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(54) **SKI BOOT**

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EP 3 175 730 B1

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Description

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

[0002] More specifically, the present invention relates to a ski mountaineering boot, use to which the following description will make explicit reference without however losing generality.

[0003] As is known, the ski mountaineering boots currently on the market basically comprise: a rigid shell made of plastic or composite material, which is shaped so as to accommodate the foot of the user and has a lower part specifically structured to be fastened to the back of a downhill ski or the like by means of a suitable ski mountaineering binding device; and a rigid cuff made of plastic or composite material, which is shaped so as to embrace the lower part of the leg of the user 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 midplane of the boot and is also locally substantially coincident with the articulation axis of the ankle.

[0004] In addition, the above-mentioned ski mountaineering boots also include: an innerboot made of soft and heat-insulating material, which is inserted in the shell and the cuff and is shaped so as to accommodate and protect both the foot and the lower part of the leg of the user; and a set of manually operated locking members which are located both on the shell and the cuff, and are structured so as to be able to selectively close/tighten the shell and the cuff to firmly immobilize the leg of the user inside the innerboot.

[0005] Finally, the above-mentioned ski mountaineering boots are provided with a manually-operated cuff-locking device which is traditionally located in the area above the heel of the boot, and is structured so as to be able to selectively and alternately lock the cuff to the shell in a rigid manner for preventing any pivoting movement of the cuff on the shell, and completely release the cuff from the shell for allowing the cuff to freely pivot on the shell.

[0006] U.S. Patent Application Publication Number 2010/229425 A1 (PARISOTTO)discloses a ski boot according to the preamble of independent claim 1.

[0007] In most of the ski mountaineering boots, the cuff locking device is made up of a coupling arm which is butt-hinged to the cuff above the heel, so as to be able to move on the midplane of the boot between a lowered position in which the arm firmly couples to the shell so as to prevent any pivoting movement of the cuff on the shell, and a raised position in which the arm does not couple to the shell and therefore allows the cuff to freely pivot on the shell.

[0008] More specifically, in the lowered position the coupling arm generally extends downwards skimming the heel of the ski boot, so that the distal end of the arm can firmly couple at a specific point of the shell thus to lock the cuff to the shell in a predetermined position.

[0009] In the raised position, instead, the coupling arm usually extends upwards skimming the cuff, so that the distal end of the arm cannot reach the shell.

[0010] In competition ski mountaineering boots, in addition, the coupling arm is also connected to a closing cable that is looped around the cuff at calf height, so that the movement of the coupling arm into the lowered position can tighten the closing cable to such an extent as to tighten the cuff firmly against the leg of the user.

[0011] While allowing the user to tighten and lock the cuff to the shell with a single movement, the above-described mechanism for closing and simultaneously locking the cuff offers a very limited adjustment capability.

[0012] The user can, in fact, vary the grip exerted by the closing cable on the cuff only by manually adjusting the length of the cable. This operation is particularly long and laborious and proves to be impractical during competitions, with all the problems that this entails. The aim of the present invention is to provide a mechanism for closing and simultaneously locking the cuff providing greater adjustment capabilities and is also easier to operate.

[0013] 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 claims dependent thereon.

[0014] 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 side view of a ski mountaineering boot made according to the teachings of the present invention;
- Figure 2 is a front view of the upper part of the ski mountaineering boot shown in Figure 1, in a first operating configuration;
- Figure 3 is a front view of the upper part of the ski mountaineering boot shown in Figure 1, in a second operating configuration; whereas
- Figure 4 is a side view of the upper part of the ski mountaineering boot shown in Figure 1.

[0015] With reference to Figures 1, 2, 3, and 4, number 1 denotes as a whole a ski boot, and in particular a ski boot specially structured for practising ski mountaineering.

[0016] The ski boot 1 basically comprises: a rigid shell 2, which is shaped so as to accommodate the foot of the user, and has a lower part specifically structured/shaped to couple/fasten in a rigid and stable, though easily releasable manner, to a ski binding device (not shown) of a known type, which in turn is adapted to be fixed in a rigid manner to the back of a generic downhill ski or the like; and a substantially tubular, rigid cuff 3 which is shaped so as to embrace the leg of the user in the area of the ankle, and is hinged to the upper part of the shell 2 so as to be able to freely pivot about a transversal rotation axis A, which is locally substantially perpendicular to the midplane of the boot (i.e. perpendicular to the plane

of the sheet in Figure 1), and is also locally substantially coincident with the articulation axis of the ankle of the user.

[0017] More specifically, the lower part of the shell 2 is provided with a front tip 4 and a rear heel 5. The front tip 4 is preferably structured so as to be able to couple/fasten in a stable though easily releasable manner, to the toe piece (not shown) of a ski binding device which, in turn, is firmly fixed to the back of a generic downhill ski or the like. Instead, the rear heel 5 is preferably structured so as to be able to couple/hasten in a stable though easily releasable manner, to the heel piece (not shown) of a ski binding device which, in turn, is firmly fixed to the back of a generic downhill ski or the like.

[0018] Preferably, the lower part of the shell 2 also has a threaded profile so as to allow the user to walk on snow and ice.

[0019] In the example shown, in particular, the shell 2 is preferably consists of a rigid casing 6 made of plastic or composite material and which is substantially basin-shaped so as to be able to accommodate inside the foot of the user; and of a bottom sole 7 which is preferably made of vulcanized rubber or other elastomeric material with high friction coefficient, and is firmly fixed to the bottom wall of the rigid casing 6, preferably by gluing.

[0020] Preferably, the shell 2 additionally comprises a first insert 8 made of metallic material and which is incorporated into the rigid casing 6 at the tip 4 of the shell 2 and structured so as to be able to couple/fasten in a known manner to the toe piece (not shown) of a ski binding device; and optionally also a second insert 9 made of metallic material and which, instead, is incorporated in the rigid casing 6, at rear heel 5, and structured so as to be able to couple/fasten in a known manner to the heel piece (not shown) of a ski binding device.

[0021] More specifically, in the example shown, the front insert 8 is preferably embedded within the bottom wall of the rigid casing 6, at the tip 4 of the shell 2, and extends inside the casing 6 perpendicular to the midplane of the boot so that the two opposite ends of the insert 8 can emerge/surface outside the casing 6 in the area of the two lateral sides of the tip 4.

[0022] Preferably, the two ends of the front insert 8 are also shaped/structured so as to be able to be coupled in a known manner to the jaw of the toe piece of a ski mountaineering binding device.

[0023] Instead, the rear insert 9 is preferably recessed within a hollow seat specially formed on the rigid casing 6 at sidewall of the rear heel 5 of shell 2, substantially astride the midplane of the boot, and it is preferably structured so as to be engaged in a known manner by the locking pins of the heel piece of a ski mountaineering binding device.

[0024] With reference to Figure 1, instead cuff 3 is fixed in freely rotatable manner to the shell 2, or rather to the rigid casing 6, by means of two connecting side hinges 10 which are located on the inner and outer lateral sides of shell 2 and cuff 3, aligned along the axis A, so as to allow the cuff 3 to freely pivot on shell 2 both forwards and backwards, while remaining on a reference plane orthogonal to the axis A and substantially coincident with the midplane of the boot.

[0025] Preferably, cuff 3 moreover basically consists of a rigid casing 11 made of plastic or composite material, which is substantially C-bent so as to cover the back of the leg of the user at calf height, and is provided with two oblong lateral flaps which extend forwards on opposite sides of the midplane of the boot, so as to overlap to one another at the front of the leg thus forming a tubular structure that embraces the leg of the user roughly from the ankle to the calf and is hinged at the bottom on the shell 2.

[0026] Furthermore, with reference to Figures 1, 2, 3 and 4, the ski boot 1 preferably additionally comprises: an innerboot 12 with a soft and heat-proof structure, optionally also of the thermoformable type, which is inserted into shell 2 and optionally also into cuff 3 preferably, though not necessarily, in a removable manner, and is shaped so as to accommodate and protect the foot and optionally also the lower part of the leg of the user; and a manually-operated, shell closing mechanism 13 which is structured so as to be able to selectively close/tighten the shell 2 on the foot of the user, for immobilizing the foot of the user inside the boot, or rather inside the innerboot 12.

[0027] In the example shown, in particular, the shell closing mechanism 13 preferably consists of a manually-operated winch fastening device, as those currently marketed by the US company BOA TECHNOLOGY INC, which is located on the shell 2, preferably in the area above the instep, and is overall structured so as to be able to selectively close/ tighten the shell 2 on the foot of the user, thus to firmly immobilize the foot of the user inside the shell 2, or rather inside the innerboot 12.

[0028] In a different embodiment, however, the shell closing mechanism 13 may comprise one or more lever closing buckles of known type.

[0029] With reference to Figures 1, 2, 3 and 4, the ski boot 1 is finally provided with a manually-operated cuff closing and locking mechanism 14 which is structured so as to be able to selectively and alternately,

- lock the cuff 3 in rigid manner to the shell 2 so as to prevent any pivoting movement of the cuff 3 on the shell 2; or
- fully unlock/release the cuff 3 from the shell 2 so as to allow the cuff 3 to freely pivot back and forth on the shell 2 about the axis A, while remaining on the midplane of the boot.

[0030] More specifically, the cuff closing and locking mechanism 14 is preferably structured so as to be able to lock the cuff 3 in rigid manner to the shell 2 in a predetermined downhill position in which the cuff 3 is tilted forward with respect to the vertical by a given angle α preferably ranging between 3° and 30°, while preventing any pivoting movement of cuff 3 on shell 2.

[0031] In addition, the cuff closing and locking mechanism 14 is additionally structured so as to be able, when locking the cuff 3 to the shell 2 in rigid manner, to close/tighten the cuff 3 on the leg of the user, preferably roughly at calf height, so as to be able to selectively and alternately,

- immobilize the leg of the user inside the cuff 3, or rather inside the innerboot 12, so as to prevent any movement of the leg inside the ski boot 1; or
- hold the leg of the user inside the cuff 3, or rather inside the innerboot 12, allowing the leg a limited movement/pivoting capability inside the same cuff 3, or rather inside the innerboot 12.

[0032] More specifically, with reference to Figures 1, 2, 3 and 4, the cuff closing and locking mechanism 14 is at least partially located on the cuff 3, and first of all it comprises an oblong-shaped coupling arm 15 which is hinged on the cuff 3 in the area above the heel of the boot, so as to be able to rotate on the cuff 3 while remaining substantially on the midplane of the boot, and is movable to and from a locking position in which the coupling arm 15 extends downwards roughly skimming the heel of the ski boot so as to straddle the shell 2 and the cuff 3, and in addition it firmly couples to the shell 2 so as to prevent any pivoting movement of the cuff 3 about the axis A.

[0033] With reference to Figure 1, in the example shown, in particular, the coupling arm 15 is preferably made of metallic material and is preferably butt-hinged to the cuff 3 in proximity of the lower edge of the cuff 3, above the heel of the boot, so as to be able to rotate freely about a transversal axis B which is substantially parallel to axis A and perpendicular to the midplane of the boot.

[0034] The distal end 15b of coupling arm 15 is moreover suitably structured/shaped so as to be able to couple/ fasten in a rigid and stable, though easily releasable manner, to the shell 2 at a specific coupling point 16 which is located on the rear part of the shell 2, astride the midplane of the boot and at a given distance from the lower edge of the cuff 3.

[0035] More specifically, in the example shown the distal end 15b of coupling arm 15 is preferably structured/shaped so as to be able to engage in a rigid and stable, though easily removable manner, with a protruding appendage 16 which extends in cantilever manner from the rear part of shell 2, astride the midplane of the boot.

[0036] With reference to Figure 1, preferably the coupling arm 15 is additionally movable to and from an unlocking position in which the coupling arm 15 extends upwards roughly skimming the cuff 3, so as not to couple to the shell 2 and thus allow the cuff 3 to freely pivot on the shell 2 about axis A.

[0037] In other words, the coupling arm 15 is preferably hinged on cuff 3 in the area above the heel of the boot, so as to be able to rotate, on the midplane of the boot, between a lowered or locking position in which the coupling arm 15 locks the cuff 3 in rigid manner to the shell 2, and a raised or unlocking position in which the coupling arm 15 allows the cuff 3 to freely pivot on shell 2 about axis A.

[0038] With reference to Figures 1, 2, 3 and 4, in addition the cuff closing and locking mechanism 14 also comprises a tightening cable 17 which is arranged on the cuff 3 so as to be able to pull, one towards the other, the two opposite lateral flaps 18 and 19 of cuff 3 that extend in cantilever manner from the inner and outer lateral sides of the cuff 3, on opposite sides of the midplane of the boot, and overlap to one another roughly at the front of the leg of the user, so as to form the tubular portion of cuff 3. This tightening cable 17 is also connected to the coupling arm 15 so as to be tightened when coupling arm 15 is in the locking position, so as to close/tighten the cuff 3 on the leg of the user when the coupling arm 15 is in the locking position.

[0039] More specifically, the cuff closing and locking mechanism 14 comprises: a tightening cable 17 which has its two ends firmly fastened on the cuff 3 and in addition engages in pass-through and freely sliding manner the body of coupling arm 15 in eccentric position, i.e. at a given distance from rotation axis B of arm 15; and a set of cable-guiding members which are engaged, in sequence and in freely sliding manner, by the tightening cable 17 and are alternately located on the two opposite lateral flaps 18 and 19 of cuff 3, so as to guide the tightening cable 17 along a zigzag path that passes alternately from one lateral flap 18, 19 of the cuff 3 to the other.

[0040] In addition, at least one of the cable-guiding members is additionally structured so as to be engaged in manually removable manner by the tightening cable 17, so as to allow the user to change at his/her discretion the zigzag path followed by the tightening cable 17.

[0041] With reference to Figures 1, 2 and 3, in particular, the cuff closing and locking mechanism 14 comprises at least two end cable-guiding members 20 and 21 which are engaged in free sliding manner by the tightening cable 17, are located on the lateral flap 18 of cuff 3 spaced one beside the another and form, respectively, the start and end of the zigzag path; and at least one intermediate cable-guiding member 22 which is located on the lateral flap 19 of cuff 3, is engaged in free sliding manner and also in removable manner by the section of the tightening cable 17 delimited by the two end cable-guiding members 20 and 21, and is adapted to substantially elbow-like bend the tightening cable 17 so as to form an/the intermediate vertex of said zigzag path.

[0042] More specifically, the two end cable-guiding members 20 and 21 are fixed in rigid manner to the lateral flap 18 of cuff 3, preferably vertically staggered with respect to each other, and are also preferably shaped/structured so as to be able to substantially elbow-like bend the tightening cable 17. Preferably, though not necessarily, the two end cable-guiding members 20 and

21 are additionally shaped/ structured so as to be engageable by the tightening cable 17 in manually removable manner.

[0043] The intermediate cable-guiding member 22, instead, is fixed in rigid manner to the second lateral flap 19 of cuff 3, preferably horizontally misaligned with respect to both end cable-guiding members 20 and 21.

[0044] With reference to Figures 1, 2 and 3, preferably the cuff closing and locking mechanism 14 additionally also comprises an auxiliary cable-through member 23, which is attached to the lateral side of the cuff 3 in proximity of the intermediate cable-guiding member 22, i.e. close to the lateral flap 19 of cuff 3, preferably roughly horizontally aligned with any one of the two end cable-guiding members 20 and 21, and is engaged in pass-through and free sliding manner by the section of tightening cable 17 that connects the coupling arm 15 to the end cable-guiding member 20 located on the lateral flap 18 of cuff 3.

[0045] In the example shown, in particular, the tightening cable 17 is preferably a rope made of synthetic material.

[0046] With reference to Figures 1 and 4, in addition the two ends of tightening cable 17 are preferably firmly fastened on the cuff 3 by means of two fastening members 24 and 25 that are located, respectively, on the inner side and the outer side of cuff 3, preferably substantially vertically aligned with the hinges 10.

[0047] Preferably, the fastening member 24 is also located on the lateral side of cuff 3, substantially vertically aligned with the cable-through member 23.

[0048] In other words, one end of the tightening cable 17 is preferably firmly fastened to the lateral side of cuff 3 at a point substantially vertically aligned with the cable-through member 23.

[0049] Preferably, fastening member 24 is moreover located on the lateral side of cuff 3, so as to be substantially horizontally aligned to the cable-guiding member 21, i.e. horizontally aligned to the cable-guiding member located on the lateral flap 18 of cuff 3, close to the shell 2.

[0050] More specifically, in the example shown the fastening member 24 preferably consists of a staple which is located on the outer side of cuff 3, close to the lateral flap 19 of cuff 3, and is dimensioned to be engaged in pass-through manner by the tightening cable 17, but not by any knot formed at the end of the tightening cable 17.

[0051] Preferably, the staple 24 is also made in one piece with the cuff 3, or rather with the plastic- or composite-material rigid casing 11.

[0052] With reference to Figure 4, the fastening member 25 is instead rigidly attached to the inner side of cuff 3, close to the lateral flap 18 of cuff 3, and preferably comprises an automatic-closing and manual-opening gripping device 27 with a clamp structure.

[0053] More specifically, the gripping device 27 comprises two jaws structured so as to be able to grip and stably hold any section of the tightening cable 17, and a counteracting spring (not shown in the figures) which is capable of bringing and keeping, in elastic manner, the two jaws in a clenched position, so that the same jaws can stably hold the tightening cable 17.

[0054] With reference to Figures 1, 2 and 3, the cable-through member 23, instead, preferably consists of a second staple which is dimensioned so as to be engaged in pass-through and free sliding manner by the tightening cable 17, and is located on the outer side of cuff 3, roughly vertically aligned to fastening member 24 and roughly horizontally aligned to the cable-guiding member 20 located on the lateral flap 18 of cuff 3, close to the upper mouth of the cuff 3.

[0055] Similar to staple 24, preferably also staple 23 is made in one piece with cuff 3, or rather with the plastic- or composite- material, rigid casing 11.

[0056] With reference to Figures 1, 2, 3 and 4, each cable-guiding member 20, 21, 22, instead, preferably consists of a substantially semicircular plate-shaped block, which is located in abutment on the outer surface of the lateral flap 18 of cuff 3 and is provided, on the curved lateral sidewall, with a long peripheral groove or slot 28 adapted to be engaged in free sliding manner by the tightening cable 17.

[0057] With reference to Figures 1, 2 and 3, preferably the cuff closing and locking mechanism 14 finally also comprises a manually-operated, cable-removing device 29 that allows the user to quickly remove the tightening cable 17 from the intermediate cable-guiding member(s) 22.

[0058] In the example shown, in particular, the cable-removing device 29 is preferably located on the section of the tightening cable 17 that extends between the two end cable-guiding members 20, and preferably consists of a preferably ribbon-like, oblong body which has a pass-through hole at one end and is therein engaged in pass-through and free sliding manner by the tightening cable 17.

[0059] More specifically, the cable-removing device 29 preferably consists of a ribbon which is U-folded back on itself, and is sewn at the middle segment so as to form a loop.

[0060] Operation of ski boot 1 is easily inferable from the above description and requires no further explanation.

[0061] As regards on the other hand the cuff closing and locking mechanism 14, the cable-guiding members 20, 21 and 22 operate as pulleys and thus allow to multiply the tensile force with which the tightening cable 17 pulls the two opposite lateral flaps 18 and 19 of cuff 3 one towards the other.

[0062] In use, furthermore, just before moving the coupling arm 15 into the locking position, the user can choose to couple, or not, the tightening cable 17 also to the intermediate cable-guiding member 22, consequently varying the grip exerted by the tightening cable 17 on the tubular portion of the cuff 3.

[0063] More specifically, if the user wants to firmly immobilize the lower part of the leg inside the cuff 3, he/she

must wind/couple the tightening cable 17 onto the intermediate cable-guiding member 22 before lowering the coupling arm 15 into the locking position.

[0064] If, instead, the user wants to keep the lower part of the leg inside the cuff 3 allowing, at same time, a limited movement/pivoting of the leg inside the cuff 3, he/she must not wind/couple the tightening cable 17 around the intermediate cable-guiding member 22 before lowering the coupling arm 15 into the locking position.

[0065] The advantages resulting from the particular structure of the cuff closing and locking mechanism 14 are remarkable.

[0066] First of all, the cuff closing and locking mechanism 14 allows the grip exerted by the tightening cable 17 on the upper part of the cuff 3 to be varied extremely rapidly, and therefore can also be used in competitions.

[0067] Furthermore, the presence of the fastening member 27 with clamp structure allows to also rapidly vary the overall useful length of the tightening cable 17.

[0068] Last, but not least, the cuff closing and locking mechanism 14 has particularly low production costs, with all the benefits that this entails.

[0069] Finally, changes and variations may be clearly made to the ski boot 1 described above without, however, departing from the scope of the present invention.

[0070] For example, with reference to Figure 1, in a more sophisticated embodiment, the cuff closing and locking mechanism 14 can comprise a plurality of intermediate cable-guiding members 22 which are attached in rigid manner onto the lateral flap 19 of cuff 3, preferably horizontally aligned one beside the another.

[0071] In a less sophisticated embodiment, in addition, the cuff closing and locking mechanism 14 can be devoid of the fastening member 25, and the end of the tightening cable 17 is fixed directly onto the body of coupling arm 15 in an eccentric position with respect to the rotation axis B of arm 15.

[0072] In other words, the tightening cable 17 has a first end integral with the coupling arm 15, and a second end firmly fastened to the body of cuff 3, preferably by means of staple 24.

Claims

1. A ski boot (1) comprising a rigid shell (2), which is shaped so as to accommodate the foot of the user, and has a lower part structured to couple to a ski binding device; a rigid cuff (3) which is shaped so as to surround the ankle of the user, and is pivotally jointed to the shell (2) so as to be able to pivot about a rotation axis (A) substantially perpendicular to the midplane of the boot; and cuff closing and locking means (14) comprising a coupling arm (15) which is hinged on the cuff (3) in the area above the heel of the boot, so as to be able to rotate on the cuff (3) while remaining substantially on the midplane of the boot, and is movable to and from a locking position in which the coupling arm (15) extends downwards, straddling the shell (2) and the cuff (3), and firmly couples to the shell (2) to prevent the pivoting movement of the cuff (3);
the rigid cuff (3) being provided with two lateral flaps (18, 19) that overlap to one another approximately at the front of the leg of the user; the cuff closing and locking means (14) additionally comprising a tightening cable (17) which is capable of pulling the two lateral flaps (18, 19) of the cuff (3) towards each other so as to tighten the cuff (3) on the leg of the user, and is connected to the coupling arm (15) so as to be tightened when the coupling arm (15) is in the locking position;
the ski boot (1) being **characterised in that** the cuff closing and locking means (14) additionally comprise a series of cable-guiding members (20, 21, 22) which are engaged in sequence and in freely sliding manner by the tightening cable (17), and are located alternately on the two lateral flaps (18, 19) of the cuff (3) so as to guide the tightening cable (17) along a zigzag path that passes alternately from one lateral flap (18) of the cuff (3) to the other (19); at least one (22) of said cable-guiding members (20, 21, 22) being additionally engaged in manually removable manner by the tightening cable (17).

2. A ski boot according to claim 1, **characterised in that** said series of cable-guiding members comprises at least two end cable-guiding members (20, 21) that form the beginning and the end of the zigzag path respectively, and are located on a first lateral flap (18) of the cuff (3) spaced side by side to one another; and at least one intermediate cable-guiding member (22) which is located on the second lateral flap (19) of the cuff (3), is engaged in freely sliding and removable manner by the section of the tightening cable (17) delimited by said end cable-guiding members (20, 21), and is able to substantially elbow-like bend the tightening cable (17) to form an intermediate vertex of said zigzag path.

3. A ski boot according to claim 2, **characterised in that** said end cable-guiding members (20, 21) are located on the first lateral flap (18) of the cuff (3) vertically staggered to one another.

4. A ski boot according to claim 2 or 3, **characterised in that** said end cable-guiding members (20, 21) are shaped/structured so as to be able to substantially elbow-like bend the tightening cable (17).

5. A ski boot according to claim 2, 3 or 4, **characterised in that** said end cable-guiding members (20, 21) are shaped/structured to be engaged in a manually removable manner by the tightening cable (17).

6. A ski boot according to claim 2, 3, 4 or 5, **character-**

ised in that said at least one intermediate cable-guiding member (22) is located on the second lateral flap (19) of the cuff (3) horizontally misaligned with respect to both end cable-guiding members (20, 21).

7. A ski boot according to any one of the preceding claims, **characterised in that** said cuff closing and locking means (14) additionally comprise an auxiliary cable-through member (23) which is located on the lateral side of the cuff (3) close to the second lateral flap (19) of the cuff (3), and is engaged in pass-through and freely sliding manner by the section of the tightening cable (17) that connects the coupling arm (15) to one (20) of the two end cable-guiding members (20, 21).

8. A ski boot according to claim 7, **characterised in that** said auxiliary cable-through member (23) is substantially horizontally aligned with one (20) of the two end cable-guiding members (20, 21).

9. A ski boot according to claim 7 or 8, **characterised in that** one end of the tightening cable (17) is fixed on the lateral side of the cuff (3) at a point substantially vertically aligned with said auxiliary cable-through member (23) .

10. A ski boot according to any one of the preceding claims, **characterised in that** the cuff closing and locking means (14) additionally comprise a manually-operated cable-removing device (29), which is adapted to rapidly remove the tightening cable (17) from said at least one intermediate cable-guiding member (22).

11. A ski boot according to claim 10, **characterised in that** the cable-removing device (29) is located on the section of the tightening cable (17) that extends between the two end cable-guiding members (20, 21), and consists of an oblong element having a pass-through hole at an end and is therein engaged by the tightening cable (17) in pass-through and freely sliding manner.

12. A ski boot according to any one of the preceding claims, **characterised in that** the tightening cable (17) has the two ends firmly fixed to the cuff (3) and engages the body of the coupling arm (15) in a pass-through and freely sliding manner, in eccentric position with respect to the rotation axis (B) of the arm.

13. A ski boot according to claim 12, **characterised in that** the two ends of the tightening cable (17) are fixed to the cuff (3) by means of two fastening members (24, 25) that are respectively located on the inner side and on the outer side of the cuff (3).

14. A ski boot according to claim 13, **characterised in that** one of the two fastening members (24, 25) comprises an automatic-closing and manual-opening gripping device (27).

15. A ski boot according to claim 14, **characterised in that** the gripping device (27) comprises two jaws structured so as to be able to grip and stably hold any section of the tightening cable (17), and a counteracting spring capable of bringing and keeping the two jaws in a clenched position.

Patentansprüche

1. Skistiefel (1), umfassend eine steife Schale (2), die so geformt ist, dass sie den Fuß des Nutzers aufnehmen kann, und deren unterer Teil so strukturiert ist, dass er mit einer Skibindungsvorrichtung gekoppelt werden kann; eine steife Manschette (3), die so geformt ist, dass sie den Fußknöchel des Nutzers umgibt, und so an der Schale (2) angelenkt ist, dass sie um eine Rotationsachse (A) im Wesentlichen senkrecht zur Mittelebene der Stiefels schwenken kann; und ein Manschettenschließ- und -arretiermittel (14), das einen Kopplungsarm (15) umfasst, der an der Manschette (3) in dem Bereich über der Ferse des Stiefels so angelenkt ist, dass er sich an der Manschette (3) drehen kann, während er im Wesentlichen auf der Mittelebene des Stiefels bleibt, und sich in eine und aus einer Arretierposition, in welcher der Kopplungsarm (25) sich abwärts erstreckt und dabei über die Schale (2) und die Manschette (3) hinweg erstreckt, und sicher mit der Schale (2) gekoppelt ist, um die Schwenkbewegung der Manschette (3) zu verhindern;
wobei die steife Manschette (3) mit zwei seitlichen Klappen (18, 19) versehen ist, die einander ungefähr an der Vorderseite des Beines des Nutzers überlappen; wobei das Manschettenschließ- und -arretiermittel (14) zusätzlich eine Spannschnur (17) umfasst, die in der Lage ist, die zwei seitlichen Klappen (18, 19) der Manschette (3) zu einander zu ziehen, um die Manschette (3) an dem Bein des Nutzers festzuziehen, und mit dem Kopplungsarm (15) verbunden ist, um festgezogen zu werden, wenn der Kopplungsarm (15) in der Arretierposition ist;
wobei der Skistiefel (1) **dadurch gekennzeichnet ist, dass** das Manschettenschließ- und -arretiermittel (14) zusätzlich eine Reihe von Schnurführungselementen (20, 21, 22) umfasst, die nacheinander und in frei gleitender Weise durch die Spannschnur (17) in Eingriff genommen werden, und im Wechsel an den zwei seitlichen Klappen (18, 19) der Manschette (3) so angeordnet sind, dass sie die Spannschnur (17) entlang eines Zickzackpfades führen, der abwechselnd von einer seitlichen Klappe (18) der Manschette (3) zu der anderen (19) verläuft; wobei mindestens eines (22) der Schnurführungsele-

mente (20, 21, 22) zusätzlich in manuell entfernbarer Weise durch die Spannschnur (17) in Eingriff genommen wird.

2. Skistiefel nach Anspruch 1, **dadurch gekennzeichnet, dass** die Reihe von Schnurführungselementen mindestens zwei End-Schnurführungselemente (20, 21) umfasst, die den Anfang bzw. das Ende des Zickzackpfades bilden, und an einer ersten seitlichen Klappe (18) der Manschette (3) in einem Abstand nebeneinander angeordnet sind; und mindestens ein Zwischen-Schnurführungselement (22) umfasst, das sich an der zweiten seitlichen Klappe (19) der Manschette (3) befindet, in frei gleitender und entfernbarer Weise durch die Sektion der Spannschnur (17) in Eingriff genommen, die durch die End-Schnurführungselemente (20, 21) begrenzt wird, und in der Lage ist, die Spannschnur (17) im Wesentlichen im rechten Winkel zu biegen, um einen Zwischenscheitel des Zickzackpfades zu bilden.

3. Skistiefel nach Anspruch 2, **dadurch gekennzeichnet, dass** die End-Schnurführungselemente (20, 21) an der ersten seitlichen Klappe (18) der Manschette (3) vertikal zueinander versetzt angeordnet sind.

4. Skistiefel nach Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** die End-Schnurführungselemente (20, 21) so geformt oder strukturiert sind, dass sie die Spannschnur (17) im Wesentlichen im rechten Winkel biegen können.

5. Skistiefel nach Anspruch 2, 3 oder 4, **dadurch gekennzeichnet, dass** die End-Schnurführungselemente (20, 21) so geformt oder strukturiert sind, dass sie in einer manuell entfernbaren Weise durch die Spannschnur (17) in Eingriff genommen werden.

6. Skistiefel nach Anspruch 2, 3, 4 oder 5, **dadurch gekennzeichnet, dass** das mindestens eine Zwischen-Schnurführungselement (22) an der zweiten seitlichen Klappe (19) der Manschette (3) mit Bezug auf beide End-Schnurführungselemente (20, 21) horizontal nichtausgerichtet angeordnet ist.

7. Skistiefel nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das Manschettenschließ- und -arretiermittel (14) zusätzlich ein Hilfs-Schnurdurchführungselement (23) umfasst, das sich auf der lateralen Seite der Manschette (3) nahe der zweiten seitlichen Klappe (19) der Manschette (3) befindet, und in hindurchführender und frei gleitender Weise durch die Sektion der Spannschnur (17) in Eingriff genommen wird, die den Kopplungsarm (15) mit einem (20) der zwei End-Schnurführungselemente (20, 21) verbindet.

8. Skistiefel nach Anspruch 7, **dadurch gekennzeichnet, dass** das Hilfs-Schnurdurchführungselement (23) im Wesentlichen horizontal auf eines (20) der zwei End-Schnurführungselemente (20, 21) ausgerichtet ist.

9. Skistiefel nach Anspruch 7 oder 8, **dadurch gekennzeichnet, dass** ein Ende der Spannschnur (17) auf der lateralen Seite der Manschette (3) an einem Punkt befestigt ist, der im Wesentlichen vertikal auf das Hilfs-Schnurdurchführungselement (23) ausgerichtet ist.

10. Skistiefel nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das Manschettenschließ- und -arretiermittel (14) zusätzlich eine manuell betätigte Schnurentfernvorrichtung (29) umfasst, die dafür ausgelegt ist, schnell die Spannschnur (17) von dem mindestens einen Zwischen-Schnurführungselement (22) zu entfernen.

11. Skistiefel nach Anspruch 10, **dadurch gekennzeichnet, dass** die Schnurentfernvorrichtung (29) an der Sektion der Spannschnur (17) angeordnet ist, die sich zwischen den zwei End-Schnurführungselementen (20, 21) erstreckt, und aus einem länglichen Element besteht, das an einem Ende ein Durchführloch aufweist und darin durch die Spannschnur (17) in einer hindurchführenden und frei gleitenden Weise in Eingriff genommen wird.

12. Skistiefel nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Spannschnur (17) an den beiden Enden sicher an der Manschette (3) befestigt ist und den Korpus des Kopplungsarms (15) in einer hindurchführenden und frei gleitenden Weise an einer außermittigen Position mit Bezug auf die Rotationsachse (B) des Armes in Eingriff nimmt.

13. Skistiefel nach Anspruch 12, **dadurch gekennzeichnet, dass** die zwei Enden der Spannschnur (17) an der Manschette (3) mittels zweier Befestigungselemente (24, 25) befestigt sind, die sich jeweils auf der Innenseite und auf der Außenseite der Manschette (3) befinden.

14. Skistiefel nach Anspruch 13, **dadurch gekennzeichnet, dass** eines der zwei Befestigungselemente (24, 25) eine automatisch schließende und manuell öffnende Greifvorrichtung (27) umfasst.

15. Skistiefel nach Anspruch 14, **dadurch gekennzeichnet, dass** die Greifvorrichtung (27) zwei Backen umfasst, die so strukturiert sind, dass sie jede Sektion der Spannschnur (17) ergreifen und stabil halten können, und eine gegenwirkende Feder umfasst, die in der Lage ist, die zwei Backen in eine Zwingenposition zu bringen und darin zu halten.

Revendications

1. Chaussure de ski (1) comprenant une coque rigide (2), qui est formée afin d'accueillir le pied de l'utilisateur, et a une partie inférieure structurée pour se coupler à un dispositif de fixation de ski ; un collier rigide (3) qui est formé afin d'entourer la cheville de l'utilisateur, et est assemblé, de manière pivotante, à la coque (2) afin de pouvoir pivoter autour d'un axe de rotation (A) sensiblement perpendiculaire au plan central de la chaussure ; et des moyens de fermeture et de verrouillage de collier (14) comprenant un bras de couplage (15) qui est articulé sur le collier (3) dans la zone au-dessus du talon de la chaussure, afin de pouvoir tourner sur le collier (3) tout en restant sensiblement sur le plan central de la chaussure, et est mobile vers et depuis une position de verrouillage dans laquelle le bras de couplage (15) s'étend vers le bas, chevauchant la coque (2) et le collier (3), et se couple fermement à la coque (2) pour empêcher le mouvement de pivotement du collier (3) ;
le collier rigide (3) étant prévu avec deux rabats latéraux (18, 19) qui se chevauchent approximativement à l'avant de la jambe de l'utilisateur ; et les moyens de fermeture et de verrouillage de collier (14) comprenant de plus un câble de serrage (17) qui est capable de tirer les deux rabats latéraux (18, 19) du collier (3) l'un vers l'autre afin de serrer le collier (3) sur la jambe de l'utilisateur, et est raccordé au bras de couplage (15) afin d'être serré lorsque le bras de couplage (15) est dans la position de verrouillage ;
la chaussure de ski (1) étant **caractérisée en ce que** les moyens de fermeture et de verrouillage de collier (14) comprennent de plus une série d'éléments de guidage de câble (20, 21, 22) qui sont mis en prise en séquence et d'une manière librement coulissante par le câble de serrage (17) et sont positionnés, de manière alternée, sur les deux rabats latéraux (18, 19) du collier (3) afin de guider le câble de serrage (17) le long d'une trajectoire en zigzag qui passe, de manière alternée, d'un rabat latéral (18) du collier (3) à l'autre (19) ; au moins l'un (22) desdits éléments de guidage de câble (20, 21, 22) étant de plus, mis en prise d'une manière manuellement amovible par le câble de serrage (17).

2. Chaussure de ski selon la revendication 1, **caractérisée en ce que** ladite série d'éléments de guidage de câble comprend au moins deux éléments de guidage de câble d'extrémité (20, 21) qui forment le début et la fin de la trajectoire de zigzag, respectivement, et sont positionnés sur un premier rabat latéral (18) du collier (3) espacés côte à côte l'un de l'autre ; et au moins un élément de guidage de câble intermédiaire (22) qui est positionné sur le second rabat latéral (19) du collier (3), est mis en prise d'une manière librement coulissante et amovible par la section du câble de serrage (17) délimitée par lesdits éléments de guidage de câble d'extrémité (20, 21), et peut plier sensiblement comme un coude le câble de serrage (17) pour former un sommet intermédiaire de ladite trajectoire de zigzag.

3. Chaussure de ski selon la revendication 2, **caractérisée en ce que** lesdits élément de guidage de câble d'extrémité (20, 21) sont positionnés sur le premier rabat latéral (18) du collier (3) verticalement en quinconce l'un par rapport à l'autre.

4. Chaussure de ski selon la revendication 2 ou 3, **caractérisée en ce que** lesdits éléments de guidage de câble d'extrémité (20, 21) sont formés / structurés afin de pouvoir plier sensiblement à la manière d'un coude le câble de serrage (17).

5. Chaussure de ski selon la revendication 2, 3 ou 4, **caractérisée en ce que** lesdits éléments de guidage de câble (20, 21) sont formés / structurés pour être mis en prise d'une manière manuellement amovible par le câble de serrage (17).

6. Chaussure de ski selon la revendication 2, 3, 4 ou 5, **caractérisée en ce que** ledit au moins un élément de guidage de câble intermédiaire (22) est positionné sur le second rabat latéral (19) du collier (3) présentant horizontalement un défaut d'alignement par rapport aux deux éléments de guidage de câble d'extrémité (20, 21).

7. Chaussure de ski selon l'une quelconque des revendications précédentes, **caractérisée en ce que** lesdits moyens de fermeture et de verrouillage de collier (14) comprennent, de plus, un élément traversant de câble auxiliaire (23) qui est positionné sur le côté latéral du collier (3) à proximité du second rabat latéral (19) du collier (3), et est mis en prise de manière débouchante et de manière librement coulissante par la section du câble de serrage (17) qui raccorde le bras de couplage (15) à l'un (20) des deux éléments de guidage de câble d'extrémité (20, 21).

8. Chaussure de ski selon la revendication 7, **caractérisée en ce que** ledit élément débouchant de câble auxiliaire (23) est aligné de manière sensiblement horizontale avec l'un (20) des deux éléments de guidage de câble d'extrémité (20, 21).

9. Chaussure de ski selon la revendication 7 ou 8, **caractérisée en ce qu'**une extrémité du câble de serrage (17) est fixée sur le côté latéral du collier (3) au niveau d'un point aligné de manière sensiblement verticale avec ledit élément débouchant de câble auxiliaire (23).

10. Chaussure de ski selon l'une quelconque des reven-

dications précédentes, **caractérisée en ce que** les moyens de fermeture et de verrouillage de collier (14) comprennent de plus un dispositif de retrait de câble (29) actionné manuellement, qui est adapté pour retirer rapidement le câble de serrage (17) dudit au moins un élément de guidage de câble intermédiaire (22).

11. Chaussure de ski selon la revendication 10, **caractérisée en ce que** le dispositif de retrait de câble (29) est positionné sur la section du câble de serrage (17) qui s'étend entre les deux éléments de guidage de câble d'extrémité (20, 21) et se compose d'un élément oblong ayant un trou débouchant de passage au niveau d'une extrémité et est mis en prise par le câble de serrage (17) d'une manière débouchante et librement coulissante.

12. Chaussure de ski selon l'une quelconque des revendications précédentes, **caractérisée en ce que** le câble de serrage (17) a les deux extrémités fermement fixées au collier (3) et met en prise le corps du bras de couplage (15) d'une manière débouchante et librement coulissante, en position excentrique par rapport à l'axe de rotation (B) du bras.

13. Chaussure de ski selon la revendication 12, **caractérisée en ce que** les deux extrémités du câble de serrage (17) sont fixées sur le collier (3) au moyen de deux éléments de fixation (24, 25) qui sont respectivement positionnés sur le côté interne et sur le côté externe du collier (3).

14. Chaussure de ski selon la revendication 13, **caractérisée en ce que** l'un des deux éléments de fixation (24, 25) comprend un dispositif de préhension de fermeture automatique et d'ouverture manuelle (27).

15. Chaussure de ski selon la revendication 14, **caractérisée en ce que** le dispositif de préhension (27) comprend deux mâchoires structurées pour pouvoir saisir et maintenir de manière stable n'importe quelle section du câble de serrage (17) et un ressort antagoniste capable d'amener et de maintenir les deux mâchoires dans une position serrée.

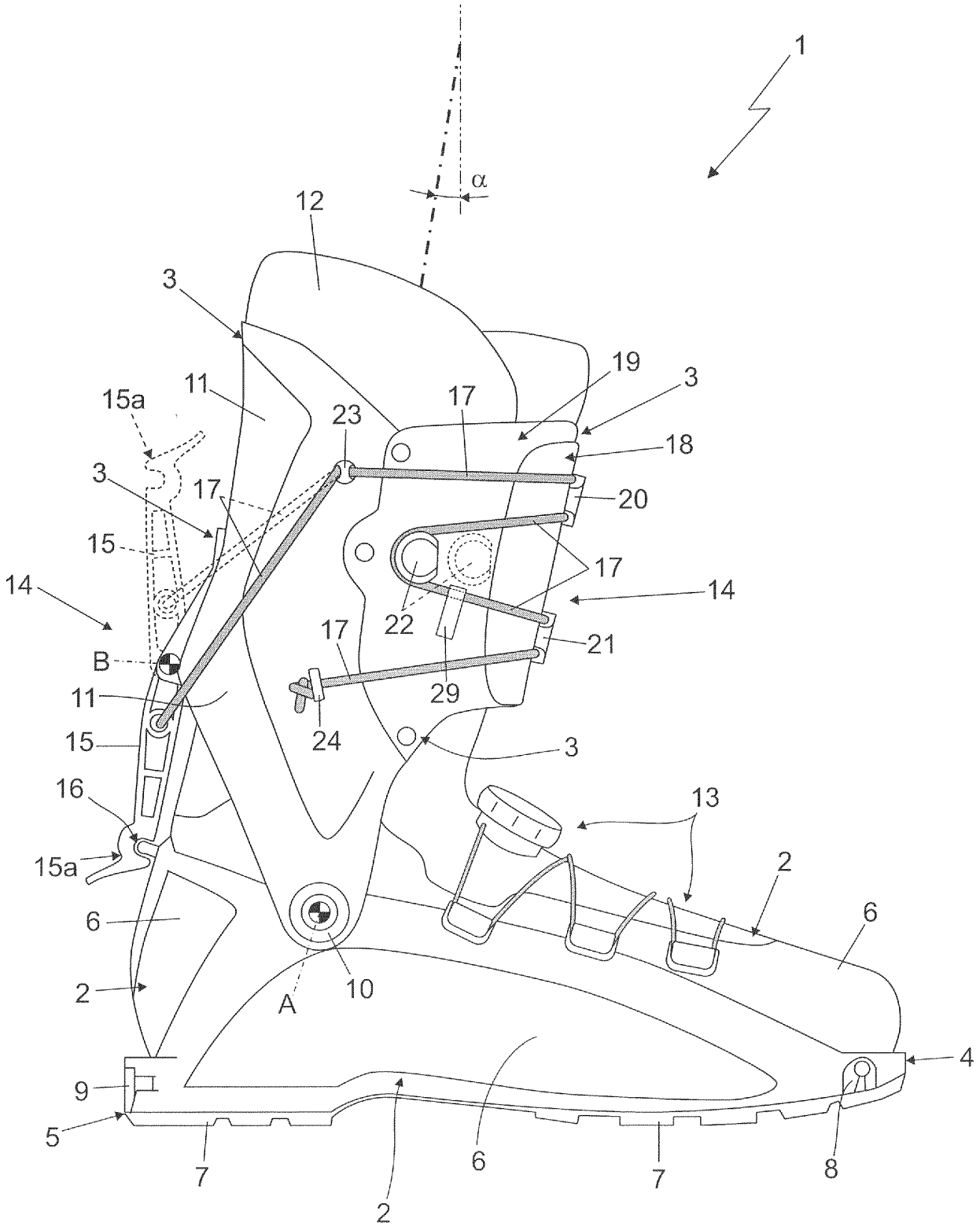
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Fig. 1

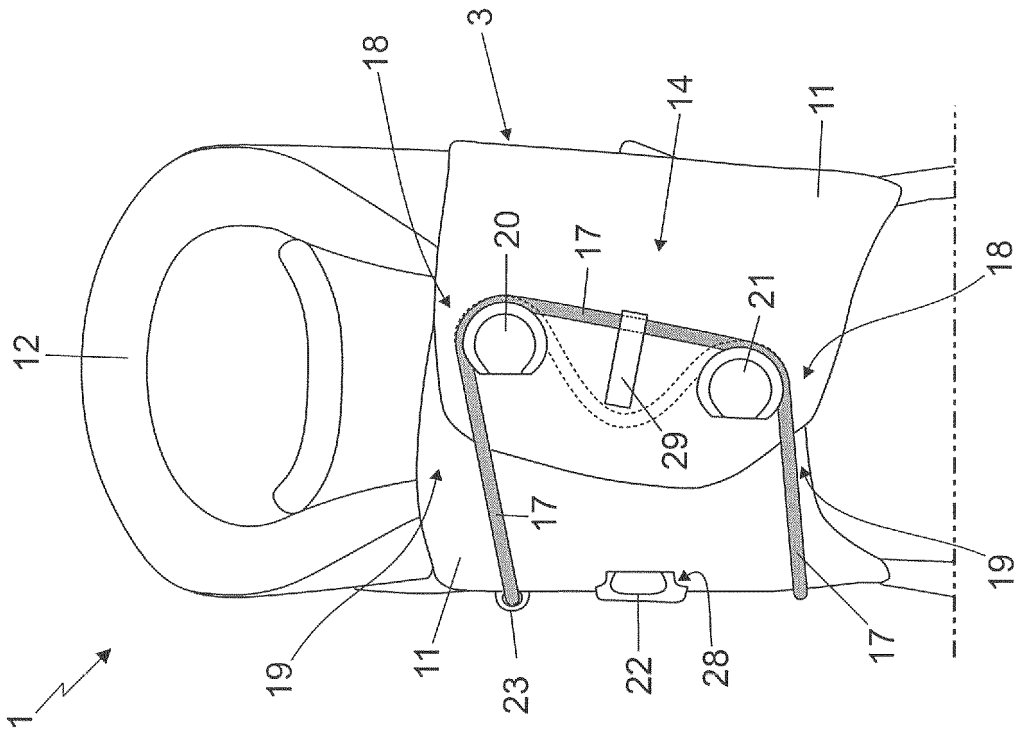
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Fig. 3

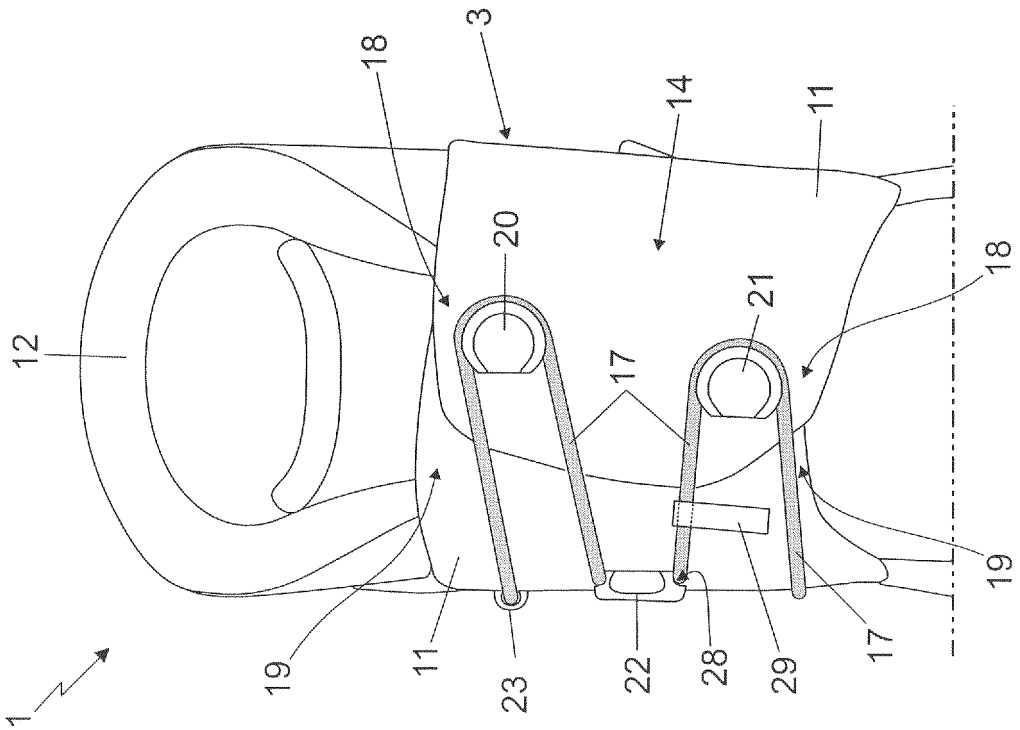
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Fig. 2

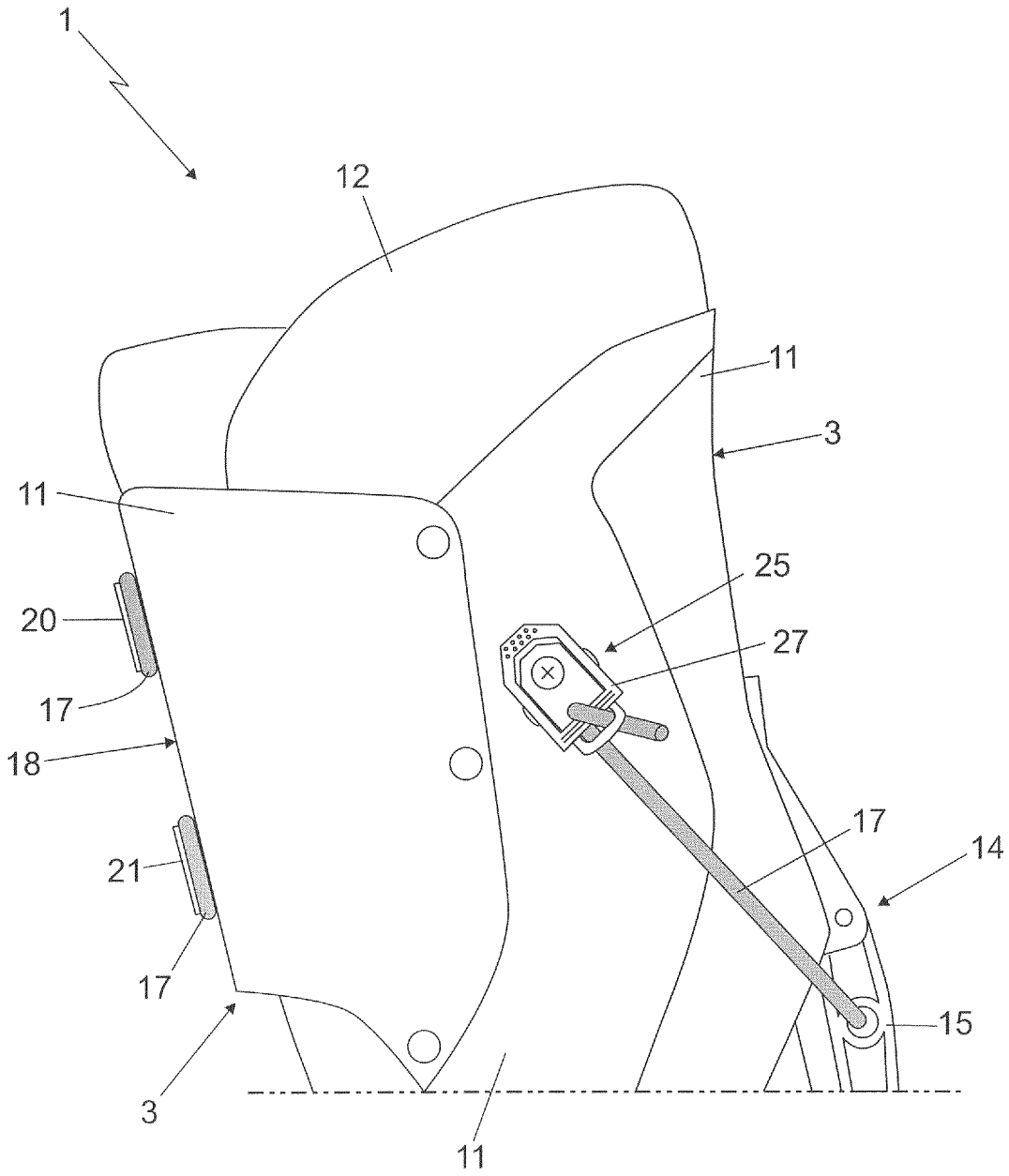

Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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