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PREMOLDED OUTSOLES

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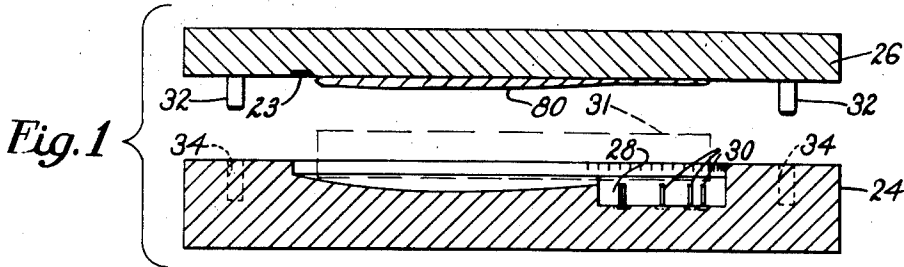


Fig. 1

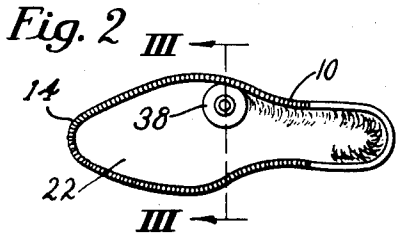


Fig. 2

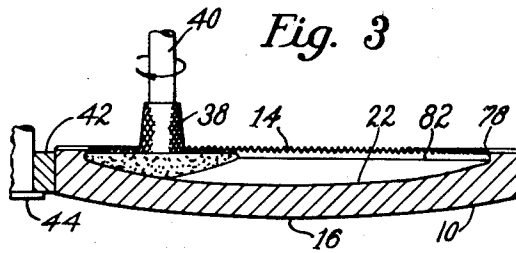


Fig. 3

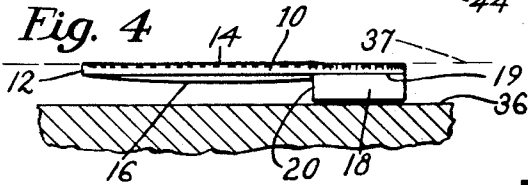


Fig. 4

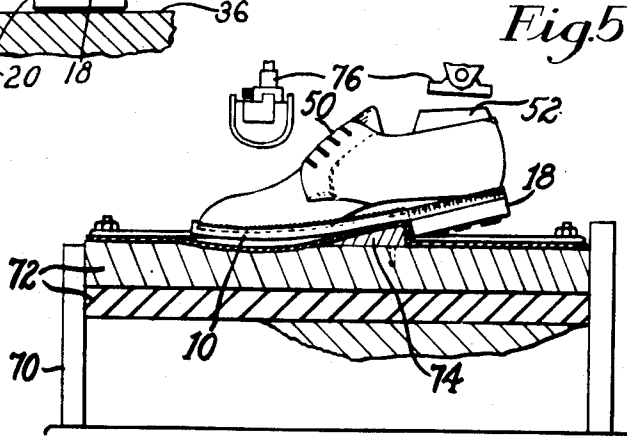


Fig. 5

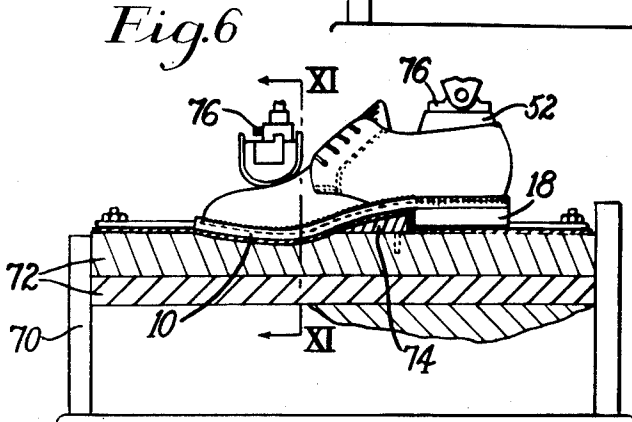


Fig. 6

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1

2

3,146,536

PREMOLDED OUTSOLES

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Original application Feb. 1, 1960, Ser. No. 5,884, now Patent No. 3,021,543, dated Feb. 20, 1962. Divided and this application June 16, 1961, Ser. No. 117,712
3 Claims. (Cl. 36—32)

This invention relates to improvements in molded rubbery shoe outsoles adapted for use with an improved method of making shoes illustrated and described in a prior copending application for United States Letters Patent Serial No. 5,884, filed February 1, 1960, now Patent No. 3,021,543, granted February 20, 1962 in the name of the present inventor, of which prior application the present application is a division. The characteristics of the molded outsole described herein which render it uniquely applicable in the method delineated in the above application facilitate and simplify the attainment of the improved method of making shoes simulating those made by the Goodyear welt process.

Heretofore, rubbery soled cement shoes were commonly manufactured by attaching an adhesively coated flat blank to the overlasted bottom marginal portion of a shoe upper through the application of pressure to a flat outsole blank in such a manner as to conform the blank to the configuration of the shoe bottom and thereby to produce a continuous adhesive bond between said blank and said bottom marginal portion. Thereafter, the projecting portions of the outsole blank were rough rounded with an outline bearing a relationship with the break line of a last within the shoe and the shoe completed in accordance with acceptable shoemaking practices. The principal disadvantage of a shoe manufactured in accordance with these procedures is the tendency of the outsole, after being conformed with the configuration of the overlasted upper, to reassume its original flat form as a result of a characteristic known as elastic resistance or memory. This characteristic frequently results in rupture of the adhesive bond between the outsole and the marginal portion of the upper or in the deformation of the shoe itself.

In some instances attempts have been made to use pre-molded rubbery outsoles with edges finished and tread surfaces convexly shaped and finished exactly to fit a flat lasted shoe bottom. Such practice, however, has been found not to be economically advantageous due to the large number of alternate mold configurations necessary for shoes of different sizes and designs. Also, to accommodate lengthwise curvature it is necessary to form a two-part mold with its separation plane corresponding to the lengthwise curvature of the shoe. Accordingly, molds have been made with a hollow die and a cover plate curved along their mating surfaces to fit together exactly, so that leakage of the molding material used to form the outsole is avoided. Such construction is objectionable because the machining of the mold is expensive and difficult because it requires a high degree of precision. Even if such outsole is successively molded it tends to flatten out when stacked one upon another as in storage, so that it may lose a large part of its curvature and offer heavy elastic resistance to exact conformity with a shoe bottom, especially in smaller sizes.

According to one object of the present invention there is provided a premolded shoe outsole composed of vulcanized rubber or similar hardened thermoplastic material capable of being conformed with the bottom surface of a shoe and of receiving intricate features of decoration without the necessity of subsequent trimming of the sole

and without the likelihood of offering elastic resistance due to molded in or otherwise impressed memory of the material. Another purpose of the invention is to provide a simplified form of molded outsole, which may be manufactured in sets of simplified and improved molds through the use of a die and cover plate, the mating surfaces of which are not required to be curved. The die and cover plate thus may be formed to separate along a flat plane and may be constructed of flat stock without any machining required along such surfaces. To these ends a premolded shoe outsole has been constructed merely with transverse curvatures conforming with the widthwise curvature of a shoe bottom, but with no lengthwise curvatures. When so constructed, it has been found that lengthwise curvature may be impressed during the attachment of an outsole to a shoe without excessive resistance. The lengthwise curvature of a shoe bottom is not so abrupt as the widthwise curvature. Consequently, resistance to lengthwise flexure is much less, so that the lengthwise curvature results in little or no residual elastic resistance or memory in the sole after attachment. An outsole thus molded has the advantage that a concave central upper receiving recess may also be molded into it and several sizes of shoes may be manufactured with a single size of outsole.

Preferably, the outsole has a heel integrally attached thereto, so that all of the edges of the outsole and heel may be formed to exact size and to required finish within the forming mold. Also, by so doing the transverse curvature is made to merge with the breast of the heel, which is thicker and relatively inflexible (FIG. 4), to avoid complete flattening of the transverse curvature when a number of sole and heel units are stacked upon each other during storage. After attachment of such an outsole to a shoe no further trimming, heel attaching or edge finishing operations are required. Such outsole before attachment in unstressed condition to a shoe is characterized by its ability, when the tread surface of the heel is pressed against a table or other flat surface, to have its forepart portion raised away from the table and into spaced parallel relation therewith.

Another difficulty encountered when cement attaching rubber outsoles to lasted shoe uppers is in smearing the exposed surfaces of the upper and sole with adhesive, so that considerable time and effort are required in cleaning after manufacture.

Further objects of this invention are to provide a molded and vulcanized rubber shoe outsole in which all of the surfaces of the outsole and upper exposed in a shoe after manufacture may be kept free of smear from displaced adhesive more readily than with prior outsoles, without the necessity for making a set of expensive molds wherein a method of making shoes having an extremely close fit is rendered possible between the outsole and upper of a shoe but without requiring high precision machining procedures or equipment.

These and other features of the invention, as hereinafter described and claimed will readily be apparent to those skilled in the art from the following detailed specification and drawings, in which:

FIG. 1 is a lengthwise sectional view of a mold for an outsole embodying the features of the present invention;

FIG. 2 is a plan view on a reduced scale of an outsole vulcanized in the mold shown in FIG. 1;

FIG. 3 is a sectional view on an enlarged scale of the outsole shown in FIG. 2 taken along line III—III;

FIG. 4 is a view in side elevation and on the same scale as the outsole shown in FIG. 2, indicating the natural unstressed form of the forepart of the outsole, after being taken from the mold of FIG. 1;

FIG. 5 is a sectional view of a pad box in an outsole

attaching machine, showing the preliminary attachment of an outsole described herein; and

FIG. 6 is a similar view of the pad box shown in FIG. 5 and a shoe thereon during the final permanent attachment of the outsole.

The premolded outsole of disclosed herein is shown at 10 in FIGS. 2 to 4, inclusive. In these figures the outsole is shown in its molded and vulcanized condition before it is attached to a lasted upper 50 of a shoe (FIG. 5), all of the outsole surfaces including an edge 12, (FIG. 4) a flat raised marginal surface 14, and a convex tread surface 16, being complete without requiring any further finishing operations after attachment to the shoe. To support the shoe upper during attachment of the outsole the last, indicated at 52, is retained in the upper in order to give the shoe bottom its proper curvature. The outsole also has molded integrally therewith a relatively thick, stiff block heel 18 formed with suitable flat configuration on its tread surface and imitation nail holes and a score mark 19 to simulate a separately attached heel. The heel has an abrupt breast surface 20 corresponding to that of a Goodyear welt shoe.

To assist in fitting the outsole to the shoe, the entire length of the outsole from the heel to the toe is formed with a concave central recess 22 of a length and width slightly less than that of the shoe bottom to which it is to be attached. The recess 22 is surrounded by the raised marginal surface 14 formed with an inturred fin-like lip 78. The lip 78 assists in guiding the outsole during the roughening of the surface within the recess, prevents the spread of cement outside the lip during the attaching operation and improves the fit of the shoe within the recess. The lip is less sharp about the heel of the outsole than about the forepart, since there is less flexure of the shoe along the heel and less opportunity for smearing cement on exposed surfaces. Also, the smaller lip about the heel affords a greater tolerance for lengthwise positioning between the heel of the outsole and the corresponding end of the shoe, so that a single size of outsole may be employed on several sizes of shoes.

The inner surface of the central recess 22 in a direction widthwise of the outsole and heel portions of the unit are formed with a concave curvature corresponding to the transverse curvature of a shoe bottom to which it is to be attached, the transverse curvature merging with the breast surface of the heel, which is stiff and resistant to flexure, so that it is impossible for the curvature to be flattened out completely, even when a plurality of sole and heel units are stacked during storage before use. In a lengthwise direction no curvature is molded into the sole except that which is incidental to the widthwise curvature. The appropriate lengthwise curvature being less abrupt than the widthwise curvature is readily obtained when an outsole having the above-described characteristics is attached to the shoe.

The advantages of this form of sole construction, described above, are readily apparent when taking into consideration the problems involved in manufacturing a series of molds for different styles and sizes of shoes. By eliminating the lengthwise curvature of the sole it is possible to utilize metal blocks formed of flat bar stock for the molds without special outside machining, as would be required if a lengthwise curvature were also molded into the outsoles. Thus, a simple two-part mold such as shown in FIG. 1, consisting of a die 24 and a cover plate 26, may be employed. To form the lip 78 the cover plate has a filler plate 30 secured to it. The edges of the cover plate 30 are rounded entirely about its periphery. The various characteristics of a standard leather outsole and nailed heel can be readily imitated by engraving the mold with appropriate decorative configurations. For instance, the cover plate 26 is formed with impression stitch indentations 23 between the filler 30 and the outer margin of the hollow portion of the die for marking the raised marginal portion 14 of the outsole surrounding the recess

to simulate the appearance of a Goodyear welt when incorporated into a shoe.

The outsole shown in FIGS. 2 to 4 has a rigidity corresponding approximately with that of a leather outsole, so that a completed shoe utilizing the outsole will display the same characteristics and conform with accepted requirements of leather shoe construction. When an unstressed outsole is laid with its tread against a table or other flat surface 36, as shown in FIG. 4, and pressure is applied to the upper surface of the heel portion of the outsole, the transversely curved toe portion may be raised and the marginal portion 14 of the outsole assumes a position approximately in a plane 37 parallel to the table surface 36.

As stated hereinabove, the characteristics of the outsole described herein which facilitate its use in the method described in the above referenced co-pending application, result in many other incidental benefits for mass production procedures. In order to attach the above-described outsole in accordance with the method of the co-pending application, the recess 22 of the outsole is first roughened and an adhesive material applied thereto. To roughen the outsole it is acted upon by a roughening tool 38 attached to a rotating spindle 40 and the edge of the outsole is engaged by a roll 42 rotatably mounted on a screw 44. After roughening, adhesive is applied to the roughened area. When the adhesive has partially cured, the outsole is heated to activate the cement and also to plasticize the outsole, so as to cause a small amount of widthwise and lengthwise expansion. After the heating process is completed, the forepart of the shoe is placed in engagement with the toe end of the recess and the plasticized outsole stretched in such a manner as to enable the heel portion of the shoe to be positioned temporarily in the rearward portion of the outsole recess. The temporarily positioned outsole and shoe are introduced into a pad box 70 of a press, as shown in FIG. 5. Pressure of pads 72 in the box 70 is supported by abutments 76 engaging the toe and heel portions of the shoe and is applied to the tread surface of the outsole, which remains heated to a plasticizing temperature, in such a manner as to expand the outsole both lengthwise and widthwise and thereafter, when the pressure is released, the outsole is permitted to contract into snug fitting relation with the shoe upper 50 with accurate conformity of the lip 78 about the recess of the outsole with the shoe bottom. Below the lip there is a cement receiving groove 82 for entry of any cement squeezed out from between the outsole and the shoe bottom. The application of pressure by the pressing pads, besides expanding the outsole into conformity with the shoe during permanent attachment of the outsole by cement acts against a wedge 74 to bring the shank of the outsole from a straight lengthwise position of FIG. 5 to a fully conformed position of FIG. 6, thus taking up some of the extra length of the outsole produced by the sole attaching pressure and resulting in a more snugly fitting outsole without visible outside smearing of cement on the sides of the upper than is possible with outsoles of other constructions. In this way smearing of cement and consequent discoloration of the upper outside the lip 78 is avoided.

Also, because the transverse curvature of the sole merges with that of the heel a close fitting shank is insured, and when the projecting margin of a completed shoe thus constructed is decorated with stitch impressions, a favorable appearance is produced closely resembling a Goodyear welt shoe, and in many instances surpassing in uniformity and finish anything obtainable in such shoe.

The nature and scope of the invention having been described, what I claim as new and desire to secure by Letters Patent of the United States is:

1. An outsole premolded before attachment to a shoe, said outsole having a concave central recess shaped to conform with the transverse curvature on a bottom surface of an upper supported by a last, a raised marginal surface

5

disposed in a single flat plane surrounding the central recess on the outsole, a convex tread surface and a heel having an abrupt breast surface connected integrally and merging with the transverse curvature on the tread surface of the outsole to cause the raised marginal surface of the unstressed outsole, when the tread surface of the heel is pressed against a flat support, to lie in spaced parallel relationship with the flat support.

2. A premolded outsole having a central recess shaped to conform with the transverse curvature on a tread surface of an upper supported by a last, a raised marginal surface disposed in a single flat plane surrounding the central recess on the outsole, a heel having a breast surface connected integrally and merging with the transverse curvature of the outsole to enable the unstressed outsole, when the tread surface of the heel is pressed against a flat support, to lie in spaced parallel relationship with the flat support, and an inturned fin-like lip formed by the marginal surface about the forepart of the outsole to insure a close fitting relationship between the inner edge about the raised marginal surface and the bottom, including the shank of the shoe upper inserted in the recess, the lip extending about the heel of the outsole being less sharp than about the forepart to afford greater tolerance in positioning the heel of the outsole on the corresponding end of the upper.

3. A premolded outsole having a central recess shaped to conform with the transverse curvature on a tread sur-

6

face of an upper supported by a last, a raised marginal surface disposed in a single flat plane surrounding the central recess on the outsole, a heel having a breast surface connected integrally and merging with the transverse curvature of the outsole to enable the unstressed outsole, when the tread surface of the heel is pressed against a flat support, to lie in spaced parallel relationship with the flat support, and a lip formed by the marginal surface about the forepart of the outsole to insure a close fitting relationship between the inner edge about the raised marginal surface and the bottom, including the shank of the shoe upper inserted in the recess, the lip extending about the heel of the outsole being less sharp than about the forepart to afford greater tolerance in positioning the heel of the outsole on the corresponding end of the shoe, and the raised marginal portion about the forepart of the shoe being indented with impression stitches.

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