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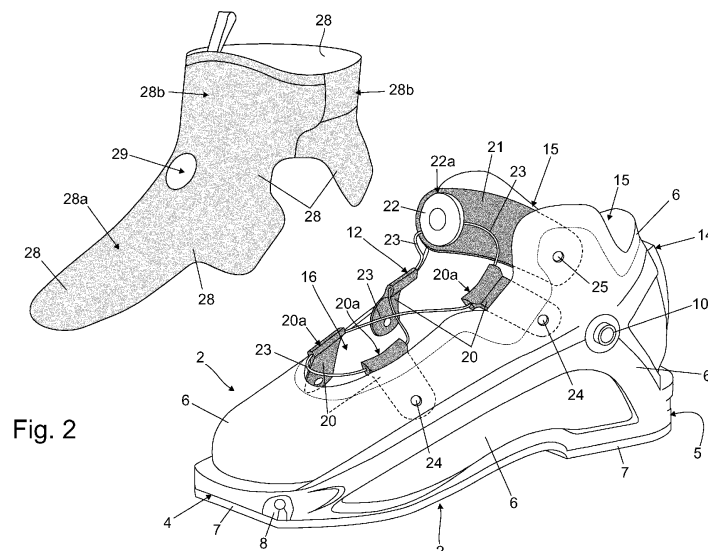
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(54) **SKI BOOT**

(57) 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) located on the upper part of the foot-casing (2) and which comprise: a plurality of first transversal flexible tongues (20) that are arranged inside the foot-casing (2) astride and transversal to the two longer lateral and opposite edges of the

longitudinal slit (16), so as to protrude cantilevered inside of the longitudinal slit (16); a second transversal flexible tongue (21) which is arranged inside the foot-casing (2) astride and transversal to one of the two longer lateral edges of the longitudinal slit (16), so as to protrude cantilevered inside the longitudinal slit (16); and a cable-winding winch (22) which is rigidly fixed to said second transversal flexible tongue (21), within the perimeter of the longitudinal slit (16), and is provided with a tightening cable (23) that exits from the cable-winding winch (22) and engages, in a pass-through and freely sliding manner, the distal ends of the various first transversal flexible tongues (20).



## Description

### CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** This Patent Application claims priority from Italian Patent Application No. 102020000019399 filed on August 6, 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, a use to which the following disclosure will make explicit reference without however losing generality.

### BACKGROUND ART

**[0004]** As is well 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 lower part specifically structured to be fixed to 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 that 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 ski mountaineering boots mentioned above also 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 rigid floating 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, which 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 first transversal flexible tongues, passing alternatively from one side of the rigid

floating body to the other.

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

**[0009]** Notwithstanding the excellent operation, experimental tests have highlighted that often the rigid floating body of the foot-casing closing mechanism, especially if supported by the flexible cable alone, 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 thermal-insulating inner 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 which 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 advantageously be used for practicing ski mountaineering or telemark.

**[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 specifically structured/shaped so as to couple/attach in a rigid and stable, thought 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 the 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 that, 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 piece (not shown) of a ski binding device that, in turn, is stably fixed to the back of a generic downhill ski or similar.

**[0018]** Even in more detail, the front tip 4 of foot-casing 2 is preferably structured so as to be able 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 be able 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 treaded 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: an oblong basin-shaped and substantially 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 ankle height; and optionally a lower sole 7 preferably with a treaded 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, 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 to one another 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 rigid front 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 be able to couple/attach in known manner with the toe piece (not shown) of the ski-mountaineering binding device; and optionally also a rigid rear insert (not shown in the figures) preferably made of a metal material, which is instead recessed in the shell 6 at heel 5, and is structured so as to be able 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 moreover has two oblong, protruding lateral flaps that extend forward on opposite sides of the boot midplane, so as to embrace the user's leg from behind approximately at the calf height, and preferably then overlap to one another at the front part of the leg, thus 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 to 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 back and forth on the foot-casing 2, 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 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 moreover 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 selectively close/tighten the upper part of the foot-casing 2 against the user's foot, in order 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 selectively close/tighten the upper part of the cuff 3 against the user's leg, in order 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, on choice and alternatively: 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 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 a substantially inextensible structure, which are arranged inside the foot-casing 2, or rather inside the shell 6, astride and transversal to the two longer lateral and opposite edges of longitudinal slit 16, and are firmly fixed to the foot-casing 2, or rather to shell 6, so as to extend cantilevered inside the longitudinal slit 16, preferably while remaining locally substantially flush with the beneath-located liner 11; a further oblong transversal flexible tongue 21 with substantially inextensible structure, which is arranged inside foot-casing 2, or rather inside shell 6, astride and transversal to one of the two longer lateral edges of longitudinal slit 16, and is firmly fixed to the foot-casing 2, or rather to the shell 6, so as to extend cantilevered inside the longitudinal slit 16, preferably while remaining locally substantially flush with the beneath-located liner 11; and a manually-operated cable-winding winch 22 which is rigidly fixed to the transversal flexible tongue 21, within the perimeter of longitudinal slit 16, and is provided with a flexible tightening cable 23 that exits from the cable-winding winch 22 and engages, in a pass-through and freely sliding manner, the distal ends of the various first transversal flexible tongues 20.

**[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 same tongues.

**[0035]** The cable-winding winch 22, on the other hand, is structured so as to selectively tension and then keep the tightening cable 23 tensioned, thus forcing the transversal flexible tongues 20 and 21, 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, in order 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 lateral edges 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 within the perimeter of longitudinal slit 16, towards the midplane of the boot, transversally to the centreline of longitudinal slit 16 and/or the corresponding longer lateral edge 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 lateral wall of foot-casing 2, or rather 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 two transversal flexible tongues 20 are moreover arranged one in front of the other, on opposite sides of the longitudinal slit 16.

**[0041]** With reference to Figure 2, similarly, the transversal flexible tongue 21 is rigidly butt fixed to the foot-casing 2, or rather to the shell 6, so as to extend cantilevered within the perimeter of longitudinal slit 16, towards the midplane of the boot, transversal to the centreline of longitudinal slit 16 and/or the corresponding longer lateral edge of longitudinal slit 16.

**[0042]** In addition, the transversal flexible tongue 21 preferably has a ribbon-like structure, and its proximal end is preferably firmly fixed to the corresponding lateral wall of foot-casing 2, or rather of shell 6, at a given distance from the longitudinal slit 16.

**[0043]** Also the transversal flexible tongue 21, therefore, extends for a segment of its length flush with the inner surface of foot-casing 2, or rather of shell 6.

**[0044]** The cable-winding winch 22, on the other hand, is preferably located on the distal end of the transversal flexible tongue 21, and is structured so as to selectively and alternatively wind the tightening cable 23 inside itself, stably block the tightening cable 23, and finally unwind the tightening cable 23.

**[0045]** The tightening cable 23 of cable-winding winch 22, moreover, is preferably substantially inextensible, and is preferably arranged so as to engage in succession the distal ends of the various transversal flexible tongues 20, preferably while alternatively passing from one side of the longitudinal slit 16 to the other. In addition, after having engaged the distal end of the last transversal flexible tongue 20, the tightening cable 23 preferably re-enters/ returns inside the cable-winding winch 22.

**[0046]** Optionally, the tightening cable 23 may engage in pass-through and freely slidable manner also the body of the transversal flexible tongue 21.

**[0047]** With reference to Figure 2, in particular, the transversal flexible tongues 20 are preferably arranged in pairs on opposite sides of the longitudinal slit 16, in a substantially specular position with respect to the vertical midplane of the boot, so as to extend cantilevered one towards the other.

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

**[0049]** In a different embodiment, however, the proximal ends of the transversal flexible tongues 20 could be embedded/ trapped in the lateral walls of foot-casing 2, or rather of shell 6, or could be interlocked or heat-welded directly onto the lateral walls 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 flexible cable 23.

**[0051]** Each transversal flexible tongue 20 is preferably made of plastic material.

**[0052]** With reference to Figure 2, on the other hand, the transversal flexible tongue 21 has the proximal end firmly fixed to the inner or outer side of foot-casing 2, and preferably extends obliquely towards the midplane of the boot, so as to jut out cantilevered inside the longitudinal slit 16 behind the transversal flexible tongues 20, i.e. in the segment of the slit between the main opening 15 of foot-casing 2 and the area engaged by the transversal flexible tongues 20.

**[0053]** In addition, the transversal flexible tongue 21 is preferably dimensioned so as to arrange its distal end substantially astride the centreline of longitudinal slit 16, i.e. substantially astride the vertical midplane of the boot, and optionally also close to the main opening 15 of the foot-casing 2. Consequently, the cable-winding winch 22 is preferably placed astride the vertical midplane of the boot.

**[0054]** Similar to the transversal flexible tongues 20, also the transversal flexible tongue 21 is preferably rigidly fixed to the corresponding lateral wall of foot-casing 2, or rather of shell 6, by means of a rivet 25 or other similar mechanical anchoring member.

**[0055]** In a different embodiment, however, the proximal end of the transversal flexible tongue 21 could be embedded/trapped in the corresponding lateral wall of foot-casing 2, or rather of shell 6, or could be interlocked or heat-welded directly onto the lateral wall of foot-casing 2, or rather of shell 6.

**[0056]** Finally, similarly to the flexible tongues 20, the transversal flexible tongue 21 preferably has a monolithic ribbon-like structure, and is preferably made of plastic material.

**[0057]** With reference to Figure 2, the cable-winding winch 22 is preferably at least partially recessed in the distal end of the transversal flexible tongue 21, and the tightening cable 23 is preferably made of metal material.

**[0058]** The cable-winding winch 22 and the flexible cable 23 are components already widely known and used in the footwear field, and therefore need no further ex-

planation.

**[0059]** In the example shown, in particular, cable-winding winch 22 and flexible cable 23 are preferably made by the US company BOA TECHNOLOGY INC. and are already extensively described and shown, for example, in patent applications US2014/0290016 and US2015/0007422.

**[0060]** With reference to Figures 1 and 2, preferably the ski boot 1 moreover includes a protective gaiter 28, which is preferably made of waterproof and optionally also elasticised material, and is located on 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 also cover, at the same time, the foot-casing closing mechanism 12.

**[0061]** In more detail, the protective gaiter 28 is preferably longitudinally divided into a front part 28a and a rear part 28b.

**[0062]** The front part 28a of gaiter 28 is oblong in shape and is adapted to cover substantially entirely the longitudinal slit 16 of foot-casing 2, while always remaining above the transversal flexible tongues 20 and 21, the cable-winding winch 22 and the tightening cable 23.

**[0063]** In addition, the front part 28a of gaiter 28 is preferably also provided with a small auxiliary opening 29, which is aligned with the cable-winding winch 22 and is dimensioned to allow solely the command knob 22a of the winch to protrude outside of the ski boot 1.

**[0064]** Preferably, the rear part 28b of the gaiter 28, on the other hand, extends 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.

**[0065]** In more detail, the rear part 28b of gaiter 28 is preferably shaped/dimensioned so as to extend upwards up to reaches and optionally also prolong underneath the cuff 3, or rather underneath the two protruding lateral flaps of cuff 3, covering the front part of the liner 11.

**[0066]** With reference to Figure 2, in the example shown, in particular, the rear part 28b of gaiter 28 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 calf height.

**[0067]** Finally, in the example shown, the perimeter edge of protective gaiter 28 is preferably fixed to foot-casing 2, or rather on shell 6, in an unmovable and substantially fluid-tight manner, by welding and/or gluing.

**[0068]** 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 that the upper part of shell 9 can be tightened on the user's leg.

**[0069]** Furthermore, in the example shown, the cuff closing mechanism 13 is preferably operated directly by the cuff locking device 14.

**[0070]** In more detail, the cuff locking device 14 is pref-

erably fixed to the cuff 3 in the area above the heel of the boot, substantially astride the boot midplane, 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 with the outer surface of the 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.

**[0071]** The cuff closing mechanism 13, on the other hand, preferably comprises: two fairlead members 31 that are placed on the lateral sides of cuff 3, or rather of shell 9, substantially vertically aligned to the connecting hinge 10; and a flexible and substantially inextensible tightening rope 32, which has the two ends hooked to the cuff 3 directly on or in proximity of the two protruding lateral flaps of the cuff 3, and is looped around the upper part of the 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.

**[0072]** The length of the tightening rope 32 is selected so that the movable arm 30 of cuff locking device 14 can tension the tightening rope 32 when it is in the locking position.

**[0073]** Operation of the ski boot 1 is easily inferable from what written above and does not require further explanations.

**[0074]** As regards instead the operation of the foot-casing closing mechanism 12, the tensioning of the tightening cable 23 forces the flexible tongues 20 and 21 to flex/bend towards the inside of the foot-casing 2, or rather of shell 6, tightening and forcefully pressing the user's foot against the bottom of foot-casing 2, or rather against the bottom of shell 6.

**[0075]** The advantages resulting from the particular structure of foot-casing closing mechanism 12 are remarkable.

**[0076]** Firstly, the orientation of flexible tongue 21 transversal to the midplane of the boot, eliminates the risk that the foot-casing closing mechanism 12 may somehow hinder the insertion of the foot inside the ski boot 1.

**[0077]** In addition, the transversal flexible tongue 21 allows the foot-casing closing mechanism 12 to more effectively embrace and tighten the foot-casing 2 on the user's foot, improving the capability of the ski boot 1 to transmit forces from the skier to the ski and vice versa.

**[0078]** 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 invention.

**[0079]** For example, with reference to Figure 3, in a first alternative embodiment the transversal flexible tongue 21 has the proximal end firmly fixed to the inner

or outer side of foot-casing 2, and extends cantilevered inside the longitudinal slit 16 in a segment of longitudinal slit 16 between two pairs of transversal flexible tongues 20.

**[0080]** Clearly also in this variation, the protective gaiter 25 (not shown in the Figure) is always fixed to the upper part of the foot-casing 2, or rather of shell 6, so as to close the longitudinal slit 16 substantially in fluid-tight manner, and is provided with the through opening 29 via which the command knob 22a of cable-winding winch 22 protrudes outside of the ski boot 1.

**[0081]** With reference to Figure 4, in a second alternative embodiment the transversal flexible tongue 21 is arranged in front of one of the transversal flexible tongues 20.

**[0082]** In other words, the transversal flexible tongue 21 and a transversal flexible tongue 20 are preferably arranged on opposite sides of longitudinal slit 16, in a substantially specular position with respect to the midplane of the boot, so as to extend cantilevered one towards the other.

**[0083]** Preferably, the tightening cable 23 furthermore engages in pass-through and freely slidable manner also the body of the transversal flexible tongue 21.

**[0084]** Clearly also in this variation, the protective gaiter 25 (not shown in the Figure) is always fixed to the upper part of the foot-casing 2, or rather of shell 6, so as to close the longitudinal slit 16 substantially in fluid-tight manner, and is provided with the through opening 29 via which the command knob 22a of cable-winding winch 22 protrudes outside of the ski boot 1.

## 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 first transversal flexible tongues (20) that are arranged inside the foot-casing (2) astride

- and transversal to the two longer lateral and opposite edges of the longitudinal slit (16), and are firmly fixed to the foot-casing (2) so as to extend cantilevered inside of the longitudinal slit (16); a second transversal flexible tongue (21) which is arranged inside the foot-casing (2) astride and transversal to one of the two longer lateral edges of the longitudinal slit (16), and is firmly fixed to the foot-casing (2) so as to extend cantilevered inside the longitudinal slit (16); and a cable-winding winch (22) which is rigidly fixed on said second transversal flexible tongue (21), within the perimeter of the longitudinal slit (16), and is provided with a tightening cable (23) that exits from the cable-winding winch (22) and engages, in pass-through and freely sliding manner, the distal ends of the various first transversal flexible tongues (20) .
2. Ski boot according to Claim 1, wherein the cable-winding winch (22) is located on the distal end of said second transversal flexible tongue (21).
  3. Ski boot according to Claim 2, wherein the second transversal flexible tongue (21) is dimensioned so that its distal end is arranged substantially astride the centreline of the longitudinal slit (16).
  4. Ski boot according to any one of the preceding claims, wherein at least two of said first transversal flexible tongues (20) are arranged one in front of the other, on opposite sides of the longitudinal slit (16) of the foot-casing (2).
  5. Ski boot according to any one of the preceding claims, wherein said second transversal flexible tongue (21) protrudes cantilevered inside the longitudinal slit (16), in the slit segment between the main opening (15) of the foot-casing (2) and said first transversal flexible tongues (20).
  6. Ski boot according to any one of Claims from 1 to 4, wherein said second transversal flexible tongue (21) protrudes cantilevered inside the longitudinal slit (16), in the slit segment between two pairs of first transversal flexible tongues (20).
  7. Ski boot according to any one of Claims from 1 to 4, wherein said second transversal flexible tongue (21) protrudes cantilevered inside the longitudinal slit (16) in front of one of said first transversal flexible tongues (20).
  8. Ski boot according to any one of the preceding claims, wherein said first transversal flexible tongues (20) have a ribbon-like structure, and are firmly fixed to the corresponding lateral wall of the foot-casing (2), at a given distance from said longitudinal slit (16).
  9. Ski boot according to any one of the preceding claims, wherein said second transversal flexible tongue (21) has a ribbon-like structure, and is firmly fixed to the corresponding lateral wall of the foot-casing (2), at a given distance from said longitudinal slit (16).
  10. Ski boot according to any one of the preceding claims, wherein the tightening cable (23) engages in pass-through and freely slidable manner also the body of said second transversal flexible tongue (21).
  11. Ski boot according to any one of the preceding claims, wherein the foot-casing (2) additionally comprises a protective gaiter (28) that closes the longitudinal slit (16) and at same time covers also said foot-casing closing means (12).
  12. Ski boot according to Claim 11, wherein the protective gaiter (28) is provided with an auxiliary opening (29) that is aligned with the cable-winding winch (22) and is dimensioned to allow the command knob (22a) of the winch to protrude outside of the ski boot (1).
  13. 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.

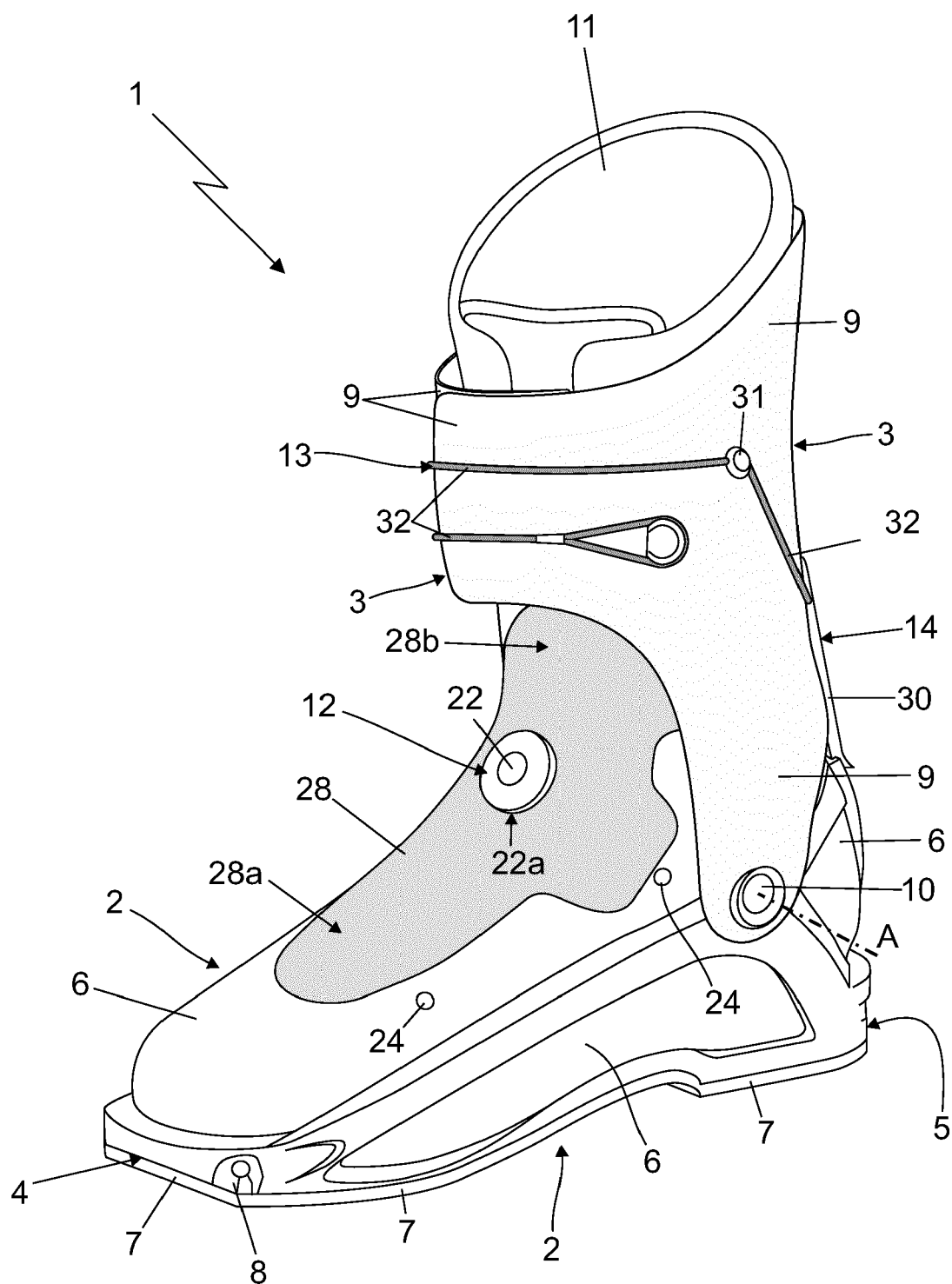


Fig. 1



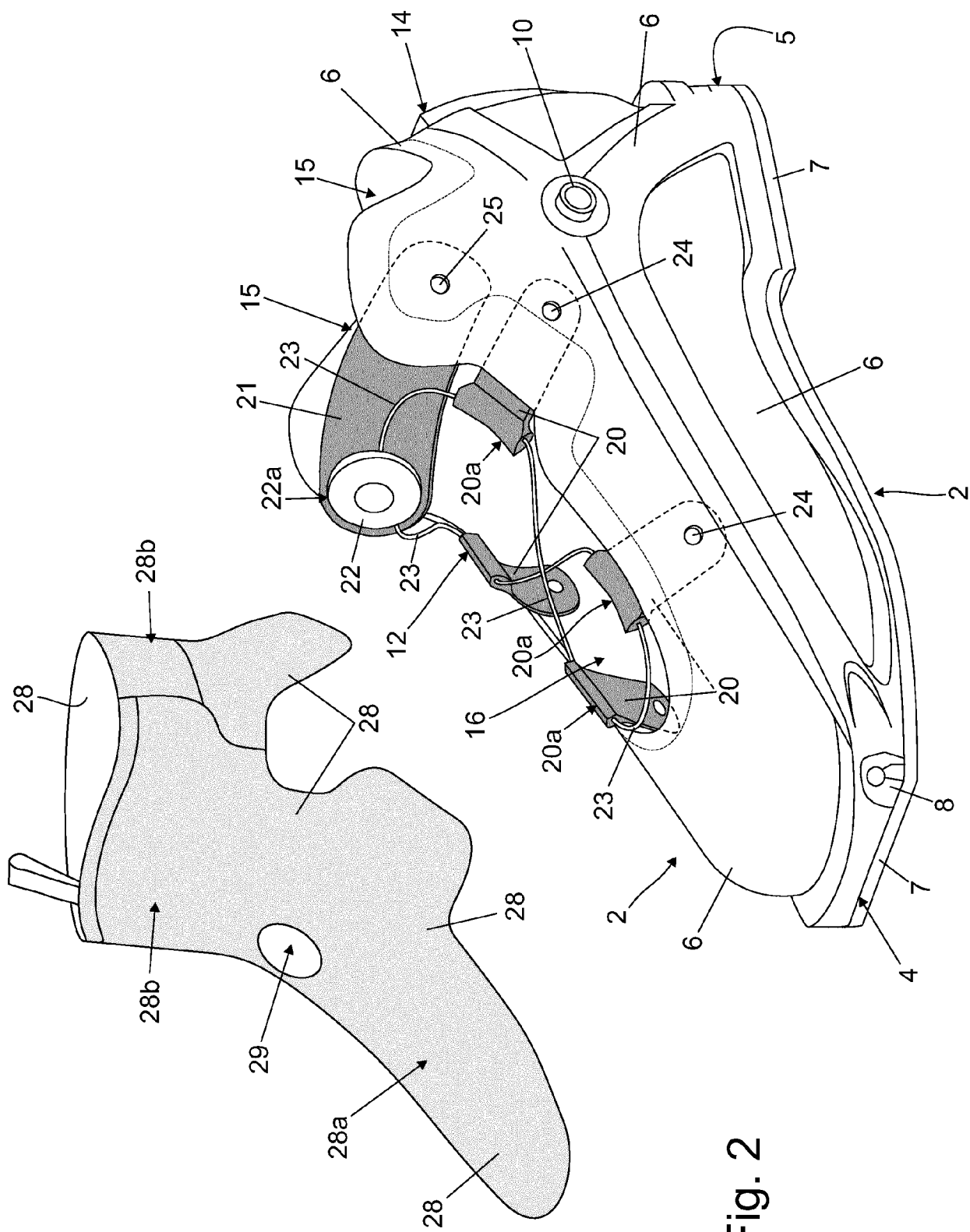


Fig. 2

Fig. 3

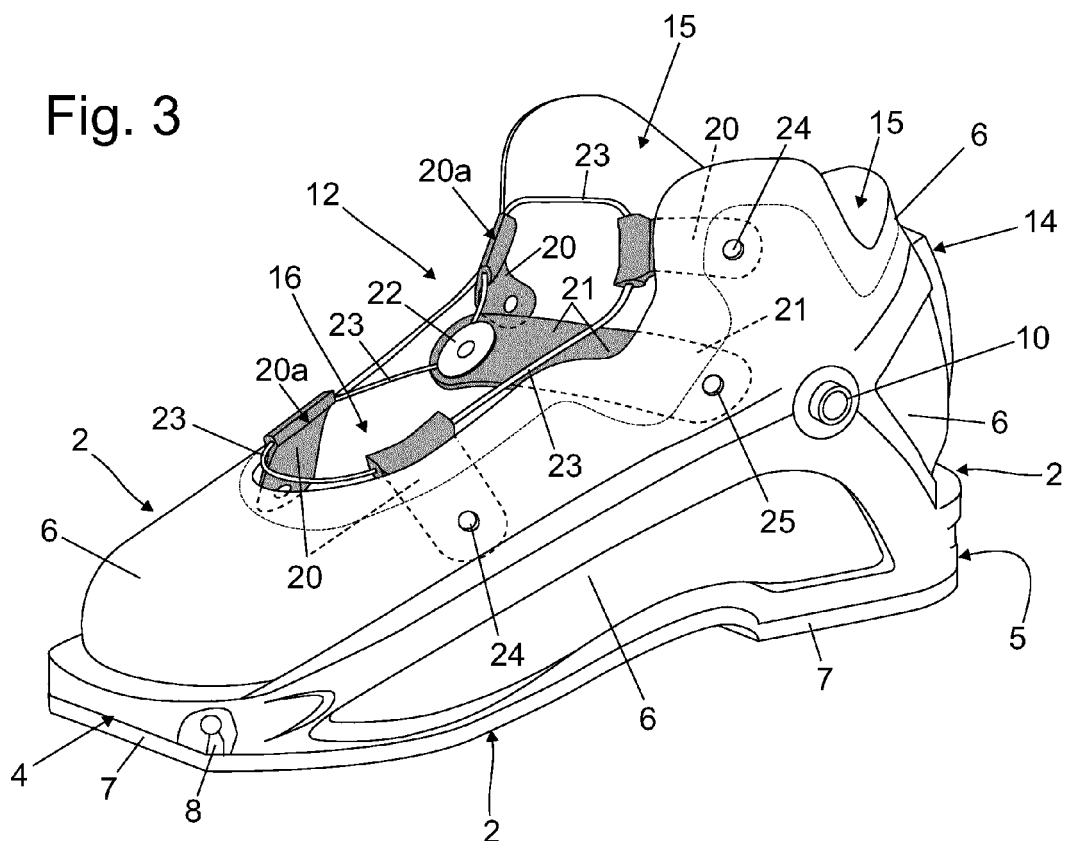
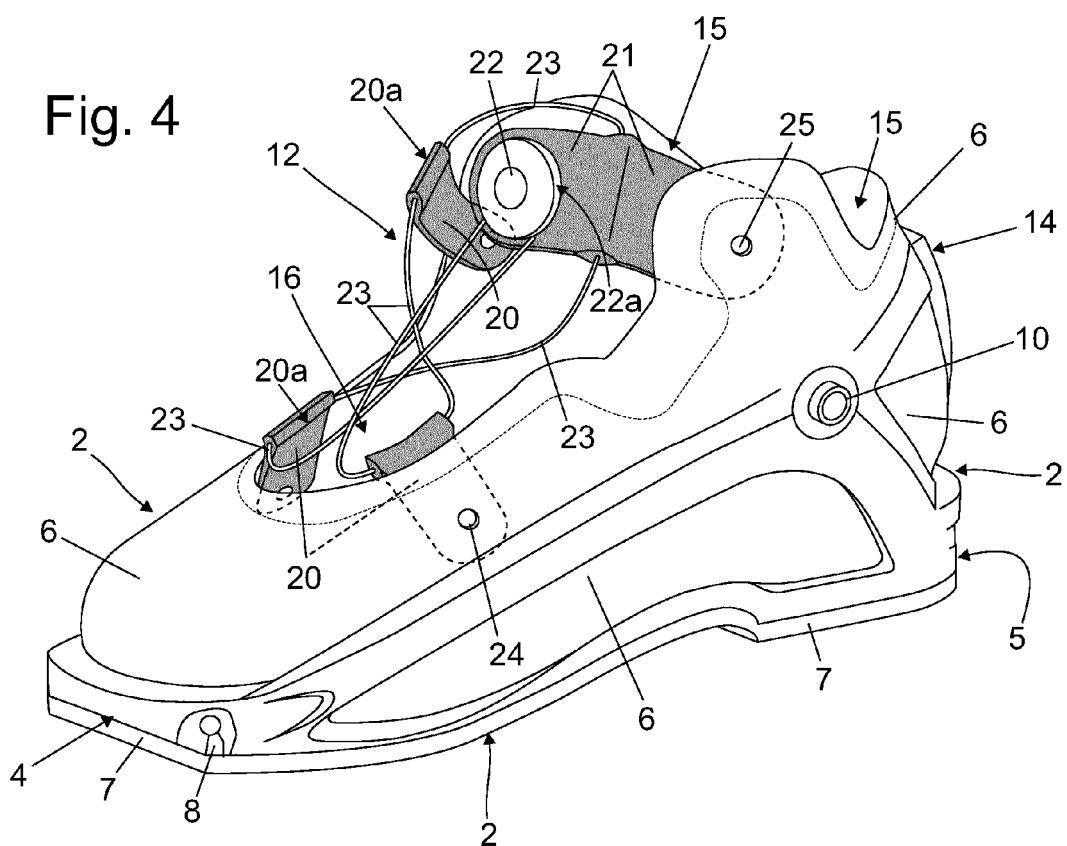


Fig. 4





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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
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