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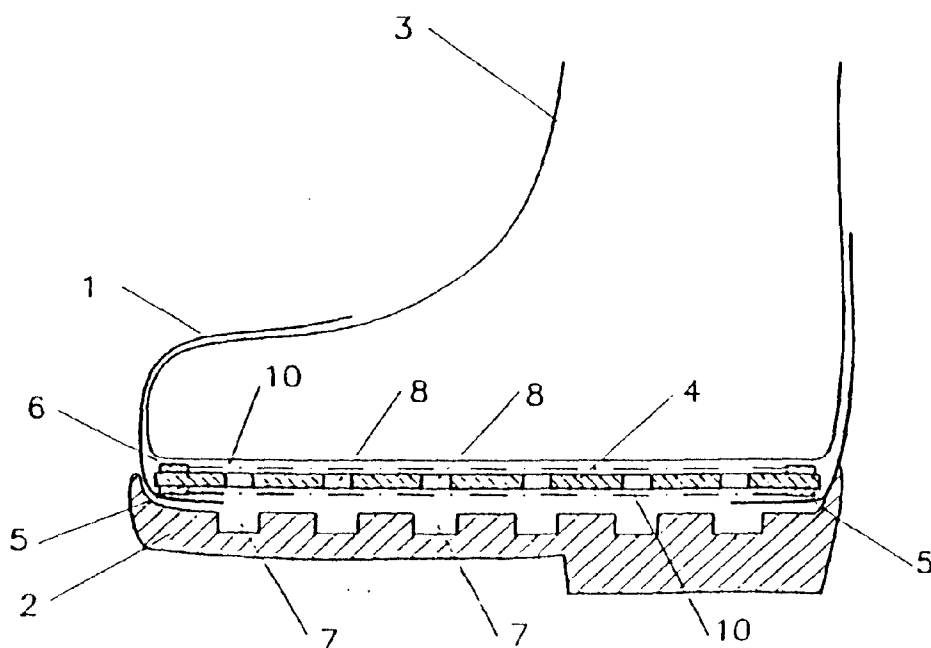
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(54) **Footwear having a shaped outsole for providing internal ventilation of the shoe**

(57) According to the invention, footwear having an upper, outsole and midsole, has the inner part of the outsole having a cellular structure, e.g., in a shaped structure of a honeycomb type, and has the midsole perforated for allowing air to pass from the outsole to the interior of the footwear. With this construction, deforma-

tions of the cells of the outsole during walking cause a pumping effect that induces air circulation between the outsole and the interior of the footwear. This contributes to a recirculation and to a self-ventilation effect being induced in the area of the foot where such functions are needed.

FIG. 1



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Description

FIELD OF THE INVENTION

The present invention relates to footwear having a plastic outsole, and an upper.

BACKGROUND OF THE INVENTION

In recent years, footwear has come into a wide use in which the outsole is made of a pressed or injection molded plastic, e. g., footwear with an outsole of foamed polyurethane and the like, welded to the upper that is also often made of a synthetic material.

Also known in the art is footwear of the above type internally provided with a liner of a liquid water impervious and water vapor permeable material, e. g., expanded polytetrafluoroethylene.

The synthetic materials used for making the outsole and other parts of the footwear offer substantial advantages of being economical, light-weight and durable. For these reasons the employment of such materials has become commonplace.

However, in spite of such advantages described above, most synthetic materials have the disadvantage of being completely impervious thus inhibiting an appropriate transpiration of water vapor from the feet with adverse consequences for the user.

This imperviousness compromises the advantages derived from the use of a water vapor permeable lining.

It is an object of the present invention to provide footwear in which the above disadvantages are eliminated.

SUMMARY OF THE INVENTION

According to the invention, footwear having an upper, outsole and midsole, has the inner part of the outsole having a cellular structure, e. g., in a shaped structure of a honeycomb type, and has the midsole perforated for allowing air to pass from the outsole to the interior of the footwear.

With this construction, deformations of the cells of the outsole during walking cause a pumping effect that induces air circulation between the outsole and the interior of the footwear. This contributes to a recirculation and to a self-ventilation effect being induced in the area of the foot where such functions are needed.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 schematically shows a piece of footwear according to the invention in a vertical section; Figure 2 shows a detail of Figure 1.

DETAILED DESCRIPTION OF THE INVENTION

In this invention the outsole has in its inner part a

cellular structure, e. g., a honeycomb structure, and the midsole has a number of holes for establishing communication between the outsole and the interior of the footwear. With this construction, deformations of the outsole during walking result in a pumping effect taking place which creates circulation of air into the interior of the shoe. A self-ventilation is thus provided to enhance comfort for the user and to make the footwear especially useful and comfortable.

Referring to the drawings, a piece of footwear according to the invention comprises an upper 1 having its lower part attached to an outsole generally shown at 2 which is made of a synthetic material, e. g., of an injection molded material such as foamed polyurethane or the like.

The interior of the footwear is lined with a layer 3 an impervious material that is capable of allowing water vapor transpiration, i. e., it is breathable, which can be in particular, a layer of expanded porous PTFE.

Located between the outsole 2 and the inner lining 3 is a midsole 4 that has an edge which is attached, on the one side, to the outsole or to the upper and, on the other side, to the inner liner by means of adhesive layers shown at 5 and 6, respectively.

The inner part of the outsole is cellular, in other words, it is shaped so as to have a plurality of blind holes or cells 7 open into the interior of the footwear. For example, the outsole can have internally the honeycomb structure. Midsole 4, which can be made of felt or of another appropriate material, has a plurality of through holes 8 for establishing communication between the cells of the outsole structure and the interior of the footwear. Holes 8 preferably have an upper edge 9 (see Fig. 2) that is rounded to prevent the inner lining 3 from being damaged during movement of the shoe.

And finally, one or two layers 10, e. g., of a non-woven fabric can be provided for protecting midsole 4.

In use, deformations imposed upon the outsole during walking cause cells 7 to collapse. Thus a part of the air present in the cells is expelled in the upward direction. A pumping effect is created in the interior of the footwear to induce air circulation. The air passes from the cells of the outsole through holes 8 of the midsole and tends to escape to the outside along the walls, and vice versa. A self-ventilation is thus practically implemented which contributes to recirculation of air into the interior of the footwear, in particular, under the plantar zone of the foot. This has a favorable effect for the user and almost completely eliminates disadvantages associated with the footwear where breathability is impaired.

While the inner part of the outsole can remain cellular in structure, the shape of the cells is not limited to the hexagonal configuration of the honeycomb structure, and it can be, e. g., round or different without going beyond the scope of protection of this invention.

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

Claims

1. Footwear of the type having an upper, an outsole made of a plastic material adhered to said upper, and a midsole positioned in the interior in contact with the outsole, characterized by the fact that said outsole has its internal part comprised of a cellular structure having cells open into the interior of the footwear, said midsole having a plurality of through holes for establishing communication between said cells of the outsole and the interior of the footwear.
2. The footwear of claim 1, characterized by the fact that it is internally provided with a lining of a liquid water impervious, water vapor permeable material.
3. The footwear of claim 2, wherein said impervious and transpirable material is porous PTFE.
4. Footwear according to Claims 1, 2 or 3, characterized by the fact that the inner part of the outsole has a honeycomb structure.

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FIG. 1

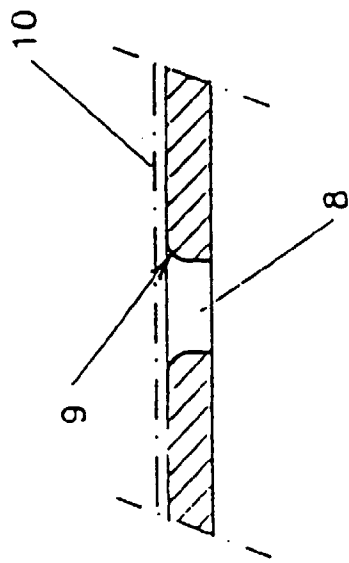
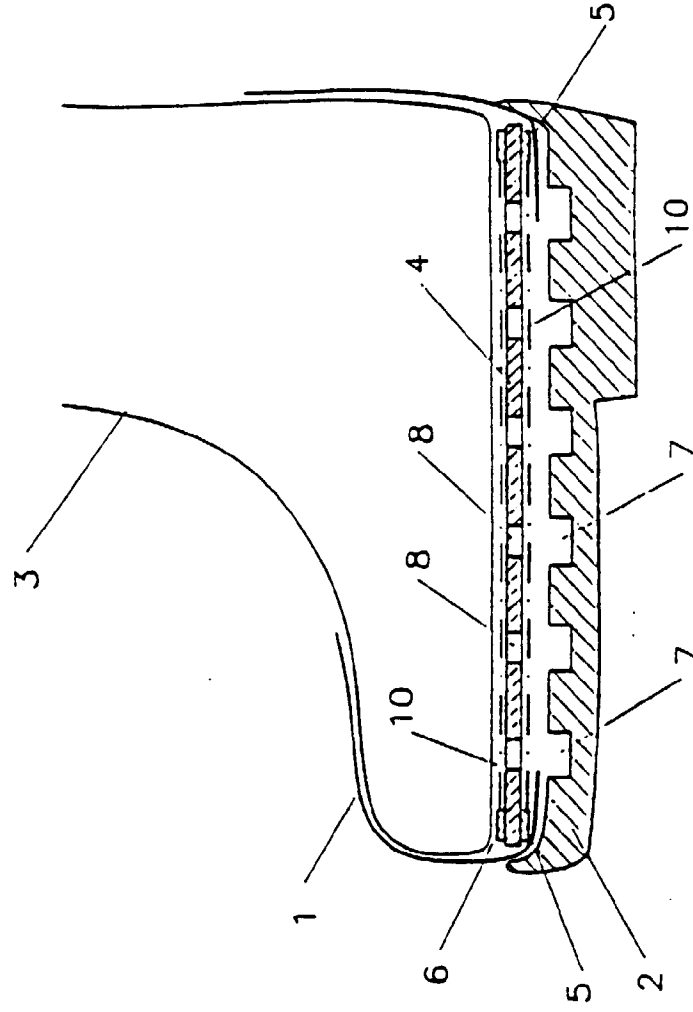


FIG. 2