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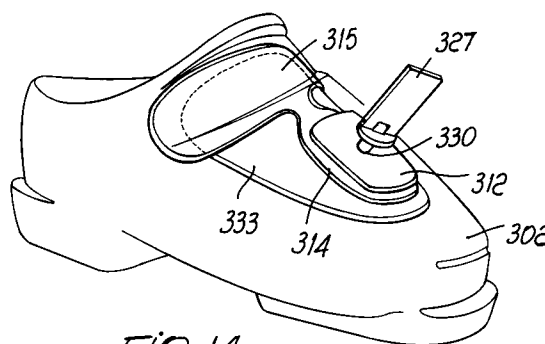
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I-20123 Milano(IT)(54) **Foot securing device, particularly for ski boots.**

(57) A foot securing device, for ski boots composed of a shell (302) to which at least one quarter is articulated, containing one or more containers (315) for a fluid. The device includes at least one actuator which interacts, by means of a plate (312) and in contrast with possible elastic means, with at least one tank (314) which is connected to the one or more containers. The actuator thus allows the user to determine beforehand the feeding of the fluid from the tank or the discharge thereof from the one or more containers: it is thus possible to achieve an optimum fit of the foot inside the boot by providing a device which is structurally and operatingly very simple.

*FIG. 14***EP 0 501 383 A2**

The present invention relates to a foot securing device, particularly for ski boots.

Several devices are currently known for securing the heel or the instep of the foot or the metatarsal region inside a boot.

Among these, devices are known which are constituted by a knob which is rotatably associated for example at the rear of the rear quarter of the boot and has, at the end of a threaded stem which belongs to said knob and is arranged inside the quarter, a presser which interacts with a protruding flap of the shell.

However, this known type of device has problems: the actuation of the knob in fact produces a pressure on the flap which is concentrated on a very small region constituted by the region occupied by the presser.

This arrangement makes the securing device difficult to adapt to the various anatomical shapes of the heel or of the foot, and can furthermore cause pain due to the concentration of pressure on a small area which is not optimum for every skier.

The known use of cables, which partially embrace the flap which protrudes from the shell or from an innerboot arranged inside the boot, does not solve the above problems.

As a partial solution to these problems, the same Applicant filed, on September 5, 1988, a European patent application, no. 88114445.5, which discloses a heel securing device whose peculiarity consists of the fact that it comprises at least one wedge-like element interposed, at the heel region, between the rear inner surface of the rear quarter and the skier's foot.

Means are then provided for adjusting the position of the wedge-like element.

Although undoubtedly valid, also this device has problems because, although it is possible to regulate the degree of inclination of the flap, localized pressure regions due to the use of rigid securing elements may nonetheless be created.

A French patent application, No. 1,406,610, is also known which claims a device for adjusting and securing an item of footwear on the foot, which is characterized in that one or more elements, which can be inflated by means of a gas, a fluid or a mixture of the two, are interposed between the inner part of the item of footwear and the foot.

The main problem of this solution is that it requires external means suitable for allowing to inject the fluid, such as a pump or a pressurized cylinder.

This inflation operation is awkward and furthermore creates problems for accommodating the pumping means (in one's pockets or hand or in a bag, etc.) which severely restrict its use.

As a partial solution to this problem, a French patent No. 74.39713 is also known which discloses

a means for pumping air into a pad arranged between the quarter and an inner lining.

This pumping means also creates problems: it in fact has hardly negligible dimensions which also substantially alter the overall aesthetics of the boot.

Furthermore, the user must have a certain manual skill in order to achieve the required degree of pressure inside the pad, and the pumping means can furthermore be subject to problems in operation due to the possible infiltration of water inside it, which would compromise its correct operation.

A German patent is also known, published as No. 2,321,817 and filed on April 30, 1973, which discloses a device constituted by a bellow member which is pivoted at the sole of the boot; the actuation of said element allows to pump air into adapted pads arranged inside the boot.

Even this solution has considerable problems, since the contact of the bellow member with the ground rapidly leads to wear and therefore to malfunctions thereof; furthermore, since the sole of the boot is always in contact with snow, considerable difficulty is observed in using the bellow member since during its contraction step it can be difficult to activate due to necessary sole retention means, which are provided and necessary.

A French patent, No. 85.03257, is also known which discloses a device which comprises a knob whose actuation entails the compression of a liquid which is in turn suitable for compressing air which is distributed inside bags arranged inside the boot.

Even this solution has problems due to considerable complexity in execution, which entails both the use of an external actuator, such as the knob, which is certainly bulky, and the need to use two different containers, one for the liquid and the other for the air, with problems of interconnection between said containers and possible breakages of the connecting diaphragms.

Finally, an Italian patent application No. 59393 B/88, filed on October 28, 1988, discloses a pump device, for liquids, to be applied to ski boots in order to secure the heel, and its peculiarity consists of the fact that it is constituted by an adjustable piston pump for liquids with a lever which is connected to two elastic containment bags with form-fitting compression applied between the rear inner lateral parts of the shell proximate to the heels.

Even this solution has problems, such as considerable complexity in execution and a size which leads to a substantial alteration of the shape of the boots.

The aim of the present invention is therefore to eliminate the problems described above in known types by providing a device which allows to achieve an optimum, rapid and easy securing of

the foot inside the boot, said device having modest dimensions which do not substantially alter the aesthetic configuration and the dimensions typical of a ski boot.

Within the scope of the above aim, an important object is to provide a device which is structurally simple and can be manufactured with a small number of components.

Another important object is to provide a device which is rapid and easy to activate and deactivate for the user according to the specific contingent requirements.

Another important object is to provide a device which allows to achieve optimum fit for the user.

Another object is to provide a device which is free from jammings and maintenance due to the use of the boot.

Another object is to provide a device which associates with the preceding characteristics that of being reliable and safe in use.

Not least object is to provide a device which associates with the preceding characteristics that of having a modest cost and of being executable with conventional and known facilities and machines.

This aim, these objects and others which will become apparent hereinafter are achieved by a foot securing device, particularly for ski boots composed of a shell to which at least one quarter is articulated and which has at least one container for a fluid, characterized in that it comprises at least one actuator which interacts, by means of a plate, with at least one tank which is connected to said at least one container, said actuator allowing the user to determine beforehand the feeding of said fluid from said at least one tank or the discharge thereof from said at least one container.

Advantageously, said one or more containers are connected, with one or more cutoff means possibly interposed, to further tanks for the drainage of said fluid thereof.

Further characteristics and advantages of the invention will become apparent from the detailed description of some particular but not exclusive embodiments, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a lateral perspective view of a ski boot according to the invention;

figure 2 is a perspective view of the device according to the invention;

figure 3 is a sectional view, taken along the plane III-III of figure 2;

figure 4 is a sectional perspective view, taken along the plane IV-IV of figure 3;

figure 5 is a view, similar to that of figure 3, of the device in the condition in which the actuator is maximally activated;

figure 6 is a sectional view, taken along the

plane VI-VI of figure 5;

figure 7 is a view, similar to the one of figure 2, of the invention in its activation related to figure 5;

figure 8 is a lateral perspective view of a ski boot according to a different embodiment of the invention;

figure 9 is a first sectional partial side view of the boot of the preceding figure, in the condition in which it is not activated;

figure 10 is a second side view of the boot of figures 9-10, in the activation condition;

figure 11 is a lateral perspective view of a ski boot according to a further embodiment of the invention;

figure 12 is a first sectional partial side view of the ski boot of figure 11, taken along a median plane which is longitudinal to the rear quarter, in the activation condition;

figure 13 is a view of the boot of figures 11-12, in the activation condition;

figure 14 is a partial perspective front view of a ski boot according to still a further aspect of the invention;

figures 15 and 16 are sectional side views showing the boot of figure 14 respectively in the positions of maximum activation and non-activation of the device.

With reference to the above figures, the reference numeral designates a ski boot composed of a shell 2 to which at least one rear quarter 3 is articulated.

The numeral 4 designates a device for securing one or more parts of the foot, such as the heel, the instep or the metatarsal region.

Said device 4 comprises at least one actuator which is preferably constituted by a slider 5 which has a wedge-shaped body 6 from which at least one T-shaped arm 7 protrudes laterally and protrudes out of the rear quarter 3 through an adapted first opening 8 defined thereon.

Preferably, figure 1 illustrates an arrangement of the device approximately at the heel of the foot.

Accordingly, the head 9 of the arm 7 can be accessed by the user.

The apex of the body 6 is directed toward the upper perimetric edge 10 of the rear quarter 3, and the inclined surface 11 of said body interacts with an adapted rigid plate 12 which is pivoted at its lower end 13 transversely to the rear quarter 3.

Said body 6 and said plate 12 are arranged adjacent to at least one tank 14 which preferably has a triangular transverse cross-section with its apex orientated in the opposite direction with respect to said body 6.

Said tank 14 contains a liquid, a gas, or a mixture of the two, which is connected to one or more containers, designated by the numerals 15a

and 15b, which are arranged inside the boot 1 for example at the regions to the side of the heel.

In order to advantageously allow the arm of the slider 5 to protrude from the rear quarter 3, an adapted second opening 16 is defined between the tank 14 and one or more of the containers 15a and 15b.

Advantageously, said first and second openings are arranged at the same plane and have similar dimensions.

The use of the device is thus as follows: if the slider 5 is arranged proximate to the lower end 13 of the plate 12, as illustrated in figure 3, the fluid contained in the containers 15a and 15b is transferred entirely into the tank 14.

By acting on the slider 5 and thus making the body 6 slide toward the upper perimetric edge 10 of the rear quarter 3, the inclined surface 11 interacts with the plate 12, forcing the plate, by virtue of its pivoting at the lower end 13, to compress the tank 14.

The slider 5 may have per se known means adapted to selectively lock its position on the first opening 8.

In this manner, the fluid, gas or mixture of the two contained in the tank 14 is pushed into the containers 15a and 15b until it reaches the condition illustrated in figure 5, wherein the plate 12 is moved onto a plane which is approximately parallel to the plane of the surface of the rear quarter 3.

In this manner, the tank 14 is maximally compressed, allowing much of the fluid to flow out into the containers 15a and 15b.

It is thus possible for the user to determine beforehand the required inflation of the containers 15a and 15b according to his specific requirements, obtaining the desired foot securing.

It has thus been observed that the invention has achieved the intended aim and objects, a device having been provided which allows to rapidly, easily and effectively secure the foot while having modest dimensions and bulk which do not alter the aesthetic shape of the boot.

Its arrangement inside the boot furthermore makes it free from malfunctions due to snow or ice, although the user can perform extremely rapid and easy activation and deactivation.

The invention is naturally susceptible to numerous modifications and variations, all of which are within the scope of the same inventive concept.

Thus, for example, figures 8, 9 and 10 illustrate a second embodiment wherein a first container 115a and a second container 115b are arranged inside the boot 101 respectively for example at the heel region and at the foot instep region and/or metatarsal region.

The tank 114 is accommodated at an adapted seat 117 defined beneath the sole 118 of the shell

102; interconnection between the tank and the containers occurs by means of adapted first ducts 119a and 119b.

The plate 112 is arranged so as to close the seat 117 and is advantageously articulated transversely to the sole 118 at a region adjacent to the tip 120 of the boot 101.

The actuator is constituted by a body 106 which is preferably wedge-shaped and protrudes from a plate 121 which is rigidly associated with a binding 122 or directly with a ski 123.

Advantageously, one or more cutoff means, such as first valves 124a and 124b, may be provided at the first ducts 119a and 119b.

Conveniently, each container 115a and 115b can be connected, by means of the interposition of further cutoff means such as second valves 125a and 125b, to adapted drainage tanks 126a and 126b.

Figures 10, 11 and 12 illustrate a further embodiment, wherein an adapted lever 227 is pivoted transversely at the rear quarter 203 of the ski boot 201 and is suitable, for example, for subjecting to tension adapted cables 228 which are suitable for mutually securing the rear quarter 203 and the front quarter 229.

At the lever 227 it is possible to provide, on the rear quarter 203, an adapted seat 217 suitable for containing a tank 214 and a plate 212 pivoted transversely to the seat 217 at the end adjacent to the upper perimetric edge 210 and to the rear quarter 203.

In this case, the tank 214 again has an essentially triangular shape, with its apex directed toward said upper perimetric edge 210.

The tank 214 is furthermore interconnected to one or more containers 215 arranged inside the boot by means of one or more adapted ducts 219.

In the illustrated solution, the lever 227 is provided, at the end which is pivoted to the rear quarter 203, with a cam 230 which during the closure of said lever interacts directly with the free end of the plate 212, forcing said plate against the tank 114.

Figures 14-16 illustrate a ski boot shell 302 having a device according to a further aspect of the invention. Device comprises a tank 314 connected to at least one container 315, substantially as previously described.

A plate member 312 is arranged at tank 314. A screw member 330 is associated with the shell 302 of the boot and with plate 312, so that by rotating the screw member 330, by means of a lever 327, the plate 312 acts on the tank 314 activating the fluid, substantially as described above.

A foot presser 333 is advantageously arranged between the container 315 and the foot of the skier.

To lock the screw member 330 in the desired

position, the lever 327 may, for example, be folded in a per se known manner.

Naturally, the arrangement of the containers, their number as well as the number of tanks and their arrangement may be the most appropriate according to the specific requirements.

The materials and the dimensions of the components of the device may also be the most pertinent according to the specific requirements.

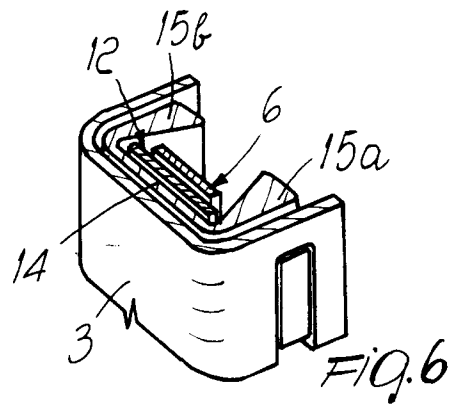
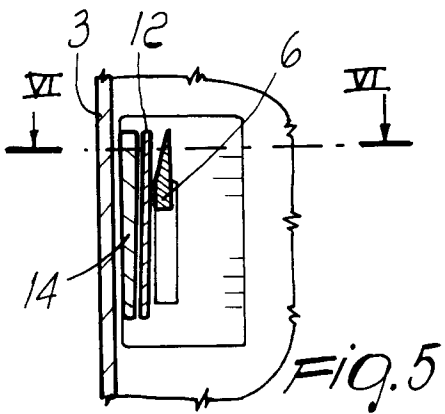
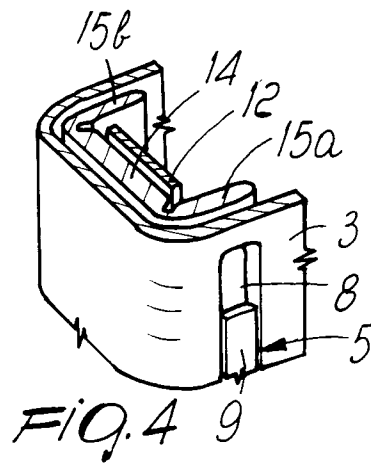
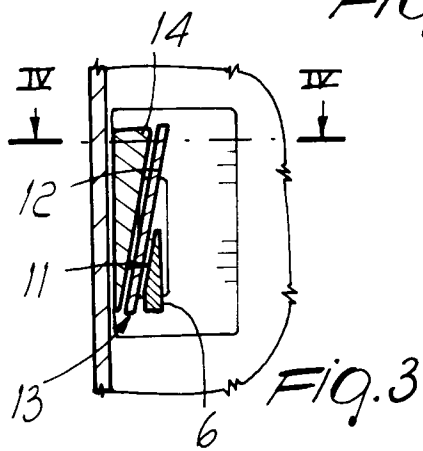
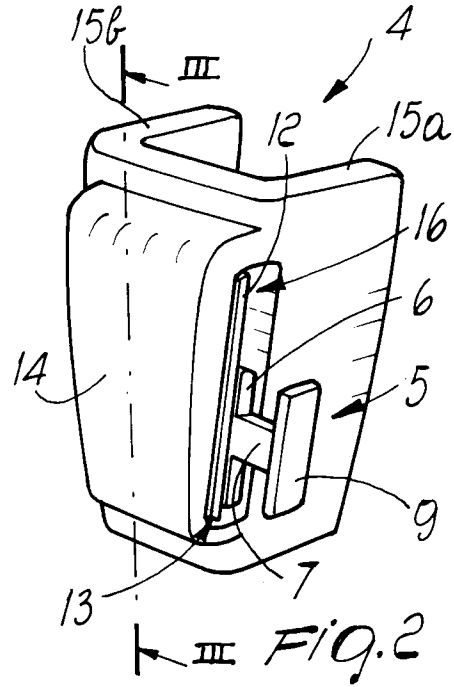
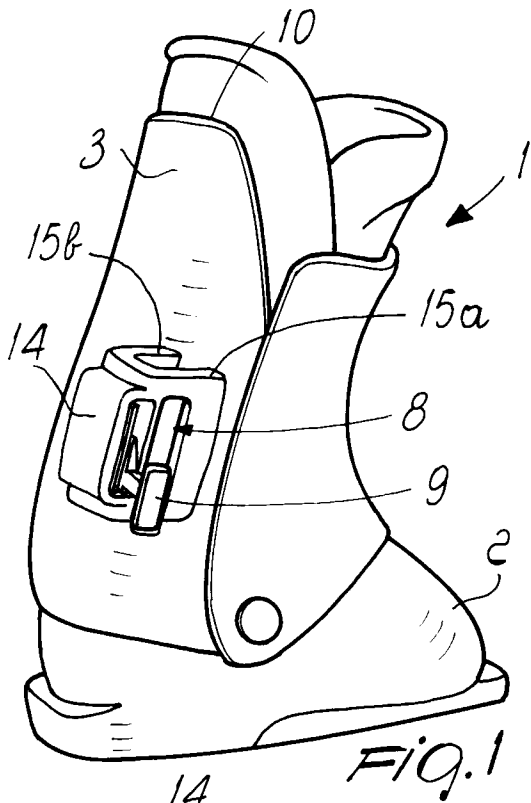
Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

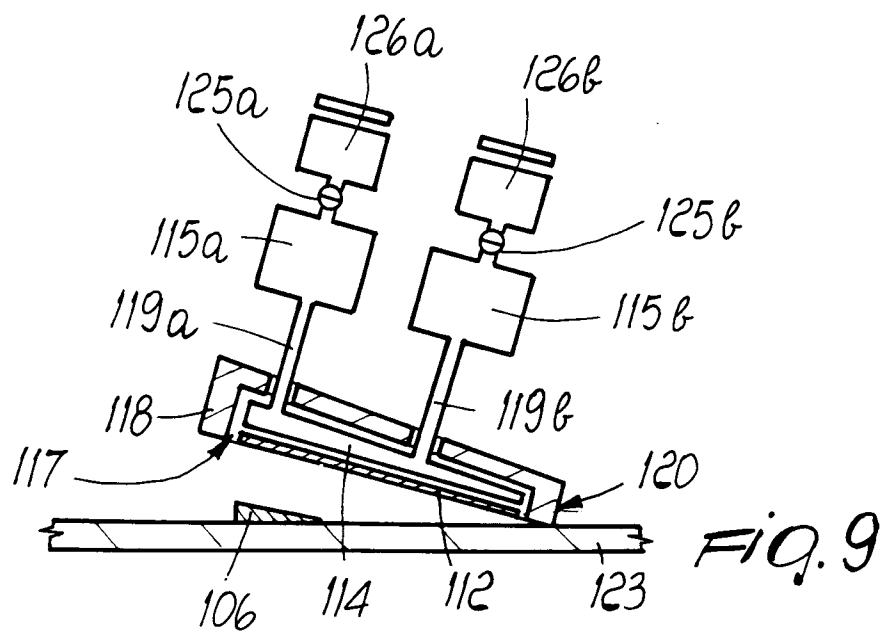
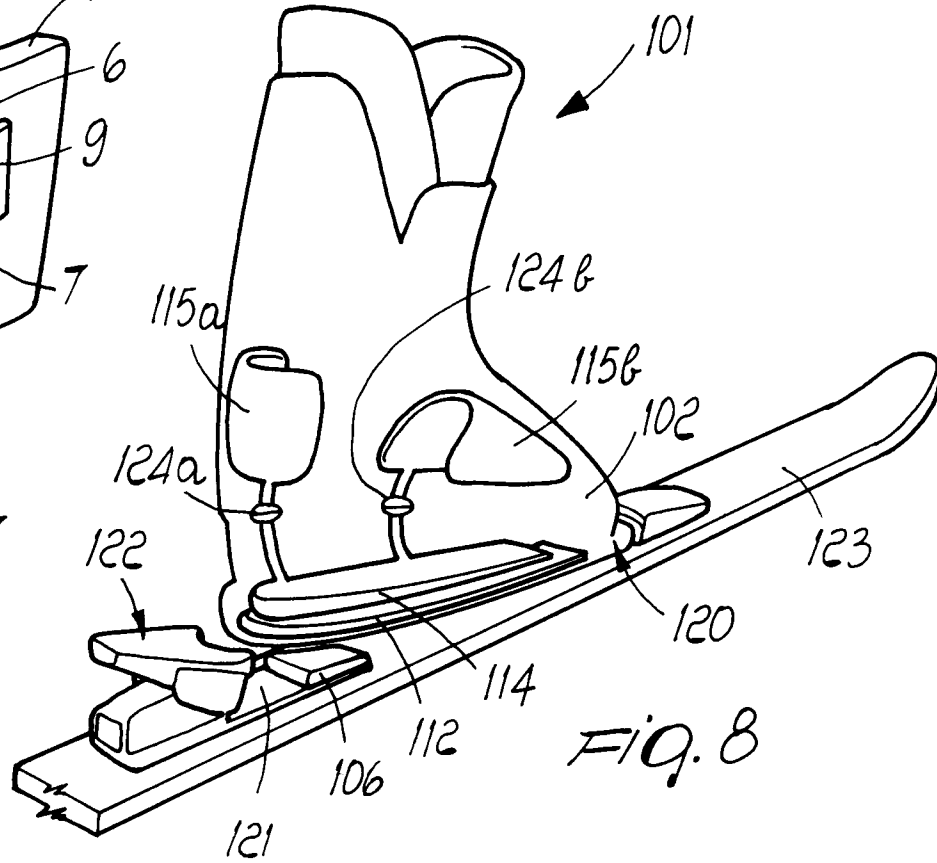
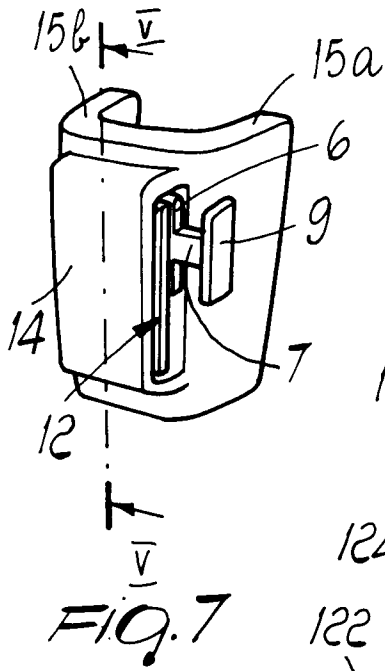
Claims

1. Foot securing device, particularly for ski boots composed of a shell (2,102,202,302) to which at least one quarter (3,203) is articulated and which has at least one container (15,115,215,315) for a fluid, characterized in that it comprises at least one actuator (5,106,227,330) which interacts, by means of a plate (12,112,212,312), with at least one tank (14,114,214,314) which is connected to said at least one container, said actuator allowing the user to determine beforehand the feeding of said fluid from said at least one tank or the discharge thereof from said at least one container.
2. Device according to claim 1, characterized in that said actuator (330) interacts with means (327) suitable for allowing the temporary and selective locking thereof in a specific position.
3. Device according to claim 1, characterized in that said at least one container is connected to further tanks (126a,126b) for the drainage of said fluid with the interposition of one or more cutoff means (125a,125b).
4. Device according to claim 3, characterized in that said at least one actuator is constituted by a slider (5) which has an essentially wedge-shaped body (6) from which at least one T-shaped arm (7) protrudes laterally, the head of said arm protruding outside said boot through a first opening (8) defined thereon.
5. Device according to claim 4, characterized in that said tank (14) is arranged inside said at least one quarter (3), said body (6) having its apex directed toward the upper perimetric

edge (10) of said at least one quarter and interacting with said plate (12) which is pivoted to said at least one quarter at one end which is opposite to said apex.

6. Device according to claim 5, characterized in that said plate (12) is arranged adjacent to at least one tank which has an essentially triangular transverse cross section with its apex oriented in the opposite direction with respect to the apex of said slider.
7. Device according to claim 1, characterized in that said at least one tank (114) is accommodated at a seat (117) defined beneath the sole (118) of said shell.
8. Device according to claim 7, characterized in that said plate (112) is arranged so as to close said seat and is articulated transversely thereto at a region adjacent to the tip of said boot.
9. Device according to claim 8, characterized in that said actuator is constituted by an essentially wedge-shaped body (106) which protrudes from a plate (121) which is rigidly associated with a binding (122) or with a ski (123).
10. Device according to claim 1, characterized in that said actuator is constituted by a lever (227) which is articulated transversely to said at least one quarter (203) and is provided, thereat, with a cam (230) which interacts with the end of a plate (212) which is freely pivoted, at its other end, to said at least one quarter.
11. Device according to claim 10, characterized in that said plate (212) interacts with a tank (214) which is accommodated within an adapted seat (217) defined at said at least one quarter, said tank having an essentially triangular cross-section with its apex directed toward said upper perimetric edge (210) of said at least one quarter (203).
12. Device, according to claim 1, characterized in that said actuator comprises a screw member (330) associated with said shell (302) and with said plate (312), said screw member being adapted to activate said plate for actuating said tank (314), said screw member comprising a lever (327).
13. Device, according to claim 1, characterized in that it comprises a presser (333) arranged between the foot of the skier and said at least one container (315).





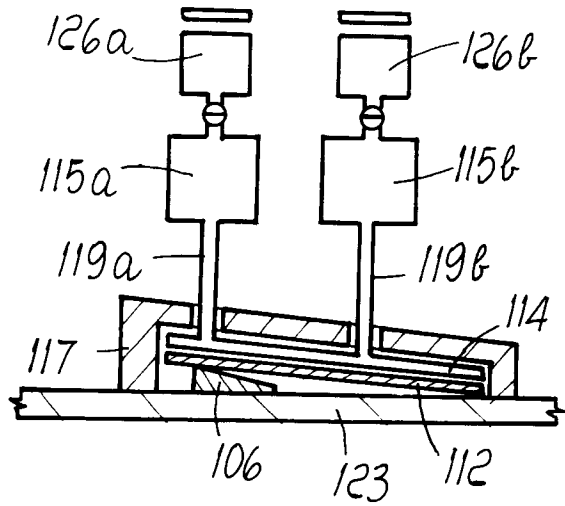


Fig. 10

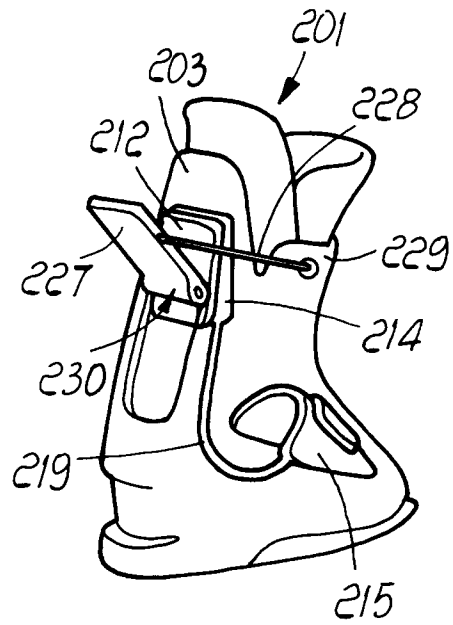


Fig. 11

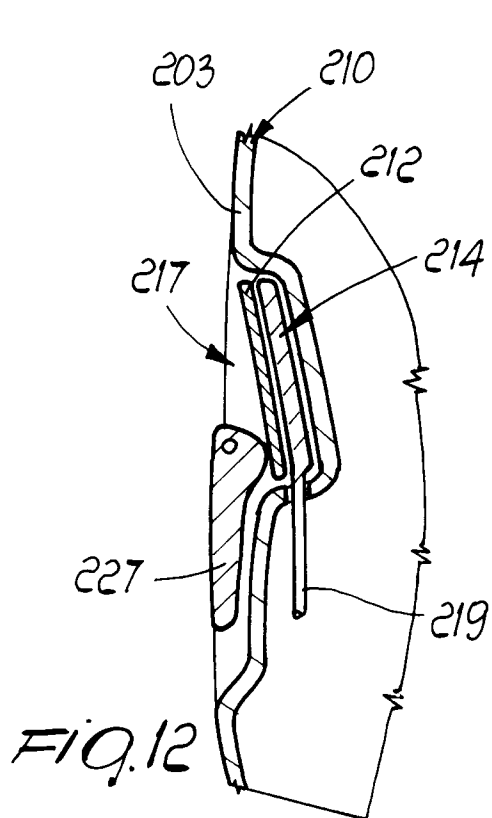


Fig. 12

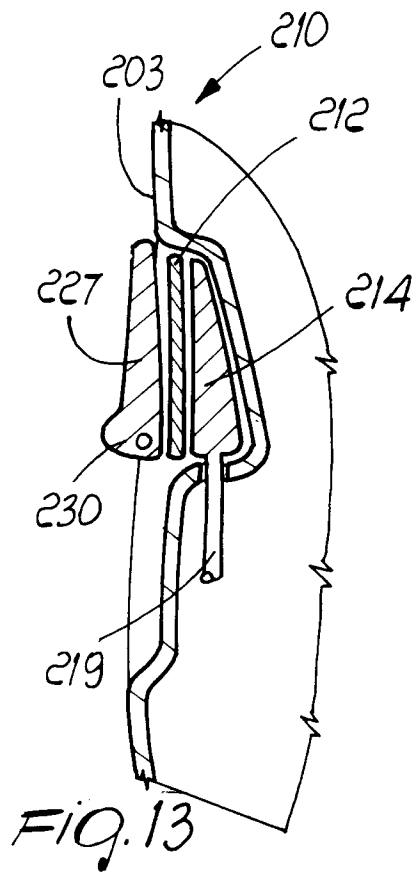


Fig. 13

