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Hanson et al.

[11] **3,848,347**

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[54] **SKI BOOT WITH ADJUSTABLE FLEXURE MEANS**

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[52] **U.S. Cl.** ..... **36/2.5 AL,** 36/5 D

[51] **Int. Cl.** **A43b 11/00**

[58] **Field of Search** ..... 36/2.5 R, 2.5 AL, 50

[56] **References Cited**

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[57] **ABSTRACT**

A ski boot having a shell comprising two complementary parts which are assembled together and include a means whereby a skier can vary the flexure of the ski boot.

16 Claims, 4 Drawing Figures

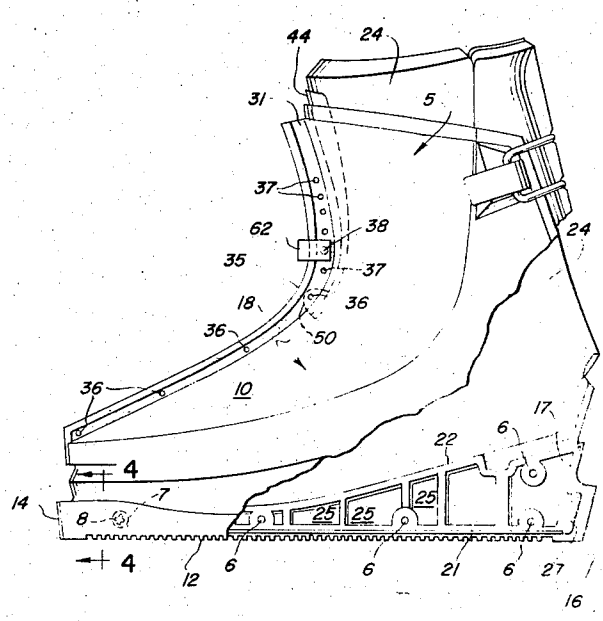


FIG. 2

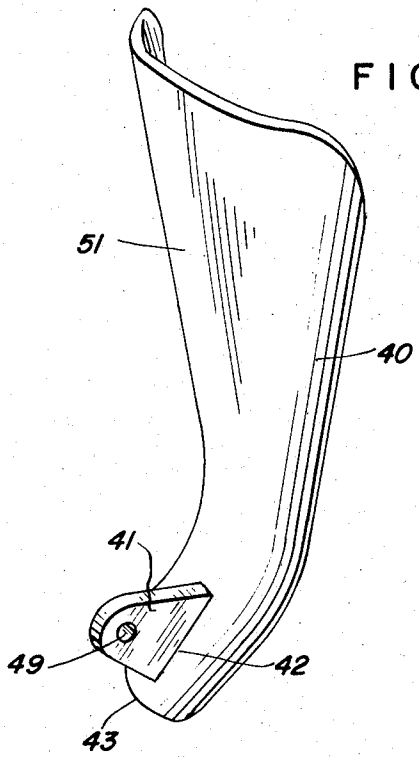


FIG. 1

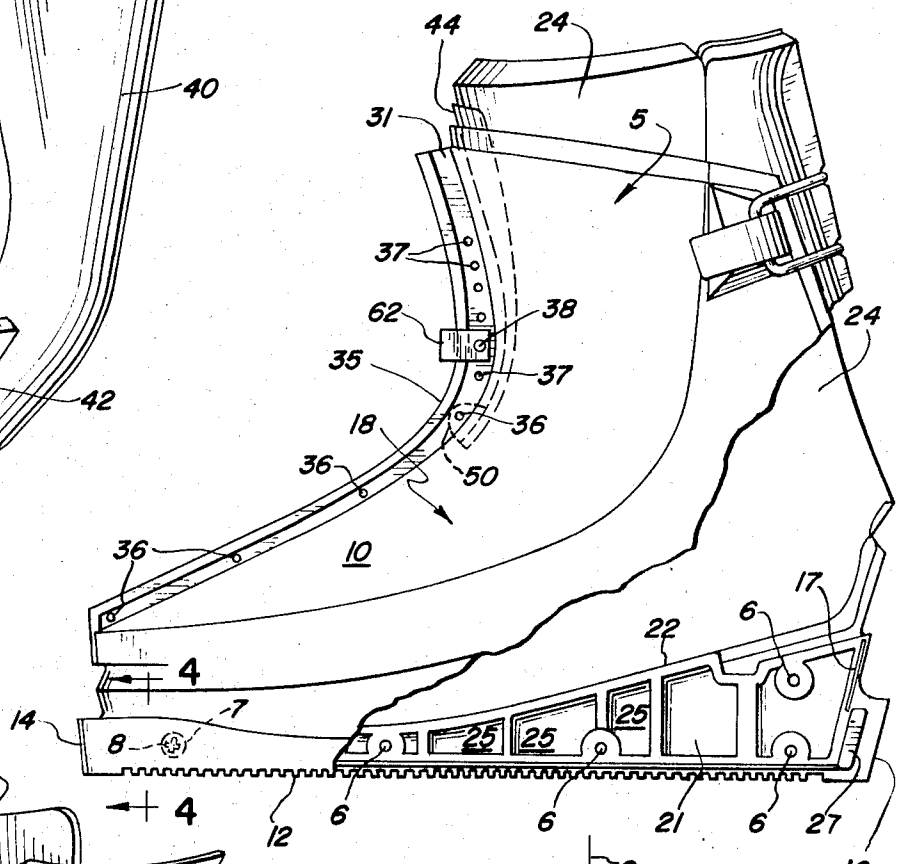


FIG. 3

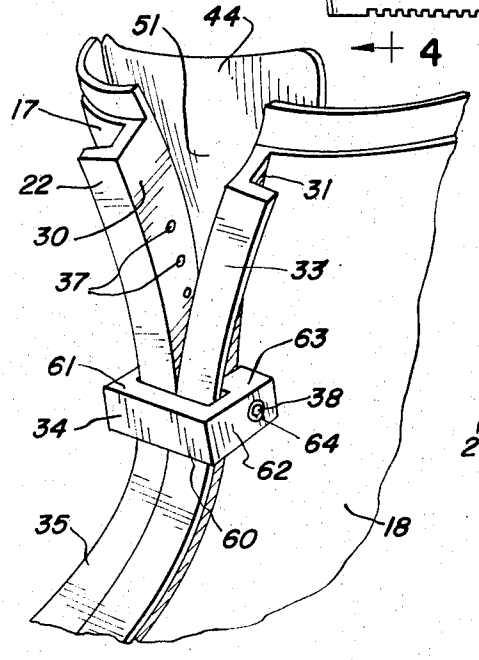
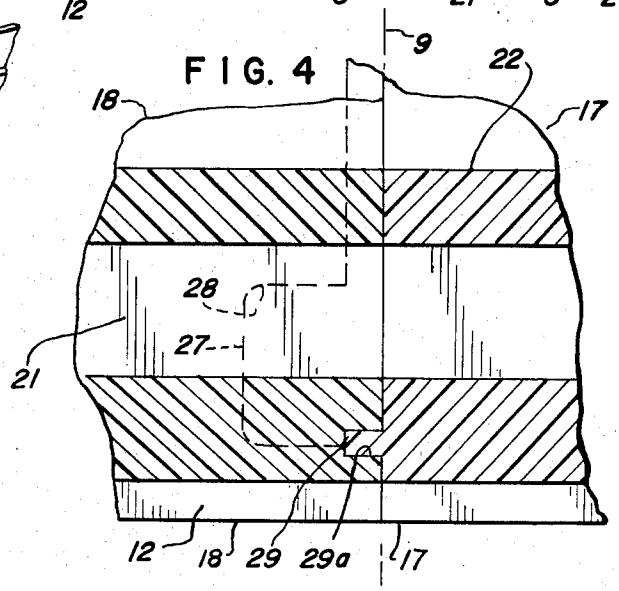


FIG. 4



SKI BOOT WITH ADJUSTABLE FLEXURE MEANS

BACKGROUND OF THE INVENTION

The present invention relates to footwear in general, and more particularly to a ski boot of the rear entry type having provisions for adjusting the flex of the boot which is generated by the force of a skier's ankle when the skier is in a forward lean position.

Further, the ski boot of the present invention comprises a multi-piece shell which is manufactured in two complementary pieces which are mated together in a plane passing through a center line which extends from the front or toe to the rear of the boot. Upon assembly, the boot of the present invention employs a slidable clamping means adapted to travel along a portion of the length of a ribbed track to provide a convenient and relatively easy means for adjusting the amount of flexure in the boot.

Many ski boots presently available comprise a substantially rigid outer shell generally made of a plastic material. A liner member is normally disposed within the shell and serves as a cushion between the shell and the foot of a skier. When a skier is in a forward lean position at which time the knees of the skier generally are located above and slightly in front of the boot, pressure is exerted against the front portion or the vamp of the boot. Generally, and particularly with boots having plastic shells, the boot is held relatively rigid so that the boot will not flex. This is particularly the case with expert skiers and racers who desire as little flex as possible in the ski boot. The less flex there is in the boot, the more responsive the ski is to the skier's feet, in which instance, the skis act as an extension of the skier's feet.

In other instances however, skiers with less experience do not desire ski boots without flex as this affects the comfort of the skier. Similarly, these skiers are desirous of having some means of controlling the responsiveness of the skis.

Unfortunately, most ski boots do not have a means for readily adjusting the flex in a boot. Rather, because of the relatively stiff plastic materials utilized in ski boot shells, the shell of the boot is substantially rigid. The sole means for providing any flexure in the boot are the adjustments provided with the buckle closure system of a particular boot. In this respect the buckle closure systems do not serve to satisfy entirely the flexure requirements for various skiers. Accordingly, it is desired to provide some other means of providing the desired flexure in the shell of a ski boot. Additionally, it is desired to accomplish the provision of an adjustable flexure means while at the same time providing a boot which affords relative ease of manufacture and assembly.

SUMMARY OF THE INVENTION

The present invention concerns itself with a ski boot having a means for adjusting the flexure in the boot to the amount desired by a particular skier. Not only does the ski boot of the present invention permit the desired flexure to be achieved, but additionally the boot affords a new and improved method of manufacture and assembly.

The boot of the present invention includes a substantially rigid outer shell which comprises two complementary shell portions which, upon assembly of the shell, are joined together by suitable fastening means such as screws. The two portions which form the vamp of the shell are complementary parts that are joined together at their respective parting lines. When the boot is assembled, the parting lines of the shell portions lie substantially in a vertical plane that transverses a center line which extends from the front or toe to the rear of the boot. The outer shell is completed by a rear tongue assembly which is adapted to be connected to the assembled shell portions.

An adjustable clamping means is adapted to slide along a flanged track located on the front of the assembled shell. The clamping means can be positioned in any one of a number of positions at which position the clamping means is securely fastened with the corresponding effect that the shell will permit only a certain amount of flexure when the boot is in use.

The boot of the present invention is adapted to be provided with a suitable liner and wax fitting system such as the liner and fitting system of the type described in our pending application, Ser. No. 216,080 filed Jan. 7, 1972. Moreover the present boot is adapted to be provided with interchangeable backs of the type described in our pending application Ser. No. 231,967 filed Mar. 6, 1972. It is appreciated, however, that other liners could be employed with the boot of the present invention and that other boots aside from the rear entry type disclosed herein could utilize the new and unobvious invention disclosed and claimed herein.

The invention will be further described in greater detail with reference to the accompanying drawings, wherein:

FIG. **1** shows a side view of the ski boot of the present invention with the rear portion of the boot cut away to expose the bottom ribbed section of one shell portion;

FIG. **2** shows a tongue with an attaching tab, the tongue, upon assembly, being disposed between the inner wall of the shell and the outer wall of the liner as shown in FIGS. **1** and **3**;

FIG. **3** shows an enlarged section of the shell portions of the ski boot of the present invention with the shell portions forced opened in an operative skiing position whereby portions of the flanged ribs on the shell portion are forced outwardly from each other so that the boot can flex the desired amount; and

FIG. **4** shows an enlarged section taken along lines **4—4** of FIG. **1.**

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings and more particularly to FIG. **1** there is shown a ski boot **10** which includes stiff sole **12** having front section **14** and rear section **16** adapted to engage ski bindings. The shell **5** of the boot is preferably molded in two complementary shell portions **17, 18** which are mated together in a vertical plane **9** which passes through a center line which extends from the front or toe to the rear of the boot. Shell portions **17, 18** are fastened together along the length of the sole by suitable fastening means such as screws **8** which are inserted into recessed holes **7** in portion **18** and screwed into holes **6** located in portion **17.** Each shell portion is preferably molded so that sole **12** is integral and that floor **22** of the shell, upon assembly of the boot, serves to support inner liner **24.** Liner **24** is

disposed within shell **5** and is located between the assembled shell and the foot of a skier.

Sole **12** is connected to floor **22** by means of spaced ribs **25.** Air spaces **26** are located between spaced ribs **25** and serve to reduce the weight of the boot by eliminating material from the sole of the boot. The ribs are of sufficient strength to withstand the weight of the skier and the forces that will act upon the boot when the boot is worn. If it is desired to vary the weight of the boot for a particular skier on application, these spaces could be filled with material to achieve the desired boot weight.

As shown more clearly in FIGS. **1** and **4,** shell portion **18** has tabs **27** located at the front and rear of the shell portion. These tabs, upon assembly, are inserted in corresponding grooves **28** located at the front and rear of shell portion **17.** A groove **29***a* is also located along a substantial portion of the length of portion **17.** A corresponding tab **29,** adapted to fit in groove **29***a*, is located along a substantial portion of portion **18** and is adapted to fit snugly in groove **29***a*. In assembly tabs **27** fit in grooves **28** and tab **29** fits in groove **29***a* after which screws **8** are employed to complete the formation of sole **12** by securely fastening shell portions **17, 18.** If desired, glue can be used to cement the tabs in the grooves so that a substantially leak free connection is provided between the shell portions in the area of sole **12.**

The front of portions **17** and **18** serve, when the portions are joined, to form the vamp of the boot. Each portion has a rib **30, 31** extending outwardly from the rounded contoured section of the shell portion. Rib **30** has a flange **32** and rib **31** has flange **33.** The flanges project outwardly from each other and are substantially perpendicular to the ribs. Upon assembly of the shell portions **17, 18,** ribs **30, 31** abut each other so that they lie substantially in vertical plane **9** which passes through the center of the boot. Slide clip **34** is positioned to slide along at least a portion of track **35** which is composed of flanged ribs **30, 31.** That portion of track **35** which is located nearest the toe area of the boot, utilizes rivets **36** or other suitable fastening means to securely fasten ribs **30, 31.** At the opposite end of track **35,** a number of holes **37** are located at selected positions along the length of the track which is unriveted so that the shell is split.

Clip **34** which is adapted to slide along the track includes a screw **38** which is adapted to pass through one of the selected holes **37.** Clip **34** comprises base **60** and two legs **61, 62** which extend outwardly from base **60.** Legs **61, 62** each have an inwardly extending flange **63** at their outboard end. Leg **61** is threaded to receive fastening screw **38** whereas the leg **62** has a hole **64** which is at least slightly larger in diameter than the head diameter of screw **38.** Hole **64** is aligned with the threaded hole in leg **61.**

The desired flex properties in the boot can be achieved by positioning clip **34** at a particular hole location **37.**

When a skier desires to change the flex in the ski boot, screw **38** is unscrewed and removed from hole **37.** Clip **34** is then moved along track **35** to one of the other holes **37.** Screw **38** is then reinserted in the hole and threaded into threaded hole in leg **61** until the head of the screw is disposed within the hole **64** of leg **62.** It will be appreciated that when clip **34** is positioned near the top portion of track **35,** the least amount of flexure will be permitted whereas the flexure in the boot will increase as clip **34** is moved along track **35** toward the toe of the boot.

As illustrated in FIG. **3,** when pressure is exerted against the liner and the shell of the boot by the ankle of a skier, shell portions **17, 18** are adapted to separate at the location of ribs **30, 31** along the length of the track **35** to the point where the ribs are fastened securely together by clip **34.** Thus, if a skier desires more flex in the boot all that is required is to slide clip **34** downward along track **35** to a particular adjusting hole **37** where the screw **38** is threaded in position to securely fasten the clip in position.

Tongue **40** is disposed between the outer wall of liner **24** and the inner wall of shell **5** to preclude snow from contacting the liner **24** upon separation of ribs **30, 31.** Tongue **40** is preferably molded and can be made of the same or different materials than the shell material. Tab **41** is integral with and projects outwardly from the bottom of tongue **40,** tab **41** being contiguous to the bottom edge **43** of the tongue. The tongue is contoured to follow substantially the contour of the shell and liner at the area where the tongue is inserted in the boot.

Viewing FIG. **1,** tongue **40** is located behind ribs **30, 31** and in front of liner **24,** which includes a foam liner and wax filled bladder. The tongue extends along a portion of the length of track **35** and projects slightly beyond the top of the shell at **44.**

Ribs **30** and **31** are each recessed at **50** for at least one half the thickness of tab **41** and are formed to the shape of the tab. Upon assembly of shell portions **17, 18,** tab **41** is positioned in recesses **50** in ribs **30, 31** and hole **49** is aligned with rivet hole **36** in each shell portion after which a rivet or other fastening means secures the tab and shell portions together.

When the shell of the boot is flexed, the area opened or exposed between the ribs, as seen in FIG. **3,** is protected by tongue **40.** The tongue serves to keep snow from entering between the shell and liner **24** at the area exposed by the opened ribs. Moreover the shell portions, upon flexure of the boot, will not rub against the liner at the location of ribs **30, 31,** but rather will contact the front surface **51** of tongue **40.**

The boot of the present invention provides a means for adjusting the flex in the boot to that desired by a skier. The shell of the boot is split for a portion commencing from the top of the boot and extending toward the bottom of the boot. Means such as clip **34** are provided for connecting the split shell at any of a number of selected positions along the length of the split portion so that when pressure is exerted on the shell, the shell will separate along the length of the split to the location where the connecting means securely fastens the split portions together.

The forms of the invention herein shown and described are to be considered as illustrative. It will be apparent to those skilled in the art that numerous modifications may be made therein without departure from the spirit of the invention or the scope of the appended claims. The adjustable flex means of the present invention could be utilized with liners and shells aside from that in the embodiment shown and disclosed herein. Similarly, the design of the flanged ribs could be modified by one skilled in the art without departing from the present invention.

What is claimed is:

1. A ski boot with means for adjusting the flex in the boot so that the flex in the boot can be changed by the wearer of the boot, said boot comprising:
a shell having a closure system adapted for closing said shell about the foot of a skier;
said shell having a split portion commencing at the top of said boot and extending toward the bottom of said boot, said split portion being defined in part by a pair of generally parallel opposed edges;
clamping means for interconnecting the edges of said split portion at a desired point along the length of said split portion;
whereby, upon exertion of pressure on said boot, the shell is adapted to separate along the length of said split portion from the top of the boot to the location where said clamping means connects the edges of said split portion.

2. A ski boot in accordance with claim 1 wherein said split extends from the top of said boot downward toward the front of said boot, said split occurring in a vertical plane which passes through the center line of the boot extending from the front to the rear of the boot.

3. A ski boot in accordance with claim 1 wherein ribs are located on said shell at least on each side of said split; and,
said clamping means includes means for allowing said clamping means to travel along said ribs.

4. A ski boot in accordance with claim 1 and further including a liner disposed within said shell.

5. A ski boot in accordance with claim 1 wherein said shell comprises two complementary shell portions which are mated together.

6. A ski boot in accordance with claim 5 wherein said shell portions are mated together in a vertical plane which passes through a center line which extends from the front to the rear of the boot; said portions being fastened together along the length of the sole of said boot and from the toe of said boot along the front of said boot for at least a portion of the length between the toe and top of said boot shell.

7. A ski boot in accordance with claim 6 wherein each shell portion includes a rib located at the edge of said portion which forms the vamp of said boot when the shell portions are assembled, and said ribs form a track upon which said clamping means travel when said shell portions are assembled.

8. A ski boot in accordance with claim 4 and further including a tongue disposed between said shell and said liner, said tongue being of sufficient areas to cover at least the maximum area of the liner that is exposed upon separation of said shell.

9. A ski boot having adjustable flex properties so that the flex in the boot can be changed by the wearer of the boot, said boot comprising:
a sole section;
a floor section disposed above said sole section;
a semi-rigid vamp integral with said sole section, said vamp having a rear opening;
a semi-rigid tongue member attached to said vamp near the lower-most portion of said rear opening, said tongue adapted to close said rear opening;
securing means adapted to secure said tongue in the closed position;
said vamp being split for at least a portion of the vamp, said split commencing at the top of said vamp;
clamping means attached to said vamp and adapted to be positioned at selected locations along the length of said split portion for fastening said split vamp at a selected location;
whereby, upon exertion of pressure on the vamp of said boot, the vamp is adapted to separate along the length of the split portion to the location of said clamping means.

10. A ski boot in accordance with claim 9 wherein said floor section is spaced from said sole section by a plurality of spaced ribs.

11. A ski boot having means for adjusting the flexure of said boot, said boot comprising:
a shell having a top, bottom and toe section;
a liner disposed within said shell;
a closure system attached to said shell and adapted for closing said shell and liner about the foot of a skier;
said shell being split, said split extending from the top of said shell section downwardly for a predetermined portion;
clamping means attached to said shell and adapted to be positioned along the length of said split portion, for fastening said shell together at a selected location along the length of said split portion;
whereby, upon exertion of pressure on the shell of said boot, the shell is adapted to separate along the length of the split portion to the location of said clamping means.

12. A ski boot in accordance with claim 11 wherein said shell is split from the top of said shell for a predetermined length along a portion of the shell in a vertical plane which passes through a line which extends through the center from the front to the rear of the boot.

13. A ski boot having adjustable flexure means, said boot comprising:
a semi-rigid shell comprising a vamp having a rear opening;
a semi-rigid rear tongue member pivotally attached to said vamp near the lower-most portion of said rear opening, said tongue member adapted to close said rear opening;
securing means adapted to secure said tongue member in the closed position;
a liner member disposed within said shell and adapted to fit over the foot of a wearer of the boot;
said shell comprising two complementary shell portions;
said shell portions being joined together at the location of a vertical plane passing through the center line of the boot extending from the front to the rear of the boot;
each shell portion having a rib which extends from the top of the shell portion to the toe of the boot, said ribs, when mated together upon assembly of said boot, forming a track;
clamping means adapted to clamp said shell portions together along the length of said track and including means for adjusting the flex in said boot.

14. The ski boot of claim 13 wherein said means for adjusting the flex in said boot comprises:
said track being adapted to be separated at the location of said ribs from the top of said shell and extending at least a portion of the length of said track;

and clamping means adjustably positionable along the length of said portion of said track adapted to be separated for clamping said ribs together at a selected position.

15. The ski boot of claim **14** and further including a tongue member connected to said shell and positioned between said liner and shell in at least the area of said track adapted to be separated.

16. The ski boot of claim **14** wherein each rib on each shell portion is flanged outwardly; and,

said clamping means including a base member;

two leg members extending outwardly from said base member;

each of said base members being flanged inwardly;

whereby, said clamping means is adapted to slide over said mated, flanged rib members, to one of a plurality of locations where said clamping means clamps said ribs together.

* * * * *