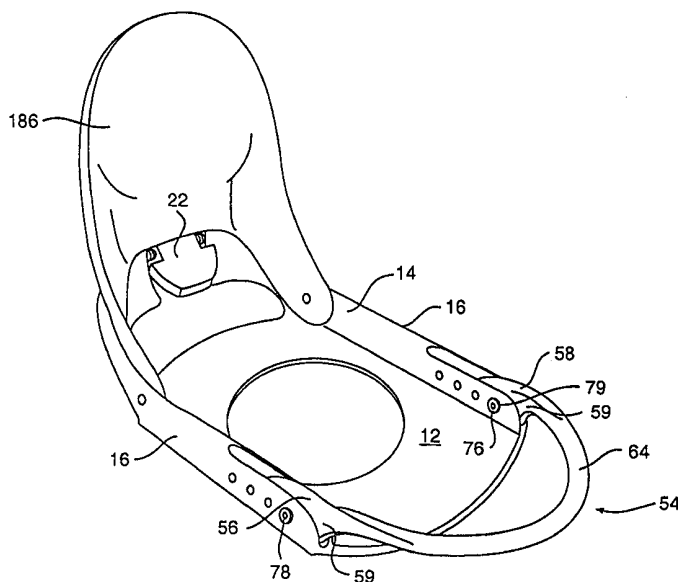




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(54) Title: STEP-IN SKI AND SNOWBOARD BINDING SYSTEM



## (57) Abstract

A boot and binding for securing the boot to an upper surface of a ski or snowboard. The boot includes a receiving structure located at a heel portion and a toe portion that, in one variation, may be covered by a thin layer of flexible elastomeric material. The bindings include a base (12) attached to the riding surface of the ski or snowboard. Disposed on the base is a frame with lateral sides (16). At the heel end of the frame, a portion (18) raised from the base connects the lateral sides. Disposed onto the raised portion is a locking mechanism (22) for resiliently engaging the receiving structure of the heel portion of the boot. At the toe end of the frame, a bail (64) is disposed onto the lateral sides for engaging the toe portion of the boot.

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DescriptionStep-in Ski and Snowboard Binding SystemBackground ArtTechnical Field

The present invention relates to skis and snowboards generally. More particularly, the present invention concerns the boot and binding systems for releasably retaining a boot on a ski or snowboard.

Description of the Prior Art

The breadth of winter, snow-related, recreational activities has increased over the last decade to encompass, among other variations, the rapidly growing sport of snowboarding. No longer considered a lesser alternative, the popularity of snowboarding is beginning to rival that of skiing.

In recent years, snowboard manufacturers have introduced several types of binding systems that permit a snowboarder to step into a snowboard binding as easily as a skier steps into a ski binding. Many of the snowboard bindings offered to the public focus on designs which require the boot to include external hardware disposed on the boot exterior to engage the binding. The difficulty with such a design requirement is that these elements often protrude outbound from the boot or are disposed on the sole of the boot. The external hardware, once affixed, is often awkward and can cause problems when the boot is disengaged from the binding. For example, the protrusion may limit the mobility of the boot, which is more likely to abut with objects in the environment. Moreover, after direct contact with the environment, the protrusion may become deformed so that it no longer properly configures to the binding mechanism. In addition, the elements disposed on the boot exterior may allow snow to accumulate and compact at the sole of the boot. This compacted snow may further prevent the boot from mating properly with the binding mechanism.

To minimize this problem, many snowboard manufacturers have designed step-in binding systems where the boots contain rigid loops or structures on the perimeter of the sole of the boot onto which the binding mechanism may attach. These designs, however, do not always address or overcome the concerns discussed above. Moreover, boots that

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include these projections offer less desirability and convenience than boots without the attached protrusions.

Finally, the binding systems proposed in the past have not addressed the possibility of use on both skis and snowboards. In the past, snowboard manufacturers have focused on designs for snowboards and ski manufacturers have focused on bindings for skis. While there are differences between skiing and snowboarding and the equipment needed for the two sports, there are also similarities which permit a certain amount of cross-hybridization in the area of the boot and binding mechanisms.

These voids in the systems of the prior art have created a specific need for a boot and binding which is practical and adaptable in its design and application for both snowboards and skis.

#### Disclosure of the Invention

The advantages and purpose of the invention will be set forth in part in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The advantages and purpose of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims.

To attain the advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, the invention comprises a boot and binding provided for securing a boot to the upper surface of a ski or snowboard, the binding comprising a frame with lateral sides disposed on a base where a portion raised from the base connects the lateral sides at one end of the frame. Disposed on to the raised portion is a locking device for engaging a heel portion of the boot. At the other end of the frame is a bail disposed between the lateral sides to engage a toe portion of the boot. The boot includes a heel portion with a receiving structure for communicating with the locking device and a toe portion with a receiving structure for communicating with the bail.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

### Brief Description of the Drawings

The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate preferred embodiments of the invention and, together with the description, serve to explain the principles of the invention. In the drawings,

Fig. 1 is a top view of a first embodiment of the binding according to the present invention, showing a first variation of a locking mechanism, a first variation of a bail, and a first variation of a support member;

Fig. 2 is a side elevation view of the first embodiment of the binding according to the present invention;

Fig. 3 is a rear elevation view of the first embodiment of the binding according to the present invention;

Fig. 4 is a perspective view of the first embodiment of the binding according to the present invention;

Fig. 5 is a perspective view of a second embodiment of the binding according to the present invention;

Fig. 6 is a side elevation view of a variation of the first embodiment of the binding according to the present invention;

Fig. 7 is a rear elevation of the second embodiment of the binding system according to the present invention;

Fig. 8 is a partial side elevation view of the binding according to the present invention, showing the first variation of the locking mechanism;

Fig. 9 is a partial side elevation view of the binding according to the present invention, showing a second variation of the locking mechanism;

Fig. 10 is a partial side elevation view of the binding according to the present invention, showing a third variation of the locking mechanism;

Fig. 11 is a partial side elevation view of the binding according to the present invention, showing a fourth variation of the locking mechanism;

Fig. 12 is a partial top view of the toe portion of the binding according to the present invention, showing a second variation of the bail;

Fig. 13 is a partial top view of the toe portion of the binding according to the present invention, showing a third variation of the bail;

Fig. 14 is a partial top view of the toe portion of the binding according to the present invention, showing a variation of the attachment of the bail to the binding;

Fig. 15 is a cross-sectional view of a first embodiment of a boot according to the present invention;

Fig. 16 is a cross-sectional view of a second embodiment of a boot according to the present invention;

Fig. 17 is a cross-sectional view of a third embodiment of a boot according to the present invention; and

Fig. 18 is a cross-sectional view of a variation of the third embodiment of a boot according to the present invention.

#### Best Mode for Carrying Out the Invention

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

In accordance with the invention, there is provided a boot and binding for securing a boot to an upper surface of a ski or snowboard. In order to secure the boot to the upper surface of the ski or snowboard and alleviate the problems facing conventional boot and binding systems, the present invention includes a binding structure whose application relieves the exterior boot structure of any receiving apertures disposed in, on, or near the sole of the boot or its periphery. The structure of the bindings present, at one end, a latching mechanism disposed on a raised portion to engage the heel of the boot and, at the other end, a bail to engage the toe of the boot.

The first embodiment of binding 10 of the present invention is generally depicted in Figs. 1-4. The first embodiment of boot B according to the present invention is depicted in Fig. 15, with other embodiments of that design being depicted in Figs. 16-18.

As illustrated in Fig. 1, binding 10 includes base 12, which attaches to an upper riding surface of the ski or snowboard in a manner conventional and well known to those of ordinary skill in the art. Particularly in the case of a snowboard, base 12 may attach to the riding surface at various positions and angles depending upon the particular stance of the rider. Again, such an attachment is well known in the art. Disposed on base 12 is frame 14

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having lateral sides 16. At the end of frame 14 where the rider's heel is positioned, portion 18 is raised from base 12 and connects lateral sides 16.

At the same end of frame 14, on raised portion 18, is locking device 22. While several variations of locking devices 22, 24, 26, 28 are contemplated by the present invention, the purpose of the locking device is to hold the rider's boot B securely in binding 10. As designed, the locking device permits the snowboarder to step into binding 10.

The first embodiment of locking device 22 is depicted in expanded detail in Fig. 8. Locking device 22 includes latch 30, which pivotally mounts and revolves about horizontal axis 32 on raised portion 18. Latch 30 is V-shaped with legs 34, 36 and vertex 38. Latch 30, pivotally mounted in an inverted position, revolves about horizontal axis 32 at vertex 38. Latch 30 is biased so that leg 34 is resiliently positioned toward the toe of binding 10 to engage heel portion 40 of boot B. As with all embodiments of the latch, the bias may be applied by a spring or other mechanism known to those of ordinary skill in the art. When latch 30 engages heel portion 40 of boot B, locking device 22 removably secures boot B to binding 10. As a result of this bias, when the rider inserts his boot B into binding 10, latch 30 will retract until leg 34 nestles in heel portion 40 to secure boot B to binding 10.

To disengage latch 30 from heel portion 40 of boot B, the rider need only apply pressure to leg 36 to rotate latch 30 in a clockwise direction (when viewing Fig. 8) so that leg 34 no longer engages heel portion 40. After removing boot B from binding 10 and releasing latch 30, the bias of latch 30 will return latch 30 to its rest position.

As illustrated alternatively in Fig. 9, locking device 24 includes V-shaped latch 42. Latch 42 may be pivotally disposed about horizontal axis 32 on raised portion 18 so that it is in an upright position. In such a configuration, to engage boot B, latch 42 includes engaging arm 44 attached to end 46 of leg 48. As with the first embodiment, a bias is applied to latch 42 to cause arm 44 to resiliently engage heel portion 40 of boot B. Accordingly, to release boot B from binding 10, the rider applies pressure to leg 52 to rotate latch 42 in a counterclockwise direction (as seen in Fig. 9). Once boot B is removed from binding 10 and latch 42 is released, the bias of latch 42 will return latch 42 to its rest position. Just as in the first example, latch 42 permits the rider to step into binding 10. As the rider steps into binding 10, latch 42 retracts until engaging arm 44 nestles into heel portion 40 to secure boot B to binding 10.

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In yet another variation, as illustrated in Fig. 11, locking device 26 of binding 10 includes L-shape member 160 having first leg 161 and second leg 170. Affixed to first leg 161 is engaging arm 162 having first end 164 and second end 166. First end 164 is mounted to raised portion 18, while second end 166 resiliently engages heel portion 40 of boot B. As with the first embodiment, L-shaped member 160 is biased so that second end 166 resiliently engages heel portion 40 of boot B. When second end 166 engages heel portion 40, locking device 26 removably secures boot B to binding 10. As the rider steps into binding 10, second end 166 retracts until it nestles into heel portion 40 to secure boot B to binding 10.

To disengage second end 166 from heel portion 40 of boot B, the rider need only apply pressure to second leg 170 to move L-shape member 160 in a clockwise direction (when viewing Fig. 10) so that second end 166 no longer engages heel portion 40. After removing boot B and releasing second leg 170, the bias of member 160 will return member 160 to return to its rest position.

In still another variation, as illustrated in Fig. 10, locking device 28 includes releasable spring-loaded member 172 having front end 174, back end 178, and spring 175. Front end 174 possesses angled structure 176 located at an upper surface of its tip to facilitate insertion of boot B into binding 10. Member 172 is biased such that front end 174 is resiliently biased by spring 175 toward the toe of binding 10 to engage heel portion 40 of boot B. When front end 174 engages heel portion 40 of boot B, member 172 removably secures boot B to binding 10. As the rider steps into binding 10, front end 174 retracts until it nestles into heel portion 40 to secure boot B to binding 10.

To disengage front end 174 from heel portion 40 of boot B, the rider need only withdraw member 172 by grasping ring 177 affixed to back end 178. By moving member 172 in a direction opposing heel portion 40 of boot B, front end 174 disengages heel portion 40. After removing boot B and releasing ring 177, the bias of member 172 will return member 172 to its rest position.

At the other end of frame 14, where the rider's toe is positioned, bail 54 is affixed to lateral sides 16. While several embodiments of bail 54, 70, 82 are contemplated by the present invention, the purpose of the bail is to restrain the movement of boot B while secured in binding 10. As designed, the bail permits the rider to step into binding 10.

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The first embodiment of bail 54 is depicted in Figs. 1, 2, 4 and 5. Bail 54 is U-shaped with legs 56, 58. Legs 56, 58 attach to lateral sides 16 of frame 12 by inserting legs 56, 58 in slots 53, 55 located in frame 14. Alternatively, as illustrated in Fig. 14, legs 56, 58 may attach to frame 12 by affixing legs 56, 58 next to inner portions 57, 59 of lateral sides 16. Slots 53, 55, or alternatively lateral sides 16, may contain a hole or a plurality of holes 74 so that bolt 60 may insert through the hole to fasten legs 56, 58 to lateral sides 16. Alternatively, a pin may insert through the hole to fasten legs 56, 58 to lateral sides 16. Such an attachment allows bail 54 to pivot in the upward and downward direction. The upward pivotal movement of bail 54 may be limited by a stop provided by the configuration of legs 56, 58. In situations when bail 54 is not engaged with boot B, the bail may pivot downward to base 12. This downward pivot not only prevents unwanted damage to bail 54, but also enables the rider to step in the binding without interference from any preset high back positions. For example, as boot B initially inserts into binding 10, bail 54 remains downwardly pivoted until boot B engages the locking device. Upon engagement with the locking device, bail 54 then rotates to its operational position to restrain boot B.

As affixed to frame 14, bail 54 substantially restrains toe portion 94, 116, 138 of boot B (see Figs. 15-18) by impeding its movement when secured in binding 10. As illustrated in Figs. 1, 4, and 5, legs 56, 58 may have a portion 59 raised from base 12 so that bail 54 may better restrain the toe portion of boot B. In addition, bail 54 may possess a rigid structure throughout its cross-section. Moreover, center portion 64 of bail 54, located between legs 56, 58, may be flattened to enhance the engagement of bail 54 and the toe portion of boot B. As the rider steps into the binding, the toe portion of boot B engages bail 54 so that the movement of boot B is restrained in the forward, up, down and side directions.

As illustrated in Figs. 2, 4, and 5, legs 56, 58 of U-shaped bail 54 may be adjustably secured in the longitudinal direction to lateral sides 16 of frame 14. Lateral sides 16 may include a plurality of holes 74 for receiving bolt 76 through legs 56, 58 so that bail 54 may be adjustably affixed to lateral sides 16 at various longitudinal locations. Alternatively, as illustrated in Fig. 6, lateral sides 16 may include continuous elongated slots 75 for receiving bolt 76 through legs 56, 58. As configured, bail 54 may adjustably affix to lateral sides 16 at any location within the range defined by slots 75.

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This longitudinal adjustment allows bail 54 to accommodate a range of boot sizes and brands. Once the rider's boot size and brand are determined, legs 56, 58 are affixed to lateral sides 16 at the appropriate position by removable bolt 76. Again, when the rider steps into binding 10, the toe portion of boot B engages bail 54 so that boot B is restrained.

Another embodiment of the bail is depicted in expanded detail in Fig. 12. Bail 70 is U-shaped with legs 66, 68. Legs 66, 68 affix to lateral sides 72 of frame 14 by inserting legs 66, 68 into holes 67 having inserts 71 configured to receive legs 66, 68. In contrast to the first embodiment, bail 70, once affixed to frame 14, is stationary because legs 66, 68 are securely fastened to lateral sides 72.

Bail 70 may be adjustably secured to lateral sides 72. Lateral sides 72 may include a plurality of holes 67 having inserts 71 configured to receive legs 66, 68. Once the rider's boot size and brand are determined, legs 66, 68 are affixed to lateral sides 72 through appropriate holes 57, 59 by inserting legs 66, 68 into inserts 61, 63. As the rider steps into binding 10, the toe portion of boot B engages bail 70 so that boot B is restrained. As described previously with respect to bail 54, bail 70 may also possess a rigid structure throughout its cross-section. Moreover, center portion 75, located between legs, 66, 68, may be flattened to enhance the engagement of bail 70 with the toe portion of boot B.

In yet another embodiment, this ability to accommodate a range of boot sizes and brands may alternatively be accomplished by use of U-shaped bail 82, as depicted in expanded detail in Fig. 13. Instead of using a bail with a rigid cross-section throughout, bail 82 includes a rigid structure only at legs 84, 86 which attach to lateral sides 88 of frame 14. A flexible structure at a portion 90 is included on bail 82 between legs 84, 86. Portion 90 may be elastically biased, although an elastic bias is not required. As the rider steps into binding 10, portion 90 of bail 82 adapts to the contours of the rider's particular boot size and brand. Because of the adaptability of bail 82, the toe portion of boot B does not require any specific configuration such as receiving structure 98, 120, 141 shown on boot B in Figs. 15-18. Once boot B is inserted into binding 10, the elastic bias of portion 90 restrains the movement of boot B. After removing boot B from binding 10, the bias of portion 90 will return portion 90 to its rest position. In addition to its flexible structure, bail 82 may adjustably affix in the longitudinal direction to lateral sides 88 of frame 14 as previously described.

Returning to the end of frame 14 where the rider's heel is positioned, a support member 180, 186 may be disposed on raised portion 18. While support members 180, 186 are contemplated by the present invention, the purpose of a support member is to prevent the rider's leg from bending backward. As designed, the support member does not impede the rider's ability to step into binding 10. The support member, moreover, may be omitted entirely.

The first embodiment of support member 180 is depicted in Figs. 1-4. The support member 180 is pivotably disposed on raised portion 18. Support member 180 may include shaft 182, which is pivotally mounted to raised portion 18 of frame 14. As mounted, support member 180 may pivotally collapse against the upper surface of the ski or snowboard.

As illustrated alternatively, a second embodiment of support member 186 is depicted in Figs. 5 and 7. Support member 186 may be disposed on lateral sides 16 of frame 14. As with the first embodiment, support member 186 substantially prevents the rider's leg from bending backwards. As mounted, support member 186 may also pivotally collapse against the upper surface of the ski or snowboard.

The various embodiments of the boot of the present invention are illustrated in Figs. 15-18. As illustrated in Fig. 15, boot B includes a heel portion and a toe portion. The heel portion includes a receiving structure and the toe portion includes a receiving structure as well. While different embodiments for the receiving structures are contemplated by the present invention, the purpose for the receiving structure for the heel portion is to engage the locking device of binding 10, while the purpose for the receiving structure for the toe portion is to engage the bail of binding 10. The design of the receiving structure of boot B permits the rider to step into binding 10. Further, because of the design of bindings 10, the height of the receiving structures from the sole of boot B may vary depending upon the height of the locking device and bail from base 12 of binding 10.

The first embodiment of boot B is illustrated in Fig. 15. Boot B includes heel portion 92 and toe portion 94. These portions include respective receiving structures 96, 98 for communicating respectively with the locking device and the bail of binding 10. Receiving structure 96 includes ridge 100 disposed on heel portion 92 to engage the locking device. Ridge 100, located above the upper rear periphery 101 of sole 102,

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includes angled lower surface 104 and upper surface 106. When heel portion 92 is inserted in binding 10, angled lower surface 104 causes the locking device to gradually retract from its biased position. Once the lower surface 104 extends below the locking device, upper surface 106 of ridge 100 receives the locking device.

Similarly, receiving structure 98 includes ridge 108 disposed on toe portion 94 to engage the bail. Ridge 108, located above the upper front periphery 110 of sole 102, includes lip 111 having upper surface 112 for engaging the bail. When toe portion 94 of boot B inserts into binding 10, upper surface 112 of ridge 108 engages the bail.

As illustrated alternatively in Fig. 16, a second embodiment of boot B includes heel portion 114 and toe portion 116, where these portions include respective receiving structures 118, 120 for communicating respectively with the locking device and the bail of binding 10. Receiving structure 118 includes insert 122 disposed at heel portion 114 to engage the locking device. Insert 122, located above the upper rear periphery 124 of sole 102, includes lip 126 having upper surface 128 for receiving the locking device. As the rider steps into binding 10, the locking device initially retracts as it engages lower heel portion 129. Once beyond lower heel portion 129, the locking device engages upper surface 128 to secure boot B to binding 10. Receiving structure 120 includes insert 130 disposed on toe portion 116 to engage the bail. Insert 130, located above the upper front periphery 125 of sole 102, is defined by upper lip 132 and lower lip 134. When toe portion 116 of boot B inserts into binding 10, insert 130 receives the bail between upper lip 132 and lower lip 134 to restrain the movement of boot B. Insert 130 may engage any of the embodiments of the bail.

As illustrated in Fig. 17, a third embodiment of boot B includes a heel portion 136 and toe portion 138, where these portions include receiving structures 140, 141 for communicating respectively with the locking device and the bail of binding 10. Receiving structure 140 includes depression 142 disposed at heel portion 136 to engage the locking device. Depression 140, located above the upper rear periphery 143 of sole 102, includes lip 144 having upper surface 146 for receiving the locking device. Depression 140 is defined by sides 145 because it wraps around heel portion 136 to only a certain degree depending substantially upon the dimensions of the locking device.

Receiving structure 141 includes depression 148 disposed on toe portion 138 to engage the bail. Depression 148, located above the upper front periphery 150 of sole 102, is defined by upper lip 152 and lower lip 154. When the toe portion 138 of boot B inserts into binding 10, depression 148 receives the bail between upper lip 152 and lower lip 154 to restrain the movement of boot B. Depression 148 may engage any of the embodiments of the bail.

As illustrated alternatively in Fig. 18, a variation of receiving structures 140, 141 further includes thin layer 156, 158 of flexible elastomeric material. Thin layer 156, 158 covers receiving structures 140, 141. Thin layer 156, 158 not only maintains the original shape of the exterior of boot B but also allows a secure engagement between binding 10 and receiving structure 140, 141. Since it is disposed over receiving structures 140, 141, thin layer 156, 158 provides the exterior of boot B with a smooth continuous surface. When the locking device and the bail engage receiving structures 140, 141, thin layer 156, 158 will assume the shape of receiving structure 140, 141 to allow the engagement of binding 10 to boot B. As boot B is removed from binding 10, the receiving structures 140, 141 are again hidden as the elasticity of thin layer 156, 158 causes thin layer 156, 158 to return to substantially its original form. Gaps 159, located in between thin layer 156, 158 and receiving structure 140, 141, may be filled with a flexible foam to aid in the return of thin layer 156, 158 to substantially its original shape.

In situations where boot B is not manufactured with any of the different receiving structures incorporated into it, the receiving structure variations may be added to the exterior of a boot. An external system including the appropriate ridges and/or inserts may be attached to a boot to enable the engagement of the boot with binding 10. The external system may include one or more members. In situations requiring two separate members, one member may be disposed inside the boot while the other member, configured to engage the first member, may be disposed on the exterior of the boot. To create the appropriate ridge and/or insert, the members are fastened together through the surface of the boot.

As the locking device of binding 10 is disposed on raised portion 18, the receiving structure of the heel portion of boot B, corresponding to the locking device, may be disposed at any appropriate height from sole 102 of boot 10. This height depends substantially upon the height of raised portion 18 from base 12 of binding 10. In addition,

as the bail of binding 10 may include raised portion 59, the receiving structure of the toe portion of boot B, corresponding to the bail, may be disposed at any appropriate height from sole 102 of boot 10. Similarly, this height depends substantially upon the height of raised portion 59 from base 12 of binding 10.

It will be apparent to those skilled in the art that various modifications and variations can be made in the boot and binding system of the present invention and in construction of this boot and binding system without departing from the scope or spirit of the invention.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.

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Claims

1. A binding for a boot having receiving structures disposed on the boot's heel and toe portions, the binding comprising:

- a base;
- a frame with lateral sides disposed on the base;
- a portion raised from the base connecting the lateral sides at a heel end of the frame;
- a U-shaped bail disposed on the lateral sides at a toe end of the frame for engaging the toe portion of the boot; and
- a locking device attached to the raised portion for engaging the heel portion of the boot.

2. The binding of claim 1, wherein the U-shaped bail has legs joined by a connecting portion, where the connecting portion is raised from the base.

3. The binding of claim 2, wherein the U-shaped bail is disposed pivotally on the lateral sides.

4. The binding of claim 3, wherein the legs of the U-shaped bail are disposed adjustably on the lateral sides between the toe and heel ends of the frame.

5. The binding of claim 4, wherein the frame defines a plurality of holes into which the ends of the legs are adjustably insertable to position the bail on the frame.

6. The binding of claim 4, wherein the frame defines continuous elongated slots onto which ends of the legs are adjustably affixed to position the bail on the frame.

7. The binding of claim 1, wherein the U-shaped bail is rigid.

8. The binding of claim 1, wherein the U-shaped bail is rigid at the attachment to the lateral sides and flexible at a portion therebetween.

9. The binding of claim 1, wherein the locking device comprises a latch pivotally mounted about a horizontal axis of the raised portion, and the latch is biased to engage the heel portion of the boot.

10. The binding of claim 9, wherein the latch is V-shaped comprised of two connecting legs and invertedly mounted on to the horizontal axis, one leg of the latch engages the heel portion of the boot, and the other leg of the latch facilitates disengagement of the latch from the heel of the boot.

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11. The binding of claim 9, wherein the latch is V-shaped comprised of two connecting legs and mounted upright on to the horizontal axis,  
one leg of the latch has an arm horizontally protruding therefrom to engage the heel portion of the boot, and  
the other leg of the latch facilitates disengagement of the latch from the heel of the boot.

12. The binding of claim 1, wherein the locking device comprises:  
a locking member disposed transversely through the raised portion, the locking member having a front end and a back end, the front end for engaging the heel of the boot,  
a spring biasing the locking member to engage the heel of the boot, and  
a ring attached to the back end to facilitate disengagement of the locking member from the heel of the boot.

13. The binding of claim 1, wherein the locking device comprises:  
an arm on the raised rear portion biased to engage the heel of the boot,  
an L-shaped member having a first leg attached to the arm and a second leg attached to the first leg, and  
the raised portion is contoured so that pressure on the first leg biases the arm away from the heel of the boot, facilitating disengagement of the arm from the heel portion of the boot.

14. The binding of claim 1, further comprising a support member attached to one of either the raised portion of the frame or the lateral sides of the frame to substantially prevent a person's leg from bending backward.

15. The binding of claim 14, wherein the support member is pivotally disposed to rotate from a position where it overlays the base to a position where it is substantially vertical.

16. The binding of claim 14, wherein the support member includes an adjustable shaft disposed on the raised portion of the frame.

17. The binding of claim 16, wherein the shaft is pivotally disposed on the raised portion of the frame.

18. A boot for use with a binding, the binding having a frame with lateral sides disposed on a base, a portion raised from the base connecting the lateral sides at a heel end

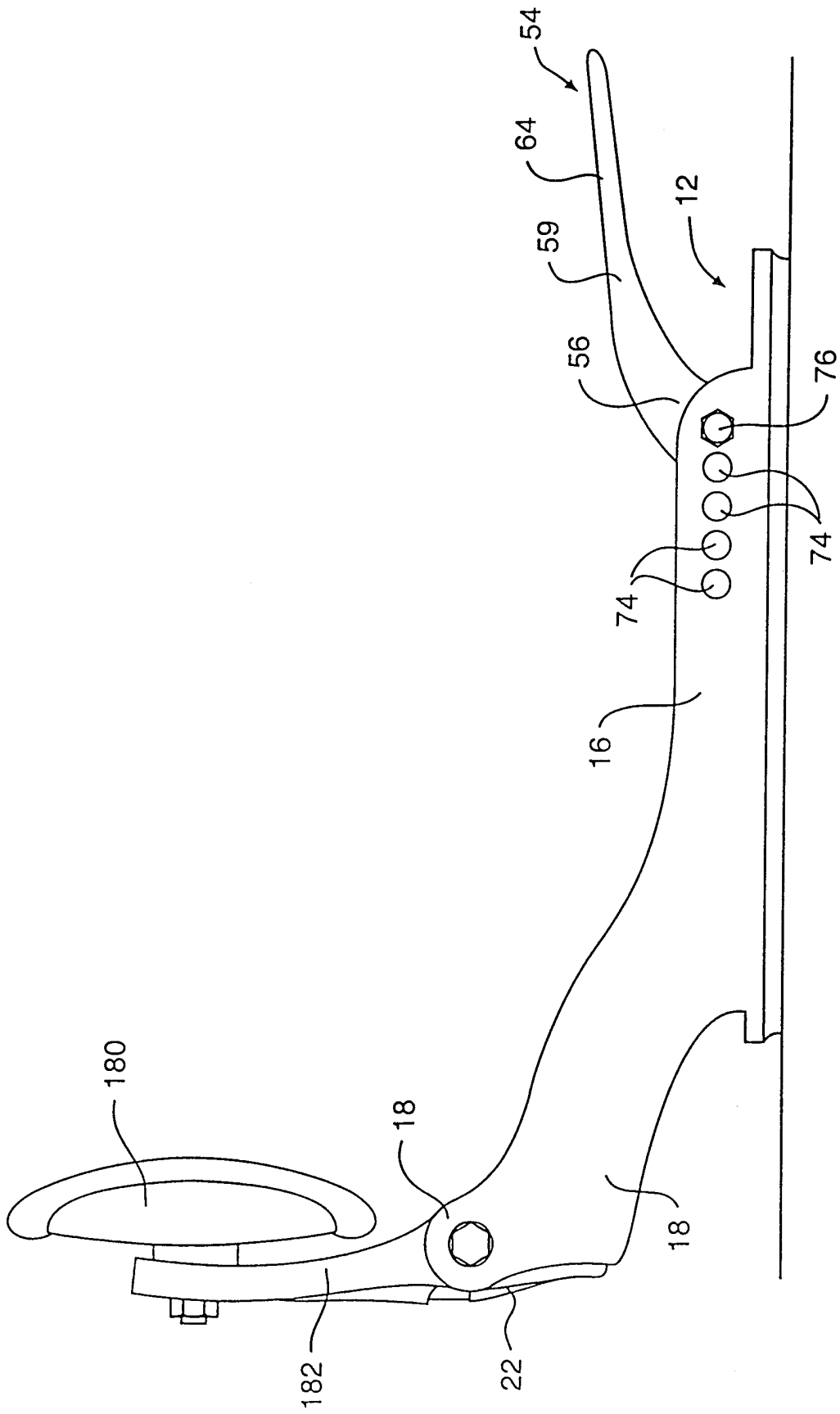
of the frame, a U-shape bail disposed between the lateral sides at a toe end of the frame for engaging the boot, and a locking device disposed on the raised portion for engaging the boot, the boot comprising:

a heel portion having a receiving structure for communicating with the locking device; and

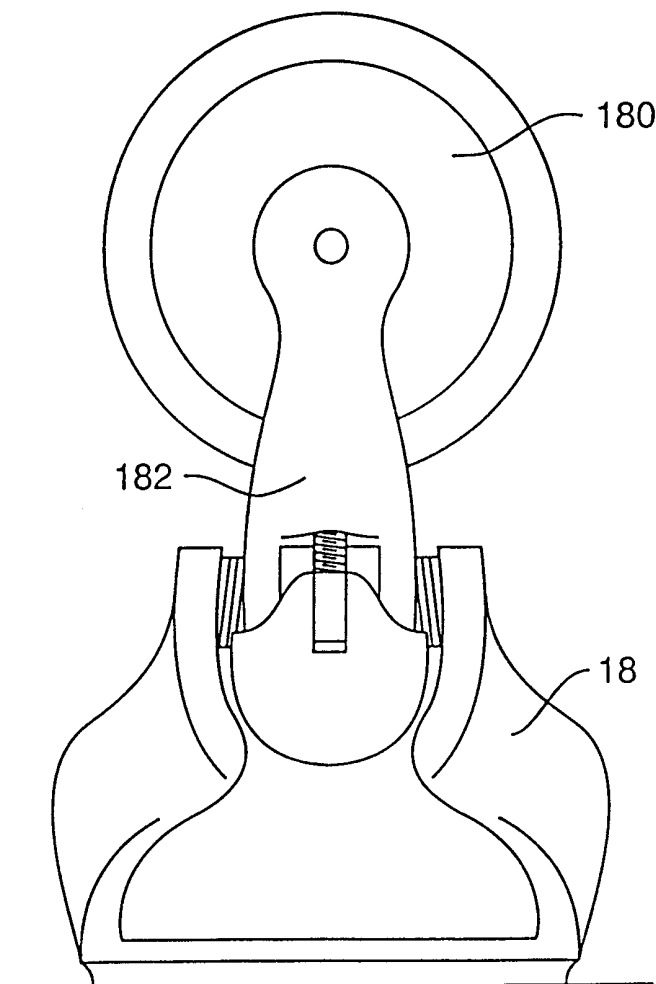
a toe portion having a receiving structure for communicating with the bail.

19. The boot as recited in claim 18, wherein the receiving structure is one selected from a singular density or variable densities.
20. The boot as recited in claim 19, wherein the receiving structure is a ridge.
21. The boot as recited in claim 19, wherein the receiving structure is an insert.
22. The boot as recited in claim 21, wherein the insert is covered by a thin layer of a flexible elastomeric material.



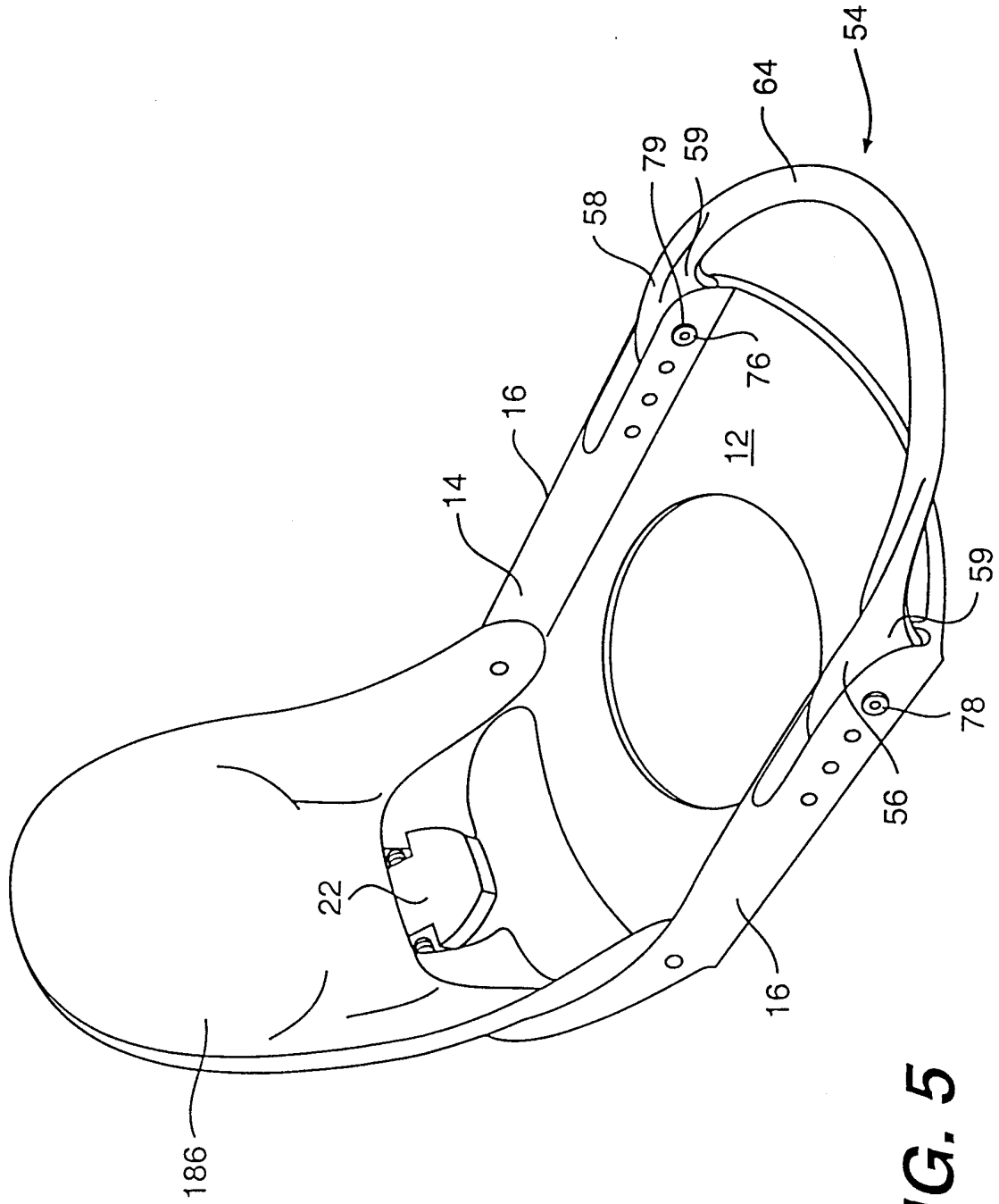


**FIG. 2**

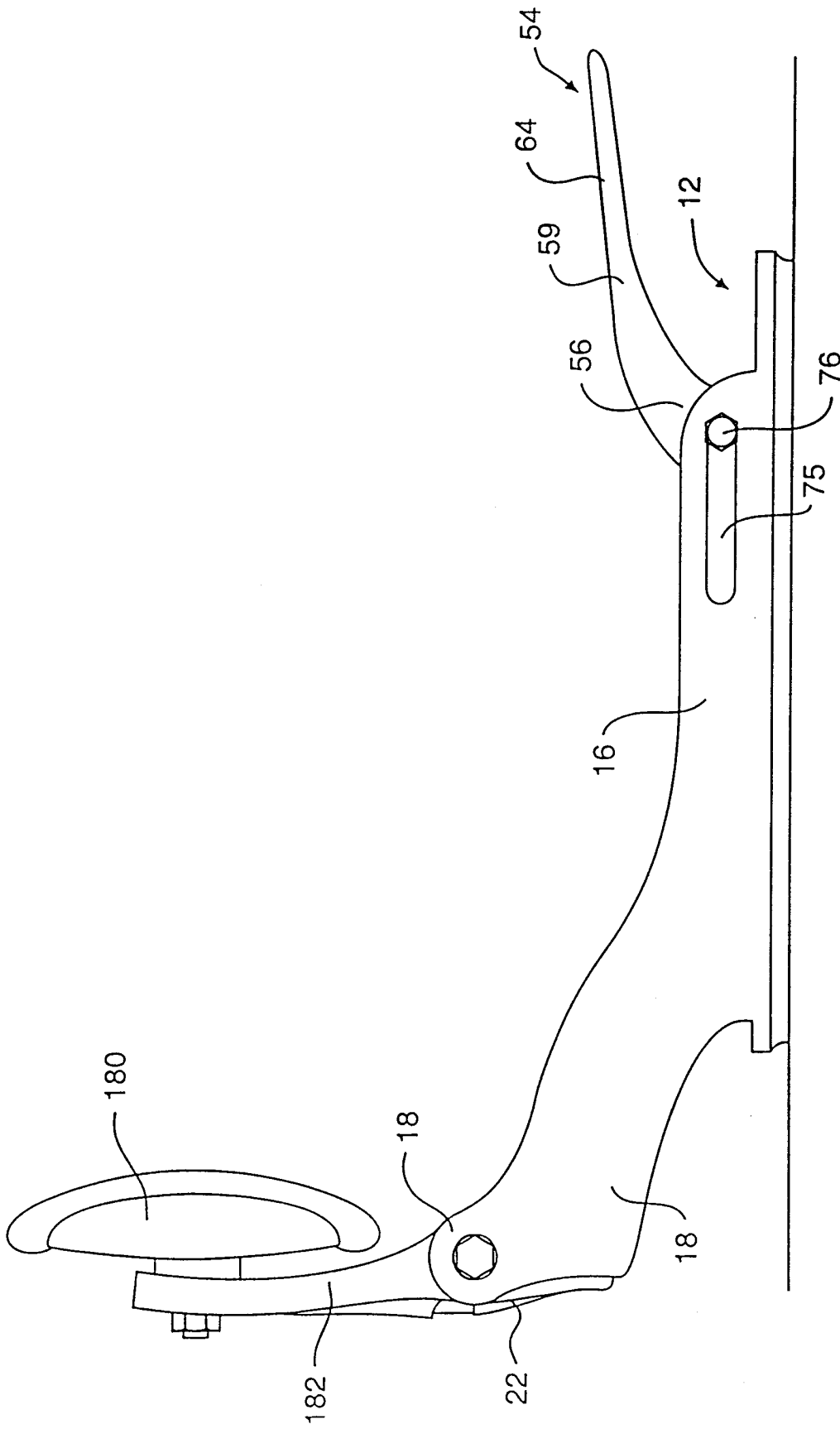


**FIG. 3**

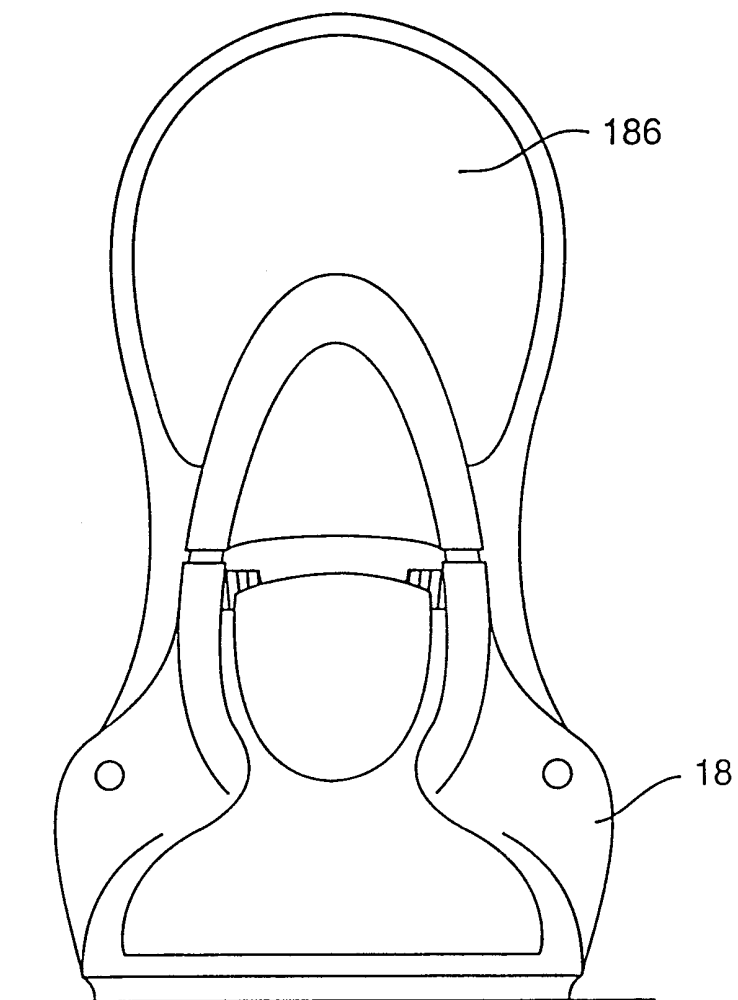




**FIG. 5**



**FIG. 6**



**FIG. 7**

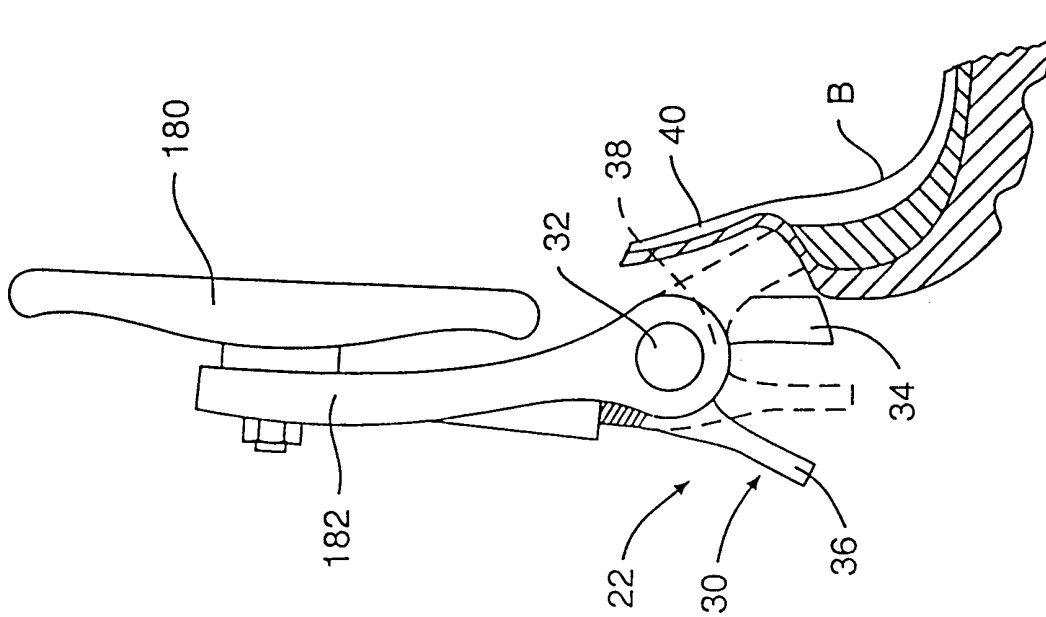


FIG. 8

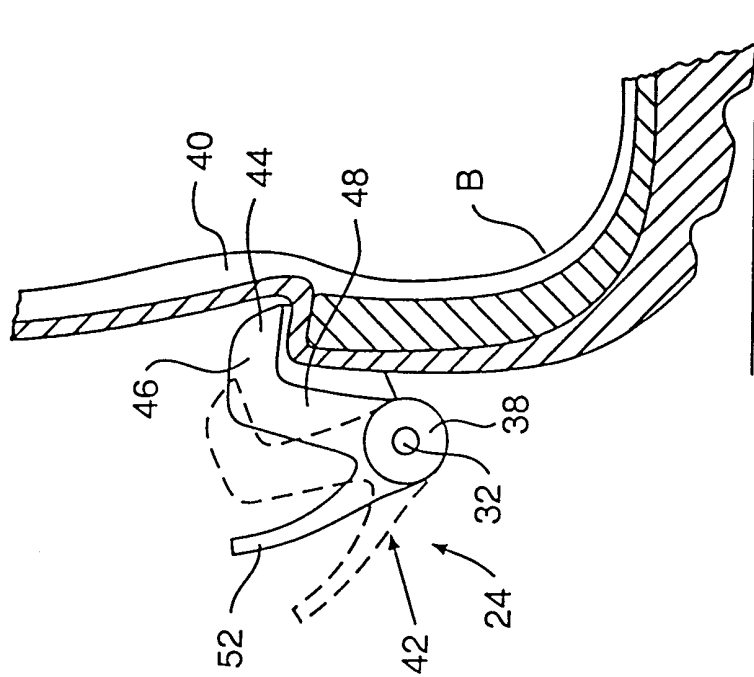


FIG. 9



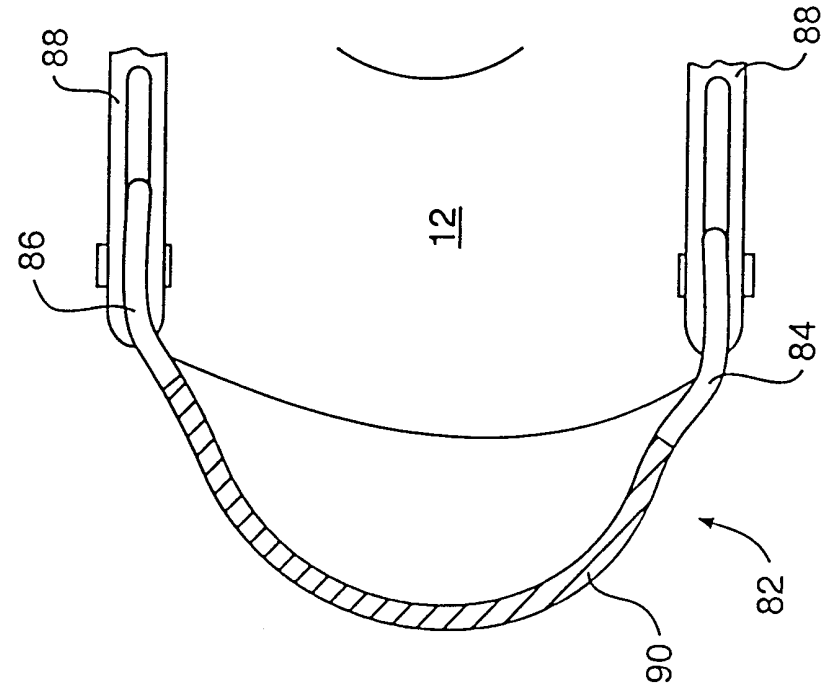


FIG. 12

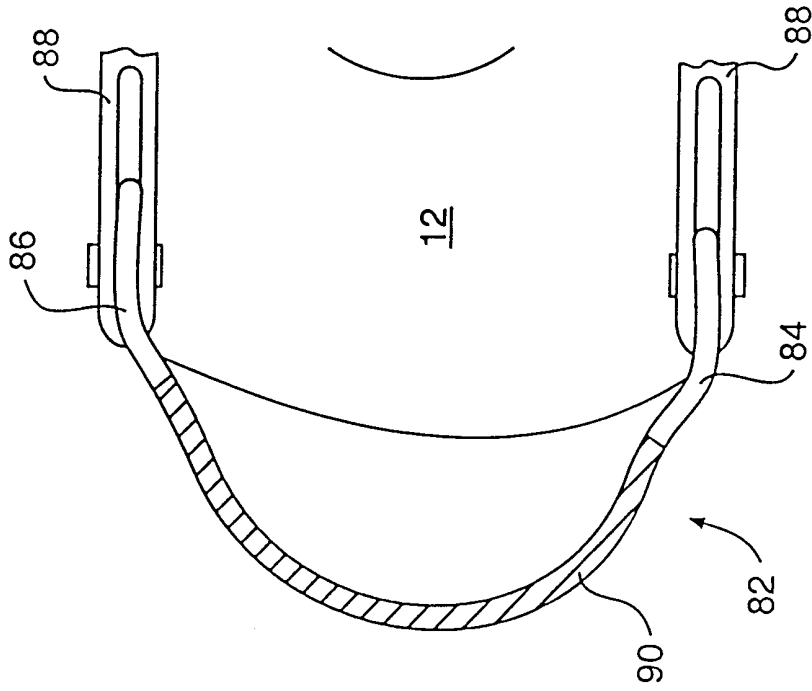
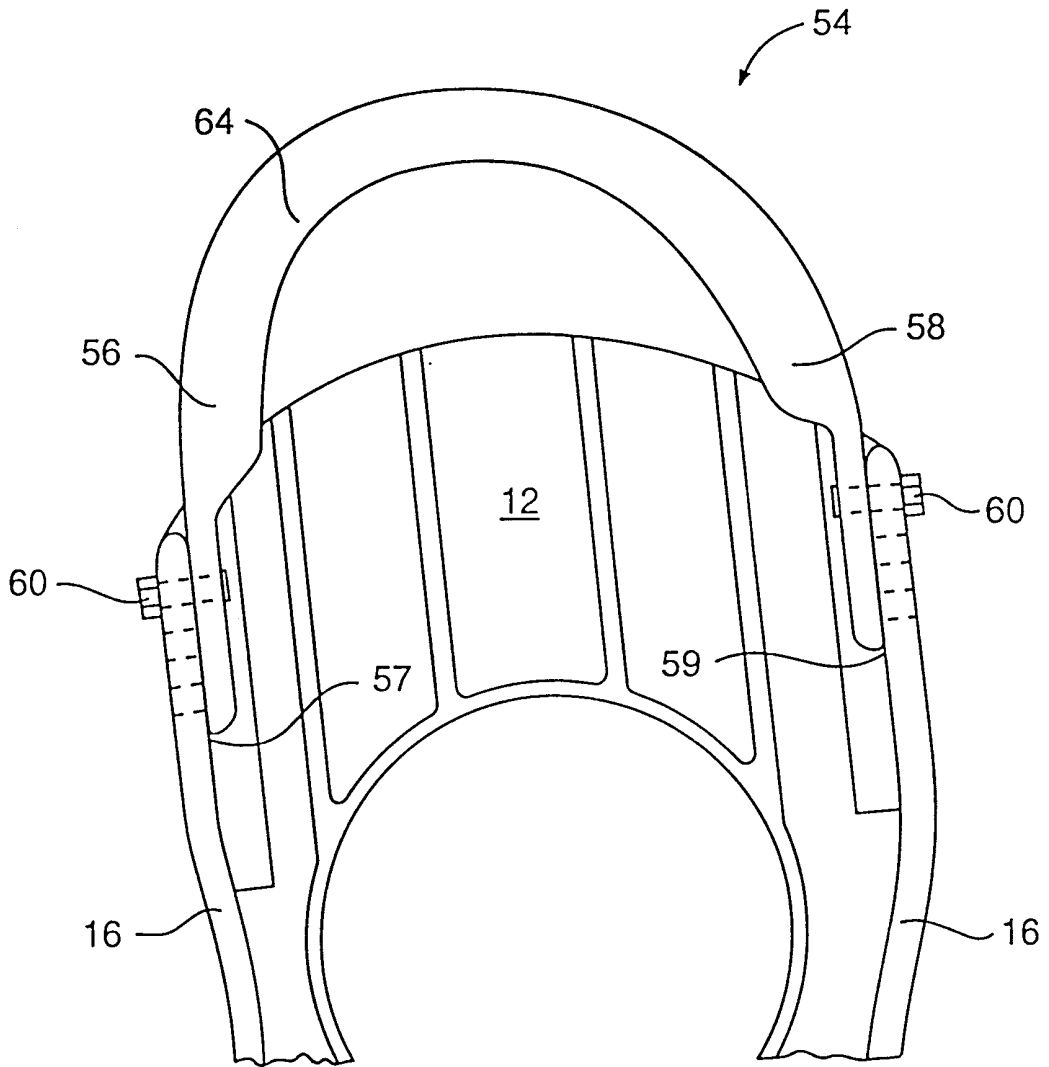
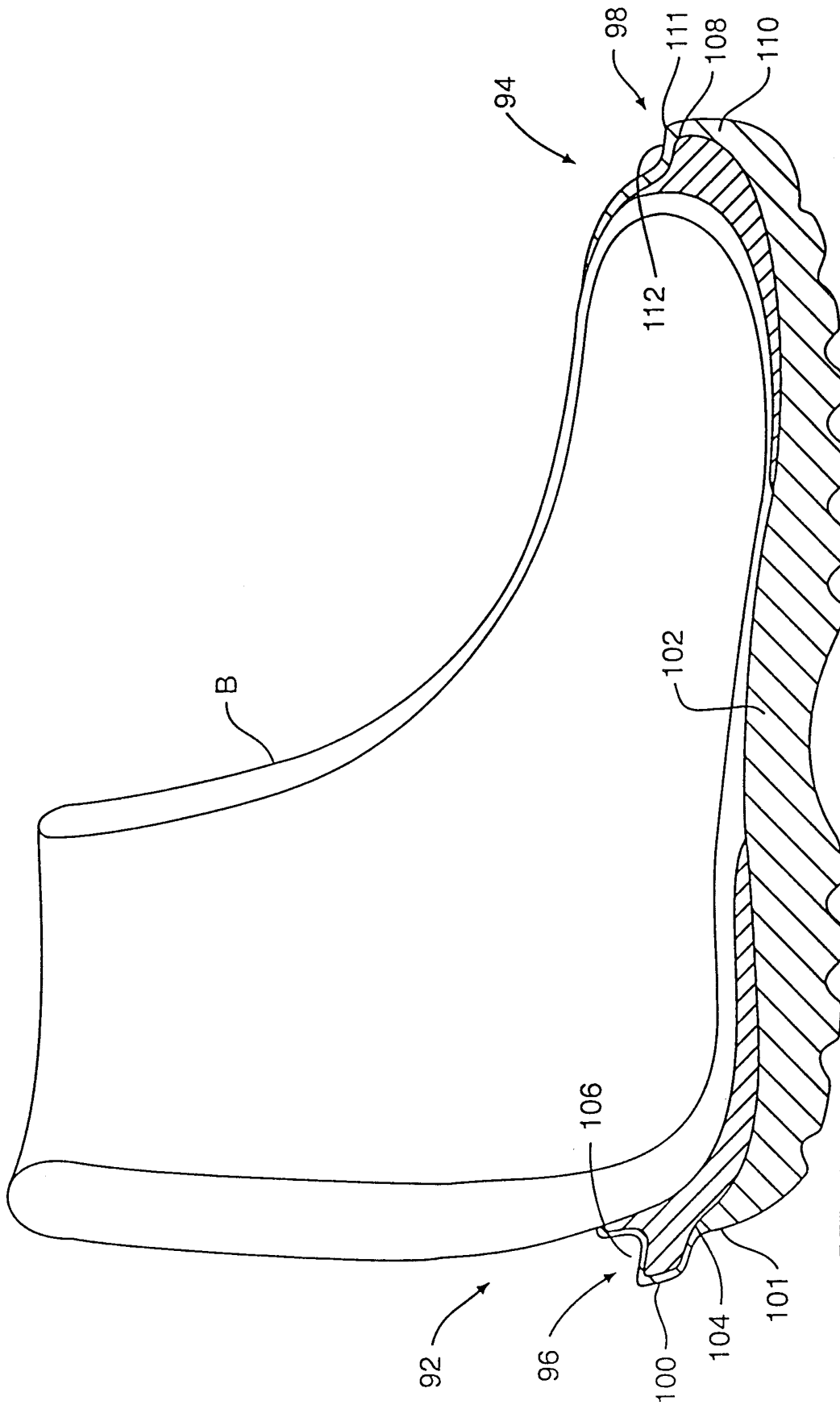


FIG. 13

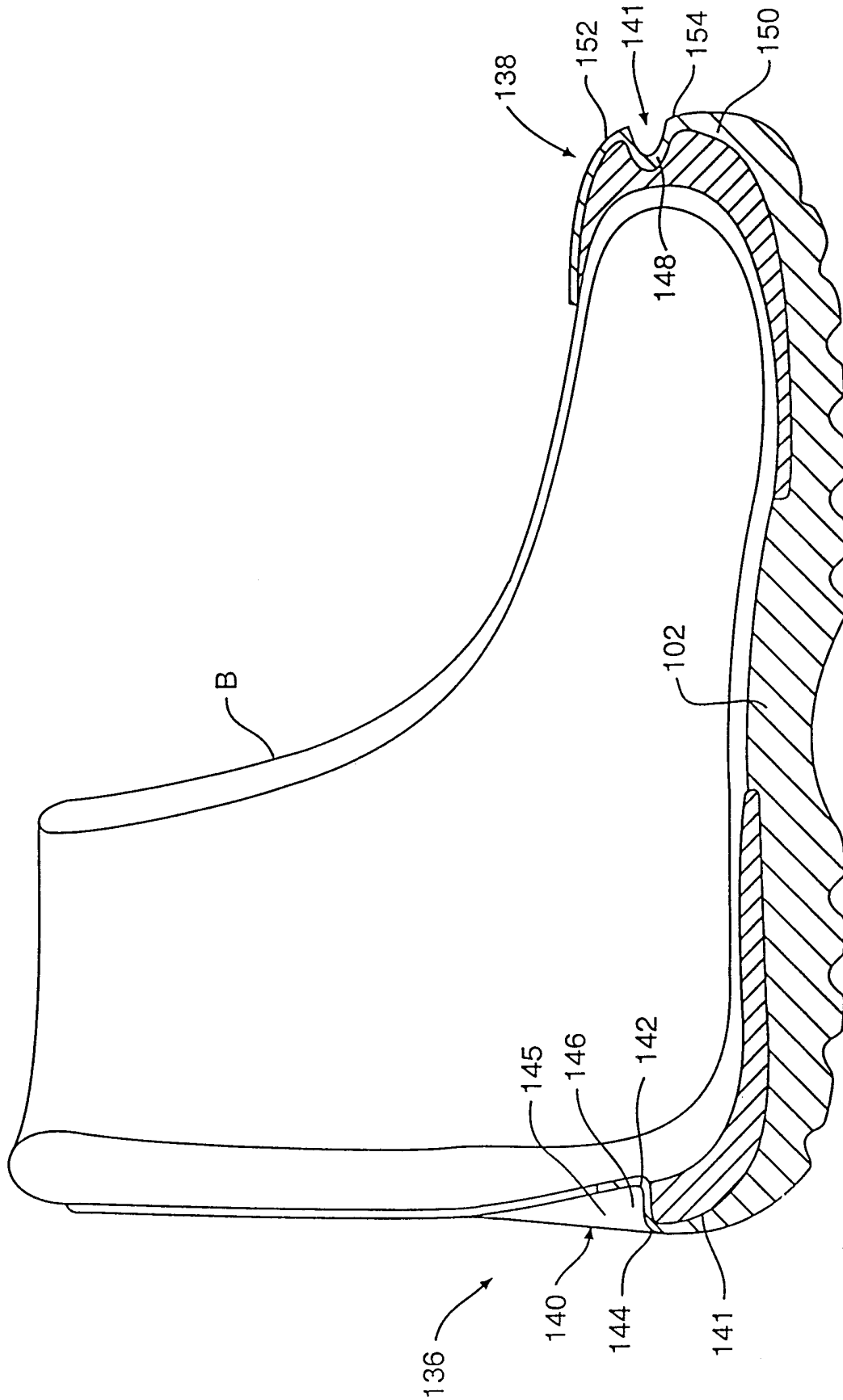


**FIG. 14**



**FIG. 15**





**FIG. 17**

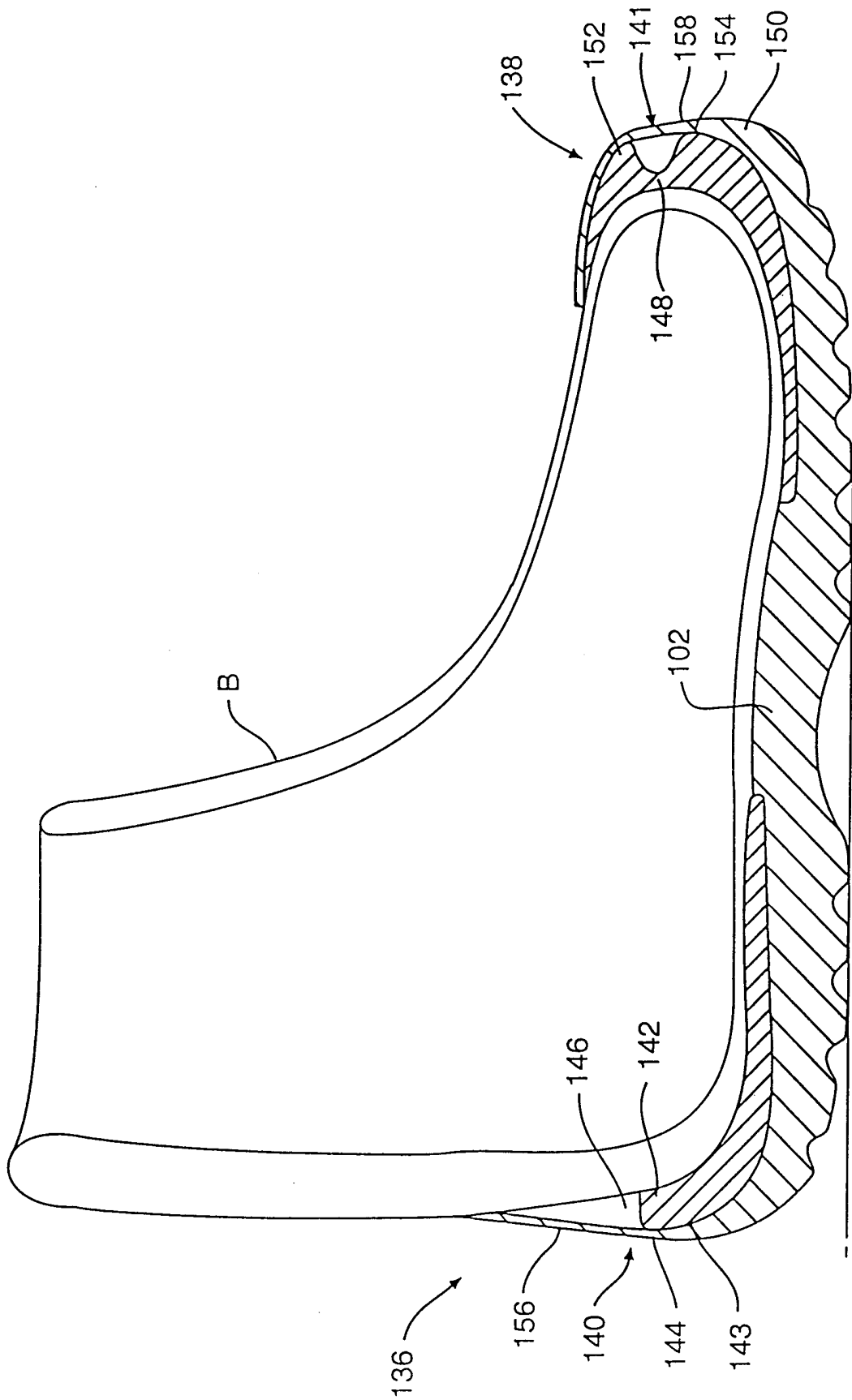


FIG. 18

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/19699

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :A63C 9/084  
US CL :280/618, 626, 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, 618, 625, 626, 14.2

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	US 5,577,756 A (CARON) 26 November 1996 (26.11.96). Note the frame formed by members 70, the U-shaped bail 38 for engaging the toe of the boot, and the pivotally movable locking device 8 for engaging the heel portion of the boot.	1, 2, 7, 9, 11
X	US 5,145,202 A (MILLER) 08 September 1992 (08.09.92). Note the U-shaped bail having rigid legs pivotally connected to the frame and a flexible portion therebetween, and the pivotal latch 24.	1-5, 8, 9, 18
Y		6, 14-17, 19-22

Further documents are listed in the continuation of Box C.  See patent family annex.

* Special categories of cited documents:	*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
*A* document defining the general state of the art which is not considered to be of particular relevance	*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
*E* earlier document published on or after the international filing date	*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
*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)	*G* document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means	
*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 03 JANUARY 1999	Date of mailing of the international search report 03 FEB 1999
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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/19699

## 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 5,660,410 A (ALDEN) 26 August 1997 (26.08.97). Note the pivotal support 36 for preventing rearward bending of the user's leg.	1, 14-17
A	US 4,196,920 A (SALOMON) 08 April 1980 (08.04.80).	
A	US 4,856,808 A (LONGONI) 15 August 1989 (15.08.89).	
A	US 5,044,654 A (MEYER) 03 September 1991 (03.09.91).	
A	US 5,401,041 A (JESPERSEN) 28 March 1995 (28.03.95).	
A	US 5,544,909 A (LAUGHLIN et al.) 13 August 1996 (13.08.96).	
A	US 5,636,455 A (MEISELMAN) 10 June 1997 (10.06.97).	
A	US 5,649,722 A (CHAMPLIN) 22 July 1997 (22.07.97).	