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(54) **Ski boot**

(57) A ski touring or telemark boot (1) having a shell (2), a shank (4) hinged to the shell (2), and a shank clamping mechanism for selectively connecting the shank (4) mechanically to the shell (2) to limit relative movement of the shank (4) with respect to the shell (2)

in predetermined manner; the shank clamping mechanism has a shank fastening and clamping device (14) for selectively fastening the shank (4) to immobilize the lower part of the user's leg inside the boot, while at the same time allowing selection of the type of mechanical constraint between the shank (4) and the shell (2).

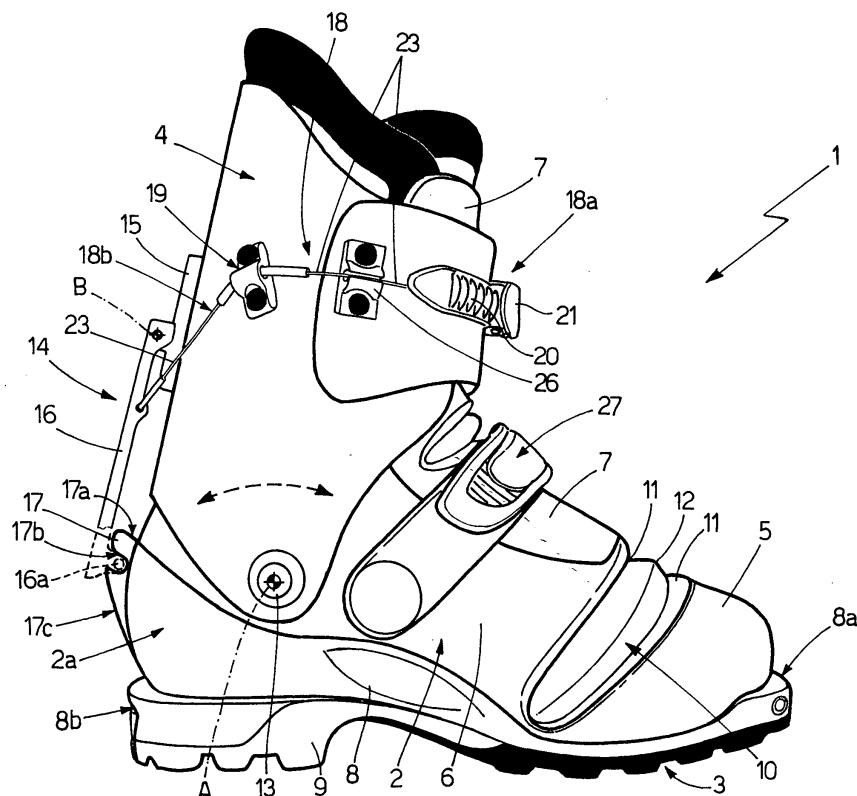


Fig.1

Description

[0001] The present invention relates to a ski boot, in particular a ski touring or telemark boot.

[0002] As is known, ski touring boots normally comprise an outer shell of plastic material; a sole; a shank hinged to the shell at the ankle; and a number of fasteners on the shell and shank, by which to fasten both the shell and the shank to immobilize the user's leg inside the boot.

[0003] Ski touring boots of the above type also have a clamping device for selectively locking the shank rigidly to the shell to prevent any relative movement between the shell and shank; allowing only forward oscillation of the shank with respect to the shell, as of a given reference position; or allowing the shank to oscillate freely back and forth with respect to the shell.

[0004] The clamping device is essential in that, as is known, ski touring calls for boots capable of assuming a downhill configuration, in which the boot is fastened to the ski at the toe and heel, and an uphill or walking configuration, in which the boot is only fastened to the ski at the toe, so the heel of the boot can be lifted freely to drag the ski as when cross-country skiing.

[0005] In the downhill configuration, the clamping device is obviously set to lock the shank rigidly to the shell, as with ordinary downhill ski boots; whereas, in the uphill or walking configuration, the clamping device is set to allow the shank to oscillate freely with respect to the shell.

[0006] When downhill skiing in fresh snow, on the other hand, in which fast weight shifting is desirable, at times shifting weight further back than normally when skiing downhill on packed snow, the clamping device is set to only allow forward oscillation of the shank with respect to the shell, as of a given reference position.

[0007] Since the user is normally called upon to fasten and adjust the boots in particularly difficult conditions, having to work separately on the fasteners and the clamping device may obviously, at times, create difficulties for the user, which are far from negligible at high altitude, at which the safety of the user is frequently at risk.

[0008] The same also applies to telemark boots: in the telemark technique, in fact, turning is performed with the heel "free", i.e. raised off the ski, as opposed to being fixed rigidly to the clamp as in conventional downhill skiing.

[0009] It is an object of the present invention to provide a ski touring or telemark boot designed to eliminate the aforementioned drawbacks.

[0010] According to the present invention, there is provided a ski boot, in particular a ski touring or telemark boot, comprising a shell, a shank hinged to said shell, and shank-shell clamping means for selectively connecting said shank mechanically to said shell to limit relative movement of the shank with respect to the shell in predetermined manner; said ski boot being character-

ized in that said shank-shell clamping means comprise a shank fastening and clamping device for selectively fastening said shank to immobilize the lower part of the user's leg inside the boot, while at the same time allowing selection of the type of mechanical constraint between said shank and said shell.

[0011] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a side view of a ski touring boot in accordance with the teachings of the present invention;

Figure 2 shows a rear view of the Figure 1 ski touring boot;

Figure 3 shows a schematic view of the clamping device of the Figure 1 and 2 boot;

Figure 4 shows a partial side view of the Figure 1 boot with the clamping device in a first operating position;

Figure 5 shows a partial side view of the Figure 1 boot with the clamping device in a second operating position;

Figure 6 shows a partial side view of the Figure 1 boot with the clamping device in a third operating position;

Figure 7 shows a partial side view of the Figure 1 boot with the clamping device in the release position.

[0012] Number 1 in Figure 1 indicates as a whole a ski boot, in particular a ski touring boot, to which reference is made purely by way of example in the following description, which also applies equally to a telemark boot.

[0013] Boot 1 substantially comprises a shell 2 of plastic material; a sole 3; and a shank 4 hinged to shell 2 at the ankle.

[0014] In the example shown, shell 2 comprises a toe portion 5; two sidewalls 6 forming a front opening (not shown) closed by a known tongue 7; and a bottom wall or inner sole 8 closing the bottom of shell 2 and at the same time forming a toe flange 8a and a heel portion 8b, which fit in known manner to the front and rear of any type of ski touring clamp (not shown); and an outer sole 9 made of elastomeric material and fixed to the underside of bottom wall 8 to form, with bottom wall 8, sole 3 of boot 1.

[0015] With reference to Figure 1, shell 2 also comprises a flexible top portion 10 extending from one side to the other of sole 3, substantially astride the metatarsus, i.e. close to toe portion 5 of shell 2. In the example shown, flexible top portion 10 has an undulated profile defined by two grooves 11 separated by a smooth intermediate ridge 12. Flexible top portion 10 conveniently extends obliquely to follow the natural bend axis of the foot, and the end on the inner side of boot 1 is located further forward than the end on the outer side of boot 1.

[0016] Shank 4 is connected to sidewalls 6 of shell 2 by two hinges 13 located along a transverse ankle articulation axis A, about which shank 4 can therefore rotate freely with respect to shell 2, and is also preferably, though not necessarily, made of plastic material.

[0017] With reference to Figures 1 and 2, boot 1 also comprises a shank fastening and clamping device 14 for selectively fastening shank 4 to immobilize the lower part of the user's leg inside boot 1, while at the same time allowing selection of the type of mechanical constraint between shank 4 and shell 2.

[0018] More specifically, when fastening shank 4, fastening and clamping device 14 provides for selectively and alternatively locking shank 4 rigidly to shell 2 to prevent any relative movement between shank 4 and shell 2; fastening shank 4 to shell 2 so that shank 4 can only oscillate, as of a given reference position, forward about axis A towards toe portion 5 of shell 2; or releasing shank 4 from shell 2, so that shank 4 can oscillate freely back and forth about axis A.

[0019] With reference to Figures 1, 2 and 3, fastening and clamping device 14 comprises: a supporting plate 15 fixed to the outer surface of shank 4, at the bottom of the calf, i.e. above the rear portion 2a of shell 2 housing the heel of the foot in use; a lock lever 16 hinged at one end to supporting plate 15 to rotate freely about an axis B substantially parallel to axis A; and a holddown projection 17 formed on the outer surface of shell 2, at rear portion 2a of shell 2.

[0020] Holddown projection 17 is shaped to comprise a top stop surface 17a facing supporting plate 15 and lock lever 16; a central seat or recess 17b just beneath top stop surface 17a; and a curved, chutelike bottom connecting surface 17c for connecting, beneath central seat or recess 17b, the top of holddown projection 17 to the surface of rear portion 2a of shell 2.

[0021] Lock lever 16, on the other hand, has an appendix 16a, which can be positioned selectively and alternatively on top stop surface 17a; inside central seat or recess 17b; or resting on curved bottom connecting surface 17c.

[0022] With reference to Figure 4, in the first case, top stop surface 17a is so oriented as to prevent distal appendix 16a from getting over holddown projection 17, thus preventing the distance between supporting plate 15 and holddown projection 17 from falling below a given limit value corresponding to the distance between appendix 16a and rotation axis B of the lever, and so preventing shank 4 from rotating backwards.

[0023] With reference to Figure 5, in the second case, recess 17b is so shaped as to house and retain appendix 16a, thus preventing any relative movement between lock lever 16 and holddown projection 17, and so locking shank 4 rigidly to shell 2.

[0024] With reference to Figure 6, in the third case, curved bottom connecting surface 17c is so located as to allow distal appendix 16a to slide freely on the outer surface of rear portion 2a of shell 2, thus permitting any

relative movement between lock lever 16 and holddown projection 17, and so releasing shank 4 from shell 2.

[0025] In the example shown, appendix 16a is defined by a cylindrical pin fixed to the body of lock lever 16 and parallel to rotation axis B of the lever; and seat or recess 17b is defined by a transverse groove formed on the body of holddown projection 17 and also parallel to rotation axis B of the lever.

[0026] With reference to Figures 1, 2 and 3, in addition to the above, fastening and clamping device 14 also comprises a tie 18 fixed at both ends to the body of lock lever 16 and looped about shank 4; and two transmission members 19, about which two portions of tie 18 are wound partly and in sliding manner.

[0027] More specifically, transmission members 19 are fixed to the outer surface of shank 4, on the opposite side of rotation axis B of lock lever 16 to holddown projection 17 (i.e. above supporting plate 15) and on opposite sides of the central plane of boot 1, and define on tie 18 two noncoplanar portions - a front portion 18a and a rear portion 18b - complementary in length. Transmission members 19 provide for holding front portion 18a of tie 18 astride the two flaps of shank 4 in a substantially horizontal plane, regardless of the total length of front portion 18a.

[0028] With reference to Figures 1 and 3, in the example shown, tie 18 is defined by a graduated strap 20 with a relative buckle 21; and by two tensioning lines 22 and 23 connecting the body of lock lever 16 to graduated strap 20 and buckle 21.

[0029] More specifically, graduated strap 20 and buckle 21 are located between the two transmission members 19, astride tongue 7 and the two flaps of shank 4, so as to define part of front portion 18a of tie 18; and tensioning lines 22 and 23 are fitted in sliding manner to respective transmission members 19, and connect the body of lock lever 16 to one end of graduated strap 20 and to buckle 21 respectively.

[0030] Buckle 21 of graduated strap 20 may be fixed firmly to one of the two flaps of shank 4, which close one over the other astride tongue 7. In which case, the end of the tensioning line connecting buckle 21 to lock lever 16, i.e. the end of tensioning line 23, may be fixed to the flap of shank 4 integrally supporting buckle 21 by means of a known ratchet mechanism, by which the end of tensioning line 23 fastens firmly onto and is released easily from the flap of shank 4.

[0031] As opposed to being fixed at one end to the body of lock lever 16, tensioning lines 22 and 23 connecting the two ends of graduated strap 20 may be connected continuously to each other to define one line, in turn connected to, i.e. engaging, the body of lock lever 16 in sliding manner.

[0032] In the example shown, each transmission member 19 is defined by a rectangular metal plate 24 fixed rigidly to shank 4; and by a metal helical spring 25 fitted through the body of plate 24 to act as a sheath for tensioning line 22 or 23. Lines 22 and 23, in fact, are

smaller in diameter than the inside diameter of the turns of the springs, so as to slide freely inside and along the whole length of helical springs 25.

[0033] With reference to Figure 1, fastening and clamping device 14 preferably, though not necessarily, also comprises a line supporting plate 26 fixed to one of the two flaps of shank 4 to support tensioning line 22 or 23 - in the example shown, tensioning line 23 - when fastening and clamping device 14 is in the release position (Figure 7) and front portion 18a of tie 18 assumes the maximum length.

[0034] Ski touring boot 1 preferably, though not necessarily, also comprises at least one fastener 27 for fastening shell 2 so as to immobilize the user's foot inside boot 1. Fastener 27 is a commonly used type and therefore not described in detail, except to state that it is fixed to the two sidewalls 6 of shell 2, astride tongue 7.

[0035] Operation of ski touring boot 1 as a whole is easily deducible from the foregoing description with no further explanation required.

[0036] With reference to Figures 4, 5, 6 and 7, operation of fastening and clamping device 14 of boot 1 will now be described, assuming lock lever 16 is initially in the Figure 7 release position, in which the lever rests against shank 4, between the two transmission members 19, i.e. on the opposite side of supporting plate 15 to holddown projection 17.

[0037] As of the above position, downward rotation of lock lever 16 tightens tensioning lines 22 and 23, which reduce the total length of front portion 18a of tie 18 to close the flaps of shank 4 one over the other and so immobilize the lower part of the user's leg inside boot 1.

[0038] Once lock lever 16 is rotated downwards, any of the following are possible, depending on the required configuration of boot 1 :

- appendix 16a of lock lever 16 is rested on tops stop surface 17a of holddown projection 17 (Figure 4) to set fastening and clamping device 14 to the first fastening position preventing rearward rotation of shank 4 and only allowing shank 4 to oscillate frontwards with respect to shell 2;
- appendix 16a of lock lever 16 is inserted inside recess 17b of holddown projection 17 (Figure 5) to set fastening and clamping device 14 to the second fastening position rigidly connecting shank 4 to shell 2; or
- appendix 16a of lock lever 16 is rested on curved bottom connecting surface 17c (Figure 6) to set fastening and clamping device 14 to the third fastening position allowing shank 4 to oscillate freely with respect to shell 2.

[0039] The advantages of ski touring boot 1 as described and illustrated herein are obvious: one single operation provides for fastening shank 4, while at the same time selecting the type of mechanical constraint between shank 4 and shell 2.

[0040] Clearly, changes may be made to ski touring boot 1 as described and illustrated herein without, however, departing from the scope of the present invention.

[0041] For example, supporting plate 15 may be fixed adjustably to shank 4, so as to adjust the position of the plate on shank 4 and so enable the user to adjust the tilt of shank 4 with respect to the vertical.

[0042] In a simplified variation of boot 1, tie 18 of fastening and clamping device 14 is defined by a single tensioning line, which has a first end fixed to lock lever 16, extends about one flap of shank 4 in the same way as tensioning line 23, and is fitted on the second end with a ratchet mechanism by which to fasten firmly onto and easily release the opposite flap of shank 4. Obviously, in this variation, fastening and clamping device 14 has only one transmission member 19, which acts as a pulley for the single tensioning line, and tie 18 is looped only partly about shank 4.

Claims

1. A ski boot (1), in particular a ski touring or telemark boot, comprising a shell (2), a shank (4) hinged to said shell (2), and shank-shell clamping means for selectively connecting said shank (4) mechanically to said shell (2) to limit relative movement of the shank (4) with respect to the shell (2) in predetermined manner; said ski boot (1) being **characterized in that** said shank-shell clamping means comprise a shank fastening and clamping device (14) for selectively fastening said shank (4) to immobilize the lower part of the user's leg inside the boot, while at the same time allowing selection of the type of mechanical constraint between said shank (4) and said shell (2).
2. A ski boot as claimed in Claim 1, **characterized in that** said shank fastening and clamping device (14) provides, selectively and alternatively, for allowing only forward rotation of the shank (4) with respect to the shell (2), as of a given reference position; for locking the shank (4) rigidly to said shell (2) to prevent any relative movement between the two; or for allowing said shank (4) to rotate freely with respect to the shell (2).
3. A ski boot as claimed in Claim 2, **characterized in that** said shank fastening and clamping device (14) comprises a first connecting member (15) integral with said shank (4); a second connecting member (17) integral with said shell (2); and a lock lever (16) hinged to said first connecting member (15) and movable selectively and alternatively to and from a first fastening position, in which an appendix (16a) of said lock lever (16) rests on said second connecting member (17); a second fastening position, in which the appendix (16a) of said lock lever (16) is

attached firmly to said second connecting member (17); and a third fastening position, in which the appendix (16a) of said lock lever (16) is located beneath said second connecting member (17) so as not to interfere mechanically with said second connecting member (17). 5

4. A ski boot as claimed in Claim 2 or 3, **characterized in that** said shank fastening and clamping device (14) comprises a tie (18) fixed at one end to said lock lever (16) and extending at least partly about said shank (4); and at least one transmission member (19) engaged in sliding manner by said tie (18); said at least one transmission member (19) being located on the shank (4), on the opposite side to said second connecting member (17) with respect to the rotation axis (B) of the lock lever (16). 10 15

5. A ski boot as claimed in Claim 4, **characterized in that** said tie (18) is looped completely about said shank (4), and comprises a graduated strap (20) with a relative buckle (21), and two tensioning lines (22, 23) for connecting the lock lever (16) to said graduated strap (20) and said buckle (21); each said tensioning line (22, 23) engaging a respective transmission member (19) in sliding manner. 20 25

6. A ski boot as claimed in Claim 4, **characterized in that** said tie (18) is looped partly about said shank (4), and comprises a tensioning line, which has a first end fixed to said lock lever (16), engages a respective transmission member (19) in sliding manner, extends about one flap of the shank (4), and is fitted on the second end with a ratchet mechanism by which to fasten onto the opposite flap of the shank (4). 30 35

7. A ski boot as claimed in any one of Claims 3 to 6, **characterized in that** said shank (4) is hinged to said shell (2) to rotate about a main rotation axis (A) substantially coincident with the articulation axis of the ankle, and the rotation axis (B) of said lock lever (16) is substantially parallel to said main rotation axis (A). 40 45

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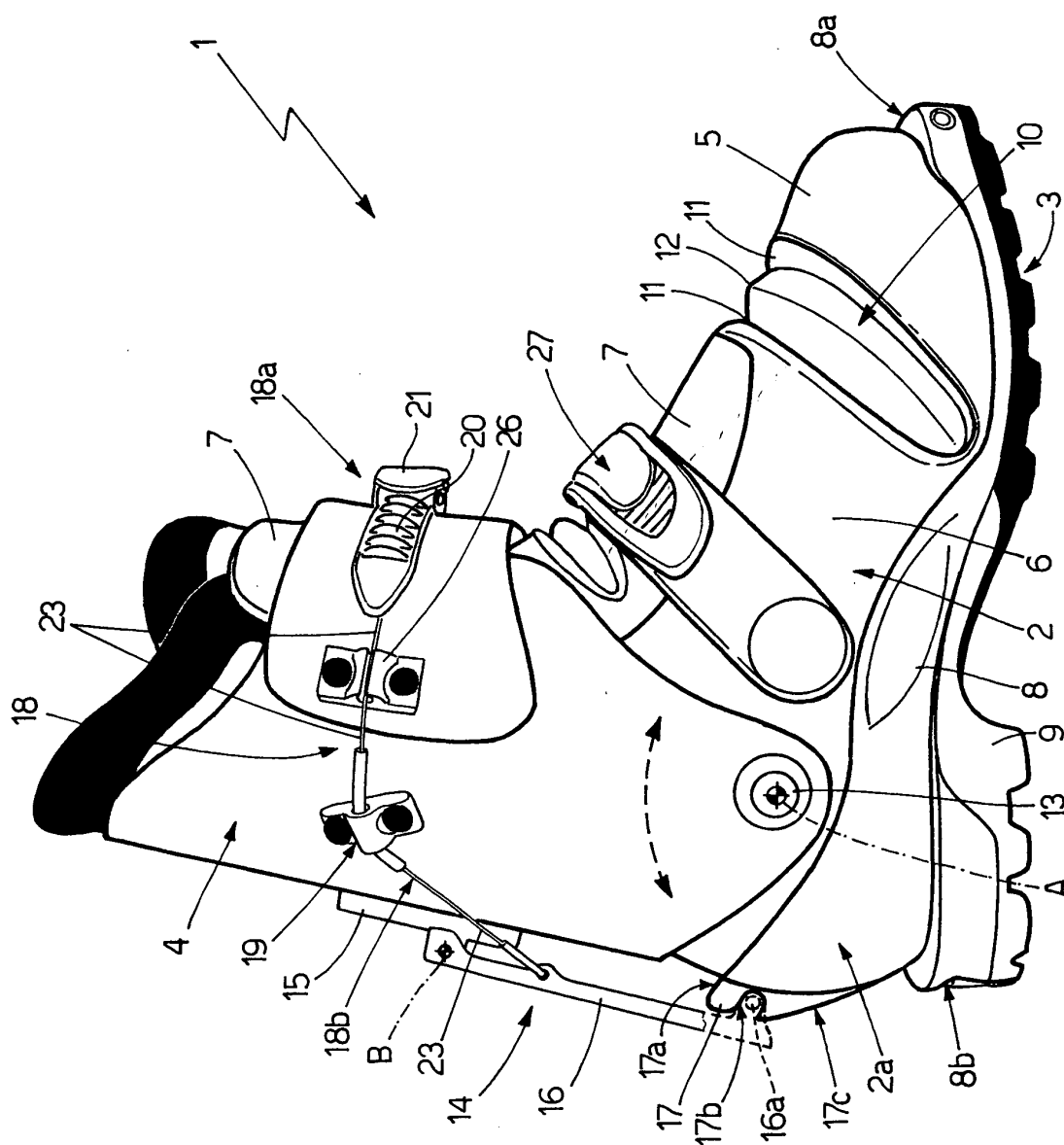


Fig.1

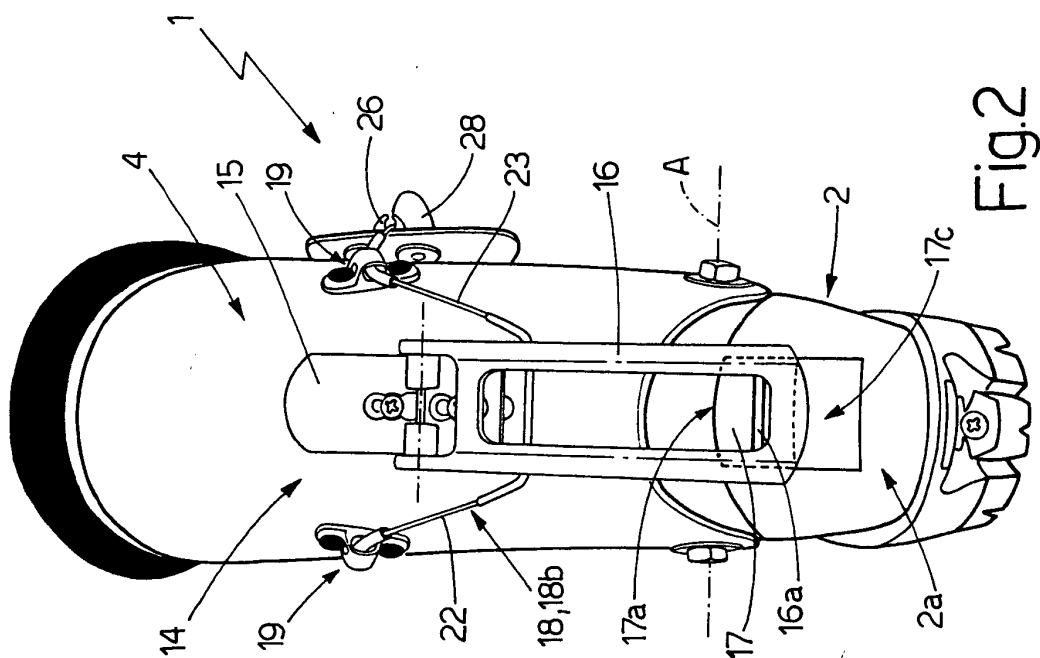


Fig. 2

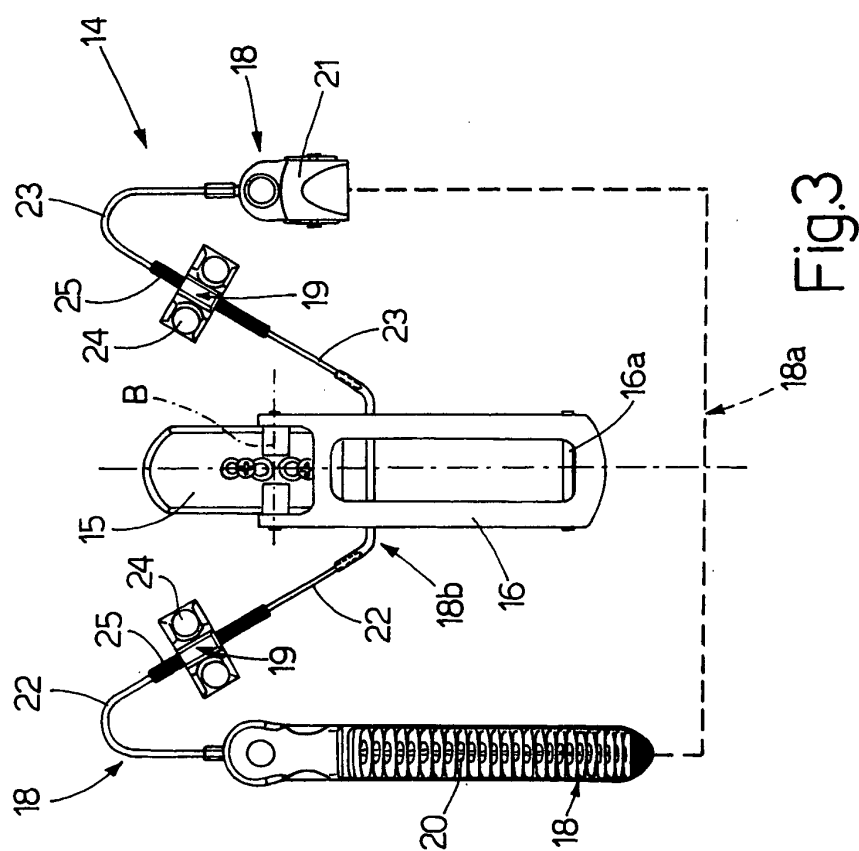
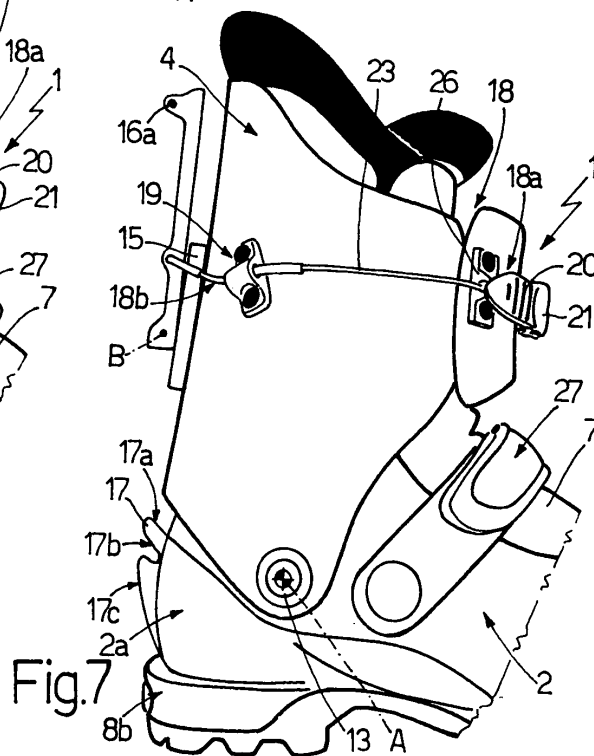
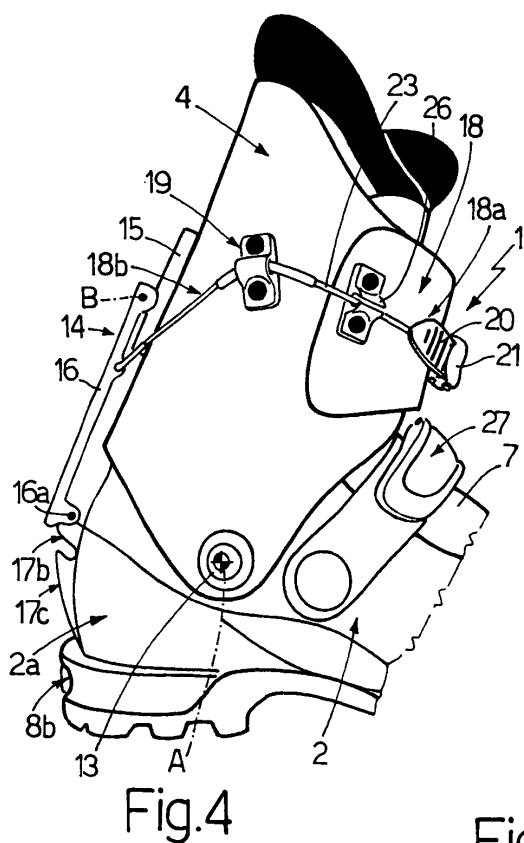
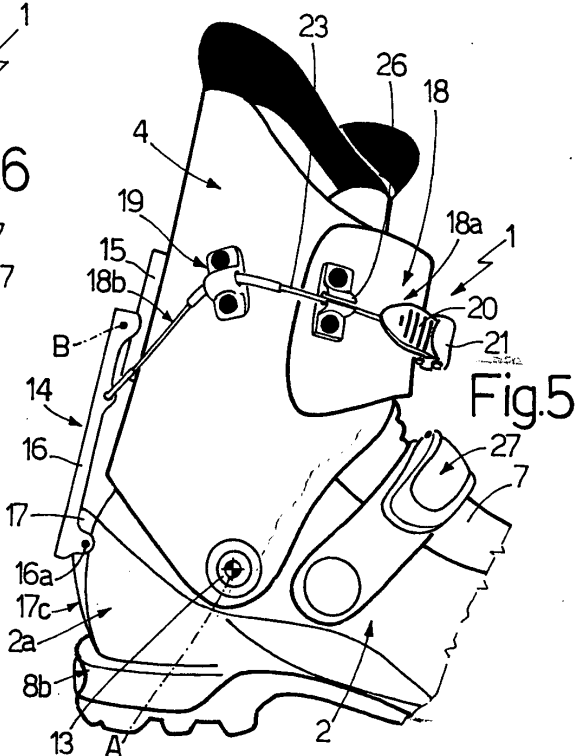
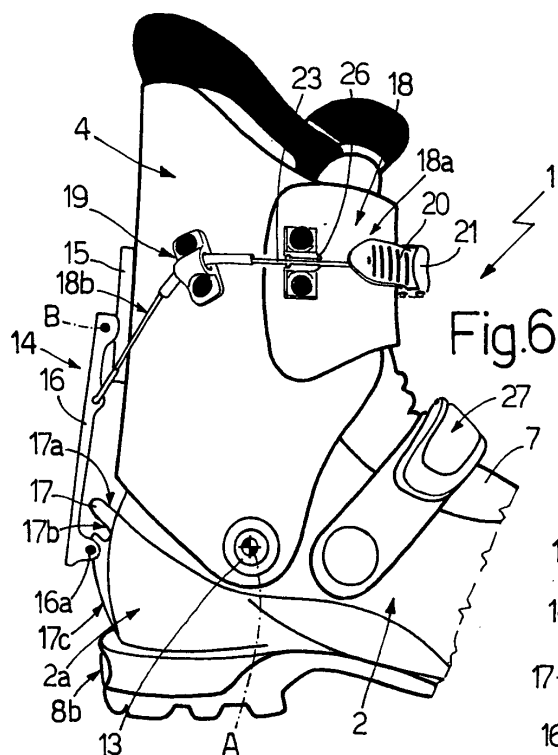


Fig. 3





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EUROPEAN SEARCH REPORT

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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