A device for supporting a foot or a boot on a sports apparatus, such as a snowboard binding. The device includes a base plate associated with a rear support element, which extends transversely between a lateral edge and a medial edge. The device includes at least one wing adapted to cover the foot or the boot, the wing extending longitudinally in the area of the lateral edge or of the medial edge of the rear support element, on the one hand, and substantially in the area of the lower portion of the rear support element, on the other hand.
DEVICE FOR SUPPORTING A BOOT ON A SPORTS ARTICLE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based upon French Patent Application No. 04.13450, filed Dec. 17, 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 invention relates to the field of devices for supporting a foot or a boot on a sports apparatus, and more particularly, to such a device that supports the lower leg. The invention relates also to an assembly including a boot and such support device. More particularly, the invention encompasses a snowboard binding as well as an assembly that includes a snowboard and binding.

[0004] 2. Background and Relevant Information

[0005] Support devices and bindings of the aforementioned types can be used for snowboarding or snowsurling, snow or water skiing, snowshoeing, roller-skating, or the like.

[0006] A device according to the prior art generally includes a base plate associated with a rear support element, or highback. The latter extends longitudinally along the lower leg between a fastening end and a free end, transversely between a lateral edge and a medial edge, and has a support surface opposite a free surface. Since it receives the back of the user’s lower leg, the support surface transmits sensory information along a longitudinal direction of the device. This direction is that along the longitudinal axis of the foot or of the supported boot. In particular, the support surface enables the user to receive forces transmitted from the rear or to transmit rearwardly directed forces during use of the sports apparatus to which the device is connected.

[0007] Occasionally, sensory information or steering forces are also transmitted substantially along a transverse direction with respect to the device.

[0008] This is, for example, the case in snowboarding, a sport which involves both of the user’s feet being retained onto the same board, substantially in a transverse direction with respect to the board. In this case, the transverse transmission in the area of the device corresponds to a longitudinal transmission in the area of the board. It is, for example, a matter of shifting the user’s weight towards an end of the board to initiate a turn, to take into account the contour of the terrain, to perform acrobatic figures, or the like.

[0009] In order to facilitate the transmission of sensory information or forces along a transverse direction of the device, the prior art has offered solutions.

[0010] U.S. Pat. No. 6,123,342 provides an example of a support device that includes a base plate associated with a rear support element, or high back, which, towards its free end, is longitudinally elongated forwardly by a lateral support plate, extending from an edge. The lateral support plate

receives a lateral portion of the user’s lower leg. Thus, by pressing transversely with the lower leg, the user transmits lateral steering forces. These forces are oriented transversely with respect to the device and longitudinally with respect to the board. Of course, sensory information is transmitted to the rider via the lateral support plate.

[0011] It has been noted, however, that the intensity of the transverse steering forces or of the sensory information is sometimes excessive. Indeed, because the lateral support plate is spaced from the base plate, the forces and sensory information are amplified. If the intensity of the forces or sensory information is too high, the steering or maneuvering of the apparatus can be disadvantageously affected. In such a case, any force or information is taken into account, although that is not necessary. Sometimes, application of an excessive force or the transmission of an excessive sensory information to the rider can even cause a steering error.

[0012] This is the case, for example, in snowboarding where too strong a steering force can modify the rider’s intended path of travel. Furthermore, overly amplified sensory information can mislead the rider, for example, as to the actual conditions of the terrain.

SUMMARY OF THE INVENTION

[0013] An object of the invention is to provide an improved support device. In particular, an object of the invention is to remedy the aforementioned drawbacks, and especially to enable a support device to transmit steering forces and to receive sensory information transversely and at moderate intensity.

[0014] To this end, the invention proposes a device for supporting a foot or a boot on a sports apparatus, the device including a base plate associated with a rear support element, the latter extending transversely between a lateral edge and a medial edge.

[0015] The support device of the invention includes at least one wing or extension adapted to cover the foot or the boot, the wing/extension extending longitudinally forward in the area of the lateral edge or of the medial edge of the rear support element, on the one hand, and substantially in the area of the lower portion of the rear support element, on the other hand.

[0016] Due to its proximity to the base plate, the wing/extension is located near the ankle or the lower portion of the lower leg. Thus, the steering forces or transverse sensory information are moderately amplified, i.e., amplified less than with a wing or extension at a higher elevation. As a consequence, steering forces applied by the rider are consistent with the rider’s intent, and only the sensory information necessary to steering are transmitted to the rider. As a result, steering the apparatus is advantageously and paradoxically easier.

BRIEF DESCRIPTION OF DRAWINGS

[0017] Other characteristics and advantages of the invention will be better understood from the description that follows, with reference to the annexed drawings showing, by way of non-limiting embodiments, how the invention can be embodied, and in which:

[0018] FIG. 1 is a front perspective view of a support device according to a first embodiment of the invention;
FIG. 2 is a cross-section along the line II-II of FIG. 1;

FIG. 3 is a view similar to FIG. 1, of a second embodiment of the invention;

FIG. 4 is a cross-section along the line IV-IV of FIG. 3.

DETAILED DESCRIPTION OF THE INVENTION

Although the embodiments of the invention described hereinafter are more particularly related to the field of snowboarding, it is to be understood that they can also apply to other fields, such as described above.

The first embodiment of the invention is shown by means of FIG. 1 and FIG. 2.

FIG. 1 shows a support device 1, in the form of a snowboard binding, that allows for a boot, not shown, to be supported on a board 2. According to the first embodiment, the support device 1 also allows for the removable retention of the boot.

In a known manner, the support device 1 includes a base plate 3, which extends longitudinally between a rear end 4 and a front end 5.

The base plate 3 includes a bottom 6 that has an upper surface 7 provided to be opposite the sole of the boot, and a lower surface 8 provided to be on top of the board.

The bottom 6 of the base plate 3 is retained to the board 2 by a means shown in the form of a disk 10, the latter being itself retained to the board 2 by screws 11.

Of course, other means known in the art for retaining the base plate 3 could be provided.

The bottom 6 of the base plate includes an upwardly extending lateral flange 12 and an upwardly extending medial flange 13, either made in one piece with the horizontal boot support between the flanges, or affixed thereto, on opposite sides of the base plate. Each of the flanges 12 and 13 forms a lateral part or a medial part, respectively, of the device 1 to demarcate a zone 14 for receiving the boot. Once the boot is in position on the device 1, the flanges 12, 13 run laterally along the sole. The lateral and medial portions of the base plate could be formed differently than in the form of the flanges 12, 13. For example, mere lateral and medial abutments could be used.

The flanges 12, 13 are connected by an arch 15, or loop, in the area of the rear end 4. As an optional construction, the bottom 6 of the base plate, the flanges 12, 13, and the arch 15 can be formed as a one-piece construction made of a synthetic material, for example. However, the flanges or the arch could be elements affixed to the base by any other means, such as adhesive, welding, screws, nesting, or the like.

A retaining arrangement is also provided to removably retain the boot on the bottom 6 of the base plate, between the flanges 12, 13, and in the receiving zone 14. The retaining arrangement can include, for example, a pair of straps, or other linkages, according to a non-limiting embodiment.

A first linkage 20 is located at the front, in the area of the metatarsophalangeal articulation when the foot is retained. A second strap 21 is located at the back, in the area of the instep when the foot is retained. Each of the linkages 20, 21 extends transversely between the flanges 12, 13. According to other embodiments encompassed by the invention, a different number of straps can be provided.

Each of the linkages 20 can be fastened, unfastened, or even opened. To this end, two ratchet tightening mechanisms are provided, a first mechanism 22 for the first linkage 20 and a second mechanism 23 for the second linkage 21. Thus, the user can put on or take off the boot, and adjust the retention of a boot in the device.

The device 1 also includes a rear support element 24, or high back, that enables the user to receive rear sensory impulses and to transmit generally rearward forces with the lower leg.

The rear support element 24 includes a forwardly facing concave plate 25, which extends longitudinally between upwardly from a fastening end 26 to a free end 27, transversely between a lateral edge 28 and a medial edge 29, and depth-wise between a support surface 30 and a free surface 31.

The support surface 30 is provided to receive the back of the user’s lower leg, the rear support element 24 and the base plate 3 being associated accordingly. According to a first embodiment of the invention, this association translates into the rear support element 24 being affixed to the flanges 12, 13, for example, by means of an articulation 32, or pivot connection. The articulation is substantially oriented along a transverse axis 33 of the device 1.

The articulation 32 can include any such component as a screw, a rivet, a washer, a screw nut, a swivel pin, or the like.

The articulation 32 allows the rear support element 24 to be pivot forwardly toward the base plate 3. A resulting advantage is that storage of the device 1 is facilitated. However, the rear support element could also be provided to be affixed to the flanges 12, 13 with no possibility of movement.

The rear support element 24 could also be affixed to the arch 15 or to the bottom 6. The rear support element 24 could also be affixed to the apparatus directly, in this case the board 2. It only has to be positioned on the apparatus to allow the rider’s lower leg to receive/transmit rearward forces.

According to the first embodiment of the invention, as shown in FIG. 2, an abutment 34 restricts the rearward rotation of the rear support element 24 about the axis 33.

In a non-limiting manner, the abutment 34 includes at least one element that projects with respect to the free surface 31 and which can abut against the arch 15 to stop rearward motion of the rear support element. The abutment 34 is affixed to the rear support element 24, in a fixed or an adjustable manner, by any means known to one having ordinary skill in the art. Possibility, the abutment 34 can form a unitary element with the support element 24.

The abutment 34 works by taking support on the arch 15. It could however function differently, for example,
by engaging with the apparatus 2. In any case, the abutment 34 enables the user to press rearward with the lower leg while restricting the rearward rotation of the support element 24.

[0043] The abutment could be differently embodied, for example, in the form of a cable. In this case, the latter can be attached to the flanges 12, 13 and go round the rear support element 24.

[0044] According to the invention, as shown in FIG. 1 and FIG. 2, the support device 1 includes at least one wing 50, 51 adapted to cover the foot or the boot, the wing 50, 51 extending longitudinally in the area of the lateral edge 28 or of the medial edge 29 of the rear support element 24, on the one hand, and substantially in the area of the lower portion of the rear support element 24, on the other hand. Each of the wings 50, 51 is adapted to at least partially cover the ankle and/or the flexion crease of the foot or of the boot. The wings 50, 51 enable the rider to transmit and receive transverse forces in the area of the ankle or in the area of the lower portion of the lower leg. The wings 50, 51 enable the transmission of sensory information between the foot or the boot and the board.

[0045] According to the first embodiment of the invention, the support device 1 includes a lateral wing 50, on the one hand, and a medial wing 51, on the other hand. The lateral wing 50 allows for the transmission of forces or the reception of sensory information on a lateral side of the user's body. The medial wing 51 functions between the legs. Only one lateral wing or only one medial wing could be provided in a particular embodiment. An advantage of having two wings 50, 51 is that the two sides of the device 1 function in the same manner.

[0046] Even if the wings 50, 51, as will be described in the description below, can be associated with various portions of the device 1, the wings 50, 51 are affixed to the rear support element 24 according to the first embodiment of the invention.

[0047] More specifically, each of the wings 50, 51 is affixed to the concave plate 25 of the rear support element 24. In this case, the wings 50, 51 are, for example, affixed to the plate 25 by the same means. Such means in FIG. 2 includes a bridge 52 that connects the lateral wing 50 to the medial wing 51. The two wings 50, 51 and the bridge form an integral unit 53, but one could also provide the wings 50, 51 to be attached to the bridge 52 by any means known to one having ordinary skill in the art. The bridge 52 is itself affixed to the plate 25 by a means such as glue, screws, ratchet locking, or the like. Thus, the wings 50, 51 can affixed either permanently or removably to the rear support element 24.

[0048] One could alternatively provide for the absence of a bridge. In such a case, the wings 50, 51 are directly affixed to the concave plate 25. One can also provide for an embodiment in which the wings 50, 51 and the concave plate 25 are made as a one-piece construction, whether by being molded as a single part or by another manner.

[0049] Each of the wings 50, 51 is located substantially in the area of the fastening end 26 of the rear support element.

[0050] More specifically, each wing 50, 51 extends along the length of the rear support element 24 from the fastening end zone 26 toward the free end 27.

[0051] According to the illustrated first embodiment, each wing 50, 51 extends along the length of the rear support element to substantially mid-way between the fastening end 26 and the free end 27. However, the top of the wing 50, 51 can be positioned slightly beneath the midway point or slightly above the midway point. This means that a wing 50, 51 is located near the articulation 32.

[0052] Each wing 50, 51 also extends away from the support surface 30, in a direction which corresponds to a direction that is substantially parallel to the flanges 12, 13 or substantially perpendicular to the support surface 30. In other words, each wing 50, 51 is substantially parallel to a transverse portion of the ankle or of the lower part of the lower leg. A wing 50, 51 thus provides the ankle or the lower part of the lower leg with a transverse support. The dimensions of the device and of the boot are provided such that the wings 50, 51 can remain in constant contact with the boot as the rider uses the snowboard. The transmission of sensory information is thus constant.

[0053] Each wing 50, 51 can include a material such as a non-reinforced or a reinforced plastic, such as a fiber-reinforced plastic, metal alloy, or any equivalent or other suitable material. Each of the wings 50, 51 is capable of reversible elastic deformation. Consequently, it can deform during the transmission of forces or sensory information, and later recover its initial shape.

[0054] In addition, a pad or cushion 54 can be provided on the side of the support surface 30 to partially cover the curved plate 25 or the bridge 52. The cushion 54 extends from the free end 27 towards the fastening end 26, for example, substantially up to the midway point between the ends 26, 27. The cushion 54 absorbs impulses of the lower leg at the rear.

[0055] The second embodiment of the invention is shown in FIG. 3 and FIG. 4. For reasons of convenience, only the elements necessary for a differentiation with respect to the first embodiment are shown.

[0056] A device 71 according to the second embodiment includes a base plate 72, which includes a bottom 73 border by a lateral flange 74 and a medial flange 75. An arch 76 connects the flanges 74, 75 to one another. A rear support element 77 is affixed to the base plate 72, for example, by means of an articulation 78. The rear support element 77 extends lengthwise between a fastening end 80 and a free end 81, width-wise between a lateral edge 82 and a medial edge 83, and depth-wise between a support surface 84 and a free surface 85. The device 71 also includes a first or front linkage 86 and a second or rear linkage 87. The first linkage 86 is located substantially in the area of the metatarsophalangeal articulation when the foot is retained. The second linkage 87 is located substantially in the area of the instep or of the ankle.

[0057] According to this embodiment of the invention, the retaining device 71 includes at least a wing 100, 101 adapted to cover the foot or the boot, the wing 100, 101 extending longitudinally in the area of the lateral edge 82 or of the medial edge 83 of the rear support element 77, on the one hand, and substantially in the area of the lower portion of the rear support element 77, on the other hand.

[0058] More specifically, according to this second embodiment of the invention, a lateral wing 100 is affixed to the lateral flange 74 and a medial wing 101 is affixed to the medial flange 75. Each wing 100, 101 is affixed to the flange 74, 75 by any means, such as glue, ratchet locking, nesting,
screws, or the like. The wing 100, 101 can be either permanently or removably affixed to the flange.

Each wing 100, 101 extends substantially parallel to the flange 74, 75, away from the bottom 73. Each wing 100, 101 thus provides the ankle or the lower portion of the lower leg with transverse support.

According to the second embodiment of the invention, each wing 100, 101 extends in part under the rear linkage 87, more precisely between the linkage and the bottom 73. Thus, the tightening of the linkage 87 guarantees that the wing 100, 101 is flattened against the foot or the boot. The transverse transmission of forces or of sensory information is improved.

From a general standpoint, the invention is embodied using materials and techniques known to the one having ordinary skill in the art.

The invention is not limited to the particular embodiments hereinabove described and includes all of the technical equivalents that fall within the scope of the following claims.

In particular, transverse asymmetries can be provided in the arrangement of the wings. The lateral and transverse forms can be different. It is also possible to provide only one side of the device with a wing.

1. A device for supporting a user’s foot or a boot on a sports apparatus, said device comprising:
   - base plate adapted to support the user’s foot or the boot;
   - a rear support element extending upwardly from the base plate, said rear support element adapted to support a rear of the user’s lower leg;
   - the rear support element extending transversely between a lateral edge and a medial edge and extending upwardly from a lower fastening end to a free upper end, said rear support element including a forward-facing support surface;
   - at least one wing extending longitudinally forwardly from the lateral edge or from the medial edge of the rear support element; and
   - said at least one wing extending substantially in a lower portion of the rear support element.

2. A device according to claim 1, wherein:
   - said at least one wing is adapted to cover in part at least the ankle and/or the flexion crease of the foot or of the boot.

3. A device according to claim 1, wherein:
   - said at least one wing comprises both a lateral wing and a medial wing.

4. A device according to claim 1, wherein:
   - said rear support element comprises a forwardly facing concave plate, said at least one wing being affixed to said concave plate.

5. A device according to claim 4, wherein:
   - said at least one wing extends along upwardly along the rear support element from a fastening end zone of the rear support element toward the free upper end of the rear support element, said wing extending away from the forward-facing support surface of the rear support element.

6. A device according to claim 2, further comprising:
   - a bridge connecting the lateral wing to the medial wing.

7. A device according to claim 1, wherein:
   - the base plate comprises a lateral flange and a medial flange;
   - said wing is affixed to the lateral flange or to the medial flange, the wing extending substantially parallel to said lateral or medial flange.

8. A device according to claim 7, further comprising:
   - at least one linkage adapted to extend over the foot or boot supported on the base plate;
   - said wing extends in part beneath said linkage.

9. A device according to claim 1, further comprising:
   - a cushion on the side of the forward-facing support surface of the rear support element.

10. A device according to claim 1, wherein:
   - the base plate includes a bottom bordered by a lateral flange and a medial flange.

11. A device according to claim 1, wherein:
   - said wing is made of a material capable of reversible elastic deformation.

12. An assembly comprising:
   - a boot; and
   - a device for supporting the boot on a sports apparatus, said device comprising:
     - base plate adapted to support the boot;
     - a rear support element extending upwardly from the base plate, said rear support element adapted to support a rear of a user’s lower leg;
     - the rear support element extending transversely between a lateral edge and a medial edge and extending upwardly from a lower fastening end to a free upper end, said rear support element including a forward-facing support surface;
     - at least one wing extending longitudinally forwardly from the lateral edge or from the medial edge of the rear support element; and
     - said at least one wing extending substantially in a lower portion of the rear support element.