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(11) **EP 0 821 890 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
04.02.1998 Bulletin 1998/06

(51) Int. Cl.<sup>6</sup>: **A43B 5/00**, A43B 5/04

(21) Application number: 97112597.6

(22) Date of filing: 23.07.1997

(84) Designated Contracting States:  
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC  
NL PT SE**  
Designated Extension States:  
**AL LT LV RO SI**

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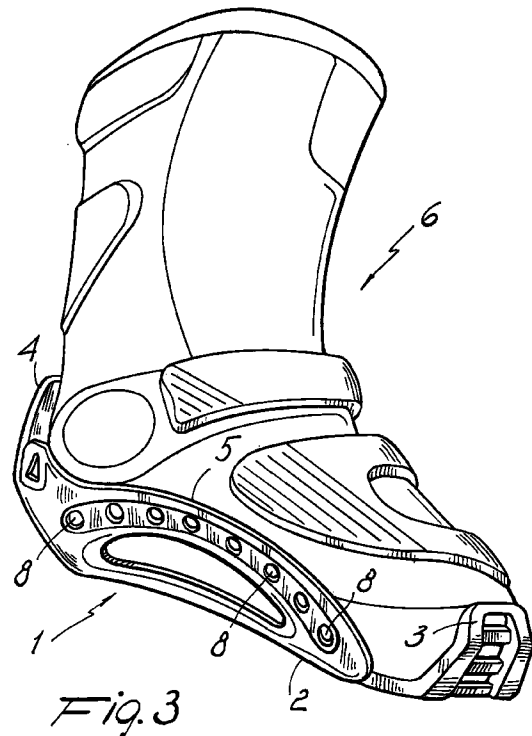
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(30) Priority: 02.08.1996 IT MI961704

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(54) **Shoe with supporting and stiffening structure and method for manufacturing said shoe**

(57) A shoe comprising a supporting and stiffening structure made of more or less rigid material according to the specifications of the individual application, characterized by two arches (5) arranged laterally with respect to the foot.



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## Description

The present invention relates to a shoe with supporting and stiffening structure and to a method for manufacturing said shoe.

Stiffening structures applied to sports shoes are conventionally used, as described for example in Italian utility model application no. 30626 B/84 and in Italian patent application no. 41517 A/85. Those patents disclose a structure formed by melting plastics and comprising an anatomical insole including the tip and the heel, the entire unit being formed monolithically. This structure can be inserted in the sports shoe during one of the various steps of the shoe assembly; it can be fitted between the lining and the padding, between the padding and the upper, between the innerboot or last and the upper, or outside the upper. When it is fitted in this last position, the structure can be covered by an injection-overmolding of plastic material adapted to impermeabilize the entire unit and rigidly couple the structure to the shoe. In this manner, high rigidity of the lower part of the shoe is ensured which can be quantified according to the thicknesses and material used for the structure. This system ensures optimum rigidity of the insole, leaving it to the upper to support the remaining surface of the foot, particularly the lateral regions of the foot.

A plurality of sport shoes are currently commercially available which have a sole shaped and manufactured so as to improve its resistance to the lateral stresses whereto it is subjected. There are in fact many soles which rise laterally with respect to the shoe beyond ordinary borders. Particular reference is made to shoes for basketball, volleyball, tennis, squash and trekking, wherein lateral support of the foot is particularly important because of the sudden and continuous direction changes during sports practice.

This structure ensures good lateral containment of the foot only if the structure rises well above the ordinary borders of the sole and in proportion to the thickness of the material being present. All this entails difficulties in manufacturing the sole and most of all considerable aesthetic constraints.

In addition to sports shoes, sports items such as ski boots, snowboarding boots, roller skates and ice skates are also commercially available which require a high degree of lateral containment owing to their particular use. Indeed, they are characterized by shells made of rigid material, generally various kinds of plastics, which completely lock the foot, preventing any movement thereof inside the boot.

An aim of the present invention is to provide a shoe which solves the above-mentioned problems of the prior art.

An object of the present invention is also to provide a shoe which is not necessarily constituted by a rigid shell but has optimum lateral containment.

A further object of the present invention is to pro-

vide a shoe having a lateral supporting structure which allows to absorb different stresses in various directions.

A further object of the present invention is to provide a shoe which can offer soft and gradual support instead of a rigid support like a conventional plastic shell.

A further object of the present invention is to provide a shoe which can be adapted to the shape of the foot and to the specific sports activity.

A further object of the present invention is to provide a shoe which is economically advantageous from the production point of view.

This aim, these objects, and others which will become apparent hereinafter are achieved by a shoe comprising a supporting and stiffening structure, characterized in that it comprises at least one arch arranged longitudinally on each side of said shoe.

Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred but not exclusive embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Fig. 1 is a perspective view of the supporting structure according to the present invention;

Fig. 2 is a perspective view of a shoe before application of the structure according to the present invention;

Fig. 3 is a perspective view of the shoe of Fig. 2, with the structure according to the present invention applied thereto;

Fig. 4 is a perspective view of the shoe of the preceding figures, completed according to the present invention;

Figs. 5, 6, and 7 are schematic rear views of the shoe in three different lateral flexing positions;

Fig. 8 is a rear perspective view of the shoe according to another aspect of the present invention;

Fig. 9 is a rear perspective view of the supporting structure of the shoe of Fig. 8.

With reference to the above figures, the shoe according to the present invention, generally designated by the reference numeral 6, comprises a supporting structure 1 composed of a lower part 2, which is adapted to connect a tip 3 to a heel unit 4, and of two lateral arches 5 provided with a plurality of holes 8.

The structure 1 is preferably assembled to the shoe 6 by injection-overmolding plastic material. A preferred manufacturing method is shown in Figs. 2, 3 and 4. The structure 1 is rested externally on a shoe 6 (Fig. 3) and a large rim 7 of plastic material (Fig. 4) is then formed which monolithically associates the structure 1 with the shoe 6.

As an alternative, the shoe can be assembled by gluing or by means of stitches. According to the assembly being used, the structure can be arranged between the lining and the padding, between the padding and the

upper, between the innerboot or last and the upper, or outside the upper. The two lateral arches 5 can be fully or partially embedded in the injection-overmolded part or can be visible or concealed. They can be shaped so as to duplicate the exact shape of the plantar arch and of the outer side of the foot, or they can assume a "standard" shape for simple lateral containment. Their shape affects the stress acting on them.

Operation of the arches 5 is very similar to that of leaf-spring suspensions used in cars.

Leaf-spring suspensions in fact absorb energy thanks to the deformation of the two opposite bundles of bars, which is allowed by the empty space between them, and occurs exclusively in a vertical direction. With respect to leaf-spring suspensions, the two arches 5 are not constrained by the vertical direction of the stress but can absorb vertical, lateral or mixed stresses because of the presence of the empty space between the arch 5 and the lower part 2. Figs. 5, 6 and 7 schematically illustrate the "mixed" behavior of the shoe according to the present invention. This freedom of deformation allows cushioning, and therefore support, regardless of the stress direction imposed by the user. According to the type of material used to manufacture the structure and to its thickness in the various deformation regions, lateral containment can therefore be adapted to the use of the shoe and to the user's characteristics.

Figs. 8 and 9 illustrate a second embodiment of the shoe according to the present invention, generally designated by the reference numeral 106. This embodiment offers the same support as the previous one and operates according to the same concepts. However, in this case the supporting structure 101 is made of the same material used for the injection-overmolding. The supporting structure 101 is composed of a lower part 102, adapted to connect a tip 103 to a heel unit 104, and of two lateral arches 105.

It has been observed in practice that the present invention achieves the intended aim and objects, a shoe having been provided which is not necessarily constituted by a rigid shell but has excellent lateral containment.

The proposed embodiment allows to provide a structure made of a material having varying degrees of rigidity, according to the specifications of the individual application, and characterized by arches arranged laterally to the foot.

The lateral supporting structure allows to absorb several stresses in various directions.

The shoe according to the present invention allows a soft and gradual support instead of a rigid one as in a plastic shell.

It is also advantageous because it allows to adapt the structure to the foot shape and therefore to perfectly adapt the support to the kind of foot and sports activity.

The shoe according to the present invention is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; all

the details may also be replaced with technically equivalent elements.

The materials employed, as well as the dimensions, may of course be any according to requirements and to the state of the art.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

### Claims

1. A shoe having a sole and comprising a supporting and stiffening structure (1,101), characterized in that it comprises at least one arch (5,105) arranged longitudinally on each side of said shoe.
2. A shoe according to claim 1, characterized in that said structure (1,101) comprises a tip (3,103) associated with a heel unit (4,104) by means of a lower portion (2,102), said heel unit being also connected to said tip by means of said lateral arches (5,105).
3. A shoe according to claim 2, characterized in that each one of said lateral arches (5) comprises a plurality of holes (8).
4. A shoe according to one or more of the preceding claims, characterized in that it comprises an outer rim (7) adapted to monolithically include said structure (1) arranged externally at least with respect to the sole of said shoe.
5. A shoe according to one or more of the preceding claims, characterized in that said structure (1) is glued to the sole of said shoe.
6. A shoe according to one or more of the preceding claims, characterized in that said structure (1) is stitched to the sole of said shoe.
7. A shoe according to one or more of the preceding claims, characterized in that said structure (1) is arranged between a lining and a padding of said shoe.
8. A shoe according to one or more of the preceding claims, characterized in that said structure (1) is arranged between a padding and an upper of said shoe.
9. A shoe according to one or more of the preceding claims, characterized in that said structure (1) is arranged between an innerboot or last and an upper of said shoe.

10. A shoe according to one or more of the preceding claims, characterized in that said structure (101) is formed monolithically together with an external plastic portion of said shoe.

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11. A method for manufacturing a shoe having a supporting structure, characterized in that it comprises the steps of: resting a supporting structure (1,101), which comprises at least one arch (5,105) arranged longitudinally on each side, on the outside of at least the sole of a shoe; injecting plastic material to embed said structure at least with respect to said sole by means of an external rim.

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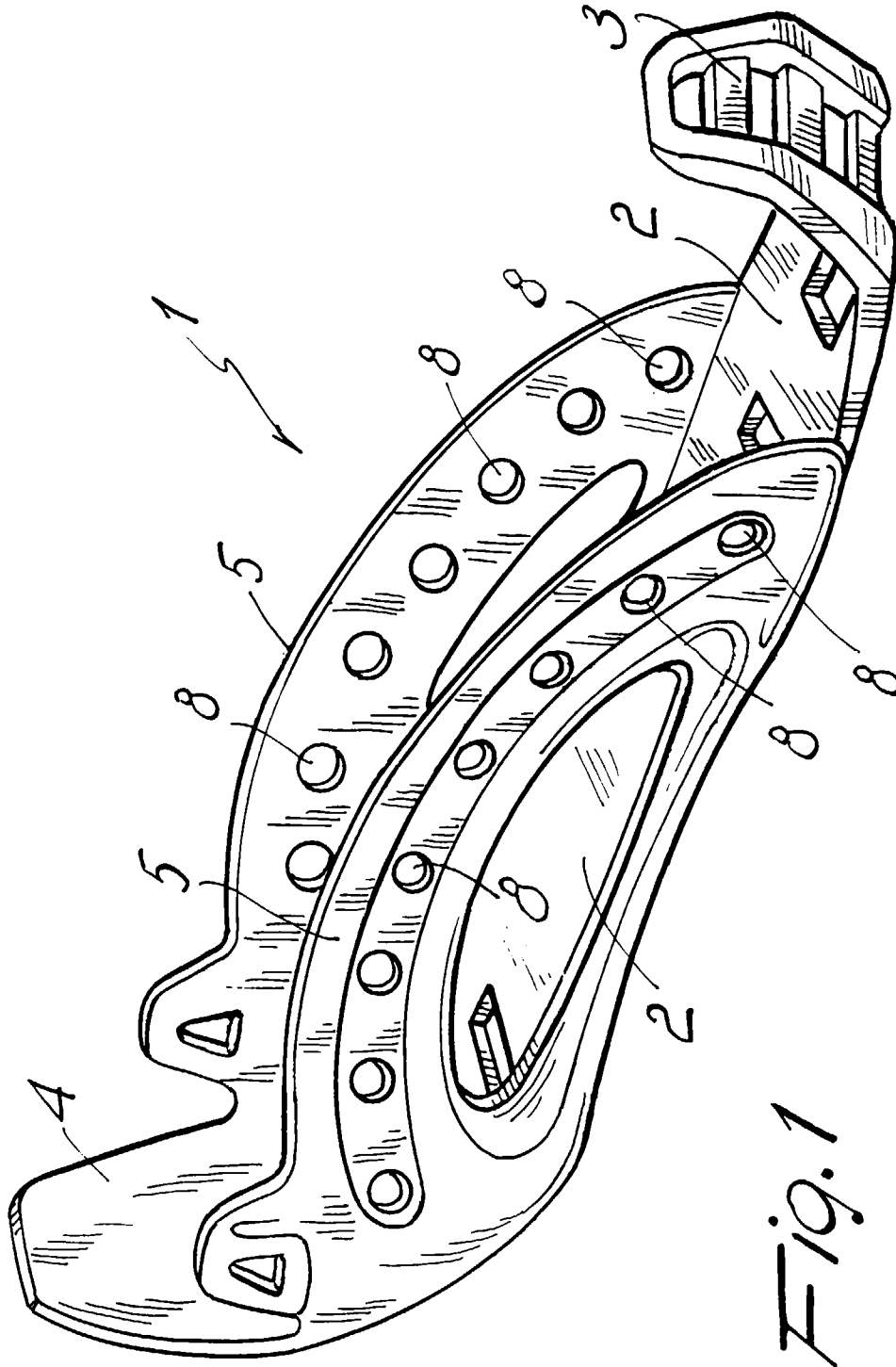
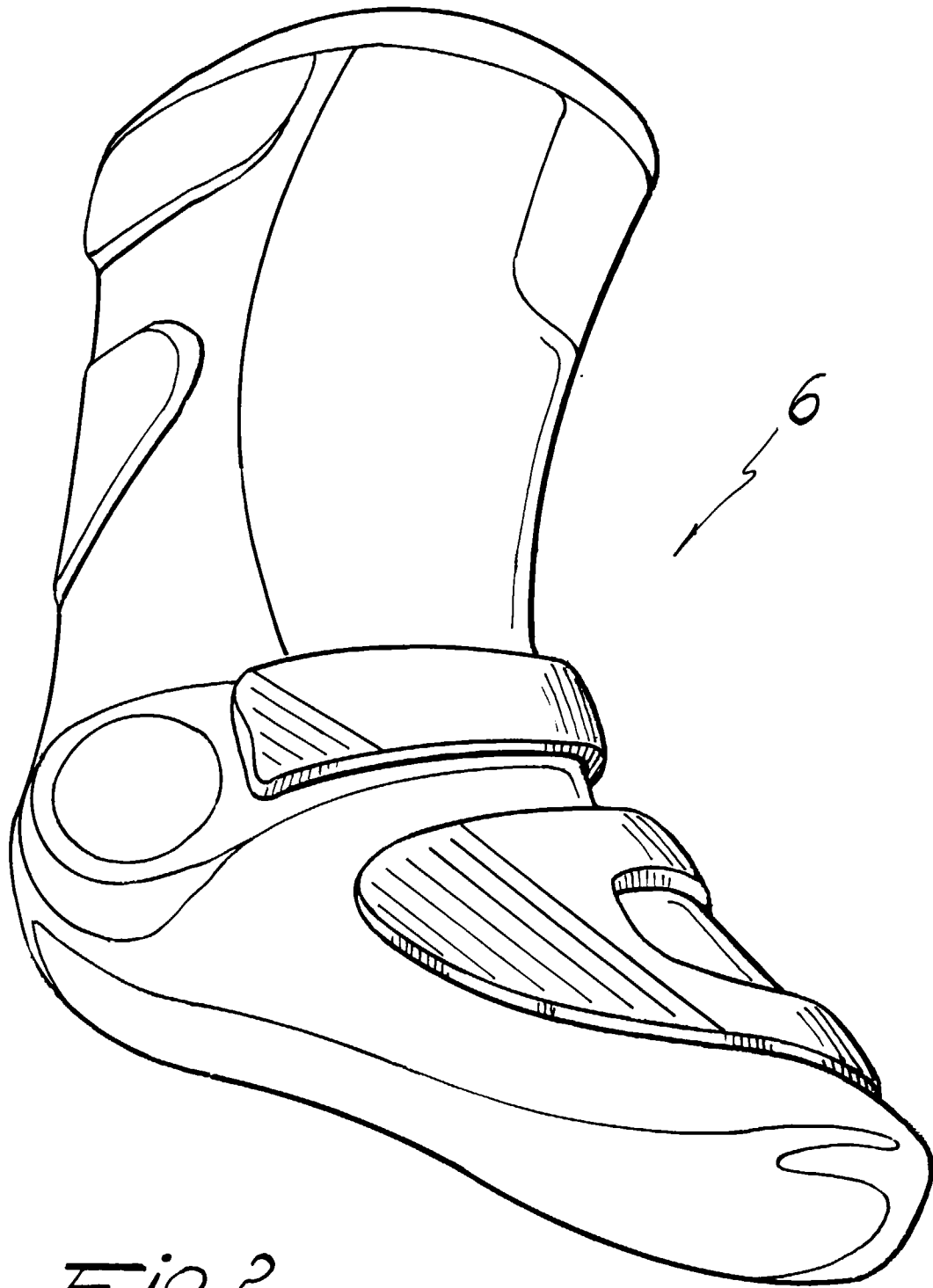
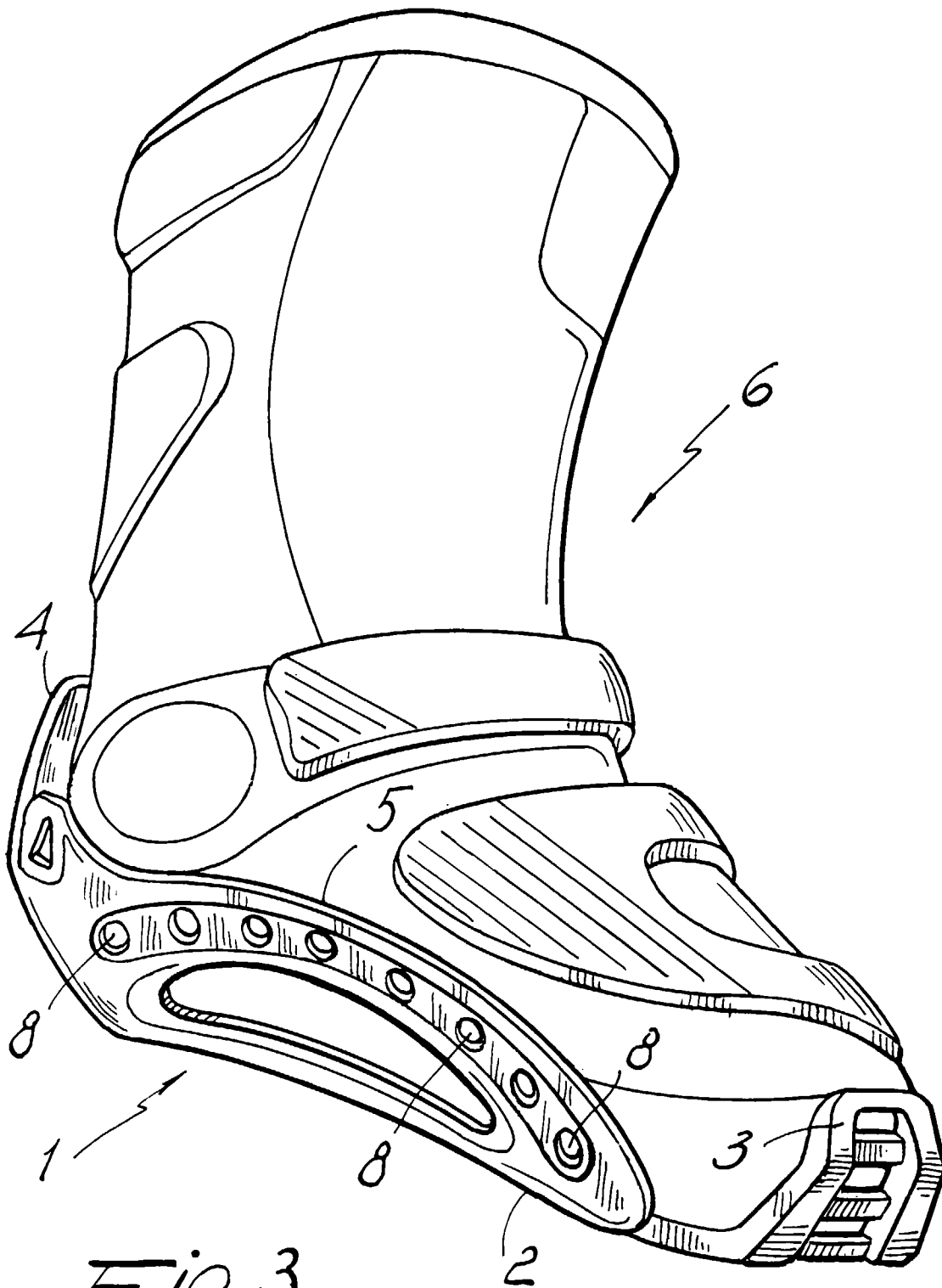


Fig. 1



*Fig. 2*



*Fig. 3*

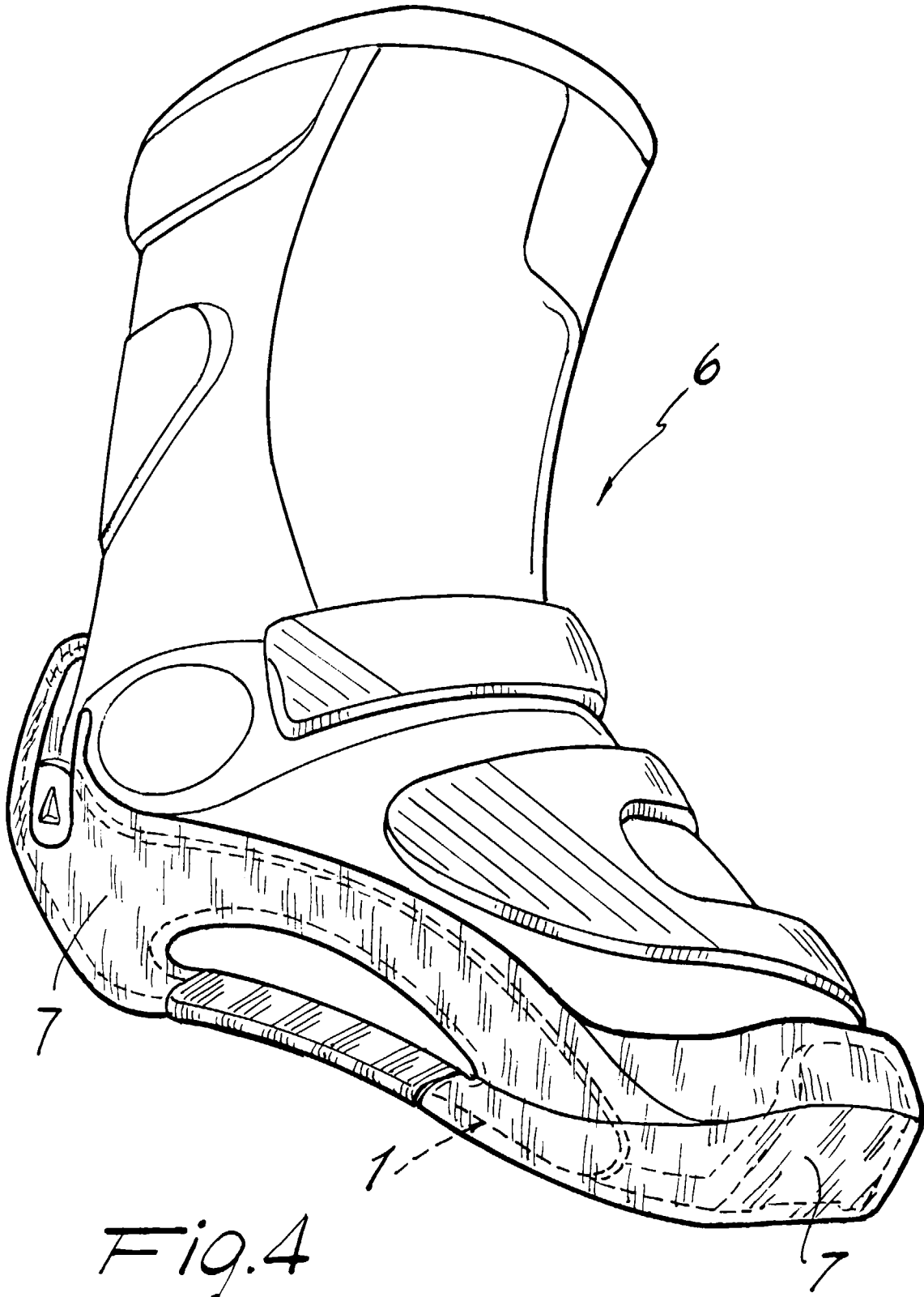


Fig. 4

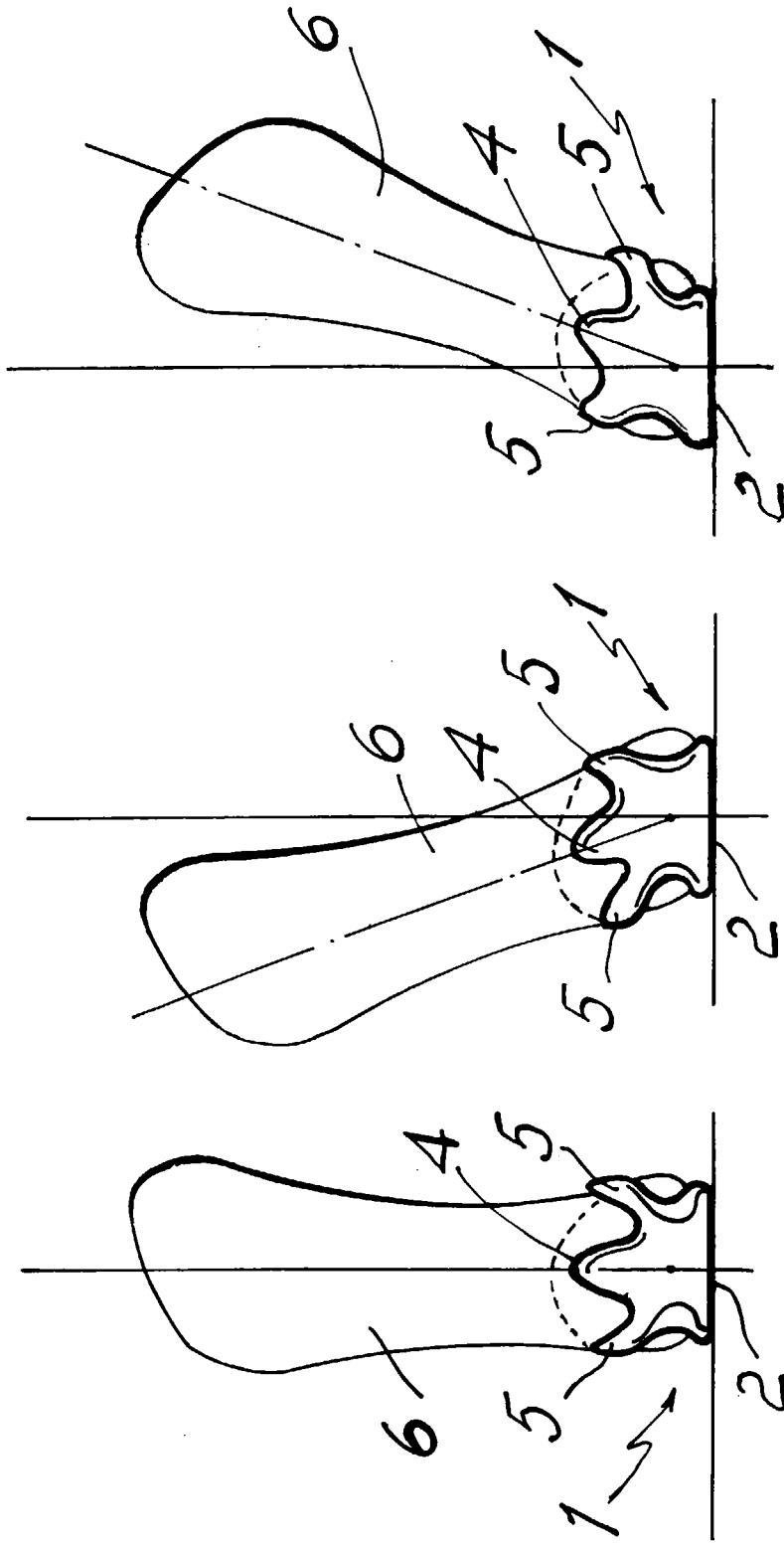
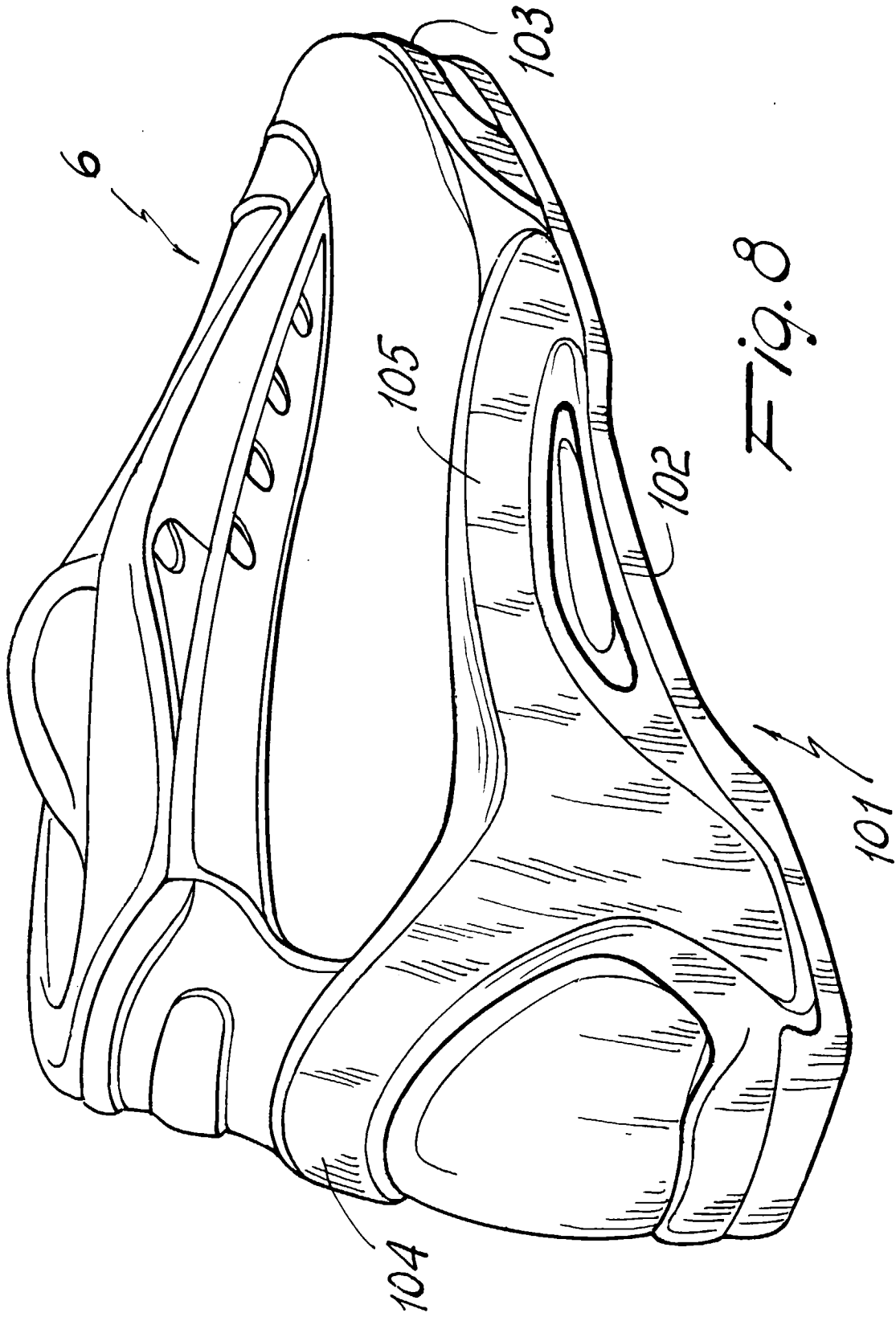


Fig. 7

Fig. 6

Fig. 5



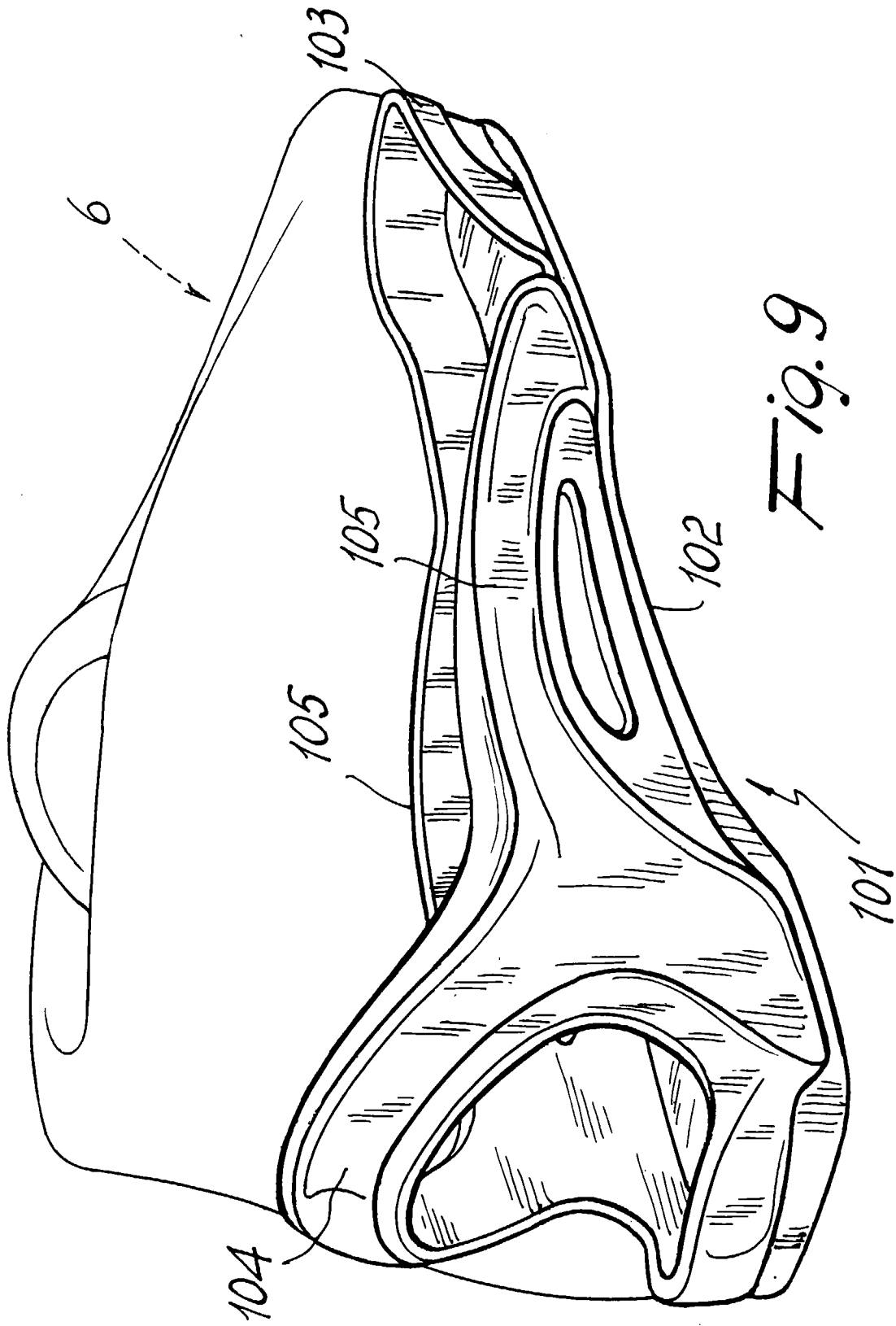


Fig. 9



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EUROPEAN SEARCH REPORT

Application Number  
EP 97 11 2597

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)
A	DE 20 05 900 A (LUTHER AUSTIN) * the whole document * ---	1,11	A43B5/00 A43B5/04
A	US 3 807 062 A (I. MARTIN SPIER) * the whole document * ---	1,11	
A	FR 2 208 279 A (M. UHLMANN) * the whole document * ---	1,11	
A	US 3 597 862 A (R. VOGEL) * the whole document * ---	1,11	
A	US 3 239 952 A (R. LANGE) * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A43B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		30 October 1997	Declerck, J
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