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(54) **SKI BOOT**

(57) 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 with a ski binding device; a rigid cuff (3) which is pivotally jointed to the shell (2) so as to be able to pivot about a transversal rotation axis (A), and is provided with two lateral flaps (11, 12) that embrace the leg of the user on opposite sides and overlap to one another so as to form a substantially tubular structure that surrounds the leg of the user; and cuff closing means (16) capable of pulling the two lateral flaps (11, 12) of the cuff (3) towards each other, so as to tighten the cuff (3) on the leg of the user.

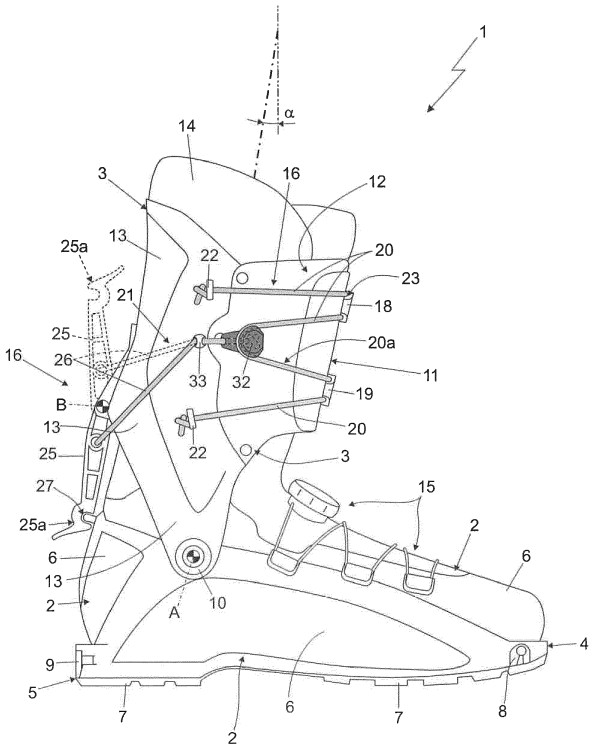

Fig. 1

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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 comprise: 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] 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.

[0007] 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.

[0008] In competition ski mountaineering boots, in addition, the coupling arm is moreover connected to a closing cable that is looped around the cuff, 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.

[0009] 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.

[0010] 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.

[0011] Unfortunately, the use of the closing cable, although allowing the user to tighten and lock the cuff to the shell with a single movement, allows only a narrow horizontal band of the cuff to be tightened effectively, with all the comfort-fit problems that ensue. This closing system, in fact, has a very limited capacity of adaptation to the morphology of the leg of the user.

[0012] Aim of the present invention is to provide a system for closing the upper part of the cuff, that offers a greater capacity of adaptation to the morphology of the leg of the user.

[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 realized 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;
- Figure 4 is a side view of the upper part of the ski mountaineering boot shown in Figure 1; whereas
- Figure 5 is a front view of the upper part of the ski mountaineering boot shown in Figure 1, in an optional third operating configuration.

[0015] With reference to Figures 1, 2, 3, 4 and 5, number 1 demotes as a whole a ski boot that can advantageously be used for practicing 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 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 lower part of the leg of the user,

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 shell 2 has 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 attached to the back of a generic downhill ski or the like. The rear heel 5, instead, is preferably structured so as to be able to couple/fasten in a stable, though easily releasable manner, to the heel piece (not shown) of a ski binding device, which in turn is firmly attached to the back of a generic downhill ski or the like.

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

[0019] In the example shown, in particular, shell 2 is preferably made up 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 rigid casing 6 preferably by gluing.

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

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

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

[0024] With reference to Figure 1, cuff 3 in turn 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 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 axis A and substantially coincident with the midplane of the boot.

[0025] The cuff 3 is additionally provided with two oblong lateral flaps 11 and 12 that embrace the leg of the user on opposite sides roughly at calf height, and overlap to one another roughly at the front of the leg of the user so as to form a substantially tubular structure that surrounds and protects the leg of the user.

[0026] More specifically, in the example shown cuff 3 preferably consists of a rigid casing 13 made of plastic or composite material and 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 that extend forwards on opposite sides of the midplane of the boot, roughly at calf height, so as to overlap to one another at the front of the leg to form a tubular structure that surrounds the leg of the user from the ankle to the calf and is hinged at the bottom on the shell 2.

[0027] With reference to Figure 1, preferably the ski boot 1 is also provided with an innerboot 14 having a soft and heat-proof structure, optionally also of the thermoformable type, and which is inserted into shell 2 and optionally also into cuff 3 preferably, though not necessarily, in 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.

[0028] Moreover, the ski boot 1 additionally comprises a shell closing mechanism 15 and a cuff closing mechanism 16, both manually operated.

[0029] The shell closing mechanism 15 is structured so as to be able to selectively close/tighten the shell 2 on the foot of the user so as to immobilize the foot of the user inside the shell 2, or rather inside the innerboot 14.

[0030] With reference to Figure 1, in the example shown, in particular, the shell closing mechanism 15 preferably consists of a manually operated winch fastening device, as those currently marketed by the US company BOA TECHNOLOGY INC, which is placed on the shell 2, preferably in the area above the instep, and is generally structured so as to be able to selectively close/tighten in known manner the upper part of the shell 2 against the foot of the user, so as to firmly immobilize the foot of the user inside the shell 2, or rather inside the innerboot 14.

[0031] In a different embodiment, however, the shell closing mechanism 15 may comprise one or more lever closing buckles of known type.

[0032] With reference to Figures 1, 2, 3, 4 and 5, the cuff closing mechanism 16, in turn, is structured so as to be able to selectively close/tighten the upper part of the cuff 3 on the leg of the user, to immobilize the leg of the user inside the cuff 3, or rather inside the innerboot 14.

[0033] More specifically, the cuff closing mechanism 16 is selectively adapted to pull the two lateral flaps 11

and 12 of cuff 3 one towards the other, so as to tighten the upper part of the cuff 3 on the leg of the user to immobilize the leg of the user inside the ski boot 1, or rather inside the innerboot 14.

[0034] Moreover, the cuff closing mechanism 16 is preferably additionally 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 around axis A, while remaining on the midplane of the boot.

[0035] In other words, the cuff closing mechanism 16 is preferably 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, while at the same time tightening the cuff 3 on the leg of the user to immobilize the leg of the user inside the ski boot 1; 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 around axis A, while remaining on the midplane of the boot.

[0036] In the example shown, in particular, the cuff closing mechanism 16 is preferably structured so as to be able to lock the cuff 3 in rigid manner to the shell 2 in a given descent 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°, thus preventing any pivoting movement of the cuff 3 on the shell 2.

[0037] More specifically, with reference to Figures 1, 2, 3, 4 and 5, the cuff closing mechanism 16 is at least partially located on the cuff 3, and comprises: at least two cable-guiding members 18 and 19 which are located on the outer lateral flap 11 of cuff 3, vertically spaced side by side to one another; and a tightening cable 20 which has its two ends firmly fastened on the cuff 3, directly on or in proximity of the inner lateral flap 12 of cuff 3, and which extends towards the outer lateral flap 11 roughly skimming the surface of the inner lateral flap 12, so as to be able to reach and engage, in free sliding manner and in sequence, the two cable-guiding members 18 and 19 following a substantially U-shaped path. Therefore, a central stretch/segment 20a of tightening cable 20 extends straddling the two cable-guiding members 18 and 19.

[0038] Preferably, each cable-guiding member 18, 19 is also structured so as to be engageable by the tightening cable 20 in a manually removable manner.

[0039] In addition to the above, the cuff closing mechanism 16 additionally comprises a manually-operated cable-tightening assembly 21 which is/can be coupled to the tightening cable 20 at a coupling point located along the central segment 20a of tightening cable 20, and is capable of pulling the cable central segment 20a transversely to the straight line r joining the two cable-guiding members 18 and 19, so as to tighten the tightening cable 20 and pull the two lateral flaps 11 and 12 of cuff 3 one towards the other.

[0040] More specifically, the cable-tightening assembly 21 is fixed to the cuff 3 substantially at a side of the central segment 20a of tightening cable 20, is coupled or coupleable to the tightening cable 20 at a point located substantially in the middle of the central segment 20a of tightening cable 20, and is capable of pulling the central segment 20a of the cable roughly perpendicularly to the straight line r on which the two cable-guiding members 18 and 19 lie in direction of the two ends of the tightening cable 20, so as to tighten the tightening cable 20 and pull the two lateral flaps 11 and 12 of cuff 3 one towards the other.

[0041] Preferably, the cable-tightening assembly 21 is additionally structured so as to be able to selectively 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 about axis A.

[0042] With reference to Figure 1, in the example shown, in particular, the two ends of tightening cable 20 are preferably firmly fastened to the cuff 3 by means of two fastening members 22 that are located on the outer side of the cuff 3, preferably substantially vertically aligned to one other.

[0043] More specifically, in the example shown each fastening member 22 preferably consists of a staple which is located on the outer side of cuff 3, preferably close to the inner lateral flap 12 of cuff 3, and is dimensioned so as to be engaged in pass-through manner by the tightening cable 20, but not by any knot formed along the tightening cable 20. Preferably, the staple is also made in one piece with the cuff 3, or rather with the plastic- or composite- material rigid casing 13.

[0044] With reference to Figures 1, 2, 3 and 5, instead, each cable-guiding member 18, 19 preferably consists of a substantially semicircular, plate-shaped block which is placed to rest on surface of the outer lateral flap 11 of cuff 3, and is has, on the curved lateral sidewall, a long peripheral groove or slot 23 adapted to be engaged in freely sliding manner by the tightening cable 20.

[0045] Preferably, the plate-shaped block is additionally made in one piece with cuff 3, or rather with the plastic- or composite- material rigid casing 13.

[0046] With reference to Figures 1, 2, 3, 4 and 5, preferably the cable-tightening assembly 21 instead comprises an auxiliary cable that extends transversely to the central segment 20a of tightening cable 20, and has a first end coupled to the central segment 20a of tightening cable 20; and a manually-operated cable-tightening device which is able to pull the auxiliary cable so as to move the first end of the auxiliary cable away from the straight line

r joining the two cable-guiding members 18 and 19, so as to tighten the tightening cable 20.

[0047] Preferably the cable-tightening device is additionally structured so as to be able, when tightening the auxiliary cable, to also rigidly lock the cuff 3 to the shell 2 so as to prevent any pivoting movement of the cuff 3 about the axis A.

[0048] More specifically, in the example shown, the cable-tightening assembly 21 preferably comprises: an oblong-shaped coupling arm 25 which is hinged to the cuff 3 so as to be able to rotate on the cuff 3 to and from a locking position in which the coupling arm 25 extends straddling the shell 2 and the cuff 3, and firmly couples to the shell 2 so as to prevent any pivoting movement of the cuff 3 about axis A; and an auxiliary cable 26 which has a first end coupled to the central segment 20a of tightening cable 20, engages in pass-through and free sliding manner the body of coupling arm 25 at a given distance from arm rotation axis B, and has the second end firmly fastened to the cuff 3.

[0049] More specifically, the coupling arm 25 is preferably butt-hinged to the cuff 3 in the area above the heel of the ski 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 25 extends downwards roughly skimming the heel of the ski boot so as to straddle the shell 2 and the cuff 3, and the distal end 25a of the arm firmly couples to the shell 2 so as to prevent any pivoting movement of the cuff 3 about axis A.

[0050] In the example shown, in particular, the coupling arm 25 is preferably made of metal 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 freely rotate about a transversal axis B substantially parallel to axis A and perpendicular to the midplane of the boot.

[0051] The coupling arm 25 moreover has the distal end 25a 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 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.

[0052] More specifically, in the example shown, the distal end 25a of coupling arm 25 is preferably structured/shaped so as to be able to engage in a rigid and stable, though easily removable manner, with a protruding appendage 27 extending in cantilever manner from the rear part of the shell 2, astride the midplane of the boot.

[0053] With reference to Figure 1, preferably the coupling arm 25 is additionally movable to and from an unlocking position in which the arm 25 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.

[0054] In other words, the coupling arm 25 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 25 locks the cuff 3 to the shell 2 in rigid manner, and a raised or unlocking position in which the coupling arm 25 allows the cuff 3 to freely pivot on the shell 2 about the axis A.

[0055] With reference to Figures 1, 2, 3, 4 and 5, the auxiliary cable 26 instead is preferably substantially V-bent and is arranged astride the midplane of the boot, so that its bend or elbow engages in pass-through and free sliding manner the body of coupling arm 22, and that its two ends are arranged on opposite sides of the midplane of the boot, skimming the outer surface of the cuff 3.

[0056] In addition, the second end of auxiliary cable 26 is preferably firmly fastened to the cuff 3 in manually tunable/adjustable manner, preferably by means of a cable-gripping device 28 which is stably fixed to the cuff 3, preferably in proximity of lateral flap 11.

[0057] With reference to Figure 4, in the example shown, in particular, the cable-gripping device 28 is an automatic-locking and manually-unlocking cable-gripping device. More specifically, the cable-gripping device 28 preferably comprises: a plate-shaped body 29 which is firmly fixed to the cuff 3, and is provided with a through slot or groove (not shown) which is adapted to be engaged in sliding manner by the auxiliary cable 26; a movable jaw 30 which is placed inside the through slot or groove of plate-shaped body 29 so as to face the bottom of the through slot or groove of the plate-shaped body 29, immediately above the auxiliary cable 26; and a trigger lever mechanism 31 which projects in cantilever manner from the through slot or groove of the plate-shaped body 29, directly supports the movable jaw 30, and is pivotally jointed to the plate-shaped body 29 so as to be able to freely rotate inside the through slot or groove, to and from a locking position in which it pushes the movable jaw 30 against the auxiliary cable 26 so as to press and stably lock the auxiliary cable 26 on the bottom of the through slot or groove of the plate-shaped body 29.

[0058] Preferably, the cable-gripping device 28 is finally provided with a torsion spring or other elastic member (not shown in the figures) able to bring and retain in elastic manner the trigger lever mechanism 31 in the locking position.

[0059] With reference to Figures 1, 2, 3 and 5, the first end of the auxiliary cable 26, instead, is preferably stably fastened to a coupling member 32 which, in turn, is fitted/coupled/hooked in freely sliding manner onto the central segment 20a of tightening cable 20. Preferably the coupling member 32 is additionally coupled to the central segment 20a of tightening cable 20 in manually uncoupleable/ releasable manner.

[0060] With reference to Figure 1, preferably the cable-tightening assembly 21 finally also comprises an auxiliary cable-through member 33 which is fixed on the cuff 3 close to the lateral side 12 of cuff 3, so as to be substantially horizontally aligned with the central segment 20a

of tightening cable 20; and the auxiliary cable 26 engages in a pass-through and free sliding manner the cable-through member 33 before reaching the central segment 20a of tightening cable 20.

[0061] In the example shown, in particular, the cable-through member 33 preferably consists of a third staple which is dimensioned so as to be engaged in pass-through and free sliding manner by the auxiliary cable 26, and is located on the outer side of cuff 3 between the two fastening members 22, preferably substantially vertically aligned with the fastening members 22. Similarly to staples 22, staple 33 is also preferably made in one piece with the cuff 3, or rather with the plastic- or composite- material rigid casing 13.

[0062] In the example shown, finally, tightening cable 20 and auxiliary cable 26 are preferably made of plastic material.

[0063] Operation of ski boot 1 is easily infereable from the above description and requires no further explanation.

[0064] As regards the cuff closing and locking mechanism 16, the movement of coupling arm 25 into the locking position tightens the auxiliary cable 26, which in turn pulls the central segment 20a of tightening cable 20 towards the cable-through member 33, so as to tighten the tightening cable 20 and then pull the two lateral flaps 11 and 12 of cuff 3 one towards the another.

[0065] The advantages resulting from the particular structure of the cuff closing and locking mechanism 16 are remarkable.

[0066] Firstly, the cuff closing mechanism 16 allows the upper part of the cuff 3 to be tightened more evenly, significantly increasing the comfort-fit of the ski boot 1.

[0067] In addition, the cuff closing and locking mechanism 16 also allows the user to choose the extent of closure of the cuff 3.

[0068] With reference to Figures 2, 3 and 5, in fact, the cuff closing and locking mechanism 16 offers three different ways of closing the cuff 3.

[0069] In the first way (see Figures 1 and 2), the coupling arm 25 is in the lowered or locking position; the coupling member 32 is located at the maximum distance from the two cable-guiding members 18 and 19, and at the minimum distance from the cable-through member 33; and the tightening cable 20 tightens the upper part of the cuff 3 on the leg of the user so as to prevent any movement of the leg inside the cuff 3, or rather the innerboot 14.

[0070] In the second way (see Figure 3), the coupling arm 25 is in the raised or unlocking position; the coupling member 32 is located at the minimum distance from the two cable-guiding members 18 and 19, and at the maximum distance from the cable-through member 33; and the tightening cable 20 tightens the upper part of the cuff 3 on the leg of the user so as to hold the leg of the user inside the cuff 3, or rather inside the innerboot 14, allowing a limited movement/pivoting of the leg inside said cuff 3, or rather inside the innerboot 14.

[0071] In the third way (see Figure 5), the central segment 20a of tightening cable 20 is fully released from the coupling member 32, and the tightening cable 20 locks the two lateral flaps 11 and 12 of cuff 3 one over the other so as to hold the leg of the user inside the cuff 3, or rather inside the innerboot 14, though allowing a wide movement/ pivoting of the leg inside said cuff 3, or rather inside the innerboot 14.

[0072] Furthermore, the presence of cable-gripping device 28 additionally allows the length of auxiliary cable 26 to be varied rapidly, allowing the cuff closing mechanism 16 to adapt to the shape of the lower part of the leg of the user.

[0073] Last, but not least, the cuff closing mechanism 16 has particularly low production costs, with all the benefits that this entails.

[0074] 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.

[0075] For example, in a less sophisticated embodiment, the cuff closing mechanism 16 lacks the cable-gripping device 28, and the second end of auxiliary cable 26 is fastened directly onto the body of coupling arm 25 in an eccentric position with respect to the arm rotation axis B.

[0076] In other words, the second end of auxiliary cable 26 is fastened directly onto the body of coupling arm 25, for example, by means of a knot, whereas the first end of auxiliary cable 26 is still fastenned to the central segment 20a of tightening cable 20, preferably by means of the coupling member 32.

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 with a ski binding device; a rigid cuff (3) which is pivotally jointed to the shell (2) so as to be able to pivot about a transversal rotation axis (A), and is provided with two lateral flaps (11, 12) that embrace the leg of the user on opposite sides and overlap to one another so as to form a substantially tubular structure that surrounds the leg of the user; and cuff closing means (16) capable of pulling the two lateral flaps (11, 12) of the cuff (3) towards each other, so as to tighten the cuff (3) on the leg of the user;
   the ski boot (1) being **characterised in that** the cuff closing means (16) comprise: at least two cable-guiding members (18, 19) that are located on a first lateral flap (11) of the cuff (3) vertically spaced side by side to one another; a tightening cable (20) which has the two ends fastened on the cuff (3), directly on or in proximity of the second lateral flap (12) of the cuff (3), and which extends towards the first lateral flap (11) so as to reach and engage, in freely sliding manner and in sequence, said two cable-guiding

members (18, 19) following a substantially U-shaped path; and a manually-operated cable-tightening assembly (21) which is coupled to the tightening cable (20) at a point located along a central segment (20a) of the tightening cable (20), and is capable of pulling the central segment (20a) of the cable transversely to the straight line (r) joining the two cable-guiding members (18, 19), so as to tighten the tightening cable (20).

2. A ski boot according to claim 1, **characterised in that** the cable-tightening assembly (21) comprises: an auxiliary cable (26) that extends transversely to the central segment (20a) of the tightening cable (20), and has a first end (32) coupled to the central segment (20a) of the tightening cable (20); and manually-operated cable-tightening means (25) which are able to pull the auxiliary cable (20) so as to move the first end (32) of the auxiliary cable (26) away from the straight line (r) joining the two cable-guiding members (18, 19).

3. A ski boot according to claim 2, **characterised in that** the first end of the auxiliary cable (26) is firmly fixed to a coupling member (32) which is coupled in freely sliding manner to the central segment (20a) of the tightening cable (20).

4. A ski boot according to claim 3, **characterised in that** said coupling member (32) is coupled in releasable manner to the central segment (20a) of the tightening cable (20).

5. A ski boot according to claim 3 or 4, **characterised in that** the cable-tightening assembly (21) additionally comprises a cable-through member (33) which is fixed on the cuff (3) close to the second lateral side (12) of the cuff (3), substantially horizontally aligned to the central segment (20a) of the tightening cable (20), and the auxiliary cable (26) engages in pass-through and freely sliding manner said cable-through member (33) before reaching the central segment (20a) of the tightening cable (20).

6. A ski boot according to claim 2, 3, 4, or 5, **characterised in that** said manually operated cable-tightening means (25), when tightening the auxiliary cable (26), are also able to rigidly lock the cuff (3) to the shell (2) so as to prevent any pivoting movement of the cuff (3) about said transversal rotation axis (A).

7. A ski boot according to claim 6, **characterised in that** said manually operated cable-tightening means comprise a coupling arm (25) which is hinged on the cuff (3) so as to be able to rotate on the cuff (3) to and from a locking position, in which the coupling arm (25) extends straddling the shell (2) and the cuff (3), and firmly couples to the shell (2) so as to prevent any pivoting movement of the cuff (3) about said transversal rotation axis (A).

8. A ski boot according to claim 7, **characterised in that** the coupling arm (25) is butt-hinged to the cuff (3) in the area above the heel of the ski 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 (25) extends downwards roughly skimming the heel of the ski boot so as to straddle the shell (2) and the cuff (3), and the distal end (25a) of the arm couples to the shell (2) in a rigid and stable, though easily releasable manner, at a predetermined coupling point (27).

9. A ski boot according to claim 7 or 8, **characterised in that** the auxiliary cable (26) has said first end (32) coupled on the central segment (20a) of the tightening cable (20), engages in pass-through and freely sliding manner the body of the coupling arm (25) at a predetermined distance from the arm rotation axis (B), and has the second end firmly fixed to the cuff (3).

10. A ski boot according to claim 9, **characterised in that** the second end of the auxiliary cable (26) is fixed to the cuff (3) in a manually adjustable manner.

11. A ski boot according to claim 10, **characterised in that** the second end of the auxiliary cable (26) is fixed to the cuff (3) by means of a cable-gripping device (28) which is fixed on the cuff (3).

12. A ski boot according to claim 11, **characterised in that** the second end of the auxiliary cable (26) is fixed to the cuff (3) by means of an automatically-locking and manually-unlocking cable-gripping device (28).

13. A ski boot according to any one of the preceding claims, **characterised by** additionally comprising shell closing means (14) capable of tightening the shell (2) on the foot of the user.

14. A ski boot according to any one of the preceding claims, **characterised in that** the shell (2) and/or the cuff (3) is/are made of plastic or composite material.

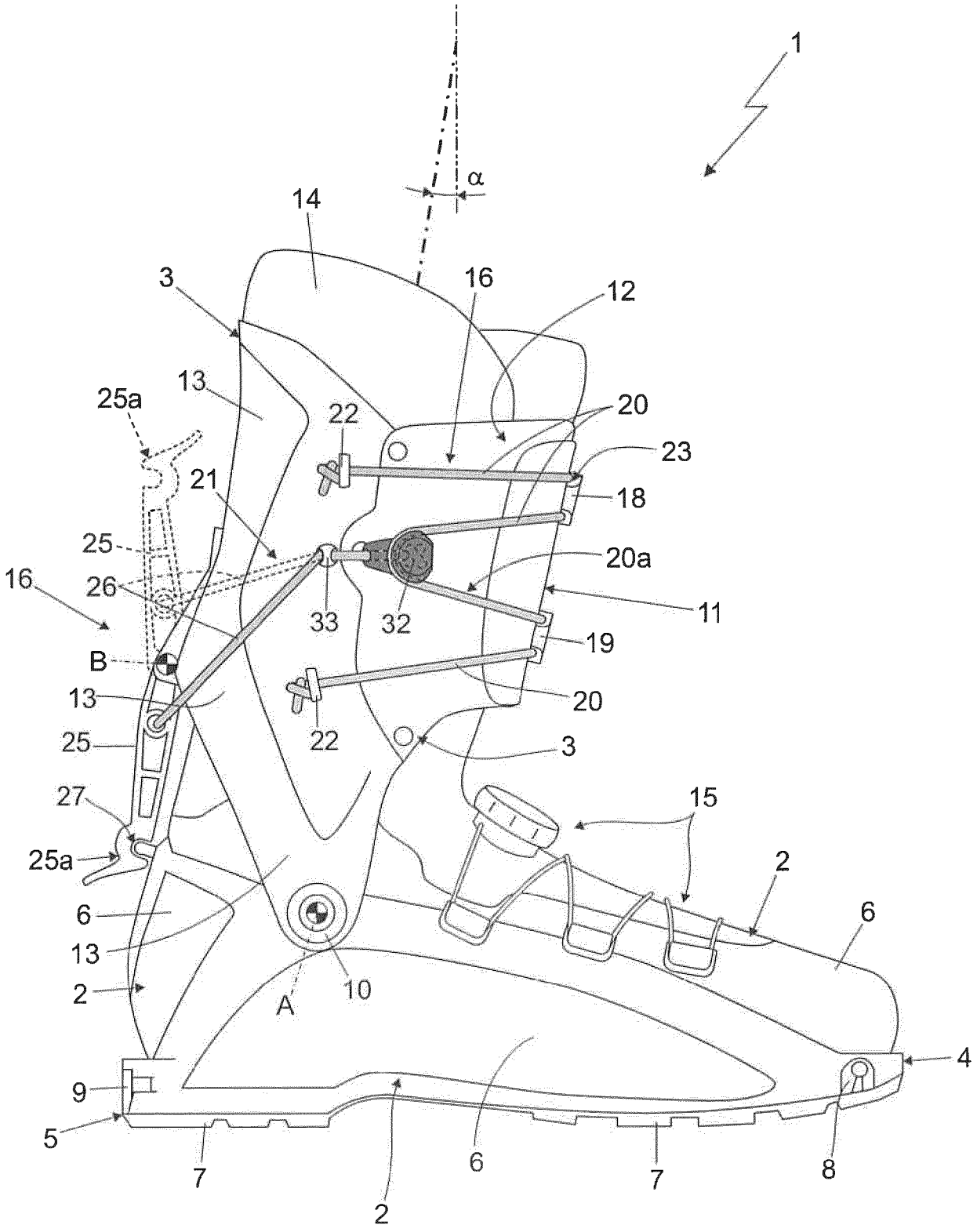
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Fig. 1

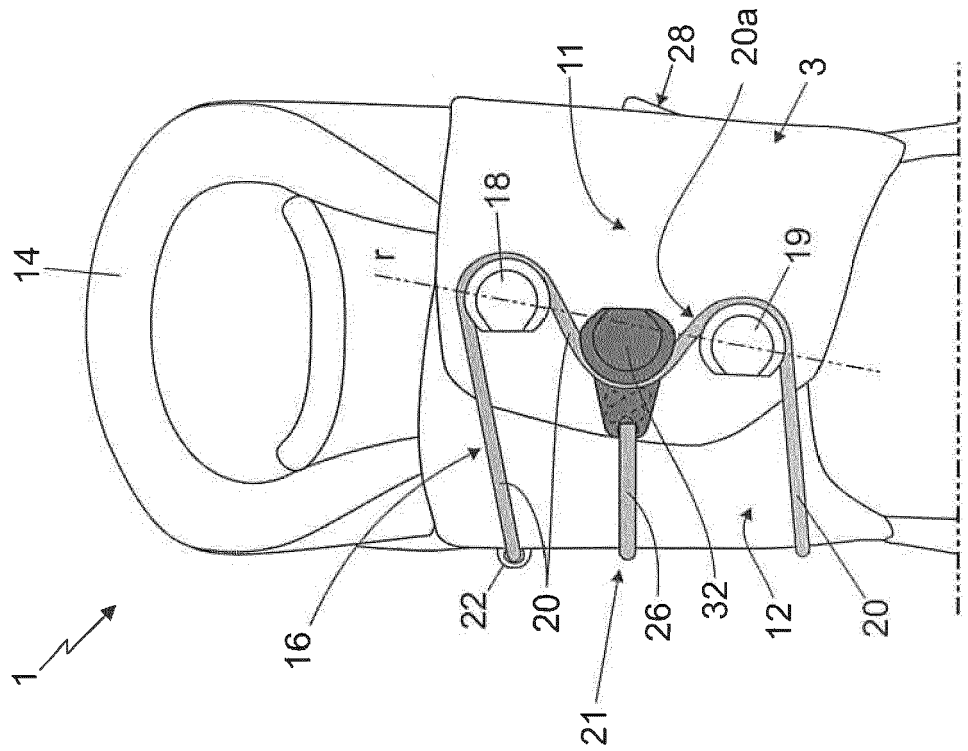
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Fig. 3

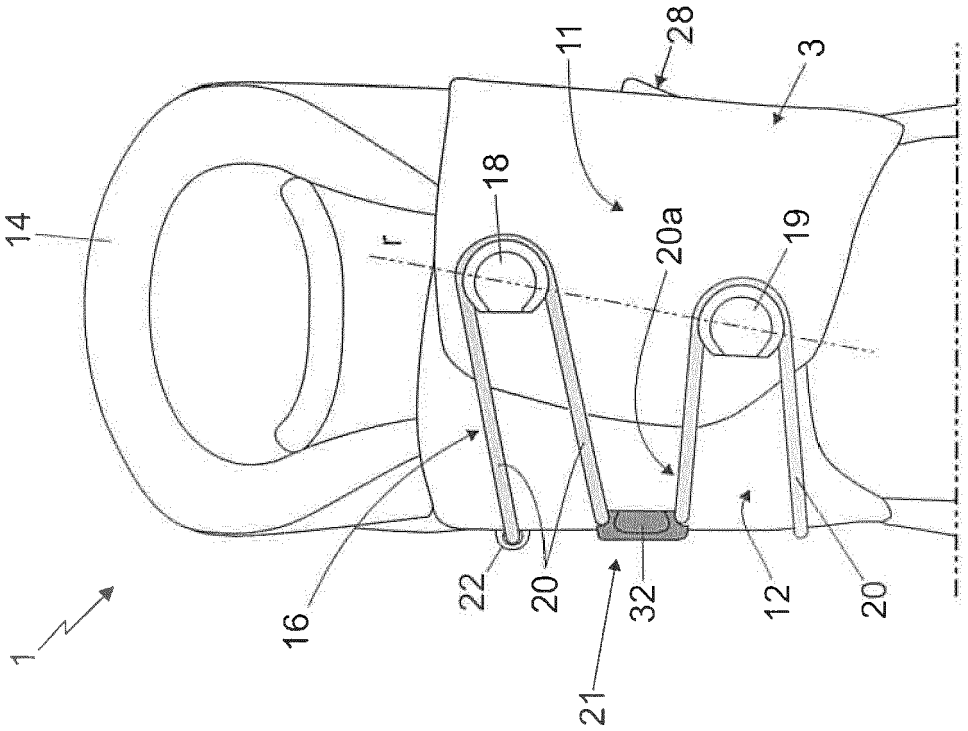
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Fig. 2

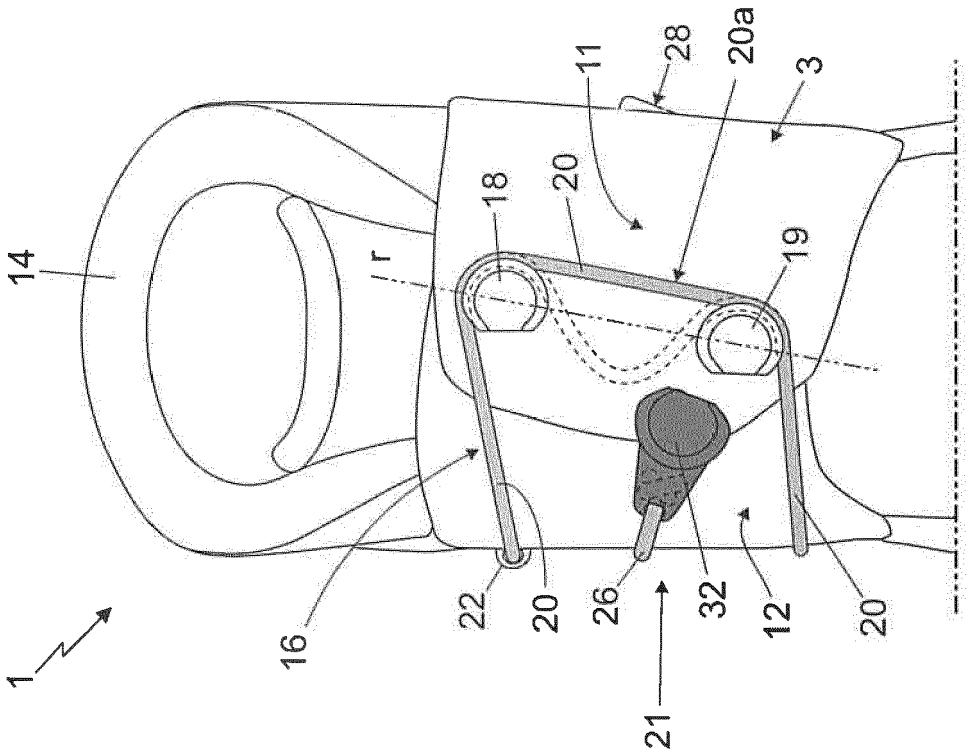
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Fig. 5

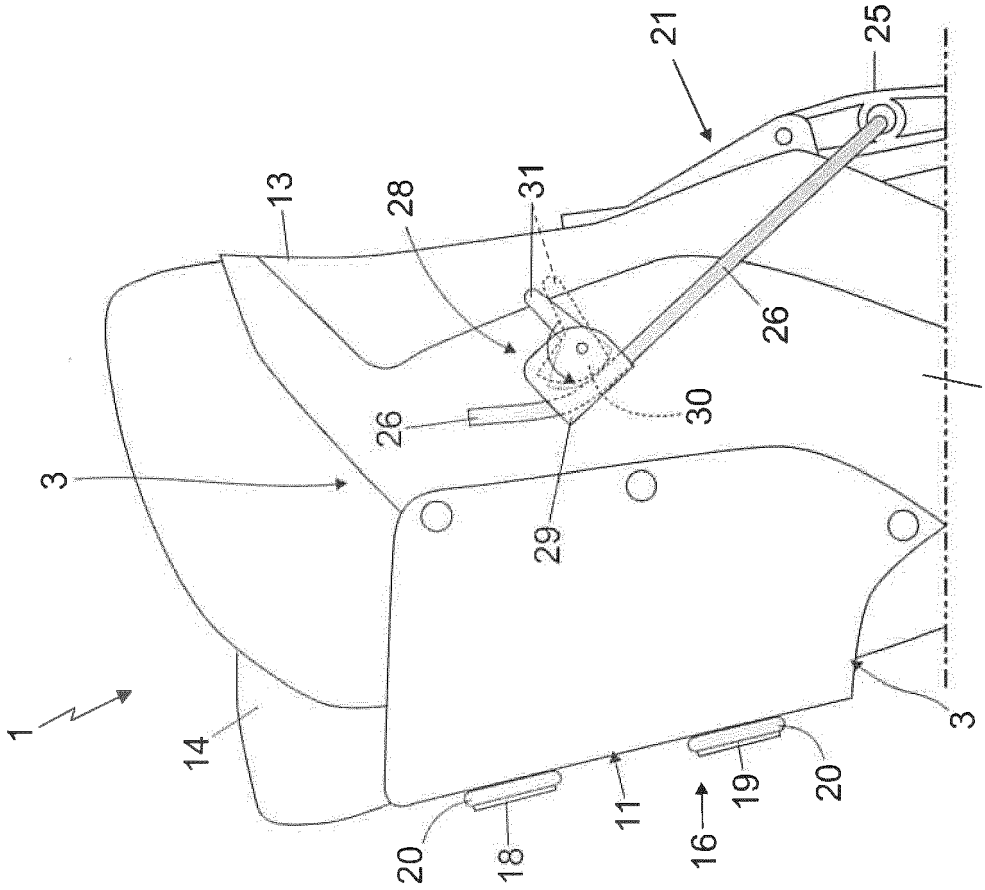
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Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 16 20 2089

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	EP 2 591 696 A1 (DAL BELLO SPORT SRL) 15 May 2013 (2013-05-15) * paragraphs [0023] - [0033]; figures 1-5 * -----	1,13,14 2	INV. A43B5/04 A43C11/16 ADD. A43C11/14
Y	US 2009/277046 A1 (SARTOR ET AL.) 12 November 2009 (2009-11-12) * paragraphs [0022] - [0035]; figures 1-6 * -----	1,13,14	
Y A	US 5 647 104 A (JAMES) 15 July 1997 (1997-07-15) * column 5, lines 49-51 * * column 10, lines 9-56; figures 5,6 * -----	1,13,14 2-4	
A	US 4 408 403 A (MARTIN) 11 October 1983 (1983-10-11) * the whole document * -----	1-5,13, 14	
A	US 2010/229425 A1 (PARISOTTO) 16 September 2010 (2010-09-16) * paragraphs [0017] - [0056]; figures 1,2 * -----	1,5-8, 13,14	TECHNICAL FIELDS SEARCHED (IPC) A43B A43C
A	JP H05 13203 U (DAIWA SEIKO) 23 February 1993 (1993-02-23) * figures 1-6 * -----	1-4,13, 14	
A	EP 0 588 757 A1 (LANGE INT SA) 23 March 1994 (1994-03-23) * column 6, lines 31-53; figure 16 * -----	1,2,13, 14	
A	US 5 341 584 A (PARIS ET AL.) 30 August 1994 (1994-08-30) * the whole document * -----	1,6-8, 13,14	
A	EP 0 598 680 A1 (LANGE INT SA) 25 May 1994 (1994-05-25) * the whole document * -----	1,2,5-8, 13,14	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 February 2017	Williams, Mark

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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24-02-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2591696 A1	15-05-2013	NONE	
US 2009277046 A1	12-11-2009	EP 2116145 A2	11-11-2009
		US 2009277046 A1	12-11-2009
US 5647104 A	15-07-1997	CA 2205645 A1	15-11-1998
		US 5647104 A	15-07-1997
US 4408403 A	11-10-1983	CA 1167254 A	15-05-1984
		DE 3131555 A1	01-07-1982
		US 4408403 A	11-10-1983
US 2010229425 A1	16-09-2010	AT 555677 T	15-05-2012
		CA 2696650 A1	10-09-2010
		EP 2227974 A1	15-09-2010
		US 2010229425 A1	16-09-2010
JP H0513203 U	23-02-1993	NONE	
EP 0588757 A1	23-03-1994	AT 132333 T	15-01-1996
		CH 688071 A5	15-05-1997
		DE 69301215 D1	15-02-1996
		DE 69301215 T2	14-08-1996
		EP 0588757 A1	23-03-1994
US 5341584 A	30-08-1994	AT 154207 T	15-06-1997
		DE 69311448 D1	17-07-1997
		DE 69311448 T2	08-01-1998
		EP 0577926 A1	12-01-1994
		FR 2692446 A1	24-12-1993
		JP H0662905 A	08-03-1994
		US 5341584 A	30-08-1994
EP 0598680 A1	25-05-1994	AT 141760 T	15-09-1996
		CH 688072 A5	15-05-1997
		DE 69304290 D1	02-10-1996
		EP 0598680 A1	25-05-1994

EPO FORM P0459

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