

[54] CUSHION SHOE INNERSOLE CONSTRUCTION

[76] Inventor: Benjamin B. Dubner, 229-02 Merrick Road, New Hyde Park, N.Y.

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[52] U.S. Cl. 36/44

[51] Int. Cl. A43b 13/38

[58] Field of Search 36/44, 71 R, 30

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Primary Examiner—Alfred R. Guest

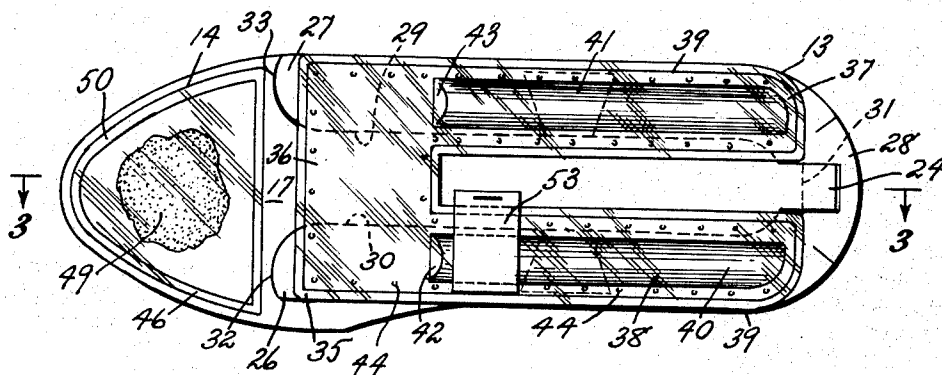
Attorney—Charles E. Temko

[57] ABSTRACT

A cushion type innersole for use with a shoe comprising a first relatively upwardly positioned innersole ele-

ment conforming generally to the shape of a foot of a wearer, a second innersole element moveably interconnected to and at least partially disposed beneath said first innersole element, the second innersole element being of a generally U-shaped configuration and extending rearwardly from that part of said first innersole element normally underlying the metatarsal area of said foot. Disposed beneath the second innersole element is a U-shaped sealed envelope, each leg of which contains a frangible flexible container in turn containing one phase of a two phase rigid foam system. The two phases are manually mixed before insertion of the device into the shoe of a wearer, and the foot placed thereupon to enable the foam upon expanding and curing to conform the upper surface of the device to the foot of the wearer. Optionally, the U-shaped sealed envelope may be provided with small perforations through which a small amount of foam, upon expanding passes to provide a cementitious effect serving to anchor the insole in position within a shoe. Forwardly of the metatarsal area, the toe cushioning portion of the device is provided with a sealed envelope containing a soft wax which conforms to the toes of the wearer as the device is used. In one embodiment, the device is formed in two pieces, whereby a variety of shoe sizes is readily accommodated by one size of device.

6 Claims, 12 Drawing Figures



SHEET 1 OF 2

Fig. 1

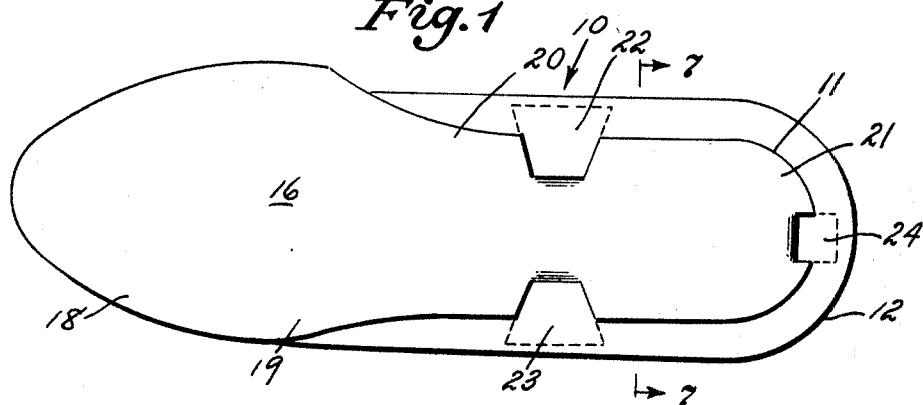
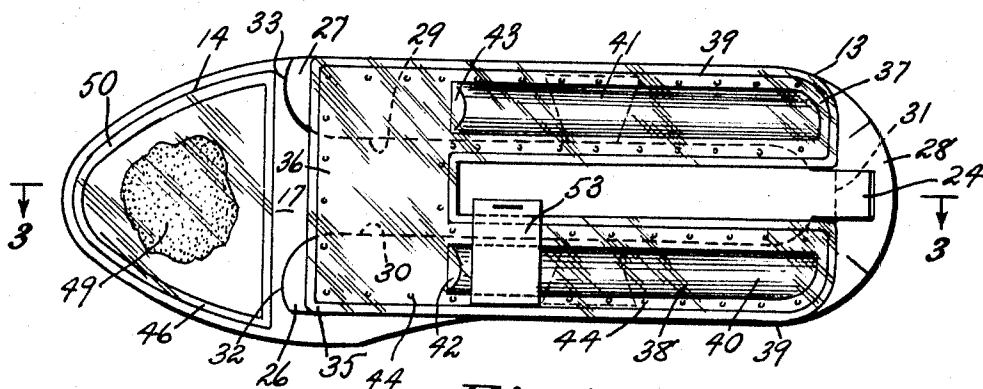


Fig. 2

Fig. 3

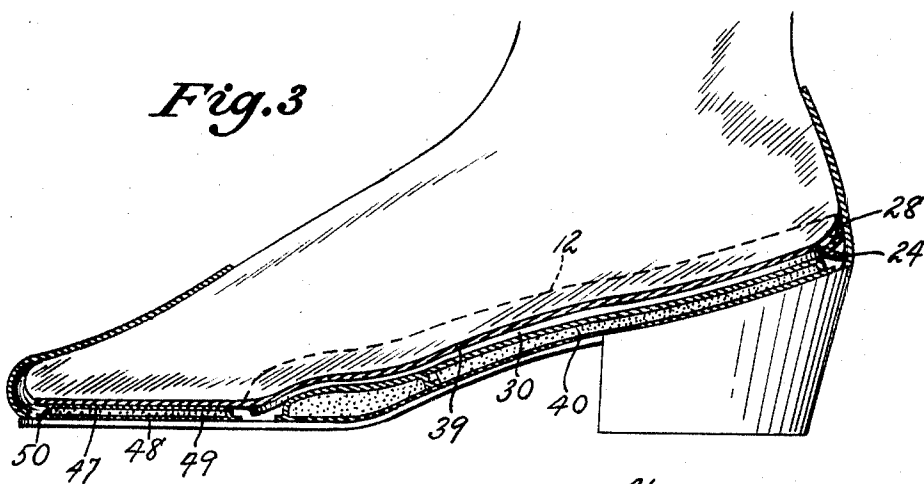
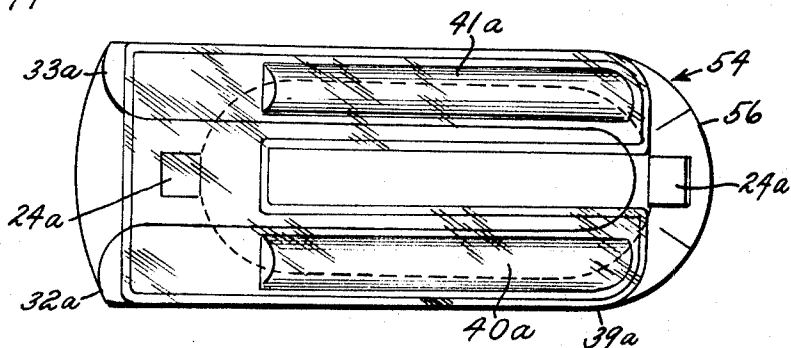


Fig. 4



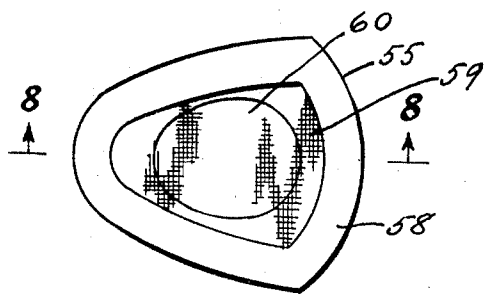


Fig. 5

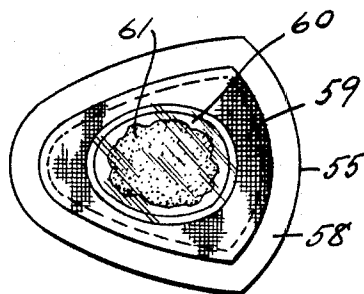


Fig. 6

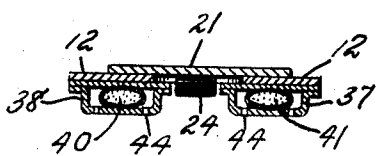


Fig. 7

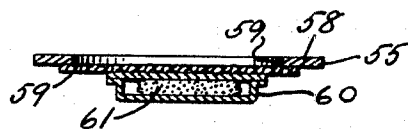


Fig. 8

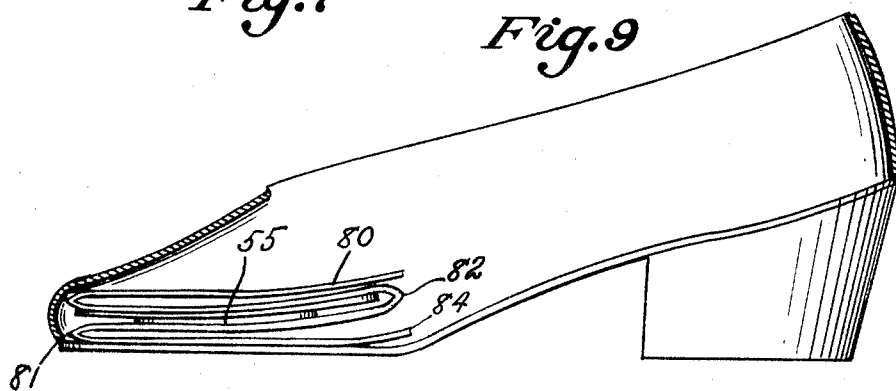


Fig. 9

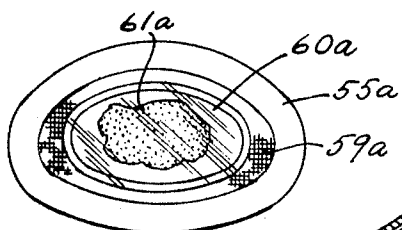


Fig. 10

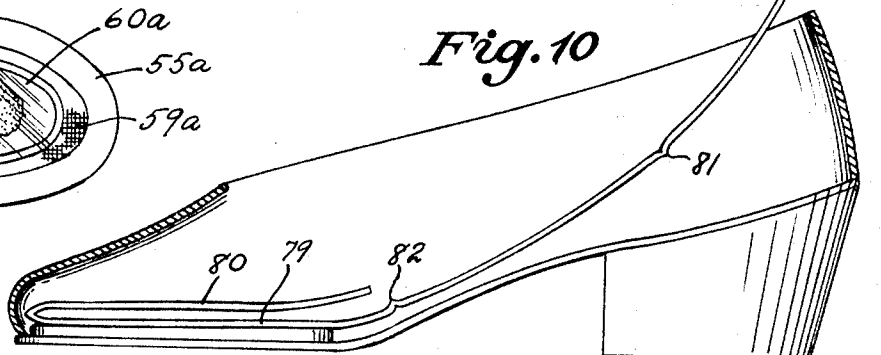


Fig. 11

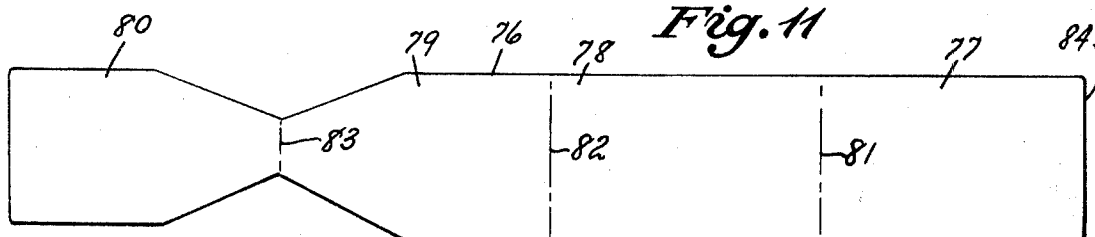


Fig. 12

CUSHION SHOE INNERSOLE CONSTRUCTION

This invention relates generally to the field of cushion innersoles which may be separately purchased and installed by a user within shoes, and more particularly to a rigid foam device which may be caused to conform to the foot of the individual wearer at the time of installation.

Cushion innersoles are well known in the art, usually consisting of a planar piece of leather or suitable substitute, the lower surface of which has adhesively adhered thereto a layer of sponge rubber or synthetic resinous foam material which deforms under the weight of the wearer with walking to provide a cushioned effect. Such devices, while not without value, tend to lose their resiliency within a relatively short period of use, so that the beneficial effect of employment is relatively short lived. Further, because such devices normally have a low elastic modulus, their assistance in supporting the foot is relatively limited.

It is also known in the art to provide, on a custom basis, a sock liner which can be filled with a rigid foam which "sets up" or cures under the foot of the wearer in such manner as to provide a shoe, the interior of which substantially conforms to the foot of the wearer, and which does provide adequate cushioned support. This type of construction, unfortunately, requires the assistance of skilled personnel, and the fitting must normally take place in a retail establishment, as a result of which the cost of such construction is often prohibitive.

It is therefore among the principal objects of the present invention to provide an improved rigid foam cushion shoe innersole construction, in which the above mentioned disadvantages have been substantially eliminated.

Another object of the invention lies in the provision of an improved cushion innersole construction which may be fitted by the user at home, without resort to special tools, and with the use of only ordinary skill.

Yet another object of the invention lies in the provision of an improved cushion innersole construction employing a rigid foam as the cushion material, rather than a soft collapsible foam, with improved supporting characteristics.

A further object of the invention lies in the provision of improved cushion innersole construction of the class described, in which the cost of fabrication may be of a reasonably low order, with consequent wide sale, distribution and use.

These object, as well as other incidental ends and advantages, will more fully appear in the progress of the following disclosure, and be pointed out in the appended claims.

In the drawings, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

FIG. 1 is a top plan view of the first embodiment of the invention.

FIG. 2 is a bottom plan view thereof.

FIG. 3 is a vertical central sectional view as seen from the plane 3—3 in FIG. 2.

FIG. 4 is a bottom plan view, corresponding to that seen in FIG. 2, but showing a second embodiment of the invention.

FIG. 5 is a top plan view of a toe supporting element forming a part of the second embodiment.

FIG. 6 is a bottom plan view of the toe supporting element shown in FIG. 5.

FIG. 7 is a transverse sectional view as seen from the plane 7—7 in FIG. 1.

FIG. 8 is a transverse sectional view as seen from the plane 8—8 in FIG. 5.

FIG. 9 is a phantom view showing a first step in the insertion and positioning of the toe supporting element shown in FIG. 5 into a shoe.

FIG. 10 is a similar phantom view showing a second step.

FIG. 11 is a developed view of a combination protective and positioning means used in conjunction with the toe supporting element of FIG. 5.

FIG. 12 is a bottom plan view showing an alternate form of toe supporting element.

In accordance with the first embodiment of the invention, the device, generally indicated by reference character 10, comprises broadly: an upper innersole element 11, a lower innersole element 12, a rigid foam cushion element 13 and a toe supporting element 14.

The upper innersole element 11 may be formed of leather, or synthetic resinous material, either alone or in conjunction with fibrous materials. It generally conforms to the shape of the foot of the wearer, and is bounded by an upper surface 16, and a lower surface 17. It includes a forward or toe portion 18, a metatarsal portion 19, an arch portion 20 and a heel portion 21. Extending peripherally from the arch and heel portions are first and second side tabs 22 and 23, respectively, and a heel tab 24.

The lower innersole element 12 is of generally U-shaped configuration, as best seen in FIG. 2 and includes an inner leg 26 and an outer leg 27 interconnected by a curved heel portion 28. It will be observed that the lower innersole element 12 commences at the metatarsal portion 19 of the upper innersole element 11, and extends laterally and rearwardly outwardly of the arch and heel portions 20—21. The tabs 22—23 engage inner edges 29 and 30 on the element 12, to provide a moveable interconnection. A similar interconnection is obtained by a slot 31 which engages the tab 24. The ends 32—33 of the legs 26—27, respectively, may be cemented or stapled to the overlying parts of the upper innersole element 11, this interconnection permitting a degree of lateral adjustment during fitting at the rearward half of the shoe tending to prevent wrinkling of the elements 11 and 12 when final positioning is obtained.

The element 13 includes a generally U-shaped sealed bag 35 having a transverse connecting member 36 and longitudinal leg members 37 and 38 which underlie the heel portion 28 and legs 26—27, respectively, of the element 12. The bag 35 includes a heat-sealed continuous periphery 39. Each of the leg members 37—38 contains a flexible rupturable tube as at 40—41 containing one phase of a two phase solid foam synthetic resinous system, whereby upon the application of manual pressure to the leg members, the tubes 40—41 will rupture at the ends 42—43 to permit the contents of the tubes to be mixed in the area of the transverse connecting member 36. Through chemical reaction, the foam is created, which expands to completely fill the bag 35. The device then is normally placed within the shoe immediately after the mixing, so that upon expanding, the foam, prior to rigidifying may flow to a limited degree through perforations 44 spaced along the peripheral

edge 39 to effect a cementitious bond between the bag 35, the lower surface of the element 12, and the inner exposed surface of the shoe in which the device is placed.

The toe cushioning element 14 is best seen in FIGS. 2 and 3 of the drawing, and includes a generally D-shaped sealed envelope 46 having upper and lower laminae 47-48, respectively. A soft wax filler 49 is maintained with the envelope by a sealed peripheral edge 50. The wax 49 softens under heat imparted by the toes of the wearer, and accompanied by pressure, it tends to conform to the shape of the lower surface of the toes, and correspondingly shapes the element 11.

The device is readied for installation by manually rupturing the tubes 40-41, and manual pressure urging the contents of tubes to the opened ends 42-43 will result in placing these contents in the relatively larger area of the transverse connecting member 36. By kneading, the contents are mixed and will expand back into the leg members 37-38 externally of the now collapsed tubes 40-41. This expansion and rigidification will normally require a period of several minutes, and during this period the device is placed within the shoe 51 and the foot 52 of the wearer placed thereupon. The foot is maintained in position for a period sufficiently long to assure that proper molding will occur.

In some cases, it may be desirable that the foam be prevented from expanding in an area immediately beneath the arch, so that when the shoe is worn the arch will not be called upon to support any portion of the weight of the wearer. The particular area will vary with individual users, and expansion may be limited in those areas by the presence of a constricting member 53 made of cardboard or other relatively rigid material stapled in surrounding relation about the leg member 38, so that it is slideably moveable therealong.

Turning now to the second embodiment of the invention, generally indicated by reference character 54, the device comprises a separate toe supporting element 55, and a physically disconnected metatarsal and heel cushioning element 56. By resort to this construction, it is possible to use a single size of device to accommodate a relatively wide range of shoe sizes, since the area interconnecting the toe cushioning element and metatarsal and heel cushioning structure in the first embodiment normally provides no support, but merely an interconnecting function.

The toe cushioning element 55 is of composite construction, including a peripheral planar member 58 of synthetic resinous material, and defining an opening into which a knit member 59 is positioned. A sealed envelope 60 containing a soft wax 61 is secured to the knit member 59 in such manner that the knit member overlies the element, and permits a greater degree of shifting and conformance to the toes than is possible in the case of the first embodiment. The variation illustrated in FIG. 12, in which corresponding parts have been designated by similar reference characters with the additional suffix *a* is adapted to be used in conjunction with shoes which have toe portions of more rounded configuration, as contrasted with the structure shown in FIGS. 5 and 6 which is particularly adapted to shoes having more pointed toe configurations.

The element 56 corresponds substantially identically with the rearward portions 19, 20 and 21 of the first embodiment, and, accordingly, corresponding parts

have been designated by similar reference characters with the additional suffix *a*.

FIGS. 9, 10 and 11 illustrate a method of conveniently positioning the toe cushioning element 55 within a shoe in such manner that it will be properly positioned with respect to the toes of the wearer, without the necessity of empirically determine the correct position. A positioning element 76, preferably formed of coated paper, and includes first, second, third and fourth portions, 77, 78, 79 and 80, respectively, separated by first, second and third fold lines 81, 82 and 83, respectively. The fold line 83 is somewhat shorter, so that when the element 76 is in the position shown in FIG. 10, it is able to project to the very end of the interior of the shoe, and thereby position the toe element 55 accurately. Following this, the edge 84 is pulled outwardly of the shoe, as seen in FIG. 11, thereby exposing the adhesive surface of the element 55 to the inner surface of the shoe, causing it to adhere in position. During this time, the exertion of manual pressure upon the fourth portion 80 prevents the element 55 from shifting in position.

It may be noted that with the expansion of the foam and the filling of the bag 35, the foam extends around the periphery of the rearward part of the foot of the wearer to provide a considerable degree of lateral cushioning effect on the medial and lateral sides of the foot, thereby adapting the construction for use in service type footwear, ski boots and the like.

I wish it to be understood that I do not consider the invention limited to the precise details of structure shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention pertains.

I claim:

1. A cushion type innersole for use with a shoe comprising: a first relatively upwardly positioned innersole element conforming generally to the shape of a foot of a wearer, a second innersole element moveably interconnected to and at least partially disposed beneath said first innersole element, said second innersole element being of generally U-shaped configuration and extending rearwardly from that point of said first innersole element normally underlying the metatarsal area of said foot, a U-shaped sealed envelope underlying and secured to said second innersole element, said envelope having a pair of symmetrically disposed legs and a transversely extending portion interconnecting said legs; a pair of frangible containers disposed one in each of said legs of said envelope, each containing one phase of a two-phase synthetic resinous foam system, whereby the manual rupturing within said sealed envelope and subsequent mixing in the transverse portion thereof of said containers will cause an expanded filling of said envelope, the system having a sufficiently slow curing period to permit the insertion of said innersole into a shoe, and the placing of the foot of a wearer thereupon to form the final shape of expanded foam within the envelope.

2. Structure in accordance with claim 1 in which the outer periphery of the second innersole element extends outwardly of the periphery of the first innersole element, whereby said U-shaped sealed envelope may conform at least partially to the shape of the shoe in which it is placed, in the absence of wrinkling of said first innersole element.

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3. Structure in accordance with claim 1, said first innersole element extending to the toe area of a shoe in which it is placed, a second sealed envelope underlying and attached to said first innersole element, and a soft wax contained within said second envelope adapted to at least partially conform to the shape of the underside of the toes of a wearer.

4. Structure in accordance with claim 1, in which said first innersole element is of a length corresponding to that part of a foot of a wearer lying rearwardly of the metatarsal area.

5. Structure in accordance with claim 4, including a

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disconnected toe supporting element adjustably positionable within a shoe with respect to said first innersole element, said toe supporting element including a sealed envelope, and a soft wax disposed within said envelope.

6. Structure in accordance with claim 5, said toe supporting element including an adhesively coated surface, and selectively removable means for protecting said adhesive surface and positioning said toe supporting element relative to the interior of the shoe.

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