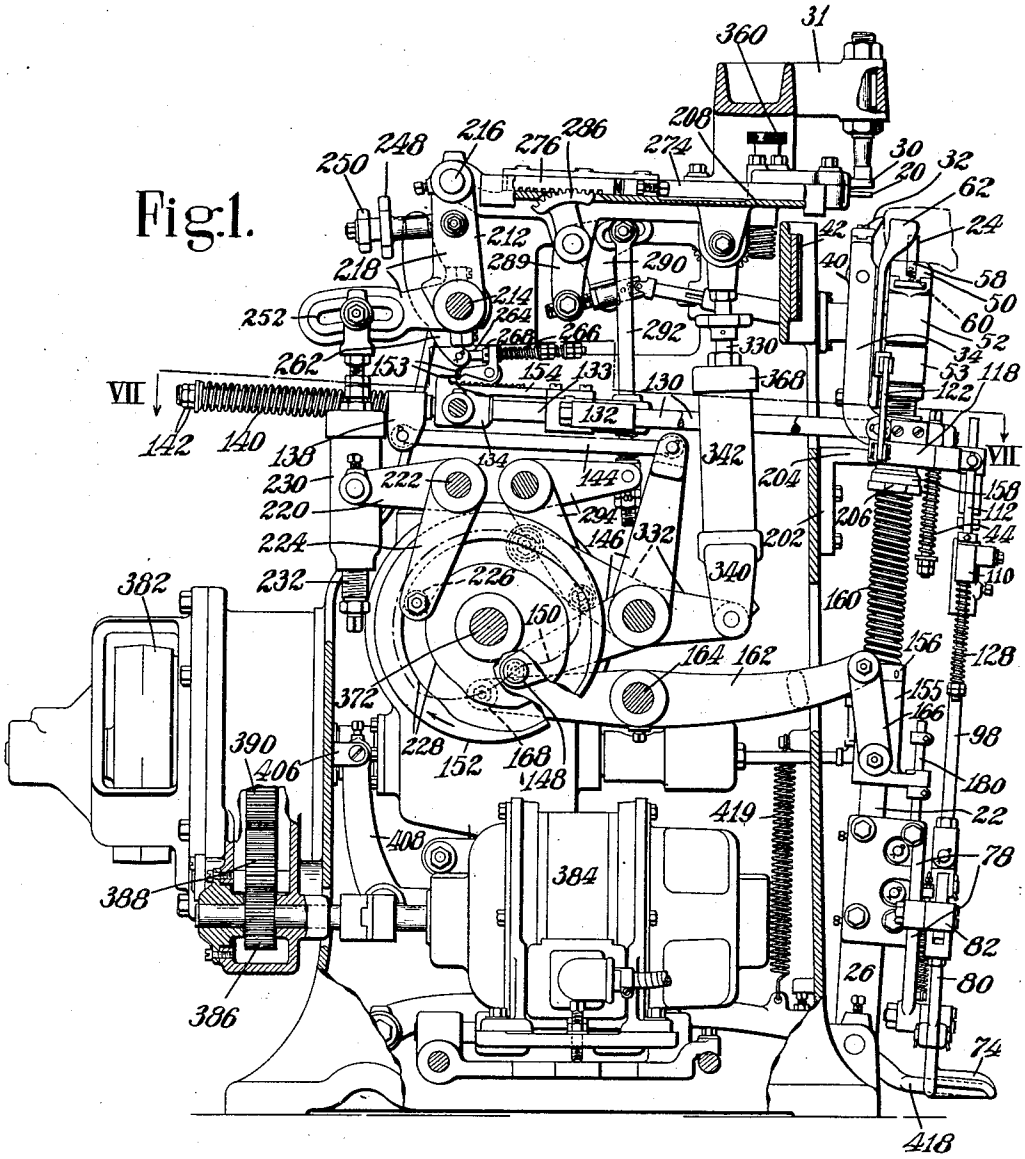
June 28, 1932. A. F. PYM ET AL 1,864,669

MACHINE FOR OPERATING ON SHOES

Filed May 20, 1930 8 Sheets-Sheet 1

Fig.1.



INVENTORS.

Arthur F. Pym

William E. Bartlett

By their Attorney

Nelson W. Howard

June 28, 1932. A. F. PYM ET AL 1,864,669

MACHINE FOR OPERATING ON SHOES

Filed May 20, 1930 8 Sheets-Sheet 2

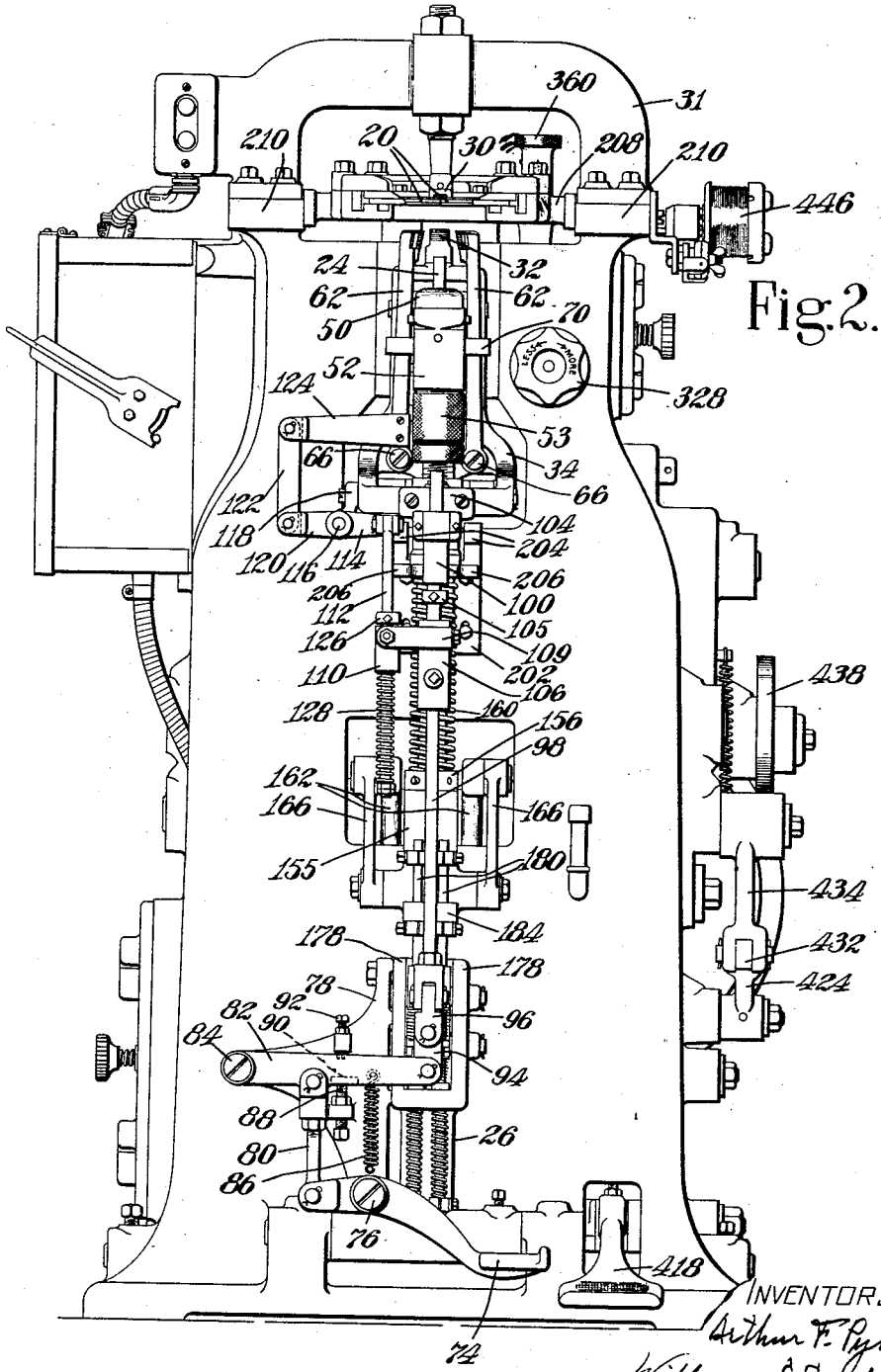


Fig. 2.

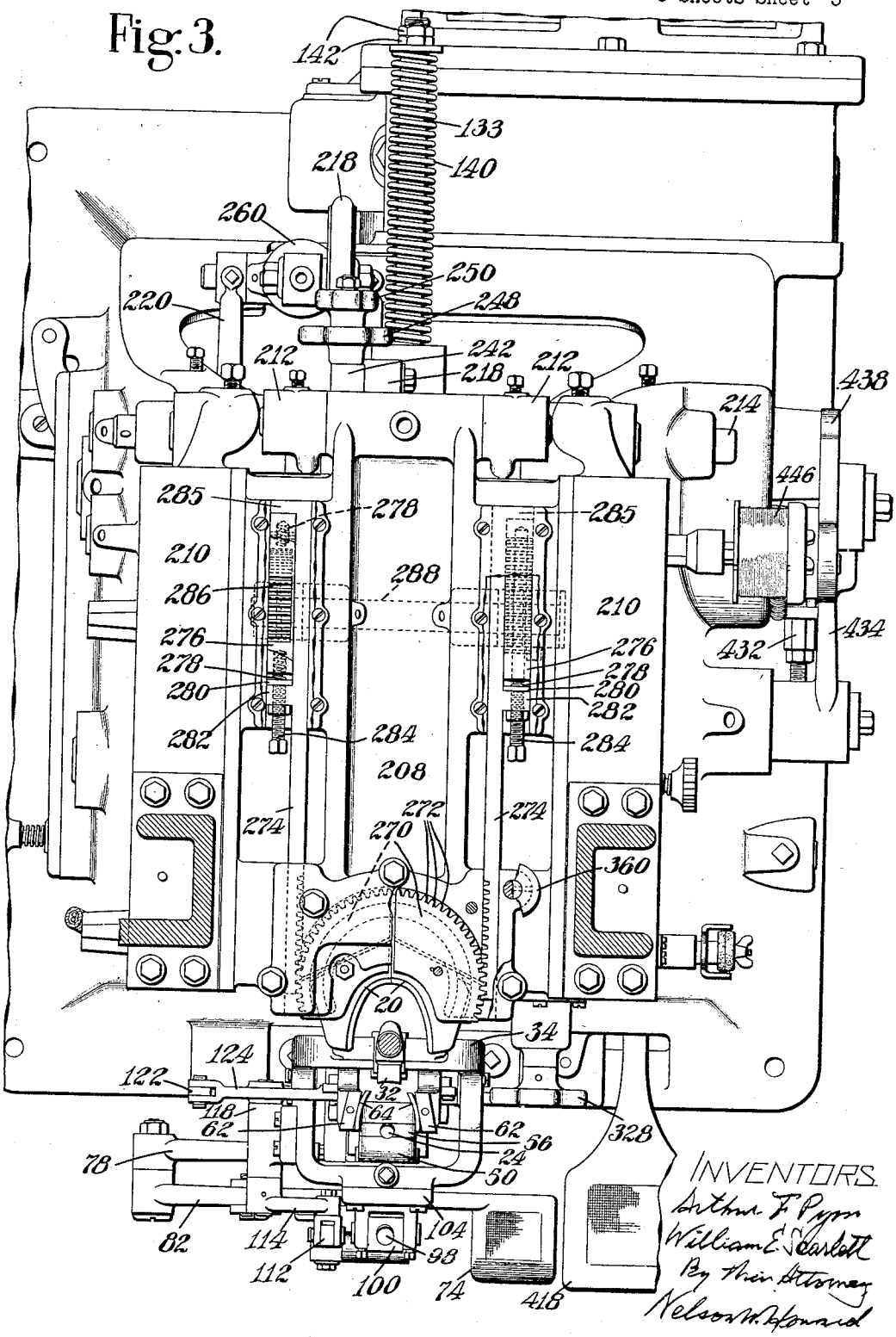
INVENTORS_
Arthur F. Pym
William E. Sachett
By their Attorney
Nelson W. Howard

June 28, 1932. A. F. PYM ET AL 1,864,669

MACHINE FOR OPERATING ON SHOES

Filed May 20, 1930 8 Sheets-Sheet 3

Fig. 3.



INVENTORS
Arthur F. Pym
William E. Scarlett
By their Attorney
Nelson W. Howard

June 28, 1932. A. F. PYM ET AL 1,864,669

MACHINE FOR OPERATING ON SHOES

Filed May 20, 1930 8 Sheets-Sheet 4

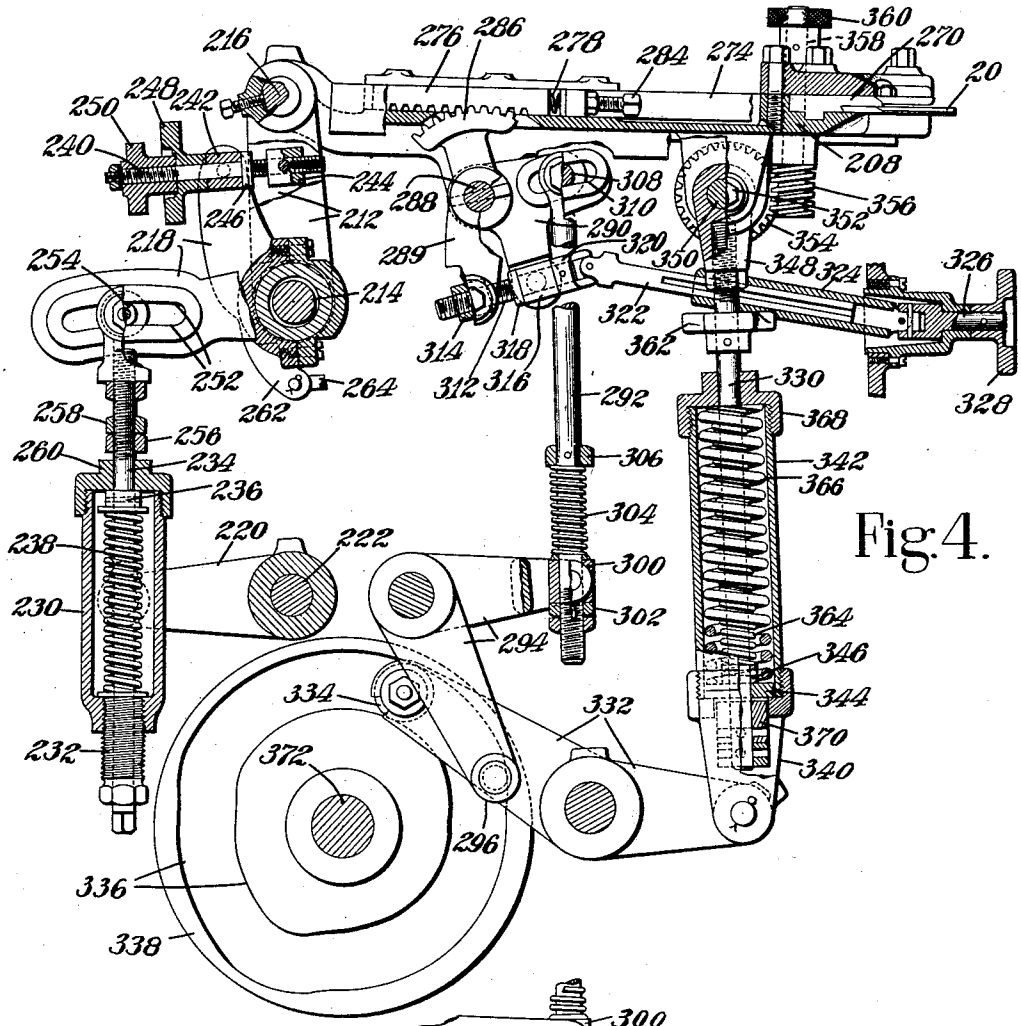


Fig. 4.

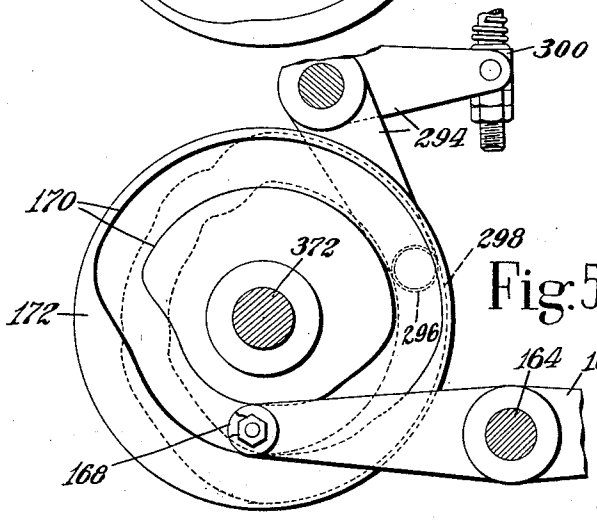


Fig. 5.

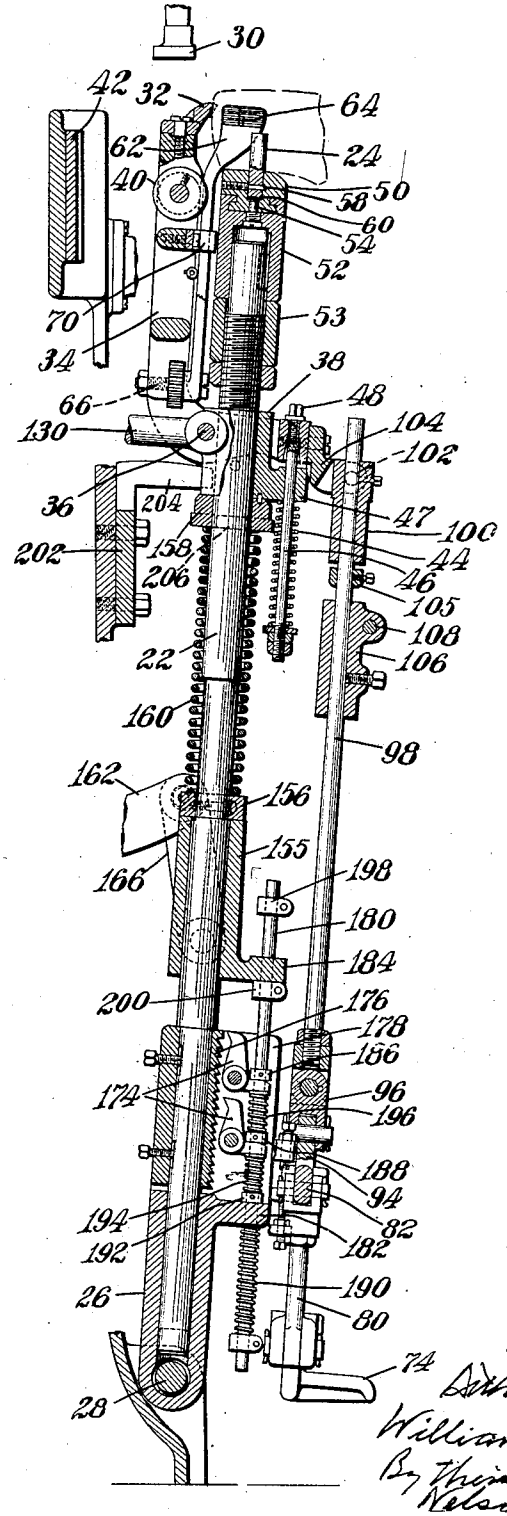
INVENTORS.
Arthur F. Pym
William E. Scarlett
By their Attorney
Nelson W. Howard

June 28, 1932. A. F. PYM ET AL 1,864,669

MACHINE FOR OPERATING ON SHOES

Filed May 20, 1930 8 Sheets-Sheet 5

Fig. 6.



INVENTORS
Arthur F. Pym
William E. Scarlett
By their Attorney,
Nelson M. Howard

June 28, 1932. A. F. PYM ET AL 1,864,669

MACHINE FOR OPERATING ON SHOES

Filed May 20, 1930 8 Sheets-Sheet 6

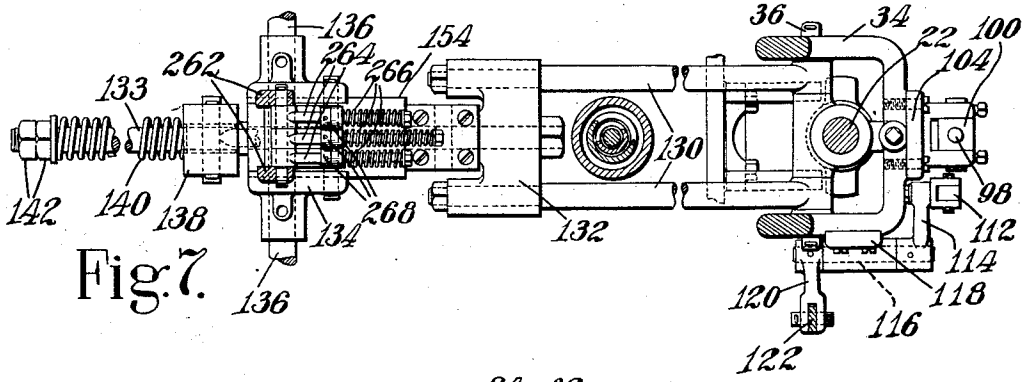


Fig. 7.

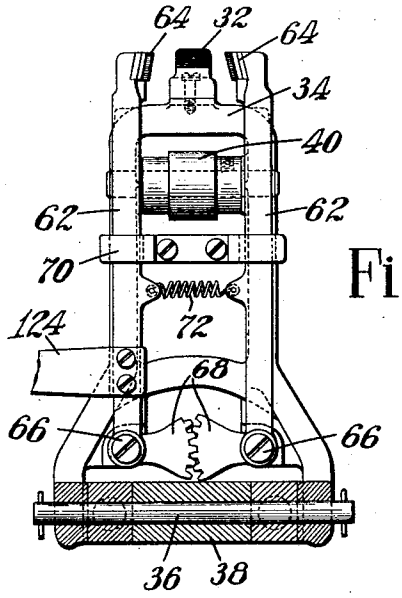


Fig. 8.

INVENTORS
Arthur F. Pym
William E. Scarlett
By their Attorney,
Nelson W. Howard

June 28, 1932. A. F. PYM ET AL 1,864,669

MACHINE FOR OPERATING ON SHOES

Filed May 20, 1930 8 Sheets-Sheet 7

Fig. 9.

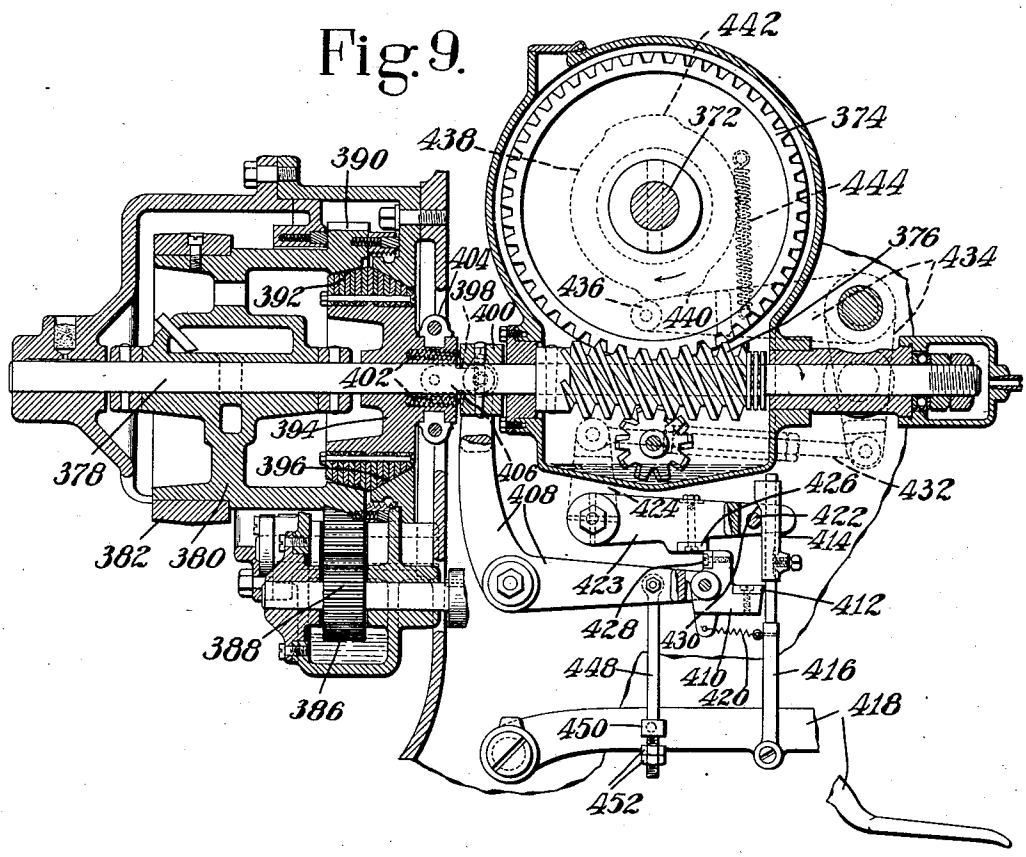
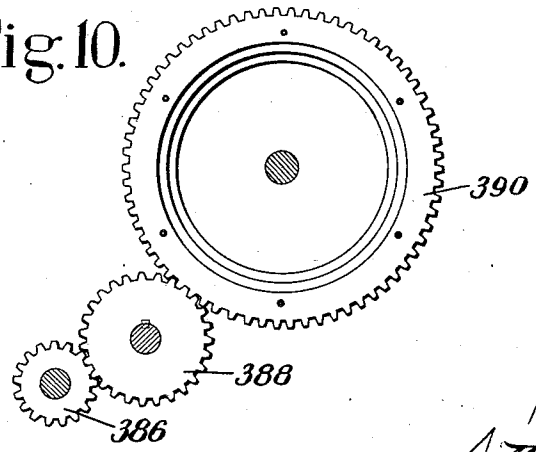


Fig. 10.



INVENTORS
Arthur F. Pym
William E. Scarlett
By their Attorney
Nelson W. Packard

June 28, 1932. A. F. PYM ET AL 1,864,669

MACHINE FOR OPERATING ON SHOES

Filed May 20, 1930 8 Sheets-Sheet 8

Fig.11.

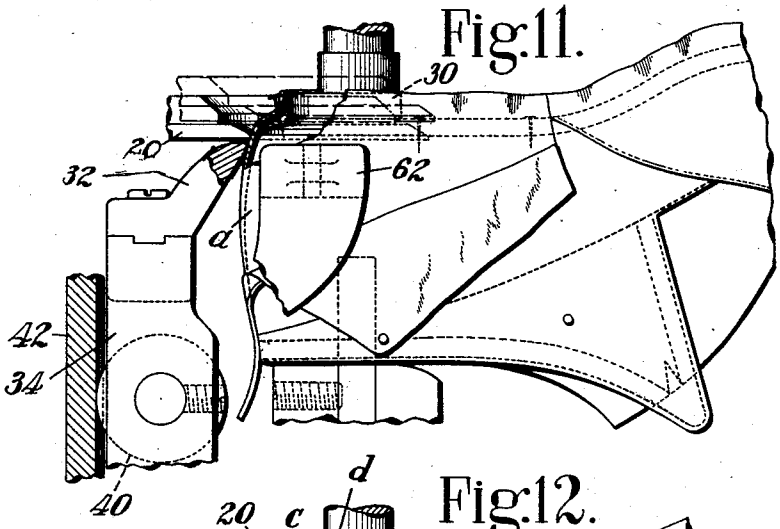


Fig.12.

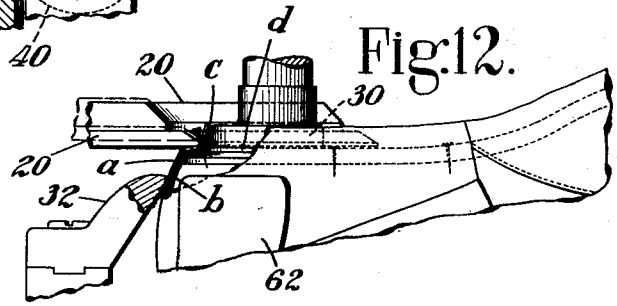
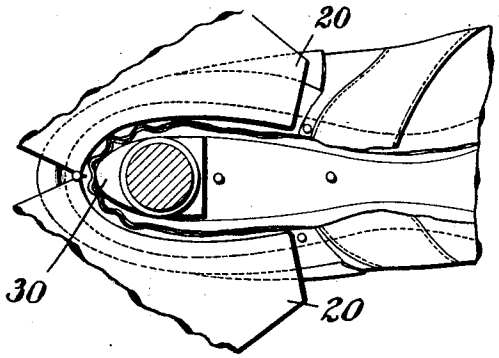


Fig.13.



INVENTORS.
Arthur F. Pym
William E. Scarlett
By their Attorney,
Nelson K. Howard

Patented June 28, 1932 1,864,669

UNITED STATES PATENT OFFICE

ARTHUR F. PYM, OF SWAMPSCOTT, AND WILLIAM E. SCARLETT, OF EAST LYNN, MASSACHUSETTS, ASSIGNORS TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY

MACHINE FOR OPERATING ON SHOES

Application filed May 20, 1930. Serial No. 454,095.

This invention relates to machines for operating on shoes, and is herein illustrated in its application to a machine particularly adapted for lasting the heel ends of turn shoes of that type in which the upper materials at the heel end are sewed to a shoulder on the sole. It is to be understood, however, that in various novel aspects the invention is more generally applicable to machines for lasting shoes of other types and for operating on other portions of a shoe, such as the toe end, and in some aspects also to machines for performing operations other than lasting operations.

In accordance with one important feature the invention provides novel means for positioning a shoe in a definitely determined relation to the means that operates thereon. In a machine of the character illustrated, which has end-lasting wipers that are advanced and closed definite distances to shape the upper materials against a shoulder on the sole, it is important that different shoes be positioned each in the same definitely determined relation to the wipers, in order to insure that the edges of the wipers at the limit of their operative movements will apply to the upper materials sufficient pressure to shape them as required. In operating, as herein shown, on the heel ends of turn shoes, such a definite relation between each shoe and the wipers is necessary in order to insure that the heel end portion of the upper materials, including the comparatively stiff counter, will be shaped in the angle between the shoulder and the margin of the sole in such manner as to provide a good crease to receive the stitches in the sewing of the upper materials to the sole. As applied to an organization having a shoe support that is movable to present the shoe in position to be operated upon, the invention, in one important aspect, accordingly provides means that is movable with the shoe support for determining by engagement with the heel end face of the shoe and with a relatively fixed portion of the machine the lengthwise position of the shoe. More particularly, as illustrated, the shoe support carries gage mechanism including a member that contacts with the heel end face of each shoe after the shoe and its last have been mounted on a last pin or spindle on the support, and the machine is provided with an abutment arranged to contact with the gage mechanism to limit the movement of the shoe support, so that the heel end face of every shoe is positioned in the same location regardless of any variation that there may be in the locations of the spindle holes in different lasts. In a further novel aspect also the shoe support, which is so constructed as to permit lateral movement of the shoe in response to pressure applied on either of its opposite side faces, is provided with members for centralizing the shoe laterally by engagement with the side faces of its heel end portion, so that the lateral position of every shoe in relation to the operating means or wipers is definitely determined. The members engaging the end and side faces of the shoe as described have a clamping action on the upper materials, including the counter, which assists in positioning the materials close to the last in preparation for the action of the wipers; and novelty is also to be recognized in this aspect of the organization. In the construction shown the end and side gaging or clamping members are so mounted that they are movable as a unit lengthwise of the shoe, while the side members are also movable laterally of the shoe; and the several members are so controlled that the side members are the last to engage the shoe in the movement of the members to operative positions and are the first to release the shoe in the reverse movement of the members. As illustrated, spring means is provided for moving the members to operative positions and a treadle for moving them reversely to release the shoe or to permit the mounting of a shoe on the shoe support.

Further novel features are to be recognized in the disclosed organization of means for operating the end-lasting wipers. Included among these features are a novel construction of means for operating the wipers first yieldingly to press them against the shoe, as illustrated to facilitate their use to wipe the upper heightwise of the shoe before

wiping it inwardly over the sole, together with means for producing a final positive pressure of the wipers on the upper materials; a novel construction of means for adjusting the wipers relatively to the shoe; and a novel construction and arrangement of means for imparting to the wipers their closing movements laterally of the shoe in combination with means for advancing them lengthwise of the shoe.

The above and other features of the invention, including novel means for controlling the shoe support, novel means whereby the wipers are rendered effective to wipe the heel end portion of the upper materials heightwise of the shoe and to press them firmly against the shoulder of the sole, and various novel details of construction and combinations of parts, will now be more particularly described by reference to the accompanying drawings and pointed out in the claims.

In the drawings,

Fig. 1 is a view, partly in left-hand side elevation and partly in section, of a machine in which the invention is embodied;

Fig. 2 is a view of the machine in front elevation;

Fig. 3 is a plan view of the machine, with parts broken away;

Fig. 4 is a view, partly in side elevation and partly in section, showing more clearly portions of the wiper-operating and controlling mechanisms;

Fig. 5 shows in side elevation one of the cam wheels and parts associated therewith;

Fig. 6 is a view, partly in left-hand side elevation and partly in section, of the shoe-supporting and controlling means;

Fig. 7 is a view, partly in plan and partly in section on the line VII—VII of Fig. 1, showing the means for imparting swinging movements to the shoe support;

Fig. 8 shows in front elevation a portion of the means on the shoe support for determining the position of the shoe;

Fig. 9 is a view, partly in left-hand side elevation and partly in section, showing the power driving means and the starting and stopping mechanism;

Fig. 10 shows a train of gears included in the power driving means;

Fig. 11 is a view in side elevation on an enlarged scale, illustrating the relation of the wipers to the shoe at the beginning of the wiping operation;

Fig. 12 is a view similar to Fig. 11, showing the wipers as positioned at the end of the wiping operation; and

Fig. 13 is a plan view showing the wipers in the same positions as illustrated in Fig. 12.

For wiping the heel-end portion of the turn shoe upper materials, comprising, as illustrated, the counter *a*, the upper leather *b*, and a portion of the lining *c* (Fig. 12), into lasted relation to the shoulder *d* of the sole, the machine is provided with heel-lasting wipers 20 which are operated and controlled as hereinafter described. It will be understood that, as usual in power-operated lasting machines, the wipers are advanced bodily a fixed distance lengthwise of the shoe and also receive swinging or closing movements of predetermined extent in directions widthwise of the shoe.

For positioning and supporting the shoe to receive the operation of the wipers 20, the machine is provided with a shoe support or jack comprising a rod 22 (Fig. 6) which carries at its upper end a last pin or spindle 24 adapted to enter the usual spindle hole in the heel end of the last. The rod 22 is movable upwardly and downwardly in a holder 26 in which it is mounted at its lower end, and this holder is fast on a rock shaft 28 mounted in bearings at the base of the machine. Accordingly the rod 22 may be swung rearwardly from an initial position in which it receives the last and shoe, and may also be raised, so as to present the shoe in proper lengthwise and heightwise relation to the wipers. The swinging and the raising of the rod 22 are effected automatically by mechanism hereinafter described. As the shoe is raised the heel-end portion of the sole is carried into engagement with a holddown or gage member 30 which, except for provision for vertical adjustment, is fixed on a yoke member 31 secured on the head of the machine.

For positioning different shoes in proper relation to the wipers for the upper materials of each shoe, hereinafter referred to generally as the upper, to be wiped inwardly against the shoulder of the sole with the required pressure all around the heel end of the sole, notwithstanding such variations as there are likely to be in the locations of the spindle holes in different lasts, the machine is provided with means for positioning every shoe with its heel end face in the same location, and also with means for centralizing each shoe laterally so that the opposite side faces of its heel end are positioned at equal distances from a central vertical plane. For properly positioning the shoe lengthwise there is provided gage mechanism comprising a member 32 arranged to contact with the heel end face of the shoe and secured on the upper end of a yoke member or carrier 34 which has connected opposite side portions extending downwardly and then forwardly at opposite sides of the rod 22 and mounted for swinging movement on a rod 36 supported in a block 38 which is fast on the rod 22. Mounted between the opposite side portions of the yoke member 34 is a roll 40 which is carried by the rearward swinging movement of the shoe support into engagement with a plate or abutment 42 fast on the frame of the machine. It

will thus be seen that the swinging movement of the shoe support is limited by engagement of the roll 40 of the gage mechanism with the plate 42 and that the rear end face of every shoe is accordingly positioned at the same distance from the plate 42. The rearward movement of the shoe support is completed prior to the completion of the upward movement of the rod 22, and the roll 40 therefore serves to avoid undue friction during the further upward movement of the rod and the parts carried thereby. The yoke member 34 is controlled by a spring 44 which is mounted on a rod 46 slidable in a lug 47 on the block 38 and extending loosely through an opening in the lower front portion of the yoke member with a head 48 at its upper end bearing downwardly on this member. The spring 44 is under compression between the lug 47 and nuts on the lower end of the rod 46. It will thus be seen that the spring 44 tends to swing the yoke member 34 about the rod 36 so as to press the gage member 32 against the heel end face of the shoe. To retract the gage member 32 initially so that a last and shoe may be mounted on the pin 24, the yoke member 34 is further controlled by means hereinafter described.

To permit the heel-end portion of the shoe to be properly centralized laterally, the last pin 24 is carried by a block 50 mounted for rectilinear sliding movement widthwise of the shoe in a holder 52 on the upper end of the rod 22, the holder being keyed to the rod to prevent it from turning and supported by a nut 53 adjustable on the rod. The block 50 is free to slide in the holder 52, but is limited in its movement by a pin 54 which is fast in the holder and projects into a slot in the block. The last pin 24 in the construction shown is not fast in the block 50, but is mounted on a member 56 (Fig. 3) which lies in a slot in the block and can tip laterally of the shoe about a pin 58 (Fig. 6) in the block, this member being controlled by small springs 60 at opposite sides of the pin 58. This permits the shoe to be tipped by the operator or by engagement of the holddown member 30 with the sole to position the heel end of the sole in parallel relation to the plane of the wipers. For centralizing the shoe laterally the machine is provided with opposite side clamp arms 62 on the upper ends of which are shoe-engaging members 64 pivotally mounted on the arms to swing about axes extending heightwise of the shoe to permit them to adjust themselves to the contour of the shoe. The arms 62 are mounted at their lower ends to swing laterally of the shoe about studs 66 on the pivoted yoke member 34 and have fast thereon intermeshing gear sectors 68 (Fig. 8) whereby the arms are required to swing equal distances toward or from each other and are always maintained at equal distances from a central vertical plane. The arms 62 are guided by the offset ends of a member 70 secured on the yoke member 34, and their movements toward each other when there is no shoe in the machine are limited by the member 70. A spring 72 connected to both arms tends to swing them toward each other. It will be evident that as the members 64 on the arms 62 are pressed by the arms against the opposite sides of the heel end of the shoe, they serve to centralize it with respect to bodily lateral movement so that the shoulder of the sole at the opposite sides of its heel end will be positioned symmetrically in relation to the edges of the wipers 20 at the limit of closing movement of the wipers. A further effect of the side clamp members 64 and of the member 32 engaging the heel end face of the shoe is to press the upper materials including the counter closely about the last preparatory to the action of the wipers.

To make room for the mounting of a last and shoe on the last pin 24 the side clamp arms 62 are swung apart and the yoke member 34, which carries these arms and also the rear gage member 32, is swung rearwardly by the operation of a treadle 74. This treadle is pivotally mounted on a stud 76 (Fig. 2) on a bracket 78 which is secured to the holder 26, the treadle being connected by a link 80 to a lever 82 pivoted on a stud 84 on the bracket 78. A spring 86 tends to swing the lever 82 downwardly and holds it initially in a position determined by a screw 88 on the bracket 78 in engagement with a lug 90 on the lever. Another screw 92 serves by engagement with the lug 90 to limit upward movement of the lever 82 in response to the action of the treadle 74. The lever 82 is connected by short links 94 and 96 to a rod 98 which is slidingly mounted at its upper end in a sleeve member 100 pivoted at 102 (Fig. 6) to two arms of a bracket 104 fast on the lower front end of the yoke member 34. Fast on the rod 98 below the sleeve member 100 is a collar 105 arranged to engage and lift the sleeve member as the rod is moved upwardly and thus to impart rearward tipping movement to the yoke member 34. Initially, however, the collar 105 is spaced somewhat below the lower end of the sleeve member 100, as illustrated, to provide for some upward movement of the rod 98 before it becomes effective to impart swinging movement to the member 34, and this initial upward movement of the rod 98 is utilized to swing the side clamp arms 62 apart. For this purpose there is secured on the rod 98 a sleeve 106 connected by a laterally extending rod 108 mounted in a projection 109 thereon to a sleeve 110 slidingly movable on a rod 112. The rod 112 at its upper end is connected to an arm 114 which is fast on a rock shaft 116 mounted in a bracket 118 se-

cured on one side of the lower front portion of the swinging yoke member 34, and also fast on the rock shaft 116 is an arm 120 connected by a link 122 to an arm 124 secured to one of the side clamp arms 62. Fast on the rod 112 is a collar 126 which is engaged by the sleeve 110 to lift the rod 112. Below the sleeve 110 is a spring 128 which serves as a yielding connection between the sleeve and the rod 112 in the latter part of the downward movement of the rod 98. It will be understood that when the operator releases the treadle 74, after a shoe has been mounted on the last pin, the spring 44 acts first to swing the yoke member 34 forwardly and thus to carry the gage member 32 into pressure-applying relation to the shoe while the side clamp arms 62 are held apart by the action of the sleeve 110 on the collar 126 to prevent the members 64 from contacting with the shoe. In the further downward movement of the rod 98 after the member 32 has engaged the shoe the sleeve 110 is moved downward relatively to the yoke member 34 and thus permits the spring 72 to swing the arms 62 toward the shoe. Before the rod 98 arrives at the limit of its downward movement determined by engagement of the lug 90 with the screw 88, the sleeve 110 will usually be carried downwardly away from the collar 126 while compressing the spring 128. In the reverse movement of the parts to unclamp the shoe the member 110 acts on the collar 126 to swing the side clamp arms apart before the collar 105 arrives in position to engage and lift the member 110 and thus to swing the yoke member 34 rearwardly away from the shoe. Accordingly the clamp members 64 are moved out of engagement with the shoe before they are swung rearwardly by the yoke member, so that they are free to be swung rearwardly without rubbing on the upper materials. It will be evident that rubbing of the side clamp members on the shoe is likewise avoided by the order of movements of the different members 32 and 64 in the clamping of the shoe. A further advantage in the movement of the member 32 against the rear end face of the shoe before the members 64 engage the shoe is that this insures that the upper materials, including the counter, will be pressed forwardly about the heel end of the last before the clamping pressure is applied at the sides.

For imparting rearward swinging movement to the shoe support the previously mentioned rod 36 has mounted thereon a pair of rearwardly extending rods 130 (Figs. 1 and 7) which are connected at their rear ends to a cross-head 132, and secured centrally in this cross-head is one end of a rod 133 which is slidingly mounted in a block 134 pivoted for turning movement on a pair of rods 136 which are fast in the frame of the machine. Slidingly mounted on the rod 133 at the rear of the block 134 is a member 138 arranged to bear on one end of a spring 140 which is mounted on the rod, the spring being confined by nuts 142 on the end of the rod. The member 138 is connected by a link 144 to a bell-crank lever 146 one arm of which carries a roll 148 engaged by a path cam indicated diagrammatically at 150 and formed in one side of a cam wheel 152. It will thus be seen that as movement toward the left (Fig. 1) is imparted to the member 138, this member acts through the spring 140 to swing the shoe support rearwardly until the roll 40 engages the plate 42, after which the spring is compressed more or less by continued movement of the member 138. The machine is further provided with means for locking the shoe support against reverse forward movement, this means comprising three pawls 153 which are pivotally mounted on the block 134 in staggered relation to one another and are arranged to cooperate with ratchet teeth formed on a plate 154 which is secured at one end on the cross-head 132 and is slidingly mounted in a guidway in the block 134. These pawls are controlled by a portion of the wiper-operating mechanism, as more particularly hereinafter explained. It will be understood that the provision for turning movement of the block 134 permits upward and downward movements of the shoe support without affecting its relation to the means for imparting to it its swinging movements.

For imparting to the shoe support rod 22 its upward movement there is slidingly mounted on the rod a sleeve 155 arranged to engage a collar 156 which is slidingly mounted on a reduced portion of the rod. Between the collar 156 and a member 158, which is positioned immediately below the block 38 previously referred to as fast on the rod 22, is a compression spring 160. When the parts are in starting positions the collar 156 rests on the enlarged portion of the rod 22 below it, as illustrated in Fig. 6, with the spring 160 under some compression. For imparting upward movement to the sleeve 155 there is provided a lever 162 mounted on a rock shaft 164 on the frame of the machine, the lever being forked at one end and connected by links 166 to the sleeve 155. At its opposite end the lever 162 is provided with a roll 168 engaged by a path cam 170 formed in one side of a cam wheel 172 (Fig. 5). It will be understood that the lever acts through the spring 160 to raise the rod 22 and the parts supported thereon and thus to carry the heel-end portion of the sole of the shoe into contact with the gage member 30, after which the spring is further compressed by continued movement of the lever. There is further provided means for locking the rod 22 positively against reverse downward movement, comprising a plurality of pawls 174 which in the

construction shown are four in number, these pawls being arranged to cooperate with ratchet teeth formed on a member 176 which is secured upon a reduced portion of the rod 22. It will be understood that the four pawls are arranged in staggered relation for greater precision. The pawls are pivotally supported on upwardly extending side portions 178 of the holder 26 and are controlled by rods 180 which are slidingly mounted in a projection 182 of the holder 26 and in a projection 184 of the sleeve 155. Each of these rods is arranged to control two of the pawls and has fast thereon collars 186 and 188 which are arranged to engage the tails of the pawls to hold the latter out of engagement with the ratchet teeth when the parts are in starting positions, as illustrated in Fig. 6. A spring 190 on each rod 180 below the projection 182 tends to move the rod downwardly, such movement of the rod being limited by a collar 192 which is fast thereon and engages the projection 182. Between the collar 192 and the tail of the lower pawl is a spring 194, and between the collar 188 and the tail of the upper pawl is a spring 196. It will be understood that upon upward movement of the rods 180 the pawls are swung yieldingly inward against the ratchet teeth through the springs 194 and 196. Such upward movement is imparted to each rod by engagement of the projection 184 of the sleeve 155 with a collar 198 which is fast on the rod. It will be evident that such upward movement is not imparted to the rods 180 until near the end of the upward movement of the sleeve 155, so that the pawls are not carried into operative relation to the ratchet teeth until the upward movement of the rod 22 has been substantially completed. The pawls serve to lock the rod against any downward movement during the operation of the wipers on the shoe, and early in the return of the parts to starting positions they are swung away from the ratchet teeth to permit the shoe to move downwardly out of contact with the member 30 prior to any forward movement of the shoe support. To insure prompt disengagement of the pawls from the ratchet teeth, there is fast on each rod 180 a collar 200 which is engaged by the projection 184 in the downward movement of the sleeve 155.

In case the machine is operated without any shoe on the shoe support, it is desirable to prevent excessive upward movement of the rod 22 such as might involve danger of breaking some part of the machine. There is accordingly secured on the front portion of the frame a plate 202 provided with spaced horizontal projections 204 arranged to cooperate with ears 206 (Figs. 1 and 2) formed on opposite sides of the previously mentioned member 158. It will be understood that by the rearward swinging movement of the shoe support the ears 206 are carried under the projections 204, and that as the rod 22 is moved upwardly the projections engage these ears and thus limit the upward movement of the rod. The projections 204 are far enough above the ears 206 to prevent any limiting action in the normal operation of the machine on a shoe.

The wipers 20 are supported on a wiper carrier 208 which is guided between side portions 210 (Figs. 2 and 3) of the head of the machine for movements lengthwise of the shoe and heightwise of the shoe. Near its front end the wiper carrier 208 is supported by mechanism hereinafter described which permits it to be moved lengthwise of the shoe and controls its movements heightwise of the shoe, and at its rear end it is connected to means which moves it lengthwise of the shoe. The last-mentioned means comprises a pair of lever arms 212 which are mounted to swing on a fixed rod 214 supported on the frame of the machine and carry at their upper ends a rod 216 on which the rear end of the wiper carrier 208 is pivotally mounted. For swinging the arms 212 there is provided a bell-crank lever 218 mounted to turn on the rod 214, one arm of this bell-crank lever being adjustably connected to one of the arms 212 and its other arm being yieldingly connected to a two-arm lever 220 which is fast on a rock shaft 222. Also fast on the shaft 222 is a lever 224 (Fig. 1) which carries a roll 226 engaged by a path cam 228 formed in one side of the cam wheel 152. The two-arm lever 220 is pivotally connected to a cylinder 230 in the lower end of which is threaded a sleeve member 232 slidingly mounted on a rod 234 the upper end of which is connected to one arm of the bell-crank lever 218. Between the member 232 and a collar 236 which is fast on the rod 234 is a compression spring 238 through which movement is transmitted from the cylinder 230 to the rod 234. The adjustable connection between the bell-crank lever 218 and one of the arms 212 comprises a spindle 240 which is swiveled in a block 242 pivotally mounted on one arm of the bell-crank lever and has screw-threaded engagement with a block 244 which is pivoted on one of the arms 212. Fast on the spindle 240 at one side of the block 242 is a collar 246, and keyed on the spindle at the other side of the block is a hand wheel 248 for turning it. For locking the hand wheel 248 in adjusted position there is threaded on the spindle another hand wheel 250 whereby the hand wheel 248 may be clamped against the block 242. It will be understood that by turning the hand wheel 248 the lever arms 212 are moved relatively to the bell-crank lever 218 and thus the wiper carrier 218 and the wipers 20 are adjusted bodily lengthwise of the shoe to determine the limit of the advancing movement of the wipers so that they will press the upper materials firmly against the shoulder of the sole at the extreme end of the shoe. The rod 234,

moreover, is adjustable relatively to the bell-crank lever 218 in such manner as to vary the amount or rate of the advancing movement of the wipers lengthwise of the shoe. For this purpose there is a slot 252 in one arm of the bell-crank lever along which a stud 254 carried by the rod 234 can be adjusted and then secured in adjusted position in a well-known manner. It will be evident that this adjustment varies the effective length of that arm of the bell-crank lever 218 in which the slot is formed. This means for varying the amount of advancing movement of the wipers, or the rate of such movement, is useful in combination with means hereinafter described for similarly controlling the closing movements of the wipers, to adapt the wipers for the best operation on shoes of different shapes.

It will be understood from the foregoing decription that the advancing movement of the wipers lengthwise of the shoe is effected yieldingly through the spring 238, the yielding connection being provided largely for the reason that in the machine herein shown the wipers are utilized to perform an upwiping operation below the edge of the shoe bottom before they wipe the upper inwardly against the shoulder of the sole, as more particularly hereinafter explained. By adjustment of the member 232 the initial compression of the spring 238 may be varied, in order to vary the pressure with which the wipers are forced yieldingly against the upper. It is desirable that at the end of the wiping operation the wipers shall act positively on the shoe, in order to form a distinct crease in the upper materials, including the counter, to provide a good sewing line. There is accordingly mounted on the rod 234 a nut 256 which is adjustable on the rod and is held in adjusted position by a lock nut 258, the nut 256 being arranged to be engaged by a cap 260 on the cylinder 230 after compression of the spring 238 so that movement is imparted positively to the rod 234 to press the wipers firmly against the shoe at the end of their overwiping movement.

The pawls 153 previously referred to as means for locking the shoe support against forward movement are arranged to be controlled by the bell-crank lever 218. For this purpose a projection 262 on the lever is pivotally connected to rods 264 which are slidingly mounted in the tails of the pawls and act through springs 266 to swing the pawls yieldingly into engagement with the ratchet teeth on the member 154 and through collars 268 to withdraw the pawls from engagement with the teeth.

The wipers 20 are mounted for closing movements laterally of the shoe on wiper holders 270 (Fig. 3) which are guided by a curved slot in the wiper carrier 208 and are provided on their outer edges with rack teeth 272 engaged by cooperating teeth formed on rack bars 274 which are mounted on the wiper carrier for sliding movements lengthwise of the shoe. For operating the rack bars 274 there are provided other rack bars 276 also slidingly mounted on the wiper carrier 208 and arranged to impart movement yieldingly to the rack bars 274 through springs 278 mounted partially within recesses in the rack bars 276 and arranged to engage small plates 280 which bear on lugs 282 on the rack bars 274 or on the ends of adjusting screws 284 which are mounted in these lugs. It will thus be seen that the springs 278 provide for closing the wipers yieldingly against the shoe and accordingly correspond in function to the previously mentioned spring 238 of the wiper-advancing mechanism. The initial tension of the springs 278 may be adjusted by the screws 284. Near the end of the wiper-closing operation the springs 278 are compressed to such an extent that the ends of the rack bars 276 engage the plates 280, so that positive closing movement is imparted to the wipers at the time when they are also advanced positively as hereinbefore described. In the return of the parts to starting positions the rack bars 276 engage lugs 285 on the rack bars 274 to return the latter and open the wipers.

The rack bars 276 have rack teeth on their lower faces in engagement with teeth formed on gear members or sectors 286, as illustrated in Fig. 4, these gear sectors being fast on a rock shaft 288 mounted in bearings on the wiper carrier 208. Extending downwardly from one of the gear sectors 286 is a lever arm 289 which is adjustably connected, as hereinafter described, to one arm of a bell-crank lever 290 loosely mounted on the shaft 288. The other arm of the bell-crank lever 290 is connected by a rod or link 292 to one arm of a bell-crank lever 294 the other arm of which carries a roll 296 engaged by a path cam 298 (Fig. 5) formed in one side of the cam wheel 172. The connection between the bell-crank lever 294 and the rod 292 comprises a block 300 which is pivoted on the lever and is slidable on the rod, this block being arranged to engage a nut 302 on the rod for imparting downward movement positively to the rod in the closing of the wipers. As a measure of safety the connection between the block 300 and the rod 292 for opening the wipers comprises a yieldable spring 304 interposed between the upper face of the block and a collar 306 fast on the rod. The connection between the upper end of the rod 292 and the bell-crank lever 290 consists of a stud 308 adjustable along a curved slot 310 in the lever and adapted to be secured in adjusted position in a well-known manner. It will be evident that this adjustment serves to vary the amount of closing movement of the wipers, or the rate of their closing movement, and corresponds to the adjustment previously

described whereby the amount or rate of the advancing movement of the wipers may be varied. The adjustable connection between the arm 289 and the bell-crank lever 290 comprises a spindle 312 threaded in a block 314 which is pivotally mounted on the arm 289 and swivelled in a block 316 pivotally mounted on the lever 290. Members 318 and 320 which are fast on the spindle 312 at opposite sides of the block 316 prevent lengthwise movement of the spindle relatively to the lever 290. The member 320 is connected by a universal joint to one member 322 of a telescopic shaft, the other member 324 of which is connected by a universal joint to a spindle 326 rotatably mounted on the frame of the machine and having fast thereon a hand wheel 328. It will thus be evident that by turning the hand wheel 328 the arm 289 and the gear sectors 286 may be adjusted relatively to the bell-crank lever 290 to swing the wipers toward or from each other and thus to determine the limit of their closing movements, this adjustment corresponding to the adjustment previously described whereby the limit of advancing movement of the wipers is varied. It will further be evident that the wiper-closing mechanism including the rock shaft 288 and associated parts supported by the wiper carrier 208 is, in effect, operatively independent of the movement of the wiper carrier lengthwise of the shoe, since by reason of the length of the link 292, its substantially perpendicular relation to the direction of the movement of the wiper carrier and the shortness of that movement, any such movement of the wiper carrier, either in adjusting the wipers or in operating on the shoe, simply effects an idle swinging movement of the link or rod 292 of the wiper-closing mechanism without altering the relation of the wipers to each other.

For supporting the front end portion of the wiper carrier 208 and for moving the carrier to impart to the wipers their movements heightwise of the shoe, there is provided a rod 330 controlled by a bell-crank lever 332 one arm of which carries a roll 334 engaged by a path cam 336 formed in one side of a cam wheel 338. Pivotally connected to the other arm of the bell-crank lever is a member 340 which is fast on the lower end of a cylinder 342 through which the rod 330 extends, this member having a shoulder normally engaged by a washer 344 loosely mounted on the rod 330 and bearing on a collar 346 which is fast on the rod. It will thus be seen that upward movement is imparted positively to the rod 330 through the engagement of the washer 344 with the collar 346 to raise the wiper carrier 208 and thus to impart to the wipers their upwiping movement. The connection between the upper end of the rod 330 and the wiper carrier comprises a member 348 which is threaded on the end of the rod and is mounted on an eccentric 350 carried by a shaft 352 which is mounted in bearings on the wiper carrier 208. Fast on the shaft 352 is a worm gear 354 engaged by a worm 356 on a spindle 358 mounted in one side of the wiper carrier, this spindle having thereon a hand wheel 360 for turning it. It will thus be seen that by turning the hand wheel 360 the wiper carrier 208 may be raised or lowered relatively to the rod 330 to vary the limit of upwiping movement of the wipers. An additional adjustment of the same character may be made by turning the threaded rod 330 relatively to the member 348, a hand wheel 362 on the rod being provided for this purpose. The latter adjustment is in the nature of a setting-up adjustment and will be required infrequently.

When the wipers are positioned over the edge of the sole, downward movement is imparted to the wiper carrier 208 by the lever 332 to increase the pressure of the wipers on the upper. For this purpose there are yielding connections between the member 340 and the rod 330, comprising a comparatively light spring 364 which is effective in the inward movement of the wipers over the sole and a heavier spring 366 which becomes effective when the wipers have substantially completed their inward movement. Both these springs bear at their upper ends on a cap 368 which is threaded on the cylinder 342 and is slidable on the rod 330, the lower end of the light spring 364 bearing on the collar 346 and the lower end of the heavy spring 366 bearing on the washer 344. Below the washer 344 is a nut 370 on the rod 330, this nut being normally spaced somewhat below the washer, as illustrated in Fig. 4. It will be evident that when the lever 332 is moved in the direction to press the wipers downwardly upon the shoe, the light spring 364 is first yieldable by reason of its engagement with the collar 346 fast on the rod 330, the heavier spring 366 being idle until the member 340 has moved relatively to the rod 330 enough to bring the washer 344 into engagement with the nut 370. Thereafter the downwardly directed force is applied to the wipers through both springs, this action occurring substantially at the time when the advancing and closing pressures of the wipers against the upper materials become positive.

The three cam wheels 152, 172 and 338 are all fast on a cam shaft 372. Fast on this cam shaft is a worm gear 374 (Fig. 9) which is driven by a worm 376 fast on a shaft 378. Mounted loosely on the shaft 378 is a drum 380 which may be driven either by a belt operating on a pulley 382 thereon, or by an electric motor 384 (Fig. 1) which is connected to the drum through a train of gears 386, 388, and 390, the gear 390 being formed on the drum itself. At one end the drum 380 is so formed as to provide an internal clutch face

392 arranged to cooperate with a clutch member 394 slidingly mounted on the shaft 378, this clutch member being also arranged to engage a stationary brake surface 396 when it is not in engagement with the clutch face 392. The clutch member 394 is connected to the shaft 378 to turn therewith by means of a tongue 398 which projects into a slot formed in a collar 400, the latter being pinned to the shaft. Springs 402 mounted in the hub of the clutch member 394 and pressing on the collar 400 tend to move the clutch member into engagement with the clutch face 392. For controlling the clutch member 394 there are mounted in an annular groove in the hub of the clutch member two halves of a collar 404 connected by links 406 to a forked arm of a bell-crank lever 408 pivoted on the frame of the machine. On the end of the other arm of the bell-crank lever 408 there is pivotally mounted a block 410 having a plate 412 thereon arranged to be engaged by the lower end of a sleeve 414 fast on a rod 416 which is pivoted at its lower end to a treadle 418 normally raised by a spring 419 (Fig. 1). A spring 420 connected both to the block 410 and to the rod 416 tends to hold these parts in the positions illustrated in Fig. 9, in which the sleeve 414 is over a portion of the upper face of the plate 412. The position of the rod 416 is determined by a pin 422 against which the sleeve 414 is held by the spring 420, this pin being mounted in the forked end of an arm 423 fast on a rock shaft which carries also an arm 424 automatically controlled as hereinafter described. The arm 423 carries a plate 426 which, as illustrated in Fig. 9, engages a plate 428 on the block 410 and thus maintains the bell-crank lever 408 in position to disconnect the clutch member 394 from the clutch face 392 and to hold it against the braking surface 396. When the operator depresses the treadle 418, the member 414 acts on the plate 412 to tip the block 410 in such manner as to carry its plate 428 out from under the plate 426, thus tripping the clutch so that the springs 402 force the clutch member 394 into engagement with the clutch face 392 to start the operation of the machine. In further downward movement of the treadle the pin 422 acts on a cam face 430 on the sleeve member 414 to swing this member out from over the plate 412 and thus permit the block 410 to be turned back to its former position by the spring 420. Such return of the block is permitted by upward movement of the arm 423 which occurs immediately after the starting of the machine. The mechanism for controlling this arm comprises a link 432 whereby the previously mentioned arm 424 is connected to one arm of a bell-crank lever 434, the other arm of the latter carrying a roll 436 which is engaged by a cam 438 on the cam shaft 372. This cam is provided with two projections 440 and 442, the former of which is in engagement with the roll 436 when the parts of the machine are in starting positions. As the projection 440 leaves the roll 436 a spring 444 acts on the bell-crank lever 434 to raise the arm 423 as above described. Thereafter, when the projection 442 arrives in position to engage the roll 436, the arm 423 is moved downwardly and acts on the lever 408 to disconnect the clutch member 394 from the clutch face 392 and thus stop the machine. In the machine herein shown the machine is thus stopped automatically at that point in the cycle when the wipers are pressing the upper materials firmly inward and downward upon the sole, to enable the operator, if he so desires, to fasten a binder wire to the shoe at one side of the heel seat and to draw it around the heel end of the shoe under the wipers ready to pull it into upper-holding position and to fasten it at the other side as soon as the wipers release their pressure on the shoe. The machine is provided with a support for a coil 446 (Fig. 3) of binder wire which the operator may thus use if he desires, although it has been found that under usual conditions the upper materials are shaped or molded so effectively in the angle between the margin and the shoulder of the sole as to require no fastening means prior to the sewing of the upper to the shoulder of the sole. It will be understood that after the machine has come to a stop as described, the operator will again start it by depressing the treadle 418, and that it will be brought to a stop automatically at the end of the cycle by the action of the cam projection 440 on the roll 436.

The machine is further provided with means whereby the operator may conveniently bring the machine to a stop at will before it is stopped automatically as above described, to enable him to adjust the upper materials before they are completely wiped into lasted position if he should observe such an adjustment to be necessary. For this purpose there is pivotally mounted on the bell-crank lever 408 a rod 448 which extends downwardly through a block 450 pivoted on one side of the treadle 418, nuts 452 being mounted on the rod below the block 450. Initially there is a considerable space between the block and the nuts to provide for lost motion such as to render the treadle effective to start the machine as described. If at any time the operator should desire to stop the machine, he simply depresses the treadle farther, so that the block 450 engages one of the nuts 452 and thus moves the rod 448 downwardly, thereby operating the bell-crank lever 408 to disengage the clutch member 394 from the clutch face 392. It will be evident that when the operator releases the treadle the machine will immediately resume its operation and will thereafter come to a stop automatically at

the point predetermined by the automatic controlling means hereinbefore described.

In the operation of the machine, briefly summarized, the operator first depresses the treadle 74 and thereby swings the side clamp arms 62 apart and then swings these arms and the end clamp member 32 rearwardly. He then mounts a last and shoe on the last pin 24 with the shoe materials wrong side out, and if necessary tips the shoe and moves it bodily sidewise to locate it approximately in a central position on the shoe support with the sole in such position that it will be substantially parallel to the plane of the wipers when the shoe is carried to operating position. Thereafter the operator releases the treadle 74, whereupon the yoke member 34 is swung forwardly by the spring 44 to press the member 32 against the rear end face of the shoe and the side clamp arms 62 are then swung toward the shoe by the spring 72 to cause the members 64 to clamp the shoe and position it centrally on the support. As illustrated, a portion of the lining of the shoe which is outside of the counter is turned back, so that the clamp members, and later the wipers, directly engage the counter.

After the shoe has been mounted on the shoe support and clamped and positioned as above described, the machine is started by depression of the treadle 418. The shoe support and the shoe clamping means are then swung rearwardly by the bell-crank lever 146 until the roll 40 engages the plate 42, and at the same time the shoe support is moved upwardly by the lever 162, the upward movement continuing after the rearward movement has ceased, until the shoe is forced against the gage member 30 under the heavy pressure of the spring 160. The shoe support rod 22 is then locked against downward movement by the pawls 174. Thereafter the wipers are moved forwardly toward the shoe and are closed around the heel end of the shoe below the edge of the shoe bottom, as illustrated in Fig. 11, and are pressed yieldingly in contact with the counter through compression of the spring 238 of the wiper-advancing mechanism and the springs 278 of the wiper-closing mechanism. In this movement of the wipers the pawls 153 are rendered effective to lock the shoe support against forward movement. While the wipers are thus pressed yieldingly against the shoe the wiper carrier 208 is swung upwardly by the bell-crank lever 332 to impart to the wipers an upwiping movement while pressing the counter inwardly all around the heel end of the shoe. The wipers are thereafter further advanced and closed to wipe the upper materials including the counter into the angle between the shoulder and the margin of the sole while being pressed yieldingly downward by the light spring 364 (Fig. 4), and at the end of their advancing and closing movements they are forced positively against the upper materials to assist in forming a good crease therein, as hereinbefore described. Substantially at the end of the wiper-advancing and closing movements the heavy spring 366 is rendered effective to force the wipers downwardly with increased pressure. The machine then comes to a stop with the wipers in the positions illustrated in Figs. 12 and 13 to enable the operator, if he desires, to fasten a binder wire to a tack at one side of the heel end of the shoe and to draw it around the shoe under the wipers ready to pull it into place against the margin of the upper materials when the wipers are raised to release their pressure on the shoe after the machine has been again started. After the operator has depressed the treadle 418 to start the machine the second time, the wipers are lifted and retracted from the shoe and the other parts are returned to their starting positions, the shoe support being first lowered and then swung forwardly from under the gage member 30. If the operator has applied the binder wire around the heel end of the shoe in the manner described, he may then fasten it to a tack at the opposite side of the shoe. As previously explained, however, the use of such a binder wire will under most conditions be found unnecesssary. Before removing the shoe from the shoe support the operator depresses the treadle 74, whereby the side clamp arms 62 are first swung away from the shoe and are then swung rearwardly together with the end clamp member 32 to release the shoe.

As hereinbefore suggested, the invention in various novel aspects is not limited to machines for operating on turn shoes, and the term "sole" is accordingly used in the claims in a generic sense to include not only the sole of a turn shoe, but also that part which in shoes of other types may be the insole.

Novel features of the starting and stopping mechanism herein disclosed are claimed in a divisional application, Serial No. 561,198 filed on Sept. 4, 1931.

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

1. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, and means movable with said shoe support for determining by engagement with the heel end face of the shoe and with a relatively fixed portion of the machine the lengthwise position of the shoe when presented to the lasting means.

2. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, gage mechanism carried

by said shoe support and arranged to contact with the heel end face of the shoe, and an abutment arranged to act on said gage mechanism to limit the movement of the shoe support, whereby the lengthwise position of the shoe when presented to the lasting means is determined by contact with its heel end face.

3. In a machine for lasting the heel ends of shoes, the combination with heel-lasting wipers movable a predetermined distance lengthwise of a shoe to wipe the upper against a shoulder on the sole, of a shoe support movable to present a shoe in position to be operated upon by said wipers, and gage mechanism movable with said shoe support and arranged to determine by contact with the heel end of the shoe and with a relatively fixed portion of the machine the lengthwise position of the shoe when presented to the wipers.

4. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support adapted to receive shoes of different sizes and movable to present each shoe in position to be operated upon by said lasting means, and gage mechanism carried by said shoe support and arranged to contact with the heel end face of each shoe and with a relatively fixed portion of the machine to position different shoes with their heel end faces in the same location regardless of their sizes.

5. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support having a spindle adapted to enter the spindle holes of lasts of different sizes and movable to present each last and shoe in position to be operated upon by said lasting means, and gage mechanism movably mounted on said shoe support for engaging the heel end face of each shoe regardless of its size and arranged to be carried by movement of the shoe support into engagement with a relatively fixed portion of the machine to position the different shoes with their heel end faces in the same location regardless of their sizes.

6. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, gage mechanism mounted on said shoe support for movement into and out of engagement with the heel end face of the shoe, means for moving said gage mechanism into contact with the shoe after the shoe has been mounted on the shoe support, and an abutment arranged to contact with said gage mechanism to limit the movement of the shoe support and determine the lengthwise position of the shoe.

7. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, gage mechanism mounted on said shoe support for movement into and out of contact with the heel end face of the shoe, spring means for moving said gage mechanism into contact with the shoe, means controlled by the operator for retracting said gage mechanism to permit a shoe to be mounted upon or removed from the shoe support, and an abutment arranged to contact with said gage mechanism to limit the movement of the shoe support and determine the lengthwise position of the shoe.

8. In a machine for operating on shoes, the combination with means for operating on the heel end portion of a shoe, of a shoe support movable to present a shoe in position to be operated upon by said means, gage mechanism movably mounted on said shoe support for engaging the heel end face of each shoe, and an abutment arranged to contact with said gage mechanism to limit the movement of the shoe support and determine the lengthwise position of the shoe.

9. In a machine for operating on shoes, the combination with means for operating on the heel end portion of a shoe, of a shoe support movable to present a shoe in position to be operated upon by said means, spring-controlled gage mechanism carried by said shoe support and arranged to contact yieldingly with the heel end face of a shoe on the support, means controlled by the operator for retracting said gage mechanism to permit a shoe to be mounted on the support, and an abutment arranged to contact with said gage mechanism to limit the movement of the shoe support and determine the lengthwise position of the shoe.

10. In a machine for operating on shoes, the combination with means for operating on the heel end portion of a shoe, of a shoe support movable to present a shoe in position to be operated upon by said means, clamping mechanism movably mounted on the shoe support for clamping engagement with the heel end of the shoe, spring means for forcing said clamping mechanism against the shoe, and means controlled by the operator for retracting the clamping mechanism against the resistance of said spring means to permit a shoe to be mounted on the shoe support.

11. In a machine for operating on shoes, the combination with means for operating on the heel end portion of a shoe, of a shoe support movable to present a shoe in position to be operated upon by said means, clamping mechanism movably mounted on the shoe support for clamping engagement with the heel end face of the shoe, means on the shoe support for pressing said clamping mechanism against the shoe, and an abutment into engagement with which said clamping mechanism is carried by the movement of the shoe support.

12. In a machine for operating on shoes, the combination with means for operating on the heel end portion of a shoe, of a shoe support movable to present a shoe in position to be operated upon by said means, clamping mechanism movably mounted on the shoe support for clamping engagement with the heel end face of the shoe, an abutment into engagement with which said clamping mechanism is carried by the movement of the shoe support, and means for moving the shoe support to force the clamping mechanism yieldingly against said abutment.

13. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, gage mechanism on said shoe support arranged to contact with the heel end face of the shoe, an abutment arranged to contact with said gage mechanism to limit the movement of the shoe support and determine the lengthwise position of the shoe, and means for locking the shoe support against reverse movement from the position determined by said abutment.

14. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present shoes of different sizes in position to be operated upon by said lasting means, gage mechanism on said shoe support arranged to contact with the heel end face of each shoe, a fixed abutment arranged to contact with said gage mechanism to limit the movement of the shoe support and determine the same position for the heel end face of each shoe regardless of its size, yieldable means for moving the shoe support to the position determined by said abutment, and means for locking the shoe support against reverse movement.

15. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, means movable with said shoe support for determining by engagement with the heel end face of the shoe and with a relatively fixed portion of the machine the lengthwise position of the shoe when presented to the lasting means, and means also movable with the shoe support for determining by engagement with the opposite sides of the shoe the lateral position of the heel end of the shoe.

16. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support adapted to receive shoes of different sizes and movable to present each shoe in position to be operated upon by said lasting means, gage mechanism carried by said shoe support and arranged to contact with the heel end face of each shoe and with a relatively fixed portion of the machine to position different shoes with their heel end faces in the same location regardless of their sizes, and mechanism also carried by the shoe support for centralizing the heel end of each shoe laterally by contact with its opposite side faces.

17. In a machine for lasting the heel ends of shoes, the combination with heel-lasting wipers movable predetermined distances lengthwise and laterally of a shoe to wipe the upper around the heel end of the shoe against a shoulder on the sole, of a shoe support movable to prevent a shoe in position to be operated upon by said wipers, and means carried by said shoe support for centralizing each shoe laterally by contact with its opposite side faces and for also determining by contact with the end face of the shoe and with a relatively fixed portion of the machine the lengthwise position of the shoe.

18. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a last and shoe in position to be operated upon by said lasting means, said shoe support having a spindle adapted to enter the spindle hole of the last and movable in directions widthwise of the shoe in response to lateral pressure on the shoe, members on the shoe support connected for equal movements toward each other to engage the opposite sides of the heel end of the shoe and centralize the shoe laterally, and means also carried by the shoe support arranged to determine by contact with the end face of the shoe and with a relatively fixed portion of the machine the lengthwise position of the shoe.

19. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, gage mechanism mounted on said shoe support for movement into contact with the heel end face of each shoe, an abutment arranged to contact with said gage mechanism to limit the movement of the shoe support and determine the lengthwise position of the shoe, and members also carried by the shoe support and movable laterally of the shoe to centralize it by contact with its opposite side faces.

20. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, gage mechanism mounted on said shoe support for determining by engagement with the heel end face of the shoe and with a relatively fixed portion of the machine the lengthwise position of the shoe when presented to the lasting means, said gage mechanism being movable lengthwise of the shoe into or out of contact with the heel end of the shoe, and members movably mounted on said gage mechanism for determining

by engagement with the opposite sides of the shoe the lateral position of the heel end of the shoe.

21. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, gage mechanism carried by said shoe support for determining by engagement with the heel end face of the shoe and with a relatively fixed portion of the machine the lengthwise position of the shoe when presented to the lasting means, said gage mechanism being mounted to swing about an axis extending laterally of the shoe into or out of contact with the shoe, and members mounted on said gage mechanism for swinging movements about axes extending lengthwise of the shoe for centralizing the shoe laterally by engagement with its opposite side faces.

22. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, and means carried by said shoe support for centralizing the shoe laterally in relation to said lasting means by engagement with the opposite side faces of the shoe.

23. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, and clamp members carried by said shoe support and connected for equal movements toward each other to engage the opposite sides of the heel end of the shoe and centralize the shoe laterally in relation to said lasting means.

24. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, said shoe support having a spindle adapted to enter the spindle hole of the last and movable in directions widthwise of the shoe in response to lateral pressure on the shoe, and means carried by the shoe support for centralizing the shoe laterally in relation to the lasting means by engagement with the opposite side faces of the shoe.

25. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, clamp members carried by said shoe support for engaging the opposite sides of the heel end of the shoe, spring means for moving said clamp members toward the shoe, and means controlled by the operator for retracting the clamp members.

26. In a machine for operating on shoes, the combination with means for operating on a shoe, of a shoe support movable to present a shoe in position to be operated upon by said means, said shoe support being so constructed as to permit a shoe to be moved laterally thereon by pressure on one or the other of its side faces, and means carried by the shoe support for centralizing the shoe laterally by engagement with its side faces.

27. In a machine for operating on shoes, the combination with means for operating on a shoe, of a shoe support movable to present a shoe in position to be operated upon by said means, said shoe support being so constructed as to permit a shoe to be moved laterally thereon by pressure on one or the other of its side faces, and members carried by the shoe support and connected for equal movements toward each other to centralize the shoe laterally by engagement with its side faces.

28. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a shoe support movable to present a shoe in position to be operated upon by said lasting means, gage mechanism mounted on said shoe support for determining by engagement with the heel end face of the shoe and with a relatively fixed portion of the machine the lengthwise position of the shoe when presented to the lasting means, said gage mechanism being movable lengthwise of the shoe into or out of contact with the heel end of the shoe, members mounted on said gage mechanism for movements laterally of the shoe to centralize it by engagement with its opposite side faces, spring means for moving said gage mechanism toward the shoe and for imparting to said members their operative movements, and means movable by the operator to retract said members and the gage mechanism from the shoe.

29. In a machine for operating on shoes, the combination with means for operating on the heel end portion of a shoe, of a shoe support movable to present a shoe in position to be operated upon by said means, shoe-positioning means carried by said shoe support and comprising members arranged to engage the opposite sides of the shoe to centralize the shoe laterally and also a member for engaging the end face of the shoe, and means arranged to cooperate with said end member to limit the movement of the shoe support and determine the lengthwise position of the shoe.

30. In a machine for operating on shoes, the combination with means for operating on the heel end portion of a shoe, of a shoe support movable to present a shoe in position to be operated upon by said means, shoe-positioning means carried by said shoe support and comprising members arranged to engage the opposite sides of the shoe to cen-

tralize the shoe laterally and also a member for engaging the end face of the shoe, the several members being movable together lengthwise of the shoe relatively to the shoe support and the side members being movable also laterally of the shoe, and means arranged to cooperate with said end member to limit the movement of the shoe support and determine the lengthwise position of the shoe.

31. In a machine for operating on shoes, the combination with means for operating on the heel end portion of a shoe, of a shoe support movable to present a shoe in position to be operated upon by said means, shoe-clamping means carried by said shoe support and comprising a member for engaging the end face of the shoe and other members for engaging the side faces of the shoe, said members being movable into and out of operative positions, and controlling mechanism constructed to cause first the end member and then the side members to engage the shoe in the movement of the several members to operative positions.

32. In a machine for operating on shoes, the combination with means for operating on the heel end portion of a shoe, of a shoe support movable to present a shoe in position to be operated upon by said means, shoe-clamping means carried by said shoe support and comprising a member for engaging the end face of the shoe and other members for engaging the side faces of the shoe, said members being movable as a unit lengthwise of the shoe and the side members being also movable laterally of the shoe toward and from operative positions, and controlling mechanism constructed first to retract the side members from the shoe and then to retract the several members lengthwise of the shoe.

33. In a machine for operating on shoes, the combination with a shoe support, and means for operating on a shoe on said support, of shoe-clamping means comprising a member for applying clamping pressure on the heel end face of the shoe and other members for applying clamping pressure on the opposite sides of the heel end of the shoe, the several members being movable as a unit lengthwise of the shoe and the side members being also movable laterally of the shoe toward and from operative positions, and controlling mechanism constructed to cause the members first to move lengthwise of the shoe to position the end member in operative relation to the shoe and then to cause the side members to move into their operative positions.

34. In a machine for operating on shoes, the combination with a shoe support, and means for operating on a shoe on said support, of shoe-clamping means comprising a member for applying clamping pressure on the heel end face of the shoe and other members for applying clamping pressure on the opposite sides of the heel end of the shoe, the several members being movable as a unit lengthwise of the shoe and the side members being also movable laterally of the shoe toward and from operative positions, spring means for moving the several members to their operative positions, and mechanism for controlling their movements constructed to cause them first to move lengthwise of the shoe to position the end member in operative relation to the shoe and then to cause the side members to move into operative relation to the shoe.

35. In a machine for operating on shoes, the combination with a shoe support, and means for operating on a shoe on said support, of shoe-clamping means comprising a member for applying clamping pressure on the heel and face of the shoe and other members for applying clamping pressure on the opposite sides of the heel end of the shoe, the several members being movable as a unit lengthwise of the shoe and the side members being also movable laterally of the shoe toward and from operative positions, and means for first retracting the side members from the shoe and for then retracting the several members lengthwise of the shoe.

36. In a machine for operating on shoes, the combination with a shoe support, and means for operating on a shoe on said support, of shoe-clamping means comprising a member for applying clamping pressure on the heel end face of the shoe and other members for applying clamping pressure on the opposite sides of the heel end of the shoe, the several members being movable as a unit lengthwise of the shoe and the side members being also movable laterally of the shoe toward and from operative positions, spring means for holding the several members in operative relation to the shoe, a treadle for retracting said members to release the shoe, and connections so constructed as to render the treadle effective first to retract the side members from the shoe and then to retract the several members lengthwise of the shoe.

37. In a machine for lasting the heel ends of shoes, the combination with heel-lasting wipers mounted for advancing movement lengthwise of a shoe and for closing movements laterally of the shoe, of a shoe support movable to present a shoe in position to be operated upon by said wipers, and means carried by said shoe support for clamping the heel end of the shoe on its end and side faces.

38. In a machine for lasting the heel ends of shoes, the combination with heel-lasting wipers mounted for advancing movement lengthwise of a shoe and for closing movements laterally of the shoe, of a shoe support movable to present a shoe in position

to be operated upon by said wipers, and means carried by the shoe support for determining the position of the shoe in relation to the wipers by engagement with the end and side faces of the heel end portion of the shoe.

39. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a movable shoe support, a fixed member for engaging the heel end portion of the sole to determine the heightwise position of the shoe, means for moving the shoe support to press the sole against said member, and means for locking the shoe support against reverse movement heightwise of the shoe.

40. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a member for engaging the heel end portion of the sole to determine the heightwise position of the shoe, a shoe support mounted for movements in directions lengthwise and heightwise of the shoe to position the shoe in relation to said member and to press the sole against the member, means for imparting the different movements to the shoe support, and means for locking the support against reverse movements.

41. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a member for engaging the heel end portion of the sole to determine the heightwise position of the shoe, a shoe support mounted for movements in directions lengthwise and heightwise of the shoe to position the shoe in relation to said member and to press the sole against the member, cam-operated mechanisms arranged respectively to impart the different movements to the shoe support, and devices for locking the support against reverse movements.

42. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a member for engaging the heel end portion of the sole to determine the heightwise position of the shoe, a shoe support mounted for movement lengthwise of the shoe from a shoe-receiving position into position to present the heel end of the shoe under said member and also for movement heightwise of the shoe to press the sole against said member, and automatic means for imparting both said movements to the shoe support.

43. In a machine for lasting the heel ends of shoes, the combination with heel-end lasting means, of a member for engaging the heel end portion of the sole to determine the heightwise position of the shoe, a shoe support mounted for movement lengthwise of the shoe from a shoe-receiving position into position to present the heel end of the shoe under said member and also for movement heightwise of the shoe to press the sole against said member, power-operated mechanisms for imparting both said movements to the shoe support, and devices for locking the support against reverse movements.

44. In a machine for shaping the upper materials about the heel end of a turn shoe in the angle between a shoulder on the sole and the margin of the sole, the combination with a shoe support and heel-embracing wipers, of means for effecting relative movement of said shoe support and wipers heightwise of the shoe to cause the wipers to wipe the upper materials toward the edge of the sole, and means for pressing the wipers yieldingly against the shoe during said relative movement and for thereafter operating them positively to shape the materials against the shoulder of the sole.

45. In a machine for shaping the upper materials about the heel end of a turn shoe in the angle between a shoulder on the sole and the margin of the sole, the combination with a shoe support and heel-embracing wipers, of a member for engaging the heel end of the sole to determine the heightwise position of the shoe in relation to the wipers, and wiper-operating mechanism constructed to press the wipers yieldingly against the shoe and to move them heightwise of the shoe to wipe the upper materials toward the edge of the sole and thereafter to operate them positively to press the materials against the shoulder of the sole.

46. In a lasting machine, the combination with end-lasting wipers mounted for advancing movement lengthwise of a shoe and for closing movements laterally of the shoe, of a train of mechanism for imparting to both the wipers their advancing movement, and other trains of mechanism for imparting respectively to the different wipers their closing movements, each of the several trains of mechanism including a spring for pressing the wiper or wipers yieldingly against the shoe and including also parts arranged to contact with each other as a result of the yield of the spring to force the wiper or wipers thereafter positively against the shoe.

47. In a lasting machine, the combination with end-lasting wipers for performing an upwiping operation on an end portion of an upper and then an overwiping operation to force the upper inwardly against a shoulder on a sole, of a train of mechanism for imparting to both the wipers advancing movement lengthwise of the shoe, and other trains of mechanism for imparting respectively to the different wipers closing movements laterally of the shoe, each of the several trains of mechanism including a spring for forcing the wiper or wipers yieldingly against the shoe in the upwiping operation and in a portion of the overwiping operation and also including parts arranged to contact with each other as a result of the yield of the spring to force the wiper or wipers positively against the

shoe at the end of the over-wiping operation.

48. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of different trains of mechanism for imparting respectively to the different wipers their closing movements, each of said trains of mechanism including a spring for forcing its wiper yieldingly against the shoe and also including parts arranged to contact with each other as a result of the yield of the spring to force the wiper thereafter positively against the shoe.

49. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of different trains of mechanism for imparting respectively to the different wipers their closing movements, each of said trains of mechanism comprising a rack bar connected to the wiper, a spring through which to impart movement yieldingly to said rack bar, and a member arranged to act on the rack bar yieldingly through the spring and then as a result of the yield of the spring to act positively on the rack bar.

50. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of different trains of mechanism for imparting respectively to the different wipers their closing movements, each of said trains of mechanism comprising two slides movable lengthwise of the shoe and a spring for operating one slide by the movement of the other.

51. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of different trains of mechanism for imparting respectively to the different wipers their closing movements, each of said trains of mechanism comprising two slides and a spring for operating one slide by the movement of the other, the slides being arranged to assume a positive operative relation to each other as a result of the yield of the spring in the operation of the wipers on the shoe.

52. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of a wiper carrier movable to carry the wipers lengthwise of the shoe, and different trains of mechanism supported on said wiper carrier for imparting respectively to the different wipers their closing movements, each of said trains of mechanism on the wiper carrier being constructed to force its wiper first yieldingly and then positively against the shoe.

53. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of a wiper carrier movable to carry the wipers lengthwise of the shoe, and different trains of mechanism supported on said wiper carrier for imparting respectively to the different wipers their closing movements, each of said trains of mechanism on the wiper carrier including a spring for forcing the wiper yieldingly against the shoe and also including parts relatively movable into abutting engagement as a result of the yield of the spring to force the wiper thereafter positively against the shoe.

54. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier movable to advance said wipers lengthwise of a shoe in operating on the shoe, means for thus moving said wiper carrier comprising a pair of coaxial members mounted for turning movements about an axis extending laterally of the shoe and operated one by the other, and a connection between said members adjustable to vary their relation to each other and thus to vary the limit of movement of the wiper carrier.

55. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier movable to advance said wipers lengthwise of a shoe in operating on the shoe, means for thus moving said wiper carrier comprising a pair of lever arms mounted to swing about a common axis extending laterally of the shoe and operated one by the other, and rotatable means for varying the relation between said lever arms and for thus varying the limit of movement of the wiper carrier.

56. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier supporting said wipers, a lever arm movable to advance said wiper carrier lengthwise of a shoe in operating on the shoe and on which the wiper carrier is mounted for swinging movements heightwise of the shoe, another lever arm coaxial with said first arm for operating it, and an adjustable connection between said arms for varying their relation to each other and for thus varying the limit of movement of the wiper carrier.

57. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier movable to advance said wipers lengthwise of a shoe in operating on the shoe, means for thus moving said wiper carrier comprising a pair of lever arms mounted to swing about a common axis and operated one by the other, an adjustable connection between said lever arms for varying their relation to each other and for thus varying the limit of movement of the wiper carrier, and operating mechanism connected to one of said lever arms and adjustable to vary the amount of movement imparted to the wiper carrier.

58. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of means for imparting said closing movements to the wipers comprising a pair of coaxial members mounted for turning movements about an axis extending laterally of the shoe and operated one by the other, and a connection between said members adjustable to vary their

relation to each other and thus to vary the positions of the wipers.

59. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of means for imparting said closing movements to the wipers comprising a pair of lever arms mounted to swing about a common axis extending laterally of the shoe and operated one by the other, and rotatable means for varying the relation between said lever arms and for thus varying the positions of the wipers.

60. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of means for imparting said closing movements to the wipers comprising a pair of lever arms mounted to swing about a common axis and operated one by the other, an adjustable connection between said lever arms for varying their relation to each other and for thus varying the positions of the wipers, and operating mechanism connected to one of said lever arms and adjustable to vary the amount of closing movements imparted to the wipers.

61. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of rack bars for imparting respectively to the different wipers their closing movements, a rock-shaft extending laterally of the shoe, gear members on said rock-shaft connected respectively to the different rack bars, and a member loosely mounted on said rock-shaft and connected to the rock-shaft to operate it, the connection between said member and the rock-shaft being adjustable for varying the positions of the wipers.

62. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of a wiper carrier movable to advance said wipers lengthwise of the shoe in operating on the shoe, mechanism supported by said wiper carrier for imparting to the wipers their closing movements comprising parts relatively adjustable to vary the positions of the wipers, a device adjustably connecting said parts, an adjusting member supported independently of the wiper carrier, and means for connecting said device to the adjusting member in all positions of the wiper carrier.

63. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of a wiper carrier movable to advance said wipers lengthwise of the shoe in operating on the shoe, means on the wiper carrier for imparting said closing movements to the wipers comprising a pair of coaxial members mounted for turning movements and operated one by the other, a device connecting said members and rotatable to vary their relation to each other and thus to vary the positions of the wipers, a rotatable adjusting member supported independently of the wiper carrier, and means for connecting said device to the adjusting member in all positions of the wiper carrier.

64. In a lasting machine, the combination with end-lasting wipers mounted for closing movements laterally of a shoe, of a wiper carrier movable to advance said wipers lengthwise of the shoe in operating on the shoe, rack bars on said wiper carrier for imparting respectively to the different wipers their closing movements, a rock-shaft mounted on the wiper carrier and extending laterally of the shoe, gear members on said rock-shaft connected respectively to the different rack bars, a member loosely mounted on said rock-shaft for operating it, a device adjustably connecting said member to the rock-shaft for varying the positions of the wipers, an adjusting member mounted on the frame of the machine, and means for connecting said device to the adjusting member in all positions of the wiper carrier.

65. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier movable to advance said wipers lengthwise of a shoe in operating on the shoe, rack bars on said wiper carrier for imparting respectively to the different wipers closing movements laterally of the shoe, gear members on the wiper carrier connected respectively to the different rack bars to operate them, and mechanism operatively independent of the movement of the wiper carrier lengthwise of the shoe for operating said gear members.

66. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier movable to advance said wipers lengthwise of a shoe in operating on the shoe, rack bars on said wiper carrier for imparting respectively to the different wipers closing movements laterally of the shoe, a rock-shaft mounted on the wiper carrier and extending laterally of the shoe, gear members on said rock-shaft connected respectively to the different rack bars to operate them, and mechanism operatively independent of the movement of the wiper carrier lengthwise of the shoe for operating said rock-shaft.

67. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier for supporting said wipers, a lever arm on which said wiper carrier is mounted for swinging movements heightwise of a shoe, said lever arm being movable to advance the wiper carrier and the wipers lengthwise of the shoe in operating on the shoe, a device mounted on said wiper carrier for movement about an axis extending laterally of the shoe to impart closing movements to the wipers, an operating member supported independently of the wiper carrier, and means for maintaining an operating connection between said device and the operating member in all positions of the wiper carrier.

68. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier for supporting said wipers, a lever arm on which said wiper carrier is mounted for swinging movements heightwise of a shoe, said lever arm being movable to advance the wiper carrier and the wipers lengthwise of the shoe in operating on the shoe, rack bars on the wiper carrier for imparting to the wipers closing movements laterally of the shoe, a rock-shaft on the wiper carrier extending laterally of the shoe, gear members on said rock-shaft connected to the rack bars, an operating member supported independently of the wiper carrier, and means for maintaining an operating connection between said operating member and the rock-shaft in all positions of the wiper carrier.

69. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier supporting said wipers and mounted for bodily movement lengthwise of a shoe and for swinging movement heightwise of the shoe in operating on the shoe, mechanism on the wiper carrier for imparting to the wipers closing movements laterally of the shoe, an operating member supported independently of the wiper carrier, and power-transmitting means leading from said operating member to the wiper-closing mechanism and connected to said mechanism at that side of the fulcrum of the wiper carrier where the wipers are located.

70. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier supporting said wipers and mounted for bodily movement lengthwise of a shoe and for swinging movement heightwise of the shoe in operating on the shoe, wiper-closing mechanism comprising a lever arm supported on the wiper carrier at that side of the fulcrum of the carrier where the wipers are located, an operating cam, and power-transmitting means leading from the cam to said lever arm.

71. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier movable to advance said wipers lengthwise of a shoe in operating on the shoe, mechanism including a lever arm on said wiper carrier for imparting to the wipers closing movements laterally of the shoe, another lever arm supported independently of the wiper carrier, and a link connecting said lever arms and movable lengthwise to transmit movement from one arm to the other, said link being arranged to swing idly in response to the movement of the wiper carrier lengthwise of the shoe.

72. In a lasting machine, the combination with end-lasting wipers, of a wiper carrier movable to advance said wipers lengthwise of a shoe in operating on the shoe, rack bars on said wiper carrier for imparting respectively to the different wipers closing movements laterally of the shoe, a rock-shaft mounted on the wiper carrier and extending laterally of the shoe, gear members on said rock-shaft connected respectively to the different rack bars to operate them, an operating member supported independently of the wiper carrier, and means comprising a link connecting said operating member to the rock-shaft and movable lengthwise to operate the rock-shaft, said link being arranged to swing idly in response to the movement of the wiper carrier lengthwise of the shoe.

In testimony whereof we have signed our names to this specification.

ARTHUR F. PYM.
WILLIAM E. SCARLETT.