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HEEL-HOLDING DEVICE FOR SAFETY SKI BINDINGS

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Fig. 3

Fig. 4

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HEEL-HELDING DEVICE FOR SAFETY SKI BINDINGS
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ABSTRACT OF THE DISCLOSURE

A closing pedal moves a sole holder to its locking position in response to the insertion of the skiing boot into the binding. The sole holder is movable to a release position automatically in response to an excessive tensile force, which is approximately vertically upwardly directed, or arbitrarily by the action of an opening device, the closing pedal and the sole holder being articulatedly connected. The closing pedal is pivotally and axially connected to the heel transversely to the longitudinal direction of the ski.

The present invention relates to a heel-holding device for safety ski bindings, which device comprises a closing pedal, which moves a sole holder to its locking position in response to the insertion of the skiing boot into the binding, whereas the sole holder is movable to a release position automatically in response to an excessive tensile force, which is approximately vertically upwardly directed, or arbitrarily by the action of an opening device, the closing pedal and the sole holder being articulatedly connected.

Various advantages are due to the fact that the closing pedal and the sole holder in such known heel-holding device are articulatedly connected to form a mouth, which receives the rear end of the sole of the skiing boot and which is opened in the release position and closed in the locking position of the device. In the first place, the insertion of the sole of the skiing boot into the heel-holding device is easier in this embodiment than with other known designs, in which the closing pedal and the sole holder are rigidly connected so that the distance between them is as large as the thickness of the skiing boot also when they are in their release position. Besides, a retention of the sole of the skiing boot between the closing pedal and the sole holder in the release position of the heel-holding device is prevented.

In the known heel-holding device to which the present invention relates, the closing pedal and the sole holder form parts of an articulated quadrant so that the device is expensive and cannot be manufactured at low cost.

It is an object of the present invention to provide a heel-holding device which has also the advantages of the known design described hereinbefore but can be manufactured in a simple manner and at low cost, is simpler in function and consequently is less liable to be damaged.

Based on a heel-holding device for safety ski bindings, which device comprises a closing pedal, which moves a sole holder to its locking position in response to the insertion of the skiing boot into the binding, whereas the sole holder is movable to a release position automatically in response to an excessive tensile force, which is approximately vertically upwardly directed, or arbitrarily

by the action of an opening device, the closing pedal and the sole holder being articulatedly connected, the above-mentioned object is accomplished according to the invention in that the sole holder is secured in known manner to a carrying member, which is pivoted on an axis extending behind the heel transversely to the longitudinal direction of the ski, the closing pedal is pivotally attached to the carrying member on an axis which is parallel to the pivotal axis of the carrying member, and the free end of the closing pedal bears on a cam track, which is fixed to the ski.

It has proved particularly suitable to design the cam which is engaged by the closing pedal and fixed to the ski to comprise a curved portion and a straight portion tangentially succeeding the curved portion, the center of curvature coinciding with the pivotal axis of the carrying member. In this case, a very small and lightweight heel-holding device can be provided.

In an advantageous design of the novel heel-holding device, that portion of the closing pedal which lies between the tread and the pivotal axis is so curved toward the tip of the ski that said portion engages the rear rim of the sole of the skiing boot during the last portion of the closing movement and thus exerts on said sole a forward pressure against a toe-holding device, which requires such forward pressure. In this design, a retention of the sole during a safety release is avoided whereas such retention may occur in the known devices, in which the portions which engage the sole from behind and are pressed against the sole are firmly connected to the sole holder, which is forced from above more or less obliquely against the sole.

An illustrative embodiment of the present invention will be described more fully hereinafter with reference to the accompanying drawings, in which:

FIG. 1 is a side elevation showing the novel heel-holding device in its locked position.
FIG. 2 is a similar elevation showing the device in release position.
FIG. 3 is a top plan view of FIG. 1, partly cut open, and
FIG. 4 is a sectional view taken on line IV—IV of FIG. 3.

The novel heel-holding device shown in the drawing has a baseplate 1, which is secured to a ski. To this end, the baseplate 2 is provided with three screw holes 2. The baseplate carries three opposite cheeks 3, 4, which extend vertically upwardly and in the longitudinal direction of the ski. A pin 5 is mounted in the cheeks and serves as a pivot for a carrying member 6, to which a sole holder 7 is secured. The sole holder is held on the carrying member so as to be detachable and adjustable in height for adaptation to soles having different thicknesses. For this purpose, the carrying member has at its rear end directed toward the tip of the ski a vertical bore 8, in which a slider 9 is slidably mounted. The slider is provided with a tapped hole, which is threaded engagement with a screw 10, which carries the sole holder and extends through a vertically elongated slot 11 in the carrying member 6. To prevent a rotation of the sole holder, the contacting surfaces of the carrying member and of the sole holder are, e.g., roughened or provided with interengaging serrations.

One end of the pin 5 is directly mounted in the cheek 3 and held against rotation. The other end of the pin 5 is screw-threaded and mounted in the cheek 4 with the aid of a bushing 12. The latter has at its outer end an end wall, which is formed with a tapped axial hole 13 for the end of the bolt. The end wall extends beyond the diameter of the bushing and forms a flange, which has a knurled or milled peripheral surface for more convenient manipulation. The carrying member 6 is pivotally and axially
displaceably mounted on the pin 5 and is urged by a compression spring 14 against a spacing ring 15, which bears on the cheek 3. The other end of the compression spring bears on the bushing 12 in the cheek 4. The initial stress of the spring can be varied by a rotation of the bushing.

The cheek 3 has a vertical guide groove 16, in which a sliding member 6 is displaceably mounted, the sliding member 6 being movable in a downward direction against the force of a pair of leaf springs 18, 19. On its side facing the carrying member 6, the slider has two cams 20. Only one of these cams is shown in FIG. 3. In the normal position of the device, with the slider in its upper end position, the two cams 20 lie in the curvature of pivotal movement of two cam tracks. The noses 21, which are provided on the carrying member 6 (FIGS. 3 and 4). Each cam and the nose associated with it form a detent device, which prevents a pivotal movement of the carrying member.

A closing pedal 22 is pivoted to the carrying member 6 by means of a rivet 23, which is parallel to the pivotal axis of the carrying member. The closing pedal has substantially the form of a U, which is suspended at its free limb ends and has a web which forms the tread. The exact form of the limbs is apparent from FIGS. 1, 2 and 4. At least close to the web, the distance between the limbs is large as the distance between the two cheeks 3 and 4. The end faces of those cheek halves which extend toward the sole holder form cam tracks for the lower ends of the limbs of the closing pedal 22. Each cam track consists of a curved portion 24 and a straight portion 25, which tangentially merges with the curved portion 24 of the cam track. The center of curvature of portion 24 coincides with the pivotal axis of the carrying member. The limbs of the closing pedal are curved from its pivotal connection to the carrying member toward the tip of the ski. The inner radius of curvature corresponds to the radius of curvature of the cam track. This curvature changes into an oppositely directed one close to the lower end.

The articulated joint between the sole holder and the closing pedal enables a relative movement between the two parts during the opening and closing of the heel-holding device. As has been stated in the introductory part of this specification, such pivotal movement facilitates the stepping into and out of the binding. In the locking position shown in FIG. 1, the distance from the sole holder to the tread of the closing pedal is as large as the thickness of the sole of the skiing boot. When the carrying member 6 and the sole holder 7 are secured to it and the pivoted closing pedal 22 are pivotally moved to the release position, shown in FIG. 2, the tread of the closing pedal will lag behind the sole holder as long as the lower ends of the limbs of the closing pedal are still in contact with the straight portions 25 of the cam tracks. This results in the desired larger distance between the sole holder and the tread.

The closing pedal limbs, which are convex toward the tip of the ski, contact the rear edge of the sole of the skiing boot during the last part of the closing movement and thus apply a forward pressure thereto against a heel-holding device, which is disposed before the skiing boot.

The slider 17 is normally in its upper end position under the action of the pair of leaf springs 18, 19. In this position, the underside of a recess 26 formed in the slider and indicated in dotted lines in FIG. 4 bears on the spacing ring 15, which is carried adjacent to said recess 26 by a pin 5 extending through the recess. If the device is in its locking position shown in FIG. 1 and an arbitrary movement to the unlocking position shown in FIG. 2 is desired, the slider 17 is to be depressed against the force of the leaf springs 18, 19 to such an extent that the cams 20 of the slider are moved out of the ranges of pivotal movement of the noses 21 of the carrying member 6. The carrying member together with the sole holder and the closing pedal can then be pivotally moved. Only frictional forces rather than spring forces must be overcome for this pivotal movement. When the noses 21 have been moved beyond the cams 20, the leaf springs 18, 19 urge the slider 17 back to its initial position if pressure is no longer exerted on the slider from above. To hold the carrying member in its open position, the slider is provided with an extension 27 (SEE FIG. 3), which is engaged by the upper nose of the carrying member at the end of the pivotal movement. The slider 17 can be depressed, e.g., with the ski stick. For this purpose, a depression 28 for inserting the tip of the ski stick is provided in the slider (SEE FIG. 3).

When an excessively high, approximately upwardly directed tensile force acts on the sole holder 7 during skiing, the noses 21 of the carrying member 6 move past the cams 20 of the slider 17 so that the spring 14 is compressed and the carrying member performs a pivotal movement to its release position. As a result, the skiing boot is released by the device. The release hardness is adjusted by a rotation of the bushing 12 to change the initial stress of the compression spring 14.

When a downward force is exerted on the ski, the heel applies pressure to the closing pedal 22 so that the carrying member 6 is pivotally moved. As a result, the noses 21 move past the cams 20. As the latter have a gentle slope on the rear, the detent resistance can easily be overcome during stepping in.

To enable an adjustment of the heel-holding device to skiing boots having different lengths, the baseplate may be held on the ski for adjustment along guide rails in the longitudinal direction of the ski rather than being directly secured to the ski 1.

An adjustment will also be enabled if the screw holes 2 consist of slots. In this case, the underside of the baseplate may be at least partly serrated and the serrations may interengage with mating engagements on the upper face of an adapter, which is fixed to the ski. If the adapter consists of a material which is softer than that of the baseplate, e.g., of a plastic material, the mating serrations in the adapter may be formed, e.g., during the first assembling of the heel-holding device in that the serrations of the baseplate are forced into the softer material.

1 claim:

1. A heel-holding device for an automatically releasing safety ski boot, said device comprising mounting means, a carrying member pivoted mounted to said mounting means on an axis extending transversely to the longitudinal direction of the ski, a sole holder adjacently mounted on said carrying member, a closing pedal pivotally connected near one of its ends to the said carrying member on an axis parallel to the pivotal axis of said carrying member, the surface of said mounting means including a curved portion and a straight portion tangentially succeeding said curved portion forming a cam track, the center of curvature of said curved portion coinciding with the pivotal axis of said carrying member, the free end of said closing pedal bearing on said cam track.

2. The heel-holding device of claim 1 in which the portion of the said closing pedal which lies between the said free end and the said pivot end is curved.

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