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(54) Moulded footwear bottom and moulding equipment

(57) The present invention relates to a footwear bottom of the type provided with a series of protuberances (3) on the tread (2), each protuberance (3) being provided with an internal cavity (4) with opening towards the upper surface (5) of the bottom (1), in which the opening of each cavity (4) is closed by at least two, preferably more than two, parallel coplanar pieces (6) that are continuously integrated with the surface (5) of the bottom (1) and in which the series of pieces (6) that close the opening of the same cavity (4) are separated by thin slots (7) that branch out radially from the central axis (Y-Y) of each cavity (4).

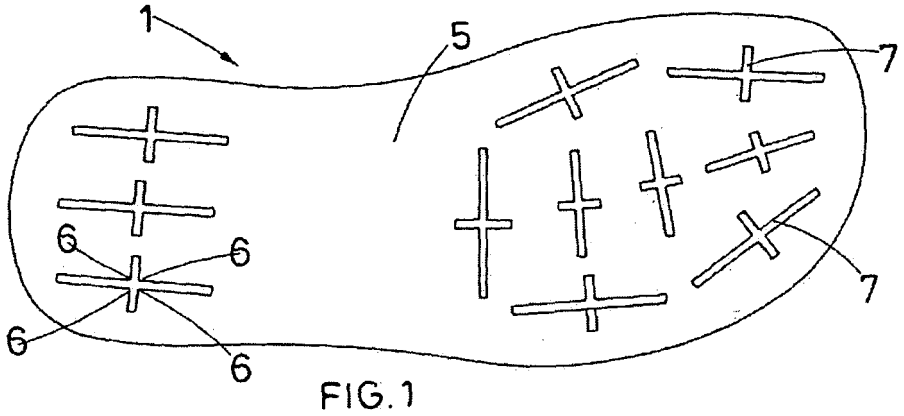


FIG. 1

EP 2 039 261 A1

Description

[0001] The present patent application for industrial invention relates to a moulded footwear bottom provided with a series of concave protuberances that project from the tread, designed to guarantee excellent anti-slip and shock-absorbing properties due to elastic deformability under pressure.

[0002] The patent protection is also extended to the moulding equipment used to obtain the aforementioned footwear bottom.

[0003] Several models of outsoles moulded with suitable materials, such as rubber, are known, being provided with a dense series of protuberances designed to increase the anti-slip properties of the outsole.

[0004] The said protuberances are normally shaped as small cylinders with vertical axis or hemispherical domes.

[0005] A concave structure is preferably used in case of dome-shaped protuberances, being designed to be elastically deformed under pressure to ensure good anti-slip properties associated with anti-shock action, meaning the capability of absorbing the impact of the foot with the ground when walking or running.

[0006] In the latter case, the internal cavity of the said protuberances is obtained by providing a series of metal domes on the lid of the mould, which are interfaced at a short distance with corresponding cavities obtained on the bottom surface of the die.

[0007] In view of the above, a series of cavities is formed on the upper side of the moulded bottom, coinciding with the internal cavity of the body of the domes that project from the tread of the bottom.

[0008] For this reason, the surface continuity of the upper side of the bottom is impaired by the presence of the said cavities, which are sometimes so numerous and dense that only small intact portions of surface are left between the cavities.

[0009] The lack of a uniform, continuous surface requires the interposition of a thick intermediate sole or a footbed between the foot and the bottom to guarantee a safe, comfortable support surface.

[0010] Nevertheless, the fixing of the intermediate sole to the bottom is rather difficult and standard glue is not very reliable, due to the fact that the upper surface of the bottom does not offer large sections to spread the glue and make it set.

[0011] The present invention has been devised to remedy the aforementioned drawbacks, the main purpose being to provide a moulded footwear bottom with a series of concave protuberances on the tread and a basically continuous uniform surface on the upper side.

[0012] The presence of the continuous surface provides a suitable surface for the glue used to fix the intermediate sole or the upper, if the cost, weight and volume caused by the interposition of the said intermediate sole between the bottom and the foot are eliminated.

[0013] The aforementioned purposes have been achieved by the moulded bottom of the invention, whose characteristics are illustrated in detail in the following claims.

[0014] In particular, the bottom of the invention is provided with a series of concave protuberances on the tread, whose internal cavity is characterised by an upward opening closed by at least two, preferably more than two, parallel coplanar pieces that form a single continuous surface with the upper surface of the bottom.

[0015] The series of pieces designed to close the opening are separated by thin slots that branch out radially from the centre of each concave body.

[0016] As a matter of fact, the thin slots coincide with the cavities left by the special cores used to obtain the concave body and basically closed by the said concave protuberances that project from the tread of the bottom of the invention.

[0017] Each core is composed of a protuberance that projects from the internal wall of the lid of the mould, with mushroom configuration, being formed of a vertical stem and an enlarged head, with shape and dimensions identical to the ones of the internal space of the concave body of each protuberance to be obtained on the tread of the bottom.

[0018] At least two, preferably more than two, vertical partitions branch out radially from the vertical stem, being designed to generate, during moulding, the slots that separate the pieces that surround and cover the back of the enlarged head.

[0019] As mentioned above, the mushroom protuberances are an integral part of the lid of the mould, in such a way that when the mould is opened, the enlarged head is extracted from the moulding material in which it is temporarily drowned.

[0020] Extraction can be performed easily without excessive traction stress and without uncontrolled lacerations of the moulding material, due to the presence of the elastically deformable pieces that are first turned over and opened to allow the enlarged head to come out of its seat, and then stretched again and closed on the opening of the empty seat.

[0021] According to the preferred embodiment of the said cores, four regularly spaced vertical partitions branch out from the cores, in such a way that the opening of each concave body is closed by four coplanar pieces separated by four crosswise slots.

[0022] For purposes of clarity, the description of the bottom 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:

- fig. 1 is a view of the tread of the bottom of the invention;
- fig. 2 is a view of the upper surface of the bottom of the invention;
- fig. 3 is a section of the bottom of the invention with plane III-III of fig. 2;
- fig. 4 is an axonometric view of one of the special

cores provided in the mould used to mould the bottom of the invention;

- fig. 5 is the same section as fig. 3, with the only difference that it shows the said core drowned in the moulding material before the lid of the die is moved away.

[0023] With reference to the aforementioned figures, the bottom of the invention (1) is provided with a series of protuberances (3) on the tread (2), each protuberance (3) being provided with an internal cavity (4) with opening towards the upper surface (5) of the bottom (1).

[0024] The opening of each cavity (4) is closed by four parallel coplanar pieces (6) that continuously integrate with the surface (5) of the bottom (1).

[0025] The pieces (6) that close the opening of the same cavity (4) are separated by thin slots (7) that branch out radially from the central axis (Y-Y) of each cavity (4).

[0026] The mould used to make the bottom (1) of the invention is characterised by the fact that it is provided with a die (M) closed by a lid (C) that incorporates a series of special cores (10), one for each protuberance (2) to be obtained on the tread (2) of the bottom (1).

[0027] As shown in fig. 4, each special core (10) is composed of a mushroom protuberance, provided with a vertical stem (11) and an enlarged head (12), with shape and dimensions identical to the ones of the internal space (4) of the concave body of each protuberance (3) to be obtained on the tread (2) of the bottom (1).

[0028] Four vertical partitions (13) branch out radially from the vertical stem (11), being designed to generate during moulding the slots (7) that separate the pieces (6) that surround and cover the back of the enlarged head (12).

[0029] According to a preferred embodiment, each partition (13) is interrupted before it reaches the edge of the enlarged head (12) in order to reduce the length (L1) of each slot (7).

[0030] The reduction in length involves two advantages.

[0031] The first advantage is to increase the extension of the upper surface (5) that is used to support the foot and make the glue set.

[0032] The second advantage is to provide lateral support points for the pieces (6), which are connected for a short section with length equal to the distance between the edge of the head (12) and the end of the partitions (13).

Claims

1. Footwear bottom of the type provided with a series of protuberances (3) on the tread (2), each protuberance (3) being provided with an internal cavity (4) with opening towards the upper surface (5) of the bottom (1), **characterised by** the fact that the opening of each cavity (4) is closed by at least two, preferably more than two, parallel coplanar pieces (6) that are continuously integrated with the surface (5) of the bottom (1) and by the fact that the pieces (6) that close the opening of the same cavity (4) are separated by thin slots (7) that branch out radially from the central axis (Y-Y) of each cavity (4).

2. Mould used to mould the bottom described in the preceding claim, of the type that traditionally comprises a die (M) closed by a lid (C), **characterised by** the fact that it is provided with a series of special cores (10), one for each protuberance (2) and consisting in a mushroom protuberance with a vertical stem (11) and an enlarged head (12) with shape and dimensions identical to the ones of the internal space (4) of the concave body of each protuberance (3) to be obtained on the tread (2) of the bottom (1), it being provided that at least two, preferably four vertical partitions (13) branch out radially from the vertical stem (11), designed to generate, during moulding, the slots (7) that separate the (6) that cover the back of the enlarged head (12) until the head is drowned in moulding material.

3. Mould as claimed in the preceding claim, **characterised by** the fact that each partition (13) is interrupted before it reaches the edge of the enlarged head (12) in order to reduce the length (L1) of each slot (7).

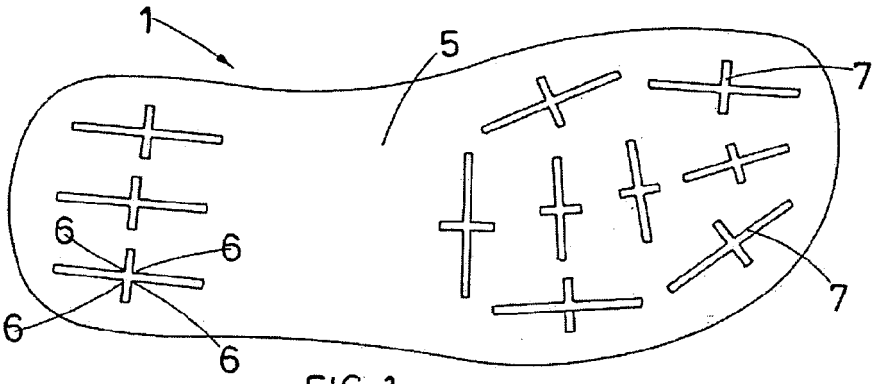


FIG. 1

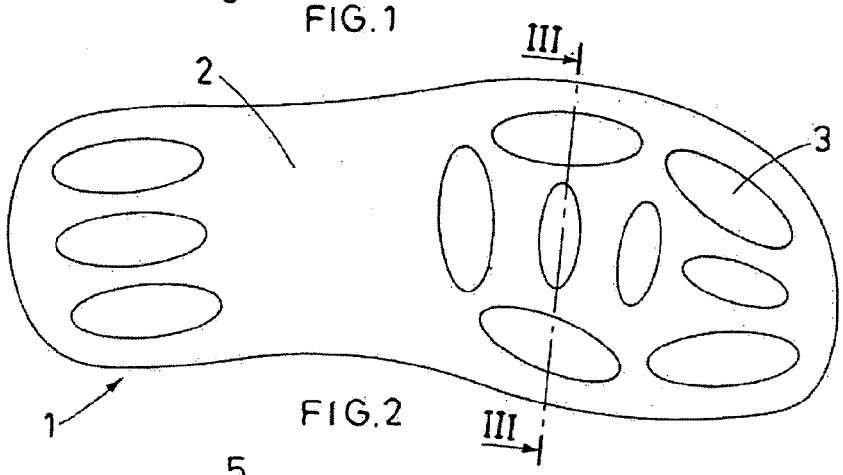


FIG. 2

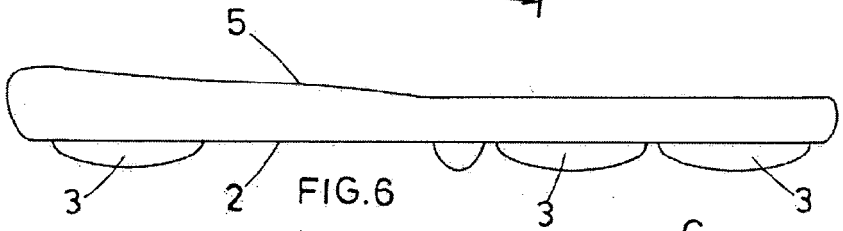


FIG. 6

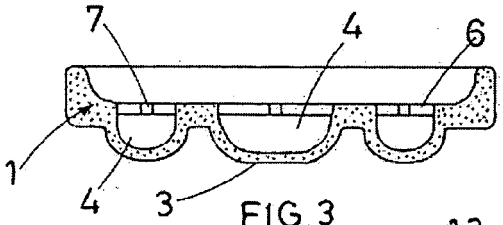


FIG. 3

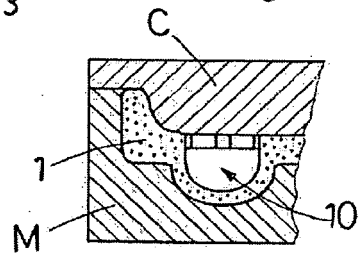


FIG. 5

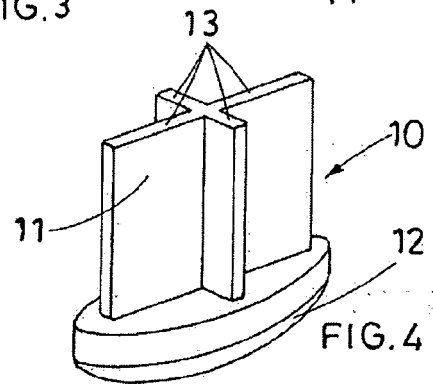


FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 07 42 5577

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	GB 947 651 A (FUNCK HERBERT) 22 January 1964 (1964-01-22) * page 1, right-hand column, lines 79,87 * * page 2, left-hand column, line 1; figure 5 *	1 2,3	INV. A43B13/20 A43B13/22
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TECHNICAL FIELDS SEARCHED (IPC)

A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 February 2008	Claudel, Benoît

CATEGORY OF CITED DOCUMENTS

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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