



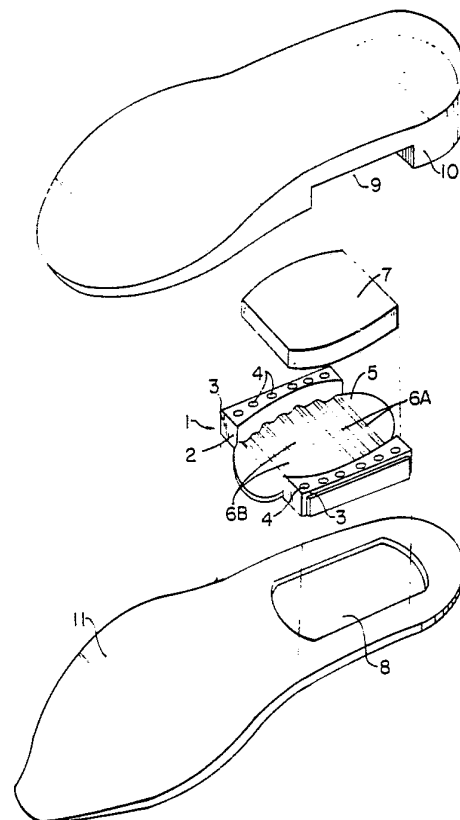
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/US90/02115 (22) International Filing Date: 18 April 1990 (18.04.90) (71) Applicant: PAGODA TRADING COMPANY, INC. [US/US]; 1950 Craig Road, Saint Louis, MO 63146 (US). (72) Inventor: YOON, Mike, K., S. ; 2-1106, Sam Ho Gardens, Pusan (KR). (74) Agent: JACKSON, David, A.; Liddy, Sullivan, Galway, Begler & Peroff, 41 Madison Avenue, New York, NY 10010 (US). (81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent)*, DK (European patent), ES (European patent), FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent).</p>		<p>Published <i>With international search report.</i></p>

(54) Title: DECORATIVE AND SHOCK ABSORBING SHOE OUTER SOLE

(57) Abstract

A shoe sole assembly is disclosed which comprises an inner ply and an outer ply adapted for mutual contact with each other. The shoe sole assembly is characterized by the provision of a shock absorbing insert in the heel area thereof, which insert comprises a transparent base portion prepared from paired opposed marginal panels with a platen disposed intermediate and integral therewith. The panels and platen of the base portion define a recessed bed within which is positioned a resilient sponge member which cooperates with the base portion to absorb the force of impact on the insert in use. The panels and the sponge member and platen, respectively, offer improved lateral and longitudinal support and the ability to prepare the insert of transparent, translucent and variably colored plastics materials offers an enhanced decorative effect.



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DECORATIVE AND SHOCK ABSORBING SHOE OUTER SOLE

BACKGROUND OF THE INVENTION

5 The present invention relates generally to an article of footwear and, more particularly, to a sole for a shoe constructed with shock absorbing capability.

Shoes, and in particular, athletic shoes, have been
10 constructed with a variety of inserts in the soles for an equal variety of purposes. Thus, U.S. Patent No. 4,712,314 to Sigoloff discloses a decorative insert to be placed in the sole or forward portion of a shoe, which provides a decorative insert having extended wear
15 capabilities. The Sigoloff patent makes reference to a variety of prior patents that relate to the placement of inserts of various types in the soles of such shoes.

Likewise, shoe heels have been modified to provide a
20 variety of energy absorbing inserts. Thus, inserts such as coil springs or pan springs have been used to provide shock absorbing capability. In some instances, wedges have been inserted in the heels or soles for this same purpose. More recently, such inserts have been prepared
25 from fluid-containing members that are designed to absorb the energy of impact that is experienced when the wearer of the shoe participates in athletic activities involving running, jumping and the like.

30 Many of the composite sole assemblies have recently turned to the inclusion of transparent members with "windows" that extend to the lateral opposite side edges of the heel portion of the shoe sole, to offer a decorative effect to the resulting shoe. Such members
35 are frequently provided with fluorescent dye or other colored inserts, to offer a fashionable coordination with the remainder of the appearance of the shoe. Certain other shoes having heel inserts of this type use cylindrical rod-like members laid side-by-side, which are

prepared from a resilient material of a differing density and resilience, so that the shoe may offer greater springiness or rebound from the shock of impact. Still other assemblies utilize solid one-piece inserts
5 for these same purposes.

The metal spring insert assemblies suffer from the deficiency that such metallic objects can cause injury when the sole of the shoe wears out. Likewise, the
10 metallic element can invade the interior of the shoe and cause injury to the wearer in this manner. Likewise, as the resistance to pressure is not uniform because of the nature of the spring element, the shoe may wear unevenly and may result in discomfort to the wearer, or even
15 injury, in the instance where the spring collapses in use.

The most popular of the insert assemblies, comprising the fluid or air-filled chambers, suffer from the drawback
20 that such chambers can be punctured, and upon puncturing, will lose their energy absorbing capability. In the instance where the chambers are filled with fluid, the fluid will escape and may result in damage to the surrounding floor surface, if such escape takes place
25 within the home or office. Likewise, all of the aforementioned assemblies suffer from the drawbacks of increased manufacturing cost, and accordingly, the shoes employing such inserts must be sold at higher prices which can detract from their marketability.

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A need, therefore, exists for a shoe sole insert offering the aforementioned advantages in combination with improved performance, at reduced cost.

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SUMMARY OF THE INVENTION

In accordance with the invention, a shoe outer sole assembly is disclosed which comprises at least one inner

ply and an outer ply adapted for mutual contact therewith, the inner ply and outer ply each defining a heel area, with the inner ply defining a recess extending the entire lateral width of the heel area, and the outer
5 ply defining an aperture adapted to register with the recess. A shock absorbing insert is disposed in the recess and comprises a transparent base portion with paired opposed marginal panels and a platen disposed therebetween. The panels and the platen define a
10 recessed bed, and a resilient sponge member is disposed within the bed and adapted to cooperate with the base portion to absorb the force of impact that is exerted on the insert during the active wearing of the shoe, whereby the insert reduces the shock imposed by said impact while
15 promoting faster recovery of shock absorbing ability.

More particularly, the present shoe sole assembly defines a decorative appearance by the provision of side windows defined by the marginal panels of the base portion of the
20 insert, which render the interior of the insert visible. As indicated, the insert may be prepared from a transparent plastic such as polyvinylacetate or the like, and may contain translucent coloration such as
fluorescent pigment, to offer an attractive appearance as
25 well as to provide night visibility.

The panels of the insert themselves define a series of cylindrical bores which have their axes aligned with the direction of impact of force on the shoe sole in use.
30 Thus, the cylindrical bores are perpendicular to the walking surface of the shoe sole, and as described later on herein, result in the definition of a series of regularly spaced columns within the panels, which flex a predetermined amount on impact.

35

The panels are connected by a platen which defines on its inner surface a series of ribs which extend between the panels and laterally across the heel portion. The ribs,

in turn, are connected by concave troughs disposed therebetween. In one embodiment, the concave troughs are equal in number to the bores disposed in the panels and are aligned with their axes contained in the same plane.

5

The resilient sponge member is disposed in the bed defined by the platen and the interior edges of the panels and is preferably configured with its marginal edges and thickness corresponding with that of the panels. The sponge may be prepared from a resilient polymer such as an ethylene-vinylacetate copolymer or a further polymer known as ELVALOY®. The sponge possesses improved shock absorbing and rebounding characteristics.

10

The present shoe construction offers improved appearance and performance without the drawbacks of a more complex assembly and reduced useful life. There are no fluid-filled chambers that will collapse and leak, and the air-filled chambers defined by the cylindrical bores and the troughs on the platen are such as to have no effect upon the performance of the shoe as it wears.

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Accordingly, a principal object of the present invention is to provide a shoe sole assembly that offers improved shock absorbing and rebound characteristics in combination with a decorative appearance.

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It is a further object of the present invention to provide a shoe sole assembly as aforesaid that is of economical manufacture.

30

It is a still further object of the present invention to provide a shoe sole assembly as aforesaid that provides improved performance and increased useful life.

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It is a further object of the present invention to provide a shoe sole assembly as aforesaid that offers

improved safety and reduced risk of damage to carpets and like exterior surfaces.

Other objects and advantages will become apparent to those skilled in the art from a review of the ensuing detailed description which proceeds with reference to the following illustrative drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

10

FIGURE 1 is an exploded perspective illustrating the shoe sole assembly of the present invention.

15 FIGURE 2 is a perspective view of the inner ply of the shoe sole assembly of the present invention, illustrating the laterally extending recess therein.

FIGURE 3 is a perspective view of the shoe sole assembly of the present invention fully assembled.

20

FIGURE 4 is a fragmentary section of the shoe sole assembly of the present invention taken through line 4-4 of FIGURE 3.

25 FIGURE 5 is a sectional view of the shoe sole assembly of the present invention taken through line 5-5 of FIGURE 3;

30 FIGURE 6 is a sectional view similar to FIGURE 4, showing the effect of impact and compressive stress on the shoe sole assembly insert of the present invention;

FIGURE 7 is a fragmentary and somewhat schematic sectional view of the shoe sole assembly of the present invention taken through line 7-7 of FIGURE 3, illustrating the effect of compression on the outer lateral edges and panels of the insert of the present invention.

DETAILED DESCRIPTION

Referring now to the drawings wherein like numerals designate like parts, and particularly to FIGURE 1, there is disclosed therein in exploded perspective, the shoe sole assembly of the present invention. The shoe sole assembly according comprises an inner ply 10 and an outer ply 11 adapted for mutual adhesive contact with each other. In conventional fashion, both inner ply 10 and outer ply 11 are seen to define a heel area characterized by a narrower width as well-known in the art.

Referring now to FIGURE 2, the inner ply 10 is shown to define a laterally extending indentation or recess 9 which is adapted to receive the insert of the present invention. Recess 9 extends the entire lateral width of the heel area of inner ply 10. Outer ply 11 is illustrated as assembled in FIGURE 3, and defines an aperture 8 that is adapted as shown to register with the recess 9 to define a chamber for the reception and securement of the shock absorbing insert of the present invention.

Shock absorbing insert 1, as shown in FIGURE 1 and elsewhere, comprises a base portion that is preferably prepared from a transparent resilient material such as polyvinylacetate. Insert 1 comprises the base portion which is, in turn, defined by paired and opposed marginal panels 2 and platen 5 disposed therebetween. Panels 2 and platen 5 define in combination a recessed bed which is adapted to receive a resilient sponge member 7 as shown. Sponge member 7 is, in turn, defined to have a thickness so that when assembled with the base portion, its height and margins do not exceed the available dimensions defined between the base portion and recess 9 of inner ply 10. The general dimensional cooperation that exists between sponge member 7, the transparent base comprising panels 2 and platen 5, and recess 9 is best

seen in FIGURES 4 and 5. The marginal dimensions of sponge member 7 are accordingly configured to make friction fitting engagement with the respective inner walls of recess 9 and panels 2, while the height of sponge member 7 is adapted so that sponge member 7 may rest flush along with the upper surfaces of panels 2, against the adjacent surface of recess 9.

The resilient sponge member 7, like the base portion of insert 1, may be prepared from a variety of resilient plastic and polymeric materials, such as polyvinylacetate, elastomer rubbers, or materials such as ethylene vinylacetate copolymers. A particular material out of which the sponge member 7 may be prepared is a foamed material known as ELVALOY®. Both components of the insert 1 may be prepared as transparent elements, and in such event, would be visible through the aperture 8 as well as the side panels of the inner ply 10, all as shown in FIGURE 3. In the instance where both elements of the insert are transparent, certain of the structures thereof, described in greater detail hereinafter, would be evident and would accordingly offer an attractive appearance. Naturally, the sponge member 7 may be a solid color, in which event certain of the structures of the platen 5 and the panels 2 would be further highlighted. The exact coloration of these elements may vary within the skill of the art, and luminescent, iridescent, fluorescent and other pigmentations may be employed in the insert to add a further decorative effect.

Referring further to FIGURES 1 and 3, it can be seen that the outer lateral surfaces of panels 1 define windows through which the interior of the insert can be viewed. These windows, and the marginal edges of the outer surface of the platen 5, are provided with marginal undercutting as shown generally at 3 in FIGURES 1, 4 and 5, to retain the insert element securely within the shoe

sole assembly. In this manner, a more streamlined, functional and decoratively attractive construction is achieved.

- 5 Referring further to FIGURE 1, panels 2 define a series of cylindrical bores 4 that are disposed with their axes aligned with the direction of impact of force against the sole in use. More particularly, bores 4 extend in the direction transverse to the longitudinal dimension of the shoe sole, between the interior of the shoe and the ground surface. Bores 4 are provided to assist in the absorption of shock in the use of the shoe, and as can be seen in FIGURE 7, permit the marginal edges defined and supported by panels 2 to deform somewhat so that the plastic material may bulge at the center thereof under impact so as to distribute and absorb the shock thereof. As discussed earlier, the density and other physical characteristics of the material from which the panels and platen are fabricated may be varied to provide the desired lateral stiffness and resilience in the resulting shoe sole assembly, so that adequate lateral support is offered under the intense impact conditions such as are encountered in active athletic pursuits such as running, jumping and the like. Particularly, when sports are played wherein the shifting of the feet in lateral fashion is frequently involved, such support is critical to provide sufficient protection to the ankles and adjacent structures of the foot.
- 10
- 15
- 20
- 25
- 30 The platen 5 is itself provided with a surface of regularly undulating configuration which likewise serves to assist in shock absorption. Specifically, the surface of platen 5 directed interiorly toward the recess 9 of inner sole 10 is provided with a series of regularly spaced ribs 6A which extend laterally between panels 2 of insert 1. Between ribs 6A extend linear concavities comprising troughs 6B. Ribs 6A and troughs 6B are regularly spaced from each other, and as shown in FIGURE
- 35

1, coincide in alignment and number with bores 4. While this provides a particularly interesting and decorative effect and likewise offers certain functional advantages, this illustrated construction is only one of a variety of configurations that may be employed. Thus, the number and exact alignment of ribs 6A and troughs 6B may not directly and exactly correspond to that of the alignment and spacing of bores 4, and such variation is contemplated within the present invention. However, and as can be appreciated from a review of FIGURE 3, the alignment of troughs 6B and bores 4 within the same plane confers a particularly interesting and desirable decorative effect.

15 Like bores 4, troughs 6B and ribs 6A offer certain advantages in shock absorption, particularly as they cooperate with sponge member 7 in use. Referring now to FIGURE 4, the insert of the present invention as fully assembled will be seen to define a series of air pockets between troughs 6B, ribs 6A and the adjacent surface of sponge member 7. These air pockets offer added comfort to the wearer of the shoe, as they further cushion the blow of the impact that is experienced when the shoe is compressed against the ground or walking surface. In such event, and particularly under the high impact and stress of active athletic endeavors, the sponge member 7 will be forced into the troughs 6B as shown in FIGURE 6 and will thereby gain an additional margin of resilience and shock absorption as this takes place. Naturally, after the force of the impact has been absorbed and rebound is under way, the air entrained within the insert of the present invention will assist in restoring the shape of the insert to that shown in FIGURE 4 and FIGURE 5, and will likewise assist the wearer of the shoe to spring back from this impact.

Accordingly, the construction of the present insert offers two distinct and unconnected levels of absorption

capacity and support, to provide therefor a uniform and stable structure that will serve particularly well in the instance where active sports are concerned. The panels 2 thus compress at their own rate as a result of the bores 5 4, while the centrally located platen 5 and sponge portion 7 cooperate with each other simultaneously to also offer absorption under impact. As mentioned earlier, this construction offers particular stability and support in the instance where rapid lateral movements 10 are concerned and likewise, during exercises such as running, provides sufficient lateral support as to minimize the incidence of ankle damage due to twisting resulting from the collapse of the shoe sole under stress.

15 Likewise, and as discussed earlier, the specific decorative effects achieved by the use of the regularly spaced bores 4 in conjunction with the regularly spaced ribs 6A and troughs 6B adds a particularly favorable 20 decorative advantage to the present construction. Various color schemes may be employed in the fabrication of the components of the insert to offer both totally transparent, translucent and reflective effects that are desirable to modern consumers for these products. Also, 25 the inclusion of luminescent materials in the fabrication of the insert will provide an added safety feature in the instance where the shoes are worn at night, as by joggers and the like, as the inserts will clearly be visible and will offer further evidence to the location of the jogger 30 that may assist in avoiding accidents at night.

Having described a specific preferred embodiment of the invention with reference to the accompanying drawings, it will be appreciated that the present invention is not 35 limited to that precise embodiment, and that various changes and modifications can be effected therein by one of ordinary skill in the art without departing from the

spirit or scope of the invention as defined by the appended claims.

WHAT IS CLAIMED IS:

1. A shoe sole assembly comprising at least one inner ply and an outer ply adapted for mutual contact therewith;

said inner ply and said outer ply defining a heel area, said inner ply defining a recess extending the entire lateral width of said heel area, and said outer ply defining an aperture adapted to register with said recess;

a shock absorbing insert, said insert comprising a transparent base portion comprising paired opposed marginal panels and a platen disposed therebetween, said panels and said platen defining a recessed bed, and

a resilient sponge member disposed within said bed and adapted to cooperate with said base portion to absorb the force of impact on said insert;

whereby the insert reduces the shock imposed by said impact while promoting faster recovery of shock absorbing ability.

2. The shoe sole assembly of Claim 1 wherein said panels define side windows in said base portion that render said sponge element visible.

3. The shoe sole assembly of Claim 1 wherein said panels define a series of cylindrical bores therein, said cylindrical bores having their axes aligned with the direction of impact of said force.

4. The shoe sole assembly of Claim 1 wherein said bores are regularly spaced from each other.

5. The shoe sole assembly of Claim 1 wherein said platen defines a series of ribs therein, said ribs extending between said panels.

6. The shoe sole assembly of Claim 5 wherein said platen further defines a series of troughs disposed between said ribs, said troughs cooperating with the adjacent surface of said sponge member in full assembly to define corresponding air chambers therebetween.

7. The shoe sole assembly of Claim 1 wherein the peripheral edges of said platen and the outer directed broad surfaces of said panels define a marginal undercut.

8. The shoe sole assembly of Claim 6 wherein said panels define a series of cylindrical bores with their axes lying in the same plane as the longitudinal axes of said troughs but transversely directed thereto.

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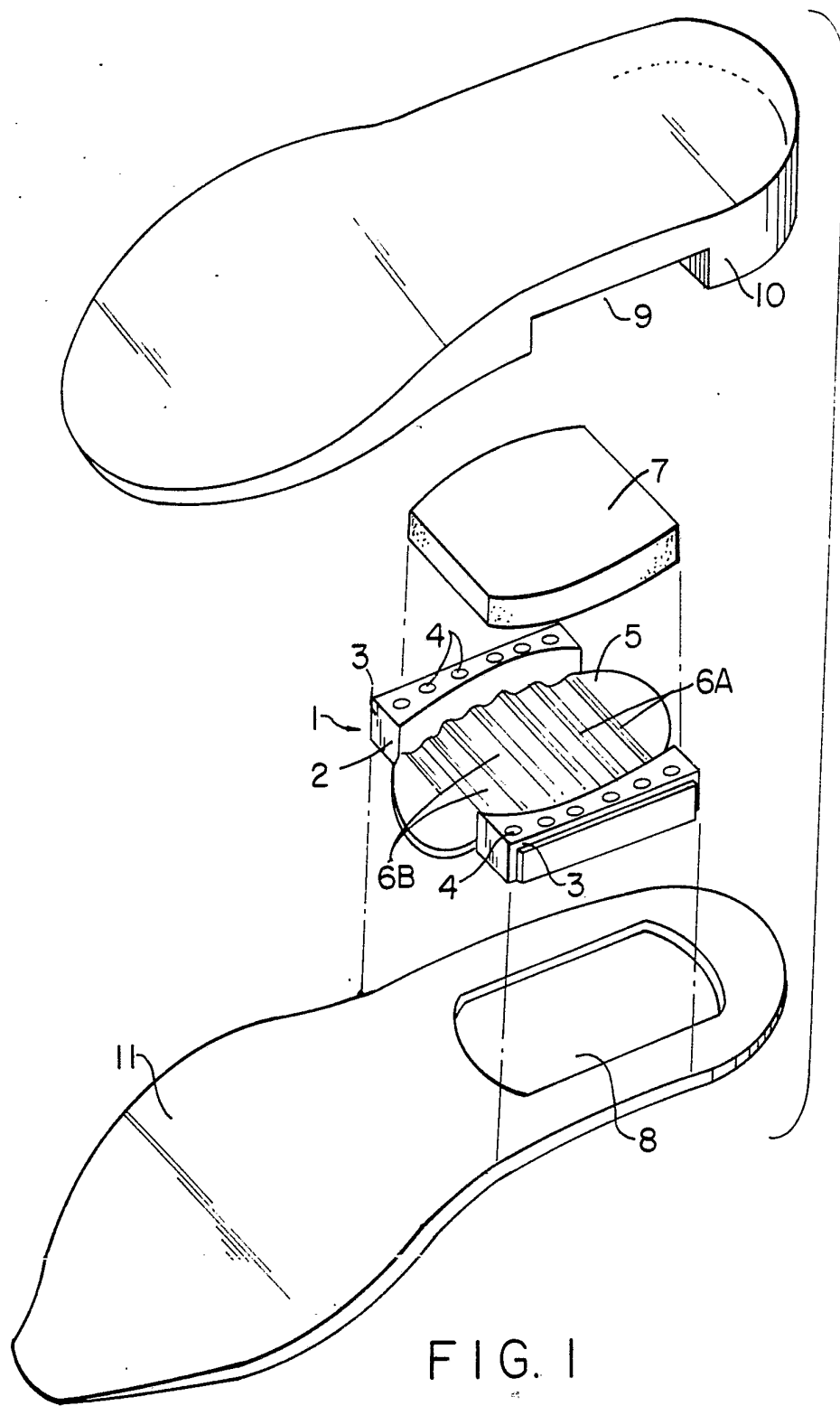


FIG. 1

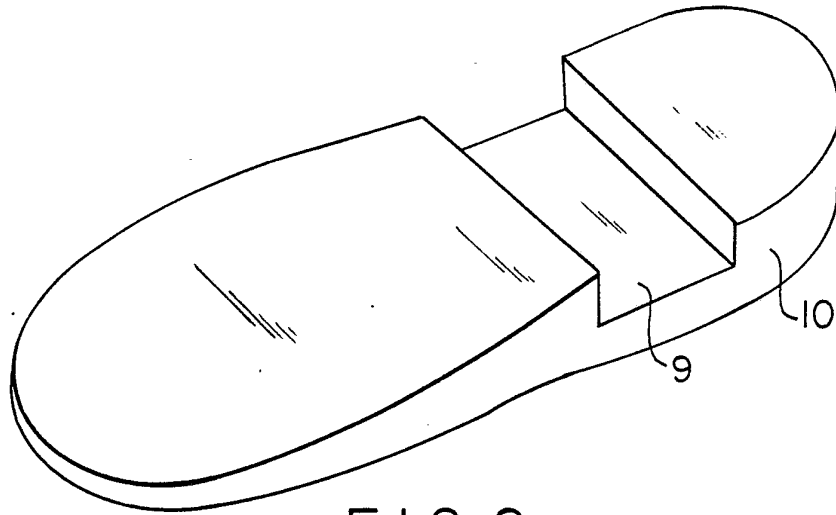


FIG. 2

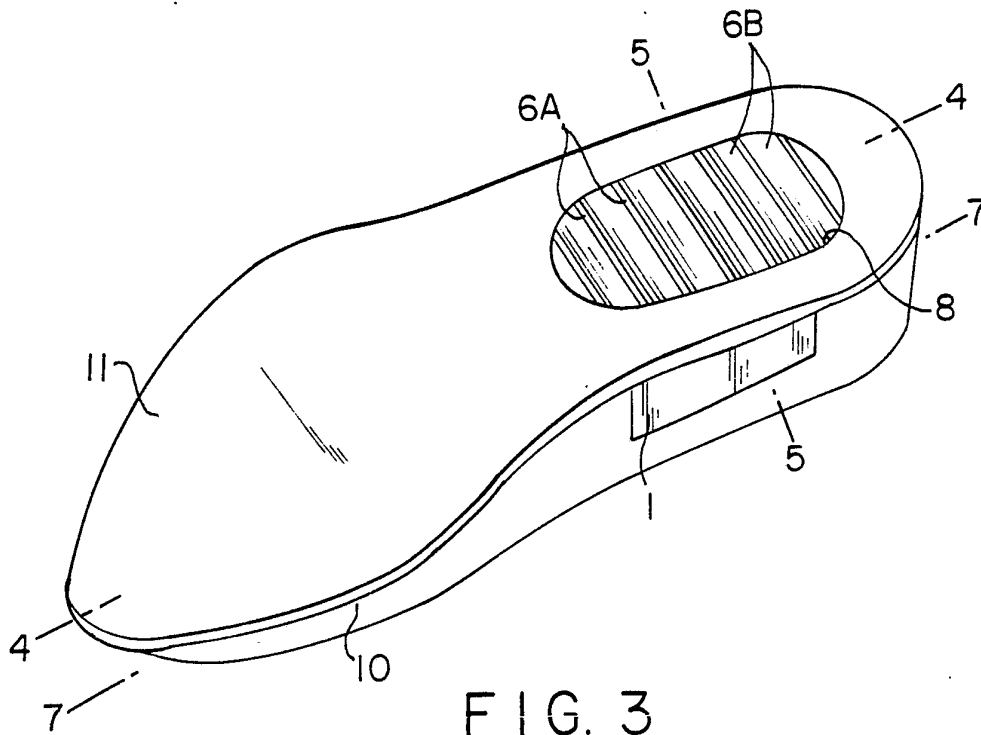


FIG. 3

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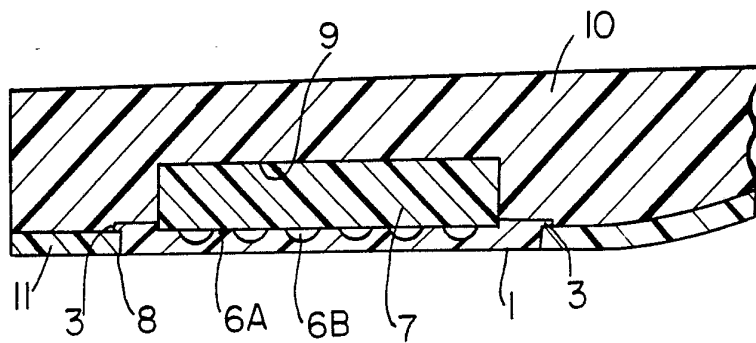


FIG. 4

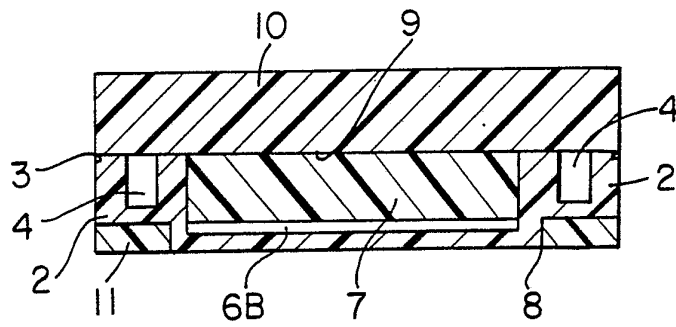


FIG. 5

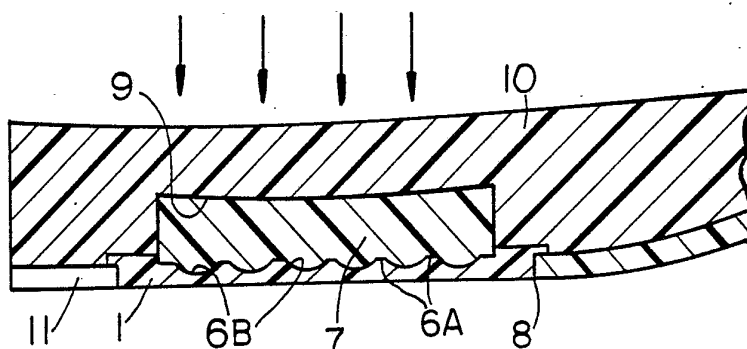


FIG. 6

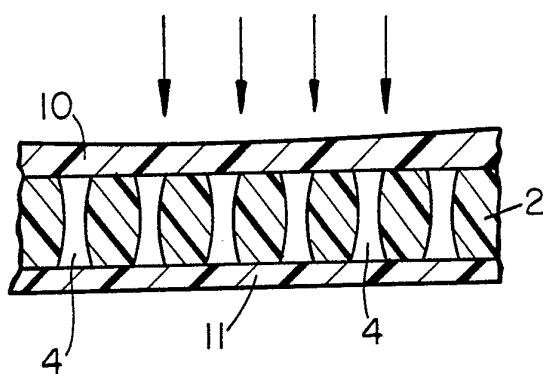


FIG. 7

INTERNATIONAL SEARCH REPORT

International Application No PCT/US 90/02115

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁵ According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: A 43 B 21/26, A 43 B 13/18				
II. FIELDS SEARCHED Minimum Documentation Searched ⁷				
Classification System	Classification Symbols			
IPC5	A 43 B			
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched ⁸				
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹				
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³		
X	WO, A1, 8905593 (ADIDAS SPORTSCHUHFABRIKEN ADI DASSLER STIFTUNG & CO KG) 29 June 1989, see page 8, line 21 - line 26; figure 1 --	1		
A	US, A, 4845863 (YUNG-MAO) 11 July 1989, see column 4, line 53 - line 63; figure 2 -- -----	1		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; border: none;"> <p>* Special categories of cited documents:¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%; vertical-align: top; border: none;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </td> </tr> </table>			<p>* Special categories of cited documents:¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>
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IV. CERTIFICATION				
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report			
10th December 1990	21. 12. 90			
International Searching Authority	Signature of Authorized Officer			
EUROPEAN PATENT OFFICE	miss T. MORTENSEN			