METHOD OF FITTING A SKI BOOT

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Related U.S. Application Data

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Field of Search ..... 12/142 R, 142 P, 36/2.5 R, 36/2.5 AL

References Cited
UNITED STATES PATENTS
3,239,952 3/1966 Lange et al....................... 36/2.5 AL

3,377,721 4/1968 Johnson…………………….. 36/2.5 AL
3,736,612 6/1973 Check et al........................ 12/142 P
3,786,580 1/1974 Dalebout.......................... 12/142 P

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ABSTRACT
A ski boot includes a semi-rigid outer shell and a liner assembly comprising a substantially flexible inner padding member which forms cavities between the inner padding member and the outer shell of the ski boot. The cavities are filled with a substantially non-compressible fitting material, which is flowable during the fitting process, and thereafter hardened to give firm support and comfort for skiing. In the preferred embodiment the fitting material is of a thermoplastic nature.

16 Claims, 4 Drawing Figures
METHOD OF FITTING A SKI BOOT

This application is a division of application Ser. No. 216,080 filed Jan. 7, 1972, now U.S. Pat. No. 3,798,799.

The present invention relates to a ski boot and liner assembly for ski boots or other footwear, and more particularly to a liner assembly comprising a flexible inner padding member having cavities molded therein. The liner assembly is adapted to be placed within a semi-rigid outer shell in order to complete the ski boot. The cavities, which are preferably molded into the inner padding member, are adapted to be filled with a substantially non-compressible fitting material, which permits custom fitting of the inner padding member to a wearer's foot. Preferably the cavities surround the entire front and side areas of the wearer's foot, so that these portions of the foot will be surrounded by the fitting material after it is injected. While a variety of methods may be used to custom fit the liner assembly of the present invention and the semi-rigid outer shell to a wearer's foot, the preferred fitting methods are premised on injecting a flowable fitting material into the cavities and permitting the inner padding member to form around the wearer's foot. The fitting material is then permitted or caused to solidify and harden to a substantially non-compressible material. Thus the non-compressible fitting material provides a skier with firm support, while the padding member provides padding which is shaped to the skier's foot for comfort.

Although a wide variety of non-compressible materials may be employed as the fitting material, such as plaster of paris, epoxy resins, poly ester resins, rigid polyurethane foam or other thermosetting materials, it is preferred to use a fitting material which is thermostatic, such as a wax or a mixture of wax and plasticer. The thermoplastic fitting materials are used by heating the fitting material to a temperature at which it becomes readily flowable, placing the foot of the skier being fitted into the boot assembly, injecting the flowable fitting material into the cavity between the padding member and the outer shell. The thermoplastic material is then cooled, whereby it becomes a non-flowing solid which fits snug and firm, but not tight around the wearer's foot and ankle. The combination of the non-flowing solid in the substantially rigid outer shell gives firm support to the foot and ankle of the wearer for the purpose of allowing the skier to obtain precise and accurate edge control of his skis, while the inner padding member provides comfort.

BACKGROUND OF THE INVENTION

Ski boots presently available generally comprise a relatively rigid outer shell which is typically molded of plastic. Disposed within the outer shell is an inner member or liner which is relatively soft and flexible, as compared to the shell. The boot also has one or more buckles or other suitable fastening means for opening and closing the boot.

Prior art liners comprise many designs. In some instances, the liner assembly includes a soft cloth or plastic bag containing a permanently flowable, putty-like material of the type described in U.S. Pat. Nos. 3,237,319; 3,402,411 and 3,582,503. Some of these materials, however, tend to flow away from those portions of the foot which require support or flow out of the original and desired location forming an uncomfortable fit.

In other instances the liner comprises a bag containing a plastic, fibrous or other non-flowable material, but the wearer of the boot was unable to fit the liner specifically to his foot because the liner was completed at the factory with no means to custom fit the boot to a wearer's foot.

Other prior artliners include the use of a thin membrane of material which surrounds the foot and ankle of the wearer. A thermostetting foam material is then injected into the space between the inner wall of the shell and the outer wall of the membrane to complete the assembly. The foam filled liner has sometimes been referred to as a "custom-fitted" boot inasmuch as the fitting operation is generally completed in a dealer's shop.

Where boots have been custom fitted to a wearer's foot by utilizing a foaming material, a number of disadvantages exist. Because foam will expand to fill a given volume, it is necessary that the precise amount of foam be injected into the space between the shell and the membrane; otherwise, the resulting foam padding is much too hard or too soft. In fitting the boot in which foam is to be injected, the wearer of the boot has his foot inside the boot during the foam injection operation. If an excessive amount of foam is injected, it will, upon expansion, cause a hard padding which will be of great discomfort and pain to the wearer. It has been reported that on occasion bones have been broken. Accordingly, it is incumbent upon an individual who is performing the foaming operation to employ the proper amount of foam. As a result, it is necessary for a dealer or manufacturer to have highly skilled personnel to perform the custom fitting operation. In some instances, the custom fitting kit sent to a dealer's shop required a mixing of the foaming ingredients, i.e., isocyanate and polyol, at the shop before the foaming operation could be undertaken. This mixing procedure often is quite unpleasant due to the spilling of ingredients in the mixing process, the heat generated by the exothermic reaction, the unpleasant odor of the components some of which are toxic and the clean up problem generated with foaming systems presently utilized.

Moreover, the time required for initially curing the thermosetting foam is as much as one hour, which means a person who is being fitted must have his foot in the boot for such an extended period of time. Since the foam cures by an exothermic reaction, the person being fitted may literally get a hot foot during the process. Additionally, since the foam material is thermosetting, rather than thermoplastic, the process is irreversible once curing has been accomplished, therefore the fit of the boot is permanent and cannot be altered.

SUMMARY OF THE INVENTION

The present invention contemplates a ski boot with a liner assembly in which the liner assembly provides both padding for comfort of the wearer's foot and, the capability to custom fit the boot to the wearer's foot. Thus, the liner assembly has two distinct functions, namely the custom fitting function of the boot to the foot and padding function of the foot in the boot.

The present invention relates to a liner assembly for a ski boot or other footwear which has a substantially semi-rigid outer shell. The liner assembly is made up of an inner padding member and a relatively non-
compressible fitting material. The inner padding member of the liner assembly of the present invention comprises a molded padding member which is adapted to fit within a substantially semi-rigid outer shell. The outer surface of the inner padding member is generally complementary to the inside of the outer shell and the inner surface of the inner padding member is adapted to surround the wearer's foot and ankle. The inner padding member is shaped to provide one or more cavities on its outer surface which cavities are adapted to be filled with a substantially non-compressible fitting material. A fitting material is inserted into these cavities preferably during the course of a fitting and sizing operation to complete the liner assembly. Alternatively, the fitting material may be placed in the cavities prior to the fitting operation, and simply rendered flowable during the fitting operation.

THE INNER PADDING MEMBER

The inner padding member of the liner assembly of the present invention is preferably sufficiently thick in over-all cross-sectional areas in order to accomplish the padding function. The thickness of the inner padding member thickness will vary depending upon whether the measurement is made where the cavity for the fitting material has been formed, or at a section where no fitting material will be employed. In addition to being sufficiently thick to accomplish the padding function, the inner padding member must be sufficiently flexible so that it can be formed to the wearer's foot during the custom fitting process. The outer surface of the inner padding member is preferably complementary to the inner surface of the outer shell, except in those areas which define the cavity. This helps to prevent slippage of the liner assembly within the outer shell, both during the fitting operation and thereafter. The placement, size and number of the cavities which are molded into the padding member may vary over wide limits, and will depend upon the style of the outer shell in which the liner assembly is used. For use in a ski boot, it is generally preferable for the cavities to be adjacent to the ankles and across the instep of the foot, so that when the fitting material is injected, the boot assembly provides firm support to the skier's ankle, in-step and the ball of the foot. The padding member of the liner assembly may be made from various materials which will be known to those skilled in the art. Basically the padding member must have a smooth inner surface, free from wrinkles or similar irregularities, although it may be lined with a fabric such as terry cloth, fur or plastics having relatively low friction surfaces or the like. The substance of the padding member is desirably flexible, in order that it may be deformed to fit the wearer's foot during the fitting process. While the padding member may be produced from a number of materials, such as polyurethane elastomers (both high and low density), polybutadiene homopolymers and copolymers (foamed or solid), foamed rubber, polyyvinyl chloride and the like, polyurethane foam has been found to be particularly satisfactory. It has been found that a relatively thin urethane foam padding member will accomplish the required padding function, since the accurate fit achieved by the fitting process will reduce the need for massive padding.

The inner padding member of the liner assembly may be produced in a variety of sizes, approximating ordinary shoe sizes at least with respect to the inner dimensions. In this manner, the padding member may be closely fitted to a wearer's foot. However, it may be desirable to produce the inner padding member of the liner assembly in a relatively small number of outside sizes. In other words the outside areas of the liner which contacts the shell would be the same for many liners, even though the other inner and/or outer dimensions were different. For example, liners that cover shoe sizes from 4 to 13 in three or four widths could have outside dimensions which fit into 6 sizes of outer shells. In this embodiment, a retail establishment could carry a complete assortment of liner assemblies, so that any sized foot could be accommodated, but all of the liners would fit into one of the small number of standard sized outer shells. This enables the retailer to fit any size foot, at a minimum cost of carrying a complete inventory.

The liner assembly of the present invention may be applied to outer shells of various design and various materials. While it is obvious to those skilled in the art that for ski boots, an outer shell that is substantially rigid is desired, for other uses, such as orthopedic devices, a relatively flexible shell may be used. However, it is essential that the outer shell be rigid as compared to the inner padding member, which must be relatively flexible. Conventional ski boot outer shells may be used, such as those produced from polyurethane elastomers, fiber glass reinforced resins including polyesters, epoxy resins, phenolics, and others which will be known to those skilled in the art.

Generally the inside of the outer shell and the outside of the inner padding member should have complementary surfaces, and should be in face to face contact, except in the area of the cavities and the access opening of the boot and liner.

In its preferred embodiment, the present invention contemplates the inner padding member being inserted into the molded ski boot shell, preferably at the factory. The padding member may be cemented to the inner surface of the shell and it has been found convenient to cement the bottom of the padding member to the bottom of the outer shell. In this embodiment the liner assembly is completed in the course of a fitting operation when a flowable fitting material is injected into the cavities.

FITTING MATERIAL

The fitting material employed by the present invention must be a substantially incompressible, non-flowable solid at body temperatures and at temperatures slightly above body temperatures, i.e. temperatures below 110°F, but it must be capable of softening and flowing during the fitting process. While many different types of material may be used as the fitting material including materials which become permanently set after the fitting process, it is preferred that the fitting material be a thermoplastic material which is flowable at slightly elevated temperatures, i.e. temperatures above 120°F. The preferred thermoplastic fitting material flows when heated to a temperature of about 150°-180°F, and will cease to be flowable and solidify, becoming substantially non-compressible, when cooled to about 115°F. Thus in carrying out the fitting process the thermoplastic material is heated to at least 150°F, where it becomes liquid or flowable. A skier to be fitted places his foot in the padding member, which is disposed within the semi-rigid outer shell. The liquid ther-
moplastic material is then injected into the cavities between the padding member and the outer shell. Since the temperature of the thermoplastic fitting is relatively low, there is little or no danger of burning the foot of the skier being fitted. As the temperature of the thermoplastic drops to 115°F. or below, the fitting material becomes solid and incompressible and is shaped to a skier’s foot. A boot employing the liner assembly of the present invention can be readily refitted, if desired, merely by reheating the thermoplastic in the cavity or cavities of the inner padding member until it flows, fitting another foot in the boot assembly, and allowing the boot assembly to cool until the thermoplastic material solidifies.

Although thermoplastic materials are preferred as the fitting materials, any material which can be made flowable in order to accomplish the fitting, but which later assumes a substantially non-compressible state may be used. For instance, the present invention contemplates the use of plaster of paris, epoxies, resins, polyester resins, rigid foams, including polyurethane foams, polystyrene foams and the like to make up all or part of the fitting material.

FITTING METHOD

The liner assembly of the present invention includes cavities which are filled with a substantially non-compressible material in order to further shape, and size the liner so that it fits the foot well, and when placed in the rigid outer shell the combination provides support for the foot and a firm connection between the skier’s foot and the ski. The inner padding member of the liner assembly preferably is manufactured at the factory whereas the fitting material preferably is inserted in the course of a fitting and sizing operation in a dealer’s shop. The inner padding member provides a substantial portion of the flexibility, padding and other desired characteristics to the liner with the fitting material serving to provide the remaining features sought, i.e., fitting and the sizing the liner to the individual’s foot and ankle. As a result of utilizing the invention disclosed and claimed herein, the control of the characteristics sought with a liner can be accomplished by the manufacturer.

Custom fitting of a boot equipped with the liner of the present invention is preferably accomplished by injecting a flowable fitting material into the cavity or cavities formed between the outer shell and the inner padding member, with the foot of the wearer being in place within the inner padding member. The preferred thermoplastic fitting material is advantageous in that it may be used simply by heating it to the point at which it becomes liquid or flowable. There are no chemicals to mix. The thermoplastic fitting material may conveniently be premixed at the factory and shipped to a dealer or shop in a single container. The fitting operation utilizing the thermoplastic fitting material of the present invention does not require skilled personnel.

The thermoplastic material of the present invention is merely heated until it becomes flowable, whereupon it is introduced into the cavity or cavities until it is vented. The lengthy curing period associated with the thermosetting materials is obviated. The wearer only need wait a relatively short time for the warm thermoplastic to cool to a temperature where it will solidify. Also, with the use of the thermoplastic the custom fit can be adjusted or repeated to suit the wearer, since the boot only need be reheated, a suitable amount of thermoplastic fitting material is added or removed and the assembly is cooled to give a new custom fit.

BRIEF DESCRIPTION OF THE DRAWING

Other features and advantages are inherent in the structure claimed and disclosed or will become apparent to those skilled in the art from the following detailed description in conjunction with the accompanying diagrammatic drawings.

FIG. 1 shows a perspective view of a ski boot comprising an outer rigid plastic shell, a liner connected to the back or outer wall 9 of tongue member 13. Access to the rear entry boot as shown in FIG. 1, is accomplished by pivoting tongue member 13 outwardly, away from shell 11. The foot of a wearer is then inserted into boot 10 from the rear. Subsequently, tongue member 13 is pivoted back in the position shown in FIG. 1 where it is partially overlapped on both sides by the rear portion of the sides of shell 11. Boot 10 is then buckled by inserting loops 17, 17a into buckle member 15. Loops 17, 17a are then drawn tight with boot 10 being secured shut by a forward rotation of pivotal buckle member 15.

FIG. 2 and FIG. 4 illustrate inner padding member 12 which is designed to cover substantially all of the foot and ankle of a wearer except for the back of the ankle and Achilles tendon area. The areas not covered by inner padding member 12 are padded by tongue liner 14 of rigid tongue member 13 as is shown in FIG. 1. Liner 14 is shaped to mate the inner padding member 12 whereby inner padding member 12 and tongue liner 14 will combine to enclose the entire foot and ankle of the wearer.

Referring to both FIG. 2 and FIG. 4 inner surface 20 of inner padding member 12 is shaped generally to conform to the contour of a wearer’s foot. Outer surface 21 of inner padding member 12 is preferably shaped to fit substantially to the inner surface 22 of the shell 11, except in the area of cavity 23 which serves to provide a space for filling material between the shell and inner padding member when inner padding member 12 is inserted in shell 11.

The thickness of the cross section of the inner padding member 12 in the area bounded by cavity 23 may be approximately ¼ inches whereas the thickness of a cross section through the remainder of member 12 may be approximately ⅛ inches. Although, the inner padding member may be a membrane or relatively thin lining member, it is preferably a flexible, cushion member which serves to provide padding between the foot and the fitting material. Thus the fitting material does not provide the padding function since it is a non-compressible material, but the fitting material provides a support function, whereby it provides support for the skier’s foot and ankle and firm contact between the foot and ski boot outer shell. In carrying out the support function, the non-compressible fitting material obviates movement of the foot within the ski boot, thus providing good control of the skier.

Cavity 23 of member 12 comprises an inner most surface 35, a vertical front ankle portion 26 and an arch portion 27. The thicker section of inner padding member 12, which fits against the inner surface 22 of shell 11 comprises a toe portion 28, which pads the wearer’s toes; a sole area 29 which serves to pad the sole of the foot; a heel area 30 for padding the heel, two vertical
ankle sides 31, 31a which substantially pad the sides of the ankles; and a substantially horizontal ankle band 32 which encircles the front and sides of the ankle top. The marginal edges of heel area 30, vertical ankle sides 31, 31a and a horizontal ankle band 32 are adapted to mate with corresponding edges on the tongue liner 14 whereby, when the boot is fastened to a wearer, the foot and ankle will be enclosed and cushioned by liner 14 and inner padding member 12.

Tongue liner 14 is a separate molded or cast piece adapted to fit between the heel of a wearer and the inside surface of substantially rigid wall 9. The tongue 13 and its liner 14 may be removed from the shell 11, and a high-rise tongue inserted in its place.

Horizontal ankle band 32 of inner padding member 12 preferably has one or more passages 33 commencing at the top of band 32 and extending through the bottom of the band. It is most preferred to have at least 2 such passages. A flowable fitting material 24, which fills cavity 23 between the outer surface of inner padding member 12 and the inside surface 22 of shell 11, is introduced through passages 33. While the holes 33 have been illustrated in FIGS. 2 and 4, it is appreciated that other fluid passage means could be employed. For example, grooves could be placed in band 32 whereby fluid fitting material would pass between the groove and the shell. Similarly, fluid passage means may be provided in shell 11.

In order to custom fit and size a boot, using the present invention, an individual places his foot into the inner padding member 12, which is disposed inside an outer shell 11. The boot is closed using tongue member 13 and is secured with buckle 15. The flowable fitting material 24 is introduced into the cavity 23 formed by inner padding member 12 and inner wall 22 of shell 11, by injecting the fitting material through one of the passages 33. After the material has flowed sufficiently to fill the spaces which exist between shell 11 and first member 12, the material will vent through the remaining passage 33. Preferably the vent is closed and additional fitting material is injected under pressure in order to fill all of the voids. After the cavity is completely filled, the skier waits until the fitting material becomes non-flowable, after which the boots may be removed. Since many materials, including most thermoplastic materials, shrink in volume upon solidifying, the pressure used in the fitting process is relieved as the fitting material solidifies.

The use of thermoplastic fitting material is similar in that heated, liquid thermoplastic fitting material is injected until it vents, and then pressurized slightly. The wearer walks about in the boot while the thermoplastic material is cooling and solidifying. The wearer need wait only a short time before the thermoplastic fitting material 24 cools and hardens to the extent it conforms padding member 12 to the foot and ankle of the wearer. No guess need be made of the amount of material to use since there will be only a relatively small change in the volume of thermoplastic material injected following the injection operation as the thermoplastic material cools and solidifies. The volume of material injected will be substantially equal to the volume of the space to be filled.

While the fitting operation has been described in which the thermoplastic material is dispensed directly onto the inner most surface 35 of cavity 23, in some instances it may be desired to provide a thin membrane bladder into which the thermoplastic material is injected. Such an embodiment is illustrated by FIG. 2, in which a bladder 36 is a thin walled member which is shaped to conform to the shape of cavity 23. The bottom wall 37 of bladder 36 is adapted to seat upon the innermost surface 35 of cavity 23, whereas the top wall surface 38 of the bladder is adapted, when the bladder is filled with material, to seat against inner wall 22 of shell 11.

Bladder 36 is shown in FIG. 2 removed from its assembled position in cavity 23. Bladder 36, which can be made of neoprene, butyl rubber, natural rubber, polyvinyl chloride or other suitable material, is closed except for one or more filling tubes 40 which are attached to or molded in bladder 36 at the top thereof. Tube 40 is adapted to be inserted in to passage 33 in ankle band 32 of inner padding member 12 when bladder 36 is placed in assembly in the cavity 23 of inner padding member 12. In using the bladder embodiment, it may be advantageous to evacuate the air there from prior to injecting the fitting material.

Viewing FIG. 3, the cross section taken through the boot 100 in FIG. 1, padding member 12 seats substantially against corresponding mating portions of the inner wall 22 of shell 11, except in the area of cavity 23 where bladder 36 is located. As shown in the drawing, the bottom wall 37 seats against the innermost surface 35 of cavity 23, whereas the top wall 38 of bladder 36 seats against inner wall 22 of shell 11 when the bladder is filled with the fitting material 24.

FIG. 4 illustrates a first member 12 adapted to be used without a bladder member. The horizontal ankle band 32 is equipped with filling passages 33, whereby the fitting material may be injected into the cavity, including arch portion 27 and front portion 26.

Further, the present invention contemplates at least partially filling the cavity 23, either with or without a bladder, with thermoplastic fitting material at the point of manufacture, or at some point in advance of the fitting process. In this embodiment, the boot equipped with the thermoplastic-filled liner assembly is heated enough to make the thermoplastic material readily deformable. The wearer places his foot in the warm boot, assumes a skiing position and permits the thermoplastic material to cool until it is solid enough to be flowable and hardens. Naturally it is advisable to provide means for excess thermoplastic fitting material to overflow and to inject additional thermoplastic fitting material if needed.

Boots equipped with the liner assembly of the present invention may be refitted by using a substantially similar process. It has been found that heat generated from a hair drier or a light bulb placed within such a ski boot for a relatively short period of time will cause the thermoplastic material to soften sufficiently to eliminate tight spots in the boot and correct other minor fitting problems. It has also been found that conventional boot fitting equipment, e.g., boot press, may be used in conjunction with heat may be used to eliminate tight spots.

While various suitable thermoplastic fitting materials can be employed for the liner assembly of the present invention, it has been found the a material comprising a mixture of paraffin wax, and a plasticizer serves to provide the desired characteristics for the thermoplastic material. This material flows easily when heated to a temperature of about 180°, yet rapidly cools to a hardened condition at room temperature. It will be ob-
vious to those skilled in the art that many other thermoplastic fitting materials may be used such as various polybutylenes, and other synthetic resins, various waxes, heavy oils (both mineral and vegetable) and the like as well as mixtures of such materials. These materials may be combined with plasticizers, thickeners, preservatives and the like, as desired. The thermoplastic material may contain various fillers such as inert granular or fibrous material, small particles of foams and any other matter which does not interfere with the mobility of the thermoplastic when heated. It is necessary that the thermoplastic material be a non-compressible, non-flowing solid when in use, but be capable of softening and flowing at temperatures which will not impair the rest of the boot structure or the foot of the wearer being custom fitted. Generally it has been found that materials softening at above 120° F. and as high as 180°F., but which will solidify at 115°F. are adequate, but higher or lower melting materials may be used. The thermoplastic material can be reheated and cooled for refitting as often as required without a damage to the thermoplastic material.

The thermoplastic material may be supplemented in the cavities by some non-thermoplastic material. For instance slips of polyurethane foam or other forms or types of foam may be placed in the cavity. Alternatively, small particles or balls of a foam, such as polyurethane foam, may be dispersed in the thermoplastic material. The use of such foamed materials to supplement the thermoplastic material will tend to reduce the weight of the complete boot.

Although the drawings herein primarily depict the liner assembly of the present invention being used in a rear entry ski boot, it will be obvious to those skilled in the art that the front or side entry ski boots and other conventional footwear may be so equipped.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, as modifications will be obvious to those skilled in the art.

What is claimed is:

1. The method of fitting a ski boot which comprises an outer shell and a liner assembly disposed within said shell, whereby at least one cavity is formed therebetween, said method comprising the steps of:
   - inserting a thermoplastic fitting material into said cavity;
   - heating said thermoplastic fitting material to a temperature substantially above ambient temperature;
   - shaping said liner assembly about the foot-to-be-fitted; and
   - thereafter cooling said thermoplastic fitting material to ambient temperature whereby said thermoplastic fitting material supports said formed liner assembly.

2. The method as described in claim 1, wherein said heated thermoplastic fitting material is heated prior to being inserted in said cavity.

3. The method as described in claim 2, wherein said heated thermoplastic fitting material is injected under pressure into said cavity.

4. The method of fitting a ski boot which comprises a substantially rigid outer shell and a liner assembly disposed within said shell, whereby at least one cavity is formed therebetween, comprising the steps of:
   - inserting a thermoplastic fitting material into said cavity;
   - heating said thermoplastic fitting material to a temperature substantially above ambient temperature,
12. A method of fitting in accordance with claim 11 wherein the amount of thermoplastic fitting material within said cavity is adjusted while said fitting material is heated.

13. A method of fitting as described in claim 11, in which said thermoplastic fitting material is maintained under pressure after said foot-to-be-fitted is inserted and during cooling of said thermoplastic fitting material.

14. A method of fitting a ski boot which comprises a substantially rigid outer shell, a liner assembly disposed within said outer shell, whereby at least one cavity is formed therebetween, and a substantially thermoplastic fitting material substantially filling said cavity, which method comprises:

heating said ski boot and said fitting material to a temperature at which said fitting material becomes flowable;

inserting a foot-to-be-fitted into said heated ski boot, whereby said thermoplastic fitting material is deformed so as to form-fit said liner assembly into snug fitting relationship with said foot-to-be-fitted; and

cooling said ski boot until said thermoplastic fitting material becomes substantially non-flowable.

15. A method of fitting in accordance with claim 14 wherein the amount of thermoplastic fitting material within said cavity is adjusted while said fitting material is heated.

16. A method of fitting as described in claim 14, in which said thermoplastic fitting material is maintained under pressure after said foot-to-be-fitted is inserted and during cooling until said thermoplastic fitting material becomes substantially non-flowable.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,882,561
DATED : May 13, 1975
INVENTOR(S) : Alden B. Hanson & Chris A. Hanson

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 7, line 15, "ban" should be --band--
   line 17, after "through" insert --to--
   line 30, "it" should be --in--
   line 35, after "inner" insert --wall--

Column 8, line 23, "100" should be --10--
   line 31, "first" should be --padding--

Column 10, line 13, claim 7, "filling" should be --fitting--

Signed and Sealed this twenty-second Day of July 1975

[SEAL]  

Attest:

RUTH C. MASON  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents and Trademarks