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(71) Applicant: **CALZATURIFICIO TECNICA SpA**
Via General Gandolfo 24
I-31044 Nervesa della Battaglia (Treviso) (IT)

(72) Inventor: **Gabrielli, Andrea**
Via FF. GG. 7/A
I-38037 Predazzo (Trento) (IT)

(74) Representative: **Caregaro, Silvio et al**
c/o Saic Brevetti Srl
Via Paris Bordone 9
I-31100 Treviso (IT)

(54) Internal shoe for ski-boot anatomically adaptable by filling pockets thereof with room temperature vulcanizable material and method for filling and shape the pockets themselves.

(57) Internal shoe to be weared by a user foot and to be insetred in a sport boot, such as a ski-boot, provided with pockets (34, 36) to be filled by liquid matter and in-situ vulcanizable at room temperature, being said pockets (34, 36) arranged around a vamp area (12) covering heel and malleoli and inside a tongue (16) of the shoe itself, inserted between an internal waterproof lining (42) and either a standard padding (48) or an external vamp (50). Every pocket (34, 36) is provided with an inlet opening (38, 40), connectable to means (80) for injecting liquid silicone, containing a valve (90, 92) openable by thin pipes (94) for ejecting air bubbles and excess silicone when it is still liquid.

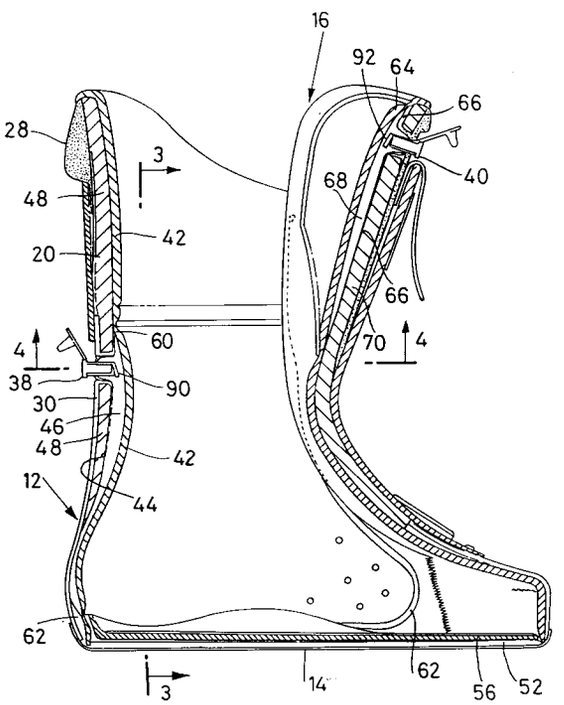

Fig.2

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The present invention is concerned with sport boots, specifically ski-boots, and refers to a shoe to be weared by a foot allowing a complet anatomic fit of a boot to a foot therein inserted.

It is well known that ski-boots have an external rigid shell and, in order not to have the shod foot suffering from shocks or constrictions therein, the foot wears a padded shoe and then the shod foot is inserted into the rigid shell of the boot. Unfortunately uman feets have shape and size, which even ranging about average size and measures, do change from a person to another, so that it is difficult to carry out an internal shoe, having inserted paddings, providing a perfectly anatomic fit of the foot to the boot.

A first method for providing such a fit consists in inserting into the shoe a rather short permanent padding and adding thereto further padding till obtaining a satisfactory fit between foot and boot. This a little rough method results rather time consuming and boring to be embodied and, unless many attempts are patiently and carefully carried out, risks to yeld mean results from the view point of the foot fit.

To solve the problems of the above mentioned method, have been devised controlled compliance paddings, in accordance with the interested foot area, inserted into the vamp of a shoe and pushed against the foot by a pocket arranged between an external surface and the above mentioned paddings and to be filled by a liquid matter gelled and changeable in an elastomer (for example in a silicone elastomer of the room temperature vulcanizable kind changing in a short time, once has been applied, in an elastic rubbery matter). This method of the controlled paddings pushed by the elastomer has been disclosed and claimed in the U. S. Patent No. 5,067,257 to Sven Coomer. From the disclosure of said patent and specifically having looked at figure 3, it is seen that are provided two different kinds of controlled paddings, one of not porous material indicated by the symbol P2 and one of porous material indicated by the symbol P3. The reasons for choosing porous or not porous materials seem reside in the fact that in some areas of the foot, such as the malleoli and the Achilles tendon, are needed a not very compliant padding whose stiffness must remain unchanged in order to fasten the foot in the boot and to transmit some strains from the foot to the boot, while in other areas, such as the heel, the ankle and the back of the foot should need a well softer padding whose stiffness can be controlled filling it partially with the liquid elastomer admitted in the pocket.

This method should seem to solve very well the problem of controlling the paddings, however it is poorin features because the areas with not porous or porous padding, even if of proper quality, have the problem to have a fixed extension and to be located in fixed locations which not always correspond to proper areas in the foot of the boot user. For example, malleoli can be more or less encumbrant or be located higher or lower in every person, so that it may happen that the padding of not porous kind can be of not sufficient size or be located in an improper area.

The present invention remedies the above mentioned drawback by embodying a shoe provide with standard external padding having a stiffness all equal in every area and inserting between said external padding and an internal lining at least a pocket to be filled by liquid material vulanizable into an elastomer.

Specifically, the internal lining is the thinnest the possible, consistently with the pressures to be applied to the liquid material, so that said liquid material is substantially in touch with the foot, in order to have the elastomer following with the most care the anatomic shape of the foot.

Preferably, the pockets to be filled are two in number, a first one covering an area of the shoe coating the heel and the sides of the foot and a second one inserted in the tongue of the shoe itself.

Specifically, the pockets to be filled have an inlet opening of the filling liquid provided wiht a stop valve of the kind commonly used for the filling of air infatable items such as pneumatic mattresses, life jackets and inflatable boats.

For filling the pockets of the shoe is used a hand actuated injection gun, for example of the kind for sealing glazed frames, acting on a cartridge filled with a meterial to be injected.

Specificaaly, the cartridge is a double catrtidge containing two components of a room temperature vulcanizable silicone elastomer mixing at the time of the injection into the pockets.

A filling method of the shoe pockets according to the invention consists in separately injecting the silicone into the heel pocket and the tongue pocket.

Further, once injected the silicone, it is evenly distributed into the pockets by means of a manual massage thereon.

In addition are used means for opening stop valves of the inlet openings of the pockets for ejecting air bubbles trapped into the silicone and any silicone in excess when it is still liquid.

Specifically, the means for opening the stop valves consist of thin pipes to be inserted into the openings of the pockets to open the valves.

The featuers and the advantages of the present invention will be pointed out in the claims forming the concluding portion of the description. However, other features and advantages will be selfevident from the following detailed description of an embodiment thereof, not to be absolutely considered

as limiting the invention, provided with the enclosed drawings, in which:

- figure 1 is a lateral view of an internal shoe, containing the present invention, particularly indicating the areas wehre are inserted the pockets to be filled with silicone;
- figure 2 is a lateral view, in cross-section, of a shoe according to the invention;
- figure 3 is a rear view in cross-section of the internal shoe, with added an external boot, taken along the line 3-3 of figure 2, showing the fit obtainable between foot and boot;
- figure 4 is a cross-section view, just limited to the shoe, taken along the line 4-4 of figure 2;
- figure 5 is a schematic view showing how is provided the silicone injection into the heel pocket of the shoe;
- figure 6 is a schematic view showing how is provided the silicone injection into the tongue pocket of the shoe;
- figure 7 is a schematic view showing how is inserted a weared shoe into a boot; and
- figure 8 is a schematic view showing how is provided the last shaping and arrangement of the shoe into the boot to obtain the personal fit of the shoe and its pocket filled with silicone with respect to the foot which will be shod.

Looking at the figures 1 to 4, it is seen that the shoe 10 consists of a vamp 12 joined to a sole 14 and front closed by a tongue 16 inserted under wings 18a and 18b of a bootleg 20 and passing under a bridge or cross-piece 22, being fastened by means of a movable rivet 24 to a tip 26 of the shoe itself. Of course, the bootleg 20 is provided with a cuff 28.

Looking specifically at figure 1, it is seen that the shoe 10 is provided with two pockets 34 and 36, respectively, of which the first one covers heel and malleoli and the second one covers the upper portion of the tongue 16, being said pockets fillable through inlet openings 38 and 40, respectively.

The cross-section views of the figures 3 and 4 depict more clearly how the pocket 34, which is that more engaged in the anatomic fit of the shoe, is inserted in the shoe itself.

The shoe is provided with an internal lining 42, inside plush-covered and ouside waterproof where is provided to be weldable to a thin and waterproof layer 44 to form the abovementioned pocket to be filled with silicone 46. About the internal lining 42 and the waterproof layer 44 is located a standard padding 48 usually formed by materials, such as plastic foams (for example foamed polyurethane) contained by an external vamp 12 sewn to a insole 52 resting on the sole 14 already seen in figure 1. Under the foot 54 depicted in figure 3 is located an arch-support 56, contributing with the shoe and a wedge 58 contained in the shell to a comfortable support of the foot 54 itself. Some weldings, for example high frequency weldings, 60 and 62 ensure the fastening between the thin layer 44 and the internal lining 42.

Similarly is formed the tongue 16 with an internal lining 64 welded to a waterproof layer 66 to form the tongue pocket 36 to be filled by silicone 68. Located thereon is a standard padding 70 outside completing the tongue 16.

The device for filling with liquid silicone the two pockets 34 and 36 of the shoe and the method for anatomically conforming the silicone batches put into said two pockets are specifically depicted in the figures 5 to 8.

Is used an injection gun 80, housing a double cartridge 82 containing two component silicone, which through a proper injection pipe 84 provides to inject the two components of the silicone, each other mixing while are advancing into the pipe 84, into the inlet openings 38 and 40 of the shoe 10. As it is shown by figures 5 and 6, the gun 80, hand actuated by means of a lever 86, advances a piston (not shown) causing the ejection of the components of the silicone from the double cartridge 82, an indication of the supplied silicone being given by a pointer 88 integral with the piston of the gun 80 itself. Firstly is injected the silicone into the inlet opening 38 of the vamp pocket 34, as it is depicted in figure 5, and then the silicone is injected into the inlet opening 40 of the pocket36 of the tongue 16, as depicted in figure 6. How it is particularly shown in figure 2, the inlet opening 38 is provided with a finger or soft tongue 90 operating as a stopping valve allowing a fluid flow from ouside to inside but not vice versa, specifically reminding that the silicone, even if not vulcanized, is a rather viscous liquid easily sealing the tongue 90 against the edge of the opening 38. In a similar way, the inlet opening 40 is provided with a finger or soft tongue 92, also operating as a stopping valve, allowing to enter the liquid silicone but preventing the outlet thereof.

Once in the pockets 34 and 36 of the shoe 10 have been admitted the intended silicone amounts, it is proceeded to spread it the most evenly the possible through manual massage of the areas of the shoe interested by the two pockets 34 and 36, having specifically care to make the silicone flowing to the bottom of the pockets themselves and, as a consequence, to collect the most the possible the air bubbles contained in the silicone near the inlet openings 38 and 40. At this time it is convenient to get rid of the air bubbles and that is provided by introducing a hollow needle or a thin pipe 94 into one of the inlet openings 38 or 40 descending to open the finger 90 or 92 operating as stop valve, allowing the outside venting of the

collected air bubbles.

For the anatomic adaptation of fit of the shoe, it is weared by the corresponding foot, the weared shoe is inserted into the rigid boot 32 (as depicted in figure 7), having care that the pipe 94 remain free and is not either pressed or however clogged, and the boot is gently clasped (as depicted in figure 8), compelling the silicone portion, not even vulcanized, to distribute in the best way into the pockets 34 and 36 and the portion thereof in excess to come out through the pipes, such as the pipe 94, inserted in the inlet openings 38 and 40. Once the silicone stops to come out, it is possible to take away the pipes and leave the silicone to vulcanize for about 20 minutes.

At this time the shoe is ready with its paddings adapted to the anatomy of the user. Obviously, it is possible to insert each of both feets in a shoe according to the invention for having in the same time the personal fit of both shoes.

What has been hereabove disclosed describes an embodiment of the invention and those skilled in the art will be able to devise, starting from the reading of the above description, changes and equivalent solutions all to be meant as here covered.

For example, it is possible to insert the shoes, already silicone injected, into the shells and then insert the feet thereinto.

It would be possible to use just the pocket 34 of the area of heel and malleoli, without personally fit the tongue 16, or the inlet openings 38 and 40 could be located in a different way, just provided not to trouble the foot.

Claims

1. Internal shoe, anatomically adaptable, provided with external standard padding (48) having even stiffness at any place characterized by inserting between said external padding (48) and an internal lining (42) at least a pocket (34) to be filled with a liquid material vulcanizable to an elastomer.

2. Internal shoe, as in claim 1, characterized in that the internal lining (42) is made the thinnest the possible, consitently with the pressures to be applied to the liquid material, so that said liquid material is substantially in touch with the foot, in order to more carefully shape the consequent elastomer according to the anatomic shape of the foot.

3. Internal shoe, as in claim 1, characterized in that the pockets to be filled are two in number, a first one (34) covering an area of the vamp (12) of the shoe coating the heel and the sides of the foot and a second one (36) inserted in the tongue (16) of the shoe itself.

4. Internal shoe, as in claim 3, characterized in that the pockets (34, 36) to be filled have an inlet opening (38, 40) of the filling liquid provided with a stopping valve (90, 92) of the kind commonly used for the filling of air inflatable items.

5. Internal shoe, as in preceding claims, characterized in that for the filling of the pockets (34, 36) is used an injection gun (80) hand actuated operating on a cartridge (82) filled with injectable matter.

6. Internal shoe, as in claim 5, characterized in that the cartridge (82) is a double cartridge containing two components of a silicone elastomer room temperature vulcanizable, which are mixed at the injection time in the pockets (34, 36).

7. Filling method of the pockets (34, 36) of the internal shoe according to the claims 1 to 5 characterized by separately injecting the silicone into the heel pocket (34) and the tongue pocket (36).

8. Filling method, as in claim 7, characterized in that once injected the silicone, it is unformly distributed in the pockets (34, 36) by means of a manual massage thereon.

9. Filling method, as in claim 7, characterized in that are provided means to open the stop valves (90, 92) of the inlet openings (38, 40) to the pockets (34, 36) to eject air bubbles and any excess of the silicone itself when it is still liquid.

10. Filling method, as in claim 9, characterized in that the means to open the stop valves consist of pipes (94) to be inserted into the openings (38, 40) of the pockets (34, 36) to open the valves (90, 92).

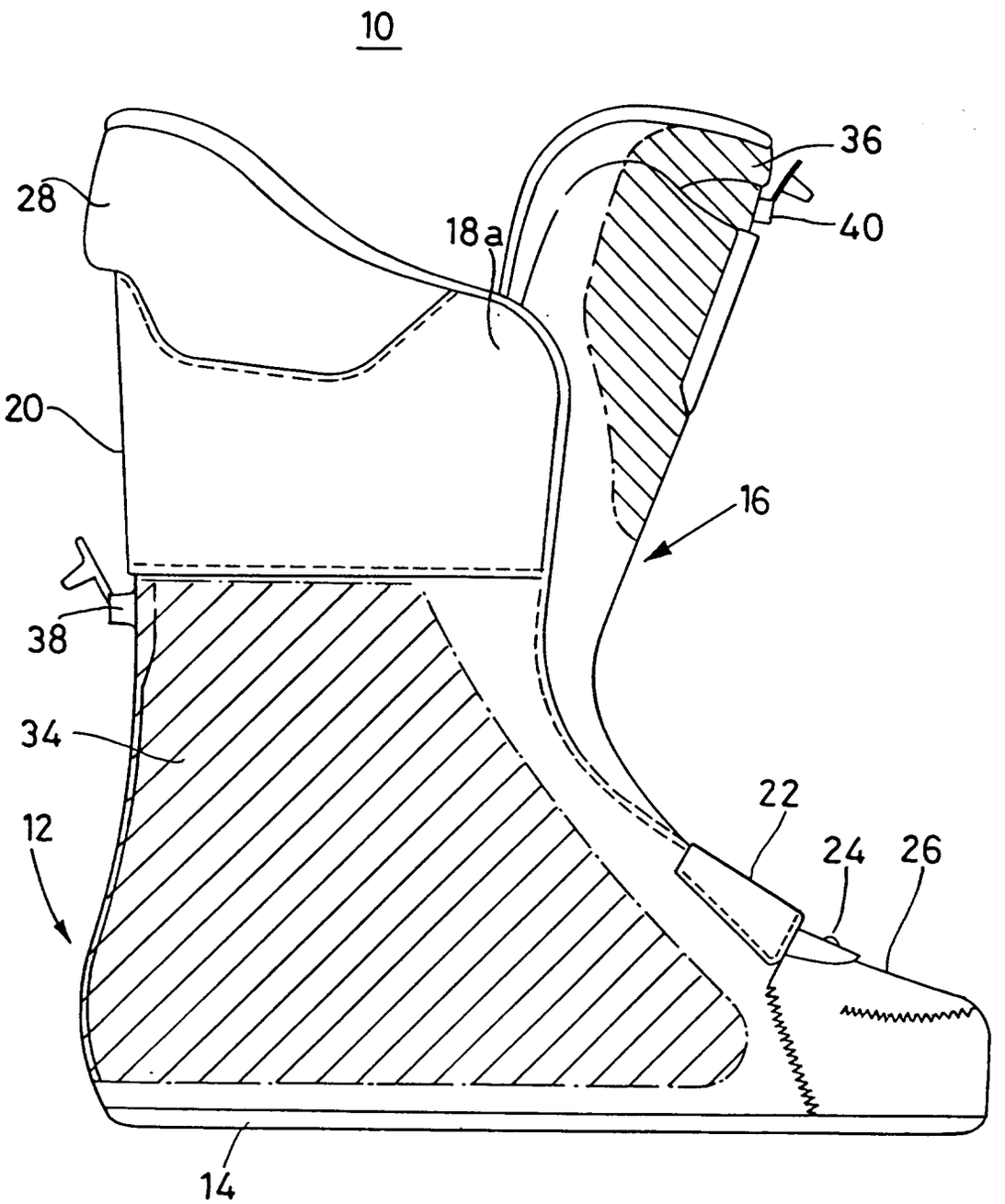

Fig.1

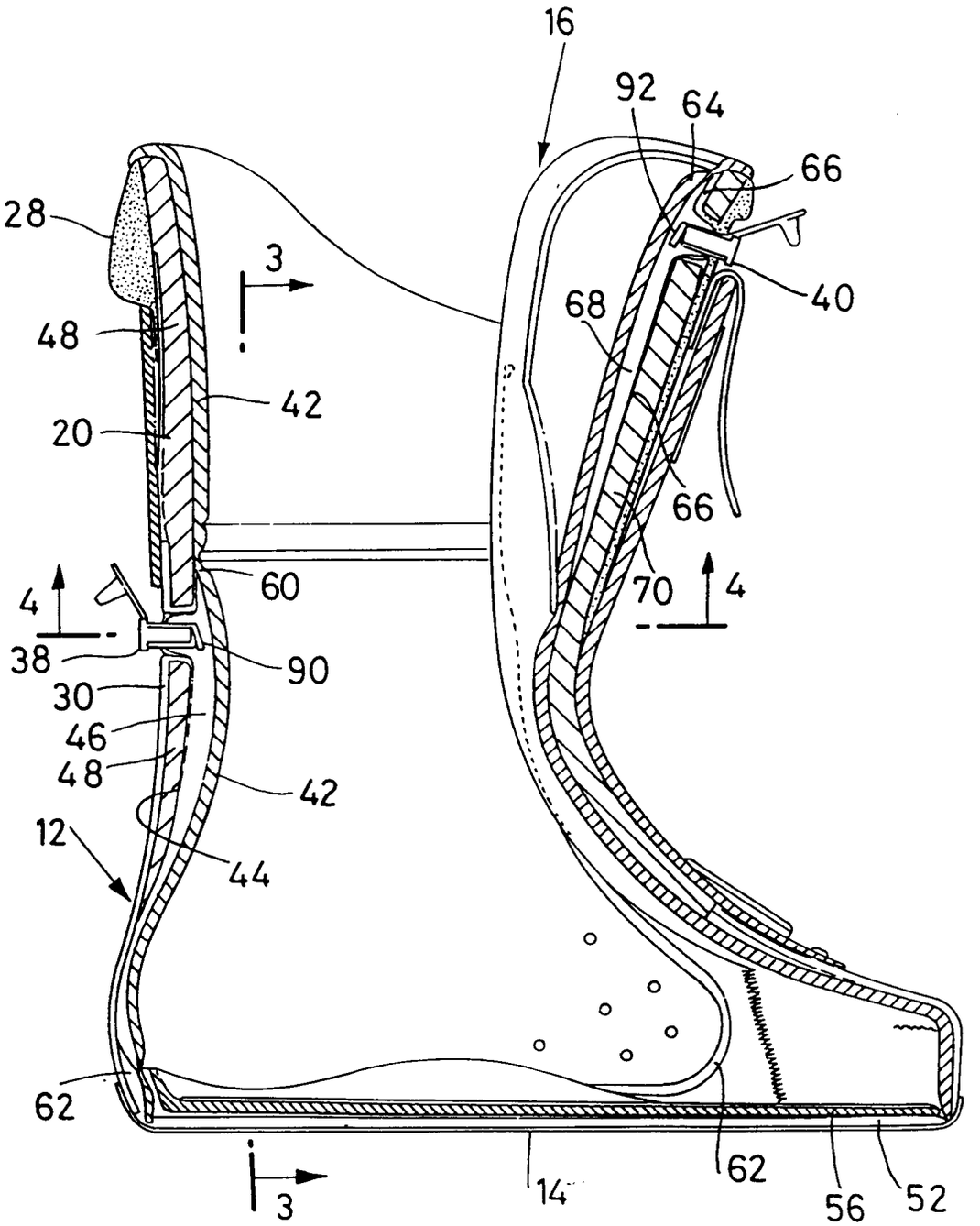
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Fig. 2

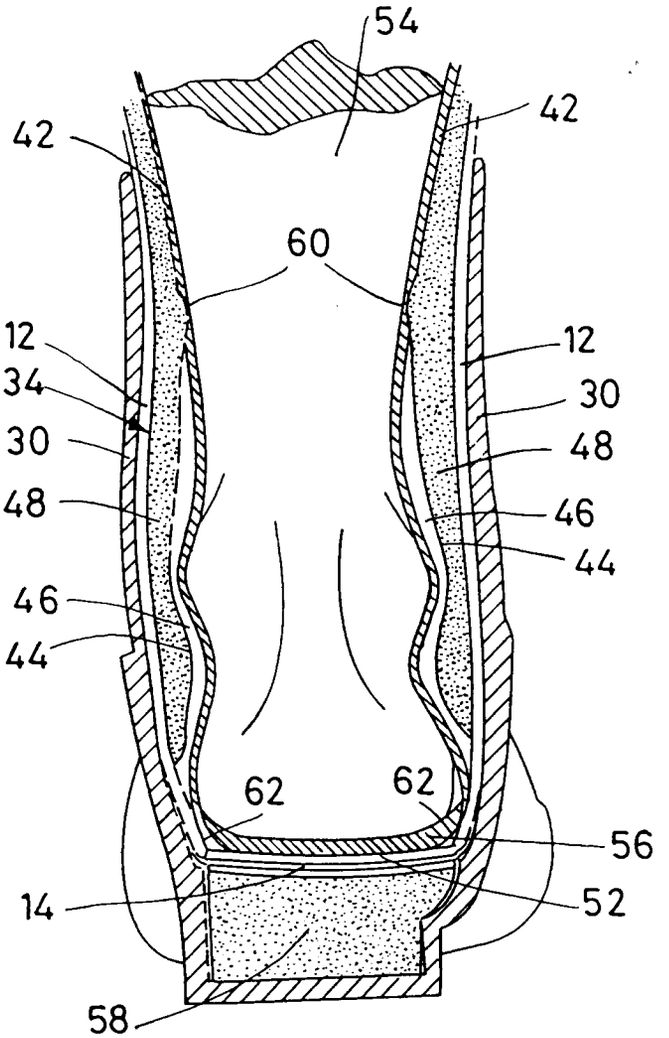
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Fig.3

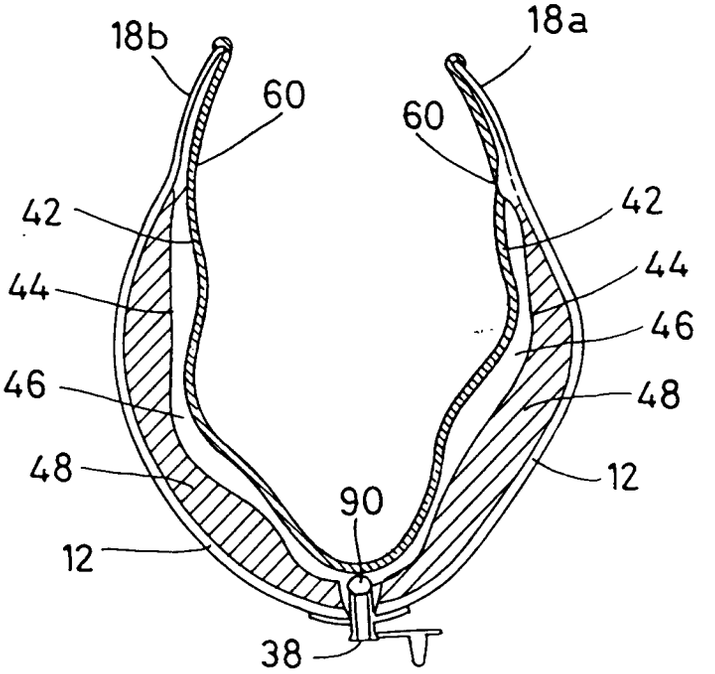
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Fig.4

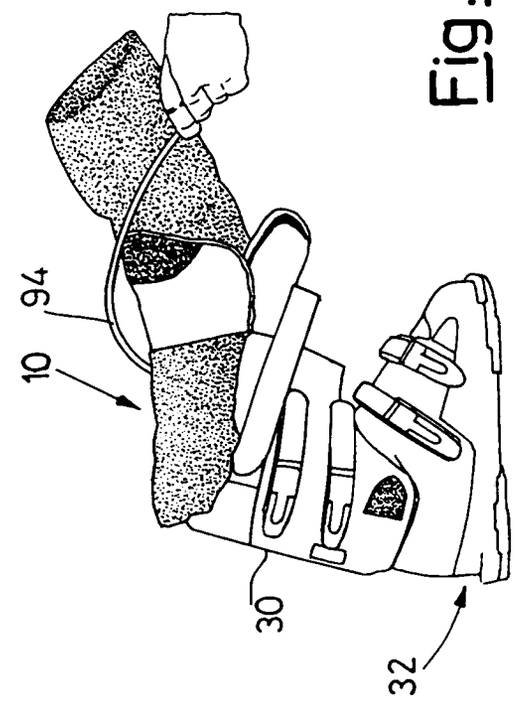

Fig.7

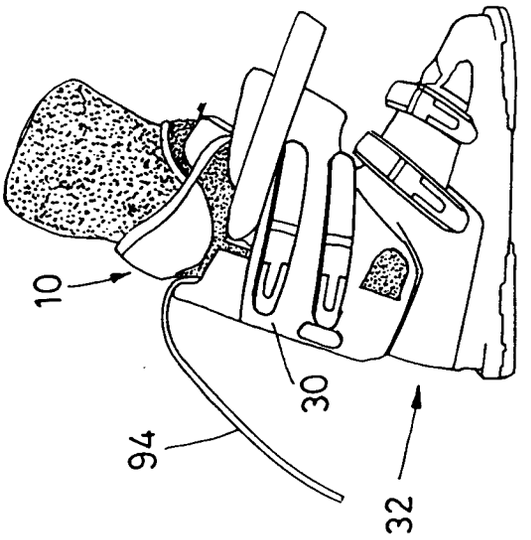

Fig.8

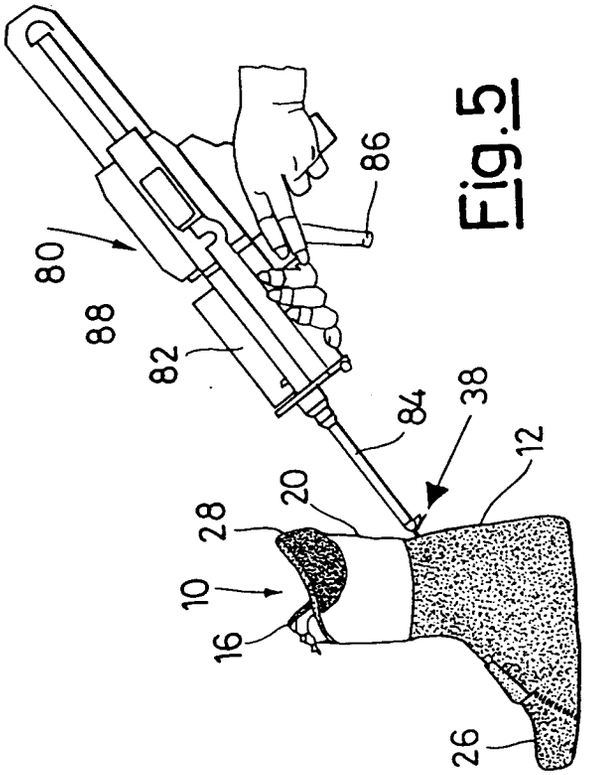

Fig.5

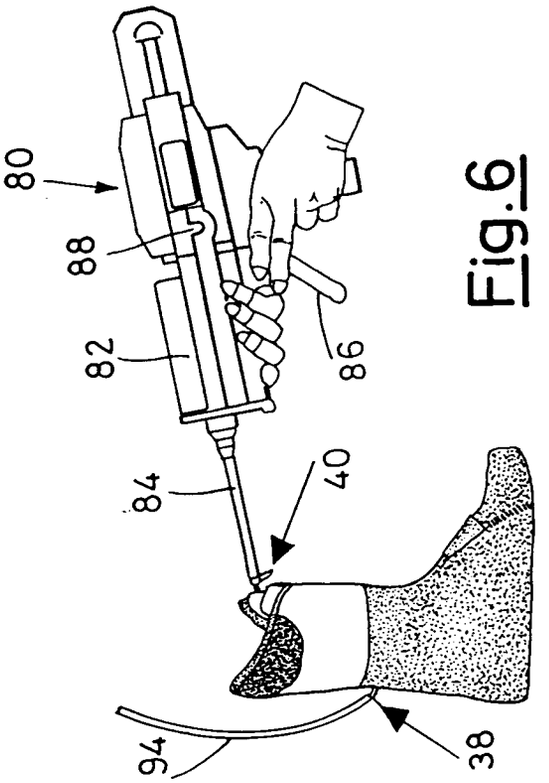

Fig.6

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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 1280

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	AT-A-317 042 (KOFLACH SPORTGERÄTE G.M.B.H.) * page 2, line 16 - line 48; figures *	1,2,5,6	A43B5/04
A	DE-A-22 21 097 (NIHON-YOHIN CO.) * figures 1-5,8 *	1-10	
A	CH-A-680 037 (LANGE INTERNATIONAL S.A.) * the whole document *	1-10	
A	FR-A-2 622 777 (SALOMON S.A.) * figures 10,11 *	1-10	
D,A	US-A-5 067 257 (COOMER) * abstract; figures *	1-10	

TECHNICAL FIELDS SEARCHED (Int.Cl.5)

A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21 September 1994	Scholvinck, T

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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