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(54) Title: SHOE WITH PLANTAR ARCH SUPPORTING ELEMENT

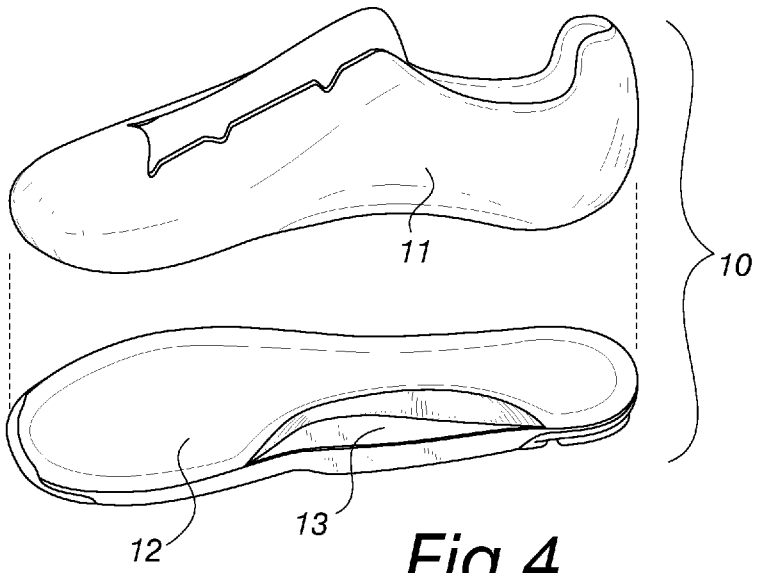

Fig.4

(57) Abstract: A shoe (10) with plantar arch supporting element, composed of an upper (11) and a bottom element (12) and comprising a distinct element (13) for supporting the plantar arch. The plantar arch supporting element (13) is applied to the bottom element (12) between the latter and the upper (11).

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SHOE WITH PLANTAR ARCH SUPPORTING ELEMENT

The present invention relates to a shoe with plantar arch supporting element.

As is known, the human body is not symmetrical.

One distinction that is normally made to delimit the different parts of the human body is to divide it into a right part and a left part.

This distinction is useful, since it allows to define the parts of the body with reference to their symmetry and asymmetry, relative to vertical centrality.

Some body parts appear to be symmetrical, such as the arms or the number of chest ribs, and others instead are asymmetrical.

As regards the symmetry of the body, it would be perhaps more appropriate to speak of symmetrical similarity, rather than pure symmetry, since there is no part of the body that is perfectly identical to the opposite one.

A right arm bicep is never identical to the left one, and vice versa, since the muscle tensions involved in the management of weight in relation to the dominant or nondominant limb are different.

When one considers the feet, this asymmetry is amplified, since the feet can be considered as the end buffers of the postural system.

Because of this characteristic, the feet deform, twist, balance in order to harmonize the postural imbalance with the ground.

In practice, there are no cases in which one foot is perfectly identical to the other.

As is known, differences are observed between the right foot and the left foot even in the same subject.

One of the greatest differences is the shape of the plantar arch and indeed various types of plantar arch are known: flat or low, normal or medium, and curved or high, etc.

It is also known that an unsuitable or limited support of the plantar arch increases pronation during the prolonged biomechanical phase, causing unpleasant plantar fasciitis and tendinitis.

Many individuals, particularly those affected by the physiopathology known as "flatfoot", in which the anatomical relations of the foot are altered, with a reduction of the plantar arch and the consequent increase in the resting surface of the sole of the foot, use extemporaneously specific supports or pads, mainly made of latex or silicone, to be applied inside shoes, or insoles or plantar inserts, also extemporaneous, with shapes that are suitable to support the plantar arch.

Even those who practice sports activity, such as for example cycling, which requires shoes with a rigid sole, skiing, etc., but also those who use soft soles, such as for example running shoes, in order to compensate for the different shape and posture and support the foot, often resort to the use of customized plantar inserts, to be inserted inside the shoe.

In this case, the specificity and the problems in use cause costs to become high.

Sometimes the personalized plantar insert is not sufficient to support the foot, since an adequate load-bearing structure of the sole is lacking from the outset.

A consequence of this is that, for example in the practice of cycling, part of the force transmitted to the pedal is lost.

Some companies have provided contoured soles which have an enhanced shaping in order to support the plantar arch; however, particularly in rigid soles, unfortunately a rigid shaping for the support of the plantar arch does not adapt to the various types of feet.

The same remarks can be made considering midsoles, if one has soles composed of various layers of elements.

The aim of the present invention is to propose a shoe that overcomes the limitations of the background art outlined above.

Within this aim, an object of the present invention is to propose a shoe with a bottom element that allows an adaptation of the internal shape of the shoe itself as a function of the foot and of the use for which it is intended.

A still further object of the invention is to propose a shoe with a bottom element that can be provided by using various types of materials and industrial processes.

This aim and these and other objects which will become better apparent hereinafter are achieved by a shoe composed of an upper and a bottom element, characterized in that it comprises a distinct element for supporting the plantar arch which is applied to said bottom element between the latter and said upper.

Further characteristics and advantages of the invention will become better apparent from the following detailed description, given by way of nonlimiting example, accompanied by the corresponding figures, wherein:

Figure 1 is a first side view of a bottom element comprised in the shoe according to the invention;

Figure 2 is a second side view, opposite with respect to the first one, of a bottom element comprised in the shoe according to the invention;

Figure 3 is a view from below of the bottom element of Figures 1 and 2;

Figure 4 is an exploded view of a shoe according to the invention;

Figure 5 is a side view of the shoe according to the invention in the assembled condition.

With reference to the figures, a shoe 10 is essentially composed of an upper 11 and a bottom element 12.

In this case, the bottom element 12 is constituted by a sole that is particularly suitable for the sport of cycling and is therefore made of materials such as fibers of carbon and/or Kevlar® and/or glass and/or made of polymers, as a function of the specific characteristics and use.

In other cases, not shown in the figures, the bottom element can be a midsole, if the sole is a set of variously layered elements.

Of course, the bottom element 12 can also be made of soft materials, depending on the specific use for which the shoe 10 is intended, for example PU (polyurethane) and/or TPU (thermoplastic polyurethane) and/or TPR (thermoplastic rubber) and/or rubber and/or EVA (ethyl vinyl acetate), etc.

According to the invention, the shoe 10 comprises a distinct plantar arch supporting element 13 which is applied to the bottom element 12 between the latter and the upper 11.

The plantar arch supporting element 13 can be provided separately, for example by molding or thermoforming, and then applied to the bottom element by adhesive bonding or other coupling, prior to the application of the upper 11 to finish the shoe.

As an alternative, it is possible to overmold the plantar arch supporting element 13 on the bottom element 12, both during the production of the latter by molding and in a later step of the production process.

Advantageously, the plantar arch supporting element 13 can be made of various materials, such as TPU and/or PU and/or TPR (thermoplastic rubber) and/or rubber and/or EVA.

Fibers of carbon and/or Kevlar® and/or glass, optionally laminated with films of TPU or polypropylene or the like, may also be provided.

In this manner, the structure of the plantar arch supporting element can be varied, softer or more rigid, depending on the requirements of the shoe, both to adapt it to various types of plantar arch and to adapt it to a given sports on nonsports use.

It is appropriate to note that the plantar arch supporting element 13 can also be made of the same material as the bottom element 12, while remaining distinct from it, as a result of the possibility to choose its shape and height (as a function of the type of shoe) and of a different density or hardness.

For example, a softer support 13 is chosen especially in cases in which the bottom element 12, a midsole made of PU or EVA, is much harder in order to provide stability or contrast pronation.

One advantage of the invention is that it increases considerably the constructive possibilities of the shoes in which the presence of a plantar arch supporting element is provided, by virtue of the possibility to choose suitable shapes and types of plantar arch supporting element to be paired with the bottom elements.

As can be seen in particular from Figure 5, the plantar arch supporting element 13 can be rendered visible from the outside and therefore the potential buyer is capable of assessing its shape and consistency, and this has a positive and informed effect on the purchase choice.

It is evident that the intended aim and objects have been achieved.

Clearly, numerous modifications are evident and can be promptly performed by the person skilled in the art without abandoning the protective scope of the present invention.

Therefore, the scope of the protection of the claims must not be limited by the illustrations or preferred embodiments shown in the description by way of example, but rather the claims must comprise all the characteristics of patentable novelty that reside in the present invention, including all the characteristics that would be treated as equivalents by the person skilled in the art.

The disclosures in Italian Patent Application no. 102017000028991, from which this application claims priority, are incorporated herein by reference.

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 (10) composed of an upper (11) and a bottom element (12), characterized in that it comprises a distinct element (13) for supporting the plantar arch which is applied to said bottom element (12) between the latter and said upper (11).

2. The shoe (10) according to claim 1, characterized in that said plantar arch supporting element (13) is applied by adhesive bonding.

3. The shoe (10) according to claim 1, characterized in that said plantar arch supporting element (13) is applied by overmolding.

4. The shoe (10) according to claim 1, characterized in that said bottom element (12) is a sole and/or midsole.

5. The shoe (10) according to one or more of the preceding claims, characterized in that said plantar arch supporting element (13) is made of TPU and/or PU and/or TPR and/or rubber and/or EVA.

6. The shoe (10) according to one or more of claims 1 to 4, characterized in that said plantar arch supporting element (13) is made of carbon and/or Kevlar® and/or glass fibers.

7. The shoe (10) according to claim 6, characterized in that said fibers are laminated with a film of TPU or polypropylene or the like.

8. The shoe (10) according to one or more of the preceding claims, characterized in that said plantar arch supporting element (13) is made of the same material as said bottom element (12) and differs from it in terms of hardness and/or density, remaining a distinct element.

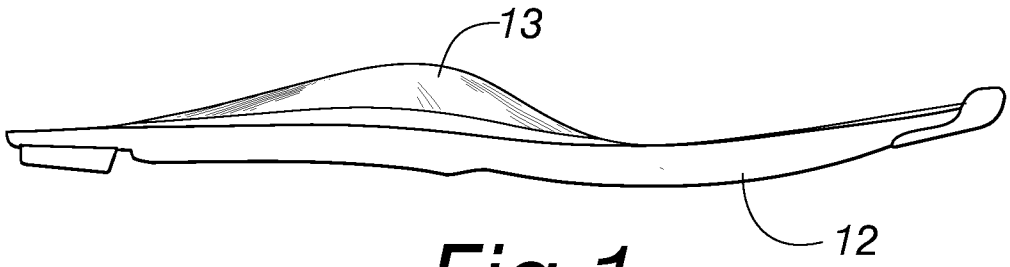

Fig.1

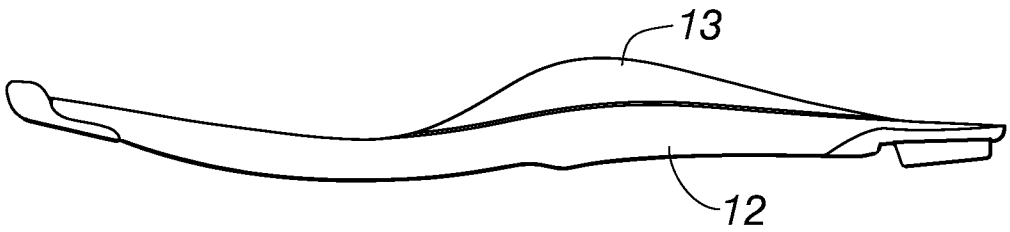

Fig.2

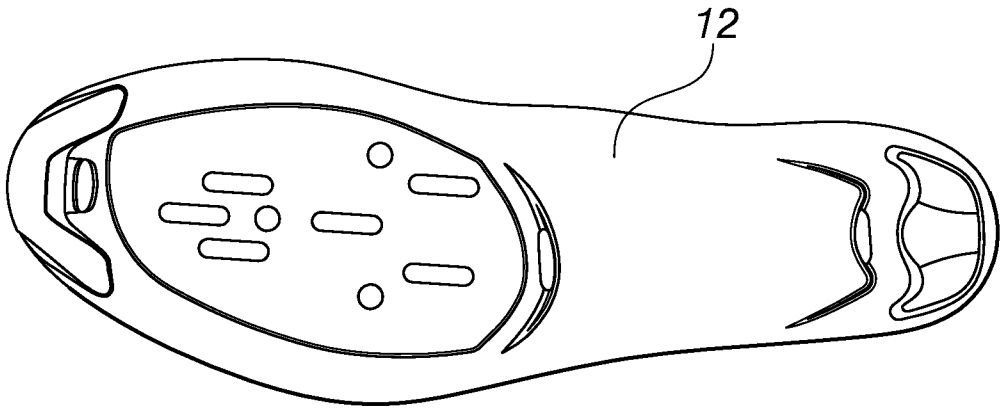

Fig.3

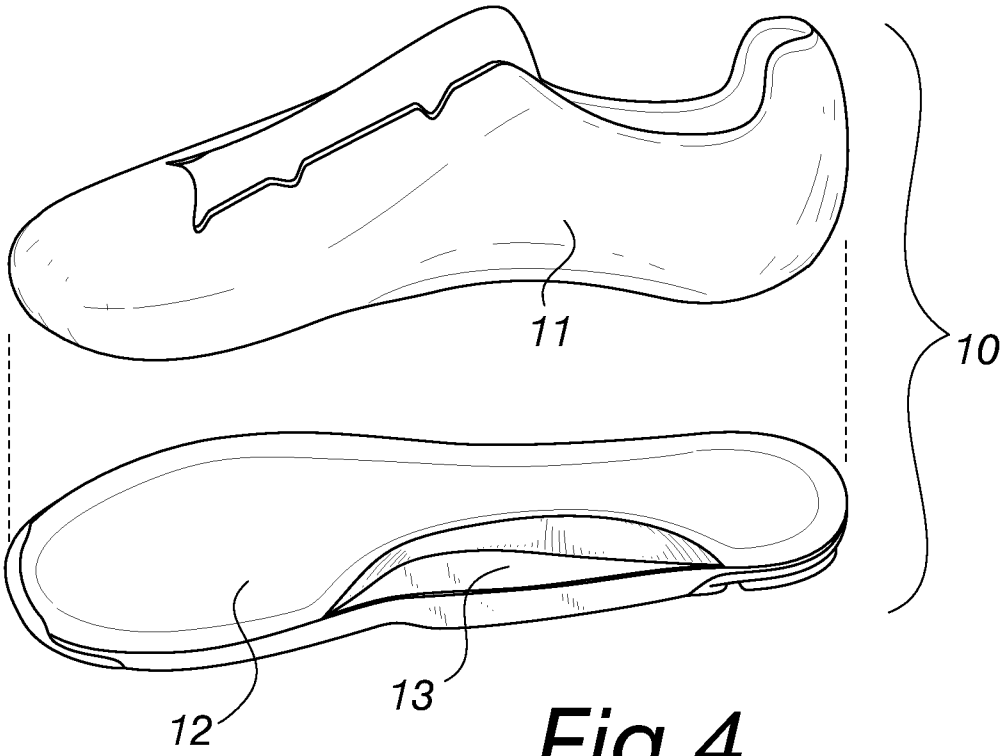

Fig.4

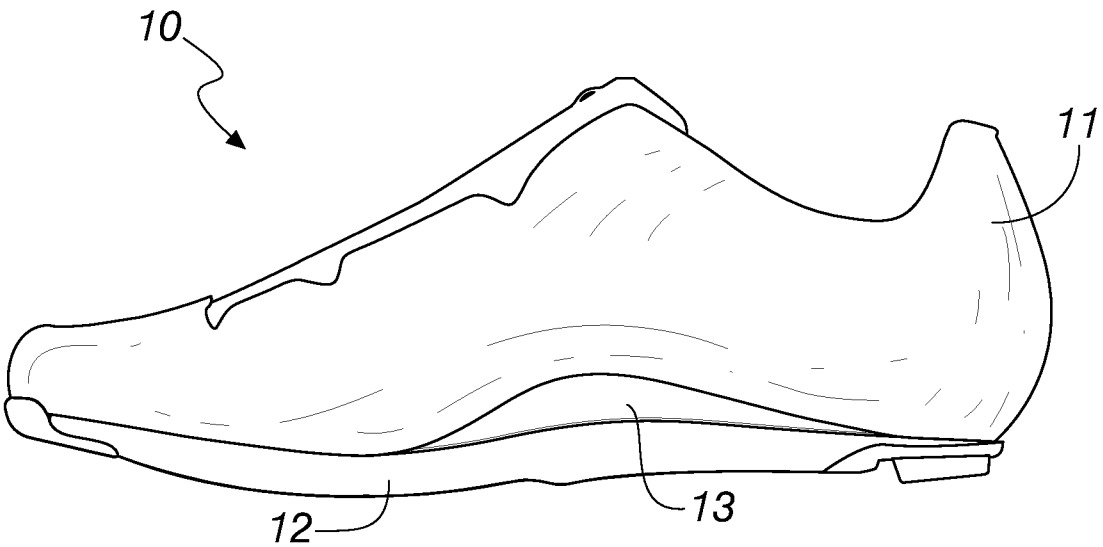

Fig.5

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. A43B7/14 A43B9/00 A43B13/12 A43B23/22
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A43B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 319 866 A (FOLEY PETER M [US] ET AL) 14 June 1994 (1994-06-14) col.7, l.13-21; col.7, l.53-64; col.7, l.62-68;; figures 1,6,9,10	1-8
X	US 7 383 647 B2 (NEW BALANCE ATHLETIC SHOE INC [US]) 10 June 2008 (2008-06-10) col.8, l.30-42; col.7,l.64-col.8,l.20;; claim 35; figures 1,27	1-8
X	EP 2 454 959 A1 (BENNERT ANDREAS [FI]) 23 May 2012 (2012-05-23) the whole document	1-8

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2018/051710

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