

May 13, 1952

L. E. PROULX ET AL

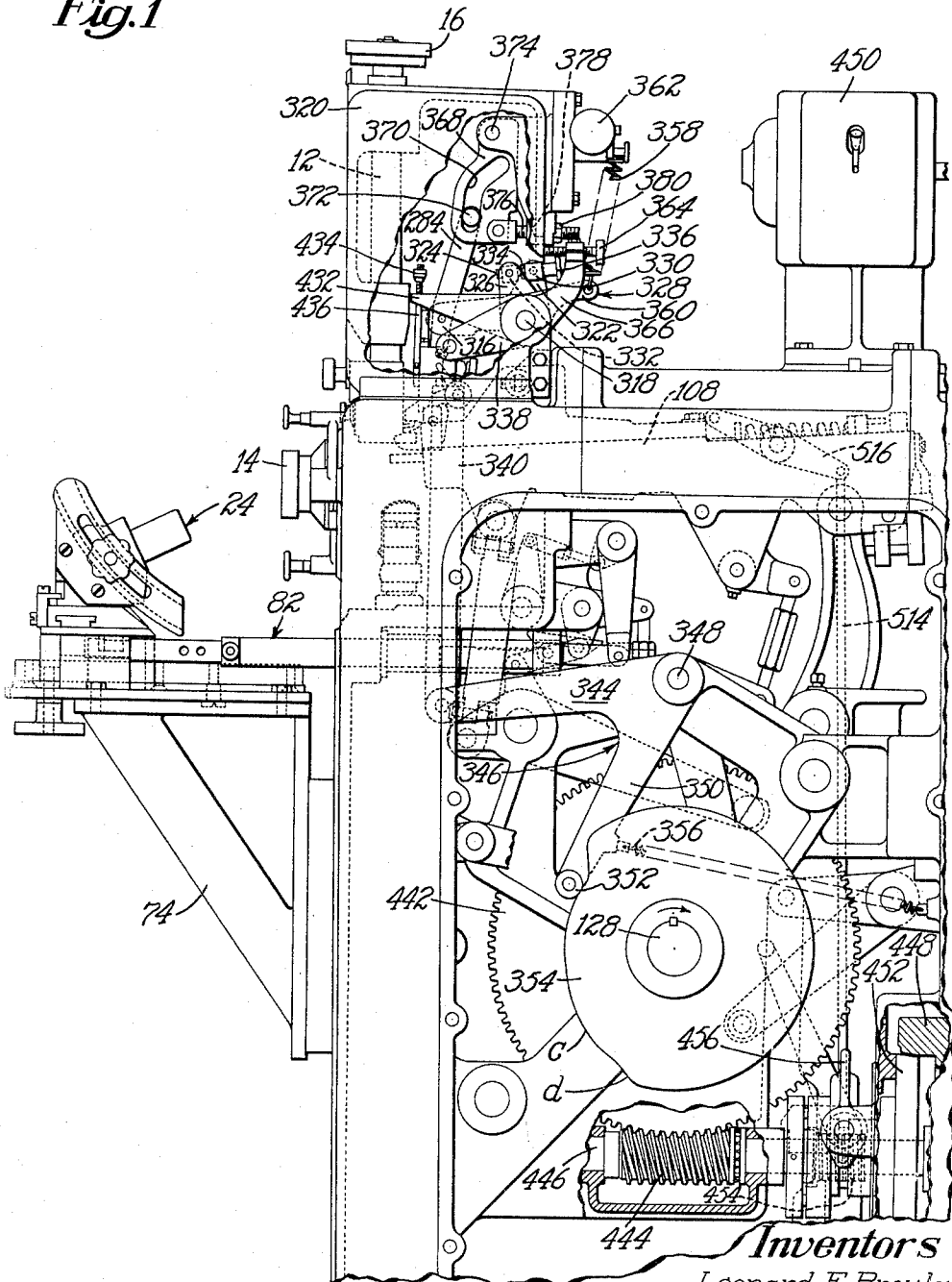
2,596,169

LASTING MACHINE

Filed Aug. 18, 1949

7 Sheets-Sheet 1

Fig. 1



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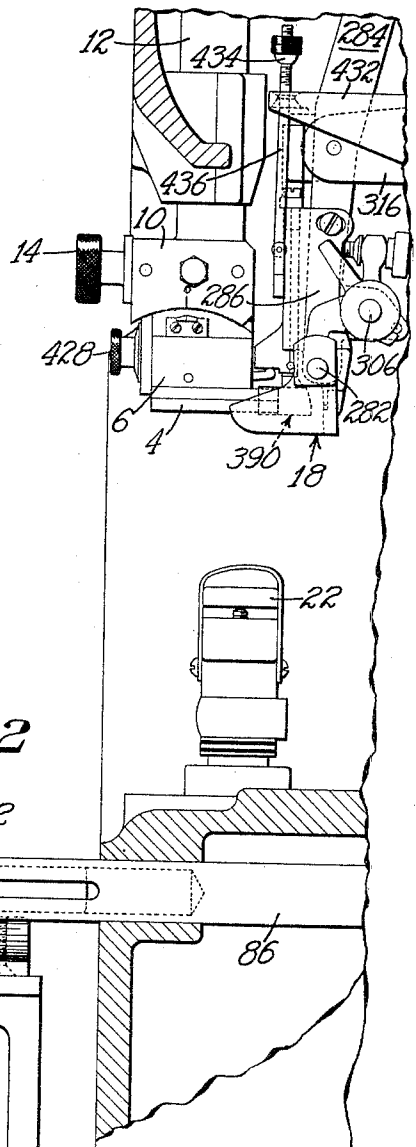
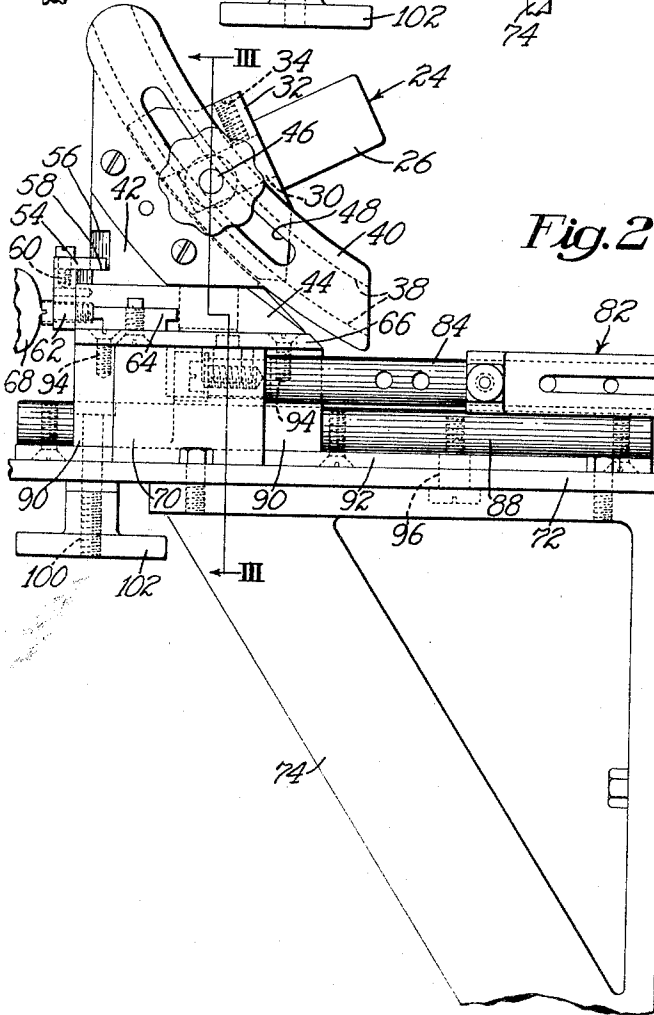
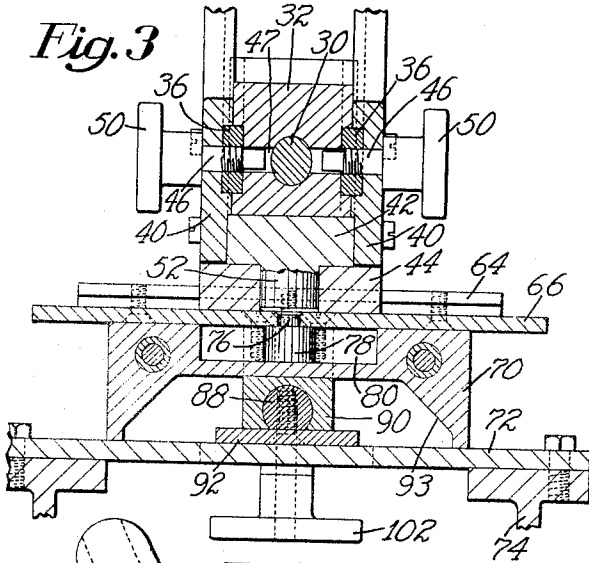
L. E. PROULX ET AL
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2,596,169

Filed Aug. 18, 1949

7 Sheets-Sheet 2

Fig. 3



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L. E. PROULX ET AL
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2,596,169

Filed Aug. 18, 1949

7 Sheets-Sheet 3

Fig. 4

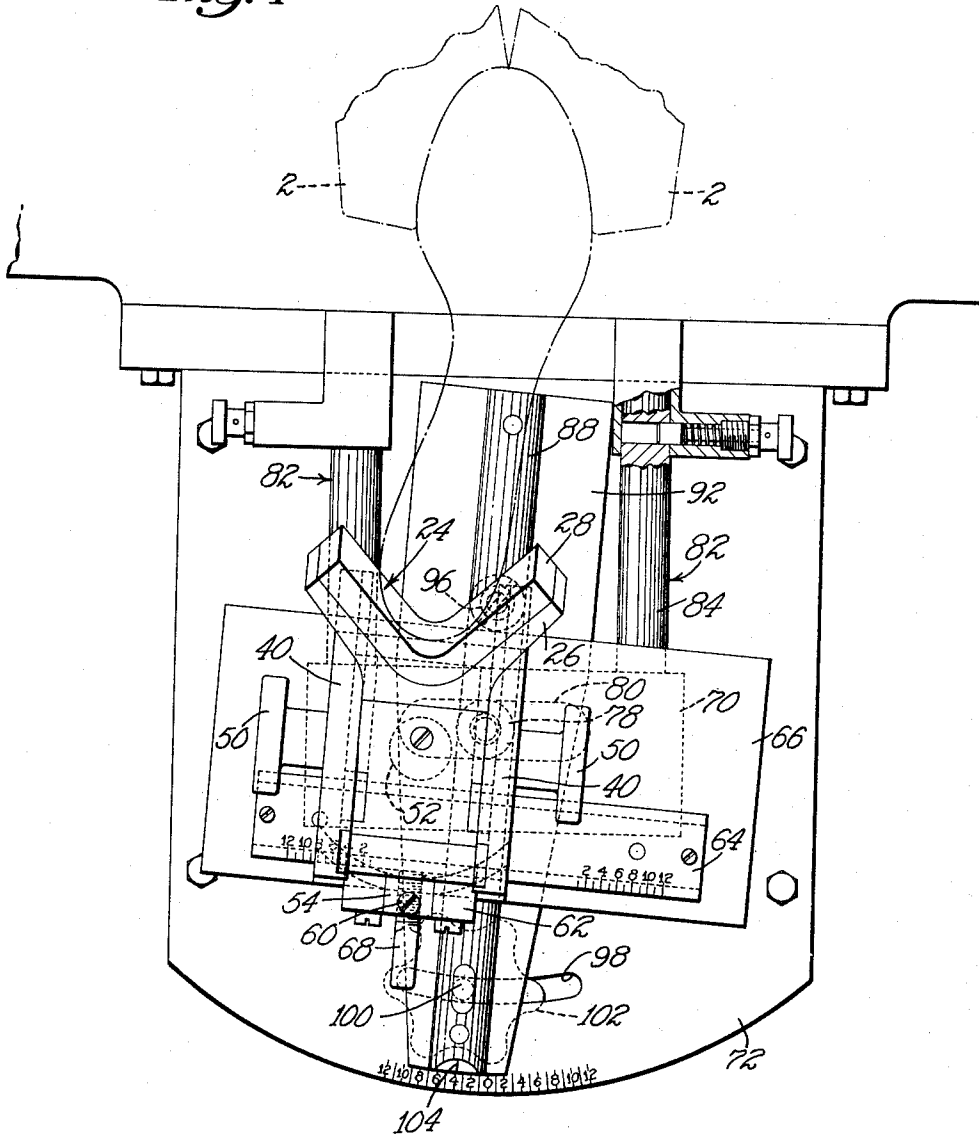
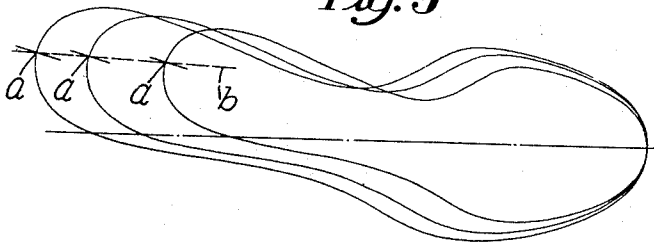


Fig. 5



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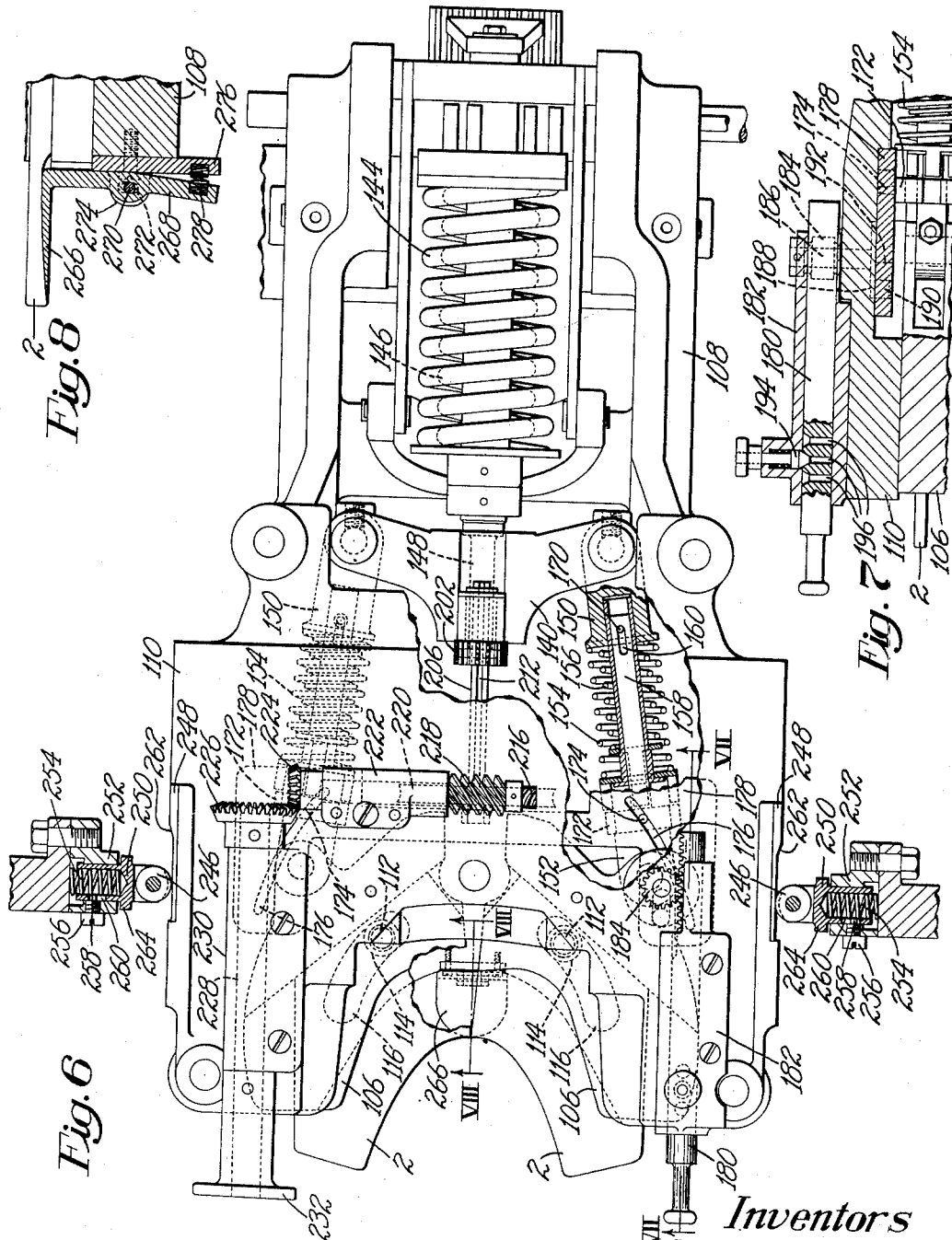
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L. E. PROULX ET AL
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2,596,169

Filed Aug. 18, 1949

7 Sheets-Sheet 4



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L. E. PROULX ET AL
LASTING MACHINE

2,596,169

Filed Aug. 18, 1949

7 Sheets-Sheet 5

Fig. 9

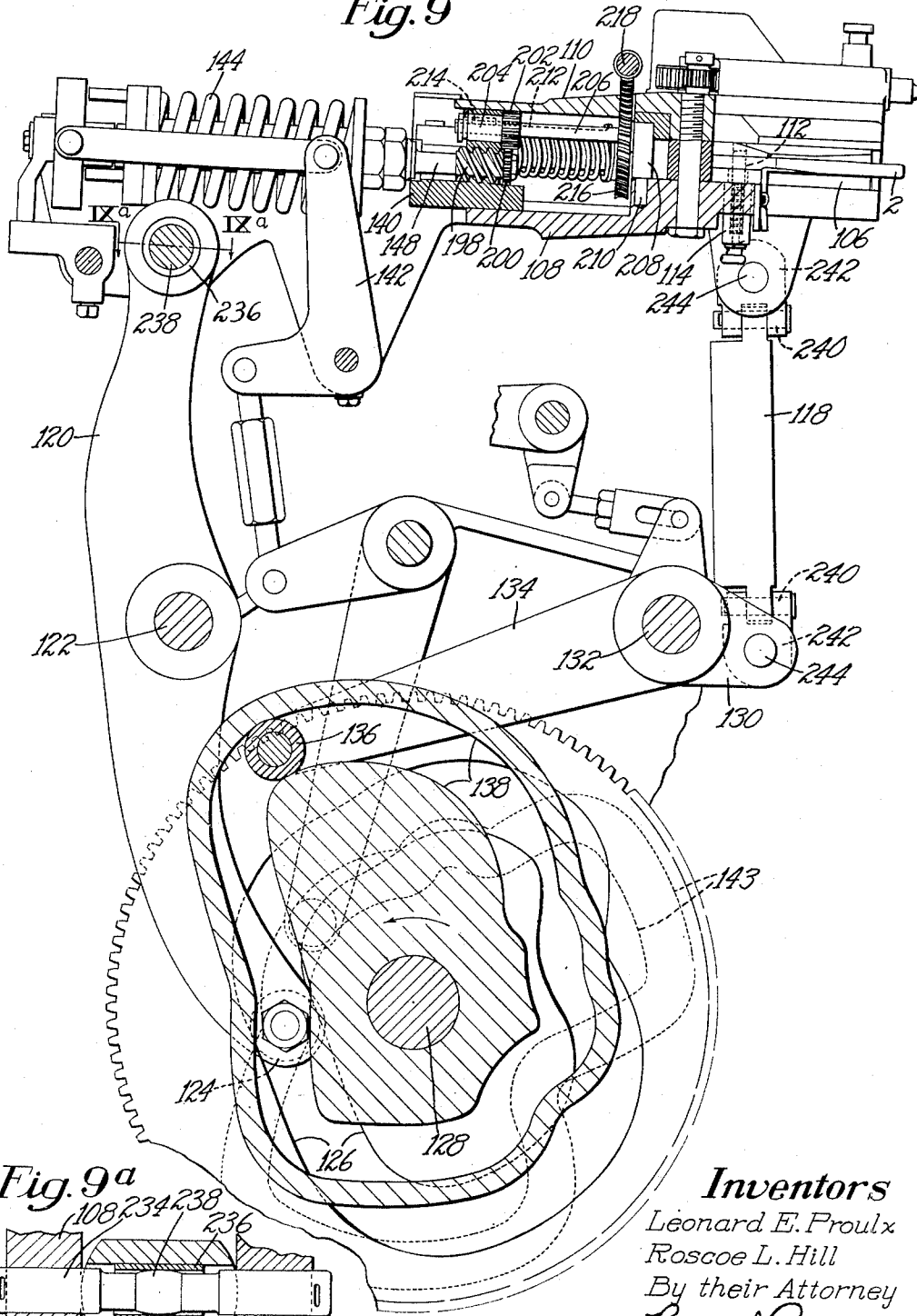
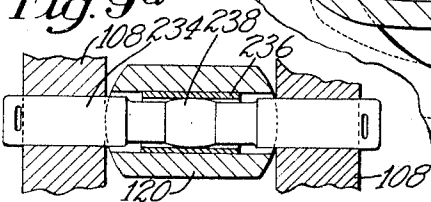


Fig. 9a



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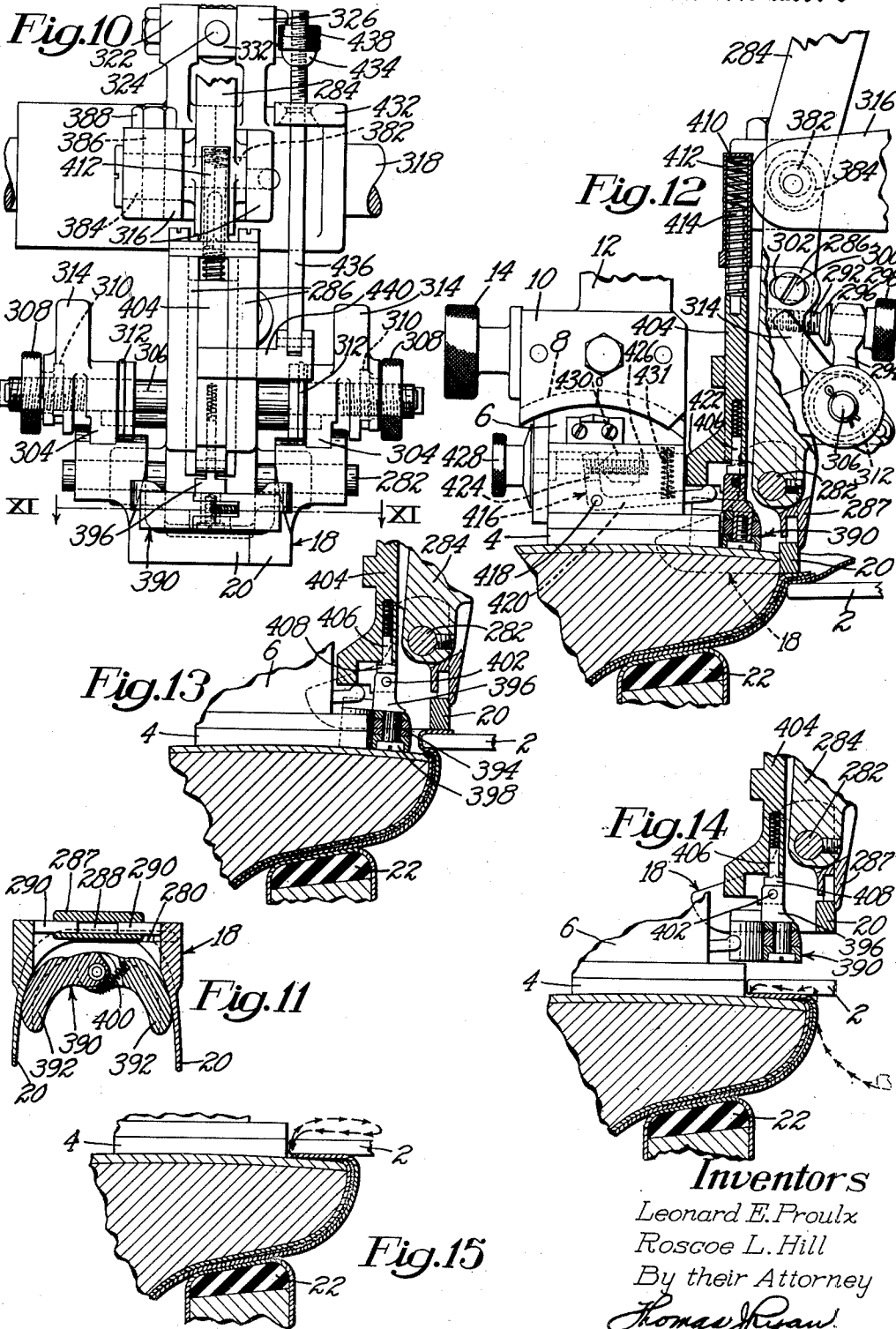
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2,596,169

LASTING MACHINE

Filed Aug. 18, 1949

7 Sheets-Sheet 6



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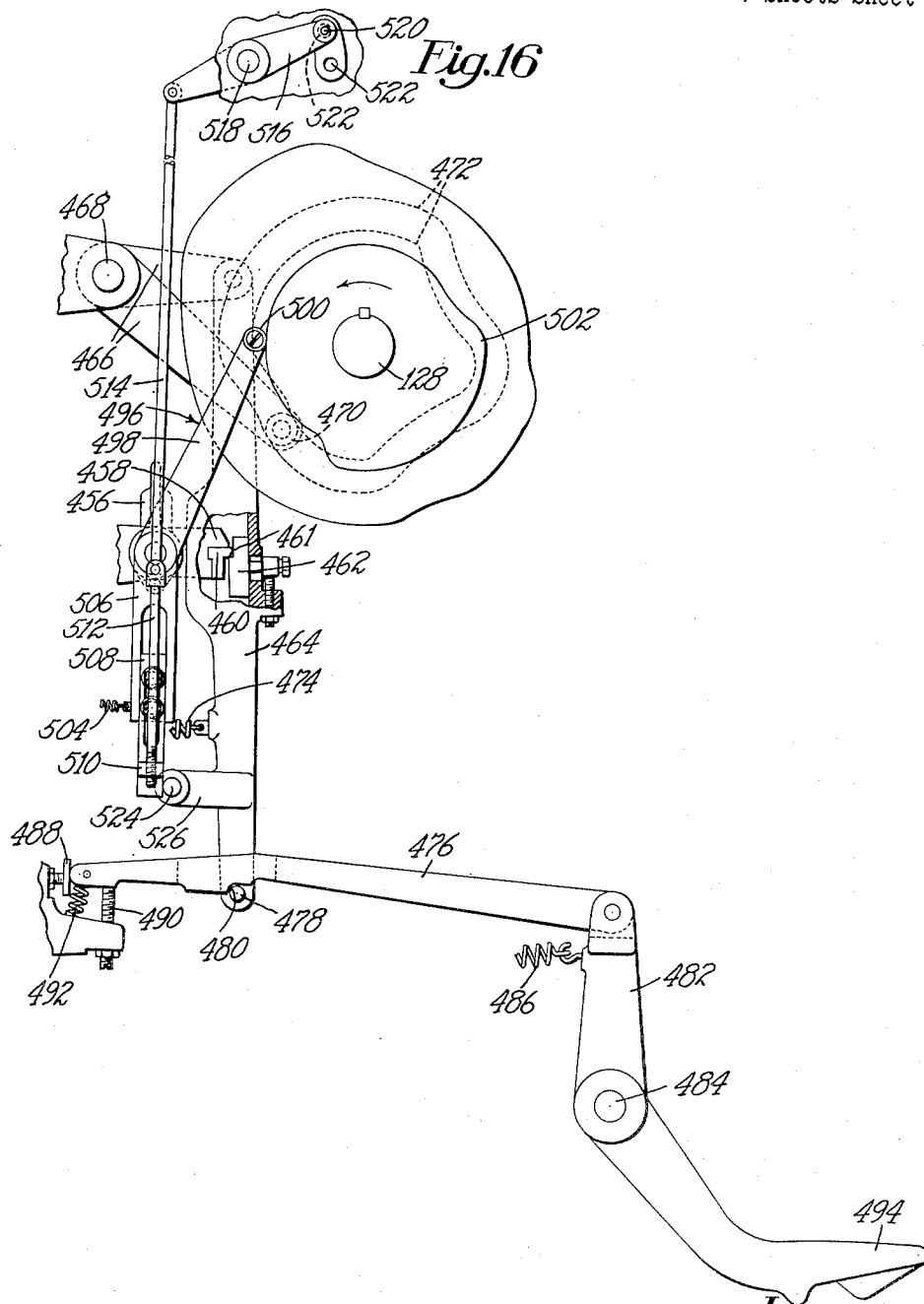
May 13, 1952

L. E. PROULX ET AL
LASTING MACHINE

2,596,169

Filed Aug. 18, 1949

7 Sheets-Sheet 7



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UNITED STATES PATENT OFFICE

2,596,169

LASTING MACHINE

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Application August 18, 1949, Serial No. 110,972

40 Claims. (Cl. 12—8.8)

1

This invention relates to lasting machines, and is herein shown as embodied in a power-operated toe-lasting machine constructed in many respects as disclosed in United States Letters Patent No. 2,160,846, granted on June 6, 1939 on an application of F. C. Eastman's and A. F. Pym's and in other Letters Patent hereinafter mentioned. It is to be understood, however, that in various novel aspects the invention is not limited to the illustrative embodiment.

An object of the invention, among others, is to provide certain improvements relating more particularly to the lasting of the toes of flat-lasted shoes, i. e., shoes in which the marginal portion of each upper lying over the insole extends throughout its width in generally parallel relation to the bottom of the last. Automatic machines for lasting the toes of such shoes with toe-embracing wipers which are shaped to conform substantially to the contour of a shoe around the toe opposite to the edge of the insole require special means for positioning the last and shoe relatively to the wipers. For purposes of this invention the machine herein shown is provided with means for engaging the toe end of the last when the work is presented to the machine to position that end of the last lengthwise and laterally, i. e., with respect to lateral bodily movement, and with additional means for further positioning the toe end of the last angularly, i. e., with respect to lateral swinging movement about an axis at the end of the toe, by control of the heel end of the last. Such additional means, in the construction shown, comprises a substantially V-shaped heel rest which is moved lengthwise of the last into engagement with the upper on the heel end of the last after the work has been presented to the machine. In order that the heel rest will thus properly position lasts of different styles, provision is afforded for determining selectively in accordance with the style of the last the direction of its movement lengthwise of the last and for also effecting a predetermined bodily adjustment thereof widthwise of the last. As illustrated, the direction of the movement of the heel rest lengthwise of the last is determined by a guide which is adjustable about an axis extending heightwise of the last in accordance with the style of the last and for right and left lasts, the heel rest being adjustable widthwise of the last relatively to the guide. The proper adjustment of the guide for lasts of different styles may be indicated on a chart and will preferably be so calculated that no additional adjustment will be required for different sizes. It is contemplated

2

also that the chart will indicate the corresponding required adjustments of the heel rest widthwise of the last for the different styles.

As common heretofore in toe-lasting machines, the wipers in the machine herein shown wipe the upper around the toe end of the last heightwise of the last, i. e., perform what is known as an upwiping operation, before they wipe the marginal portion of the upper inwardly over the insole. In this operation it is desirable that the wipers apply substantially equal pressures to the upper at the opposite sides of the toe, and for better insurance that they will act in this manner they are so controlled as to permit them to move bodily widthwise of the last in response to pressure of the upper at one side or the other of the toe on the corresponding wiper, the wipers being supported on a wiper carrier which is movable with them widthwise of the last. To insure that in wiping the upper thereafter inwardly over the insole one of the wipers will not move inwardly over the insole substantially farther than the other, the invention further provides means for preventing at that time any bodily movement of the wipers widthwise of the last. For this purpose the construction shown comprises means for centralizing the wiper carrier with respect to lateral movement after the upwiping operation and for locking it against such movement as the wipers wipe the upper inwardly over the insole.

In order to prevent the wipers from acting too severely on the gathers or pleats which develop in the margin of the upper around the end of the toe in the wiping of the upper inwardly over the insole, especially if the bottom of the toe end of the last has a convex curvature, the machine herein shown is further so constructed that after the wipers have started to wipe the upper inwardly they have an appreciable movement progressively heightwise of the last in a direction away from the bottom of the last as they are moved farther inwardly. When the wipers begin their inward movements they are so positioned heightwise of the last as to insure against displacement of the edge of the insole, and as soon as they have wiped the upper inwardly over the extreme edge of the insole they are moved toward the bottom of the last to increase their pressure on the upper before they are moved progressively in the opposite direction as above described. Substantially at the end of the inward wipe the wipers are moved toward the bottom of the last to increase their pressure on the overwiped margin of the upper. After having

thus acted on the upper, in the construction herein shown, the wipers are retracted and are thereafter moved inwardly a second time in wiping engagement with the upper, the second wipe taking place without any progressive movement of the wipers in a direction away from the bottom of the last such as occurs in the course of the first wipe. It is contemplated that cement will be used to secure the upper to the insole, and accordingly the margin of the upper will be held by the cement against any substantial retractive movement between the two wipes.

Under some conditions it may be desirable for the wipers to remain for a few seconds in pressure-applying relation to the margin of the upper after the second inward wipe to allow more time for the cement to set. Provision is, therefore, further afforded for automatically stopping the machine at that time in the cycle of operations or for optionally eliminating such a stop if desired. In the construction herein shown a cam-operated member arranged to act on a clutch thus to stop the machine prior to the end of the cycle is automatically displaced at the proper time to prevent such stopping of the machine when mechanism controlled by the operator is set to cause such displacement of the member.

The above and other features of the invention, including various novel details of construction and combinations of parts, will now be more particularly described with reference to the accompanying drawings and thereafter pointed out in the claims.

In the drawings,

Fig. 1 is a view in right-hand side elevation of the upper portion of the machine in which the invention is herein shown as embodied, with parts broken away;

Fig. 2 is a view mainly in right-hand side elevation, but with parts broken away, showing on an enlarged scale a portion of the structure shown in Fig. 1;

Fig. 3 is a section on the line III—III of Fig. 2;

Fig. 4 is mainly a plan view of the heel rest and parts associated therewith, illustrating diagrammatically the position of a shoe in relation to the wipers;

Fig. 5 is a diagrammatic view illustrating with reference to shoe bottom patterns of the same style but different sizes the direction of the movement of the heel rest in operating on shoes of that style;

Fig. 6 is a plan view of the wipers and the mechanisms for operating and controlling them, with parts broken away;

Fig. 7 is a section on the line VII—VII of Fig. 6;

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

Fig. 9 is a view partly in left-hand side elevation and partly in section of a portion of the wiper-operating mechanism;

Fig. 9a is a section on the line IXa—IXa of Fig. 9;

Fig. 10 is a view in front elevation of means associated with the wipers for controlling the upper and the insole;

Fig. 11 is a section on the line XI—XI of Fig. 10;

Figs. 12, 13, 14 and 15 are vertical sectional views, showing the positions of different parts at different times in the lasting operations; and

Fig. 16 is a view mainly in left-hand side elevation showing starting and stopping means with which the machine is provided.

In view of the disclosures in the above-men-

tioned Letters Patent No. 2,160,846 and in others hereinafter mentioned, such parts of the machine as are common to the prior disclosures will be hereinafter described only in so far as is necessary for an understanding of the present invention.

The machine includes a pair of toe-embracing wipers 2 (Fig. 6) for wiping the toe end of the upper heightwise of the last and for thereafter wiping its marginal portion inwardly over an insole on the last. The shoe is presented to the machine by the operator with the bottom of its forepart in engagement with a plate 4 (Figs. 2 and 12) the lower face of which is curved to conform approximately to such curvature as the corresponding portion of the bottom of the shoe may have. The plate thus determines the position of the shoe heightwise and with respect to lateral or longitudinal tipping movements. It is detachably secured by means not herein shown on a block 6 which is adjustable about an axis extending widthwise of the shoe along guideways 8 (Fig. 12) formed in an enlarged lower end portion 10 of a vertical rod 12, the block being thus adjusted by a screw 14 in the same manner as the block 10 shown in Letters Patent No. 2,385,414, granted on September 25, 1945 on an application of E. A. Holmgren's. The rod 12 is vertically adjustable by a hand wheel 16 (Fig. 1) in the same manner as disclosed in Letters Patent No. 2,160,846.

When the shoe is presented by the operator as above described the position of the last and shoe lengthwise is determined by engagement of the toe-end face of the last with a device 18 (Figs. 11 and 12) which, as hereinafter described, clamps the marginal portion of the toe end of the upper out-spread on the wipers 2 to control it in the lasting operation and thus has the function of what is commonly known as a retarder. This device includes a pair of fingers 20 which are curved to embrace the toe end of the last and further serve, regardless of the style or size of the last, to centralize that end of the last and shoe laterally, i. e., with respect to bodily lateral movement. Substantially at the beginning of a cycle of power operations of the machine the shoe is clamped against the plate 4 by upward movement of a toe rest 22. The mechanism for operating this toe rest is not herein shown in detail, but is of substantially the same construction as disclosed in Letters Patent No. 2,224,146, granted on December 10, 1940 on an application of F. C. Eastman's. That is, the construction is such that the toe rest is forced yieldingly against the shoe first with comparatively light pressure to control the shoe and is later forced more firmly against the shoe to support it against the downward pressure of the wipers on the margin of the upper. As hereinafter explained, however, the time when it is thus forced more firmly against the shoe is different from the disclosure of said Letters Patent.

Shortly after the beginning of the cycle of operations, when the toe rest 22 is holding the shoe against the plate 4 with comparatively light pressure as above described, a heel rest 24 (Figs. 2 and 4) is moved rearwardly into engagement with the heel end of the shoe. This heel rest comprises a V-shaped member 26 to which is secured a similarly shaped shoe-engaging pad 28, and as hereinafter explained it serves not only to assist in supporting the shoe against lengthwise movement, but also to determine the position of the heel end of the shoe laterally and

thereby to position its toe end angularly in proper relation to the wipers. The member 26 is provided with a stem 30 (Fig. 2) extending into a bore in a block 32 to permit the heel rest to be adjusted angularly about an axis extending lengthwise of the shoe, and it is held in adjusted position by a setscrew 34 threaded in the block and engaging the stem 30. Mounted in curved recesses in the opposite sides of the block 32 are segmental members 36 (Fig. 3) which are also mounted in curved guideways 38 formed in plates 40 at the opposite sides of the block, these plates being secured to a holder 42 supported on the top of a slide 44. Threaded in the segmental members 36 are screws 46 which have unthreaded ends extending inwardly into a bore 47 in the block 32, the screws having also unthreaded portions extending outwardly through curved slots 48 in the plates 40 and provided with hand wheels 50 fast thereon for turning them. It will be evident that through the provision of the segmental members 36 and the guideways 38 the block 32 and the heel rest 24 are adjustable upwardly or downwardly about an axis extending widthwise of the shoe to assist in positioning the heel rest in that respect in proper relation to shoes of different styles. After such adjustment the block and the heel rest are secured in adjusted position by the screws 46, the hubs of the hand wheels 50 cooperating with the screws to clamp the segmental members 36 firmly against the plates 40.

Extending downwardly from the holder 42 into a bore in the slide 44 is a stem 52, so that the holder and the parts supported thereon may be adjusted about an axis extending heightwise of the shoe. The holder is secured in adjusted position by a clamping finger 54 (Fig. 2) which extends into a recess 56 in the holder and engages a horizontal face 58 formed on the holder, the finger being forced down against the face 58 by a screw 60 threaded in a block 62 which is secured to the slide 44. This slide is mounted for rectilinear adjusting movements in directions widthwise of the shoe on a guide 64 which is fast on an underlying plate 66, and it is secured in adjusted position by a thumb screw 68 threaded in the slide and arranged to bear at its inner end against the front edge of the guide 64.

The plate 66 is supported on the top of a block 70 which is engaged and partially supported underneath by a plate 72 secured to a bracket 74 fast on the front of the frame of the machine. Rotatably mounted on a stud 76 fast on the plate 66 is a roll 78 which lies in a slot 80 extending widthwise of the shoe in the block 70. Upon movement of this block, therefore, in a rearward direction it acts through the roll 78 to impart rearward movement to the plate 66 and thereby to move the heel rest rearwardly into engagement with the heel end of the shoe. Such movement is imparted to the block 70 by a pair of rods 82 slidingly movable in the frame of the machine and operated by mechanism not herein shown in detail but which may be assumed to be of the same construction as mechanism shown in the previously mentioned Letters Patent No. 2,160,846 for operating corresponding rods therein shown. The rods 82 in the construction herein shown comprise telescopic parts 84 and 86 (Fig. 2) relatively adjustable to position the heel rest preliminarily for operation on shoes which differ substantially in size, in accordance with the disclosure of Letters Patent No. 2,245,580, granted on June 17, 1941, on an application of F. C. East-

man's. These telescopic parts are shown as differently adjusted in Fig. 4 than in Fig. 2.

It will be evident that the rearward movement imparted as above described to the block 70 by the rods 82 is a rectilinear movement the direction of which is invariable for all shoes. For purposes of the present invention, however, the movement imparted to the heel rest by that movement of the block 70 is a movement the direction of which varies for shoes of different styles and for right and left shoes. For determining the direction of movement of the heel rest there is provided a guide bar 88 which extends through a bore in a block 90 slidingly movable thereon and is secured underneath to a plate 92 supported on the plate 72. A portion of the block 90 extends forwardly and rearwardly through a recess 93 in the block 70, as shown in Fig. 3, and other portions thereof extend upwardly in locations forwardly and rearwardly of the block 70 and are secured by screws 94 to the plate 66 (Fig. 2). It will therefore be understood that the direction of the movement of the heel rest toward the shoe depends upon the direction in which the guide bar 88 extends lengthwise of the shoe. Threaded in this guide bar is a stud 96 (Fig. 2) a cylindrical portion of which extends downwardly through a hole in the plate 72 to provide an axis about which the bar may be adjusted. Extending downwardly from the front end portion of the guide bar through a curved slot 98 in the plate 72 is a bolt 100 on the lower end of which is threaded a hand wheel 102 for securing the guide bar in any position of adjustment about the axis of the stud 96.

In determining how the guide bar 88 should be adjusted it is necessary to consider the fact that the toe-end face of every last is in substantially the same position in the machine and that the longitudinal median line of the bottom of the forepart of each last and shoe should be located in the same relation to the edges of the wipers regardless of the style or size of the shoe. Figure 5 illustrates diagrammatically with reference to three shoe bottom patterns of the same style but of different sizes the positions which the heel ends of the shoes will occupy when their foreparts are in the above-described relation to the wipers. The customary manner of pattern grading is such that what may be termed the middle points *a* at the heel ends of the patterns all lie on the same straight line *b*. This line represents the preferred direction of movement of the heel rest 24 as determined by the adjustment of the guide bar 88, so that the guide bar will need to be adjusted only in accordance with style and not for different sizes. It will be understood, of course, that symmetrically opposite adjustments will be required for right and left shoes respectively. To indicate the adjusted positions of the guide bar the plate 72 has thereon a scale comprising two series of arbitrarily numbered graduations, one for right shoes and the other for left shoes, arranged to aline with a mark 104 on the front end of the bar. It is contemplated that the operator will have before him a chart indicating by numbers the proper adjustments for shoes of different styles. In addition to the adjustment of the guide bar 88, the "swing" of the last requires also a bodily adjustment of the heel rest widthwise of the last for different styles and for rights and lefts, in order that it will properly position the heel end of each shoe laterally and will thereby determine the proper position of the toe end of the shoe angularly relatively to the

wipers. This bodily adjustment of the heel rest is effected by moving the slide 44 along the guide 64. To indicate the adjusted positions of the slide 44, the guide 64 has thereon two series of numbered graduations, one for right shoes and the other for left shoes, arranged to register with the opposite ends of the slide, and it is contemplated that the above-mentioned chart will indicate also by numbers the proper adjustment of the slide for shoes of different styles. For some styles it may be advisable also to adjust the block 42 and the heel rest to some extent about the vertical axis of the stem 52 on the block.

As more fully disclosed in Letters Patent No. 2,160,846, the wipers 2 are mounted on wiper holders 106 (Fig. 6) which are guided for wiper-closing movements laterally of the shoe in curved paths on a wiper carrier 108 under a cover plate 110 on the carrier. The wipers are held detachably in place in slots in the wiper holders by spring-pressed pins 112 (Figs. 6 and 9) which are slidably mounted in nipples 114 fast on the wiper holders and extending through curved slots 116 in the wiper carrier, so that the wipers may be readily inverted for use on right and left shoes and different wipers may be used on shoes of different styles and sizes. The wiper carrier 108 is supported near its front end for movements to advance and retract the wipers lengthwise of the shoe on a pair of links 118 which are spaced apart widthwise of the shoe, only one of these links being visible in the drawings. Connected to and supporting the wiper carrier near its rear end is the upper end of a lever 120 for moving it lengthwise of the shoe, this lever being pivotally mounted between its upper and lower ends on a fulcrum rod 122 and being provided at its lower end with a roll 124 which lies in a path cam 126 on a cam shaft 128. The two links 118 are connected at their lower ends to arms 130 fast on a rockshaft 132, and also fast on this rockshaft is an arm 134 provided with a roll 136 which lies in a path cam 138 on the cam shaft 128. Through the arm 134, therefore, the wiper carrier is swung upwardly about its connection with the lever 120 to cause the wipers to wipe the upper heightwise of the last and is later swung downwardly and upwardly to increase and to relieve the pressure of the wipers on the marginal portion of the upper over the insole.

In proper time relation to the advancing movements of the wipers lengthwise of the shoe the wipers are closed inward laterally of the shoe, first to engage the upper in the upwiping operation and thereafter to wipe its marginal portion inwardly over the insole, by forward movement of a slide 140 guided on the wiper carrier 108. The mechanism for thus operating the slide 140 need not be herein described in detail, since it is constructed substantially as disclosed in Letters Patent No. 2,160,846. It includes a bell-crank lever 142 pivotally mounted on the wiper carrier 108 and operated by a cam 143 on the cam shaft 128 to impart forward wiper-closing movement to the slide 140 selectively through one or the other or both of a pair of springs 144 and 146 arranged to act on the slide through a rod 148. The slide 140 is connected to the wiper holders 106, in the construction herein shown, by yieldable link mechanisms substantially like corresponding mechanisms disclosed in Letters Patent No. 2,354,663, granted on August 1, 1944 on an application of P. E. Burby's. Briefly, each of these mechanisms includes a member 150 pivotally con-

nected to the slide 140, a member 152 pivotally connected to the corresponding wiper holder 106, and a pair of springs 154 and 156 through one or the other or both of which selectively wiper-closing force is transmitted from the member 150 to the member 152 to cause the wipers to engage the upper yieldingly in the upwiping operation. Extending from the member 152 is a rod 158 provided with a slot 160 through which extends a pin 170 in the member 150 to limit the yield of the springs. Associated with each pair of springs 154, 156 is a ring 172 which by turning movement renders one or the other or both of the springs selectively effective in the wiper-closing operation, as fully described in the last-mentioned Letters Patent, each ring having on its periphery a pin 174 extending into a slot 176 in an adjusting slide 178 which is guided for movements widthwise of the machine by the cover plate 110 on the wiper carrier (see Fig. 7). To facilitate adjustment of the slide 178 there is provided, in the construction herein shown, a rack bar 180 guided by a holder 182 fast on the top of the cover plate 110 and extending forwardly to a position where the operator may conveniently manipulate it. The rack bar is in engagement with a pinion 184 fast on a shaft 186 rotatable in the cover plate 110, and on the lower end of the shaft is a disk 188 having thereon a pin 190 lying in a slot 192 in the slide 178. To determine the proper adjusted positions of the slide a spring-pressed retaining member 194 is mounted in the holder 182 and is arranged to enter any one of three recesses 196 in the rack bar 180.

Mechanism constructed, in part, as disclosed in Letters Patent No. 2,354,663 is further provided for preliminarily adjusting the wipers toward or from each other by moving the wiper-closing slide 140 in a forward or a rearward direction relatively to the rod 148 through which the slide is operated, this adjustment being effected by turning movement of the rod. For this purpose the rod has formed thereon a screw thread 198 (Fig. 9) engaging a corresponding thread in the slide and has fast on its front end a pinion 200 in engagement with an elongated pinion 202 provided with a stem 204 rotatable in a bearing in the slide and confined against lengthwise movement relatively to the slide. Extending through a bore in the stem 204 is a rod 206 the front end of which is rotatably supported in a member 208 having a stem 210 extending downwardly into a hole in the wiper carrier 108. Formed in the rod 206 is a keyway 212 into which extends a key 214 mounted in the stem 204. It will accordingly be understood that when the rod 206 is turned the pinion 202 acts on the pinion 200 to turn the rod 148 and that the screw thread 198 on this rod serves to adjust the slide 140 in a forward or a rearward direction, the elongated pinion 202 sliding along the rod 206 and maintaining its connection with the pinion 200. For thus turning the rod 206, in the construction herein shown, there is fast on the rod a worm gear 216 extending upwardly through a slot in the cover plate 110 and engaged by a worm 218 which is formed on a shaft 220 (Fig. 6) rotatable in a member 222 fast on the cover plate 110. Fast on one end of this shaft is a bevel gear 224 in engagement with another bevel gear 226 fast on a shaft 228 which is rotatable in a bearing member 230 on the cover plate and extends forwardly at right angles to the shaft

220. On the front end of the shaft 228 is a hand wheel 232 in position convenient for use by the operator to adjust the wipers as described.

For better insurance that the wipers will apply substantially equal pressures to the upper at the opposite sides of the toe in wiping it heightwise of the last, the construction herein shown is such that the wiper carrier 108 may swing a short distance in a direction widthwise of the shoe in response to pressure of one side or the other of the toe on the corresponding wiper. For this purpose, as shown in Fig. 9a, the connection between the wiper carrier 108 and the lever 120 comprises a rod 234 mounted in the wiper carrier and extending through a bushing 236 in the lever, the rod having midway between its opposite ends a convexly curved portion 238 engaging the bushing and of greater diameter than other portions of the rod within the bushing. To facilitate the swinging of the wiper carrier, moreover, the links 118 are pivotally connected by forwardly and rearwardly extending pins 240 to blocks 242 which are pivotally connected respectively to the wiper carrier and to the arms 130 by pins 244 extending at right angles to the pins 240. While such provision for lateral swinging movement of the wiper carrier is desirable, for the reason above described, in the upwiping operation, it is further desirable, in operating on flat-lasted shoes, to prevent lateral movement of the wiper carrier in response to pressure of the shoe on either of the wipers when the wipers wipe the marginal portion of the upper inwardly over the insole and thus to afford better insurance that one of the wipers will not move inwardly over the shoe bottom substantially farther than the other. The machine herein shown, therefore, is provided with rolls 246 located opposite to the sides of the wiper carrier and arranged to engage cam plates 248 secured on the sides of the carrier. Each roll is mounted on a holder 250 slidably mounted for movements widthwise of the machine in a member 252 fast on the frame, the holder being controlled by a light spring 254 which tends to move it toward the carrier. Threaded in the member 252 is a screw 256 having on its inner end a stem 258 extending into a slot 260 in the holder 250 to limit the movement imparted to the holder by the spring. Initially the rolls 246 are so positioned that they are substantially in engagement with the cam plates 248 as shown in Fig. 6, but the springs 254 are so light that there is no substantial resistance to such lateral movement as the wiper carrier may receive in the upwiping operation. At the same time when the wipers begin to wipe the upper inwardly over the insole the forward movement of the wiper carrier causes inclined faces 262 on the cam plates 248 to engage the rolls and thus to force them outwardly against the resistance of the springs 254. In this manner flanges 264 on the holders 250 are moved into engagement with the members 252, thus positively insuring that the wiper carrier will occupy a centralized position widthwise of the machine as the wipers are moved inwardly over the bottom of the shoe. Further to insure that the wipers will be moved inwardly substantially equal distances from the edge of the shoe bottom at the sides of the toe, the wiper-closing slide 140 is operated through one or the other or both of the springs 144, 145 with such force that the previously mentioned nipples 114 which are mounted on the wiper holders 106 and extend downwardly through the slots 116 in the wiper carrier 108 are moved to

positions where they engage the wiper carrier at the forward ends of the slots. Furthermore, the pins 170 carried by the members 150 are moved to the forward ends of the slots 160 in the rods 158.

The cams for advancing and closing the wipers are so formed that after the wipers have wiped the margin of the upper inwardly over the insole they are retracted lengthwise and widthwise of the shoe substantially from over the shoe bottom and are then operated to repeat their inward wipe over the margin of the upper. In coordination with these inward and outward movements of the wipers they are moved heightwise of the shoe by the cam 138 in such manner that they follow a path indicated by the series of arrows in Figs. 14 and 15. That is, after the upwiping operations they start to move inwardly at such a height as to insure against displacement of the edge of the insole, and just after their wiping edges have passed the extreme edge of the insole (Fig. 13) they are moved downward to increase their pressure on the upper over the insole. From that time until they have substantially completed their inward movements they receive progressively an appreciable upward movement. In view of the gathers or pleats which develop in the margin of the upper as it is wiped inwardly, this insures that the wipers will not act too severely on the upper in the first inward wipe, especially if the bottom of the toe end of the last has a pronounced convex curvature. When the wipers have substantially completed the first inward wipe they are forced downwardly to increase their pressure on the upper. Thereafter they are raised and are retracted lengthwise and widthwise of the shoe at such a height as to avoid any outward drag on the overwiped upper, as indicated by the arrows in Fig. 15, the margin of the upper being held by the cement against any substantial retractive movement. They are then lowered and are moved inwardly again, as also indicated in Fig. 15, without any progressive upward movement such as in the course of the first inward wipe and therefore with greater pressure on the margin of the upper, after which they are forced farther downwardly to apply a final bedding-down pressure to the overwiped margin before they are raised and retracted from the shoe.

Since the wipers 2 as they close present a V-shaped opening between them at the extreme end of the toe, a wiping plate 266 (Figs. 6 and 8) is provided for bridging this opening, so that the upper over the insole will be engaged continuously around the end of the toe. This plate has a slightly convex upper face which is seated in concave recesses in the lower faces of the wipers and it tapers to a thin edge near the wiping edges of the wipers. The plate has integral therewith a downwardly extending arm 268 provided with a pin 270 the opposite ends of which extend into slots 272 formed in flanges 274 which project forwardly from a plate 276 fast on the wiper carrier 108. A spring 278 seated in recesses in the plate 276 and the arm 268 tends to swing the plate 266 in a clockwise direction with reference to Fig. 8 and thus holds it normally in a position determined by engagement of its arm 268 above the pin 270 with the plate 276, the lower face of the plate 266 being in the same plane as the lower faces of the wipers. The slots 272 into which the pin 270 extends are slightly elongated in upward and downward directions and afford leeway for some slight relative movement of the plate 266 and the wiper

carrier 193 heightwise of the shoe in case of any upward yield of the wipers 2 in pressing the upper down on the insole.

As hereinbefore explained, the device 18, here-
 in termed a retarder, has a pair of fingers 20
 curved to embrace the toe end of the last and
 arranged to clamp the marginal portion of the
 toe end of the upper outspread on the wipers to
 control it during a portion of the lasting opera-
 tion. One of the fingers 20 is so formed as to
 extend across the end of the toe and slidingly
 to engage the other finger in a location at one
 side of the extreme end portion of the toe, as
 indicated at 280 in Fig. 11, so that the fingers
 may be relatively adjusted widthwise of the shoe
 without interrupting the continuity of their en-
 gagement with the upper all around the toe. The
 two fingers are supported on a rod 282 which
 extends through and is secured to the lower end
 of an upwardly and downwardly extending bar
 284 controlled as hereinafter described. Extend-
 ing upwardly and downwardly at the opposite
 sides of the lower portion of this bar are two
 arms 286 also mounted on the rod 282 and con-
 nected together at their lower ends by a web
 287 in which is a guideway 288 extending width-
 wise of the shoe. In this guideway lie projec-
 tions 290 formed on the fingers 20, so that the
 fingers are held by the web 287 in fixed relation
 to each other with respect to movement about
 the rod 282 without interfering with their rela-
 tive adjustment widthwise of the shoe. It will be
 evident that by adjusting the arms 286 about
 the rod 282 the fingers 20 may be adjusted about
 the rod to vary in that respect their relation
 to the wipers. For thus adjusting the arms 286
 there is threaded in the upper end portion of
 one of them a screw 292 which is held against
 lengthwise movement by an arm 294 fast on the
 bar 284, this arm having a forked end lying
 between a flange 296 formed on the screw and a
 knob 298 on the end of the screw. To secure
 the arms 286 in adjusted positions a clamp screw
 300 is threaded in the bar 284 and extends
 through a slot 302 in one of the arms.

For adjusting the retarder fingers 20 toward
 or from each other there are provided two latch
 members 304 slidingly mounted on a rod 306
 which is secured to the bar 284, these latch mem-
 bers extending into grooves formed in portions
 of the fingers 20 which are above the rod 282.
 Threaded on the opposite ends of the rod 306
 are nuts 308 each provided with a flange 310
 (Fig. 10) which lies in a groove formed in the
 hub of the latch member 304 associated there-
 with. The latch members are normally held con-
 nected to the fingers 20 by springs 312 which
 tend to swing them in one direction about the
 rod 306, but they may be swung against the
 resistance of the springs by means of arms 314
 extending therefrom to release the fingers and
 thus to permit the latter to be removed from
 the rod 282 when it is necessary to substitute
 different fingers for shoes of different sizes.

The bar 284 which supports the retarder fingers
 20 as above described is pivotally supported sub-
 stantially midway between its upper and lower
 ends on the forked front end of an arm 316 (Figs.
 1, 10 and 12) which is loosely mounted on a
 rockshaft 318 supported in bearings in a head
 casting 320 mounted on the top of the frame of
 the machine. Integral with the arm 316 is an-
 other arm 322 which is connected by a spindle
 324 to one arm 326 of a three-armed lever 328
 fast on the rockshaft 318. The spindle 324 is

mounted to turn in a block 330 pivotally mounted
 on the arm 322 and is threaded in another block
 332 pivotally mounted on the arm 326. By means
 of a collar 334 and a hand wheel 336 engaging
 the block 330 on its opposite sides the spindle
 324 is prevented from moving lengthwise rela-
 tively to this block, and accordingly turning
 movement thereof serves to adjust the arm 316
 and the bar 284 either in a downward or an
 upward direction to vary the initial position of
 the retarder 18 heightwise of the shoe.

Fast on one end of the rockshaft 318 is an
 arm 338 which is connected by a downwardly
 extending link 340 to one arm 344 of a bell-
 crank lever 346 mounted to turn about a shaft
 348. The other arm 350 of this bell-crank lever
 is provided with a roll 352 arranged to engage
 the periphery of a cam 354 fast on the cam
 shaft 128. A spring 356 connected to the bell-
 crank lever 346 tends to swing the lever in a
 counterclockwise direction with reference to Fig.
 1 and thus to move the retarder 18 in a down-
 ward direction. This action of the spring 356 is
 supplemented by the action of another spring
 358 which is connected at one end to a second
 arm 360 of the three-armed lever 328 and at
 its other end to a lever 362 which is adjustable
 to vary the tension of the spring 358 and cor-
 responds to the lever 54 shown in Letters Patent
 No. 2,354,663. It will thus be seen that at the
 proper time in the lasting operation the mar-
 ginal portion of the upper is clamped on the
 wipers 2 by the retarder under the combined
 forces of both springs 356 and 358 and that the
 clamping pressure may be varied by adjusting
 the tension of the spring 358.

In the construction herein shown the cam 354
 is so formed and arranged that the retarder 18
 is initially in its lowest position, so that it serves,
 as hereinbefore described, to position the toe end
 of the shoe lengthwise and laterally by engage-
 ment with the last when the shoe is presented to
 the machine. The retarder is therefore in posi-
 tion to clamp the upper on the wipers when the
 wipers have been moved upwardly far enough to
 cause this action to occur, as illustrated in Fig.
 12, after which the wipers may start to lift the
 retarder. Instead of requiring the wipers there-
 after to lift the retarder against increasing re-
 sistance of the springs 356 and 358, the cam 354
 has on its periphery a gradual rise *c* arranged
 to act on the roll 352 to lift the retarder co-
 ordinately with the upwiping movement of the
 wipers, so that after the upper has been clamped
 with the desired pressure the pressure thus ap-
 plied will remain substantially uniform as the
 wipers are moved farther upwardly. The time
 when this rise on the cam becomes effective thus
 to act on the retarder may be varied by a screw
 364 which is threaded in an arm 366 integral with
 the arm 338 and is arranged to engage the head
 casting 320. That is, by means of this screw the
 roll 352 may be spaced more or less initially from
 the periphery of the cam to vary the time when
 the rise *c* on the cam begins to act on the roll.
 It will be evident that if the roll is thus spaced
 initially from the cam and the retarder is initial-
 ly at the same height the wipers will lift the re-
 tarder farther before the cam begins to lift it
 and accordingly the force with which the upper
 is ultimately clamped between the retarder and
 the wipers will be greater than if the roll is ini-
 tially in engagement with the cam. Such ad-
 justment of the screw 364 will, of course, vary
 the position of the retarder heightwise of the

shoe, but this may be compensated for by turning the spindle 324.

As the retarder is thus moved upwardly it is controlled with respect to movement lengthwise of the shoe by a cam plate 368 having therein a slot 370 in which is positioned a roll 372 mounted on the upper end of the bar 284. This cam plate is pivotally mounted on a pin 374 on the head casting 320 and has pivotally connected to its lower end a rod 376 extending rearwardly through an opening in the casting. Threaded on this rod are a collar 378 and a nut 380 arranged to engage the casting respectively on its inner and outer faces for adjusting the cam plate 368 about the pin 374. By adjustment of the cam plate, therefore, the initial position of the retarder with respect to movement in directions lengthwise of the shoe may be varied. To permit a variation in this respect of the initial position of the retarder independently of the cam plate 368 the connection between the bar 284 and the arm 316 comprises an eccentric 382 (Figs. 10 and 12) on which the bar is mounted, this eccentric being formed on a stud 384 adjustable in a bearing in the arm 316. To hold the eccentric in adjusted position there is mounted in the arm a pin 386 provided in one side with a curved recess (not shown) into which one side of the stud 384 extends, the pin having threaded on its upper end a nut 388 for moving it lengthwise to lock the stud.

The retarder 18 is preferably so adjusted about the rod 282 by means of the screw 292 (Fig. 12) that it clamps the upper on the wipers first at the end of the toe, the wipers occupying at this time a position in which they are somewhat inclined lengthwise of the shoe. As the wipers are thereafter swung farther upward they arrive in positions in which the retarder is effective to clamp the upper upon them also along the sides of the toe. It will be evident that by means of the screw 292 the pressures applied by the retarder to the upper at the end and the sides of the toe respectively at the completion of the upwiping operation may be relatively varied as desired.

Associated with the retarder 18 is a hold-down 390 for engaging the marginal portion of the toe end of the insole to assist in preventing its displacement as the wipers wipe the upper upwardly and begin to wipe it inwardly over the edge of the insole. This hold-down comprises a pair of curved fingers 392 (Fig. 11) pivotally mounted on a stem 394 (Fig. 13) which extends downwardly from a block 396 and held in place by the head of a screw 398 threaded in the stem. A spring 400 mounted in recesses in the fingers and held in place by pins (not shown) extending within it from the fingers tends to swing the fingers outwardly and thereby holds them against the inner faces of the retarder fingers 20. Accordingly the hold-down fingers assume positions determined by the adjustment of the retarder fingers widthwise of the shoe and require no separate adjustment for shoes of different sizes. The block 396 is pivotally mounted on a pin 402 extending widthwise of the shoe in the lower end of an upwardly and downwardly extending slide 404 mounted in guideways in the arms 286. The hold-down 390, therefore, may adjust itself to the bottom of the shoe about the pin 402. When there is no shoe in the machine it is held in a definite position with respect to movement about the pin by a spring-pressed pin 406 mounted in the slide 404

and having on its lower end a head 408 arranged to engage a flat face on the block 396. The slide 404 is under control of a spring 410 which tends to move it downwardly, the spring being seated at its upper end against a cap member 412 which partially incloses it and which is secured on the upper ends of the arms 286. To hold the lower end portion of the spring in place a pin 414 extends upwardly within it from the slide 404. For determining adjustably the height at which the hold-down 390 is initially positioned there is provided a bell-crank lever 416 pivotally mounted on a pin 418 in the block 6 (Fig. 12) with one of its arms 420 in supporting engagement with the lower face of a projection 422 on the lower end of the slide 404. The other arm 424 of the bell-crank lever is forked to straddle a screw 426 which is rotatable in the block 6 and has a hand wheel 428 thereon for turning it. Threaded on the screw is a nut 430 in contact with the arm 424 and prevented from turning by engagement with the block 6. A spring 431 acting on the arm 420 holds the arm 424 at all times against the nut. The slide 404 is preferably so adjusted by the screw 426 that the lower faces of the hold-down fingers 392 are slightly lower than the lower face of the shoe-positioning plate 4 when there is no shoe in the machine, so that when the toe rest 22 is moved upwardly the hold-down will be lifted slightly against the resistance of the spring 410 by engagement of the shoe therewith, thus insuring that it will be effective to press the marginal portion of the insole down on the last.

For withdrawing the hold-down 390 from the shoe to clear the wipers as they wipe the upper inwardly over the insole a third arm 432 of the three-armed lever 328 is arranged to engage a nut 434 held in adjusted position on a rod 436 by a lock nut 438 (Fig. 10), the lower end of the rod 436 being pivotally connected to an arm 440 projecting from the slide 404. The nut 434 is initially spaced from the arm 432 far enough to permit the upward movement of the retarder 18 with the wipers in the upwiping operation without disturbing the hold-down 390. When the wipers, as they begin to wipe the upper inwardly over the insole, arrive in positions substantially as shown in Fig. 13, an abrupt rise *d* (Fig. 1) on the cam 354 moves the retarder 18 quickly upward away from the wipers, and at the same time the arm 432 acts on the slide 404 to move the hold-down 390 upwardly out of the paths of the wipers.

The means for driving the cam shaft 128 and for starting and stopping the cycle of operations of the machine are, except as hereinafter noted, of the same construction as shown and described in Letters Patent No. 2,160,846. Briefly, there is fast on the cam shaft a gear wheel 442 (Fig. 1) engaged and driven by a worm 444 which is fast on a shaft 446 at right angles to the cam shaft. Normally rotatable about the shaft 446 is a clutch member 448 driven continuously by an electric motor 450, and connected to this shaft to turn therewith is a cooperating clutch member 452 movable lengthwise of the shaft into or out of frictional engagement with the member 448, the member 452 being held in such engagement when the machine is operating by means of a spring 454. To withdraw the member 452 from the member 448 and thus to stop the operation of the machine there is provided a yoke member 456 mounted for swinging movements and connected to the hub of the member 452. Connected to the

yoke member to swing therewith is an arm 458 (Fig. 16) on which is secured a latch member 460 normally engaged underneath by a shoulder 461 formed on a block 462 to hold the yoke member in such a position that the clutch member 452 is out of engagement with the member 448. The block 462 is mounted on an arm 464 which is pivotally supported at its upper end on one arm of a bell-crank lever 456 pivotally mounted at 468 on a lug on the frame of the machine. The other arm of this bell-crank lever carries a roll 470 engaged by a path cam 472 on the cam shaft 128. A spring 474 connected to the arm 464 tends to swing it in a rearward direction to hold the block 462 in operative relation to the latch 459. The lower end of the arm 464 extends through a slot formed in a substantially horizontal forwardly extending bar 476 and below the bar carries a pin 478 arranged to engage a shoulder 480 on the bar. The bar 476 is pivotally connected at its front end to an arm 482 fast on a rockshaft 484, and a spring 488 connected to this arm tends to swing it in a rearward direction and thus to hold the rear end of the bar 476 against a stop 488. The rear end of the bar 476 is, moreover, supported on the upper end of a screw 490 and is held down on this screw by a spring 492. Also fast on the rockshaft 484 is a treadle 494. It will thus be seen that when the treadle is depressed the bar 476 is moved in a forward direction and since it is held down by the spring 492 it swings the arm 464 forwardly by engagement of its shoulder 480 with the pin 478 to disconnect the block 462 from the latch 459. This permits the spring 454 to force the clutch member 452 into engagement with the member 448 to start the operation of the machine. For bringing the machine thereafter to a stop, the arm 464 is lowered by the action of the cam 472 on the bell-crank lever 456, thus disengaging the pin 478 from the shoulder 480, if the operator has not released the treadle, and permitting the arm to be swung by the spring 474 to carry the shoulder 461 again under the latch member 459, after which the arm 464 is lifted to swing the yoke member 456 in the direction to disconnect the clutch members from each other. In the construction herein shown the cam 472 is so formed as to bring the machine thus to a stop not only at the end of the cycle, but also before the end of the cycle when the wipers have completed their second inward wiping movements, to allow more time for the cement to set while the upper is held under pressure by the wipers. The operator thereafter starts the machine again by depression of the treadle to cause it to complete the cycle.

Under some conditions it may not be necessary to bring the machine to a stop as above described to permit the wipers to dwell on the margin of the upper. The machine herein shown is therefore provided with means for optionally rendering the cam 472 ineffective to stop the machine before the end of the cycle. For this purpose a bell-crank lever 496 is mounted to swing about the same axis as the yoke member 456 but independently thereof, one arm 498 of this lever carrying a roll 500 engaged by a peripheral cam 502 on the cam shaft 128. A spring 504 connected to the other arm 506 of this bell-crank lever holds the roll 500 against the cam. The arm 506 is forked to provide a guideway for an upwardly and downwardly movable slide 508. Threaded in a lug 510 on this slide is the lower end of a rod 512, the upper end of which is connected by a link 514 to one arm of a hand lever 516 pivotally

mounted at 518 on the frame of the machine. By the hand lever 516, therefore, the slide 508 may be moved upwardly or downwardly along its guideway in the arm 506 to one or the other of two different positions determined by a spring-pressed pin 520 on the lever and two holes 522 formed in the frame to receive the pin. As the parts are shown in Fig. 16, the slide 508 is in its lowermost position with its lower end portion directly at the rear of a pin 524 mounted in a lug 526 on the arm 464. The cam 502 is so formed that before the cam 472 becomes effective to stop the machine prior to the end of the cycle it swings the bell-crank lever 496 in a counterclockwise direction with reference to Fig. 16 and thereby causes the lower end of the arm 506 to engage the pin 524 and swing the arm 464 in a forward direction, so that when the arm is raised by the cam 472 the shoulder 461 will not engage the latch 459 and, therefore, will not stop the machine. It will be understood that the cam 502 will permit the bell-crank lever 496 to be swung reversely by the spring 504 before the end of the cycle, so that it will not interfere with the stopping of the machine at the end of the cycle. If it is desired that the machine shall come to a stop prior to the end of the cycle at the time when the wipers are over the bottom of the shoe, the operator moves the lever 516 to withdraw the lower end of the slide 508 from its position at the rear of the pin 524. With the slide thus withdrawn, it will not engage the pin when the bell-crank lever 496 is swung as above described by the cam 502, and accordingly the cam 472 will not be prevented from bringing the machine to a stop prior to the end of the cycle.

The manner of operation of the machine, in so far as it is of interest with reference to the present invention, will now be briefly summarized. It will be understood that before the shoes come to the machine the toe end portions of the uppers are trimmed, as customary prior to cement toe lasting, so that for the most part the margin of the outer layer only of the upper materials of each shoe will lie next to the insole and will be secured thereto by the cement previously applied to the shoe. Prior to the use of the machine on shoes of a given style the operator adjusts the bar 82 which guides the heel rest in its movement toward the shoe by swinging the bar laterally to the position required for shoes of that style, which may be indicated on a chart, making the proper adjustment by reference to the scale on the plate 72. If the shoes immediately to be operated upon are right shoes the adjustment is made by reference to the right-hand portion of the scale and if they are left shoes it is made by reference to the left-hand portion of the scale. The operator also adjusts the slide 44 along the guide 84 to a position which may likewise be indicated on the chart, bringing one end or the other of the slide into registration with the proper scale mark on the guide. In this manner the heel rest is properly positioned initially widthwise of the shoe relatively to the guide bar 88. If desirable, moreover, the heel rest may be adjusted about the vertical axis of the stem 52 or in an upward or a downward direction along the curved path determined by the guideways 38 (Fig. 2).

In presenting the shoe to the machine the operator moves it to a position in which the bottom of the forepart of the insole is in engagement with the plate 4 and the holddown 390 and the toe end face of the last is in engagement with

the curved fingers 20 of the retarder 18, these fingers having been preliminarily adjusted in accordance with the width of the shoe and having by their adjusting movements correspondingly adjusted the insole holddown fingers 392. The retarder 18 accordingly determines the position of the shoe lengthwise and the position of its toe end laterally. After thus presenting the shoe the operator starts the machine by depression of the treadle 494 (Fig. 16). Substantially at the beginning of the cycle of operations the toe rest 22 is moved upwardly to clamp the shoe yieldingly against the plate 4 with comparatively light pressure. If the holddown 390 is so adjusted that the insole-engaging faces of its fingers 392 are initially slightly lower than the insole-engaging face of the plate 4, it is raised by the shoe as the shoe is forced against the plate 4 by the toe rest. Shortly after the upward movement of the toe rest the rods 82 are moved rearwardly to carry the heel rest 24 into engagement with the heel end of the shoe. The heel rest is thus moved in the direction determined by the adjustment of the guide bar 88 and upon engagement with the shoe determines the position of the heel end of the shoe laterally. In this manner, as hereinbefore explained, the toe end of the shoe is properly positioned angularly in relation to the wipers which are to operate thereon. If the heel rest, upon such engagement with the shoe, causes the heel end of the shoe to move a short distance laterally in one direction or the other, such movement of the shoe is facilitated by reason of the fact that the toe rest, as above explained, is at that time holding the shoe with comparatively light pressure.

In proper time relation to the operations above described the wipers 2 are advanced and closed about the toe end of the shoe and are swung upwardly to wipe the upper heightwise of the last. When they arrive in the positions indicated, for example, in Fig. 12 they clamp the upper, which is outspread over their top faces, against the retarder 18 and may then start to lift the retarder against the resistance of the springs 356 and 358. At a time, however, depending upon the adjustment of the screw 364 (Fig. 1) the rise *c* on the cam 354 becomes effective to lift the retarder coordinately with further upward movement of the wipers while maintaining the clamping pressure on the upper substantially uniform. During the upwiping operation the wiper carrier 108, as hereinbefore explained, may swing slightly in one direction or the other widthwise of the shoe relatively to its operating lever 120 in response to pressure of one side or the other of the toe on the corresponding wiper to assist in equalizing the pressures of the wipers on both sides of the toe.

After the completion of the upwiping operation the wipers are further advanced and closed to wipe the marginal portion of the upper inwardly over the insole, the retarder at first still maintaining its clamping pressure on the upper. Shortly after the beginning of this inward wipe, when the wipers have arrived substantially in the positions illustrated in Fig. 13, the abrupt rise *d* on the cam 354 (Fig. 1) moves the retarder upwardly away from the wipers to release the margin of the upper and moves the holddown 390 also upwardly away from the insole. At approximately the same time the force applied to the toe rest 22 is increased to support the shoe more firmly against downward pressure of the wipers. The wipers begin their inward wiping

movements at such a height as to insure against displacement of the edge of the insole, and when they arrive substantially in the positions illustrated in Fig. 13 they are moved downwardly to increase their pressure on the upper over the insole. Thereafter, as they are moved farther inwardly, they receive progressively an appreciable upward movement until they have substantially completed their inward wipe on the upper to prevent them from acting too severely on the gathers or pleats which develop in the margin around the end of the toe. When the wipers have substantially completed their inward movements they are forced more firmly down on the margin of the upper. The manner in which the wipers thus act on the upper in wiping it inwardly is indicated by the directions of the arrows in Fig. 14. Substantially at the beginning of this operation the wiper carrier 108 is centralized with respect to lateral movement and is locked against such movement by the action of the cam plates 248 on the roll holders 250 (Fig. 6). After the first inward wipe the wipers are raised and retracted and are thereafter moved downwardly and are advanced and closed a second time in wiping engagement with the upper as illustrated by the arrows in Fig. 15, their downward pressure on the upper being again increased at the end of the second inward wipe. The wipers are thus moved inwardly the second time without any progressive upward movement such as they receive in the course of the first inward wipe and therefore with greater pressure on the margin of the upper.

If the hand lever 516 is positioned as shown in Fig. 16 the wipers are thereafter lifted and retracted from over the shoe and the parts of the machine are returned to their starting positions, the machine coming to a stop only at the end of the cycle, since the cam 502 by its action on the bell-crank lever 496 prevents the stopping of the machine prior to the end of the cycle, as hereinbefore explained. If, however, the hand lever has been moved to retract the slide 508 from its position at the rear of the pin 524, the machine comes to a stop with the wipers in the positions indicated in Fig. 15 to allow more time for the cement to set while the margin of the upper is held by the wipers. In that case the operator starts the machine again after the desired interval by depression of the treadle 494 to cause it to complete the cycle.

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

1. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of means for positioning the toe end of the last lengthwise and laterally relatively to the wipers, and a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to the wipers, said heel rest being mounted for movement lengthwise of the last into engagement with the heel end of the upper in a direction selectively predetermined in accordance with the style of the last while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon.

2. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of means for positioning the toe end of the last lengthwise

and laterally relatively to the wipers by engagement with that end of the last, and a substantially V-shaped heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to the wipers, said heel rest being mounted for movement lengthwise of the last into engagement with the heel end of the upper in a direction selectively predetermined in accordance with the style of the last while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon.

3. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of means for positioning the toe end of the last lengthwise and laterally relatively to the wipers when the work is presented to the machine, a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to the wipers, said heel rest being mounted for movement lengthwise of the last into engagement with the heel end of the upper after the work has thus been presented while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon, and means for selectively predetermining the direction of such movement of the heel rest.

4. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of means for positioning the toe end of the last lengthwise and laterally relatively to the wipers, a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to the wipers, said heel rest being mounted for movement lengthwise of the last into engagement with the heel end of the upper while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon, and a guide for said heel rest adjustable about an axis extending heightwise of the last for selectively predetermining the direction of such movement of the heel rest.

5. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of means for engaging the toe end of the last when the work is presented to the machine for positioning that end of the last lengthwise and laterally relatively to the wipers, a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to the wipers, and means for moving said heel rest lengthwise of the last into engagement with the heel end of the upper in a direction selectively predetermined in accordance with the style of the last after the work has been presented to the machine while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon.

6. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of means for engaging the toe end of the last when the work is presented to the machine for positioning that end of the last lengthwise and laterally relatively to the wipers, a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for

thereby further positioning its toe end relatively to the wipers, means for moving said heel rest lengthwise of the last into engagement with the heel end of the upper after the work has been presented to the machine while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon, and means for selectively predetermining the direction of such movement of the heel rest in accordance with the style of the last and in accordance with whether the last is a right last or a left last.

7. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of means for engaging the toe end of the last when the work is presented to the machine for positioning that end of the last lengthwise and laterally relatively to the wipers, a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to the wipers, means for moving said heel rest lengthwise of the last into engagement with the heel end of the upper after the work has been presented to the machine while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon, and a guide for said heel rest adjustable about an axis extending heightwise of the last to determine selectively the direction of the movement of the heel rest.

8. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of a retarder for clamping the marginal portion of the upper outspread on said wipers to control it in the lasting operation, said retarder being arranged to engage the toe end of the last when the work is presented to the machine for positioning that end of the last lengthwise and laterally relatively to the wipers, a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to the wipers, means for moving said heel rest lengthwise of the last into engagement with the heel end of the upper after the work has been presented to the machine, and means for selectively predetermining the direction of such movement of the heel rest.

9. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of means for positioning the toe end of the last lengthwise and laterally relatively to the wipers when the work is presented to the machine, means for clamping the toe end of the last to hold it after the last has thus been positioned, a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to the wipers, and means for moving said heel rest lengthwise of the last into engagement with the heel end of the upper in a direction selectively predetermined in accordance with the style of the last after the toe end of the last has thus been clamped but while its heel end is capable of being shifted laterally by the action of the heel rest thereon.

10. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of means for positioning the toe end of the last lengthwise and laterally relatively to the wipers when the work is presented to the machine,

means for clamping the toe end of the last to hold it after the last has thus been positioned, a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to the wipers, means for moving said heel rest lengthwise of the last into engagement with the heel end of the upper after the toe end of the last has thus been clamped but while its heel end is capable of being shifted laterally by the action of the heel rest thereon, and a guide for said heel rest adjustable to determine selectively the direction of such movement of the heel rest.

11. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of means for positioning the toe end of the last lengthwise and laterally relatively to the wipers, and a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to the wipers, said heel rest being mounted for movement lengthwise of the last into engagement with the heel end of the upper in a direction selectively predetermined in accordance with the style of the last while the heel end of the last is capable of being shifted laterally thereby and being also bodily adjustable in directions widthwise of the last.

12. In a lasting machine, the combination with toe-embracing wipers for wiping an upper around the toe end of a last into lasted position, of means for positioning the toe end of the last lengthwise and laterally relatively to the wipers, and a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to the wipers, means for moving said heel rest lengthwise of the last into engagement with the heel end of the upper while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon, and a guide for said heel rest adjustable about an axis extending heightwise of the last for selectively predetermining the direction of such movement of the heel rest, the heel rest being bodily adjustable relatively to said guide in directions widthwise of the last.

13. In a lasting machine, the combination with means for conforming the toe end of an upper to a last, of a substantially V-shaped heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last to assist in properly positioning its toe end relatively to said conforming means, means for moving said heel rest lengthwise of the last into engagement with the heel end of the upper after the work has been presented to the machine while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon, and means for selectively predetermining the direction of such movement of the heel rest in accordance with the style of the last and in accordance with whether the last is a right last or a left last.

14. In a lasting machine, the combination with means for conforming the toe end of an upper to a last, of a substantially V-shaped heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last to assist in properly positioning its toe end relatively to said conforming means, means for moving said heel rest lengthwise of the last

into engagement with the heel end of the upper after the work has been presented to the machine while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon, and a guide for said heel rest adjustable about an axis extending heightwise of the last for selectively predetermining the direction of such movement of the heel rest.

15. In a lasting machine, the combination with means for conforming the toe end of an upper to a last, of a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last to assist in properly positioning its toe end relatively to said conforming means, said heel rest being mounted for movement lengthwise of the last into engagement with the heel end of the upper after the work has been presented to the machine while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon, a member movable invariably in the same direction lengthwise of the last thus to move the heel rest, a connection between said member and the heel rest, and a guide for the heel rest adjustable to determine variably the direction of its movement.

16. In a lasting machine, the combination with means for conforming the toe end of an upper to a last, of a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last to assist in properly positioning its toe end relatively to said conforming means, means for moving said heel rest lengthwise of the last into engagement with the heel end of the upper after the work has been presented to the machine while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon, and a guide for the heel rest adjustable about an axis extending heightwise of the last for selectively predetermining the direction of such movement of the heel rest, the heel rest being bodily adjustable relatively to said guide in directions widthwise of the last.

17. In a lasting machine, the combination with means for conforming the toe end of an upper to a last, of a heel rest for positioning the heel end of the last laterally by engagement with the upper on that end of the last to assist in properly positioning its toe end relatively to said conforming means, means for moving said heel rest lengthwise of the last into engagement with the heel end of the upper after the work has been presented to the machine while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon, a guide for the heel rest adjustable about an axis extending heightwise of the last for selectively predetermining the direction of such movement of the heel rest, and a support for the heel rest movable along said guide and adjustable with the guide, the heel rest being bodily adjustable relatively to said support in directions widthwise of the last.

18. In a lasting machine, the combination with means for conforming the toe ends of the uppers of shoes of different styles and sizes to the contours of their lasts, of means for positioning the different lasts with their toe-end faces in the same locations and their toe ends also centralized laterally relatively to said conforming means, a heel rest for positioning the heel end of each last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to said

conforming means, means for moving the heel rest lengthwise of the last into engagement with the upper while the heel end of the last is capable of being shifted laterally by the action of the heel rest thereon, and a guide for the heel rest adjustable about an axis extending heightwise of the last to determine selectively the direction of the movement of the heel rest, the heel rest being bodily adjustable widthwise of the last relatively to said guide.

19. In a lasting machine, the combination with means for conforming the toe ends of the uppers of shoes of different styles and sizes to the contours of their lasts, of means for positioning the different lasts with their toe-end faces in the same locations and their toe ends also centralized laterally relatively to said conforming means, and a heel rest for positioning the heel end of each last laterally by engagement with the upper on that end of the last and for thereby further positioning its toe end relatively to said conforming means, said heel rest being mounted for movement lengthwise of the last into engagement with the upper in a direction selectively predetermined in accordance with the style of the last while the heel end of the last is capable of being shifted laterally thereby and being further bodily adjustable widthwise of the last also in accordance with the style of the last.

20. In a lasting machine, toe-embracing wipers for wiping an upper around the toe end of a last heightwise of the last and for thereafter wiping the marginal portion of the upper inwardly over an insole on the last, said wipers being mounted for bodily movement in unison widthwise of the last in response to pressure of the shoe on one or the other thereof to permit them thus to adjust themselves to the shoe in the wiping of the upper heightwise of the last, and means for preventing bodily movement of the wipers widthwise of the last in response to pressure of the shoe on either of them when they wipe the upper inwardly over the insole.

21. In a lasting machine, toe-embracing wipers for wiping an upper around the toe end of a last heightwise of the last and for thereafter wiping the marginal portion of the upper inwardly over an insole on the last, said wipers being mounted for bodily movement in unison widthwise of the last in response to pressure of the shoe on one or the other thereof to permit them thus to adjust themselves to the shoe in the wiping of the upper heightwise of the last, and means for centralizing the wipers with respect to such bodily movement and for holding them thus centralized when they wipe the upper inwardly over the insole.

22. In a lasting machine, toe-embracing wipers for wiping an upper around the toe end of a last heightwise of the last and for thereafter wiping the marginal portion of the upper inwardly over an insole on the last, a support for said wipers mounted to move with them widthwise of the last in response to pressure of the shoe on one or the other of the wipers to permit the wipers thus to adjust themselves to the shoe in the wiping of the upper heightwise of the last, and means for preventing movement of the wiper support widthwise of the last by pressure of the shoe on either of the wipers when they wipe the upper inwardly over the insole.

23. In a lasting machine, toe-embracing wipers for wiping an upper around the toe end of a last heightwise of the last and for thereafter wiping the marginal portion of the upper inwardly over

an insole on the last, a support for said wipers mounted to move with them widthwise of the last in response to pressure of the shoe on one or the other of the wipers to permit the wipers thus to adjust themselves to the shoe in the wiping of the upper heightwise of the last, and means for centralizing the wiper support with respect to such movement widthwise of the last and for holding it in its centralized position when the wipers wipe the upper inwardly over the insole.

24. In a lasting machine, toe-embracing wipers for wiping an upper around the toe end of a last heightwise of the last and for thereafter wiping the marginal portion of the upper inwardly over an insole on the last, a support for said wipers mounted to move with them widthwise of the last in response to pressure of the shoe on one or the other of the wipers to permit the wipers thus to adjust themselves to the shoe in the wiping of the upper heightwise of the last, and means arranged to act on the opposite sides of said wiper support to lock it against movement widthwise of the last when the wipers wipe the upper inwardly over the insole.

25. In a lasting machine, toe-embracing wipers for wiping an upper around the toe end of a last heightwise of the last and for thereafter wiping the marginal portion of the upper inwardly over an insole on the last, a wiper carrier movable to carry said wipers heightwise of the last in wiping engagement with the upper and thereafter to advance them lengthwise of the last simultaneously with closing movements thereof widthwise of the last to wipe the upper over the insole, said wiper carrier being mounted to move with the wipers widthwise of the last in response to pressure of the shoe on one or the other of the wipers to permit the wipers thus to adjust themselves to the shoe in the wiping of the upper heightwise of the last, and means responsive to the wiper-advancing movement of the wiper carrier lengthwise of the last after the wiping of the upper heightwise of the last to prevent movement of the carrier widthwise of the last by pressure of the shoe on either of the wipers when they wipe the upper inwardly over the insole.

26. In a lasting machine, toe-embracing wipers for wiping an upper around the toe end of a last heightwise of the last and for thereafter wiping the marginal portion of the upper inwardly over an insole on the last, a wiper carrier movable to carry said wipers heightwise of the last in wiping engagement with the upper and thereafter to advance them lengthwise of the last simultaneously with closing movements thereof widthwise of the last to wipe the upper over the insole, said wiper carrier being mounted to move with the wipers widthwise of the last in response to pressure of the shoe on one or the other of the wipers to permit the wipers thus to adjust themselves to the shoe in the wiping of the upper heightwise of the last, and means responsive to the wiper-advancing movement of the wiper carrier lengthwise of the last after the wiping of the upper heightwise of the last to centralize the carrier with respect to movement widthwise of the last and to hold it in its centralized position as the wipers wipe the upper inwardly over the insole.

27. In a lasting machine, toe-embracing wipers for wiping an upper around the toe end of a last heightwise of the last and for thereafter wiping the marginal portion of the upper inwardly over an insole on the last, a wiper carrier movable to carry said wipers heightwise of the last in wiping

25

engagement with the upper and thereafter to advance them lengthwise of the last simultaneously with closing movements thereof widthwise of the last to wipe the upper over the insole, said wiper carrier being mounted to move with the wipers widthwise of the last in response to pressure of the shoe on one or the other of the wipers to permit the wipers thus to adjust themselves to the shoe in the wiping of the upper heightwise of the last, and cam means responsive to the wiper-advancing movement of the wiper carrier lengthwise of the last after the wiping of the upper heightwise of the last to lock the carrier against movement widthwise of the last when the wipers wipe the upper inwardly over the insole.

28. In a lasting machine, toe-embracing wipers for wiping an upper around the toe end of a last heightwise of the last and for thereafter wiping the marginal portion of the upper inwardly over an insole on the last, a wiper carrier movable to carry said wipers heightwise of the last in wiping engagement with the upper and thereafter to advance them lengthwise of the last simultaneously with closing movements thereof widthwise of the last to wipe the upper over the insole, said wiper carrier being mounted to move with the wipers widthwise of the last in response to pressure of the shoe on one or the other of the wipers to permit the wipers thus to adjust themselves to the shoe in the wiping of the upper heightwise of the last, cams on the opposite sides of the wiper carrier, and means arranged to cooperate with said cams in response to the wiper-advancing movement of the wiper carrier lengthwise of the last after the wiping of the upper heightwise of the last to prevent movement of the carrier widthwise of the last by pressure of the shoe on either of the wipers when they wipe the upper inwardly over the insole.

29. In a lasting machine, toe-embracing wipers for wiping an upper around the toe end of a last heightwise of the last and for thereafter wiping the marginal portion of the upper inwardly over an insole on the last, a wiper carrier movable to carry said wipers heightwise of the last in wiping engagement with the upper and thereafter to advance them lengthwise of the last simultaneously with closing movements thereof widthwise of the last to wipe the upper over the insole, said wiper carrier being mounted to move with the wipers widthwise of the last in response to pressure of the shoe on one or the other of the wipers to permit the wipers thus to adjust themselves to the shoe in the wiping of the upper heightwise of the last, cams on the opposite sides of the wiper carrier, rolls arranged to engage said cams and yieldingly movable by the cams in directions away from the carrier in response to the wiper-advancing movement of the carrier lengthwise of the last after the wiping of the upper heightwise of the last, and means for positively limiting such movements of the rolls to lock the carrier against movement widthwise of the last as the wipers wipe the upper inwardly over the insole.

30. In a lasting machine, toe-embracing wipers for engaging an upper around the toe end of a last, means for imparting to said wipers inward movements over the bottom of the last to wipe the marginal portion of the upper over an insole on the last, and mechanism constructed and arranged to effect in automatically determined time relation to the inward movements of the wipers relative movement of the wipers and the

26

last heightwise of the last in the direction to increase the pressure of the wipers on the upper after they have begun to wipe it over the insole and relative movement thereafter progressively in the opposite direction as the wipers continue their inward movements.

31. In a lasting machine, toe-embracing wipers for engaging an upper around the toe end of a last, means for imparting to said wipers inward movements over the bottom of the last to wipe the marginal portion of the upper over an insole on the last, and mechanism constructed and arranged further to impart to the wipers in automatically determined time relation to their inward movements movement heightwise of the last toward the bottom of the last to increase their pressure on the upper after they have begun to wipe it over the insole and movement thereafter progressively in the opposite direction as they continue their inward movements.

32. In a lasting machine, toe-embracing wipers for engaging an upper around the toe end of a last, a wiper carrier supporting said wipers, means for moving said wiper carrier lengthwise of the last to cause the wipers to wipe the marginal portion of the upper at the end of the toe inwardly over an insole on the last, additional means for closing the wipers to cause them to wipe the upper inwardly at the sides of the toe in the course of the movement of the wiper carrier, and a cam formed to move the wiper carrier heightwise of the last in the direction to cause the wipers to increase their pressure on the upper after they have begun to wipe it over the insole and thereafter to move the carrier progressively in the opposite direction heightwise of the last as the wipers continue their inward movements.

33. In a lasting machine, toe-embracing wipers for engaging an upper around the toe end of a last, means for imparting to said wipers inward movements over the bottom of the last to wipe the marginal portion of the upper over an insole on the last and for thereafter retracting them and moving them inwardly again in wiping engagement with the upper, and mechanism constructed and arranged to effect in the course of the first inward movements only of the wipers in automatically determined time relation to said movements relative movement of the wipers and the last heightwise of the last in the direction to increase the pressure of the wipers on the upper after they have begun to wipe it over the insole and relative movement thereafter progressively in the opposite direction as the wipers continue their inward movements.

34. In a lasting machine, toe-embracing wipers for engaging an upper around the toe end of a last, means for imparting to said wipers inward movements over the bottom of the last to wipe the marginal portion of the upper over an insole on the last and for thereafter retracting them and moving them inwardly again in wiping engagement with the upper, and mechanism constructed and arranged further to impart to the wipers in the course of their first inward movements only and in automatically determined time relation to said movements movement heightwise of the last toward the bottom of the last to increase their pressure on the upper after they have begun to wipe it over the insole and movement thereafter progressively in the opposite direction as they continue their inward movements.

35. In a lasting machine, toe-embracing wipers for engaging an upper around the toe end of a

last, means for imparting to said wipers inward movements over the bottom of the last to wipe the marginal portion of the upper over an insole on the last and for thereafter retracting them and moving them inwardly again in wiping engagement with the upper, and mechanism constructed and arranged to impart to the wipers in the course of their first inward movements only in automatically determined time relation to said movements movement progressively in a direction away from the bottom of the last after they have begun to wipe the upper over the insole.

36. In a lasting machine, the combination with wiping means for wiping the marginal portion of an upper inwardly over an insole on a last in the course of a cycle of power operations of the machine, of a clutch through which the machine is operated, power-operated means for automatically stopping the operation of the machine by control of said clutch prior to the end of the cycle when the wiping means is in pressure-applying relation to the upper over the insole and again at the end of the cycle, and additional power-operated means for optionally preventing such stopping of the machine by said first-named power-operated means prior to the end of the cycle only.

37. In a lasting machine, the combination with wiping means for wiping the marginal portion of an upper inwardly over an insole on a last in the course of a cycle of power operations of the machine, of a clutch through which the machine is operated, power-operated means for automatically stopping the operation of the machine by control of said clutch prior to the end of the cycle when the wiping means is in pressure-applying relation to the upper over the insole and again at the end of the cycle, said power-operated means including a member displaceable to prevent such stopping of the machine, and additional power-operated means for optionally effecting such displacement of said member to prevent the stopping of the machine prior to the end of the cycle only.

38. In a lasting machine, the combination with wiping means for wiping the marginal portion of an upper inwardly over an insole on a last in the course of a cycle of power operations of the machine, of a clutch through which the machine is operated, power-operated means for automatically stopping the operation of the machine by control of said clutch prior to the end of the cycle when the wiping means is in pressure-applying relation to the upper over the insole, said power-operated means including a member displaceable

to prevent such stopping of the machine, and additional power-operated means for thus displacing said member, said additional means including parts relatively adjustable by the operator to prevent the displacement of said member regardless of the operation of said additional means.

39. In a lasting machine, the combination with wiping means for wiping the marginal portion of an upper inwardly over an insole on a last in the course of a cycle of power operations of the machine, of a clutch through which the machine is operated, power-operated means for automatically stopping the operation of the machine by control of said clutch prior to the end of the cycle when the wiping means is in pressure-applying relation to the upper over the insole, said power-operated means including an arm mounted for swinging movement into position to prevent such stopping of the machine, and a power-operated lever for thus swinging said arm, said lever having thereon means adjustable to prevent such swinging of the arm by the lever.

40. In a lasting machine, the combination with wiping means for wiping the marginal portion of an upper inwardly over an insole on a last in the course of a cycle of power operations of the machine, of a clutch through which the machine is operated, a member mounted for movement to stop the operation of the machine by control of said clutch prior to the end of the cycle when the wiping means is in pressure-applying relation to the upper over the insole, a cam for thus moving said member, said member being displaceable to prevent it from stopping the machine when it is operated by said cam, cam-operated means for thus automatically displacing said member, and mechanism for rendering said cam-operated means when operated either effective or ineffective to displace said member.

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