Aug. 13, 1940. W. T. B. ROBERTS 2,211,075

LASTING MACHINE

Filed Feb. 24, 1939 2 Sheets-Sheet 1

Fig. 6.

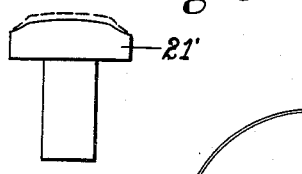


Fig. 1.

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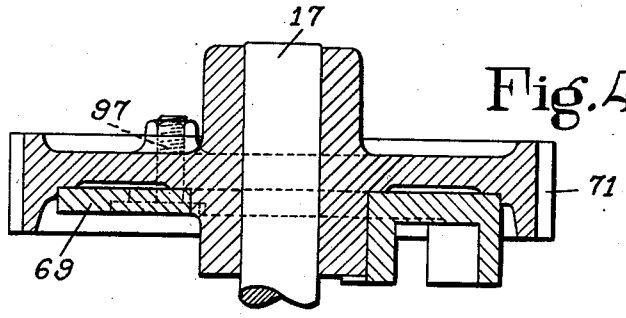


Fig.4.

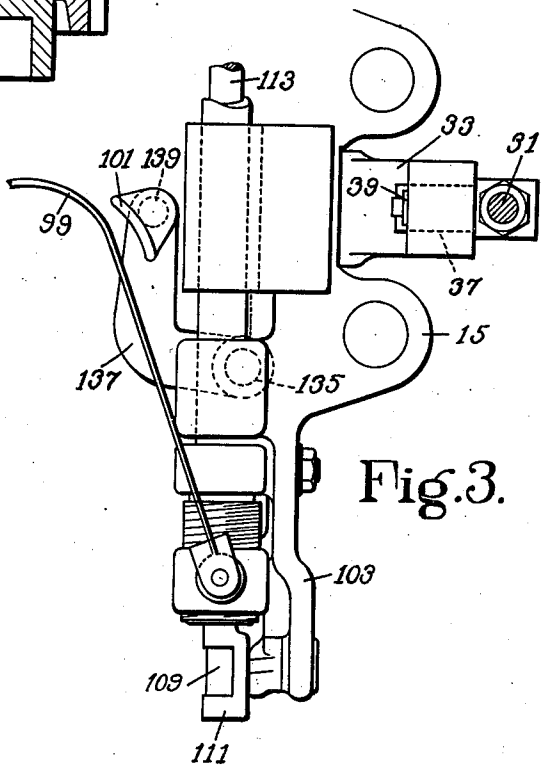


Fig.3.

Fig.5.

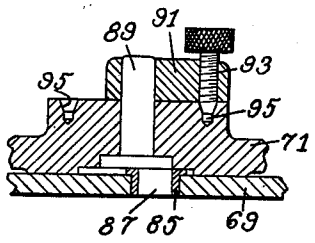
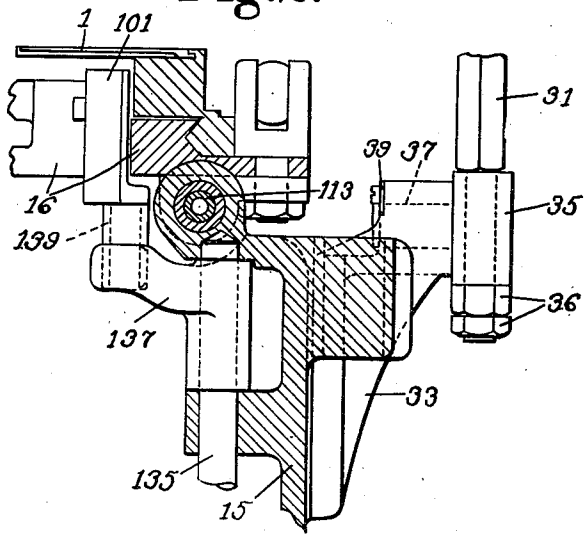


Fig.2.



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Patented Aug. 13, 1940 2,211,075

UNITED STATES PATENT OFFICE

2,211,075

LASTING MACHINE

William Thomas Buckingham Roberts, Leicester, England, assignor to United Shoe Machinery Corporation, Borough of Flemington, N. J., a corporation of New Jersey

Application February 24, 1939, Serial No. 258,254
In Great Britain May 2, 1938

17 Claims. (Cl. 12—14)

This invention relates to lasting machines, and is herein illustrated as applied to a power-operated toe-lasting machine constructed generally as disclosed in United States Letters Patent No. 2,134,148, granted on October 25, 1938 upon an application of mine, but modified in certain respects as further disclosed in Letters Patent No. 2,140,652, granted on December 20, 1938 upon another application of mine. It is to be understood, however, that in various novel aspects the invention is not thus limited in its applicability.

The machine above referred to is provided with toe-embracing wipers which are moved upwardly to wipe the toe end of an upper heightwise of a last positioned bottom upward and are thereafter advanced and closed to wipe the margin of the upper inwardly over an insole on the last, the machine being further provided with upper-spreading and retarding fingers which cooperate with the wipers to apply to the upper a pull heightwise of the toe and which have thereafter a retarding and pleat-dispersing effect on the margin of the upper as the wipers wipe it inwardly over the insole. Substantially at the end of the upward movement of the wipers the last is depressed a short distance relatively to the wipers, a result of this movement of the last and the previous movement of the wipers being that substantial clearance is provided between the lower faces of the wipers and the upper face of the insole to insure against any displacement of the margin of the insole by the wipers as they begin to wipe the margin of the upper inwardly. Early in such inward movement of the wipers they are lowered sufficiently to cause them to press firmly on the margin of the upper. After having completed this inward wiping movement, the wipers are raised a definite short distance to relieve their pressure on the margin of the upper and are then moved reversely outward nearly to the edge of the shoe bottom. Thereafter the wipers are lowered to press again firmly on the upper and receive a second relatively short inward movement to complete the wiping operation prior to the driving of a gang of upper-fastening tacks in locations beyond their wiping edges.

While a machine constructed to operate as above described has been found to produce very satisfactory results under most conditions, the present invention has in view certain changes such as to improve the results in operating, for example, on shoes having uppers of comparatively thin or flimsy material, such as thin glacé leather. In accordance with one of the features of the invention, provision is afforded for the wipers to rest on the margin of the upper under the influence of gravity as they are partially retracted after their first inward wiping movement, instead of being lifted and supported at a definite height as heretofore. The pressure which the wipers apply to the margin of the upper, due to their weight and the weight of their vertically movable supporting means, is therefore the same in operating on different shoes regardless of the thickness or resilience of the upper materials, and in operating on comparatively thin uppers this moderate pressure is regarded as sufficient to cause the wipers to redistribute any undesired wrinkles which may have resulted from their first inward movement, while at the same time not being severe enough to cause the wipers to drag the margin outwardly toward the edge of the insole. Under some conditions it may be desirable, even though the wipers are to rest on the margin of the upper under the influence of gravity, to start their upward pressure-relieving movement positively instead of depending entirely upon expansion of the upper materials to lift them, and the invention accordingly provides a construction which may be used to operate in that manner. Since, moreover, it may not be desirable for the wipers to rest on the upper under the influence of gravity in operating on comparatively heavy upper materials, provision is also afforded for effecting alternatively, as heretofore, a definite relief of their pressure on the upper and for maintaining them at a height not determined by the shoe during their retractive movement.

Further to improve the results in operating on different kinds of upper materials, the invention provides novel means whereby the amount of clearance between the wipers and the margin of the insole as the wipers begin to wipe the margin of the upper inwardly over the insole may be readily varied. While it is usually desirable, in operating on comparatively heavy upper materials, to provide as heretofore for substantial clearance between the wipers and the insole at the beginning of the overwiping operation, it is considered that better results are likely to be obtained in operating on comparatively light uppers if such clearance is, for the most part, eliminated. Accordingly the construction herein shown is such as to permit a variation in the amount of upward movement of the wipers which precedes their overwiping movement to be conveniently effected. More particularly, as herein illustrated, the upward movement of the wipers is effected by two cams arranged to operate one after the other and one of which is readily removable to permit the substitution of a different cam for varying the position to which the wipers are raised.

In accordance with another feature of the invention provision is afforded for varying the time in the operation of the machine when the pressure of the wipers on the margin of the upper as they wipe it inwardly over the insole is

increased, as may also be desirable in operating on different kinds of work. For this purpose, in the construction herein shown, a rotatable cam which operates to lower the wipers in time relation to their overwiping movement is adjustable about its axis to vary the time of its action.

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 mechanism in which features of the invention are embodied, with parts broken away;

Fig. 2 is a view partly in front elevation and partly in section of a portion of the structure shown in Fig. 1;

Fig. 3 is a plan view of parts shown in Fig. 2 and of parts associated therewith;

Fig. 4 is a section on the line IV—IV of Fig. 1;

Fig. 5 is a section on the line V—V of Fig. 1; and

Fig. 6 shows on an enlarged scale a cam which may be used in place of one of the cams shown in Fig. 1.

Except for changes hereinafter described, the machine to which the invention is herein illustrated as applied may be assumed to be constructed and to operate as disclosed in the previously mentioned Letters Patent No. 2,134,148 when modified as further disclosed in Letters Patent No. 2,140,652. For wiping the toe end of the upper heightwise of the last and for wiping its margin inwardly over an insole on the last the machine is provided with toe-embracing wipers 1 which, except for changes hereinafter described, operate in the manner hereinbefore explained, the upper-spreading and retarding fingers which cooperate with the wipers to tension the upper and to control its margin being omitted from the present drawings. Movements of the wipers heightwise of the last are effected, through mechanism hereinafter described, by a path cam 3 formed in one side of a rotatable cam wheel 4, this path cam corresponding to the path cam 82 shown in Letters Patent No. 2,140,652. For purposes of the present invention, however, the construction is such that the wipers, instead of being lifted positively to relieve their pressure on the margin of the upper and being maintained at a definite height as they are partially retracted toward the edge of the shoe bottom after their first inward wiping movement over the insole, may be permitted to rest by gravity on the margin of the upper as they are thus retracted. To this end, the inner side 5 of that portion of the path cam 3 located between the regions 7 and 9 is a concentric continuation of neighboring portions of the cam, instead of being formed to lift the wipers as heretofore, while the outer side of that portion of the cam is bulged outwardly as indicated at 11, so that the cam in this location is wider than a cam roll 13 which it controls. This leaves the wipers free to be lifted more or less by expansion of the overwiped upper materials against the force of gravity acting on the wipers and on their vertically movable supporting members 15 which are connected rigidly together by a bridge piece 16, and permits them to rest by gravity on the upper as they are partially retracted. The members 15, in the construction herein shown, are connected by links 18 (only one of which is visible in the drawings) to a forked lever 20 which carries the cam roll 13. Such expansion of the upper materials may or may not cause the cam roll 13 to move far enough to engage the outer side of the cam 3 where the bulge 11 is located, but even if such engagement occurs, it is substantially the force of gravity alone which determines the amount of pressure applied by the wipers to the upper as they are retracted. By reason of this construction, the wipers during their retractive movement will apply to the margin of the upper a moderate amount of pressure which will be substantially the same regardless of the thickness or resilience of the upper materials of different shoes, with contemplated advantages such as hereinbefore explained in operating especially on comparatively thin uppers.

Since it is desirable, in operating on comparatively heavy upper materials, that the wipers be lifted and supported at a definite height relatively to the shoe as heretofore, instead of resting on the upper by gravity during their partial retractive movement, provision is afforded for controlling the wipers alternatively in this manner. For this purpose there is secured on a shaft 17, which corresponds to the shaft 253 shown in Letters Patent No. 2,134,148, a cam carrier 19 which carries a readily removable cam 21 having a stem 22 held by a set screw in the carrier. The cam carrier 19 is secured on the hight-hand end of the shaft 17 which extends outside of the frame of the machine, and, accordingly, the cam 21 is readily accessible so that it may be removed without disturbing any other operative part of the machine. The shaft 17 rotates at the same speed as the shaft which carries the cam wheel 4, and the cam 21 is so positioned on the carrier 19 that when the cam roll 13 enters that portion of the path cam 3 where the bulge 11 is located, the cam 21 engages a roll 23 mounted on a rearwardly extending arm 25 of a lever 27 pivotally supported on the frame of the machine. A forwardly extending arm 29 of the lever 27 is connected by a downwardly extending rod 31 with a bracket 33 which is bolted to the right-hand wiper-supporting member 15. At its lower end a reduced portion of the rod 31 (Fig. 2) extends through a bore in a trunnion block 35 and is held therein by nuts 36, so that the rod is fixed against upward or downward movement relatively to the trunnion block. A stub shaft 37 on the trunnion block 35 extends into a bore in the bracket 33 and is retained therein by a disk 39 which is secured to the bracket and extends into a groove in the stub shaft. The upper end of the rod 31 is threaded in a trunnion block 41 which is pivotally mounted on the forwardly extending arm 29 of the lever 27, the rod being held against turning movement by a set screw 43. It will thus be seen that the cam 21, when mounted on the carrier 19, acts through the lever 27 and the rod 31 to lift the wipers a definite distance to relieve their pressure on the margin of the upper and to maintain them at the height predetermined by the cam as they are partially retracted. In view, moreover, of the ready accessibility of the cam, it may be quickly removed when desired, so as to permit the wipers to rest by gravity on the margin of the upper in the manner hereinbefore explained. It will be further appreciated that the construction provided permits cams of different sizes to be readily mounted on the carrier 19 to vary the amount of upward pressure-relieving movement which is imparted to the

wipers. For example, instead of the cam 21 constructed to operate as above described, there may be used a cam 21', such as shown on an enlarged scale in Fig. 6, which is of less height than the cam 21, so that it will start the upward pressure-relieving movement of the wipers positively but will not move them far enough to prevent them from being further lifted by expansion of the upper materials so as to rest by gravity on the upper as they are retracted. The use of such a cam may be desirable, for example, in operating on uppers which have less tendency than others to expand after having been compressed. The relation of the shape of the cam 21 to that of the cam 21' is suggested by a dotted line in Fig. 6.

As hereinbefore explained, and as disclosed more particularly in Letters Patent No. 2,140,652, machines of the type to which the invention is herein shown as applied have been so constructed heretofore that in wiping the upper heightwise of the toe the wipers have been moved upwardly to such a position as to provide for substantial clearance between them and the insole at the beginning of the overwiping operation so as to afford better insurance that they will not displace the margin of the insole in that operation, the wipers being thereafter moved downward early in their overwiping movement to cause them to press firmly on the upper. While this produces satisfactory results in operating on comparatively heavy upper materials, better results are likely to be produced in operating on comparatively light and flimsy uppers if the wipers are moved only to such a height as to enable them to clear the edge of the insole in the overwiping operation, with suitable allowance for the thickness of the upper materials, and do not receive any downward movement as they start to move inwardly. The construction herein shown is accordingly such as to permit variations in the amount of upwiping movement imparted to the wipers. For this purpose the path cam 3, instead of imparting the entire upward movement to the wipers like the corresponding cam used heretofore, is so formed as to impart to them only a portion of this movement, after which they are further raised to a variably predetermined position by additional cam means. The movement of the wipers effected by the cam 3 results from a rise on the inner side of the cam between the regions indicated at 47 and 49, and beyond the region 49 the inner side of the cam presents a concentric surface extending around the cam shaft to the region 53, this concentric surface effecting no further upward movement of the wipers. Between the region 49 and the region 61, however, the path cam 3 is of greater width than the diameter of the roll 13, thus permitting further upward movement of the wipers to be effected, and as soon as the roll enters this widened portion of the cam the wipers are further lifted by the action on the roll 23 of a cam face 55 formed on a cam 57 which is detachably mounted on the previously mentioned cam carrier 19. The wipers continue to rise, therefore, until the roll 23 is engaged by a concentric surface 59 on the cam 57. The cam 57 is secured on the carrier 19 by a set screw 63 which engages a stem extending from the cam into an opening in the carrier. It will be evident that by reason of the location of the carrier 19 the cam 57 may be readily removed without disturbing any other operating part of the machine, so that cams of different shapes may be mounted on the carrier to vary as desired the amount of upward movement imparted to the wipers and accordingly the relation of the wipers to the plane of the toe end of the insole at the beginning of the overwiping operation. By using different cams, therefore, the wipers may be moved to the same height as heretofore or only to such a height that they will just clear the edge of the insole in the overwiping operation, or they may be moved to any intermediate position between these two extremes.

The construction shown is further such that downward movement is not imparted to the wipers by the path cam 3 early in their overwiping movement as heretofore, but such downward movement is effected by other means by which it may be variably timed relatively to the overwiping movement of the wipers. This means comprises a cam 67 formed as part of a plate 69 adjustably mounted on a gear wheel 71 which is secured to the left-hand end of the shaft 17 outside of the frame of the machine, the cam 67 being arranged to act on a roll 73 mounted on an arm 75 of a bell-crank lever 77 which has a forwardly extending arm 79 connected to the left-hand one of the pair of wiper-supporting members 15 in the same manner that the arm 29 is connected to the right-hand supporting member. The cam 67 has an inclined face 81 which is arranged to act on the roll 73 to lower the wipers as soon as the concentric portion 59 of the cam 57 leaves the roll 23. It will be understood that when the cam 67 thus acts to lower the wipers the roll 13 is still located in the widened portion of the path cam 3 between the region 49 and the region 61. By means hereinafter described the plate 69 on which the cam 67 is formed is adjustable about the axis of the gear 71 to vary the time when the cam acts to lower the wipers, and in order that the actions of the two cams 57 and 67 may be properly coordinated, cams 57 of different lengths are to be used to correspond respectively to different adjusted positions of the cam 67. Accordingly, by using cams 57 of the same thickness but having concentric faces 59 of different lengths and by adjusting the plate 69 to the appropriate positions for the different cams 57, the wipers may be moved upwardly to the same position, but the time when they are pressed down on the margin of the upper as they are moved inwardly over the insole may be varied. It will also be understood that by using cams 57 of different thicknesses but having faces 59 of the same length, and leaving the plate 69 in the same position, the height to which the wipers are moved will be varied while the time when they are moved downwardly to cause them to press firmly on the upper will remain constant. Furthermore, by using cams 57 which vary both in length and in thickness and properly adjusting the plate 69, both the height to which the wipers are moved and the time when they are depressed will be varied. If the wipers are moved only to the minimum height, so that they will just clear the edge of the insole in the overwiping operation, the roll 73 will not be near enough to the cam 67 for the incline 81 to act thereon, and accordingly no downward movement will be imparted to the wipers by the cam.

Provision is afforded for adjusting the plate 69 to five different positions. For this purpose the plate has therein a radial slot 83 in which lies a block 85 pivotally mounted on an eccentric portion 87 of a shaft 89 rotatable in the gear 71.

Pinned to the shaft 89 is an arm 91 (Fig. 5) having threaded therein a screw 93 provided with a tapered end portion which is arranged to enter any one of a series of five tapered holes 95 in the gear. It will be understood that after turning the screw to withdraw it from any one of the holes the arm 91 may be swung to adjust the plate 69 to the position determined by any one of the other holes, after which the plate may be locked in adjusted position by turning the screw in the opposite direction. Headed studs 97 extending through slots in the plate 69 and threaded in the gear 71 serve to hold the plate in place on the gear.

The operation of the wipers under control of the means above described will now be briefly summarized. The initial upward movement of the wipers is derived from that portion of the path cam 3 located between the regions 47 and 49, such movement being effected through the lever 20. Thereafter the upward movement of the wipers is continued by the action of the cam 57 on the lever 27, the height to which the wipers are raised depending upon the thickness of the cam in use. The wipers are then held in this raised position by the concentric face 59 of the cam 57 until such time as the roll 73 of the lever 77 is engaged by the inclined face 81 of the cam 67, the wipers being moved downwardly by this cam to increase their pressure on the margin of the upper at a time in their inward movement over the insole determined by the adjustment of the cam 67. Thereafter the wipers are maintained in pressing engagement with the margin of the upper during part of their overwiping movement by contact of a concentric surface 143 of the cam 67 with the roll 73. Before their overwiping movement is completed, however, the roll 73 leaves the surface 143 and the wipers are thereafter maintained in pressing relation to the upper during the latter part of their overwiping movement by the action of the path cam 3 on the roll 13 between the regions 145 and 7 of the cam. After the completion of the overwiping movement of the wipers their pressure on the margin of the upper is relieved by reason of the fact that the roll 13 enters that portion of the cam 3 where the bulge 11 is located, and the wipers begin to move outwardly toward the edge of the insole. At this time the cam 21 on the carrier 19 occupies a position opposite the roll 23 on the lever 27, and if the cam is of sufficient thickness it lifts the wipers positively to relieve their pressure on the upper, either lifting them only such a short distance that they may be further lifted by expansion of the upper materials, or lifting them the full distance required, depending upon the shape of the cam in use. If the cam 21 is omitted, or if its place is occupied by a member which is not of such shape as to impart any upward movement to the wipers, the wipers will be lifted solely by the expansion of the upper materials and will thereafter rest on the margin of the upper by gravity as the wipers are retracted. After the wipers have completed their partial retractive movement, they are again pressed downwardly on the upper by the action of the cam 3 on the roll 13. The wipers then receive another comparatively short inward wiping movement and the tacks are driven to fasten the upper. Thereafter the wipers are lifted to relieve their pressure on the margin of the upper by the action of the cam 3 on the roll 13 between the regions 53 and 149 of the cam and the wipers are moved outwardly from over the bottom of the shoe while the roll tracks along a concentric portion 151 of the cam. Finally, the wipers are moved downwardly to their starting position by the action of a portion 153 of the cam.

For clamping the upper against the last around the toe end thereof, the machine is provided with a flexible band 99 of thin steel as disclosed in Letters Patent No. 2,134,148, the band being applied to the upper substantially at the beginning of the overwiping movement of the wipers by operating mechanism of the character disclosed in Letters Patent No. 2,140,652. To insure against any lateral displacement of the toe end of the shoe in the lasting operation, as well as to assist in preventing the formation of objectionable wrinkles in the upper, the construction herein shown includes means for clamping the band against the upper at the sides of the toe. This means comprises a pair of clamping blocks 101 arranged respectively at the opposite sides of the toe, only one of these blocks being shown in the drawings. For supporting these blocks and their operating mechanisms each of the two wiper-supporting members 15 has a forwardly extending vertical web 103 on which is supported, on a pivot pin 105, a bell-crank lever 107 having an upwardly extending arm 109. The upper ends of these two arms, only one of which is shown in the drawings, are rounded and lie in lateral recesses provided in members 111 secured on the forward ends of rods 113, these rods corresponding to the rods 233 shown in Letters Patent No. 2,134,148. The rods are connected to the ends of the band and are moved forwardly lengthwise of the shoe to apply the band 99 in clamping engagement with the toe end of the upper by drawing it tightly about the toe. It will be evident that in response to such movement of the rods 113 the upwardly extending arms 109 of the bell-crank levers 107 are swung forwardly. These levers also have downwardly and rearwardly extending arms 115 each of which has pivotally connected to its rear end a downwardly extending yoke 117 provided at its upper and lower ends with bearings for a rod 119. A spring 121 on the rod 119 rests at its lower end against the lower bearing portion of the yoke 117 and at its upper end engages a collar 123 which is threaded on the rod and is slidable with the rod in the upper bearing, so that the lifting of the yoke 117 which results from the swinging of the bell-crank lever 107 in the manner above described causes the rod 119 to be moved yieldingly upward. The lower end of each rod 119 is pivotally connected to the forward end of a short rearwardly extending lever 125 pivotally supported midway between its opposite ends on a link 127 which is pivotally suspended on a pin 129 on the web 103. The rear ends of the levers 125 are bifurcated and carry pins 131 which extend through twisted cam slots 133 formed in the lower ends of vertical rods 135 which are rotatably mounted in lugs on the wiper-supporting members 15 and are held against upward or downward movements. Each of the rods 135 has fast on its upper end an arm 137 (Fig. 3) a portion of which extends rearwardly and carries one of the previously mentioned clamping blocks 101, the block being mounted to turn on a vertical stud 139 on the arm. Each of the blocks 101 extends upward substantially to the level of the top of the band 99, and has a band-engaging face which is somewhat concave lengthwise of the edge of the shoe bottom. Initially the blocks 101 are spaced well away from the band, but as the band is applied

to the shoe by the forward movement of the rods 113 the downward movement of the pins 131 in the cam slots 133 causes the rods 135 to turn in directions to swing the blocks 101 into engagement with the band. It will be evident that the springs 121 are yieldable to permit continued movement of the rods 113 after the blocks 101 have arrived in clamping engagement with the band, so that the band will be properly applied to the shoe and clamped by the blocks regardless of the width of the toe end of the shoe. The blocks, moreover, are positively held against reverse movement after they have arrived in their clamping positions by reason of the self-locking action of the pins 131 and the cam slots 133. When the rods 113 are moved rearwardly to return the band after the lasting operation the bell-crank levers 107 move the yokes 117 downwardly and these yokes by engagement with shoulders 140 on the rods 119 swing the levers 125 to impart upward movement to the pins 131 and thus to swing the blocks 101 outwardly away from the band. It will be evident that by the action of the blocks not only is the upper clamped firmly against the last at the sides of the toe to assist in preventing the formation of objectionable wrinkles during the action of the wipers on the margin of the upper, but the toe end of the last and shoe are also held positively against any lateral displacement in the lasting operation such as might be detrimental to the proper wiping of the upper over the insole and the fastening thereof in lasted position. Novel features of this work-clamping and holding mechanism are claimed in a divisional application, Serial No. 289,004, filed on August 8, 1939.

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

1. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last positioned bottom upward inwardly over the bottom of the last and thereafter reversely movable outwardly over the margin of the upper, of power-operated controlling means for holding the wipers down in pressure-applying relation to the margin of the upper as they wipe it inwardly and for thereafter releasing them from such holding force sufficiently to permit them to rest on the margin of the upper substantially under the influence of gravity alone during their reverse outward movement.

2. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last positioned bottom upward inwardly over the bottom of the last and thereafter reversely movable outwardly over the margin of the upper, of mechanism including a power-driven cam for holding the wipers down in pressure-applying relation to the margin of the upper as they wipe it inwardly, said cam being so formed as to release the wipers thereafter substantially from control thereof while permitting them to rest on the margin of the upper under the influence of gravity during their reverse outward movement.

3. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last positioned bottom upward inwardly over the bottom of the last and thereafter reversely movable outwardly over the margin of the upper, of a power-driven cam and mechanism controlled thereby for holding the wipers positively down in pressure-applying relation to the margin of the upper as they wipe it inwardly, said cam being so formed as to release the wipers thereafter for upward movement and permit them to be lifted by expansion of the upper materials and to rest on the margin of the upper substantially under the influence of gravity alone during their reverse outward movement.

4. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last positioned bottom upward inwardly over the bottom of the last and thereafter reversely movable outwardly over the margin of the upper, of power-operated cam means for either lifting the wipers to relieve their pressure on the margin of the upper in such reverse outward movement thereof or for alternatively permitting them to rest on the margin of the upper substantially under the influence of gravity alone during that movement.

5. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last positioned bottom upward inwardly over the bottom of the last and thereafter reversely movable outwardly over the margin of the upper, of power-operated controlling means for holding the wipers down in pressure-applying relation to the margin of the upper as they wipe it inwardly and for thereafter releasing them from such holding force sufficiently to permit them to rest on the margin of the upper substantially under the influence of gravity alone during their reverse outward movement, and automatically operative mechanism arranged for optional use to lift the wipers and thus relieve their pressure on the margin of the upper when they are thus released.

6. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last positioned bottom upward inwardly over the bottom of the last and thereafter reversely movable outwardly over the margin of the upper, of mechanism including a power-driven cam for holding the wipers positively down in pressure-applying relation to the margin of the upper as they wipe it inwardly and for then releasing them sufficiently to permit them to be lifted, and another power-driven cam arranged for optional use to lift the wipers when they are thus released and thereby to relieve their pressure on the margin of the upper in their reverse movement.

7. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last positioned bottom upward inwardly over the bottom of the last and thereafter reversely movable outwardly over the margin of the upper, of mechanism for holding the wipers down in pressure-applying relation to the margin of the upper as they wipe it inwardly and for then automatically releasing them sufficiently to permit them to rest on the upper substantially under the influence of gravity alone, and additional mechanism including a power-driven cam for lifting the wipers to relieve their pressure on the margin of the upper when they are thus released, said cam being displaceable at the will of the operator to prevent it from lifting the wipers when the machine is operated.

8. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last positioned bottom upward inwardly over the bottom

of the last and thereafter reversely movable outwardly over the margin of the upper, of mechanism including a power-driven cam for holding the wipers down in pressure-applying relation to the margin of the upper as they wipe it inwardly and for then releasing them from such holding force, and another cam arranged to raise the wipers and thereby relieve their pressure on the margin of the upper in their reverse movement, said other cam being removable without otherwise disturbing the operating parts of the machine to permit substitution of a different cam for varying the amount of upward movement imparted to the wipers.

9. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last positioned bottom upward inwardly over the bottom of the last and thereafter reversely movable outwardly over the margin of the upper, of mechanism for holding the wipers down in pressure-applying relation to the margin of the upper as they wipe it inwardly and for then substantially releasing them to permit them to be lifted, and additional mechanism for automatically imparting to the wipers when they are thus released a short upward movement to relieve their pressure on the margin of the upper while permitting them to be further lifted against the force of gravity by expansion of the upper materials so as to rest on the upper substantially under the influence of gravity alone in their reverse movement.

10. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last inwardly over the bottom of the last and thereafter reversely movable outwardly over the margin of the upper, of mechanism including a cam for effecting relative movement of the wipers and the last in a direction heightwise of the last to relieve the pressure of the wipers on the margin of the upper after they have wiped it inwardly, a rotatable cam shaft, and a cam carrier fast on said shaft for supporting said cam, the cam being removable from said carrier without otherwise disturbing the operating parts of the machine to permit substitution of a different cam for varying the amount of such relative movement of the wipers and the last.

11. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last inwardly over the bottom of the last, of means for effecting relative movement of said wipers and the last to cause the wipers to wipe the upper heightwise of the last before they wipe its margin inwardly, said means including two cams arranged to act one after the other to effect such relative movement, one of said cams being removable without otherwise disturbing the operating parts of the machine to permit substitution of a different cam for varying the amount of such relative movement.

12. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last inwardly over the bottom of the last, of means for moving said wipers heightwise of the last in wiping engagement with the upper before they wipe its margin inwardly, said means including a cam for beginning such movement of the wipers and another cam for thereafter continuing their movement, a rotatable cam shaft, and a cam carrier fast on said shaft for removably supporting said other cam to permit a different cam to be mounted on the carrier for varying the amount of movement imparted to the wipers.

13. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last inwardly over the bottom of the last, of a wiper carrier supporting said wipers, different cam shafts and cams rotatable therewith arranged to act one after the other to move said wiper carrier heightwise of the last with the wipers in wiping engagement with the upper before they wipe its margin inwardly, and different mechanisms leading respectively from said different cams for thus operating the wiper carrier, one of said cams being removable without otherwise disturbing the operating parts of the machine to permit substitution of a different cam for varying the amount of movement imparted to the wiper carrier.

14. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last inwardly over the bottom of the last, of mechanism for effecting automatically, at a time in the operation of the machine selectively predetermined by the operator, relative movement of the wipers and the last heightwise of the last to increase the pressure of the wipers on the margin of the upper.

15. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last inwardly over the bottom of the last, of power-operated mechanism for effecting automatically, at a predetermined time in the operation of the machine, movement of the wipers heightwise of the last to increase the pressure of the wipers on the margin of the upper, said mechanism being adjustable to vary the time in the operation of the machine when said movement of the wipers is effected.

16. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last inwardly over the bottom of the last, of power-operated mechanism including a cam rotatable to effect at a predetermined time in the operation of the machine relative movement of the wipers and the last heightwise of the last to increase the pressure of the wipers on the margin of the upper, said cam being adjustable about its axis to vary the time in the operation of the machine when said relative movement is effected.

17. In a power-operated lasting machine, the combination with wipers movable to wipe the margin of an upper around an end of a last inwardly over the bottom of the last, of power-operated mechanism including a cam rotatable to effect at a predetermined time in the operation of the machine movement of said wipers in a direction heightwise of the last to increase their pressure on the margin of the upper, said cam being adjustable about its axis to vary the time in the operation of the machine when the wipers are thus operated, and another cam arranged to move the wipers in the opposite direction heightwise of the last and to control them until said first-named cam is substantially in position to operate thereon, said other cam being removable to permit the substitution of cams of different lengths to correspond to different adjustments of said first-named cam.

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