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(54) **SKI-BOOT**

(57) A ski boot (1) comprising: a substantially rigid foot-casing (2) which is shaped so as to accommodate the user's foot, and has the lower part structured so as to couple with a ski binding device; a substantially rigid cuff (3) which is shaped so as to surround the lower part of the user's leg, and is pivotally joined to the foot-casing (2) so as to be able to swing about a rotation axis (A) substantially perpendicular to the midplane of the boot; and foot-casing closing means (12) which are adapted to selectively tighten the longitudinal slit (16) which is located on the upper part of the foot-casing (2), and which comprise: a plurality of transversal flexible tongues (20) that are arranged inside the foot-casing (2) astride and transversal to a first longer lateral edge (16a) of the longitudinal slit (16), and are firmly fixed to the foot-casing (2) so as to extend cantilevered inside the longitudinal slit (16) towards a second longer lateral edge (16b) of the longitudinal slit (16), opposite to said first longer lateral edge (16a); a series of substantially non-deformable cable-return members (21) that are located on the foot-casing (2) along or close to the second longer lateral edge (16b) of the longitudinal slit (16); a cable-winding winch (22) which is fixed onto the foot-casing (2), close to the second longer lateral edge (16b) of the longitudinal slit (16), and is provided with a tightening cable (23) that exits from the cable-winding winch (2) and engages in pass-through and freely slidable manner the distal ends of the transversal flexible tongues (20) and the cable-return members (21).

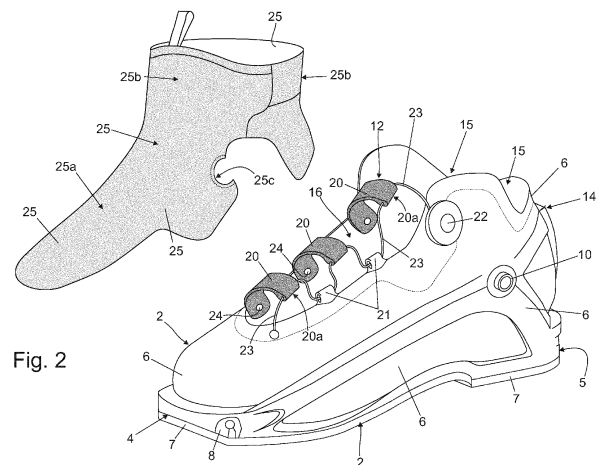


Fig. 2

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims priority from Italian patent application no. 102020000019396 filed on 06/08/2020.

TECHNICAL FIELD

[0002] The present invention relates to a ski boot.

[0003] In more detail, the present invention relates to a ski mountaineering boot, use to which the following disclosure will make explicit reference without however losing generality.

BACKGROUND ART

[0004] As is known, ski mountaineering boots currently on the market basically comprise: a rigid foot-casing made of plastic or composite material, which is shaped so as to accommodate the user's foot, and has the bottom part specifically structured so as to be fixed on the back of a downhill ski or similar by means of a special ski-mountaineering binding device; a rigid cuff made of plastic or composite material, which is shaped so as to embrace the lower part of the user's leg from behind, and is hinged to the upper part of the foot-casing so as to be able to rotate about a transversal reference axis, which is substantially perpendicular to the vertical midplane of the boot, and is also locally substantially coincident with the articulation axis of the ankle; and an inner liner made of soft, thermal-insulating material, which is inserted into the foot-casing and the cuff and is shaped so as to accommodate and protect both the foot and the lower part of the user's leg.

[0005] In addition, the above-mentioned ski mountaineering boots additionally comprise a foot-casing closing mechanism and a cuff closing mechanism, both manually operated.

[0006] In patent EP3192386 B1, the foot-casing closing mechanism includes: an oblong-shaped floating rigid body, which is suspended in the centre of the longitudinal slit present on the upper part of the foot-casing, so as to extend saddle-like above the instep of the user, substantially astride the centreline of the longitudinal slit; a series of flexible and inextensible, transversal tongues that are located inside the foot-casing, in pairs on opposite sides of the longitudinal slit of the foot-casing, and are firmly fixed to the foot-casing so as to jut out cantilevered inside the longitudinal slit in a direction transversal to the centreline of the longitudinal slit; and a manually-operated cable-winding winch, which is fixed above the rigid floating body and is provided with a flexible cable that exits from the cable-winding winch and engages, in a pass-through and freely sliding manner and in succession, the distal ends of the various flexible tongues, passing alternately from one side of the rigid floating body to the

other.

[0007] The floating rigid body is generally held in position in the centre of the longitudinal slit by the segments of the flexible cable that also engage the floating rigid body in sliding manner.

[0008] In addition, in some models of ski boots, the front end of the rigid floating body is firmly fixed to the front part of the foot-casing by means of an elastic element that still allows the component to move freely up and down.

[0009] Notwithstanding the excellent operation, experimental tests have highlighted that often the rigid floating body of the foot-casing closing mechanism, especially if supported only by the flexible cable, can rotate above the instep due to the torque applied by the user on the command knob of the winch, with all the fitting problems that this entails.

[0010] In addition, other experimental tests have highlighted that, occasionally, the rigid floating body of the foot-casing closing mechanism, especially if linked to the front part of the foot-casing, can behave like a strut and get stuck on the tongue of the internal thermal-insulating liner, hindering the opening of the tongue, with all the fitting problems that this entails.

DISCLOSURE OF INVENTION

[0011] Aim of the present invention is to provide a foot-casing closing system that can overcome the drawbacks described above, and which is also reliable and economical to produce.

[0012] In accordance with these aims, according to the present invention there is provided a ski boot as defined in Claim 1 and preferably, though not necessarily, in any one of the claims depending on it.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The present invention will now be described with reference to the attached drawings, which show a non-limiting embodiment thereof, in which:

- Figure 1 is a perspective view of a ski boot realized according to the teachings of the present invention;
- Figure 2 is a perspective and partially exploded view of the foot-casing of the ski boot shown in Figure 1, with parts removed for clarity's sake; whereas
- Figures 3 and 4 are perspective views of as many variants of the foot-casing shown in Figure 2, with parts removed for clarity's sake.

BEST MODE FOR CARRYING OUT THE INVENTION

[0014] With reference to Figures 1 and 2, number 1 denotes, as a whole, a ski boot that can be advantageously used for ski mountaineering or telemark skiing.

[0015] The ski boot 1 firstly comprises: a substantially rigid foot-casing 2 which is shaped substantially like a

shoe, is adapted to accommodate the user's foot, and preferably has a lower part that is specifically structured/shaped so as to be able to couple/attach in a rigid and stable, though easily releasable manner with a ski binding device of known type (not shown), which in turn is adapted to be rigidly fixed to the back of a generic downhill ski or similar equipment; and a substantially rigid cuff 3 which is shaped so as to surround the lower part of the user's leg, and is pivotally joined to the foot-casing 2 so as to be able to swing about a transversal rotation axis A that is locally substantially perpendicular to the vertical midplane of the boot, and is also substantially coincident with the articulation axis of the user's ankle.

[0016] In more detail, the lower part of foot-casing 2 is preferably provided with a front tip 4 and a rear heel 5.

[0017] The front tip 4 is preferably structured so as to be able to couple/attach, in a stable though easily releasable manner, with the toe piece (not shown) of a ski binding device which, in turn, is stably fixed to the back of a generic downhill ski or similar. The rear heel 5, on the other hand, is preferably structured so as to be able to couple/attach, in a stable though easily releasable manner, with the heel (not shown) of a ski binding device which, in turn, is stably fixed to the back of a generic downhill ski or similar.

[0018] In even more detail, the front tip 4 of foot-casing 2 is preferably structured so as to couple/attach in known manner with the toe piece of a ski-mountaineering binding device; whereas the rear heel 5 of foot-casing 2 is preferably structured so as to couple/attach in known manner with the heel piece of the same ski-mountaineering binding device.

[0019] Preferably, the lower part of foot-casing 2 moreover has a tread profile so as to grip on snow and/or ice, and thus allow the user to walk on snow and ice in relative safety.

[0020] In more detail, with reference to Figures 1 and 2, the foot-casing 2 preferably comprises: a substantially oblong basin-shaped rigid shell 6, which is preferably made of plastic and/or composite material, and is shaped so as to accommodate and enclose the user's foot, preferably roughly up to the ankle height; and optionally a lower sole 7 preferably with a tread profile, which is preferably made of vulcanised rubber or other elastomeric material with a high coefficient of friction, and is firmly fixed to the bottom wall of shell 6 preferably by gluing.

[0021] In the example shown, in particular, the shell 6 is preferably made of PEBAX (polyester-amide), Nylon (polyamide) or other similar plastic polymer.

[0022] Clearly, the shell 6 could also be made of a composite material preferably formed by one or more superimposed layers of carbon fibres and/or glass fibres and/or aramid fibres, suitably interwoven and/or superimposed on each other and embedded in a matrix of epoxy, phenolic or polyester resin, preferably of the thermosetting type.

[0023] In addition, the foot-casing 2 preferably additionally comprises a front rigid insert 8, preferably made

of metal material, which is stably embedded/incorporated in the bottom wall of shell 6 roughly at the tip 4 of the foot-casing 2, and is structured so as to couple/attach in known manner with the toe piece (not shown) of the ski-mountaineering binding device; and optionally also a rear rigid insert (not shown in the figures), preferably made of metal material, which is instead recessed in the shell 6 at the heel 5, and is structured so as to couple/attach in known manner with the heel piece (not shown) of the same ski-mountaineering binding device.

[0024] With reference to Figure 1, on the other hand, the cuff 3 preferably comprises a substantially rigid shell 9, preferably made of plastic and/or composite material, which is preferably substantially C-bent so as to cover the rear part of the user's leg, from the ankle substantially up to the calf height, and is moreover provided with two oblong, protruding lateral flaps extending forward on opposite sides of the boot midplane, so as to embrace the user's leg from behind approximately at calf height, and preferably then overlap to one another at the front part of the leg, forming a tubular structure that surrounds the user's leg at calf height.

[0025] The cuff 3, in addition, is preferably fixed in freely rotatable manner onto the upper part of foot-casing 2, or rather of shell 6, by means of two connecting hinges 10 preferably made of metallic material, which are placed on the inner and outer lateral sides of foot-casing 2 and of cuff 3, aligned along the transversal axis A, so as to allow the cuff 3 to freely swing on the foot-casing 2 back and forth, while always remaining on a reference plane orthogonal to the transversal axis A and substantially coincident with the midplane of the boot.

[0026] With reference to Figure 1, in addition the ski boot 1 moreover comprises a protective liner 11 which has a soft, thermal-insulating structure, is shaped so as to accommodate and protect the foot and optionally also the lower part of the user's leg, and is inserted into the foot-casing 2 and optionally also into the cuff 3 preferably in a manually removable manner.

[0027] In the example shown, in particular, the liner 11 is preferably shaped substantially like a boot, so as to be able to accommodate and protect the foot and the lower part of the user's leg roughly up to the top of the calf. Preferably the thermal-insulating liner 11 additionally has a thermoformable structure.

[0028] With reference to Figures 1 and 2, in addition the ski boot 1 furthermore includes a foot-casing closing mechanism 12 and, preferably, also a cuff closing mechanism 13, both manually operated. Preferably, the ski boot 1 is additionally provided with a manually or automatically operated, cuff locking device 14.

[0029] The foot-casing closing mechanism 12 is structured so as to be able to selectively close/tighten the upper part of the foot-casing 2 against the user's foot, thus to immobilise the user's foot inside the foot-casing 2, or rather inside the liner 11.

[0030] The cuff closing mechanism 13 is structured so as to be able to selectively close/tighten the upper part

of the cuff 3 against the user's leg, thus to immobilise the user's leg inside the cuff 3, or rather inside the liner 11.

[0031] The cuff locking device 14, on the other hand, is structured so as to be able, alternatively and on choice: to lock the cuff 3 rigidly to the foot-casing 2 in a given position, preventing any swinging movement of the cuff 3 on the foot-casing 2; or to completely unlock/release the cuff 3 from the foot-casing 2 so as to allow the cuff 3 to freely swing back and forth on the foot-casing 2 about transversal axis A, while remaining on the midplane of the boot.

[0032] In more detail, with reference to Figure 2, the upper part of foot-casing 2, or rather of shell 6, is provided with a main opening 15 from which the user's leg comes out, and with an oblong-shaped longitudinal slit 16 that branches off/departs from the main opening 15 and extends towards the front tip 4 of foot-casing 2 along the area of shell 6 above the instep, while remaining substantially astride of the midplane of the boot.

[0033] The foot-casing closing mechanism 12 is located at the longitudinal slit 16, and basically comprises: a plurality of oblong transversal flexible tongues 20 with substantially inextensible structure, which are arranged side by side to one another inside the foot-casing 2, or rather inside the shell 6, astride and transversal to a first longer lateral edge 16a of longitudinal slit 16, and are firmly fixed to the foot-casing 2, or rather to the shell 6, so as to extend cantilevered inside the longitudinal slit 16, towards a second longer lateral edge 16b of longitudinal slit 16 opposite to said first longer lateral edge 16a, preferably while remaining locally substantially flush with the beneath-located liner 11; a series of rigid and substantially non-deformable, small cable-return members 21 that are located stationary/immobile on foot-casing 2, or rather on shell 6, along the second longer lateral edge 16b of longitudinal slit 16; and a manually-operated cable-winding winch 22 which is firmly fixed onto foot-casing 2, or rather onto shell 6, close to the second longer lateral edge 16b of longitudinal slit 16, and is provided with a flexible tightening cable 23 that exits from the cable-winding winch 2 and engages in pass-through and freely slidable manner and in succession both the distal ends of the various transversal flexible tongues 20 and the cable-return members 21.

[0034] The distal ends of the various transversal flexible tongues 20 are structured so as to allow the tightening cable 23 to freely slide inside the tongues. Similarly, the various cable-return members 21 are structured so as to allow the tightening cable 23 to freely slide inside the cable-return members 21.

[0035] The cable-winding winch 22, on the other hand, is structured so as to be able to selectively tension and then keep tensioned the tightening cable 23, forcing the transversal flexible tongues 20, and as far as possible also the foot-casing 2, or rather the shell 6, to flex/bend downwards, i.e. towards the inside of foot-casing 2, so as to tighten and stably block the user's foot inside the foot-casing 2, or rather the liner 11.

[0036] In more detail, the two longer and opposite lateral edges 16a and 16b of the longitudinal slit 16 of foot-casing 2, or rather of shell 6, are arranged on opposite sides of the vertical midplane of the boot.

[0037] The transversal flexible tongues 20 are rigidly butt fixed to the foot-casing 2, or rather to the shell 6, so as to extend cantilevered inside the perimeter of longitudinal slit 16, towards the midplane of the boot, transversally to the longer lateral edge 16a of longitudinal slit 16 and to the centreline of longitudinal slit 16.

[0038] In addition, each transversal flexible tongue 20 preferably has a ribbon-like structure, and its proximal end is preferably firmly fixed to the corresponding inner side of foot-casing 2, or preferably on the lateral wall of shell 6, at a given distance from the longitudinal slit 16.

[0039] Each transversal flexible tongue 20, therefore, extends for a segment of its length flush with the inner surface of foot-casing 2, or rather of shell 6.

[0040] Preferably at least one and more conveniently half or more of the transversal flexible tongues 20 is furthermore dimensioned to extend cantilevered beyond the longer lateral edge 16a of longitudinal slit 16, up to reach and cross the centreline of longitudinal slit 16, so as to place its distal end at a short distance from the facing longer lateral edge 16b of longitudinal slit 16.

[0041] In more detail, in the example shown, the entirety of transversal flexible tongues 20 is preferably dimensioned to extend cantilevered beyond the longer lateral edge 16a of longitudinal slit 16, up to reach and cross the centreline of longitudinal slit 16.

[0042] With reference to Figure 2, the cable-return members 21, on the other hand, are preferably distributed along the longer lateral edge 16b of longitudinal slit 16, so as to be staggered relative to the distal ends of transversal flexible tongues 20.

[0043] In more detail, each cable-return member 21 is preferably placed along the longer lateral edge 16b of longitudinal slit 16, so as to be aligned with/facing the groove/recess between two adjacent transversal flexible tongues 20.

[0044] The cable winding winch 22, on the other hand, is preferably located on the side of foot-casing 2, or rather of shell 6, in proximity of the main opening 15 of foot-casing 2 and/or of connecting hinge 10, and is structured so as to be able, selectively and alternatively, to wind the tightening cable 23 inside itself, to stably block the tightening cable 23, and finally to unwind the tightening cable 23.

[0045] The tightening cable 23 of cable-winding winch 22, moreover, is preferably substantially inextensible, and preferably extends in a zigzag manner close to the longer lateral edge 16b of longitudinal slit 16, alternatively engaging the distal ends of transversal flexible tongues 20 and the cable-return members 21. Finally, the free end of the tightening cable 23 is preferably rigidly anchored to the foot-casing 2, or rather to the shell 6, in proximity of the front end of the longitudinal slit 16.

[0046] With reference to Figure 2, in particular, the

transversal flexible tongues 20 are preferably located on the inner side of foot-casing 2, whereas the cable-winding winch 22 is preferably located on the outer side of foot-casing 2.

[0047] Preferably, the transversal flexible tongues 20 are moreover substantially evenly distributed/spaced on the longer lateral edge 16a of longitudinal slit 16 and/or extend cantilevered towards the facing longer lateral edge 16b while remaining substantially parallel to each other.

[0048] Each transversal flexible tongue 20, in addition, is preferably fixed rigidly to the lateral wall of foot-casing 2, or rather of shell 6, via a rivet 24 or other similar mechanical anchoring member.

[0049] In a different embodiment, however, the proximal ends of transversal flexible tongues 20 could be embedded/trapped in the lateral wall of foot-casing 2, or better of shell 6, or they could be interlocked or heat-welded directly onto the lateral wall of foot-casing 2, or rather of shell 6.

[0050] In addition, each transversal flexible tongue 20 preferably has a monolithic ribbon-like structure, and the distal end of the transversal flexible tongue 20 is preferably provided with an enlarged head 20a having a transversal through-hole, adapted to be engaged in pass-through and freely slidable manner by a corresponding segment of the tightening cable 23.

[0051] Finally each transversal flexible tongue 20 is preferably made of plastic material.

[0052] With reference to Figure 2, on the other hand, the cable-return members 21 are preferably placed exactly on the longer lateral edge 16b of longitudinal slit 16, and are preferably distributed/spaced substantially evenly on the same longer lateral edge 16b in a manner complementary to the transversal flexible tongues 20.

[0053] Preferably, the cable-return members 21 are moreover made in one piece with the foot-casing 2, or rather with shell 6.

[0054] In more detail, at least one and more conveniently each cable-return members 21 preferably consists of a small enlarged piece/segment of the edge of foot-casing 2, or rather of shell 6, that is substantially tubular in shape and is dimensioned to be engaged in pass-through and freely slidable manner by a corresponding segment of tightening cable 23.

[0055] Clearly in a different embodiment, the cable-return members 21 could be elements/pieces completely separate and distinct from the foot-casing 2, or rather from shell 6, and could be rigidly fixed to the edge of foot-casing 2, or rather of shell 6.

[0056] With reference to Figure 2, the cable-winding winch 22 is preferably at least partially recessed into the outer side of the foot-casing 2, or rather of shell 6, and the tightening cable 23 is preferably made of metal material.

[0057] The cable-winding winch 22 and the flexible cable 23 are components already widely known and used in the footwear industry, and therefore they need no fur-

ther explanation.

[0058] In the example shown, in particular, the cable-winding winch 22 and the flexible cable 23 are preferably made by the US company BOA TECHNOLOGY INC. and are already widely described and shown, for example, in patent applications US2014/0290016 and US2015/0007422.

[0059] With reference to Figures 1 and 2, preferably the ski boot 1 furthermore includes a protective gaiter 25, which is preferably made of waterproof and optionally also elasticised material, and is fixed onto the upper part of foot-casing 2, or rather of shell 6, so as to close the longitudinal slit 16 substantially in fluid-tight manner, and to simultaneously also cover the foot-casing closing mechanism 12.

[0060] In more detail, the protective gaiter 25 is preferably divided longitudinally into a front part 25a and a rear part 25b.

[0061] The front part 25a of gaiter 25 is oblong in shape and is adapted to substantially entirely cover the longitudinal slit 16 of foot-casing 2, while always remaining over the transversal flexible tongues 20, the cable-return members 21 and the tightening cable 23.

[0062] In addition, a lateral flap 25c of the front part 25a of gaiter 25 is shaped so as to surmount/cover at least a part of the base of cable-winding winch 22. Preferably, the tightening cable 23 moreover exits from the base of cable-winding winch 22, beneath the lateral flap 25c of gaiter 25, and extends/prolongs towards the distal end of the first transversal flexible tongue 20, thus remaining always beneath the gaiter 25.

[0063] Preferably, the rear part 25b of gaiter 25, on the other hand, extends/prolongs upwards roughly at the boundary between the longitudinal slit 16 and the main opening 15 of foot-casing 2, to cover and protect the beneath-located liner 11.

[0064] In more detail, the rear part 25b of gaiter 25 is preferably shaped/dimensioned so as to extend upwards up to reach and optionally also prolong beneath the cuff 3, or rather beneath the two protruding lateral flaps of cuff 3, covering the front part of liner 11.

[0065] With reference to Figure 2, in the example shown, in particular, the rear part 25b of gaiter 25 is preferably substantially tubular in shape, and is substantially vertically aligned with the main opening 15 of foot-casing 2, or rather of shell 6, so as to surround and cover the portion of liner 11 that protects the ankle area of the user, preferably roughly up to the calf height.

[0066] Finally, in the example shown, the perimeter edge of protective gaiter 25 is preferably fixed to the foot-casing 2, or rather on the shell 6, in unmovable and substantially fluid-tight manner, by welding and/or gluing.

[0067] With reference to Figure 1, the cuff closing mechanism 13, on the other hand, is adapted to pull the two oblong lateral flaps of shell 9 one towards the other, so as to tighten the upper part of shell 9 against the user's leg.

[0068] Furthermore, in the example shown, the cuff

closing mechanism 13 is preferably directly operated by the cuff locking device 14.

[0069] In more detail, the cuff locking device 14 is preferably fixed to the cuff 3 in the area above the heel of the boot, substantially astride the midplane of the boot, and preferably includes an oblong and rigid movable arm 30, which is butt hinged to the rear of cuff 3, so as to be able to freely rotate while remaining astride the midplane of the boot, to and from a locking position in which the movable arm 30 extends cantilevered downwards, substantially flush to the outer surface of cuff 3, and allows the distal end of the arm to couple in a rigid and stable, though easily releasable manner, with a specific anchoring point located on the foot-casing 2, spaced above the rear heel 5.

[0070] The cuff closing mechanism 13, on the other hand, preferably comprises: two fairlead members 31 that are placed on the lateral sides of the cuff 3, or rather of the shell 9, substantially vertically aligned to the connecting hinges 10; and a flexible and substantially inextensible tightening rope 32 that has the two ends hooked to the cuff 3 directly on, or in proximity of, the two protruding lateral flaps of cuff 3, and is looped around the upper part of cuff 3, so as to engage in succession and in freely sliding manner the two fairlead members 31 and the movable arm 30 at a given distance from its rotation axis.

[0071] The length of the tightening rope 32 is selected so that the movable arm 30 of the cuff locking device 14 can tension the tightening rope 32 when it is in the locking position.

[0072] Operation of the ski boot 1 is easily inferable from what written above and does not require further explanation.

[0073] As regards instead the operation of foot-casing closing mechanism 12, the tensioning of tightening cable 23 forces the transversal flexible tongues 20 to flex/bend inwards towards the inside of foot-casing 2, or rather shell 6, thus tightening and forcefully pressing the user's foot against the bottom of foot-casing 2, or rather against the bottom of shell 6.

[0074] The advantages resulting from the special structure of foot-casing closing mechanism 12 are remarkable.

[0075] Firstly, the presence of only the transversal flexible tongues and their orientation transversal to the midplane of the boot, eliminates the risk that the foot-casing closing mechanism 12 may in some way hinder the insertion of the foot inside the ski boot 1.

[0076] In addition, the increased length of the transversal flexible tongues 21 allows the foot-casing closing mechanism 12 to more effectively embrace and tighten the user's instep inside the foot-casing 2, thus improving the ability of the ski boot 1 to transmit the forces from the skier to the ski and vice versa.

[0077] It is finally clear that modifications and variations may be made to the ski boot 1 described above without however departing from the scope of the present inven-

tion.

[0078] For example, in a not-shown and less sophisticated embodiment, the gaiter 25 may be provided with a small through opening, which is placed in proximity of the cable-winding winch 22 and is dimensioned to allow the tightening cable 23 to penetrate beneath the gaiter 25 and reach the distal end of the first transversal flexible tongue 20.

[0079] Clearly, the tightening cable 23 could also reach the distal end of the first transversal flexible tongue 20, while engaging a small opening or through-duct specially made in the foot-casing 2.

[0080] With reference to Figure 3, in a second embodiment of the foot-casing closing mechanism 12, the cable-winding winch 22 is placed on the distal end 20a of one of the transversal flexible tongues 20. In addition, the cable-return members 21 are preferably located on the foot-casing 2, or rather on the shell 6, along the longer lateral edge 16b of longitudinal slit 16, each aligned with the distal end, or rather with the enlarged head 20a, of a respective transversal flexible tongue 20.

[0081] In this embodiment, moreover, the tightening cable 23 of cable-winding winch 22 preferably engages in pass-through and freely slidable manner and in succession both the distal ends of the various flexible transversal tongues 20 and the cable-return members 21, re-entering/returning then inside the cable-winding winch 22 itself.

[0082] Clearly, the cable-return members 21 may also be staggered relative to the distal ends of the transversal flexible tongues 20. In addition, the free end of the tightening cable 23 could be rigidly anchored to the foot-casing 2, or rather to the shell 6, preferably in proximity of the front end of longitudinal slit 16.

[0083] In this embodiment, the protective gaiter (not visible) is always fixed to the upper part of foot-casing 2, or rather of shell 6, so as to close the longitudinal slit 16 substantially in fluid-tight manner, and at the same time to also cover the foot-casing closing mechanism 12, but is provided with a small through opening via which solely the command knob 22a of cable winding winch 22 protrudes outside of the ski boot 1.

[0084] With reference to Figure 4, in a third embodiment of the foot-casing closing mechanism 12, the cable-return members 21 are small return pulleys 40 that are arranged flush to the foot-casing 2, or rather the shell 6, close to the longer lateral edge 16b of longitudinal slit 16, and are pivotally joined idle/freely rotatable to the foot-casing 2, or rather to the shell 6.

[0085] Clearly, the protective gaiter (not visible) covers also the return pulleys 40.

[0086] Finally, in a fourth, less sophisticated and not-shown embodiment of the foot-casing closing mechanism 12, one or more of the cable-return members 21 may be small through-eyelets made directly on foot-casing 2, or rather on shell 6, close to the longer lateral edge 16b of longitudinal slit 16.

Claims

1. A ski boot (1) comprising: a substantially rigid foot-casing (2) which is shaped so as to accommodate the user's foot, and has the lower part structured so as to couple with a ski binding device; a substantially rigid cuff (3) which is shaped so as to surround the lower part of the user's leg, and is pivotally joined to the foot-casing (2) so as to be able to swing about a rotation axis (A) substantially perpendicular to the midplane of the boot; and foot-casing closing means (12) adapted to selectively tighten the foot-casing (2) against the user's foot;

the foot-casing (2) being superiorly provided with a main opening (15) from which the user's leg comes out, and with a longitudinal slit (16) that branches off from said main opening (15) and extends along the upper part of the foot-casing (2), towards the front tip (4) of the same foot-casing (2) ;

the ski boot (1) being **characterised in that** said foot-casing closing means (12) comprise: a plurality of transversal flexible tongues (20) that are arranged inside the foot-casing (2) astride and transversal to a first longer lateral edge (16a) of the longitudinal slit (16), and are firmly fixed to the foot-casing (2) so as to extend cantilevered inside the longitudinal slit (16) towards a second longer lateral edge (16b) of the longitudinal slit (16), opposite to said first longer lateral edge (16a); a series of substantially non-deformable cable-return members (21) that are located on the foot-casing (2) along or close to the second longer lateral edge (16b) of the longitudinal slit (16); a cable-winding winch (22) which is fixed onto the foot-casing (2), close to the second longer lateral edge (16b) of the longitudinal slit (16), or onto one of the transversal flexible tongues (20), and is provided with a tightening cable (23) that exits from the cable-winding winch (22) and engages in pass-through and freely slidable manner both the distal ends of the transversal flexible tongues (20) and the cable-return members (21).

2. Ski boot according to Claim 1, wherein at least one of the transversal flexible tongues (20) extends cantilevered beyond the first longer lateral edge (16a) of the longitudinal slit (16), up to reach and cross the centreline of the longitudinal slit (16).
3. Ski boot according to Claim 2, wherein the majority of the transversal flexible tongues (20) extend cantilevered beyond the first longer lateral edge (16a) of the longitudinal slit (16), up to reach and cross the centreline of the longitudinal slit (16).

4. Ski boot according to any one of the preceding claims, wherein the cable-return members (21) are distributed along the second longer lateral edge (16b) of the longitudinal slit (16), so as to be staggered relative to the transversal flexible tongues (20).
5. Ski boot according to Claim 4, wherein each cable-return member (21) is placed on or close to the second longer lateral edge (16b) of the longitudinal slit (16), so as to be aligned with/facing the groove/recess between two adjacent transversal flexible tongues (20).
6. Ski boot according to any one of the preceding claims, wherein the cable-return members (21) are made in one piece with the foot-casing (2).
7. Ski boot according to Claim 6, wherein at least one cable-return member (21) consists of a small enlarged piece /segment of the edge of the foot-casing (2) that is substantially tubular in shape and is dimensioned to be engaged in pass-through and freely slidable manner by a corresponding segment of the tightening cable (23).
8. Ski boot according to Claim 6, wherein at least one cable-return member (21) is a through-eyelet made on the foot-casing (2), close to the second longer lateral edge (16b) of the longitudinal slit (16).
9. Ski boot according to any one of the preceding claims, wherein the cable-winding winch (22) is located in proximity of said main opening (15).
10. Ski boot according to any one of the preceding claims, wherein the transversal flexible tongues (20) have a ribbon-like structure and are firmly fixed to the lateral wall of the foot-casing (2), at a given distance from said longitudinal slit (16) .
11. Ski boot according to any one of the preceding claims, wherein the tightening cable (23) extends in a zigzag manner close to the second longer lateral edge (16b) of the longitudinal slit (16), alternatively engaging the distal ends of the transversal flexible tongues (20) and the cable-return members (21); the free end of the tightening cable (23) being anchored in rigid manner to the foot-casing (2) in proximity of the front end of the longitudinal slit (16).
12. Ski boot according to any one of the preceding claims, wherein the foot-casing (2) additionally comprises a protective gaiter (25) that closes the longitudinal slit (16) and at same time covers also said foot-casing closing means (12).
13. Ski boot according to any one of the preceding

claims, wherein the transversal flexible tongues (20) are located on the inner side of the foot-casing (2), whereas the cable-winding winch (22) is located on the outer side of the foot-casing (2).

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- 14.** Ski boot according to any one of the preceding claims, wherein the foot-casing (2) comprises a substantially oblong basin-shaped rigid shell (6) that is shaped so as to contain the user's foot and is made of plastic and/or composite material.

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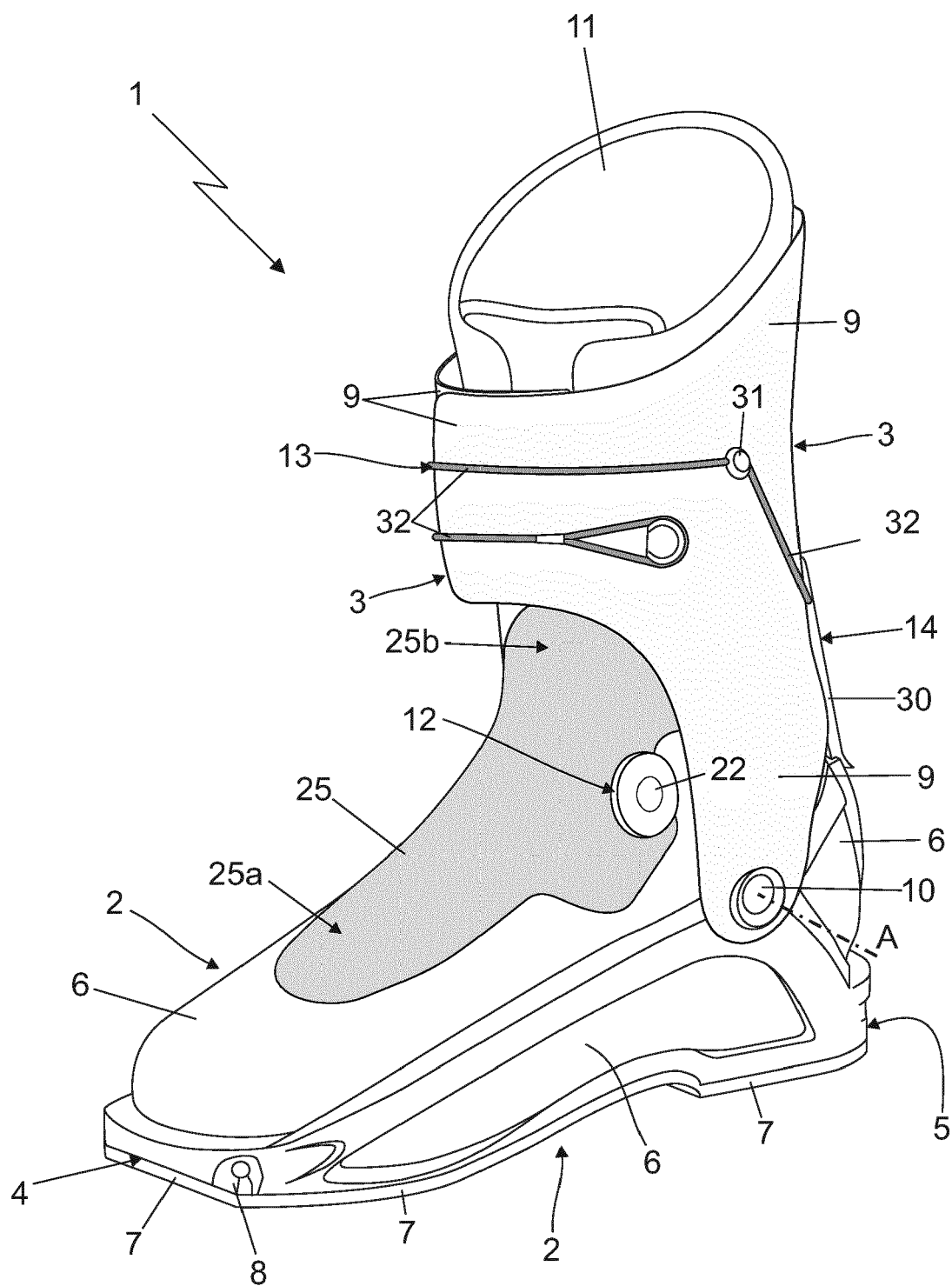


Fig. 1

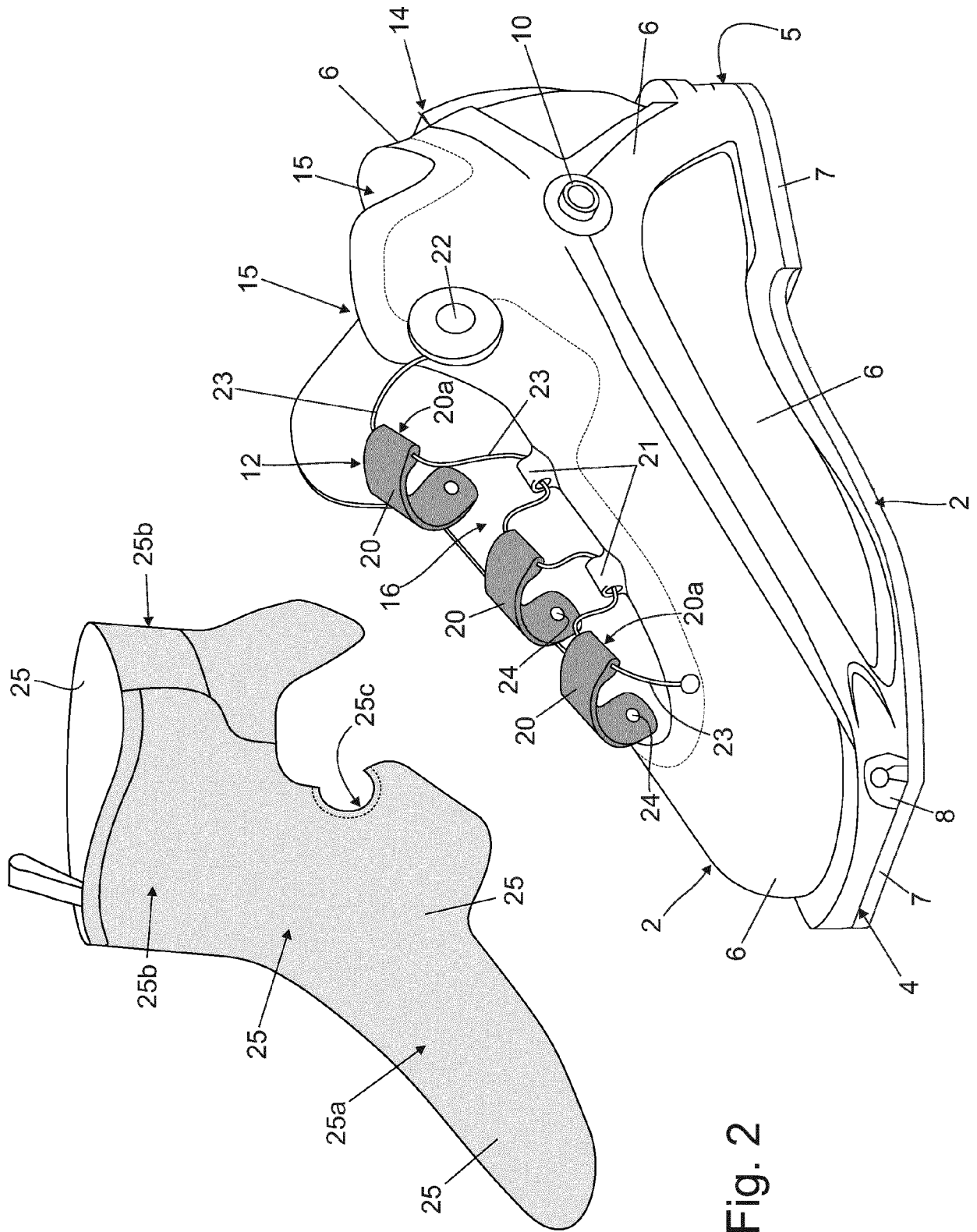


Fig. 2

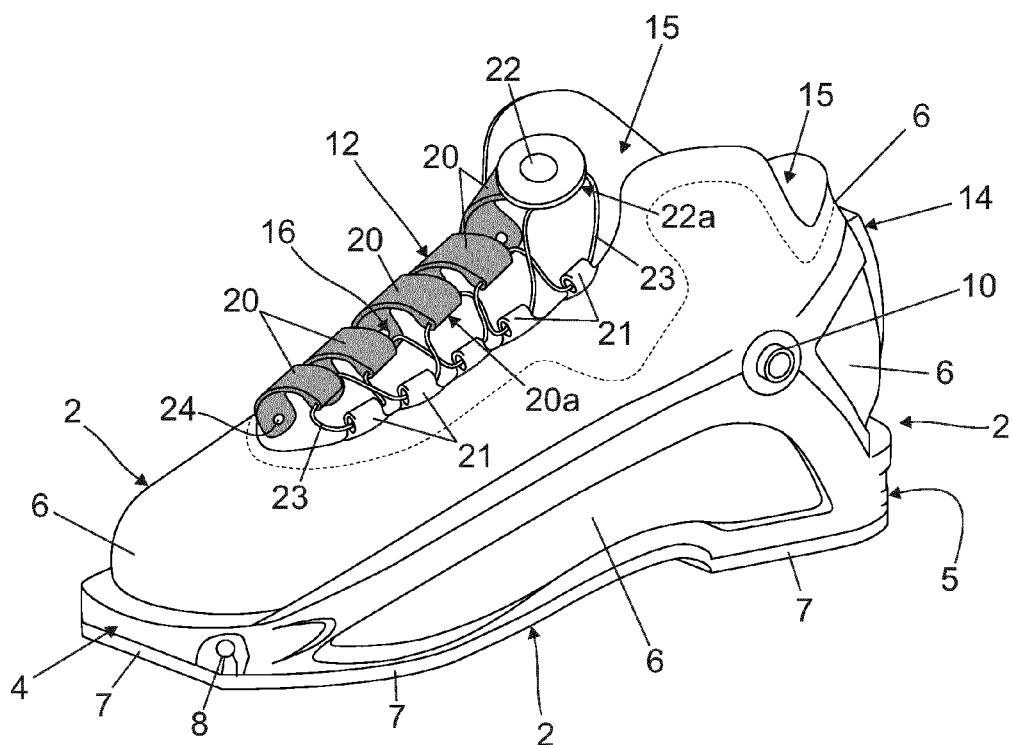


Fig. 3

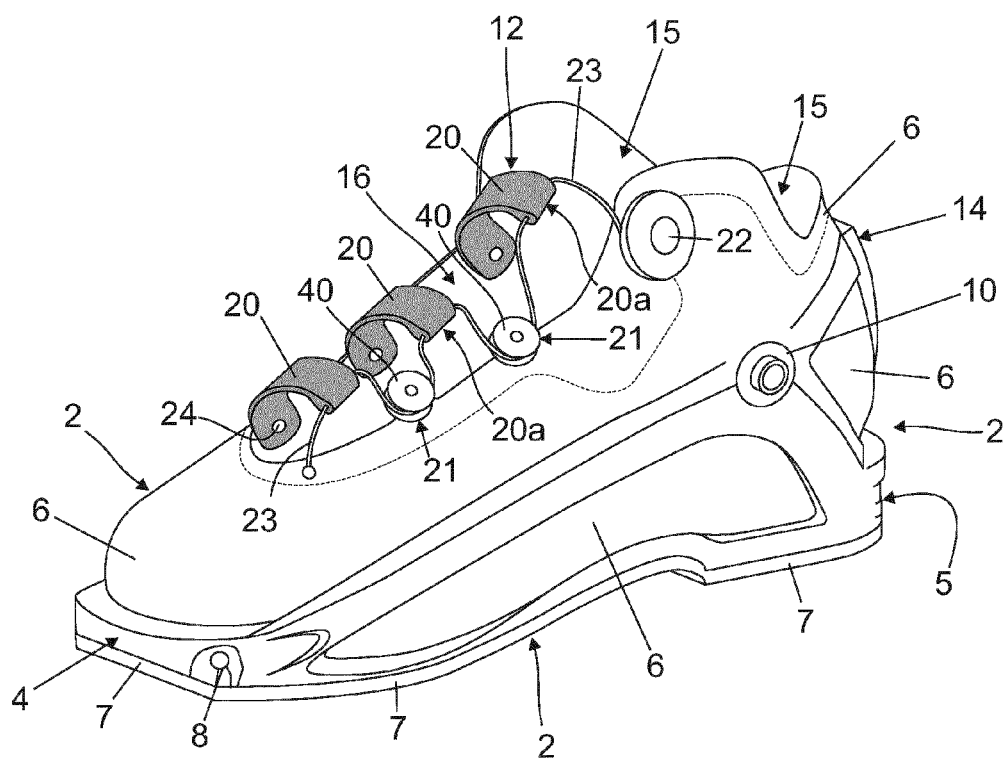


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 12 October 2021	Examiner Ariza De Miguel, Jon
CATEGORY OF CITED DOCUMENTS		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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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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