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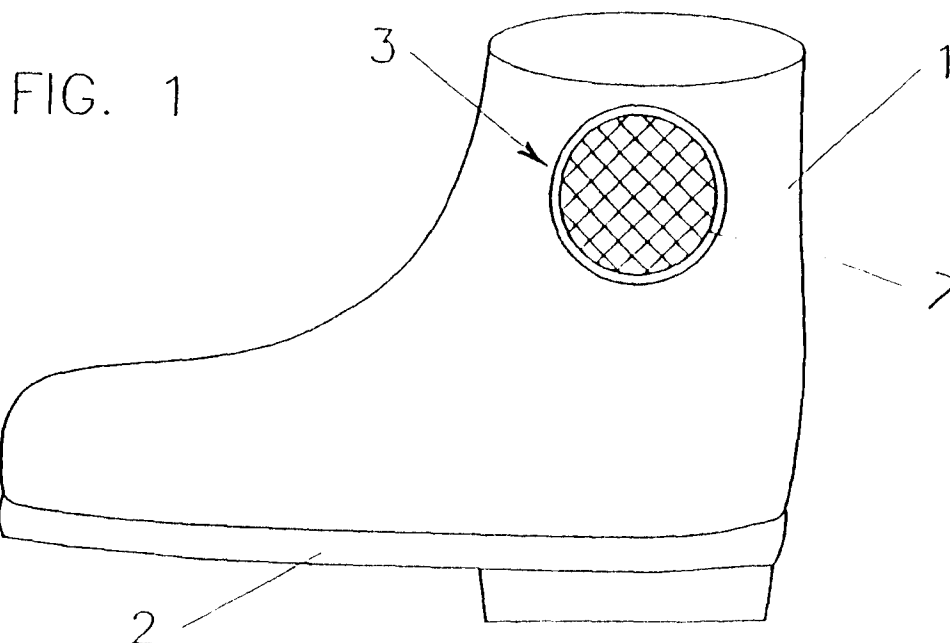
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(54) **Footwear having a water vapor permeable member inserted into the upper**

(57) This invention provides footwear having a liquid water impermeable, but breathable member (3) inserted in the upper so as to provide transmission of water vapor from the inside of the footwear to the outside. Preferably, the member (3) is protected by a protective layer in one

or both sides. In accordance with a preferred embodiment of the invention, the member (3) and any protective layers are attached along their perimeter to a structure in the form of a molding, frame or a similar structure that can be easily attached to the upper by insertion into a socket (7) provided in the upper.



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Description

FIELD OF THE INVENTION

The present invention relates to footwear having a liquid waterproof, water vapor permeable component.

BACKGROUND OF THE INVENTION

There has been a demand on the market, especially of recent, for having a thicker upper either of leather or of synthetic materials possessing a number of advantageous characteristics, and, in particular, improved wear resistance. construction adapted for use in sports such as hiking, easy maintenance, and good protection of the feet against concussions.

While a thicker upper is advantageous for the above-mentioned reasons, it is also disadvantageous because transmission of water vapor (i.e., breathability hereinafter) is almost completely inhibited by preventing any passage of water or vapor through the footwear walls.

This is very uncomfortable for a user suffering from a major sweating of the feet as an inconvenience to more serious consequences such as damage to the epidermis, e. g., maceration, ulceration, and the like caused by permanent accumulation of moisture in the footwear.

For these reasons, there has been a long-felt need in the industry to improve footwear of this type so as to eliminate the above disadvantages while retaining the advantages offered by using an upper of a considerable thickness.

SUMMARY OF THE INVENTION

This object is accomplished by providing footwear having a liquid water impermeable, but breathable member inserted in the upper so as to provide transmission of water vapor from the inside of the footwear to the outside. Preferably, the member is protected by a protective layer in one or both sides.

In accordance with a preferred embodiment of the invention, the member and any protective layers are attached along their perimeter to a structure in the form of a molding, frame or a similar structure that can be easily attached to the upper by insertion into a socket provided in the upper.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 schematically shows a side elevation of a piece of footwear having a waterproof, breathable member according to the invention;

Figure 2 schematically shows, in vertical section, the member.

DETAILED DESCRIPTION OF THE INVENTION

This invention is useful for footwear having a thick upper which almost completely inhibits breathability, i. e., water vapor transmission.

It comprises inserting into the upper a layer of a liquid water impermeable but breathable material, e. g., a layer of stretched porous polytetrafluoroethylene, preferably enclosed between an inner abrasion resistant protective layer and an outer layer made of a material capable of providing an adequate protection against concussions. The member may be made like a button or the like having a peripheral area for insertion and attachment in an appropriate socket of the upper. The protective layers are of a breathable material also, and can be fixed to the perimeter of the member.

With reference to the drawings, reference numeral 1 designates an upper of a piece of footwear, 2 is for an outsole of the footwear, and 3 is for a liquid water impermeable, breathable member attached to the wall of the upper at socket 7. It is seen that member 3 covers a window, or zone, in the upper.

The breathable member is preferably covered by protective layers of different materials. These layers are joined in such a manner as to form a member that is adapted to be inserted into the upper for ensuring transpiration of the foot.

In a three-component material, the breathable member shown at reference numeral 4 in Figure 2, is enclosed between an outer protective layer and an inner layer 5.

Outer layer 5 should possess enhanced mechanical properties and abrasion resistance. It should be highly breathable and protect layers 4 and 6 and the foot against concussions and against penetration of foreign bodies such as pebble stone, wood splinters, and the like.

Inner layer 6 is primarily designed to protect membrane 4 against abrasion caused by friction with the interior of the footwear, etc. It should be breathable also. It may possess good heat insulating properties and high mechanical strength, while being capable of absorbing external shocks.

Outer layer 5 is preferably made of such materials as a metal net, a synthetic net made of plastics, solid layers made of such plastics as silicone plastic, perforated rubber, etc., natural and synthetic leather.

Layer 6 can be felt, e.g., a polyester felt or felt made of another synthetic and/or natural fiber of an appropriate thickness, or the like. Alternatively, layer 6 can be in the form of a layer of synthetic foam with open or closed cells, preferably perforated.

The various layers are attached to each other by conventional means known to those skilled in the art, e. g., by means of adhesive dots or by joining at the edges, etc.

The member can be attached to the upper of the footwear by gluing at the perimeter or by any other ap-

propriate known method. It is preferred, yet not necessary, that the member have at its perimeter a molding defining a lip or a frame with raised edges 8 so that this structure having the appropriate transpirable layers could be inserted into a matching socket 7 of the upper . 5

In this manner, footwear is provided in which advantages of the thicker upper are combined with the advantages of having good breathability.

It will be apparent that dimensions and materials used may vary depending on specific application. 10

Claims

1. Footwear having a substantially liquid water and water vapor impermeable upper in which a portion of the upper contains an opening through it to provide a window, said window being covered by a liquid water impermeable, but water vapor permeable material. 15
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2. The footwear of claim 1, characterized by the fact that said liquid water impermeable, water vapor permeable material is stretched porous polytetrafluoroethylene. 25
3. The footwear of Claim 1 or 2, wherein said material is protected by an inner protective layer is made of felt. 30
4. The footwear of Claim 3, wherein said material is also protected by an outer protective layer. 35

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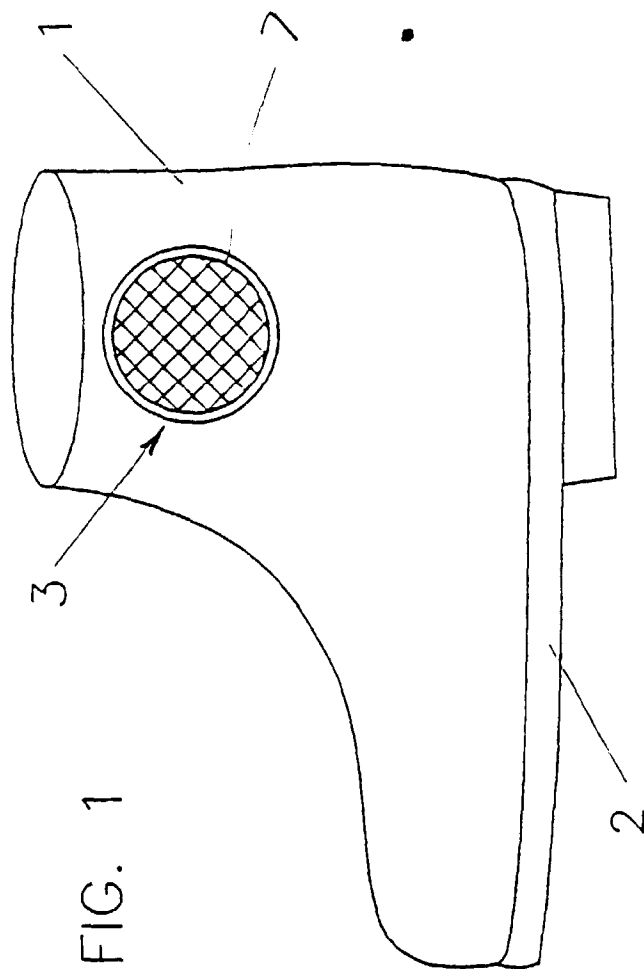


FIG. 1

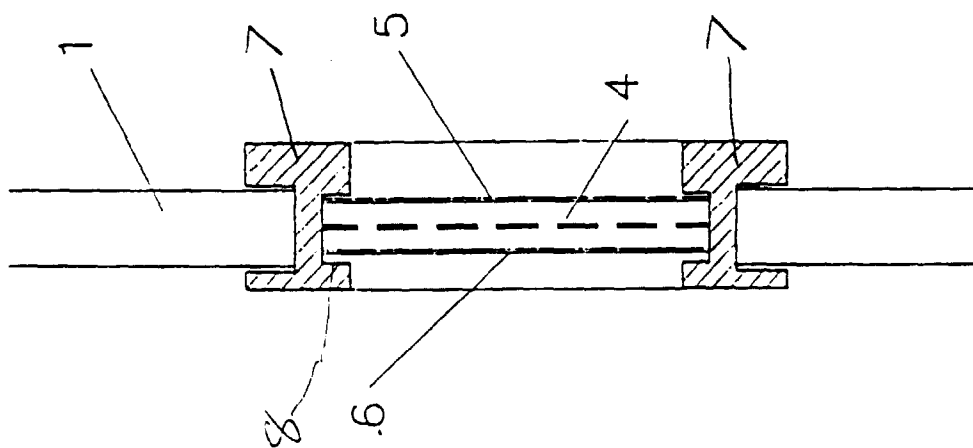


FIG. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 97 20 0542

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP 0 260 874 A (OHASHI KAZUO) 23 March 1988 * abstract; claims; figures * ---	1-4	A43B7/12 A43B7/08
X	FR 2 116 790 A (SOCIÉTÉ LABELLE & CIE) 21 July 1972 * the whole document * ---	1-4	
A	FR 2 410 448 A (MAUDOUIT ALAIN) 29 June 1979 ---		
A	WO 95 29605 A (ATOMIC AUSTRIA GMBH ;TRINKAUS GERHARD (AT)) 9 November 1995 ---		
A	EP 0 350 103 A (LEE KYUN CHEOL) 10 January 1990 ---		
A	WO 94 00033 A (DAHLGREN RAYMOND E) 6 January 1994 -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A43B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 9 June 1997	Examiner Soederberg, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document I : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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