

Sept. 22, 1970

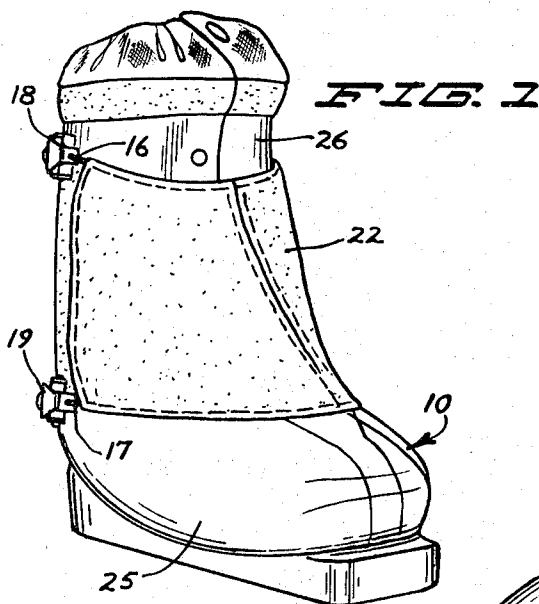
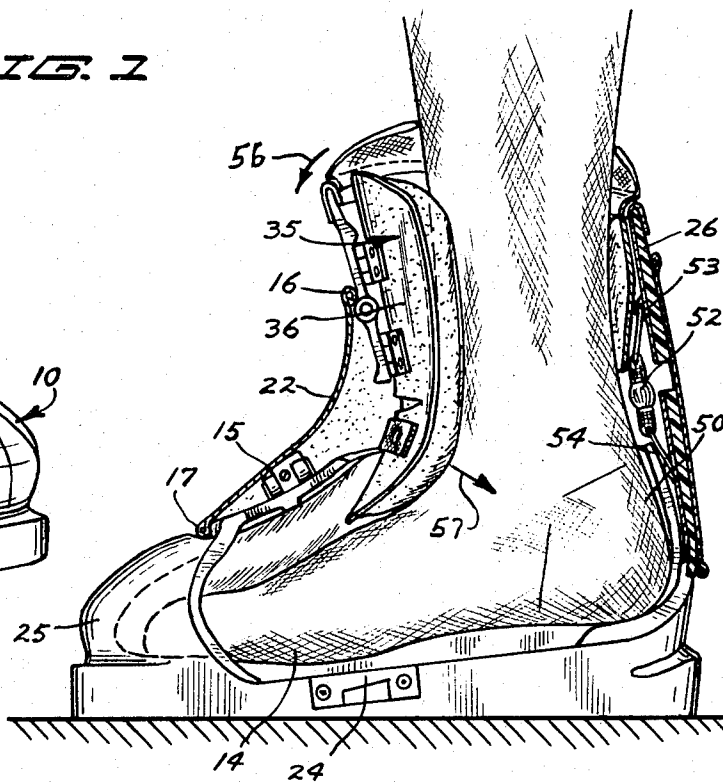
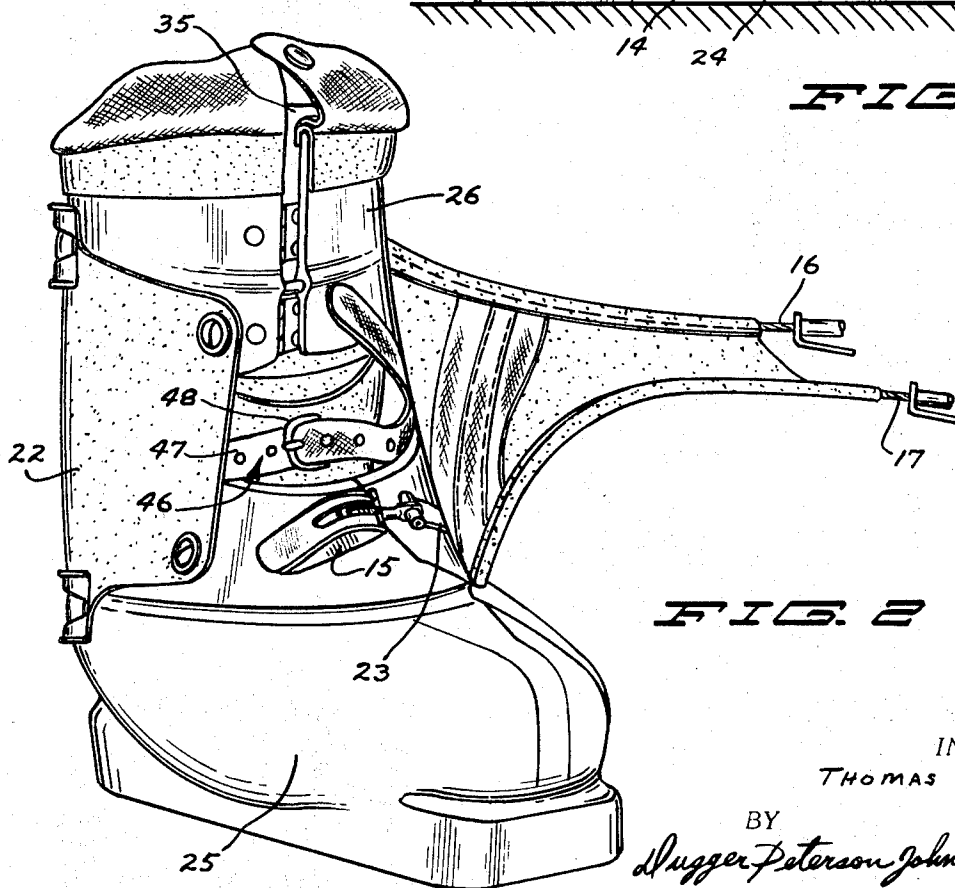
T. F. CANFIELD

3,529,368

RETAINING DEVICE AND PAD FOR SKI BOOTS

Filed March 10, 1969

2 Sheets-Sheet 1



1

3,529,368

RETAINING DEVICE AND PAD FOR SKI BOOTS
Thomas F. Canfield, Minneapolis, Minn., assignor to
Sports Technology, Inc., Minneapolis, Minn., a corpo-
ration of Delaware

Filed Mar. 10, 1969, Ser. No. 805,613

Int. Cl. A43b 5/04, 7/14

U.S. Cl. 36—2.5

9 Claims

ABSTRACT OF THE DISCLOSURE

A foot retaining device for use with rigid shell ski boots comprising a pad across the forward portion of the lower leg and the upper instep of the foot, and a strap for acting against the pad to force the foot rearwardly into the boot to retain it in place in the boot.

BACKGROUND OF THE INVENTION

Field of the invention

The present invention relates to retaining devices for holding feet firmly within a ski boot.

Prior art

Rigid shell ski boots such as those shown on U.S. Pat. Nos. 3,405,463 and 3,313,046 give excellent skiing control, and when fitted properly are very comfortable. One of the problems in rigid shell ski boots is to quickly fit the boots to many different feet. Further, very advanced skiers desire high heel hold down forces in the boots.

SUMMARY OF THE INVENTION

The present invention relates to a pad used at the forward portions of the leg and rear of the instep of a wearer and used in combination with a retaining device in the boot to give a rearwardly and downwardly fitting force on the foot in the boot without causing undue discomfort. This simplifies the boot fitting process, and holds the heel portions of the foot securely during skiing. The present invention also provides for a quick adjustment of boot fit to accommodate small changes in foot size during the day.

As disclosed, the frontal pad is pivoted to the cuff portion of the boot about an upright axis and extends down over the instep portion of the foot to provide a cushion for the retaining forces from a retaining strap. The pad is made in two sections. A closed cell foam which is not quickly conforming is used in the instep area. The pad has relatively quick conformability characteristics in the portion in contact with the lower leg bone of a wearer. The slowly resilient material in the instep area permits the tendons leading to the foot to move the foam material out of the way, and permit blood to flow during normal foot movement so that circulation is not cut off from the boot even though the pad is tightened securely.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective view of a ski boot having a pad installed therein according to the present invention;

FIG. 2 is a perspective view of the boot of FIG. 1 showing an outer cover in partially open position to illustrate the pad and securing strap of the present invention;

FIG. 3 is a front view of the boot of FIG. 1 with an access door in an open position;

FIG. 4 is a sectional view taken as on line 4—4 in FIG. 3; and

FIG. 5 is a view taken on substantially the same line as FIG. 4 showing a foot in position when a foot retaining strap is in a secured position.

2

DESCRIPTION OF THE PREFERRED EMBODIMENT

A ski boot illustrated generally at 10 is of the rigid shell type as shown in U.S. Pats. Nos. 3,405,463 and 3,325,920. The shell is preferably made of rigid reinforced fiber glass material, and an access door 11 is pivotally mounted to a main portion or member 12 of the boot about an upright hinge axis, for example, the axis of hinge 13. The foot 14 of a wearer can be placed inside the main portion of the boot, and then the door 11 closed. The door 11 is secured with a buckle 15 acting on the instep area, and a pair of cable and clamp assemblies. The cable and clamp assemblies 16 and 17 respectively, have ends that are fastened to the boot on one side thereof, and the cables encircle the boot, and then when the clamps 18 and 19, respectively, are closed, the cables will tighten around the boot to hold the door 11 tightly clamped against the main portion 12 of the boot. A tough fabric or synthetic material cover member 22 is carried by the cables and extends between the two cables as shown. When the clamp assemblies 18 and 19 are released, the cover 22 can be folded back, and the instep clamp 15 can be released and the door can be opened. It should be noted the instep clamp 15 includes a strap member 23 that hooks into a latch 24 so that when the instep clamp 15 is closed, it exerts a force against the latch 24 to pull the door down and to seal the lower edge of the door 11 against the mating edge of the boot.

When the boot door 11 is closed, the boot has a lower foot receiving portion 25 and a cuff or lower leg encircling portion 26. The lower leg encircling portion 26 is supported on the foot receiving portion 25 with suitable supports so that when the door is closed the portion 26 will pivot with respect to the lower portion 25 about a transverse axis adjacent the ankle bone of the wearer. The lower leg of a wearer can be flexed by the wearer and the cuff portion 26 will pivot to permit this flexing. The structure for holding the cuff portion 26 is placed with respect to the lower portion 25 is illustrated generally at 27 and includes straps extending up to the ankle portion, one on each side of the leg, with the straps being pivotally mounted to the lower foot receiving portion on suitable members.

In the form of boot shown, the cuff portion 26 is completely separate from the boot lower portion 25, and as perhaps can be best seen in FIG. 2, the upper edge 30 of the boot lower portion and the lower edge 31 of the cuff portion are spaced apart a substantial distance in the front portions of the boot.

It should be noted that in FIG. 2 the boot door is shown partially opened at the cuff area to be illustrative.

The interior of the lower portion of the boot is lined with pads 32 and 33, on opposite sides of the foot, and the cuff member is lined with pads 34 along the sides of the cuff, and at the rear of the cuff.

The side pads for the boot also extend back along to the heel areas of the foot as shown. The pads are made so that they can be adjusted in size by inserting pillows behind the pads to take up space between the pads and the foot until a snug fit is assumed. These pads are fixed to the boot shell in a suitable manner. However, in order to insure that the heel of the foot 14 is held rearwardly and downwardly with adequate force as is necessary for good skiing control, a frontal pad illustrated generally at 35 is mounted onto the cuff. The pad extends along the lower leg bone of the wearer and downwardly and forwardly over the instep rear portions of the foot as shown. The term instep rear portions as used in this specification means the rear portions of the instep where the foot and leg join, and the actual transition portion between the foot and leg. The frontal pad 35 comprises a relatively

thick and stiff leather backing member 36 that can be preshaped so that it inclines forwardly over the instep area of the foot adjacent the lower part of the pad. The backing member 36 is fastened with suitable hinges 37 to the cuff portion of the boot. Note that the cuff portion includes two sections, one which forms part of the door 11 and the which is on the main part of the boot. Likewise, the boot lower portion also has two sections, a main boot section and a door section. The pad 35 is on the cuff section that forms the main part of the boot.

The backing member has a relief cut into it as illustrated at 40 to permit the pad to flex a little in the instep area of the foot. Also, the pad 35 can swing about its hinges as the foot is inserted or removed from the boot to make it easier to put the boot on or take it off.

As perhaps best shown in FIG. 4, the pad 35 includes a cushion material 41 that is molded to the desired shape in the lower portions of the pad (in the rear instep and leg-foot junction areas). As can be seen, the lower portion of the cushion material 41 is the full thickness of the pad. The upper portion of the pad has a thin layer 42 of the cushion material which contacts the leg of the wearer, and behind this thin layer 42 there is a pocket 43 which is filled with a pad 44. The pad 4 is filled with a quickly conforming material, such as a filling of small discrete elastomeric particles covered with a thin coating of lubricant which will quickly conform to the leg when under high pressures exerted by the frontal area of the leg during skiing. The pad 44 could also be liquid filled if desired.

The pad 35 is fairly wide across the frontal area of the leg and the foot, and is relieved or contoured to fit around the leg and instep area. In other words it is formed so that it does generally conform to the shape of the foot and leg of a wearer.

The cushion material 41 is covered with an outer layer 45 of soft leather or other material that is sewed to the relatively stiff backing member 36. A flap made of the layer 45 is provided to permit access to the pocket 43 so that the pad 44 can be inserted, and this flap is merely a piece of material on one free edge of the pad that can be tucked into place to close the opening to pocket 43 after the pad 44 is in place. This also permits the addition of more pads or padding in the pocket 43 if necessary.

The cushion material 41 is a closed celled foam which forms a combination of polyvinyl chloride and latex that has a cushioning effect, but has a slow memory or recovery rate, or in other words once it is depressed, it does not immediately spring back into shape but goes back to its original shape relative slowly. The foam is fairly firm, and is sold under the trademark Ensulite by Uniroyal, Incorporated, Mishawaka, Ind.

When the foot is to be placed into the boot, the door 11 is opened as shown in FIG. 3, and the frontal pad 35 can be pivoted about the hinge axis of the hinges 37 to permit the leg to slip into the main boot member and then the pad will pivot into place as the leg is moved into the main member of the boot. The door 11 is then closed, and with the cover 22 still open as shown in FIG. 2, the foot is moved firmly back against the back portions of the boot through the use of a foot retaining device comprising a strap and buckle assembly illustrated generally at 46. The strap and buckle assembly is two parts, first a free end portion 47 that is fastened suitably to the back of the pad 33 or to the boot shell on the main part of the boot, and a buckle end 48 that is suitably fastened to the back of the pad 32 or to the shell on the door part of the boot. Rivets or suitable adhesives can be used for fastening the strap member to the pad back member or to the boot shell directly. This is shown in FIG. 3 where the buckle portion is moving with the door. The strap members are fixed with respect to the boot, because the pads 32 and 33 are securely fastened with adhesive or other devices to the boot shell.

As shown, an ordinary buckle using holes in the free end portion of the strap is utilized, but a friction lock

buckle can also be used. The friction lock buckle will give the strap infinite adjustment in strap length and can include a quick release mechanism something similar to those used in automotive seat belts or the like. Many friction type buckles can be used for the infinite adjustment if desired. The free end portion 47 of the strap is then fastened to the buckle and sufficient force is put on the strap to force the heel of the foot 14 of a wearer back against a pad 50 that is at the rear portions of the boot and downwardly against the insole of the boot. The pad 50 can be a foam or sponge pad.

The pads on the sides of the foot and in the cuff, and pads 32, 33 and 34 are filled with slowly conformable material such as that shown in U.S. Pat. No. 3,407,406.

The buckle is tightened until the pad 35 forces the foot into the desired position, and then the cover can be closed. If desired, the padding around the heel area and in the instep area can be built up by inserting small pillows or pads behind the main pads to take up space. The strap assembly passes on the outside of pad 35 so the retaining force from the strap is transmitted to the foot through the backing member 36 and the cushion material.

Because the cushion material 41 is a closed cell foam, the tendons working in the junction between the the foot and leg can move the cushion material out of the way, and it will not return immediately back to its initial position. This will permit blood to circulate before the pad tightens up to prevent the feet from going to sleep and cutting off all circulation.

The portion of the leg bone that contacts the portion 42 of the frontal pad will still be permitted to move relatively rapidly because the quickly conforming material in pad 44 will move out of the way to let the leg move to accommodate high, rapidly changing loads encountered on the lower leg bone when skiing.

As shown, an elastic member 52 is fastened between the boot lower portion and cuff portion with suitable clips 53 and 54, to provide some resilient resistance to forward pivoting of the cuff portion 26 with respect to the boot lower portion 25.

The frontal pad 35 closes the open area over the instep area of the foot between the lower boot portion and the cuff portion, and provides the cushioning necessary for the use of a strap assembly 46 for holding the foot rearwardly in the boot to give good fitting and also to give adjustments.

After the strap assembly 46 has been securely fastened, the cover member 22 can be closed and the cable 16 and 17 fastened with the clamps 18 and 19. The instep clamp 15 can be fastened before the strap assembly 46 is fastened.

The relatively stiff backing member 36 for the pad and the slowly conformable cushion material 41 distributes the load from the strap evenly onto the wearer's foot. This provides a good feel for a skier because the skiers are used to having some clamping or pressure over the instep area when they are skiing.

The strap portions are fastened to the boot to exert a rearwardly and downwardly force on the foot when the strap assembly is fastened. A small laced girdle or support having a lace closure could be used as a strap assembly, and actually an over center buckle could also be used for a fastener.

The strap assembly and pad greatly aid in fitting the rigid shell boots for the skier. The strap adjustment can be used to effectively make the boot fit properly without adding material to the pads that line the sides of the boot. Thus, while the volume inside a rigid shell boot that has a hinged door as shown is fixed, the adjustable strap and pad disclosed permits take up of this volume with a cushion material to give a quick fit.

The attachment of the frontal pad to the cuff also aids in increasing the holding force on the heel when the lower leg of a wearer is moved forwardly during skiing.

5

As can be seen when the cuff pivots forwardly as shown by the arrow 56 in FIG. 5, the portion of the pad at the rear instep part of the foot will be urged downwardly and rearwardly by this movement as shown by the arrow 57 in FIG. 5. Thus when the skier flexes his leg for a turn, the pad will tend to help hold the heel down for better control.

What is claimed is:

1. In a ski boot having a rigid outer shell and including a lower boot portion and a lower leg encircling cuff portion pivotally mounted to the lower boot portion to permit movement of a leg of a wearer with respect to the foot of the wearer, said boot including a door member and a main boot member, said door member being hingedly attached to said main boot member and movable from an open position to permit a foot to be inserted into the main boot member and to a closed position, and padding means in the boot on the sides of the foot and on the sides of the cuff portion, the improvement comprising a pad member extending at least partially over the rear instep portion of the foot of a wearer of the boot, said pad extending along the front of the cuff portion and being hingedly attached to said cuff portion about a substantially upright axis to permit insertion and removal of the foot and leg of a wearer of the boot, said foot retaining means, means to mount said foot retaining means with respect to said boot, said foot retaining means including means to permit releasably fastening said retaining means with respect to said pad member to urge said pad member against the rear instep portion of the foot of a wearer of the boot in direction to tend to urge the heel of the wearer rearwardly and downwardly in the boot.

2. The boot of claim 1 wherein said pad member has two sections, a first section adjacent the front of the leg of a wearer in the cuff portion of the boot, and a second section adjacent the junction between the instep and leg of the wearer, said first section having means padding said pad that permits quick conforming of the pad to the leg portion of a wearer of the boot under high loads, and said second section comprising slowly conformable closed cell foamed material with a slow rate of recovery.

3. In a ski boot having a lower foot portion and an ankle cuff portion, the improvement comprising a pad member attached to said boot and extending along the frontal portion of the lower leg of a wearer of the boot and covering at least a rear instep portion of the foot of the wearer of the boot, said pad member comprising a resilient cushion material and a relatively stiff backing member on a side of said cushion material opposite from the leg and instep of a wearer, an adjustable strap means, means to fasten said adjustable strap means with respect to said boot to the rear of and below the rear instep portion of the foot of the wearer, said strap means being positioned to bear on said backing member, and means to tighten said strap means against said backing member to exert a rearwardly and downwardly force on the pad and the foot of the wearer of the boot, whereby said backing member distributes forces from said strap across a greater area of said pad than the area of contact between the strap and the backing member.

4. The boot of claim 3 where in said boot comprises a substantially rigid outer shell for retaining said foot.

5. The boot of claim 3 wherein said stiff backing member comprises a layer of heavy leather.

6

6. In a ski boot having a lower foot portion and an ankle cuff portion, the improvement comprising a pad member attached to said boot and extending along the frontal portion of the lower leg of a wearer of the boot and covering at least a rear instep portion of the foot of a wearer of the boot, said pad comprising a closed cell foam cushion member in the rear instep portion of the foot of the wearer of the boot, said closed cell foam deforming under load and slowly returning to its original configuration after the load is removed, and adjustable strap means, means to fasten said adjustable strap means with respect to the boot to the rear of and below the rear instep portion of the foot of the wearer, said strap means being positioned to bear on said pad on the side of said pad not in contact with the leg of the wearer of the boot, and means to tighten said strap means against said pad to exert a rearwardly and downwardly force on the pad and on the foot of the wearer of the boot.

7. In a ski boot having an outer shell and including a lower boot portion and a lower leg cuff portion pivotally mounted to the lower boot portion to permit movement of a leg of a wearer with respect to the wearer, said boot having an access door comprising a section of the lower portion of the boot and a section of the cuff portion of the boot, hinge means to mount said access door to the remainder of said boot, the improvement comprising a frontal pad member and means to mount said frontal pad member to said cuff portion, said frontal pad member overlying the frontal portion of the lower leg of the wearer of said boot in the cuff portion and extending partially over the rear instep portion of the foot of a wearer of the boot, adjustable retaining means, means to mount said adjustable retaining means with respect to said boot, with a portion of said adjustable retaining means mounted to said access door, and a portion of said adjustable retaining means mounted to the remainder of the boot, said adjustable retaining means being positioned on the outside of said frontal pad and being tightenable against said frontal pad, said frontal pad thereby being tightened against the foot and leg of a wearer of the boot in direction to tend to urge the heel of the foot of a wearer of the boot downwardly and rearwardly.

8. The boot of claim 7 wherein said frontal pad includes a stiff backing member on the side thereof away from the leg and foot of the wearer, said retaining means bearing against said backing member when said retaining means is tightened.

9. The boot of claim 8 wherein said retaining means comprises an adjustable strap member fastened with respect to the boot and bearing against the backing member of said frontal pad.

References Cited

UNITED STATES PATENTS

2,531,763	11/1950	Andre	36—2.5
3,313,046	4/1967	Werner et al.	36—2.5
3,405,463	10/1968	Werner	36—2.5

FOREIGN PATENTS

891,063	9/1953	Germany.
917,173	8/1954	Germany.

PATRICK D. LAWSON, Primary Examiner

U.S. Cl. X.R.