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

Schuh mit Stützungs- und Versteifungsstruktur und Verfahren zu dessen Herstellung

Chaussure avec structure de support et de renforcement et procédé de sa fabrication

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DE-A- 2 005 900
FR-A- 2 208 279
US-A- 3 239 952
US-A- 3 597 862
US-A- 3 807 062

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Description

[0001] The present invention relates to a shoe with supporting and stiffening structure and to a method for manufacturing said shoe.

[0002] 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.

[0003] 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.

[0004] 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.

[0005] DE-A-2 005 900 discloses such a shoe (actually a ski boot) where a pair of stiffening side pieces are attached to the periphery of the sole without discontinuity. A number of apertures along the said pieces permit only a limited flexibility to the shoe since their main purpose is to ensure the same pieces to be embedded in an outer shell.

[0006] US-A-3 807 602 shows an athletic boot where arc-shaped flaps are provided on top of an outer shell due to be coupled to an inner shell.

[0007] FR-A-2 208 279 discloses a shoe having a lower part monolithically including the sole and a pair of side parts which are extended from the heel unit through a portion of the foot length and also having a separate upper part, including the shoe tip, overmoulded onto the lower part.

[0008] An aim of the present invention is to provide a shoe which solves the above-mentioned problems of the prior art.

[0009] 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.

[0010] A further object of the present invention is to provide a shoe having a lateral supporting structure which allows to absorb different stresses in various directions.

[0011] 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.

[0012] 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.

[0013] A further object of the present invention is to provide a shoe which is economically advantageous from the production point of view.

[0014] 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.

[0015] 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.

[0016] 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 arches 5. *The arches 5 are arranged longitudinally on each side and have attachment lines 5a, 5b to the lower part 2 at, or near to, the tip 3 and the heel unit 4. In this way a wide empty space 9 is provided between the front and the*

rear portion of the shoe, adjacent to the sole. Substantially above the said empty space 9 each arch 5 is provided with a plurality of holes 8.

[0017] 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.

[0018] As an alternative, the shoe can be assembled by gluing or by means of stitches. According to the assembly being used, the structure *1* 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.

[0019] Operation of the arches is very similar to that of leaf-spring suspensions used in cars.

[0020] 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.

[0021] 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.

[0022] Is 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.

[0023] 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.

[0024] The lateral supporting structure allows to absorb several stresses in various directions.

[0025] The shoe according to the present invention allows a soft and gradual support instead of a rigid one as in a plastic shell.

[0026] 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.

[0027] 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 as defined in the appended claims; all the details may also be replaced with technically equivalent elements.

[0028] The materials employed, as well as the dimensions, may of course be any according to requirements and to the state of the art.

[0029] 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 (6) having a sole and a supporting and stiffening structure (1, 101) comprising a lower part (2, 102) for the mutual connection of a tip (3, 103) and a heel unit (4, 104) and also comprising at least a pair of parts (5, 105) arranged longitudinally on each side, **characterized in that** the said longitudinal parts (5, 105) are arch-shaped and have their attachment points (5a, 5b) to the said lower part (2) at, or in proximity of, the tip (3, 103) and the heel unit (4, 104) so as to provide an empty space (9) between the front and the rear portion of the shoe, adjacent to the sole.

2. A shoe (6) according to claim 1, **characterized in that** said arch-shaped parts (5, 105) duplicate the plantar arch and the outer sides of the foot.

3. A shoe (6) according to claim 1 or 2, **characterized in that** each one of said arc-shaped parts (5, 105) is provided with a plurality of holes (8) which are arranged substantially above the said empty space (9).

4. A shoe according to one or more of the preceding claims, **characterized in that** it comprises an outer rim (7) adapted around said arc-shaped side parts (5, 105) 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.

11. A method for manufacturing a shoe (6) having a sole and comprising a supporting and stiffening structure comprising a lower part (2, 102) for the mutual connection of a tip (3, 103) and a heel unit (4, 104) and also comprising at least at least a pair of arc-shaped parts (5, 105) arranged longitudinally, as defined in the previous claims, **characterized in that** it comprises the steps of : resting the said structure on the outside of at least the sole of the shoe and of injecting plastic material to realize an external rim (7) around said arc-shaped parts (5, 105) so as to make said structure (1,101) monolithically associated at least with the sole of the shoe (6).

Patentansprüche

1. Schuh (6) mit einer Sohle und einer Stützungs- und Versteifungsstruktur (1, 101) mit einem unteren Teil (2, 102) für das gegenseitige Verbinden einer Spitze (3, 103) und einer Absatzeinheit (4, 104) sowie mit mindestens einem Paar Teile (5, 105), die in Längsrichtung an jeder Seite angeordnet sind; **dadurch gekennzeichnet, dass** die in Längsrichtung angeordneten Teile (5, 105) bogenförmig sind und ihre Befestigungspunkte (5a, 5b) an dem unteren Teil (2) an oder in der Nähe der Spitze (3, 103) und der Absatzeinheit (4, 104) haben, um einen Leerraum (9) zwischen dem vorderen und dem hinteren Abschnitt des Schuhes neben der Sohle zu erzeugen.

2. Schuh (6) nach Anspruch 1, **dadurch gekennzeichnet, dass** die bogenförmigen Teile (5, 105) den Sohlenbogen und die Außenseiten des, Fußes nachahmen.

3. Schuh (6) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** jeder der bogenförmigen Teile (5, 105) mit einer Vielzahl von Löchern (8) ausgestattet ist, die im wesentlichen oberhalb des Leerraums (9) angeordnet sind.

4. Schuh nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** er einen äußeren Rand (7) aufweist, der um die bogenförmigen Seitenteile (5, 105) herum so ausgelegt ist, dass er die außen angeordnete Struktur (1) zumindest bezüglich der Sohle des Schuhs einstückig enthalten kann.

5. Schuh nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Struktur (1) an die Sohle des Schuhs geklebt ist.

6. Schuh nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Struktur (1) an die Sohle des Schuhs genäht ist.

7. Schuh nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Struktur (1) zwischen einem Futter und einer Polsterung des Schuhs angeordnet ist.

8. Schuh nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Struktur (1) zwischen einer Polsterung und einem Obermaterial des Schuhs angeordnet ist.

9. Schuh nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Struktur (1) zwischen einem Innenstiefel oder einem Leisten und einem Obermaterial des Schuhs angeordnet ist.

10. Schuh nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Struktur (101) mit einem äußeren Kunststoffabschnitt des Schuhs einstückig gebildet ist.

11. Verfahren zum Herstellen eines Schuhs (6) mit ei-

ner Sohle und mit einer Stützungs- und Versteifungsstruktur mit einem unteren Teil (2, 102) zum gegenseitigen Verbinden einer Spitze (3, 103) und einer Absatzeinheit (4, 104) sowie mit mindestens einem Paar bogenförmiger Teile (5, 105), die in Längsrichtung angeordnet sind, wie in den vorhergehenden Ansprüchen definiert, **dadurch gekennzeichnet, dass** es die folgenden Schritte aufweist: Auflegen der Struktur auf die Außenseite mindestens der Sohle des Schuhs und Einspritzen von Kunststoffmaterial, um einen äußeren Rand (7) um die bogenförmigen Teile (5, 105) herum herzustellen, um die Struktur (1, 101) mindestens der Sohle des Schuhs (6) einstückig zuzuordnen.

Revendications

1. Chaussure (6) munie d'une semelle et d'une structure de support et de renforcement (1, 101) comprenant une partie inférieure (2, 102) pour le raccordement mutuel d'un bout de pied (3, 103) et d'un bloc de talon (4, 104), et comprenant également au moins une paire de parties (5, 105) disposées longitudinalement de chaque côté,
caractérisée en ce que
les parties longitudinales (5, 105) sont en forme d'arc et comportent des points (5a, 5b) de fixation à la partie inférieure (2), qui sont situés à l'endroit ou à proximité du bout de pied (3, 103) et du bloc de talon (4, 104) de manière à former un espace vide (9) entre la partie avant et la partie arrière de la chaussure, au voisinage de la semelle.

2. Chaussure (6) selon la revendication 1,
caractérisée en ce que
les parties en forme d'arc (5, 105) reproduisent la voûte plantaire et les côtés extérieurs du pied.

3. Chaussure (6) selon la revendication 1 ou 2,
caractérisée en ce que
chacune des parties en forme d'arc (5, 105) est munie d'un certain nombre de trous (8) qui sont disposés essentiellement au-dessus de l'espace vide (9).

4. Chaussure selon l'une ou plusieurs des revendications précédentes,
caractérisée en ce qu'
elle comprend un rebord extérieur (7) adapté autour des parties latérales en forme d'arc (5, 105) pour inclure monolithiquement la structure (1) disposée extérieurement au moins par rapport à la semelle de la chaussure.

5. Chaussure selon l'une ou plusieurs des revendications précédentes,
caractérisée en ce que
la structure (1) est collée à la semelle de la chaussure.

6. Chaussure selon l'une ou plusieurs des revendications précédentes,
caractérisée en ce que
la structure (1) est cousue à la semelle de la chaussure.

7. Chaussure selon l'une ou plusieurs des revendications précédentes,
caractérisée en ce que
la structure (1) est disposée entre un revêtement intérieur et un rembourrage de la chaussure.

8. Chaussure selon l'une ou plusieurs des revendications précédentes,
caractérisée en ce que
la structure (1) est disposée entre un rembourrage et l'empeigne de la chaussure.

9. Chaussure selon l'une ou plusieurs des revendications précédentes,
caractérisée en ce que
la structure (1) est disposée entre une botte intérieure ou forme, et l'empeigne de la chaussure.

10. Chaussure selon l'une ou plusieurs des revendications précédentes,
caractérisée en ce que
la structure (101) est formée monolithiquement avec une partie de matière plastique extérieure de la chaussure.

11. Procédé de fabrication d'une chaussure (6) munie d'une semelle et comportant une structure de support et de renforcement comprenant une partie inférieure (2, 102) pour le raccordement mutuel d'un bout de pied (3, 103) et d'un bloc de talon (4, 104), en comprenant également au moins une paire de parties en forme d'arc (5, 105) disposées longitudinalement, comme défini dans les revendications précédentes,
caractérisée en ce qu'
il comprend les étapes consistant à :

appuyer la structure sur l'extérieur d'au moins la semelle de la chaussure, et
injecter de la matière plastique pour former un rebord extérieur (7) autour des parties en forme d'arc (5, 105), de manière à associer monolithiquement la structure (1, 101) au moins avec la semelle de la chaussure (6).

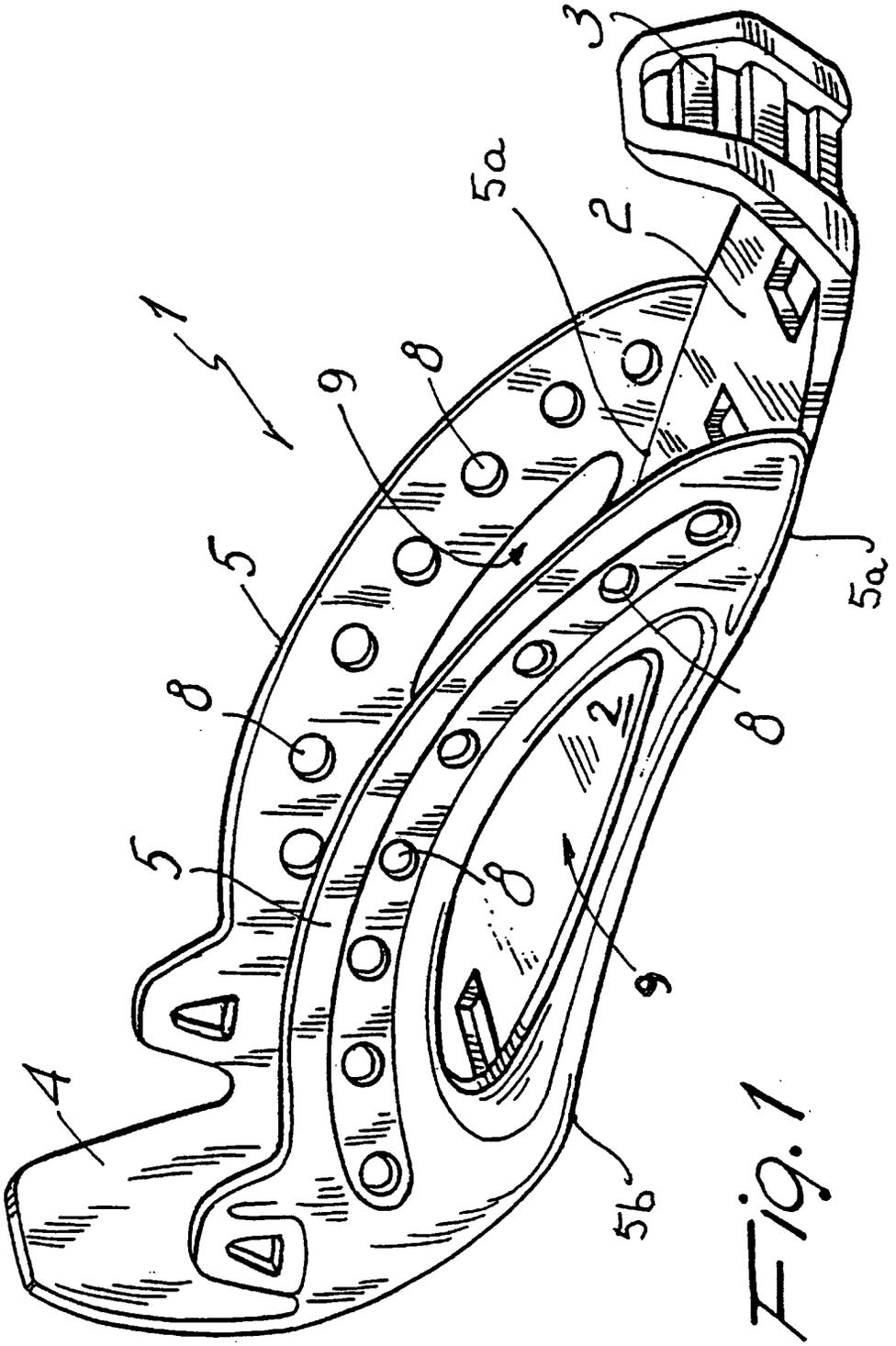

Fig. 1

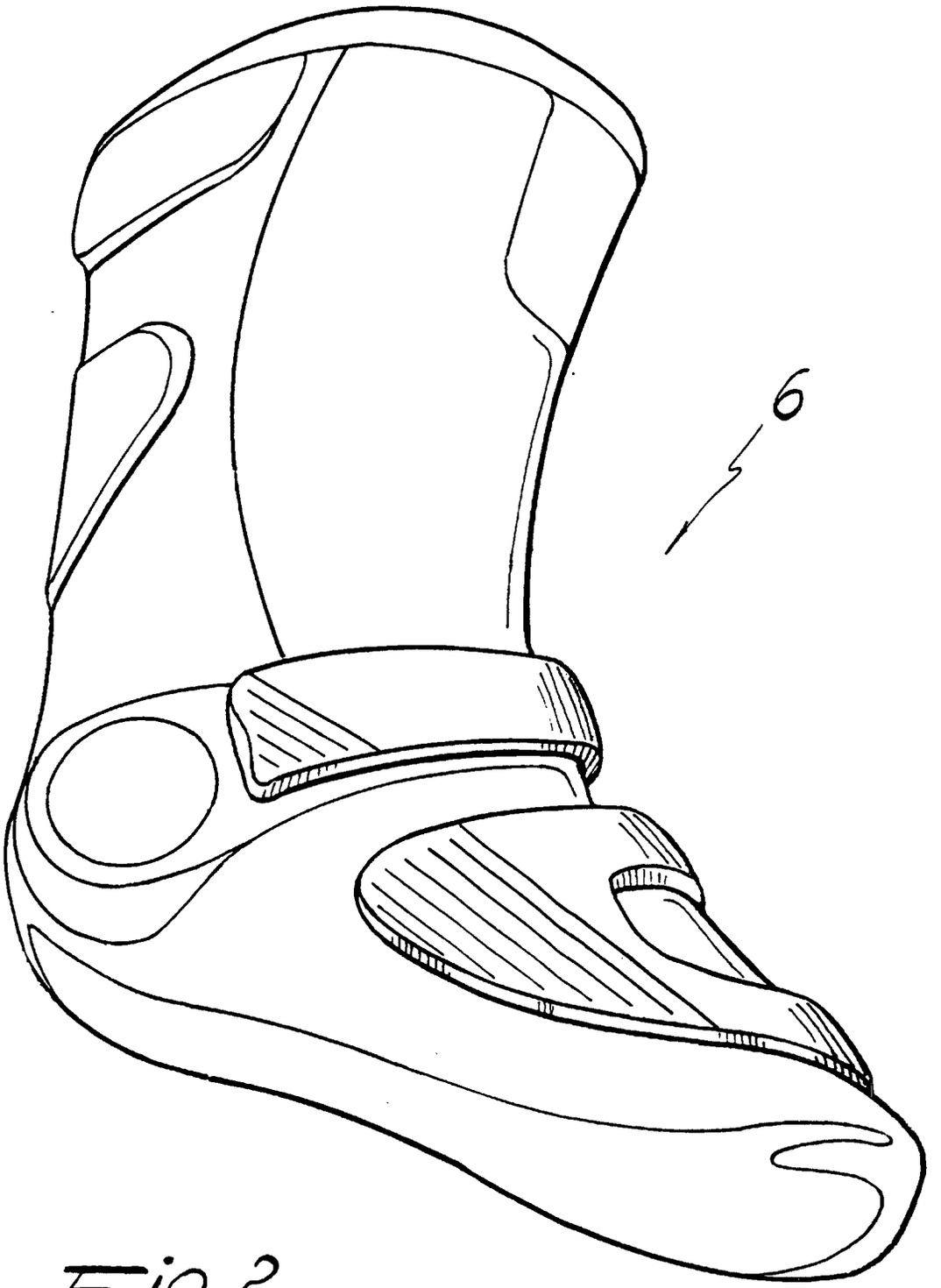

Fig. 2

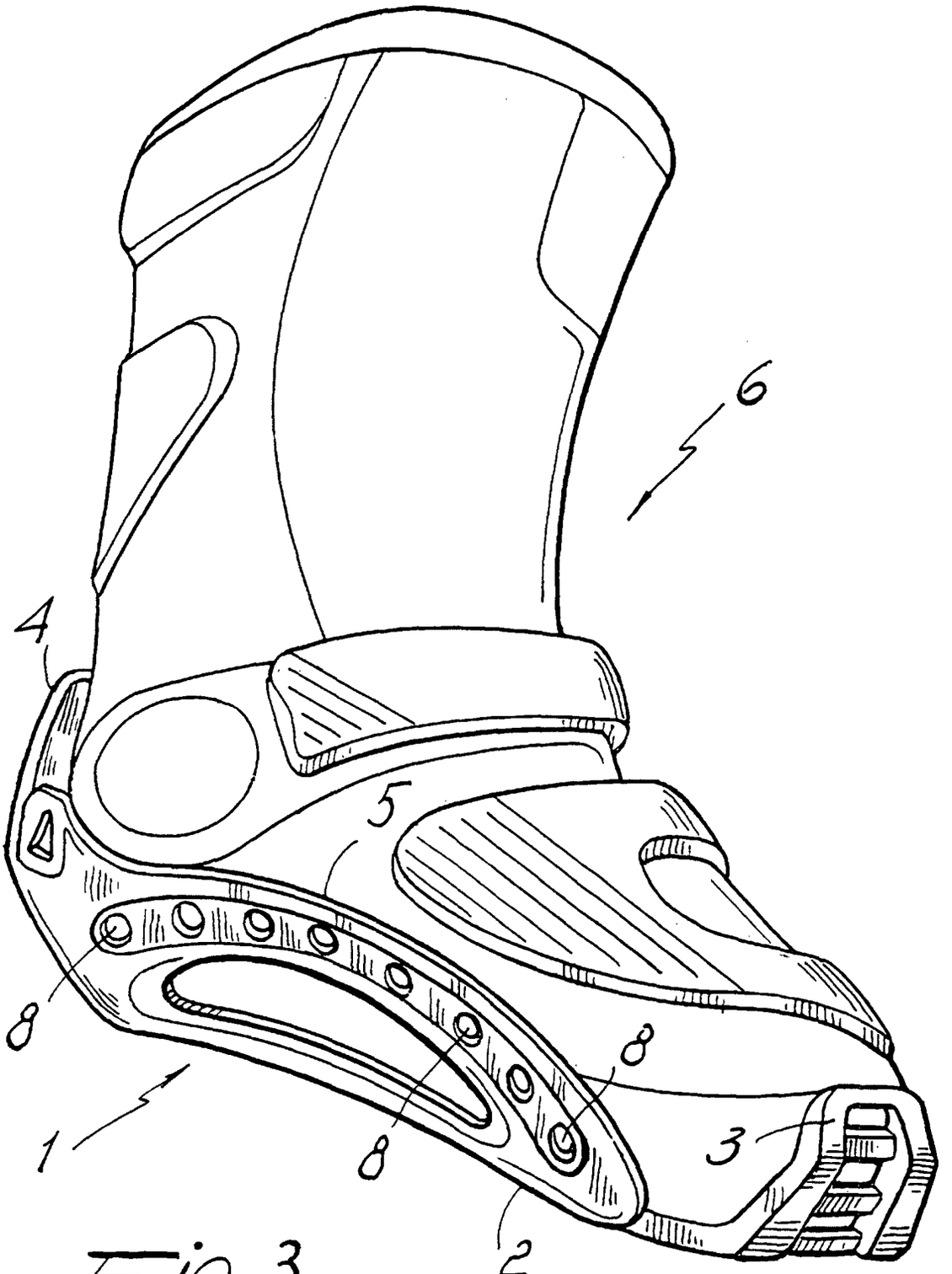

Fig. 3

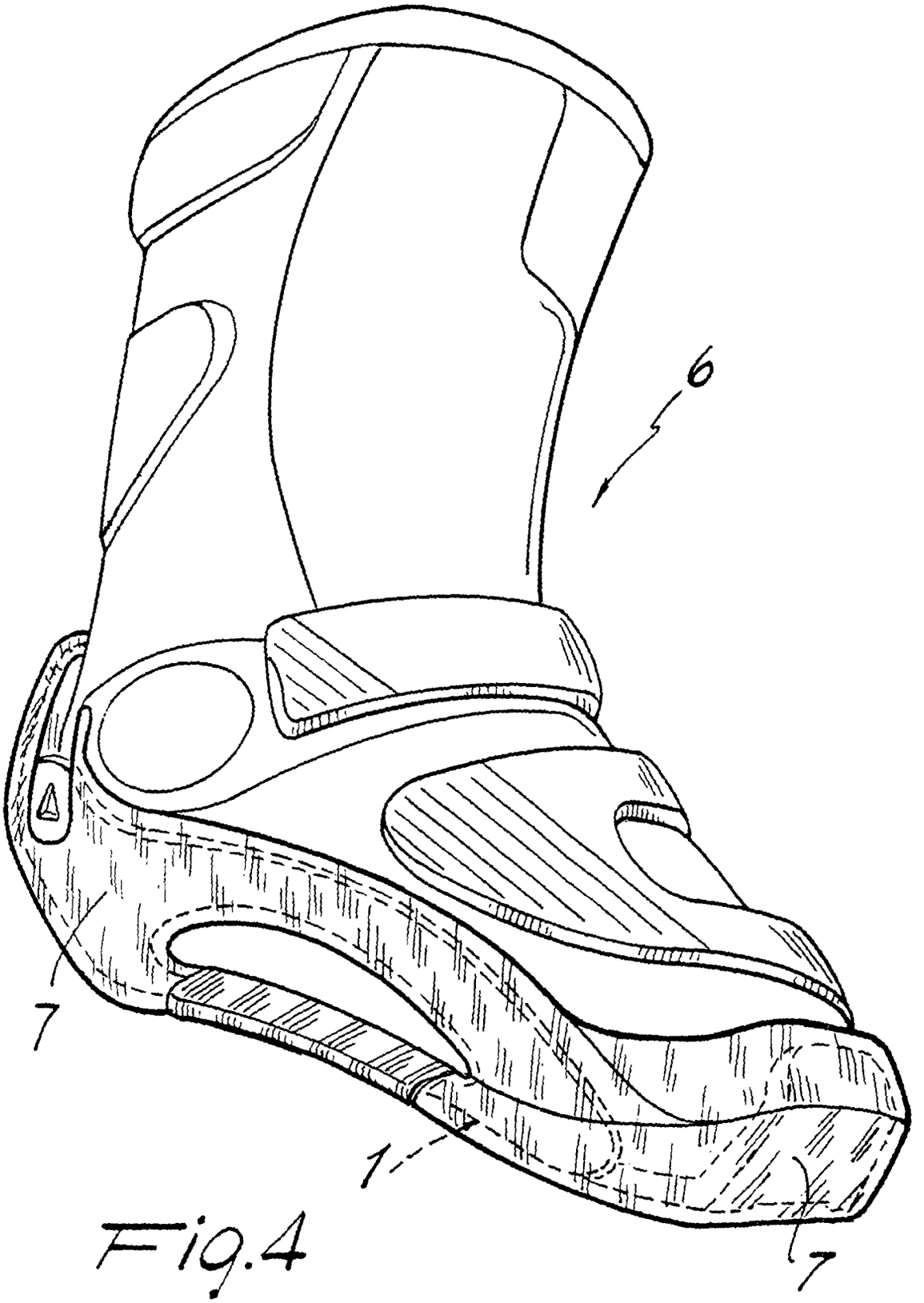

Fig.4

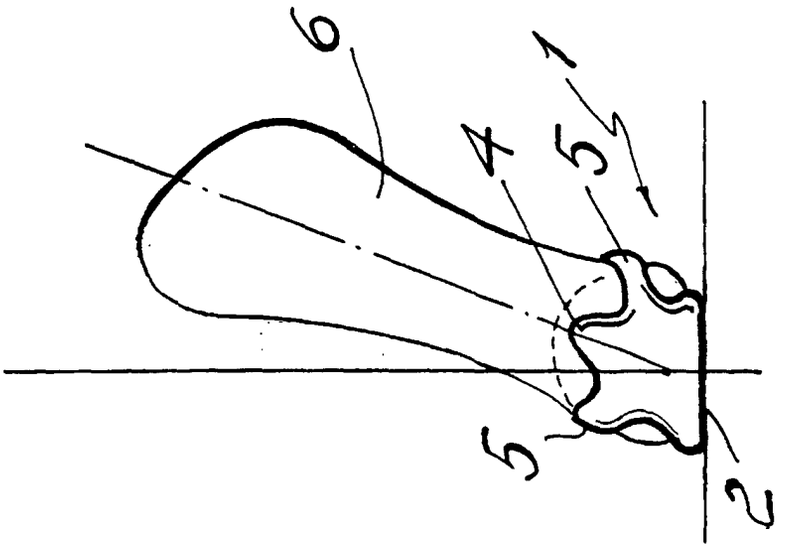

Fig. 7

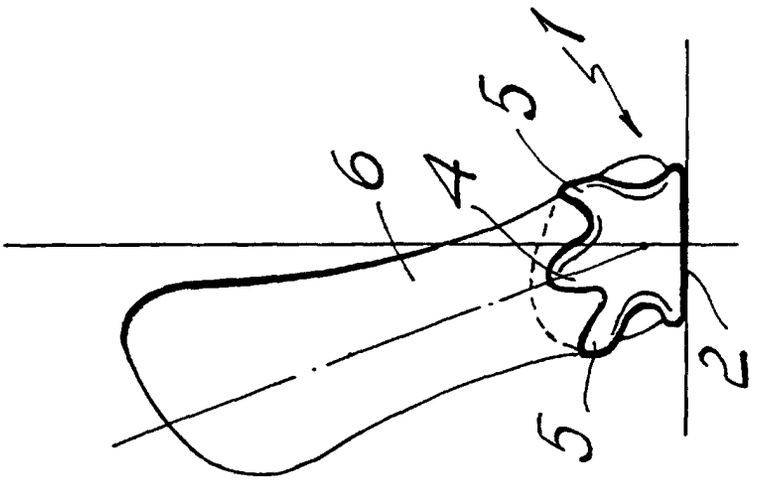

Fig. 6

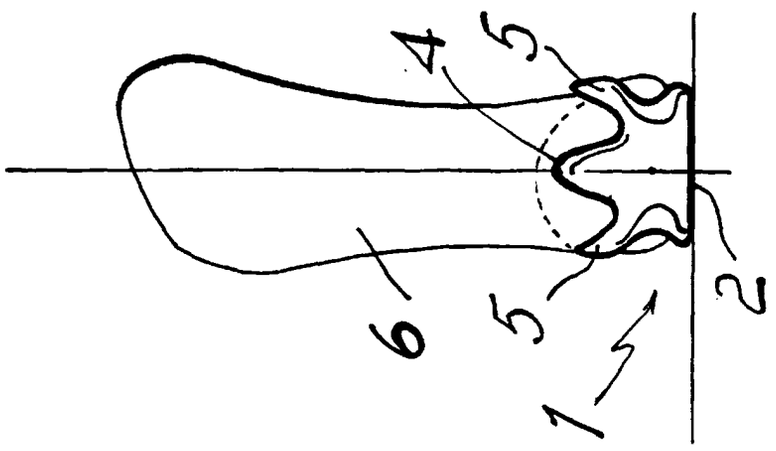

Fig. 5

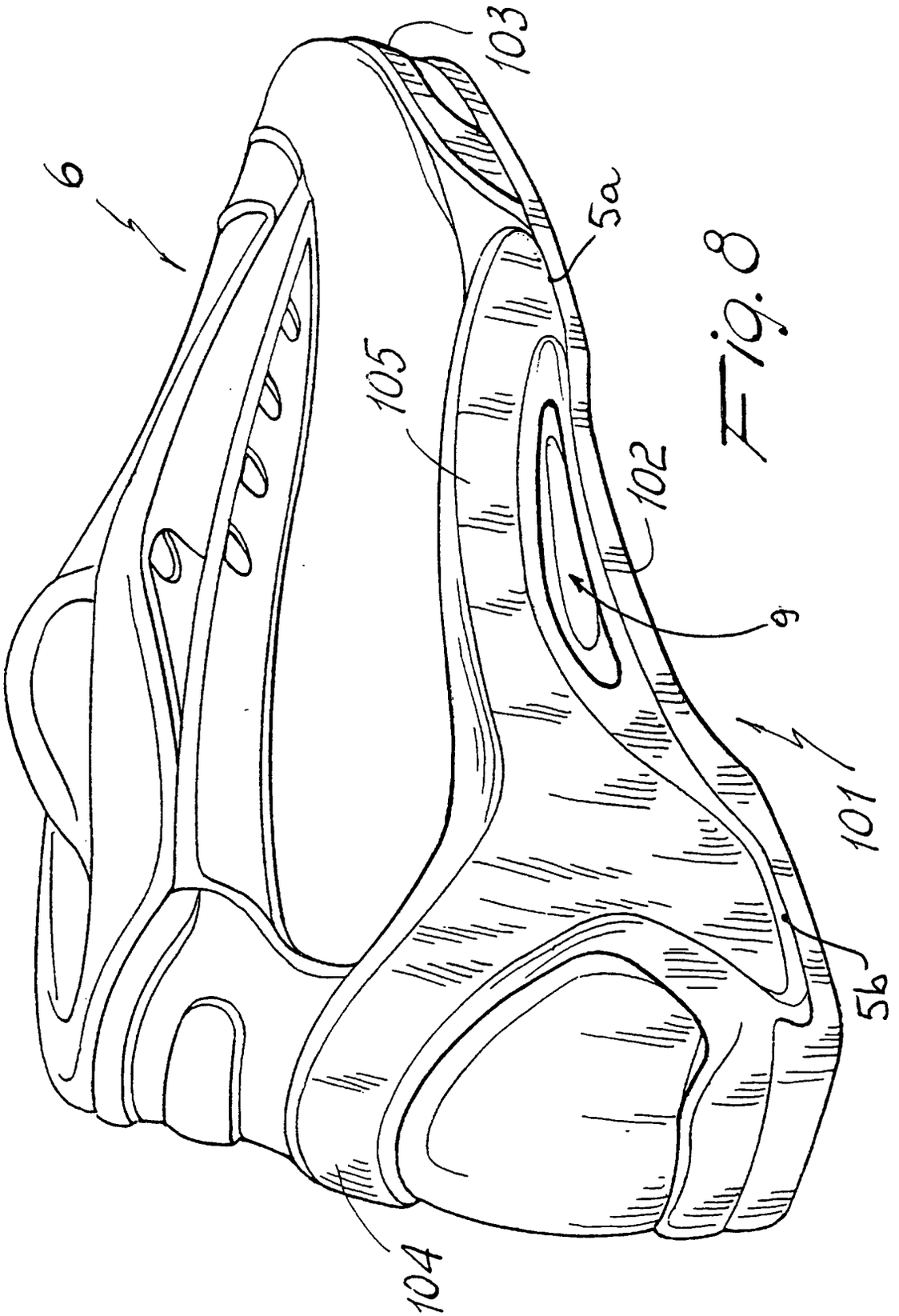

Fig. 8

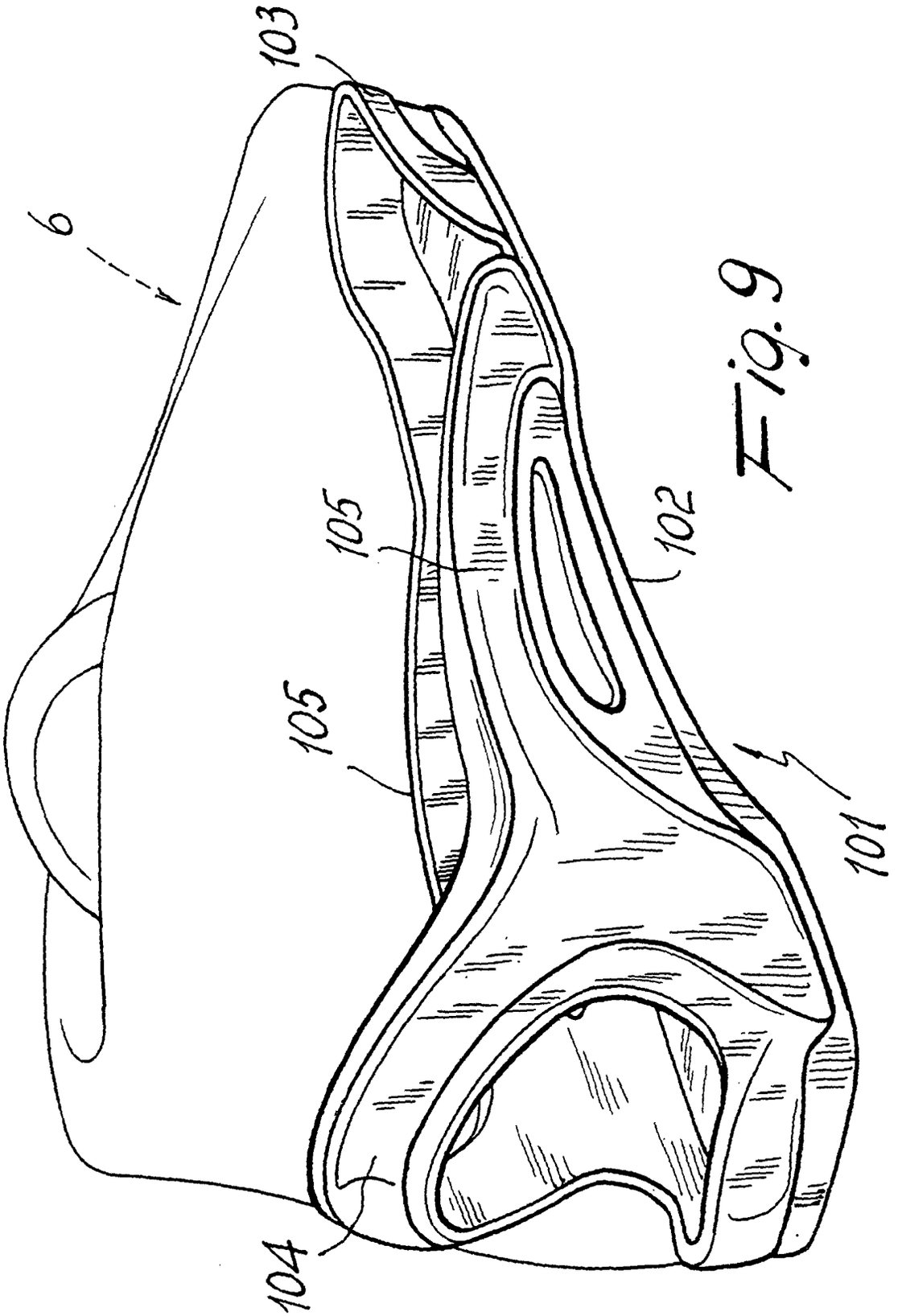

Fig. 9