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US-A- 6 029 962
US-A1- 2002 119 276
US-A1- 2005 132 610
US-A1- 2006 277 685
US-B1- 6 976 321

DESCRIPTION

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention lies in the field of hollow soles for footwear.

[0002] This invention is a hollow sole for footwear that combines several cushioning methods meant to absorb the greatest range of possible loads with a simple and easily adjustable configuration.

BACKGROUND OF THE INVENTION

[0003] Hollow soles for footwear are known formed by two parts joined to each other to configure a hollow part between them that is filled with air, as shown by the same applicant in Spanish Utility Model with application number 201030592.

[0004] This type of sole is convenient for different uses due to its shock-absorbing qualities, which are inherent to the configuration of the sole, which results in a specific mechanical behaviour. For this reason, modifications in the shock-absorbing properties are meant to modify the configurations that are compressed, normally truncated pyramids or prisms, as well as modifying the type of material used to manufacture the sole, which will provide the restoration from the compression.

[0005] Other known types of sole use solid configurations of different plastic components, combining different hardness and elastic properties. In this case, however, the soles tend to have poor lateral support, as it is the structure of the plastic material that must withstand the lateral load, so that it is not uncommon to see feet with excessive pronation or supination.

[0006] In both hollow and solid soles, once a problem is known and the corresponding adjustment is decided, it is complicated and expensive to carry it out, as it involves acting on a single factor, either the configuration or the material, which has a working range that may be inadequate for solving the problem.

[0007] Thus, configurations made of rubber in hollow soles of geometric type, such as truncated cones and others, are suitable for absorbing high impact forces, such as the first contact of the heel with the ground. However, plastic foams in solid soles are suitable for medium and small impacts, such as during foot roll and toe lift.

[0008] It is known the patent US 6,029,962 wherein a shock absorbing component and its construction method is disclosed, such component suitable for footwear, including a bottom half and a top half, both comprising a sheet and hollow vertical configurations, indentations,

oriented towards the interior of the component, that define internal pockets filled with hollow inserts.

[0009] It is also known the patent 2006/0277685 wherein a cushioning system is disclosed, such system suitable for footwear, including a bottom half and a top half, both comprising a sheet and hollow vertical configurations, oriented towards the interior of the component, that define internal pockets, the top half ones filled with a foam leaving a gas chamber in front of the foam.

[0010] For this reason, no soles are known that combine in an optimum manner several cushioning methods to cover a wide range of loads and that are easily adjustable while designing the sole. That is, on one hand a structure made of a strong material, normally rubber, that supports greater loads and provides the support pillars for said structure, and on the other components that support smaller loads and that generally provide a sensation of comfort to the user.

[0011] The present invention discloses a sole that combines several cushioning methods meant to solve the drawbacks of the state of the art and absorb the greatest range of possible loads with a simple and easily adjustable configuration.

DESCRIPTION OF THE INVENTION

[0012] The present invention is established and characterised in the independent claims, while the dependent claims describe additional characteristics thereof.

[0013] In view of the foregoing, the present invention relates to a hollow sole for footwear that comprises a bottom half and a top half, the top half in turn comprising a sheet and hollow vertical configurations that define internal pockets, with the hollow base integrated in said sheet, and said hollow vertical configurations being oriented towards the inside of the sole, the bottom half being disposed such that it contacts the surfaces of the hollow vertical configurations that face the inside of the sole, wherein the internal pockets of the hollow vertical configurations of the top half are at least half-filled by a shock-absorbing plastic material, the hollow vertical configurations of the top half are filled such that a gas chamber is left between the front of the shock-absorbing material and the free surface of the hollow vertical configurations, and the sheet of the top half includes through orifices.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] This specification is supplemented with a set of drawings illustrating the preferred embodiment, which are never intended to limit the invention.

Figure 1 represents a cross section of an embodiment of prior art in which the shock-absorbing

material reaches beyond the top part of the top half.

Figure 2 represents a cross section of the same embodiment of prior art in which the shock-absorbing material does not reach beyond the top part of the top half.

Figure 3 represents a cross section of an embodiment of the invention in which the shock-absorbing material reaches beyond the top part of the top half and includes through orifices.

Figure 4 represents a cross section of the same embodiment of prior art in which the shock-absorbing material does not reach beyond the top part of the top half.

[0015] Figures 1, 2 and 4 and the soles concerned do not form part of the invention but represent background art that is useful for understanding the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

[0016] An embodiment of prior art, figure 1, is described in what follows wherein the sole comprises a bottom half (1) and a top half (2), in the form of two shells or one shell and a lid, such that air is trapped inside it, between the two halves (1,2), which air can be at atmospheric pressure or at a greater pressure in order to cushion shocks when striking the ground. To ensure that the pressure is maintained, in the top half (2) normally an orifice is made (not shown) that is either sealed or is provided with a flow-control valve, of those known, to the internal pocket defined between the two halves (1,2).

[0017] The top half (2) in turn comprises a sheet (2.1) and hollow vertical configurations (2.2) that form internal pockets (2.3), with the base being integrated in said sheet (2.1), said hollow vertical configurations (2.2) being oriented towards the inside of the sole. This is, the hollow configurations (2.2) are integrated in the sheet (2.1) to form a single continuous surface.

[0018] In one embodiment of prior art, figure 2, the other half (1) is disposed such that it contacts the surface of the hollow vertical configurations (2.2) that is facing the inside of the sole. In this way, the bottom half (1) acts as a cover and as the part of the sole that contacts the ground.

[0019] The above configuration provides cushioning due to the elasticity of the sole material, normally rubber, together with the mechanical characteristics of the hollow vertical configurations (2.2), which are normally truncated cones, cylinders or prisms. There is a second cushioning provided by the compression of air caused by each step, whether or not the air is at a pressure above atmospheric pressure, as in the step the internal volume of the sole is always reduced by the compression of the material that allows the hollow vertical configurations (2.2) to compress and later recover their original shape.

[0020] These two cushioning forms are those known in hollow soles; in this embodiment, a third form is added by filling the internal pockets (2.3) of the hollow configurations of the top half to at least half of their volume, or even completely, with a shock-absorbing plastic material (3). In this way, in the step the elastic characteristics of the footwear sole material are combined with hollow vertical configurations (2.2) filled with a specific material appropriate for the mechanical loads of the step, so that the impact is absorbed better and the recovery is optimised, as well as providing a feeling of comfort and safety to the user.

[0021] In a variant of the above-described embodiments of prior art the two halves (1,2) are similar, figure 4, that is, the bottom half (1) comprises a sheet (1.1) and hollow vertical configurations (1.2), which form internal pockets (1.3), the base being integrated in said sheet (1.1) so that said hollow vertical configurations (1.2) are facing the inside of the sole, such that they contact the surfaces of the hollow configurations (1.2,2.2) facing the inside of the sole in each of the halves (1,2).

[0022] In this case it may be convenient to add an additional sheet (5) acting as a sole in contact with the ground.

[0023] In this variant, the hollow vertical configurations (1.2, 2.2) are duplicated and act jointly, with the two halves (1,2) opposite each other, resulting in a greater cushioning, in other words, adjusting to a different cushioning scale, as the fine adjustment of the cushioning in any of the embodiments shown is performed by combining all the variables involved: material of the halves, air compression between the halves, geometry of the hollow vertical configurations (1.2, 2.2) and filler material (3) therefor.

[0024] As stated above, the hollow vertical configurations (1.2,2.2) are preferably truncated pyramids, truncated cones, cylinders or prisms.

[0025] An advantageous manner of filling the hollow vertical configurations (2.2) of the top half (2) is filling them to the top surface of the latter. In this way, the shoe cut closes directly on the top half (2) of the sole.

[0026] Another advantageous manner of filling the hollow configurations (2.2) of the top half (2) is until passing the upper surface of the top half (2), so that a sheet (3.1) is created above the top half made of the shock-absorbing plastic material (3). The shoe cut will then be placed on top of this sheet (3.1).

[0027] Both advantageous variants can include through orifices (2.4, 3.2) that place the hollow inside of the sole with the cut, and thus with the user's foot, directly in contact with the air chamber between the two halves (1,2). In this way the foot will be cooled better in warm weather. It is clear that as the air chamber is communicated with the outside, the air in it can never be at a pressure greater than atmospheric pressure.

[0028] Specifically, in the embodiment with the sheet (3.1) above the top half (2) of the shock-

absorbing plastic material (3), this half (2) has through orifices (2.4) that coincide with the through orifices (3.2) of the sheet (3.1) of the top half (2), figure 2.

[0029] In addition to the three aforementioned cushioning methods, a fourth one can be added that consists in using the gas generated when setting the materials so that in the hollow configurations of the (2.2) of the top half, a gas chamber (4) is defined between the front of the shock-absorbing material (3) and the free surface (2.2.1), by which is meant the surface that is not the base integrated in the sheet (2.1) that is facing the inside of the sole, of the hollow configurations (2.2).

[0030] Preferably, the shock-absorbing plastic material (3) used is polyurethane.

[0031] The manufacturing method for a footwear sole as described above always includes the following stages:

- moulding the top half (2),
- moulding the bottom half (1),
- joining the two halves (1,2),
- introducing the shock-absorbing material (3) to the top half (2) by injection or casting.

[0032] When the sole is of the type in which the shock-absorbing material (3) does not extend beyond the top surface of the top half (2), before introducing the shock-absorbing material (3) in the top half (2) the shoe cut is placed flush against the top half (2), so that this cut acts as a countermould.

[0033] Instead, when the shoe cut is not placed because the shock-absorbing material (3) extends beyond the top surface of the top half (2), before introducing the shock-absorbing material (3) in the top half (2) it will be necessary to place a countermould in order to leave a space between the top half (2) and said countermould, so that the shock-absorbing material (3) approximately forms a sheet (3.1) above the top half (2) of the sole.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- ES201030592 [0003]
- US6029962A [0008]
- US20060277685A [0009]

Patentkrav

1. Hul sål til skotøj, der omfatter en nedre halvdel (1) og en øvre halvdel (2), idet den øvre halvdel (2) igen omfatter et ark (2.1) samt hule, lodrette konfigurationer (2.2), som definerer indvendige lommer (2.3), idet den hule base er indbygget i arket (2.1), idet de hule, lodrette konfigurationer (2.2) er rettet mod indersiden af sålen, idet den nedre halvdel (1) er således beliggende, at den er i kontakt med overfladerne af de hule, lodrette konfigurationer (2.2), der vender mod indersiden af sålen, de indvendige lommer (2.3) af den øvre halvdel (2) hule, lodrette konfigurationer (2.2) er halvt fyldt med et stødabsorberende materiale (3), den øvre halvdel (2) hule, lodrette konfigurationer (2.2) er således fyldt, at der efterlades et gaskammer (4) mellem forsiden af det stødabsorberende materiale (3) og den frie overflade (2.2.1) af de hule, lodrette konfigurationer (2.2), **kendetegnet ved, at** den øvre halvdel (2) ark (2.1) indbefatter gennemgående åbninger (2.4).
2. Hul sål til fodtøj ifølge krav 1, **kendetegnet ved, at** den nedre halvdel (1) omfatter et ark (1.1) og hule, lodrette konfigurationer (1.2), som danner indvendige lommer (1.3), idet basen er indbygget i arket (1.1), således at de hule, lodrette konfigurationer (1.2) vender mod indersiden af sålen, således at de er i kontakt med overfladerne af de hule konfigurationer (1.2.2.2), der vender mod indersiden af sålen i hver af halvdelene (1, 2).
3. Hul sål til fodtøj ifølge krav 1 eller 2, **kendetegnet ved, at** de hule, lodrette konfigurationer (1.2.2.2) er afskårne pyramider, afskårne kegler, cylindre eller prismer.
4. Hul sål til fodtøj ifølge krav 1 eller 2, **kendetegnet ved, at** den øvre halvdel (2) hule, lodrette konfigurationer (2.2) er fyldt op til den øvre halvdel (2) øvre overflade.
5. Hul sål til fodtøj ifølge krav 1 eller 2, **kendetegnet ved, at** den øvre halvdel (2) hule, lodrette konfigurationer (2.2) er fyldt ud over den øvre halvdel (2) øvre overflade, således at et ark (3.1) lavet af det stødabsorberende plastmateriale (3) dannes over den øvre halvdel (2).
6. Hul sål til fodtøj ifølge et hvilket som helst af de ovenstående krav, **kendetegnet ved, at** det stødabsorberende plastmateriale (3) er polyurethan.

7. Hul sål til fodtøj ifølge krav 5, **kendetegnet ved, at** arket (3.1) over den øvre halvdel (2) er
5 lavet af det stødabsorberende plastmateriale (3), idet denne halvdel (2) har gennemgående
åbninger (2.4), der er sammenfaldende med de gennemgående åbninger (3.2) i den øvre
halvdels (2) ark (3.1).

8. Fremgangsmåde til fremstilling af en skosål ifølge krav 7, hvor fremgangsmåden omfatter
10 følgende trin:

- formstøbning af den øvre halvdel (2),
- formstøbning af den nedre halvdel (1),
- sammenføjning af de to halvdele (1, 2),
- indførelse af det stødabsorberende materiale (3) i den øvre halvdel (2) ved
15 indsprøjtning eller støbning

kendetegnet ved, at inden indførelsen af det stødabsorberende materiale (3) i den øvre
halvdel (2) placeres skoudskæringen flugtende på den øvre halvdel (2), eller en modform
placeres, så der efterlades et mellemrum mellem den øvre halvdel (2) og modformen, således
at det stødabsorberende materiale (3) danner et ark (3.1) på den øvre halvdel (2) af sålen.

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9. Fremgangsmåde til fremstilling af en skosål ifølge krav 8, **kendetegnet ved, at** det
stødabsorberende plastmateriale (3) er polyurethan.

DRAWINGS

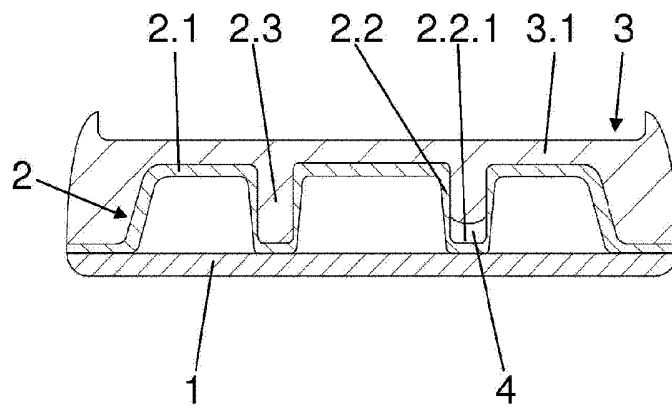


Fig.1

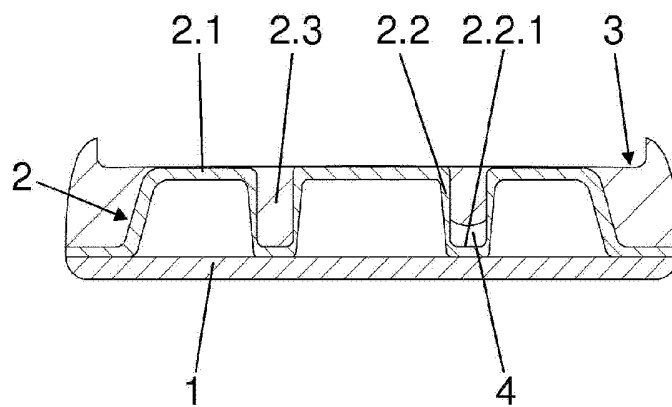


Fig.2

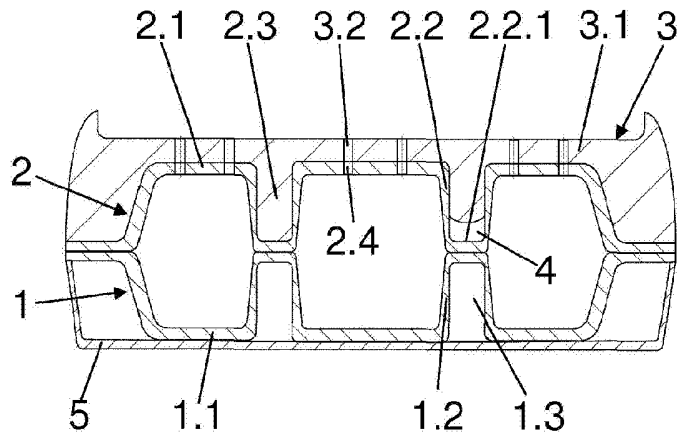


Fig.3

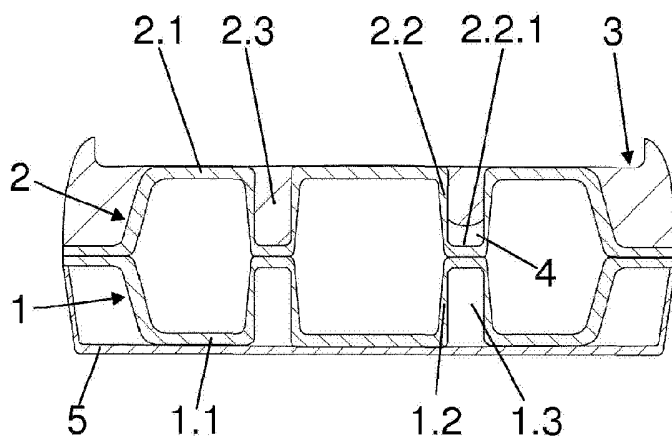


Fig.4