SAFETY BOOT HEEL CLAMP FOR SKIS WITH RELEASE AND RECOCKING MEANS
10 Claims, 8 Drawing Figs.

ABSTRACT: A safety boot heel clamp for skis provided with means to easily release the clamp and second means to automatically recock the clamp by simple downward pressure exerted by the boot heel.
SAFETY BOOT HEEL CLAMP FOR SKIS WITH RELEASE AND RECOCKING MEANS

Safety boot clamps or bindings for skis are known, in which the release and/or recocking operations must be manually effected by the user, these operations being difficult to effect especially in deep snow or on a steep hill.

Moreover, after each boot release, it is necessary to recock the clamp and this constitutes an additional operation for the user.

The present invention has for its object to obviate the above-noted disadvantages in an efficient and simple manner.

In accordance with one embodiment of the invention, there is provided at least one arm, one end of which rests on the recocking means for the elastic safety locking means and the other end of which is slidably mounted in a longitudinal slot and is connected to said elastic means, and at least one crank arm articulated on the clamp housing and engaging a notch in the arm and forming therewith a toggle lever arrangement tensioning the elastic means by downward push of the boot heel on the recocking treble of the boot retaining jaw, and the release of said elastic means by action on said crank arm.

In accordance with another embodiment, the above-noted arm carries a roller or a ramp cooperating with a fixed ramp or roller to cause, by downward pushing of the boot heel on the front end of the arm, the tensioning of said elastic means.

Again in this embodiment, the fixedly mounted roller, or ramp, with which the ramp or roller of the arm coacts, can be disengaged, thereby releasing the elastic safety locking means, and allowing opening of the boot clamping jaw.

The invention will become more apparent during the following disclosure and by referring to the drawings, in which like reference characters indicate like elements throughout:

FIG. 1 shows in longitudinal elevation a clamp in accordance with a first embodiment in boot clamping or closed position on a ski;

FIG. 2 is a longitudinal section of the clamp of FIG. 1;

FIGS. 3 and 4 show the same embodiment in different stages of its operation;

FIG. 5 is a longitudinal section of a second embodiment in closed position;

FIG. 6 is a similar section of the second embodiment in open position; and

FIG. 7 and 8 are longitudinal sections of a third embodiment in closed and open position, respectively.

In FIGS. 1 and 2, the boot heel 1 is clamped on a ski 2 by means of jaw 3 of a clamp housing 6. This jaw is pivoted on a shaft 7 and resiliently maintained in closed position by a latch 8 slidable in guide ways 9 and by a tension spring 10 attached at one end to said latch 8 and urging the latter in the direction of arrow 11, the other end of the spring 10 being attached to a transverse shaft 12 slidable in longitudinal slots 13 of the clamp housing 6.

Two arms 21 are secured to shaft 12 at one end and the opposite end 17 overlies treble 18 of the jaw 3, said treble serving to recock the clamp. Moreover, each arm 17 is provided with a notch 19 for receiving a stud 20 of a crank arm 21 secured to a shaft 22 pivotable in the clamp housing and elastically urged in accordance with arrow 23 by a spiral spring 24 resting at one end on the clamp housing and having its other end engaging under a lever 26, secured to shaft 22.

Crank arms 21 and arms 16 constitute a toggle lever system.

The clamp operates in the following manner:

Jaw 3 retains the boot heel due to the action of latch 8 and tension spring 10 maintained under tension, because studs 20 engage notches 19 of arms 16 (see FIGS. 1 and 2). In fact, the three shafts 12, 20, and 22 are pivotable in sliding slots, respectively, on stationary shaft 17 pivoted by the clamp housing 6 in the direction of arrows 27 by a spiral spring 32 (see FIG. 2). This push plate acts on lever 26 and therefore rotates shaft 22 and crank arms 21 in accordance with arrow 27. This operation allows the release of studs 20 from notches 19 and, therefore, arms 16 are now free. These arms slide forwardly under the boot heel in the direction of arrow 24; shaft 12 moves forwardly in slots 13 and causes the release of the retaining spring 10. Jaw 3 being no longer under the action of spring 10, is urged into open position under the action of a spiral spring 28 attached at one end to the jaw and at the other end to shaft 7. Spring 28 opens the jaw in the direction of arrow 27. The jaw treble 18 raises the end 17 of arms 16 in a position for the next boot clamping and safety mechanism recocking operation.

Moreover, during the raising of arms 16, the crank arms 21 which are urged in the direction of arrow 23 by spiral spring 25 (see FIG. 2), rotate to a substantially upright position whereby their studs 20 again engage notches 19 (see FIG. 4). The clamp is therefore ready for the next boot clamping operation.

For this purpose, it is only necessary for the user to engage the boot heel under the jaw and to press down on arm end 17. The jaw pivots downwardly by action of the boot heel on the treble 18 and is hooked by latch 8 (see FIG. 2), which is simultaneously pulled by spring 10, itself put under tension due to the toggle lever mechanism constituted by arms 16 and crank arms 21. Thus, shaft 12 is pushed rearwardly within slots 13 of the clamp housing. The clamp is now in latched position, as shown in FIGS. 1 and 2.

In FIGS. 5 and 6, clamp housing 40 has pivoted therein a jaw 41 for retaining a boot heel 1 on a ski 2. This jaw 41 is retained in closed position by a tension spring 42 attached at its other end to a transverse shaft 43 of an arm 43. Shaft 12 is slidable in guide slots 15 of the clamp housing. Arm 43 rests at its forward end on the treble 46 of the jaw 41 and is maintained in a position tensioning spring 42 by means of a roller 47 carried by arm 43, said roller coacting with a ramp 48 of a cam 49 and allowing, when the arm is in the raised position, shown in FIG. 6, the release of tension spring 42 and, therefore, opening of the jaw which is then urged into open position by spiral spring 28, one end of which is secured to the pivot shaft 7 of the jaw.

For the boot clamping operation, the downward push exerted by the boot heel on arm 43 causes, in addition to the closing of the jaw by its treble 46, the rearward movement of arm 43, this rearward movement being caused by roller 47 moving on ramp 48 and therefore tension spring 42 is recocked.

Advantageously, in order to allow manual opening of the clamp, cam 49 is pivotally mounted on jaw shaft 7 and abuts against a lever 59 which is pivoted to the clamp housing at 51 and maintained in a cam retaining position by a leaf spring 52 attached to the clamp housing.

A downward push on lever 50, for example by means of the end of a ski pole, causes the release of cam 49 which then can pivot in accordance with arrow 27 to allow forward movement of arm 43 in the direction of arrow 24. This causes release of tension spring 42 and opening of jaw 41.

In FIGS. 7 and 8, clamp 60 is differentiated from the embodiment of FIGS. 5 and 6 by the fact that the ram 61 and the roller 62 are disposed in inverted position, that is respectively on the arm 63 and on a support 66 which is pivoted on a shaft 67 and latched by a release lever 69. Moreover, in order to improve the operation of the mechanism, shaft 70 to which is attached the locking tension spring 71, the latter also attached to jaw 72, is no longer slidably mounted in slots 13 but rotates in a link 73 which pivotally rotates on stationary shaft 76 serving as a pivot for the release lever 69. Rotation of lever 69 in the direction of arrow 27 against the action of a leaf spring 77, causes the release of support 66, forward movement of arm 63 in the direction of arrow 24 and, therefore, the release of spring 71. Jaw 72 being now free, is urged into open position in the direction of arrow 27 under the action of spiral spring 28.
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1 claim:
1. A ski boot heel safety clamp comprising a housing, a boot heel engaging jaw having a treadle and pivoted in said housing between open and closed position, shaft means mounted in said housing for movement towards and away from said jaw, tension spring means acting on said jaw and on said shaft means to urge said jaw into closed position, an arm pivoted at one end to said shaft means and having its other end resting on said treadle whereby lowering movement of said arm by a ski boot heel causes pivoting of said jaw into closed position, spring means urging said jaw into open boot releasing position and said treadle into raised position, means engageable with said arm and causing movement of said arm and shaft means away from said jaw into a retracted position and, consequently, tensioning of said tension spring means, upon said lowering movement of said arm, by a ski boot heel and release means acting on said means engageable with said arm to release the last named means from said arm.

2. A clamp as claimed in claim 1, wherein said means engageable with said arm include a crank arm pivoted in said casing and carrying a stud, said arm having a notch engageable by said stud, spring means urging said crank arm into a substantially upright position, said arm, when in lowered position, causing said stud, shaft means and pivotal axis of said crank arm to be in substantial alignment to maintain said arm in retracted position.

3. A clamp as claimed in claim 2, wherein said release means include a pusher plate pivoted on said housing at the top thereof, a lever secured to the pivotal axis of said crank arm and engageable by said pusher plate to move said crank arm into notch disengaged position.

4. A clamp as claimed in claim 2, wherein said housing has slots in which said shaft means are slidably mounted.

5. A clamp as claimed in claim 1, further including a latch member slidably mounted in said housing and engageable with said jaw, said latch member attached to said tension spring means and retaining said jaw in closed position when said tension spring means are stressed.

6. A clamp as claimed in claim 1, wherein said tension spring means are directly attached to said jaw and said means engageable with said arm include a cam member mounted in said housing and having a ramp, roller means carried by said arm and engageable by said ramp, said ramp causing movement of said arm away from said jaw upon lowering of said arm and allowing movement of said arm towards said jaw upon raising of said arm.

7. A clamp as claimed in claim 6, wherein said release means include a pusher plate pivotally mounted in said housing on the top thereof, said cam member being pivotally mounted on the pivotal axis of said jaw and held against pivotal movement by engagement with said pusher plate, pivotal movement of said pusher plate releasing said cam member to allow pivotal movement of the latter and, consequently, forward movement of said arm.

8. A clamp as claimed in claim 6, wherein said housing has longitudinal slots, said shaft means mounted for slidable and guided movement is said slots.

9. A clamp as claimed in claim 1, wherein said tension spring means are directly attached to said jaw and further including link means pivoted on said housing at one end and carrying said shaft means at their other end, said means engageable with said arm including a support mounted in said housing, roller means carried by said support, said arm having a ramp and notch engageable by said roller means, whereby upon lowering movement of said arm, said roller means will ride on said ramp and will cause rearward displacement of said arm.

10. A clamp as claimed in claim 9, wherein said support is pivotally mounted in said housing and wherein said release means include a pusher plate pivoted in said housing and normally engaging said support and retaining the same against rotation, pivotal movement of said pusher plate disengaging said support and allowing longitudinal movement of said arm.