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(54) **SKI BOOT**

(57) A ski boot (1) comprising a rigid shell (2) which is suitable to accommodate the foot of the user, and has the bottom part structured to couple with a ski binding device or the like; a rigid cuff (3) which is suitable to enclose the leg of the user, and is pivotally joined to the shell (2) so as to be able to pivot about a rotation axis (A) substantially perpendicular to the midplane of the boot; a rigid and oblong tongue (15) which is arranged resting on the upper part of the shell (2), astride the midplane of the boot, and has its front end hinged to the shell (2) so as to be able to tilt forward while remaining substantially coplanar with the midplane of the boot; and shell closing means (11) selectively suitable to tighten the shell (2) against the foot of the user, and comprising one or more anchoring teeth (18) that protrude from the shell (2), below a first longer lateral edge (15a) of the tongue (15), and are suitable to engage in a latching manner corresponding coupling seats (19) specifically made in the body of the tongue (15), close to the first longer lateral edge (15a) of the tongue, so as to prevent the tongue (15) from skimming the surface of the shell (2).

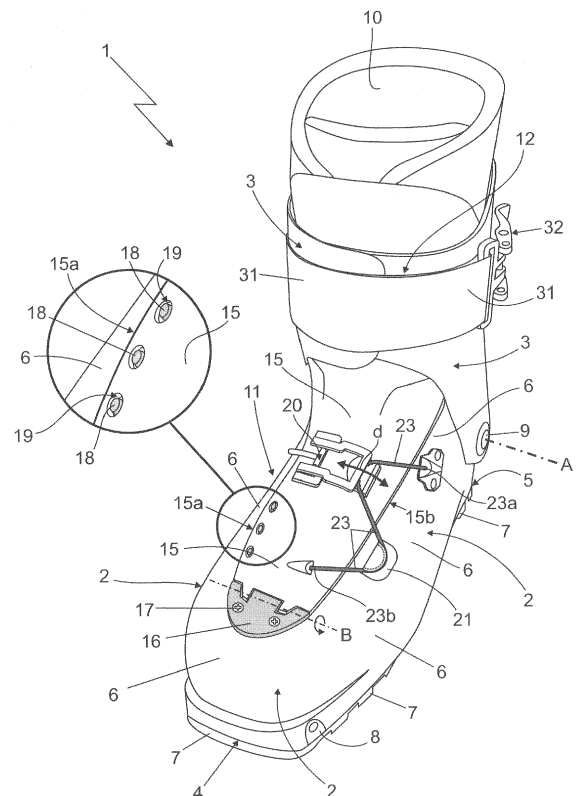


Fig. 1

Description

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

[0002] More in detail, the present invention relates to a ski mountaineering or Telemark ski boot. Uses to which the following disclosure specifically refers without however losing in generality.

[0003] As is known, the ski-mountaineering boots currently on the market basically comprise: a rigid shell made of plastic material, which is in the shape substantially like a shoe so as to accommodate the user's foot, and has the bottom part specifically structured so as to be fastened to the back of a downhill ski or the like by means of a specific 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 shell 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 boot made of soft and thermal insulating material, which is inserted inside the shell and the cuff, and is shaped so as to accommodate and protect both the foot and the lower part of the user's leg.

[0004] The ski-mountaineering boots referred above are additionally provided with a shell closing mechanism and with a cuff closing mechanism, both manually operated. The shell closing mechanism is structured so as to be able to selectively close/tighten the shell on the user's foot, thus immobilising the user's foot inside the inner boot. The cuff closing mechanism, in turn, is structured so as to be able to selectively close/tighten the upper part of the cuff on the user's leg, thus immobilising the user's leg inside the inner boot.

[0005] More in detail, the shell is usually provided with a longitudinal slit which extends along the upper part of the shell, astride the midplane of the boot and above the instep of the foot, and is covered by a flattened and oblong in shape, protective tongue which is arranged to rest on the upper part of the shell, astride the midplane of the boot.

[0006] In some models of ski-mountaineering boots currently on the market, the protective tongue is hinged to the upper part of the shell on one of the two lateral edges of the tongue. The shell closing mechanism, in turn, is arranged astride the second lateral edge of the tongue and the outer lateral side of the shell, and is adapted to pull the two components one towards the other so as to tighten the upper part of the shell against the user's foot.

[0007] Unfortunately, the specific arrangement of the components of the shell closing mechanism with respect to the hinge of the tongue limits the possibility of lateral tilting of the tongue, thus making the fitting of the ski boot in some way more difficult to less experienced users.

[0008] In addition, the particular position of the hinge forces the user to apply, on fitting the ski boot, a twisting

force to the tongue that may cause, in the long term, the yielding of the tongue and/or the breaking of the hinge.

[0009] Aim of the present invention is to provide a shell closing system that can overcome the drawbacks described above and is also easier to use.

[0010] In compliance with the above 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 dependent claims.

[0011] The present invention will now be described with reference to the accompanying drawings, which illustrate 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 an enlarged view of the front part of the ski boot shown in Figure 1, with parts in section and parts removed for clarity;
- Figure 3 is a perspective view of the front part of a second embodiment of the ski boot shown in Figure 1; whereas
- Figure 4 is a perspective view of the front part of a third embodiment of the ski boot shown in Figure 1.

[0012] With reference to Figures 1 and 2, number 1 denoted as a whole a ski boot that may advantageously be used for practising ski-mountaineering or Telemark.

[0013] The ski boot 1 firstly comprises: a rigid shell 2 preferably made of plastic and/or composite material, which is shaped substantially like a shoe so as to accommodate the foot of the user, and has the bottom part specifically structured/shaped so as to couple/engage in a rigid and stable, though easily releasable manner, with a ski binding device (not shown) of known type which is, in turn, is suitable to be rigidly fastened to the back of a generic downhill ski or the like; and a rigid cuff 3, preferably made of plastic and/or composite material, which is shaped so as to enclose the lower part of the user's leg, and is hinged to the upper part of shell 2 so as to freely pivot about a transversal rotation axis A which is locally substantially perpendicular to the vertical midplane of the boot and also substantially coincident with the articulation axis of the user's ankle.

[0014] More in detail, the bottom part of shell 2 is preferably has a front tip 4 and a rear heel 5. The front tip 4 is preferably structured so as to be able to couple/engage 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 the like. The rear heel 5, in turn, is preferably structured so as to be able to couple/engage in a stable, though easily releasable manner, with the heel piece (not shown) of the same ski binding device that, in turn, is stably fastened to the back of a generic downhill ski or the like.

[0015] Moreover, the bottom part of shell 2 preferably has a treaded profile so as to grip on snow or ice and therefore allow the user to walk on snow and ice in relative safety.

[0016] In the example shown, in particular, the front tip 4 of shell 2 is preferably structured so as to couple/engage in known manner with the toe piece of a ski-mountaineering binding device; whereas the rear heel 5 of shell 2 is preferably structured so as to couple/engage in a known manner with the heel piece of the same ski-mountaineering binding device.

[0017] More in detail, with reference to Figures 1 and 2, shell 2 preferably comprises: a substantially basin-shaped rigid casing 6, which is made of plastic and/or composite material and is shaped so as to accommodate, enclose and protect the foot of the user roughly up to the height of the ankle; and optionally also a bottom sole 7 preferably with a treaded profile, which is made of vulcanized rubber or other high friction elastomeric material, and which is firmly fixed to the bottom wall of the casing 6 preferably by gluing.

[0018] With reference to Figures 1 and 2, preferably shell 2 additionally comprises a rigid front insert 8 preferably having a substantially plate-like structure, which is preferably made of metal material, and is stably embedded/ incorporated in the bottom wall of rigid casing 6 roughly at the tip 4 of shell 2. Furthermore, the rigid insert 8 is dimensioned so as to emerge/surface outside of casing 6 on opposite sides of the front tip 4 of shell 2, roughly in a specular position with respect to the midpoint of the boot, so that the two distal ends of rigid insert 8 can couple in a known manner with the toe piece of the ski-mountaineering binding device.

[0019] With reference to Figure 1, preferably the cuff 3 in turn basically consists of a rigid casing made of plastic and/or composite material, which is substantially C-bent so as to cover the rear part of the user's leg, from the ankle substantially up to the height of the calf, and is additionally provided with two oblong lateral flaps that extend forward on opposite sides of the midplane of the boot, so as to embrace the user's leg from behind roughly at the height of the calf, and which then overlap to one another at the front of the leg, thus forming a tubular structure that encloses the user's leg at the height of the calf.

[0020] Furthermore, cuff 3 is preferably fixed in freely rotating manner to the upper part of the shell 2, or rather of rigid casing 6, by means of two connecting hinges 9 preferably made of metal material, which are arranged on the inner and outer lateral sides of shell 2 and of cuff 3, aligned along the rotation axis A, so as to allow the cuff 3 to freely swing forward and backward on shell 2, while always remaining on a reference plane orthogonal to axis A and substantially coincident with the midplane of the boot.

[0021] In the example shown, in particular, the casing 6 of shell 2 and/or the cuff 3 is/are preferably made of PEBAX (poly[ether block amide]), nylon (polyamide) or other similar plastic polymer.

[0022] According to an alternative embodiment, however, the casing 6 of shell 2 and/or the cuff 3 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, appropriately interwoven and/or superimposed to one another and embedded in an epoxy, phenolic or polyester resin matrix preferably of the thermosetting type.

[0023] With reference to Figure 1, the ski boot 1 preferably additionally comprises an inner boot 10 with a soft and thermal insulating structure, which is shaped so as to accommodate and protect the user's foot and possibly also the lower part of the user's leg, and is inserted inside shell 2 and optionally also inside cuff 3, preferably in manually removable manner.

[0024] More in detail, in the example shown the inner boot 10 is preferably shaped so as to accommodate, cover and protect the user's foot and also the lower part of the user's leg, roughly up to the top of the calf. Preferably the inner boot 10 also has a thermoformable-type structure.

[0025] With reference to Figures 1 and 2, the ski boot 1 is moreover provided with shell closing means 11 and preferably also with cuff closing means 12, both manually operated.

[0026] The shell closing means 11 are structured so as to be able to selectively close/tighten the shell 2 on the user's foot, to immobilise the user's foot inside the shell 2, or rather inside the inner boot 10. The cuff closing means 12, on the other hand, are structured so as to be able to selectively close/tighten the upper part of cuff 3 against the user's leg, to immobilise the user's leg inside the cuff 3, or rather inside the inner boot 10.

[0027] More in detail, with reference to Figures 1 and 2, the upper part of shell 2, or rather of casing 6, is provided with a longitudinal slit 13 which branches/leads off from the upper opening (not visible in the figures), and extends towards the front tip 4 while remaining substantially astride the midplane of the boot, preferably roughly up to the phalangeal region of the user's foot. The longitudinal slit 13 is furthermore shaped/dimensioned so as to allow the upper part of shell 2, or rather of rigid casing 6, to be closed/tightened against the instep of the user's foot.

[0028] The shell closing means 11 are located on shell 2, astride the longitudinal slit 13, and are structured so as to be able to selectively close/tighten the upper part of the shell 2 against the foot of the user.

[0029] With reference to Figures 1 and 2, the ski boot 1 moreover comprises a substantially rigid, oblong tongue 15 which is preferably made of plastic and/or composite material, and is arranged so as to rest on the upper part of shell 2, astride the midplane of the boot, in order to cover the longitudinal slit 13. Furthermore, the front end of oblong tongue 15 is hinged to the shell 2 near to the tip 4, so that the entire tongue 15 can pivot on the shell 2 in order to tilt forward while remaining substantially coplanar with the midplane of the boot.

[0030] More in detail, the oblong tongue 15 is provided with a first and a second longer lateral edges 15a and 15b that are opposite to one another and extend flush

with/tangent to the surface of shell 2, or rather of casing 6, on opposite sides of longitudinal slit 13 and of the midplane of the boot. Preferably, the longer lateral edges 15a and 15b of tongue 15 moreover reciprocally diverge towards the cuff 3.

[0031] Furthermore, the tongue 15 is preferably hinged to the shell 2 near to the front tip 4 thereof, so that the entire tongue 15 can freely pivot with respect to shell 2 about a transversal rotation axis B which is substantially perpendicular to the midplane of the boot and, thus, substantially parallel to rotation axis A.

[0032] With reference to Figures 1 and 2, in the example shown, in particular, the oblong tongue 15 is preferably substantially L-bent, and is structured to flex in elastic manner at its central elbow.

[0033] Preferably, the tongue 15 is additionally arranged so as to rest on the upper part of shell 2, so that the lower part of tongue 15 is flush with/tangent to the area of shell 2 covering the instep of the foot and the tibio-talar joint of the ankle, so as to completely cover the longitudinal slit 13.

[0034] The upper part of tongue 15, in turn, detaches from the shell 2 close to the tibio-talar joint of the ankle, and then rises more or less vertically along the user's leg preferably until reaching and entering under the cuff 3, in order to cover the front part of the user's leg.

[0035] Preferably the front end of tongue 15 is lastly stably connected to shell 2, or rather to rigid casing 6, by means of a connecting hinge 16 which is preferably located astride the midplane of the boot, and is preferably fixed to the outer surface of shell 2, or rather of rigid casing 6, in a stable, though easily removable manner, via a series of anchoring screws or rivets 17.

[0036] With reference to Figures 1 and 2, the shell closing means 11 are adapted selectively to pull, one towards the other, the two reciprocally-facing longitudinal edges of shell 2, or rather of casing 6, that delimit/flank the longitudinal slit 13, on opposite sides of the midplane of the boot.

[0037] More in detail, the shell closing means 11 firstly comprise: at least one and, more conveniently, a series of anchoring teeth 18 that protrude from the shell 2, beneath the longer lateral edge 15a of tongue 15, and are adapted to engage in latching manner corresponding blind or through coupling seats 19 specifically formed in the body of tongue 15, along the longer lateral edge 15a, so as to prevent the tongue 15 from sliding/moving grazed over the surface of shell 2 transversally to the midplane of the boot and preferably also parallel to the midplane of the boot.

[0038] Preferably, the shape of coupling seat or seats 19 is complementary to that of the corresponding anchoring teeth 18.

[0039] More in detail, the coupling seat or seats 19 are preferably blind or through holes that are formed in the body of tongue 15, and preferably have a shape that is complementary to that of the corresponding anchoring teeth 18. Preferably, the blind or through hole or holes

moreover have a circular cross section.

[0040] In addition, the shell closing means 11 also comprise a manually-operated transversal tensioning mechanism 20 which is arranged astride shell 2 and tongue 15, along the second longer lateral edge 15b of tongue 15, i.e. on the opposite side of the midplane of the boot with respect to anchoring teeth 18, and is structured so as to pull the tongue 15 towards the lateral side of shell 2 that flanks the longer lateral edge 15b of tongue 15.

[0041] In the example shown, in particular, the anchoring teeth 18 are preferably located on the inner side of shell 2, whereas the transversal tensioning mechanism 20 is preferably located on the outer side of the shell 2.

[0042] With reference to Figures 1 and 2, the transversal tensioning mechanism 20 in turn preferably comprises: at least a first cable-through element 21 which is rigidly fixed to the shell 2, or rather to the casing 6, close to the lateral edge 15b of tongue 15; at least a second cable-through element 22 which rests in freely sliding manner on tongue 15, more or less close to the lateral edge 15b of tongue 15; and a tightening cable 23 with a flexible and substantially non-extendible structure, which extends in a zigzag manner astride the lateral edge 15b of tongue 15, engaging in succession the cable-through elements 21 and 22 in a pass-through and freely sliding manner, and preferably has at least one of the two ends rigidly anchored to the shell 2.

[0043] Preferably, the cable 23 additionally engages the cable-through element 21 and/or 22 in a manually removable manner.

[0044] Furthermore, the transversal tensioning mechanism 20 additionally comprises a manually operated cable-tensioning device 24, which is able to move the cable-through element 22 skimmed over the tongue 15 in order to selectively tension the cable 23.

[0045] More in detail, the cable-tensioning device 24 is mechanically connected to the cable-through element 22, and is preferably structured so as to be able to selectively move the cable-through element 22 skimmed over the tongue 15 and locally transversally to the cable 23 and/or to the midplane of the boot, between a first operating position (see Figure 1) in which the cable-through element 22 is at the shortest distance from the midplane and at the maximum distance from the cable-through element 21, so as to tension the cable 23; and a second operating position (see Figure 2) in which the cable-through element 22 is at the maximum distance from the midplane and at the shortest distance from the cable-through element 21, in order to release the cable 23.

[0046] In the example shown, in particular, the tightening cable 23 is preferably made of metal material.

[0047] Preferably, a first end 23a of cable 23 is moreover rigidly anchored to shell 2, or rather to casing 6, preferably close to one of the two connecting hinges 9. Preferably, a second end 23b of cable 23 is instead rigidly anchored to the body of tongue 15, preferably close to

the front end of tongue 15, i.e. close to hinge 16.

[0048] In other words, the second end 23b of cable 23 is preferably rigidly fixed directly to the tongue 15 at an anchoring point that is preferably located above the metatarsophalangeal area of the foot of the user.

[0049] Furthermore, with reference to Figures 1 and 2, the anchoring teeth 18 are preferably spaced along the border of shell 2 flanking/delimiting the longitudinal slit 13, preferably at least above the metatarsophalangeal area of the foot of the user, i.e. along the end section of the longitudinal slit 13.

[0050] Preferably, the anchoring teeth 18 and the cable-through element 21 are also located on the shell 2, on opposite sides of the longitudinal slit 13 and of the midplane of the boot, roughly above the metatarsophalangeal area of the foot of the user.

[0051] Preferably, the anchoring point of the second end 23b of tightening cable 23 on the tongue 15 and at least one of the coupling seats 19 are additionally arranged on tongue 15, on opposite sides of the midplane of the boot, substantially above the metatarsophalangeal area of the foot of the user.

[0052] With reference to Figures 1 and 2, preferably the cable-through element 22 and the cable-tensioning device 24 are instead arranged above the cuboid-metatarsal area of the foot of the user.

[0053] Furthermore the cable-tensioning device 24 is preferably firmly fixed to the shell 2 close to the longer lateral edge 15a of tongue 15, and extends over the tongue 15 up to the cable-through element 22, preferably above the cuboid-metatarsal area of the foot of the user.

[0054] Furthermore, the cable-tensioning device 24 is able to move the cable-through element 22 skimmed over the tongue 15, in a direction d which is locally substantially perpendicular to the cable 23 and/or to the midplane of the boot, so as to selectively move the cable-through element 22 away from the cable-through element 21, thus to tension the tightening cable 23.

[0055] Preferably, the cable-tensioning device 24 moreover directly supports the cable-through element 22.

[0056] With reference to Figures 1 and 2, in particular the cable-tensioning device 24 preferably basically consists in a manually-operated lever closing buckle which is arranged astride the tongue 15, roughly perpendicular to the midplane of the boot.

[0057] More in detail, the cable-tensioning device 24 preferably comprises: an anchoring plate (not visible in the figures) which is rigidly fixed to the inner side of the shell 2, close to the lateral edge 15a of tongue 15; a preferably articulated and preferably slightly arched, supporting stem 28 which has the proximal end hinged to the anchoring plate so as to be able to rotate freely about a reference axis (not visible in the figures) locally substantially perpendicular to the longitudinal axis of the stem and locally substantially tangential to the surface of the shell 2, and which extends cantilevered from the anchoring plate skimming the tongue 15, towards the ca-

ble-through element 22; a manually-operated, plate-like lever 29 which is hinged as a rocker arm to the distal end of the stem 28 so as to be able to rotate freely about a second reference axis D locally substantially perpendicular to the longitudinal axis of the stem and locally substantially tangential to the surface of tongue 15; and lastly an end tongue 30 which is butt hinged directly to the lever 29 in an eccentric position with respect to the axis of rotation of the lever 29 on the distal end of the stem 28, and is adapted to support or incorporate the cable-through element 22.

[0058] In the example shown, in particular, the end tongue 30 is provided with one or more cable-guiding grooves preferably having an arched shape, each of which is dimensioned so as to be engaged in freely sliding manner by a portion of cable 23. The cable guiding grooves form the cable-through element 22.

[0059] In other words, the cable-through element 22 is incorporated in the lever closing buckle 24.

[0060] Preferably, the anchoring plate (not shown) and/or the supporting stem 28 and/or the lever 29 and/or the end tongue 30 is/are made of metal material.

[0061] The cable-through element 21, in turn, is preferably made of plastic material, and is rigidly and stably fixed to the shell 2, or rather to the casing 6, preferably by means of one or more anchoring screws.

[0062] With reference to Figure 1, instead, the cuff closing means 12 are preferably located on the cuff 3, and are selectively suitable to pull the two oblong lateral flaps of cuff 3 one towards the other, in order to tighten the upper part of cuff 3 on the user's leg to immobilise the user's leg inside the boot 1, or rather the inner boot 10.

[0063] In the example shown, in particular, the cuff closing means 12 preferably comprise: a transversal belt 31 made of flexible and substantially non-extendible material, which has one end rigidly fixed to a first lateral flap of cuff 3, and extends astride the front part of the cuff 3; and a lever closing buckle 32 which is rigidly fixed to the second lateral flap of cuff 3, is mechanically connected to the transversal belt 31, and is adapted to tension the transversal belt 31 in order to pull the two oblong lateral flaps of cuff 3 one towards the other.

[0064] More in detail, in the example shown, the transversal belt 31 is preferably U-folded on itself, and is held in the folded position by a velcro locking system; whereas the lever closing buckle 32 is rigidly fixed to the second lateral flap of cuff 3, and is engaged in pass-through manner by the loop of transversal belt 31.

[0065] Preferably, lastly the ski boot 1 also includes a either manually operated or automatic, cuff locking device (not visible in the figures) which is preferably located astride the shell 2 and the cuff 3 in the area above the heel of the boot, and is structured so as to be able to selectively rigidly connect the cuff 3 to the shell 2, so as to prevent the cuff 3 from freely pivoting about the rotation axis A.

[0066] More in detail, the cuff locking device is preferably structured so as to be able, on choice and alterna-

tively: to rigidly lock the cuff 3 to the shell 2 in a given downhill position in which the cuff 3 is tilted forward with respect to the vertical by a predetermined angle preferably, though not necessarily, ranging between 3° and 30°, so as to prevent any swinging movement of the cuff 3 on the shell 2; and to completely unlock/release the cuff 3 from the shell 2 so as to allow the cuff 3 to freely swing forward and backward on the shell 2 about rotation axis A, while remaining on the midplane of the ski boot.

[0067] Functioning of ski boot 1 is easily inferable from what disclosed above, and therefore does not require any further explanation.

[0068] As regards instead the functioning of shell closing means 11, the anchoring teeth 18 prevent the longer lateral edge 15a of tongue 15 from moving transversally, i.e. perpendicularly to the midplane of the boot, whereas the cable-tensioning device 24, by tensioning the tightening cable 23, is capable of pulling the longer lateral edge 15b of tongue 15 towards the outer lateral side of the shell 2, thus closing the upper part of shell 2 against the instep of the user's foot practically without pushing/pressing the tongue 15 against the instep of the foot.

[0069] More in detail, it is the part of shell 2 beneath the longer lateral edge 15b of tongue 15 that is forced to slide under the tongue 15.

[0070] The advantages resulting from the particular structure of the shell closing means 11 are remarkable.

[0071] Firstly, the arrangement of anchoring teeth 18 and transversal tensioning mechanism 20 on opposite sides of the midplane of the boot forces the shell 2 to slide under the tongue 15, without pressing the tongue 15 against the instep of the user's foot, thus binding up in the best way the instep and the sides of the user's foot.

[0072] Moreover, the anchoring teeth 18 are also able to centre the tongue 15 on the upper part of shell 2, or rather of casing 6, thus optimising the distribution of the tensioning forces.

[0073] In addition, the combined use of the anchoring teeth 18, of the cable-through elements 21 and 22, and of the tightening cable 23, allows to tilt forwards the tongue 15 by almost 180°, making the footwear considerably easier to put on.

[0074] Lastly, the use of the cable-through elements 21 and 22 and of the cable-tensioning device 24 considerably reduces the overall weight of the ski boot 1, with all the advantages that this entails.

[0075] Lastly, changes and variations may be clearly made to the ski boot 1 described above without, however, departing from the scope of the present invention.

[0076] For example, with particular reference to Figure 3, according to an alternative embodiment, the transversal tensioning mechanism 20 preferably comprises at least one transversal lever closing buckle 33, which is rigidly and stably fixed directly to the tongue 15, above the cuboid-metatarsal area of the user's foot, and extends astride the tongue 15 and the outer lateral side of shell 2, or rather of casing 6, at the longer lateral edge 15b of tongue 15 and transversally to the midplane of the

boot.

[0077] In this embodiment the anchoring teeth 18 are preferably spaced along the entire border of shell 2 flanking/delimiting the longitudinal slit 13, and some coupling seats 19 are arranged on the body of tongue 15, along the longer lateral edge 15a, above the cuboid-metatarsal area of the user's foot, beside the lever closing buckle 33.

[0078] Clearly the anchoring teeth 18 and the corresponding coupling seats 19 could also be arranged along the segment of the longer lateral edge 15a of tongue 15 immediately adjacent to the lever closing buckle 33.

[0079] According to a not-shown second embodiment, likewise to the lever closing buckle 33, also the cable-tensioning device 24 could be rigidly and stably fixed directly to the tongue 15, above the cuboid-metatarsal area of the user's foot.

[0080] With reference to Figure 4, according to a third embodiment, the transversal tensioning mechanism 20 comprises: at least one and preferably a series of first cable-through elements 41 rigidly fixed to the shell 2, or rather to the casing 6, close to the lateral edge 15b of tongue 15; at least a second cable-through element 42 rigidly fixed to the tongue 15, close to the lateral edge 15b of tongue 15; a tightening cable 43 with a flexible and substantially non-extendible structure, which extends in a zigzag manner astride the lateral edge 15b of tongue 15, engaging in succession the cable-through elements 41 and 42 in a pass-through and freely sliding manner, and which preferably has a first end 43b rigidly anchored to the tongue 15 or to the shell 2 close to the front end of tongue 15, i.e. close to hinge 16; and lastly a manually-operated cable winch 44 that is rigidly fixed to the upper face of tongue 15, preferably astride the midplane of the boot, and is structured so as to be able to selectively wind, block or unwind the cable 43 inside it, for being able to selectively place and hold the cable 43 under tension.

[0081] Preferably, the cable 43 additionally engages the cable-through elements 41 and/or 42 in manually removable manner.

[0082] The cable winch 44 is a component already widely known in the sector of ski-mountaineering boots and sports footwear in general, and is therefore not described in further details.

[0083] Lastly, according to a less sophisticated not-shown embodiment, in addition to the anchoring teeth 18, the shell closing means 11 may comprise one or more transversal lever closing buckles, each of which extends like a bridge from the inner side to the outer side of shell 2, skimming over tongue 15, so as to be able to selectively pull the two lateral sides of shell 2 one towards the other.

Claims

1. A ski boot (1) comprising a rigid shell (2) which is adapted to accommodate the foot of the user, and

has the bottom part structured to couple with a ski binding device or the like; a rigid cuff (3) which is adapted to enclose the leg of the user, and is pivotally joined to the shell (2) so as to be able to pivot about a rotation axis (A) substantially perpendicular to the midplane of the boot; a rigid and oblong tongue (15) which is arranged resting on the upper part of the shell (2), astride the midplane of the boot, and has its front end hinged to the shell (2) so as to be able to tilt forward while remaining substantially on the midplane of the boot; and shell closing means (11) selectively adapted to tighten the shell (2) against the foot of the user;

the ski boot (1) being **characterized in that** the shell closing means (11) comprise one or more anchoring teeth (18) that protrude from the shell (2), beneath a first longer lateral edge (15a) of the tongue (15), and are adapted to engage in latching manner corresponding coupling seats (19) specifically made in the body of the tongue (15), so as to prevent the tongue (15) from moving skimming over the surface of the shell (2) transversally to the midplane of the boot.

2. Ski boot according to Claim 1, **characterized in that** the shell closing means (11) additionally comprise a manually-operated transversal tensioning mechanism (20) which is arranged astride the shell (2) and the tongue (15) along a second longer lateral edge (15b) of the tongue (15) opposite to said first longer lateral edge (15a), and is structured so as to pull the tongue (15) towards the lateral side of the shell (2) that flanks said second longer lateral edge (15b) of the tongue (15).
3. Ski boot according to Claim 2, **characterized in that** the transversal tensioning mechanism (20) comprises: a series of cable-through elements (21, 22, 41, 42) arranged close to the second longer lateral edge (15b) of the tongue, partly on the shell (2) and partly on the tongue (15); a tightening cable (23, 43) which extends in a zigzag manner astride the second longer lateral edge (15b) of the tongue (15), engaging in succession said cable-through elements (21, 22, 41, 42) in a pass-through and sliding manner; and a manually operated cable-tensioning member (24, 44) capable of tensioning said tightening cable (23, 43).
4. Ski boot according to Claim 3, **characterized in that** said transversal tensioning mechanism (20) comprises: at least a first cable-through element (21) which is rigidly fixed to the shell (2) close to the second longer lateral edge (15b) of the tongue; at least a second cable-through element (22) which rests in freely sliding manner on the tongue (15), close to the second longer lateral edge (15b) of the tongue; a tightening cable (23) which extends in a zigzag manner astride the second longer lateral edge (15b) of

the tongue (15), engaging in succession said first (21) and second (22) cable-through elements in a pass-through and sliding manner; and a manually-operated cable-tensioning device (24) which is able to move said second cable-through element (22) skimming the tongue (15), so as to selectively tension said tightening cable (23).

5. Ski boot according to Claim 3 or 4, **characterized in that** a first end (23b, 43b) of the tightening cable (23, 43) is anchored in rigid manner to the body of the tongue (15).
6. Ski boot according to Claim 5, **characterized in that** the second end (23b, 43b) of the tightening cable (23, 43) is anchored in rigid manner to the body of the tongue (15) close to the front end of the tongue (15).
7. Ski boot according to Claim 6, **characterized in that** the anchoring point of the second end (23b, 43b) of the tightening cable (23, 43) on the tongue (15) and at least one of the coupling seats (19) are arranged on the tongue (15), on opposite sides of the midplane of the boot, substantially above the metatarsophalangeal area of the foot of the user.
8. Ski boot according to any one of Claims from 3 to 7, **characterized in that** a second end (23a, 43b) of the tightening cable (23, 43) is anchored in a rigid manner to the shell (2).
9. Ski boot according to any one of the preceding claims, **characterized in that** the tongue (15) is arranged resting on the upper part of the shell (2), to cover a longitudinal slit (13) which extends on the upper part of the shell (2) substantially astride the midplane of the boot; and **in that** the anchoring teeth (18) are spaced along the border of the shell (2) that flanks/delimits said longitudinal slit (13), preferably at least above the metatarsophalangeal area of the foot of the user.
10. Ski boot according to Claim 9, **characterized in that** the anchoring teeth (18) and the first cable-through element (21) are located on the shell (2), on opposite sides of the longitudinal slit (13) of the shell (2), roughly above the metatarsophalangeal area of the foot of the user.
11. Ski boot according to any one of Claims from 4 to 10, **characterized in that** the second cable-through element (22) and the cable-tensioning device (24) are arranged above the cuboid-metatarsal area of the foot of the user.
12. Ski boot according to any one of Claims from 4 to 11, **characterized in that** the cable-tensioning de-

vice (24) is firmly fixed to the shell (2) close to the first longer lateral edge (15a) of the tongue (15), extends over the tongue (15) up to the second cable-through element (22), and is able to move said second cable-through element (22) skimming the tongue (15) in a direction (d) which is locally substantially perpendicular to the tightening cable (23) and/or to the midplane of the boot, so as to selectively move the second cable-through element (22) away from the first cable-through element (21).

13. Ski boot according to any one of Claims from 4 to 12, **characterized in that** the cable-tensioning device (24) directly supports said second cable-through element (22).
14. Ski boot according to any one of Claims from 4 to 13, **characterized in that** the cable-tensioning device comprises a manually operated lever closing buckle (24) which is arranged astride the tongue (15), roughly perpendicular to the midplane of the boot.
15. Ski boot according to Claim 14, **characterized in that** the second cable-through element (22) is incorporated in the lever closing buckle (24).
16. Ski boot according to any one of the preceding claims, **characterized in that** the anchoring teeth (18) are arranged on the inner side of the shell (2), while the transversal tensioning mechanism (20) is arranged on the outer side of the shell (2).

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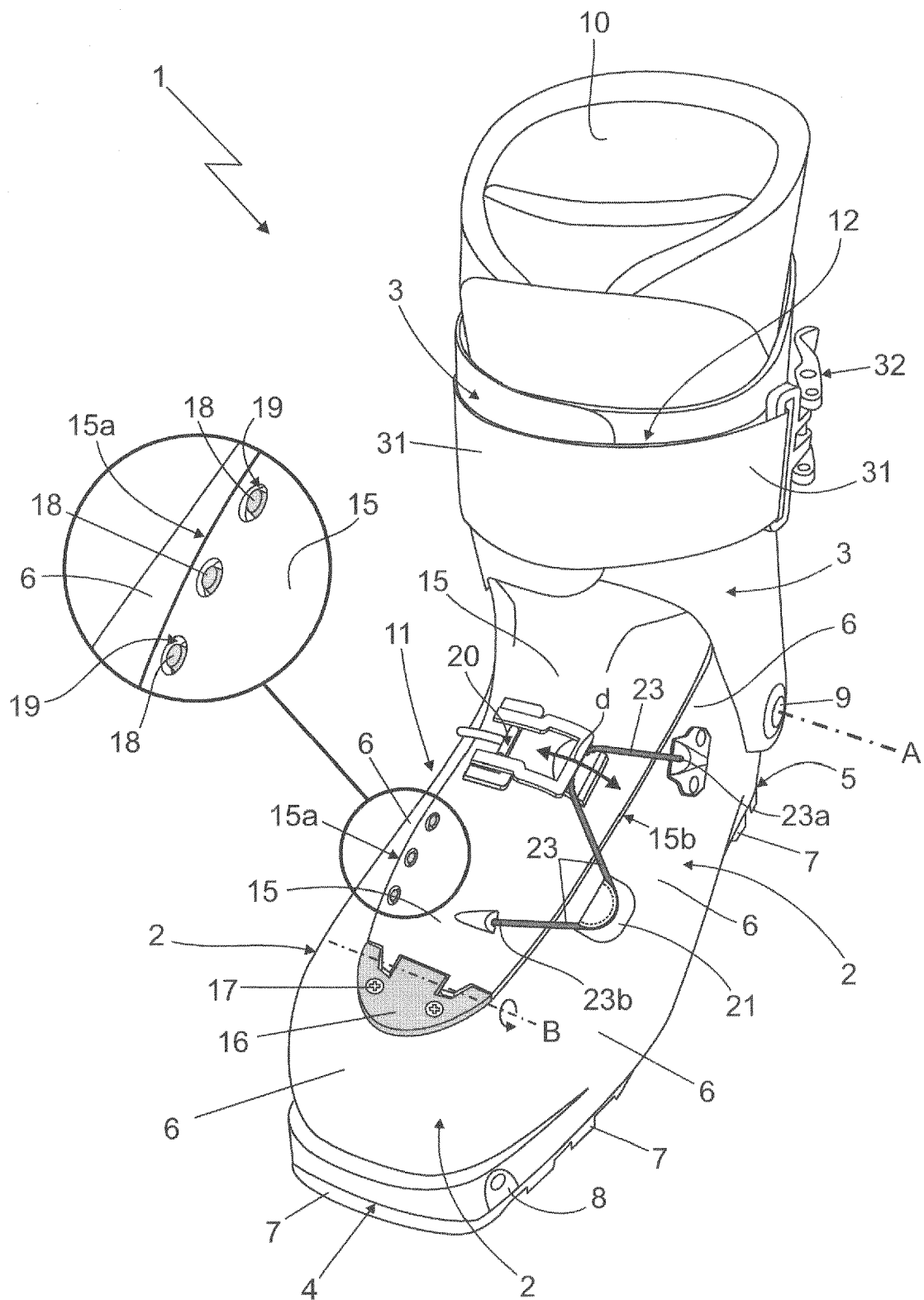


Fig. 1

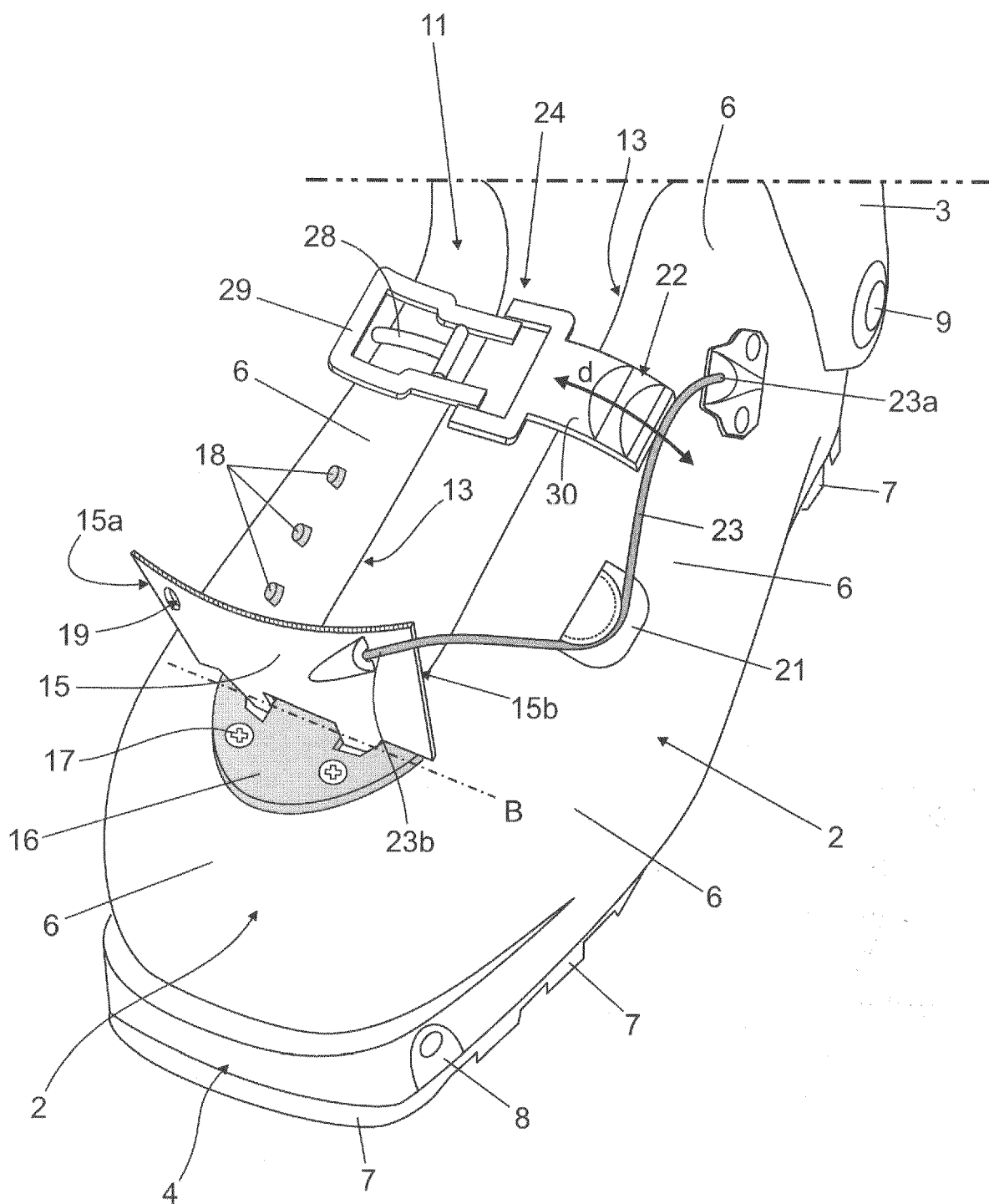


Fig. 2

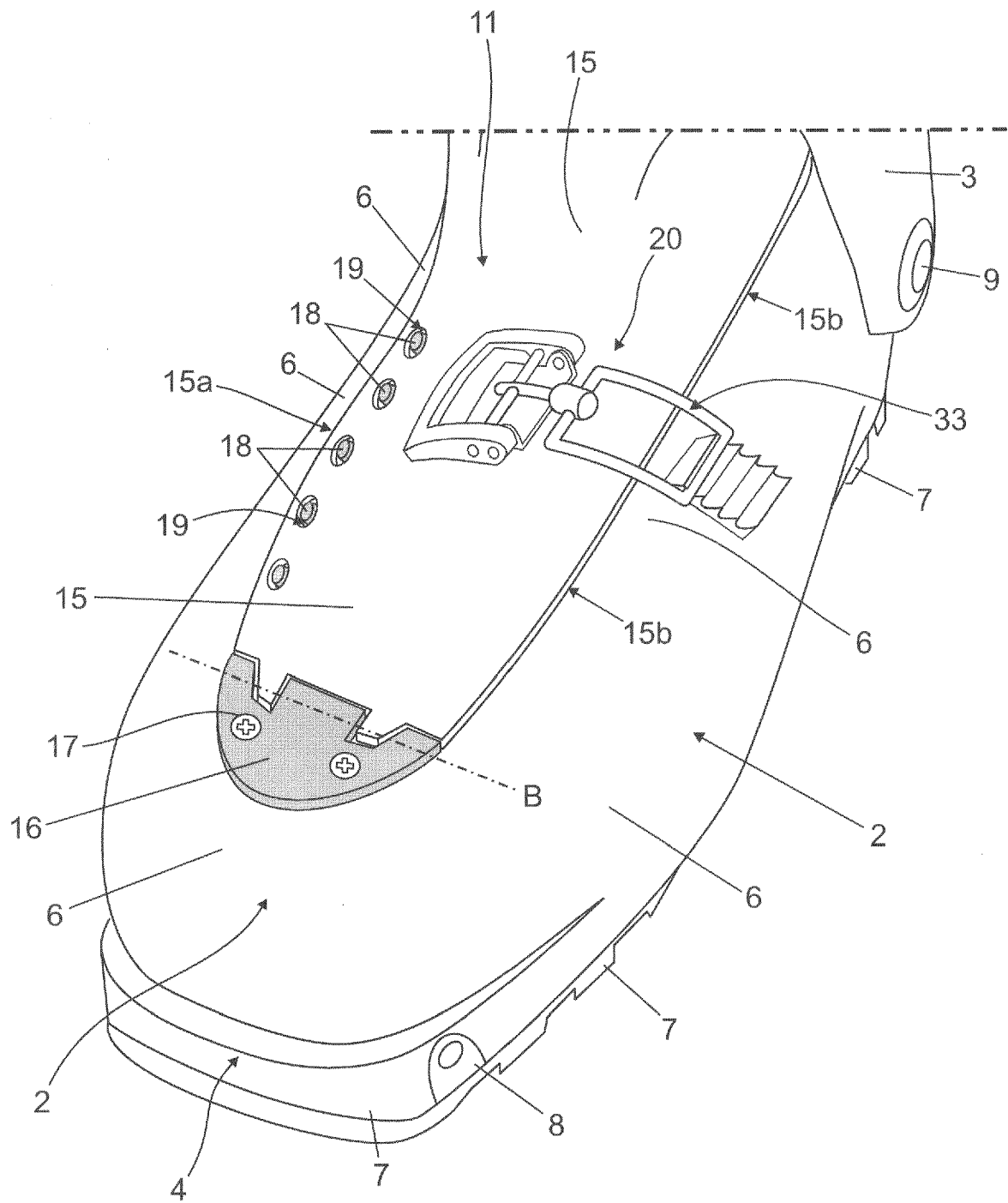


Fig. 3

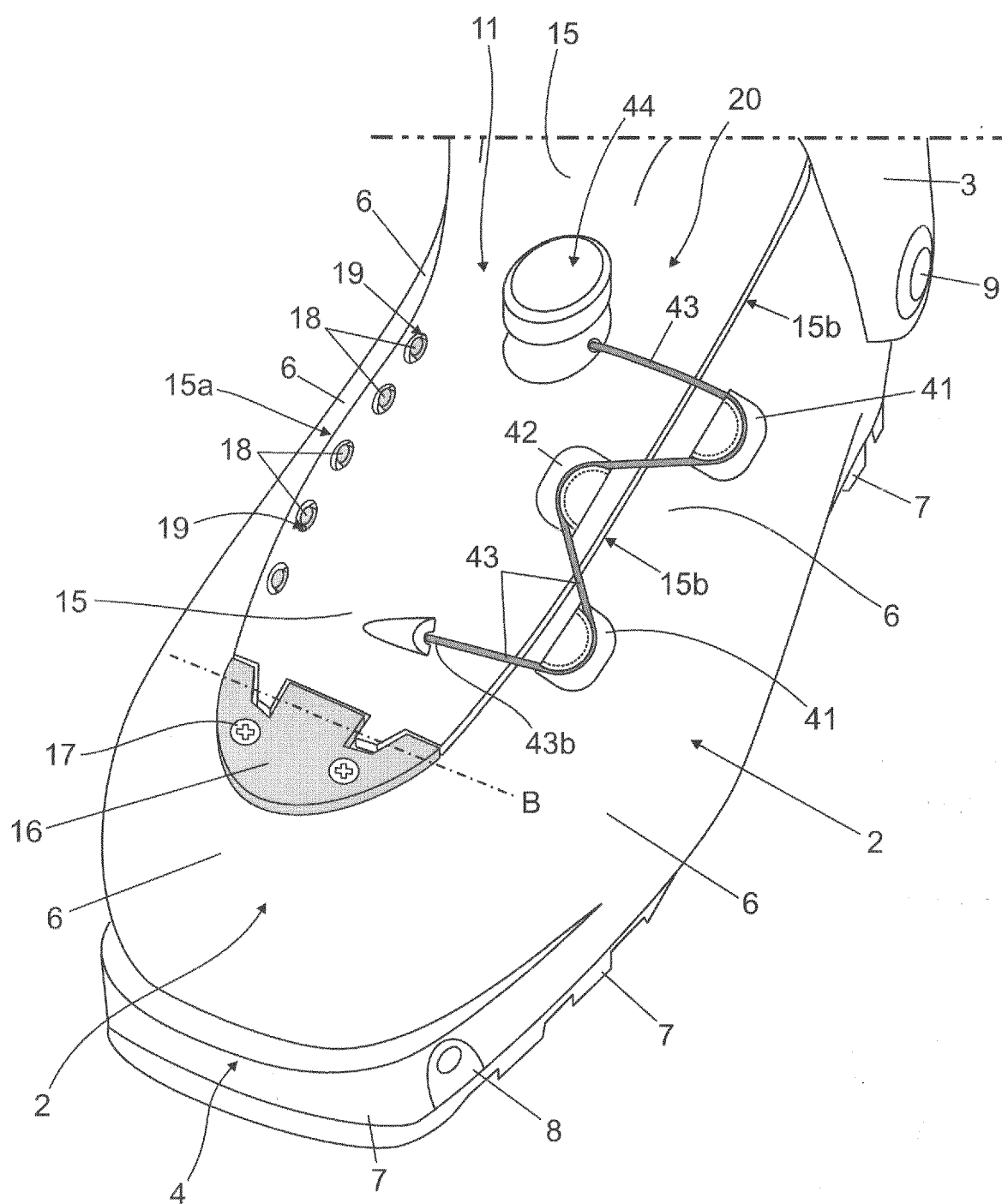


Fig. 4



EUROPEAN SEARCH REPORT

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			A43B A43C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 25 October 2017	Examiner Ciubotariu, Adrian
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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