

A U S T R A L I A

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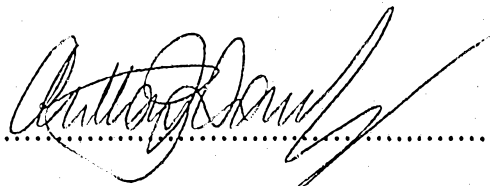
NOTICE OF ENTITLEMENT

THE BURTON CORPORATION, of 80 Industrial Parkway, Burlington, Vermont, 05406, United States of America, the Applicant/Nominated Person in respect of Australian Patent Application No. 37736/93 state the following:-

The Nominated Person is entitled to the grant of the patent because the Nominated Person has entitlement from the actual inventors, JAKE BURTON CARPENTER and DAVID DODGE, by assignment.

The Nominated Person is entitled to claim priority from the basic application listed in the declaration under Article 8 of the PCT because the Nominated Person made the application listed in the declaration under Article 8 of the PCT, and because the application is the first application made in a Convention country in respect of the invention.

Dated this 11th day of July, 1996



.....
a member of the firm of
DAVIES COLLISON CAVE
for and on behalf of
the applicant(s).



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SNOWBOARD BOOT BINDING SYSTEM
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- (56) Prior Art Documents
FR 2627097
- (57) Claim

1. An assembly for mounting a boot to a snowboard, comprising:
 - a base plate having an opening; and
 - a hold-down plate adapted to be received in the opening to mount the assembly to the snowboard, the hold-down plate tapering inwardly from a top surface to a bottom surface thereof.



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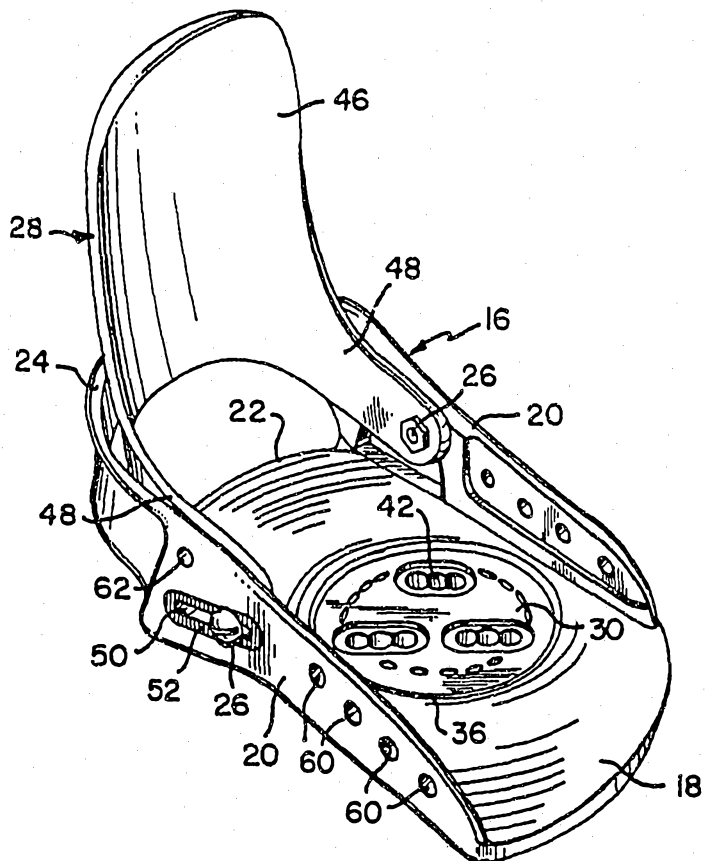
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<p>(21) International Application Number: PCT/US93/01090 (22) International Filing Date: 27 January 1993 (27.01.93) (30) Priority data: 826,598 28 January 1992 (28.01.92) US (71) Applicant: THE BURTON CORPORATION [US/US]; 80 Industrial Parkway, P.O. Box 4449, Burlington, VT 05406 (US). (72) Inventors: CARPENTER, Jake, Burton ; P.O. Box 550, Shelburne, VT 05442 (US). DODGE, David ; P.O. Box 1201, Shelburne, VT 05482 (US). (74) Agents: LERCH, Joseph, B. et al.; Darby & Darby, P.C., 805 Third Avenue, New York, NY 10022 (US).</p>		<p>(81) Designated States: AU, BG, CA, CZ, FI, HU, JP, KP, KR, NO, NZ, PL, RU, SK, UA, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p style="font-size: 2em; text-align: center;">672196</p>

(54) Title: SNOWBOARD BOOT BINDING SYSTEM

(57) Abstract

A snowboard binding system having a binding plate (18), the bottom of which is supported on a snowboard (10). The plate (18) includes a circular-opening (36) in its center which receives a disk shaped hold-down plate (30). The hold-down plate (30) may be secured to the snowboard (10) in several different positions on the snowboard (10) with the binding plate (18) assuming any rotational position with respect to the hold-down plate (30). Additionally, a high-back support (28) attached at the rear of the binding plate (18) may be rotated along an axis generally normal to the binding plate (18) (and therefore the snowboard (10)) and secured in its rotated position, to enable a rider to transmit forces to the snowboard (10) from a variety of stance positions.



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SNOWBOARD BOOT BINDING SYSTEMField of the Invention

This invention relates generally to boot binding systems for snowboards. More specifically, the invention relates to a snowboard binding having multiple degrees of freedom and adjustability.

Background of the Invention

A recently popular sport, snowboarding presents operating conditions and physical demands not found in other skiing-type sports. In snowboarding, the operator stands with both feet on the snowboard, somewhat similar to a slalom water ski. However, in waterskiing, the operator is pulled in a single direction by a power boat. The strength and positioning requirements of the attachment apparatus used for securing the operator's feet to the ski are therefore quite limited.

In snowboarding, since the motive force is provided by gravity as the rider travels down a hill, the rider is able to and often must assume body positions not often found in other sports. Specifically, the angle between the midline of the foot and the midline of the snowboard is often greatly altered for different snowboarding styles, such as acrobatics or simple traveling, and for different athletes.

It is often the case that either a boot worn by the rider or the binding itself will be provided with a support for the lower leg just above the ankle. However, when the angle of the midline

of the foot with respect to the board is changed, this can also change the angle between the leg and the foot. Currently, a simple, rigid support that is merely perpendicular to the board and aligned along the midline of the foot is used. Some of these supports have the capability to fold down against the snowboard surface. Other degrees of freedom are available, but
5 only by disassembly and reassembly of the binding and snowboard.

Different riders also have differing requirements as to the distance between the two bindings on the board as well as the binding's position with respect to the lateral dimension of the board.

10

Summary of the Invention

The present invention seeks to provide a boot binding system for a snowboard that has several degrees of freedom along the surface of the board.

The present invention also seeks to provide a boot binding system providing freedom
15 about a normal to the surface of the board.

The present invention also seeks to provide a boot binding system which is collapsible for storage and transport.

The present invention also seeks to provide a boot binding system which is simple and cost effective to manufacture, yet reliable and efficient in use.

In one broad form, the present invention provides an assembly for mounting a boot
20 to a snowboard, comprising:

a base plate having an opening; and

a hold-down plate adapted to be received in the opening to mount the assembly to the snowboard, the hold-down plate tapering inwardly from a top surface to a bottom surface
25 thereof.

Preferably, the base plate has a mating surface that defines the opening and is tapered inwardly from a top surface to a bottom surface of the base plate.

Also preferably, the base plate and hold-down plate include mating features that are adapted to enable the hold-down plate to be received in the opening in any of a plurality of
30 rotational orientations with respect to the base plate.

Perhaps most preferably, the base plate includes a mating surface that defines the



opening, and wherein the mating surface of the base plate and the hold-down plate each is frusto-conical in shape.

In its most preferred form, the mating surface of the base plate and the hold-down plate include sloped walls that mate when the hold-down plate is received in the opening in
5 the base plate, wherein the sloped wall of the mating surface of the base plate includes a first set of ridges that is symmetrical about a centre of the opening, and wherein the hold-down plate includes a second set of ridges, complementary with the first set of ridges, that are symmetrical about a centre of the hold-down plate so that the hold-down plate can be received in the opening in any of a plurality of rotational orientations with respect to the base plate.

10 Preferably, the hold-down plate includes a plurality of holes adapted to receive screws to mount the assembly to the snowboard, the plurality of holes being arranged in a triangular pattern.

Also preferably, the hold-down plate and the opening in the base plate have substantially the same thickness so that when the hold-down plate is received in the opening,
15 a top of the hold-down plate sits flush with a top of the base plate.

In a preferred form, the assembly further comprises a highback leg support mounted to the base plate, the highback leg support being rotatably adjustable with respect to the base plate about an axis that is substantially normal to the base plate.

Preferably, the highback leg support is mounted to the base plate at first and second
20 adjustable attachment points that can each be adjusted forward and rearward along a length of the base plate.

In a preferred form, the assembly is embodied wherein:

the base plate includes a heel wall having a semi-circular contacting surface adapted to contact the highback leg support;

25 the highback leg support has a semi-circular contacting surface adapted to contact the contacting surface of the heel wall; and,

the contacting surfaces of the highback leg support and the heel wall have substantially the same radii.



Brief Description of the Drawings

The foregoing and other objects, features and advantages of the present invention will be understood more completely by those skilled in the art upon reading the following detailed description in conjunction with a review of the appended drawings, in which:

5 Fig. 1 is a perspective view of a rider on a board having a snowboard binding system according to the invention;

Fig. 2 is a perspective view of a single snowboard binding according to the present invention;

Fig. 3 is a top view of a snowboard binding according to the present invention;

10 Fig. 4 is a cross sectional view taken along the line IV-IV of Fig. 3 and looking in the direction of the arrows; and

Fig. 5 is a schematic view of the pattern of a set of screw-receiving openings formed in a snowboard using the snowboard binding system of the present invention.

15 Detailed Description of the Preferred Embodiments

Referring now to the details of the drawings, Fig. 1 shows a snowboard 10 having a snowboard binding system 12 according to the present invention, with a rider 14 having his feet engaged in the system. As can be seen in the figure, the center line of each of the rider's feet, i.e., a line from the heel to the toe, is situated at an angle to the center line A of the
20 board 10. It can also be seen generally that, at each of the riders ankles, the angle between the lower leg and the foot is somewhat different with each leg, partially due to the spread of the feet and also the varied angle of the feet with respect to the center line of the board 10.

Support for the feet, preferably wearing a boot, and the lower legs while in this and
25 various other body positions is



provided by each individual binding 16. In Figure 2, the base binding plate 18 that is mounted to the top of the snowboard 10 (Fig. 4) is seen with two side walls 20 rising from it near the heel 22 of the plate 18. At the heel 22 the two side walls 20 preferably extend rearward of the binding plate 16 and connect to form a curved heel wall 24 (Fig. 3).

Mounted at two connection points 26 to the side walls 20 is a highback leg support 28 which is adjustable as described more fully below. As seen in Figs. 3 and 4, the binding plate 18 is attached to the snowboard 10 through the use of a hold-down plate 30 having splines, ribs or ridges 32 on at least a portion of its under surface that engage complimentary splines, ribs or ridges 34 on a central aperture 36 in the binding plate 18. As will be described more fully below, the structure of these various components of the binding 16 allows for freedom of movement of the binding plate 18 along the center line A of the board, movement lateral to the center line A of the board, rotation about an axis normal to the board, and rotation of the leg support 28 toward the binding plate 18 and about an axis normal to the board 10.

The hold-down plate 30 preferably has an inverted frusto-conical shape where the sloped walls 38 include the ridges 32 that engage the binding plate 18. The aperture 36 in the binding plate 18 has a complimentary frusto-conical shape with sloped walls 40 having complimentary ridges 34. Both sets of ridges 32,34 are symmetrical around their entire circumferences so that they will mate at many discrete positions.

For connection to the board 10, the hold-down plate 30 includes three screw-receiving holes 42 which are arranged so as to lie at the vertices of an equilateral triangle.

The pattern of holes 42 of the hold-down plate is repeated on the hold-down plate 30 three times in laterally shifted orientation. Preferably, the three repetitions of each hole 42 overlap as shown in Figs. 2 and 3 for quick adjustment by loosening the screws (not shown) used to mount the plate 30, but not removing them, and sliding the hold-down plate 30. Alternatively, the three

repetitions of holes 42 could be separate or could be merged into a single oblong hole. The three repetitions of the holes 42 allow the hold-down plate 30 to be shifted to either side of the board in order to achieve further positioning flexibility of the binding plate 18 on the board 10.

In addition, a similar pattern of holes 44 is provided on the board 10 to match the equilateral orientation of the holes 42 in the hold-down plate 30 and is repeated twice. Each pattern repetition includes a fourth hole intermediate to two of the holes of the equilateral triangle and being on a circle intersecting the three holes of the triangle. Also, the two triangles are arranged so that they are rotated by 180° with respect to each other, placing the two intermediate holes as close as possible to each other. The pattern of holes 44 permits the hold-down plate 30 to be oriented in four positions that are displaced from each other along the length of the snowboard. Each possible position of the hold-down plate 30, not taking into account the three repetitions of holes 42, is indicated by a circle B in Fig. 5. The pattern 44 permits the hold-down plate 30 to be mounted in two positions facing in one direction and two positions facing the other direction, for a total of four positions, since the rotation of the hold-down plate 30 with respect to the center line A of the board 10 is irrelevant, because the binding plate 18 may be rotated a full 360° relative to the hold-down plate 30. It can be seen, for example, that the two rightmost positions B (as seen in Fig. 5) are formed by adding only one additional hole 44 (at position E) to those holes 44 already used to form the rightmost position B.

Once the particular set of holes 44 in the board 10 is determined, the particular repetition of holes 42 in the hold-down plate 30 and its rotational orientation are chosen, the binding plate 18 is held at the desired angular position while the hold-down plate 30 is mounted on top of the binding plate 18 and screwed into the board 10. The holes 44 in the board 10 may also include metal sleeves having internal threads for sturdier connection to the hold-down plate 30. It will also be appreciated by those

skilled in the art that the pattern of holes 44 could be formed in a plate (not shown) embedded within or mounted onto the board 10.

It will be appreciated that the construction of the binding plate and hole pattern permit a great deal of freedom in adjusting the position of the bindings fore and aft, laterally and rotationally on the board, as well as the spacing between them. It will also be appreciated by those skilled in the art that the hold-down plate 30 need not be round to achieve the advantages of the pattern of holes 44, but should be symmetrical when rotated 180°.

The highback leg support 28 embodying the present invention includes an upright portion 46 and two forward diagonally extending arms 48 terminating at connection points 26 with the side walls 20 of the binding plate 18. These two connection points 26 allow pivoting of the highback 28 to a forward closed position (folded down) (indicated by arrow D, Fig. 4) for transport or storage.

The highback 28 may also be rotatably adjusted about the vertical axis (indicated by arrow C, Fig. 3) due to several structural elements. At the heel of the binding 16 the contacting surfaces of the highback 28 and the heel wall 24 of the binding plate 18 are both generally semi-cylindrical having similar radii. Additionally, the connection points 26 of the highback 28 are bolted through mounting holes 50 that are oblong along the length of the side walls 20. Therefore, it is possible to move one connection point 26 towards the heel while moving the other connection point 26 towards the toe of the binding 16, creating a rotation of the highback 28 about the vertical axis.

To insure positive locking of the highback 28 in its rotated position, the outer surface of the side walls 20 adjacent the oblong mounting holes 50 is provided with splines, ribs or ridges 52. Preferably, a bolt 54 and washer 56 are used with a corresponding nut 58 to lock the connection points 26 in place, the washer 56 having complimentary splines, ribs or ridges to those around the oblong mounting holes 50.

The preferred binding 16 shown in Figs. 2, 3 and 4 is specifically designed for a left foot in that the front of the binding plate is skewed to the right side to accommodate the ball and large toe of the foot. Of course, this can simply be mirror-
5 imaged to result in a similar binding for the right foot. The front areas of the side walls 20 are preferably provided with a plurality of holes 60 or any other attachment points necessary to attach accessories (not shown) to the binding 16, such as straps for holding a boot in the binding. A similar hole 62 is formed
10 toward the rear of the side walls 20 for attachment of an ankle strap (not shown).

All of the components of the binding system 12 shown in Figs. 1-4, except the nut 58, bolt 54 and washer 56 used to secure the highback 28, are preferably formed of a high impact, high
15 strength plastic, such as polycarbonate or any other known plastic material. These components can be formed by injection molding or any known manufacturing technique. Of course, other materials able to withstand the significant forces exerted during operation of the snowboard can be used similarly.

20 While the preferred embodiments shown and described are fully capable of achieving the objects of the present invention, these embodiments are shown and described only for the purpose of illustration and not for the purpose of limitation, and those skilled in the art will appreciate that many additions, modifica-
25 tions and substitutions are possible without departing from the scope and spirit of the invention as defined in the accompanying claims.

The claims defining the present invention are as follows:

1. An assembly for mounting a boot to a snowboard, comprising:
a base plate having an opening; and
a hold-down plate adapted to be received in the opening to mount the assembly to the
5 snowboard, the hold-down plate tapering inwardly from a top surface to a bottom surface
thereof.
2. The assembly as claimed in claim 1, wherein the base plate has a mating surface that
defines the opening and is tapered inwardly from a top surface to a bottom surface of the base
10 plate.
3. The assembly as claimed in claim 1 or 2, wherein the base plate and hold-down plate
include mating features that are adapted to enable the hold-down plate to be received in the
opening in any of a plurality of rotational orientations with respect to the base plate.
15
4. The assembly as claimed in any one of claims 1 to 3, wherein the base plate includes
a mating surface that defines the opening, and wherein the mating surface of the base plate
and the hold-down plate each is frusto-conical in shape.
- 20 5. The assembly as claimed in claim 4, wherein the mating surface of the base plate and
the hold-down plate include sloped walls that mate when the hold-down plate is received in
the opening in the base plate, wherein the sloped wall of the mating surface of the base plate
includes a first set of ridges that is symmetrical about a centre of the opening, and wherein
the hold-down plate includes a second set of ridges, complementary with the first set of
25 ridges, that are symmetrical about a centre of the hold-down plate so that the hold-down plate
can be received in the opening in any of a plurality of rotational orientations with respect to
the base plate.
6. The assembly as claimed in any one of claims 1 to 4, wherein the hold-down plate
30 includes a plurality of holes adapted to receive screws to mount the assembly to the
snowboard, the plurality of holes being arranged in a triangular pattern.



7. The assembly as claimed in any one of claims 1 to 6, wherein the hold-down plate and the opening in the base plate have substantially the same thickness so that when the hold-down plate is received in the opening, a top of the hold-down plate sits flush with a top of the base plate.

5

8. The assembly as claimed in any one of claims 1 to 7, further including a highback leg support mounted to the base plate, the highback leg support being rotatably adjustable with respect to the base plate about an axis that is substantially normal to the base plate.

10 9. The assembly as claimed in claim 8, wherein the highback leg support is mounted to the base plate at first and second adjustable attachment points that can each be adjusted forward and rearward along a length of the base plate.

10. The assembly as claimed in claim 8 or 9, wherein:

15 the base plate includes a heel wall having a semi-circular contacting surface adapted to contact the highback leg support;

the highback leg support has a semi-circular contacting surface adapted to contact the contacting surface of the heel wall; and,

20 the contacting surfaces of the highback leg support and the heel wall have substantially the same radii.

11. An assembly comprising a base plate and a hold-down plate, substantially as herein described with reference to the accompanying drawings.

25 DATED this 9th day of July, 1996.

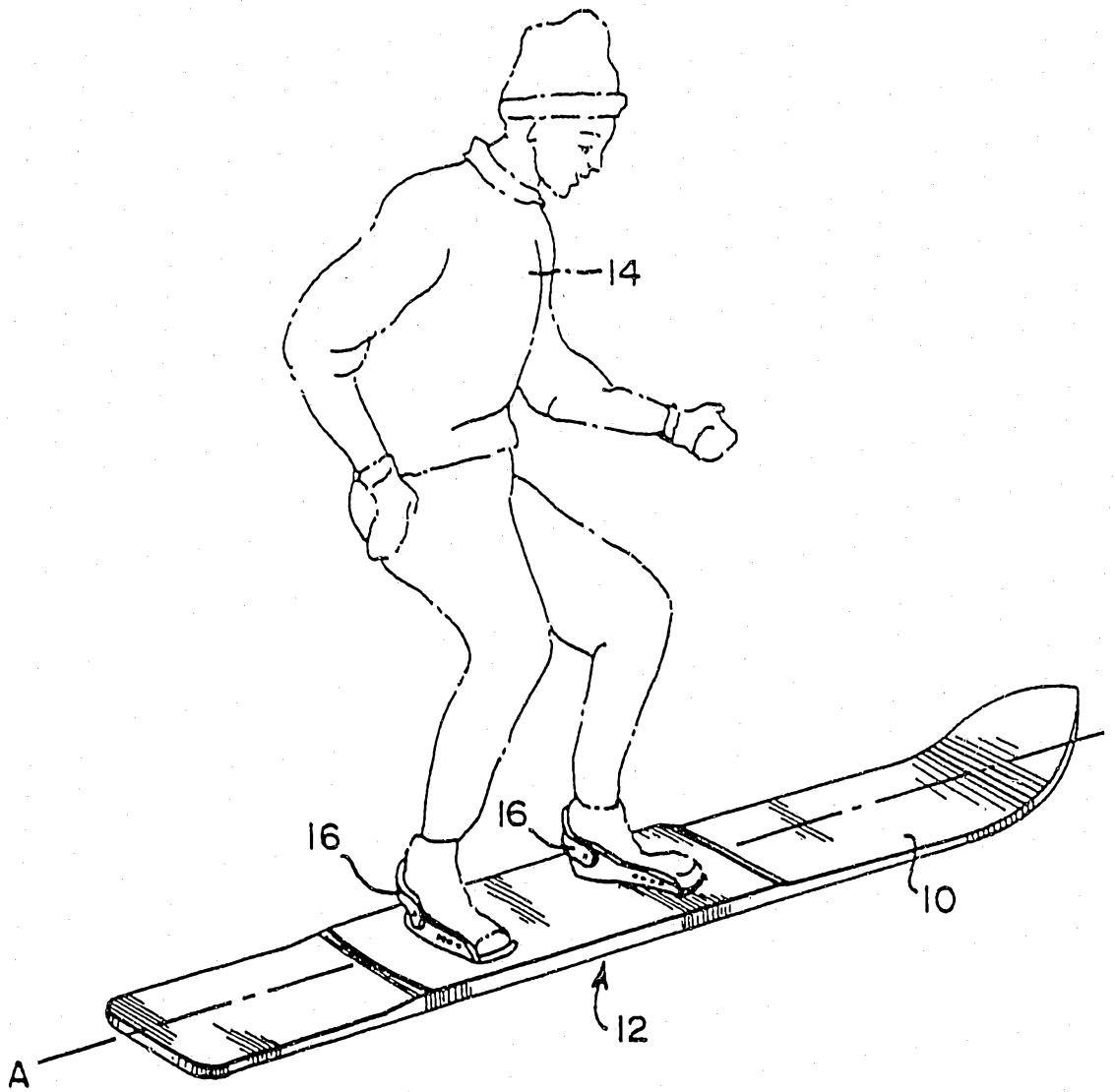
THE BURTON CORPORATION

By Its Patent Attorneys

DAVIES COLLISON CAVE



FIG. 1



SUBSTITUTE SHEET

FIG. 2

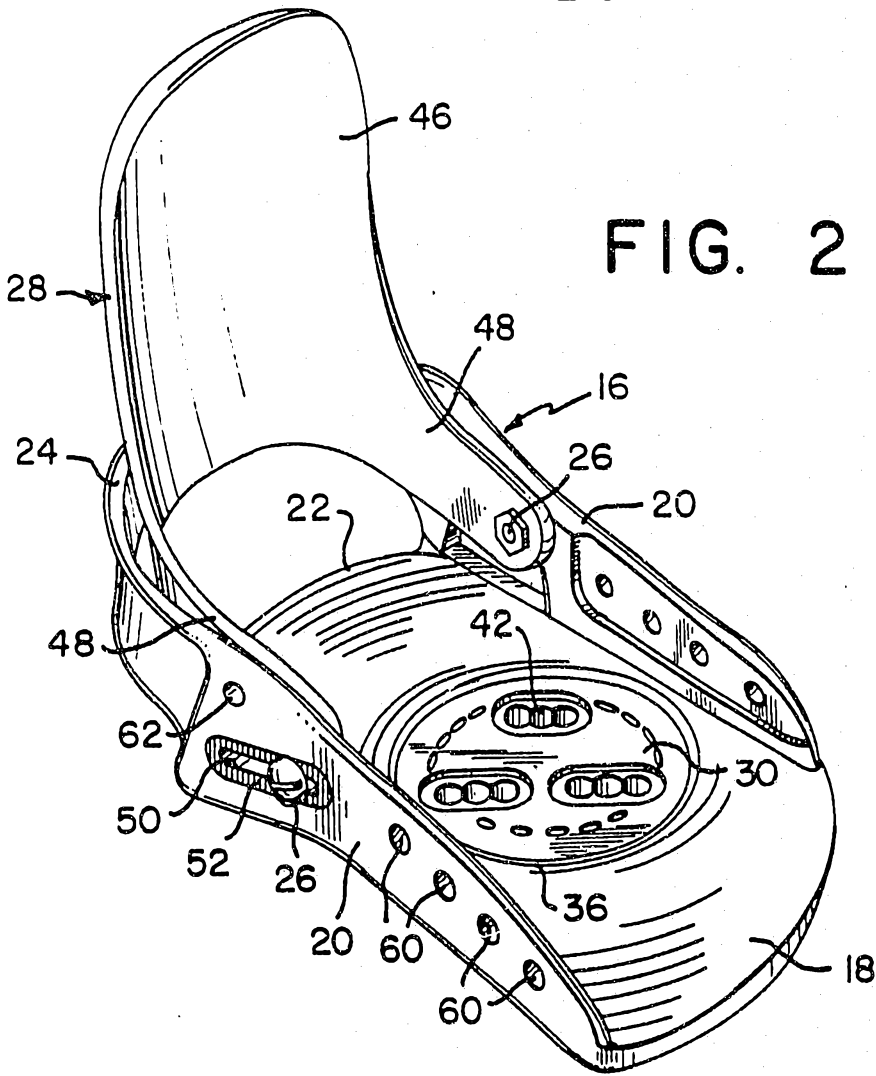


FIG. 3

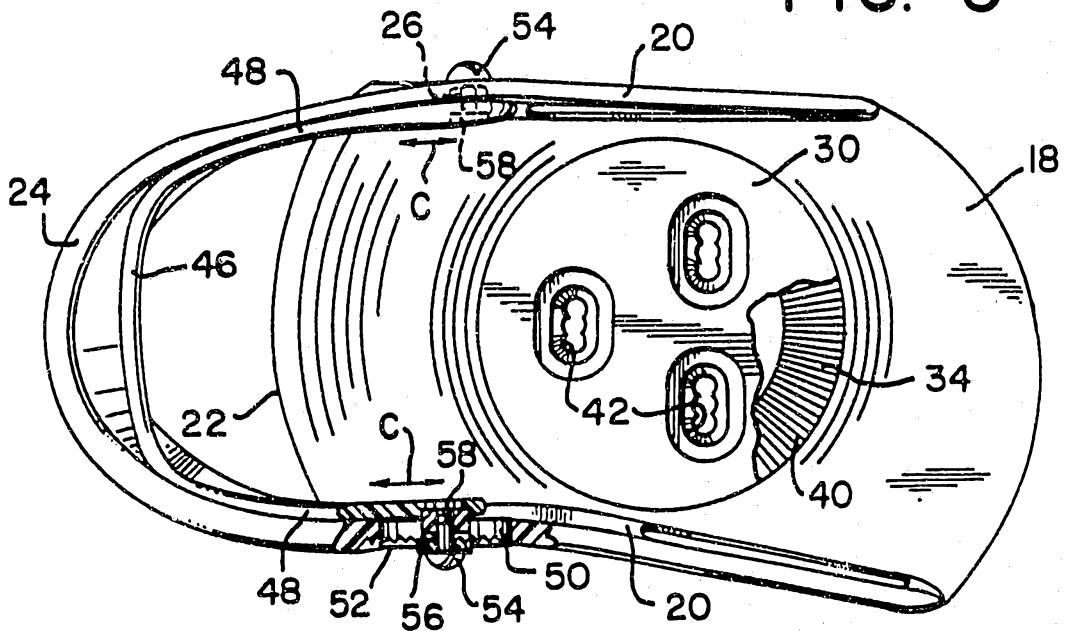


FIG. 4

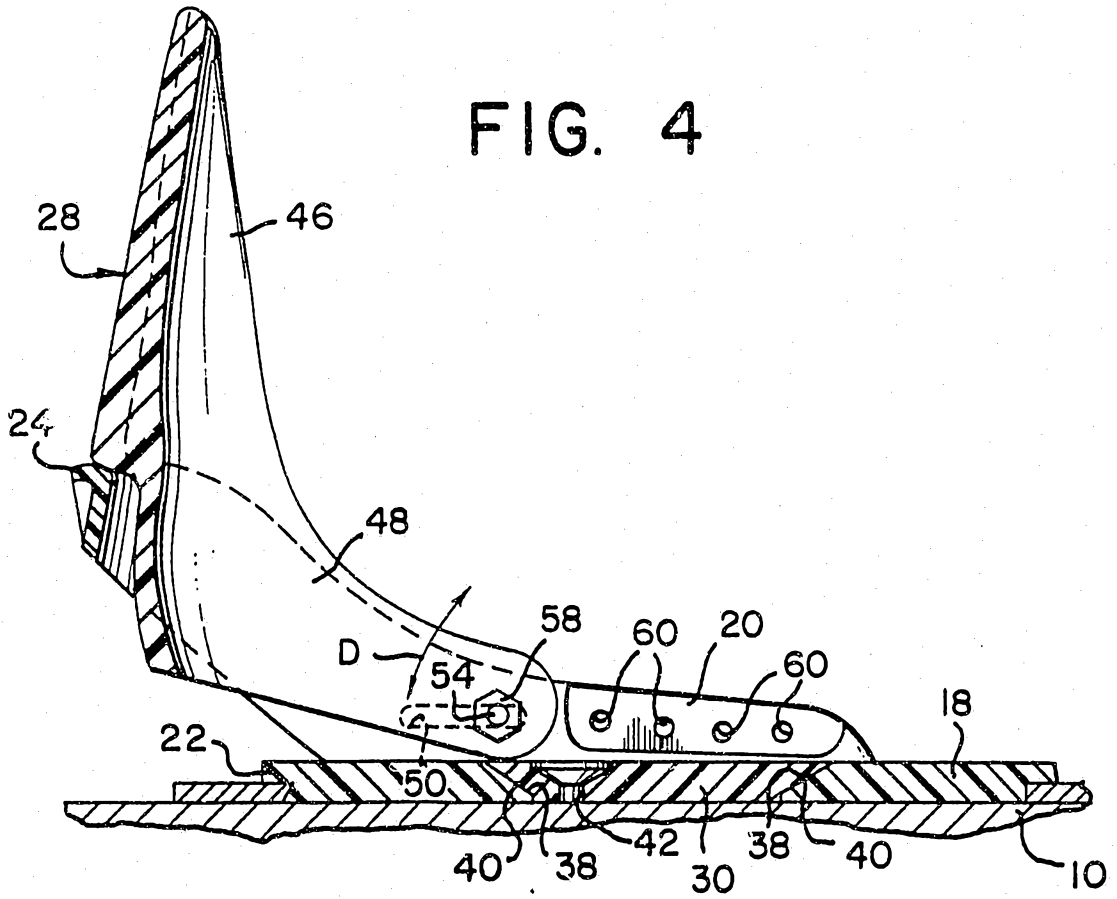
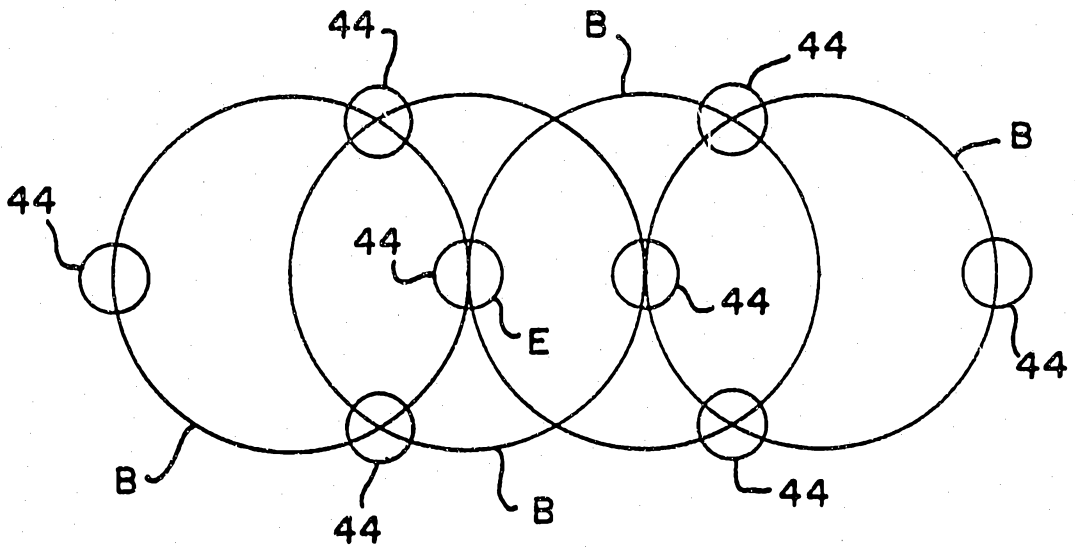
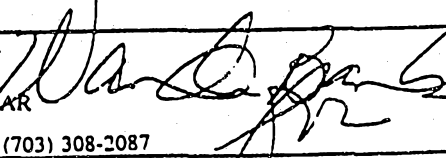


FIG. 5



INTERNATIONAL SEARCH REPORT

PCT/US93/01090

A. CLASSIFICATION OF SUBJECT MATTER IPC(5) :A63C 5/03 US CL. :280/618,633,14.2 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 280/607,617,626,629,634 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	FR,A, 2,627,097 (DURET) 18 AUGUST 1989 Note means for rotating base plate 6 relative to plate 8.	<u>1,2,5-7</u> 3,4,8-20
Y	US,A, 4,718,873 (SHAW ET AL) 12 JANUARY 1988 Leg support 29 has elongated openings with ridges 48.	3,4,8
Y	EP, 398,794 (CHABILAND) 22 NOVEMBER 1990 Note the three spaced openings in the hold down plate 9.	9-13,15-20
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
A	document defining the general state of the art which is not considered to be part of particular relevance	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
E	earlier document published on or after the international filing date	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
L	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
O	document referring to an oral disclosure, use, exhibition or other means	*Z* document member of the same patent family
P	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search 01 JUNE 1993	Date of mailing of the international search report 30 JUN 1993	
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. NOT APPLICABLE	Authorized officer MICHAEL MAR Telephone No. (703) 308-3087	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US93/01090

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US,A, 2,740,972 (TAYLOR) 10 APRIL 1956 Note the elongated opening having overlapping holes 2b for adjusting the hold down plate.	14
A	US,A, 2,919,452 (KLUGE). 05 JANUARY 1960	
A	US,A, 4,040,137 (FETHERSTON ET AL) 09 AUGUST 1997	
A	US,A, 4,871,337 (HARRIS) 03 OCTOBER 1989	
A	US,A, 5,021,017 (OTT) 04 JUNE 1991	