

United States Patent

Winkler

[15] 3,704,474

[45] Dec. 5, 1972

[54] **METHOD OF STRING-LASTING**
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[73] Assignee: **Compo Industries, Inc.**, Waltham, Mass.
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[21] Appl. No.: **191,317**

[52] U.S. Cl.12/145
[51] Int. Cl.A43d 21/00
[58] Field of Search12/145, 128 R, 133 R

[56] **References Cited**

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1,124,184 1/1915 Straub12/145

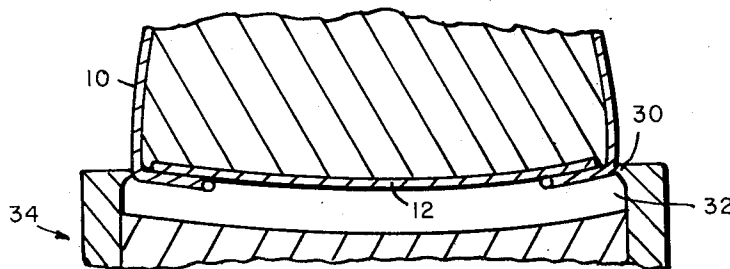
3,007,184 11/1961 Makovski12/145
3,249,955 5/1966 Bourassa et al.12/145

Primary Examiner—Patrick D. Lawson
Attorney—G. Eugene Dacey

[57] **ABSTRACT**

The method of shoe making which comprises placing an insole on the bottom of a last, string-lasting an upper onto the last over the exposed face of the insole while holding the inner side of the lasting margin spaced from the edge face of the insole and thereafter forming an outsole against the insole and lasting margin of the upper by injection molding.

14 Claims, 14 Drawing Figures



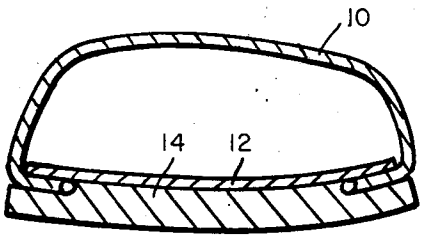


FIG. 1

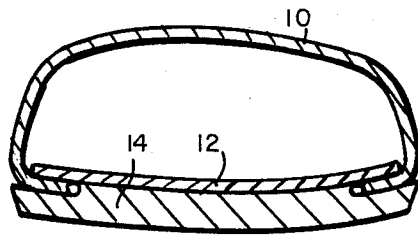


FIG. 2

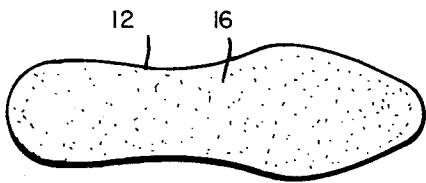


FIG. 3

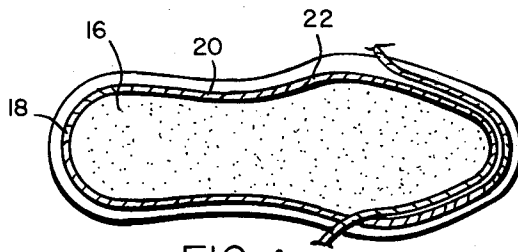


FIG. 4

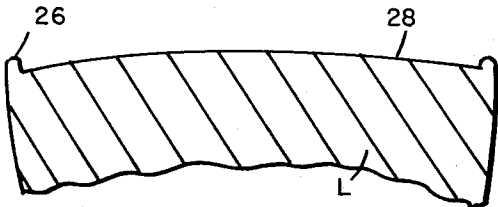


FIG. 5

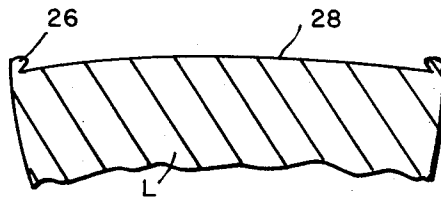


FIG. 7

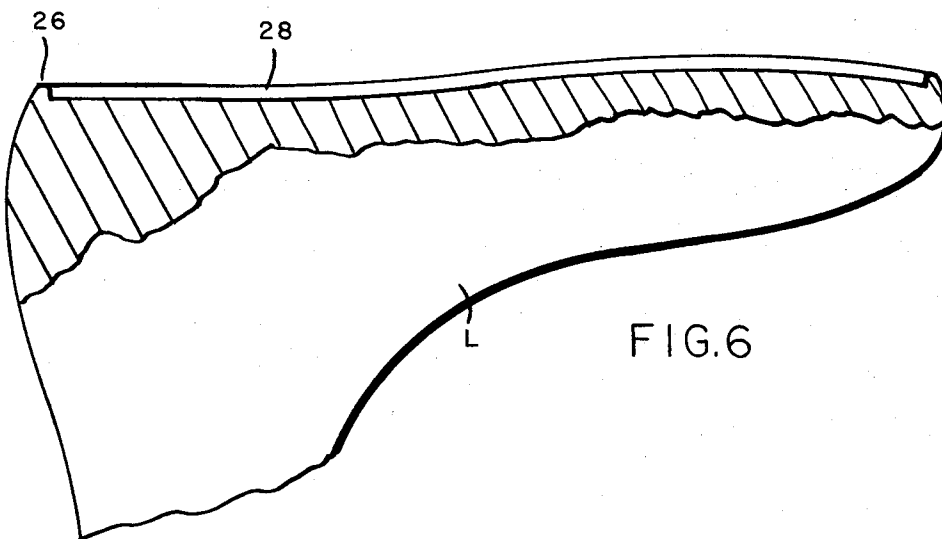


FIG. 6

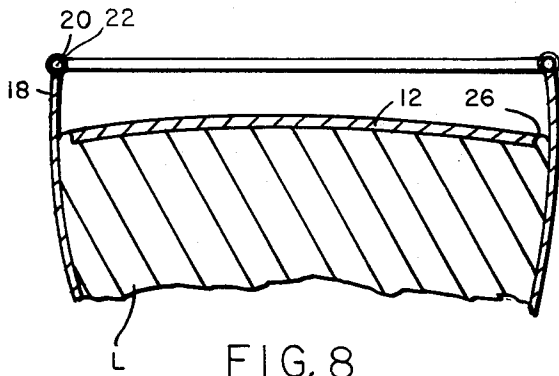


FIG. 8

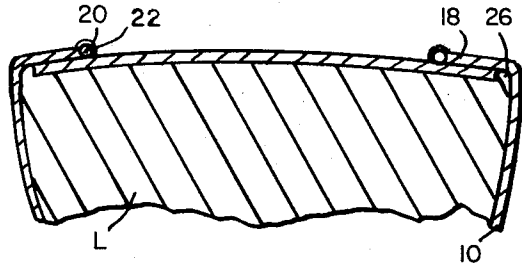


FIG. 9

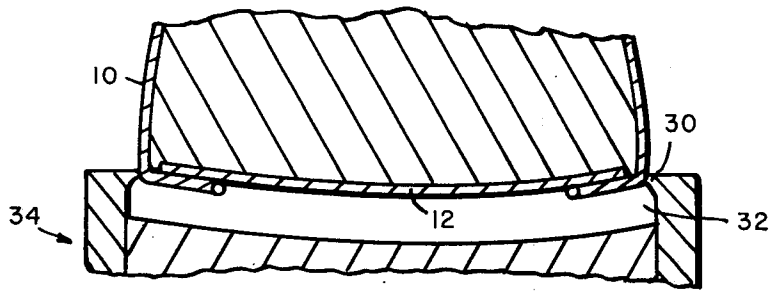


FIG. 10

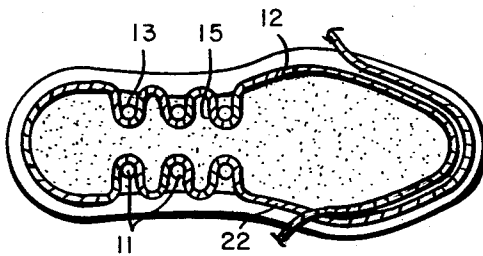


FIG. 11

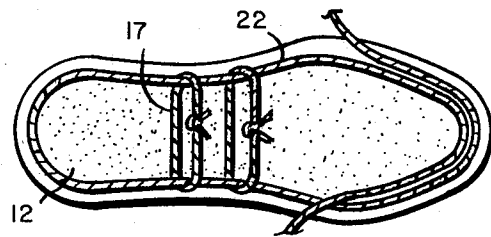


FIG. 12

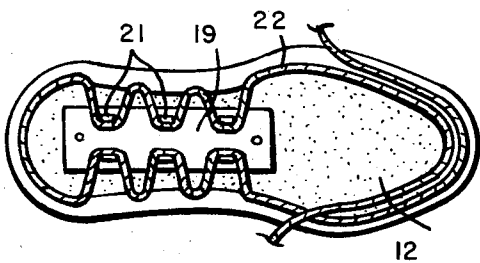


FIG. 13

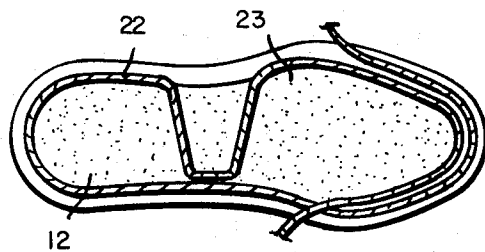


FIG. 14

METHOD OF STRING-LASTING

BACKGROUND OF THE INVENTION

String-lasting an upper to a last for the purpose of applying an elastomeric bottom thereto by compression or injection molding is disclosed, for example, in U.S. Pat. Nos. 2,878,523, 3,129,519, 3,249,955 and 3,570,151. In the aforesaid patents the shoe structure does not include an insole and when it becomes desirable to make a shoe embodying an insole problems are encountered during the string-lasting of the upper to the last for if the insole is not attached in some way to the last bottom the string-lasting operation if not performed with care may shift the insole laterally or skew it relatively to the bottom and even if the insole is securely fastened the drafting of the upper over the edge face of the insole tends to lift the edge and/or separate or fray the edge. Moreover, if a relatively thick insole is employed the frictional resistance to drafting of the lasting margin over the edge face makes it difficult to properly constrict the lasting margin so as to lay it smoothly in place. Additionally, if the insole extends all the way to the inner side of the lasting margin it resists shrinkage of the outsole at the interfaces during cooling and since the lower face of the insole is free to shrink it causes the edge face of the insole to slope inwardly a noticeable amount. The purpose of this invention is to provide a method of making shoes with insoles which may be incorporated during the injection molding of the bottom thereto in such fashion as to avoid the aforesaid problem.

SUMMARY

As herein illustrated, the method comprises supporting an insole on the bottom of a last, providing an upper with a lasting string along its lasting margin, placing the upper on the last with its margin extending upwardly from the bottom, holding the lasting margin spaced from the edge of the insole, drawing the lasting string to pull the lasting margin inwardly over the bottom of the insole while holding said margin spaced from the edge, supporting the string-lasting upper in engagement with a mold containing a cavity corresponding to the dimensions of the outsole to be applied and injecting an elastomeric bottom-forming composition into said cavity against the insole and lasting margin. According to the invention the lasting margin is held away from the edge face of the insole by a spacing member mounted on the bottom of the last peripherally thereof and such spacing member, as herein illustrated, comprises an upstanding lip formed integral with the bottom of the last which defines a cavity at the bottom of the last corresponding in shape to the insole and in depth to the thickness of the insole. The lip has an outer surface comprising a continuation of the side of the last, an upper surface which is slightly convex and substantially flush with the exposed surface of an insole deposited in the cavity and an inside surface for engagement with the edge face of the insole, said inside surface being optionally slightly re-entrant so as to wedgingly receive the insole. The outer and upper sides of the lip have smooth polished surfaces.

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

FIG. 1 is a transverse vertical section through the forepart of a shoe embodying an insole and an outsole

comprised of an elastomer made according to this invention;

FIG. 2 is a corresponding section of a shoe made without following the procedure of the invention herein described;

FIG. 3 is a plan view of an insole for incorporation in a shoe;

FIG. 4 is a bottom view of a closed upper with a lasting string along its lasting margin;

FIG. 5 is a transverse section of a last used in carrying out the method;

FIG. 6 is a longitudinal section of a last shown in FIG. 5;

FIG. 7 is a transverse section of a last provided with a modified lip;

FIG. 8 shows the first step in performing the method wherein the insole is mounted on the bottom and the upper is mounted on the last with the lasting margin projecting upwardly from the bottom thereof;

FIG. 9 is a view corresponding to FIG. 8 with the lasting margin drawn inwardly over the bottom of the insole;

FIG. 10 is a section showing the lasted upper held in engagement with a mold cavity preparatory to injection molding of an outsole;

FIG. 11 is a plan view at the bottom of a last showing the use of pins at the bottom about which the lasting string is adapted to be looped to pull the margin in at the shank;

FIG. 12 is a view corresponding to FIG. 11 wherein lengths of string are looped about the lasting string at opposite sides of the shank to draw the margin in at the shank;

FIG. 13 is a view corresponding to FIG. 11 in which a shank plate provided with prongs is employed, the lasting string being looped about the prongs; and

FIG. 14 is a view corresponding to FIG. 11 in which the lasting string embodies a constrictive loop or loops for drawing the lasting margin in at the shank.

Referring to the drawings, the shoe which is to be made comprises an upper 10 of suitable material, natural or man-made, an insole 12 also of natural or man-made material and an outsole 14 comprised of an elastomer which is applied by an injection molding process.

The insole 12 is preferably coated with a suitable adhesive 16 which is compatible with the elastomer of the outsole which is to be applied thereto and which will enhance the bond between the insole and the outsole.

The upper 10, which is closed, has applied to the edge of its lasting margin 18 by means of overedge stitching 20 a lasting string 22, the ends 24—24 of the latter being adapted to be drawn tight to constrict the lasting margin.

In the performance of the method, as will be described, a metal last L, such as shown in FIGS. 5 and 6, is employed which has peripherally of its bottom an upstanding lip 26, the lip defining a cavity 28 at the bottom of the last which corresponds in shape to the insole and in depth to the thickness of the insole. The lip may, for example, be in the order of 5/64 of an inch in height and 3/32 of an inch in width. As illustrated in FIGS. 5, 6 and 7 the outer surface of the lip comprises a smooth continuation of the outer surface of the last, the top surface is slightly convex and the inner surface is sub-

stantially perpendicular to the bottom surface of the last. Optionally, the inner surface, as shown in FIG. 7, may be slightly re-entrant throughout its entire length or the inner surface may have at peripherally spaced intervals inwardly extending re-entrant projections.

In accordance with the performance of the method the insole 12 is mounted on the bottom of the last within the cavity 28 with its edge face in engagement with the inner side of the lip. If the last as shown in FIG. 7 is employed, the insole, when pressed into the cavity, becomes wedgingly engaged therein and this formation may be desired to make sure that the insole is not accidentally lifted out of the recess. Preferably the depth of the cavity is such that the upper edge of the lip is slightly above the exposed surface of the insole when the latter is placed in the cavity. The upper 10 is now placed over the last, as shown in FIG. 8, so that its lasting margin 18 projects upwardly from the bottom of the last whereupon the ends 24—24 of the lasting string are drawn tight to pull the lasting margin 18 inwardly over the lip and onto the exposed surface of the insole as shown in FIG. 9. The lip 26 holds the inner side of the upper and lasting margin away from the edge face of the insole during the upward and inward drafting movement of the lasting margin so that such movement cannot possibly lift the edge of the insole away from the bottom and or shift it laterally or skew it relative to the bottom or, for example, damage the edge of the insole by spreading or fraying the edge. Moreover, because the lip is rigid and has a smooth polished surface the frictional engagement of the inner side of the upper therewith during the drafting and lasting is materially lessened so that the string-lasting operation can be easily performed with the least amount of effort and in a manner such as to lay the lasting margin smoothly over the insole and uniformly about the shoulder of the last.

The string-lasting may be effected in any of several known procedures; for example, as shown in FIG. 11, by providing pins 11 at the bottom of the last and holes 13 in the insole through which they project, upon which loops 15 of the lasting string may be disposed to constrict the lasting margin at the shank, or, as shown in FIG. 12, lengths of string 17 may be looped from one side to the other about the lasting string at the shank to draw the lasting margin together at the shank, or, as shown in FIG. 13, a shank plate 19 provided with prongs 21, as shown in the aforesaid U.S. Pat. No. 3,249,555, may be mounted on the bottom at the shank and the lasting string 22 looped about the prongs, and finally, as shown in FIG. 14, a double loop 23 arrangement may be employed as shown in U.S. Pat. No. 3,570,151, to enable drawing the lasting margin snugly in at the shank.

Having lasted the upper to the last and insole the lasted upper is now placed in engagement with the lip 30 surrounding the cavity 32 in a mold assembly 34 for injection molding whereupon an elastomer of suitable kind is injected into this mold cavity against the exposed surface of the insole and the lasted upper to form the outsole 14.

In carrying out the method of string-lasting on a last such as shown in FIGS. 5, 6, and 7, the presence of the lip 26 provides a clearance between the upper and the edge face of the insole in addition to the fact that it retains the insole in position and enables easy and

smooth lasting of the lasting margin over the bottom without displacing or roughing the edge so that when the outsole is applied by the injection molding process shrinkage of the outsole during cooling will be permitted without distortion of the outsole. In the absence of such a clearance the insole prevents shrinkage of the outsole at its interfaces and since the lower part of the outsole is not so restrained the edge faces will be caused to slope toward each other from the inside to the outside, as shown in FIG. 2.

In the practice of the invention it is desirable to heat the last, an expedient which is commonly used and hence need not be described further herein. It is also desirable to preheat the upper to provide for maximum flexibility during the string-lasting operation and also to avoid chilling of the elastomeric bottom-forming composition as the latter is injected into the mold cavity against the bottom so as to afford a maximum bond. As related above, an adhesive is applied to the surface of the insole which may be a vinyl or polyurethane. The elastomeric bottom-forming composition employed is PVC; however, other materials of a comparable make-up may be employed.

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 a shoe with an insole and an outsole, the latter being comprised of an elastomer, comprising supporting the insole on the bottom of a last, providing an upper with a lasting string along its lasting margin, placing the upper on the last with its lasting margin projecting upwardly from the bottom, holding the margin spaced from the edge of the insole, drawing said lasting string tight to pull the lasting margin inwardly over the bottom of the insole while holding the margin spaced from the edge of the insole, supporting said string-lasted upper in engagement with a mold containing a cavity corresponding in dimensions to the outsole to be applied, and injecting an elastomeric bottom-forming composition into said cavity against the insole and lasting margin.

2. The method of making a shoe with an insole and an outsole, the latter being comprised of an elastomer, comprising supporting the insole on the bottom of a last, providing an upper with a lasting string along its lasting margin, placing the upper on the last with its lasting margin projecting upwardly from the bottom, providing spacing means between the edge face of the insole at the inner side of the upwardly projecting lasting margin for holding the lasting margin spaced from the edge of the insole, drawing the lasting string tight to pull the lasting margin inwardly over the bottom while held out of engagement with the edge face of the insole, supporting the lasted upper in engagement with a mold containing a cavity corresponding in dimensions to the outsole to be applied, and injecting an elastomeric bottom-forming composition into the cavity against the insole and surrounding lasting margin.

3. The method of making a shoe with an insole and an outsole, the latter being comprised of an elastomer, comprising placing the insole on the bottom of a last, providing an upper with a lasting string along its lasting margin, mounting the upper on the last with its lasting

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margin projecting upwardly from the bottom, providing means at the edge of the last bottom between the edge face of the insole and the inner side of the upstanding lasting margin for constraining the insole against lateral movement on the bottom and for holding the lasting margin away from said edge face, drawing the lasting string tight to pull the lasting margin inwardly over the top of said means onto the insole while held out of engagement with the edge face by said means, supporting the lasted upper in engagement with a mold containing a cavity corresponding to the dimensions of the outsole to be applied, and injecting an elastomeric bottom-forming composition into the cavity against the insole and the lasting margin.

4. The method of string-lasting an upper onto an insole supported on a last for making a shoe provided with an insole and an elastomeric outsole, comprising placing the insole on the bottom of the last, providing an upper with a lasting string along its lasting margin, mounting the upper on the last with its lasting margin projecting upwardly from the bottom, holding the inner side of the lasting margin spaced from the edge of the insole, and while so holding the lasting margin spaced from the edge of the insole drawing the lasting string tight to pull the lasting margin inwardly onto the bottom of the insole.

5. The method of string-lasting an upper onto an insole supported on a last preparatory to making a shoe with an insole and an elastomeric outsole, comprising placing the insole on the bottom of the last, providing an upper with a lasting string along its lasting margin, placing the upper on the last with the lasting margin projecting upwardly from the bottom, providing at the edge of the last bottom a spacing member having a smooth outer surface forming a continuation of the side surface of the last, a smooth top surface substantially flush with said exposed surface of the insole, and an inner surface of a configuration such as to have contact with the edge face of the insole, and drawing the lasting string tight to pull the lasting margin inwardly over said spacer onto the exposed surface of the insole.

6. The method according to claim 5, wherein the inner surface of the spacer is slightly re-entrant so as to

wedgingly receive said insole.

7. The method of string-lasting an upper onto an insole supported on a last preparatory to making a shoe with an insole and an elastomeric outsole, comprising providing a last with an upstanding lip projecting from its bottom, said lip defining a cavity at the bottom corresponding in shape and depth to the shape and thickness of the insole, said lip having an outer surface forming a continuation of the side surface of the last and a top surface substantially flush with the exposed surface of the insole, placing the insole within said cavity and string-lasting an upper to the last to draw the lasting margin inwardly over the exposed surface of the insole.

8. A method according to claim 7, wherein the outer side and top of the lip are smooth and rigid.

9. A method according to claim 7, wherein the inner side of the lip is re-entrant.

10. A method according to claim 7, wherein the lip is formed integral with the bottom of the last.

11. The method of string-lasting an upper to an insole supported on a last preparatory to making a shoe with an insole and an elastomeric outsole, comprising placing an adhesive-coated insole on the bottom of the last with the adhesive-coated side exposed, providing an upper with a lasting string along its lasting margin, mounting the upper on the last with its lasting margin projecting upwardly from the bottom of the last, and while holding the lasting margin spaced from the edge face of the insole drawing the lasting string tight to pull the lasting margin inwardly over the exposed surface of the insole.

12. A last for use in making a shoe according to claim 1, said last having at its bottom an upstanding peripherally disposed lip, said lip defining a cavity at the bottom corresponding in configuration to the shape of the insole and in depth to the thickness of the insole.

13. A last according to claim 12, wherein said lip has an outer smooth surface comprising a continuation of the side surface of the last and a smooth slightly convex top surface.

14. A last according to claim 12, wherein the inner side of the lip is slightly re-entrant.

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Notice of Adverse Decision in Interference

In Interference No. 98,467 involving Patent No. 3,704,474, J. G. Winkler, METHOD OF STRING-LASTING, final judgment adverse to patentee was rendered Apr. 18, 1974, as to claims 1, 2, 3, 4, 5, 7, 8, 10, 11 and 12.

[Official Gazette August 13, 1974.]