Sept. 30, 1947 P. E. BURBY 2,428,062

LASTING MACHINE

Filed Oct. 17, 1945 4 Sheets-Sheet 1

Fig. 1.

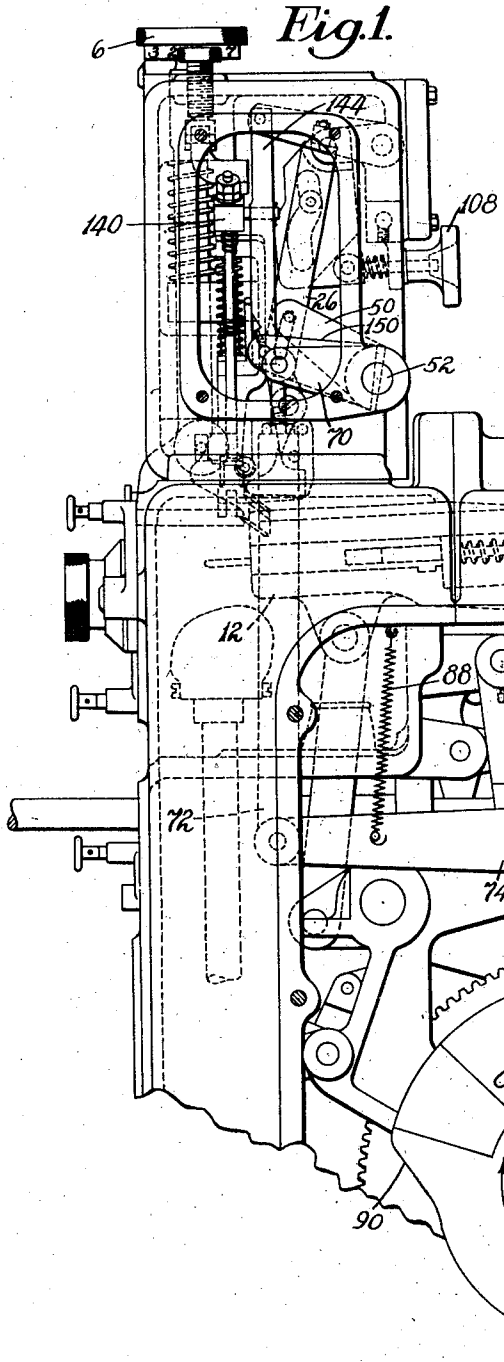
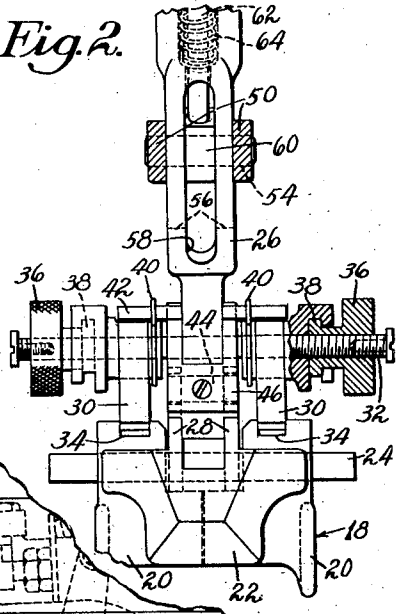


Fig. 2.



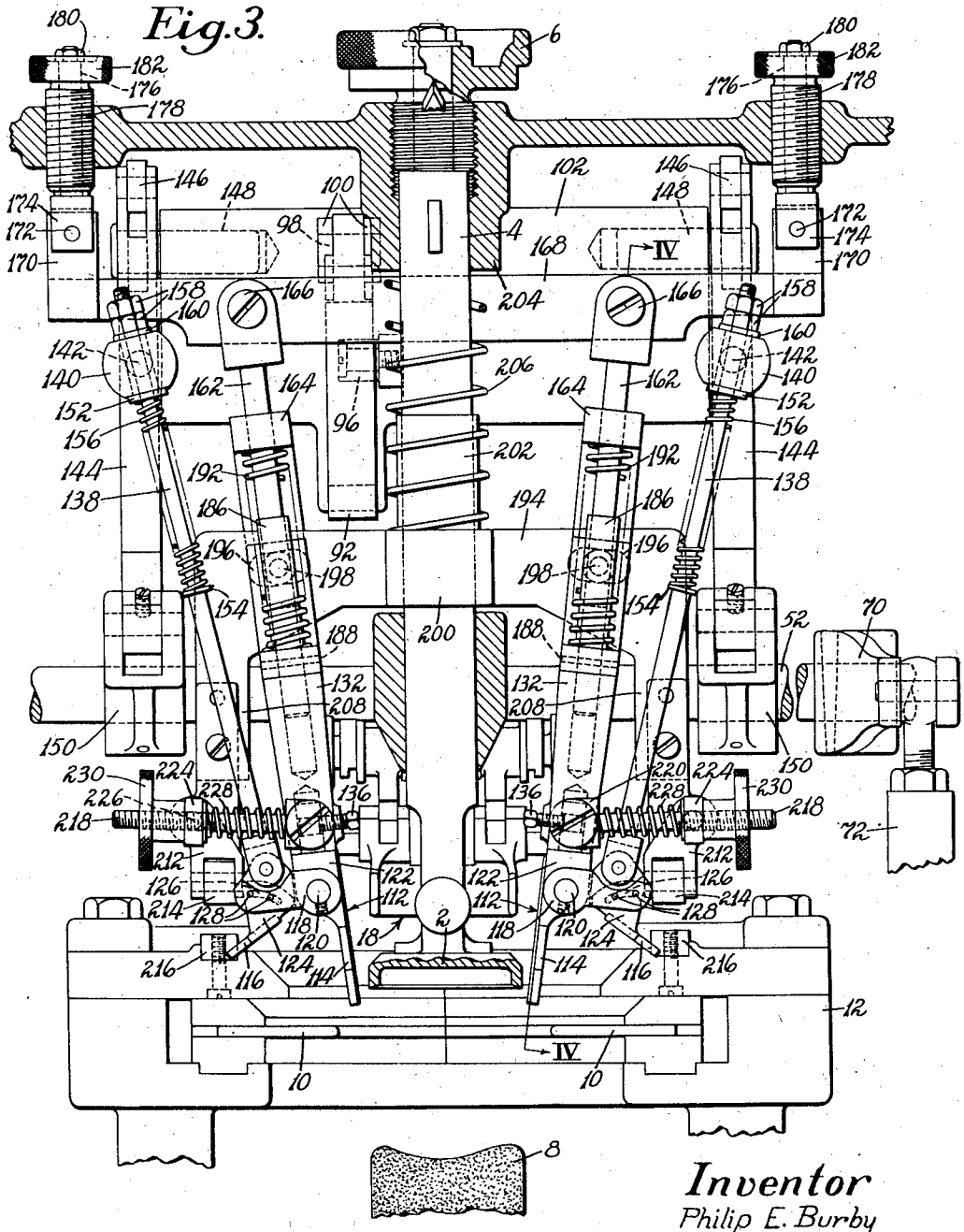
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Fig. 3.



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Fig. 4.

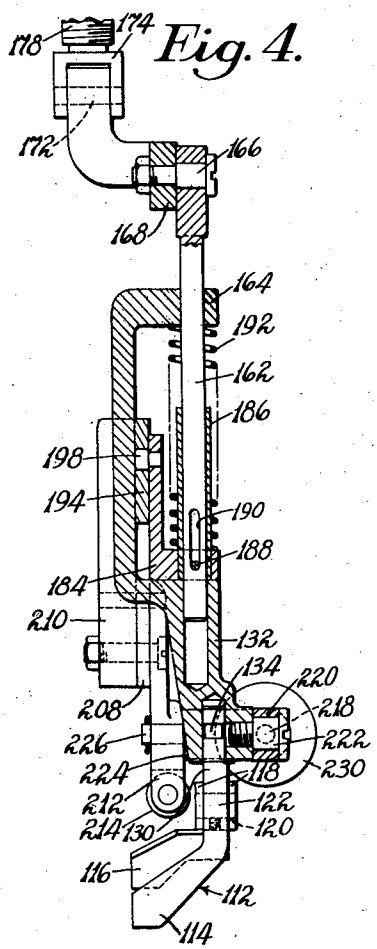


Fig. 5.

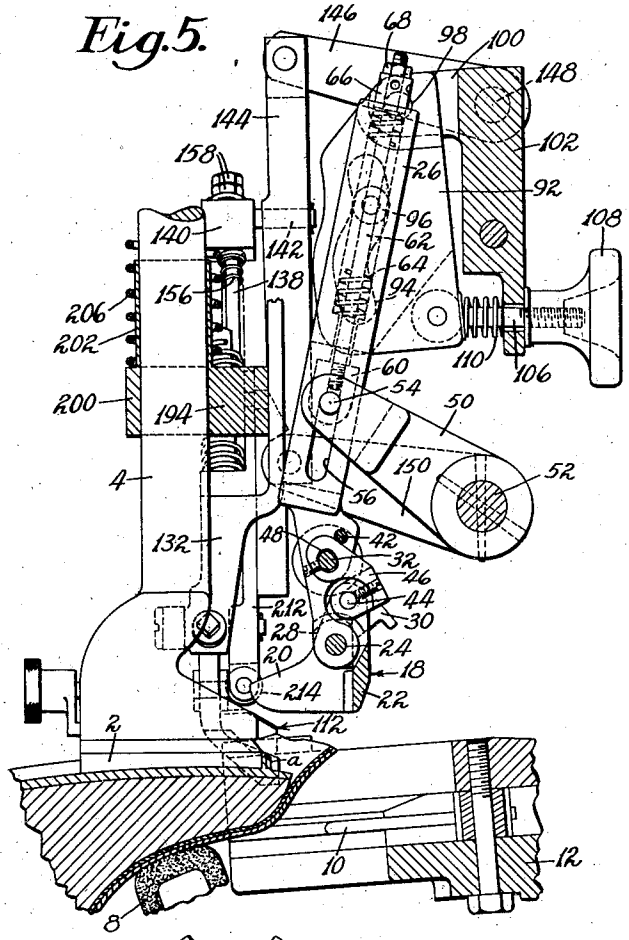


Fig. 6.

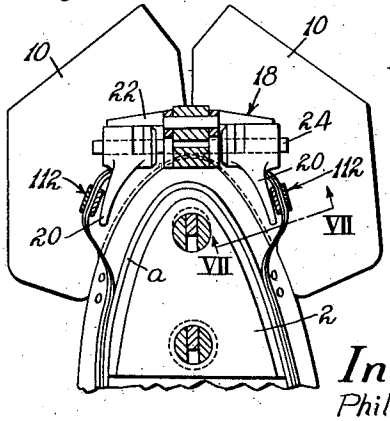
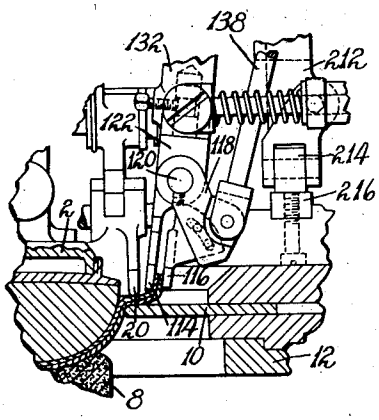


Fig. 7.



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Fig. 8.

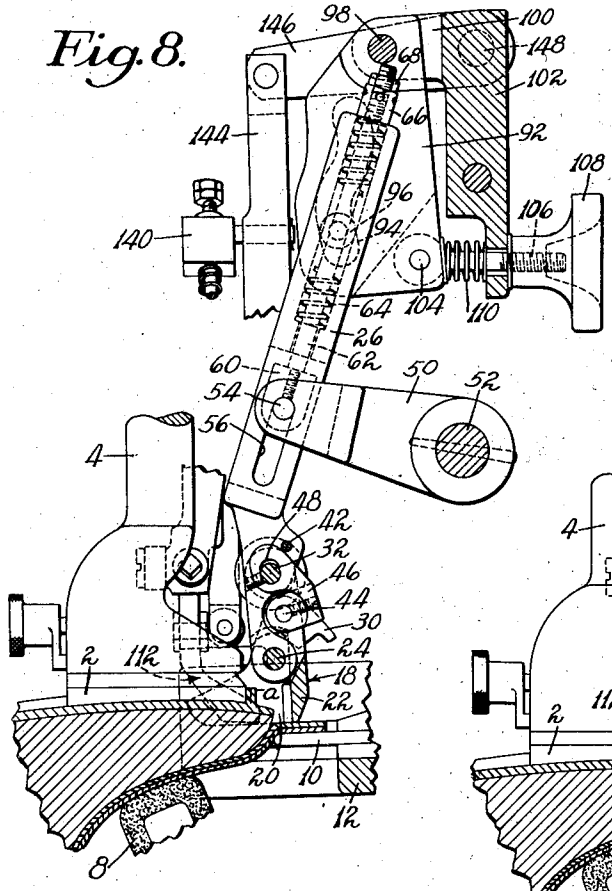


Fig. 9.

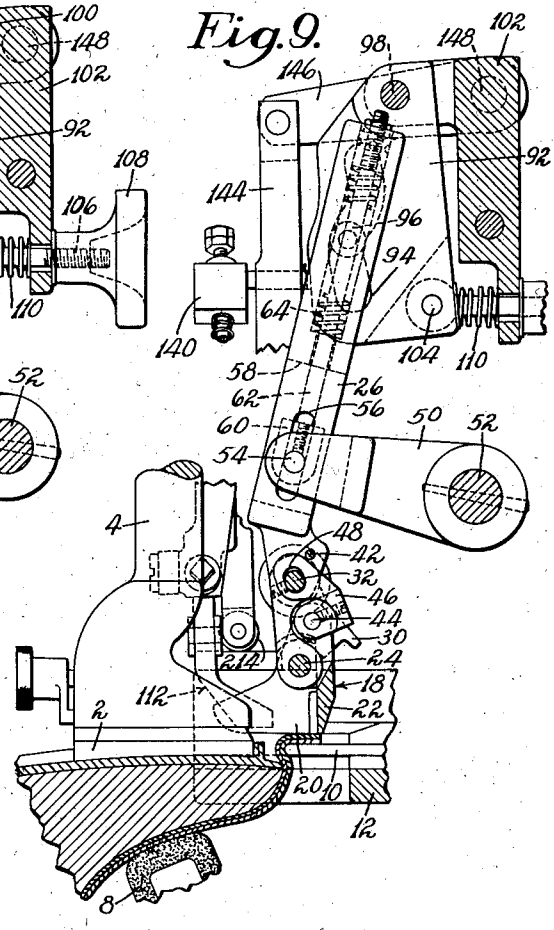
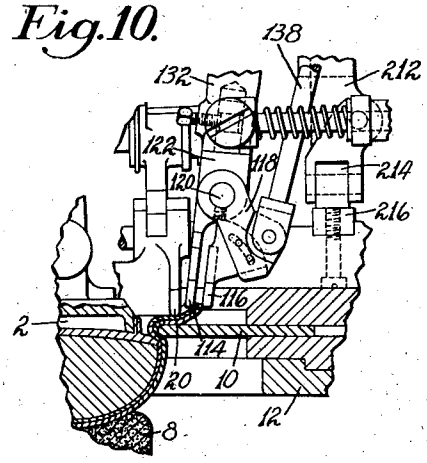


Fig. 10.



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2,428,062

UNITED STATES PATENT OFFICE

2,428,062

LASTING MACHINE

Philip E. Burby, Beverly, Mass., assignor to United Shoe Machinery Corporation, Flemington, N. J., a corporation of New Jersey

Application October 17, 1945, Serial No. 622,783

20 Claims. (Cl. 12—14)

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This invention relates to lasting machines, and is herein illustrated as applied to a power-operated toe-lasting machine which, except as hereinafter noted, is constructed generally 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. It is to be understood, however, that the invention is not thus limited in its applicability.

The machine shown in the above-mentioned Letters Patent is provided with wipers which are moved by a wiper carrier heightwise of the last to wipe the toe-end portion of the upper in that direction and are then operated to wipe the marginal portion of the upper inwardly over an insole on the last, and also with grippers which apply a pull to the upper at the end and the sides of the toe and thereafter control it during the greater portion of the wiping operations of the wipers. It has been proposed heretofore to substitute for such grippers a device having the function of what is commonly known as a retarder, the device being arranged to clamp the marginal portion of the upper outspread on the wipers about the end and along the sides of the toe and to cooperate with them in applying a pull to the upper and having the further function of maintaining the marginal portion of the upper smoothly outspread to assist in preventing the formation of any objectionable wrinkles in the course of the toe-lasting operation. Such a device or retarder is shown, for example, in United States Letters Patent No. 2,380,407, granted on July 31, 1945, on an application of mine. The present invention, in one aspect, provides novel toe-lasting means including a retarder controlling the upper generally as above described and grippers which grip the marginal portion of the upper at the sides only of the toe and serve as supplemental means for pulling and controlling the upper in those locations, thus affording further insurance against any looseness or wrinkling of the upper at the sides of the toe near the portions thereof beyond the toe which in accordance with the usual practice have already been lasted prior to the toe-lasting operation. In the construction shown the grippers engage the margin of portions of the upper which are also controlled by the retarder, and both the grippers and the retarder permit the upper to slip relatively thereto in response to its resistance to the force of the pull applied as the upper is wiped heightwise of the last by the wipers. Preferably, moreover, the retarder and the grippers continue their control of the upper until

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the wipers begin to wipe its marginal portion inwardly over the insole. For operating the grippers to pull the upper the construction shown provides mechanism which is operated by the movement of the wiper carrier heightwise of the last, comprising an operating device connected to both grippers and extending into the path of movement of the wiper carrier. Novel means also are provided for closing the grippers on the upper simultaneously with the movement of the retarder into position to clamp the upper on the wipers, the construction shown comprising a cam-operated rockshaft having an arm thereon for thus moving the retarder and provided also with other arms acting on members which close the grippers.

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 a portion of the machine in which the invention is herein shown as embodied;

Fig. 2 is a view in rear elevation of the retarder and parts associated therewith, a portion of the structure being broken away;

Fig. 3 is a view of a portion of the machine in front elevation, with parts broken away;

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

Fig. 5 is a view partly in left-hand side elevation and partly in section, showing portions of the structure as they appear shortly after the starting of the machine but prior to the beginning of the movements of the retarder and the wipers;

Fig. 6 is mainly a plan view showing the wipers and other parts as they appear when the upper is first clamped on the wipers by the retarder;

Fig. 7 is a view partly in elevation and partly in section on the line VII—VII of Fig. 6, showing one of the side grippers and associated parts at the same stage in the operation of the machine as in Fig. 6;

Fig. 8 is a view similar to Fig. 5, with the parts in the same positions as in Figs. 6 and 7;

Fig. 9 is a view similar to Fig. 8, with the parts as they appear when the wipers are beginning their movements to wipe the marginal portion of the upper inwardly over the insole; and

Fig. 10 is a view similar to Fig. 7 with the parts positioned as in Fig. 9.

In view of the disclosure in the above-men-

tioned Letters Patent No. 2,160,846, as much of the machine herein shown as is common to that prior disclosure will be herein described only in so far as is necessary for an understanding of the present invention. The position of a welt shoe and its last presented to the machine bottom upward by the operator is determined by a member 2 arranged to engage the bottom face of the toe end of the insole adjacent to its welt-attaching lip *a* and also to engage the inner face of the lip about the end and along the sides of the toe. The member 2 is detachably supported on the lower end of a post 4 adjustable vertically in bearings in the frame by a hand wheel 6. Immediately after the starting of the cycle of power operations of the machine the shoe is clamped against the member 2 by a toe rest 8 which is moved upwardly to clamping position. For lasting the toe end of the shoe the machine is provided with a pair of wipers 10 which are advanced lengthwise of the last and are closed inwardly widthwise of the last to embrace the upper closely about the toe end of the last and are moved upwardly to wipe the wiper heightwise of the last, after which they are further advanced and closed to wipe the marginal portion of the upper inwardly over the feather and against the lip of the insole. The wipers are supported by a wiper carrier 12 mounted for swinging movement to carry them heightwise of the last about a connection (not shown) with a lever 14 (Fig. 1) by which the carrier and the wipers are advanced lengthwise of the last. Closing movements relatively to the wiper carrier are imparted to the wipers by mechanism including a bell-crank lever 16 on the carrier. For a better understanding of the construction of the wiper-operating means Letters Patent No. 2,160,846 may be consulted.

Instead of the grippers shown in Letters Patent No. 2,160,846 for pulling the upper, the machine herein shown has other means cooperating with the wipers to last the toe end of the shoe, including a device 18, herein termed a retarder, which clamps the marginal portion of the upper outspread on the wipers. This retarder, which is similar in construction to that shown in Letters Patent No. 2,380,407, comprises a pair of upper-clamping members 20 each arranged to engage the upper along one side and part way around the end of the toe, and a central upper-clamping member 22 arranged to bridge any space between the two members 20 at the end of the toe. The two members 20 are mounted on a rod 24 for adjustment toward or from each other in directions widthwise of the shoe, this rod being secured in the lower end of an upwardly extending bar 26 controlled as hereinafter described. The central member 22 is provided at the opposite sides of the bar 26 with a pair of ears 28 (Fig. 2) whereby it also is mounted on the rod 24, and it is arranged to overlap and to engage flat faces on the two members 20 so that all three members are held in fixed relation to one another for movement as a unit about the rod 24. For adjusting the two members 20 toward or from each other there are provided two latch members 30 slidingly mounted on a rod 32 secured in the bar 26, these latch members being arranged to extend into grooves 34 (Fig. 2) formed in portions of the members 20 which are located above the rod 24. Threaded on the opposite end portions of the rod 32 are nuts 36 each provided with a flange 38 arranged to lie in a groove formed in the hub of the latch member 30 associated therewith. The latch members are normally held in the grooves 34 by springs 40 connected to a pin 42 extending through the bar 26, but may be swung against the resistance of these springs to release the members 20 and permit them to be removed from the rod 24 if desired. In the construction herein shown, as distinguished from that disclosed in Letters Patent No. 2,380,407, portions of the ears 28 which extend upwardly above the rod 24 are further connected by a pin 44 to a link 46 which is forked to extend upwardly at opposite sides of the bar 26 and is provided at the opposite sides of the bar with slots 48 through which the rod 32 extends. These slots permit limited tipping movement of the retarder 18 about the rod 24, so that the retarder is free to adjust itself to the plane of the wipers when it first clamps the margin of the upper on the wipers and maintains a parallel relation to that plane as long as it continues thus to clamp the upper.

In the construction herein shown the bar 26 which supports the retarder is controlled by an arm 50 fast on a rockshaft 52 arranged to extend laterally of the shoe and mounted in bearings in the frame. The arm 50 is forked (Fig. 2) and carries a pin 54 extending through slots 56 formed in portions of the bar 26 which are spaced from each other by a slot 58 (Fig. 2) extending lengthwise of the bar. Mounted on the pin 54 in the slot 58 is a block 60 in which is threaded the lower end of a rod 62 extending upwardly within the bar 26 and surrounded by a spring 64 bearing at its lower end on a shoulder on the bar. Threaded on the upper end of the rod is a nut 66 which, in accordance with its adjustment, holds the spring under more or less initial compression, the pin 54 being positioned initially at the upper ends of the slots 56 (Fig. 5). A lock nut 68 holds the nut 66 in adjusted position. It will thus be seen that the bar 26 and the retarder 18 are supported initially at a height determined by the position of the arm 50, as illustrated in Fig. 5. At a predetermined time in the operation of the machine, prior to the effective upwiping action of the wipers on the upper, the retarder is moved downwardly by the arm 50 to clamp the marginal portion of the toe end of the upper outspread on the wipers, as illustrated in Fig. 8, in response to turning movement of the rockshaft 52. For thus turning the rockshaft there is fast thereon an arm 70 (Figs. 1 and 3) connected by a link 72 to one arm of a lever 74 mounted to turn about a shaft 76, the other arm of the lever having thereon a roll 78 engaged by the periphery of a cam 80 fast on the operating cam shaft 82 of the machine. The cam 80 includes a cam plate 84 adjustable about the axis of the shaft 82 to determine variably the time in the operation of the machine when the rockshaft 52 is operated to move the retarder into upper-clamping position, the cam plate being held in adjusted position by screws 86 extending through slots therein. A spring 88 connected to the lever 74 holds the roll 78 at all times in engagement with the cam and serves to return the retarder to its initial position when permitted by a drop 90 on the cam.

After the retarder has been moved downwardly into upper-clamping position as above described, the arm 50 is held stationary by the cam 80 during the upwiping movement of the wipers. Accordingly the retarder and the bar 26 are lifted by the wipers against the resistance of the spring 64, the nut 66 entering the opening in the bar in which the spring is mounted, as illustrated in Fig. 9. Further to control the bar 26 with respect

to swinging movement about the pin 54, and thus to determine the position of the retarder lengthwise of the shoe, there is provided a cam block 92 having therein a cam slot 94 in which lies a roll 96 mounted on one side of the bar 26. This cam block is pivotally mounted at its upper end on a pin 98 supported by two ears 100 projecting forwardly from a plate 102 fast on the frame. Pivotally connected at 104 to the lower end of the cam block is a pin 106 extending rearwardly through an opening in an ear extending downwardly from the plate 102 and having threaded thereon a thumb nut 108 engaging the rear face of this ear. Between the ear and the lower end of the cam block is a compression spring 110. The thumb nut and the spring thus cooperate in adjusting the cam block 92 about the pin 98 to determine variably the initial position of the retarder lengthwise of the shoe. The lower end portion of the cam slot 94, in which the roll 96 lies during the upwiping movement of the wipers, is inclined in such manner as to swing the bar 26 in a counterclockwise direction with reference to Fig. 8 as the bar is lifted by the wipers, thus causing the retarder to move in an outward direction lengthwise of the shoe over the margin of the upper with a smoothing and tightening action thereon in the course of the upwiping operation.

In addition to the retarder, the machine herein shown is provided with two grippers 112 arranged to grip the margin of the upper respectively at the opposite sides of the toe to assist in the toelasting operation. Preferably, as shown in Fig. 6, these grippers act on portions of the upper which are also controlled by the end portions of the retarder. Each gripper includes a jaw 114 arranged to engage the inner face of the upper and a jaw 116 supported on a holder 118 which is pivotally mounted on a pin 120 secured in an upwardly extending shank portion 122 of the jaw 114. By swinging movement about the pin 120, therefore, the holder 118 carries the jaw 116 toward and from the jaw 114. A thin plate-like portion 124 of the jaw 116 extends into a slot in the holder 118 and is itself provided with a curved slot 126 through which extend two pins 128 in the holder. The jaw 116 is therefore permitted by the slot 126 and the pins 128 to adjust itself to the upper when it grips the upper against the jaw 114. The shank portion 122 of the jaw 114 is provided with a stem 130 (Fig. 4) extending upwardly into a bore formed in the lower end of a jaw carrier 132, the stem having therein an annular recess 134 to receive the end of a setscrew 136 (Fig. 3) in the jaw carrier. By this setscrew the two jaws are secured on the jaw carrier with provision for adjustment thereof about the axis of the stem 130, the jaw carrier being controlled as hereinafter described.

For closing each gripper on the upper there is pivotally connected to the holder 118 which carries the jaw 116 the lower end of a rod 138 extending upward loosely through an opening formed in a block 140 which has thereon a stem 142 mounted to turn in an upwardly and downwardly extending bar 144. This bar is pivotally mounted at its upper end (Fig. 5) on the front end of a rearwardly extending arm 146 pivotally mounted on a pin 148 on the plate 102. At its lower end the bar 144 is pivotally connected to the front end of an arm 150 fast on the rockshaft 52. Surrounding the rod 138 between a washer 152 bearing on the block 140 and another washer 154 seated on a shoulder on the rod is a compression spring 156. On the upper end of the rod are threaded a pair of nuts 158 one of which engages a washer 160 bearing on the upper face of the block 140. It will thus be seen that when the rockshaft 52 is turned to move the retarder 18 downwardly into position to clamp the upper on the wipers, as hereinbefore described, the two arms 150 on the rockshaft impart downward movements to the bars 144, thus causing the blocks 140 to act through the springs 156 and the rods 138 to swing the gripper jaws 116 into positions to grip the upper against the jaws 114, the springs being compressed more or less to maintain the grip on the upper.

Each gripper jaw carrier 132 is guided for upward and downward movements by a rod 162 (Figs. 3 and 4) extending downwardly through a bearing formed in a forwardly extending upper end portion 164 of the carrier into a bearing in the lower portion of the carrier. The two rods 162 are pivotally supported at their upper ends on studs 166 mounted in a crossbar 168, this crossbar being provided at its opposite ends with forwardly and upwardly curved portions 170 mounted on pins 172 supported by holders 174. Each holder 174 is provided with a stem 176 extending upwardly through a sleeve 178 which is threaded in the frame, the stem having on its upper end a nut 180 engaging the upper end of the sleeve. The two sleeves 178 may be turned by means of knurled heads 182 formed thereon, and it will be evident that in this manner the crossbar 168 may be adjusted upwardly or downwardly. Also mounted on each guide rod 162 to move lengthwise thereof is an L-shaped member 184 normally seated on the lower end portion of the carrier 132 and having fast thereon a sleeve 186 extending upwardly along the rod to assist in preventing any cramping of the member 184 on the rod. The member 184 carries a pin 188 extending through a slot 190 in the rod 162 to limit downward movement of the member. Between the lower portion of the L-shaped member 184 and the forwardly extending upper portion 164 of the carrier 132 is a compression spring 192. It will thus be seen that by upward movement of the member 184 along the rod 162 upward movement is imparted yieldingly through the spring 192 to the gripper jaw carrier 132 and the gripper jaws to cause the gripper to pull the upper. For thus operating the two members 184 there is provided a crossbar 194 provided with slots 196 into which extend pins 198 carried by the members 184. This crossbar has formed thereon a central boss 200 guided for upward and downward movements on the previously mentioned post 4, the boss having a sleeve 202 extending upwardly therefrom to assist in preventing any cramping of the crossbar on the post. Between the boss 200 and a boss 204 on the frame is a compression spring 206 which tends to move the crossbar downwardly, its downward movement being limited by the two pins 188 and the slots 190. The crossbar 194 is provided at its opposite ends with downwardly extending arms 208 to which are secured reenforcing pieces 210 (Fig. 4), and fastened to these arms are downwardly extending bars 212 provided at their lower ends with rolls 214. These rolls are arranged to be engaged by hardened blocks 216 (Fig. 3) secured on the wiper carrier 12. When upward movement is imparted to the wiper carrier, therefore, to cause the wipers to wipe the upper heightwise of the last the crossbar 194 is moved upwardly by the carrier along the post 4 to impart

upper-pulling movements yieldingly heightwise of the last to the grippers 112. It will be evident that in this operation the gripper-closing rods 138 also are moved upwardly, further compressing the springs 156 and increasing somewhat the pressure with which the upper is gripped by the gripper jaws. These jaws are provided with smooth upper-engaging faces to permit the upper to slip relatively to the jaws in response to its resistance to the force of the pull applied thereto. The grippers may be adjusted initially heightwise of the last by turning the sleeves 178, and by this means the crossbar 194 is correspondingly adjusted through its connections with the L-shaped members 184, thus varying the time in the upward movement of the wiper carrier 12 when the upper-pulling movements of the grippers begin.

To determine variably the positions of the grippers widthwise of the last there is associated with each gripper a rod 218 (Figs. 3 and 4) having an enlarged head 220 pivotally mounted on a stud 222 threaded in the gripper jaw carrier 132. This rod extends outwardly through an opening formed in an arm 224 provided with a pin 226 mounted to turn in the corresponding bar 212. Between the head 220 and the arm 224 is a compression spring 228, and threaded on the rod 218 at the outer side of the arm 224 is a thumb nut 230 cooperating with the spring to adjust the gripper widthwise of the last about the stud 166.

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. The operator presents the shoe to the machine in the position determined by the insole-engaging member 2 with the margin of the toe-end portion of the upper materials outspread from the edge of the insole and with portions thereof at the sides of the toe extending upwardly between the jaws of the open grippers 112. He then starts the machine, whereupon the toe rest 8 is moved upwardly to clamp the shoe against the member 2 (Fig. 5). Early in the cycle of operations the wipers 10 are advanced and closed and are swung upwardly to bring their edges into positions to begin effectively to wipe the upper heightwise of the last, and in the course of these movements of the wipers the rockshaft 52 is turned by the cam 80 to move the retarder 18 downwardly into position to clamp the marginal portion of the upper outspread on the wipers about the end and along the sides of the toe, as shown in Figs. 6, 7 and 8. As the retarder is thus moved downwardly it is guided into proper position relatively to the last and the wipers by the action of the cam slot 94 on the bar 26. When the retarder thus clamps the upper it adjusts itself to the plane of the wipers, which are at that time somewhat inclined lengthwise of the last, by reason of the provision of the slots 48 in the link 46. The retarder may become effective thus to clamp the upper on the wipers substantially at the time when the wipers in their upward swinging movement arrive in positions to begin an effective upwiping action on the upper. As the retarder is thus moved downwardly by the rockshaft 52 the arms 150 on this rockshaft impart downward movements to the two bars 144 which act through the springs 156 and the rods 138 to swing the outer gripper jaws 116 into positions to grip the portions of the upper which they engage yieldingly against the inner jaws 114. As the wipers are thereafter swung farther upwardly to wipe the upper heightwise of the last they lift the

retarder and its supporting bar 26 against the resistance of the spring 64 through which the retarder is pressed yieldingly on the upper, the retarder cooperating with the wipers to apply an upward pull to the upper while the margin of the upper slips more or less inwardly between the retarder and the wipers. At the same time the cam slot 94 acts through the roll 96 on the bar 26 to move the retarder a short distance outwardly over the wipers lengthwise of the shoe with a tightening and smoothing action on the margin of the upper at the end of the toe. In the course of the upwiping action of the wipers the crossbar 194 is lifted by the wiper carrier 12 and acts through the members 184 and the springs 192 to impart upward movements yieldingly to the gripper jaw carriers 132. Accordingly the grippers, which preferably act on portions of the upper also controlled by the retarder at the sides of the toe as shown in Fig. 6, apply a pull to those portions of the upper supplemental to the pull applied thereto by the cooperative action of the wipers and the retarder, thus affording better insurance that the upper will be tightly conformed to the last and will be free from any wrinkles at the sides of the toe near the portions which have already been lasted. As the grippers are thus moved heightwise of the last their closing rods 138 move upwardly with them through the blocks 140, as a result of which the springs 156 are further compressed and increase the pressure with which the jaws of the grippers grip the upper. These jaws, however, slip on the upper as the grippers are moved upwardly, but preferably, like the retarder, retain control of the margin of the upper until the wipers, by further advancing and closing movements, begin to wipe the marginal portion of the upper inwardly over the feather of the insole, as illustrated in Fig. 10. When the wipers have moved inwardly far enough to grip the upper effectively against the margin of the insole the drop 99 on the cam 80 permits the spring 88 to impart reverse turning movement to the rockshaft 52, thereby moving the retarder upwardly away from the wipers and causing the rods 138 to open the grippers. The wipers by their continued inward movements then complete the wiping of the margin of the upper over the feather and against the lip of the insole. The lasting of the toe is thereafter completed in the same manner as disclosed in Letters Patent No. 2,160,846. It will be understood that in the return of the parts of the machine to starting positions the crossbar 194 is moved downwardly by the spring 206 to return the grippers to their starting positions when permitted by the downward movement of the wiper carrier 12.

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

1. In a lasting machine, wipers for wiping an upper about the toe end of a last into lasted position, a retarder for clamping the marginal portion of the upper on the wipers about the end and along the sides of the toe, means for effecting relative movement of the last and the wipers while the retarder is thus clamping the upper to cause the retarder and the wipers to apply a pull to the upper heightwise of the last, and means for gripping at the sides only of the toe the margin of portions of the upper also controlled by said retarder and for applying to the upper in those locations a supplemental pull beginning at

substantially the same time as the pull applied by the retarder and wipers.

2. In a lasting machine, wipers for wiping an upper about the toe end of a last into lasted position, a retarder for clamping the marginal portion of the upper on the wipers about the end and along the sides of the toe, means for effecting relative movement of the last and the wipers while the retarder is thus clamping the upper to cause the retarder and the wipers to apply a pull to the upper heightwise of the last, and grippers for gripping at the sides only of the toe the margin of portions of the upper also controlled by said retarder and for applying a supplemental pull to the upper in those locations in the course of the pull applied by the retarder and wipers, said retarder and grippers being so formed as to permit the upper to slip relatively thereto in response to its resistance to the force of the pull thereon.

3. In a lasting machine, wipers movable to wipe the marginal portion of an upper about the toe end of a last inwardly over an insole on the last, a retarder for clamping the marginal portion of the upper on the wipers about the end and along the sides of the toe, means for effecting relative movement of the last and the wipers while the retarder is thus clamping the upper to cause the retarder and the wipers to apply a pull to the upper heightwise of the last before its marginal portion is wiped inwardly over the insole, grippers for gripping at the sides only of the toe the margin of portions of the upper also controlled by said retarder and for applying a supplemental pull to the upper in those locations in the course of the pull applied by the retarder and wipers, said retarder and grippers being so formed as to permit the upper to slip relatively thereto in response to its resistance to the force of the pull thereon, and means for withdrawing the retarder from the wipers and for opening the grippers only after the beginning of the movements of the wipers to wipe the marginal portion of the upper inwardly over the insole.

4. In a lasting machine, wipers for wiping an upper about the toe end of a last heightwise of the last and then inwardly over an insole on the last, a retarder for clamping the marginal portion of the upper on the wipers about the end and along the sides of the toe to apply a pull to the upper as it is wiped heightwise of the last, means for gripping at the sides only of the toe the margin of portions of the upper also controlled by said retarder, and means for subjecting the upper at the sides of the toe to a supplemental pull by relative movement of said upper-gripping means and the last in the course of the pull applied by the retarder and wipers.

5. In a lasting machine, wipers for wiping an upper about the toe end of a last heightwise of the last and then inwardly over an insole on the last, a retarder for clamping the marginal portion of the upper on the wipers about the end and along the sides of the toe to apply a pull to the upper as it is wiped heightwise of the last, and grippers for gripping at the sides only of the toe the margin of portions of the upper also controlled by said retarder and for applying a supplemental pull to the upper in those locations in the course of the pull applied by the retarder and wipers, said retarder and grippers being so formed as to permit the upper to slip relatively thereto in response to its resistance to the force of the pull thereon.

6. In a lasting machine, wipers for wiping an upper about the toe end of a last into lasted position, a retarder for clamping the marginal portion of the upper on the wipers about the end and along the sides of the toe, the wipers and retarder being movable heightwise of the last to apply a pull to the upper in that direction, grippers for gripping at the sides only of the toe the margin of portions of the upper also controlled by said retarder, and means for moving said grippers heightwise of the last as the wipers and retarder are moved in that direction to apply a supplemental pull to the upper at the sides of the toe.

7. In a lasting machine, wipers for wiping an upper about the toe end of a last heightwise of the last and then inwardly over an insole on the last, a wiper carrier movable to carry the wipers heightwise of the last thus to wipe the upper in that direction, a retarder for clamping the marginal portion of the upper on the wipers about the end and along the sides of the toe to apply a pull to the upper as it is wiped heightwise of the last, grippers for gripping the upper at the sides of the toe, and means for moving said grippers heightwise of the last by the movement of said wiper carrier to apply an additional pull to the upper.

8. In a lasting machine, wipers for wiping an upper about the toe end of a last into lasted position, a retarder for clamping the marginal portion of the upper on the wipers, a wiper carrier movable to carry the wipers heightwise of the last to cause the retarder and wipers to apply a pull to the upper in that direction, and additional means comprising jaws arranged to grip the margin of the toe end of the upper between them and to be operated wholly by that movement of the wiper carrier to apply a supplemental pull to the upper.

9. In a lasting machine, wipers for wiping an upper about the toe end of a last heightwise of the last and then inwardly over an insole on the last, a wiper carrier movable to carry the wipers heightwise of the last thus to wipe the upper in that direction, and upper-gripping means supported independently of the wiper carrier and comprising jaws arranged to grip the margin of the toe end of the upper between them, said upper-gripping means being arranged to be operated wholly by the movement of the wiper carrier to apply a pull to the upper as it is wiped heightwise of the last.

10. In a lasting machine, wipers for wiping an upper about the toe end of a last heightwise of the last and then inwardly over an insole on the last, a wiper carrier movable to carry the wipers heightwise of the last thus to wipe the upper in that direction, grippers supported independently of the wiper carrier for gripping the upper at the sides of the toe, and mechanism associated with said grippers for operating them to pull the upper heightwise of the last, said wiper carrier having means for engaging and moving said mechanism thus to operate the grippers.

11. In a lasting machine, wipers for wiping an upper about the toe end of a last heightwise of the last and then inwardly over an insole on the last, a wiper carrier movable to carry the wipers heightwise of the last thus to wipe the upper in that direction, grippers for gripping the upper at the sides of the toe, and means guided independently of the wiper carrier for movement heightwise of the last and arranged to be thus moved by the wiper carrier to impart upper-pulling

movements to the grippers as the upper is wiped heightwise of the last by the wipers.

12. In a lasting machine, wipers for wiping an upper about the toe end of a last heightwise of the last and then inwardly over an insole on the last, a wiper carrier movable to carry the wipers heightwise of the last thus to wipe the upper in that direction, grippers for gripping the upper at the sides of the toe, and a crossbar guided independently of the wiper carrier for movement heightwise of the last to impart upper-pulling movements to the grippers, said crossbar having at its opposite ends members extending toward the wiper carrier for operating the crossbar by the movement of said carrier heightwise of the last.

13. In a lasting machine, wipers for wiping an upper about the toe end of a last heightwise of the last and then inwardly over an insole on the last, a wiper carrier movable to carry the wipers heightwise of the last thus to wipe the upper in that direction, grippers for gripping the upper at the sides of the toe, a device guided independently of the wiper carrier for movement heightwise of the last and arranged to be thus moved by the wiper carrier to impart upper-pulling movements to the grippers as the upper is wiped heightwise of the last by the wipers, connections between said device and the grippers arranged to permit adjustments of the grippers widthwise of the last, and means for thus adjusting the grippers.

14. In a lasting machine, wipers for wiping an upper about the toe end of a last into lasted position, a retarder for clamping the marginal portion of the upper on the wipers about the end and along the sides of the toe, means for effecting relative movement of the last and the wipers while the retarder is thus clamping the upper to cause the retarder and the wipers to apply a pull to the upper heightwise of the last, grippers for gripping at the sides of the toe the margin of portions of the upper also controlled by said retarder and for applying a supplemental pull to the upper in those locations in the course of the pull applied by the retarder and wipers, the retarder and grippers being so formed as to permit the upper to slip relatively thereto in response to its resistance to the force of the pull thereon, and means for simultaneously moving the retarder toward the wipers and closing the grippers.

15. In a lasting machine, wipers for wiping an upper about the toe end of a last into lasted position, a retarder for clamping the marginal portion of the upper on the wipers about the end and along the sides of the toe, means for effecting relative movement of the last and the wipers while the retarder is thus clamping the upper to cause the retarder and the wipers to apply a pull to the upper heightwise of the last, grippers for gripping the margin of the upper at the sides of the toe and for pulling the upper in those locations in the course of the pull applied by the retarder and wipers, a rockshaft arranged to extend laterally of the shoe, and means carried by said rockshaft for moving the retarder toward the wipers and for enclosing the grippers.

16. In a lasting machine, wipers for wiping an upper about the toe end of a last into lasted position, a retarder for clamping the marginal portion of the upper on the wipers about the end

and along the sides of the toe, means for effecting relative movement of the last and the wipers while the retarder is thus clamping the upper to cause the retarder and the wipers to apply a pull to the upper heightwise of the last, grippers for gripping the margin of the upper at the sides of the toe and for pulling the upper in those locations in the course of the pull applied by the retarder and wipers, a rockshaft arranged to extend laterally of the shoe, an arm on said rockshaft for moving the retarder toward the wipers, and other arms on said rockshaft for closing the grippers.

17. In a lasting machine, wipers for wiping an upper about the toe end of a last into lasted position, a retarder for clamping the marginal portion of the toe end of the upper on the wipers, the wipers and retarder being movable heightwise of the last to apply a pull to the upper in that direction, grippers arranged to grip the margin of the upper at the sides of the toe and movable heightwise of the last to pull the upper in those locations in the course of the pull applied by the retarder and wipers, members connected to said grippers and movable to close them on the upper, and springs through which said members are operated, said members being movable with the grippers against the resistance of said springs in the upper-pulling operation.

18. In a lasting machine, grippers for gripping the margin of an upper respectively at opposite sides of a last, means for moving said grippers heightwise of the last to pull the upper, rods arranged to extend heightwise of the last and connected to said grippers, said rods being movable to close the grippers on the upper, and springs through which said rods are thus operated, the rods being reversely movable with the grippers against the resistance of said springs in the upper-pulling operation.

19. In a lasting machine, grippers for gripping the margin of an upper respectively at opposite sides of a last, said grippers each comprising a pair of jaws and a carrier supporting said jaws, guide rods along which the jaw carriers are movable to cause the jaws to pull the upper, members movable along said rods to operate the carriers, and springs for transmitting force from said members to the carriers.

20. In a lasting machine, grippers for gripping the margin of an upper respectively at opposite sides of a last, guide rods along which said grippers are movable heightwise of the last to pull the upper, said guide rods being mounted to swing about axes extending lengthwise of the last to permit adjustment of the grippers about said axes, means for thus adjusting the grippers, a device common to said grippers and movable heightwise of the last to operate them, and connections between said device and the grippers permitting such adjustment of the grippers.

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