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(71) Applicant: **Calzados Hergar, S.A.**
26580 Arnedo (La Rioja) (ES)

(72) Inventor: **Moron, Basilio, Garcia**
26580 Arnedo (La Rioja) (ES)

(74) Representative: **Villamor Muguerza, Jon**
Gran Via 81
Planta 5.a, Dpto 9
E-48011 Bilbao (Vizcaya) (ES)

(54) Sole for footwear

(57) The invention relates to a sole for footwear, which is structured by means of three parts, a sole (1) of wear-resistant elastomeric material provided in the area corresponding to the front portion of the sole with a bellows type structure allowing its elastic deformation in width, an intermediate mid-sole (2), also of an elastomeric material, but with a considerably higher degree of deformability, which is coupled in a tongued and grooved manner to the sole, and an upper insole (3), which is turn seated on the upper face of the mid-sole, which is also elastically deformable in a transverse direction in the area corresponding to the front portion of the sole, and which in the area corresponding to the waist and the heel is formed as a part of rigid plastic distributing the body load generated through the heel of the foot over the entire rear surface of the mid-sole.

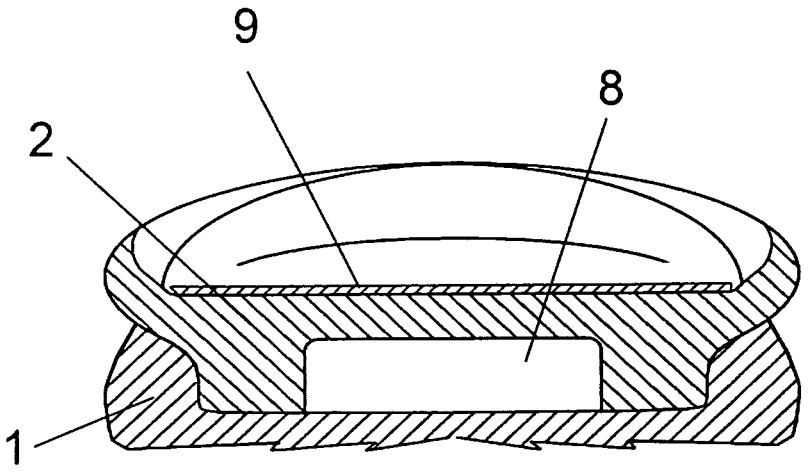


FIG. 4
C-D

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Description

Object of the Invention

[0001] The present invention relates to a sole for footwear, of the type intended to be complemented with the corresponding upper, which sole is designed and structured in order to allow both transverse and vertical expansions, for the purpose of absorbing the overstresses generated by the foot on the footwear while walking.

[0002] Therefore, the object of the invention is to achieve a sole for footwear offering full comfort to the user thereof since it is capable of being deformed due to the effect of the body weight of the user, absorbing the stresses generated by the latter, and at the same time also adapting to the considerable width increase experienced by the foot in the area corresponding to the front portion of the sole, when it is this area thereof which receives the body load.

Background of the Invention

[0003] Upon starting to walk, the entire weight of the body falls on the heel of the foot, whereas as the other foot moves forward the weight is concentrated on the sole of the foot. In addition, the foot is anatomically configured to walk barefoot and over soft ground, such that there is a cushioning effect on the ground, accompanied by a considerable widening of the foot in the area corresponding to the front portion of the sole which can reach the order of 10 mm. However, in practice different types of footwear are used which have as a common denominator a substantial rigidity in the area corresponding to their sole, such that they neither cushion the body weight when it is put on the heel nor allow the widening of the foot when the pressure area is transferred to the front portion of the sole of the shoe.

[0004] This evidently entails that the use conditions of a shoe or any other footwear are completely different with respect to what is anatomically correct.

[0005] In an attempt to solve this problem, the applicant himself is the proprietor of the utility models with application numbers 200400736 and 200400737 (PCT ES05000018), which describe an ergonomic footwear, the outsole of which is elastically deformable in a transverse direction in the area corresponding to the front portion of the sole, such that it allows the mentioned widening of said sole of the foot when the body weight is put thereon, and the subsequent recovery when said pressure stops.

[0006] However, the problem inherent to the deformability of the outsole in the direction of the flattening thereof is not solved, particularly when the body load occurs through the heel of the foot and on the area of the heel of the sole.

[0007] It may seem that the evident solution to this problem is to use an outsole of a soft, elastically deformable material capable of absorbing the mentioned overstresses occurring in an isolated manner while walking, but this is not feasible in practice because the use of a soft material entails a quick deterioration of the outsole and, consequently, a considerable shortening of the service life of the footwear.

Description of the Invention

[0008] The sole for footwear proposed by the invention fully and satisfactorily solves the aforementioned problems, making the footwear offer as a whole optimal features in any of the mentioned aspects.

[0009] To that end and more specifically, it has been provided that said sole is structured by means of three superimposed parts, an outsole having in the area corresponding to the front portion of the sole the features inherent to the utility models with application numbers 200400736 and 200400737 (PCT ES05000018), of any suitable elastomeric material to offer, at the same time as an acceptable elastic deformability, a suitable wear barrier for a long service life, a mid-sole intended to be superimposed on the mentioned outsole and of a material which is also elastomeric but much softer and elastically deformable, and an upper insole which in the area corresponding to the front portion of the sole is elastically deformable, as will be seen below, with the exception of the waist and the heel where it is rigid, preferably obtained based on rigid plastic.

[0010] According to another feature of the invention, the outsole has suitable shape features on its upper face so that the complementary mid-sole fits in a tongued and grooved manner therein, which mid-sole in the area corresponding to the front portion of the sole is fixed to the outsole by means of a tongued and grooved coupling with a dovetail profile, whereas in the area corresponding to the waist and the heel it projects substantially in an upward direction offering a considerably larger thickness, since it is this rear area which receives the most pronounced isolated stresses.

[0011] Thus, the mid-sole, which confers to the sole the high degree of elastic deformability that it offers to vertical stresses generated through the heel of the foot, is completely independent from the ground by the lower outsole, preventing wear problems and the load being uniformly distributed over the whole of said area through the rear and rigid sector of the insole, which rigid sector furthermore has small holes to facilitate the passage of air therethrough and, consequently, facilitate the transpiration of the foot.

[0012] In order to achieve the required deformability in a transverse direction, the front area of the insole, the one corresponding to the front portion of the sole, is formed from a laminar body having a wide window, occupied by an elastic part, which allows the deformations.

Description of the Drawings

[0013] To complement the description which is being

made and for the purpose of aiding to better understand the features of the invention according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of said description, in which the following has been depicted with an illustrative and non-limiting character:

Figure 1 shows a perspective exploded view of a sole for footwear made according to the object of the present invention, in which the mid-sole is depicted by both faces.

Figure 2 shows, also according to a perspective view, the same assembly of the previous figure duly assembled.

Figure 3 shows a cross-sectional detail of the assembly of the previous figure according to section line A-B of said figure.

Figure 4 shows another cross-sectional detail of the same assembly, now according to section line C-D of Figure 2.

Preferred Embodiment of the Invention

[0014] In view of the mentioned figures and particularly of Figure 1, it can be observed how three parts, an outsole (1), a mid-sole (2) and an insole (3), participate in the sole for footwear proposed by the invention.

[0015] The outsole (1), obtained by means of injection molding from a suitable elastomeric material, combining elasticity with wear resistance, incorporates as in the repeatedly mentioned invention patent a series of grooves (4) in the area corresponding to the front portion of the sole, which are complemented with other grooves of its outer face, offset with respect to the previous ones, in order to allow a "bellows" type deformation when it receives a considerable load, and consequently in order to allow a widening of the footwear in the area corresponding to the front portion of the sole, which in turn allows the widening of the foot when it receives most of the body load of the user.

[0016] According to the invention, the mentioned outsole (1) also incorporates in the area corresponding to the front portion of the sole a thick perimetric rib (5) defining immediately below same a groove (6), converging towards the edge of said rib (5), determining a dovetail coupling for the mid-sole (2), which is thus locked to the outsole (1) by simple tonguing and grooving, whereas the rear portion of said mid-sole (2) simply rests on the rear area of the outsole (1), specifically in a sort of receptacle defined by the free and raised edge (7) of said area of the outsole.

[0017] The mid-sole (2) in turn has a beveled edge in the area corresponding to the front portion of the sole for its tongued and grooved coupling to the groove (6) of the outsole, and in its rear area it has an outer surface suitable in size and shape for tightly fitting on the recess of the outsole, said mid-sole (2) being of a considerably soft material, which is easily elastically deformable, this deformability being enhanced by the existence in said mid-sole of a hollow (8) considerably centered on the area of the heel of the foot.

[0018] The sole is complemented with the insole (3), the rear area (9) of which, the one corresponding to the waist and the heel, is of a rigid material, preferably of rigid plastic, such that the stresses due to the body load of the user on this area are homogeneously distributed over the rear area of the mid-sole (2) and consequently also over the rear area of the outsole (1), the one corresponding to the heel and to the waist.

[0019] On the contrary, the sector of the insole (3) corresponding to the front portion of the sole is of a flexible material (10) and a large part of it has a window (11), occupied by an elastic textile sheet (12), which confers to the insole the necessary elasticity and possibility of elastic deformation in a transverse direction, when the front sector of the outsole (1) does so, said textile sheet (12) being attached through its perimeter to the part (10) with the collaboration of a seam (13).

[0020] It must finally only be indicated that for the purpose of also extending the comfort of the sole to the aspect of airing the foot, the rigid part (9) participating in the insole (3) has a plurality of small circular holes (14) allowing the passage of air therethrough.

Claims

1. A sole for footwear, of the type having an outsole of a wear-resistant elastomeric material, duly configured in the area corresponding to the front portion of the sole to allow the elastic deformability thereof in a transverse direction, in order to absorb the widening of the foot when the body load occurs on the front portion thereof, **characterized in that** it is formed by means of the functional combination of three parts, a lower outsole (1), an intermediate mid-sole (2) and an upper insole (3), said outsole (1) having an upper and inner perimetric rib (5) in the area corresponding to the front portion of the sole, below which there is established a groove (6) allowing a preferably dovetail tongued and grooved coupling of the mid-sole (2), with beveled edges in correspondence and also in the area corresponding to the front portion of the sole, which mid-sole is obtained in an elastomeric material with high elastic deformability, whereas the insole (3), which is also elastically deformable in a transverse direction in the area corresponding to the front portion of the sole, is formed in the area corresponding to the waist and the heel as a rigid part (9), preferably of plastic, which adapts to the corresponding area of the mid-sole and which distributes the body load over the entire surface of the rear area of the latter.

2. The sole for footwear according to claim 1, **characterized in that** the sole (1) configures in the

area corresponding to the waist and the heel a sort of receptacle in which the rear and corresponding area of the mid-sole is tightly coupled, in which area the insole is in turn fitted.

3. The sole for footwear according to claim 1, **characterized in that** the mid-sole (2) incorporates a hollow (8) considerably centered on the area corresponding to the heel of the foot.

4. The sole for footwear according to claim 1, **characterized in that** the rear and rigid part (9) participating in the insole, the one made of hard plastic, incorporates a plurality of small holes (14) for airing the foot, whereas the front part (10), the one corresponding to the front portion of the sole, is deformable and a large part of it has a wide window (11) occupied by an elastic fabric sheet (12) which is fixed to the mentioned part (10) through a perimetric seam (13).

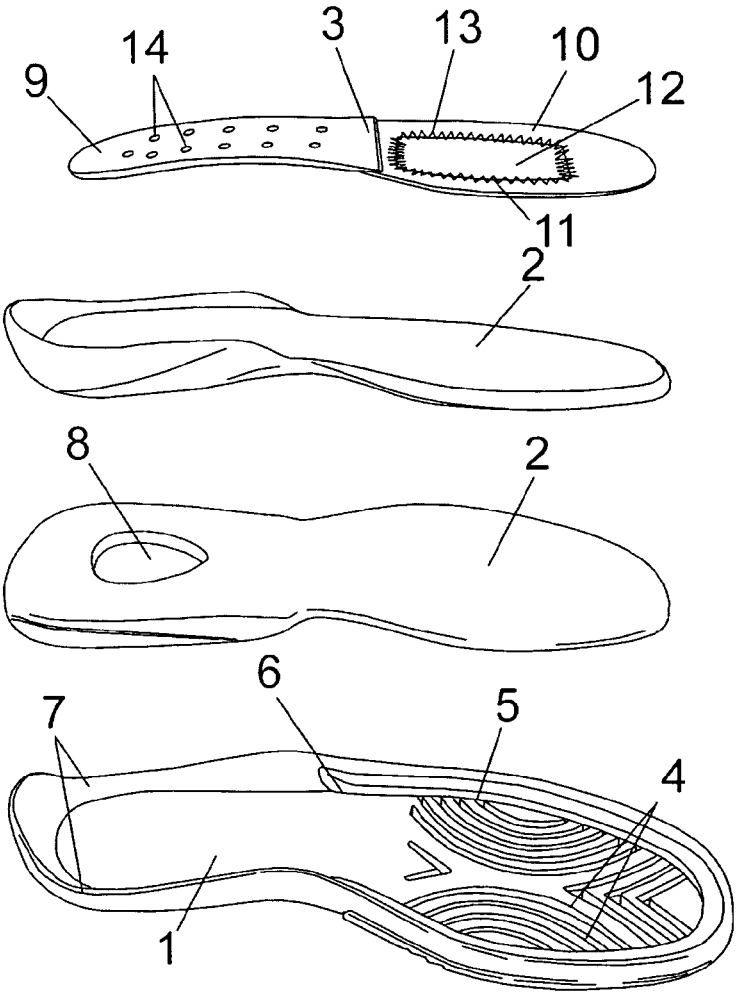


FIG. 1

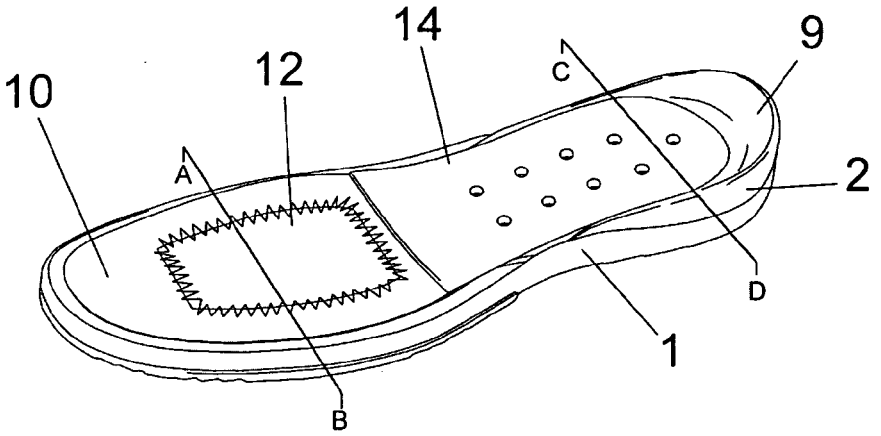


FIG. 2

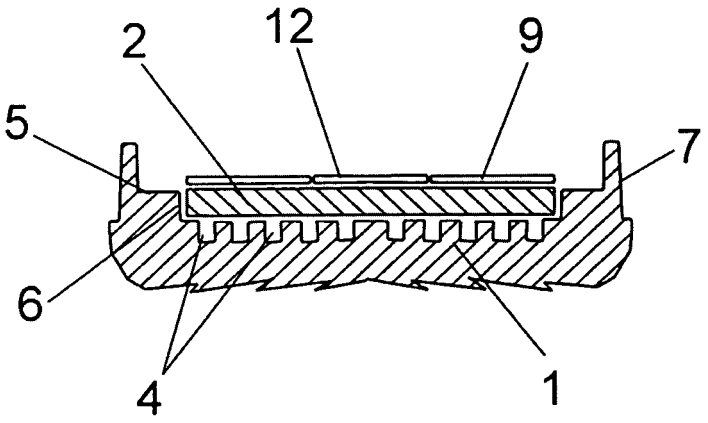


FIG. 3
A-B

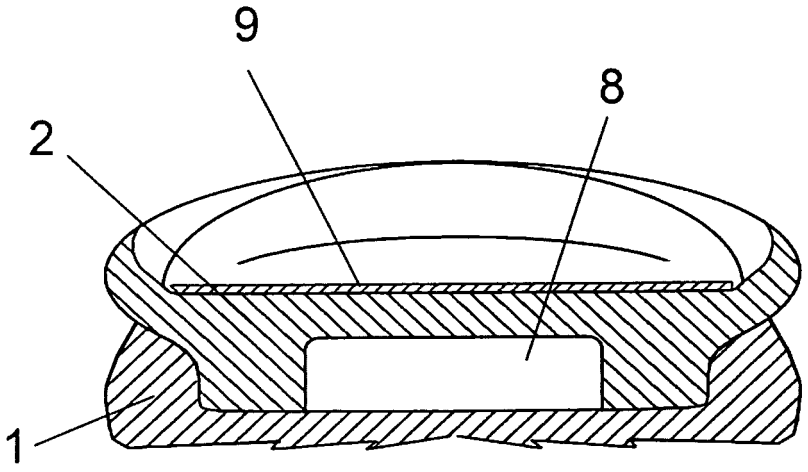


FIG. 4
C-D

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EUROPEAN SEARCH REPORT

Application Number
EP 10 00 2834

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Place of search	Date of completion of the search	Examiner
Munich	13 July 2010	Tejada Biarge, Diego

CATEGORY OF CITED DOCUMENTS

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