Oct. 30, 1973 V. TESSARO 3,769,392
PROCESS FOR MAKING ANATOMICAL
PADDING FOR SKI BOOTS
Filed Feb. 2, 1971 2 Sheets-Sheet 1

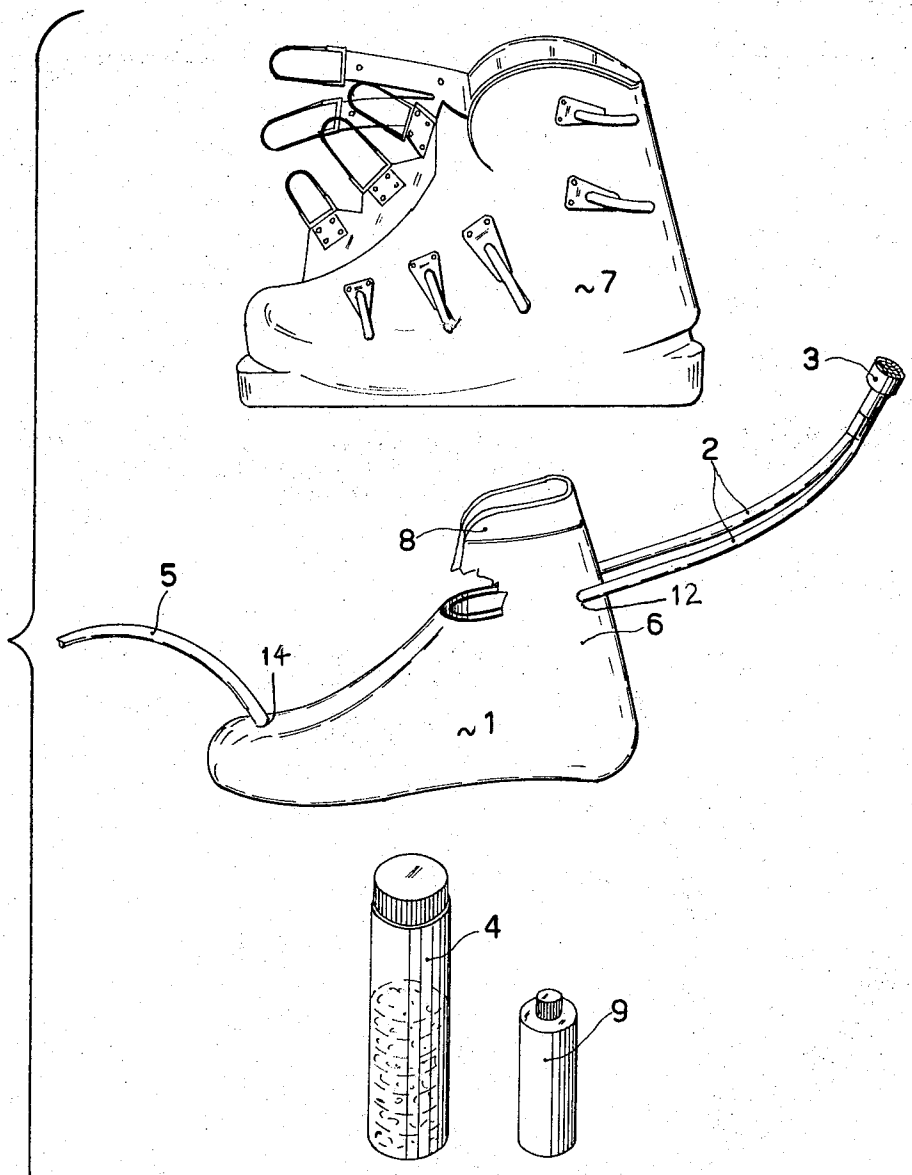

Fig. 1

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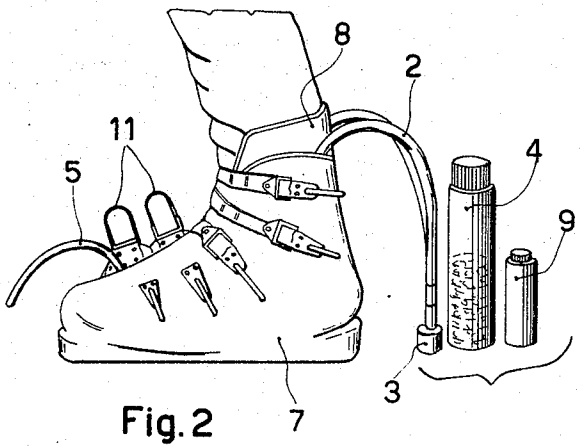

Fig. 2

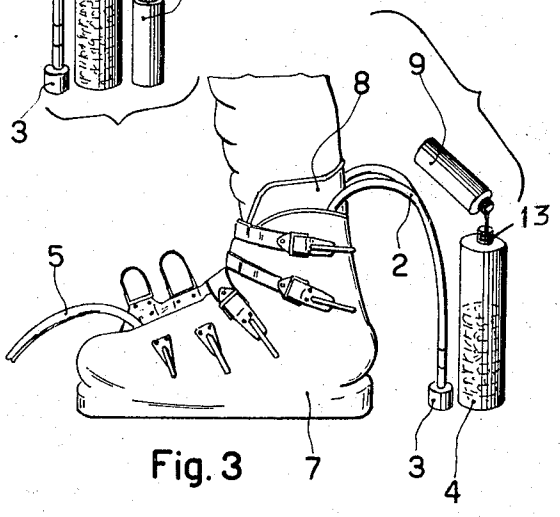

Fig. 3

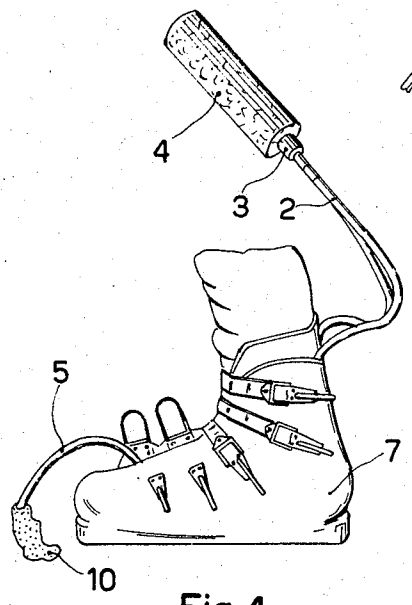

Fig. 4

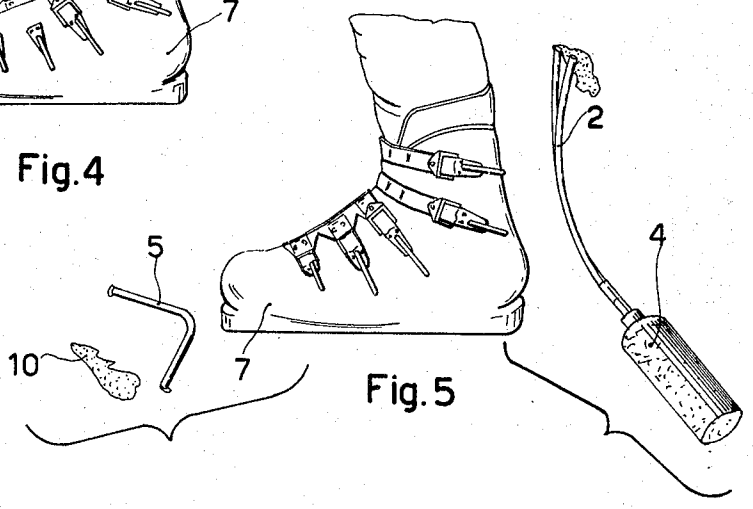

Fig. 5

United States Patent Office 3,769,392 Patented Oct. 30, 1973

3,769,392

PROCESS FOR MAKING ANATOMICAL PADDING FOR SKI BOOTS

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Int. Cl. A43b 5/04; B29d 27/00
U.S. Cl. 264—45 1 Claim

ABSTRACT OF THE DISCLOSURE

A method of making anatomical padding for boots in in which a liquid mixture for forming expanded polyurethane is introduced into a confined space between adjacent walls of an inner boot while the inner boot is on the foot of the wearer and an outer boot surrounds the inner boot.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to the formation of anatomical pads for boots, and more specifically for ski boots, so that the boot will conform to the shape of the user's foot more perfectly to promote greater comfort and more support.

Description of the prior art

It is already known, in the ski boot art, to form a padding that is contoured to the shape of the wearer's foot for insertion between the wearer's foot and the ski boot. These paddings were made of rubber, sponge and other materials. Pads that were pneumatically inflated have been used too. It is also known, in prior art, to form a padding between a rigid outer boot and a more supple inner boot, the inner boot fitting closely over the skier's foot. This was done by pouring a foamable liquid plastic composition into the space between the outer boot and the inner boot and permitting it to expand to form an expanded polyurethane layer that would assume the shape of the skier's foot.

This method of forming the padding was, however, objectionable because frequently the mixture would flow over the top of the inner boot to dirty the inside of the boot and the skier's foot as well. Additionally, this method was objectionable in that gases became trapped in the space between the inner and outer boots to cause a back pressure which prevented complete filling of the space. This resulted in the formation of padding having voids and which was of non-uniform thickness. The method was further objectionable in that more of the liquid tended to stay on the side of the inner boot on which it was injected whereby the foot was caused to be laterally displaced to the other side and the padding formed was thicker on one side than on the other.

SUMMARY OF THE INVENTION

According to the present invention, the foregoing disadvantages of the prior art are avoided by using an inner boot having a double wall, with a liquid mixture for forming expanded polyurethane being introduced into the space between the double walls through two holes located on opposite sides of the inner boot at the heel end thereof. At least one other hole is provided in the inner boot so that gases formed by the chemical reaction of the liquid mixture can escape and so that any excess of the liquid mixture can also escape once the space between the walls of the inner boot has been completely filled. Tubing is also provided to connect the holes at the rear of the inner boot to a container in which the liquid mixture is placed at the outset so that the liquid mixture can be fed between the spaced walls of the inner boot, while

the inner boot is on the skier's foot, with the rigid outer boot in place around the inner boot. Additional tubing is connected to the other hole or holes so that the gases and excess material can be conveyed to a point outside of the outer boot. The hole or tubing through which the excess liquid mixture is allowed to escape may be regulated during the time when the mixture is solidifying in such a way as to obtain the desired softness of padding.

The primary object of the invention is to provide a method whereby an anatomical padding for a ski boot may be formed to the shape of a siker's foot while the ski boot is on the skier's foot.

A further object of the invention is to provide a method whereby the padding formed will be of uniform thickness and will be free of voids.

A further object of the invention is to provide a simplified method for forming padding of the type described which can be used by the skier and does not require the services of a specialist to form such padding.

Other and further objects of the invention will become apparent from a consideration of the following specification when read in the light of the annexed drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view, partially broken away, of all the elements required for practicing the process of the present invention;

FIG. 2 is a perspective view of the outer boot and inner boot on the foot of the skier prior to the formation of the anatomical padding;

FIG. 3 is a perspective view showing the mixing of the ingredients for formation of the anatomical padding prior to injection thereof into the inner boot;

FIG. 4 is a perspective view showing injection of the mix into the inner boot at the heel and release of gases and excess mix at the toe end of the boot; and

FIG. 5 is a perspective view showing removal of the injection tubing and relief tubing after completion of the formation of an anatomical padding.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, the numeral **1** refers to an inner boot. The inner boot has a double wall, as is shown in the broken away portion of FIG. 1, that extends from just behind the toe area, at the front of the boot, to a point above the ankle area at the rear of the boot. The double wall is sealed off to retain liquid material to be injected thereinto. A semi-rigid collar **8** is attached to the top of the inner boot adjacent the ankle area **6**. The collar is covered with leather and is designed to extend slightly above the upper edge of an outer boot **7**. The outer boot **7** is normally designed to be worn over the inner boot, and has a plurality of lacing devices **11**. Two holes **12** are provided in the outer wall of the inner boot **1** and are disposed symmetrically on either side adjacent the top of the ankle area thereof when the boot is viewed from the rear. A pair of hollow tubes **2** are provided, with one end of each of the tubes being inserted through a corresponding one of the holes **12** for communication with the space between the walls of the inner boot. The other end of each of the tubes is connected to and passes through a cap **3**. The cap **3** has screw threads (not shown) on the inner walls thereof and is adapted to be screwed onto the top of a mixing container **4**, the neck of which has mating threads **13**. The mixing container **4** may contain one of the ingredients to be used in making the liquid mixture for forming the anatomical padding, and a second container **9** is provided which contains the second ingredient of the liquid mixture that is to be used.

At the front end of the inner boot **1**, a hole **14** is provided in the outer wall, and one end of a hollow tube **5**

is inserted therethrough with the free end of the tube extending beyond the toe area of the inner boot. This hole should be placed as far away as is possible from the holes **12** at the rear of the boot. The tubes **2** and **5** are flexible and are made, preferably, of a plastic material.

In order to make the anatomical padding for the boot, the tubes **2** and **5** are placed through the corresponding holes **12** and **14** of the inner boot and the inner boot **1** is placed within the outer boot **7**. The pair of tubes **2** are disposed between the inner boot **1** and the outer boot **7** and hang over the top of the outer boot in a rearward direction. The tube **5** extends upwardly and forwardly through the opening at the front of the outer boot **7**. The skier places his foot inside of the assembled inner boot **1** and outer boot **7** and loosely laces up the upper lacing devices **11**. The bottom lacing devices are left undone so as to avoid possible collapsing of the tube **5** (see FIG. 2).

After the above has been done, the user pours the ingredient contained in the container **9** into mixing container **4** for combination with the ingredient contained in the mixing container and attaches the threaded cap **3** to the top of the container. It is contemplated that one of the containers will have isocyanate in it, while the other container will have a polyester therein, which ingredients when mixed will form an expanded polyurethane. The amounts of the ingredients in the containers **4** and **9** should be calculated to produce an amount of expanded polyurethane in excess of that that will be required to fill the area between the spaced walls of the inner shoe. The container **4** should then be shaken very vigorously for about twenty seconds, at which time, due to the reaction of the ingredients the mixture will begin to pass into the tubes **2**. The container **4** should then be turned upside down and held at a level above the boot, as shown in FIG. 4. The pressure of the gas developed in the bottle due to the chemical reaction will force the mixture into the area between the spaced walls of the inner boot. Gas forming in or transmitted to the inner boot can escape through tube **5** which will prevent the formation of voids within the spaced wall area of the inner boot. Also, as the material expands or foams within the spaced wall area excess foam **10** can escape through tube **5**.

After about one minute has passed, tube **5** should be pulled out of opening **14** and the lower lacing members **11** should be closed tightly (see FIG. 5). The upper lacing members should also be closed tightly at this time. After five minutes more the tubes **2** should be removed from the holes **12**. At this time, the foaming action should be completed and the boot may be removed. The boot should be then set aside for a period of twenty-four hours before actual use.

It should be understood that, during the time the foam is being forced into the area between the spaced walls of the inner shoe, the skier should stand in an erect position, and should not move his foot. The positioning of the tubes **2** on opposite sides of the heels will assist the skier in maintaining his foot and the inner boot **1** in a position that is centered within the more rigid outer boot while the foaming action is taking place which, in turn, will prevent prejudicial and undesired asymmetrical formation in the padding. After the foaming operation, the inside of the inner boot **1** will be conformed to the shape of the skier's foot and the outside of the inner boot **1** will be exactly conformed to the shape of the inner wall of the outer boot **7**, which padding will be stable during usage and will have an anatomically exact fit.

As has already been mentioned, the double wall area of the inner boot **1** does not include the area normally occupied by the skier's toes, so that the liquid mixture will not expand the inner boot into engagement with the toes of the user, but will leave them room in which to move comfortably. Similarly the upper part of the ankle of the inner boot **1** is not provided with spaced walls, but is instead covered with the leather collar **8** which, rising out of the rigid outer boot **7**, ensures a firm support for the skier's ankle, as well as producing a more pleasing external appearance.

The herein described invention is described and illustrated in its preferred embodiment, but it should be understood that improvements and modifications may be made without departing from the scope of the invention, the same being herein defined in the appended claim.

What is claimed is:

1. A process for making anatomical padding for boots comprising in squence the steps of: placing an inner boot within an outer boot, the inner boot having a pair of spaced apart, sealed walls with two entrance holes intersecting the space between the sealed walls at opposite sides of a heel end of the inner boot, two entrance tubes, one in each entrance hole, extending from the inner boot, the entrance tubes extending over the top of the outer boot in a rearward direction, an exit hole intersecting the toe end of the space between the sealed walls of the inner boot, and an exit tube in the exit hole extending outwardly of the outer boot; placing the user's foot within the inner boot; introducing by connecting a container with a liquid mixture therein to said entrance tubes, a liquid mixture, to thereby introduce the liquid mixture between said walls of the inner boot, said liquid mixture foaming, expanding, giving off gases, and solidifying with the passage of time, said mixture being introduced in a quantity in excess of that needed to fill the area between said spaced apart, sealed walls to thereby form a foam padding contoured to the shape of the user's foot, said gases and the excess liquid, after the space between the walls is filled, escaping from between said walls and outwardly of the outer boot through said exit tube; simultaneously regulating the flow of excess liquid therethrough; and retaining the inner boot within the outer boot and retaining the user's foot within the inner boot during solidification of the mixture.

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