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P. UNGER

3,194,573

SAFETY HEAD FOR SKI BINDINGS

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2 Sheets-Sheet 2

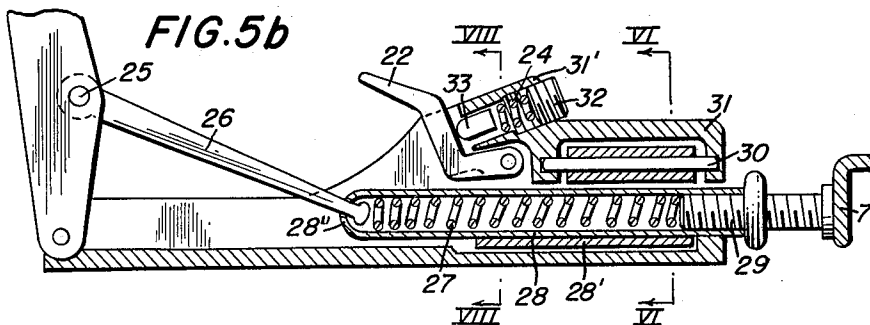
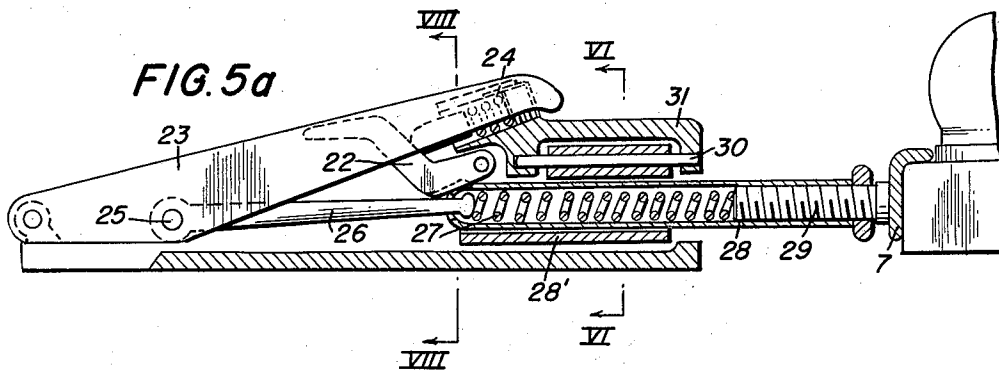


FIG. 6a

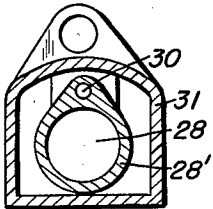


FIG. 6b

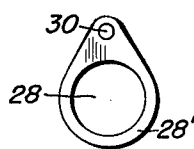


FIG. 6c

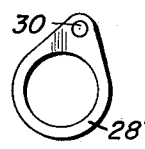


FIG. 7a

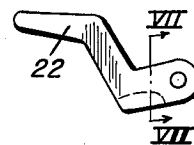


FIG. 7c

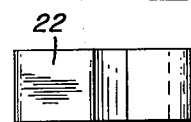


FIG. 7b

FIG. 8a

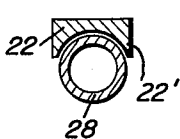
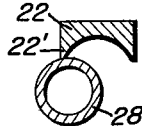


FIG. 8b



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3,194,573

SAFETY HEAD FOR SKI BINDINGS

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U 8,682

9 Claims. (Cl. 280—11.35)

The invention relates to ski bindings and is particularly concerned with a safety head for ski bindings, and it is particularly intended to provide a safety device to protect skiers in the event of forward and turning or twisting falls in a reliable and simple manner.

It is already known to provide a rotatable safety head for protection during turning falls in which case turning is first impeded by a spring biased ball which engages the safety head and which only becomes disengaged as a result of an excessive torsional load. The danger to the skier in connection with forward falls is to be prevented here in that the so-called tensioner is released when the pull on the binding cord is too great. With this binding as well as with other known safety bindings it is first of all a disadvantage that the release means are not adjustable or only to an insufficient extent. As a result, these bindings can release the foot too soon, which is highly undesirable for the skier because in the event of any considerable force on his binding he must expect that it will be unintentionally released. On the other hand there is the danger that these bindings are set too tightly so that they no longer afford the skier the intended protection against fractures in the event of forward or twisting falls.

The so-called safety bindings involve further problems in that after being released it is not readily possible, especially for unskilled skiers, to bring them back to the initial position. This is the case for example with the safety bindings described above because there the relatively small safety head must be swung back against the total spring pressure of the ball catch. In this connection it must also be taken into consideration that the manipulations must usually be performed out of doors on an ice covered ski and at very low temperatures.

Furthermore a safety head or a safety binding of this type must provide the facility of lifting the foot from the ski for climbing as well as to establish the desired fixed connection between ski and foot prior to the start.

Safety bindings are also known which have a device which during a forward fall as well as during a turning fall effects the unlatching, i.e., the release of the foot, but such bindings are inherently of complicated technical construction and therefore expensive to manufacture while at the same time they are subject to failure. Besides the components of such devices are frequently exposed and therefore are insufficiently protected against the entrance of snow and ice so that as a result they may fail to function during use.

It is an object of the invention to provide a safety head for ski bindings where the aforementioned shortcomings are avoided and which particularly insures of satisfactory and ready operation and where the danger of icing is prevented.

Therefore in accordance with the invention a pressure member is provided for the release that is rotatable as well as longitudinally slidable where the turning and/or longitudinal sliding of the pressure member is possible only after overcoming of the counter forces of the springs that can be adjusted to the required strength in a known manner. In a preferred embodiment of the invention the pressure member is in the form of a bolt which together with its catches or detents and the springs is

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encompassed by the housing of the safety head. Such a safety head therefore is of very advantageous as well as simple construction. On the one hand the construction is relatively economical and on the other hand the safety head is very robust as well as responsive and reliable in operation.

Inasmuch as this safety means comprises merely the safety head arranged at the front end of the foot, i.e., substantially in a line with the latch for the shoe, it leaves the choice of the remaining binding parts entirely optional. Consequently the safety head in accordance with the invention can be employed with any type of binding means and can be adapted to all requirements or demands arising in practice. In accordance with a further object of the invention, it is also made possible to combine this safety head with a tensioner in such a manner that the pressure member during forward fall as well as also during turning fall becomes immediately effective for releasing the tensioner, thereby providing a ski binding that is readily and simply operative while being safe at the same time.

As already mentioned, all parts may be encompassed by a common housing. In this manner the danger is avoided of the operativeness or the reliability of the safety head being affected by soiling or entrance of snow and ice. That is of very decisive significance for a device which serves for the protection of the skier.

A further advantage resides in that the pressure member can be readily returned to the initial position upon release of the binding and without use of essential force. To facilitate the return movement and also to improve the release it is a further object of the invention to mount the boot latch on an angular offset of the pressure member which is in the form of a lever so that the release force and the resetting force act by way of the lever arm on the pressure member. With the aforementioned combination of the safety head with a tensioner, it is even possible to return simultaneously with the latching movement of the tensioner, also the released safety device to their initial positions so that these two operations can be carried out in a single operation. This facilitates the operation not only for unskilled persons but is also of decisive advantage for participants in sporting events because on the one hand they can readily use the long strap binding which is conventional and on the other hand secure the released ski to the boot with a single manipulation, thereby being enabled to continue the race without considerable loss in time.

It is of significance here that if the safety device in accordance with the invention is used, the straps of the long strap binding need not be placed again after the release but that the ski boot with the strap closed about it can immediately be replaced on the ski and the tensioner can be latched in the manner described.

In addition the safety head in accordance with the invention is structurally simple while separate accessories such as turn plates are avoided. Also it requires relatively little space and can be installed ahead of the boot, between boot and tensioner or it can be structurally combined with the latter.

Further objects and advantages will become apparent from the following description of the embodiments illustrated in the drawings in which:

FIGS. 1a, 1b show a longitudinal section of the safety head with a part of the ski boot where also as with the remaining figures the numeral associated with a shows the operative position and the numeral associated with b shows the parts upon being released;

FIGS. 2a, 2b illustrate the corresponding cross sections of the operative and inoperative positions taken along lines II—II of FIGS. 1a, 1b;

FIGS. 3a, 3b are partial views showing sections of the operative and inoperative positions of the boot latch with respect to the ski;

FIGS. 4a, 4b are partial views showing the forward end of the pressure member in relation to the detent ball;

FIGS. 5a, 5b illustrate the operative and the inoperative position of the parts of a different embodiment of the invention in longitudinal section;

FIG. 6a is a cross section along line VI—VI in FIGS. 5a and 5b;

FIG. 6b is a view indicating the normal position of the pressure member in its hollow bearing shell;

FIG. 6c shows the position of the hollow shell for the released position of the latch;

FIG. 7a is a side view of the release member of the embodiment in accordance with FIGS. 5a and 5b;

FIG. 7b is a top view thereof;

FIG. 7c is a section taken along line VII—VII in FIG. 7a; and

FIGS. 8a, 8b illustrate the positions of the release member and pressure member in sections taken along lines VIII—VIII in FIGS. 5a and 5b, respectively.

The housing 1 of the safety head encloses the pressure member 2 in the form of a bolt which is longitudinally and pivotally movable. Longitudinal or sliding movements are limited in one direction by the end wall of the housing and in the other direction by a lip 4 which in the end position engages the bearing sleeve 5 of the housing 1. The boot latch 7 for the ski boot 8 is secured by way of an angular offset 6 to the end of the bolt 2. It is furthermore advantageous if the boot latch 7 is arranged to be interchangeable on the angular offset 6 or on the pressure member 2, as the case may be, so that suitable latches can always be provided for the particular ski boot that may be used. At the head of the pressure member 2 a ball 9 is provided which preferably engages an inclined plane 10. A wedge or other detent means could be provided in lieu of the ball. At the opposite side the ball 9 is held by the inclined surface 11 of a member 13 which is spring biased by a spring 12. Furthermore, another ball 15 or the like is provided in a longitudinal groove 14 of the pressure member which is likewise under the pressure of a spring indicated at 16. The tension forces of the springs 12, 16 can be adjusted with great precision to the desired strength of the release device by means of setting nuts 17, 18.

The manner of operation of this arrangement is as follows:

In the event of a forward fall considerable undesirable thrust arises between the boot and the ski longitudinally of the ski so that a corresponding force is exerted by the boot against the pressure member 2 by way of the boot latch 7. If this force exceeds the magnitude of the counter pressure exerted by spring 12 the part 13 yields forwardly and the ball 9 slides downwardly in bore 19 far enough that the pressure member 2 can slide forward and thereby release boot 8. The groove 14 should be of such dimensions that the turn or twist fall safety device does not prevent the longitudinal displacement of the pressure member 2.

In the event of a turn or twist fall, the boot 8 has a tendency to swing the boot latch 7 and the safety head laterally or to turn the pressure member 2 about its longitudinal axis by means of the angular member 6. If this force exceeds the counter pressure of spring 16, then the ball 15 disengages the groove 14, pressure member 2 moves pivotally and the boot latch 7 is moved laterally with the angular member and is raised so that the boot is given an opportunity by further lateral turning to become disengaged from the ski 21 or from the binding. Besides, the boot latch is rotatably supported on the angular offset so that in the event of lateral movement of the shoe it also moves laterally, which furthermore facilitates the release.

A preferred embodiment of the invention furthermore provides that in the event of turning of the pressure member about its longitudinal axis also the detent against longitudinal displacement is eliminated. For this purpose the forward end 2' of the pressure member 2 may, for example, be provided with lateral recesses or flat surfaces 20 so that even a minor turn of the pressure member 2 is sufficient to remove the detent means, such as ball 9, out of the range of the forward end of the pressure member 2. The ball 9 then slides laterally along the pressure member, i.e., it permits the longitudinal displacement thereof (see FIG. 4b). Thus it is accomplished that in the event of a turning fall not only the boot latch rocks laterally in the manner described but at the same time also the pressure member 2 slides forward whereby more room is provided for lifting the boot 8 from the binding. Inasmuch as normally in the event of a fall not merely forward or merely twisting forces occur but usually a combination of both, protection for that type of falls is provided in a particularly advantageous manner. This is explained by the fact that when the pressure member is subjected simultaneously to twisting and longitudinal displacement forces these forces work together in order to move the pressure member out of the position in accordance with FIG. 4a into the position in accordance with FIG. 4b.

If it is desired after a fall to restore the safety head to operative condition, i.e., to move the parts from position b to position a, this can be accomplished without any essential application of force. It is only necessary to seize the boot latch 7 and pull the pressure member 2 into position in accordance with FIG. 1a for which purpose it is only necessary in general to overcome the very minor frictional forces between the balls 9 and 15 and the pressure member 2. If then finally the boot latch 7 with the pressure member 2 is placed into the correct position, then the balls 9, 15 snap into place automatically under the pressure of springs 12 and 16 to resume operative position (FIG. 1a).

In accordance with FIGS. 5a, 5b and those that follow the pressure member may also act on the automatic release member 22 of a tensioner 23 known per se. The release member 22 is held in the operative position (FIG. 5a) by a spring 24 which is likewise adjustable and covers the end of the pressure member 28 which faces the tensioner from the front and from the sides so that with any forward displacement as well as also in the event of a twisting or turning movement of the pressure member 28 against the effect of the spring 24 it is also moved upwardly. This then brings the connection point 25 of the plunger 26 that extends into the forward end of the pressure member beyond its position of dead center and thereupon the tensioner is released by the pressure of the tensioner spring 27.

The pressure member 28 may in accordance with this embodiment also be located in a hollow shell 28'. A screw head 29 is provided that may be threaded into the pressure member 28 and it carries the boot latch 7. The tension of the spring 27 may be changed by varying the threaded engagement between the part 29 and the part 28.

The hollow shell 28' is pivotally supported in the housing 31 of the protection or safety head by means of a pin 30 so that during turning or twisting falls it swings outwardly (FIGS. 6c and 8b). As illustrated in the drawing (FIGS. 8a and 8b) the lateral edge 22' of the release member 22 is suitably raised from the pressure member 28 and the release of the tensioner is effected. The same thing occurs if the pressure member is only moved in longitudinal direction because then its forward end 28'' also raises the release member 22.

The spring 24 is disposed in an extension 31' of the housing 31. This extension is provided with an internal thread in which the adjusting screw 32 is threadedly received. At the other end of spring 24 a small bolt 33

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extends outwardly of the housing against the release member 22. If the set screw 32 is turned to tension spring 24, then the spring pressure on bolt 33 is increased which also increases the pressure on release member 22. As a result, the safety head is only released by a greater torsional force exerted on it. The setting of the release for forward falls is effected by means of screw 29. If this screw is turned far into sleeve 28, the spring 27 is further compressed and the spring pressure increased so that in the event of a forward fall the release operates only after a greater forward force is applied.

Upon release of the binding it is merely necessary to place the boot on the ski if need be within a closed longitudinal strap, and then to close the tensioner 23. As a result of this closing movement the boot is securely pressed into the binding while it is also pushed to the rear. This obtains furthermore that the parts of the protection or safety head described return again into the operative position in accordance with FIG. 5a so that as already mentioned it is possible with a single manipulation to render the safety head operative and also to close the binding.

Having now described my invention with reference to the embodiments illustrated in the drawings, I do not wish to be limited thereto, but what I wish to protect by Letters Patent of the United States of America is set forth in the appended claims.

I claim:

1. Safety head for ski bindings comprising release means operative in response to forward as well as turning falls to effect release of the foot, said release means including a closed housing, a pressure member extending longitudinally of and into said housing and being slidable relative to said housing and rotatable about a horizontal axis in said housing, a boot latch supported externally of said housing at one end of said pressure member, and spring loaded locking means retaining said pressure member and thereby said boot latch in engagement with the front end of the ski boot, said locking means including a first spring adapted to yield to twisting forces and a second spring adapted to yield to forward forces on said pressure member.

2. Safety head for ski bindings comprising release means operative in response to forward as well as turning falls to effect release of the foot, said release means including a closed housing, a pressure member extending longitudinally of and into said housing and being slidable relative to said housing and rotatable about a horizontal axis in said housing, a boot latch supported externally of said housing at one end of said pressure member, and spring loaded locking means retaining said pressure member and thereby said boot latch in engagement with the front end of the ski boot, said locking means including a first spring adapted to yield to twisting forces and a second spring adapted to yield to forward forces on said pressure member, and said pressure member being in the form of a bolt and having an offset defining a lever supporting said boot latch.

3. Safety head for ski bindings comprising release means operative in response to forward as well as turning falls to effect release of the foot, said release means including a closed housing, a pressure member extending longitudinally of and into said housing and being slidable relative to said housing and rotatable about a horizontal axis in said housing, a boot latch supported externally of said housing at one end of said pressure member, and spring loaded locking means retaining said pressure member and thereby said boot latch in engagement with the front end of the ski boot, said locking means including a first spring adapted to yield to twisting forces and a second spring adapted to yield to forward forces on said pressure member, and said boot latch being removably supported on said pressure member.

4. Safety head for ski bindings comprising release means operative in response to forward as well as turning

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falls to effect release of the foot, said release means including a closed housing, a pressure member extending longitudinally of and into said housing and being slidable relative to said housing and rotatable about a horizontal axis in said housing, a boot latch supported externally of said housing at one end of said pressure member, and spring loaded locking means retaining said pressure member and thereby said boot latch in engagement with the front end of the ski boot, said locking means including a first spring adapted to yield to twisting forces and a second spring adapted to yield to forward forces on said pressure member, said spring loaded locking means comprising a longitudinal groove in said pressure member, said first spring applying a force in a direction transversely of said pressure member and a ball between said first spring and said groove, and a spring loaded member including said second spring applying a force effective in axial direction of said pressure member, said second spring being disposed at the forward end of said housing.

5. Safety head for ski bindings comprising release means operative in response to forward as well as turning falls to effect release of the foot, said release means including a closed housing, a pressure member extending longitudinally of and into said housing and being slidable relative to said housing and rotatable about a horizontal axis in said housing, a boot latch supported externally of said housing at one end of said pressure member, and spring loaded locking means retaining said pressure member and thereby said boot latch in engagement with the front end of the ski boot, said locking means including a first spring adapted to yield to twisting forces and a second spring adapted to yield to forward forces on said pressure member, said spring loaded locking means comprising a longitudinal groove in said pressure member, said first spring applying a force in a direction transversely of said pressure member and a first ball between said first spring and said groove, and a spring loaded member including said second spring applying a force effective in axial direction of said pressure member, said second spring being disposed at the forward end of said housing, said spring loaded member being a detent such as a ball intermediate said second spring and the forward end of said pressure member opposing forward pressure in axial direction.

6. Safety head for ski bindings comprising release means operative in response to forward as well as turning falls to effect release of the foot, said release means including a closed housing, a pressure member extending longitudinally of and into said housing and being slidable relative to said housing and rotatable about a horizontal axis in said housing, a boot latch supported externally of said housing at one end of said pressure member, and spring loaded locking means retaining said pressure member and thereby said boot latch in engagement with the front end of the ski boot, said locking means including a first spring adapted to yield to twisting forces and a second spring adapted to yield to forward forces on said pressure member, said spring loaded locking means comprising a longitudinal groove in said pressure member, said first spring applying a force in a direction transversely of said pressure member and a first ball between said first spring and said groove, and a spring loaded member including said second spring applying a force effective in axial direction of said pressure member, said second spring being disposed at the forward end of said housing, said spring loaded member being a detent such as a ball intermediate said second spring and the forward end of said pressure member opposing forward pressure in axial direction, said pressure member being of generally cylindrical configuration and having at the forward end thereof a recessed surface area slidable on said detent when said pressure member is rotated.

7. Safety head for ski bindings comprising release means operative in response to forward as well as turning falls to effect release of the foot, said release means in-

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cluding a closed housing, a pressure member extending longitudinally of and into said housing and being slidable relative to said housing and rotatable about a horizontal axis in said housing, a boot latch supported externally of said housing at one end of said pressure member, and spring loaded locking means retaining said pressure member and thereby said boot latch in engagement with the front end of the ski boot, said locking means including a first spring adapted to yield to twisting forces and a second spring adapted to yield to forward forces on said pressure member, said spring loaded locking means comprising a longitudinal groove in said pressure member, said first spring applying a force in a direction transversely of said pressure member and a ball between said first spring and said groove, and a spring loaded member including said second spring applying a force effective in axial direction of said pressure member, said second spring being disposed at the forward end of said housing, said longitudinal groove being of a length permitting unimpeded forward movement of said pressure member over a predetermined distance.

8. Safety head for ski bindings comprising release means operative in response to forward as well as turning falls to effect release of the foot, said release means including a closed housing, a pressure member extending longitudinally of and into said housing and being slidable relative to said housing and rotatable about a horizontal axis in said housing, a boot latch supported externally of said housing at one end of said pressure member, and spring loaded locking means retaining said pressure member and thereby said boot latch in engagement with the front end of the ski boot, said locking means including a first spring adapted to yield to twisting forces and a second spring adapted to yield to forward forces on said pressure member, said locking means being adapted to oppose and to yield to forward and rotational pressures on said pressure member, said pressure member being of gener-

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ally cylindrical conformation and said second spring means being disposed in said pressure member, said safety head having a tensioner pivotally mounted at the forward end of said safety head, a tensioner release member pivotally supported above the forward end of said pressure member and having a portion engaging the forward end of said pressure member and a portion in engagement with said tensioner, and a plunger having one end pivotally connected to said tensioner and having a plunger end extending into said pressure member, and spring loaded latch means including said first spring and having a latch portion for engaging said tensioner and the pressure member in engagement with said release member, whereby forward pressure on said pressure member moves said release member to disengage said tensioner from said latch means.

9. Safety head in accordance with claim 8, wherein said pressure member includes a threaded member having one end in threaded engagement with said pressure member and with said second spring means and being operative to adjust the pressure of said second spring means and said boot latch being releasably supported by the other end of said threaded member.

References Cited by the Examiner

UNITED STATES PATENTS

2,573,955	11/51	Cubberley	280—11.35
2,698,757	1/55	Berlenbach	280—11.35
2,899,211	8/59	Salomon	280—11.35
2,950,119	8/60	Gembruch	280—11.35
3,095,210	6/63	Hallam	280—11.35

FOREIGN PATENTS

1,229,272	3/60	France.
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