

[54] FOOT CONFORMING INSOLE FOR A SHOE

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[58] Field of Search ..... 128/622, 621, 619, 596,  
128/595, 581, 586; 36/44, 30

[56]

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[57]

## ABSTRACT

A foot conforming shoe insole which includes upper and lower layers of resilient foam material and an intermediate layer of solid material bonded between the upper and lower layers. Upturned tabs are formed by the layers on opposite sides of the insole for cradling the foot at the medial and lateral sides of the foot where the arch thereof is located.

5 Claims, 11 Drawing Figures

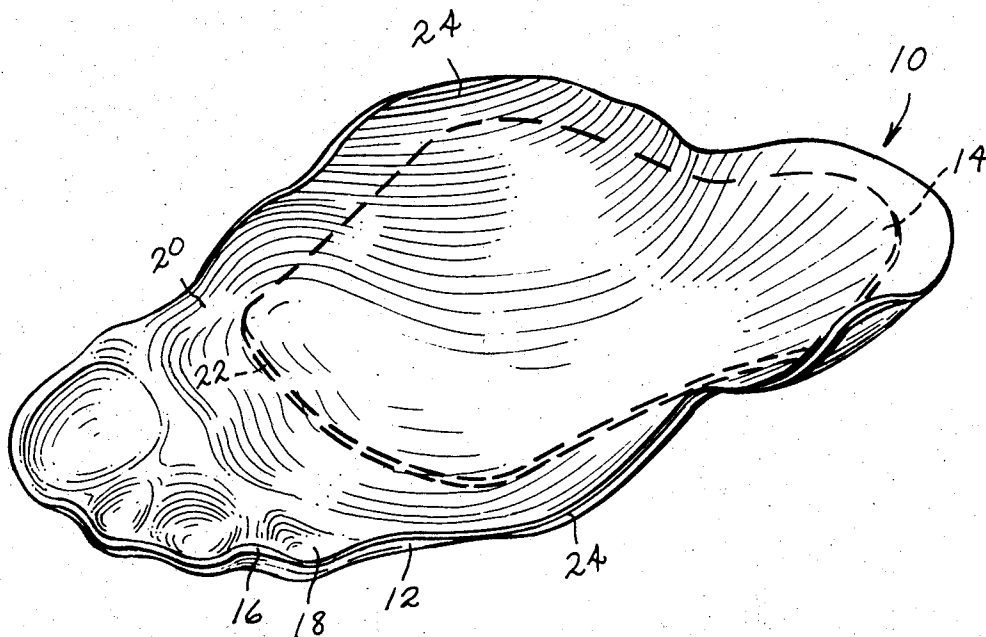


Fig. 1

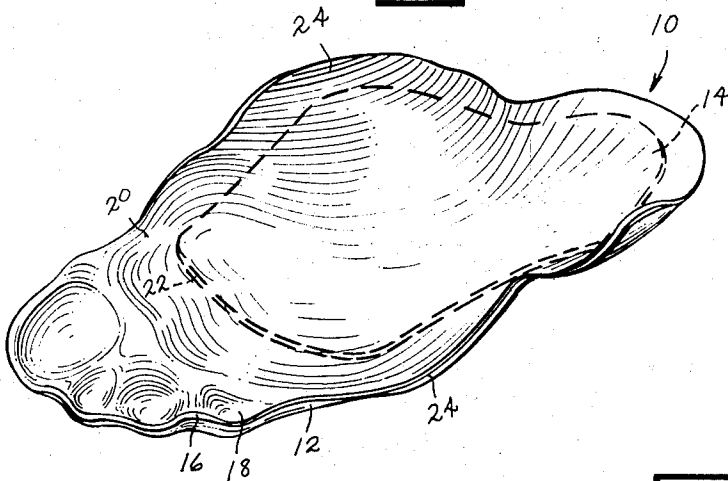


Fig. 2

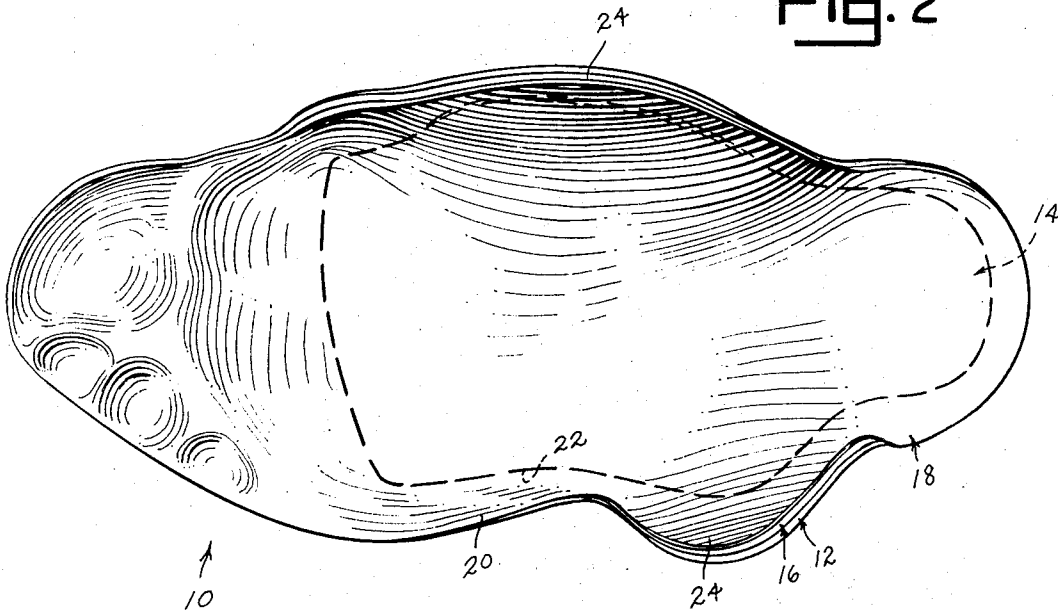


Fig. 3

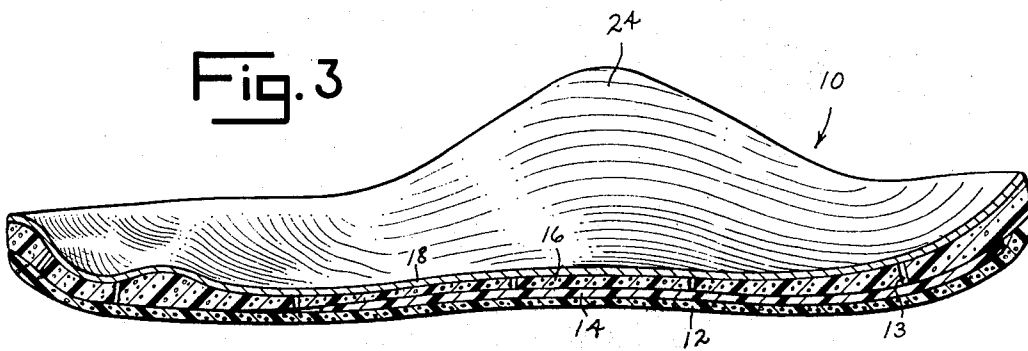
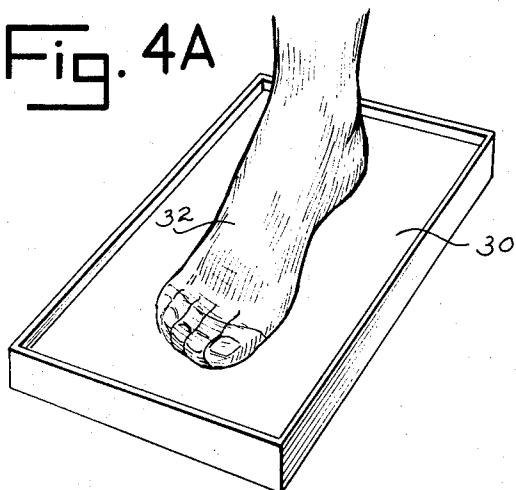


Fig. 4A



**Fig. 4B**

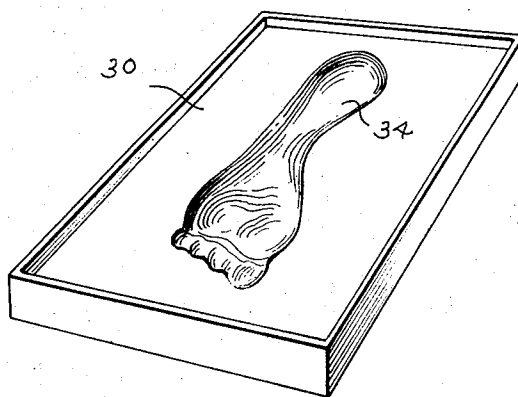


Fig.4C

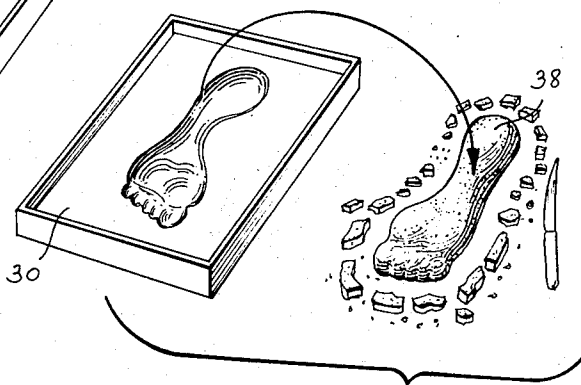
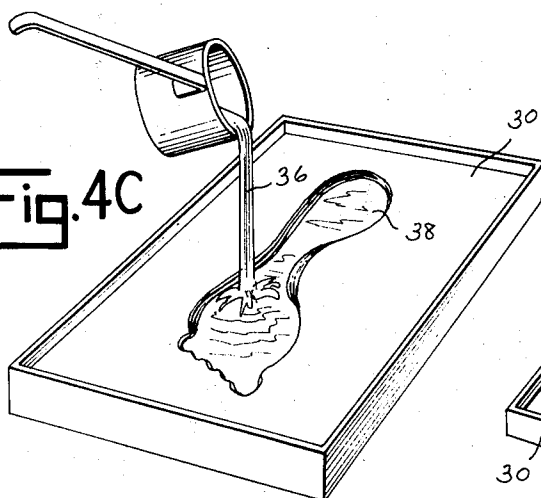


Fig. 4D

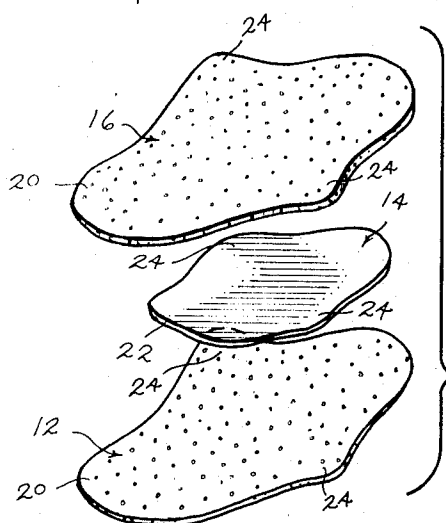


Fig. 4E

Fig. 4F

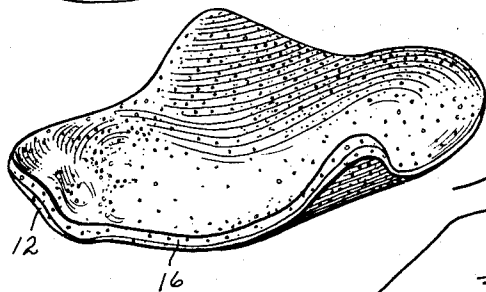
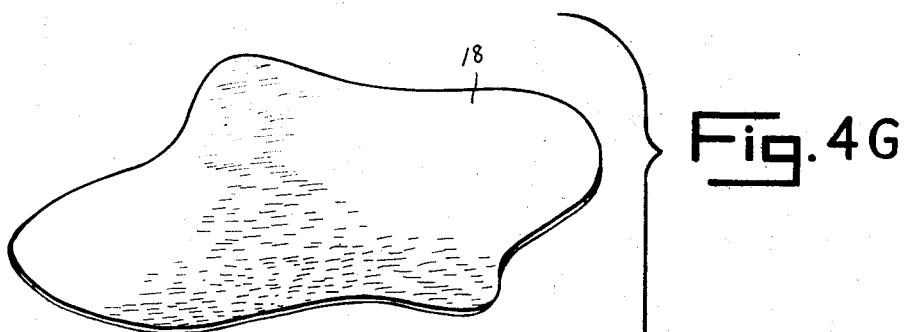
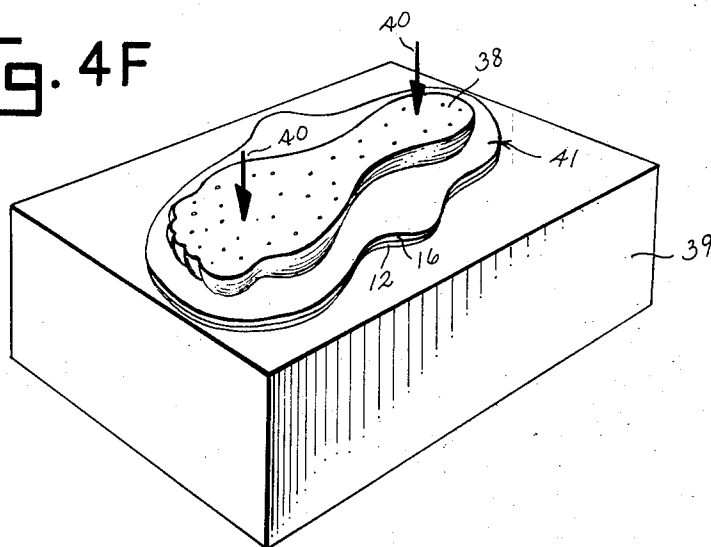


Fig. 4H

# FOOT CONFORMING INSOLE FOR A SHOE

## SUMMARY OF THE INVENTION

This invention relates to a support for the foot and has specific application to an insole which is for use in a shoe and which has a foot conforming fit.

The insole of this invention includes a bottom layer of resilient foam material which extends from the heel to the toe of the foot. An intermediate layer of solid shape-retaining material is applied over the first layer and extends from the heel to just rearwardly of the ball of the foot. An upper layer of resilient foam material is applied over the lower and intermediate material layers with the upper layer extending from the heel to the toes of the foot coextensively with the lower layer. This insole is principally intended to be utilized as an insert into a slightly oversized ordinary shoe or a corrective shoe to serve either as a comfort aid for a normally developed foot or as a corrective aid for an ailing foot.

Accordingly, it is an object of this invention to provide an insole constructed of multiple layers of resilient foam and solid materials which are molded to conform to the foot of the insole user.

Another object of this invention is to provide a corrective insole which can be inserted into the shoe of the user thereof.

Another object of this invention is to provide an insole of a substantially foot conforming configuration which is adapted to be inserted into the shoe of the insole user.

Still another object of this invention is to provide an insole which is adapted to be inserted into a shoe and which is of economical construction.

Still another object of this invention is to provide a method for forming a foot conforming insole for a shoe.

Other objects of this invention will become apparent upon a reading of the invention's description.

## BRIEF DESCRIPTION OF THE DRAWINGS

A preferred embodiment of this invention has been chosen for purposes of illustration and description wherein: 24,

FIG. 1 is a perspective view of the insole as viewed from above.

FIG. 2 is a top plan view of the insole of FIG. 1.

FIG. 3 is a longitudinal sectional view of the insole of FIG. 1.

FIGS. 4A-4H are views illustrating a method of manufacturing the insole.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiment illustrated is not intended to be exhaustive or to limit the invention to the precise form disclosed. It is chosen and described in order to best explain the principles of the invention and its application and practical use to thereby enable others skilled in the art to best utilize the invention. for

Insole 10 shown in FIGS. 1-3 is of multiple-layer sandwiched construction including a lower layer 12, an intermediate layer 14, an upper layer 16 and an optional covering 18. Lower layer 12 is formed of a resilient foam material, such as one-eighth inch thick closed cellular foamed polyethylene, and is adapted to extend from the heel of the foot to the toes thereof. Intermediate layer 14 is formed of a solid shape-retaining mate-

rial, such as one-sixteenth inch thick solid sheet of polyethylene, and is adapted to extend from the heel of the foot to just rearwardly of the ball of the foot. Upper layer 16 is formed of a resilient foam material, such as one-fourth inch thick closed cellular foamed polyethylene, and is adapted to extend from the heel to the toes of the foot. Upper layer 16 is preferably perforated with the openings 13 therein providing an increased aerating effect. Layers 12, 14 and 16 are bonded together with the outer margins 20 of layers 12 and 16 extending beyond the marginal edge 22 of intermediate layer 14 and being bonded together. Covering 18, which may be of leather or leather-like composition, is applied to the upper surface of upper layer 16 so as to provide a wear surface for the insole.

Insole 10 includes a pair of upturned wings or tabs 24 which are located at opposite side edges of the insole. Tabs 24 serve to cradle the foot on its medial side at the arch and on its lateral side just rearwardly of the base of the tuberosity of the fifth metatarsal. Insole 10 is inserted into a shoe which is generally one-half to a full size larger than the ordinary shoe size of the user and is transferable from one pair of shoes to another. The insole of this invention can be utilized as a comfort aid for a normal foot or as a corrective aid for an ailing foot, in which case the insole may have portions thereof built up for the vehicles may be manufactured in widely different ways, and since such manufacture, and the a correction to the foot.

FIGS. 4A to 4H are illustrative of a method of forming the insole above described. A negative impression of the foot of the user is first obtained. This can be accomplished by utilizing a pressure sensitive block of plastic foam 30 which serves as an impression mold. Other forms of impression molds may have sand or clay impression taking material. The user places her foot 32, which is preferably socked, upon the mold as shown in FIG. 4A and applies sufficient pressure thereon to form a deep impression 34 of the foot in the mold material as shown in FIG. 4B. Impression 34 is then filled with plaster 36 or a similar casting compound as illustrated in FIG. 4C, to obtain a positive impression or casting of the bottom of the user's foot. Once the casting 38 is hardened, it is removed from the mold and trimmed as seen in FIG. 4D.

After casting 38 is obtained of the bottom of the user's foot, a flat insole composite 41, which consists of layers 12, 14 and 16, is formed. This is accomplished by cutting intermediate layer 14 to size so that it fills the voids or the soft flesh part of the plantar or bottom of the foot. Ordinarily layer 14 would be cut so as to extend from the heel to just rearwardly of the ball of the foot. In this operation casting 38 is utilized as a guide with wings or tabs 24 being formed on opposite side edges of layer 14. After intermediate layer 14 has been sized, a sander or similar abrasive tool can be utilized to taper the edges of the layer.

Following the sizing of intermediate layer 14, lower layer 12 and upper layer 16 are cut from sheets of resilient foam material. Each of the layers 12 and 16 is cut to oversize and follows the general outline of the bottom of the user's foot with tabs 24 formed on opposite side edges of each layer. Layers 12, 14 and 16 are then placed one on top of another, as shown in FIG. 4E, and bonded together at their confronting side faces by the utilization of a contact cement or other type bonding agent to form composite 41. Insole composite 41 is

placed in a suitable heating facility or oven and heated until layers 12, 14 and 16 are pliable. It has been found that a composite 41 of  $\frac{1}{4}$  inch foamed polyethylene layer 16,  $\frac{1}{16}$  inch solid polyethylene layer 16,  $\frac{1}{16}$  inch solid polyethylene layer 14 and a  $\frac{1}{8}$  inch foamed polyethylene layer 12 can be heated to a suitable pliable condition in ten to twelve minutes at a temperature between 250° F and 310° F.

The heated composite 41 is removed from the oven and immediately placed in compressive contact at its U.S. 16 with casting 38, which has preferably been coated with a varnish or similar sealer, to conform the composite to the shape of the casting. This conforming of the composite may be accomplished in any of several ways, such as by providing a pressure sensitive foam block 39 upon which the heated composite is placed with layer 16 being uppermost. Casting 38 is placed upon composite 41 and pressed, as shown by arrows 40 in FIG. 4F, against upper layer 16 to force the composite into the foam block and to cause the composite layers to conform to the foot impression of the casting. The molded composite is then allowed to cool while in contact with casting 38 until set. Once set, the molded composite can be separated from the casting and permitted to further cool. The molded composite 41 is then trimmed to size and the edges feathered so as to accommodate insertion and fitting within the shoe of the user. Preferably, the front of composite 41 is trimmed so that the insole will only contact the bottom of the toes of the user while the heel portion and sides of the composite will cup the foot of the user.

Covering 18 seen in FIG. 4G serves as a wear surface and is applied to the outer surface of upper layer 16 of the insole. The covering if formed of leather is preferably wetted and stretched over the casting and dried prior to application to upper layer 16. To complete construction of the insole, covering 18 is trimmed as illustrated in FIG. 4H.

It is to be understood that the invention is not to be limited to the details above given, but may be modified within the scope of the appended claims.

What I claim is:

1. An insole for a shoe, said insole comprising a first layer of resilient foam material, a layer of solid shape-retaining material applied over portions of said first layer, a second layer of resilient foam material applied over said solid layer and coextensively overlying said first layer, said first and second and solid layers being bonded together at all areas of mutual contact with the marginal areas of said first and second layers extending beyond all peripheral edges of said solid layer, said second layer having at least twice the thickness of said first layer, said first and second layers adapted to extend from the furthestmost posterior aspect of the heel to the tip of the toes, a pair of upturned tab means formed by said first and second and solid layers at opposite side edges of said insole for cradling the heel, one tab means adapted to be on the medial side of the foot at the arch thereof, the other tab means adapted to be on the lateral side of the foot just rearwardly of the base of the tuberosity of the fifth metatarsal, said solid layer adapted to extend from the furthestmost posterior aspect of the heel to adjacently rearwardly of the ball of the foot, said first and solid layers having a rounded foot cradling transverse cross sectional configuration, the upper face of said second layer having a resilient shape retaining configuration conforming to the planar of the foot and including cradling depressions for the toes and heel.

2. The insole of claim 1 wherein said solid layer is formed of a high density plastic and said first and second layers are formed of a cellular foamed plastic.

3. The insole of claim 2 wherein said solid layer is one-sixteenth inch thick and said first layer is one-eighth inch thick and said second layer is one-fourth inch thick.

4. The insole of claim 2 wherein said second layer has a plurality of perforations formed therein for aeration.

5. The insole of claim 1 and a thin layer of wear resistant material applied over said second layer.

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