



US 20150096202A1

(19) **United States**(12) **Patent Application Publication**
Hahnenberger et al.(10) **Pub. No.: US 2015/0096202 A1**(43) **Pub. Date: Apr. 9, 2015**(54) **SPORTS BOOT WITH ARTICULATING LACE GUIDE***A43C 11/20* (2006.01)*A43B 5/00* (2006.01)(71) Applicant: **K-2 Corporation**, Seattle, WA (US)(52) **U.S. Cl.**CPC . *A43C 11/12* (2013.01); *A43B 5/00* (2013.01);*A43B 23/02* (2013.01); *A43C 11/20* (2013.01)(72) Inventors: **Treu M. Hahnenberger**, Seattle, WA (US); **William B. Hall**, Seattle, WA (US)

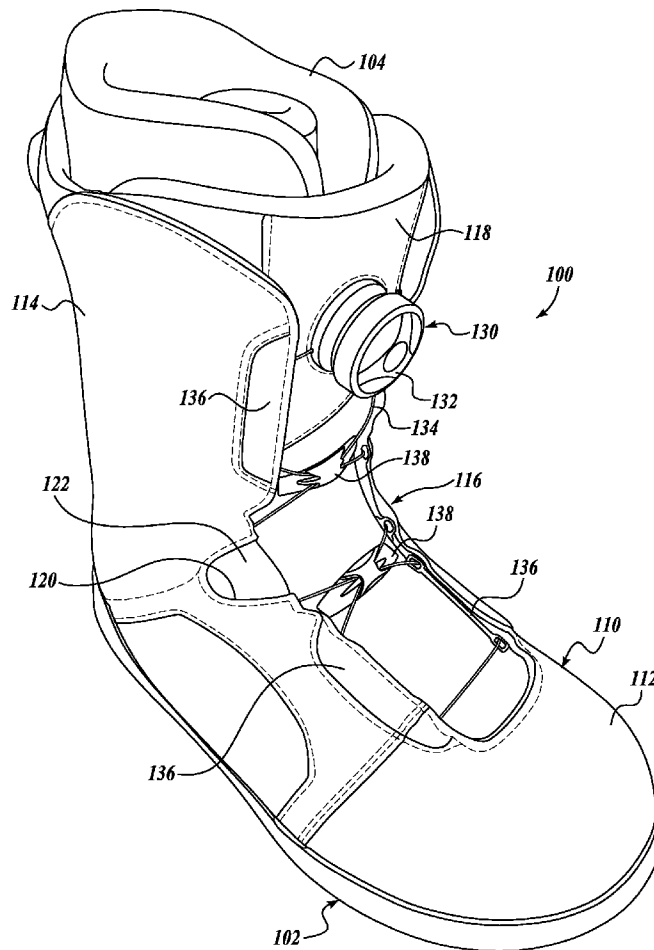
(57)

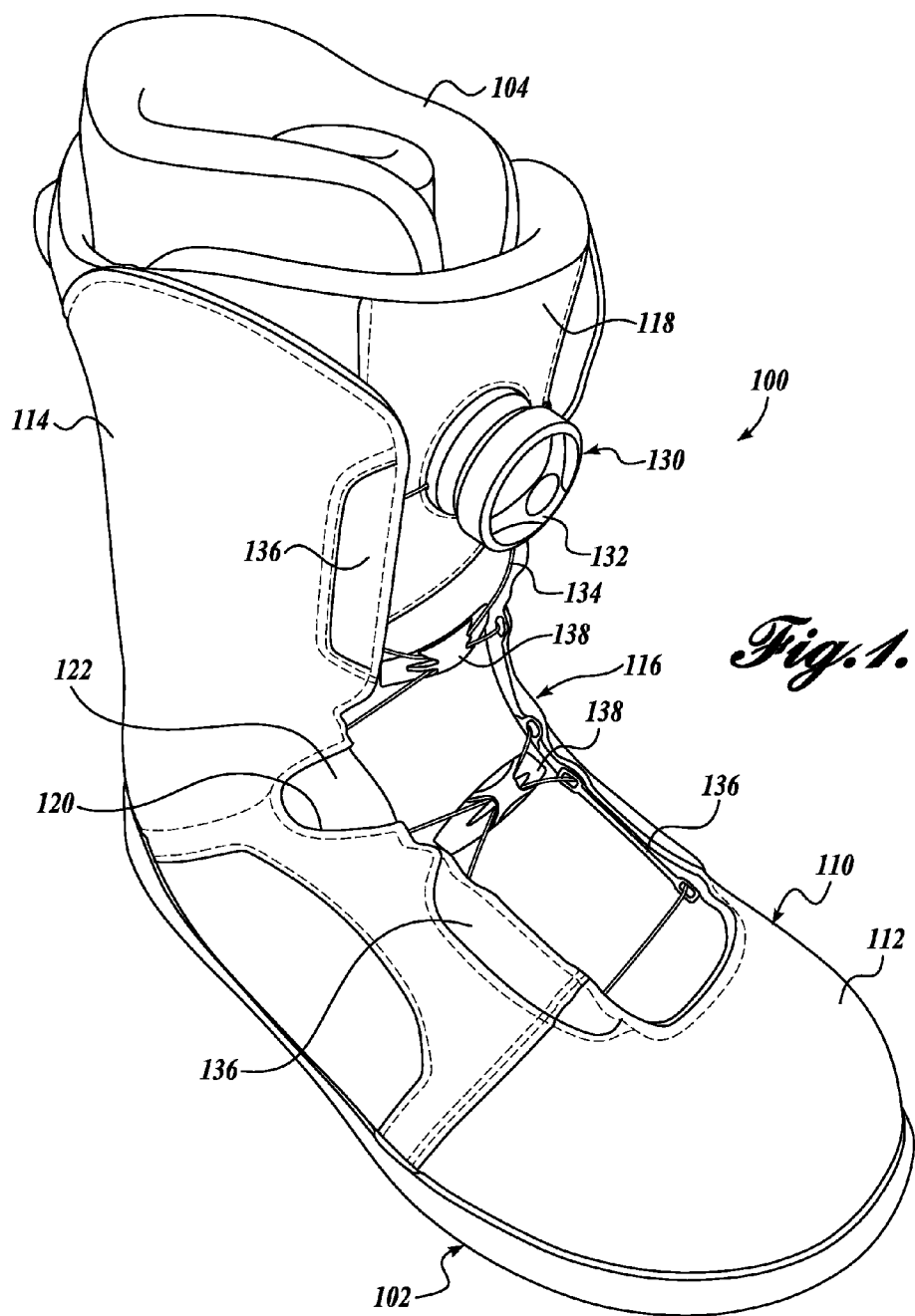
ABSTRACT(73) Assignee: **K-2 CORPORATION**, Seattle, WA (US)(21) Appl. No.: **14/485,350**(22) Filed: **Sep. 12, 2014****Related U.S. Application Data**

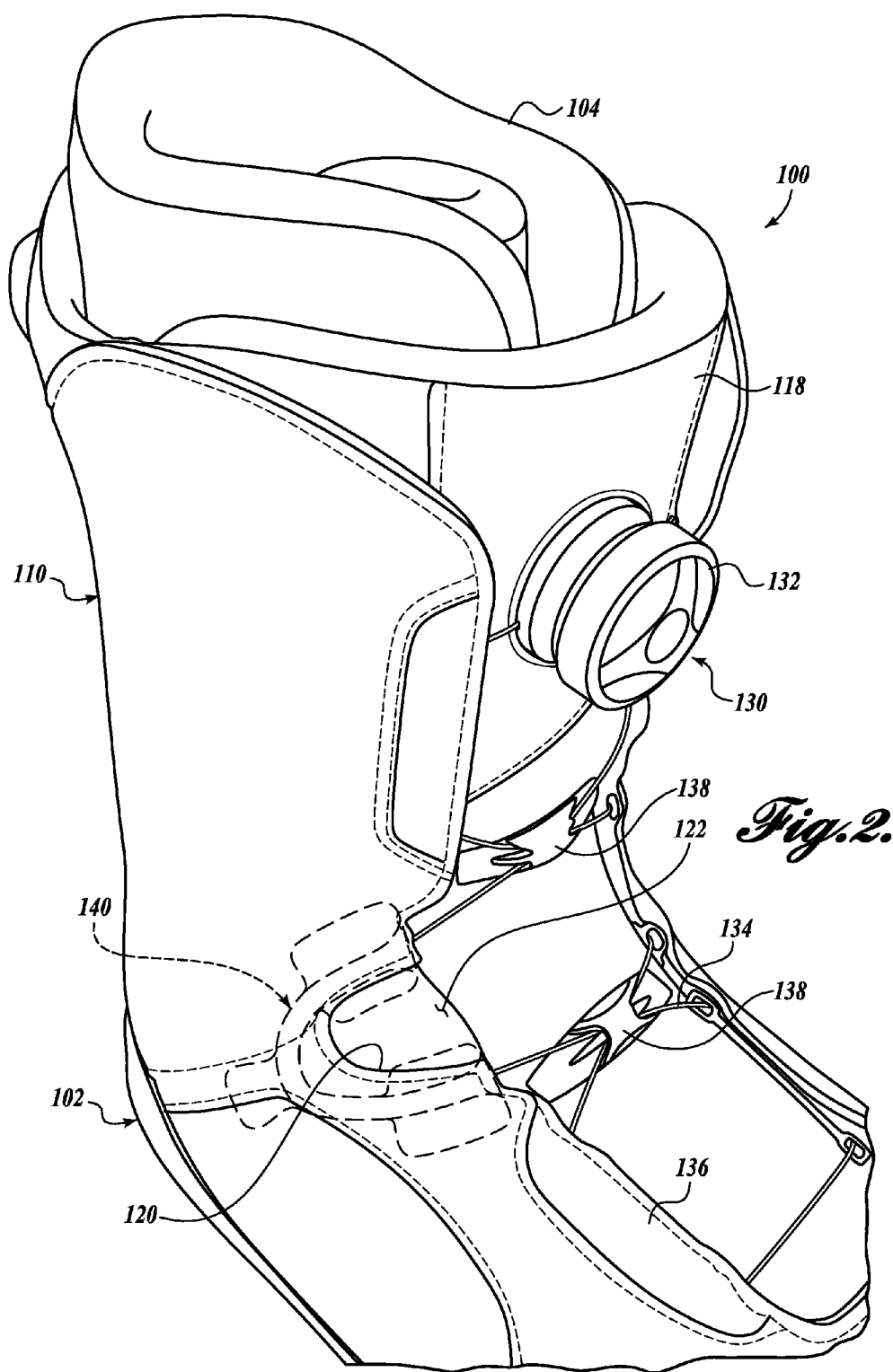
(60) Provisional application No. 61/877,893, filed on Sep. 13, 2013.

Publication Classification(51) **Int. Cl.***A43C 11/12* (2006.01)*A43B 23/02* (2006.01)

A sports boot includes a sole fixed to an upper having an ankle portion and a forefoot portion. Lateral and medial articulating cable or lace guides are provided in the upper generally between the ankle portion and the forefoot portion. Each of the cable guides define a flexible and elongate arcuate channel for guiding the cable, preferably having fluted ends. Installation panels are provided adjacent each end of the flexible channels. An intermediate installation panel extends outwardly from the arcuate channel and does not significantly interfere with flexure of the arcuate channel. Therefore, the portion of the flexible channel away from the installation panels forms a natural hinge. The channel may be configured to flex such that the spacing between the ends of the channel may vary by more than three centimeters. The upper may be provided with deep U-shaped cutouts that generally co-extend with the U-shaped cable guide.







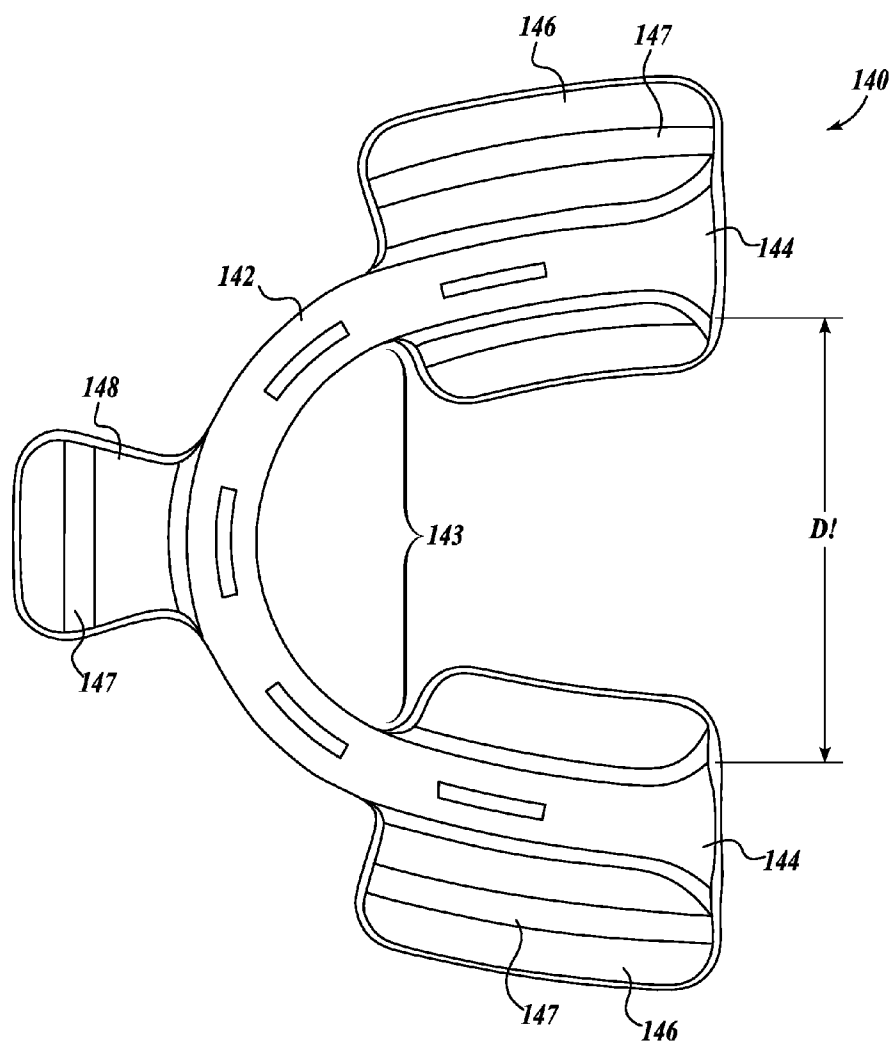


Fig. 3A.

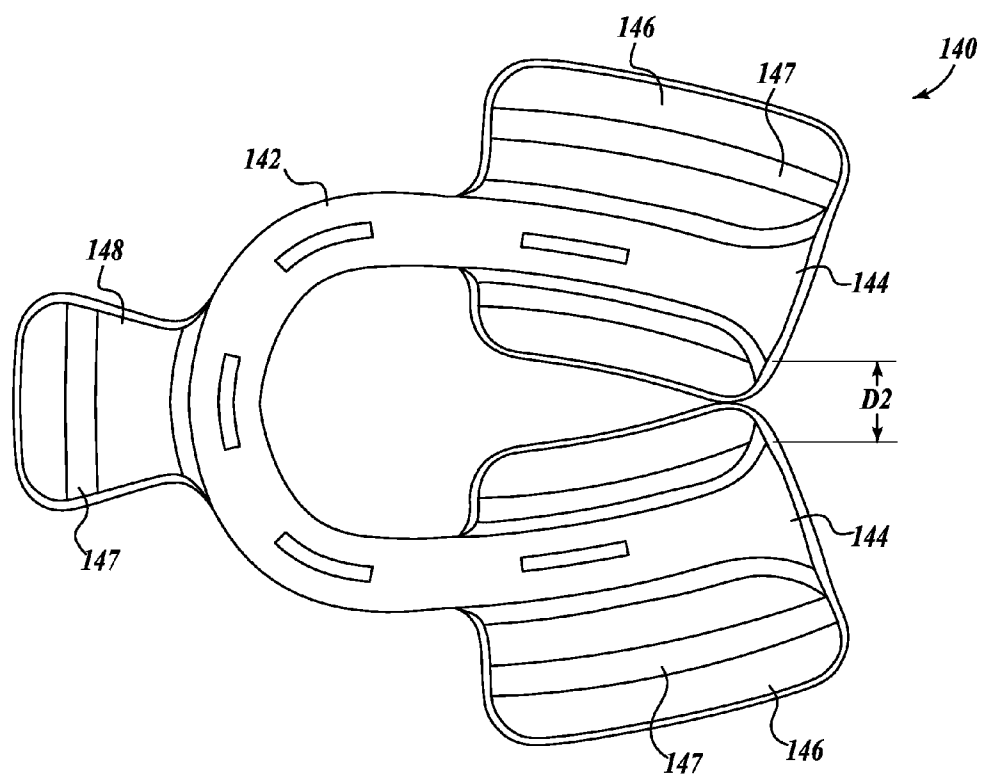


Fig. 3B.

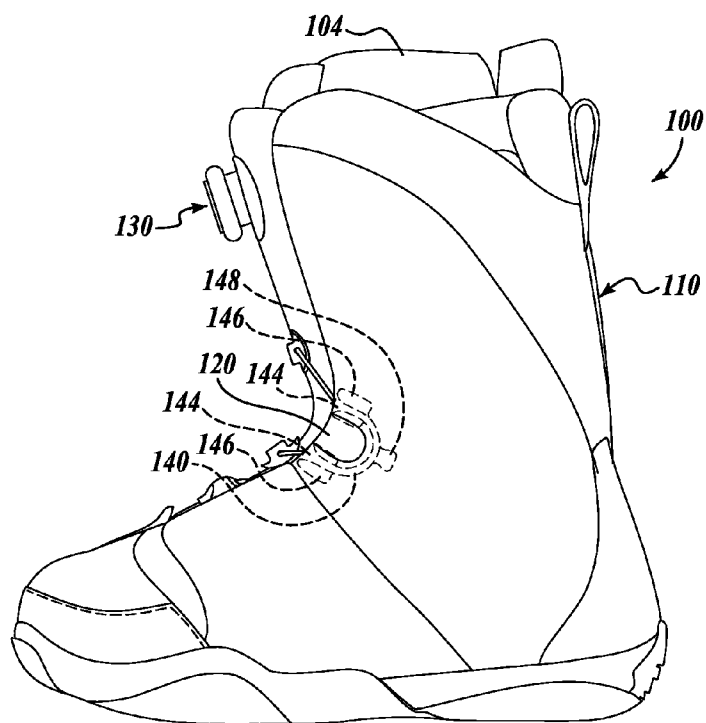


Fig. 4A.

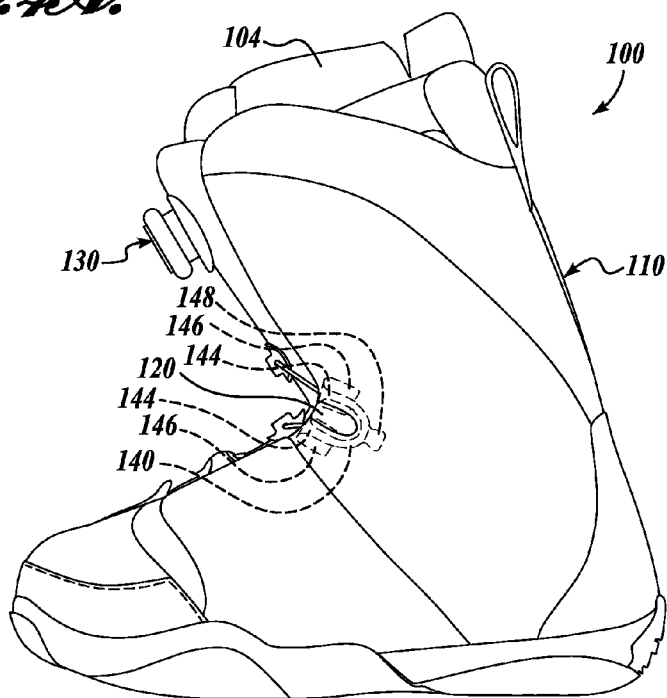


Fig. 4B.

SPORTS BOOT WITH ARTICULATING LACE GUIDE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of Provisional Application No. 61/877,893, filed Sep. 13, 2013, the entire disclosure of said application is hereby incorporated by reference herein.

BACKGROUND

[0002] The construction of sports boots, and in particular, boots for winter sports, has been evolving over time. Sports boots often present a large number of competing objectives that a designer must consider. Low weight, comfort, responsiveness, ease of entry/egress, durability, and ruggedness are all priorities. Sports boots are typically worn and actively in use for extended periods, requiring that the boots be comfortable. However, in many applications and especially in boots for snow/winter sports, the boots must also be responsive to the user, and configured such that attached sports equipment, for example, skis, snowboards, and the like, can be readily and precisely controlled. Also, because sports boots are typically subjected to rigorous usage and difficult environments, it is important that they be constructed ruggedly and for endurance.

[0003] Sports boots are typically secured to the user with a lacing or cable system. A typical cable system, for example, utilizes a cable that is slidably disposed through rigid cable guides installed on either side of the boot front opening, and optionally through one or more crossing guides installed on the boot tongue. A tightening mechanism having a spool is attached to the boot, for example, on the tongue or ankle portion of the upper, and the cable is attached to the spool to permit ready tightening and loosening of the cable. The tightening mechanism is located on a portion of the boot that can be easily accessed by the user. For example, U.S. Pat. No. 5,934,599, to Hammerslag, which is hereby incorporated by reference, discloses a cable-type lacing system wherein the tightening mechanism is externally disposed on the back of the boot upper. Another particular embodiment of a spooling cable-type lacing system with a snow sports boot is disclosed in U.S. Pat. No. 7,386,947, which is hereby incorporated by reference. Such systems, however, require a suitable external surface for mounting the tightening mechanism.

[0004] A particular difficulty with prior art sports boots using cable guides is that the guides increase the rigidity of the boot upper, reducing the ability of the upper to flex. For example, typical snow sports activities require extensive dorsiflexion and plantar flexion about the user's ankle. It is desirable that the ankle portion of the boot upper be able to readily accommodate such flexion with respect to the forefoot portion of the upper.

[0005] In conventional boots, deep forward dorsiflexion at the ankle causes the boot upper to buckle in the region near the user's ankle, wherein portions of the boot upper buckle or bend inwardly and outwardly to accommodate the flexure. This buckling not only limits the user's range of motion but can be very uncomfortable because it generates local stresses on the user's foot and ankle.

[0006] In particular, rigid cable guides attached along the edges of the front opening undesirably interfere with flexure of the boot, and can cause discomfort to the user's foot during use.

[0007] Sports boots are typically worn for extended periods and are subject to vigorous use by the user. It is important to improve the comfort and responsiveness of the boot, both to enable the user to continue in a selected activity for extended periods, and to optimize performance in a competitive environment.

SUMMARY

[0008] 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.

[0009] A cable or lace guide is disclosed having a flexible U-shaped channel with opposite ends that may be fluted. The guide includes first and second installation panels at the opposite ends of the flexible channel, and one or more intermediate installation panels that are disposed only on the outer side of the flexible channel, such that they do not significantly interfere with flexing the channel.

[0010] In an embodiment the first and second installation panels extend on either side of the ends of the flexible channel. The cable or lace guide may be formed unitarily from a composite or thermoplastic material, for example, by injection molding.

[0011] In an embodiment, significant portions along the length of the flexible channel are not adjacent any of the installation panels, for example, at least 30% of the length of the flexible channel may be disposed away from any of the installation panels. In another example, 30% to 70% of the length of the flexible channel may be not adjacent to either of the first or second installation panel.

[0012] In an embodiment the tubular channel is sized to extend around a corresponding U-shaped cutout in the upper.

[0013] A sports boot is disclosed that includes a sole and an upper fixed to the sole, wherein the upper defines a front opening having a first portion extending down from the top of the upper and a second portion extending forwardly from the first portion, and also defines a pair of oppositely disposed U-shaped cutouts. A pair of cable guides are fixed to the upper, each disposed along one of the pair of U-shaped cutouts. The cable guides include (i) a flexible U-shaped channel having a first end and a second end, (ii) a first installation panel co-formed with the tubular channel and disposed on the first end of the tubular channel, and (iii) a second installation panel co-formed with the tubular channel and disposed on the second end of the tubular channel; and (iv) an intermediate installation panel disposed at an intermediate location on the U-shaped channel and extending away from the first and second installation panels.

[0014] In an embodiment, the upper further comprises a tongue portion that extends along the front opening and includes at least one lace guide fixed thereto, the boot further comprising a reel and cable closure system having a cable that engages the pair of guides and the lace guide, and a locking reel configured to tension the cable to secure the front opening. A pair of flexible panels may be fixed to the upper that span the U-shaped cutouts.

DESCRIPTION OF THE DRAWINGS

[0015] The foregoing aspects and many of the attendant advantages of this invention will become more readily apparent

ciated as the same become better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

[0016] FIG. 1 is a perspective view of a sports boot having an upper with articulating U-shaped cable guides installed in the ankle portion of the front opening, in accordance with the present invention;

[0017] FIG. 2 is a detail perspective view of the ankle portion of the sports boot shown in FIG. 1 with one of the articulating cable guides shown in phantom;

[0018] FIG. 3A is a plan view of the U-shaped articulating cable guide for the sports boot shown in FIG. 1;

[0019] FIG. 3B is a plan view of the U-shaped articulating cable guide shown in FIG. 3A, shown flexed to bring the ends of the cable guide into close proximity;

[0020] FIG. 4A is a side view of the boot shown in FIG. 1 in a natural or unflexed position; and

[0021] FIG. 4B is a side view of the boot shown in FIG. 4A in a flexed position.

DETAILED DESCRIPTION

[0022] A currently preferred embodiment of the present invention will now be described with reference to the Figures, wherein like numbers indicate like parts. FIG. 1 is a perspective view of a sports boot 100, for example, a snowboard boot, in accordance with the present invention. The sports boot 100 comprises a sole portion 102 and an upper 110 that is fixedly attached to the sole portion 102. For example, the sole portion 102 may be attached to the upper 110 by any combination of stitching, adhesives, attachment hardware, and/or co-forming. A liner 104 (top portion visible) is shown inserted in the sports boot 100. Such liners are known in the art, and generally increase user comfort.

[0023] The upper 110 includes a forefoot portion 112 and an upwardly extending ankle portion 114. The forefoot portion 112 and ankle portion 114 cooperatively define a front opening 116 to facilitate entry and exit from the sports boot 100. The opening has a first portion that extends downwardly from a top end of the upper 110 generally along the user's leg, and a second portion that extends forwardly from the first portion. A tongue 118 extends along the front opening 116.

[0024] In this embodiment the forefoot portion 112 and the ankle portion 114 define a pair of deep U-shaped cutouts 120 generally near or adjacent the user's ankle on both the lateral and medial sides (only the medial side is visible in FIG. 1). The U-shaped cutout 120 is optionally spanned with a flexible panel 122 that is fixed to the upper 110. It will be appreciated by persons of skill in the art that the U-shaped cutout 120 greatly increases the flexibility dorsiflexure/plantarflexure of the sports boot 100, reducing resistance to such flexure, and therefore improving the user's comfort. In particular for sporting activities such as snowboarding, wherein the rider must typically and repeatedly flex his/her ankle, the U-shaped cutout can reduce or eliminate uncomfortable buckling in the upper 110, particularly in the ankle region of the upper 110.

[0025] The boot 100 further comprises a reel and cable closure system 130 comprising a locking reel mechanism 132 fixed to an upper portion of the tongue 118, and a cable 134 that is adjustably coiled onto the locking reel mechanism 132. In the current embodiment, an upper pair of conventional cable guides 136 are installed on the upper 110 on opposite sides of the front opening 116 on the ankle portion 114, and a lower pair of conventional cable guides 136 are installed on opposite sides of the front opening 116 on the forefoot portion

112 of the upper 110. Although conventional cable guides 136 are shown in this exemplary embodiment, it is contemplated that these cable guides 136 may alternatively be replaced by an articulating (or flexing) cable guide such as the articulating lace guide disclosed below to further increase the flexibility of the boot 100.

[0026] One or more crossing guides 138 (two shown) are fixedly installed on the tongue 118 at longitudinally spaced-apart locations, and are configured to receive and guide the cable 134 across the front opening 116.

[0027] FIG. 2 is a detail view of the boot 100 showing a flexure region of the boot 100 near the ankle. A U-shaped cable guide 140 is shown in phantom, and is installed in the upper 110, along the U-shaped cutout 120. The U-shaped cable guide 140, therefore extends generally between the forefoot portion 112 of the upper 110 and the ankle portion 114 of the upper 110. The U-shaped cable guide 140 is fabricated and configured to be flexible and compliant, to improve the comfort and flexibility of the boot 100, as discussed below.

[0028] The flexible panel 122 generally spans the region between the arms of the U-shaped cable guide 140. The flexible panel 122 may comprise an elastic material, for example, a thin neoprene, or a woven fabric panel having rubber strands embedded therein. Alternatively, the flexible panel 122 may comprise any woven or non-woven fabric member.

[0029] FIG. 3A is a plan view of the U-shaped cable guide 140 shown in isolation. The U-shaped cable guide 140 includes a flexible elongate channel 142 having fluted openings 144 on both ends. In the current embodiment, the flexible elongate channel 142 is tubular, although it is contemplated that it may alternatively be constructed as an open channel with retaining members spanning the open channel, or wherein the open channel is covered by a panel or by a portion of the upper 110. The U-shaped cable guide 140 is therefore configured such that the fluted openings 144 of the flexible elongate channel 142 are movable to bring them closer together or farther apart, and, further, the flexible elongate channel 142 may be twisted such that the fluted openings 144 can be moved relative to each other out of the original plane of the cable guide 140.

[0030] Two first installation panels 146 are co-formed with the flexible elongate channel 142 underlying the fluted openings 144. The size of the first installation panels 146 may be selected to accommodate a particular application. Preferably, the first installation panels 146 extend outwardly on either side of the flexible elongate channel 142. The first installation panels 146 in the current embodiment are substantially flat and may be provided with apertures (not shown) and/or elongate cutouts 147 for stitching or other attachment means, as are known in the art. The first installation panels 146 may be formed from a soft material and are thin panels to permit stitching therethrough without preformed apertures or elongate cutouts 147. Alternatively, or in addition, the installation panels 146 may be attached to the upper 110 with an adhesive coating for fixing the U-shaped cable guide 140 to the upper 110.

[0031] A longitudinal center portion 143 of the flexible elongate channel 142 is not abutted by either of the first installation panels 146. Therefore, it will be appreciated that the flexibility of the center portion 143 of the channel 142 is not diminished or hindered by the first installation panels 146. In current embodiments, the center portion 143 of the flexible

elongate channel **142**, i.e., the portion of the channel **142** that is not directly adjacent the first installation panels **146**, comprises between 30% and 70% of the length of the channel **142**. In another embodiment, less than half of the length of the flexible elongate channel **142** is directly adjacent either of the first installation panels **146**, and more than half of the length of the channel **142** is not adjacent either of the first installation panels **146**.

[0032] A co-formed intermediate installation panel **148** extends distally from one side of a small subsection of the center portion **143** of the flexible elongate channel **142**. In particular, the inwardly facing periphery of the center portion **143** (the side of the center portion **143** facing the fluted openings **144**) is not significantly hindered from flexure. Therefore, the center portion **143** of the channel defines a natural hinge, such that the cable guide **140** is an articulating guide. Moreover, only a relatively small portion of the outwardly facing periphery of the center portion **143**, e.g., less than half, is adjacent the intermediate installation panel **148**. Therefore, the intermediate installation panel **148** does not significantly interfere with flexure of channel **142**. The intermediate panel **148** may similarly be provided with apertures for stitches or the like **147**. In alternative embodiments, a plurality of narrower, spaced-apart intermediate installation panels extends outwardly from the channel **142**.

[0033] It will now be appreciated that the flexible elongate channel **142** may readily be flexed such that the first installation panels **146** are substantially adjacent, as illustrated in FIG. 3B. In a particular embodiment, the shape and material for the U-shaped guide **140** are selected to accommodate changing the distance between the fluted openings **144** by at least 3 centimeters. For example, the channel **142** is configured such that the fluted openings **144** are movable between a first position wherein the distance D1 between the fluted openings **144** is at least 4 centimeters (FIG. 3A) to a second position wherein the distance D2 between the fluted openings **144** is 1 centimeter or less (FIG. 3B).

[0034] In an exemplary embodiment, the length of either leg of the flexible elongate channel **142** (i.e., half of the length of the channel **142**) is greater than the distance between the fluted openings **144** when the flexible elongate channel **142** is unflexed.

[0035] The U-shaped cable guide **140** in a current embodiment is integrally formed, for example, by injection molding, from a relatively soft and flexible material, for example, a pliable plastic or composite material. Suitable materials include thermoplastics such as nylon, polyethylene, polyvinyl chloride, and the like. The material must also be sufficiently tough to withstand abrasion from the cable **134** during tightening of the cable **134** with the closure system **130** and during use.

[0036] FIG. 4A illustrates the sports boot **100** (with the U-shaped cable guide **140** shown for illustration) in a relaxed or unflexed position. FIG. 4B illustrates the sports boot **100** in the flexed position, for example, the position wherein the user's knees are bent and leaning forward. The U-shaped cable guide **140** flexes such that the fluted openings **144** move closer together to accommodate the flexure of the user's ankle without generating undesirable resistance to the flexure. In particular, the U-shaped cutout **120** and U-shaped cable guide **140** allow the sports boot **100** to assume a deep forward flex without any significant resistance from the U-shaped cable guide **140**.

[0037] The flexibility of the U-shaped cable guide **140** also allows the guide **140** to be installed with the distance (and angle) between the fluted openings **144** adjusted at the time the boot **100** is assembled. Therefore, for example, the same guide **140** design can be used with different boots and installed to meet the needs of the particular boot.

[0038] It will also be appreciated that the U-shaped cable guide **140** is flexible to permitting twisting flexure of the channel **142**. The elongate tube **142** may be flexed, for example, such that one fluted opening **144** moves outwardly or laterally and the other fluted opening **144** moves inwardly or medially.

[0039] In a particular embodiment, the shape and material for the U-shaped guide **140** are selected to accommodate changing the distance between the fluted openings **144** by at least 3 centimeters. For example, the openings **144** may be configured to flex sufficiently to allow the fluted openings **144** to be flexed between a first position wherein the fluted openings **144** are 1 centimeter apart and a second position wherein the fluted openings **144** are 4 centimeters apart.

[0040] A boot **100** in accordance with the present invention provides consistent boot flexure that is not constrained by rigid, or relatively stiff, cable guides. The fluted openings **144** and flexible installation provide a broad range of cable angles that the U-shaped cable guide **140** can accommodate. It will be appreciated by persons of skill in the art that the installation panels **146**, **148** provide for a slimmer profile due to less stack up and layering in the boot construction, and they do not significantly interfere with flexure of the flexible elongate channel **142**.

[0041] The U-shape and flexibility of the guide **140** also provides better closure due to the ankle portion **114** of the upper and the lower or forefoot portion **112** being able to close partially independently when the cable **134** is tightened. In particular, the U-shaped cutouts **120** (seen most clearly in FIG. 2) partially decouples the tension in the forefoot portion **112** and ankle portion **114** of the upper somewhat.

[0042] In addition, user comfort is improved. For example, with snowboard boots, the comfort of the snowboard binding strap may be improved by reducing the amount of hard plastic under the ankle strap.

[0043] It will also be appreciated by persons of skill in the art that removable liners are frequently used with sports boots **100**, such as liner **104** shown in FIG. 1. Such liners typically envelope the user's foot and may comprise, for example, a compressible polymeric material such as neoprene with a fabric covering, and optionally with a thin sole portion. Such liners **104** frequently include a front opening and tongue construction for ease of use and to allow the user to adjust the tightness of the liner **104**. A flexible cable or lace guide similar to the cable guide **140** discussed above may also, or alternatively, be provided on the liner **104**. In an exemplary embodiment, the liner **104** includes a fabric or non-cable type lace with a slidable lace lock as are known in the art. It is contemplated that one or more articulating lace guides as discussed above may be provided on the liner front opening to improve user comfort.

[0044] It will now be appreciated that sports boot in accordance with the present invention, such as sports boot **100**, provide improved flexibility in the ankle region of the upper, thereby minimizing buckling of the boot material in that region when the user flexes forward in the ankle joint. The U-shaped cutouts **120** replace relatively stiff and inflexible upper material in this region, and the flexible U-shaped cable

guide **140** permits the cable (or lace) to perform the desired function of securing and tensioning the front opening **116** of the upper in this region, while also retaining flexibility to permit comfortable flexure of the ankle.

[0045] 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 cable guide comprising: (i) a flexible U-shaped channel having a first end and a second end; (ii) a first installation panel co-formed with the tubular channel and disposed on the first end of the tubular channel; (iii) a second installation panel co-formed with the tubular channel and disposed on the second end of the tubular channel; and (iv) an intermediate installation panel disposed at an intermediate location on the U-shaped channel and extending away from the first and second installation panels.

2. The cable or lace guide of claim **1**, wherein the first and second installation panels extend on opposite sides of the first end of the U-shaped channel.

3. The cable or lace guide of claim **1**, wherein the first end of the tubular channel and the second end of the tubular channel are fluted.

4. The cable or lace guide of claim **1**, wherein the cable or lace guide comprises a unitary injection molded thermoplastic component.

5. The cable or lace guide of claim **1**, wherein at least 30% of the U-shaped channel length is not adjacent any of the first, second or intermediate installation panels.

6. The cable or lace guide of claim **1**, wherein 30% to 70% of the U-shaped channel is not adjacent either of the first and second installation panels.

7. The cable or lace guide of claim **1**, wherein the tubular channel is sized and configured to extend around a corresponding U-shaped cutout in a portion of sports boot upper.

8. A sports boot comprising:

an upper fixedly attached to a sole portion, wherein the upper includes a forefoot portion and an ankle portion, wherein the upper defines a front opening having a first portion extending downwardly from a top edge of the upper and a second portion extending forwardly from the first portion, wherein the upper further defines a pair of U-shaped cutouts disposed on opposite sides of the front opening and extending at a downward angle;

a pair of cable or lace guides fixed to the upper, each guide being disposed along one of the pair of U-shaped cutouts, wherein each of the pair of guides comprises: (i) a flexible U-shaped channel having a first end and a second end; (ii) a first installation panel co-formed with the flexible channel and disposed on the first end of the flexible channel; and (iii) a second installation panel co-formed with the flexible channel and disposed on the second end of the flexible channel; and (iv) an intermediate installation panel disposed at an intermediate location on the flexible channel and extending away from the first and second installation panels;

wherein an intermediate portion of the flexible channel disposed between the first and second installation panels is not constrained from flexing such that the intermediate portion of the flexible channel comprises a natural hinge.

9. The sports boot of claim **8**, wherein for each cable or lace guide the first installation panels extends on opposite sides of the first end of the flexible channel.

10. The sports boot of claim **8**, wherein for each cable or lace guide the first end of the flexible channel and the second end of the flexible channel are fluted.

11. The sports boot of claim **8**, wherein for each cable or lace guide comprises an injection molded thermoplastic.

12. The sports boot of claim **8**, wherein for each cable or lace guide at least 30% of the flexible channel length is not adjacent any of the first, second or intermediate installation panels.

13. The sports boot of claim **8**, wherein for each cable or lace guide 30% to 70% of the flexible channel is not adjacent either of the first and second installation panels.

14. The sports boot of claim **8**, wherein the upper further comprises a tongue portion that extends along the front opening and includes at least one crossing guide fixed thereto, the boot further comprising a reel and cable closure system having a cable that engages the pair of cable or guides and the at least one crossing guide, and a locking reel configured to tension the cable to secure the front opening.

15. The sports boot of claim **8**, wherein the upper further comprises a pair of flexible panels, each flexible panel being fixed to the upper and spanning an associated one of the U-shaped cutouts.

* * * * *