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Cannon

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(54) **WATER SPORTS BINDING ASSEMBLY**

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Related U.S. Application Data

(63) Continuation-in-part of application No. 11/817,402, filed as application No. PCT/US2006/032075 on Aug. 15, 2006, now Pat. No. 7,699,678, which is a continuation of application No. 11/206,253, filed on Aug. 16, 2005, now Pat. No. 7,134,928.

(51) **Int. Cl.**

A63C 9/00	(2006.01)
A63C 9/08	(2006.01)
A63C 9/24	(2006.01)
B63B 35/85	(2006.01)

(52) **U.S. Cl.** **441/70**; 280/617

(58) **Field of Classification Search** 441/70; 280/617–634, 14.22, 14.23

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,143,750	A		8/1964	Kluge
3,360,812	A		1/1968	Kluge
3,839,758	A		10/1974	Jack
4,095,356	A		6/1978	Robran
4,131,963	A		1/1979	Johnson
4,168,084	A	*	9/1979	von Besser et al. 280/618
4,265,034	A		5/1981	Salomon
4,575,957	A		3/1986	Petrini
4,869,697	A		9/1989	Ackert
4,972,613	A		11/1990	Loveder
5,277,635	A		1/1994	Gillis
5,354,088	A		10/1994	Vetter
5,356,170	A		10/1994	Carpenter
5,417,443	A		5/1995	Blattner
5,624,291	A		4/1997	McClaskey
5,660,410	A		8/1997	Alden
5,909,886	A		6/1999	Tugutaka
5,913,530	A		6/1999	Berger
5,947,781	A		9/1999	VonWald
6,007,077	A		12/1999	Moe
6,017,256	A		1/2000	Gillis
6,095,881	A		8/2000	Neubauer
6,174,212	B1		1/2001	Chang
6,336,650	B1		1/2002	Alspaugh
6,390,492	B1		5/2002	Bumgarner
6,557,865	B1		5/2003	Reuss

(Continued)

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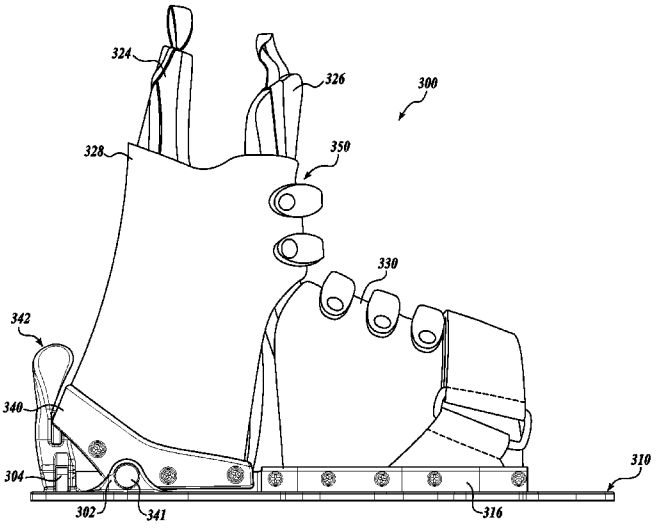
(57) **ABSTRACT**

A binding for water sports comprises a baseplate, which may optionally include a toe cup, and a heel cup. A heel loop is pivotably attached to the heel cup, and is pivotable between an upper position and a lower position to adjust the amount of support provided to the user's ankle. An adjustment control, for example a lever and cam mechanism pivotably attaches to the heel cup and is positioned such that the user can selectively move the cam portion between a release position wherein the heel loop is not supported in the upper position, and a support position wherein the heel loop is supported in the upper position. A flexible upper portion is attached to the base plate.

17 Claims, 14 Drawing Sheets



U.S. PATENT DOCUMENTS

6,641,163	B2	11/2003	Joubert des Ouches
6,659,493	B1	12/2003	Trnka
6,726,238	B2	4/2004	Poscich
6,739,615	B1	5/2004	Maravetz
6,855,023	B2	2/2005	Berger
6,955,362	B2	10/2005	Bazzi
7,134,928	B1	11/2006	Cannon
7,147,233	B2	12/2006	Edmond
7,159,892	B2	1/2007	Draper
7,246,811	B2	7/2007	Martin
7,699,678	B2 *	4/2010	Cannon 441/70

* cited by examiner

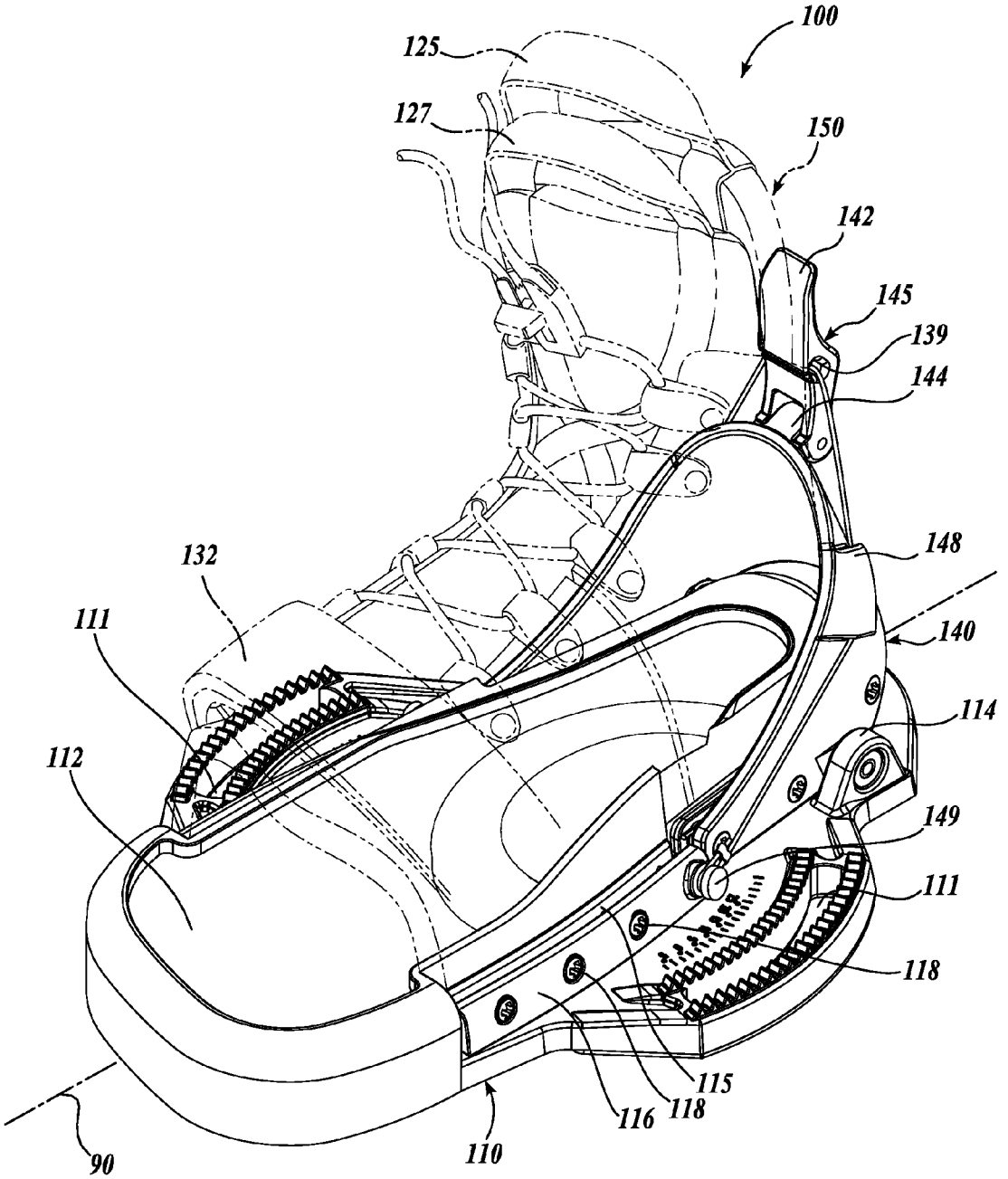

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Fig.1.

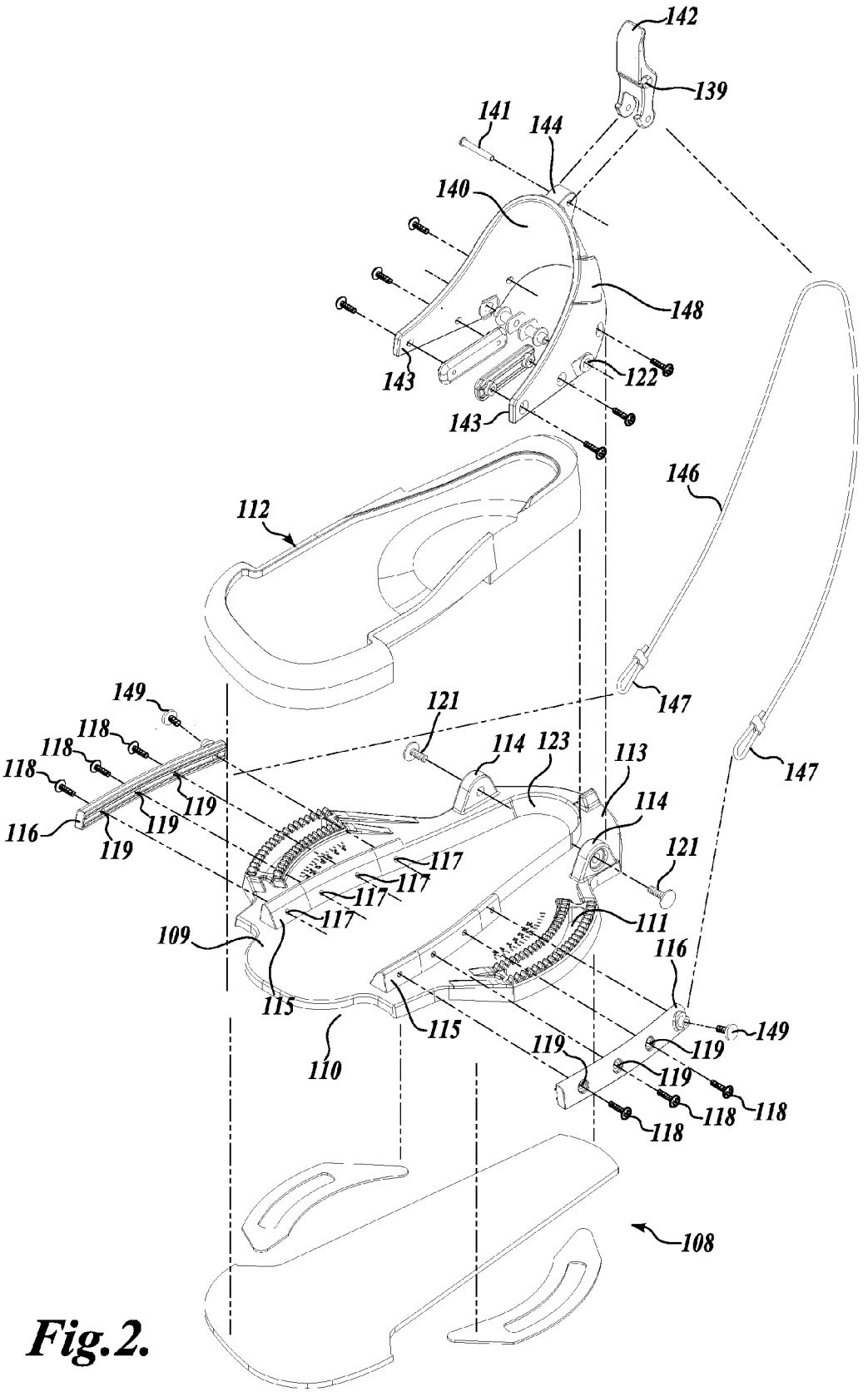
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Fig.2.

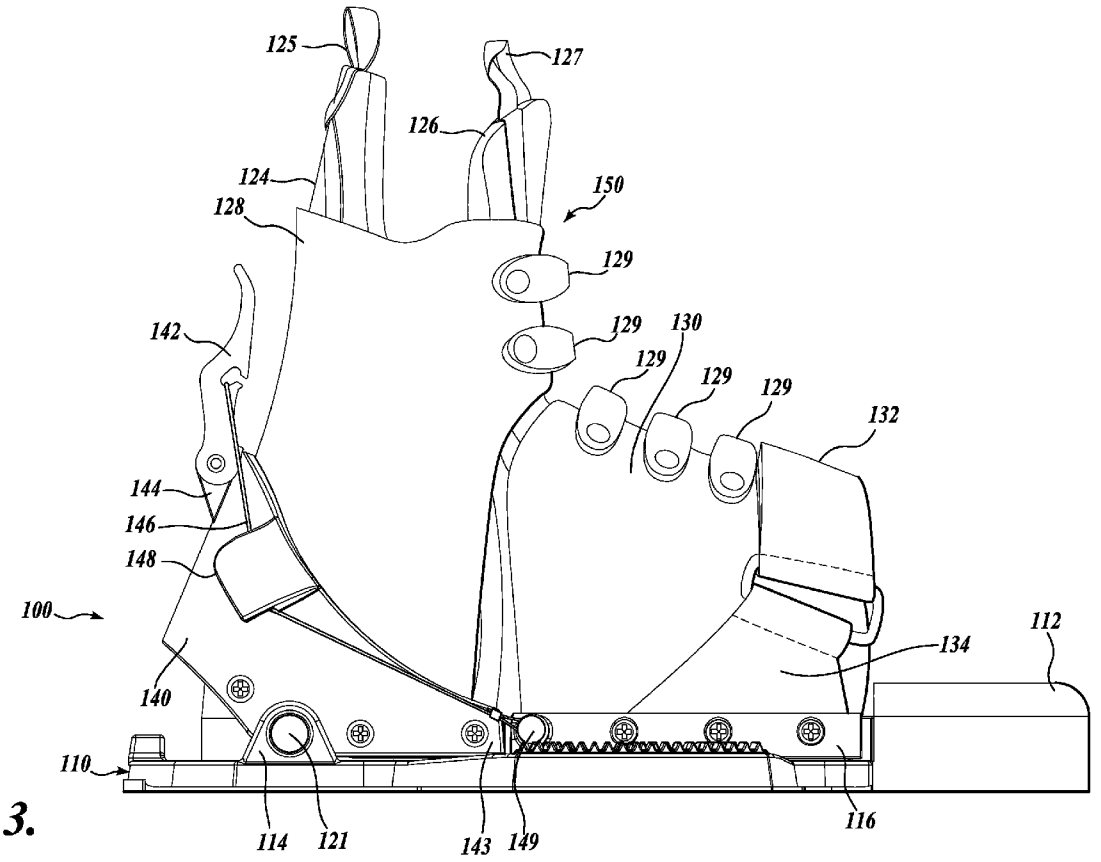
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Fig.3.

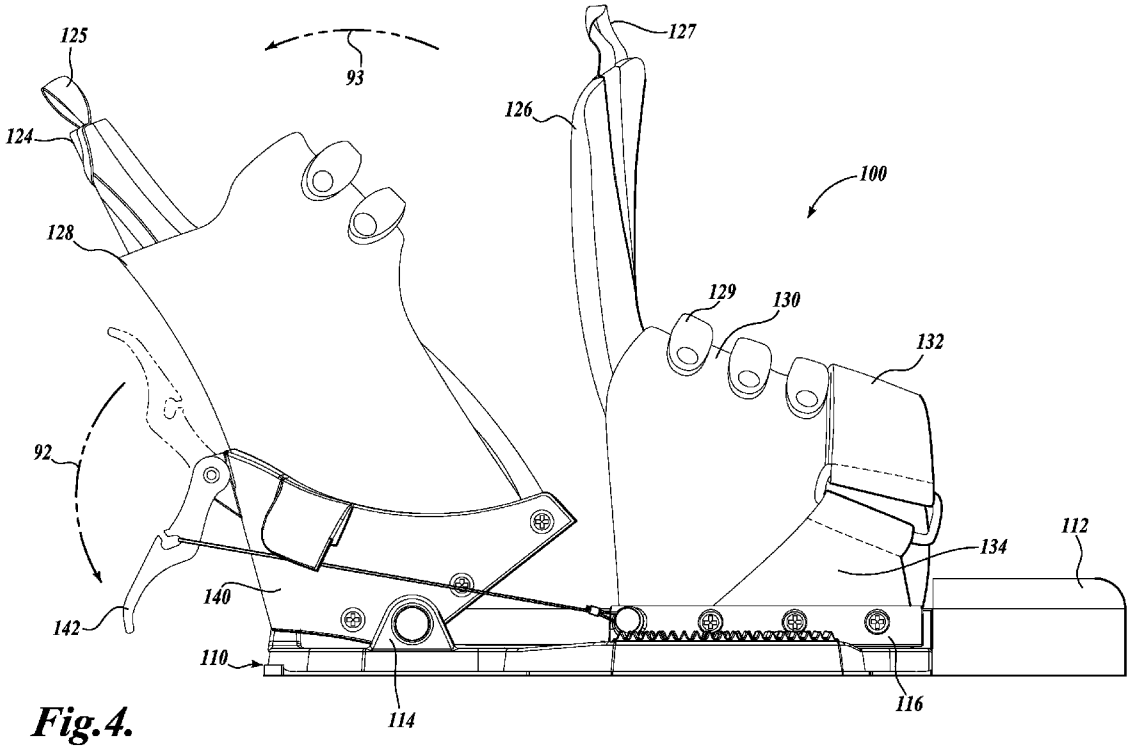
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Fig.4.

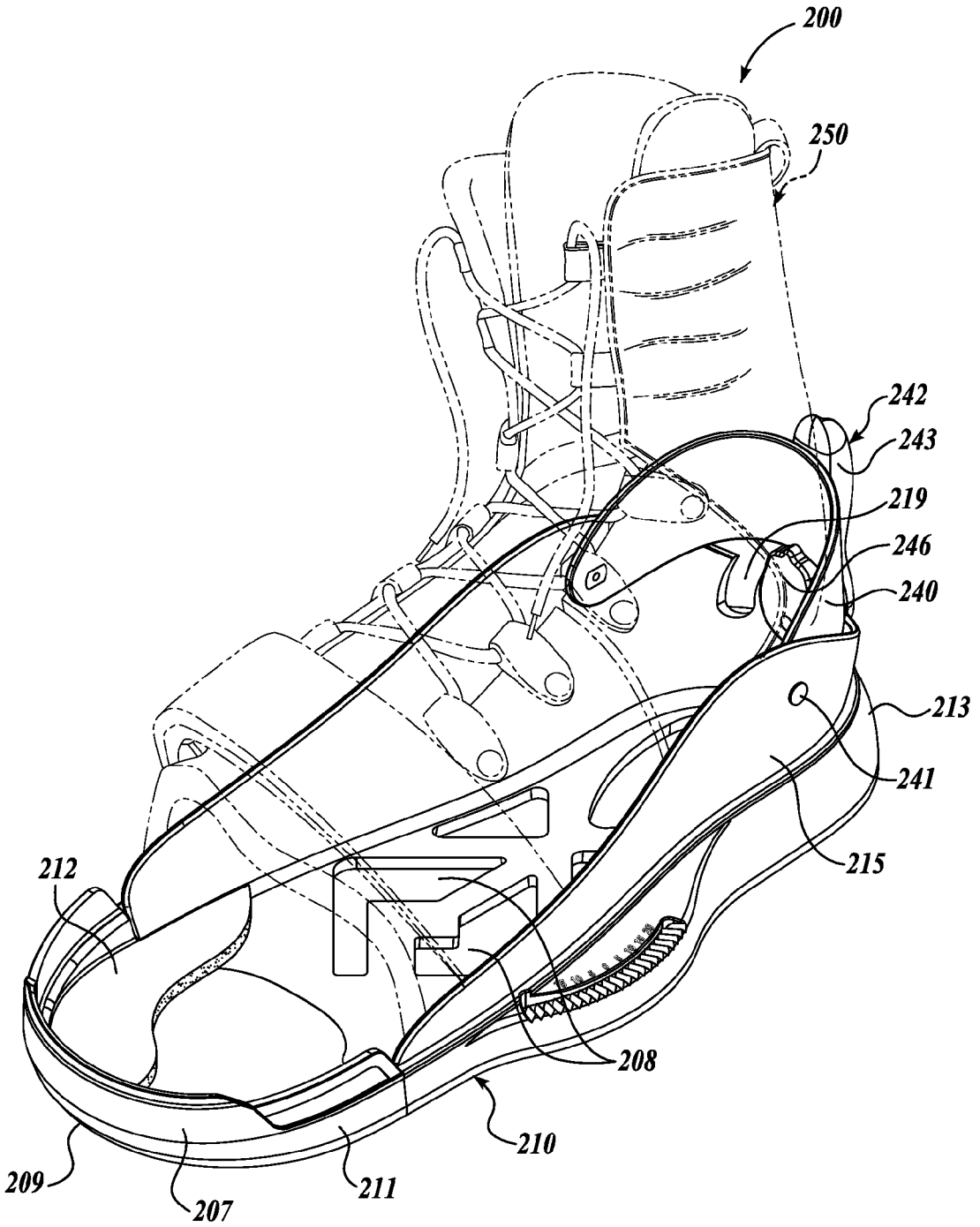

Fig.5.

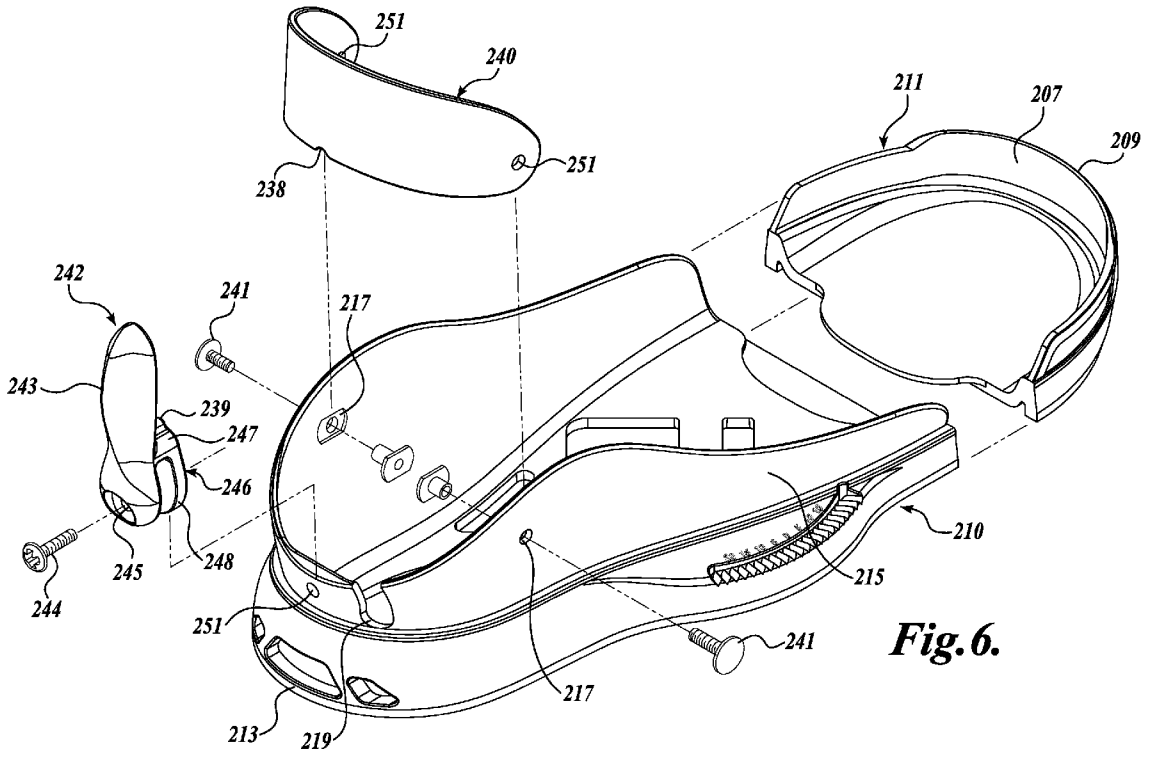
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Fig. 6.

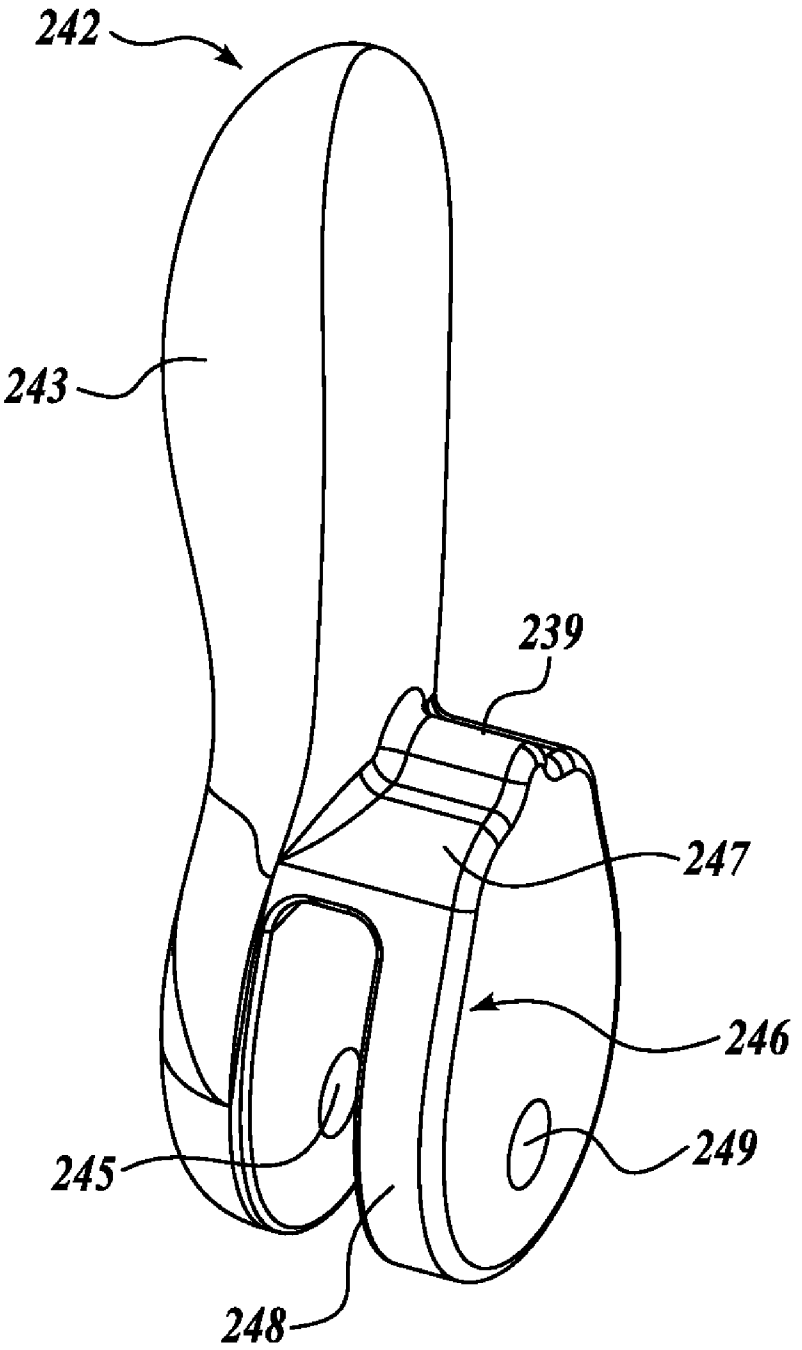

Fig. 7.

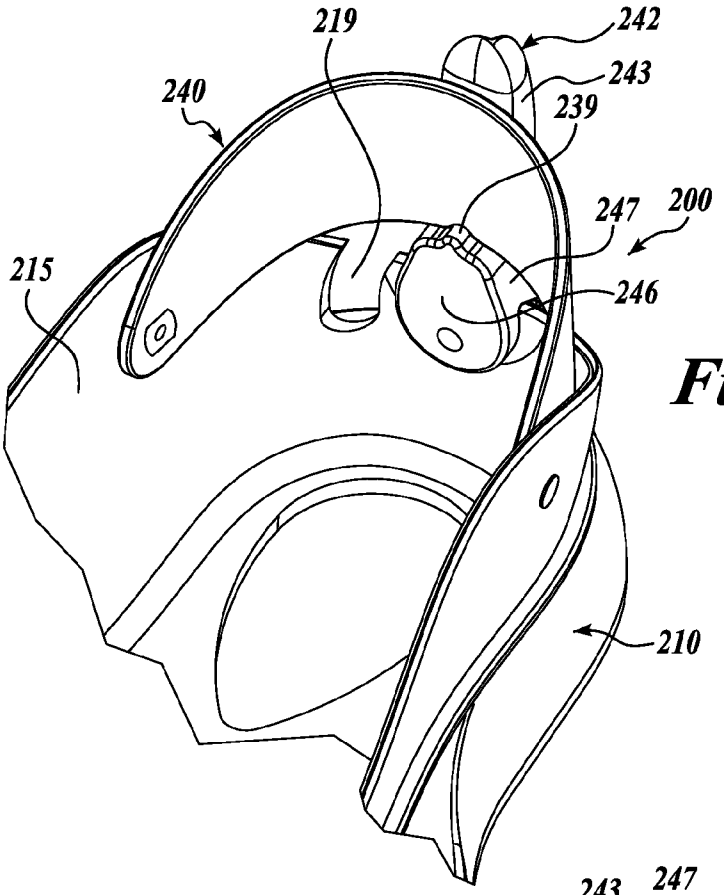
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Fig.8A.

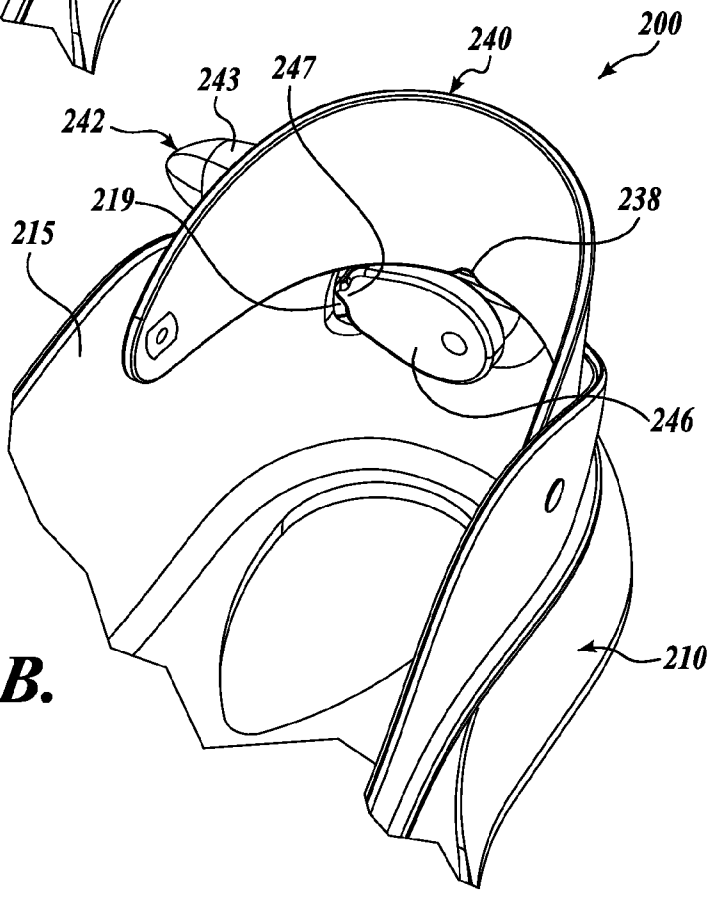
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Fig.8B.

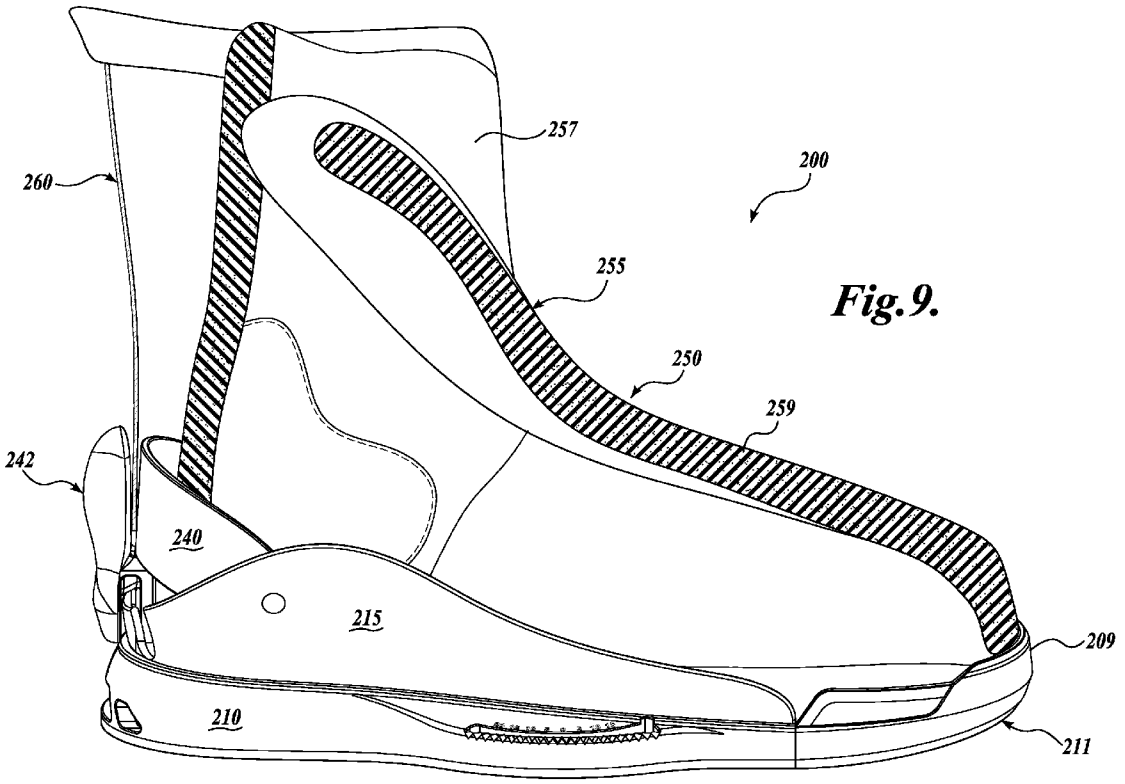

Fig. 9.

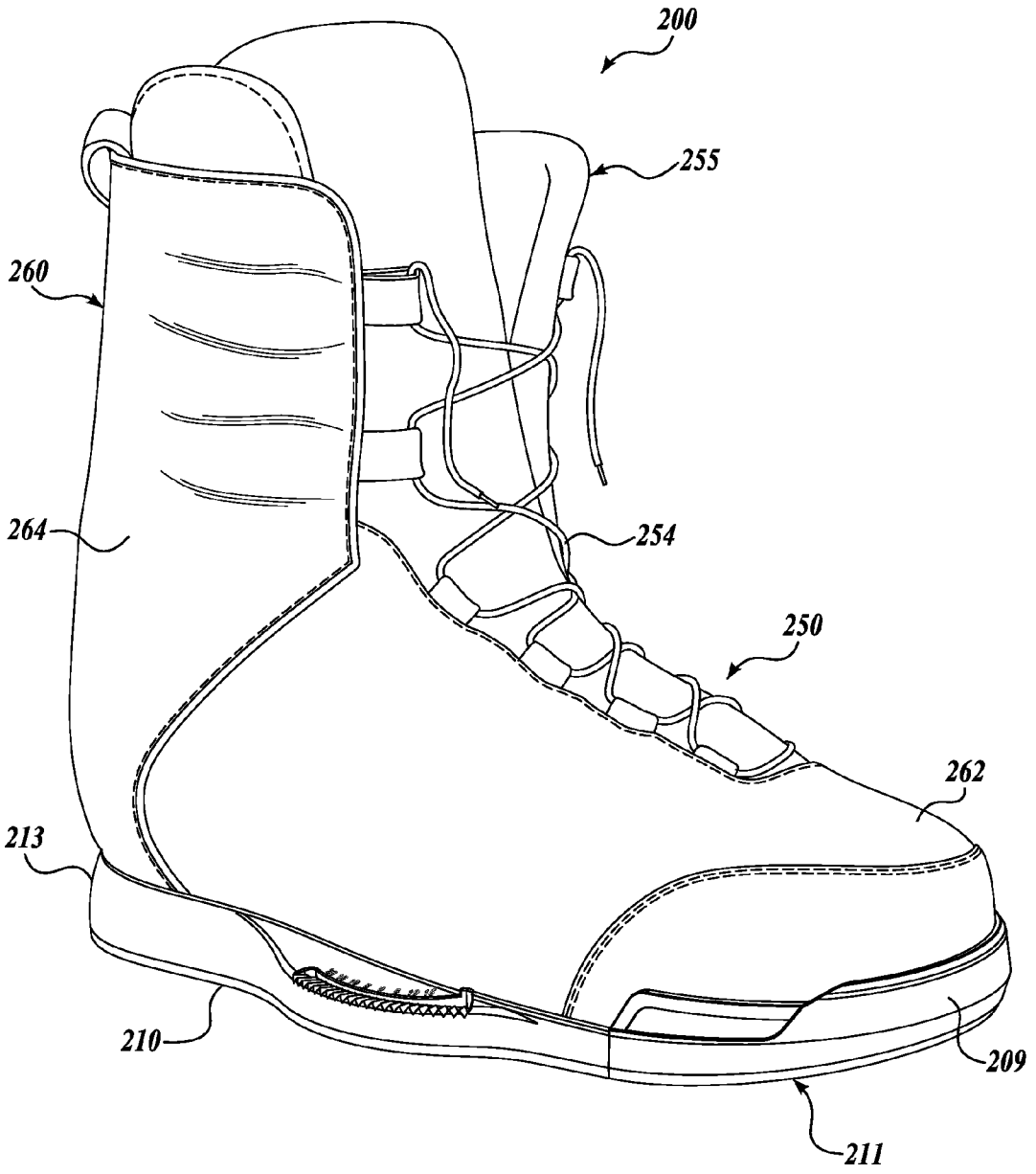

Fig.10.

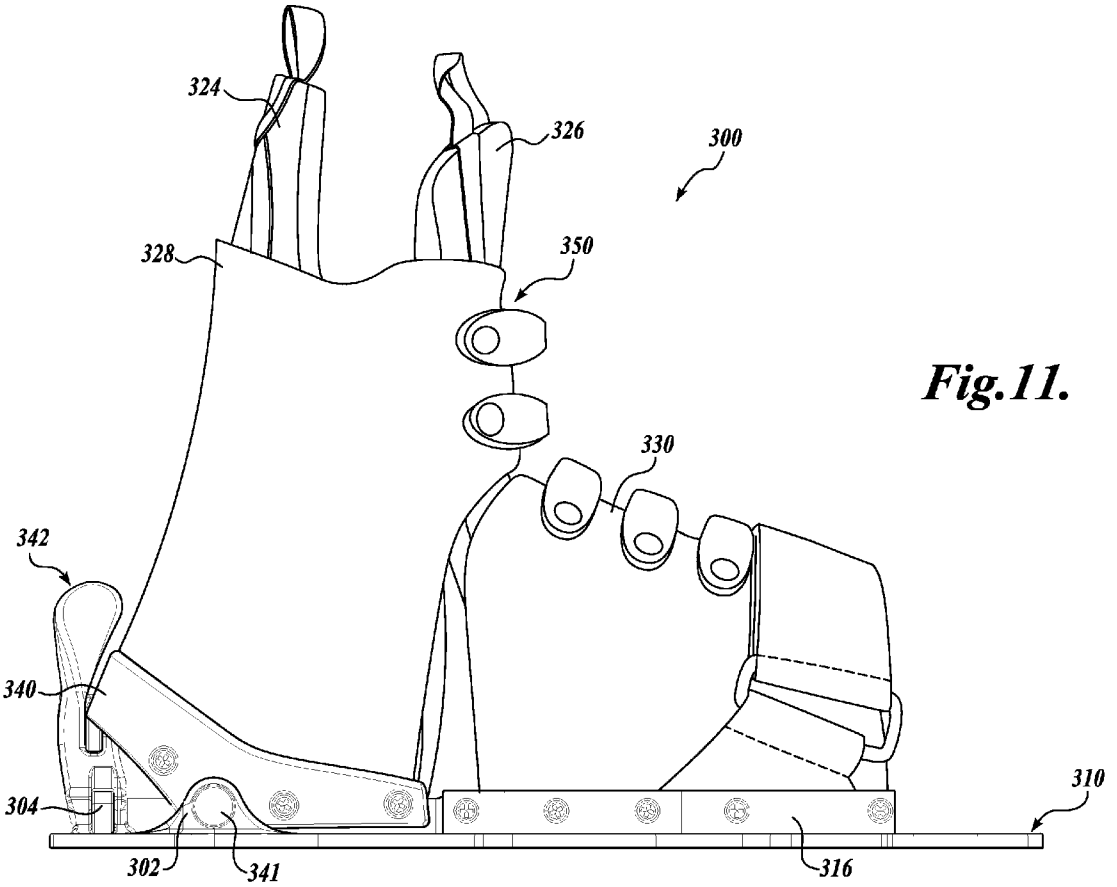

Fig.11.

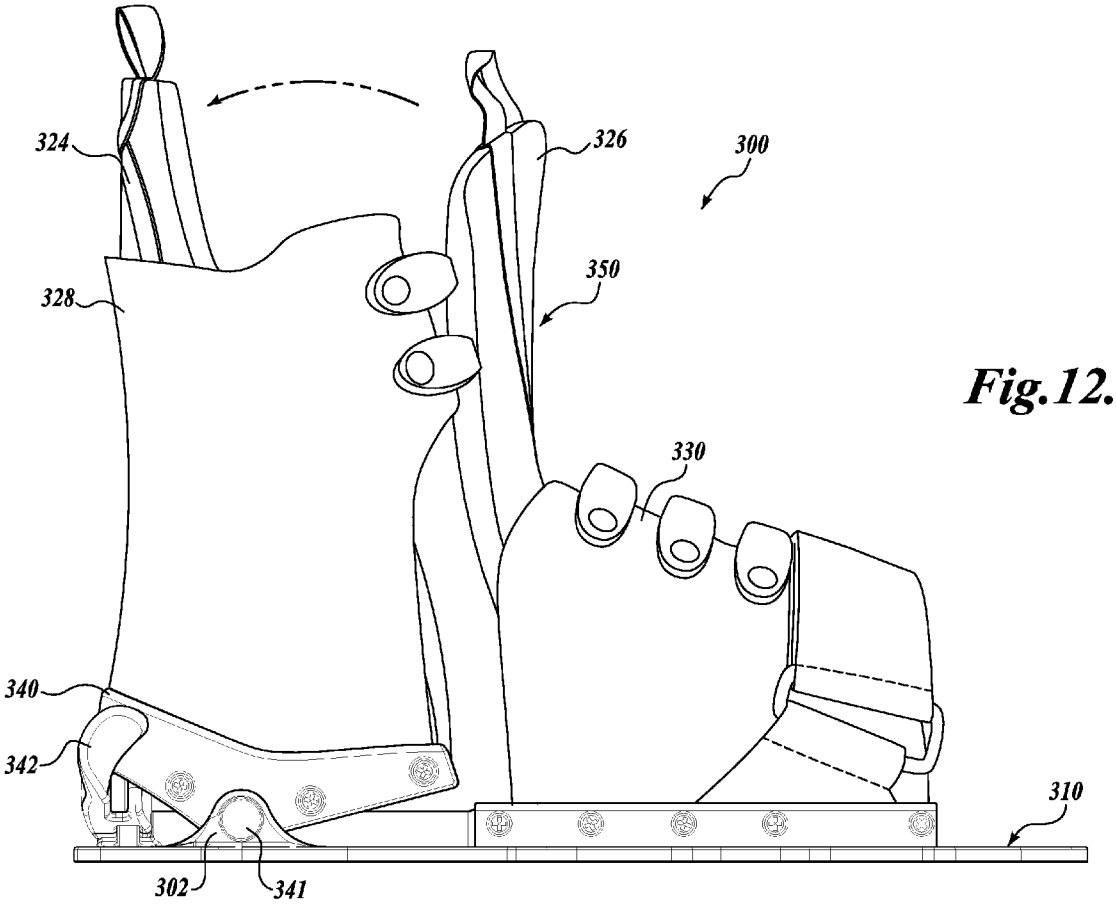

Fig.12.

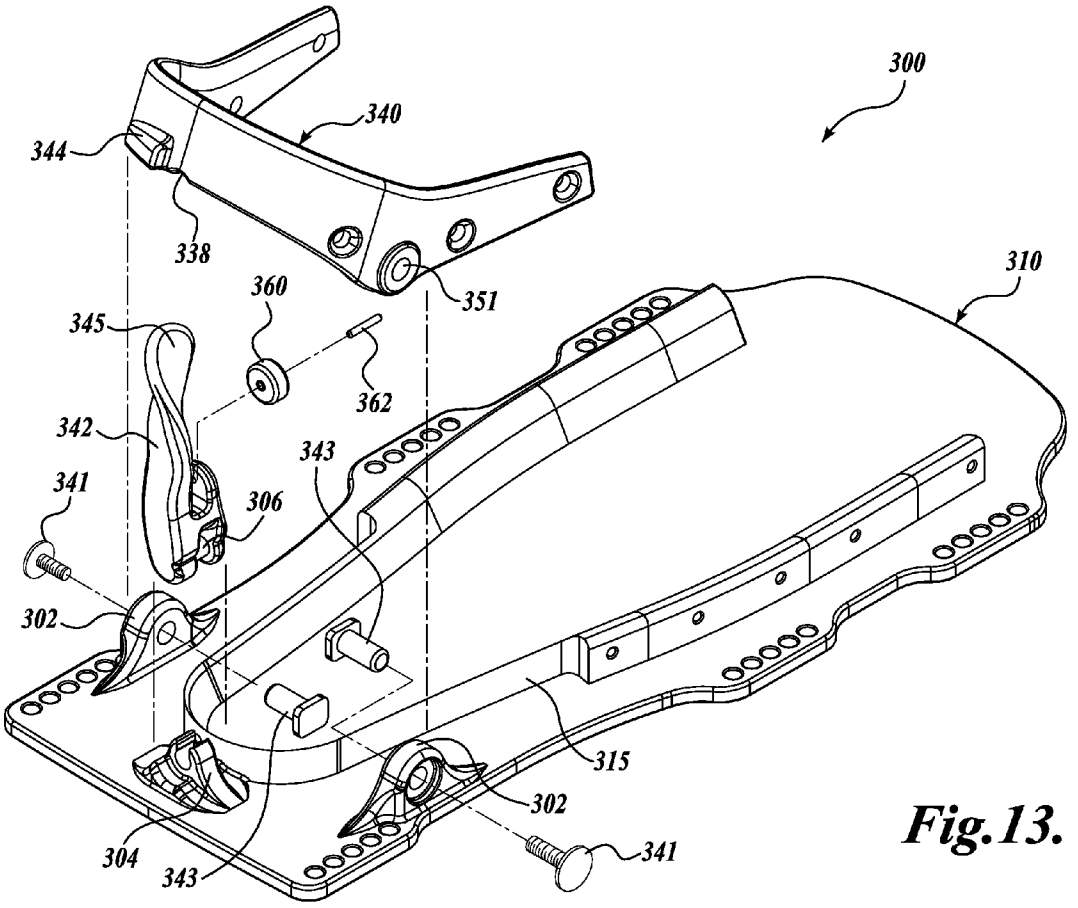
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Fig.13.

Fig.14A.

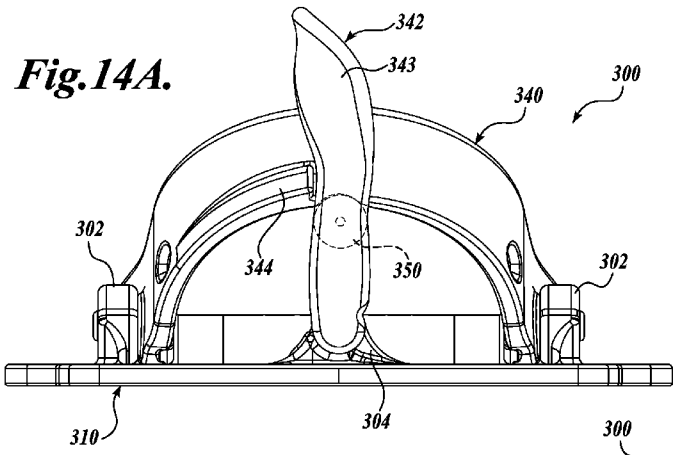
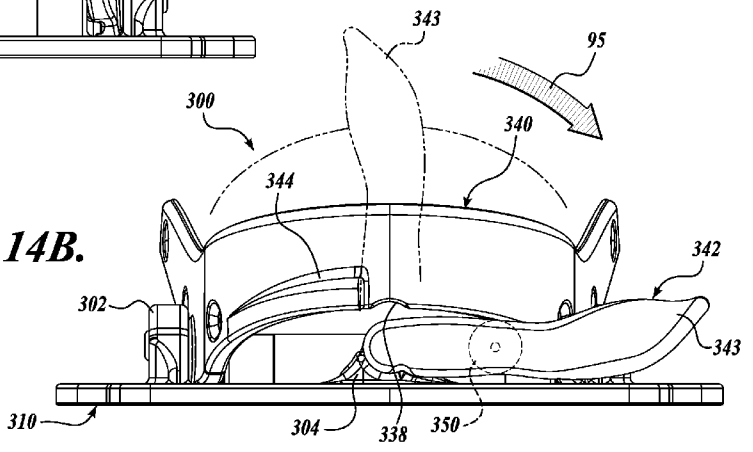


Fig.14B.



WATER SPORTS BINDING ASSEMBLY

CROSS-REFERENCES TO RELATED APPLICATIONS

This application is a continuation-in-part of U.S. application Ser. No. 11/817,402, filed Aug. 29, 2007, now U.S. Pat. No. 7,699,678, which is the National Stage of International Application No. PCT/US06/32075, filed Aug. 15, 2006, which is a continuation of U.S. application Ser. No. 11/206,253, filed Aug. 16, 2005, now U.S. Pat. No. 7,134,928, issued Nov. 14, 2006, the disclosures of which are hereby incorporated by reference in their entirety as if set forth fully herein.

BACKGROUND

Water skis, wake boards, and other water sporting boards generally require a binding that releasably attaches the user to the water sports board. Typically, a user rides a wake board while being towed behind a boat or jet ski. The wake board resembles a surf board but, unlike a surf board, the wake board includes bindings that attach the feet of a rider onto the top surface of the wake board.

One challenge associated with bindings for wake boards and water skis is that the binding must securely hold the rider's foot in contact with the wake board during rigorous use and during relatively benign falls, but must be flexible enough to allow release of the rider upon a sufficiently violent fall. Prior art bindings addressed these problems in a number of ways. For example, some water sports bindings are designed primarily of an elastic material that is stretchable to fit and grip many different foot sizes, but is sufficiently stretchable to release the foot upon a sufficiently dynamic fall. These designs are often uncomfortable, however, because the stretchable material is tensioned around the entire foot to hold the rider in place. An example of a prior art wake board binding having this construction can be found in U.S. Pat. No. 5,624,291 to McClaskey. The wake board binding in McClaskey includes two strips that are attached at the top of the wake board on opposite sides of a heel of a rider. The strips extend upward around the instep of the rider and are attached by hook-and-loop material. Attachment of the two strips binds the rider's foot to the upper surface of the wake board and maintains the rider's foot against the upper surface.

Another type of water ski or wake board binding is formed primarily of a semirigid material. For example, the two patents to Uren et al. (U.S. Pat. Nos. 5,181,332 and 5,334,065) disclose a water ski boot and binding including rigid side panels or cowls, rigid heel supports, and straps mounted over the instep of a rider's foot. A rigid cuff extends around the ankle of the rider that is made as a monolithic tube of stiff, semirigid, or substantially rigid plastic material. A problem with this design is that it does not permit release of the rider's foot, but instead, the boot releases from the ski upon a fall.

In yet another type of water sports binding, a releasable boot is worn by the user, wherein the boot is attachable to the binding. An example of this type of binding is found in U.S. Pat. No. 6,855,023 to Berger et al, wherein a coupling is attached to the sole of the boot, the coupling being adapted to mate with a second coupling attached to a lower attachment plate. These bindings require the user to wear relatively heavy and uncomfortable boots in the water and have not gained wide acceptance.

All of the prior art water sports bindings are difficult or impossible to engage while in the water, so if a user falls and releases from the binding, the user may have to return to shore or onto the pulling watercraft to re-engage the binding to continue the sport. There remains a need for water sports bindings that provide the functional benefits of a binding and that also are relatively easy to engage while in the water.

SUMMARY

This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This summary is not intended to identify key features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

A water sports binding is disclosed for releasably attaching a user's foot to a water sports board. The binding include a base plate that is configured for attachment to the water sports board. A heel loop is pivotably attached to the base plate, and positioned to generally extend around the back of the user's foot and/or ankle. The heel loop is adapted to pivot about a transverse between a first or support position and a second or release position. A flexible upper assembly is attached to the base plate. An adjustment control mechanism, preferably a lever and cam type of control, is pivotably attached to the base plate, and positioned such that the adjustment control mechanism can move the heel loop from the release position to the support position such that the control supports the heel loop in the support position. When the adjustment control mechanism is moved to the release position it does not support the heel loop.

In one embodiment, the base plate includes an upright heel cup portion that pivotably mounts the heel loop, and that also pivotably mounts the adjustment control mechanism. When the adjustment control mechanism is moved to the support position, the heel loop is moved to a position that more securely engages the user's ankle. When the heel loop is in the release position, in one embodiment the user's ankle is less firmly supported, which may be preferable for certain water sports activities or user skill levels. In another embodiment, the heel loop is moved to the release position to facilitate entry or exit from the binding.

In an embodiment, the binding for releasably attaching a user's foot to a water sports board comprises a base plate having a heel portion and a toe cup. A heel loop is attached to the base plate and pivotably between a support position and a release position. A flexible upper assembly is attached to the base plate. An adjustment control mechanism includes a cam portion that engages the heel loop and pivots between a first position wherein the adjustment control mechanism supports the heel loop in the support position and a second position wherein the adjustment control mechanism does not support the heel loop.

In an embodiment, the binding includes a base plate having a heel portion and a toe cup, and a heel loop pivotably attached to the base plate. The heel loop pivots between a support position wherein a rearward portion of the heel loop is disposed toward the base plate, and a release position where the rearward portion of the heel loop is disposed relatively farther away from the base plate. An adjustment control mechanism is pivotably attached to the base plate and includes a cam portion that is pivotable between a first position wherein the adjustment control mechanism supports the heel loop in the support position and a second position wherein the adjustment control mechanism does not support the heel loop.

The base plate may further include a heel cup extending upwardly from the heel portion of the base plate, and the adjustment control mechanism includes a lever that is pivotably mounted to the heel cup such that the cam underlies the heel loop.

In an embodiment, the cam includes an eccentric portion that depends away from the lever and a spaced leg portion that depends away from the eccentric portion.

DESCRIPTION OF THE DRAWINGS

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same become better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIG. **1** is a perspective view of a water sports binding according to the present invention, with the generally pliable upper portions of the binding shown in phantom;

FIG. **2** is an exploded view of the water sports binding shown in FIG. **1**, wherein the generally pliable upper portions are removed for clarity;

FIG. **3** is a side view of the water sports binding shown in FIG. **1**;

FIG. **4** is a side view of the water sports binding shown in FIG. **1** and showing the heel loop pivoted to the release position;

FIG. **5** is a perspective view of a second embodiment of a water sports binding in accordance with the present invention with the soft upper portions shown in phantom;

FIG. **6** is an exploded view of the water sports binding shown in FIG. **5**, wherein the soft upper portions are removed for clarity;

FIG. **7** is a perspective view of the adjustment control lever for the water sports binding shown in FIG. **5**;

FIGS. **8**A and **8**B are fragmentary perspective views of the water sports binding shown in FIG. **5**, showing the adjustment control lever in different positions;

FIG. **9** is a partially cross-sectioned side view of the water sports binding shown in FIG. **5**;

FIG. **10** is a perspective view of the assembled water sports binding shown in FIG. **5**;

FIG. **11** is a side view of a third embodiment of a water sports binding in accordance with the present invention, shown in a support position;

FIG. **12** is a side view of the water sports binding shown in FIG. **11**, with the binding in the release position

FIG. **13** is an exploded view of the hard components of the water sports binding shown in FIG. **11**; and

FIGS. **14**A and **14**B are rear views of the water sports binding shown in FIG. **11**, with the soft components removed for clarity, and showing the binding in the support and release positions respectively.

DETAILED DESCRIPTION

A currently preferred embodiment of a water sports binding **100** according to the present invention will now be described with reference to the figures, wherein like numbers indicate like parts.

Referring first to FIGS. **1** and **2**, FIG. **1** shows a perspective view of the water sports binding **100**, wherein the flexible upper assembly **150** is shown in phantom to better expose certain novel aspects of the present invention. An exploded view of the binding **100** with the upper assembly **150** removed for clarity is shown in FIG. **2**. Although the water sports binding **100** described in this embodiment is intended for use with a wake board (not shown), it is contemplated that the present invention may also be practiced with other water sports boards, including water skis and the like.

The binding **100** includes a substantially rigid base plate **110** that is adapted to be adjustably mounted on a wake board, the base plate **110** having a front or toe end **109** and a back or heel end **113**. In a current embodiment, the base plate **110** is formed from a composite material, such as a glass-filled nylon composite, although other suitable materials are appropriate and within the skill in the art to identify. A vibration-absorbing pad **108**, which may be a unitary pad or formed in multiple portions (three portions shown), underlies the base plate **110**. The base plate **110** includes oppositely-disposed, curved, elongate apertures or slots **111** such that the angular position of the base plate **110** on the wake board may be selectively fixed using conventional attachment hardware (not shown). Other configurations for attaching the base plate **110** to a wake board are also contemplated and are well-known in the art including, for example, using a plurality of spaced apertures rather than elongate slots. A relatively thick foot pad **112** is provided on top of the base plate **110** and is preferably affixed to the base plate **110**. The foot pad **112** is preferably formed from closed-cell polymeric foam and may extend beyond the toe end **109** of the base plate **110**.

The base plate **110** includes left and right inner attachment rails **115** that extend upwardly from the base plate **110**. In the current embodiment the attachment rails **115** are connected by a rib portion **123** that extends generally around towards the heel end **113** of the base plate **110**, stiffening the base plate **110**. The inner attachment rails **115** include a plurality of threaded apertures **117**. The inner attachment rails **115** may be separable components—for example, elongate members attached to the base plate **110** with conventional attachment hardware (not shown) extending through the bottom of the base plate **110**. In the current embodiment, the inner attachment rails **115** are integrally formed with the base plate **110**. Left and right outer attachment rails **116** are releasably attachable to the corresponding inner attachment rails **115**—for example, using bolts **118** that extend through apertures **119** in the outer attachment rails **116** and engage the threaded apertures **117**. It will be apparent to those of skill in the art that the inner and outer attachment rails **115**, **116** are suitable for attaching portions of the upper assembly **150** to the base plate **110**, as discussed below.

A rigid U-shaped heel loop **140** is pivotably attached to the base plate **110**. In the preferred embodiment, the heel loop **140** is attached through a pair of oppositely-disposed lugs **114** extending upwardly from the base plate **110**. The heel loop **140** may also be formed, for example, from a glass-filled nylon. Pivot pins **121** (including conventional attachment hardware) extend through each lug **114** and through a corresponding aperture **122** in a lower portion of the heel loop **140**, such that the heel loop **140** is pivotable relative to the base plate **110** through an angle about an axis transverse to the longitudinal axis **90** of the binding **100**. The heel loop **140** includes oppositely-disposed forward leg portions **143** that abut the base plate **110** to limit the forward pivoting of the heel loop **140**.

A lever mechanism **145** allows the pivotable heel loop **140** to be locked in an upright position during use. The lever mechanism **145** includes a lever **142** that is pivotably mounted on the back of the heel loop **140** through an integral center lug **144** and using pivot pin mounting hardware **141**. The lever **142** is movable between a first position (the upper position in FIG. **3**), wherein the heel loop **140** is held in the upright position, and a second position, wherein the heel loop **140** is pivotable rearwardly. The lever **142** includes a channel **139** that slidably engages a cable **146** having loop portions **147** at each end that attach to posts **149** fixed on opposite sides of the base plate **110**. A pair of cable guides **148** (one visible in the figures) is mounted to the heel loop **140** intermediate of the leg portions **143** and the lever **142** to position and retain

the cable **146**. It will be appreciated that the length of the cable **146** is selected such that when the lever **142** is in the first (upper) position shown in FIG. **3**, the tension in the cable **146** urges the lever toward the heel loop **140** such that the lever **146** tends to stay in the first position and the heel loop **140** is held in the upright position wherein the leg portions **143** abut the base plate **110**.

Referring in particular now to FIG. **3** that shows a side view of the binding **100**, the flexible upper assembly **150** of the preferred embodiment will now be described. The upper assembly **150** is made substantially from pliable elements that comfortably and securely engage a user's foot. The upper assembly **150** of the preferred embodiment includes a forward portion attached to the base plate **110** and a rearward portion attached to the heel loop **140**. A back panel **124** extends upwardly behind the foot and ankle of the user and is attached to the base plate **110** through the pivotable heel loop **140**. The back panel **124** is curved about an upright axis to generally conform to the back of the user's foot and leg and optionally includes a pull loop **125** fixedly attached at an upper end of the back panel **124**. A front panel **126** extends upwardly from the base plate **110** and is attached to the base plate **110** by clamping between the inner and outer attachment rails **115**, **116** described above (FIG. **2**). The front panel **126** overlies the user's instep and front ankle and optionally includes a second pull loop **127** fixedly attached to the top end of the front panel **126**. The back panel **124** and front panel **126** may be formed from a closed-cell, polymeric foam material to substantially wrap the user's ankle in a comfortable and flexible assembly and may include a relatively soft and compressible inner portion that is permanently adhered to a denser and less compressible outer portion.

A relatively sturdy ankle support **128** is attached to the heel loop **140** between the back panel **124** and the heel loop **140**. The ankle support **128** is preferably formed from a rubbery polymeric material and wraps generally around the user's ankle. A plurality of keepers **129** is attached to the ankle support **128**, whereby the ankle support **128** can be fixed about the user's ankle with a lace (not shown). Alternatively, a strap with an alternative attachment mechanism, such as a hook-and-loop type material or a mechanical clasp, may be used to adjustably attach the ankle support **128** about the user's ankle.

Similarly, relatively sturdy left and right instep supports **130** (right instep support visible in FIG. **3**) are attached to the base plate **110** between the inner attachment rail **115** and outer attachment rail **116**. The left and right instep supports **130** may be formed from the same material as the ankle support **128** and extend generally over the user's instep. A plurality of keepers **129** is provided such that the instep support **130** can be adjustably fixed about the user's instep with the lace (not shown) to comfortably secure the user to the binding **100**. It will be readily apparent that alternative attachment means may be utilized as discussed above. In the disclosed embodiment an optional forward toe strap **132** is also provided. The optional toe strap **132** is substantially inelastic and is adjustably attached to strap supports **134** disposed on either side of the base plate **110** (one visible in FIG. **3**). The strap supports **134** are attached to the base plate **110** through the inner attachment rail **115** and outer attachment rail **116**. The toe strap **132** of the preferred embodiment is adjustably secured about the user's foot using hook-and-loop type panels (not shown). In another preferred embodiment the binding does not include a toe strap.

A novel aspect of the binding **100** is the heel loop **140** that is pivotably attached to the base plate **110**. As shown in FIG. **4**, to facilitate entry or egress from the binding **100**, the user moves the lever **142** from the first (upper) position (shown in phantom in FIG. **4**) to the release or second position, as indicate by arrow **92**. This loosens the tension in the cable **146**, thereby permitting the user to pivot the heel loop **140** rearwardly, as indicated by arrow **93**. The back panel **124** and ankle support **128** are attached to the heel loop **140** and, therefore, pivot with the heel loop **140** away from the front panel **126** and instep support **130**. This action opens the binding **100**, allowing the user to easily engage or disengage from the binding **100**. When engaging the binding **100**, the user inserts a foot between the foot pad **112** and the front panel **126** (which may be greatly facilitated by using pull loops **125**, **127**) and pivots the lever **142** from the second or lower position back to the first or upper position.

It will be apparent to persons of skill in the art that the present invention provides substantial benefits for water sports applications, wherein a user may frequently wish to engage the binding **100** while floating in the water. In prior art bindings, the elasticity of the upper assembly is typically relied upon to provide sufficient stretching to allow the user to insert a foot, while also providing sufficient binding forces to securely retain the user's foot. The present invention eases the process of engaging the binding so that a user can quite easily reenter the binding while in the water. It will also be appreciated that, in embodiments wherein the heel loop **140** is rigid, the heel loop **140** also provides the user with improved leverage on the water sports board, which can improve the user's comfort and ease in manipulating the board during use.

A second embodiment of a binding **200** in accordance with the present invention is shown in FIGS. **5-10**. FIG. **5** is a perspective view of the binding **200** showing the structural components and wherein the flexible upper assembly **250** is shown in phantom to better illustrate other novel aspects of the binding **200**. FIG. **6** shows an exploded view of the binding **200** without the upper assembly **250**. The binding **200** includes a substantially rigid base plate **210** that is adapted to be mounted on a water sports board (not shown). The base plate **210** has a front or toe end **209** and a back or heel end **213**. For convenience, the base plate **210** may include a separable toe cup portion **211** defining an upright wall **207** about the front end **209** of the base plate **210**.

In a current embodiment, the base plate **210** is formed from a composite material, such as a glass-filled nylon composite, although other suitable materials may be used and are within the skill in the art to identify, including for example aluminum, aluminum alloy or relatively rigid plastic. The base plate may include any number of lightening holes **208**, to reduce the weight of the base plate **210**. Although not shown in FIG. **5**, it is contemplated that a vibration-absorbing pad will typically underlie the base plate **210**, i.e., between the base plate **210** and the water sports board.

In a current embodiment, the base plate **210** may be selectively mounted at a different angular position on the sports board, and adjusted using conventional attachment hardware (not shown). A relatively thick and compliant foot pad **212** is disposed on top of the base plate **210**, which may comprise a closed-cell polymeric foam or the like.

The base plate **210** further comprises a generally U-shaped rigid heel cup **215** that extend upwardly from the base plate **210**. In the current embodiment the heel cup **215** extends along at least a portion of the medial side of the base plate **210**, about the heel end **213** and along at least a portion of the medial side of the base plate **210**. Although in the present embodiment the base plate **210** and heel cup **215** are integrally formed, it is contemplated that the binding may alternatively be constructed with a separately-formed heel cup that is attached to the base plate by conventional means. The

heel cup **215** includes an optional slot **219** near the back end, the purpose of which is discussed below.

A rigid arcuate heel loop **240** is pivotably attached to the heel cup **215**. The heel loop **240** includes oppositely-disposed mounting apertures **251**, and a center portion having a locking recess **238** disposed on a lower surface. Lateral and medial pivot members **241** extend through corresponding apertures **217** in the heel cup **215**, to pivotably attach the heel loop **240** to the heel cup **215**. The heel loop **240** may be formed from any suitable material, for example, from a glass-filled nylon composite, aluminum or the like.

A cam and lever-type adjustment control **242** is pivotably attached to a rearward end of the heel cup **215** with a pivot member **244**. Refer now also to FIG. **7**, which shows the adjustment control **242** in isolation. The adjustment control **242** includes a lever **243** having an aperture **245** at a proximal end that receives the pivot member **244**. The lever **243** is attached to, or co-formed with, a cam **246**. The cam **246** comprises an eccentric portion **247** disposed away from the pivot member **244**, and a spaced leg portion **248** depending from the eccentric portion **247**. In the current embodiment, the eccentric portion **247** of the cam **246** includes a locking tab **239**.

The spaced leg portion has **248** an aperture **249** aligned with the lever aperture **245** that also receives the pivot member **244**. The rear end of the heel cup **215** is substantially flat, and the lever **243** and the spaced leg portion **248** of the cam **246** straddle the flat end of the heel cup **215**. The pivot member **244** extends through the three apertures **245**, **251**, **249**.

When the binding **200** is assembled as shown in FIG. **5**, the cam **246** of the adjustment mechanism **242** is disposed beneath a lower edge of the heel loop **240**. Refer now also to FIGS. **8**A and **8**B, which show fragmentary perspective views of the structural portions of the binding **200** with the adjustment mechanism **242** in different positions. The adjustment mechanism **242** is pivotable between a first or support position (FIG. **8**A) and a second or release position (FIG. **8**B). In the support position shown in FIG. **8**A the cam **246** supports and holds the heel loop **240** in an upper support positions. In the release position shown in FIG. **8**B the heel loop **240** is not held in the upper support position.

It will now be appreciated that the slot **219** in the heel cup **215** is positioned and oriented to receive the eccentric portion **247** of the cam **246** when the adjustment control **242** is moved to the release position. It will also be appreciated that the locking tab **239** on the cam **246** is sized and shaped to engage the corresponding recess **238** on the lower edge of the heel loop **240** when the adjustment control **242** is in the support position.

FIG. **9** is a partially cutaway side view of the binding **200**, showing additional details of the upper assembly **250** for the currently preferred embodiment. In this embodiment, a relatively thick and soft liner **255** encloses the user's foot. The liner **255** may be formed from a closed-cell polymeric foam or the like. The liner **255** extends generally from the front end **209** of the base plate **210** and about the user's foot including over the instep and about the ankle. The liner **255** provides comfort to the user's foot and ankle, and may be of unitary construction or be formed in multiple parts, such as separate front and back panels. The liner **255** may be removable from the structural components or permanently affixed thereto. An ankle portion **257** of the liner **255** is disposed generally about the user's ankle, and a foot portion **259** is disposed generally about the user's foot and instep. The liner **255** is disposed between the user's foot and structural components of the binding such as the heel cup **215** and the heel loop **240**.

Refer also to FIG. **10**, showing a perspective view of the assembled binding **200**. A relatively thin and tough overlay **260** substantially encloses the soft liner **255** and may include a lace and keepers **254** or other conventional attachment mechanism for securing and selectively controlling and tightening the fit about the user's foot, as are well known in the art. The overlay **260** may be formed from any suitable material, for example from a flexible polymeric panel or the like. In a current embodiment, the overlay **260** comprises a toe overlay **262** that generally overlies the user's forefoot and extends about the sides of the user's foot, and a separate heel and ankle overlay **264** that is disposed about the user's heel and ankle. The overlay **260** is fixedly attached to the base plate **210**, for example by stitching or adhesive attachment to the heel cup **215** and toe cup **211**. The heel and ankle overlay **264** may overlap the toe overlay **262** to facilitate flexure of the user's ankle.

Although in the currently preferred embodiment, the overlay **260** is fixedly attached to the heel cup **215**, it will be appreciated from the present disclosure, and in particular with reference to the first embodiment of a binding **100** described above, that the heel and ankle overlay **260** may alternatively be affixed to the heel loop **240**, such that when the adjustment control **242** is moved to the release position (FIG. **8**B) the heel and ankle overlay **260** will tend to pivot rearwardly, facilitating entry in to the binding **200**.

When using a water sports binding such as binding **200**, a user may desire to have greater or lesser support about the heel, for reasons of performance, control and/or comfort. With the binding **200**, a user may adjust the support about the user's heel by grasping the lever **243** and pivoting the adjustment control **242** between the support and release positions shown in FIGS. **8**A and **8**B, respectively. In the support position the heel loop **240** is pivoted upwardly providing greater support about the user's foot and ankle. In the release position the heel loop can pivot downwardly providing greater flexibility to the user's ankle.

In addition, it will be appreciated that entry and exit from a conventional water sports binding may be difficult particularly when trying to engage or disengage from the binding while floating in the water. With the present binding **200**, a user may move the adjustment control **242** to the release position to facilitate entry or exit from the binding **200**.

A third embodiment of a water ski binding **300** in accordance with the present invention is shown in FIGS. **11**-**14**B. FIG. **11** is a side view of the binding **300**, shown in the support position and FIG. **12** is a similar view showing the binding **300** in the release position. The binding **300** includes a base plate **310** that is adapted for attachment to a water sports board (not shown). A heel loop **340** is pivotably attached to the base plate **310** through oppositely-disposed lugs **302** (one visible), and pivots **341**.

A flexible upper portion **350** is attached to a base plate **310**, similar to the first embodiment above, and may include a front panel **326** and an instep support **330** that are attached at a forward portion of the baseplate **310**, for example with attachment rails **316**. A back panel **324** and ankle support **328** are attached to the heel loop **340**.

The pivotably heel loop **340** engages an adjustment control **342** that is pivotably attached to the base plate **310** through transverse lug **304**. In the support position shown in FIG. **11** the adjustment control **342** is in an upright position, which supports the heel loop **340** in a position for engaging a user's foot. In the release position shown in FIG. **12**, the adjustment control **342** is pivoted down such that the heel loop **340** can pivot rearwardly, allowing the user to more easily enter or release from the binding **300**.

Referring now to FIG. **13**, which shows a partial exploded view of the binding **300** wherein the flexible upper portion **350** is removed for clarity. The base plate **310** includes an optional short sidewall **315** that extends generally about the rear of the user's foot. The heel loop **340** attaches to the oppositely disposed lugs **302** with pivots **341** that engage nut plates **343**. Other attachment means may be used, as are well known in the art. An optional stop **344** is formed on the back side of the heel loop **340**, generally adjacent a recess **338**.

The adjustment control **342** pivotably attaches to the transverse lug **304**, for example with an integral pivot **306**. The adjustment control **342** further includes a lever portion **345** for pivoting the adjustment control **342** between the support and release positions, and a heel loop engagement piece, such as wheel **360** that is rotatably attached to the lever portion **345** with pivot **362**.

FIG. **14**A shows a rear view of the binding **300** with the flexible upper **350** removed for clarity, and showing the adjustment control **342** in the support position. The lever **343** is moved to the upright position, such that it abuts the stop **344** formed on the heel loop **340**, and the wheel **360** engages the recess **338**. FIG. **14**B shows the same view, with the adjustment control **342** pivoted to the release potion, as indicated by the arrow **95**. In the release position the heel loop **340** is free to pivot rearwardly, as discussed above.

While illustrative embodiments have been illustrated and described, it will be appreciated that various changes can be made therein without departing from the spirit and scope of the invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A binding for releasably attaching a user's foot to a water sports board, the binding comprising:

a rigid base plate;

an arcuate heel loop pivotably attached to the base plate and positioned to extend around a back portion of a user's foot, the heel loop being pivotable between an upper position and a lower position;

a flexible upper assembly attached to the base plate; and

an adjustment control movable between a support position wherein the heel loop is supported in the upper position, and a release position wherein the heel loop is not supported in the upper position, wherein the adjustment control comprises a lever with a cam that is pivotably mounted to the base plate such that the cam underlies the heel loop, and wherein the cam engages a bottom edge of the heel loop such that moving the adjustment control from the release position to the support position moves the heel loop from the lower position to the upper position.

2. The binding of claim **1**, wherein the cam comprises an eccentric portion that depends away from the lever and a spaced leg portion that depends away from the eccentric portion.

3. The binding of claim **1**, wherein the cam further comprises a locking tab, and the heel loop further comprises a locking recess, wherein the locking tab engages the locking recess when the adjustment control is in the support position.

4. The binding of claim **1**, wherein the base plate further comprises a heel cup and the adjustment control is pivotably attached to the heel cup, the heel cup including a slot that is sized and positioned to receive the cam when the adjustment control is in the release position.

5. The binding of claim **1**, wherein the upper assembly comprises an inner liner portion and an outer overlay.

6. The binding of claim **5**, wherein the inner liner portion is disposed inwardly from the heel loop, and the outer overlay is attached to the base plate.

7. The binding of claim **1**, wherein the base plate further comprises a transverse lug, and wherein the adjustment control is pivotably attached to the transverse lug.

8. The binding of claim **1**, wherein the cam comprises a rotatable wheel that engages the heel loop.

9. The binding of claim **1**, wherein the base plate is formed from a composite material.

10. A binding for releasably attaching a user's foot to a water sports board, the binding comprising:

a base plate having a heel portion and a toe cup;

a heel loop pivotably attached to the base plate wherein the heel loop pivots between a release position wherein a rearward portion of the heel loop is disposed toward the base plate, and a support position where the rearward portion of the heel loop is disposed relatively farther away from the base plate;

a flexible upper assembly attached to the base plate; and

an adjustment control mechanism pivotably attached to the base plate and having a lever with a cam portion, wherein the cam portion engages a bottom edge of the heel loop; and

wherein the adjustment control mechanism is pivotable between a first position wherein the adjustment control mechanism supports the heel loop in the support position and a second position wherein the adjustment control mechanism does not support the heel loop and the heel loop is in the release position.

11. The binding of claim **10**, wherein the base plate further comprises a heel cup extending upwardly from the heel portion of the base plate and the lever is pivotably mounted to the heel cup such that the cam portion underlies the heel loop.

12. The binding of claim **11**, wherein the cam portion comprises an eccentric portion that depends away from the lever and a spaced leg portion that depends away from the eccentric portion, and further wherein the adjustment control mechanism straddles the back end of the heel cup.

13. The binding of claim **11**, wherein the heel cup includes a slot that is sized and positioned to receive the cam portion when the adjustment control mechanism is in the second position.

14. The binding of claim **10**, wherein the cam portion further comprises a locking tab, and the heel loop further comprises a locking recess, wherein the locking tab engages the locking recess when the adjustment control mechanism is in the second position.

15. The binding of claim **10**, wherein the upper assembly comprises an inner liner portion and an outer overlay.

16. The binding of claim **15**, wherein the inner liner portion is disposed inwardly from the heel loop, and the outer overlay is attached to the base plate.

17. The binding of claim **10**, wherein the base plate is formed from a composite material

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