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(54) **Ski boot**

Skischuh

Chaussure de ski

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EP-A- 1 023 849 EP-A- 1 224 878
DE-A- 19 854 705 US-A- 3 619 914

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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] The features of the preamble of claim 1 are known from US-A-3619914, EP-A-1 023 849 and from the intermediate document EP-A-1 224 878.

[0010] It is an object of the present invention to provide a ski touring or telemark boot designed to eliminate the aforementioned drawbacks.

[0011] According to the present invention, there is provided a ski boot, in particular a ski touring or telemark boot, comprising the features of claim 1.

[0012] 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.

[0013] 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.

[0014] Boot 1 substantially comprises a shell 2 of plastic material; a sole 3; and a shank 4 hinged to shell 2 at the ankle.

[0015] 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 30 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.

[0016] 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.

[0017] 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.

[0018] With reference to Figures 1 and 2, boot 1 also comprises a shank fastening and locking device 14 for selectively fastening shank 4 to immobilize the lower part 55 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.

[0019] More specifically, when fastening shank 4, fas-

tening and locking 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.

[0020] With reference to Figures 1, 2 and 3, fastening and locking 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 holdown projection 17 formed on the outer surface of shell 2, at rear portion 2a of shell 2.

[0021] Holdown 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 holdown projection 17 to the surface of rear portion 2a of shell 2.

[0022] 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.

[0023] 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 holdown projection 17, thus preventing the distance between supporting plate 15 and holdown 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.

[0024] 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 holdown projection 17, and so locking shank 4 rigidly to shell 2.

[0025] 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 holdown projection 17, and so releasing shank 4 from shell 2.

[0026] 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 holdown projection 17 and also parallel to rotation axis B of the lever.

[0027] With reference to Figures 1, 2 and 3, in addition to the above, fastening and locking 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 mem-

bers 19, about which two portions of tie 18 are wound partly and in sliding manner.

[0028] 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 holdown 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.

[0029] 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.

[0030] 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.

[0031] 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.

[0032] 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.

[0033] 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.

[0034] With reference to Figure 1, fastening and locking 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 locking device 14 is in the release position (Figure 7) and front portion 18a of tie 18 assumes the maximum length.

[0035] Ski touring boot 1 preferably, though not nec-

essarily, 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.

[0036] Operation of ski touring boot 1 as a whole is easily deducible from the foregoing description with no further explanation required.

[0037] With reference to Figures 4, 5, 6 and 7, operation of fastening and locking 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 holdown projection 17.

[0038] 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.

[0039] 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 holdown projection 17 (Figure 4) to set fastening and locking 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 holdown projection 17 (Figure 5) to set fastening and locking 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 locking device 14 to the third fastening position allowing shank 4 to oscillate freely with respect to shell 2.

[0040] 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.

[0041] 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.

[0042] 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.

[0043] In a simplified variation of boot 1, tie 18 of fastening and locking 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 locking 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 locking 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 locking means comprise a shank fastening and locking device (14) for selectively fastening said shank (4) to immobilize the lower part of the user's leg inside the boot, and at the same time selectively and alternatively
 - locking said shank (4) rigidly to said shell (2) to prevent any relative movement between the two, or
 - fastening said shank (4) to said shell (2) so to allow, as of a given reference position, only forward rotation of the shank (4) with respect to the shell (2), or
 - allowing said shank (4) to freely rotate with respect to the shell (2).
2. A ski boot as claimed in Claim 1, characterized in that said shank fastening and locking 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).
3. A ski boot as claimed in Claim 1 or 2, characterized in that said shank fastening and locking 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).
4. A ski boot as claimed in Claim 3, **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.
5. A ski boot as claimed in Claim 3, **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).
6. A ski boot as claimed in any one of Claims 2 to 5, **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).

Patentansprüche

- Skistiefel (1), insbesondere ein Skitouring- oder Telemarkstiefel, der Folgendes umfasst: eine Schale (2), einen Schaft (4), der an der Schale (2) angelenkt ist, und ein Schaft-Schale-Arretierungsmittel zum selektiven mechanischen Verbinden des Schafte (4) mit der Schale (2), um eine relative Bewegung des Schafte (4) mit Bezug auf die Schale (2) in einer vorgegebenen Weise zu begrenzen; wobei der Skistiefel (1) **dadurch gekennzeichnet ist, dass** das Schaft-Schale-Arretierungsmittel eine Vorrichtung für die Schaftbefestigung und Schaftarretierung (14) zum selektiven Befestigen des Schafte (4) umfasst, um den unteren Teil des Beines des Nutzers im Inneren des Stiefels unbeweglich zu machen, und um gleichzeitig selektiv und alternativ
 - den Schaft (4) starr mit der Schale (2) zu verriegeln, um jede Relativbewegung zwischen den beiden zu verhindern, oder
 - den Schaft (4) so an der Schale (2) zu befestigen, dass ab einer bestimmten Bezugsposition nur eine Vorwärtsrotation des Schafte (4) mit Bezug auf die Schale (2) möglich ist, oder
 - dem Schaft (4) das freie Drehen mit Bezug auf
- Skistiefel nach Anspruch 1, **dadurch gekennzeichnet, dass** die Vorrichtung für die Schaftbefestigung und Schaftarretierung (14) Folgendes umfasst: ein erstes Verbindungselement (15), das integral mit dem Schaft (4) ausgebildet ist; ein zweites Verbindungselement (17), das integral mit der Schale (2) ausgebildet ist; und einen Arretierungshebel (16), der an dem ersten Verbindungselement (15) angelenkt ist und selektiv und alternativ beweglich ist zwischen: einer ersten Befestigungsposition, in der ein Anhang (16a) des Arretierungshebels (16) auf dem zweiten Verbindungselement (17) liegt, einer zweiten Befestigungsposition, in der der Anhang (16a) des Arretierungshebels (16) fest an dem zweiten Verbindungselement (17) angebracht ist, und einer dritten Befestigungsposition, in der sich der Anhang (16a) des Arretierungshebels (16) so unter dem zweiten Verbindungselement (17) befindet, dass er nicht mechanisch das zweite Verbindungselement (17) behindert.
- Skistiefel nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Vorrichtung für die Schaftbefestigung und Schaftarretierung (14) Folgendes umfasst: einen Zuganker (18), der an einem Ende an dem Arretierungshebel (16) befestigt ist und mindestens teilweise um den Schaft (4) herum verläuft; und mindestens ein Kraftübertragungselement (19), durch das der Zuganker (18) gleitet; wobei das mindestens eine Kraftübertragungselement (19) an dem Schaft (4) auf der Seite angeordnet ist, die dem zweiten Verbindungselement (17) mit Bezug auf die Rotationsachse (B) des Arretierungshebels (16) gegenüber liegt.
- Skistiefel nach Anspruch 3, **dadurch gekennzeichnet, dass** der Zuganker (18) vollständig um den Schaft (4) herum gelegt ist und einen abgestuften Riemen (20) mit einer relativen Schnalle (21) sowie zwei Spannleinen (22, 23) zum Verbinden des Arretierungshebels (16) mit dem abgestuften Riemen (20) und der Schnalle (21) umfasst; wobei jede der Spannleinen (22, 23) gleitend durch ein jeweiliges Kraftübertragungselement (19) hindurchführt.
- Skistiefel nach Anspruch 3, **dadurch gekennzeichnet, dass** der Zuganker (18) teilweise um den Schaft (4) herum gelegt ist und eine Spannleine umfasst, die ein erstes Ende aufweist, das an dem Arretierungshebel (16) befestigt ist, durch ein jeweiliges Kraftübertragungselement (19) hindurch gleitet, um eine Klappe des Schafte (4) herum verläuft und am zweiten Ende mit einem Ratschenmechanismus versehen ist, mit dem eine Befestigung an der gegenüberliegenden Klappe des Schafte (4) vorgenommen wird.

6. Skistiefel nach einem der Ansprüche 2 bis 5, **durch gekennzeichnet, dass** der Schaft (4) an der Schale (2) angelenkt ist, um sich um eine Hauptrotationsachse (A) zu drehen, die im Wesentlichen mit der Knickachse des Fußknöchels übereinstimmt, und die Rotationsachse (B) des Arretierungshebels (16) im Wesentlichen parallel zu der Hauptrotationsachse (A) verläuft.

Revendications

1. Chaussure de ski (1), en particulier une chaussure de ski de fond ou télémark, comprenant une coque (2), une tige (4) articulée sur ladite coque (2), des moyens de verrouillage tige-coque pour relier de manière sélective ladite tige (4) mécaniquement à ladite coque (2) pour limiter un mouvement relatif de la tige (4) par rapport à la coque (2) d'une manière pré-déterminée ; ladite chaussure de ski (1) étant **caractérisée en ce que** lesdits moyens de verrouillage tige-coque comprennent un dispositif de fixation et de verrouillage de tige (14) pour fixer de manière sélective ladite tige (4) pour immobiliser la partie inférieure de la jambe de l'utilisateur à l'intérieur de la chaussure, et en même temps de manière sélective et alternativement

- verrouiller ladite tige (4) rigidement sur ladite coque (2) pour empêcher tout mouvement relatif entre les deux, ou

- fixer ladite tige (4) sur ladite coque (2) de manière à ne permettre, à partir d'une position de référence donnée, qu'une rotation vers l'avant de la tige (4) par rapport à la coque (2), ou

- permettre à ladite tige (4) de tourner librement par rapport à la coque (2).

2. Chaussure de ski selon la revendication 1, **caractérisée en ce que** ledit dispositif de fixation et de verrouillage de tige (14) comprend un premier élément de liaison (15) d'un seul tenant avec ladite tige (4) ; un deuxième élément de liaison (17) d'un seul tenant avec ladite coque (2) ; et un levier de verrouillage (16) articulé sur ledit premier élément de liaison (15) et pouvant être déplacé de manière sélective et alternativement vers et à partir d'une première position de fixation, dans laquelle un appendice (16a) dudit levier de verrouillage (16) repose sur ledit deuxième élément de liaison (17) ; d'une deuxième position de fixation, dans laquelle l'appendice (16a) dudit levier de verrouillage (16) est fixé fermement au dit deuxième élément de liaison (17) ; et d'une troisième position de fixation, dans laquelle l'appendice (16a) dudit levier de verrouillage (16) est situé au-dessous dudit deuxième élément de liaison (17) de manière à ne pas interférer mécaniquement avec ledit deuxième élément de liaison (17).

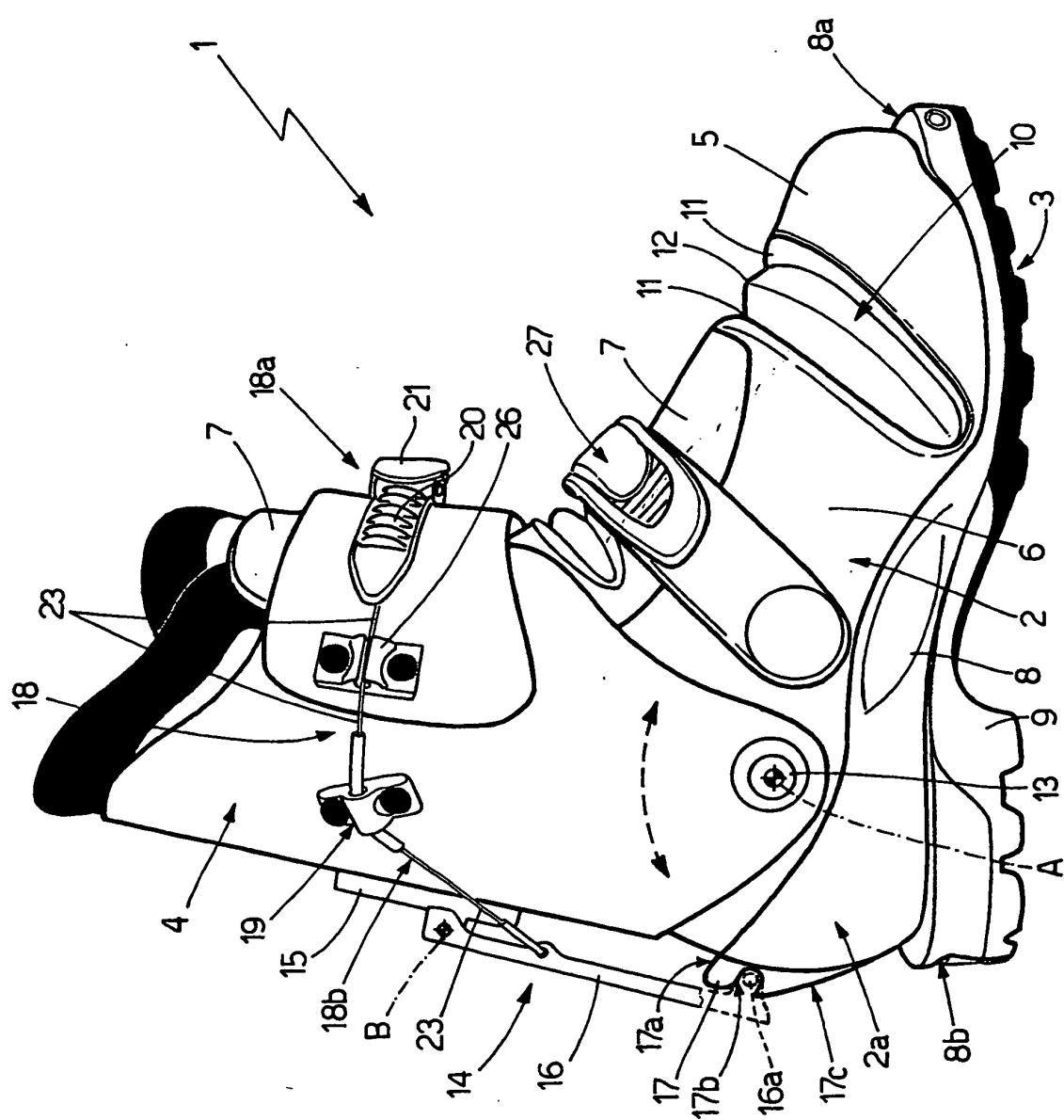
3. Chaussure de ski selon la revendication 1 ou 2, **caractérisée en ce que** ledit dispositif de fixation et de verrouillage de tige (14) comprend un lien (18) fixé à une extrémité au dit levier de verrouillage (16) et s'étendant au moins partiellement autour de ladite tige (4) ; et au moins un élément de transmission (19) dans lequel ledit lien (18) est engagé de manière coulissante ; ledit au moins un élément de transmission (19) étant situé sur la tige (4), du côté opposé au dit deuxième élément de liaison (17) par rapport à l'axe de rotation (B) du levier de verrouillage (16).

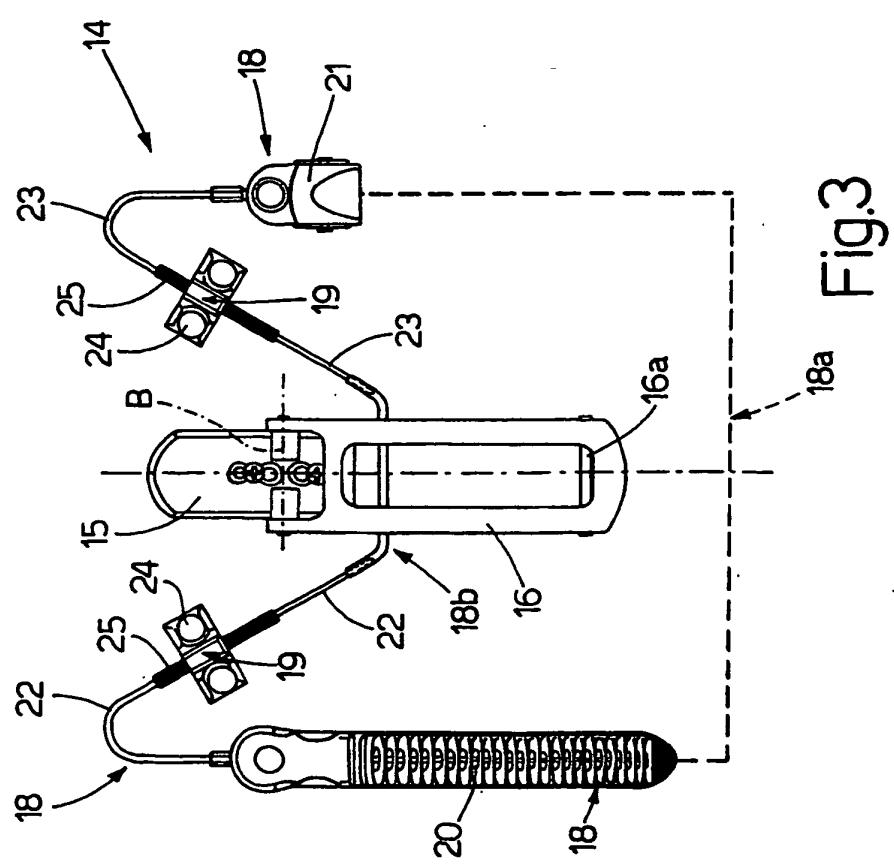
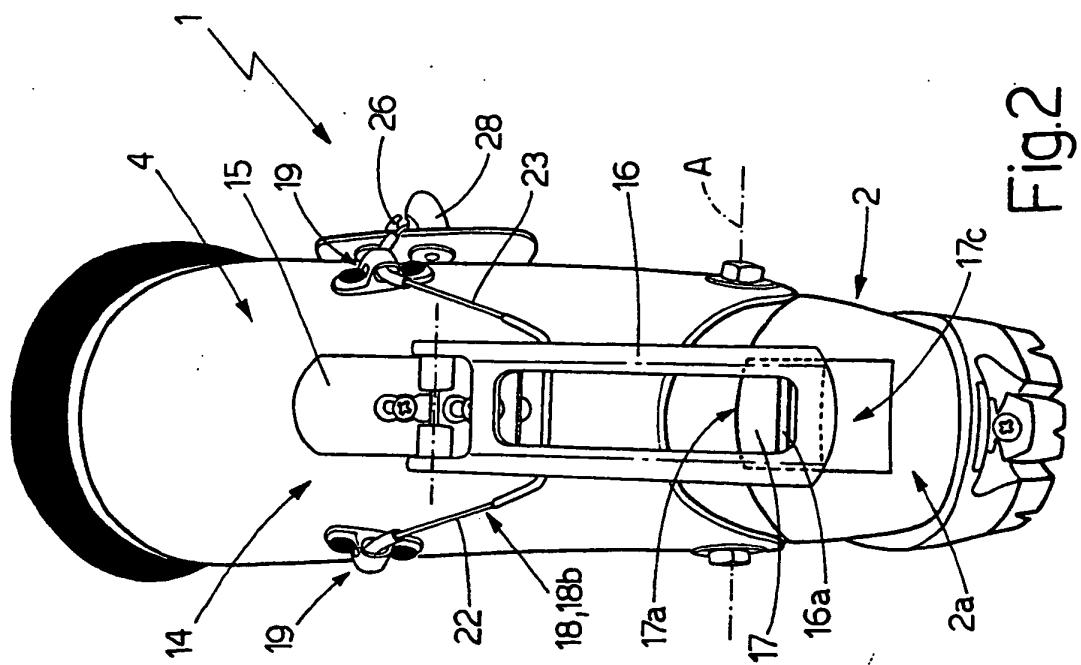
4. Chaussure de ski selon la revendication 3, **caractérisée en ce que** ledit lien (18) est enroulé complètement autour de ladite tige (4), et comprend une sangle graduée (20) avec une boucle relative (21), et deux lignes de tension (22, 23) pour relier le levier de verrouillage (16) à ladite sangle graduée (20) et à ladite boucle (21) ; chaque dite ligne de tension (22, 23) s'engageant dans un élément de transmission (19) respectif d'une manière coulissante.

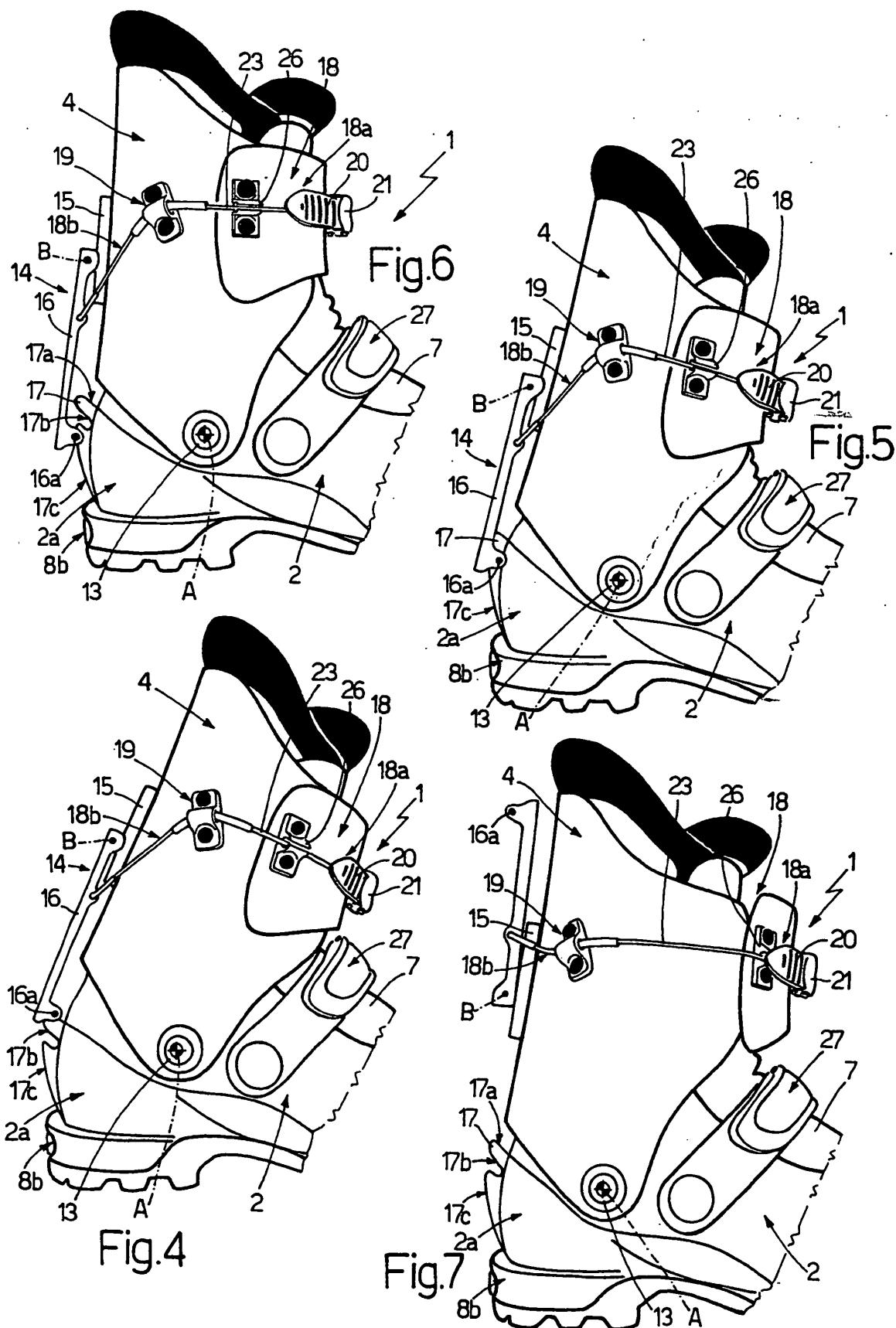
5. Chaussure de ski selon la revendication 3, **caractérisée en ce que** ledit lien (18) est enroulé partiellement autour de ladite tige (4), et comprend une ligne de tension, qui a une première extrémité fixée au dit levier de verrouillage (16), s'engage dans un élément de transmission (19) respectif d'une manière coulissante, s'étend autour d'un panneau de la tige (4), et est pourvue sur la deuxième extrémité d'un mécanisme à cliquet par lequel elle est fixée sur le panneau opposé de la tige (4).

6. Chaussure de ski selon l'une quelconque des revendications 2 à 5, **caractérisée en ce que** ladite tige (4) est articulée sur ladite coque (2) pour tourner autour d'un axe de rotation principal (A) coïncidant sensiblement avec l'axe d'articulation de la cheville, et l'axe de rotation (B) dudit levier de verrouillage (16) est sensiblement parallèle au dit axe de rotation principal (A).

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REFERENCES CITED IN THE DESCRIPTION

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