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(54) **Ski boot**

(57) A ski-boot (1) comprising an outer rigid shell (2), which is shaped so as to receive the user's foot, and a rigid bootleg (5) which is shaped so as to wrap round the user's ankle and is hinged on the top part of the shell (2) in order to be able to swing about a first reference axis (A) that locally substantially coincides with the articulation axis of the user's ankle; the shell (2) being made up of a front half-shell (9) and a rear half-shell (10) rigidly fixed

to one another; the front half-shell (9) having a substantially ogival shape for covering the user's toe substantially up to the beginning of the plantar arch area of the foot and being made of at least one plastic polymer by injection moulding; the rear half-shell (10) being designed to completely cover the remaining part of the foot, starting substantially from the plantar arch area of the foot and being made of a composite material containing fibres embedded in a resin matrix.

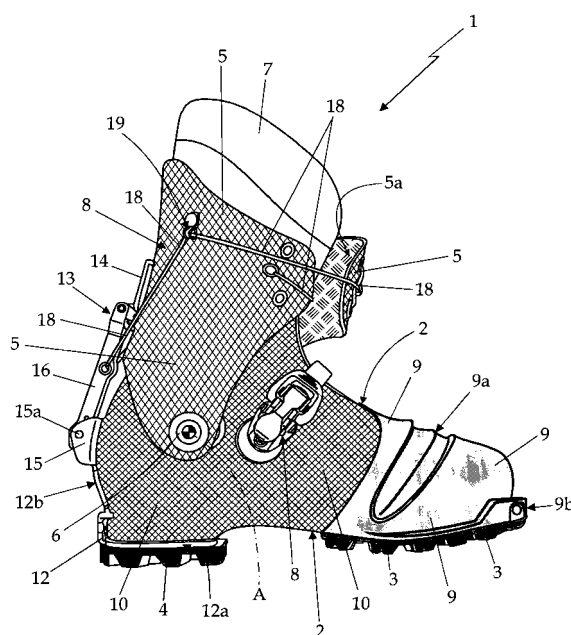


Fig. 1

Description

[0001] The present invention relates to a ski-boot.

[0002] More specifically, the present invention relates to a ski-boot for alpine skiing or telemark, to which the following description refers purely by way of example, without this implying any loss of generality.

[0003] As is known, ski-boots for alpine skiing or telemark are generally made up of: a rigid shell made of plastic material, which is shaped in as to receive the skier's foot, and is provided at the bottom with a front sole and a rear heel made of anti-slip elastomeric material; a rigid bootleg made of plastic material, which is shaped so as to wrap round the ankle of the skier and is hinged to the top part of the shell so as to be able to rotate about a reference axis substantially coinciding with the articulation axis of the ankle; an internal shoe-liner made of soft and thermally insulating material, which is inserted in a removable manner inside the shell and the bootleg and is shaped so as to envelop and protect both the foot and the bottom part of the skier's leg; and a number of manually operated closing members, which are appropriately distributed on the shell and on the bootleg and are structured so as to be able to tighten both the shell and the bootleg so to immobilize the skier's leg stably inside the ski-boot.

[0004] In addition to the above, ski-boots for alpine skiing or telemark are moreover provided with a manually-operated collar locking device which can, according to the skier's choice and alternatively,

- clamp the bootleg rigidly to the shell so as to prevent any relative movement between the two elements;
- engage the bootleg to the shell so as to allow only positive oscillations of the bootleg about the ankle articulation axis, which, starting from a pre-set resting position, bring the bootleg up towards the toe of the ski-boot; or else
- completely release the bootleg from the shell so to allow the bootleg to freely oscillate about the articulation axis of the ankle both forwards and backwards.

[0005] In the telemark sporting activity it is moreover indispensable to be able to lift in an accentuated way the heel of the ski-boot from the underlying ski, always keeping the toe of the ski-boot firmly anchored to the ski, thus the top part of the shell of telemark ski-boots is also provided with a programmed deformation bellows, which extends astride of the metatarsal region of the foot so to allow the rear part of the shell to bend forwards with respect to the toe of the shell so as to favour the natural movement of the skier's foot.

[0006] In more recent years, some manufacturers of ski-boots have marketed ski-boots for alpine skiing or telemark in which the bootleg is integrally made of a composite material basically constituted by one or more superimposed layers of glass fibres and/or carbon fibres appropriately intertwined and/or superimposed on one

another and embedded in a matrix of epoxy resin of a thermosetting type.

[0007] Said solution enables a slight reduction in the overall weight of the ski-boot, simultaneously increasing the structural stiffness of the ski-boot in the area of the ankle.

[0008] Aim of the present invention is to further reduce the overall weight of ski-boots for alpine skiing or telemark, without however jeopardizing the flexibility of the shell. The latter being a characteristic that is essential for practising alpine skiing and telemark properly and in safe conditions.

[0009] In compliance with the above aims, according to the present invention a ski-boot is provided as specified in claim 1 and preferably, though not necessarily, in any one of the dependent claims.

[0010] The present invention will now be disclosed with reference to the accompanying drawings, which show a non-limitative embodiment thereof, in which:

- Figure 1 is a side view of a ski-boot for telemark made according to the teachings of the present invention;
- Figure 2 is a rear view of the ski-boot shown in Figure 1; and
- Figure 3 is a section view of the front part of the ski-boot shown in Figure 1.

[0011] With reference to Figures 1 and 2, indicates as a whole a ski-boot, and in particular a ski-boot specifically structured for practising the sport activities of alpine skiing or telemark.

[0012] The ski-boot 1 basically comprises an outer rigid shell 2, which is shaped so as to receive the skier's foot and is provided at the bottom with a front sole 3 and a rear heel 4 made preferably, though not necessarily, of anti-slip elastomeric material; and a rigid bootleg 5, which is shaped so as to wrap round the user's ankle and is hinged on the top part of shell 2 in order to be able to freely swing about a rotation axis A which is substantially perpendicular to the longitudinal mid plane of the ski-boot and which locally substantially coincides with the articulation axis of the user's ankle.

[0013] More specifically, bootleg 5 is fixed in a freely swivelling manner on the shell 2 via two connecting hinges 6, which are positioned on the outer and inner lateral sides of shell 2, aligned along the axis A.

[0014] The ski-boot 1 is moreover provided with an internal shoe-liner 7 made of soft and thermally insulating material, which is positioned inside shell 2 and bootleg 5 preferably, though not necessarily, in a removable manner and is shaped so as to envelop and protect both the foot and the bottom part of the user's leg; and a number of manually operated closing members 8 which are appropriately distributed on shell 2 and on bootleg 5, and are structured so as to be able to selectively tighten shell 2 and/or bootleg 5 so as to immobilize the user's leg stably inside the ski-boot 1.

[0015] With reference to Figures 1 and 2, the bootleg 5 consists of a shell 5 having preferably, though not necessarily, a monolithic structure and which is made of a composite material constituted by one or more superimposed layers of glass fibres and/or carbon fibres and/or aramidic fibres, appropriately intertwined and/or superimposed on one another and embedded in a matrix of epoxy resin, phenolic resin, or polyester resin of a thermosetting type.

[0016] Preferably, though not necessarily, shell 5 is also provided with a surface layer made of mono-oriented polyester-polyarylate fibres (commercially known as VECTRAN) embedded in the matrix of thermosetting resin. Said surface layer forms the entire internal surface 5a of shell 5, i.e. the surface of shell 5 facing shell 2 and the shoe-liner 7, and performs the dual function of absorbing the mechanical vibrations in the contact areas between bootleg 5 and the shell 2 and of preventing any splinters of composite material deriving from possible breaking of the shell 5 from reaching the user's leg.

[0017] Unlike currently known ski-boots for alpine skiing or telemark, shell 2 is, instead, formed by a front half-shell 9 and a rear half-shell 10, fixed in a rigid and unmovable way to one another.

[0018] The front half-shell 9 has a substantially ogival shape, covers completely the user's toes approximately up to the beginning of the plantar arch area and is entirely made of at least one non-reinforced plastic polymer, via a process of injection moulding of a known type. In other words, front half-shell 9 is entirely made of at least one homogeneous plastic polymer that does not enclose reinforcement fibres, such as, for example, high-density polyurethane and/or polyester and/or polyether amide (commercially known as PEBAX) and/or other similar plastic polymers, through a process of injection moulding.

[0019] Instead, the rear half-shell 10 completely covers the remaining part of the user's foot, starting substantially from the boundary between the plantar arch and the metatarsal region of the foot, and is entirely made of a composite material constituted by one or more superimposed layers of glass fibres and/or carbon fibres and/or aramidic fibres, appropriately intertwined and/or superimposed on one another and embedded in a matrix of epoxy resin, phenolic resin, or polyester resin of a thermosetting type.

[0020] With reference to Figures 1 and 3, the front half-shell 9 of shell 2 is moreover provided with a transverse elastically deformable portion 9a which extends from one side to the other of the shell 2, approximately astride of the metatarsal region of the foot, and is structured so as to enable the front half-shell 9 to deform locally in an elastic way in order to enable the entire shell 2 to bend in the metatarsal region of the foot and favour possible bending of the user's foot.

[0021] More specifically, sole 3 is stably fixed on the bottom wall of front half-shell 9, and front half-shell 9 is divided into a front portion and a rear portion, both of which are substantially rigid and undeformable, and into

an elastically deformable intermediate portion 9a that extends on the top wall of the front half-shell 9 from one side to the other of the shell 2, roughly above the metatarsal region of the foot and almost reaching sole 3 so to separate and joint together the front portion and the rear portion of front half-shell 9.

[0022] In the example shown, in particular, the elastically deformable portion 9a of front half-shell 9 is formed by a programmed deformation bellows 9a extending from one side to the other of the shell 2, roughly astride of the metatarsal region of the foot, and almost reaching sole 3, and which is structured so as to allow the user's toes to freely bend by a few degrees.

[0023] In addition to what set above, in the example shown bellows 9a, i.e. the elastically deformable portion 9a of front half-shell 9, extends from one side to the other of shell 2 following a slightly oblique arched path, so that the end on the inner side of shell 2 is located further forwards with respect to the end set on the outer side of shell 2 so as to follow the natural bending axis of the foot.

[0024] Finally, front half-shell 9 is preferably, though not necessarily, also provided with a projecting appendage 9b of a substantially duck-bill shape, which prolongs in cantilever manner from the toe of the ski-boot 1 remaining substantially coplanar to the sole 3 and is structured in so to be able to couple in a rigid and stable, but easily releasable manner with the forward piece of any known-type ski-coupling device.

[0025] With reference to Figure 3, rear half-shell 10, instead, substantially has the shape of a tub without one of the smaller side walls, and is telescopically inserted inside the front half-shell 9 so to form a single body with the latter. In the example shown, the rear half-shell 10 is moreover provided with a plane projecting tongue or flap 10a, which prolongs in cantilever manner inside the front half-shell 9 remaining locally tangential to the bottom wall of the front half-shell 9, on the opposite side of sole 3, more or less as far as the bottom of the front half-shell 9, and adheres stably to the bottom wall of the front half-shell 9 throughout the contact area with the front half-shell 9.

[0026] Preferably, though not necessarily, the rear half-shell 10 is moreover provided with a surface layer made of mono-oriented polyester-polyarylate fibres (commercially known as VECTRAN) embedded in the matrix of thermosetting resin. Said surface layer forms the entire internal surface 10b of the rear half-shell 10, i.e. the surface of the rear half-shell 10 directly facing the shoe-liner 7, and performs the dual function of absorbing the mechanical vibrations in the contact areas between shell 2 and shoe-liner 7 and of preventing any splinters of composite material deriving from possible breaking of the rear half-shell 10 from reaching the user's foot.

[0027] With reference to Figure 3, finally shell 2 is preferably, though not necessarily, also provided with an insole 11 made of foamed plastic polymer, which has the function of absorbing the mechanical vibrations in the contact areas between shell 2 and shoe-liner 7, and is

fixed in an unmovable manner on the bottom of the shell 2, astride of the front half-shell 9 and the rear half-shell 10 so as to coat substantially the entire internal surface of shell 2 which is to support the sole of the user's foot.

[0028] In the example shown, in particular, insole 11 has preferably, though not necessarily, the shape of a tray, and is made of ethylene-vinyl-acetate foam with closed cells (commercially known as EVA).

[0029] With reference to Figures 1 and 2, in the example illustrated, moreover, heel 4 of shell 2 is an element which is completely separate from the rear half-shell 10, and which is attached to the rear half-shell 10 by means of a metal supporting bracket 12 which, in turn, is rigidly fixed on the outside of the rear half-shell 10, on the area corresponding to the heel of the foot, and is preferably, though not necessarily, structured so as to be able to couple in a rigid and stable, but easily releasable, manner with the heel piece of any known type ski-coupling device.

[0030] In the example shown, in particular, the metal supporting bracket 12 is substantially L-shaped so that a first portion 12a of the bracket extends underneath the rear half-shell 10, towards the toe of the ski-boot, remaining locally adherent to the outer surface of the rear half-shell 10, whilst the second portion 12b of the bracket prolongs upwards, remaining always locally adherent to the outer surface of the rear half-shell 10, up to almost reach the attachment of Achilles tendon after passing completely over the heel of the foot.

[0031] Heel 4, instead, consists of a wedge of anti-slip elastomeric material, which is fixed directly on the horizontal portion 12a of the bracket, on the opposite side of the rear half-shell 10.

[0032] Finally, with reference to Figures 1 and 2, ski-boot 1 is preferably, though not necessarily, also provided with a manually-operated bootleg locking device 13 which, according to the skier's choice and alternatively, is able to rigidly clamp the bootleg 5 to the shell 2 so to prevent any relative movement between the two elements; engage the bootleg 5 to the shell 2 so as to allow only positive oscillations of the bootleg 5 about the axis A, which, starting from a pre-set resting position, bring bootleg 5 up toward the toe of shell 2 of ski-boot 1; or else release bootleg 5 from shell 2 so as to allow the bootleg 5 to freely oscillate about the axis A both forwards and backwards.

[0033] More specifically, in the example shown, the bootleg locking device 13 comprises:

- a top supporting plate 14 which is fixed on the outer surface of bootleg 5 in a position corresponding to the bottom part of the calf, i.e. immediately above the area of rear half-shell 10 that, in use, is to receive the heel of the foot;
- a bottom anchorage plate 15 which is rigidly fixed on the outer surface of rear half-shell 10 underneath the supporting plate 14, i.e. in a position corresponding to the area of rear half-shell 10 that, in use, is to receive the heel of the foot; and finally

- an coupling lever 16 which lies substantially in the longitudinal mid plane of the ski-boot, is hinged on the supporting plate 14 next to its proximal end so to be able to freely rotate about an axis B that is locally substantially parallel to axis A, while always remaining on the longitudinal mid plane of the ski-boot, and has the distal end shaped so to be able to engage in a rigid and stable, but easily releasable manner, to the anchorage plate 15 so as to constrain the bootleg 5 rigidly to the rear half-shell 10.

[0034] More specifically, in the example shown, the coupling lever 16 is positionable by the user in three different operating positions, in which the distal end of the coupling lever 16 comes to bear upon the anchorage plate 16 or upon the rear half-shell 10.

[0035] In the first operating position, the distal end of coupling lever 16 is engaged to the anchorage plate 15 so as to rigidly clamp the bootleg 5 to the rear half-shell 10 and prevent any relative movement between the two elements. In the second operating position, the distal end of coupling lever 16 is set bearing upon the surface of the rear half-shell 10, immediately above the anchorage plate 15, and can bear upon the anchorage plate 15 so as to allow only oscillations of the bootleg 5 about axis A which, starting from a pre-set resting position, bring the bootleg 5 up toward the toe of the ski-boot 1, i.e. to the front half-shell 9. Finally, in the third operating position, the distal end of coupling lever 16 is set bearing upon the surface of the rear half-shell 10, immediately underneath the anchorage plate 15 so as to release the bootleg 5 from the rear half-shell 10 and allow the bootleg 5 to freely oscillate about axis A both forwards and backwards.

[0036] In the example shown, in particular, the anchorage plate 15 is preferably, though not necessarily, made in one piece with the metal supporting bracket 12 that connects the heel 4 to the rear half-shell 10, and is provided with a cylindrical transverse pin 15a which is fixed to the body of the metal supporting bracket 12 at a given distance from the surface of the rear half-shell 10 and so to be parallel to the rotation axis B of the lever; whilst the distal end of coupling lever 16 is provided with a transverse groove or indent (not visible in the figures), which extends on the lever body parallel to axis B and is sized so as to receive and trap temporarily the transverse pin 15a.

[0037] With reference to Figures 1 and 2, in addition to what above, the bootleg locking device 13 is preferably, though not necessarily, also provided with a closing lace 18 which has its two ends fixed to two opposite side flaps of the bootleg 5 so as to completely surround the bootleg 5, and is centrally engaged to the coupling lever 16; and a pair of driving elements 19 which are fixed on the outer surface of the bootleg 5 on opposite sides of the top supporting plate 14 and are slidably engaged by the two stretches of the closing lace 18.

[0038] The driving elements 19 are designed to keep

the two terminal portions of closing lace 18 which cross over each other on the front part of bootleg 5, in a position astride of the two opposite side flaps of bootleg 5, so that the positioning of coupling lever 16 in any of the three operating positions described above will enable tensioning of the closing lace 18, which, in turn, pulls the two opposite side flaps of bootleg 5 one against the other so to tighten the bootleg 5 against the shoe-liner 7 and block the user's ankle stably inside the ski-boot 1.

[0039] In other words, the bootleg locking device 13, according to the skier's choice and alternatively, is able to

- clamp the bootleg 5 rigidly to the shell 2 so to prevent any relative movement between the two elements;
- engage the bootleg 5 to the shell 2 so as to allow only positive oscillations of the bootleg 5 about axis A; or else
- release the bootleg 5 from the shell 2 so to allow the bootleg 5 to freely oscillate about axis A both forwards and backwards;

and also simultaneously tighten the bootleg 5 so to immobilize the user's leg stably inside the ski-boot 1, as any other manually operated closing member 8 present on the ski-boot 1.

[0040] In the example shown, in particular, the ski-boot 1 is provided with only one other manually operated closing member 8, which is designed to tighten the shell 2 so to immobilize the user's foot stably inside the ski-boot 1.

[0041] Said closing member 8 is preferably, though not necessarily, constituted by a traditional clamping hook 8 with manually operated tensioning leverage, which is positioned crosswise on the outer surface of the rear half-shell 10, astride of the longitudinal opening (not illustrated) that allows the user to insert his foot inside the shell 2.

[0042] The clamping hook 8 is a component already widely known in the field and hence won't be further described.

[0043] Operation of ski-boot 1 is practically identical to that of any other ski-boot for alpine skiing or telemark currently on the market and hence does not require any further explanations.

[0044] On the other hand, the advantages deriving from the particular structure of ski-boot 1 for alpine skiing or telemark are really remarkable. The division of shell 2 into a front half-shell 9 made of plastic polymer and a rear half-shell 10 made of composite material enables drastic reduction in the overall weight of the ski-boot, without jeopardizing the possibility of elastic deformation of shell 2, which is essential for the alpine-ski and telemark sporting activities.

[0045] In addition, construction of the front portion of shell 2 in normal plastic polymer prevents the mechanical stresses that are transmitted from the ski-boot 1 to the forward piece of the ski-coupling device from causing an unexpected and sudden crumbling of the parts made of

composite material.

[0046] The fact that the anchorage plate 15 is made in one piece with the metal supporting bracket 12 which connects the heel 4 to the rear half-shell 10 and is moreover structured so to be able to couple in a rigid and stable, but easily releasable, manner with the heel piece of the ski-coupling device, enables all mechanical stresses transmitted by bootleg 5 to be discharged directly on the heel piece of the ski-coupling device, without involving the rear half-shell 10.

[0047] In this way, during normal use, the rear half-shell 10 is not subjected to repetitive bending loads that could cause failure due to fatigue of the composite material, making possible a drastic reduction in the thickness of the wall of composite material to the advantage of lightness and of reduction in the production costs of the rear half-shell 10.

[0048] Clearly, changes may be made to the ski-boot 1 for alpine skiing or telemark herein described and illustrated, without however departing from the scope of the present invention.

[0049] For example, in a simplified embodiment, the front half-shell 9 of shell 2 may be deprived of the elastically deformable portion 9a.

Claims

1. A ski-boot (1) comprising an outer rigid shell (2) shaped so as to receive the user's foot, and a rigid bootleg (5) which is shaped so as to wrap round the user's ankle and is hinged on the top part of the shell (2) so to be able to swing about a first reference axis (A) that locally substantially coincides with the articulation axis of the user's ankle; the ski-boot (1) being **characterized in that** the shell (2) is formed by a front half-shell (9) and a rear half-shell (10) rigidly fixed to one another; the front half-shell (9) having a substantially ogival shape for covering the user's toe substantially up to the beginning of the plantar arch area of the foot and being made of at least one non-reinforced plastic polymer; the rear half-shell (10) being designed to completely cover the remaining part of the foot, starting substantially from the plantar arch area of foot and being made of a composite material containing fibres embedded in a resin matrix.
2. A ski-boot according to Claim 1, **characterized in that** the front half-shell (9) is provided with a transverse elastically deformable portion (9a) which extends from one side to the other of the shell (2), approximately astride of the metatarsal region of the foot, and is structured so as to enable the front half-shell (9) to deform locally in an elastic way in order to enable the entire shell (2) to bend in an area corresponding to the metatarsal region of the user's foot.

3. A ski-boot according to Claim 2, **characterized in that** the elastically deformable portion (9a) of the front half-shell (9) is defined by a programmed deformation bellows (9a) which extends from one side to the other of the shell (2), roughly astride of the metatarsal region of the foot. 5
4. A ski-boot according to any one of the preceding claims, **characterized in that** the shell (2) is provided at the bottom with a front sole (3) and a rear heel (4) made of anti-slip elastomeric material; the front sole (3) being stably fixed on the front half-shell (9) of the shell (2); the rear heel (4) being, instead, stably fixed on the rear half-shell (10) of the shell (2). 10
5. A ski-boot according to Claim 4, **characterized in that** the heel (4) is attached to the rear half-shell (10) via a metal supporting bracket (12) which, in turn, is rigidly fixed on the rear half-shell (10), on the area corresponding to the heel of the foot. 15
6. A ski-boot according to Claim 5, **characterized in that** the metal supporting bracket (12) is structured so as to be able to couple in a rigid and stable, but easily releasable, manner with the heel piece of a ski-coupling device. 20
7. A ski-boot according to Claim 5 or 6, **characterized in that** the metal supporting bracket (12) is substantially L-shaped so that a first portion (12a) of the bracket prolongs underneath the rear half-shell (10) towards the toe of the ski-boot, remaining locally adherent to the outer surface of the rear half-shell (10), whilst the second portion (12b) of the bracket prolongs upwards, remaining always locally adherent to the outer surface of the rear half-shell (10). 25
8. A ski-boot according to Claim 7, **characterized in that** the rear heel (4) consists of a wedge of anti-slip elastomeric material, which is fixed directly on the second portion (12a) of the bracket, on the opposite side of the rear half-shell (10). 30
9. A ski-boot according to any one of the preceding claims, **characterized in that** the shell (2) is also provided inside with an insole (11) made of foamed plastic polymer, which is positioned on the bottom of the shell (2), astride of the front half-shell (9) and the rear half-shell (10) so to coat substantially the entire internal surface of the shell (2) which is to support the sole of the user's foot. 35
10. A ski-boot according to any one of the preceding claims, **characterized in that** it also comprises a bootleg locking device (13) which, according to the skier's choice and alternatively, is able to clamp the bootleg (5) rigidly to the shell (2) so to prevent any relative movement between the two elements; to engage the bootleg (5) to the shell (2) so to allow only positive oscillations of the bootleg (5) which, starting from a pre-set resting position, bring the bootleg (5) up toward the toe of the shell (2); or else to release the bootleg (5) from the shell (2) so to allow the bootleg (5) to freely oscillate both forwards and backwards. 40
11. A ski-boot according to Claim 10, **characterized in that** the bootleg locking device (13) comprises:
 - a supporting plate (14) fixed on the outer surface of the bootleg (5) immediately above the area of the rear half-shell (10) that, in use, is to receive the heel of the foot;
 - an anchorage plate (15) fixed on the outer surface of the rear half-shell (10), in a position corresponding to the area of the rear half-shell (10) that, in use, is to receive the heel of the foot; and
 - an coupling lever (16) which is hinged on the supporting plate (14) next to its proximal end so to be able to freely rotate about a second reference axis (B) locally substantially parallel to the first reference axis (A), and which has the distal end shaped so to be able to engage in a rigid and stable, but easily releasable, manner to said anchorage plate (15) so as to rigidly constrain the bootleg (5) to the rear half-shell (10). 45
12. A ski-boot according to Claims 5 and 10, **characterized in that** the anchorage plate (15) of the bootleg locking device (13) is made in one piece with the metal supporting bracket (12) connecting the heel (4) to the rear half-shell (10). 50
13. A ski-boot according to any one of the preceding claims, **characterized in that** the bootleg (5) is made of a composite material containing fibres embedded in a resin matrix. 55
14. A ski-boot according to any one of the preceding claims, **characterized in that** the front half-shell (9) is made of at least one non-reinforced plastic polymer by means of a process of injection moulding.
15. A ski-boot according to any one of the preceding claims, **characterized in that** it also comprises an internal shoe-liner (7) made of soft and thermally insulating material, which is positioned inside the shell (2) and the bootleg (5) and is shaped so to envelop and protect both the foot and the bottom part of the user's leg.
16. A ski-boot according to any one of the preceding claims, **characterized in that** it also comprises manually-operated closing means (8) which are appropriately distributed on the shell (2) and/or on the bootleg (5), and are structured so to be able to selectively

tighten the shell (2) or the bootleg (5) so as to immobilize the user's leg stably inside the ski-boot (1).

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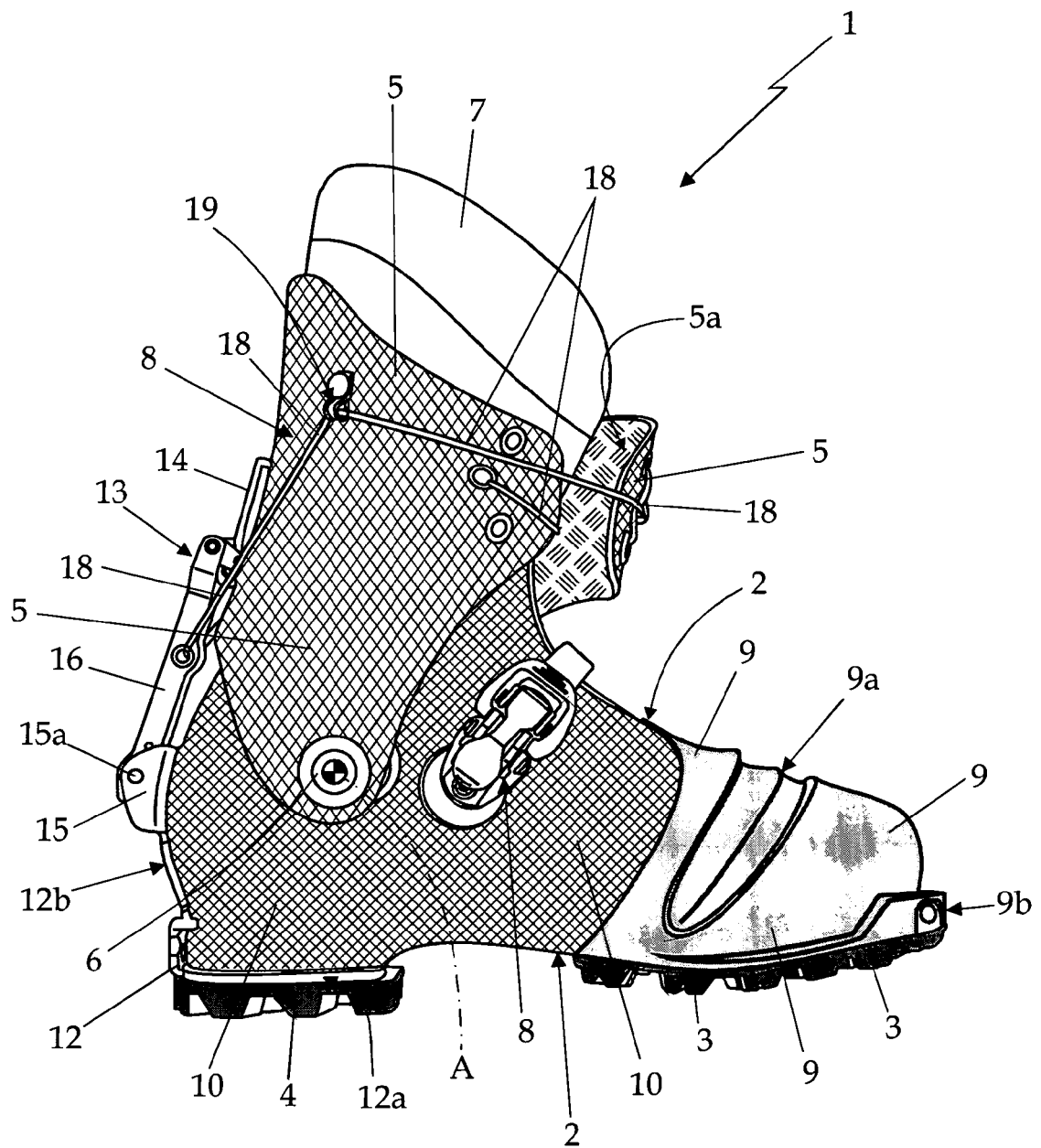


Fig. 1

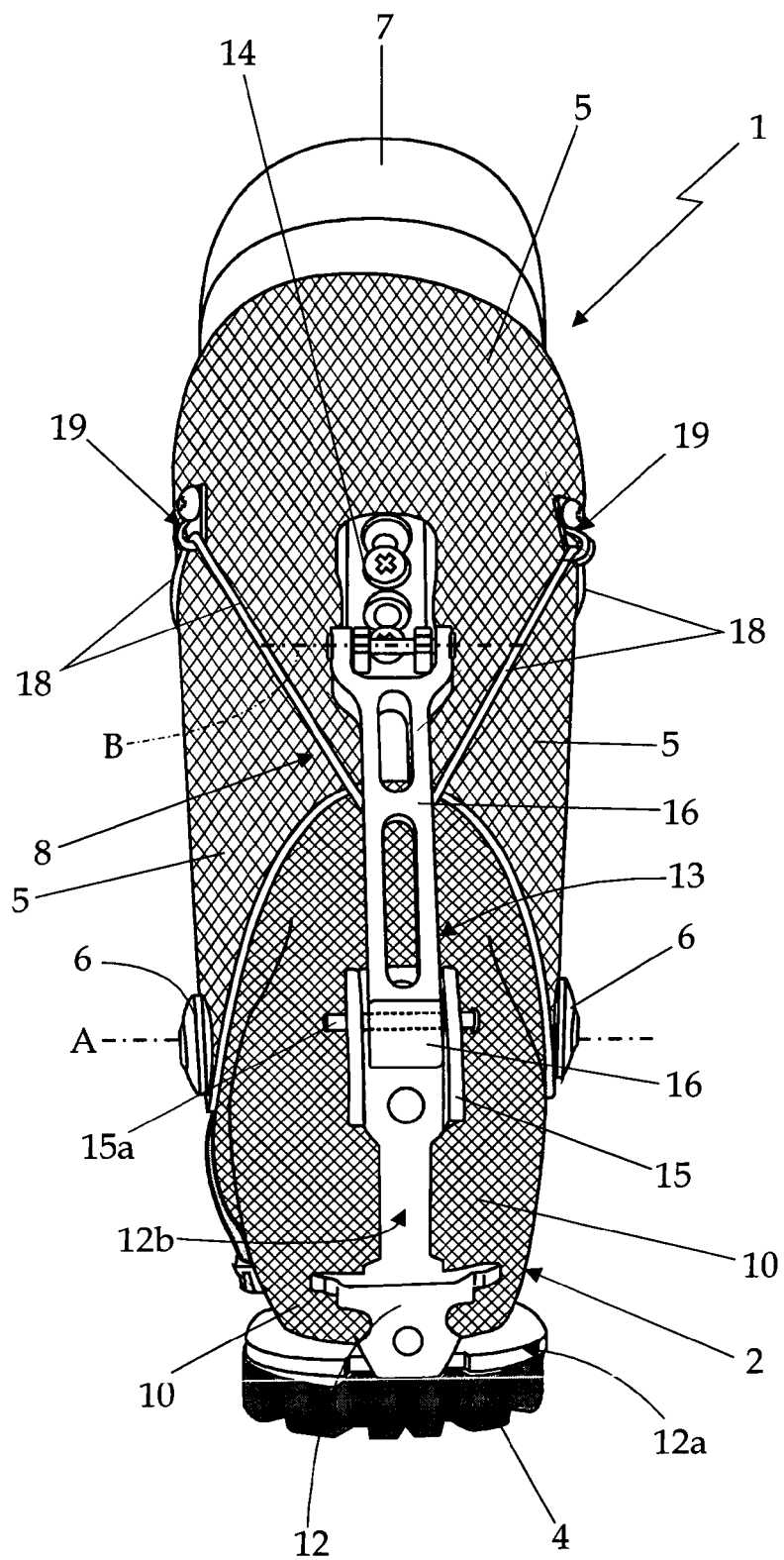


Fig. 2

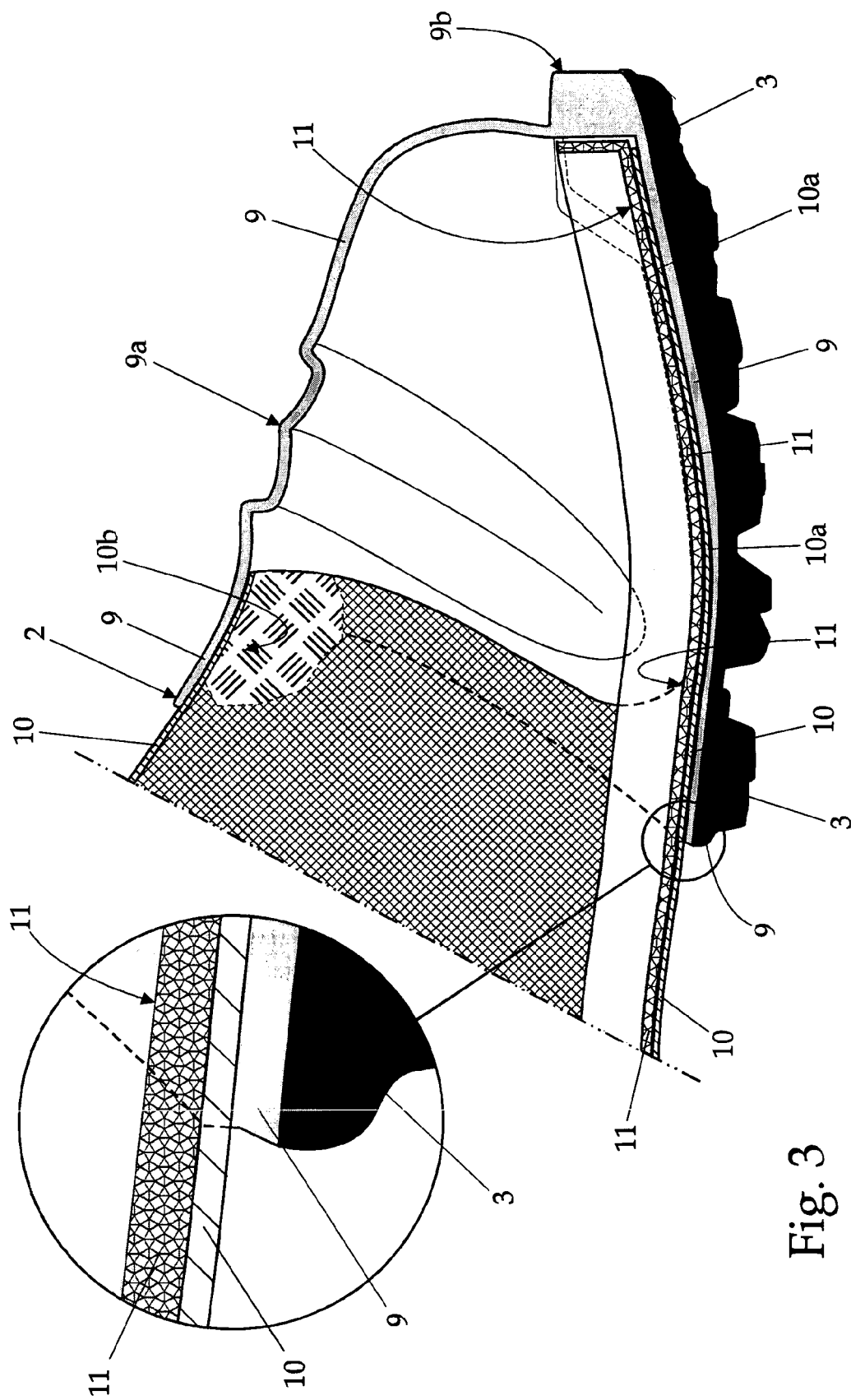


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 09 42 5098

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2008/271345 A1 (NARAJOWSKI DAVID [US] ET AL) 6 November 2008 (2008-11-06) * paragraphs [0025], [0029]; figures 1a,1b *	1-9, 13-16	INV. A43B5/04
A	WO 00/74514 A (PROCTOR TECHNOLOGIES GROUP INC [US]; PROCTOR CHARLES WESLEY SR [US]) 14 December 2000 (2000-12-14) * the whole document *	1-9, 13-16	
A	WO 99/10054 A (PROCTOR CHARLES WESLEY SR [US]) 4 March 1999 (1999-03-04) * page 6, line 17 - page 8, line 8; figures 1-4 *	1-9, 13-16	
A	EP 1 221 290 A (SCARPA CALZATURIFICIO SPA [IT]) 10 July 2002 (2002-07-10) * the whole document *	1-9, 13-16	
			TECHNICAL FIELDS SEARCHED (IPC)
			A43B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 24 August 2009	Examiner Cianci, Sabino
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 42 5098

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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24-08-2009

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