DEVICE FOR RETAINING A FOOT OR A BOOT

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ABSTRACT
A device for retaining a foot or a boot on a sports apparatus, the device including a lateral portion and a medial portion demarcating a zone for receiving the boot, as well as at least one linkage connected to each of the lateral and medial portions by a lateral fastener and medial fastener. The lateral fastener and medial fastener of the linkage are arranged asymmetrically heightwise on the device.
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CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based upon French Patent Application No. 04.07271, filed on Jun. 30, 2004, the disclosure of which is hereby incorporated by reference thereto in its entirety and the priority of which is hereby claimed under 35 U.S.C. 119.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a device for retaining a foot or a boot on a sports apparatus, in which the retention of the foot or of the boot is carried out by means of at least one linkage or strap, for example.

[0004] More particularly, the invention is related to such retaining devices, or bindings, for snowboarding, snowsking, water skiing, snowshoeing, roller-skating, and the like.

[0005] 2. Description of Background and Relevant Information

[0006] A device of the prior art of the aforementioned type, which include linkages, generally has a lateral portion and a medial portion that demarcate therebetween a zone for receiving the foot or the boot, as well as at least one linkage or strap connected to each of the lateral and medial portions by a lateral fastener and a medial fastener. Each linkage is used to retain the foot or the boot in the receiving zone.

[0007] The lateral and medial fasteners are arranged on the lateral and medial portions, respectively, so that they are located substantially in the area of the sole of the foot or of the boot sole while they are retained in the device. Thus, the linkage covers the sides and the top of the foot or the boot. The arrangement of the lateral and medial fasteners promotes a certain transverse bending or flexing freedom for the boot, on the lateral side and medial side.

[0008] In snowboarding, for example, this freedom helps to shift the body weight transversely. As a result, the rider can adjust the contact forces between the ends of his/her apparatus, or board, and the ground. The end toward which the rider off-centers the body weight is subject to a higher weight force than the opposite end. This phenomenon is instrumental in managing the changes in the path of the board.

[0009] However, a shift of the body weight is not the only action that is useful to the steering of the apparatus. Indeed, the transmission of forces, between the user and the apparatus, is also useful to the steering. Since such forces are transmitted through the linkages, it has been proposed to structure the linkages in order to make them more rigid.

[0010] For example, according to the French Patent Publication FR 2 839 978 and U.S. patent application Publication No. US 2005/0201623, a retaining device is provided with linkages having rigid portions. When the portions are reassembled, the linkage forms a rigid frame around the foot or the boot. An efficient transmission of the steering forces has been noted on this device. However, it has been observed that the boot transverse bending/flexing freedom is reduced. Consequently, it is not as easy to shift the body weight transversely.

[0011] In other words, what is gained in the area of force transmission is lost in the area of transverse movement of body weight.

SUMMARY OF THE INVENTION

[0012] One of the objectives of the invention is to provide an improved retaining device. In particular, the invention allows for both an adequate transverse displacement of the body weight and an efficient transmission of steering forces on a retaining device provided with at least one linkage or strap.

[0013] To this end, the invention provides for a device for retaining a foot or a boot on a sports apparatus, the device including a lateral portion and a medial portion demarcating a zone for receiving the foot or the boot, as well as at least one linkage/strap connected to each of the lateral and medial portions by a lateral fastener and a medial fastener.

[0014] The lateral and medial fasteners of the linkage/strap of the retaining device according to the invention are asymmetrically arranged heightwise on the device.

[0015] Consequently, one of the lateral and medial fasteners is relatively further spaced from the apparatus, while the other is relatively closer thereto. As a result, one of the lateral and medial portions of the device borders the foot or the boot over a more substantial height. Due to this edge height, a larger portion of the foot or of the boot is opposite a more rigid element of the device. The foot or the boot is supported over a more rigid surface, on the side where the linkage is attached at a higher point. As a result, the user/rider is able to transmit steering forces with efficiency.

[0016] Furthermore, the length of the linkage or strap, opposite the foot or the boot, remains sufficient to allow for transverse bending/flexing over a satisfactory amplitude/distance. This linkage length, from the lowermost fastener, enables the foot or the boot to be properly enveloped. This envelopment helps to press the foot or the boot on the top edge.

[0017] Therefore, the device according to the invention has the advantage of reconciling two properties: the transmission of steering impulses, on the one hand, and a transverse bending freedom, on the other hand. The result is a superior steering control of the apparatus.

[0018] In certain cases, the lateral portion has a lateral bottom surface, the medial portion having a medial bottom surface, the lateral and medial bottom surfaces being adapted to be associated with the sports apparatus.

[0019] The distance that separates the lateral fastener from the lateral bottom surface is then provided to be different from the distance that separates the medial fastener from the medial bottom surface.

[0020] This is a way of achieving heightwise positioning asymmetry of the lateral and medial fasteners of the linkage.

BRIEF DESCRIPTION OF DRAWINGS

[0021] Other characteristics and advantages of the invention will be better understood by means of the following
description, with reference to the attached drawings showing how the invention can be embodied, according to non-limiting embodiments, and in which:

[0022] FIG. 1 is a perspective view of a retaining device according to a first embodiment of the invention, showing the linkages to be closed;
[0023] FIG. 2 is a cross-section along the line II-II of FIG. 1;
[0024] FIG. 3 is a view, similar to FIG. 2, with the linkage shown to be open;
[0025] FIG. 4 is similar to FIG. 2, according to a second embodiment of the invention;
[0026] FIG. 5 is similar to FIG. 4, with the linkage open.

DETAILED DESCRIPTION OF THE INVENTION

[0027] Although the embodiments described hereinafter relate more particularly to the field of snowboarding, it is to be understood that they also apply to other fields as mentioned hereinabove.

[0028] An example of the first embodiment is shown by means of FIGS. 1-3.

[0029] As seen in FIG. 1, a retaining device enables the temporary retention of a boot, not shown, on a board 2.

[0030] In a known fashion, the retention device 1 has a base 3 that extends longitudinally between a rear end 4 and a front end 5.

[0031] The base 3 has a top surface 6 provided to be on the side of the boot sole, and a bottom surface 7 provided to be on the side of the board.

[0032] The base 3 is secured to the board 2 by a means shown in the form of a disk 10, which is in turn retained to the board 2 by screws 11.

[0033] The invention encompasses other structures for retaining the base 3 as well.

[0034] The base 3 is transversely bordered with a lateral portion 12 and a medial portion 13, which demarcate a zone 14 for receiving the boot. The lateral portion 12 has a lateral bottom surface 15 provided to be on the side of the board 2. Similarly, the medial portion 13 has a medial bottom surface 16, which is also provided to be on the side of the board.

[0035] According to the first embodiment of the invention, as seen in FIG. 2, for example, the lateral 15 and medial 16 bottom surfaces of the portions 12, 13 each extend the bottom surface 7 of the base 3. The three bottom surfaces 15, 16, 7 thus form a continuous bottom surface 17 of the device 1. In this case, this surface 17 is substantially planar; but it could be non-planar and have a relief.

[0036] The bottom surface 17 contacts the boards 2 directly. Consequently, the bottom surface 7 of the base 3 and the bottom surfaces 15, 16 of the lateral 12 and medial 13 portions contact the board 2 directly. But it can be provided that these surfaces 7, 15, 16 contact the board indirectly, for example, via a shock absorbing or non-shock absorbing plate.

[0037] According to the first embodiment of the invention, the lateral 12 and medial 13 portions are shown in the form of a lateral flange 12 and a medial flange 13, respectively. When the boot is positioned on the device 1, the flanges 12, 13 extend laterally along the sole. The invention also encompasses something other than the flanges 12, 13 which could form the lateral and medial portions. For example, mere lateral and medial abutments or enlargements of the base could be used.

[0038] The lateral 12 and medial 13 portions are rigid, in the sense that they do not become substantially deformed due to the steering forces. Thus, the user can apply steering forces or receive sensory information during use of the board.

[0039] As seen in FIG. 1, the flanges 12, 13 are connected by an arch or loop 20 in the area of the rear end 4. Preferably, the base 3, the flanges 12, 13, and the arch 20 form a unitary/one-piece element made, for example, of a synthetic material. However, one can provide that the flanges or the arch be elements that are affixed to the base by any other means, such as gluing, welding, screws, nesting, or the like.

[0040] One can also provide that the device 1 does not include an arch, or that the portions 12, 13 come directly from the board.

[0041] Further, a rear support element 21, or high back, enables the user to be rearwardly supported with the lower leg. The rear support element 21 is affixed to the flanges 12, 13, for example, by means of a pivot or articulation 22.

[0042] Two linkages are also provided to removably retain the boot on the base 3, between the flanges 12, 13, in the receiving zone 14.

[0043] A first linkage 23, or strap, is located toward the rear, in the area of the instep, when the foot is retained. A second linkage 24, or strap, is located toward the front, in the area of the metatarsophalangeal articulation, when the foot is retained.

[0044] Each of the linkages 23, 24 extends transversely between the flanges 12, 13.

[0045] A different number of linkages could be provided.

[0046] For reasons of convenience, only the first linkage is described in detail hereinafter.

[0047] According to the first embodiment of the invention, as seen in FIGS. 2 and 3, the first linkage 23, or rear strap, includes, for example, a lateral portion 25 and a medial portion 26.

[0048] The lateral portion 25 of the linkage 23 is connected to the lateral portion, or lateral flange 12, by means of a first lateral fastener 30. Similarly, the medial portion 26 of the linkage 23 is connected to the medial portion, or medial flange 13, by a first medial fastener 31.

[0049] The lateral 30 and medial 31 fasteners are each shown in the form of an articulation having an axis 32, 33, respectively. Each articulation 30, 31 can include a component such as a rivet, a screw, a nut, a washer, a swivel pin, or the like.

[0050] Alternatively, other structures can be used for making the fasteners 30, 31, such a winding around a keeper, or the like.
The axes 32, 33 of the articulations 30, 31 are oriented substantially transversely, and substantially parallel to the base 3. This enables the first linkage 23 to better cover the boot.

By way of example, the lateral portion 25 of the first linkage 23 includes a rack 34. The medial portion 26 includes a ratchet-tightening device 35. The rack 34 and the ratchet tightening device 35 form a connecting device that removably connect the lateral 25 and medial 26 portions to one another. It is thus possible to tighten the boot to a desired level, as is the case in FIG. 2, or to open the linkage 23, as is the case in FIG. 3.

Alternatively, any other connecting device structure can be provided, in lieu of the rack and ratchet device association.

Generally speaking, for an application in the field of snowboarding, the linkages 23, 24 are inextensible or substantially inextensible lengthwise, i.e., from one flange to the other. Their constituent materials are selected to this end. For example, such materials can include polyamide, polyurethane, whether reinforced or non-reinforced, or the like.

Each portion 25, 26 of a linkage 23, 24 is nevertheless more or less flexible. Its curvature is variable, and it can bend to adapt to the foot or the boot.

Depending upon the type of application, the linkages 23, 24 can comprise materials that are much more flexible in order to adapt even better to the foot or the boot.

According to the invention, the distance d1 that separates the first lateral fastener 30 from the lateral bottom surface 15 is different from the distance d2 that separates the first medial fastener 31 from the medial bottom surface 16.

Consequently, one of the lateral 30 and medial 31 fasteners is spaced more greatly from the board 2, while the other is closer to the board. As a result, one of the lateral 12 and medial 13 portions of the device 1 borders the boot over a more substantial height. Due to this edge height, a larger portion of the boot takes support on a more rigid element of the device 1, in this case one of the flanges 12, 13. As a result, the user transmits steering forces with greater efficiency.

Moreover, there remains a sufficient length of the linkage 23, opposite the boot, to enable transverse bending or flexing over a sufficient amplitude.

The device 1 according to the invention enables the transmission of steering forces, on the one hand, and a transverse bending/flexing freedom, on the other hand. As a result, the steering of the board is better controlled.

According to the first embodiment, still with reference to FIGS. 2 and 3, the distance d1 that separates the lateral fastener 30 from the lateral bottom surface 15 is shorter than the distance d2 that separates the medial fastener 31 from the medial bottom surface 16. As the distance d1 is shorter than the distance d2, the lateral fastener 30 is closer to the bottom surface 17 than the medial fastener 31.

In other words, the lateral axis 32 of the lateral articulation 30 is closer to the bottom surface 17 than the medial axis 33 of the medial articulation 31. Consequently, since the device 1 is affixed to the board 2, the lateral fastener 30 is closer to the board 2 than the medial fastener 31.

This arrangement enables the medial side of the boot, relative to the lateral side, to be pressed on a rigid portion of the device 1 along a more substantial height. In this case, it is the medial portion 13. Indeed, the linkage 23 completely envelops the boot on the lateral side and presses it against the rigid portion 13.

As a result, there is a better control of the forces on the medial side, correlated with a possibility of body weight off-centering toward the lateral side.

A body weight off-centering toward the medial side remains possible.

The control of forces is also better on the lateral side. The fact that the fastener 31 is higher on the medial side reduces the deformations of the linkage in a transverse direction of the device 1. Indeed, a larger portion of the linkage 23 is biased in traction when the user transfers his weight on the lateral side. Consequently, his/her support on the lateral side is more precise.

A difference in the height of the fasteners of a linkage therefore enables a better control of the forces on the lateral side and medial side.

An inverse embodiment is possible, as can be understood with reference to FIGS. 4 and 5, which are directed to the second embodiment of the invention.

For reasons of convenience, only the reference numerals that are necessary for the understanding are used.

A retaining device 51 has a base 52 that includes a top surface 53 and a bottom surface 54. The base 52 is transversely bordered by a lateral portion, or flange 55, and a medial portion, or flange 56. The lateral 55 and medial 56 portions demarcate a receiving zone 57.

The lateral 55 and medial 56 portions have a lateral bottom surface 58 and a medial bottom surface 59, respectively. The bottom surfaces 58, 59 of the lateral 55 and medial 56 portions each extend the bottom surface 54 of the base 52. The three bottom surfaces 58, 59, 54 thus form a continuous bottom surface 60 of the device 51.

In particular, a first linkage 65 is provided, which connects the lateral 55 and medial 56 portions to one another, by means of a first lateral fastener 66 and a first medial fastener 67. The fasteners 66, 67 are obtained, for example, by means of articulations having a lateral axis 68 and a medial axis 69, respectively.

According to the second embodiment, the distance d3 that separates the lateral fastener 66 from the lateral bottom surface 58 is longer than the distance d4 that separates the medial fastener 67 from the medial bottom surface 59. As the distance d3 is longer than the distance d4, the lateral fastener 66 is further distanced from the bottom surface 60 than the medial fastener 67. In other words, the lateral axis 68 of the lateral articulation 66 is further spaced from the bottom surface 60 than the medial axis 69 of the medial articulation 67. Consequently, since the device 51 is affixed to the board, the lateral fastener 66 is further spaced from the board than the medial fastener 67.

This arrangement enables the lateral side of the boot, relative to the medial side, to be in contact with a rigid portion of the device 51 along a more substantial height. In this case, it is the lateral portion 55. As a result, there is a
better control of forces on the lateral side, correlated with a possibility of body weight off-centering toward the medial side.

[0074] A body weight off-centering toward the lateral side remains possible.

[0075] Generally speaking, the invention can be constructed from materials and according to implementation techniques known to one with ordinary skill in the art.

[0076] The invention is not limited to the particular embodiments described hereinabove, and encompasses all equivalents that fall within the scope of the claims that follow.

[0077] For example, one can provide that the distance that separates the lateral fastener from the lateral bottom surface be different from the distance that separates the medial fastener from the medial bottom surface, either for a single linkage, for part of the linkages, or for all of the linkages of a device.

[0078] The distance that separates the lowermost fastener of a linkage and the bottom surface of a portion can be between zero and fifty per cent of the distance that separates the bottom surface 7 and the uppermost point of the linkage 23, when the latter is closed.

[0079] The distance that separates the uppermost fastener of a linkage and the bottom surface of a portion can be between fifteen and eighty five per cent of the distance that separates the bottom surface 7 and the uppermost point of the linkage 23, when the latter is closed.

[0080] It can also be provided that the device does not include a base, and that the lateral and medial portions be fixed directly to the board.

[0081] Any shape can be provided for the lateral portions 12, 13. For example, a portion can be substantially configured to the shape of the boot. In this case, it has an appearance that is at least partially incurved, or partially straight and partially curved.

1. A device for retaining a foot or a boot on a sports apparatus, the device comprising:
   a lateral portion and a medial portion demarcating a zone for receiving the foot or the boot;
   at least one linkage connected to both the lateral and medial portions by a lateral fastener and a medial fastener, respectively;
   the lateral fastener and the medial fastener of the linkage are arranged asymmetrically heightwise on the device.

2. A retaining device according to claim 1, wherein:
   the lateral portion has a lateral bottom surface, the medial portion having a medial bottom surface, the lateral and medial bottom surfaces being adapted to be engaged with the sports apparatus;
   the lateral fastener is spaced from the lateral bottom surface by a distance different from a distance separating the medial fastener and the medial bottom surface.

3. A retaining device according to claim 2, wherein:
   the distance separating the lateral fastener and the lateral bottom surface is less than the distance separating the medial fastener and the medial bottom surface.

4. A retaining device according to claim 2, wherein:
   the distance separating the lateral fastener and the lateral bottom surface is greater than the distance separating the medial fastener and the medial bottom surface.

5. A retaining device according to claim 1, wherein:
   the fasteners of the linkages are each at least part of an articulation.

6. A retaining device according to claim 1, wherein:
   the lateral and medial portions are flanges.

7. A retaining device according to claim 1, further comprising:
   a base transversely border by the lateral and medial portions.

8. A retaining device according to claim 1, wherein:
   said at least one linkage comprises two linkages.

9. A retaining device according to claim 1, further comprising:
   a rear support element for supporting a user’s lower leg.