April 6, 1937. B. JORGENSEN 2,075,852

LASTING MACHINE

Filed May 17, 1935 8 Sheets-Sheet 1

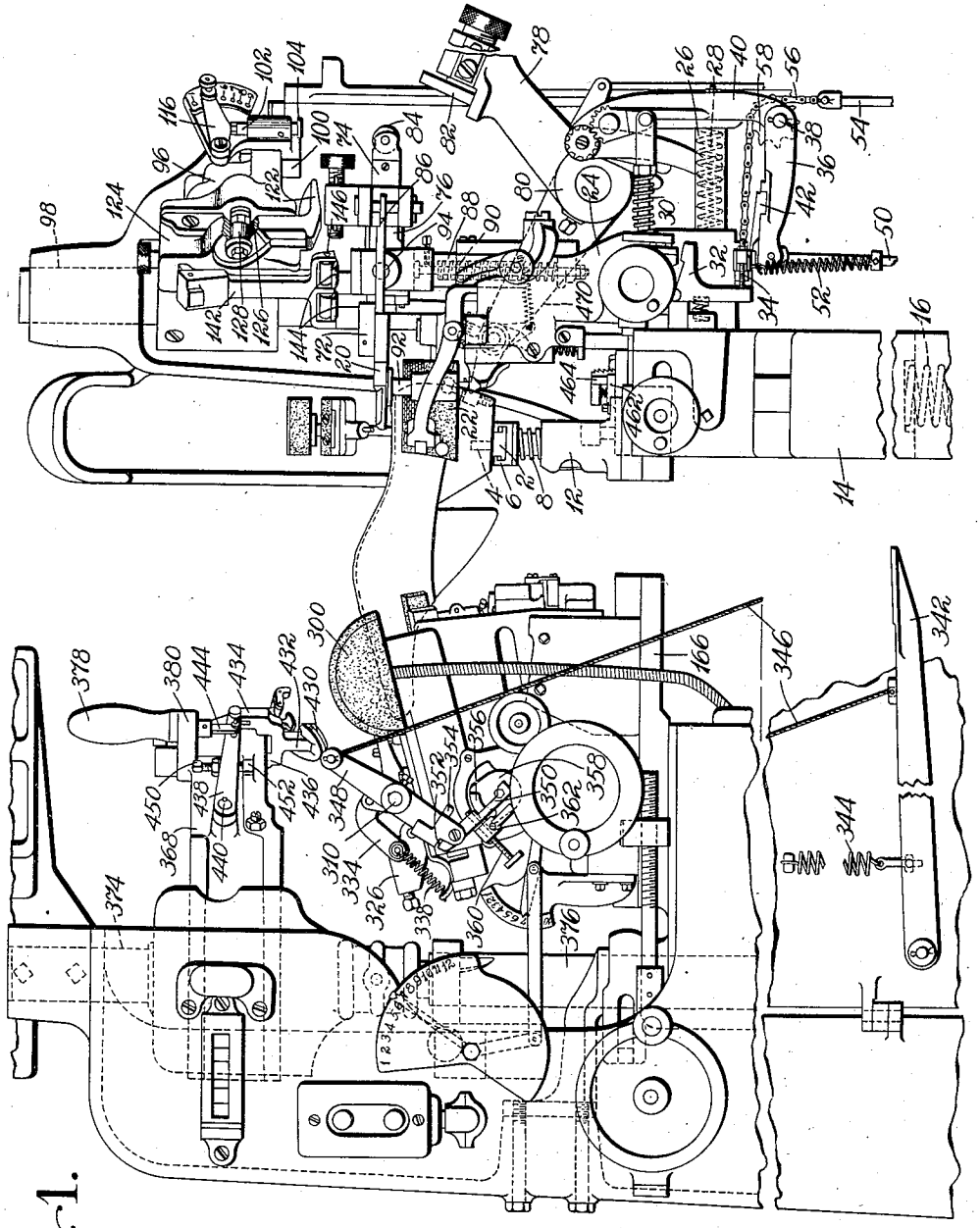


Fig. 1.

INVENTOR
Bernhardt Jorgensen
By his attorney
Victor Cobb

April 6, 1937. B. JORGENSEN 2,075,852

LASTING MACHINE

Filed May 17, 1935 8 Sheets-Sheet 2

Fig. 2.

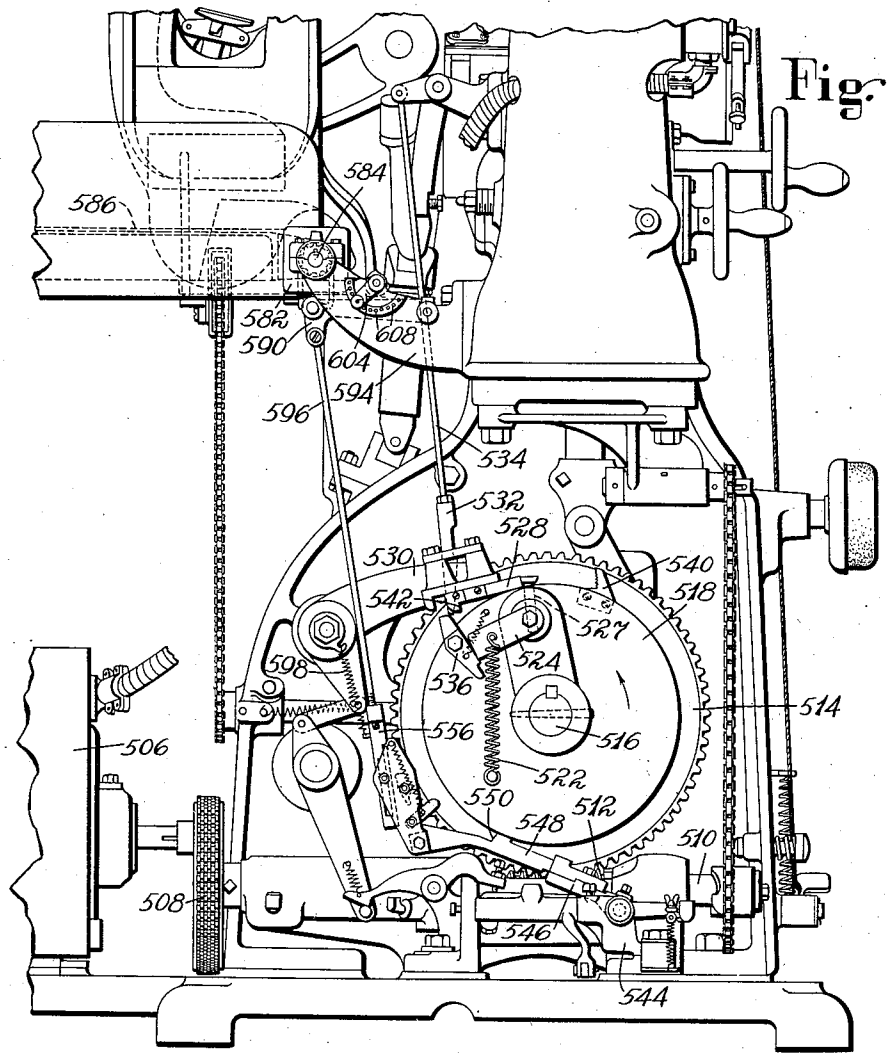
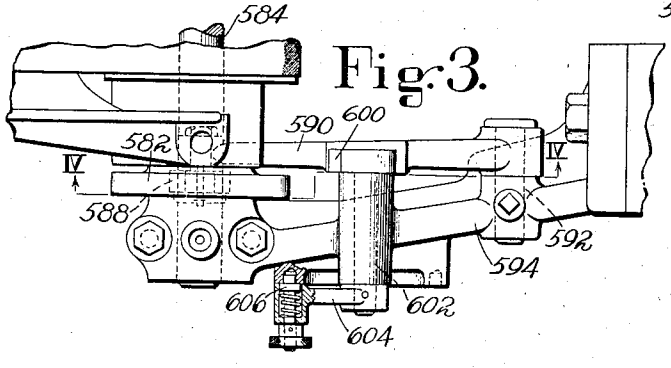



Fig. 3.



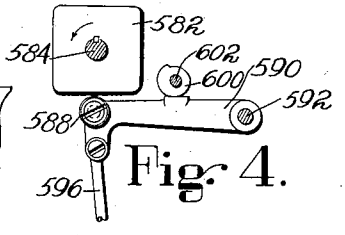




Fig. 4.

INVENTOR
Bernhardt Jorgensen
By his attorney
Victor Cobb

April 6, 1937. B. JORGENSEN 2,075,852

LASTING MACHINE

Filed May 17, 1935 8 Sheets-Sheet 3

Fig. 5.

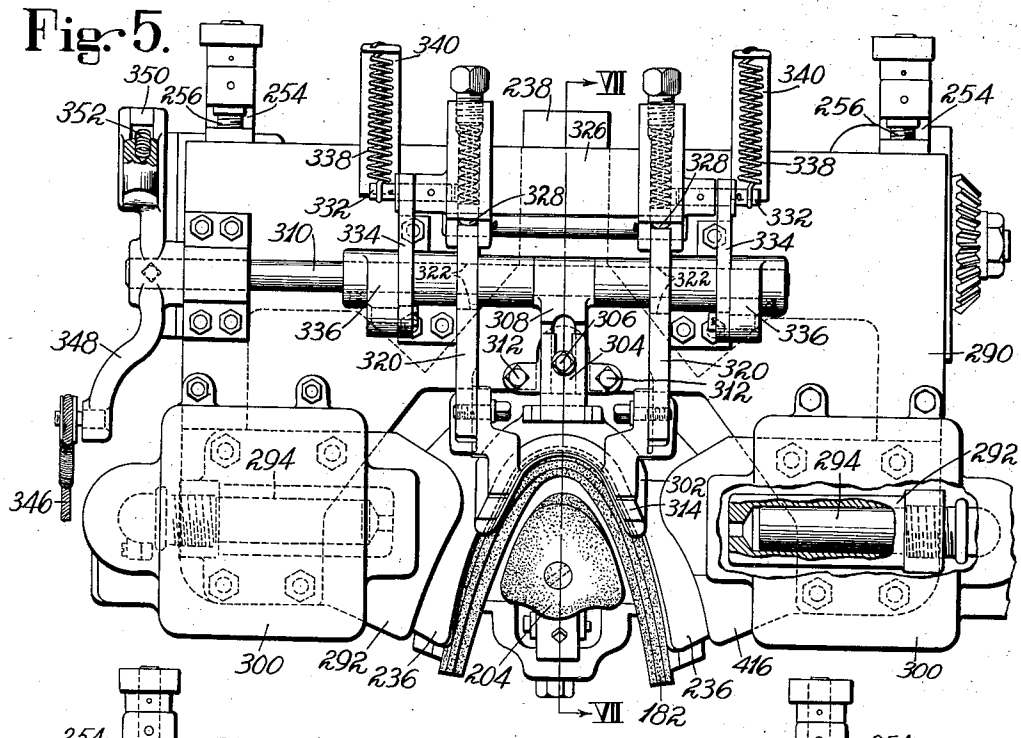
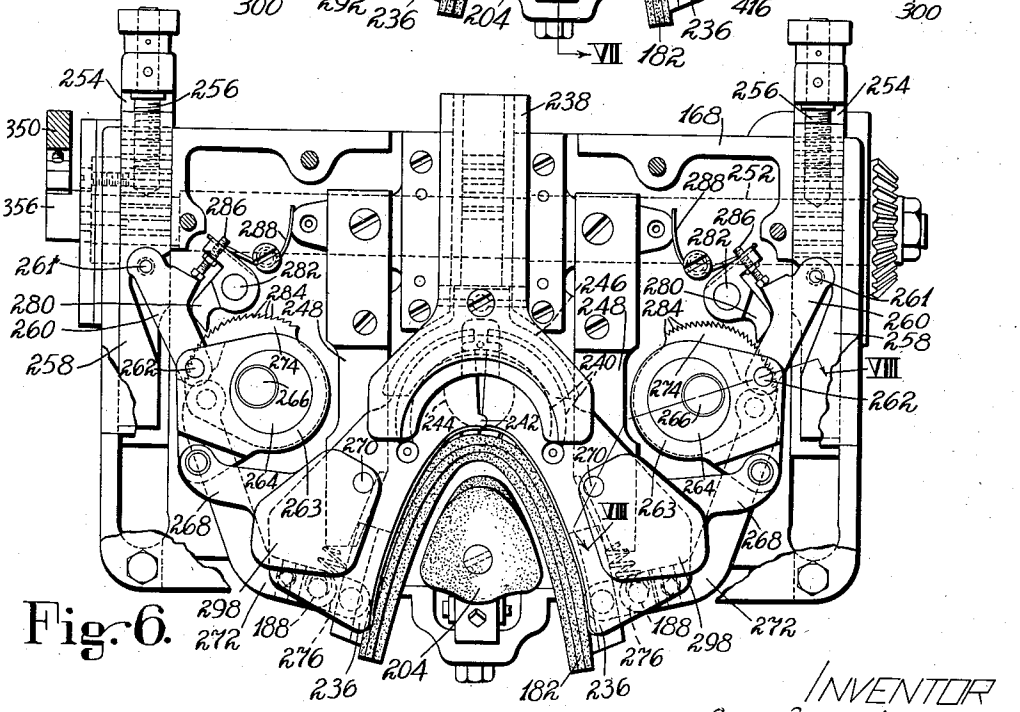



Fig. 6.




INVENTOR

Bernhardt Jorgensen

By his attorney

Victor Cobb

April 6, 1937. B. JORGENSEN 2,075,852

LASTING MACHINE

Filed May 17, 1935 8 Sheets-Sheet 4

Fig. 7.

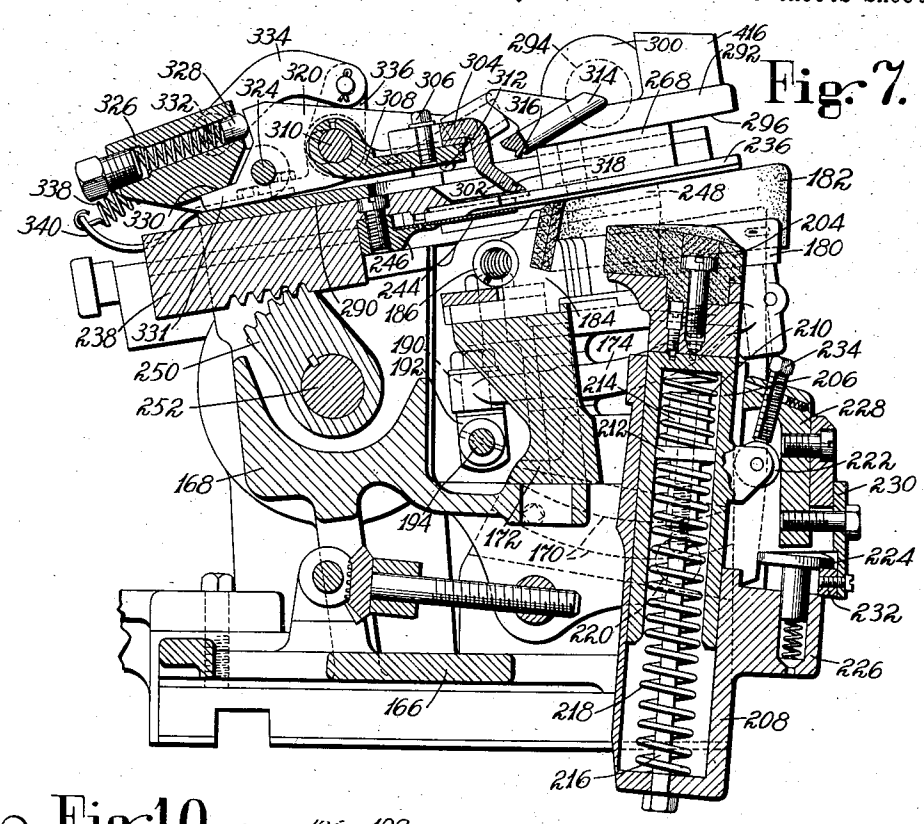



Fig. 10.

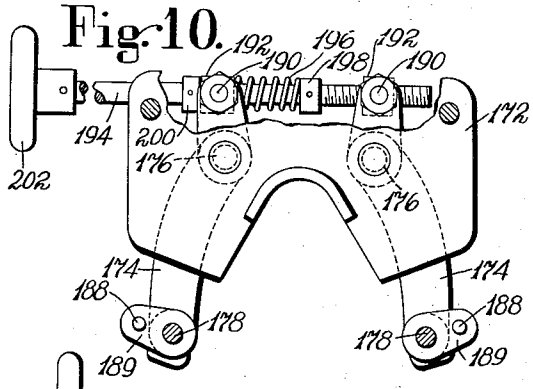



Fig. 8.

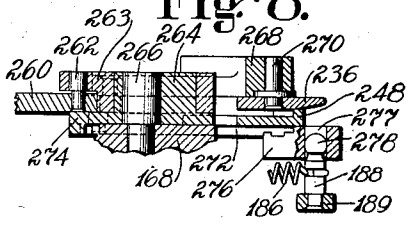
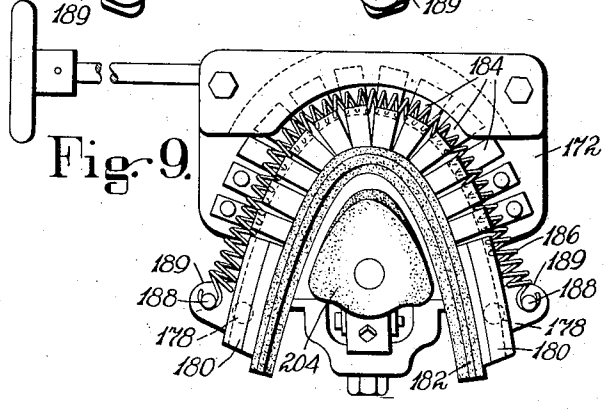



Fig. 9.




INVENTOR
Bernhardt Jorgensen
By his attorney
Victor Cobb

April 6, 1937. B. JORGENSEN 2,075,852

LASTING MACHINE

Filed May 17, 1935 8 Sheets-Sheet 5

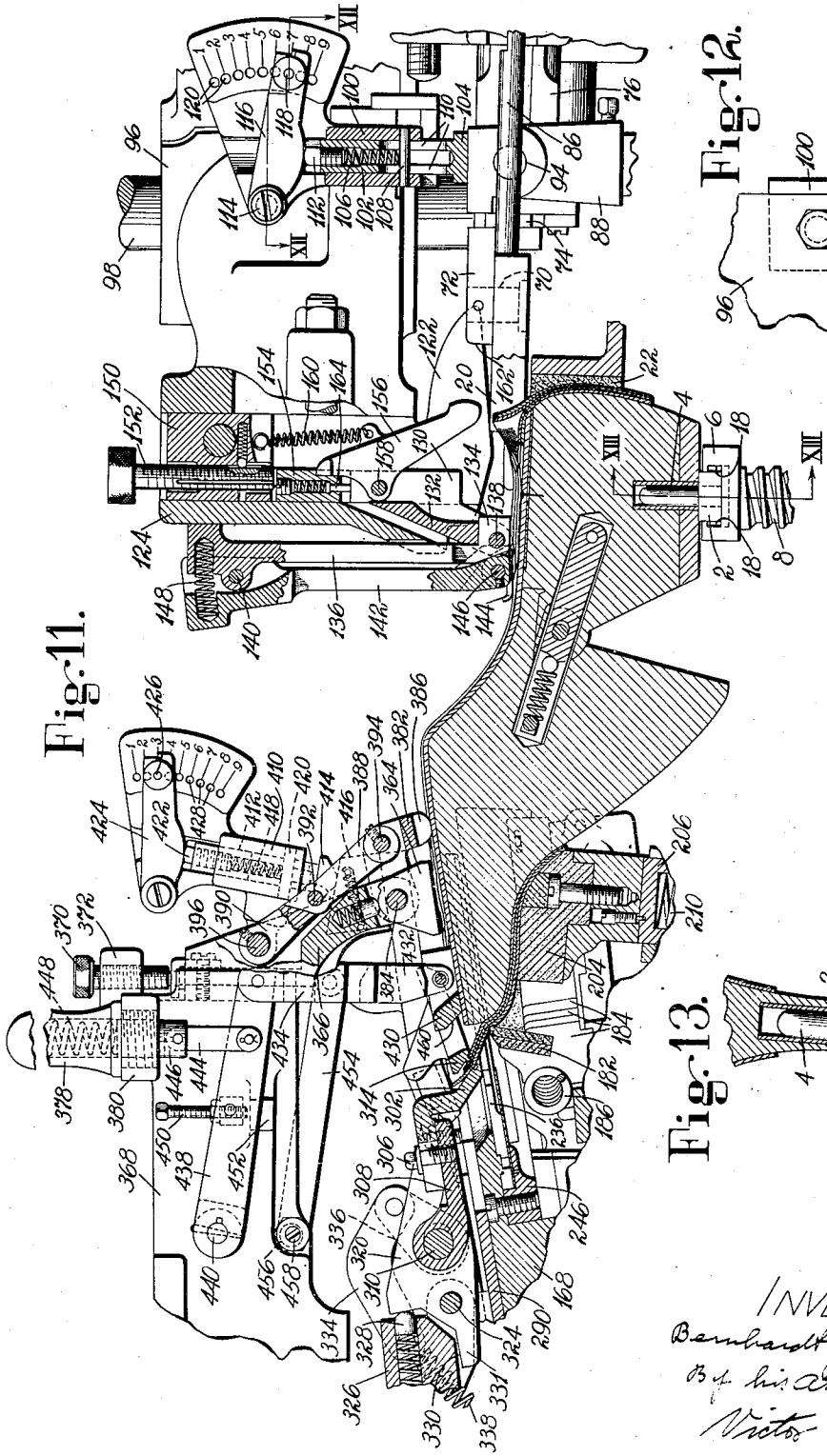


Fig. 11.

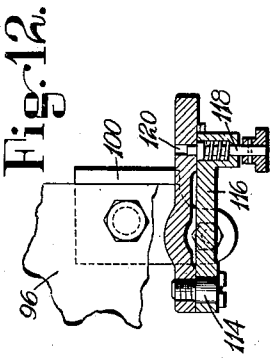


Fig. 12.



Fig. 13.

INVENTOR
Bernhardt Jorgensen
By his attorney
Victor Cobb.

April 6, 1937. B. JORGENSEN 2,075,852

LASTING MACHINE

Filed May 17, 1935 8 Sheets-Sheet 6

Fig. 14.

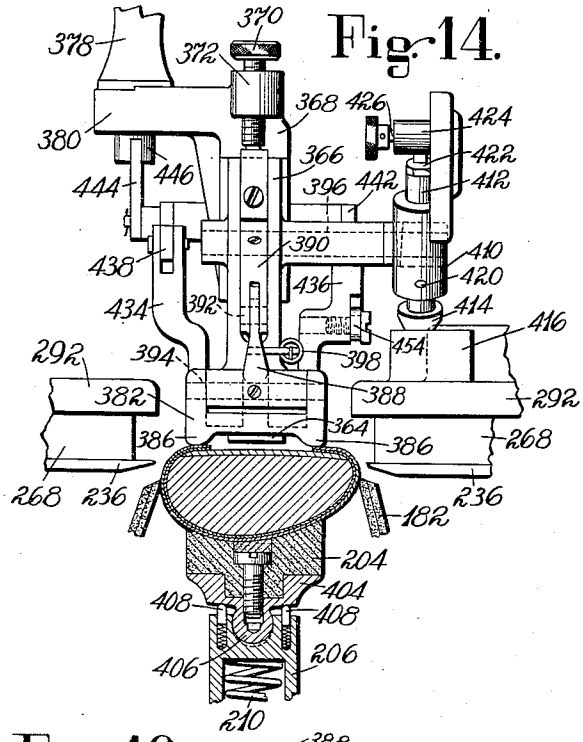



Fig. 15.

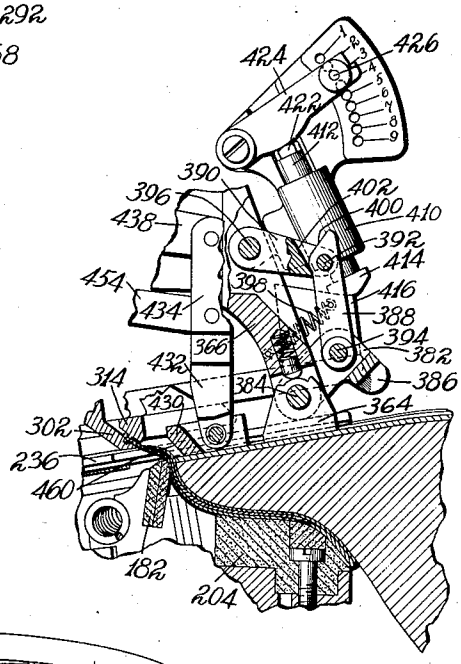



Fig. 16.

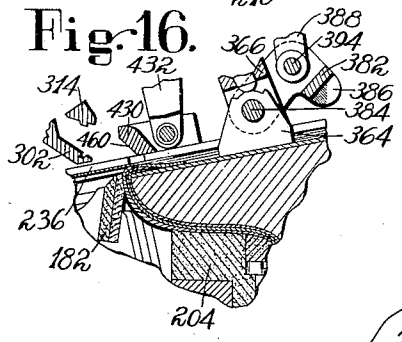
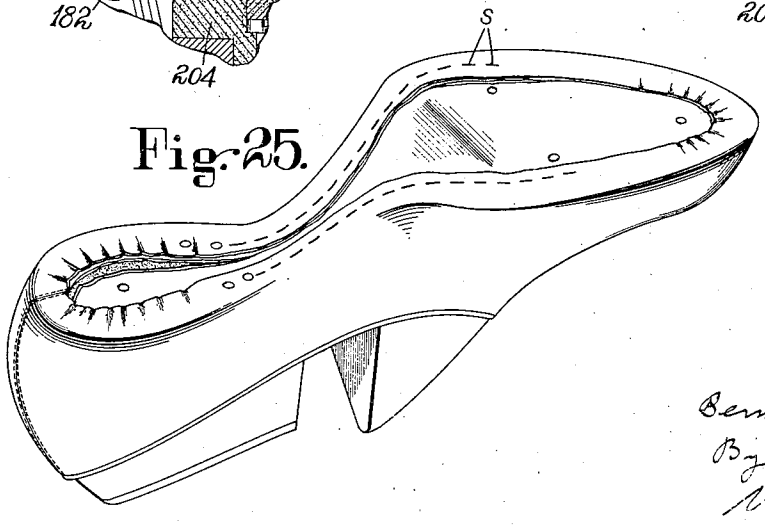



Fig. 25.




INVENTOR
Bernhardt Jorgensen
By his attorney
Victor Cobb.

April 6, 1937. B. JORGENSEN 2,075,852

LASTING MACHINE

Filed May 17, 1935 8 Sheets-Sheet 7

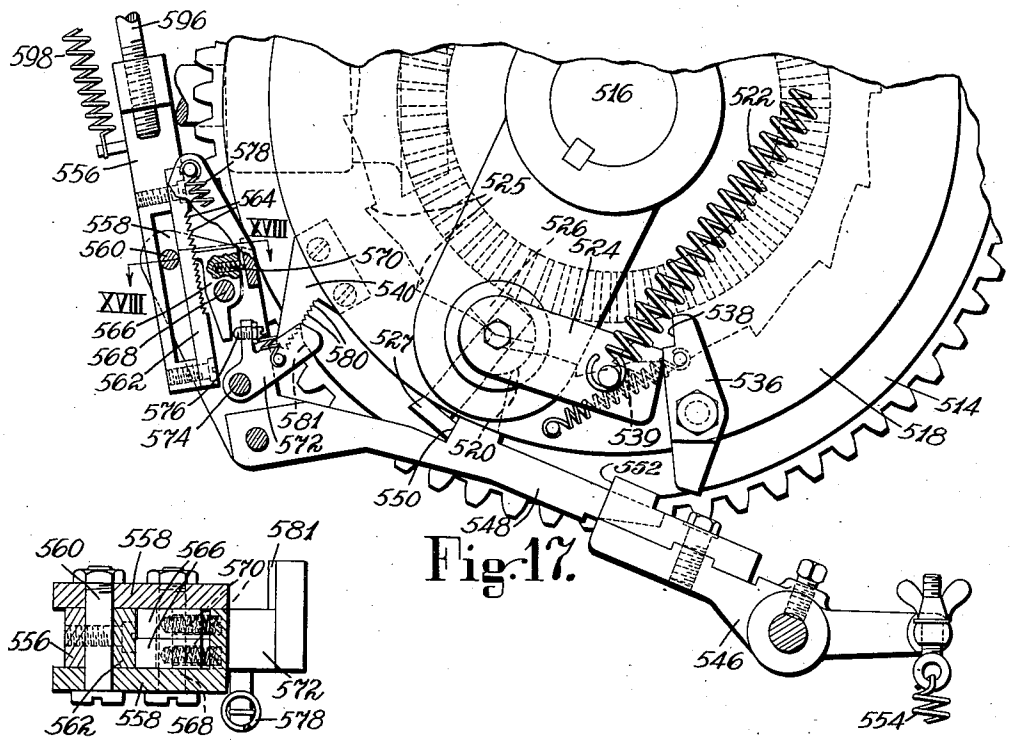



Fig. 17.




Fig. 18.

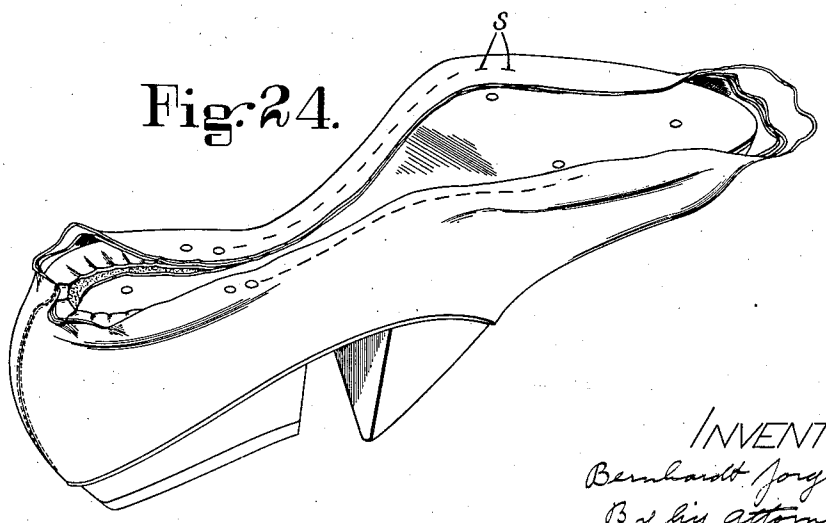



Fig. 24.

INVENTOR
Bernhardt Jorgensen
By his attorney
Victor Cobb

April 6, 1937. B. JORGENSEN 2,075,852

LASTING MACHINE

Filed May 17, 1935 8 Sheets-Sheet 8

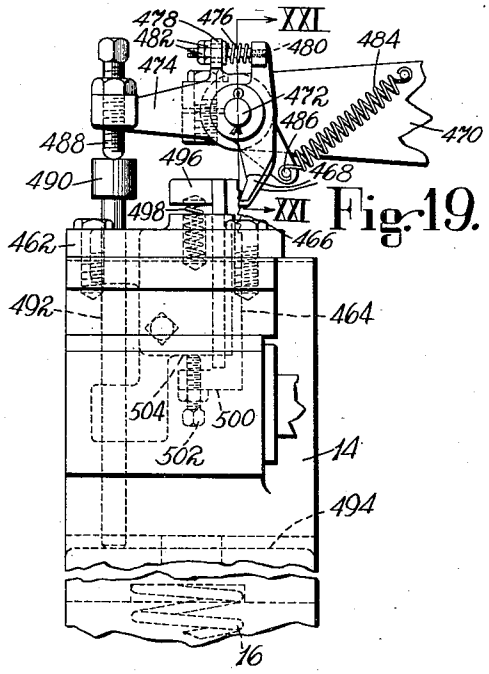



Fig. 19.

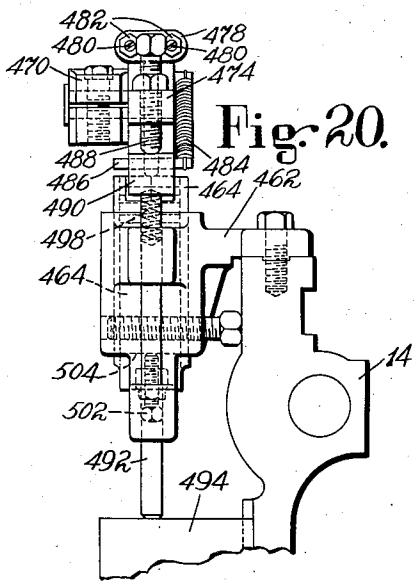



Fig. 20.

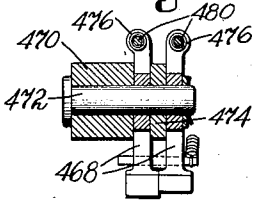



Fig. 21.

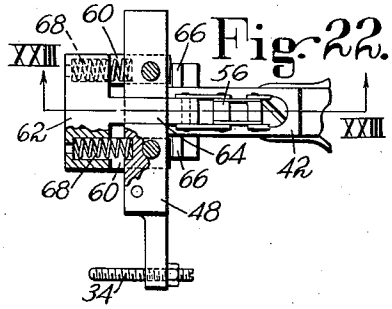



Fig. 22.

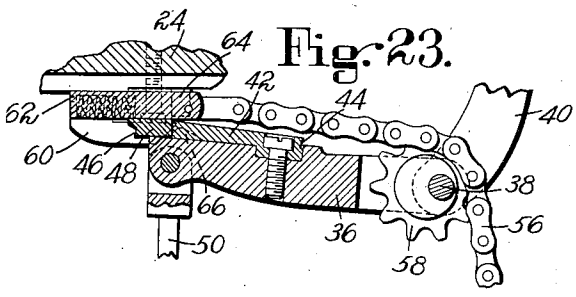



Fig. 23.

INVENTOR
Bernhardt Jorgensen
By his attorney
Victor Cobb.

Patented Apr. 6, 1937 2,075,852

# UNITED STATES PATENT OFFICE

2,075,852

## LASTING MACHINE

Bernhardt Jorgensen, Marblehead, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

Application May 17, 1935, Serial No. 22,053

60 Claims. (Cl. 12—12)

This invention relates to lasting machines, and is herein illustrated as applied to a machine organization of the same general character as disclosed in United States Letters Patent No. 1,843,232, granted on February 2, 1932 upon an application of mine, but modified in certain respects as further disclosed in Letters Patent No. 1,979,269, granted also upon an application of mine on November 6, 1934, and in Letters Patent No. 2,026,539, granted on January 7, 1936 upon still another application of mine. The present invention has particularly in view further improvements in an organization of that character; but it is to be understood that in various aspects the invention is not limited to machines of the illustrated type.

In general similarity to prior machines, the machine herein shown is provided with wipers for wiping the margin of the toe end of an upper inwardly over an insole on a last, and with a device for clamping the upper about the toe and for also wiping it heightwise of the last, the clamping device being so controlled as to permit it to adjust itself to the lateral "swing" of the forepart of a right or a left last. In accordance with the present invention there is further provided novel means whereby the toe wipers are differently adjusted for right and left lasts under control of the clamping device, thus affording better insurance that in operating on shoes in which there are pronounced differences between rights and lefts the wipers will be so positioned as to wipe the margin of the upper inwardly the proper distances from the opposite side edges of the insole. For the purpose in view, the construction herein shown includes eccentric members arranged to control portions of the wiper-closing mechanisms and adjustable by the clamping device to effect a corresponding adjustment of the wipers. To insure against any such action of the wiper-closing mechanisms on the eccentric members as to relax the pressure of the clamping device on the shoe when the wipers are operated, there is further provided means for locking the clamping device against movement in directions away from the sides of the toe after the adjustment of the wipers.

In a further aspect, the invention provides novel means for determining the position of each shoe with respect to lateral tipping movement, to insure that the bottom of the shoe will extend laterally in proper relation to the plane of end wipers, herein shown as the toe wipers. As herein illustrated, this means comprises a device movable into engagement with the opposite side portions of the forepart of the shoe bottom in the path of the wipers to tip the shoe laterally into proper relation to the wipers if it is not already in that relation, together with mechanism for thereafter withdrawing the device from operative position to make way for the wipers. More particularly, in the construction shown the shoe-positioning device is supported on a movable carrier provided with a presser foot for engaging the shoe and moving it heightwise as heretofore, and is arranged to engage and position the shoe before the presser foot engages it, after which control of the shoe is transferred from the positioning device to the presser foot in response to further movement of the carrier.

Machines of the illustrated type include heel wipers mounted for tipping movements about an axis extending lengthwise of the shoe, and a device controlled by engagement with the bottom of the heel end of the shoe for tipping them as determined by the shoe into proper relation to the shoe bottom. To insure greater accuracy in such positioning of the wipers, this device in the construction herein shown is provided with presser feet arranged to engage the opposite side portions of the heel end of the shoe bottom in the path of the wipers, the presser feet being movable lengthwise of the shoe by the action of the wipers thereon to make way for the wipers.

To assist in properly shaping the upper over the toe end of the last, the invention further provides novel means for clamping the margin of the toe end of the upper to apply a pull to the upper in the power operation of the machine. As illustrated this clamping means comprises a clamp member movable by the operator into position to clamp the margin of the upper outspread in a location over the toe wipers prior to the starting of the power operation of the machine, thus enabling the operator to insure that the upper is properly positioned and clamped before the machine begins its power movements. Novel means also are provided for locking the clamp member in clamping position and for thereafter releasing it, and also novel means for moving it from an initial retracted position into clamping relation to the upper.

In the machine herein shown the toe wipers are maintained in a heated condition to render them more effective in pressing the margin of the upper free from wrinkles and also to accelerate by the heat the drying or hardening of adhesive used to secure the upper to the insole. To increase further the effectiveness of the machine in these respects, the invention provides means for bringing the machine automatically to a stop at a time in the cycle when the toe wipers are pressing the upper upon the insole and for starting it again automatically after a predetermined interval, the construction shown being such that the time during which the machine thus remains at rest is adjustably variable.

The above and other features of the invention, including also novel wiper-heating means, novel

means for insuring against any objectionable lengthwise tipping movement of the shoe relatively to the toe wipers by mechanism controlling the heel end of the shoe, novel mechanism for locking and unlocking movable heel-end clamping means with which the machine is provided, 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 in front elevation showing mainly the upper portion of a machine in which the features of the invention are embodied, with the parts in the positions which they occupy after the heel-end clamping means has been moved into engagement with the shoe but before the starting of the power operation of the machine;

Fig. 2 shows mainly the lower portion of the machine in left-hand end elevation;

Fig. 3 is a plan view on an enlarged scale of a portion of the structure shown in Fig. 2;

Fig. 4 is a section on the line IV—IV of Fig. 3, on a smaller scale;

Fig. 5 is mainly a plan view of the toe-lasting mechanism, showing the means for clamping the margin of the toe end of the upper in its clamping position;

Fig. 6 is a plan view of the parts of the toe-lasting mechanism as they appear with a portion of the structure shown in Fig. 5 removed;

Fig. 7 is a section on the line VII—VII of Fig. 5;

Fig. 8 is a section on the line VIII—VIII of Fig. 6;

Fig. 9 is a plan view showing the means for clamping the upper about the toe end of the last and for wiping it heightwise of the last;

Fig. 10 is a plan view of parts of the toe-end clamping means as they appear with a portion of the structure shown in Fig. 9 broken away;

Fig. 11 is a view partly in front elevation and partly in vertical section showing portions of the machine which are closely associated with the shoe;

Fig. 12 is a section on the line XII—XII of Fig. 11;

Fig. 13 is a section on the line XIII—XIII of Fig. 11;

Fig. 14 is a view mainly in elevation showing a portion of the shoe-positioning means as viewed from the right in Fig. 11, with the parts in the same positions as in Fig. 11;

Fig. 15 is a sectional view similar to a portion of Fig. 11, but showing the parts as they appear at a later stage in the toe-lasting operation;

Fig. 16 is a view similar to a portion of Fig. 15, but showing the parts as they appear at a still later stage;

Fig. 17 is a view mainly in end elevation, on an enlarged scale, of parts which appear at the lower portion of Fig. 2, with the parts differently positioned;

Fig. 18 is a section on the line XVIII—XVIII of Fig. 17;

Fig. 19 is a view in front elevation, on an enlarged scale, of a portion of the structure shown in Fig. 1, with parts in front thereof removed, the parts shown being differently positioned than in Fig. 1;

Fig. 20 shows the same structure as Fig. 19, as viewed from the left of that figure;

Fig. 21 is a section on the line XXI—XXI of Fig. 19;

Fig. 22 is mainly a plan view, on an enlarged scale, of a portion of the mechanism shown in Fig. 1 for controlling the heel-end clamping means;

Fig. 23 is mainly a sectional view on an enlarged scale on the line XXIII—XXIII of Fig. 22;

Fig. 24 is a perspective view of a shoe as it appears before it is presented to the machine; and

Fig. 25 shows the shoe as it appears after its removal from the machine.

In view of the disclosures in the above-mentioned Letters Patent, only such portions of the complete machine as it is necessary to refer to for an understanding of the novel features of this invention are herein shown, and such parts as are common to the prior disclosures, as well as the manner of their operation, will be only briefly hereinafter described. The machine herein shown is intended for use only in lasting the opposite end portions of a shoe, the side-lasting mechanisms included heretofore in machines of the illustrated type being omitted, although it is to be understood that the novel features of the invention are applicable to machines which include such side-lasting mechanisms.

For supporting and positioning the last and shoe at the heel end there is provided a block **2** having thereon a heel pin or spindle **4** which enters the spindle hole in the last, the block **2** being supported on the head **6** of a vertical rod **8** which is screw-threaded for upward or downward adjustment in a holder **12**. The holder **12** is supported on a vertically movable slide **14** which is depressible with the shoe against the resistance of a spring **16** in response to pressure applied on the bottom of the shoe. The block **2** is freely movable, as heretofore, along guideways **18** in the head **6** (Figs. 11 and 13) which are curved about an axis located at or near the bottom of the heel end of the shoe, so that the shoe may be tipped laterally to position the bottom of its forepart in proper relation to the toe wipers without any substantial bodily lateral displacement of the heel end of the shoe. In the construction herein shown, however, the means provided heretofore for limiting such tipping movement of the shoe by contact with a side face of the heel end of the last and for thereby determining the position of the shoe is omitted, the position of the shoe being determined by other means hereinafter described.

To last the heel end of the shoe there are provided heel wipers **20** (Figs. 1 and 11) for wiping the margin of the upper inwardly over the insole and a heel band **22** for clamping the upper around the heel end of the last. The wipers and the heel band are carried as heretofore by a slide **24** guided for movements lengthwise of the shoe on a pair of horizontal rods **26**, only one of which is shown in the drawings, which are mounted on the vertically movable slide **14**. The slide **24** is maintained initially in an idle position comparatively remote from the shoe support by latch mechanism constructed somewhat differently than heretofore, as hereinafter described, this mechanism being movable by the operator to release the slide to the action of a spring **28** which then moves the slide toward the shoe support to a fixed position relatively to the vertical slide **14**. As fully disclosed in the previously mentioned Letters Patent No. 2,026,539, the holder **12** which supports the heel end of the last and shoe is movable in directions lengthwise of the shoe along guideways on the slide **14** and is moved toward the right (Fig. 1) by a spring **30** when the slide **24** has arrived substantially at the end of its movement toward the shoe support.

The spring 30 is released by a latch 32 operated by a screw 34 carried by the slide 24, all as fully disclosed in the above-mentioned Letters Patent. The shoe is thus carried by the holder 12 into contact with the heel band 22 which determines the lengthwise position of the shoe.

The above-mentioned latch mechanism comprises a lever 36 pivotally mounted on a rod 38 supported by a bracket 40 which is fast on the rods 26, this lever in the construction herein shown having fast thereon a plate 42 (Fig. 23) provided with a shoulder 44 arranged to engage a shoulder 46 on a bar 48 secured to the lower end of the slide 24. It will be understood that when the shoulder 44 is thus in engagement with the shoulder 46 the slide 24 is held in retracted position against the resistance of the spring 28. The slide 24 is released as heretofore, prior to the starting of the power operation of the machine, by downward movement of the lever 36 effected by the operator through a rod 50 against the resistance of a spring 52 (Fig. 1), and the slide is returned to its idle position near the end of the cycle of operations of the machine by downward movement of a rod 54 (Fig. 1) connected by a chain 56 to the above-mentioned bar 48. This chain engages a sprocket wheel 58 mounted to turn on the above-mentioned rod 38, the sprocket wheel in the construction herein shown being eccentrically mounted on the rod and so arranged that the portions thereof which are farthest from its axis are effective on the chain as the retractive movement is imparted to the slide 24. This reduces the amount of power required to retract the slide without the inconvenience of providing an unduly large sprocket wheel.

The construction herein shown is such that the slide 24 is positively locked during the operation of the machine on the shoe against any retractive movement such as might result from pressure of the shoe on the heel band 22. For this purpose the left-hand end of the plate 42 is arranged to engage the right-hand face of the bar 48, as illustrated in Fig. 23. In order to release the slide 24 to permit it to be retracted by the chain 56 there is provided means for swinging the lever 36 downwardly far enough to withdraw the plate 42 from contact with the right-hand face of the bar 48. This means comprises downwardly extending cam members 60 (Figs. 22 and 23) formed on a member 62 which has an arm 64 slidingly movable in a guideway in the bar 48 and to which the chain 56 is directly connected, these cam members being arranged to act on lugs 66 formed on lateral extensions of the plate 42. Springs 68 mounted in sockets in the member 62 and engaging the bar 48 hold the member 62 in such a position relatively to the bar that the cam members 60 are at the left of the lugs 66 when the slide 24 is locked in its operating position by the plate 42, the chain 56 being slack enough to permit this. When the chain is operated to retract the slide 24 to its idle position the first effect of the chain is to move the member 62 to the right against the resistance of the springs 68, thus rendering the cam members 60 effective on the lugs 66 to force the lever 36 far enough downward to release the bar 48. Thereafter the slide 24 is retracted by the continued movement of the chain.

The heel-lasting wipers 20, as disclosed in the abovementioned Letters Patent No. 2,026,539, are mounted for swinging or closing movements on a stud 70 (Fig. 11) carried by the head 72 of a plunger 74 which serves as a wiper carrier and is mounted for lengthwise movements and also for turning movements in a holder 76 supported as hereinafter described. The wipers are advanced lengthwise of the shoe by forward movement of the plunger 74 effected by an arm 78 (Fig. 1) of a bell-crank lever 80, this arm being provided with a plate 82 for engaging a roll 84 on the end of the plunger. As the wipers are thus advanced they are closed through the action of links 86, only one of which is herein shown, as more fully disclosed in Letters Patent No. 1,979,269. The wipers are supported initially, as heretofore, in a position higher than when operating on a shoe, and prior to their operation on the shoe they are depressed to a position determined by the height of the bottom of the heel end of the shoe. As they are depressed they may also be tipped lengthwise and laterally to position them so that their wiping faces will extend in substantially parallel relation to the plane of the heel seat, their lateral tipping movement being permitted by the turning of the plunger 74 in the holder 76. For supporting the wipers as above described, the holder 76 is mounted on a plunger 88 which is movable vertically in a recess in the slide 24 and is depressible against the resistance of a spring 90, the wipers being further supported by yieldingly depressible plungers 92, only one of which is herein shown, mounted in the means which supports the heel band 22 and engaging the lower faces of the wipers. The holder 76 is supported on the plunger 88 by trunnions 94 which permit the tipping of the holder and the wipers about an axis extending laterally of the shoe so that the wipers will extend lengthwise of the shoe in parallel relation to the heel seat.

The wipers are depressed and are properly positioned as above described by the operation of a carrier 96 fast on a rod 98 mounted for vertical movements and for turning movements in the frame of the machine. This carrier is swung from an initial idle position (Fig. 1) into position to bring parts thereon over the heel end of the shoe, and is then moved downwardly to depress and position the heel wipers and thereafter also to depress the last and shoe together with these wipers relatively to toe-lasting means hereinafter described. For depressing and positioning the wipers the carrier 96 is provided with means which acts directly on the plunger 88 and with other means which acts directly on the two wipers themselves in locations over the plungers 92. The means which acts on the plunger 88 differs in construction from the means provided heretofore for this purpose, the construction herein shown being more readily and quickly adjustable to vary the amount of downward movement imparted to the plunger. Secured to the carrier 96 is a bracket 100 in which is mounted a tubular member 102 having a head 104 on its lower end for engaging the top of the plunger 88. Confined in the member 102 is a spring 106 the lower end of which engages a pin 108 fast in the bracket 100 and extending through slots 110 in the member 102. At its upper end the spring 106 abuts against a screw 112 which is threaded in the member 102. Pivotally mounted on a stud 114 on the bracket 100 is an arm 116 arranged to bear on the top of the screw 112 and thus to determine the height to which the tubular member 102 is raised by the spring 106. The arm 116 carries a spring-pressed pin 118 (Fig. 12) arranged to enter one or another of a plurality of holes 120 in the bracket 100 to hold the arm 116 in ad-

justed position. As shown in Fig. 11, the holes 120 are designated by numerals on the bracket 100 to assist the operator in determining the proper adjustment of the arm 116, these numerals having no particular significance with reference to shoe characteristics. The operator sets the arm 116 in a position which may be determined by trial in beginning the use of the machine on shoes of a particular style or character, the object being to depress the plunger 88 to such a position, relatively to the means on the carrier 96 which acts directly on the top of the wipers themselves, that the wipers will extend lengthwise of the shoe in directions substantially parallel to the heel seat.

The above-mentioned means on the carrier 96 for controlling the wipers 20 by contact therewith over the plungers 92 comprises, as heretofore, two arms 122, one of which is shown in Fig. 1 and the other in Fig. 11, these arms being part of a holder 124 which is mounted on the carrier 96 for rocking or tipping movements laterally of the shoe. As more fully disclosed in Letters Patent No. 1,979,269, provision for such tipping of the holder 124 is afforded by a pair of curved slots in the holder in which lie rolls supported on the carrier 96, one of these slots and the cooperating roll being shown respectively at 126 and 128 in Fig. 1. It will thus be understood that the direction in which the wipers 20 extend laterally of the shoe is determined by the arms 122 in contact therewith and depends upon the position of the holder 124. The position of the holder is determined, as heretofore, by means controlled by the shoe itself, this means also determining by contact with the shoe the position to which the wipers are depressed relatively to the heel seat. The present invention, however, provides for this purpose a construction different from that used heretofore, an object being to facilitate the control of the holder 124 by the shoe and to insure greater accuracy in the positioning of the wipers. As shown in Fig. 11, there is mounted for vertical movement in the holder 124 a slide 130 in the same location as a corresponding slide shown in Letters Patent No. 1,979,269 but differing therefrom in construction. The slide 130 in the construction herein shown has an inclined downwardly extending arm 132 in the lower end of which there is a slot to receive a lug 134 projecting laterally from the lower end of a bar 136 which extends upwardly adjacent to the holder 124 with its upper end portion in contact with the holder, the lug 134 being secured to the arm 132 by a pin 138. Pivotally mounted on a pin 140 in the upper end portion of the bar 136 is a downwardly extending arm 142 which carries at its lower end two presser feet 144 (Fig. 1) mounted for turning movements about a pin 146 extending laterally of the shoe. The two presser feet 144 are arranged respectively to engage the opposite side portions of the bottom of the shoe in locations substantially at the forward end of the heel seat, their shoe-engaging portions extending substantial distances lengthwise of the shoe and the ends thereof which are nearest the shank portion of the shoe being curved upwardly. It will be understood that by turning about the pin 146 the presser feet adjust themselves to the contour of the shoe bottom. In operating on work of the character herein shown these presser feet actually engage portions of the upper previously laid inward over the insole and fastened by assembling tacks.

The arm 142 is controlled by a spring 148 which tends to swing it in one direction about the pin 140 and holds it initially with its lower end in engagement with the lower end of the bar 136, as shown in Fig. 11. When the carrier 96 is moved downwardly as hereinbefore described the two presser feet 144 are carried into engagement with the shoe, and if the position of the shoe is such that one of them engages the shoe before the other the holder 124 is tipped as determined by the shoe until both presser feet are seated firmly upon the shoe bottom, the wipers 20 being correspondingly tipped under control of the arms 122 so that they extend laterally of the shoe in parallel relation to the heel seat. Since the presser feet engage the opposite side portions of the shoe bottom in spaced locations the holder 124 is more readily and accurately controlled by the shoe than in prior constructions having only a single presser foot engaging the intermediate portion of the shoe bottom. It will be understood that the presser feet 144 likewise determine by their contact with the shoe how far the wipers 20 are depressed relatively to the heel seat by the arms 122 and how far the plunger 88 is depressed relatively to the shoe by the member 102 preliminarily adjusted as hereinbefore described. The presser feet are preferably located, as shown, partly in the path of movement of the heel wipers, and near the end of the wiping operation they are engaged and moved lengthwise of the shoe by the wipers, the arm 142 being swung about the pin 140.

The machine herein shown is provided with means constructed substantially as disclosed in Letters Patent No. 1,979,269 for adjusting the presser feet 144 heightwise of the shoe to vary the height of the wipers relatively to the heel seat and for also releasing the presser feet near the end of the operative movement of the wipers to permit the shoe to be forced more firmly upward against the wipers by the action of the spring 16 on the vertical slide 14. As shown in Fig. 11, there is threaded in a block 150 fast on the holder 124 a screw 152 which bears at its lower end on the top of a slide 154 vertically movable in the holder above the slide 130. These two slides are normally connected by a latch 156 pivoted on a pin 158 on the slide 130 and lying at its upper end in a notch in the slide 154. A spring 160 connected to the block 150 and to the latch 156 tends to move both the slides 130 and 154 upwardly and holds the upper slide 154 against the screw 152 while also holding the latch in operative position. It will accordingly be evident that turning of the screw 152 results in downward or upward adjustment of the slide 130 and the presser feet 144 relatively to the holder 124. To permit the shoe to be forced more firmly upward against the wipers by the spring 16, the lower end of the latch 156 is engaged near the end of the operative movements of the wipers by a shoulder 162 on the head 72 of the wiper-operating plunger 74, the latch being thereby withdrawn from the notch in the slide 154 to permit upward movement of the slide 130. This releases the shoe from the control of the presser feet 144. In the return of the parts of the machine to starting positions a spring-pressed pin 164 in the slide 154 insures such separation of the two slides 130 and 154 as to cause the latch 156 again to enter the notch in the slide 154.

The toe-lasting mechanism comprises, as heretofore, a slide 166 (Figs. 1 and 7) adjustable in directions lengthwise of the shoe for shoes of different sizes, and a casting 168 supported on the slide 166 for adjustment along curved guide-

ways, one of which is shown in dotted lines at 170, about an axis extending laterally of the shoe to position the toe wipers so that they will extend lengthwise of the shoe in substantially parallel relation to the forepart of the shoe bottom. Supported on the casting 168 is means constructed substantially as disclosed in the previously mentioned Letters Patent No. 2,026,539 for wiping the upper upwardly about the toe end of the last as the last is forced downwardly by the previously mentioned presser feet 144 and by other means, hereinafter described, which engages the forepart of the shoe bottom. For thus wiping the upper upwardly there is fast on the casting 168 a block 172 (Figs. 7 and 10) which supports a pair of levers 174 pivotally mounted between their ends on pins 176 for swinging movements widthwise of the shoe. On the inner arms of these levers are pins 178 which serve as pivotal supports for blocks 180 (Fig. 9) having slots therein to receive the end portions of a flexible toe band 182. Supported on the upper face of the block 172 are a plurality of slides 184 extending in a series between the two blocks 180 and having slots in which the band 182 is also mounted. The slides 184 are movable inwardly or outwardly along the supporting face of the block 172 and are controlled by a coil spring 186 located in recesses in their outer sides and connected at its ends to pins 188 mounted on ears 189 on the inner ends of the levers 174. It will thus be seen that the slides 184 may be forced outwardly against the resistance of the spring 186 by pressure of the shoe on the band 182 as the shoe is forced downwardly.

The band-supporting end blocks 180 also are yieldingly controlled to permit them to be forced apart by wedging action of the shoe on the band. For this purpose the outer arm of each lever 174 has rotatably mounted therein a stud 190 (Figs. 7 and 10) provided below the arm with a block 192 through which extends a transverse rod 194, one end of the rod having screw threads thereon in engagement with corresponding threads in one of the blocks 192 and the intermediate portion of the rod being swiveled in the other block. A spring 196 mounted on the rod 194 between the last-mentioned block and a collar 198 fast on the rod tends to swing the inner band-supporting arms of the levers 174 toward each other and is yieldable to permit these arms to be forced apart. Inward movements of these arms are limited by a collar 200 fast on the rod 194 and engaging that block 192 in which the rod is swiveled. It will be evident that by turning the rod 194 through a hand wheel 202 thereon the band-supporting arms of the levers 174 may be adjusted toward or from each other for shoes of different widths. It will also be evident that the connections between the two levers 174 permit the forward end portions of the band 182, i. e., the portions which are farthest from the extreme end of the toe, to be swung simultaneously in the same direction laterally of the shoe to permit the band to adjust itself to a right or a left shoe.

As the shoe is depressed to cause the band 182 to wipe the upper upwardly, the toe end of the shoe is engaged, as heretofore, by a rubber toe rest 204 which is forced downwardly by contact of the shoe therewith, the toe rest being supported on a hollow plunger 206 slidingly movable in a holder 208. In the construction herein shown, for a purpose hereinafter described, the downward movement of the toe rest and the plunger 206 is resisted initially by a comparatively light spring 210 mounted between the closed upper end of the plunger and a flange 212 formed on a spool 214 fast on a rod 216 extending downwardly through an opening in the lower end of the holder 208. Between the flange 212 and the lower end of the holder is a heavier spring 218 which is compressed by further downward movement of the toe rest after the upper end of the plunger 206 has moved downwardly far enough to engage the upper end of the spool 214. In the construction shown in the previously mentioned Letters Patent No. 2,026,539 the holder 208 was pivotally mounted on the casting 168, by means of trunnions indicated herein at 220, to permit it to swing with the toe rest lengthwise of the shoe, and such swinging movement was effected in the downward movement of the toe rest by a cam acting on a roll 222 supported on the plunger 206 so as to cause the toe rest to apply a frictional pull to the upper toward the end of the toe. Return movement of the holder and the toe rest was effected by a spring-controlled plunger 224 mounted in a lug 226 on the holder 208 and engaging a bracket corresponding in location to a bracket 228 herein shown which is fast on the casting 168. For the purpose of operating on shoes which have already been pulled over and it may be also side lasted, the machine herein shown is provided with means for preventing such swinging movement of the toe rest, the above-mentioned cam being omitted. To this end, there is secured to the bracket 228 a plate 230 having thereon a block 232 interposed between the upper face of the lug 226 and the head of the plunger 224 which engages the bracket 228 above it, so as to lock the holder 208 from swinging about the axes of the trunnions 220. If desired, however, the bracket 228 and the parts thereon may be removed and another bracket provided with a cam, as shown in the last-mentioned Letters Patent, may be substituted therefor, so that by the action of the cam on the roll 222 the toe rest will be swung as formerly as it is depressed. Upward movement of the toe rest is adjustably limited by a stop screw 234 threaded in the bracket 228 and engaging the roll 222.

For wiping the marginal portion of the toe end of the upper inwardly over the insole the machine herein shown is provided with a single pair of wipers 236 (Figs. 5, 6 and 7) mounted on a wiper carrier 238 which is movable in directions lengthwise of the shoe along guideways in the casting 168. These wipers are extended lengthwise of the shoe far enough to engage portions of the upper extending more or less rearwardly of the toe portion of the shoe toward the ball line. The wiper carrier 238 overlies portions of the wipers and has a curved tongue-and-groove connection therewith indicated by dotted lines at 240 in Fig. 6 to guide them for swinging or closing movements about an axis located approximately at their wiping edges, one of the wipers having a small curved extension 242 lying in a correspondingly curved recess in the other wiper to prevent undue separation between the two wipers at the extreme end of the toe when they are in their closed positions. The wipers are supported underneath, in part, by a plate 244 fast on a bracket 246 (Fig. 7) which is secured to the wiper carrier 238, and they are further supported in locations opposite the sides of the toe by plates 248 fast on the casting 168. The wiper carrier 238 is operated to advance the wipers lengthwise of

the shoe by a gear sector **250** fast on a rock shaft **252** operated by the same means as heretofore in machines of the illustrated type. For closing the wipers laterally of the shoe there are provided, as heretofore, rack bars **254** operated by the rock shaft **252** and adjustably connected by screws **256** to slides **258** mounted in guideways in the casting **168**. These slides are connected to the wipers by mechanisms constructed differently than heretofore. Each of these mechanisms comprises a link **260** pivotally connected at one end by a pin **261** to the corresponding slide **258** and at the other end by a pin **262** to a member **263** mounted to turn about an eccentric **264** which is rotatably mounted, for a purpose hereinafter described, on a stud **266** on the casting **168**. The member **263** is connected by a link **268** to a pivot pin **270** which extends upwardly from the wiper **236**. It will thus be seen that as the wipers are advanced lengthwise of the shoe by the wiper carrier **238** they are closed laterally of the shoe by the slides **258** which act thereon through the links **260**, the members **263** and the links **268**, the members **263** turning about the eccentrics **264**.

Reference has been made to the fact that the toe band **182** is so controlled that its forward end portions may swing simultaneously in the same direction laterally of a shoe in response to pressure of the shoe thereon. In this way the band adjusts itself to the lateral "swing" of the forepart of a right or a left shoe, the heel end of which is centralized laterally by the heel band **22**. In operating on shoes in which there are pronounced differences between rights and lefts with respect to the lateral swing of the forepart it is desirable that the toe wipers **236** also be differently positioned for rights and lefts, so that they will wipe the margin of the upper inwardly substantially equal distances from the opposite side edges of the insole. Accordingly the machine herein shown is so constructed that the wipers are adjusted to different shoes by the toe band. For this purpose each of the band-controlling levers **174** is connected by a link **272** to a plate **274** (Figs. 6 and 8) which is integral with the previously mentioned eccentric **264**, the link having fast on one end thereof a block **276** provided with an opening **277** in which lies the ball-shaped upper end **278** of the previously mentioned pin **188**. Accordingly, if the forward end portions of the band **182** are swung, for example, to the right (Fig. 6) by the action of the shoe thereon as the shoe is forced downwardly within the band, the two links **272** are moved by the band to turn the eccentrics **264** in counterclockwise directions, and by such movements of the eccentrics the members **263** which are mounted thereon are swung about the pins **262** and act through the links **268** to swing the wipers **236** in the same direction as the forward ends of the toe band. By the same means both wipers are swung toward the left (Fig. 6) if the forward ends of the toe band are swung in that direction by pressure of a shoe thereon. It will thus be seen that the wipers are adjusted under control of the shoe so that their wiping edges will be substantially equidistant from the opposite side edges of the shoe bottom prior to the operation of the wipers on the shoe, and accordingly when they operate they will move inwardly over the shoe bottom substantially equal distances from the opposite side edges of the insole.

After the toe band and the wipers have adjusted themselves to the shoe as above described, the toe band is locked against any such displacement of either of the opposite side portions thereof as might result from the action of either of the members **263** on the corresponding eccentric **264** by reason, for example, of resistance of the shoe to the inward movement of either of the wipers. For this purpose there is associated with each of the plates **274** a pawl **280** pivotally mounted on a stud **282** on the casting **168** and arranged to engage ratchet teeth **284** formed on the plate **274**. The pawl is held initially out of engagement with the ratchet teeth by the action of the link **260** on the head of a screw **286** adjustably threaded in a tail of the pawl, and is swung into engagement with the ratchet teeth by a leaf spring **288** when permitted by the link substantially at the beginning of the operative movements of the wipers.

In the construction herein shown the toe wipers **236** are maintained in a heated condition in order to render them more effective to wipe the margin of the upper free from wrinkles as well as to accelerate the hardening or setting of adhesive whereby the margin of the upper is secured to the insole. For this purpose there are fastened to a cover plate **290** on the casting **168** heating members **292** having electrical heating units **294** mounted therein, each of the members **292** having a flat lower face **296** (Fig. 7) arranged for sliding contact with an extended flat face **298** (Fig. 6) formed on an enlarged portion of the previously mentioned link **268** which is adjacent thereto. The link **268** has also an extended flat lower face arranged for sliding contact with the top of the wiper **236**, and it will accordingly be evident that heat is conducted at all times to the wipers from the members **292** through the links **268**. For the protection of the operator there is mounted over each heating member **292** a cap **300** preferably covered with felt (Fig. 1) or other suitable heat-insulating material.

For better insurance that the toe end of the upper will be conformed tightly to the contour of the last as the shoe is depressed within the band **182**, the machine herein shown is provided with means constructed differently than heretofore for clamping the marginal portion of the toe end of the upper and subjecting it to an upward pull in response to the depression of the last. This means comprises a lower clamp member **302** (Figs. 5, 7 and 11) curved to extend around the end of the toe and provided with an upper-clamping portion located immediately over the wipers **236**, the member **302** having a forked arm **304** secured by a clamping screw **306** to a bracket **308** which is mounted to turn about a shaft **310** supported in bearings on the top of the cover plate **290**. Threaded in the bracket **308** are two screws **312** the lower ends of which are arranged to rest on the cover plate to determine the height of the clamp member **302**, these screws preferably being so adjusted that the clamp member is supported out of contact with the wipers so as not to interfere frictionally with the adjustment of the wipers to the shoe by the action of the toe band as hereinbefore described. It will be evident that upon loosening the clamping screw **306** the clamp member **302** may be properly adjusted lengthwise of the shoe and angularly. To cooperate with this member there is provided another similarly curved clamp member **314** having thereon a lip **316** arranged to enter a corresponding recess **318** in the member **302** to increase the frictional hold of the clamp members on the upper. The clamp member **314** is se-

cured to two arms 320 which serve as a holder therefor, these arms having therein slots 322 through which the shaft 310 extends so that the arms may not only swing with the clamp member about this shaft but may also move lengthwise relatively to the shaft. Extending through the arms 320 is a rod 324 on which is pivotally mounted a block 326 which carries two spring-pressed plungers 328 arranged to bear against shoulders on the arms 320 above the rod 324. These plungers tend to swing the block 326 downwardly about the rod 324 and position the block initially in engagement with shoulders 330 formed on tail portions 331 of the arms 320, as indicated in Fig. 7. Pivotally connected to pins 332 carried by the block 326 in locations higher than the rod 324 are links 334 which are also connected to crank arms 336 fast on the shaft 310. Springs 338 connected to the pins 332 and to brackets 340 fast on the cover plate 290 tend to pull the block 326 and the arms 320 in a direction lengthwise of the shoe away from the toe end of the shoe, and also tend to swing the block and the arms about the shaft 310 in the direction to lift the clamp member 314 away from the member 302. Such movement of the block and the arms away from the shoe is limited by contact of the shaft 310 with the arms in the slots 322, and such swinging movement is limited by contact of the tail portions 331 of the arms with the cover plate 290. When the parts are in these initial positions the clamp member 314 is both lifted and retracted lengthwise of the shoe relatively to the member 302 in such manner as to facilitate positioning the margin of the toe end of the upper in proper relation to the member 302.

Movement of the clamp member 314 into clamping position is effected by turning the shaft 310 in a clockwise direction (Fig. 7). At the beginning of such movement of the shaft the crank arms 336 act through the links 334 to move the block 326 and the arms 320 lengthwise of the shoe against the resistance of the springs 338 as far as permitted by the shaft 310 in the slots 322 of the arms, thus advancing the clamp member 314 lengthwise of the shoe before it begins its downward swinging movement. When such movement of the arms 320 is stopped by the shaft 310 the links 334 begin to swing the block 326 and the arms about the shaft 310 to carry the clamp member 314 into clamping engagement with the upper, and after this member has engaged the upper the block 326 is swung, by further movement of the links, about the rod 324 against the resistance of the spring-controlled plungers 328, as illustrated in Fig. 11. The clamp member 314 is thus pressed yieldingly against the upper. The turning of the shaft 310 for the purpose in view is effected by the operator through depression of a treadle 342 (Fig. 1) against the resistance of a spring 344, the treadle being connected by a flexible cable 346 to one arm of a lever 348 fast on the shaft 310. Pivotally mounted on the other arm of this lever is a finger 350 (Fig. 1) arranged to serve as a detent and controlled by a compression spring 352 (Fig. 5) which tends to swing the lower portion of the finger toward a lug 354 on the lever. Initially the finger 350 is held by the spring 352 with one side thereof in engagement with one end of a lug 356 formed on a plate 358 which is fast on one end of the previously mentioned rock shaft 252 (Fig. 7) whereby the toe wipers are operated. When the operator depresses the treadle 342 to effect the clamping of the toe end of the upper the finger 350 is carried upwardly by the lever 348 past the lug 356, whereupon the spring 352 swings the lower end of the finger to a position over the top face of the lug, such swinging movement of the finger being limited by contact of the lug 354 on the lever 348 with the end of a screw 360 adjustably threaded in the finger. A lock nut 362 threaded on the screw 360 serves by engagement with the finger 350 to lock the screw in any adjusted position. When the finger 350 is moved to a position over the top of the lug 356 the clamp member 314 is locked by this lug in clamping position, so that the operator may remove his foot from the treadle 342. As the rock shaft 252 is turned to operate the toe wipers, after the depression of the shoe and the pulling of the upper by the upper-clamping means, the lug 356 is carried out from under the lower end of the finger 350, thereby releasing the lever 348 and the parts controlled thereby so that the clamp member 314 is lifted to release the upper and is returned to its starting position by the action of the springs 338. Preferably such release of the clamp member 314 is timed, by adjustment of the screw 360, to occur just as the wipers begin to wipe the upper inwardly over the insole.

As previously described, the downward movement of the shoe within the toe band 182 is effected, in part, by the two presser feet 144 engaging the bottom of the heel-end portion of the shoe and operated by the downwardly movable carrier 96 on the rod 98. Cooperating with these presser feet is another presser foot 364 arranged to engage the forepart of the insole over the toe rest 204, this presser foot being pivotally mounted as heretofore on a bracket 366 adjustable upwardly or downwardly on an arm 368 by a screw 370 threaded in a lug 372 on the arm. The arm 368 is supported by alined rods 374 and 376 (Fig. 1) mounted for vertical movements and for turning movements in bearings in the frame. The arm 368 occupies initially a position in which the presser foot 364 is retracted rearwardly from over the shoe bottom, and the operator swings the arm forwardly to position the presser foot over the shoe bottom by use of a handle 378 mounted on a lug 380 projecting forwardly from the arm. As fully described in Letters Patent No. 1,843,232, the machine is started in operation by a forward swinging movement of the arm 368, whereupon the arm is carried downward simultaneously with the means engaging the heel end of the insole to effect the depression of the shoe, the rod 98 at the heel end and the alined rods 374 and 376 at the toe end being, in fact, operated by the same cam.

From the above description it will be evident that in the lasting operation the position of the shoe with respect to tipping movement about any axis extending laterally thereof is determined by the cooperative action of the presser foot 364 at the forepart and the two presser feet 144 at the heel end, and by suitable adjustment of the casting 168 (Fig. 7) along the guideways 170 the toe wipers 236, as hereinbefore explained, may be so positioned that they will extend lengthwise of the shoe in substantially parallel relation to the forepart of the shoe bottom. To insure a substantially parallel relation between these wipers and the forepart of the shoe bottom in directions laterally of the shoe in the toe-lasting operation, the machine herein shown is provided with means for bringing the shoe into

proper relation to the wipers, if it is not already in that relation, by tipping it laterally through contact with the forepart of the shoe bottom. This means comprises a member **382** (Figs. 11 and 14) supported on the previously mentioned bracket **366** on the arm **368** and mounted to turn on a pin **384** on which the presser foot **364** also is mounted. The member **382** is provided with two downwardly projecting lugs **386** arranged to act on the forepart of the shoe bottom in spaced locations near the opposite side edges of the insole and to engage either the insole itself or a portion of the margin of the upper previously lasted over the insole, depending upon the condition of the shoe when it comes to the machine. The member **382** is controlled by two links **388** and **390** pivotally connected together by a pin **392**, the link **388** being pivotally connected to the member **382** by a pin **394** and the link **390** being pivotally connected by a rod **396** to the bracket **366**. A spring **398** (Fig. 15) connected to the link **388** and to the bracket **366** holds the links initially in alinement with each other as shown in Fig. **11**, such positions of the links being determined by engagement of a shoulder **400** on the link **388** with a shoulder **402** on the link **390**. When the links are thus positioned the member **382** is held rigidly thereby in a relation to the presser foot **364** such as illustrated in Figs. 11 and 14, the two lugs **386** projecting far enough downwardly to engage the bottom of the shoe in the downward movement of the arm **368** while the presser foot **364** is still a little above the insole. Such engagement of the lugs **386** with the shoe occurs before the presser feet **144** at the heel end arrive in shoe-engaging positions, and if the shoe is not already in such position that the forepart of the insole extends laterally in substantially parallel relation to the plane of the toe wipers the shoe is tipped to the proper position by the action of the lugs **386** thereon. Such tipping of the shoe is facilitated by the mounting of the heel-pin-supporting block **2** in the guideways **18** (Fig. 13) as previously described, and although the heel end of the shoe is at this time clamped by the heel band **22**, the yielding pressure of the heel band on the shoe is not such as to oppose substantial resistance to any tipping of the shoe that may be necessary for the purpose in view. Since the member **382** ordinarily performs its shoe-positioning function before the shoe is forced downwardly with any substantial pressure against the toe rest **204**, the shoe as it is tipped will readily slip over the toe rest. In the construction herein shown, however, the rubber toe rest **204** is so supported on the plunger **206** that it may tip with the shoe, the toe rest being fast on a metallic member **404** (Fig. 14) provided with a depending curved rib **406** mounted in a similarly curved recess in the top of the plunger **206**. Two spring-pressed pins **408** mounted in the upper end of the plunger **206** and bearing on the lower face of the member **404** maintain the toe rest normally in a centralized position.

After the shoe has been positioned as above described by the action of the member **382** thereon, control of the forepart of the shoe is transferred from the member **382** to the presser foot **364** and the member **382** is withdrawn from operative position, since if it remained in that position it would be in the way of the toe wipers **236** in their inward wiping movements. The withdrawal of the member **382** from operative position is preferably effected prior to any substantial downward movement of the shoe and the toe rest **204**; but since under some conditions the depression of the shoe and the toe rest may begin before the member **382** is withdrawn, the comparatively light spring **210** is provided as hereinbefore described in the plunger **206** to lessen the force of impact of the shoe against the presser foot **364** as compared with the force which would result from compression of the heavy spring **218** controlling the toe rest. It will be understood that such impact is due to the small space which must be taken up between the shoe bottom and the presser foot **364** when the shoe is released from control of the member **382**.

To move the member **382** out of its operative position it is swung upwardly about the pin **384** through the links **388** and **390**. To this end, the link **390** is fast on the rod **396** which is mounted to turn in a bearing in the bracket **366**, and also fast on this rod is a bracket **410** in which is slidingly mounted a tubular member **412** having on its lower end a head **414** arranged to engage a lug **416** formed on one of the wiper-heating members **292**. A spring **418** in the tubular member **412** bears at its lower end on a pin **420** fast in the bracket **410** and extending through slots in the member **412**, and bears at its upper end on a screw **422** threaded in the upper end of the member **412**. It will thus be seen that the spring **418** tends to move the member **412** upwardly in the bracket **410**. The position of the member **412** in the bracket is determined by a lever **424** pivoted on the bracket and engaging the head of the screw **422**, this lever being held in different adjusted positions by a spring-pressed pin **426** carried thereby and arranged to enter one or another of a plurality of holes **428** in the bracket **410**. It will be observed that these parts are similar to those shown in Figs. 11 and 12 for variably controlling the plunger **88** which supports the heel wipers. It will be understood that the member **412** is preferably so adjusted that its head **414** engages the lug **416** just as the shoe is properly positioned in the manner hereinbefore described by the member **382**, and that in further downward movement of the arm **368** the rod **396** is turned by the action of the lug **416** on the member **412** so as to swing the links **388** and **390** out of alinement with each other, as illustrated in Fig. 15. In the return of the parts to starting positions the spring **398** swings the links again into alinement with each other and thereby positions the member **382** in proper relation to the presser foot **364**.

Supported on the arm **368** is also means differing somewhat from that disclosed in the previously mentioned Letters Patent No. 2,026,539 for pressing the margin of the toe end of the insole close to the bottom of the last and for also engaging the margin of the upper to assist the toe wipers in wiping the upper tightly and smoothly over the insole. This means comprises a clamp member **430** (Figs. 1 and 11) curved for engagement with the margin of the insole around the toe end and pivotally mounted on the lower end of a yoke member **432** having upwardly extending arms **434** and **436** (Fig. 14). The arm **434** is pivotally supported on one end of an arm **438** which is secured at its other end to a rock shaft **440** extending through the arm **368**, and on the other end of this rock shaft is an arm **442**, a portion of which is visible in Fig. 14, this arm being connected to the upwardly extending arm **436** of the yoke member **432**. Connected to the arm **438** by a link **444** is a plunger **446** pressed down by a spring **448**

(Fig. 11) mounted in the handle 378, the downward swinging movement of the arm 438 being adjustably limited by a screw 450 threaded therein and engaging a lug 452 on the arm 368. The yoke member 432 is further controlled by a link 454 connected to its arm 436 and to an eccentric 456 formed on a pin 458 mounted to turn in the arm 368 and adjustable by means of a screw driver to vary the position of the clamp member 430 lengthwise of the shoe. It will be understood that the clamp member is so adjusted heightwise of the shoe by the screw 450 that when the presser foot 364 is in engagement with the insole the clamp member is under control of the spring 448 which holds it pressed yieldingly down upon the insole. The clamp member is provided with an outwardly inclined face 460 against which the margin of the upper is pressed by the wipers 236 as the wipers begin to wipe the upper inwardly over the edge of the insole, and by wedging action of the upper and the wipers against this inclined face the clamp member 430 is lifted against the resistance of the spring 448 to permit the wipers to wipe the upper inwardly beneath it, as illustrated in Fig. 16.

As in prior machines of the illustrated type, the toe wipers 236 are operated to wipe the margin of the upper inwardly over the insole at substantially the same time as the heel wipers 20, and near the end of the inward wiping movements of the toe and heel wipers the heel presser feet 144, as previously described, are released by the latch 156 to permit the heel end of the shoe to be pressed more firmly up against the heel wipers by the action of the spring 16 on the slide 14. Any actual upward movement of the slide 14 and the heel end of the shoe at this time is, however, very small, since the wipers 20 are held against upward movement by the arms 122. Thereafter, in order similarly to increase the pressure of the toe wipers on the overwiped margin of the upper, both the arm 368 which carries the toe presser foot 364 and the carrier 96 on which the arms 122 are supported are moved upwardly by their operating cam, as described in Letters Patent No. 1,843,232. This permits the spring 218 controlling the toe rest 204 to press the toe end of the shoe more firmly up against the toe wipers. It will be evident, however, that any actual upward movement of the toe end of the shoe is very small because of the resistance of the toe wipers. Since the arms 122 which press down on the heel wipers are necessarily moved upward with the carrier 96, the heel end of the shoe might, unless prevented, be moved far enough upward by the action of the spring 16 on the slide 14 to tip the forepart of the shoe relatively to the elongated toe wipers so as to decrease the pressure applied by the latter at the extreme toe end of the shoe. The machine is accordingly provided with means for limiting or preventing such upward movement of the slide 14 when the carrier 96 receives its upward movement. For this purpose there is secured to the upper end of the slide 14 (Figs. 1, 19 and 20) a bracket 462 on which there is mounted a small vertically movable slide 464 provided with ratchet teeth 466 arranged to cooperate with a pair of pawls 468 which are carried by an arm 470 of the previously mentioned bell-crank lever 80 the arm 78 of which imparts operative movement to the heel wipers 20. The two pawls 468 are arranged in staggered relation for greater precision and are mounted to turn on a pin 472 on the arm 470. The pawls are controlled by a lever 474, also mounted to turn on the pin 472, through springs 476 mounted between an upwardly extending lug 478 on the lever and upwardly extending tail portions of the pawls, each of the pawls carrying a pin 480 which extends through the spring and through an opening in the lug 476 and which carries nuts 482 for limiting relative movement of the lever 474 and the pawl under the influence of the spring. A spring 484 connected to one end of the lever 474 and to the arm 470 tends to swing the lever in a counterclockwise direction (Fig. 19), such movement of the lever being limited by engagement of a pin 486 thereon with the lower face of the arm 470. The lever 474 carries at one end a screw 488 arranged to engage the head 490 of a rod 492 slidingly mounted in lugs on the bracket 462 and arranged to rest at its lower end on a shoulder 494 on the frame of the machine. Accordingly, as the bell-crank lever 80 is operated to advance and close the heel wipers, the arm 470 near the end of the wiper operation carries the screw 488 into contact with the head 490, whereupon the pawls 468 are swung yieldingly into engagement with the ratchet teeth 466 through the action of the lever 474 on the springs 476 as the arm 470 continues to move downwardly. In this manner the small slide 464 is locked against upward movement. This locking of the slide 464 occurs just before the presser feet 144 are released by the latch 156; and in order to permit the shoe to be pressed more forcibly up against the heel wipers by the spring 16 when the presser feet are thus released, there is provision for limited upward movement of th slide 14 relatively to the small slide 464. To this end, the slide 464 is slidingly mounted in a vertical guideway in the bracket 462. Extending laterally from the upper end of the slide 464 is a lug 496 underneath which is a spring 498 mounted in a recess in the bracket 462, and extending laterally from the lower end of the slide is a lug 500 in which is mounted a screw 502 arranged to engage a shoulder 504 on the bracket. The spring 498 normally holds the slide 464 in a position determined by the screw 502, the screw being so adjusted that there is a small space between the lug 496 and the top of the bracket 462. This permits a short upward movement of the slide 14 to increase the pressure of the shoe on the heel wipers at the time when the presser feet 144 are released by the latch 156. By such upward movement of the slide 14 the space between the lug 496 and the bracket 462 is substantially or nearly taken up, so that when the carrier 96 is thereafter raised with the arm 368 to permit the toe end of the shoe to be pressed more firmly up against the toe wipers, but little, if any, upward movement of the slide 14 can take place by reason of engagement of the bracket 462 with the lug 496 on the slide 464 which is locked against upward movement by one or the other of the pawls 468.

The power driving means in the machine herein shown, and the mechanism for starting the machine and for automatically stopping it at the end of the cycle, are substantially the same as disclosed in Letters Patent No. 1,843,232 and will be only briefly described. As shown in Fig. 2, there is an electric motor 506 connected by a chain 508 to a shaft 510 having thereon a worm 512 for driving continuously a worm gear 514 mounted to turn on a cam shaft 516. The gear 514 serves as a clutch member cooperating with another clutch member 518 fast on the cam shaft 516. The two clutch members are connected together to drive the machine by the turning of a

cylindrical member 520 (Fig. 17) in the member 518 by a spring 522 connected to an arm 524 fast on the outer end of the member 520. The inner end of the member 520 is recessed on one side to clear normally a series of teeth 525 carried by the gear 514, and when the member is turned by the spring 522 a portion 526 thereof is moved into the path of these teeth to cause the gear 514 to drive the member 518. The member 520 carries a pin 527 normally engaged by a plate 528 on a lever 530 to disconnect the clutch members 514 and 518. The lever 530 is lifted to release the pin 527 and start the machine through a hook 532 connected by mechanism including a link 534 to the previously mentioned toe presser foot arm 368. When the arm 524 is operated by the spring 522 to connect the two clutch members it is locked against reverse movement by a spring-controlled lever 536 mounted on the clutch member 518 and having therein a notch 538 to receive a projection 539 (Fig. 17) on the arm 524. After the starting of the machine the lever 530 is released from the hook 532, to permit the plate 528 to be returned into the path of movement of the pin 527, by a finger 540 fast on the clutch member 518 and arranged to engage the lower end of the hook 532. The lever 536 is engaged by a lug 542 on the plate 528 to release the arm 524 just before the pin 527 arrives in position to engage the end of the plate 528, after which this plate acts through the pin to disconnect the two clutch members and stop the machine at the end of the cycle of operations.

The machine herein shown is provided additionally with means for bringing the machine to a stop at a point in the cycle immediately after the shoe has been pressed more firmly upward against the toe wipers 236 by the action of the spring 218 under the toe rest, as hereinbefore described, and for again starting the machine automatically after a variably predetermined interval. This renders the toe wipers more effective to press the upper free from wrinkles and to transmit their heat to the adhesive for accelerating the drying out or hardening of the adhesive. For thus stopping the machine, there is mounted on a bracket 544 on the base of the machine a lever 546 having fast thereon an arm 548 provided with a shoulder 550 for engaging the pin 527 and disconnecting the two clutch members and provided also with a shoulder 552 for operating the lever 536 to release the arm 524. The lever 546 is controlled by a spring 554 which holds the arm 548 normally with its shoulder 550 in the path of the pin 527. The arm 548 is swung downwardly to start the machine again by an automatic timing device including a bar 556 which is reciprocated periodically at all times in downward and upward directions by means hereinafter described. This bar is guided by two plates 558 (Fig. 18) which are secured to the arm 548 and by a bolt 560 mounted in the plates 558 and lying between a portion of the bar 556 and a plate 562 fast on the bar. Formed on this plate are ratchet teeth 564 engaged by two pawls 566 which are mounted to turn on a bolt 568 in the plates 558, the pawls being arranged in staggered relation for greater precision. Each pawl is controlled by a spring 570 which tends to hold it against the ratchet teeth. Normally, however, the pawls are held out of engagement with the ratchet teeth by a small bell-crank lever 572 mounted to turn on a pin 574 carried by the plates 558 and provided with screws 576 arranged to engage tails on the pawls to swing them away from the ratchet teeth against the resistance of their springs 570. The bell-crank lever 572 is held in position to disconnect the pawls from the ratchet teeth by a spring 578. Substantially at the time, however, when the arm 548 acts on the pin 527 to stop the machine the previously mentioned finger 540 on the clutch member 518 engages the bell-crank lever 572 and swings it far enough to release the pawls 566 and permit them to engage the ratchet teeth 564. Thereafter, each downward movement of the bar 556 results in a corresponding downward swinging movement of the lever arm 548 by reason of the fact that the ratchet teeth 564 tend to turn the pawls 566 in a counterclockwise direction (Fig. 17) and thus to cramp them against the plate 562. The arm 548 is locked against reverse upward movement by teeth 580 on the finger 540 in engagement with a tooth 581 on the bell-crank lever 572, the finger 540 thus serving as a detent. As the bar 556 receives each upward movement the teeth 564 are carried past the pawls 566 by reason of the fact that the pawls are turned by the teeth in a clockwise direction. It will thus be seen that the arm 548 is moved downward step by step until the shoulder 550 on the arm passes beyond the end of the pin 527, whereupon the machine is started again in operation. Just as the shoulder 550 passes beyond the end of the pin the bell-crank lever 572 also passes beyond the end of the finger 540, whereupon the spring 578 swings the bell-crank lever into position to disconnect the pawls from the ratchet teeth and the arm 548 is returned upward to its normal position by the spring 554.

For imparting to the bar 556 its repeated downward movements there is provided a cam member 582 (Figs. 2, 3 and 4) fast on a shaft 584 which is driven continuously and serves to operate a belt conveyor 586, as disclosed in Letters Patent No. 1,843,232. This cam member engages a roll 588 mounted on a lever 590 which is pivoted at 592 on a bracket 594 on the frame and is connected by a rod 596 to the bar 556. The cam member 582 is a substantially square member, as shown in Fig. 4, so that it imparts four downward movements to the lever 590 and the bar 556 in each revolution of the shaft 584. After each downward movement the bar and the lever are returned upwardly by a spring 598 connected to the bar. The limit of upward movement of the lever 590 is variably determined by a cam 600 which engages the upper face of the lever and is fast on a shaft 602 mounted in the bracket 594, the shaft having also fast thereon a crank arm 604 for turning it and thereby adjusting the cam. The cam 600 is held in adjusted position by a spring-pressed pin 606 mounted in the arm 604 and arranged to enter one or another of a plurality of holes 608 in the bracket 594. It will thus be understood that by adjustment of the cam 600 the amount of downward movement imparted each time to the lever 590 and the bar 556 may be varied so as to vary the number of downward movements of the bar required to move the arm 548 downwardly far enough to start the machine. Accordingly the length of time that the heated wipers remain in contact with the overwiped margin of the upper may be varied at will.

The character of operations previously performed on a shoe to be operated upon by the above-described machine will vary in accordance with the preferences of different manufacturers. In Fig. 24 is shown, for example, a shoe which

after the customary assembling and pulling-over operations has been lasted along the sides with the well-known Littleway staples *s*, the rows of staples extending forwardly of the ball line but terminating in locations somewhat short of the toe portion of the shoe so as to leave not only the toe portion but also a portion of the shoe extending rearwardly therefrom toward the ball line to be lasted with adhesive. Suitable adhesive will preferably have been applied to the heel end of the insole and to the margins of the heel end of the upper materials prior to the assembling operation; and such adhesive may have been applied also at the forepart before assembling, or may be applied in this location just before the shoe is presented to the illustrated machine. Preferably also at the toe end the layers of the upper materials, with the exception of the outer layer, will have been so cut prior to assembling, or will be so trimmed before the shoe is presented to the machine, as to extend but little inwardly from the extreme edge of the insole when in lasted position.

After mounting the shoe on the shoe support the operator releases the slide **24** which carries the heel band **22** and the heel wipers **20**, as customary in the use of machines of the illustrated type, whereupon the spring **28** moves the slide toward the shoe and the spring **30** moves the shoe back against the heel band, as hereinbefore described. The operator then spreads the margin of the toe end of the upper outwardly over the lower clamp member **302** and by use of the treadle **342** moves the cooperating clamp member **314** from its idle position into clamping relation to the upper. The clamp member **314** is locked in clamping position by engagement of the lug **356** with the lower end face of the finger **350**. Thereafter the operator swings the arm **368** forwardly by the handle **378**, this movement of the arm resulting in the starting of the power operation of the machine.

Upon the starting of the machine the arm **368** begins its downward movement, and the carrier **96** at the heel end is swung to carry the presser feet **144** into position over the heel end of the shoe bottom and is also moved downwardly. Before the presser feet **144**, however, engage the shoe the member **382** carried by the arm **368** arrives in position to engage the bottom of the forepart of the shoe and to tip the shoe laterally into proper relation to the toe wipers if it is not already in that relation. Immediately thereafter, in response to continued downward movement of the arm **368**, the member **382** is swung upwardly and control of the forepart of the shoe is thus transferred to the presser foot **334**. In the downward movement of the carrier **96**, just after the shoe has been properly positioned by the member **382**, the presser feet **144** arrive in positions to engage the heel end of the shoe and are acted upon by the shoe to tip the heel wipers laterally into proper relation to the heel seat in the manner previously described, these wipers being positioned at the proper height relatively to the heel seat by the arms **122**. Continued downward movements of the arm **368** and the carrier **96** serve thereafter to depress the shoe, the heel wipers and the heel band being moved downwardly with the shoe. In response to such depression of the shoe the toe-end portion of the upper is wiped upwardly by the toe band **182** and is also subjected to a pull by the action of the means which clamps its margin, the upper being permitted to slip more or less between the clamping members **302** and **314**. As the shoe is forced down within the toe band the toe wipers are adjusted in accordance with the lateral swing of the forepart of the last under control of the toe band, in the manner previously described. At the end of the downward movement of the shoe the parts which operate at the forepart of the shoe are in the positions illustrated in Fig. 15, the margin of the toe end of the insole being pressed down on the last yieldingly by the member **430** carried by the arm **368**.

The toe and heel wipers are next operated to wipe the margin of the upper at the toe and heel ends inwardly over the insole. Substantially at the time when the toe wipers arrive at the edge of the insole the clamp member **314** is released by movement of the lug **356** out from under the finger **350**, and as the wipers continue their inward movement they press the marginal portion of the upper against the insole-engaging member **430** which thus acts as a retarder on the upper, this member being forced upwardly by the wedging action of the wipers and the upper thereon and then assuming a position over the wipers, as illustrated in Fig. 16. As the heel wipers **20** are advanced and closed over the heel seat they move the presser feet **144** more or less forwardly, and near the end of the inward movement of the heel wipers these presser feet are released by the latch **156** to permit the heel end of the shoe to be forced more firmly up against the wipers by the action of the spring **16** on the slide **14**. Thereafter the arm **368** and the carrier **96** are moved upwardly a short distance to permit the forepart of the shoe to be forced more firmly up against the toe wipers by the action of the spring **218** on the toe rest **204**, any substantial upward movement of the heel end of the shoe at this time being prevented by the pawl-and-ratchet mechanism shown in Fig. 19.

After the shoe has been forced upwardly against the heated toe wipers as above described, the machine is brought automatically to a stop by the mechanism shown in Fig. 17 to permit the overwiped margin of the forepart of the upper to remain for a short time under the pressure of the toe wipers and under the influence of the heat transmitted therefrom. It will be understood that these wipers may overlap more or less portions of the forepart of the upper previously lasted with staples, these previously lasted portions accordingly being subjected to an ironing action by the wipers. After an interval variably predetermined by adjustment of the automatic controlling mechanism shown in Figs. 2 and 17 the clutch is actuated to start the machine again in operation, whereupon the arm **368** and the carrier **96** are moved downwardly to depress the shoe far enough to relieve the pressure of the toe wipers on the shoe as they are withdrawn from over the shoe bottom. The parts are thereafter all returned to their starting positions, the shoe being removed from its support by automatic shoe-removing mechanism not herein shown in detail but fully shown and described in Letters Patent No. 1,843,232.

Features of the mechanism herein disclosed for bringing the machine to a stop prior to the completion of its cycle and for automatically starting it again are claimed in a divisional application Serial No. 72,860, filed on April 6, 1936.

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

1. In a lasting machine, a device for wiping an

upper heightwise of a last about the toe end of the last, a work support yieldingly movable in a direction heightwise of the last, means for moving the last with said work support relatively to said wiping device by pressure on the bottom of the last to cause said device to wipe the upper heightwise of the last, said device being movable to adjust itself to the lateral swing of the forepart of a right or a left last in response to pressure of the work thereon, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, and means controlled by said wiping device for adjusting the wipers also in accordance with the lateral swing of the forepart of the last.

2. In a lasting machine, a device for wiping an upper heightwise of a last about the toe end of the last, means for moving the last relatively to said wiping device to cause the device to wipe the upper heightwise of the last, yieldable means against the resistance of which said device may swing in one direction or the other widthwise of the last in response to pressure of the work thereon to adjust itself to the lateral swing of the forepart of a right or a left last, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, and means controlled by said wiping device for swinging said wipers also in one direction or the other in accordance with the lateral swing of the forepart of the last.

3. In a lasting machine, a device for clamping an upper about the toe end of a last, said device being movable to adjust itself to the lateral swing of the forepart of a right or a left last in response to pressure of the work thereon, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, members movable to impart respectively to the different wipers closing movements widthwise of the last, connections between said members and the wipers, and means controlled by said clamping device and arranged to act on said connections while said members are stationary to adjust the wipers also in accordance with the lateral swing of the forepart of the last.

4. In a lasting machine, a device for clamping an upper about the toe end of a last, said device being movable to adjust itself to the lateral swing of the forepart of a right or a left last in response to pressure of the work thereon, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last. members movable lengthwise of the last for imparting respectively to the different wipers closing movements widthwise of the last, link connections between said members and the wipers, and means arranged to be operated by the movement of said clamping device while said members are stationary to adjust said link connections and thereby to adjust the wipers also in accordance with the lateral swing of the forepart of the last.

5. In a lasting machine, a device for clamping an upper about the toe end of a last, said device being movable to adjust itself to the lateral swing of the forepart of a right or a left last in response to pressure of the work thereon, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, mechanisms associated respectively with the different wipers for imparting to them closing movements widthwise of the last, and members connected respectively to the portions of said clamping device located at the opposite sides of the last and also connected separately to the different respective wiper-closing mechanisms for adjusting the wipers by said clamping device in accordance with the lateral swing of the forepart of the last.

6. In a lasting machine, a device for clamping an upper about the toe end of a last, said device being movable to adjust itself to the lateral swing of the forepart of a right or a left last in response to pressure of the work thereon, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, mechanisms associated respectively with the different wipers for imparting to them closing movements widthwise of the last, each of said mechanisms comprising two links and a member connecting said links together, and means controlled by said clamping device for moving each said member relatively to one of the links to cause the members to act through the other links to adjust the wipers in accordance with the lateral swing of the forepart of the last.

7. In a lasting machine, a device for clamping an upper about the toe end of a last, said device being movable to adjust itself to the lateral swing of the forepart of a right or a left last in response to pressure of the work thereon, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, mechanisms associated respectively with the different wipers for imparting to them closing movements widthwise of the last, each of said mechanisms comprising two links and a member pivotally connected to both links, an eccentric about which each said member is mounted to turn in the closing of the wipers, and connections between the clamping device and the eccentrics for swinging said members each about its connection with one of the links to adjust the wipers through the other links in accordance with the lateral swing of the forepart of the last.

8. In a lasting machine, a device for clamping an upper about the toe end of a last, said device being movable to adjust itself to the lateral swing of the forepart of a right or a left last in response to pressure of the work thereon, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, mechanisms associated respectively with the different wipers for imparting to them closing movements widthwise of the last, said mechanisms including members mounted for turning movements in the closing of the wipers, eccentrics on which said members are thus mounted, and links connected respectively to the portions of said clamping device located at the opposite sides of the last and connected also to said eccentrics for turning the eccentrics as determined by the clamping device to adjust the wipers in accordance with the lateral swing of the forepart of the last.

9. In a lasting machine, a device for clamping an upper about the toe end of a last, said device being movable to adjust itself to the lateral swing of the forepart of a right or a left last in response to pressure of the work thereon, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, means controlled by said clamping device for adjusting the wipers also in accordance with the lateral swing of the forepart of the last, and means movable after such adjustment of the wipers to lock said clamping device against movement in a direction away from either side of the last in the operation of the wipers.

10. In a lasting machine, a device for clamping an upper about the toe end of a last, said device being movable to adjust itself to the lateral swing of the forepart of a right or a left last in

response to pressure of the work thereon, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, mechanisms associated respectively with the different wipers for imparting to them closing movements widthwise of the last, members controlled by said clamping device and arranged to act through said wiper-closing mechanisms to adjust the wipers in accordance with the lateral swing of the forepart of the last as determined by the clamping device, and devices associated with said members for locking the clamping device against movement in a direction away from either side of the last in the operation of the wipers.

11. In a lasting machine, a device for clamping an upper about the toe end of a last, said device being movable to adjust itself to the lateral swing of the forepart of a right or a left last in response to pressure of the work thereon, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, mechanisms associated respectively with the different wipers for imparting to them closing movements widthwise of the last, said mechanisms including members mounted for turning movements in the closing of the wipers, eccentrics on which said members are thus mounted, connections between the clamping device and said eccentrics for turning the eccentrics as determined by the clamping device to adjust the wipers in accordance with the lateral swing of the forepart of the last, and means for locking said eccentrics against movement in such directions as to relax the pressure of the clamping device on the sides of the toe in the operation of the wipers.

12. In a lasting machine, a device for clamping an upper about the toe end of a last, said device being movable to adjust itself to the lateral swing of the forepart of a right or a left last in response to pressure of the work thereon, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, mechanisms associated respectively with the different wipers for imparting to them closing movements widthwise of the last, said mechanisms including members mounted for turning movements in the closing of the wipers, eccentrics on which said members are thus mounted, connections between the clamping device and said eccentrics for turning the eccentrics as determined by the clamping device to adjust the wipers in accordance with the lateral swing of the forepart of the last, ratchet teeth movable with said eccentrics, and pawls controlled by the wiper-closing mechanisms and arranged to engage said ratchet teeth to lock the eccentrics against movement in such directions as to relax the pressure of the clamping device on the sides of the toe in the operation of the wipers.

13. In a lasting machine, the combination with a shoe support, and wipers for wiping the margin of an end of the upper of a shoe on said support into lasted position, of a device movable automatically heightwise of the shoe into engagement with the bottom of the shoe in locations spaced apart widthwise of the shoe to tip the shoe laterally into proper relation to the wipers if it is not already in that relation.

14. In a lasting machine, the combination with a shoe support, and wipers for wiping the margin of an end of the upper of a shoe on said support into lasted position, of a device movable heightwise of the shoe into engagement with portions of the bottom of the shoe where said wipers are thereafter to operate to tip the shoe laterally into proper relation to the wipers if it is not already in that relation, and means for withdrawing said device from operative position to make way for the wipers.

15. In a lasting machine, the combination with a shoe support, and wipers for wiping the margin of an end of the upper of a shoe on said support into lasted position, of a presser foot movable heightwise of the shoe and arranged to engage the bottom of the shoe to control the shoe in the lasting operation, a device movable heightwise of the shoe with said presser foot for engaging the bottom of the shoe and tipping the shoe laterally into proper relation to the wipers if it is not already in that relation, said device being arranged to engage and position the shoe before the presser foot arrives in shoe-engaging position, and means for thereafter transferring control of the shoe from said device to the presser foot.

16. In a power-operated lasting machine, the combination with a shoe support, and wipers for wiping the margin of the toe end of the upper of a shoe on said support into lasted position, of a device arranged to act automatically at a predetermined time in the power operation of the machine to engage the bottom of the forepart of the shoe in locations spaced apart widthwise of the shoe and to tip the shoe laterally into proper relation to the wipers if it is not already in that relation.

17. In a lasting machine, the combination with a shoe support, and wipers for wiping the margin of the toe end of the upper of a shoe on said support into lasted position, of a presser foot movable heightwise of the shoe and arranged to engage the bottom of the forepart of the shoe and to move the shoe heightwise relatively to the wipers, a device movable heightwise of the shoe with said presser foot and arranged to engage the bottom of the shoe in locations nearer the opposite sides of the shoe than said presser foot and where the wipers are thereafter to operate for tipping the shoe laterally into proper relation to the wipers if it is not already in that relation, and means for withdrawing said device from operative position to make way for the wipers.

18. In a lasting machine, the combination with a shoe support, and wipers for wiping the margin of the toe end of the upper of a shoe on said support into lasted position, of a presser foot arranged to engage the bottom of the forepart of the shoe and to move the shoe heightwise relatively to the wipers, a presser foot carrier movable heightwise of the shoe to carry the presser foot toward the shoe, and a device supported on said carrier in position to engage the bottom of the shoe before the presser foot for tipping the shoe laterally into proper relation to the wipers if it is not already in that relation.

19. In a lasting machine, the combination with a shoe support, and wipers for wiping the margin of the toe end of the upper of a shoe on said support into lasted position, of a presser foot arranged to engage the bottom of the forepart of the shoe and to move the shoe heightwise relatively to the wipers, a presser foot carrier movable heightwise of the shoe to carry the presser foot toward the shoe, and a device supported on said carrier in position to engage the bottom of the shoe before the presser foot and having portions arranged to act on the shoe in locations farther from the end of the toe and nearer the sides of the shoe than the presser foot for tipping

the shoe laterally into proper relation to the wipers if it is not already in that relation.

20. In a lasting machine, the combination with a shoe support, and wipers for wiping the margin of the toe end of the upper of a shoe on said support into lasted position, of a presser foot arranged to engage the bottom of the forepart of the shoe and to move the shoe heightwise relatively to the wipers, a presser foot carrier movable heightwise of the shoe to carry the presser foot toward the shoe, and a device supported on said carrier for engaging the bottom of the shoe in locations nearer the sides of the shoe than the presser foot to tip the shoe laterally into proper relation to the wipers if it is not already in that relation, said device being mounted to swing heightwise of the shoe relatively to the presser foot out of operative position.

21. In a lasting machine, the combination with a shoe support, and wipers for wiping the margin of an end of the upper of a shoe on said support into lasted position, of a presser foot arranged to engage the bottom of the shoe to control the shoe in the lasting operation, a presser foot carrier movable heightwise of the shoe with the presser foot, a device supported on said carrier for engaging the bottom of the shoe and tipping the shoe laterally into proper relation to the wipers if it is not already in that relation, and mechanism for withdrawing said device from operative position in response to further movement of said carrier after the shoe has been thus positioned by the device.

22. In a lasting machine, the combination with a shoe support, and wipers for wiping the margin of the toe end of the upper of a shoe on said support into lasted position, of a presser foot arranged to engage the bottom of the forepart of the shoe and to move the shoe heightwise relatively to the wipers, a presser foot carrier movable heightwise of the shoe with the presser foot, a device supported on said carrier in position to engage the bottom of the shoe before the presser foot for tipping the shoe laterally into proper relation to the wipers if it is not already in that relation, and mechanism automatically operative in response to further movement of the carrier after the shoe has been thus positioned by the device to transfer control of the shoe from said device to the presser foot.

23. In a lasting machine, the combination with a shoe support, and wipers for wiping the margin of the toe end of the upper of a shoe on said support into lasted position, of a presser foot arranged to engage the bottom of the forepart of the shoe and to move the shoe heightwise relatively to the wipers, a presser foot carrier movable heightwise of the shoe with the presser foot, a device pivotally mounted on said carrier for swinging movements heightwise of the shoe and arranged to engage the bottom of the shoe to tip the shoe laterally into proper relation to the wipers if it is not already in that relation, a pair of links mounted for swinging movements and arranged in substantial alinement to maintain said device initially in position to engage the shoe before the presser foot, and mechanism for swinging said links to withdraw said device from operative position in response to further movement of said carrier after the device has positioned the shoe.

24. In a lasting machine, the combination with a shoe support, toe wipers and heel wipers, of a device movable to tip a shoe on said support laterally by contact with the bottom of its forepart to position the shoe relatively to the toe wipers, and another device controlled by contact with the heel end of the shoe for tipping the heel wipers laterally as determined by the shoe after the shoe has been positioned relatively to the toe wipers by said first-named device.

25. In a lasting machine, the combination with a shoe support, toe wipers and heel wipers, of a device movable heightwise of a shoe on said support and having means for engaging the bottom of the forepart of the shoe in spaced locations to tip the shoe laterally into proper relation to the toe wipers, and another device movable heightwise of the shoe with said first-named device and controlled by contact with the bottom of the heel end of the shoe for tipping the heel wipers laterally as determined by the shoe, said other device being arranged to engage the shoe only after the shoe has been positioned by said first-named device.

26. In a lasting machine, the combination with a shoe support, of wipers for wiping the margin of an end of the upper of a shoe on said support into lasted position, means supporting said wipers for tipping movements about an axis extending lengthwise of the shoe, and a device controlled by engagement with the bottom of the shoe for tipping the wipers about said axis as determined by the shoe, said device having a shoe-engaging portion arranged to engage the shoe in a location where the wipers are to operate and displaceable by the action of the wipers thereon.

27. In a lasting machine, the combination with a shoe support, of wipers for wiping the margin of an end of the upper of a shoe on said support into lasted position, means supporting said wipers for tipping movements about an axis extending lengthwise of the shoe, and a device controlled by engagement with the bottom of the shoe for tipping the wipers about said axis as determined by the shoe, said device having presser feet arranged to engage the opposite side portions of the shoe bottom in the paths of wiping movement of the wipers and movable lengthwise of the shoe by the action of the wipers thereon.

28. In a lasting machine, the combination with a shoe support, of wipers for wiping the margin of the heel end of the upper of a shoe on said support into lasted position, means supporting said wipers for tipping movements about an axis extending lengthwise of the shoe, a member also mounted to tip about an axis extending lengthwise of the shoe and having means for correspondingly tipping the wipers, an arm arranged to extend heightwise of the shoe and supported by said member for swinging movements lengthwise of the shoe, and a pair of presser feet supported on said arm and arranged to engage the opposite side portions of the shoe bottom in the paths of wiping movement of the wipers to determine the positions to which said member and the wipers are tipped, said arm being movable lengthwise of the shoe with the presser feet to make way for the wipers.

29. In a lasting machine, the combination with a shoe support, of wipers for wiping the margin of the heel end of the upper of a shoe on said support into lasted position, means supporting said wipers for tipping movements about an axis extending lengthwise of the shoe, a member also mounted to tip about an axis extending lengthwise of the shoe and having means for correspondingly tipping the wipers, a pair of presser feet supported by said member and arranged

to engage the opposite side portions of the shoe bottom in the paths of wiping movement of the wipers to determine the positions to which said member and the wipers are tipped, and spring means against the resistance of which said presser feet are movable lengthwise of the shoe by the action of the wipers thereon to make way for the wipers.

30. In a power-operated lasting machine, a device for wiping the toe end of an upper heightwise of a last by relative movement of said device and the last after the starting of the power operation of the machine, and means for clamping the margin of the toe end of the upper prior to the starting of the machine and for thereafter applying a pull to the upper by engagement with its clamped margin in the course of said relative movement.

31. In a power-operated lasting machine, a device for wiping the toe end of an upper heightwise of a last, means for moving the last relatively to said device to effect the wiping operation after the starting of the power operation of the machine, and means for applying a pull to the toe end of the upper by clamping engagement with its margin through such movement of the last, said upper-pulling means comprising an upper-clamping member movable by the operator into clamping engagement with the upper prior to the starting of the machine.

32. In a power-operated lasting machine, a toe band for wiping the toe end of an upper heightwise of a last, wipers for wiping the margin of the toe end of the upper inwardly over the bottom of the last, means for clamping the margin of the toe end of the upper comprising a clamp member movable by the operator into upper-clamping position prior to the starting of the power operation of the machine, and power-operated means for moving the last heightwise relatively to said toe band, wipers and clamping means.

33. In a power-operated lasting machine, wipers for wiping the margin of the toe end of an upper inwardly over the bottom of a last, means for clamping the margin of the toe end of the upper outspread over said wipers prior to the starting of the power operation of the machine, and means for effecting relative movement of said clamping means and the last to pull the upper heightwise of the last after the starting of the machine.

34. In a power-operated lasting machine, wipers for wiping the margin of the toe end of an upper inwardly over the bottom of a last, means for clamping the margin of the toe end of the upper outspread over said wipers prior to the starting of the power operation of the machine, said clamping means comprising a clamp member movable by the operator into upper-clamping position, a device for locking the clamp member in that position, means for effecting relative movement of said clamping means and the last to pull the upper heightwise of the last in the power operation of the machine, and automatic means to cause said locking device to release the clamp member at a predetermined time in the operation of the machine.

35. In a power-operated lasting machine, wipers for wiping the margin of the toe end of an upper inwardly over the bottom of a last, a clamp member adjacent to the wipers for engaging the margin of the toe end of the upper outspread over the wipers, a cooperating clamp member movable by the operator into upper-clamping position prior to the starting of the power operation of the machine, and means for effecting relative movement of the last and said clamp members and wipers to pull and wipe the upper in the power operation of the machine.

36. In a power-operated lasting machine, means for conforming the toe end of an upper to a last and to an insole thereon in the power operation of the machine, and means for clamping the margin of the toe end of the upper to control it in the upper-conforming operation, said clamping means comprising a clamp member movable by the operator into upper-clamping position prior to the starting of the power operation of the machine.

37. In a power-operated lasting machine, means for conforming the toe end of an upper to a last and to an insole thereon in the power operation of the machine, and means for clamping the margin of the toe end of the upper to control it in the upper-conforming operation, said clamping means comprising a clamp member movable by the operator into upper-clamping position prior to the starting of the power operation of the machine, a device for locking the clamp member in that position, and automatic means to cause said locking device to release the clamp member at a predetermined time in the operation of the machine.

38. In a lasting machine, means for conforming the toe end of an upper to a last and to an insole thereon, and means for clamping the margin of the toe end of the upper to control it in the upper-conforming operation, said clamping means comprising a clamp member movable into upper-clamping position, an arm mounted to swing as the clamp member is moved to that position, a detent movably mounted on said arm, a locking member for engaging said detent to lock the clamp member in upper-clamping position, a spring for moving the detent into cooperative relation to said locking member when the arm arrives substantially at the end of its movement, and means for carrying said locking member away from the detent to release the clamp member in the operation of the machine.

39. In a power-operated lasting machine, means for conforming the toe end of an upper to a last and to an insole thereon in the power operation of the machine, and means for clamping the margin of the toe end of the upper to control it in the upper-conforming operation, said clamping means comprising a clamp member movable both lengthwise of the shoe and heightwise of the shoe, means for maintaining the clamp member initially in a retracted position lengthwise of the shoe, and means movable by the operator prior to the starting of the power operation of the machine to advance the clamp member first lengthwise of the shoe and then to move it heightwise of the shoe into upper-clamping position.

40. In a lasting machine, the combination with a shoe support, of means for clamping the margin of the toe end of the upper of a shoe on said support to control it in the lasting operation, said clamping means comprising an upper-engaging clamp member, a holder for said clamp member, a shaft arranged to extend widthwise of the shoe and to guide said holder for bodily movement lengthwise of the shoe and for swinging movement heightwise of the shoe, spring means arranged to act on said holder to maintain the clamp member initially in a retracted position both lengthwise and heightwise of the shoe, and

means for first moving said holder lengthwise of the shoe and for then swinging it heightwise of the shoe by the turning of said shaft to carry the clamp member into upper-clamping position.

41. In a lasting machine, the combination with a shoe support, of means for clamping the margin of the toe end of the upper of a shoe on said support to control it in the lasting operation, said clamping means comprising an upper-engaging clamp member, a holder for said clamp member, a shaft arranged to extend widthwise of the shoe and to guide said holder for bodily movement lengthwise of the shoe and for swinging movement heightwise of the shoe, spring means arranged to act on said holder to maintain the clamp member initially in a retracted position both lengthwise and heightwise of the shoe, and crank-and-link connections between said shaft and holder for moving the holder lengthwise of the shoe by the turning of the shaft and for swinging the holder heightwise of the shoe to carry the clamp member into upper-clamping position by further turning of the shaft.

42. In a lasting machine, the combination with a shoe support, of means for clamping the margin of the toe end of the upper of a shoe on said support to control it in the lasting operation, said clamping means comprising an upper-engaging clamp member, a holder for said clamp member, a shaft arranged to extend widthwise of the shoe and to guide said holder for bodily movement lengthwise of the shoe and for swinging movement heightwise of the shoe, spring means arranged to act on said holder to maintain the clamp member initially in a retracted position both lengthwise and heightwise of the shoe, a block pivotally mounted on the holder, connections between the shaft and said block for operating the holder through the block by the turning of the shaft and for thereby moving the clamp member lengthwise of the shoe and for swinging it into upper-clamping position, and spring means for applying force yieldingly to the holder by turning of the block relatively to the holder.

43. In a lasting machine, wipers for wiping the margin of the toe end of an upper inwardly over an insole on a last, means for moving the last heightwise relatively to said wipers prior to the inward wiping movements of the wipers, a device arranged to clamp the margin of the toe end of the upper outspread independently of the wipers and to apply a pull to the upper in response to the heightwise movement of the last, means for maintaining said device in control of the upper until after the wipers begin their operative movements, and another device arranged to press the toe end of the insole upon the bottom of the last and also to press the margin of the upper against the edges of the wipers as the wipers move inwardly, said last-named device being displaceable by the action of the wipers thereon.

44. In a lasting machine, wipers for wiping the margin of the toe end of an upper inwardly over an insole on a last, a toe-end support and a heel-end support for the last, springs associated respectively with said different supports for controlling them, pressure mechanism for moving the last heightwise with said supports against the resistance of said springs before the margin of the upper is wiped inwardly by the toe wipers, said pressure mechanism being thereafter reversely movable to permit the last to be forced heightwise toward the toe wipers for increasing their pressure on the margin of the upper, and means for preventing any substantial reverse movement of the heel-end support by its spring when the pressure mechanism is thus moved reversely.

45. In a lasting machine, wipers for wiping the margin of the toe end of an upper inwardly over an insole on a last, a toe-end support and a heel-end support for the last, springs associated respectively with said different supports for controlling them, pressure mechanism for moving the last heightwise with said supports against the resistance of said springs before the margin of the upper is wiped inwardly by the toe wipers, said pressure mechanism being thereafter reversely movable to permit the last to be forced heightwise toward the toe wipers for increasing their pressure on the margin of the upper, and a pawl-and-ratchet device arranged to act independently of said pressure mechanism to lock the heel-end support against any substantial reverse movement by its spring when the pressure mechanism is thus moved reversely.

46. In a lasting machine, wipers for wiping the margin of the toe end of an upper inwardly over an insole on a last, a toe-end support and a heel-end support for the last, spring's associated respectively with said different supports for controlling them, pressure mechanism for moving the last heightwise with said supports against the resistance of said springs before the margin of the upper is wiped inwardly by the toe wipers, said pressure mechanism being thereafter reversely movable to permit the last to be forced heightwise toward the toe wipers for increasing their pressure on the margin of the upper, and a member movable at a predetermined time in the operation of the machine into position to lock the heel-end support against any substantial reverse movement by its spring when the pressure mechanism is thus moved reversely, said member being thereafter movable to release the heel-end support and permit its return to starting position.

47. In a lasting machine, wipers for wiping the margin of the toe end of an upper inwardly over an insole on a last, a toe-end support and a heel-end support for the last, springs associated respectively with said different supports for controlling them, pressure mechanism for moving the last heightwise with said supports against the resistance of said springs before the margin of the upper is wiped inwardly by the toe wipers, said pressure mechanism being thereafter reversely movable to permit the last to be forced heightwise toward the toe wipers for increasing their pressure on the margin of the upper, ratchet teeth carried by said heel-end support, and a pawl movable into engagement with said ratchet teeth at a predetermined time in the operation of the machine to lock the heel-end support against any substantial reverse movement by its spring when said pressure mechanism is thus moved reversely.

48. In a lasting machine, toe and heel wipers arranged respectively to wipe the margin of an upper inwardly over an insole at the toe and heel ends of a last, a toe-end support and a heel-end support for the last, springs associated respectively with said different supports for controlling them, pressure devices arranged to act respectively at the toe and heel ends of the last to move the last and its supports heightwise against the resistance of said springs before the margin of the upper is wiped inwardly by the wipers, the pressure device at the heel end of the last comprising parts relatively movable at a predetermined time in the operation of the ma-

chine to permit the heel-end support to be operated by its spring to increase the pressure of the heel wipers on the margin of the upper, both said pressure devices being thereafter movable to permit the last to be forced heightwise toward the toe wipers for increasing their pressure on the margin of the upper, and mechanism constructed and arranged to permit the movement of the heel-end support by its spring to increase the pressure of the heel wipers on the upper but to prevent any substantial further movement of the heel-end support when the last is forced toward the toe wipers.

49. In a lasting machine, the combination with a shoe support, of heel-end clamping means movable lengthwise of a shoe on said support toward and from the heel end of the shoe, a spring for moving said clamping means toward the shoe, and mechanism for releasing the clamping means to permit its movement toward the shoe by said spring and for thereafter locking it against reverse movement in response to pressure of the shoe thereon.

50. In a lasting machine, the combination with a shoe support, of heel-end clamping means movable lengthwise of a shoe on said support toward and from the heel end of the shoe, a spring for moving said clamping means toward the shoe, and a latch device arranged to hold the clamping means initially retracted against the resistance of said spring and movable to release it to the action of the spring, said device being constructed to lock the clamping means automatically against reverse movement after its movement toward the shoe by the spring.

51. In a lasting machine, the combination with a shoe support, of heel-end clamping means movable lengthwise of a shoe on said support toward and from the heel end of the shoe, a device for locking the clamping means against reverse movement after its movement toward the shoe, a member for thereafter withdrawing the clamping means from the shoe, and means controlled by said member for unlocking the clamping means to permit it to be withdrawn from the shoe.

52. In a lasting machine, the combination with a shoe support, of heel-end clamping means movable lengthwise of a shoe on said support toward and from the heel end of the shoe, a device for locking the clamping means against reverse movement after its movement toward the shoe, mechanism for thereafter withdrawing the clamping means from the shoe, and a member connecting said mechanism to the clamping means and movable relatively to the clamping means to unlock it and permit it to be withdrawn.

53. In a lasting machine, the combination with a shoe support, of heel-end clamping means movable lengthwise of a shoe on said support toward and from the heel end of the shoe, a latch for locking the clamping means against reverse movement after its movement toward the shoe, mechanism connected to said clamping means for thereafter withdrawing it from the shoe by a pull thereon, and cam means operative in response to the pull of said mechanism to retract said latch from locking position.

54. In a lasting machine, wipers movable to wipe the margin of an end of an upper inwardly over an insole on a last, links connected to said wipers for operating them and arranged for sliding contact with faces of the wipers on the opposite sides thereof from their wiping faces, and heating means arranged to be engaged slidingly by said links on the opposite sides of the links from the wipers for heating the wipers through the links.

55. In a lasting machine, wipers movable to wipe the margin of an end of an upper inwardly over an insole on a last, heating members associated respectively with the different wipers for heating them, and links connected to said wipers for operating them, said links being arranged between the wipers and the heating members for sliding contact both with the wipers and with said members for conducting heat from said members to the wipers.

56. In a lasting machine, wipers movable to wipe the margin of an end of an upper inwardly over an insole on a last, links connected to said wipers for operating them and arranged for sliding contact with faces of the wipers on the opposite sides thereof from their wiping faces, and heating members arranged to be engaged slidingly by said links for heating the wipers through the links, portions of said links being enlarged relatively to other portions thereof to increase the area of contact of the links with said wipers and heating members.

57. In a lasting machine, wipers movable to wipe the margin of an end of an upper inwardly over an insole on a last, wiper-operating mechanism including links connected respectively to the different wipers, a cover plate over portions of said wiper-operating mechanism, and heating members mounted on said cover plate and having electrical heating units therein, portions of said heating members being arranged in substantial contact with said links for heating the wipers through the links.

58. In a power-operated lasting machine, wipers for wiping the margin of an upper inwardly over an insole on a last, means for heating said wipers, automatic means for bringing the machine to a stop after the wipers have wiped the upper inwardly to cause them to dwell on the upper while subjecting it to pressure and heat, and automatic means for thereafter again starting the machine.

59. In a power-operated lasting machine, wipers for wiping the margin of an upper inwardly over an insole on a last, means for heating said wipers, a clutch through which power is applied to drive the machine, a device arranged to act on said clutch to bring the machine to a stop after the wipers have wiped the upper inwardly to cause them to dwell on the upper while subjecting it to pressure and heat, and automatic means for operating said device thereafter to start the machine again in operation.

60. In a power-operated lasting machine, wipers for wiping the margin of an upper inwardly over an insole on a last, means for heating said wipers, a clutch through which power is applied to drive the machine, and clutch-controlling mechanism for bringing the machine automatically to a stop after the wipers have wiped the upper inwardly to cause them to dwell on the upper while subjecting it to pressure and heat and for thereafter automatically starting the machine again in operation, said clutch-controlling mechanism being adjustable to vary the length of time that the wipers dwell on the upper.

BERNHARDT JORGENSEN.