



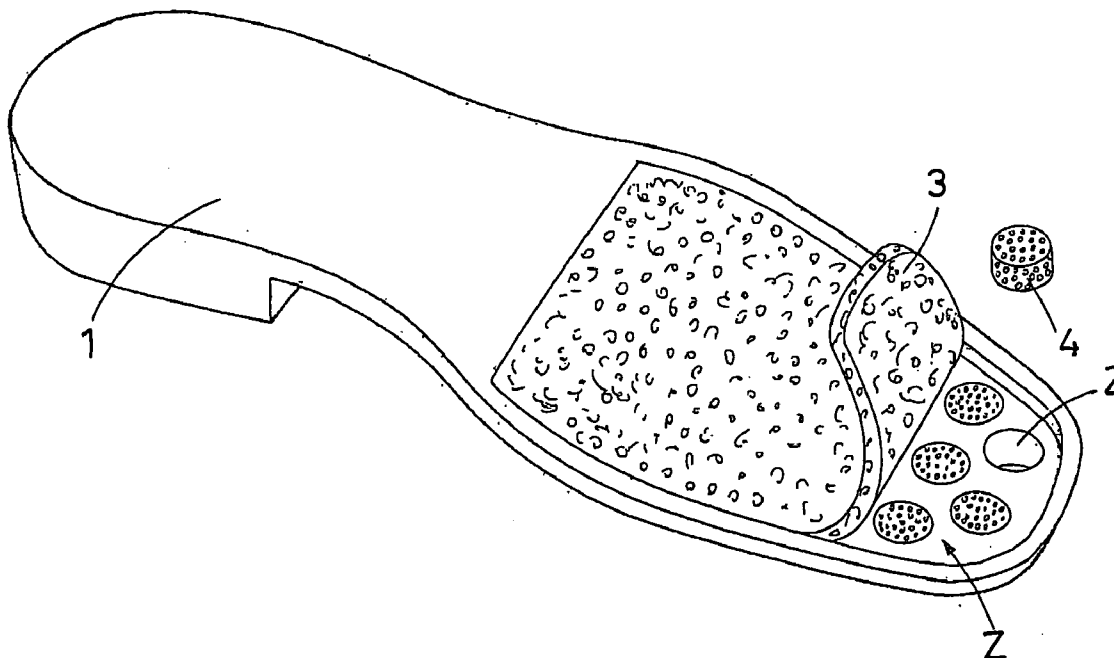
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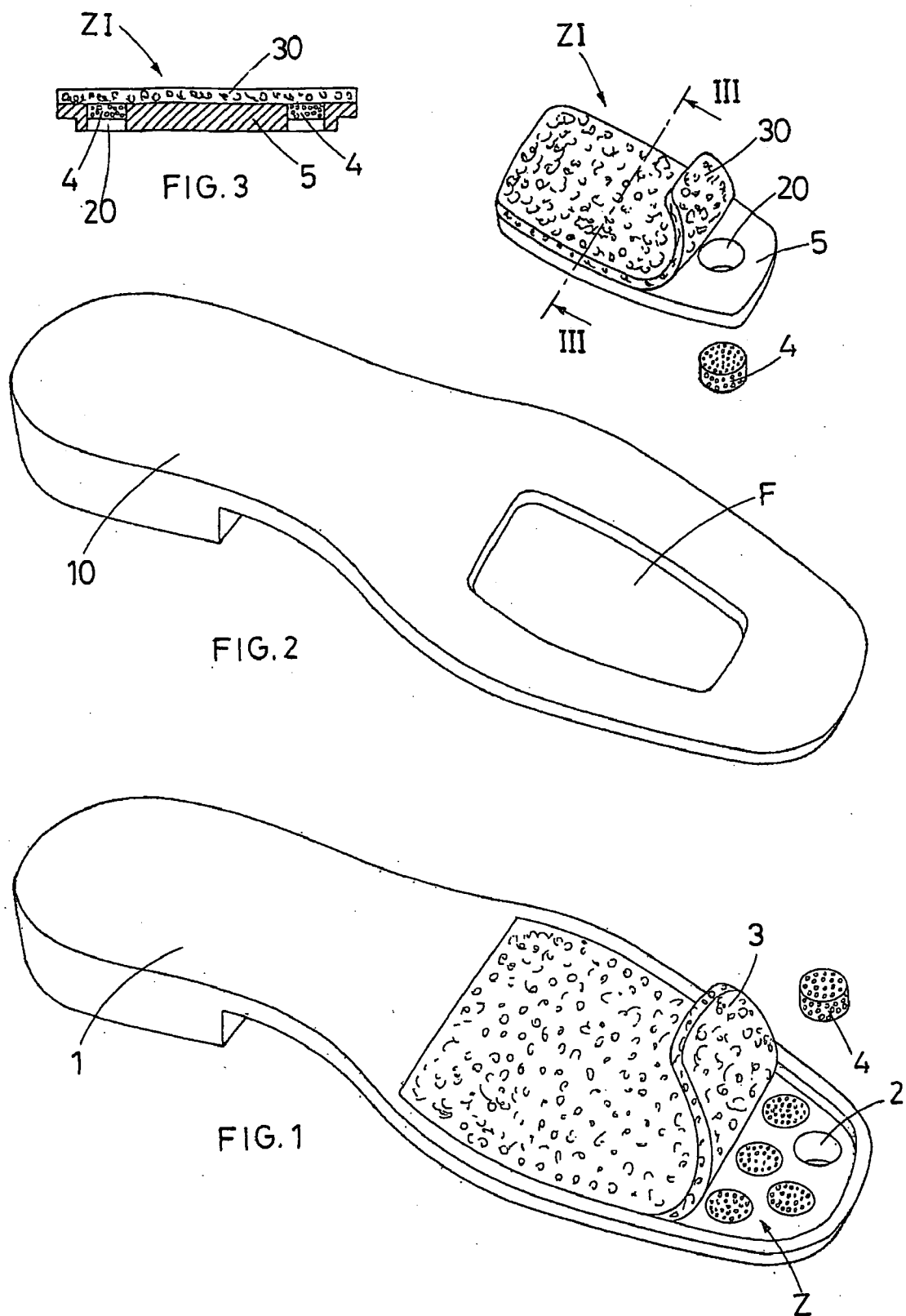
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Adelchi(10) **Pub. No.: US 2009/0031586 A1**(43) **Pub. Date: Feb. 5, 2009**(54) **TRANSPIRANT WATERPROOF OUTER SOLE
FOR SHOES**(30) **Foreign Application Priority Data**

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901 Dulaney Valley Road Suite 400
Towson, MD 21204 (US)(51) **Int. Cl.**
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(52) **U.S. Cl.** **36/103; 36/3 B; 36/25 R**(21) Appl. No.: **11/920,589**(22) PCT Filed: **Nov. 24, 2005**(86) PCT No.: **PCT/IT2005/000689**§ 371 (c)(1),
(2), (4) Date: **Nov. 16, 2007****ABSTRACT**

The present invention refers to a transpirant waterproof outer sole for shoes, of the type moulded from plastic materials, characterised in that the front part of the foot is provided with a special section (2, 21) with multiple through holes (2, 20) capable of exactly and permanently housing suitable synthesized spherical bronze inserts (4) and coated on the upper part by a transpirant waterproof membrane (3, 30) capable of covering the external side of the holes (2).





TRANSPIRANT WATERPROOF OUTER SOLE FOR SHOES

[0001] The present patent application refers to an outer sole for shoes provided with transpirant and waterproof properties.

[0002] As it is known, moulded plastic soles with one or more holes capable of guaranteeing circulation of external air inside shoes have been available for long on the market to increase the user's comfort.

[0003] According to a known type of transpirant shoes, the holes used to introduce air are opened on the shoe walking surface.

[0004] In this perspective, it appears evident that these holes must prevent water from penetrating from the ground through the holes and reaching the user's feet inside the shoes

[0005] In particular, the internal side of the holes is "sealed" with a membrane of known type that is transpirant and waterproof, since it permits the introduction of air and prevents the entrance of water and humidity.

[0006] This means that the water that tends to raise through the holes used to introduce air does not penetrate into the shoes, in view of the barrier offered by the waterproof membrane.

[0007] However, this consolidated technology is not fully satisfactory from the functional viewpoint, being impaired by a significant drawback.

[0008] Reference is made to the fact that the holes designed to introduce air inside shoes tend to fill with soil, dust and even small stones, following to repeated contacts of the outer sole with the ground.

[0009] In such a case, the cross-section of the holes gets clogged, and, consequently, the desired introduction of air is not possible.

[0010] In brief, shoes provided with outer soles impaired by the said drawback lose their transpiring properties in a short time.

[0011] Additionally, the forced introduction of small stones inside the holes may tear the transpirant waterproof membrane that protects the internal side of the holes in the sole.

[0012] Evidently, once the membrane is damaged, an additional drawback occurs, since rain water penetrates inside the shoes and gets the user's feet wet.

[0013] To reduce the risk of damaging the membrane, the cross-section of the ventilation holes has been reduced to minimum; however, although this reduces the risk of penetration of sharp micro-objects, it negatively reduces the air capacity of the holes and makes them more vulnerable of being suddenly clogged with soil or mud.

[0014] The purpose of the present invention is to innovate the said technology, with the specific aim of eliminating the aforementioned inconveniences.

[0015] More precisely, the purpose of the present invention is to prevent air ventilation holes on the outer sole from getting filled with soil, small stones and different impurities; another purpose of the invention is to protect the internal transpirant waterproof membrane against the risk of getting damaged under the energetic interference action of hard impurities introduced through the holes.

[0016] The aforementioned purposes have been achieved by the present invention without reducing the cross-section of the ventilation holes and therefore leaving the air capacity and the transpirant properties of the outer sole unchanged.

[0017] In order to achieve the aforementioned purposes, a special section is provided on the moulded plastic outer sole (preferably in the centre of the front part of the foot) to guarantee reliable durable transpirant waterproof properties.

[0018] Practically speaking, the special section of the outer sole of the invention can be obtained as an independent insert fixed at a later stage inside a suitable opening on the outer sole or as the result of a specific machining operation during production of the outer sole one-piece structure.

[0019] In both constructive embodiments of the invention, the special section of the outer sole is provided with multiple holes with circular cross-section for air introduction, as well as with the traditional transpirant waterproof membrane that covers the internal side of the holes on the sole.

[0020] The peculiarity of the invention consists in the fact that the holes contain corresponding small cylinders made of synthesized spherical bronze, in order to completely fill the entire cross-section and the entire height of the holes.

[0021] More exactly, the cylinders are microspherated products obtained from spherical bronze powder.

[0022] Spherical bronze powder permits to obtain a machinable solid mass with good mechanical resistance and at the same time capable of being penetrated by air flow, by means of hot soldering process of the microspheres.

[0023] In particular, air delivery through these products changes according to the diameter of the powder microspheres and the thickness of the product obtained and, in general, is a linear function of load loss.

[0024] Based on the aforementioned considerations, it appears evident that the synthesized bronze cylinders used in the outer sole of the invention permit air penetration to ensure foot transpiration, although they cannot oppose water raising (this explains the need to provide the traditional transpirant waterproof membrane on the special section of the outer sole).

[0025] Nevertheless, the real advantage of the said cylinders consists in the fact that, although they do not impair air circulation in favour the user's foot, they are able to prevent the risk of occlusion for the holes and the risk of damage for the internal membrane.

[0026] As a matter of fact, if the holes on the outer shoe are completely filled by the corresponding structure of the said cylinders, it appears evident that the holes cannot be accidentally filled with soil, mud or small waste from the ground.

[0027] Likewise, the presence of the cylinders inside the holes makes it absolutely impossible for solid compact debris able to damage the waterproof membrane to raise to the membrane.

[0028] In this perspective, the fact that the synthesized bronze powder cylinders have a hard structure is extremely useful, since it protects their integrity also in case of energetic contacts with small stones, rock fragments or other sharp micro-impurities.

[0029] For major clarity the description of the invention continues with reference to the enclosed drawings, which are intended for purposes of illustration only and not in a limiting sense, whereby:

[0030] FIG. 1 is an axonometric view of the one-piece version of the outer sole of the invention;

[0031] FIG. 2 is an exploded axonometric view of the version of the outer sole of the invention in which the special section is obtained separately and then inserted into a corresponding opening on the front part of the outer sole;

[0032] FIG. 3 is a cross-section with plane III-III of the special section of FIG. 2.

[0033] With reference to FIG. 1, the outer sole of the invention (1) is provided with a special transpirant waterproof section (Z) located on the front part of the foot.

[0034] The section (Z) is provided with multiple through holes (2), preferably with circular cross-section.

[0035] The internal side of the special section (Z) is entirely coated with a transpirant waterproof membrane (3) that, in this position, covers the external sides of the holes (2).

[0036] Each hole (2) exactly and permanently houses a cylinder (4) made of synthesized spherical bronze that allows air to penetrate the hole (2), while protecting the hole (2) against the risk of being clogged by impurities found on the ground that may eventually damage the membrane (3).

[0037] As mentioned above, the invention may be realised according to two different constructive embodiments that are however absolutely equivalent in functional and conceptual terms.

[0038] As shown in FIG. 1, in the first embodiment of the invention the special section (Z) is originally incorporated into the one-piece structure of the outer sole.

[0039] As shown in FIGS. 2 and 3, in the second embodiment of the invention, the special section (Z1) is obtained as a sort of independent moulded plastic plate (5), exactly mounted inside a suitable opening (F) on the corresponding version (10) of the outer sole of the invention.

[0040] Evidently, the independent plate (5) is provided with suitable through holes (20) that exactly house the synthesized

bronze cylinders (4) and is coated on the upper side with the traditional transpirant waterproof membrane (30).

[0041] Finally, it must be noted that although the holes (2, 20) on the special section (Z, Z1) have a circular cross-section and, consequently, the synthesized bronze cylinders (4) have a corresponding cylindrical structure, the same holes (2, 20) may also have a different cross-section and, consequently, the synthesized bronze cylinders (4) contained in the holes (2, 20) may also have a different structure.

1. Transpirant waterproof outer sole for shoes, of the type moulded from plastic materials, characterized in that the front part of the foot is provided with a special section (Z, Z1) with multiple through holes (2, 20) capable of exactly and permanently housing suitable synthesized spherical bronze inserts (4) and coated on the upper part by a transpirant waterproof membrane (3, 30) capable of covering the external side of the holes (2).

2. Outer sole for shoes as defined in claim 1, characterized in that the special section (Z) is originally incorporated into the one-piece structure of the outer sole.

3. Outer sole for shoes as defined in claim 1, characterized in that the special section (Z1) is obtained as an independent moulded plastic plate (5) exactly mounted inside a suitable opening (F) on the outer sole.

4. Outer sole for shoes as defined in claim 1, characterized in that the through holes (2, 20) on the special section (Z, Z1) have a circular cross-section and, consequently, the synthesized bronze inserts (4) are shaped as suitable cylinders.

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