(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 591 691 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
15.05.2013 Bulletin 2013/20

(21) Application number: **12192531.7**

(22) Date of filing: **14.11.2012**

(51) Int Cl.:
A43B 5/04 *(2006.01)* ***A43B 13/02*** *(2006.01)*
A43B 13/12 *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **14.11.2011 IT UD20110183**

(71) Applicant: **Calzaturificio Dal Bello Srl**
31011 Casella d'Asolo (TV) (IT)

(72) Inventor: **Battilana, Carletto**
31011 Casella d'Asolo (TV) (IT)

(74) Representative: **Petraz, Gilberto Luigi et al**
GLP S.r.l.
Piazzale Cavedalis 6/2
33100 Udine (IT)

(54) Sports footwear such as a ski boot or suchlike

(57) Sports footwear comprising a casing (11) made of plastic material to define a compartment (18) in which the foot of a user is accommodated, and a sole (13) disposed below said casing (11). The sole (13) comprises at least a reinforcement element (21) made of a different material from that of which the casing (11) is made and having a greater mechanical resistance and a lower specific weight than that of the plastic material.

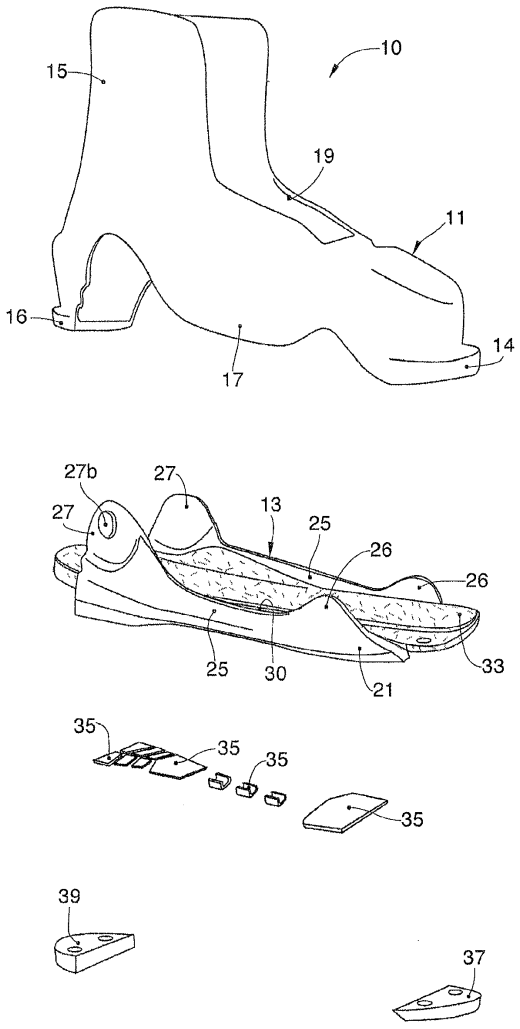

fig.2

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Description

FIELD OF THE INVENTION

[0001] The present invention concerns a sports footwear, such as for example a ski boot, a snowboard boot or suchlike, having a sole with a reduced thickness, so that the sole of the foot of the person wearing it is as close as possible to the sports equipment underneath, so as to lower the overall barycenter.

BACKGROUND OF THE INVENTION

[0002] Sports footwear are known, such as ski boots, which comprise a substantially impermeable structure, commonly known as casing, made of polyurethane. The sole of the boot is made in a single piece with the casing and is relatively thick so as to guarantee adequate resistance to mechanical stresses, such as pressures, torsions and/or flexions, when it is coupled by the bindings to the sports equipment underneath, for example to the skis or snowboard.

[0003] One disadvantage of these known sports footwear is that the sole is rather thick, usually more than 2 cm, so that, apart from requiring a relatively large quantity of polyurethane to be used in order to make it, with a consequent heavier weight of the whole footwear and hence greater production costs, it also keeps the sole of the foot of the person wearing it relatively distant from the sports equipment underneath.

[0004] Known sports footwear are described in the documents WO-A-95/27416, which provides a flat base reinforcement, DE-A-3325019 which provides an elastic foil included in a matrix associated with the sole, FR-A-2.743.990, which provides a reinforcement frame formed by at least two separate rigid lateral elements and connected by intermediate brackets above, and in US-A-5,974,696, which shows rigid inserts in the form of a platelet and separated from each other, disposed in the sole of a sports footwear.

[0005] Purpose of the present invention is to obtain a sports footwear, such as a ski boot or suchlike, which is as light as possible, while still maintaining the mechanical characteristics and the properties of thermal and hydraulic seal that are proper for this type of footwear, and which has a sole with a limited thickness, to allow the sole of the foot of the person wearing it to be brought as close as possible to the sports equipment underneath, in order to lower the overall barycenter and thus allow him/her to obtain a better sporting performance.

[0006] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0007] The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0008] In accordance with the above purpose, a sports footwear such as a ski boot or suchlike according to the present invention comprises an upper structure or casing, made of plastic material, such as for example polyurethane, which defines a compartment in which the user's foot is suitable to be accommodated, and a sole located in the lower part of the casing. The casing and the sole are assembled together so as to render the compartment watertight, at least at the bottom part.

[0009] According to a characteristic feature of the present invention, the sole is provided with at least a reinforcement element made in a single piece and comprising a first base part, substantially flat, from the opposite sides of which two lateral walls extend, wherein each of the lateral walls comprises a front fin, disposed substantially in proximity to a toe of the casing and a rear fin, disposed substantially in a malleolar zone of the casing.

[0010] According to the present invention, moreover, the reinforcement element is made of a different material from that which the casing is made of, and having a greater mechanical resistance and a lower specific weight than the plastic material.

[0011] According to a particular form of embodiment of the present invention, the reinforcement element is made of composite material with a resin and fiber base, such as for example carbon fibers, glass or aramid fibers, or other fibers, both natural and synthetic.

[0012] In some forms of embodiment, the resin is a thermosetting resin, in particular epoxy resin.

[0013] In some forms of embodiment, the fibers comprise one or more types of fibers selected from a group consisting of carbon fibers, glass or aramid fibers.

[0014] The material of the reinforcement element is therefore light and very resistant to mechanical stresses, and thus it allows to have a sole with an overall thickness that is much less than in the state of the art.

[0015] The reinforcement element is disposed longitudinally at least along the part of the sole comprised between the toe and the heel, and is attached to the lower part of the casing. Advantageously, the shape of the reinforcement element is substantially mating with that of the lower part of the casing.

[0016] In particular, the reinforcement element comprises a first substantially flat part and two lateral walls which extend from opposite sides of the first part, along the flanks of the casing.

[0017] In fact, according to the present invention, the thickness of the sole is limited to a few millimeters and the overall weight of the boot is less than that of a traditional boot.

[0018] In some forms of embodiment the reinforcement element is a solid piece, without any through holes.

[0019] In some forms of embodiment, the reinforcement element is substantially shaped like a cradle.

[0020] In some forms of embodiment, along its longi-

tudinal extension the reinforcement element has a substantially U-shaped cross section.

[0021] In some forms of embodiment, for each of the lateral walls, the front fin is connected in continuity to the rear fin by means of an intermediate segment, substantially U-shaped and lowered with respect to the front fin and the rear fin.

[0022] In some forms of embodiment the reinforcement element is attached to the casing by gluing.

[0023] In other forms of embodiment the reinforcement element is attached to the casing by means of mechanical components.

[0024] In still other forms of embodiment, the reinforcement element is attached to the casing by the direct injection of the material that constitutes the casing on the reinforcement element.

[0025] In other forms of embodiment, the reinforcement element is attached to the casing obtaining the reinforcement element directly on the lower part of the casing.

[0026] In some forms of embodiment, the casing is made of polyurethane or a polymer material comprising polyurethane.

[0027] The present invention also concerns a method to obtain a sports footwear as described above, which provides to make available at least a reinforcement element to be associated to the sole. The reinforcement element is made in a single piece and comprises a first, substantially flat base part, from the opposite sides of which two lateral walls extend, wherein each of the lateral walls comprises a front fin, disposed substantially in proximity to a toe of the casing and a rear fin, disposed substantially in a malleolar zone of the casing. According to the method of the present invention, moreover, the reinforcement element is made of a different material from that which the casing is made of, and having a greater mechanical resistance and a lower specific weight than the plastic material. According to the method of the present invention, the reinforcement element is attached to the casing of the sports footwear by gluing, or by means of mechanical components, or by the direct injection of the material that constitutes the casing on the reinforcement element, or by obtaining the reinforcement element directly on the lower part of the casing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] These and other characteristics of the present invention will become apparent from the following description of some forms of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a perspective view of a sports footwear according to the present invention;
- fig. 2 is an exploded view of the sports footwear in fig. 1;
- fig. 3 is a longitudinal section of the sports footwear in fig. 1;
- fig. 4 is a cross section of the sports footwear in fig. 1.

DESCRIPTION OF SOME FORMS OF EMBODIMENT

[0029] With reference to fig. 1, a sports footwear or boot 10 according to the present invention, which in this case is a ski boot, comprises a casing 11, made by molding plastic material, for example polyurethane, and a sole 13 disposed under the casing 11. The casing 11 comprises a toe 14 at the front, a heel 16 at the rear, an upper part or instep 15, and a body 17 or outsole which are shaped so as to define an internal compartment 18 suitable to house the user's foot. An aperture 19, in which the closing elements of the boot 10, not shown in the drawings, are disposed, is made on the upper and front part of the instep 15 and also extends partly on the upper part of the body 17.

[0030] The sole 13 comprises a reinforcement element 21 (figs. 2 to 4), made of resin-based composite material such as thermosetting resin, for example epoxy resin, and of fibers, such as for example carbon fibers, glass or aramid fibers or suchlike, and is suitable to increase both the rigidity and the mechanical resistance of the lower part of the boot 10.

[0031] A composite material used to obtain the reinforcement element 21 can be made with a thermosetting matrix, obtained by impregnating a fabric formed by fibers with liquid thermosetting resins, or by means of hot molding, usually in an autoclave or in a high-pressure mold. In this case, a pre-preg formed by reinforcement fibers incorporated in a thermosetting matrix is put into the autoclave or high-pressure mold, where the effects of temperature and pressure determine the desired final structure of the composite material.

[0032] The reinforcement element 21, as well as maintaining and even improving the mechanical characteristics of the sole 13 in its entirety, compared with known soles, also has the function of lightening the overall structure of the boot 10, because its material has a specific weight lower than that of the material that the casing 11 is made of.

[0033] In particular, the reinforcement element 21 is substantially mating in shape with that of the lower part of the body 17 of the casing 11, and has a substantially U-shaped cross section (fig. 4). For example, the reinforcement element 21 is shaped like a cradle. The reinforcement element 21 is a single piece, which comprises a lower part or first base part 23 (fig. 2), substantially flat, and two lateral walls 25 which extend from opposite sides toward the casing 11. Each lateral wall 25 comprises a front fin 26, disposed substantially in proximity to the toe 14, and a rear fin 27 (figs 1 and 2), which affects a malleolar zone 29 of the casing 11, near the heel 16. By malleolar zone 29 we mean the zone of the casing 11 which clothes or covers each of the two bone protuberances at the neck of the foot at the two sides of the ankle.

[0034] In some forms of embodiment, the two lateral

walls 25 can have laterally a rounded or convex protuberance 25a, which can function as a lateral stiffening of the reinforcement element 21 (fig 3).

[0035] In some forms of embodiment, the front fin 26 and the rear fin 27 can be less thick than the lateral wall 25, to enable the flush coupling with a mating step-shaped end of the casing 11 (fig. 3). In some forms of embodiment, the front fin 26 is lower than the rear fin 27. In some forms of embodiment, the rear fin 27 has a rotatable coupling element 27b for pivoting a mobile part of the boot 10 (fig. 2).

[0036] In some forms of embodiment, the reinforcement element 21 is a solid piece, without through holes.

[0037] The reinforcement element is disposed longitudinally at least along the part of the sole comprised between the toe 14 and the heel 16 of the casing 11, and is attached to the lower part of the casing 11.

[0038] In some forms of embodiment, the reinforcement element 21 develops in continuity, without substantive interruptions, from the toe 14 to the heel 16, occupying the whole zone comprised between toe 14 and heel 16, thus affecting most of the longitudinal development of the sole 13 and the casing 11, and therefore most of the sole of the foot of the user wearing the sports footwear 10.

[0039] In some forms of embodiment, the reinforcement element 21 is an external part of the sole 13 of the boot 10, and not included inside it, and is therefore in contact with the environment outside the boot 10 and can also be in direct contact with the ground or the sports equipment to which the boot 10 is attached.

[0040] In some forms of embodiment, the reinforcement element 21 is attached to the casing 11 by gluing. Alternatively, any mechanical mean may be used, such as screws, rivets or other, although the watertight seal must be guaranteed, to prevent water or damp from entering into the compartment 18 through the joining zone between the casing 11 and the sole 13.

[0041] Alternatively, the casing 11 may be made by injection of plastic material, for example polyurethane, directly onto the reinforcement element 21, and vice versa, the reinforcement element 21 may be made directly on the lower part of the casing 11. The sole 13 inside the compartment 18 of the casing 11 optionally also comprises an insole 33 (fig. 2), made of light material, for example cork, expanded polyurethane or other, sufficiently resistant and with heat insulation characteristics, and which for example extends substantially from the toe 14 to the heel 16 and can be a few millimeters thick. For example, the insole 33 is disposed adjacent on the lower part 23 of the reinforcement element 21.

[0042] According to one form of embodiment of the present invention, the insole 33 is made of expanded polyurethane and is made by injection on the reinforcement element 21, so that it adheres to it in the best possible way.

[0043] The boot 10 also comprises a plurality of anti-slip studs 35, a front insert 37 and a rear insert 39 which are attached by means of gluing or any mechanical mean, such as screws, rivets or other. In this case, the two inserts 37 and 39 are made of plastic material suitable to guarantee a suitable grip of the attachments of the skis, for example polyurethane, polyethylene or polypropylene. For example the front insert 37 and the rear insert 39 occupy the front and rear space under the casing 11 not affected in length by the reinforcement element 21, substantially completing the base structure of the sole 13 as can be seen in fig. 3. In some forms of embodiment, the reinforcement element 21 may have a raised front part 21a, overlapping and in contact with at least a part of the front insert 37, as can be seen for example in fig. 3. In some forms of embodiment, the reinforcement element 21 may have an at least partly stepped or knurled surface 21b, for example with the function of increasing friction or grip or in any case anti-slip properties.

[0044] The boot 10 as described heretofore has great rigidity in the lower part, which is the part that goes into contact with the skis or other sports equipment and is subjected to considerable mechanical stresses.

[0045] Furthermore, the boot 10 is lighter than similar known boots made completely of polyurethane, and the sole 13 is much thinner while still guaranteeing adequate heat insulation.

[0046] Merely by way of example, the rear part of the sole 13, comprising the thickness of the insole 33 and the rear insert 39, has an overall thickness comprised between 27 mm and 29 mm. The front part of the sole 13, comprising the insole 33 and the front insert 37, has a thickness comprised between 16 mm and 18 mm.

[0047] The rear insert 39 has a thickness comprised between 17 mm and 21 mm, by way of example 19 mm, while the insole 33 can have a maximum thickness near the heel 16 of about 10 mm.

[0048] It is clear that modifications and/or additions of parts may be made to the sports footwear or boot as described heretofore, without departing from the field and scope of the present invention.

[0049] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of sports footwear or boot, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Sports footwear comprising a casing (11) made of plastic material to define a compartment (18) in which the foot of a user is suitable to be accommodated, and a sole (13) disposed below said casing (11), **characterized in that** said sole (13) comprises at least a reinforcement element (21) made in a single piece, wherein said reinforcement element (21) comprises a substantially flat first base part (23),

from the opposite sides of which two lateral walls (25) extend, wherein each of said lateral walls (25) comprises a front fin (26), disposed substantially in proximity to a toe (14) of said casing (11), and a rear fin (27) disposed substantially in a malleolar zone (29) of said casing (11), wherein, moreover, said reinforcement element (21) is made of a different material from that of which said casing (11) is made and having a greater mechanical resistance and a lower specific weight than that of said plastic material.

2. Sports footwear as in claim 1, **characterized in that** the material of which said reinforcement element (21) is made is a composite material with a resin and fiber base.

3. Sports footwear as in claim 2, **characterized in that** the resin is a thermosetting resin, in particular epoxy resin.

4. Sports footwear as in claim 2, **characterized in that** the fibers comprise one or more types of fibers selected from a group which consists of carbon fibers, glass fibers, or aramid fibers.

5. Sports footwear as in any claim hereinbefore, **characterized in that** said reinforcement element (21) is a solid piece, without through holes.

6. Sports footwear as in any claim hereinbefore, **characterized in that** said reinforcement element (21) is substantially cradle shaped.

7. Sports footwear as in any claim hereinbefore, **characterized in that,** along its longitudinal extension, said reinforcement element (21) has a substantially U-shaped cross section.

8. Sports footwear as in any claim hereinbefore, **characterized in that** for each of said lateral walls, the front fin (26) is connected continuously to the rear fin (27) by means of a substantially U-shaped intermediate segment (30) and lowered with respect to the front fin (26) and to the rear fin (27).

9. Sports footwear as in any claim hereinbefore, **characterized in that** said reinforcement element (21) has a shape substantially mating with that of the lower part of said casing (11).

10. Sports footwear as in any claim hereinbefore, **characterized in that** said reinforcement element (21) is disposed longitudinally at least along the part of the sole (13) comprised between the toe (14) and the heel (16) of said casing (11) and is attached to the lower part of said casing (11).

11. Sports footwear as in any claim hereinbefore, **characterized in that** said sole (13) also comprises two inserts (37, 39) made of plastic material attached to said casing (11), one in proximity to the toe (14) and one in proximity to the heel (16) of said casing (11).

12. Sports footwear as in any claim hereinbefore, **characterized in that** it also comprises an insole (33) disposed in the lower part of said compartment (18), said insole (33) being made of a heat insulating material, extending substantially from the toe (14) to the heel (16) of said casing (11) and having a shape substantially mating with that of said reinforcement element (21).

13. Sports footwear as in claim 12, **characterized in that** said insole (33) is made of expanded polyurethane.

14. Sports footwear as in claim 12 or 13, **characterized in that** said insole (33) is made by injection on said reinforcement element (21).

15. Sports footwear as in any claim hereinbefore, **characterized in that** the reinforcement element (21) is attached to the casing (11) by means of gluing, or by means of mechanical components, or by means of direct injection of the material which makes up the casing (11) on the reinforcement element (21), or making the reinforcement element (21) directly on the lower part of the casing (11).

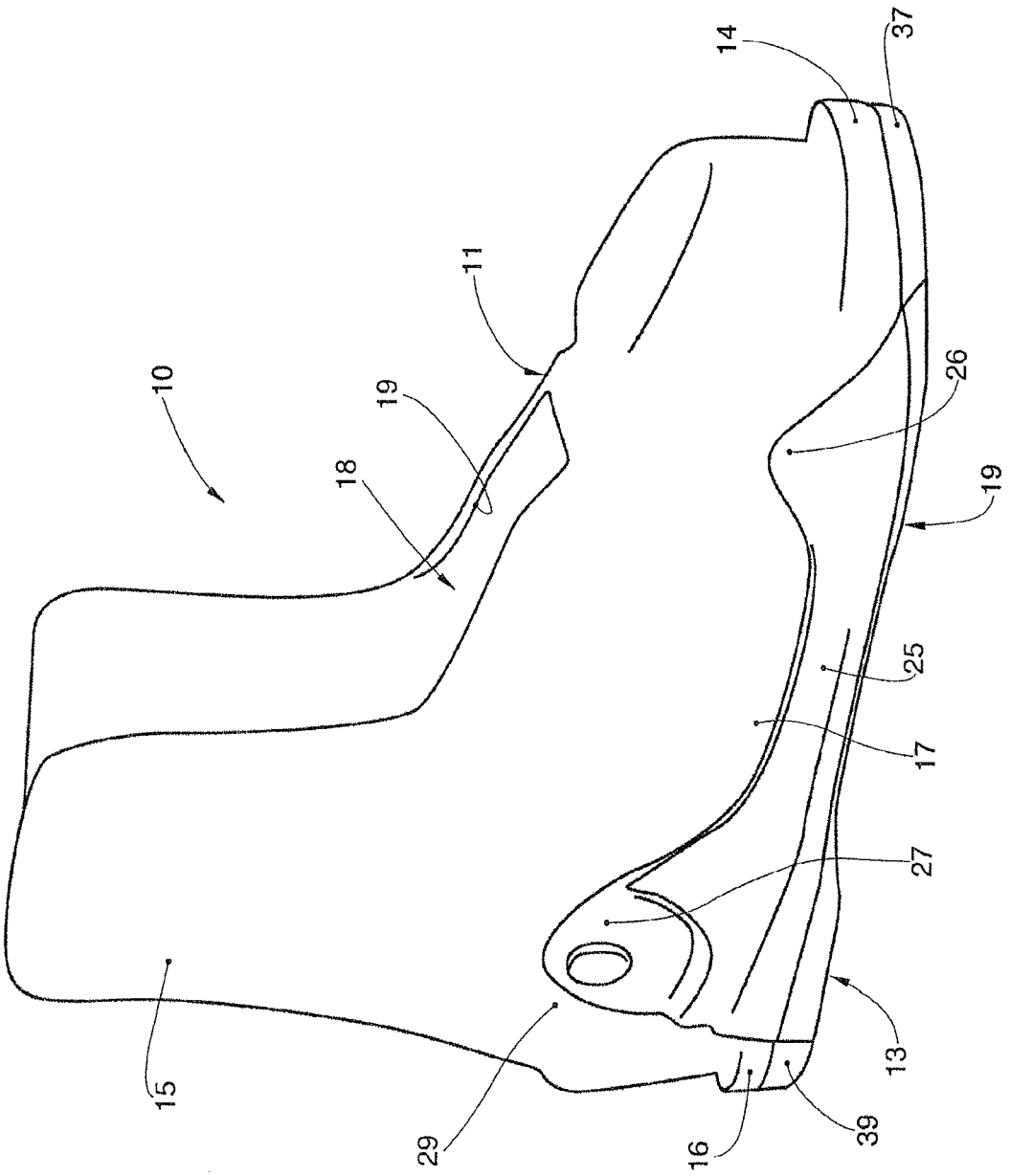

fig.1

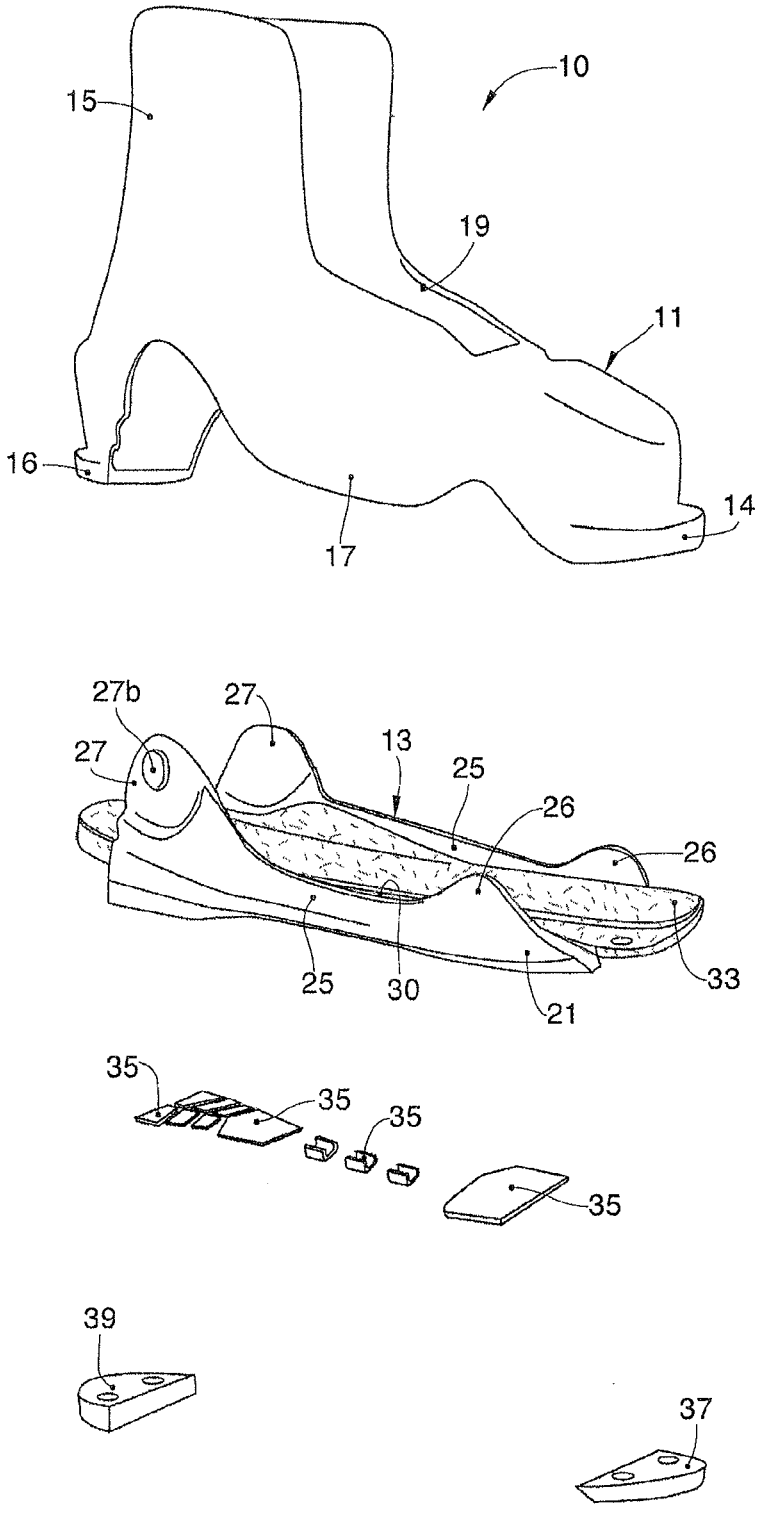

fig.2

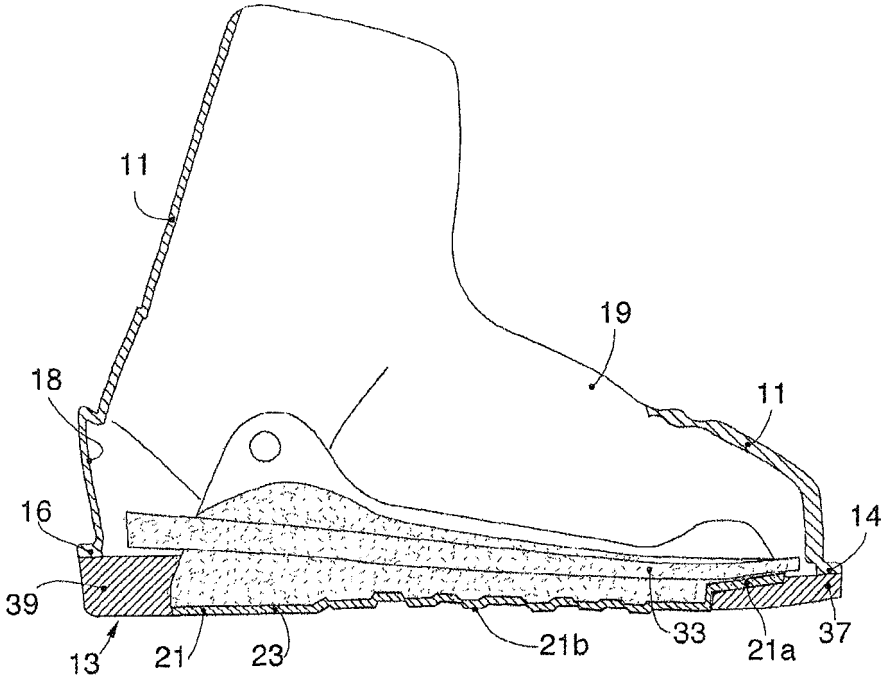
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fig.3

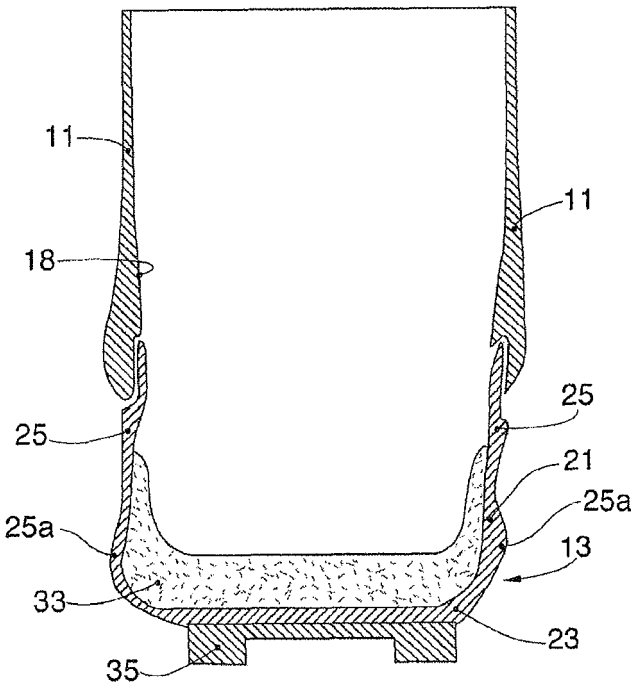
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fig.4

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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 2531

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 95/27416 A1 (NORDICA SPA [IT]; FOFFANO MASSIMO [IT]; PAMIO CECILIA [IT]) 19 October 1995 (1995-10-19) * claims; figures *	1-15	INV. A43B5/04 A43B13/02 A43B13/12
Y	US 4 253 251 A (SALOMON GEORGES P J) 3 March 1981 (1981-03-03) * page 9, line 7 * * page 10, lines 14-34; claims; figures 17-21 *	1-15	
A	FR 2 743 990 A1 (SALOMON SA [FR]) 1 August 1997 (1997-08-01) * claims; figures *	1-15	
A	US 5 363 571 A (MONTFORT BENOIT [FR]) 15 November 1994 (1994-11-15) * column 2, lines 12-48; claims; figures *	1-15	
A	US 5 974 696 A (AIRD FREDERIC [CA] ET AL) 2 November 1999 (1999-11-02) * claims; figures *	1-15	TECHNICAL FIELDS SEARCHED (IPC) A43B
A	EP 0 931 468 A1 (MARCOLIN ALESSANDRO [IT]) 28 July 1999 (1999-07-28) * claims; figures *	1-15	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	6 February 2013	Claudel, Benoît

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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06-02-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9527416 A1	19-10-1995	IT TV940038 A1	12-10-1995
		WO 9527416 A1	19-10-1995
US 4253251 A	03-03-1981	AT 361807 B	10-04-1981
		DE 2725972 A1	22-12-1977
		FR 2354065 A1	06-01-1978
		JP 52152350 A	17-12-1977
		US 4253251 A	03-03-1981
FR 2743990 A1	01-08-1997	EP 0817578 A1	14-01-1998
		FR 2743990 A1	01-08-1997
		JP H11503355 A	26-03-1999
		WO 9727772 A1	07-08-1997
US 5363571 A	15-11-1994	FR 2657507 A1	02-08-1991
		JP 4212306 A	03-08-1992
		US 5363571 A	15-11-1994
US 5974696 A	02-11-1999	CA 2209488 A1	24-07-1998
		US 5913593 A	22-06-1999
		US 5974696 A	02-11-1999
EP 0931468 A1	28-07-1999	CA 2258417 A1	23-07-1999
		DE 69900075 D1	17-05-2001
		DE 69900075 T2	23-08-2001
		EP 0931468 A1	28-07-1999
		IT TV980003 U1	23-07-1999
		NO 990100 A	26-07-1999
		US 6105280 A	22-08-2000

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 9527416 A **[0004]**
- DE 3325019 A **[0004]**
- FR 2743990 A **[0004]**
- US 5974696 A **[0004]**