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METHOD FOR MOLDING THE INNER SIDE OF A SHOE AT THE HEEL END

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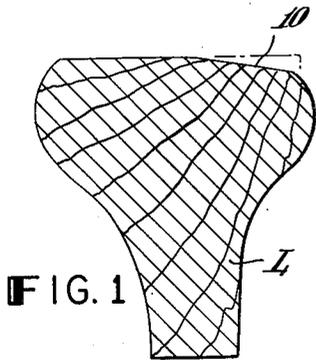


FIG. 1

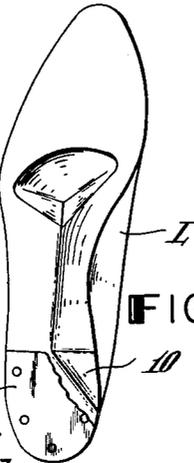


FIG. 2

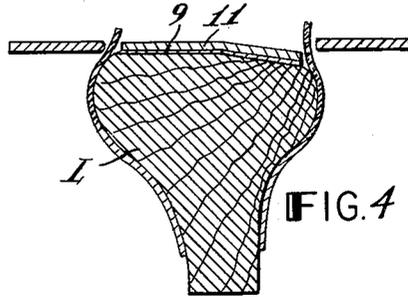


FIG. 4

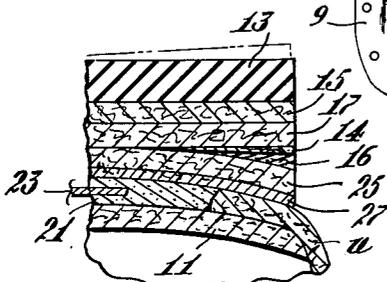


FIG. 5

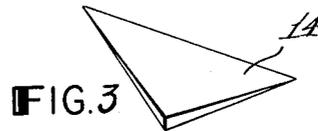


FIG. 3

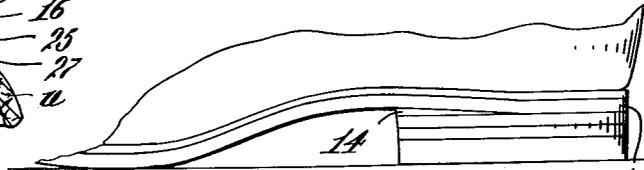


FIG. 6

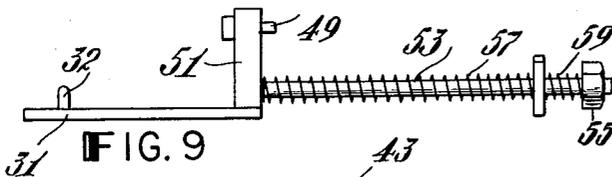


FIG. 9



FIG. 5a

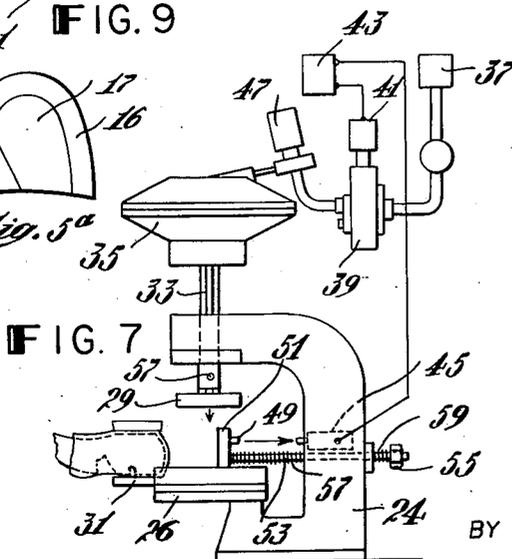


FIG. 7

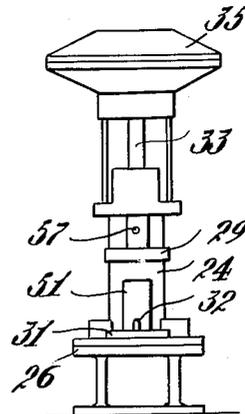


FIG. 8

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3,072,934

METHOD FOR MOLDING THE INNER SIDE OF A SHOE AT THE HEEL END

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12 Claims. (Cl. 12-142)

This invention relates to shoe manufacture and more especially to molding the heel ends of shoes.

The natural arch at the inner side of the foot commences rearwardly of the breast line of the heel hence to derive the fullest benefit from an arch support, the bottom of the shoe should be elevated internally in this region so as to constitute a continuation of the shank of the shoe and hence to support the arch of the foot throughout its entire length.

The principal objects of this invention are therefore to provide a shoe with a support, internally thereof at the inner side, for the entire arch and to the method of making the same.

In accordance with the invention, the shoe has a centrally curved internal shank extending from the breast line of the heel to the ball and, in addition, an internal elevation commencing rearwardly of the breast line of the heel at the inner side where the natural arch of the foot commences to rise and which continues forwardly and upwardly therefrom into the shank to support the inner side of the foot. The elevated portion of the insole slopes upwardly, both forwardly and inwardly, and is supported by a substantially triangular wedge situated between the bottom lift of the heel and the insole which lifts the latter in this area.

In accordance with the method of making the shoe a wedge is included in the heel assembly so as to be situated between the sole and bottom lift of the heel at the inner side in the area where the bottom is to be raised, of about the thickness of the elevation desired, and then pressure is applied to the top lift of the heel to restore the tread surface thereof to a plane parallel to the sole, thereby to force the bottom upwardly by the predetermined thickness of the wedge.

The invention will now be described in greater detail with reference to the accompanying drawings wherein:

FIG. 1 is a transverse section through a last at the breast line of the heel, showing the wood removed from the bottom at the inner side;

FIG. 2 is a plan view of the bottom of a last with the metal heel plate broken away to show the area from which the wood is removed;

FIG. 3 is a perspective view of a wedge;

FIG. 4 is a transverse section through a last with an upper and insole assembled thereon, showing the normal position of the wipers relative to the bottom of the last;

FIG. 5 is a transverse section through the heel of a shoe near the breast line made according to the invention;

FIG. 5a is a plan view of the inner side of the heel, showing the wedge disposed on the bottom lift beneath the rand strip;

FIG. 6 is an elevation at the inner side of the shoe, showing the location of the wedge;

FIG. 7 is an elevation of an apparatus for molding the back part of a shoe to raise the insole internally in accordance with the method described herein;

FIG. 8 is a front elevation of the apparatus; and

FIG. 9 is an elevation of the trip for effecting operation of the apparatus.

In the construction of many shoes, a steel shank piece is employed to give shape to the arch of the shoe and

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to preserve the shape of the shoe throughout its life. In the manufacture of shoes which are designed especially to correct deficiencies in the arch, considerable care is employed in disposing the shank piece to give the maximum corrective benefits; however, no account is taken of the fact that the natural arch of the foot commences rearwardly of the breast line of the heel hence the medially disposed shank pieces do not give full support to the foot. This is remedied herein by removing wood from the bottom of the last L at the heel, beneath the heel seat clinching plate 9, in the area in which the insole is to be raised and then pushing the insole 11 upwardly in this area. As shown in FIGS. 1 and 2, a substantially triangular portion 10 is removed starting about midway between the sides of the heel and the breast line and extending toward the inner side of the foot and substantially midway between the heel end and the breast line and extending forwardly to the breast line. The triangular portion is wedge-shaped starting from a feather edge at the hypotenuse and increasing in thickness both laterally and forwardly toward the legs of the triangle. The maximum depth of the low area at the outer side is in the order of $\frac{1}{16}$ of an inch. The amount removed from the bottom of the last corresponds to the amount that the insole should be raised to support the heel of the foot rearwardly of the breast line of the heel.

Due to the fact that the wipers of a conventional heel seat lasting machine move in a plane which is substantially parallel to the bottom of the last, as shown in FIG. 4, the upper and insole cannot be wiped in to conform to the low area where the wood has been removed from the last except by manipulating the last relative to the wipers and this is not practical because it slows up production. Moreover the usual bottom laying and molding operations performed upon the bottom prior to attaching the heel for the purpose of further conforming the bottom to the last is not wholly effective because the bottom mold is but an approximation of the bottom of the last, since each mold, for practical purposes, must be designed for use with a range of sizes and it would be much too expensive to provide a mold for each size shoe. Accordingly, as illustrated herein, the insole is pushed upwardly into the low area following attachment of the heel by adding to the heel assembly a wedge of the shape removed from the bottom of the last and forcing the heel against the bottom so as to displace the insole at the low area upwardly against the bottom of the last. The heel thus becomes in effect a mold.

The heel, as shown in FIG. 5, comprises a top lift 13, an intermediate lift 15, and a bottom lift 17. As herein used, the term "bottom lift" is the inner lift and the term "top lift" is the outer lift. The shoe comprises an upper U lasted over an insole 11, filling 21, a medially disposed, metallic arch supporter 23 and an outsole 25. A heel seat lift 27 may be included between the sole and the bottom filling.

The wedge 14, as shown in FIG. 4, is comprised of leather, fiber or other composition and is attached to the bottom lift 17 (base) (FIG. 5a) of the heel, so that when the heel is applied to the sole the wedge is situated adjacent the sole at the area removed from the last as shown in FIGS. 5 and 6. The wedge-shaped piece 14 is an addition to the heel supplementing the conventional rand strip 16, which is a horseshoe-shaped piece attached to the bottom lift of the heel and which extends around its peripheral edge. The added thickness of the wedge holds the corner of the heel, at the inner side, canted upwardly with respect to its normal horizontal plane, as shown in dot and dash lines in FIG. 5. By applying pressure to the tread surface of the upwardly canted top lift 13, so as

to bring it down to its proper position parallel to the plane of the bottom, the wedge is forced upwardly toward the bottom of the last and hence displaces the insole 11 internally of the shoe, upwardly into contact with the low area of the last. While the wedge is shown situated between the bottom lift (base) and the rand strip, it may be placed between any of the several lifts making up the heel assembly, or between the last and insole, or the insole and upper assembly.

Application of pressure to the heel to force the wedge upwardly is effected by means of pressure-applying apparatus such as shown in FIGS. 7 and 8.

The apparatus has a rigid frame 24 supporting a table 27 and a pressure-applying plate 29 in vertically spaced, parallel relation. The table has on it a slide 31 movable forwardly and rearwardly relative to the pressure plate on which there is fixed a jacket pin 32 for supporting a last bottom side up. By moving the slide 31 rearwardly, the heel of the shoe mounted on the last, may be disposed directly beneath the pressure plate 29. The pressure plate 29 is loosely fastened by a pin 57 to the lower end of a rod 33 so as to be free to tilt and the rod 33 is slidably mounted on the frame for movement to and from the table. The upper end of the rod is connected to the diaphragm of a low pressure cylinder 35 mounted on the frame. The cylinder 35 is supplied with air from a source 37 through a control valve 39. The control valve 39 is operable by a solenoid 41 and this, in turn, is energized and de-energized through a time delay switch 43. A switch 45 is mounted on the frame behind the table which is operable to energize the solenoid 41 through the time delay 43, the latter being operable at the end of a predetermined time to break the circuit and hence vent the cylinder. A muffler 47 may be employed to eliminate the unpleasant sound of the rapidly escaping venting air. The switch 45 is actuated by movement of the slide rearwardly, when the heel is disposed beneath the pressure plate, by a pin 49 mounted on a post 51 fixed to the slide. A rod 53 is fixed at its forward end to the post and extends rearwardly therefrom through the frame and has on its rear end a nut 55. Springs 57 and 59, mounted on the rod, normally hold the slide in a forward position. When pressure is applied to the top of the heel, with the foregoing apparatus, the heel forces the insole internally of the shoe, upwardly against the bottom of the last, into the low area and, in doing so, resets the lasting nails and sole and heel attaching nails against the heel plate so as to secure the parts in the conformed position. The heel, in effect, becomes a custom-made mold which, by application of conforming pressure to the bottom of the last, molds the insole of the shoe into intimate contact with the last and, at the same time, pulls the upper inwardly close to the bottom of the last.

The base of the heel is nailed to the bottom of the shoe and the top lift may be attached either with nails or adhesive. When employing adhesive the base of the heel and the top lift are precoated with a thermoplastic adhesive hence when they are assembled for the molding operation they should be activated by application of heat, for example, by placing them in a heater. It may also be desirable to condition the heel end of the shoe prior to application of pressure, for example, it may be moistened by placing it in a steamer so as to soften and take the fight out of the leather and at the same time to activate the thermoplastic adhesive for attaching the top lift to the heel base. This augments the molding by making the material more amenable to the conforming pressure and, if the pressure is held for a period, for example, of 30 seconds to give the adhesive time to set, the molding becomes permanent and the heel level.

The method is equally effective whether employing nails for attaching the heel or high strength bonding adhesive such as is now available.

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. The method of making shoes with the bottom raised upwardly at the inner side adjacent the breast line of the heel, in continuation of the line of the shank, comprising, applying a heel to the bottom with a wedge added at the inner side at the area where the bottom is to be raised of about the thickness of the elevation desired, and then pressing the heel to restore the tread surface thereof to a plane substantially parallel to the plane of the sole to force the bottom upwardly, internally of the shoe, by an amount corresponding substantially to the thickness of the wedge.

2. A method according to claim 1, wherein the heel assembly includes a rand strip and the wedge is interposed between the bottom lift and the rand, or between the insole and last, or between the insole and upper assembly.

3. A method according to claim 1, wherein the heel is attached by nailing.

4. A method according to claim 1, wherein the heel is attached by adhesive.

5. A method according to claim 4, wherein the heel end of the shoe is heated prior to the attachment of the heel by adhesive.

6. A method according to claim 1, wherein the heel end is mulled prior to application of pressure.

7. A method according to claim 1, wherein the heel is conditioned prior to application of pressure and pressure is maintained for a period in the order of 30 seconds.

8. The method of making a shoe with the bottom at the heel end raised upwardly at the inner side adjacent the breast line of the heel, in continuation of the line of the shank, comprising, applying a heel to the bottom with a wedge added thereto at the inner side at the area where the bottom is to be raised, the wedge extending from the breast line approximately half the length of the heel, rearwardly, and from the inner corner approximately half the width of the heel, and then subjecting the heel to pressure to restore the tread surface to a plane substantially parallel to the plane of the sole and to force the bottom upwardly, internally of the shoe, by an amount corresponding substantially to the thickness of the wedge.

9. The method of making a shoe with the bottom of the heel end raised upwardly at the inner side adjacent the breast line of the heel, in continuation with the line of the shank, comprising, adding a triangular wedge to a heel at the inner side at the corner with its legs extending along the breast line of the heel and inner side, the wedge being thicker at the outer edges, attaching the heel to the sole with the wedge situated therebetween, and then subjecting the heel to pressure to restore the tread surface to a plane substantially parallel to a plane of the sole, to force the bottom upwardly, internally of the shoe, a predetermined amount, and simultaneously pull the upper inwardly against the last.

10. The method of making a shoe on a last with the bottom of the shoe at the heel end raised upwardly at the inner side adjacent the breast line of the heel, in continuation of the line of the shank, comprising, removing wood from the last to the extent of the lift desired, lasting the upper to the insole, applying the outsole, fastening the heel to the outsole with a wedge situated between its tread surface and the outsole at the inner side at the place where the wood is removed from the last, applying pressure to the heel to bring the tread surface of the heel into a plane substantially parallel to the bottom by forcing the bottom internally of the shoe upwardly against the low place of the last, and simultaneously pulling the upper into the wood of the last at the low place.

11. The method of making a shoe on a last with the bottom of the shoe at the heel end raised upwardly at the inner side adjacent the breast line of the heel, in continuation of the line of the shank, comprising, removing wood from the last to provide a low place corresponding in

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depth to the elevation of the lift desired, lasting the upper to the insole, applying an outsole to the bottom, nailing a heel with a wedge situated between it and the outsole at the place where the wood was removed from the last and applying pressure to the heel to force the upper into the wood of the last at said low place to make the tread surface of the heel substantially parallel to the sole and to clinch the heel attaching nail.

12. The method of making a shoe on a last with the bottom of the shoe at the heel end raised upwardly at the inner side adjacent the breast line of the heel, in continuation of the line of the shank, comprising, removing wood from the last throughout a substantial triangular area adjacent the inside corner of the last at the breast line to provide a low place corresponding in depth to the elevation of the lift desired, lasting an upper together with counter lining to an insole on the last, attaching a heel seat lift and outsole to the bottom, attaching a heel assembly with a wedge at the inner side, of a shape corre-

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sponding to the wood removed from the last, to the bottom, and applying pressure to the entire tread surface of the heel to bring its tread surface into substantially parallelism with the outsole and to force the wedge upwardly relative to the bottom to raise that portion of the bottom above the wedge internally of the shoe to the desired elevation.

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