

(86) Date de dépôt PCT/PCT Filing Date: 2004/02/10
(87) Date publication PCT/PCT Publication Date: 2004/08/26
(45) Date de délivrance/Issue Date: 2010/04/27
(85) Entrée phase nationale/National Entry: 2005/08/10
(86) N° demande PCT/PCT Application No.: US 2004/003919
(87) N° publication PCT/PCT Publication No.: 2004/071227
(30) Priorité/Priority: 2003/02/11 (US10/365,725)

(51) Cl.Int./Int.Cl. *A43B 5/04* (2006.01),
A43C 1/00 (2006.01), *A43C 11/16* (2006.01)

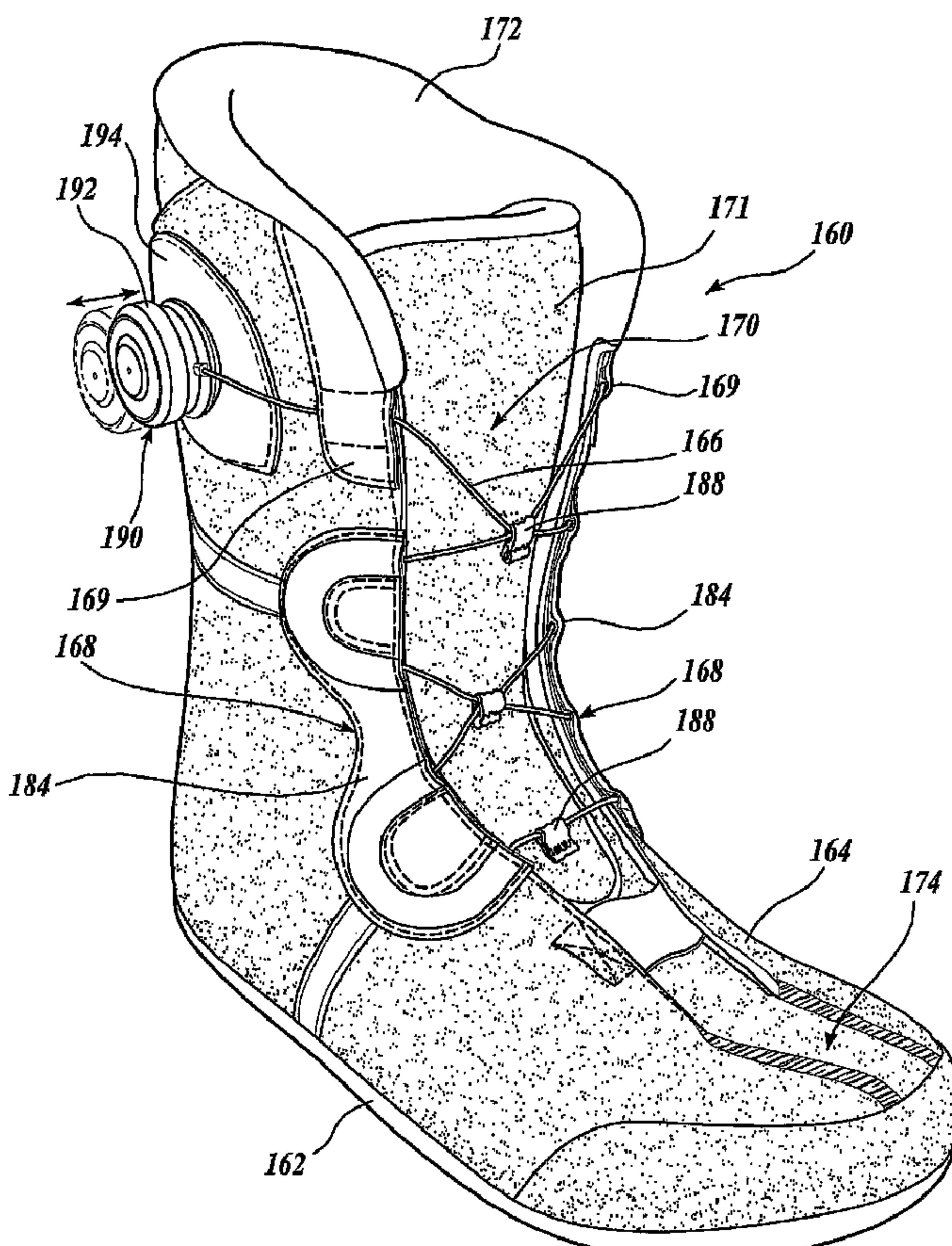
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(54) Titre : BOTTE ET CHAUSSON AVEC MECANISME DE SERRAGE

(54) Title: BOOT AND LINER WITH TIGHTENING MECHANISM



(57) Abrégé/Abstract:

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A boot (100), such as a sports boot, having a removable liner (160) that is adapted to be inserted into an outer shell (110). The liner includes a vamp gap (170) with a plurality of cable keepers (168) disposed on either side of the gap, and a cable (166) that slidably

(57) Abrégé(suite)/Abstract(continued):

engages the cable keepers, for tightening the liner about the user's foot. A tightening mechanism (190) having a knob (192) is attached to the liner and engages the cable, whereby the user can releasably tension the cable. An aperture (126) including a grommet portion (130) in the outer shell is adapted to receive the knob whereby the user can tighten the liner without removing the boot outer shell.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
26 August 2004 (26.08.2004)

PCT

(10) International Publication Number
WO 2004/071227 A1

(51) International Patent Classification⁷: **A43B 5/04**, **A43C 11/16, 1/00**

(21) International Application Number: **PCT/US2004/003919**

(22) International Filing Date: 10 February 2004 (10.02.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 10/365,725 11 February 2003 (11.02.2003) US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier application:
US 10/365,725 (CON)
Filed on 11 February 2003 (11.02.2003)

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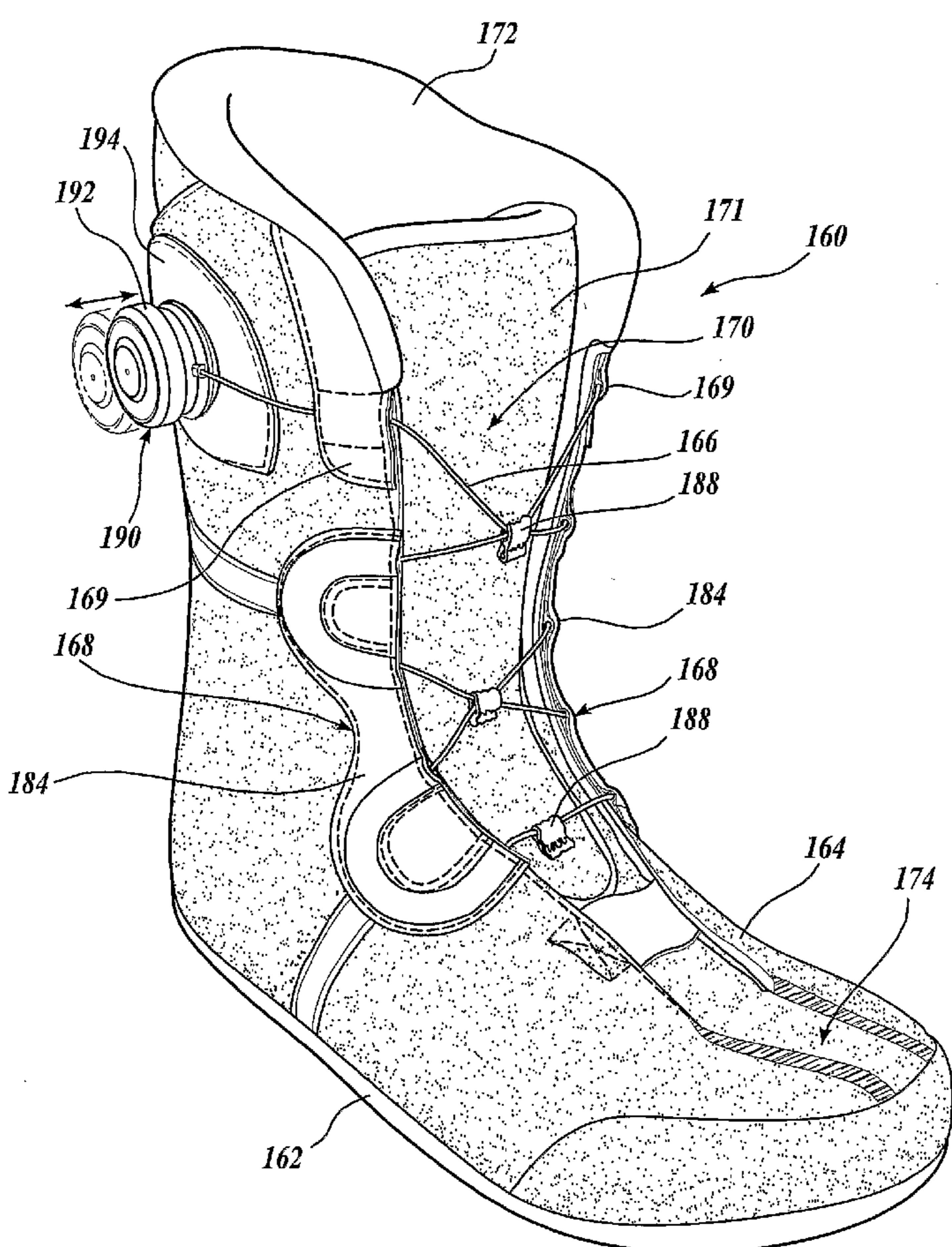
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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,

[Continued on next page]

(54) Title: BOOT AND LINER WITH TIGHTENING MECHANISM



(57) Abstract: A boot (100), such as a sports boot, having a removable liner (160) that is adapted to be inserted into an outer shell (110). The liner includes a vamp gap (170) with a plurality of cable keepers (168) disposed on either side of the gap, and a cable (166) that slidably engages the cable keepers, for tightening the liner about the user's foot. A tightening mechanism (190) having a knob (192) is attached to the liner and engages the cable, whereby the user can releasably tension the cable. An aperture (126) including a grommet portion (130) in the outer shell is adapted to receive the knob whereby the user can tighten the liner without removing the boot outer shell.

WO 2004/071227 A1

WO 2004/071227 A1



PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*

BOOT AND LINER WITH TIGHTENING MECHANISM

FIELD OF THE INVENTION

The present invention relates generally to boots and boot liners and, more 5 specifically, to a boot liner that can be tightened about a user's foot.

BACKGROUND OF THE INVENTION

Many boots, and particularly boots for sporting applications such as skiing, snowboarding, skating, hiking and the like, are intended to be worn with a boot liner that fits inside the boot between the boot and the user's foot. The liner may be removable 10 from the boot or permanently attached to the boot. The liner provides many benefits--for example a liner conforms to the shape of the user's foot, providing a more exact fit between the user and the boot. The liner also helps to keep the user's foot warm, provides padding to the user, absorbs accumulated perspiration and other moisture, and provides a comfortable, snug fit between the user's foot and ankle, and the boot. Removable liners 15 have the advantage of being easily cleaned and replaced, as needed. Frequently, liners are provided with a relatively stiff and durable sole portion to protect the liner from excessive wear.

Prior art boot liners may be simply sock-type liners wherein the liner is generally 20 L-shaped and tubular with sufficient stretchability and flexibility to receive the user's foot. These types of liners can be difficult for the user to put on and take off. Often a longitudinal vamp comprising a slit and tongue is provided in the liner to facilitate putting on the liner and boot. Conventional liners generally rely on the boot fastening system, e.g., laces and buckles, to provide a comfortably tight fit between the liner and the user. The boot fastening system may not be adequate for achieving the desired fit for the liner, 25 however, because the boot is generally of a much stiffer construction than the liner.

Addressing this need, some prior art boot liners have a conventional vamp portion and separate tightening systems, such as laces or straps. Such laces or straps permit the liner to be fastened about the foot and ankle of the user at a selective tightness. This enables the user to achieve a more comfortable fit. Additionally, this vamp-type 30 construction permits a greater range of options for the material that is used for the liner, since the liner does not have to be as stretchable as a sock-type liner. This greater choice in materials permits the designer greater options in selecting materials that are more suitable to meet the various functions of the liner described above. Such prior art liners,

however, have the disadvantage that the user must lace up two sets of footwear, and the user typically cannot adjust the tightness of the liner without first unlacing and/or removing the outer shell to reach the liner lacing. Therefore, if the user determines the liner is too tight or too loose during use of the sports boot—for example, if the liner 5 loosens during use—it may be inconvenient or impractical for the user to adjust the tightness of the liner. This can be especially problematic in snow sports such as skiing and snowboarding, where environmental conditions make it difficult for the user to remove his or her sports boots *in situ*. The user may also have to remove or loosen snow-gaiters to remove the boot shell, further exacerbating the inconvenience. In fact, with 10 prior art liner tightening systems it is common for the snowboarder to make one or two runs down a slope, and then have to remove the boot shell to retighten the liner, then put the boot shell back on before making another run. This procedure is inconvenient, and reduces the amount of time the user has to actually snowboard over any given day.

Lacing systems for boot shells are known that utilize a cord such as a lace that is 15 slidably disposed in lace guides such that the lace criss-crosses the boot vamp, and a tightening mechanism having a spool attached to the boot, whereby the tightening mechanism can be easily accessed to tension the lace. For example U.S. Patent No. 5,934,599 to Hammerslag, discloses such a lacing system wherein the tightening mechanism is externally disposed on the back of 20 the boot upper. Such systems, however, require a suitable external surface for mounting the tightening mechanism.

There remains a need, therefore, for a boot liner that incorporates a separate tightening system and wherein the liner can be tightened without loosening or removing the associated boot, or without lifting or loosening the snow-gaiter or the pants and 25 exposing the boot to the environment.

SUMMARY OF THE INVENTION

A sports boot having an outer shell and an inner liner, wherein the inner liner includes a fastener for tightening the liner about the foot and ankle of the user independently of the outer shell. The outer shell includes a relatively rugged sole and an 30 upper that is attached to the sole, the upper having an aperture therethrough. The liner is held in the outer shell. A plurality of cord keepers is attached to the liner, and a fastener is slidably retained by the cord keepers. A tightening mechanism is attached to the liner, engaging the fastener such that the cord can be tensioned to tighten the liner about the

user's foot. The tightening device is positioned and sized to extend, at least in part, through the aperture in the outer shell, whereby the user can access the tightening mechanism to adjust the cord tension without removing the outer shell.

In an aspect of the present invention, the tightening mechanism can be moved 5 between a first position, wherein the tightening mechanism drivably engages the cord, and a second position, wherein the tightening mechanism does not drivably engage the cord.

In an embodiment of the invention, the outer shell aperture includes a flexible grommet through which at least of portion of the tensioning mechanism extends.

10 In an embodiment of the invention, the cord is a stainless steel cable.

In an embodiment of the invention, the cord keepers include U-shaped channels for the cord, the U-shaped channels having a relatively large minimum radius.

15 In an embodiment of the invention, a supplemental cord keeper is attached to the liner, the supplemental cord keeper providing a channel for the cord that is disposed generally about the backside of the liner.

BRIEF 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 20 drawings, wherein:

FIGURE 1 shows a perspective view of a boot including a shell and liner, showing a particular embodiment of the present invention;

FIGURE 2 shows a perspective view of the boot and liner shown in FIGURE 1, wherein the liner is positioned for insertion into the boot shell;

25 FIGURE 3 shows an isolated perspective view of the liner shown in FIGURE 1;

FIGURE 4A shows the lacing system for the liner shown in FIGURE 3, with the liner shown in phantom;

FIGURE 4B shows a cross section of the liner cord keeper tubular member, for the liner shown in FIGURE 3; and

30 FIGURE 5 shows a fragmentary view of the outer shell aperture assembly for the liner tightening mechanism of the boot shown in FIGURE 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the figures, wherein like parts are indicated with like numbers, FIGURES 1 and 2 show a sports boot 100 that exemplifies the present invention. The sports boot 100 has an outer shell 110 and a removable liner 160. It will be appreciated 5 that although a removable liner is described herein, the invention is not intended to be limited to removable liner embodiments. The outer shell 110 of the sports boot 100 includes a rugged sole 112, and a relatively flexible upper 114 attached to the sole 112. The attachment of the upper 114 to the sole 112 may be accomplished in any number of ways as are well-known in the art, including, for example, by bonding, sewing, 10 attachment hardware, or co-forming. It will be appreciated that the selection of such attachment options may depend on the particular application that the sports boot is designed to accommodate, such as skating, skiing, snowboarding, hiking, and the like.

The upper 114 includes an elongate gap 120 that extends from a top end 122 of the upper 114, through a substantial portion of the length of the upper 114 towards the toe 15 end 124. A tongue 121 is attached near the base of the elongate gap 120 and disposed generally along the elongate gap 120. In the disclosed embodiment, the upper 114 is intended to be tightenable about a received user's foot (not shown), using a cord 116, such as a cable or lace, that is slidably disposed within a plurality of opposed cord keepers 118, 119. Although cord keepers made as fabric loops 118 and metal hooks 119 are shown in 20 the disclosed embodiment, it will be appreciated that any number of different cord keepers might also be selected. Some floating cord keepers may also be provided. As used in this application, "cord" refers to any elongate, flexible lace, cable, strip, or the like, that is used as a tensioning element for the sports boot, and may be made from any suitable material, including leather, metal such as stainless steel, cloth, plastic, *etc.* In the 25 preferred embodiment, the cord 116 is a conventional fabric lace. It will be appreciated that alternate or additional securing mechanisms may be used for tightening the outer shell 110 including, for example, straps and buckles, hook-and-hoop type fasteners, an external cable system, and the like.

An aperture assembly 126 is provided near the top end 122 of the upper 114, with 30 an elastic grommet 130 attached thereto. The purpose and exemplary structure for the aperture assembly 126 and grommet 130 is discussed below.

As seen most clearly in FIGURE 2, the liner 160 is adapted to be removably inserted into the outer shell 110. In the disclosed embodiment the liner 160 includes a

flexible and relatively rugged sole 162, and a relatively soft and flexible upper 164. The sole 162 may be made of any suitable material, including, for example, a polymer such as an ethylene-vinyl acetate copolymer or similar polymer. It may be desirable to texture the bottom of the sole 162, for example, by providing a plurality of nibs (not shown) or other short projections, to discourage relative sliding between the liner sole 162 and boot shell 110 during use. The padded upper 164 may be attached to the sole 162 in any conventional manner, including, for example, by stitching, bonding, or co-forming.

The padded upper 164 is intended to provide a snug fit, comfort, protection, moisture dispersal, and shock absorption for the user, and therefore suitable flexible materials as are well-known in the art may be used to construct the upper 164, including, for example, natural and man-made fibers, leather, padding materials, and combinations thereof. It will be appreciated that the upper 164 may be a composite structure having several layers, and that the various layers may be selected to provide different functions. For example, a soft inner layer may be used for comfort, while a relatively stiff outer layer may be used to provide support and durability. Partial layers, such as leather or polymeric strips, may be attached to provide strength and/or support in desired locations. The liner upper 164 includes an elongate gap 170 extending from near the top end 172 of the liner 160 down towards the toe end 174. A tongue 171 is provided that extends generally along the length of the elongate gap 170.

Referring now to FIGURES 3 and 4, which show details of the liner 160, a plurality of opposed cord keepers 168 is attached to the liner 160 on opposite sides of the elongate gap 170. The presently preferred cord keepers 168 may include a low-friction plastic tubular member 180 (See FIGURES 4A and 4B) having a transverse flange 182, and defining a generally U-shaped channel 185 adapted to slidably receive a cord 166. The tubular members 180 are attached to the liner 160, preferably with a leather panel 184 stitched over the tubular member 180, although it will be apparent that any suitable attachment systems may alternatively be used. It will be appreciated that the cord keepers 168 and in particular the tubular members 180, define generally U-shaped channels 185 (FIGURE 4B) having a relatively large minimum radius on the "U" portion.

A cord 166 slidably engages the cord keepers 168, criss-crossing the elongate gap 170. In the disclosed embodiment, the cord 166 is a stainless steel cable having a low coefficient of friction with respect to the tubular members 180, whereby the cord 166 will slide relatively freely in the cord keepers 168. It should be appreciated, however,

that the cord may be made from any suitably strong and flexible materials, including other metal cables, composite materials, fabrics and the like. The relatively large minimum radius defined by the U-shaped channels 185 in the cord keepers 168 also help to reduce frictional binding of the cord 166 in the channel 185. In the disclosed 5 embodiment, a two-piece supplemental cord keeper 169 is provided that extends generally around the upper back portion of the upper 164. The two-piece supplemental cord keeper 169 is similar in construction to the cord keepers 168 previously described, including a flanged tubular member 189. The supplemental cord keeper 169 provides a low-friction channel for the cord 166 to wrap behind the liner 160. In the disclosed 10 embodiment, a plurality of fabric loops 188 is attached to the tongue 171 generally along its longitudinal centerline. The criss-crossing cord 166 engages the loops 188, thereby holding the tongue 171 in the desired position.

FIGURE 4B shows an end view of the tubular member 180, showing the flanges 182. It will be appreciated that the flanges provide a relatively broad flat surface 15 for attachment of the tubular members 180 to the liner 160. The flanges 182 preferably extend across the tubular member 180, as shown, to maintain the desired orientation of the legs of the U-shaped channels 185.

A tightening mechanism 190 is attached to the liner 160, preferably near the top end 172 of the upper 164. The tightening mechanism 190 is preferably a gear-driven 20 spool mechanism as is known in the art—for example, the spool mechanism disclosed in U.S. Patent No. 5,934,599. The

tightening mechanism 190 includes a rotatable knob 192 that projects generally away from the liner 160. As indicated by the broken lines and arrows in FIGURE 3, the knob 192 can be moved between an inwardly-disposed first position wherein the 25 knob 192 drivably engages the tightening mechanism 190, and an outwardly-disposed second position wherein the tightening mechanism 190 is not engaged. The tightening mechanism 190 includes an internal spool (not shown) that is functionally attached to both ends of the cord 166, whereby rotation of the spool will cause the cord 166 to wind around (or unwind from) the spool.

30 When the knob 192 is in the first position to drivably engage the tightening mechanism 190, rotating the knob 192 will cause the spool to rotate, thereby enabling the user to selectively apply a tension to the cord 166. An integral locking mechanism, as is well known in the art, restricts the spool to rotating in one direction only when the

5 knob 192 is in the first position. It will now be appreciated that the user can achieve the desired tightening of the liner 160 by placing the knob in the first position and rotating the knob 192 until the desired tightness is achieved. The low frictional resistance between the cord 166 and the cord keepers 168, 169 help to ensure that the tension in the cord 166 is relatively uniform along the length of the cord 166. The user may pull the knob 192 outwardly to the second position to release the tension on the cord 166

10 The tightening mechanism 190 may be attached to the outer surface of the liner 160, for example, by stitching a panel, such as a leather panel 194 (See FIGURE 3), over a flange (not shown) on the tightening mechanism 190. Other suitable attachment mechanisms may alternatively be used such as those delineated above, and are contemplated by the present invention. It will be appreciated that the tightening mechanism 190 is preferably relatively thin, and is attached to the liner 160 in a manner that precludes causing discomfort to the user, *e.g.*, outside the padded portion of the liner 160.

15 Referring again to FIGURES 1 and 2, the boot shell 110 is provided with an aperture assembly 126, including an elastic grommet 130, that is positioned to removably receive the tightening mechanism 190 when the liner 160 is properly inserted into the boot shell 110. The boot shell 110 is sufficiently flexible to permit the liner 160, including the tightening mechanism 190, to be inserted into the boot shell 110 when the 20 outer shell lace 116 is untightened. It will be apparent that, although the aperture assembly 126 of the disclosed embodiment incorporates a closed aperture and grommet assembly, other configurations are possible and contemplated by the present invention. For example, the aperture may be open at the top, forming a slot in the boot shell that 25 slidably accommodates the tightening mechanism 190. Similarly, a closable aperture, such as a slot having a strap, or some other fastening mechanism that is releasably engageable to close the open top of the aperture may be provided. The term "aperture" as used herein is intended to encompass such alternate constructions.

30 FIGURE 5 shows a fragmentary view of the boot shell 110 and liner 160, showing the aperture assembly 126, including the grommet 130 of the exemplary embodiment. In the preferred embodiment, the aperture assembly 126 comprises an annular leather outer panel 132 disposed on the outer surface of the shell 110 over an aperture in the shell 110, and an annular elastic inner panel 134 disposed on the inner surface of the shell 110, concentrically disposed with respect to the outer panel 132. The inner and outer annular

panels 132, 134 are preferably stitched to the boot shell 110. The elastic inner panel 134 may be made of any suitably elastic material such as a thermo-plastic rubber, and has a smaller inner radius than the outer panel 132, such that a portion of the inner panel 134 extends inwardly further than the outer panel 132, forming the grommet 130. The 5 grommet 130 is adapted to receive the knob 192 of the tightening mechanism 190 by flexing sufficiently to permit the tightening mechanism to pass through the inner aperture of the inner panel 134. This structure provides a relatively tight, weather resistant seal between the tightening mechanism 190 and the boot shell 110.

It will be obvious to one of ordinary skill in the art that other similar structures 10 may be utilized to permit the tightening mechanism 190 to be accessible externally from the shell 110. For example, a slot may be provided on the shell 110 to receive the tightening mechanism, or a fastenable strap, such as a hoops and hooks-type strap, may be provided to open an aperture for the tightening mechanism. Other equivalent structures will be readily apparent, and are contemplated by the present invention. 15 Similarly, the aperture may be located in a different location on the shell 110 (with a compatible change to the liner 110) without departing from the present invention.

It will also be apparent to one of skill in the art that although the disclosed embodiment tightens the liner generally along the entire length of the vamp portion of the liner, the invention could also be applied to a heel harness, i.e. to tightening only about 20 the user's heel area in order to reduce heel lift, which is a common problem associated with snowboarding.

It should now be appreciated that the disclosed boot 100 includes an externally accessible tightening mechanism 190 for the tightening apparatus of the inner liner 160. This system permits the user to tighten or loosen the fit of the liner 160 about the user's 25 foot without removing or loosening the outer shell 110. In the disclosed embodiment the tightening mechanism is conveniently disposed near the top of the boot 100, on the lateral or outer side of the user, for easy access. Moreover, the liner may be easily removed from the outer shell 110 for easy cleaning, drying, maintenance, or replacement, if desired.

30 While the preferred embodiment of the invention has 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 sports boot adapted to receive a user's foot, the sports boot comprising:
an outer shell having a sole and an upper attached to the sole, the upper having an aperture therethrough;
a liner disposed within the outer shell;
an adjustable fastener secured to the liner such that adjusting the fastener will cause a portion of the liner to tighten or loosen about a received user's foot; and
a tightening mechanism attached to the liner, the tightening mechanism engaging the fastener to hold the fastener in a desired adjustment;
wherein the tensioning mechanism is positioned to extend through the aperture in the upper when the liner is held within the outer shell.
2. The sports boot of Claim 1 wherein the liner is removably insertable into the outer shell.
3. The sports boot of Claim 1, wherein the fastener is a cord.
4. The sports boot of Claim 3, wherein the cord is a stainless steel cable.
5. The sports boot of Claim 3, wherein the liner further comprises an elongate vamp gap extending from a top of the upper, and a pair of cord keepers attached to the liner on opposite sides of the elongate vamp gap, wherein the cord keepers each define a U-shaped channel for receiving the cord.
6. The sports boot of Claim 5, further comprising an elongate cord keeper that extends around a back portion of the liner.
7. The sports boot of Claim 3, wherein the tightening mechanism comprises a knob that is movable between a first position wherein the knob drivingly engages the cord, and a second position wherein the knob does not drivably engage the cord.
8. The sports boot of Claim 1, further comprising an elastic grommet disposed in the outer shell aperture, the grommet having a center hole adapted to releasably receive a portion of the tightening mechanism.

9. The sports boot of Claim 8, wherein the grommet is made from a thermoplastic rubber.

10. The sports boot of Claim 3, further comprising an aperture assembly, the aperture assembly including an annular outer panel attached to an outer surface of the outer shell and an elastic annular inner panel attached to an inner surface of the outer shell.

11. The sports boot of Claim 3, further comprising a second cord keeper attached to the tongue, the second cord keeper adapted to slidably receive the cord.

12. A boot assembly comprising:

a liner having a flexible upper portion and a hard sole portion, the flexible upper portion including an elongate gap;

an elongate cord having first and second ends;

a pair of cord keepers attached to the liner, the cord keepers disposed on opposite sides of the elongate gap, wherein each cord keeper defines a channel that is adapted to slidably receive the elongate cord;

a tightening mechanism attached to the liner, the tightening mechanism adapted to engage the cord and wherein the tightening mechanism includes a knob; and

an outer shell sized to receive the liner, the shell having an upper ankle portion, the upper ankle portion having an aperture adapted to receive at least a portion of the tightening mechanism such that the knob of the tightening mechanism extends through the aperture when the liner is disposed in the outer shell.

13. The boot assembly of Claim 12, wherein the cord is a stainless steel cable.

14. The boot assembly of Claim 12, wherein the tightening mechanism knob has a maximum diameter and, further, wherein the aperture in the outer shell includes an annular, flexible inner panel having a hole diameter that is approximately equal to the knob maximum diameter.

15. The boot assembly of Claim 12, wherein the channels defined by the cord keepers are U-shaped.

16. The boot assembly of Claim 12, further comprising a second elongate cord keeper attached to the liner, the second cord keeper extending around a back portion of the liner.

17. A sports boot comprising:

- a liner having an upper and a sole, the upper including an elongate gap;
- an elongate cable having first and second ends;
- a pair of keepers attached to the liner, the keepers disposed on opposite sides of the elongate gap, wherein each keeper includes a flange portion and a U-shaped channel portion, the U-shaped channel portion being adapted to slidably receive the elongate cable;
- a cable tightening mechanism attached to the liner, the cable tightening mechanism having a rotatable member that receives the first and second ends of the cable, and a knob adapted to drivably engage the rotatable member; and
- an outer shell adapted to receive the liner, the shell having an upper ankle portion with an aperture that is adapted to receive the cable tightening mechanism when the liner is disposed in the outer shell; and

wherein the knob of the cable tightening mechanism extends through the aperture when the liner is disposed in the outer shell.

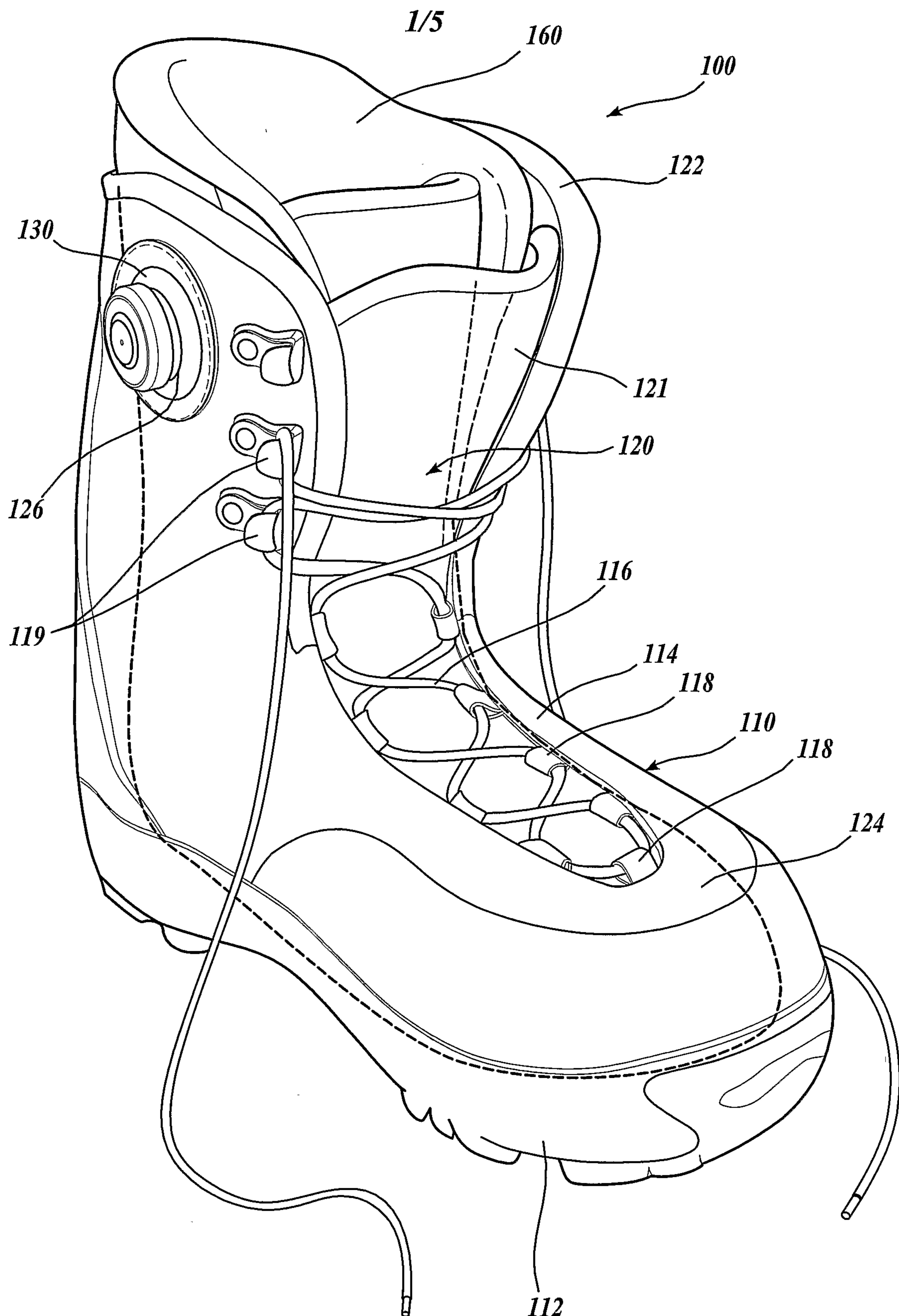
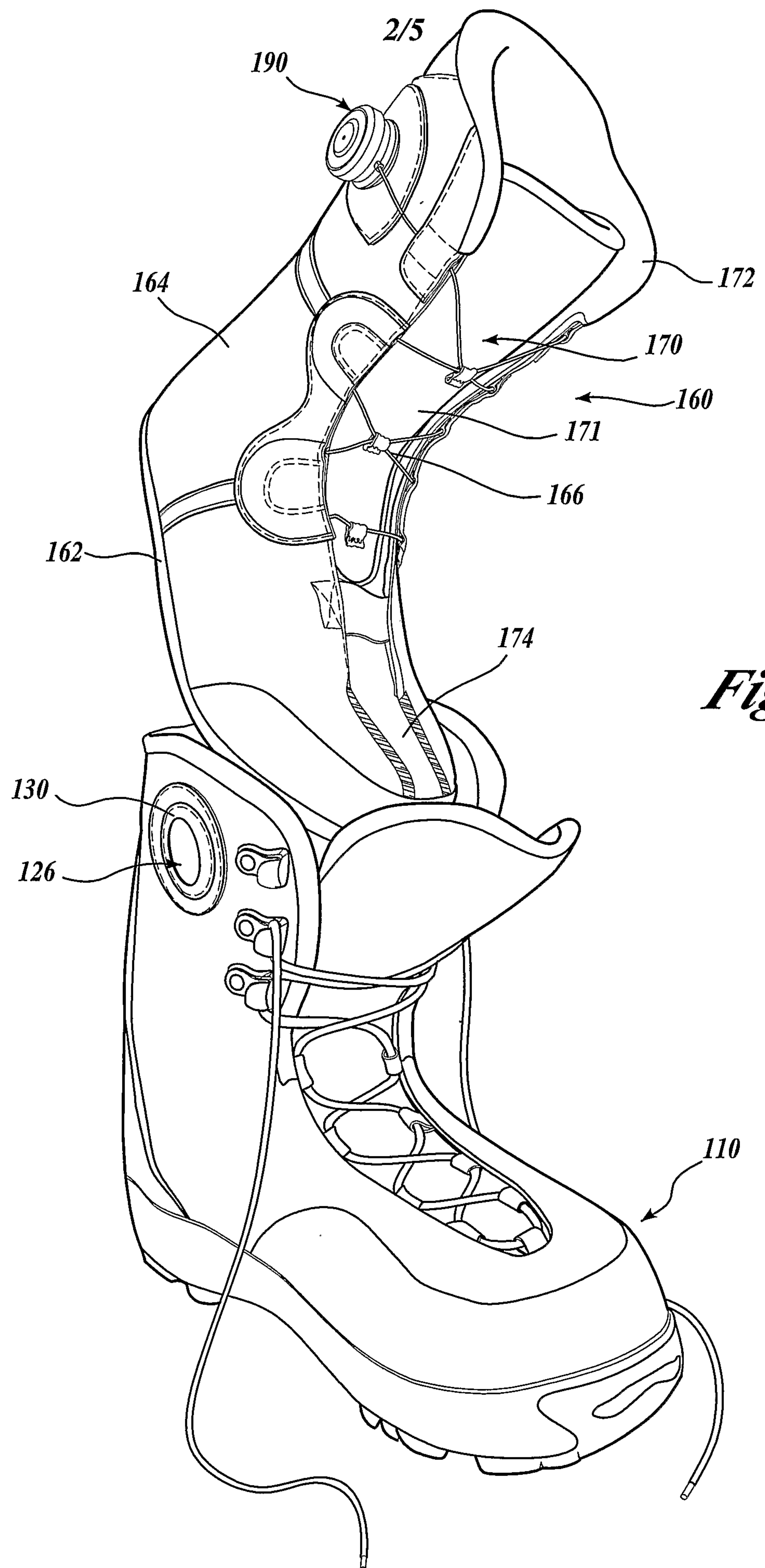
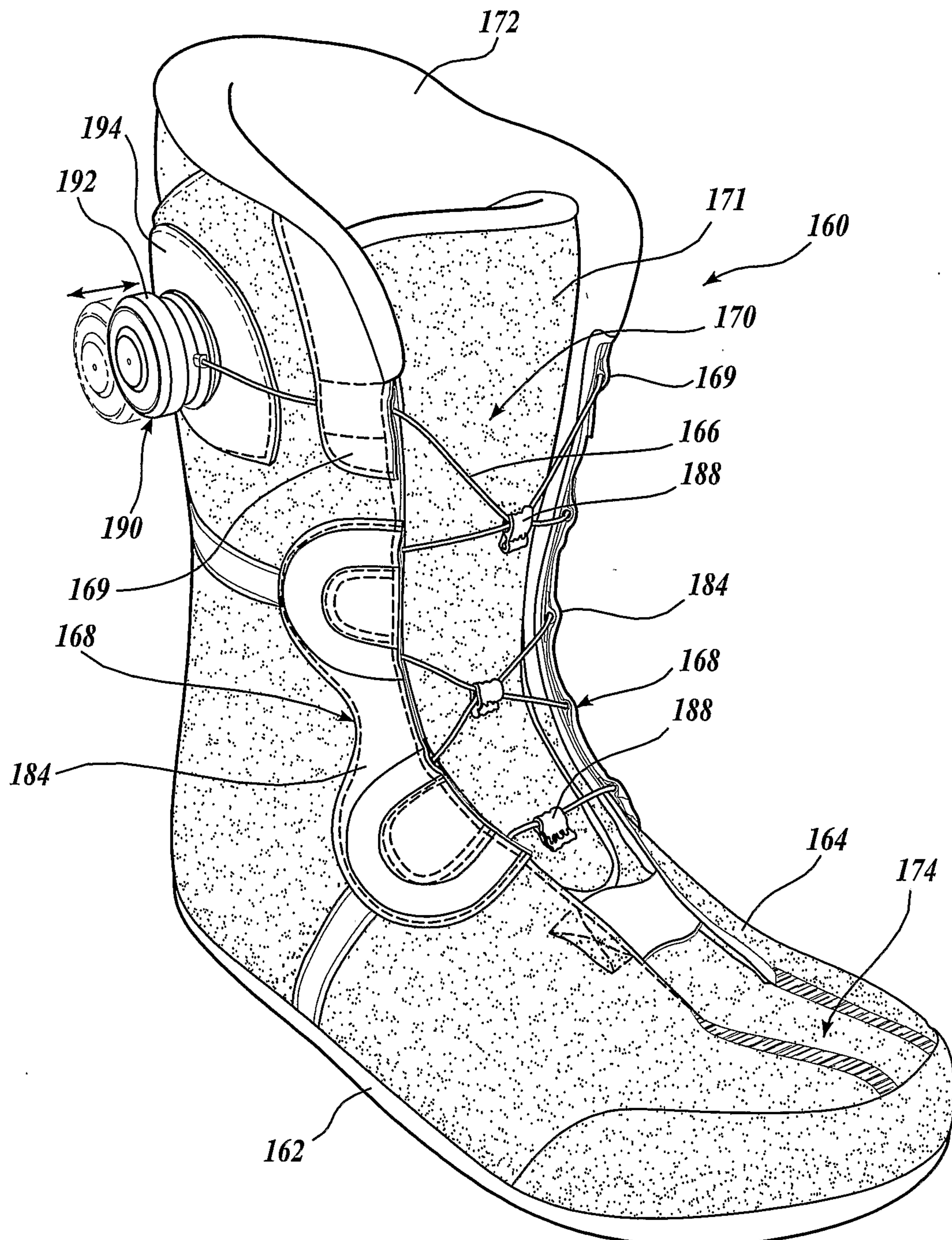


Fig.1.



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*Fig. 3.*

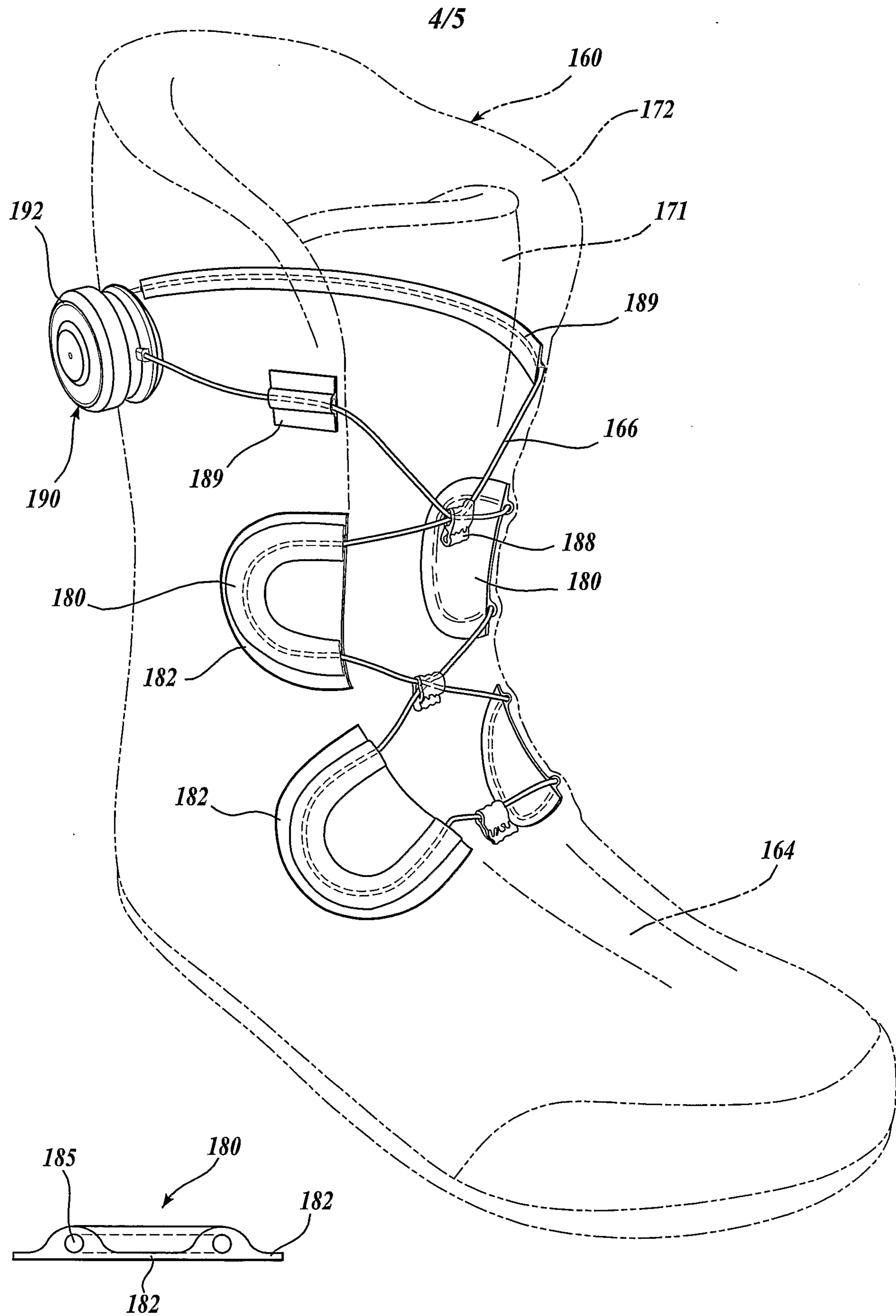
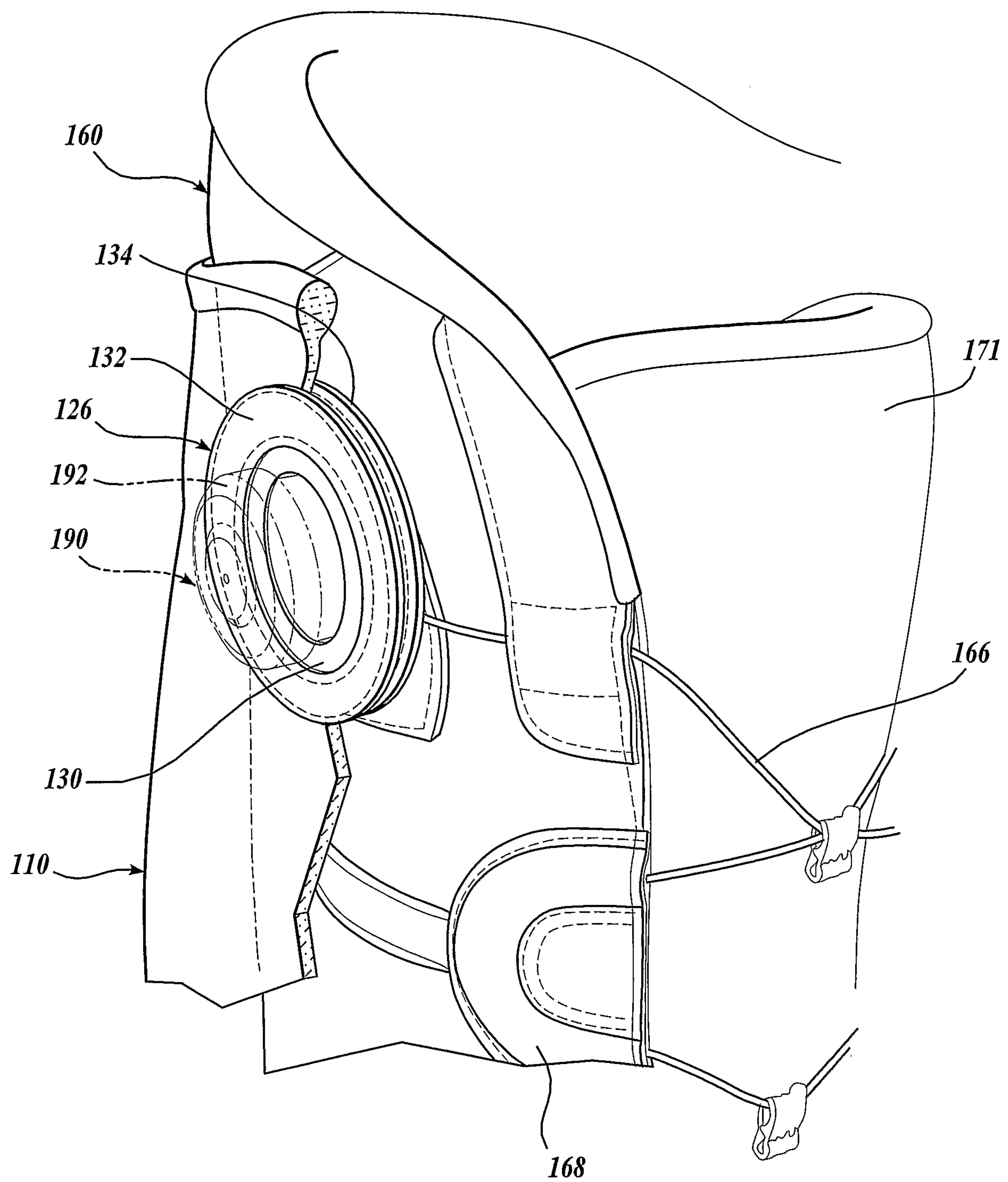


Fig. 4B.

Fig. 4A.

5/5

*Fig. 5.*

