SKI-BINDING HEEL MECHANISM

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ABSTRACT
A ski-binding heel mechanism comprising a movable housing to a main housing to be attached to a ski. The movable housing is provided with a step plate and also a heel clamp. In particular, the movable housing is provided with a cam roller that reacts against a compound cam surface of a spring-loaded plunger provided in the main housing. Said compound cam surface comprises an upper (hold) face and a lower (release) face. A lever is provided in the main housing which is independent of the movable housing and which operates to effect a manual release of the ski boot, by pressing down upon a reaction member associated with the movable housing.

In a preferred form of the invention, the heel clamp is pivoted to the movable housing by a bolt to allow adjustment of the heel clamp for different sized boots. Also, a set screw adjustment is provided to permit adjustment of the release pressure.

9 Claims, 6 Drawing Figures

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This invention relates to a ski-binding heel mechanism which operates to hold the heel of a ski boot to the upper surface of its respective ski and also to release said heel of said ski boot when lateral forces acting on said heel ski boot safety binding exceed a pre-determined, adjustable threshold level. A skier's legs are normally subjected to strong longitudinal and lateral forces when skiing. If such forces are allowed to stress the skier's legs too severely, the skier may suffer sprained muscles, torn ligaments, or even broken bones. In order to avoid such injuries, releasable bindings at both the toe and heel ends of the skier's boots are generally used to fasten each boot to its respective ski runner, or ski, said bindings operating to release instantaneously when subjected to forces exceeding a pre-set level.

The subject of this invention is a releasable binding for the heel end of a ski boot, said releasable binding herein referred to as a heel ski boot safety binding. Because it is recognized that such heel ski boot safety bindings are not new in the sport of skiing, and also that many such bindings have already been patented, it is necessary to emphasize that the present invention offers significant advantages and improvements over such devices already patented.

Accordingly, an object of the present invention is to provide a heel ski safety binding that releasably holds the heel end of a ski boot to a ski, allowing an upward release of said heel end of said ski boot when said pressure exerted against said heel ski safety binding exceeds an adjustable, pre-set level. In an alternate embodiment, limited lateral release of said heel end of said ski boot is provided.

A further object of the present invention is to provide a heel ski safety binding having no appreciable lateral play and that defines upward normal shock and vibration limits. In the absence of releasing, and further, when so deflected, will restore itself to its former latched position from any deflected position short of the position corresponding to release. The above described action is independent to, and in no way affects the releasing action of said heel ski safety binding, wherein said binding automatically releases the heel end of said ski boot when the upward force on said binding exceeds an adjustable, pre-set level.

A further object is to provide a heel ski safety binding having manual releasing means independent of the actual release mechanism; manual release is made extremely reliable and vulnerable to clogging and freezing or otherwise affecting the release mechanism.

A further object of the present invention is to provide a heel ski safety binding featuring a step plate, which makes said binding unusually easy to engage and disengage.

A further object is to provide a heel ski safety binding having set for the pre-set release point. The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with other objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings in which:

FIG. 1 is a perspective view of the heel ski safety binding, shown as it is mounted to a ski's upper surface.

FIG. 2 is a plan view, partially broken away, as it appears along line 2--2 in FIG. 1.

FIG. 3 is an end view taken along line 3--3 in FIG. 2.

FIG. 4 is a cross-sectional view taken along line 4--4 in FIG. 2, showing the movable housing in latched position.

FIG. 5 is also a cross-sectional view taken along line 4--4 in FIG. 2, but with the movable housing shown in the unlatched position.

FIG. 6 is a transverse section taken along line 6--6 in FIG. 2.

Referring to FIG. 1, the main housing 1 is secured to the upper surface of the ski 2 by screws 3 and retainer 5, and is made adjustable by means of slots 4 and serrated surfaces 6 and 6'. A movable housing 7 includes forwardly extending plunger 16 causes the movable housing 7 to rotate upward, effecting release of the heel end of the ski boot. Referring back to FIG. 4, manual release of said heel of said ski boot is effected easily by raising the rearward end of the release latch 12. The opposite end of said release latch 12, where said release latch 12 is pivoted to the main housing 1 by pivot pin 19, then moves downward against roller 20, as pivoted by pivot pin 21, turning the movable housing 7 counter-clockwise, and moving cam roller 13 downward to the lower cam surface 15 where the steeper incline of said lower cam surface 15 allows the heel clamp 9 to travel upward, effecting release of the heel end of said ski boot.

Referring to FIG. 5, re-insertion of the heel end of the ski boot into the heel ski safety binding is made effective and simple by the construction of the step plate 11. As the boot comes down into the heel ski safety binding in the open, or released position, the bottom of the heel pushes downward on the step plate 11, which step plate 11 turns about its pivot 8 until stop 22 presses against the lower surface of the movable housing 7, causing said movable housing 7 to turn clockwise until cam roller 13 is moved to the upper cam surface 14 of plunger 16, where the greatly-increased torque now exerted by said plunger 16 causes the movable housing 7 to rotate further.
clockwise, until the heel clamp 9 securely holds the heel end of the ski boot 26 between itself and step plate 11. The heel ski safety binding is then in the normal holding position.

While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects, and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

1. A heel safety-binding mechanism for skis including, in combination, a main housing constructed for securement to a ski, a movable housing, means for pivoting said movable housing to said main housing for rotation about a horizontal axis, said main housing having an essentially horizontal, longitudinal guide passageway, a plunger disposed for longitudinal reciprocation in said guide passageway, spring means for urging said plunger forwardly, said plunger having a head provided with a forwardly facing compound cam surface having an upper cam surface portion facing in a direction above said pivoting means and a lower cam surface portion of steeper incline than that of said upper cam surface portion and facing in a direction below said pivoting means, a heel clamp assembly including said movable housing and having a step plate pivoted to said movable housing for movement about a horizontal, transverse axis, a forwardly extending heel clamp, means for mounting said heel clamp to said movable housing, said movable housing being provided with a revolvable, transversely mounted cam roller disposed in rotary contact with said compound cam surface of said plunger head, said movable housing having reaction means, a lever pivoted to said main housing and engaging said reaction means for selectively pivoting said movable housing to effect manual release of a ski boot, said reaction means engaging said lever for automatically restoring said lever to original position upon the re-entry of a ski boot heel beneath said heel clamp and depression thereof by said step plate, said step plate including stop means engageable with said movable housing to effect a downward movement of said heel clamp with downward terminal movement of said step plate, said lever being constructed and arranged to depress selectively said reaction means sufficiently that said cam roller is advanced from said upper cam surface portion to said lower cam surface portion for manual binding release.

2. Structure according to claim 1 wherein said reaction means comprises a movable roller means journaled to said movable housing.

3. Structure according to claim 1 wherein said main housing has a forward opening receiving said movable housing, said forward opening being dimensioned such that when said heel clamp is disposed in the uppermost position said main housing is relieved at said forward opening sufficient for said movable housing to assume a forwardly inclined position.

4. Structure according to claim 1 wherein said movable housing includes a threaded bore, said heel clamp mounting comprising a threaded bolt disposed through said heel clamp and threaded engaging said threaded bore, whereby to enable up and down adjustment of said heel clamp relative to said movable housing.

5. Structure according to claim 1 wherein said upper and lower cam surfaces are constructed and arranged such that during time intervals when said cam roller is riding on said upper cam surface portion said heel clamp will be retained in heel securing position through the relief action of said spring means and when said cam roller commences to proceed downwardly over said lower cam surface, said movable housing is pivoted upwardly whereby to release the heel of the user's ski boot.

6. Structure according to claim 1 wherein said main housing includes adjustment means backing said spring means, said plunger, spring, and adjustment means are constructed and arranged to adjust spring pressure and hence the release point relative to the heel clamp of said mechanism.

7. A ski boot heel safety binding mechanism including, in combination a housing constructed for mounting to the upper surface of a ski, said housing being provided with a spring plunger and a spring urging the latter forwardly, said plunger having a forward compound cam face providing an upper cam portion, a lower cam portion, and a break point juncture disposed therebetween, a movable housing pivoted to said main housing and having a rearwardly extending portion, a cam roller journaled to said rearwardly extending portion and rollingly engaging said compound face of said plunger, a step plate pivotably secured to the combination of said main and movable housings and having stop means engageable therewith for restricting movement with respect to said movable housing, a heel clamp secured to said movable housing, said movable housing, cam roller, and plunger being constructed and arranged such that an automatic release of said ski binding, as produced through the pressured reaction of said plunger under the pressure of said spring acting upon said cam roller, is effected solely after said cam roller has proceeded downwardly past said break point juncture, said plunger under said spring pressure serving to pivot said movable housing for movement in a downward direction when said upper cam portion is engaging said cam roller.

8. A heel safety-binding mechanism for skis including, in combination, a main housing constructed for securement to a ski, a movable housing, means for pivoting said movable housing to said main housing for rotation about a horizontal, longitudinal guide passageway, a plunger disposed for longitudinal reciprocation in said guide passageway, spring means for urging said plunger forwardly, adjustment means for selectively varying the spring pressure exerted by said spring means against said plunger, said plunger having a head provided with a forwardly facing compound cam surface having an upper cam surface portion facing in a direction above said pivoting means and a lower cam surface portion of steeper incline than that of said upper cam surface portion and facing in a direction below said pivoting means, a heel clamp assembly including said movable housing and having a step plate pivoted to said movable housing for movement about a horizontal, transverse axis, a forwardly extending heel clamp, means for mounting said heel clamp to said movable housing, said movable housing being provided with a revolvable, transversely mounted cam roller disposed in rotary contact with said compound cam surface of said plunger head, said movable housing having reaction means, a lever pivoted to said main housing and engaging said reaction means for selectively pivoting said movable housing to effect manual release of a ski boot, said reaction means engaging said lever for automatically restoring said lever to original position upon the re-entry of a ski boot heel beneath said heel clamp and depression thereof by said step plate, said step plate including stop means engageable with said movable housing to effect a downward movement of said heel clamp with downward terminal movement of said step plate, said lever being constructed and arranged to depress selectively said reaction means sufficiently that said cam roller is advanced from said upper cam surface portion to said lower cam surface portion for manual binding release.

9. Structure according to claim 1 wherein said bolt means, and said heel clamp at said aperture, include contiguous, aligned grooves, and means disposed cooperatively in said grooves for retaining the same in essential alignment.

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