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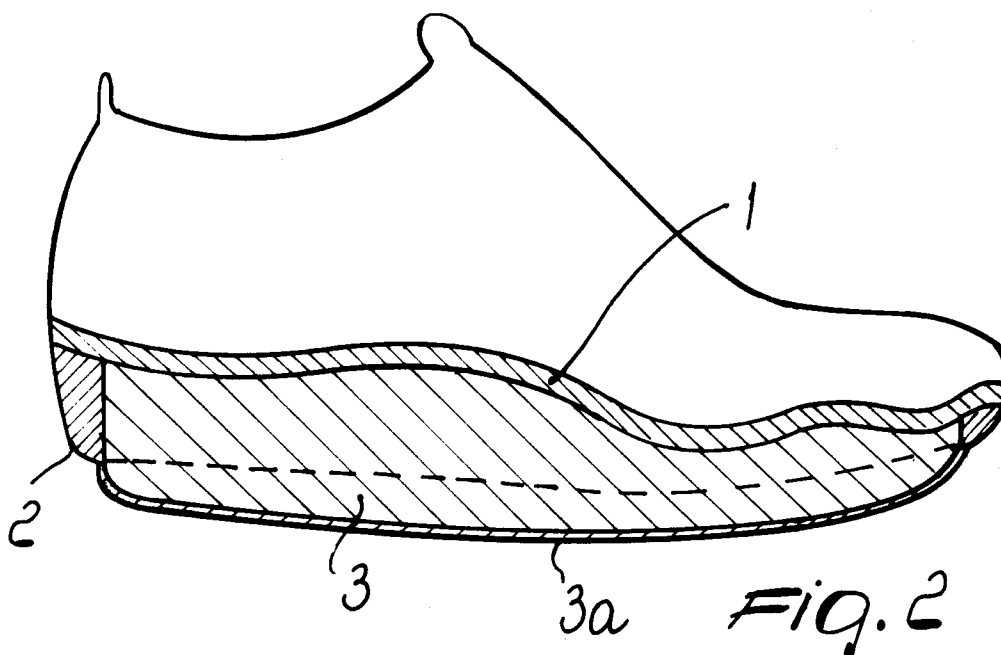
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I-20123 Milano (IT)(54) **Footwear outsole with differentiated elasticity, particularly adapted for running and other sports**

(57) A footwear outsole, with differentiated elasticity, particularly adapted for running and other sports, characterized in that it has, at a lower part (3), zones (3a) being particularly elastic and protruding down-

wards with respect to other more rigid zones so as to allow the latter to make contact with the ground during elastic compression of the former.

**Fig. 2****EP 0 687 425 A1**

The present invention relates to a footwear outsole, with differentiated elasticity, particularly adapted for running and other sports.

As is known, once, in track and field athletics only one type of shoe existed for practicing all sports; it was the so-called "gym" shoe or "tennis" shoe because it was used for this latter sport also.

Nowadays instead, for any sport, the athletes can avail themselves of specific shoes expressly devised.

Thus, a change occurred from the traditional "gym" shoes made of rubber and cloth to more sophisticated solutions using composite uppers and shaped outsoles, as well as inserts as air or gel pads allowing anatomical fit to the athlete's foot.

Therefore, the known solutions exclusively aim at providing an optimum support for the foot in the footwear.

The principal aim of the present invention is instead to perfect a footwear outsole with the particular purpose of improving the athletic performance, said outsole being able to soften the foot impact on the ground by dampening the traumatic pounding which reflects back from the limbs all over the body, which reduces tiring and which increases the pushing action by returning, upon detaching the foot from the ground, the energy accumulated by the compression at the landing.

Within the scope of the above aim, a consequent primary object is to perfect an outsole adapted for providing an effective elastic reaction, while not compromising the safe bearing on the ground.

Another object is to perfect an outsole having an adhesion that is variable according to the changing of the load conditions.

It is yet another object to perfect an outsole adapted to enhance the grip on the ground when subjected to a prevailing compressive load.

It is yet another object to perfect an outsole which, under normal use conditions, has such an adhesion so as to allow good mobility.

It is yet another object to perfect an outsole having optimum flexibility features.

Another object is to perfect an outsole obtainable at low costs with common equipment and installations.

These and still other objects, which will better become apparent from the following description, are achieved by an outsole, with differentiated elasticity, particularly adapted for running and other sports, characterized in that it has, at a lower part, zones being particularly elastic and protruding downwards with respect to other more rigid zones so as to allow the latter to make contact with the ground during elastic compression of the former.

Further characteristics and advantages of the present invention will better become apparent from

the detailed description of some embodiments thereof illustrated, by way of example only, but non-limitative for the scope, in the accompanying drawings in which:

5 figure 1 is a view from below of a footwear outsole having an elastic part extending on almost the whole surface and sized so as to protrude in height with respect to a perimetric rim or sole, of a more rigid material;

10 figures 2 and 3 are respective longitudinal sectional views referred to figure 1 according to two different embodiments of the footwear outsole;

figures 4 and 5 are respectively a view from below and a longitudinal sectional view of a footwear outsole, the sole having two fillers of more elastic material protruding in height with respect to the standing out surfaces of said sole; figures 6 and 7 are respectively a view from below and a longitudinal sectional view of a footwear outsole having a sole, with inserted three fillers of more elastic material protruding in height with respect to the standing out surfaces of said sole, shaped to frame each of the elastic fillers;

25 figures 8 and 9 are a view from below and a longitudinal sectional view of part of a footwear outsole similar to that in figures 6 and 7 with the elastic fillers provided with steel springs.

With particular reference to figures 1 and 2, a footwear outsole according to the invention has a plan profile not differing from the known ones, while the vertical profile, both longitudinally and transversely, has a part 3 protruding downwardly with respect to the ground bearing surface of part 2, said sole being shaped so as to perimetrically frame said part 3.

Conveniently, the part 3 is covered below with a tread 3a which provides the necessary resistance in the ground contact zones.

40 Both, the part 3 and sole 2 are filed to a plantar element or insole 1 and the former has a sufficient consistency to avoid that the foot perceives the different degree of elasticity of the latter, since, as mentioned before, the part 3 is considerably more elastic than the part 2 and therefore is intended to compress during the impact of the foot on the ground until also the sole 2 comes to bear thereon.

Thereafter, during the foot run, while passing from the landing position to that of pushing, the part 3 advantageously yields back the energy accumulated from the elastic deformation.

Referring now to figure 3, also related to the same view from below of figure 1, in a different embodiment there is provided an insole 4 less thick than the previous 1, for it is combined with a sole 5 which is not only limited to the framing of the elastic part 6, but extends over the entire plan surface of the outsole and accommodates in a re-

cessed part thereof the aforesaid part 6 which, even in this case and for the above-mentioned reasons, protrudes downwardly with respect to the ground bearing surface of the sole 5.

The surface 6 is also provided with a tread 6a.

With regard to the embodiment of figures 4 and 5, the outsole is obtained by fixing in recessed or depressed seats of a sole 7 provided with a plantar element or insole 4, similar to that of the preceding embodiment, two fillers 8 and 9 of a more elastic material, both extending from one side to the other of the aforesaid outsole.

These fillers also are suitably provided with treads 8a and 9a respectively.

Therefore, the stability of the foot while bearing on ground is assured, during the flattening of the elastic part 8, by the rear 7a and middle 7b sole zones, between which said part is located, while during the subsequent flattening of the front elastic part 9, that is in the pushing phase, the stability is given by the middle 7b and front 7c zones of the sole 7.

Referring now to figures 6 and 7, a sole 10 is shown therein, for connection to the above cited plantar element or insole 4 which accommodates in adapted recessed seats or gaps, several filler elements, of a particularly elastic material, in this instance designated by numeral references 11, 12 and 13 and suitably covered at the lower part by a tread, respectively 11a, 12a and 13a.

In such embodiments, obviously, each of the elastic filler elements, in relation to the various stresses foreseen for every outsole zone, can have an elasticity degree different from the others and, in any case, the flattening would be limited by the coming into bearing position of the sole 10, which is anyway of a more rigid material.

The numerous variety of materials currently existing and adapted for making footwear outsoles does not limit the choice of the most adapted combination for the practical accomplishment of the invention, being understood that it is necessary to use a more rigid material for the stabilizer sole and a more elastic one for those parts or filler elements sized in thickness for projecting from the aforesaid sole by a height which is not greater than the foreseen flattening.

However, by way of example, use of a solid para rubber for the stabilizer sole, and use of flexible foamed polyurethane may be suggested for the elastic filler parts or elements.

Furthermore, it is not to be excluded, as shown for instance in figures 8 and 9, that inside the elastic filler elements, for example 11, obtained by moulding flexible foamed polyurethane or any other adapted material, a plurality of helical steel springs 14 may be inserted and arranged so as to integrate the elasticity of the material on the top.

Insertion of the steel springs may regard all or part of the elastic filler elements of an outsole, as well as elastic fillers of the other embodiments illustrated in the other figures.

A further advantage of the present invention is given by the possibility to have a different distribution of the footwear and elastic filler elements, which by being fixable in adapted seats and through adapted adhesive substances, or with known coupling means, would be provided with different elasticity degrees allowing to personalize the outsole according to the individual weight and requirements of the athlete.

Such a prerogative may be advantageous even from an economical point of view because, in the same way, it is possible to replace periodically the elastic filler elements, or rather those parts which are more exposed to wear.

Finally it is to be added that, without departing from the general concept as defined by the illustrated and described features, the present invention may be susceptible to modifications and variations being anyway within the scope of the present invention.

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

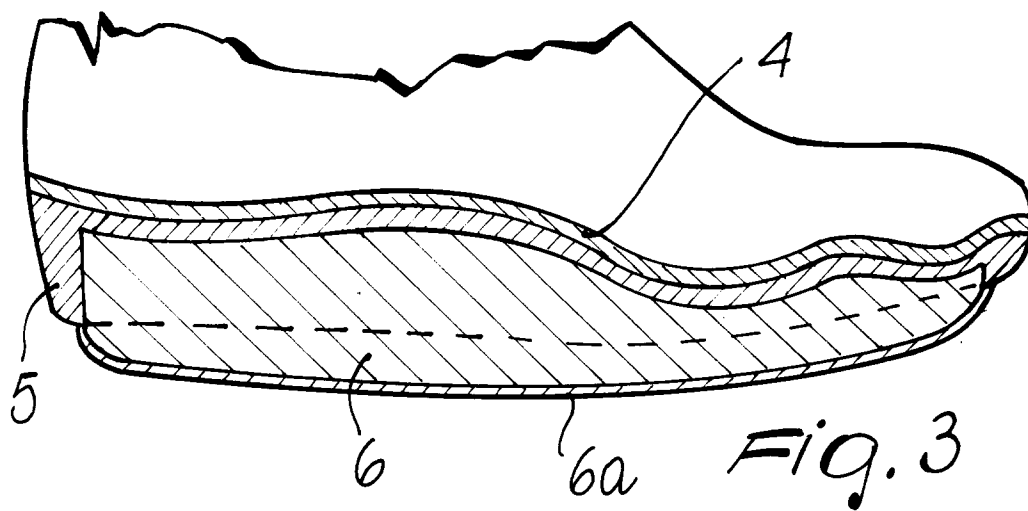
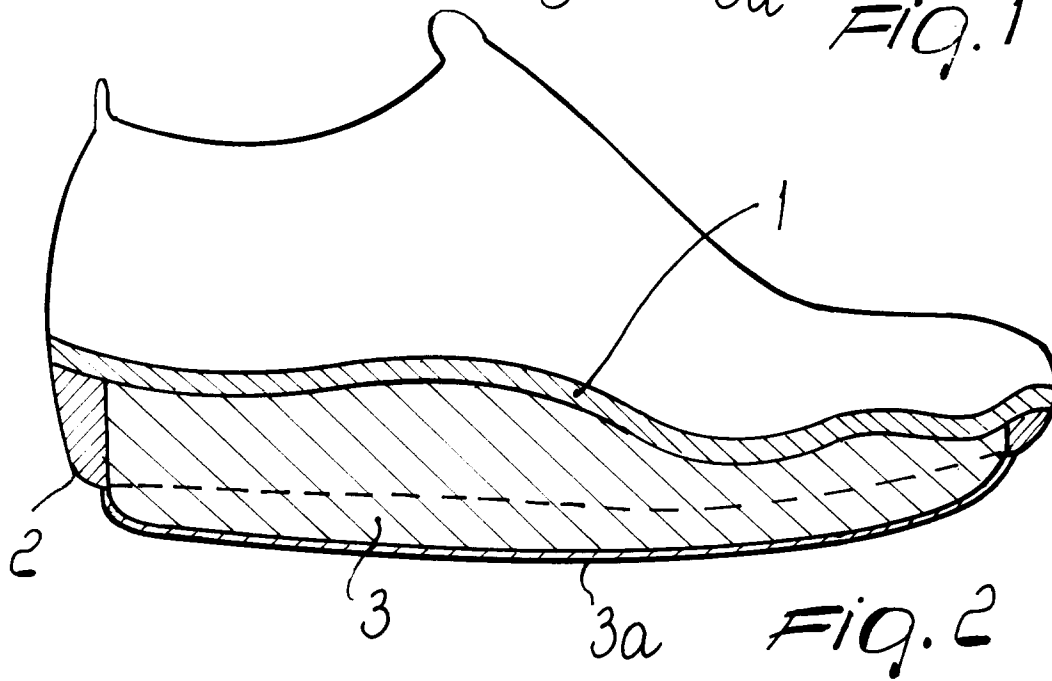
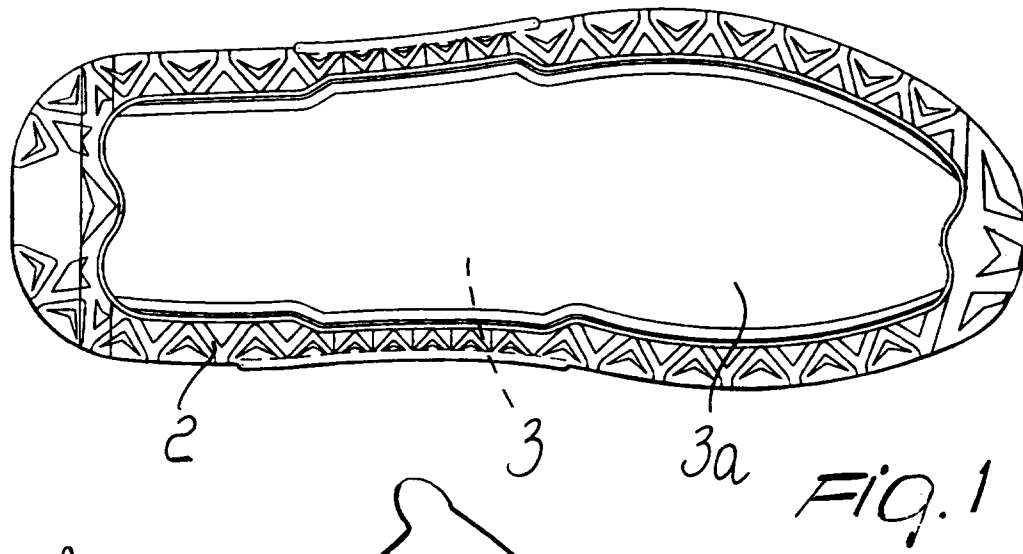
1. A footwear outsole, with differentiated elasticity, particularly adapted for running and other sports, characterized in that it has, at a lower part, zones being particularly elastic and protruding downwards with respect to other more rigid zones so as to allow the latter to make contact with the ground during elastic compression of the former.
2. Footwear outsole according to claim 1, characterized in that, to an insole of a known type, an elastic material portion is fixed, which extends for almost the whole surface of the insole and is perimetricaly framed by a sole part of a more rigid material also fixed to the insole and is less thick so as to come into bearing on the ground only after elastic flattening of the former.
3. Footwear outsole according to one or more of the preceding claims, characterized in that, to an insole of a known type, a sole is fixed which extends over the whole surface of said insole

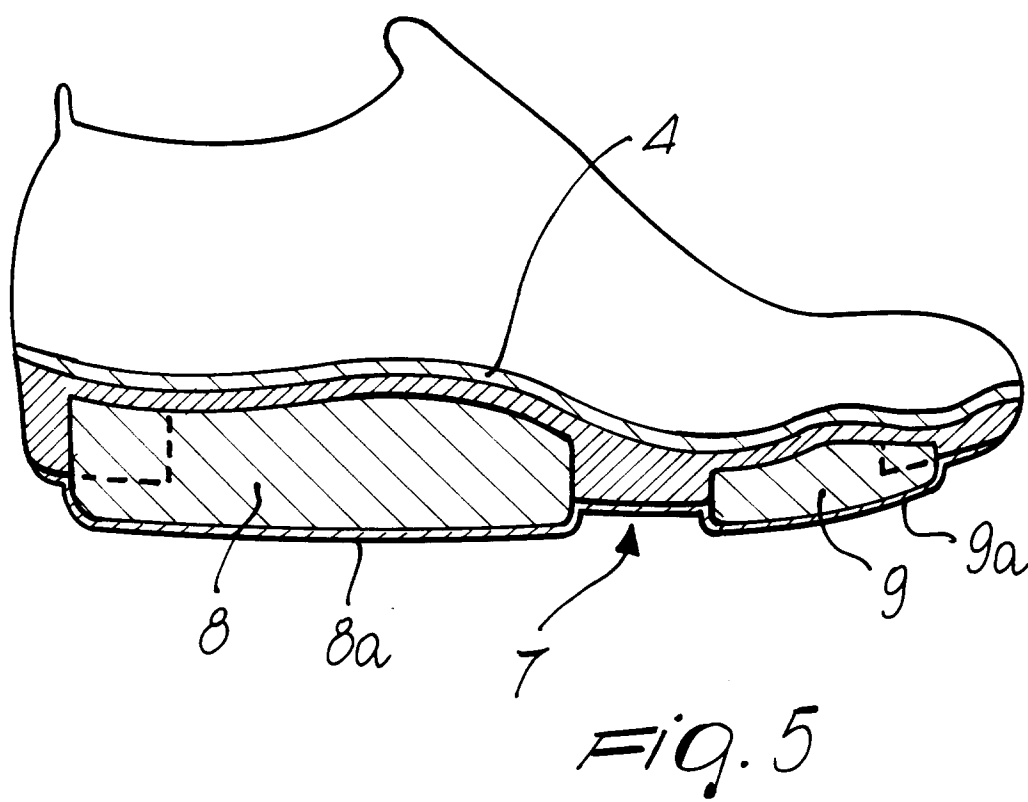
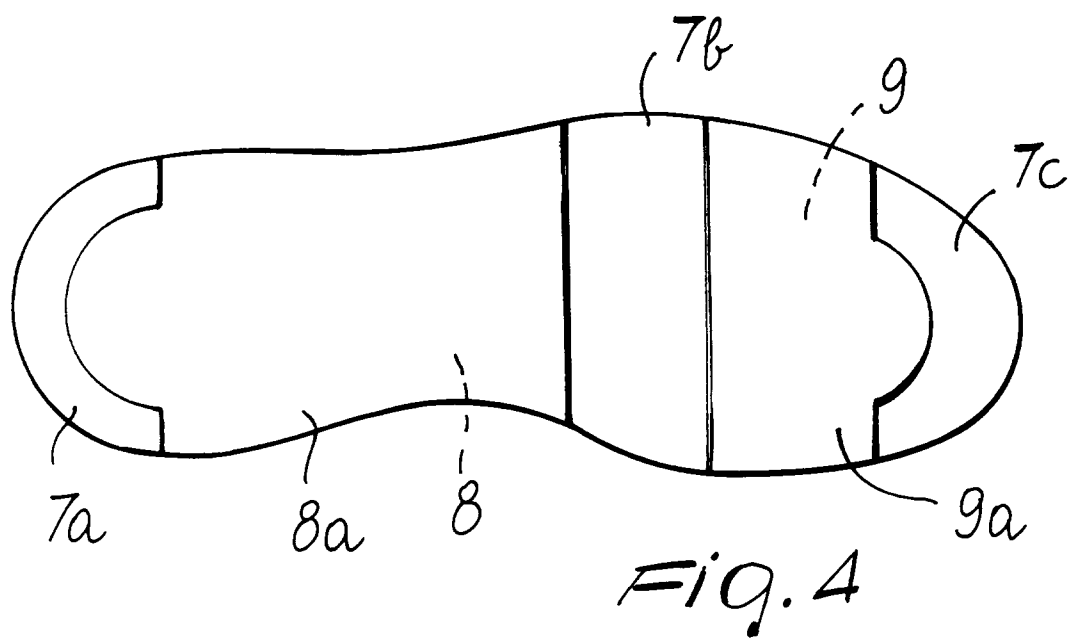
and has a recessed seat which fixedly accommodates a more elastic material part protruding downwardly for preceding, by dampening the impact on the ground, the coming into bearing of said sole.

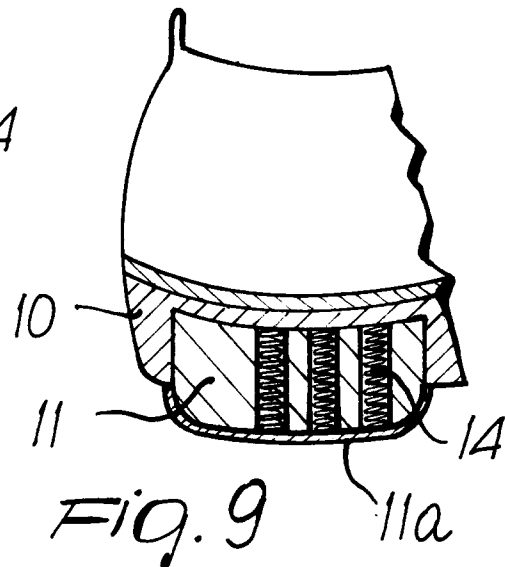
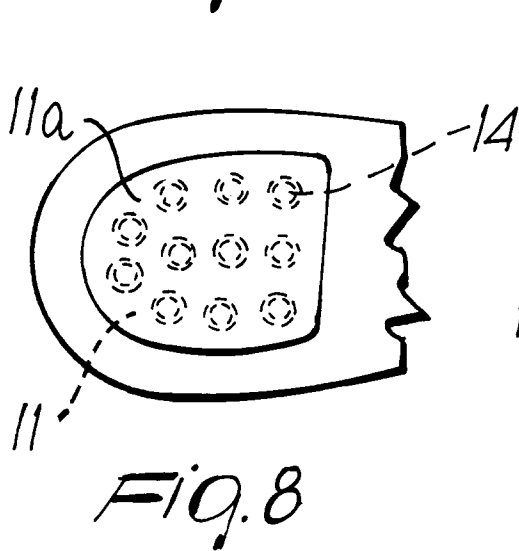
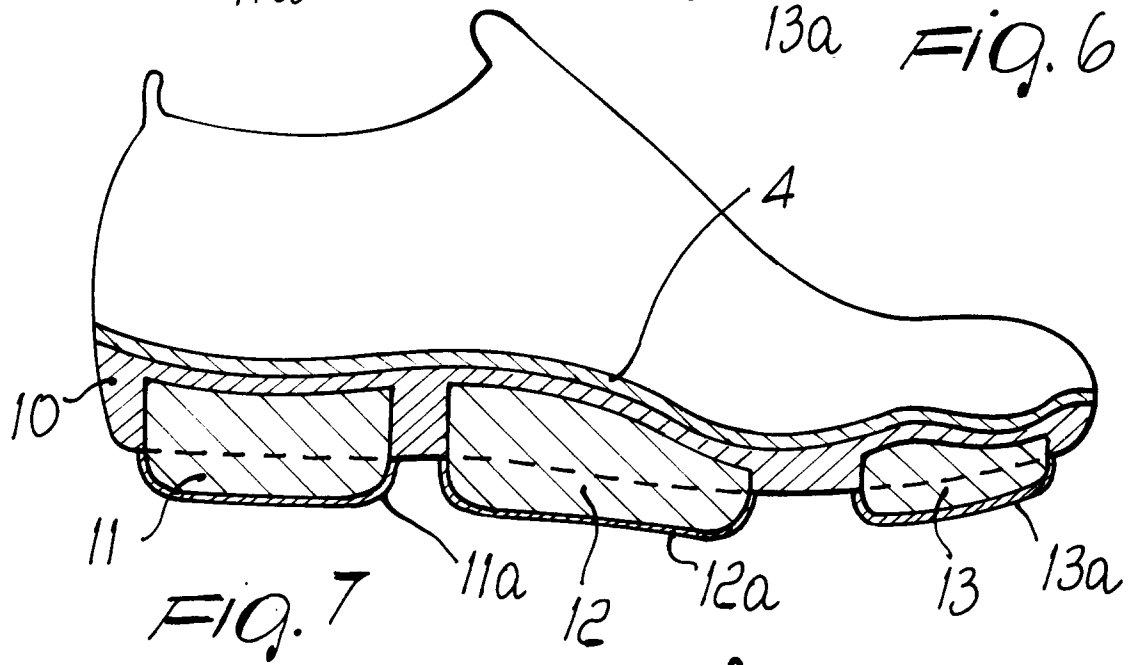
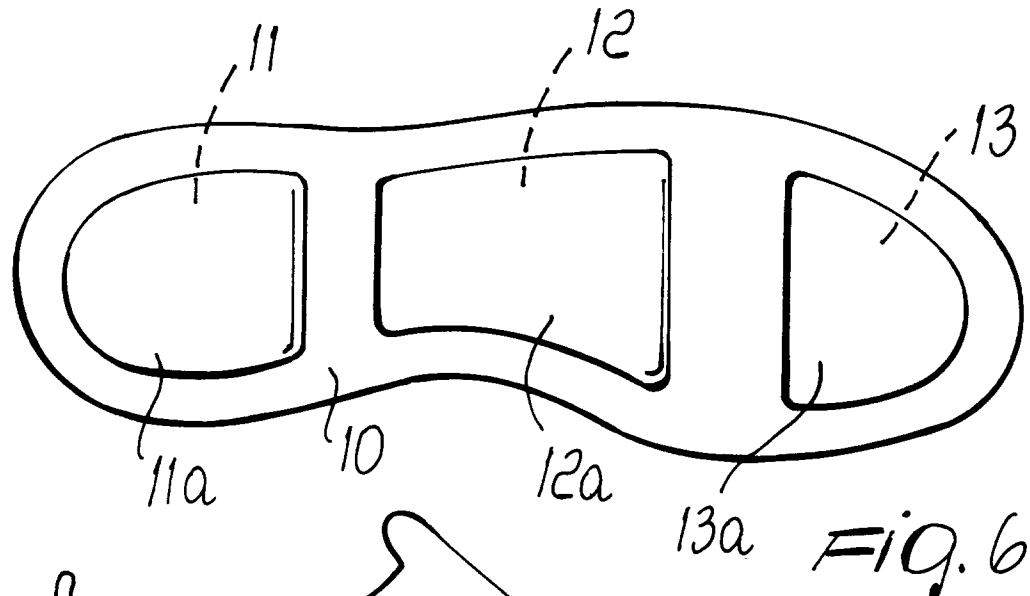
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4. Footwear outsole according to one or more of the preceding claims, characterized in that, to an insole of a known type, a sole is fixed which has, in two recessed seats or gaps, respective fillers of a more elastic material both extending from one side of the outsole to the other and protruding downwardly for preceding, by dampening the impact on the ground, the coming into bearing of said sole. 10 15
5. Footwear outsole according to one or more of the preceding claims, characterized in that, to an insole of a known type, a sole is fixed having three recessed seats or gaps which accommodate fillers of a more elastic material and protrude downwardly for preceding, by dampening the impact on the ground, the coming into bearing of said sole. 20 25
6. Footwear outsole according to one or more of the preceding claims, characterized in that two or more elastic filler elements can have different elasticity degrees one from another and determined according to personalized choice. 30
7. Footwear outsoles according to one or more of the preceding claims, characterized in that said elastic filler elements can be completed with steel helical springs for integrating the elasticity of the material of which said elements are made. 35
8. Footwear outsole according to one or more of the preceding claims, characterized in that said elastic filler parts or elements can be interchangeable, allowing personalized adaptation of the footwear at the time of purchase, as well as the subsequent replacement of the worn elements. 40 45
9. Footwear outsole according to one or more of the preceding claims, characterized in that said elastic parts or elements are provided at a lower part thereof with a tread made of a material resistant to the wear deriving from the contact with the ground. 50

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EUROPEAN SEARCH REPORT

Application Number
EP 95 10 9215

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	FR-A-601 278 (TALALAY) * page 1, line 35 - line 48; figures * ---	1-5	A43B13/18
P,X	US-A-5 367 791 (GROSS ET AL) * column 2, line 31 - line 42; figures 8-14 * ---	1,3-5,9	
X	FR-A-2 006 270 (FUKUOKA KAGAKU KOGYO CO.) * page 2, line 33 - page 3, line 17; figures 6,10 * ---	1,3-5,9	
X	DE-A-34 06 039 (SCHUSTER) * page 5, line 17 - line 23; figures * ---	1,3	
X	US-A-4 833 795 (DIAZ) * column 3, line 19 - line 25; figures * ---	1,2	
X	FR-A-2 088 626 (ETS PARITZKY S.A.) * figures * ---	1,2,9	
X	FR-A-873 618 (LACOSTE) * page 1, line 21 - line 32; figures * ---	1,3,4,8	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
X	US-A-4 372 059 (AMBROSE) * column 2, line 60 - line 66; figures * ---	1,2	A43B
X	US-E-RE31173 (DASWICK) * column 1, line 38 - line 51 * * column 2, line 19 - line 29 * * figures * ---	1,7	
X	FR-A-880 711 (ERGMANN) * figures * ---	1,3-5	
X	DE-U-77 29 025 (REPPERT) * page 4, paragraph 3; figures * -----	1,3-5,7	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 9 August 1995	Examiner Scholvinck, T
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 T : 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			