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(54) Fastening device particularly for sports shoes

(57) A fastening device (1), particularly for sports shoes having a first flap (7a) and a second flap (7b) to be fastened, is constituted by a single tensioning member (13) that is guided on the first flap, affects the instep and forefoot regions, and can be selectively associated at its ends with the second flap and with a traction member that is associated with the second flap.

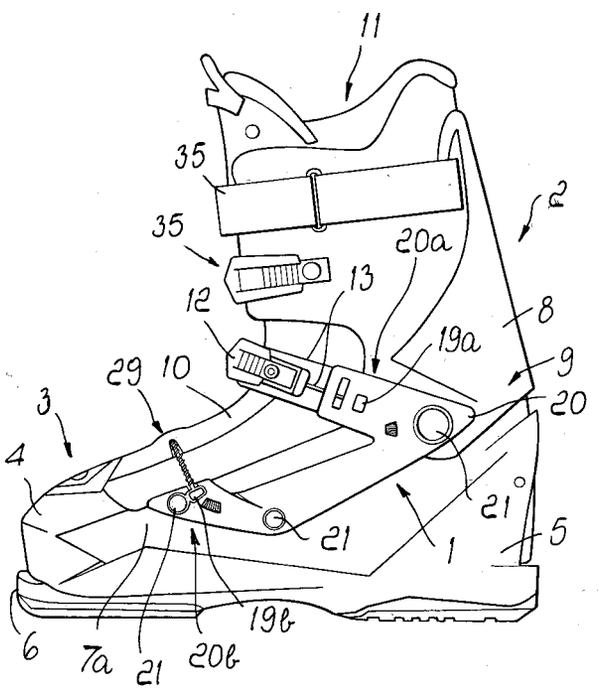

Fig. 1

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Description

[0001] The present invention relates to a fastening device particularly for sports shoes, such as for example ski boots.

[0002] Conventional ski boots are generally constituted by a first flap and by a second flap associated with the shell and/or with a quarter articulated thereto.

[0003] The two flaps are fastened together by levers. A conventional closure lever generally comprises a plate associated with one flap and from which two shoulders protrude. A lever arm is pivoted between the shoulders and can be gripped by the user, and a ring is pivoted to the lever arm. A toothed band can be connected to the ring and is in turn associated with the other flap.

[0004] Those conventional levers are usually arranged transversely to the quarter and/or shell, so as to achieve the intended fastening of the shoe around the foot and the lower region of the user's leg.

[0005] More particularly, two levers are usually associated with the shell: a first lever affects the foot instep region and a second lever affects the forefoot.

[0006] The presence of the first and second levers entails discomfort for the user, who is forced to act separately on the two levers in order to achieve the intended degree of fastening of the shoe around the foot.

[0007] Another drawback of conventional types of fastening device is the fact that the separate activation of the first and second levers requires the user to perform a double adjustment, with consequent lack of uniformity in fastening and therefore difficult adjustment of the distribution of the force along the longitudinal axis of the upper metatarsal region, since the adjustment of the levers is of the discrete type and is not continuous.

[0008] This leads to uneven compression of the foot, causing regions subjected to different degrees of pressure.

[0009] Another drawback that can be noted in the conventional devices is the fact that the fastening operations require rather long times for the user, because it is necessary to act several times on all the levers in the attempt to achieve a suitable balance among the fastening forces applied to each one of the levers.

[0010] Another drawback of the conventional fastening devices is that the shape of the levers, particularly of the levers located in the forefoot and/or ankle region, produces considerable bulks that can even cause the user to fall due to accidental contact of the levers with the snow or with other obstacles.

[0011] Another drawback is that those accidental impacts, or a fall, can entail the opening or breakage of the levers involved in these impacts or at least damage them.

[0012] Another drawback that can be noted in conventional devices is that the presence of many levers having members and/or components that protrude laterally in various regions of the shoe penalizes the overall aesthetics of the shoe, encumbering it and making its shape scarcely linear and harmonious.

[0013] An aim of the present invention is therefore to solve the noted technical problems, eliminating the drawbacks of the cited prior art, by providing a device that allows to achieve optimum fastening of a shoe around the user's foot, so that the foot is compressed uniformly at every region thereof.

[0014] An important object is to provide a device that allows the user to perform overall fastening of the boot rapidly and easily.

[0015] A further object is to provide a fastening device that allows to reduce the number of the regions of the shoe affected by the levers.

[0016] A further object is to provide a device that is reliable, safe and free from malfunctions.

[0017] A further object is to obtain a fastening device that allows to provide a shoe that is lightweight and aesthetically pleasant.

[0018] A further object is to provide a fastening device that combines the above characteristics with low production costs and can be obtained with conventional and known machines and systems.

[0019] This aim and these and other objects that will become better apparent from the description that follows are achieved by a fastening device as claimed in the appended claims.

[0020] Other objects will become better apparent from the description that follows, which must be considered in combination with the accompanying drawings, which illustrate by way of non-limitative example a particular embodiment wherein:

Figure 1 is a first side view of a boot provided with a fastening device according to the invention;
Figure 2 is a second side view of the boot of Figure 1;
Figure 3 is a view of the fastening device;
Figure 4 is a second view, in phantom lines, of the fastening device without the rack;
Figures 5 and 6 are views of the connection of the device to the second flap;
Figure 7 is a sectional view, taken along the line VII-VII of Figure 5;
Figure 8 is a rear view of the device.

[0021] With reference to the cited figures, the reference numeral 1 designates a fastening device, particularly usable in a sports shoe, such as a ski boot, generally designated by the reference numeral 2.

[0022] In the example shown in Figures 1 and 2, the ski boot 2 includes a shell 3 that has a toe 4 and a heel 5, which protrude upward at the ends of a sole 6.

[0023] The shell 3 has a first flap and a second flap, designated by the reference numerals 7a and 7b, which can be mutually connected for example by partial overlap in the upper metatarsal region.

[0024] The boot 2 further includes a quarter 8, which is pivoted to the shell 3 approximately at a first region 9

of the malleoli.

[0025] The first and second flaps 7a and 7b can also be provided so that they are mutually adjacent and concealed by using a tongue, designated by the reference numeral 10, that is associated with the toe 4 at one end, so as to be arranged along the upper metatarsal and instep regions of the foot.

[0026] The shell 3 and the quarter 8 constitute a containment structure for a soft innerboot 11 that surrounds the user's foot.

[0027] The first and second flaps 7a and 7b and the tongue 10 are fastened around the user's foot by activating the device 1.

[0028] The device is constituted by a single tensioning member 13, such as for example a cable that is associated, at one end 14, by way of a first connection means 15 such as an annular eye, with a plate 45 to which a rack or toothed band 12 is rigidly coupled, the band or rack being arranged transversely to the shell 3 approximately at the level of the instep.

[0029] The plate 45 has two separate holes formed axially thereto, respectively for connection to the eye and to the rack or toothed band 12.

[0030] The cable 13 is arranged and slides at a guiding means 16, for example a sheath that is preferably flexible and is arranged approximately like a letter U, with rounded corners, and is associated with the boot 2 at the first flap 7a.

[0031] The sheath is associated, at its ends 17 and 18, preferably by way of first and second sheath holders 19a and 19b, with the first flap 7a or with a rigid supporting plate 20, which is U-shaped and is associated with the first flap 7a by means of first studs, designated by the reference numeral 21.

[0032] The supporting plate 20 has wings 20a and 20b that are directed toward the second flap 7b and lie respectively in a region that is adjacent to the instep and the forefoot. The supporting plate has, on the surface that faces the shell, a seat for the sheath, so as to allow to maintain its position when the cable is tensioned and so as to protect it against any accidental impacts.

[0033] As an alternative, it is possible to provide guiding members 40a and 40b for the sheath, which are associated with the first flap 7a or with the supporting plate 20 and are arranged in the arc-like region for connection to the overlying wings 20a and 20b of the supporting plate 20.

[0034] The cable then has a first portion 22a, which is connected to the rack 12 and is arranged approximately transversely to the foot instep. A second portion 22b is located downstream of the guiding member at the first bend 41 of the sheath and is arranged approximately longitudinally to the first flap 7a. A third portion 22c is located downstream of the guiding member at the second bend 41 of the sheath and is arranged approximately transversely to the forefoot region and reaches the second flap 7b.

[0035] A means for detachable and selective connection to the second flap 7b is associated with the end of the third portion 22c of the cable and is constituted by a hook 23 that is approximately S-shaped and can be positioned selectively at a stop member 26, such as a plate that is preferably but non-limitatively triangular and is associated with the second flap 7b by way of suitable second studs 25.

[0036] A wing 27 protrudes above the plate, approximately transversely to the forefoot region, and an axial slot 43 is formed therein along part of the thickness and at least internally thereto. First and second through holes,. designated by the reference numerals 44a and 44b, are provided in the plate at the slot.

[0037] The diameter of the first and second holes and the length and depth of the slot are such as to allow to position in the slot and selectively at one of the first or second holes the free end of the hook 23, as shown in Figure 7.

[0038] Coaxially to the cable 13 there is, in the portion 22c, a helical spring 28 that is interposed between the first sheath holder 19b and the wing 27 of the plate 26: the spring is compressed when the cable is tensioned and allows to compensate the force applied in the forefoot region both during sports practice and during fit adaptation following the imparted fastening.

[0039] This allows to achieve continuous, dynamic and automatic adjustment of the degree of fastening of the first and second flaps.

[0040] At least part of the third portion 22c and part of the helical spring 28 pass through a through seat 29 that is formed approximately transversely to the tongue 10.

[0041] The helical spring 28 may have a number of coils and therefore such a shape adapted to completely, or almost completely, surround cable 13 in order to constitute a protective means for the cable against possible impact. Such a construction, wherein a further protective sheath is coaxially provided around the helical spring 28 which is in turn coaxially mounted around the cable 13, extends the protection of the cable on the entire tongue 10 rather than on only the region where the through seat 29 is provided. With the provision of a further sheath, the through seat 29 may be omitted.

[0042] The device comprises a traction member 30, which is associated, or formed monolithically, with the second flap 7b approximately at the instep region.

[0043] The traction member 30 is constituted by a second plate 31, from which two shoulders 32a and 32b protrude. A lever arm 33 that can be gripped by the user is articulated between the shoulders.

[0044] The lever arm 33 is connected to a ring-shaped grip means for selective connection to one of the teeth of the rack 12.

[0045] Once the ring-shaped grip means is connected to the rack 12 and the hook 23 is arranged in one of the first and second holes 44a and 44b, the user applies, when the lever arm is turned, a traction to the cable 13 which entails the mutual fastening of the first and second flaps.

[0046] During the fastening of the first and second flaps 7a and 7b, the spring 28 is suitably preloaded: this allows, during sports practice, to adapt the degree of mutual fastening of the first and second flaps according to the adaptation of the foot inside the boot. When the lever arm is opened the mutual spacing of the first and second flaps is forced.

[0047] The fastening of the boot 2 in the lower part of the leg is then completed by applying conventional closure levers and/or straps, generally designated by the reference numeral 35.

[0048] It has thus been shown that the invention has achieved the intended aim and objects, a device having been provided which, by way of a single tensioning member, allows to achieve optimum fastening of the boot around the user's foot, allowing a uniform distribution of force along the regions of the boot that lie between the instep and the forefoot.

[0049] The absence of levers or other particularly protruding means at the forefoot region allows to reduce the possibility of impacts between the boot and the snow during skiing.

[0050] It is also evident that the presence of a single tensioning member improves the aesthetic aspect of the boot, by way of the harmoniousness and linearity of the boot in the region below the instep.

[0051] The device allows the user to speed up and simplify the fastening operation, since it is not necessary to activate a lever in order to achieve fastening at two separate regions.

[0052] To summarize, the invention allows, by way of the arrangements and configurations of the cable and of the helical spring, a continuous, dynamic and automatic adjustment of the degree of mutual fastening of the first and second flaps.

[0053] The device according to the invention is susceptible of numerous modifications and variations, within the scope of the appended claims.

[0054] Thus, for example, it is possible to apply the device also in the regions of the boot that affect the lower part of the leg, as a replacement of the levers or other conventional closure means provided thereat.

[0055] The materials used, as well as the dimensions that constitute the individual components of the invention, may of course be more pertinent according to specific requirements.

[0056] The various means for performing certain different functions need not certainly coexist only in the illustrated embodiment but can be present per se in many embodiments, including ones that are not illustrated.

Claims

1. A fastening device, particularly for sports shoes that comprise at least a first flap and a second flap to be fastened, **characterized in that** it comprises a single tensioning member that is guided on said first flap and which affects the instep and forefoot regions of the boot, and can be selectively associated at its ends with said second flap of said shell and/or quarter and with a traction member that is associated with said second flap.

2. The device according to claim 1, **characterized in that** said single tensioning member, comprises a cable that is associated, at one end, by way of a first connection means such as an annular eye, with a plate to which a rack or toothed band is rigidly coupled, said rack or band being arranged transversely to said shell approximately at the level of the instep.

3. The device according to claim 2, **characterized in that** said cable is arranged and slides at a guiding means, such as a flexible sheath arranged approximately in a U-shaped configuration with rounded corners and associated with said shell at said first flap.

4. The device according to claim 3, **characterized in that** said sheath is associated, at its ends, by way of first and second sheath holders, with said first flap or with a supporting plate that is in turn U-shaped and is associated with said first flap by way of first studs.

5. The device according to claim 4, **characterized in that** said rigidsupporting plate has wings directed toward said second flap and arranged respectively in a region that is adjacent to the instep and the forefoot.

6. The device according to claim 5, **characterized in that** said supporting plate has, on the surface that faces said shell, a seat for said sheath so as to allow to maintain its position when said cable is tensioned and so as to protect it against any accidental impacts.

7. The device according to claims 5 and 6, **characterized in that** it comprises guiding members for said sheath which are associated with said first flap or with said supporting plate and are arranged in the arc-like region for connection to said overlying wings of said supporting plate.

8. The device according to claim 7, **characterized in that** said cable has a first portion, which is connected to said rack and is arranged approximately transversely to the foot instep; a second portion, which is located downstream of the guiding member at the first bend of said sheath and is arranged approximately longitudinally to said first flap; and a third portion, which is located downstream of the guiding member at the second bend of said sheath and is

arranged approximately transversely to the forefoot region and reaches said second flap.

9. The device according to one or more of the preceding claims, **characterized in that** a means for detachable and selective connection to said second flap is associated with the end of said third portion of said cable, said means being constituted by a hook that is approximately S-shaped and can be arranged selectively at a temporary stop member, such as a triangular plate that is associated with said second flap by way of suitable second studs.

10. The device according to claim 9, **characterized in that** a wing protrudes above said plate approximately transversely to the forefoot region, an axial slot being formed in said wing along part of its thickness and at least internally thereto, at least one first through hole being provided at said slot in said plate.

11. The device according to claim 10, **characterized in that** the diameter of said first and second holes and the length and depth of said slot are such as to allow to position the free end of said hook in said slot and selectively at one of said first or second holes.

12. The device according to claim 11, **characterized in that** a helical spring is arranged in said third portion coaxially to said cable and is interposed between said second sheath holder and said wing of said plate.

13. The device according to claim 12, **characterized in that** said helical spring is compressed when said cable is tensioned and allows to compensate the force applied in the forefoot region.

14. The device according to claim 10, **characterized in that** said cable and said helical spring allow continuous, dynamic and automatic adjustment of the degree of fastening of said first and second flaps.

15. The device according to one or more of the preceding claims, **characterized in that** at least part of said third portion of said helical spring passes through a through seat formed approximately transversely to said tongue.

16. The device according to one or more of the preceding claims, **characterized in that** it comprises a traction member that is associated with said second flap approximately at the foot instep region, said traction member being constituted by a second plate from which two shoulders protrude, a lever arm being articulated to the shoulders and being connected to a grip means that is ring-shaped for selective connection to one of the teeth of said rack.

17. The device according to claim 10, **characterized in that** a first through hole and a second through hole are arranged sequentially on said plate.

18. The device according to one or more of the preceding claims, **characterized in that** said hook can be arranged selectively and detachably in at least one of said first or second holes.

19. The device according to one or more of the preceding claims, **characterized in that** during the fastening of said first and second flaps said spring is preloaded.

20. The device according to one or more of the preceding claims, **characterized in that** during sports practice the degree of mutual fastening of said first and second flaps is adapted.

21. The device according to claim 18, **characterized in that** when said lever arm is opened said spring forces the mutual spacing of said first and second flaps.

22. The device according to claim 12, **characterized in that** a further protective sheath for said cable is provided coaxially to said helical spring.

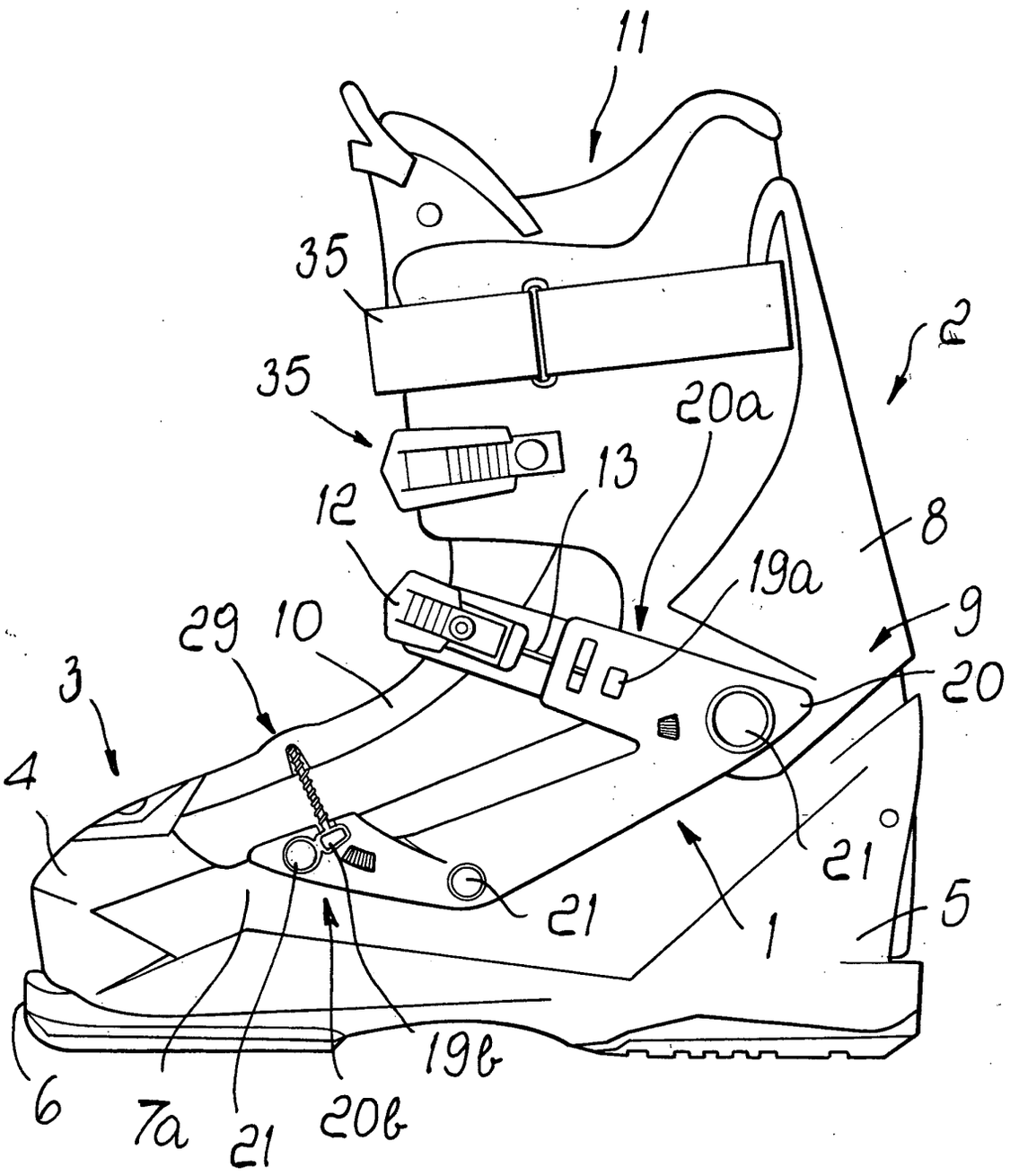


Fig. 1

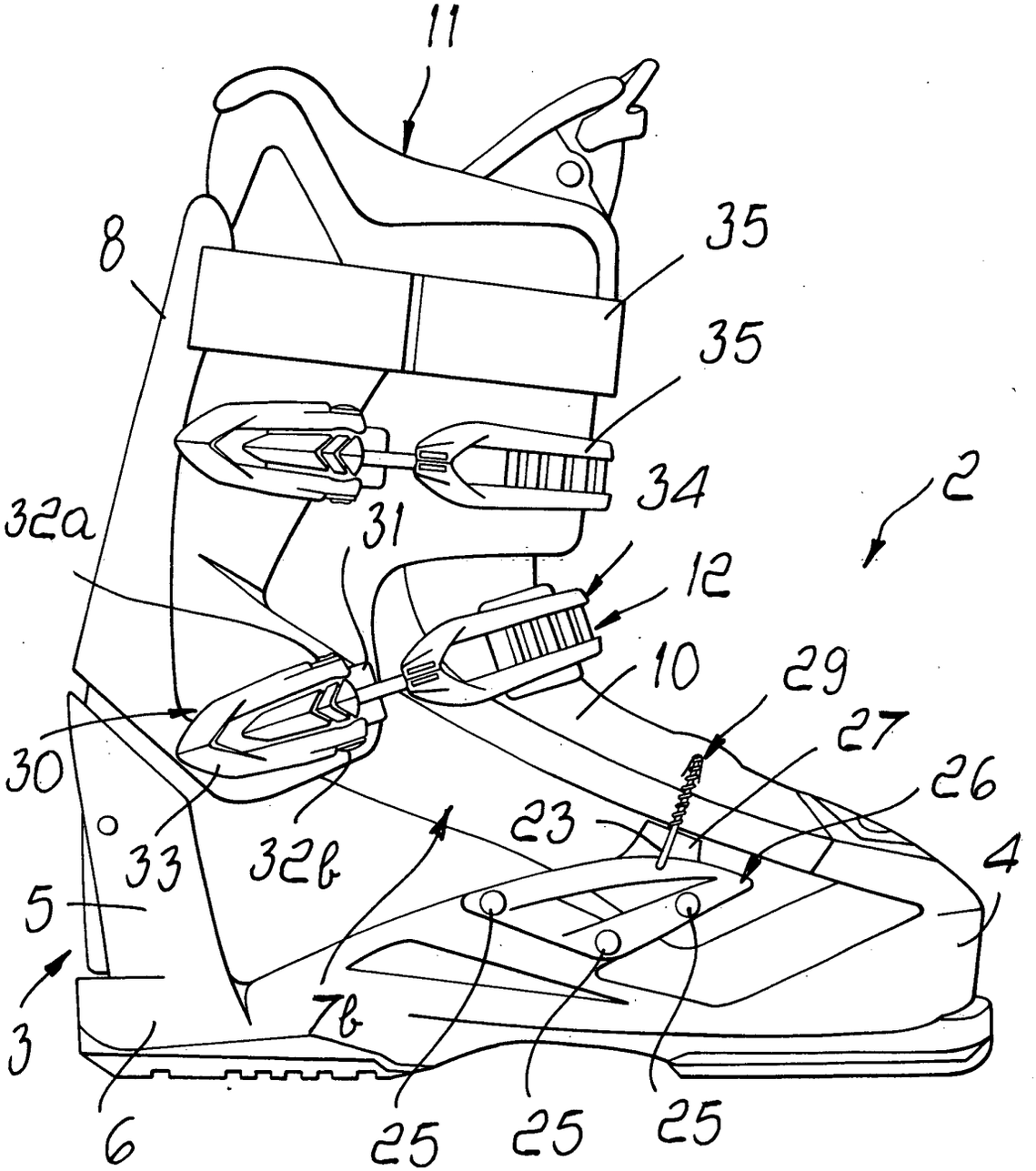
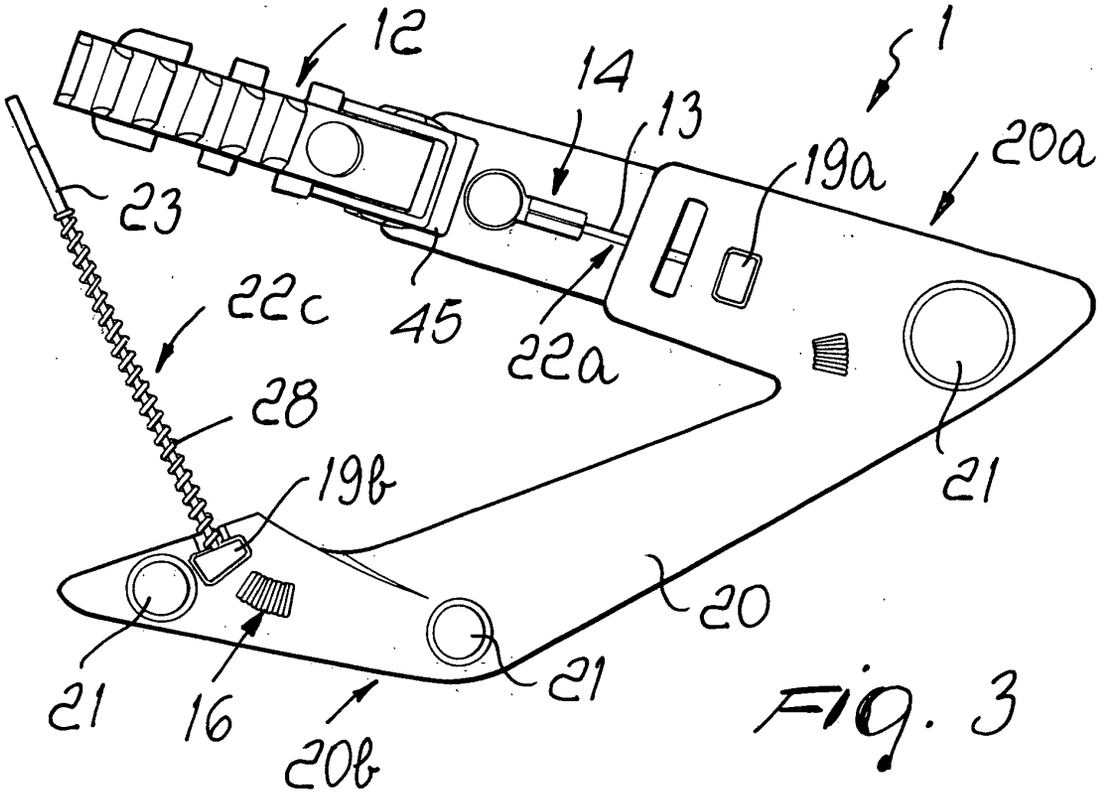


Fig. 2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22a
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19b
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16
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20b

Fig. 3

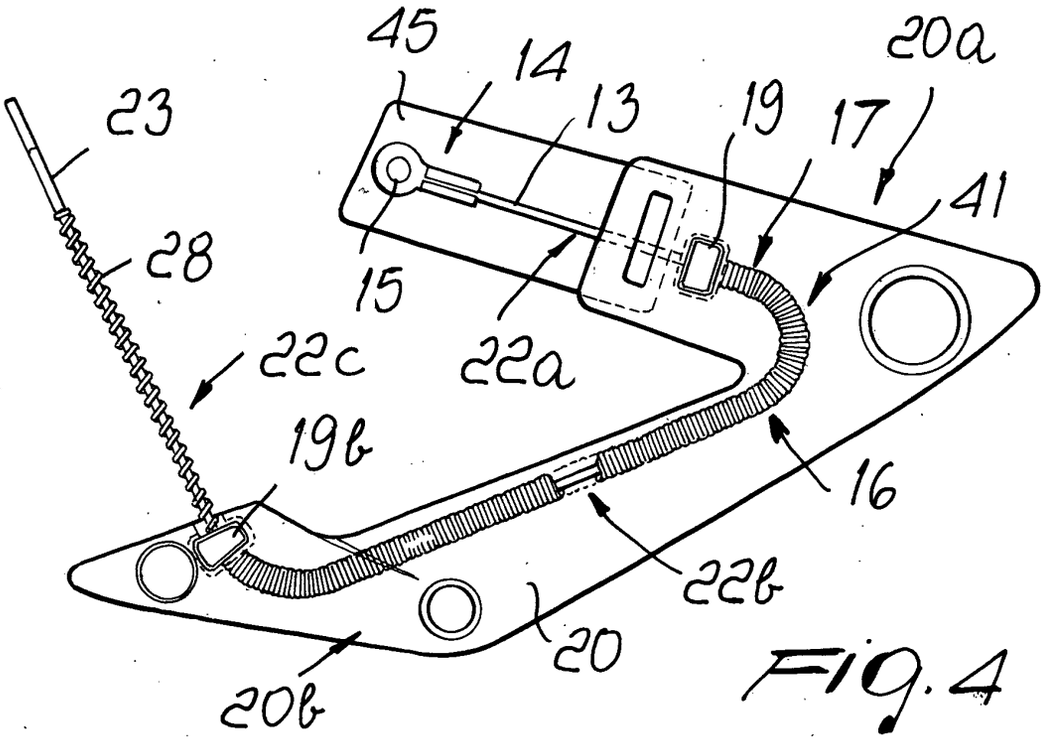
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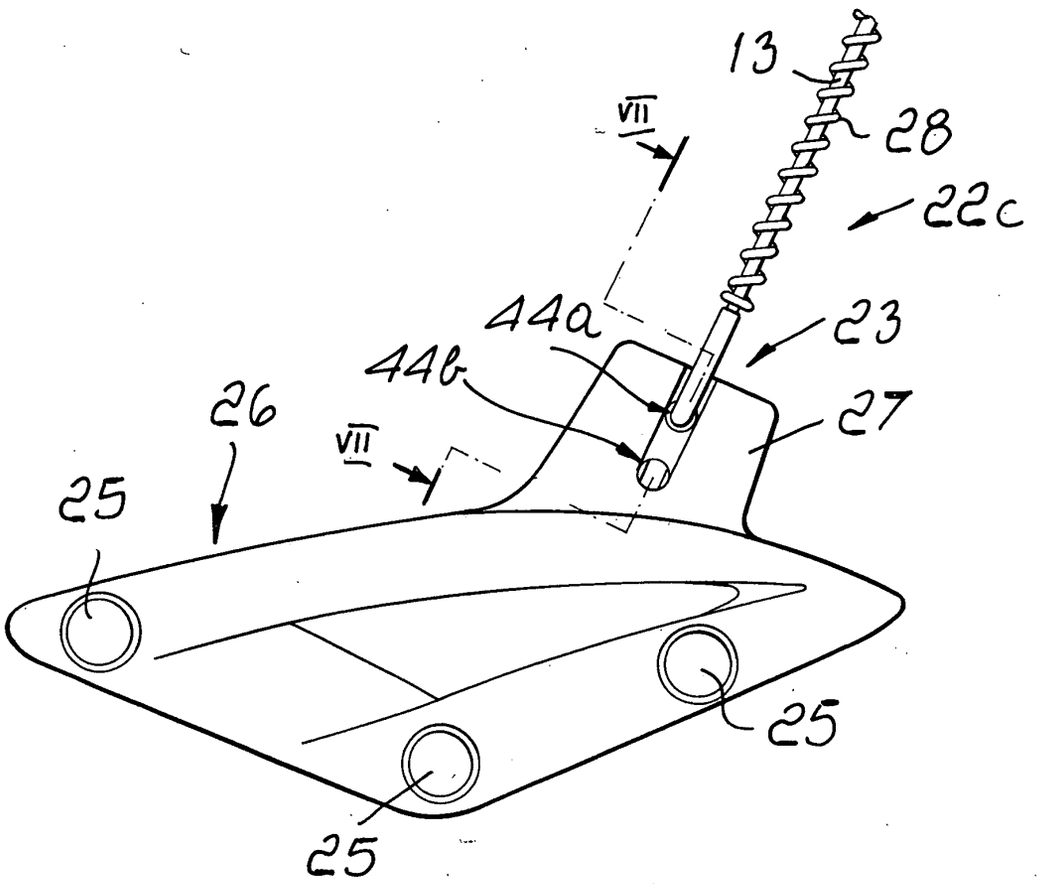
Fig. 4


13
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22c
44a
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Fig. 5

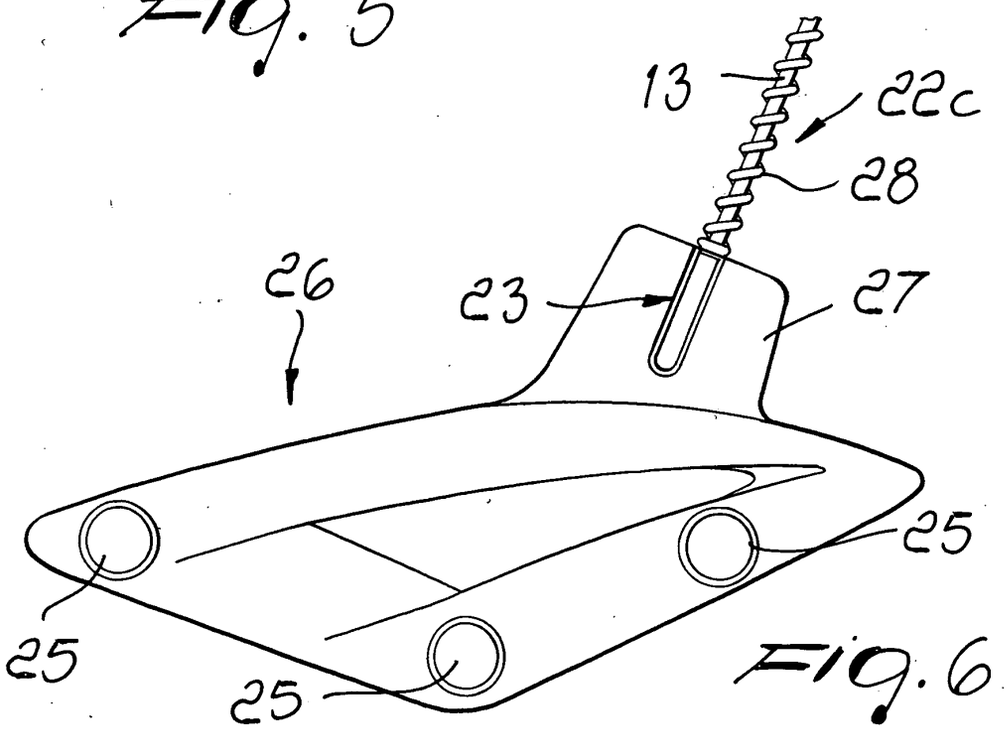
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Fig. 6

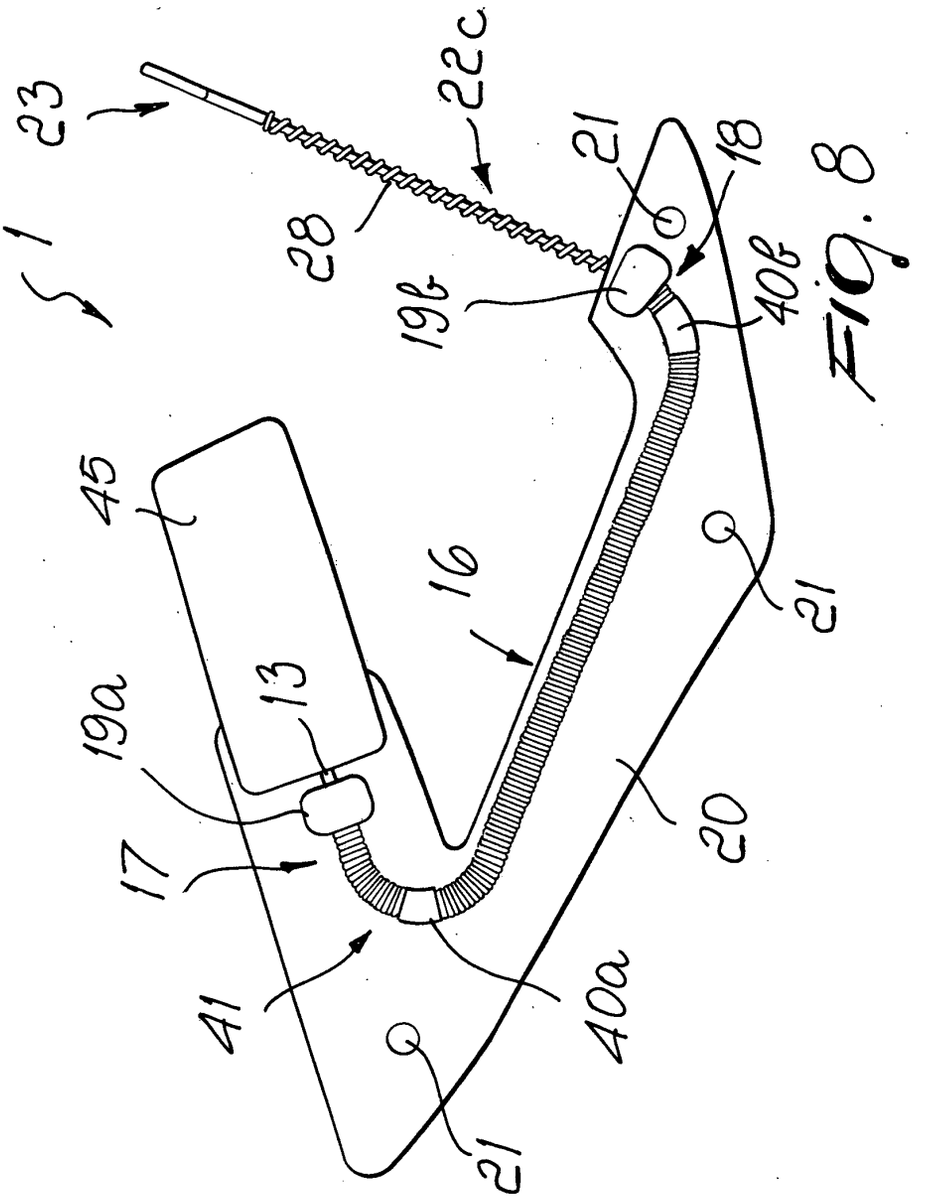
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Fig. 8

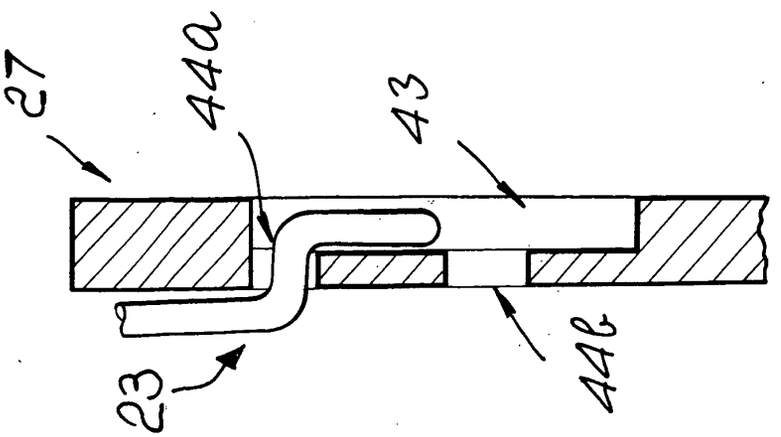
27
44a
43
23
44b

Fig. 7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 00 1504

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A43C A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14 August 2003	Claudel, B

CATEGORY OF CITED DOCUMENTS

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