APPARATUS FOR LASTING POINTE SHOES

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This invention relates to lasting the ends of shoes and more especially to an improved apparatus for lasting the toes of pointed toe shoes.

In Patent No. 3,011,186, granted December 5, 1961, in the names of Robert B. Dunlap and Jacob S. Kamborian, there is shown a last positioned bottom side having an upper and insole mounted thereon and the wipers means that includes a pair of toe wipers having diverging toe embracing surfaces that extend forwardly of surfaces that are in abutting relationship when the wipers are in their retracted position. In this arrangement, the wipers are caused to concomitantly move forwardly toward the last and to swing toward each other about an axis perpendicular to the plane of movement of the wipers and passing through the point where the divergent surfaces meet. Thus, when the wipers are moved forwardly to engage the upstanding lasting margin of the upper and wipe the lasting margin down upon the insole, the toe end of the last and the sides of the last, extending rearwardly of the toe, are engaged substantially simultaneously. While this has proved satisfactory in lasting most styles of shoes, it was found that when lasting pointed toe shoes, the wiped down lasting margin became crowded at the toe end and that the simultaneous forces moving over the bottom of the last, inwardly of the last at the toe end of the last and along the sides of the last, caused the upper material to break at the pointed toe.

The principal object of this invention is to overcome the aforementioned disadvantages and this is accomplished, according to the method hereinafter disclosed, by first wiping the sides of the lasting margin extending rearwardly of the tip and then wiping the lasting margin at the tip that was previously left unwiped. The mechanism for carrying out the method comprises a pair of wiper plates having diverging wiping edges which collectively form an opening which, in shape, is substantially the counterpart of the toe of the shoe, mounted for swinging movement about a center which lies forwardly of the point of intersection of their edges on a median line between the edges and for translatory movement in union along said median line. As the edges of the wipers, forwardly of the center, swing inwardly over the sides of the shoe, they wipe the margins at the sides rearwardly of the tip into engagement with the bottom of the shoe. However, since the edges of the wipers, rearwardly of the center, move away from each other they leave the margin at the tip unstressed. Accordingly, a bridging element is operably associated with the wipers which is movable into a position opposite the end of the tip during the swinging movement of the wipers to fill the gap between them and hence to provide a wiping element movable forwardly with the wipers as the latter are moved in translation to wipe the margin at the tip into engagement with the bottom. Translation of the wipers is effected by a plate movable toward and away from the last and swinging movement by a pair of wiper cams slidably mounted on the plate, each wiper cam having an arcuate slot in which is located a pair of pins that are upstanding from the plate. A wiper is fixed to each wiper cam and the wipers are adapted to be moved forwardly across the insole to wipe the upstanding lasting margin down upon the insole.
mounted on the frame for heightwise movement relative to the frame. This is accomplished by heightwise movement of a sleeve 18, supported in a vertical position on the frame 10 by brackets 24 and 26. The carriage is fastened to the sleeve by bolts 14 and 16 and is secured to the frame 10 by nuts 20 and 22 which are rigidly connected to the sleeve above and below the bracket 14 to provide for movement of the carriage with the sleeve. A fluid operated motor 28, having a piston rod 30 connected to the lower end of the sleeve, provides for effecting heightwise movement of the sleeve and hence the carriage 12. The sleeve 18 supports a toe post 32 upon which is mounted a toe rest 34.

A toe clamp 36 for clamping a last 37 against the toe rest 34 is slidably mounted in the carriage 12 for movement heightwise of the carriage by being connected to a plate 38 which is slidably mounted in a guide way 40 secured to the carriage 12. The plate 38 is connected to the piston rod 42 of a fluid-actuated motor 44 mounted on the carriage 12. Thus, actuation of the motor 44 to raise or lower the piston rod 42 causes a corresponding raising or lowering of the toe clamp 36.

A heel clamp 46 engageable with the heel end of the last is slidably mounted for horizontal movement at the top of the carriage 12. The heel clamp, comprising a pair of divergent jaws 48 adapted to engage the heel end of the last 37, is connected through a post 50 to a bracket 52. The bracket 52 is connected to a piston rod 54 of a fluid-actuated motor 56, so that actuation of the motor 56 to move the piston rod 54 causes a corresponding movement of the heel clamp 46 towards or away from the heel end of the last. A fluid-actuated motor 58 is mounted on the frame and drives a latch 60 into engagement with a toothed bar 62 on the heel clamp 46 to lock the heel clamp into clamped position.

The frame 10 includes a block 64 (FIGS. 2 and 3) upon which is slidably mounted a plate 66. A pair of wiper cams 68 are slidably over the plate 66 and have arcuate cam slots 70 therein to receive pins 72 that are upstanding from the plate 66. A pair of wipers 74 and 76 are rigidly attached to the wiper cams 68.

A fluid-actuated motor 78, mounted in the frame 10, is connected to the plate 66 and the wiper cams 68 so as to concomitantly impart rectilinear translation of the plate 66 with respect to the stationary block 64 and arcuate movement of the wiper cams 68 with respect to the plate 66 about the center of curvature of the slots 70. The motor 78 has a piston rod 80 that is coupled to a block 82, the latter being slidably in ways 84 bounding the edge of a slot 86 in the plate 66. Short links 88 are pivotally connected at one end to the block and at their opposite ends to the levers 90. The levers 90 are pivotally connected to the plate 66 intermediate the ends by pivots 92 and at the ends remote from the links 88 to links 94. Each link 94, in turn, is pivotally connected to the block 64 at a fixed point 96 in a slot 98 in the block 64. The block 82 has links 100 pivotally connected thereto at one end. The links 100 are pivotally connected at the ends remote from the block 82 to the cam plates 68.

It will thus be seen that movement of the piston rod 80 toward the right (FIG. 3), causes a corresponding movement of the block 82. Due to the connection at pivot 92 between the plate 66 and the lever 90, movement of the block 82 toward the right causes the wiper cams 68 to swing with respect to the plate 66 about an axis lying at the center of curvature of the cam slots 70 with the pins 72 riding on the cam slots during the translation of the plate 66.

The wipers 74, 76 (FIGS. 4 and 5) comprise a pair of thin plates, preferably of steel, having flat undersurfaces 101 and 103. The wipers have flat edges 102 and 104 that abut and form a straight line of contact between the wipers in their retracted position (FIG. 4), the line of contact terminating at its forward end at a point 106. Forwardly of the point 106, the wipers have diverging edges 108 and 110 that are intended to embrace the periphery of the shoe and are spaced laterally of the shoe in the retracted position of the wipers, the space between the edges 108 and 110 being substantially the counterpart of the toe of the shoe. The wiper 74 has an arcuate recess 112 in its undersurface 101, which recess intersects the edge 102. A disc 114 is located in the recess 112 and is secured to the wiper 74 by spot welding or in any other appropriate manner. The bottom of the disc is a flat face 115 that lies in the same plane as the undersurface 101 of the wiper 74.

The wiper 76 has a recess 116 in its undersurface intersecting the edge 104. The recess 116 is adapted to receive the disc 114 and therefore has a depth substantially equal to the thickness of the disc and a curved edge 118 complementary to the curved periphery of the disc. The recess 116 has a length that is greater than the diameter of the disc to facilitate assembling the wipers in the machine.

The aforementioned cam slots 70 form segments of a circle whose center of curvature is positioned forwardly of the point 106, defining the termination of the line of contact between the wipers in their retracted position and the point at which the diverging wiper edges 108 and 110 meet. This center of curvature is located at a point c in FIGS. 2 and 3. The point c is spaced forwardly of the point 106 an amount sufficient to allow the edges 102 and 104 to move apart from each other when the wipers are moved forwardly over the shoe in the manner described below. When the wipers move apart the disc 114 maintains a bridge across the gap between the rear ends of the edges 108 and 110 and the edge 117 of the disc, thus exposed, provides a tip wiper element movable into engagement with the margin at the tip following movement of the edges 108 and 110 into engagement with the sides, as will appear hereinafter.

With the wipers in their retracted position as seen in FIG. 2, and the carriage 12 in an elevated position, the last with the upper and insole thereon is placed on the toe rest 34. The toe clamp 36 is lowered against the insole to clamp the last between it and the toe rest 34 and the heel clamp 46 is brought into engagement with the heel end of the last. The motor 28 is actuated to lower the carriage 12 an amount sufficient to bring the upwardly facing surface of the insole below the bottom surface of the wipers an amount substantially equal to the thickness of the last margin. At this time the last margin 130 is upstanding from the sides 124 and 126 and point 128 of the last (FIG. 1). Adhesive may now be applied into the angle formed by the last margin and insole to bond the last margin to the insole in the subsequent wiping operation. Alternatively, the shoe upper may be precremented with adhesive that becomes effective under the pressure created during wiping. It is also within the purview of the invention to use other conventional attaching means such as tacks or staples to secure the wiped last margin to the insole.

The motor 78 is now actuated to move the block 82 toward the right (FIG. 2) and move the wipers over the last to wipe or fold the last margin down over the insole. As the wipers move over the shoe, upward pressure may be applied to the last through the motor 28 to create pressure between the undersurfaces of the wipers and the upwardly facing surface of the insole during the wiping operation. Movement of the block 82 toward the right causes the block 66 to move in a corresponding abduction, but at a slower rate than the wipers to swing over the block and have relative movement with respect thereto about the point c, that is, the center of curvature of the cam slots 70. Since the point c is spaced forwardly of the point 106, the abutting edges 102 and 104 of the wipers separate as the edges 108 and
110 of the wipers move over the sides 124 and 126 of the last along lines that terminate short of the toe end of the last, so that the portion of the last that is the point 128 of the last and extending for a short distance along the sides 124 and 126 is unengaged by the wiper edges 108 and 110. This is followed shortly by the engagement of the last margin at the point of the last by the now exposed edge 117 of the disc 114 to wipe the portion of the last margin that was not wiped by the wiper edges 108 and 110. The effect of applying wiping stresses to the sides is to draw the margins inwardly at the sides into substantially surface contact, forming a low ridge or rib substantially medially of the shoe and leaving the margin at the tip substantially un-stressed. Now, when the margin at the tip is wiped inwardly, there is sufficient stretch left in the upper material so that it can be pulled in over the tip simultaneously with a shifting of the rib previously formed rearwardly, so that the initial or original narrow rib does not increase in bulk. By having the last margin wiped thusly in two stages, the wiped-in last margin has a maximum point of bunching at the toe end where the maximum crowding of the material takes place and a much finer quality product results than if all of the last margin were wiped in at the same time, with the likelihood of a break in the upper material at the toe being substantially eliminated. This is especially true in last that pointed toe shoes where there is a great deal of crowding of the last margin.

After the completion of the wiping operation, the motor 28 is actuated to lower the last, the motor 78 is actuated to retract the wipers, the toe clamp 36 and heel clamp 46 are disengaged from the shoe and the carriage 12 is raised to its starting position. The lasted shoe may now be removed from the machine.

Although it is preferred to wipe the last margin at the point of the toe with the disc 114 after the sides have been wiped by the edges 108 and 110, the wiper edges 108 and 110 may be set to engage the last margin very close to the point of the last and thereby wipe substantially all of the last margin and the disc 114 may be eliminated. The spacing between the edges of the wipers in this case is small, however, it leaves sufficient stretch in the margin at the tip, so that the latter can be pulled inwardly over the bottom by an edge translatory movement of the wipers without the added bridging element.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents falling within the scope of the appended claims.

I claim:

1. A toe lasting apparatus comprising: a support for supporting bottom side up a last having a shoe insole and upper mounted thereon; a pair of wipers mounted for movement across the insole to wipe the upward last margin upon the insole, said wipers having in their retracted position diverging surfaces adapted to embrace the toe of the last; and means to cause the wipers to be moved forwardly toward the last and to be swung inwardly over the last about an axis that is forward of the point where said diverging surfaces meet to thereby wipe those side portions of the last margin that lie rearwardly of the toe end of the last.

2. The apparatus of claim 1, wherein one of said wipers has a projection extending toward the other wiper adapted to wipe the toe end of the last margin after the wiping of the side portions.

3. The apparatus of claim 2, wherein the projection comprises a flat plate in the first-mentioned wiper having a bottom coextensive with the bottom of the wiper, and the other wiper has a recess in its bottom surface adapted to receive said projection.

4. A toe lasting apparatus comprising: a support for supporting bottom side up a last having a shoe insole and upper mounted thereon; a pair of wipers having flat under-surfaces mounted for movement across the insole to wipe the upward last margin of the upper down upon the insole, said wipers having in their retracted position abutting surfaces forming a line of contact therebetween and diverging surfaces adapted to embrace the toe of the last extending forwardly of the forward end of said line of contact; and means to cause the wipers to be moved forwardly toward the last and to be swung inwardly over the last about an axis that is forward of the forward end of said line of contact to thereby wipe those portions of the last margin that lie rearwardly of the toe end of the last.

5. The apparatus of claim 4, wherein one of said wipers has a flat projection whose undersurface is coextensive with the wiper undersurface, said projection extending laterally from its abutting surface, and the other wiper has a recess in its abutting surface adapted to receive said projection.

6. A toe lasting apparatus comprising: a support for supporting bottom side up a last having a shoe insole and upper mounted thereon; a plate mounted for movement toward and away from the last; a pair of wiper cams slidably mounted on the plate; a wiper fixed to each cam; said wipers being movable across the insole to wipe the upward last margin of the upper down upon the insole, said wipers having in their retracted position divergent surfaces adapted to embrace the toe of the last; an arcuate slot in each of said cams, said slots having a common center of curvature positioned forwardly of the point where said divergent surfaces meet; a pair of pins projecting upwardly from said plate into each of said slots; and means for concomitantly translating said plate forwardly and swinging the wiper cams forwardly about the center of curvature of the slots to thereby wipe those portions of the last margin that lie rearwardly of the toe end of the last.

7. In a toe lasting machine: wipers having diverging edges defining an opening which is generally the counterpart of the toe of a shoe; means supporting the wipers for swinging movement of their edges toward each other about a center situated forwardly of the junction of the edges on the median line between the edges; other means supporting the wipers for translation along said median line following swinging movement; and power operated means for effecting operation of said first and second means.

8. In a toe lasting machine: wipers having diverging edges defining an opening which is generally the counterpart of the toe of a shoe; means supporting the wipers for swinging movement of the edges toward each other about a center situated forwardly of the junction of the edges on the median line between their edges and simultaneously separating the edges rearwardly of said center; other means supporting the wipers for movement in translation along said median line; a bridging element associated with the wipers movable by said separation of the rearward edges of said wipers to fill the gap rearwardly of said center; and means for effecting movement of the supporting means for the wipers.

References Cited in the file of this patent

UNITED STATES PATENTS

2,221,864 Cummings Nov. 19, 1940