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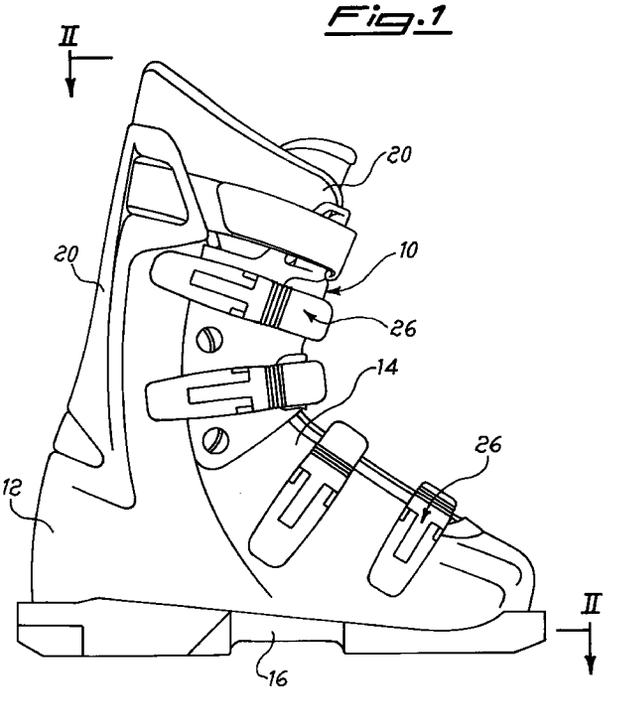
## (54) Ski boot structure

(57) Ski boot structure that consists of a monobloc constituted by the shell alone, which extends upwards to form or to substitute at least partially the portion of the lower leg envelopment (20) capable of receiving the lower portion of the tibia of the user, so that the lower leg envelopment becomes a part regidly integrated with the shell.

The monobloc has a portion of boot upper (14) provided with an elongate front opening, which makes the boot a front entry boot, the opening is shielded externally by a sealing element (24,28) anchored to one of the two edges forming the said front opening, and the portion of the boot upper surrounded by wrap-around elements (30,32) which define the upper edge of the boot and its height.

Fig.1

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## Description

The present invention relates to a ski boot structure, and more specifically a monobloc ski boot structure.

It is well known that for many years ski boots have been manufactured in the form of a rigid shell made of plastics material, on which shell is hinged a lower leg envelopment, also made of rigid plastics material, ensuring that the boot is equipped with padding and inner boots which come into direct contact with the foot of the user, so that not only is damage to the foot avoided, but increased comfort in use is ensured without sacrificing the rapid and faithful transmission of the commands of the skier's leg and foot through the boot and the binding to the ski.

It is also known that, in these boots of modern type, many adjustments have been provided and are still provided with regard to the degree of inclination of the lower leg envelopment with respect to the sole of the shell (and therefore the position of the lower part of the leg of the skier with respect to the ski), the so-called "canting" or the inclination of the longitudinal plane of the boot with respect to the plane orthogonal to the ski, the flexibility of the lower leg envelopment of the boot, the possibility of holding and releasing the lower leg envelopment with respect to the shell in the position of execution of the sporting activity and respectively in the free walking position, and so on.

It is therefore clear that up to now an endeavour has been made to make the two components of the ski boot, that is to say, the shell and the lower leg envelopment, as detached from one another as possible in order to permit all the adjustments mentioned above.

More recently, however, there has been an evolution in the techniques of ski construction.

According to such innovations, the lateral edges of the ski have "side cuts", or narrowed sections connected by wide radius arcs to the ends of the ski, so that the skier is obliged to act constantly on the edges of the skis and above all, in order to turn better, the athlete must act substantially in the central region of the ski, while in order to modity the radius of curvature he must increase or reduce (depending on the desired result) the lateral angulation of the system constituted by the boot, the binding and the ski.

Under these conditions it is also clear that the efforts of the athlete, and in particular such variations of angulation, are not favoured by the boot structure described previously and in particular by the fact that the lower leg envelopment can be unfastened with respect to the shell of the boot.

It has now been found that this problem can be solved by a boot structure which is characterized in that the lower leg envelopment becomes a part rigidly integrated with the shell, or the hinging of the lower leg envelopment to the shell disappears.

In other words, and in the preferred embodiment of the present invention, the ski boot structure becomes a monobloc constituted by the shell alone, which preferably extends upwards to form or to substitute at least partially the part of the lower leg envelopment capable of receiving the lower portion of the tibia of the user, which shell is intended to receive padding and/or an inner boot of the known type.

In relation to the present invention, it should be noted that one-piece ski boots have already been known in the past, but were made of hide, so that it was not feasible for them to provide a lower leg envelopment of the traditional type. Moreover, the lack of rigidity of the boot upper discouraged then, as now, its adoption for any application which requires faithful transmission of the commands of the skier's leg to the ski.

The prior art also includes one-piece boots produced when the structures made of plastics material are proposed and produced as a substitute for the hide boots, without it being possible, however, to provide the functional capability which is achieved with the boot structure according to the present invention.

Without wishing to impose undue limitations on the scope of the present invention, among the principal advantages obtained with the ski boot structure according to the present invention the following may be mentioned:

(a) precise and immediate transmission of the transverse forces applied by the user to the boots is ensured, and likewise the transmission back to the foot and above all to the leg of the skier of any variation; especially if unwanted, of the degree of angulation of the flat portions of the ski;
(b) leaning forward by the skier is limited, since he is no longer obliged to take the weight off the tail of the skis in order to turn the skis themselves and therefore to make turns, insofar as, in order to make turns, use is made principally of the variation in section and therefore the side cut of the ski;
(c) the forces applied by the skier to the boot are brought back to the centre of the soles as a consequence of the substantially inclined state in which the shell of the boot constrains the foot of the skier, and of the predetermination of such inclination.

The present invention will now be described in relation to the accompanying drawings which show the preferred embodiment of the invention itself.

In the drawings:

- Figure 1 is a view in side elevation of the monobloc ski boot in the basic version;
- Figure 2 is a section in the plane II-II in Figure 1;
- Figure 3 is a front view of the boot, with a partial exploded view of some component parts;
- Figures 4 and 4A are views from the rear part of the boot with a particular configuration for rigidifying it in the operating position;
- Figures 5, 5A and 6, 6A are perspective views of two alternative forms of particular components of

the boot in Figures 1 and 3;

- Figure 7 is a sectional view in the plane VII-VII in Figure 4;
- Figures 8 and 8A are similar views to Figure 2, but refer to the boot completed with component parts shown in Figures 5 and 5A, and
- Figures 9 and 10 are sections in plane IX-IX and X-X in Figures 8 and 8A respectively.

Considering firstly Figures 1 and 2, the ski boot according to the present invention comprises a shell 10, produced for example by injection from a suitable plastics material, so as to produce both the shell 12 itself, the boot upper 14 and a sole 16 as one body.

On the sole 16 there will then be inserted an inner sole 18, for example wedge-shaped, while the boot upper extends upwards, differing in this respect from the shell of the traditional boots known hitherto, in forming a part similar to a lower leg envelopment 20 and intended to receive the lower end of the leg and the ankle joint.

The boot upper 14 is divided at the front into two halves 22A, 22B (Fig. 7), the edges of which define an opening which is elongate in a longitudinal direction in the front part of the shell 10, so that it is defined as a front entry boot, the opening preferably being closed by means of an added-on sealing element which prevents the penetration of snow and ice, and which may alternatively be produced in the form illustrated in Figures 5 and 5A or in that in Figures 6 and 6A.

In the case of the solution illustrated in Figures 5 and 5A, with reference also to Figures 8, 8A and 9, the sealing element 24 is shaped at the lower end, or that nearest the toe of the boot, with a laterally deformed tongue 25 for end anchorage in a corresponding recess 27 formed in the part 14A of the boot upper.

The sealing element 24 is fixed to the edge 22A of the boot upper, for example by means of rivets which engage the holes 29, and has an enlargement 31 at the end, so that it forms a seal between the edges 22(A,B) and the fixed portion 14A of the boot upper. The particular shape of the sealing element 24 should be noted, which as shown in particular in Fig. 9, follows the shape of the longitudinal margin of the edge 22A of the boot upper (or the margin of this edge which defines the front opening of the boot upper); it can also be seen from Figure 8 that a part of that same sealing element 24 extends below the lower horizontal margin of the edge 22A, after having formed the enlarged portion 31.

Figures 6 and 6A show a different embodiment of the sealing element, indicated this time with the overall reference 28, this also being shaped so as to follow the shape of the longitudinal margin of the edge 22A (as can be seen in Fig. 10).

In this case also, the anchorage to one of the edges of the boot upper is effected by means of rivets which engage the holes 29.

The traditional clip closure levers 26 complete the boot.

Considering Figure 3, accessory elements are shown which consist of the wrap-around portions 30 and 32 which are fixed externally to the shell at the level of the boot upper in a manner which is known per se (for example by means of rivets 33) and the height of which is adjusted according to the desired height of the lower leg envelopment 20. For this reason, these wrap-around portions are preferably interchangeable, so as to allow a choice between other wrap-around parts which are lower, higher, harder or softer.

From Figure 7 can be observed the co-operation between these wrap-around cheeks 30, 32 with each other and with the edges 22 (A,B) of the boot upper.

Referring finally to Figures 4 and 4A, there is shown an element 32 having the function of permitting limited forward articulation of the upper part 20 of the boot.

As can be clearly seen, this element 32, in the form of a shaped insert, is seated in a corresponding recess 42 formed in the body of the upper part of the shell 12 and is equipped on the inner surface (or that turned towards the shell of the boot), with an L-shaped tooth 34 capable of engaging a projection 36 of corresponding and complementary shape, formed on the facing surface of the monobloc. The fixing of the element 32 is completed by a screw 38 which engages an oblong hole 40 and a corresponding hole provided in the body of the shell 12.

It is clear that the possibility of a slight forward inclination of the upper part of the monobloc will depend principally on the nature of the plastics material from which it is manufactured, on the thicknesses, in particular of the front portion of the boot upper, and so on.

Figure 4 shows other recesses 46, 48 similar to 42 and which can be accompanied by inserts analogous to that indicated by 32.

In this respect, there should also be mentioned the possibility of producing this monobloc by the technique of co-injection of two different but compatible plastics materials, so as to produce the monobloc with the appropriate materials in the different parts which constitute it, according to their specific function.

For example, for the sole portion, which must be as rigid as possible, there can be carried out the co- injection of a very rigid material resistant to wear and to torsion on the outside which encloses a core of lighter, heat-insulating material.

On the other hand, at the level of the top of the boot upper the position of the two materials can be inverted, so that the outer material is more flexible and surrounds an inner core of more rigid material.

The present invention has been described in relation to a preferred embodiment, it being understood that conceptually equivalent modifications and variants are possible and can be provided without departing from the scope thereof.

## Claims

1. Ski boot structure characterized in that it consists of a monobloc constituted by the shell alone, which

extends upwards to form or to substitute at least partially the portion of the lower leg envelopment capable of receiving the lower portion of the tibia of the user, so that the lower leg envelopment becomes a part rigidly integrated with the shell, in that the said monobloc has a portion of boot upper provided with an elongate front opening, which makes the boot a front entry boot, the said opening being shielded externally by a sealing element anchored to one of the two edges forming the said front opening, and in that the said portion of the boot upper is surrounded by wrap-around elements which define the upper edge of the boot and its height.

2. Ski boot structure according to Claim 1, characterized in that the said sealing element has an enlargement at the end.

3. Ski boot structure according to Claim 1, characterized in that the said sealing element is shaped at the end nearest the toe of the boot with a laterally deformed tongue for end anchorage in a corresponding recess formed in the corresponding portion of the boot upper.

4. Ski boot structure according to Claim 3, characterized in that the said sealing element has a section shaped so as to follow the shape of the margin of the adjacent edge of the said opening and extends beyond the said enlargement so as to be arranged below a part of the said edge.

5. Ski boot structure according to Claim 4, characterized in that the said sealing element is fixed to the said boot upper by means of a plurality of rivets which engage corresponding holes provided in the said sealing element and in the corresponding edge of the boot upper.

6. Ski boot structure according to Claim 1, characterized in that the rear portion of the boot upper of the monobloc has a seating for an insert which can be hooked in position by means of an L-shaped tooth capable of engaging a correspondingly shaped projection formed on the said boot upper.

Fig.1

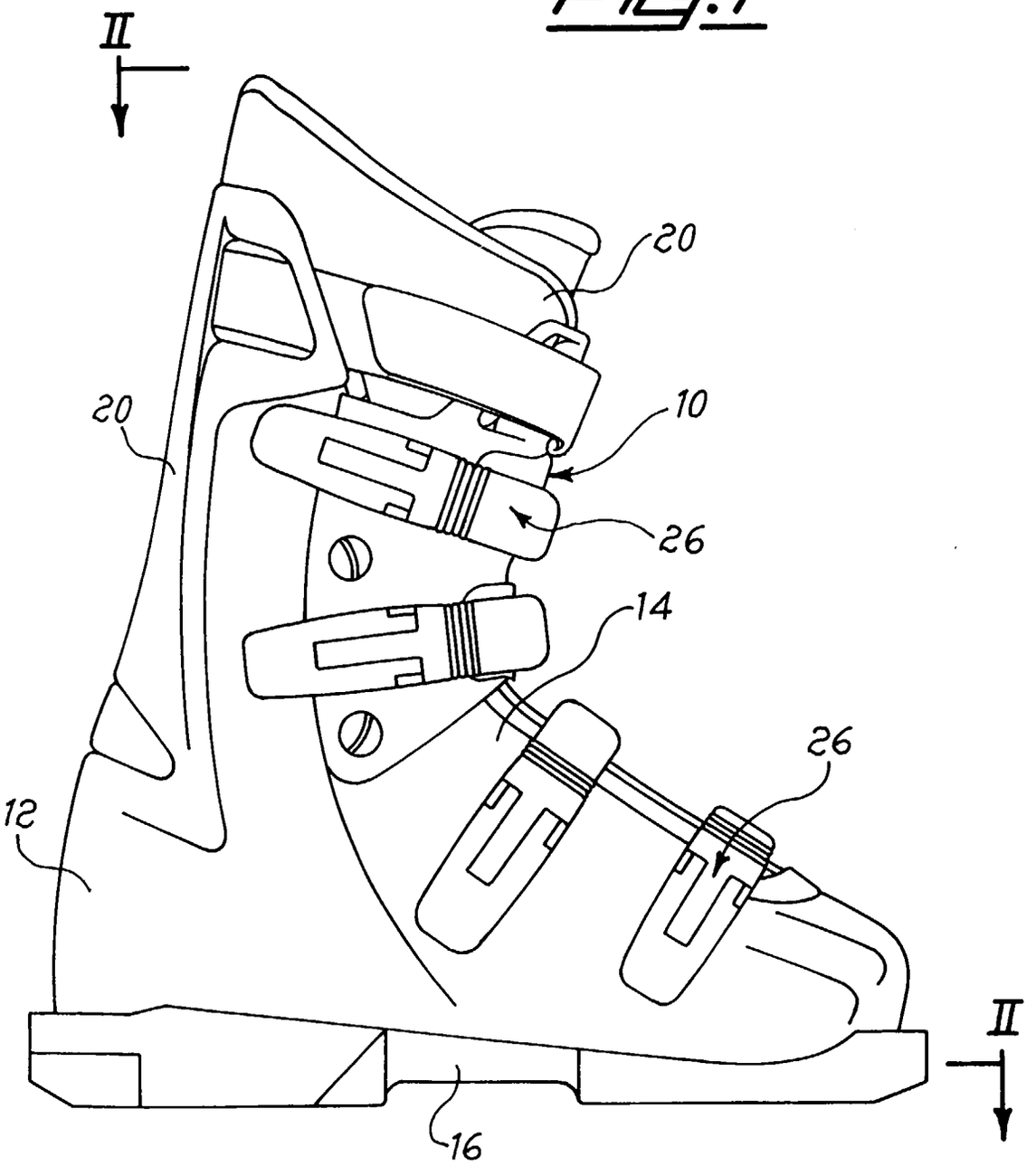

Fig. 2

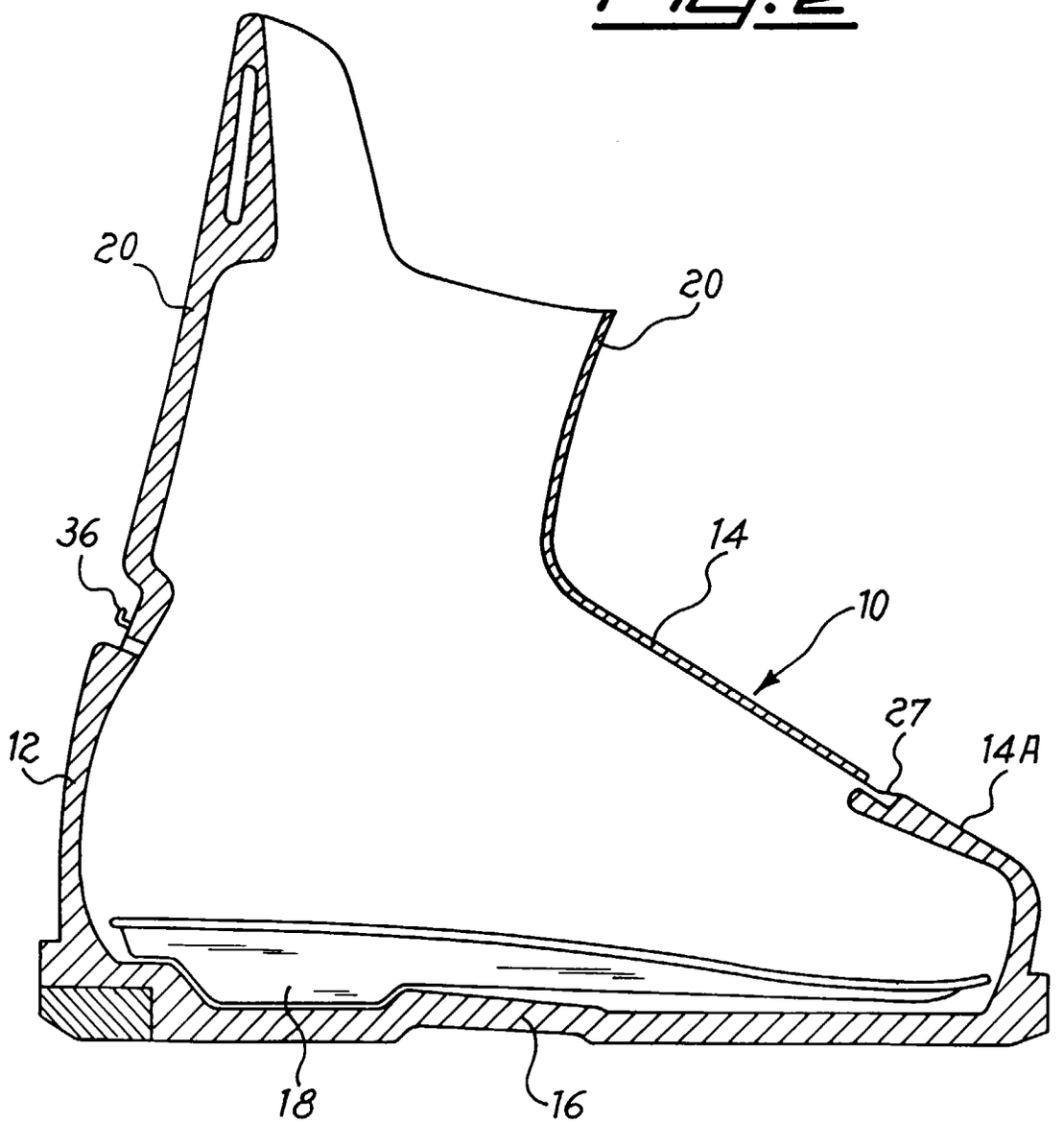

Fig.7

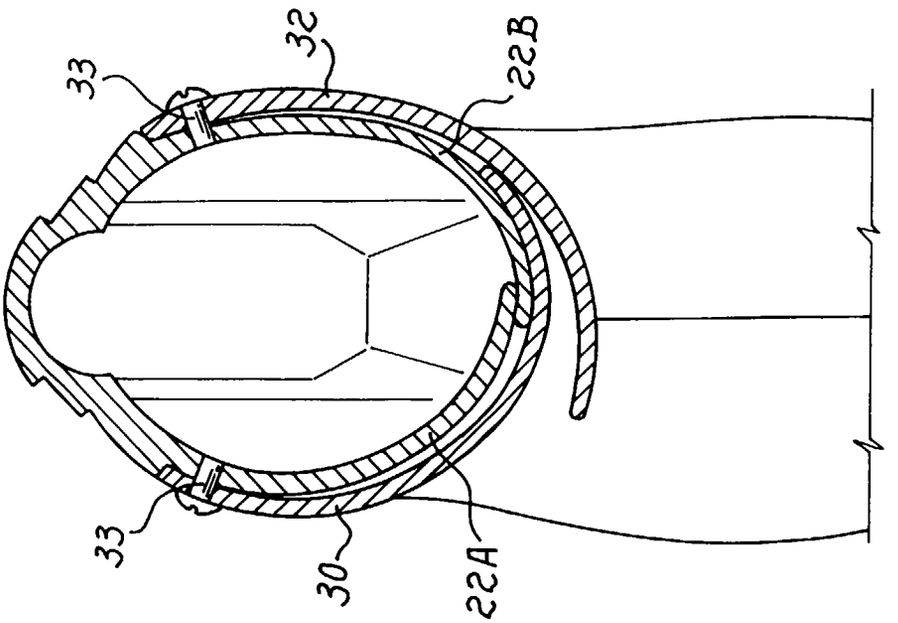


Fig.3

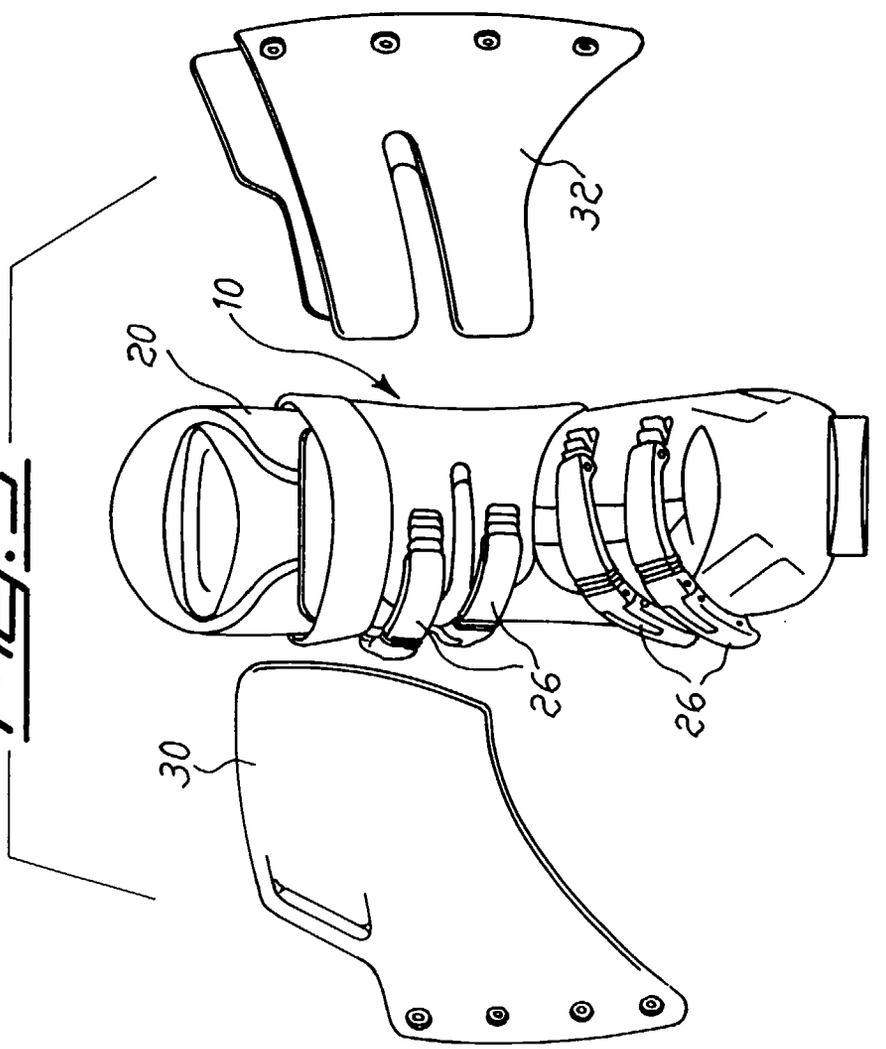

Fig.4A

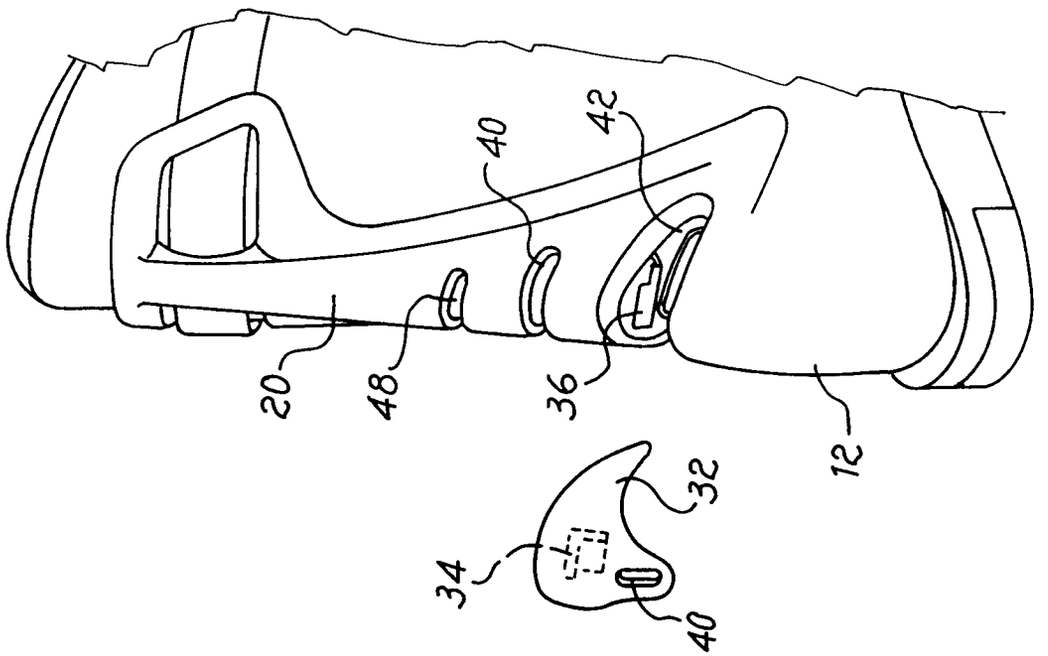


Fig.4

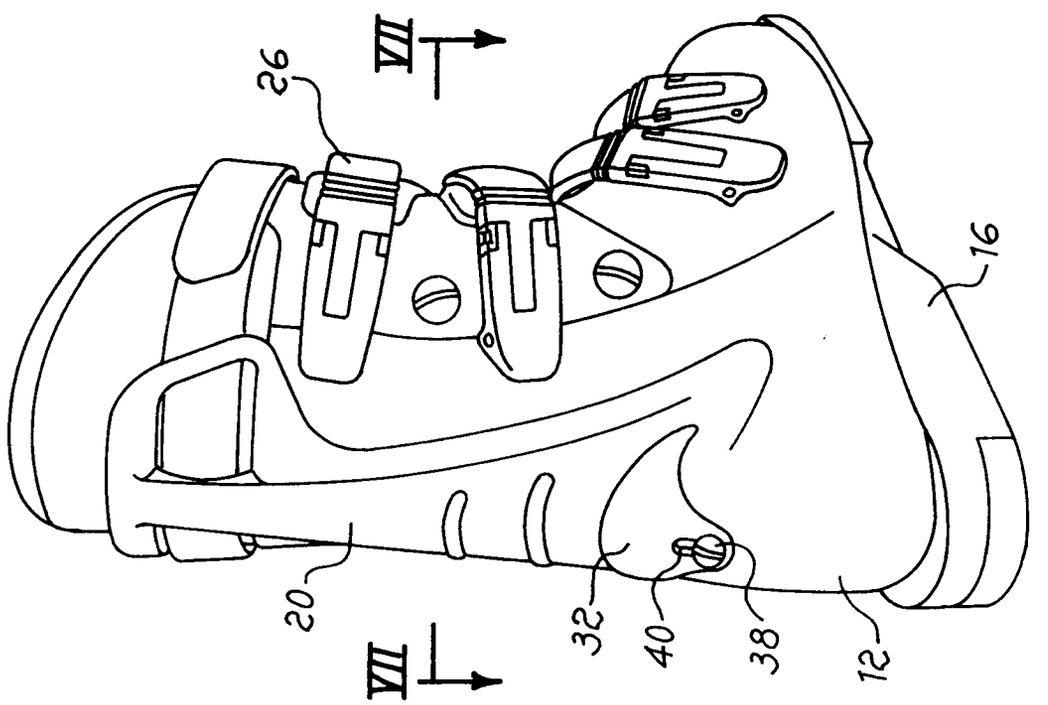

Fig.5A

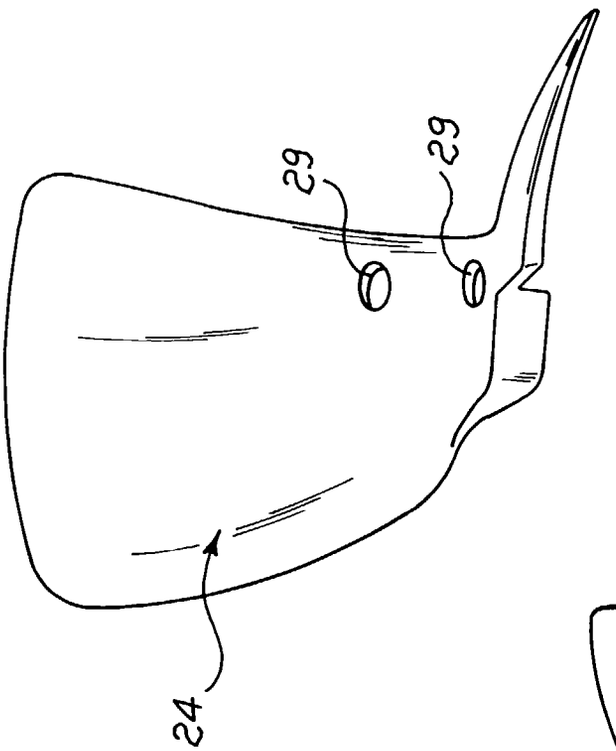


Fig.5

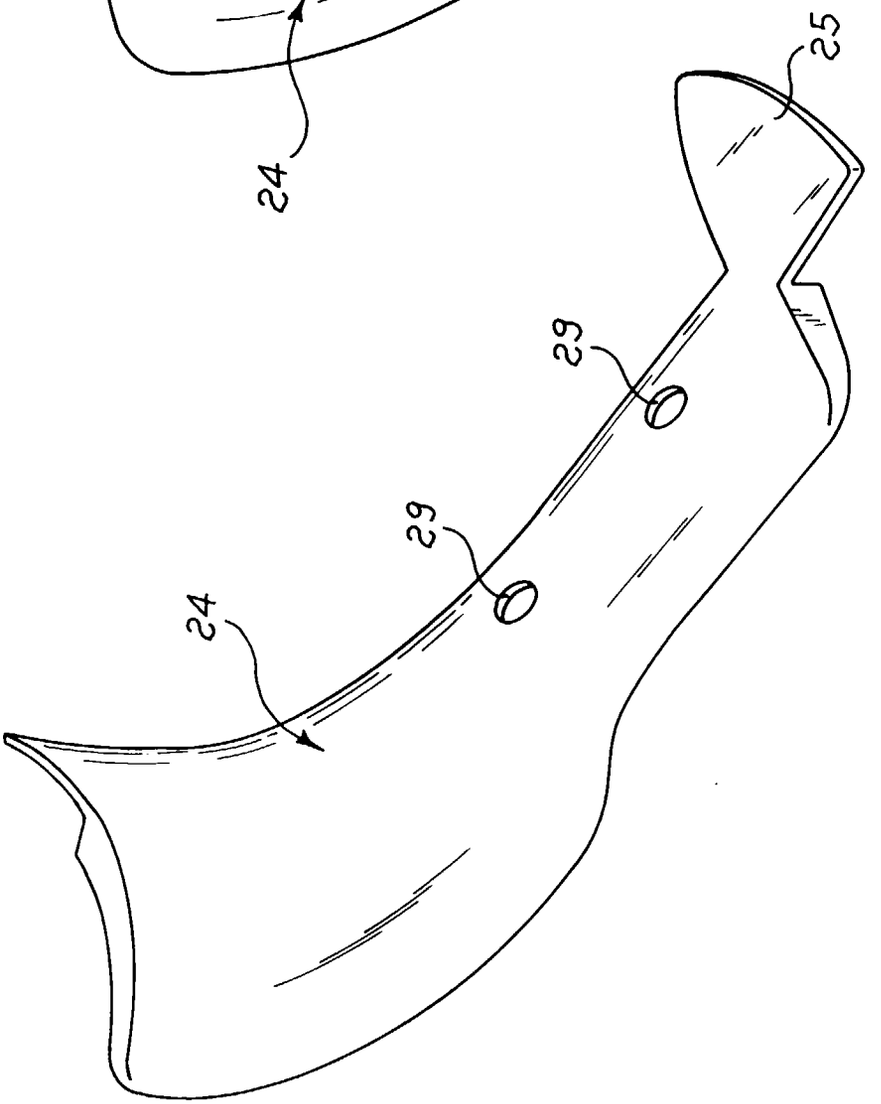

Fig.6A

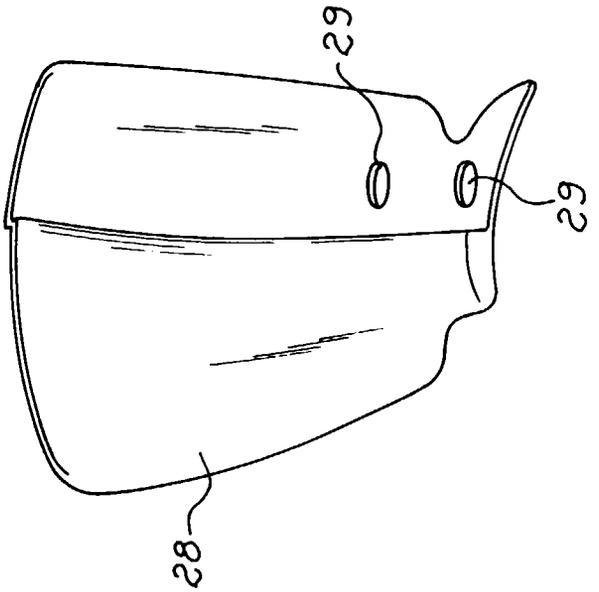


Fig.6

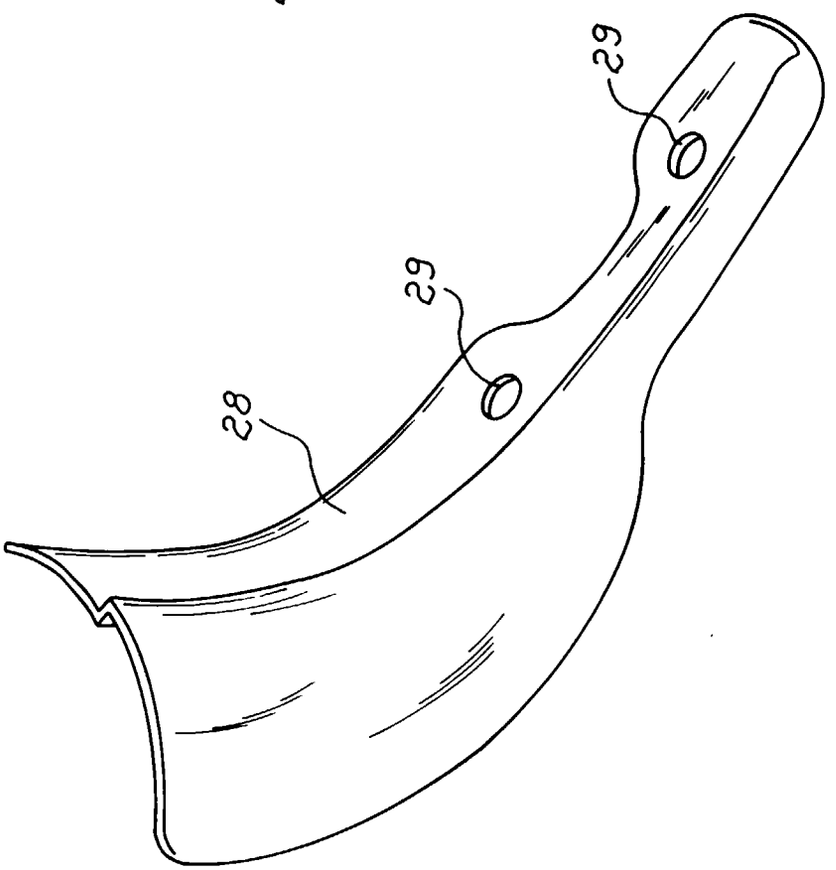

Fig.8A

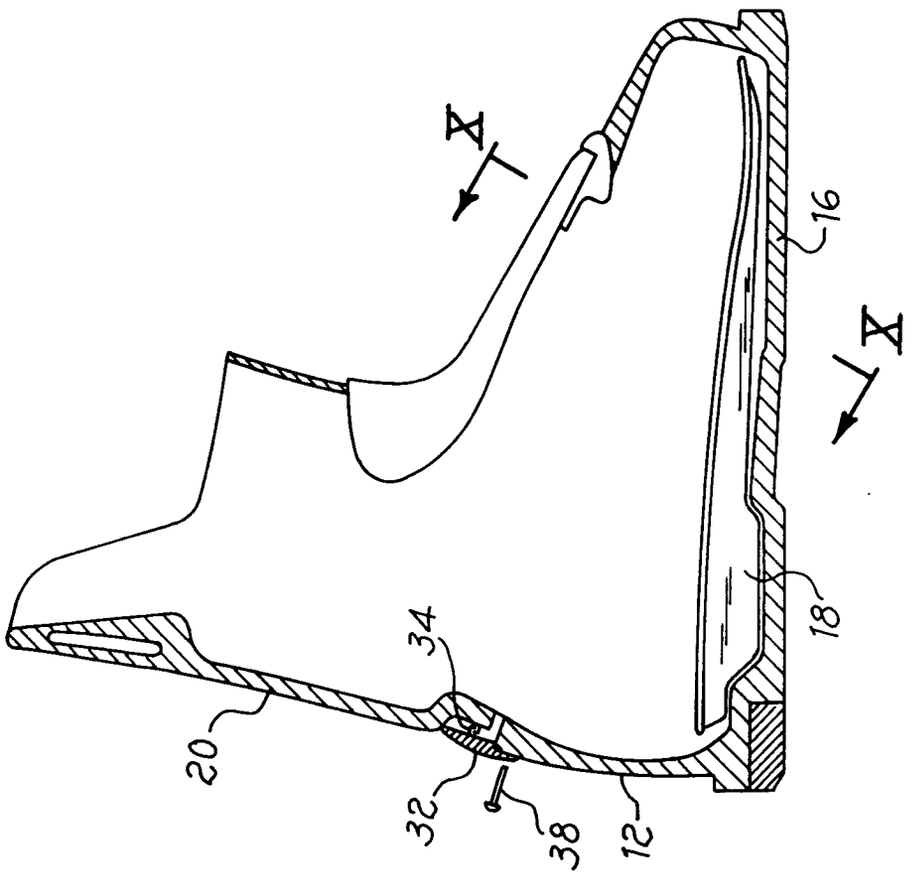


Fig.8

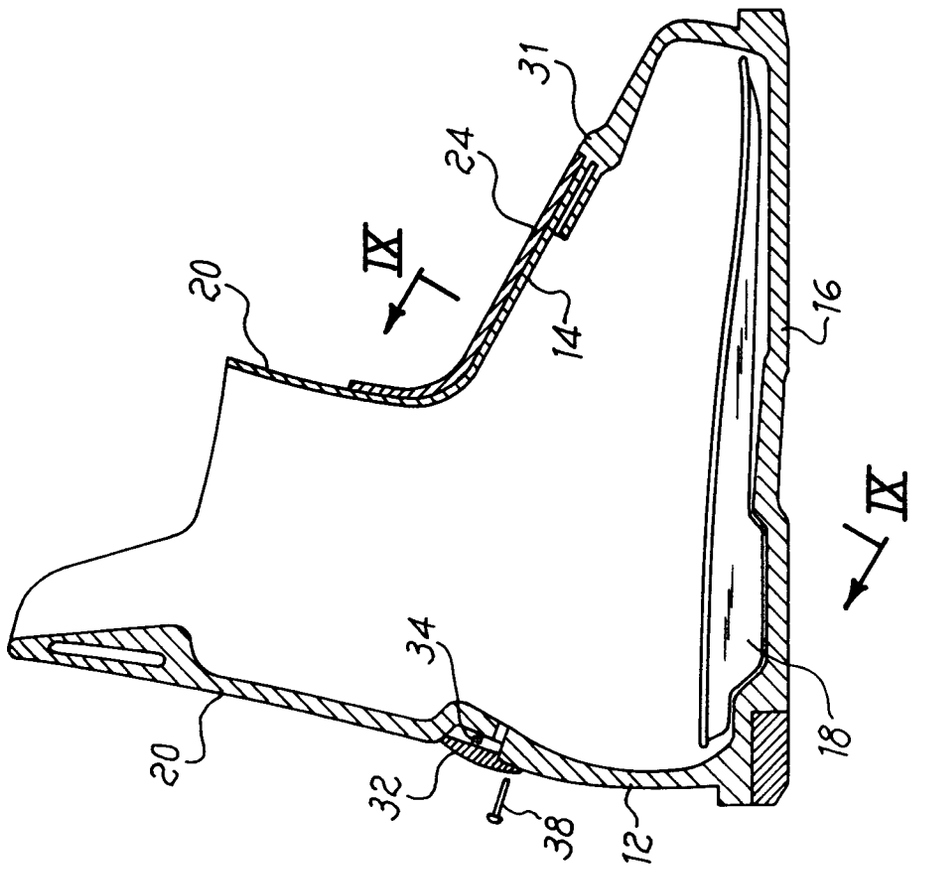

Fig.10

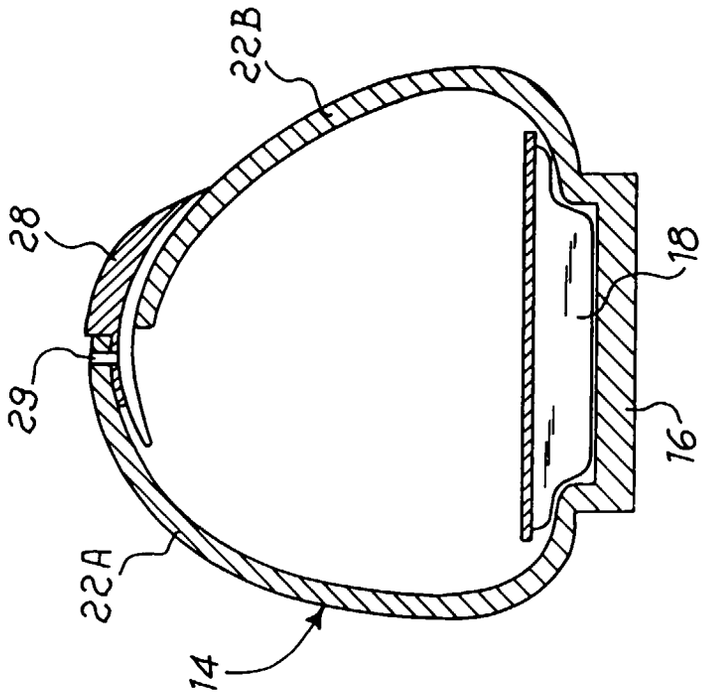


Fig.9