the invention will now be described with reference to the accompanying drawings which disclose a preferred embodiment thereof and will be pointed out in the appended claims.

In the drawings,—

Fig. 1 is a side elevation of a machine embodying the invention, the machine being shown partly in section and with the outer casing removed and the shoe supporting jack being shown in its outward, inoperative position;

Fig. 2 is a view similar to Fig. 1 showing the relative positions of the shoe and last supporting jack and the clamping means during the sole and welt cutting operation;

Fig. 3 is a plan view of the machine with the outer casing removed;

Fig. 4 is a front elevation of the machine with the cover plate of the right-hand sole and welt cutting unit removed and showing more in detail the construction of that unit;

Fig. 5 is a detail view of the right-hand sole and welt cutting unit with the parts positioned as they appear after the crease plate has been moved into operative position and prior to the cutting operation;

Fig. 6 is a detail view of the end of a shoe with a sole and welt attached showing the angle of the heel-receiving cuts relatively to the longitudinal median line of the shoe;

Fig. 7 is a detail view of the parts shown in Fig. 5 at the finish of the sole and welt cutting operation; and

Fig. 8 is a perspective view of a shoe after the sole and welt cutting operation.

Referring now particularly to Figs. 1 and 2, the illustrated sole and welt cutting machine comprises a head 10 mounted upon a base 12 and having a pair of forwardly extending lugs 14 to which is pivotally mounted at 16 a shoe supporting jack 18. A pair of jig-pins 20 are carried by the jack 18 and located and spaced to pass through jig-holes 200 formed in the heel portion of a shoe such as a welt shoe having a short sole to present the rear ends of the sole and welt invariably in predetermined relation to the operating instrumentalities of the machine. In order to assist the operator in removing a shoe from the jig-pins 20 after the shoe has been operated upon, an ejecting plunger 22 is provided which is operated by a hand-lever 24 carried by the jack 18. The hand lever is fulcrumed in the jack 18 at 26 and may be depressed by the operator against the action of a spring 28 to force the plunger 22 upwardly against the shoe between the jig-holes 200.

A starting lever 32 mounted on a shaft 34 supported by suitable bearings in the head 10 of the machine carries a spring-pressed plunger 36 arranged to engage a shoulder 38 formed on a one-revolution clutch 40 of any suitable type and acts to hold the clutch out of engagement with a constantly running worm-wheel 42 loosely mounted upon a shaft 52 having suitable bearings in the head 10 of the machine. Motion is imparted to the worm-wheel 42 from a motor 50 through a coupling 48, shaft 46, and worm 44. A cam block 58 fast to the shaft 52 has a cam groove 56 formed thereon for engaging a cam-roll 54 carried by the lever 32 and acts during each revolution of the cam to rock the lever 32 into clutch releasing position. The jack 18 and lever 32 are connected by means of a link 30 one end of which is pivotally connected at 60 to the lower end of the lever 32 and the other end to the jack 18 at 62. The configuration of the cam groove 56 is such that the lever 32 may be moved in a counterclockwise direction as viewed in Fig. 1 by movement of the jack 18 toward its operative position, thus disengaging the plunger 36 from the shoulder 38 and allowing the clutch 40 and the shaft 52 to make one revolution. Rotation of the shaft 52 causes the cam groove 56 to engage the cam-roll 54 to move the lever 32 in a counterclockwise direction (Fig. 1) until the jack 18 is located positively in operative position and then to hold the lever 32 and consequently the jack 18 against further movement during the sole and welt-cutting operation.

After the jack 18 has been moved into operative position (Fig. 2) means is provided for yieldingly clamping the shoe upon the jack and for engaging the jig-pins 20 to hold the shoe in position during the sole and welt cutting operation. The clamping means comprises a pair of plungers 68, 70 carried by a pair of vertically movable sleeves 64, 64 mounted in the head 10 of the machine above the jack 18 and movable with the plungers 68, 70 into and out of work-engaging position by means hereinafter described. Reduced ends 72, 74 of the plungers 68, 70 extend through the sleeves 64, 64 and have their upper ends threaded to receive adjusting nuts 78 and lock-nuts 80. Surrounding the reduced ends 72, 74 of the plungers 68, 70 are coiled springs 76, 76 bearing at one end against shoulders 82, 82 formed on the sleeves 64, 64 and at the other end against shoulders 84, 84 on the plungers 68, 70. Fast to the shaft 52 is a cam block 86 (Figs. 1, 2 and 4) having a cam groove 88 formed on one face thereof for engaging a cam-roll 90 (Fig. 3) carried by a downwardly extending arm 92 of a bell-crank lever fulcrumed on the shaft 34 and having its other arm indicated at 96, this arm 96 extending forwardly and carrying a gear segment 98 meshing with a pinion 100 (Figs. 1, 2 and 3). The pinion 100 meshes with teeth 102 (Fig. 4) formed upon the sleeves 64, 64. The cam groove 88, by its contour maintains the sleeves 64, 64 in their uppermost positions until the jack 18 is

moved into operative position (Fig. 2) and then moves the lever 94 in a clockwise direction, as viewed in Fig. 2, to lower the sleeves 64, 64 by rotating the pinion 100. The downward movement of the sleeves 64, 64 continues until the work-engaging surfaces 104, 106 (Figs. 1 and 4) of the plungers 68, 70 come in contact with the end portion of the sole of a shoe and the heel-seat portion of the shoe respectively, the jig-pins 20 entering vertical openings in the plungers 68, 70. The downward movement of the sleeves 64, 64 continues, compressing the springs 76 and holding the shoe 300 firmly upon the jack 18. The movement of the angle lever 92, 96 is then reversed elevating the sleeves 64, 64 to free the shoe upon the jack 18. The work-engaging surface 104 of the plunger 68 is curved to correspond approximately to the transverse curve of the last at the heel-breast line and has laterally extending ears 107 (Fig. 4) having knife-guiding surfaces 108 (Fig. 1) formed thereon to guide cutting knives 114, 114 during the sole and welt cutting operation.

Located upon opposite sides of the jack 18 are sole and welt cutting units 110, 110 (Fig. 3) secured by bolts 111 to finished surfaces 113, 113 formed on the outer face of the head 10 of the machine. The surfaces 113, 113 are inclined relatively to each other and to the longitudinal median line of the jack 18 to position the units 110, 110 so that disk-cutters 114, 114 will cut the sole of a shoe to form heel-receiving surfaces 115, 115 (Fig. 8) invariably at a predetermined angle to the line determined by the jig-pins 20 and at a fixed distance therefrom when the pins are in operative position. Since these units 110, 110 are of similar construction only one of them need be described. The right-hand sole and welt cutting unit 110, as illustrated in Fig. 4, has its cover-plate 112 removed to show the relative positions of the disk-cutter 114 and crease-plate 116 when the machine is at rest. Each unit 110 has a circular groove 118 formed therein for receiving segmental members 120, 122. The members 120, 122 are free to move in the groove 118 and are connected by means of a toggle comprising links 124, 125 pivoted to each other and having their free ends pivoted respectively to the members 120, 122. The link 125 of the toggle has a projection 126 normally engaging the upper surface 128 of an adjustable cam piece 130. The cam piece 130 has a raised surface 132 adapted to engage the projection 126 of the toggle link 124 to break the toggle. The cam piece 130 is secured to the unit 110 by screws 134 extending through slots 136 in the unit 110 so that by loosening the screws the cam piece 130 may be moved along the path of the projection 126 and then clamped in adjusted position to vary the point in the conjoint movement of the segmental members 120, 122 when the toggle 124, 125 will be broken and relative movement of said members permitted.

A link 138 (Fig. 7) is pivotally connected to the member 120 at 142 and has the disk-cutter 114 pivotally connected at 140 to its forward end. The member 120 is slotted at 144 to receive the link 138 and has an overhanging surface 146 against which the link 138 bears when the disk-cutter 114 engages the sole and welt during the cutting operation. A thin, curved crease-plate 116 is clamped to the forward end of the segmental member 122 and has a sharpened edge 148 for severing, rearwardly of the heel-breast line, the inseam stitches uniting the welt shoe upper and insole thereby freeing the severed portions of the sole and welt from the shoe upper. The segmental member 122 has a friction device 150 which bears against the inside surface 152 of the cover-plate 112 (Fig. 3) and acts to maintain the crease-plate 116 in engagement with the shoe in the crease, between the shoe upper and the welt, after the toggle connection 124 has been broken. The friction device 150 consists of a spring-pressed plunger 151 carried by the segmental member 122 and bearing against the inside surface 152 of the cover-plate 112. Fixed to the shaft 52 is a cam 154 (Figs. 1, 2, 3 and 4) having a groove 156 formed thereon and engaging a cam-roll 158 carried by a lever 160 loosely mounted upon a shaft 162 having bearings in the head 10 of the machine. A similar groove is formed upon the outer surface of the cam 86 engaging a cam-roll 159 carried by the left-hand lever 160 (Fig. 3). Formed on the outer extremity of the lever 160 are gear teeth 164 engaging an elongated pinion 166 the teeth of which mesh for a portion of the length with teeth 168 formed on the outer surface of the segment 120 (Fig. 4). In order that the pressure existing between the driving gear teeth 164 and the driven pinion 166 will not cause the gear teeth 164 to climb upon the teeth of the pinion 166, a bearing roll 170 (Fig. 3) is rotatably mounted in the head 10 of the machine upon a stud 172 and engages a finished surface 174 of the lever 160 in the plane of the axes of the pinion 166 and lever 160.

The configuration of the cam groove 156 is such that the lever 160 is first moved in a clockwise direction (Fig. 1) to move the segmental member 120 upwardly in a counter-clockwise direction (Fig. 4) by rotation of the pinion 166. Upward movement of the member 120 causes the member 122 to move in the same direction through the toggle connection 124, 125. When, however, the crease-plate 116 engages the shoe between the shoe upper and the welt the raised portion 132 of the cam 130 contacts with the projection 126 formed on the link 125 of the toggle 124, 125 and interrupts the conjoint movement of

the member 120, 122. The friction device 150 holds the crease-plate 116 in engagement with the shoe while the member 120 continues to move upwardly causing the disk-cutter 114 to remove the surplus stock from the rear portions of the sole and welt. As the disk-cutters engage the sole the frictional drag, caused by the resistance of the sole to being cut, rotates the cutters in opposite directions thereby causing them to exert pressure downwardly on the sole and welt during their cutting action. The crease plates 116, 116 have knife guiding grooves 176, 176 (Fig. 3) formed thereon said grooves extending along each plate 116, 116 in the direction of the movement thereof. The knives 114, 114 bear against one side or shoulder of the grooves 176, 176, the shoulder of the grooves forming straight edges against which the sharp edges of the knives work during the cutting operation. Thus a pair of shear couples are formed for trimming the surplus material from the rearward portions of the sole and welt.

Mounted upon the shaft 162 is a brake-lever 178 (Fig. 2) having a leather covered face 180 for engaging the outer surface 182 of the cam 58. A spacing bar 184 extending between the opposite sides of the head 10 has an opening 186 formed thereon to receive one end of a coil spring 188, the other end of which extends into an opening 190 in the lever 178. An adjustable set screw 192 is threaded into the upper portion of the lever 178 and may be locked in adjusted position by a lock-nut 194. The end of the set-screw 192 is engaged by a surface 198 formed on the lever 32 to move the brake-lever 178 out of engagement with the outer surface 182 of the cam 58 when the jack 18 is moved toward its operative position.

In the operation of the machine, the operator mounts a shoe 300, with the heel-end of the last removed, upon the shoe supporting jack 18, the jig pins 20 entering jig-holes 200 formed in the rear portion of the shoe, and moves the jack 18 toward its operative position. Movement of the jack 18 toward its operative position causes the lever 32 to move in a counter-clockwise direction (Fig. 1) through the connecting link 30 thereby disengaging the plunger 36 from the shoulder 38 formed on the clutch 40, the surface 198 of the lever 32 engaging the end of the adjustable set-screw 192 thereby releasing the brake-lever 178 and allowing the clutch member 40 and shaft 52 to make one revolution. The first result of the rotation of shaft 52 is the movement of the jack 18 positively into operative position due to continued counter-clockwise movement being imparted to the lever 32 by the contour of the cam-groove 56. The configuration of the cam-groove 56 is such that the jack 18 is locked in operative position during the subsequent sole and welt cutting operation. After the jack 18 has been moved into operative position the angle lever 92, 96 is moved in a clockwise direction by the cam track 88 in the block 86, thereby lowering the sleeves 64, 64 and plungers 68, 70 yieldingly to clamp the shoe upon the jack 18 and to engage the jig pins 20 to hold the shoe in position during the sole and welt cutting operation. Continued movement of the shaft 52 causes the cam 154 to move the levers 160, 160 first in a clockwise direction (Fig. 2) and then in a counter-clockwise direction (Fig. 1), these movements of the levers, through the mechanism described, causing the crease-plates 116, 116 to engage the shoe at opposite sides thereof between the shoe upper and the welt, then moving the disk-knives 114, 114 toward each other and relatively to the crease plates 116, 116 to remove the surplus stock from the rear portions of the sole and welt rearwardly of the heel-breast line; and then returning the crease-plates 116, 116 and disk cutters 114, 114 to their initial positions (Fig. 4). During the sole and welt cutting operation the cutters 114, 114 are guided by grooves 176 in the crease plates 116, 116 and surfaces 108, 108 formed on the plunger 68. The angle lever 92, 96 is then moved in a counter-clockwise direction elevating the sleeves 64, 64 and freeing the shoe upon the jack and moving the plungers 68, 70 out of engagement with the jig pins 20. The jack 18 is then moved outwardly into its inoperative position by the return of the lever 32 into clutch releasing position by the cam-groove 56. Movement of the lever 32 into clutch releasing position allows the brake-lever 178 to engage the outer surface 182 of the cam 58, thereby preventing overthrow of the parts and insuring that the cams will stop in their initial positions. The operator then depresses the lever 24 to move the pin 22 upwardly and remove the shoe 300 from the jack 18.

It will be apparent from the foregoing description that the operation of the machine relieves the operator from the responsibility of positioning the shoe accurately relatively to the operating instrumentalities of the machine, the only task of the operator being to remove and replace the shoes and to initiate the movement of the shoe support toward its operative position.

Having described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine of the class described the combination of operating instrumentalities, a work support normally in inoperative position with respect to the operating instrumentalities and movable toward operative position with respect thereto, means constructed and arranged upon initial movement of the support toward its operative position to cause the machine to start and to operate automati-

cally throughout its cycle, and power-operated means for continuing the movement of the support into operative position, said means being constructed and arranged to hold the support in said position during the operation of the operating instrumentalities, and then to return the support to its initial position before the machine comes to a stop.

2. In a machine of the class described, the combination of operating instrumentalities, a shoe support normally in inoperative position with respect to the operating instrumentalities and movable toward operative position with respect thereto, a pair of jig pins carried by said support and arranged to be received by jig ho es formed in the heel seat portion of the sole of a shoe to be operated on to locate the shoe in predetermined relation to the support and after movement of the support into operative position to assist in locating the shoe in operative relation to the operating instrumentalities, and means acting upon initial movement of the support toward its operative position automatically to continue said movement and to present the shoe to the operating instrumentalities in predetermined relation thereto.

3. In a machine of the class described, the combination of operating instrumentalities, a shoe support normally in inoperative position with respect to the operating instrumentalities and movable toward operative position with respect thereto, means for positioning a shoe on the support, and power-operated means acting upon initial movement of the support toward its operative position automatically to continue the movement of the support into operative position to cause the desired operations on the shoe.

4. In a machine of the class described, the combination of means for effecting a cutting operation upon the sole and welt of a shoe, a shoe support normally out of operative position with respect to said cutting means, means for locating a shoe on the support, and power-operated means for moving the support into operative position and for holding the support in said position during the cutting operation.

5. In a machine of the class described, the combination of means for effecting a cutting operation upon a shoe, a work support mounted for movement into and out of operative position and having a plurality of shoe positioning devices mounted thereon, power-operated means for clamping a shoe on the support and for operating the cutting means, and means constructed and arranged upon initial movement of the work support toward its operative position to set the power means in operation.

6. In a machine of the class described, the combination of welt cutting means, a shoe support constructed and arranged for movement into and out of operative relation to said cutting means, means for locating a shoe in a predetermined position on said support, means for operating the welt cutting means, means constructed and arranged, upon movement of the shoe support toward its operative position, to cause said cutting means to operate upon the welt, and power-operated means for holding the support in operative position during the welt cutting operation.

7. A machine for operating on the bottoms of shoes having, in combination, a support for a welt shoe having a sole attached thereto, means for locating the shoe upon the support, a disk knife mounted for movement in a curved path the axis of which is inclined relatively to the longitudinal median line of the shoe, means for automatically moving the shoe to a predetermined position in the path of the knife, and means for moving the knife in said path to form a heel receiving shoulder on the lateral portion of the sole and on the welt.

8. In a machine of the class described, the combination of operating instrumentalities, a shoe support normally in inoperative position with respect to the operating instrumentalities and movable toward operative position with respect thereto, means for positioning a shoe on the support, and means acting upon initial movement of the support towards its operative position automatically to continue said movement to present the shoe to the operating instrumentalities in predetermined relation thereto and to return the support to normal position after the operation of said instrumentalities.

9. In a machine of the class described, the combination of means for effecting a cutting operation upon the sole and welt of a shoe, a shoe support normally out of operative position with respect to said cutting mea s, means for locating a shoe on the support, and power-operated means for moving the support into operative position for holding the support in said position during the cutting operation and for moving the support out of operative position after the cutting operation has been effected.

10. In a machine of the class described, the combination of means for effecting a cutting operation upon a shoe, a work support mounted for movement into and out of operative position and having a plurality of shoe positioning devices mounted thereon, power-operated means for moving the support into operative position for clamping a shoe on the support and for operating the cutting means, and means constructed and arranged upon initial movement of the work support toward its operative position to set the power means in operation, said means acting further to release the clamping means and to move the support out of operative position.

11. In a machine of the class described, the combination of welt cutting means, a shoe

support constructed and arranged for movement into and out of operative relation to said cutting means, said support having an initial position out of said operative relation, means for operating the welt cutting means, and means constructed and arranged upon movement of the shoe support toward its operative position to cause said cutting means to operate upon the welt and to cause the shoe support to return to its initial position.

12. A machine for operating on the bottom of shoes having, in combination, a support for a shoe having a sole attached thereto, means for locating the shoe upon the support, a disk knife mounted for movement in a path curved to correspond substantially to the transverse curvature of the shoe bottom in proximity to the breast line, means for automatically moving the shoe to a predetermined position in the path of the knife, and means for moving the knife in said path to form a heel receiving shoulder on the lateral portion of the sole.

13. A machine for operating on the bottoms of shoes having, in combination, a shoe support, means for locating the shoe upon the support, a freely movable disk knife mounted for movement in a curved path transversely of the shoe, said path being in a plane inclined with respect to the longitudinal median plane of the shoe, means for automatically moving the shoe into predetermined relation to the path of the knife, means for locking the shoe in said predetermined position, and means for moving the knife in its curved path to remove surplus material from the lateral portion of the sole and from the attached welt.

14. A machine for operating on the bottoms of shoes having, in combination, a shoe support mounted for movement into and out of operative position, means for locating the shoe upon the support, and power-operated means adapted upon initial movement of the support toward its operative position automatically to control the further movement of the support into and out of operative position before the machine comes to a stop.

15. A machine for operating on the bottoms of shoes having, in combination, a pair of freely movable disk knives, a shoe support having a plurality of shoe positioning devices mounted thereon, means for moving the support into operative position, means for clamping the shoe upon the support, said means having guiding surfaces formed thereon to co-operate with the knives during the cutting operation, and means for producing relative movement of the knives and the support to form heel-breast receiving shoulders on the lateral portion of a short sole and on the attached welt.

16. A machine for operating on the bottoms of shoes having, in combination, a pair of freely movable disk knives for forming plane surfaces on the lateral portion of a short sole and on the attached welt, means for moving the knives toward and from each other, and means for supporting the opposite lateral portions of the short sole and attached welt, said means having knife-guiding grooves formed thereon to guide the knives during the cutting operation.

17. In a machine for operating on the bottom of a shoe having a short sole and attached welt, the combination of operating instrumentalities, a disk knife arranged for movement to form a straight cut on the lateral end portion of the short sole and on the attached welt, a knife support, a crease plate movable with the knife to support the end portions of the sole and welt during the cutting operation, a toggle connection between the knife support and the crease plate, an adjustable member for breaking the toggle to limit the conjoint movement of the knife and crease plate, and means for holding the crease plate in its forward position during the sole and welt cutting operation.

18. A machine for operating on the bottoms of shoes having, in combination, a shoe support mounted for movement into and out of operative position, means for locating the shoe upon the support, and means adapted upon initial movement of the support toward its operative position automatically to cause further movement of the support into its operative position and the return of the support to its initial position before the machine comes to a stop.

19. A machine for operating on the bottoms of shoes having, in combination, a shoe support movable into and out of operative position, means for jigging the shoe upon the support, means for moving the support into operative position, and means for clamping the shoe upon the support, said clamping means comprising a pair of vertically movable members adapted yieldingly to press the shoe upon the support and to co-operate with the jigging means to hold the shoe upon the support.

20. A machine for operating on the bottoms of shoes having, in combination, means for operating on shoe bottoms, a shoe support movable into and out of operative position, a pair of jig pins carried by the support and arranged to be received by jig holes formed in the heel seat portion of the sole of a shoe to be operated on to locate the shoe in predetermined relation to the support, means for moving the support into operative position, and means for engaging the jig pins and adjacent portions of the sole thereby to locate the support relatively to said operating means and to clamp the shoe upon the support.

21. A machine for operating on the bottoms of shoes having, in combination, a shoe support movable into and out of operative

position, a pair of jig pins carried by the support and arranged to be received by jig holes formed in the heel seat portion of the sole of a shoe to be operated on to locate the shoe in predetermined relation to the support, means for moving the support into operative position, and a pair of vertically movable plungers constructed and arranged after the support has been moved into operative position to engage the jig pins and adjacent portions of the sole to locate the support and yieldingly to clamp the shoe upon the support.

22. A machine for operating on the bottoms of shoes having, in combination, a shoe support movable into and out of operative position, a pair of jig pins carried by the support and arranged to be received by jig holes formed in the heel seat portion of the sole of a shoe to be operated on to locate the shoe in a predetermined relation to the support, means for moving the support into operative position, and a pair of plungers movable from a position above the shoe into engagement with the shoe after the support has been moved into operative position to clamp the shoe upon the support, said plungers having vertical openings therein to receive the jig pins thereby to locate the support in operative position.

23. A sole and welt cutting machine having, in combination, a support for a welted, soled shoe, said support being movable into and out of operative position, means for jigging the shoe upon the support, a pair of freely rotatable disk knives one upon each side of the shoe, means for moving the shoe into operative relation thereto, and means for moving the knives toward and from each other to remove the surplus stock from the lateral portions of the short sole and attached welt rearwardly of the heel breast line.

24. A sole and welt cutting machine having, in combination, a support for a welted, soled shoe, said support being mounted for movement into and out of operative position and having a plurality of jig pins mounted therein for positioning a shoe upon the support, means for moving the support into operative position, a pair of vertically movable clamping members arranged to engage the shoe with the support in said position, a pair of freely movable disk cutters, and means for moving the cutters in curved paths to form heel-receiving surfaces on the lateral portion of a short sole and attached welt.

25. A sole and welt cutting machine having, in combination, a support for a welted, soled shoe, said support being mounted for movement into and out of operative position and having a plurality of jig pins mounted thereon for positioning a shoe upon the support, means for moving the support into operative position, a pair of vertically movable clamping members arranged to engage the shoe upon the support in said position, a pair of freely movable disk cutters, and means for moving the cutters in curved paths corresponding to the transverse curvature of the heel seat of the shoe to form heel-receiving surfaces on the lateral portion of a short sole and attached welt.

26. A machine for operating on the bottoms of shoes having, in combination, a shoe support mounted for movement into and out of operative position, a starting lever, a connecting link between the starting lever and the support, and means constructed and arranged to be actuated upon initial movement of the support toward its operative position, to rock said starting lever about its fulcrum to move the support into and out of operative position before the machine comes to a stop.

27. A machine for operating on the bottoms of shoes having, in combination, a shoe support mounted for movement into and out of operative position, a starting lever, a connecting link between the starting lever and the support, and means including a cam constructed and arranged for operation, upon movement of the support toward its operative position, to rock said starting lever about its fulcrum to move the support into operative position.

28. A machine for operating on the bottoms of shoes having, in combination, a shoe support mounted for movement into and out of operative position, a starting lever, a connecting link between the starting lever and the support, and means constructed and arranged to rock said starting lever about its fulcrum to move said support out of operative position before the machine comes to a stop.

29. A machine for forming a shoulder on the sole of a shoe in the vicinity of the heel breast line having, in combination, a support for a shoe, means for moving the support into operative position, means for clamping the shoe upon the support, a pair of freely movable disk knives, and means for moving the knives toward and from each other in planes extending substantially normal to the sole edge to form shoulder cuts on the rear portion of a sole.

30. A machine for operating on the bottoms of shoes having, in combination, a pair of freely movable disk cutters, means for supporting a shoe in operative relation thereto, clamping means movable from a position above the shoe into engagement with the shoe while it is so supported, and means for moving the disc-cutters toward and from each other to trim away the surplus material from the lateral portion of the sole.

31. A machine for forming a shoulder on the sole of a shoe in the vicinity of the heel-breast line having, in combination, a shoe support, means for holding the shoe upon the support, a pair of freely rotatable disk cut-

ters mounted for movement in curved paths in planes extending transversely of the shoe bottom, means for moving the shoe into operative relation to the disk-cutters, and means for moving the disk cutters in their curved paths to form heel-breast receiving cuts on the sole of the shoe in the vicinity of the heel-breast line.

32. A machine for forming a shoulder on the sole of a shoe in the vicinity of the heel-breast line having, in combination, a pair of freely movable disk knives, a shoe support, means acting upon initial movement of the support toward operative position automatically to move the support into operative relation to the knives and to lock the support in said position, and means for moving the knives transversely of the shoe to form shoulder cuts on the sole of the shoe.

33. A machine for forming a shoulder on the sole of a shoe in the vicinity of the heel-breast line having, in combination, a pair of freely movable disk knives, a shoe support, means for holding the shoe upon the support, means for moving the support into operative relation to the knives and for locking the support in said position, and means for moving the knives in paths substantially normal to the edge of the sole of the shoe to form shoulder cuts on the sole of the shoe.

34. A machine for forming a shoulder on the sole of a shoe in the vicinity of the heel-breast line having, in combination, a pair of freely movable disk-knives, a shoe support, means for positioning the shoe upon the support, means for moving the support into operative relation to the knives and for locking the support in said position, and means for moving the knives transversely of the shoe bottom in planes extending heightwise of the shoe to form shoulder cuts in the sole of the shoe.

35. A machine for forming a shoulder on the sole of a shoe in the vicinity of the heel-breast line having, in combination, a support for a shoe to be operated upon, means for positioning the shoe upon the support, means for moving the support into operative position, a pair of crease plates arranged for movement into engagement with the shoe upon the support between the upper and the welt at opposite ends of the heed-breast line, a pair of freely movable disk-knives adjacent to the respective crease-plates, toggle connections between the crease-plates and the knives, cams arranged to break the toggle-connections with the crease-plates in engagement with the shoe, frictional devices for holding the crease-plates in said positions, and means for moving the knives and crease-plates together toward the shoe until the crease-plates are brought into engagement with the shoe and then with the toggle-connections broken for thereafter moving the knives relatively to the crease-plates to cut the sole of the shoe to form a pair of shoulders thereon in the vicinity of the heel-breast line.

36. A machine for forming a shoulder on the sole of a shoe in the vicinity of the heel-breast line having, in combination, a support for a shoe to be operated upon, means for jigging the shoe upon the support, means for moving the shoe support into operative position, means for clamping the shoe upon the support, a pair of crease-plates movable toward and from the shoe in curved paths, to position the crease-plates in engagement with the shoe between the upper and the welt, a pair of knives, one upon each side of the shoe, and means for moving the knives and crease-plates toward the shoe until the crease plates engage the shoe and for thereafter moving the knives in curved paths relatively to the crease plates to cut a pair of heel-engaging surfaces on the sole of a shoe.

37. A machine for forming a shoulder on the sole of a shoe in the vicinity of the heel-breast line having, in combination, a support for a shoe to be operated upon, means for jigging the shoe upon the support, means for moving the shoe support into operative position, means for clamping the shoe upon the support, a pair of crease-plates movable toward and from the shoe in curved paths the centers of which are beneath the shoe, to position the crease-plates in engagement with the shoe between the upper and the welt, a pair of freely movable disk knives, one upon each side of the shoe, and means for moving the knives and crease-plates toward the shoe until the crease plates engage the shoe and for thereafter moving the knives relatively to the crease-plates to cut a pair of heel-engaging surfaces on the sole of a shoe.

38. A machine for forming a shoulder on the sole of a shoe in the vicinity of the heel-breast line having, in combination, a shoe support, means for locating the shoe upon the support, means for moving the shoe support into operative position, means for clamping the shoe upon the support, a pair of crease-plates movable toward and from the shoe in curved paths, said paths corresponding approximately to the transverse curve of the last at the heel-breast line to position the crease-plates in engagement with the shoe between the upper and the welt, a pair of knives, one upon each side of the shoe, and means for moving the knives and crease-plates toward the shoe until the crease-plates engage the shoe and for thereafter moving the knives in said curved paths relatively to the crease-plates to cut a pair of heel-engaging surfaces on the sole of a shoe.

39. A machine for operating upon the sole of a shoe prior to the attachment of a heel thereto, having in combination a support, means for positioning the shoe upon the support, longitudinally grooved plates mounted

for movement about axes extending lengthwise of the shoe, said plates being constructed and arranged to enter the rand crease of the shoe to support the lateral portions of the shoe, and knives mounted for movement about said axes and constructed and arranged to cut heel-engaging surfaces upon the sole, portions of said knives occupying the grooves in said plates so that the knives will cut through the surfaces of the shoe which engage said plates.

40. A machine for operating upon the sole of a shoe prior to the attachment of a heel thereto, having in combination a support, means for positioning the shoe upon the support, plates mounted for movement about axes extending lengthwise of the shoe, said plates being constructed and arranged to enter the rand crease of the shoe and to support the lateral portions of the sole, and knives mounted for movement about said axes and constructed and arranged to co-operate with the plates to constitute therewith shear couples for forming heel-breast-receiving shoulders upon the sole.

41. A machine for operating upon the sole of a shoe prior to the attachment of a heel thereto, having in combination a support, means for positioning the shoe upon the support, grooved plates mounted for movement about axes extending lengthwise of the shoe, said plates being constructed and arranged to enter the rand crease of the shoe to form supports for engaging lateral portions of the shoe, and knives mounted for cutting movement relatively to the crease plates in paths extending transversely of the sole, said knives moving in the grooves in the crease plates so that their cutting action will extend below the surfaces of the shoe engaged by said supports.

42. A machine for operating upon the sole of a shoe prior to the attachment of a heel thereto, having, in combination, a support, means for positioning the shoe upon the support, plates arranged for movement about axes extending lengthwise of the shoe, said plates being constructed and arranged to enter the rand-crease of the shoe and to support the lateral portions of the sole, and knives mounted for movament about an axis extending lengthwise of the shoe and constructed and arranged to co-operate with the plates to constitute therewith shear couples for forming heel-breast-receiving shoulders upon the sole.

43. A machine for operating upon the sole of a shoe prior to the attachment of a heel thereto having, in combination, a support, means for positioning a shoe upon the support, a plate positioned at each side of the shoe upon the support and mounted for movement about an axis extending lengthwise of the shoe, said plate being constructed and arranged to enter the rand-crease of the shoe in the vicinity of the breast line of the sole for supporting the lateral portions of the sole of the shoe, a cutter movable with each of the crease-plates and also movable relatively to each of the crease-plates and forming therewith a shear couple constructed and arranged to cut heel-breast-receiving shoulders upon the sole.

44. A machine for operating upon the sole of a shoe prior to the attachment of a heel thereto, having, in combination, a support, means for positioning a shoe upon the support, a plate positioned at each side of the shoe and mounted for movement about an axis extending lengthwise of the shoe, each of the plates having a shoulder formed on and extending along the plate in the direction of the movement thereof, a knife movable with each of the crease-plates and also movable relatively to each of the crease-plates, said knife being constructed and arranged to engage said shoulder of the crease-plate and constituting therewith a shear couple constructed and arranged to form heel-breast-receiving shoulders on the sole.

45. A machine for operating upon the bottoms of shoes having, in combination, a shoe support mounted for movement into and out of operative position, a starting lever, a connecting link between the starting lever and the work support, and a power operated cam arranged to be actuated upon initial movement of said starting lever by movement of said work support toward its operative position, said power operated cam being constructed and arranged to rock said starting lever about its fulcrum to move said support into and out of operative position before the machine comes to a stop.

46. A machine for operating upon the bottoms of shoes having, in combination, a shoe support mounted for movement into and out of operative position, a starting lever, a connecting link between the starting lever and the work support, a power operated member, a cam arranged to rock said starting lever about its fulcrum, a clutch for connecting said power member and said cam, and means carried by said starting lever and arranged normally to hold said clutch out of engagement with said cam and operated upon initial movement of said starting lever by movement of said work support toward its operative position to connect said power member and said cam whereby through the link connecting the starting lever and the work support the work support is moved into and out of operative position before the machine comes to a stop.

47. A machine for operating upon the sole of a shoe prior to the attachment of a heel thereto having, in combination, a support for a shoe, means for holding the shoe on the support, a pair of freely rotatable disk knives for forming heel-breast-receiving shoulders

on the sole of the shoe, said knives being mounted for movement in paths extending transversely of the shoe and having axes located above the general plane of the sole so that the knives will be caused to rotate in opposite directions upon engagement with the sole during said transverse movement.

48. A machine for operating upon the sole of a shoe prior to the attachment of a heel thereto having, in combination, a support for a shoe, means for holding the shoe on the support, a pair of freely rotatable disk knives for cutting heel-engaging surfaces on the sole of the shoe, the axes of said knives being located above the general plane of the sole during the cutting operation, means for moving said knives toward each other in paths extending transversely of the sole to effect said cutting operation, said movement causing the knives to rotate in opposite directions upon engagement with the sole and thus to exert pressure downwardly on the sole during the cutting operation, and a pair of crease plates constructed and arranged to engage surfaces of the shoe below the knives to support the sole against the downward pressure exerted by the knives during the cutting operation.

49. A machine for operating upon the sole of a shoe prior to the attachment of a heel thereto having, in combination, a support for a shoe, means for holding the shoe upon the support, a pair of freely rotatable disk knives for forming heel-breast-receiving shoulders on the sole of the shoe, said knives being mounted for movement in paths extending transversely of the shoe and having axes located above the general plane of the sole during their cutting action so that the frictional drag of the knives against the sole will tend to rotate the knives in opposite directions and to cause them to exert pressure downwardly as they cut through the sole, and a pair of crease plates for engaging lateral portions of the sole adjacent to the heel-breast line to support these portions against the downward pressure of the knives.

50. A machine for operating upon the sole of a shoe prior to the attachment of a heel thereto having, in combination, a support for a shoe, means for holding the shoe on the support, a pair of freely rotatable disk knives for forming heel-breast-receiving shoulders on the sole of the shoe, the axes of said knives being positioned above the general plane of the sole, means for moving the knives toward each other in paths transversely of the sole to form said heel-breast-receiving shoulders, the knives being caused to rotate in opposite directions because of the resistance of the sole to being cut and thus to exert a downward pressure as they move toward each other transversely of the sole, and a pair of crease plates for supporting the portions of the sole operated on by said knives.

In testimony whereof I have signed my name to this specification.

ROBERT H. LAWSON.