

# United States Patent

[19]

Smolka et al.

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[54] SPRING LOCKING DEVICE

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[58] Field of Search ..... 74/527; 280/11.35 T

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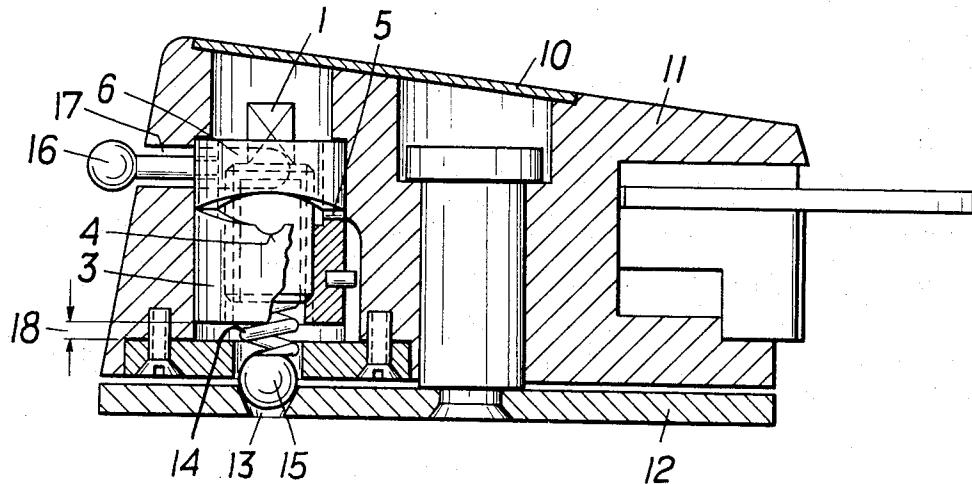
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[57]

## ABSTRACT

Spring backed releasable detent mechanism particularly for safety ski bindings. There is provided, particularly for use in a safety ski binding, a spring backed detent mechanism wherein the spring tension is determined in part by a rough adjusting means and partly by fine adjusting means. The rough adjusting means is contained within the mechanism where it is accessible only to the possessor of a predetermined special tool, such as would be available in a ski shop, and not to a skier on the slope and only the fine adjustment is accessible to the skier under conditions of normal use.

8 Claims, 5 Drawing Figures



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FIG. 4

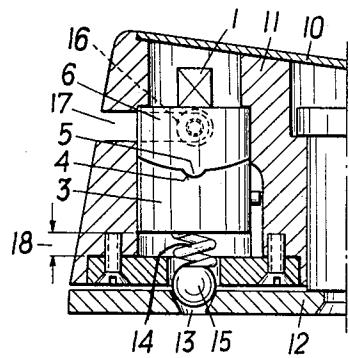


FIG. 1

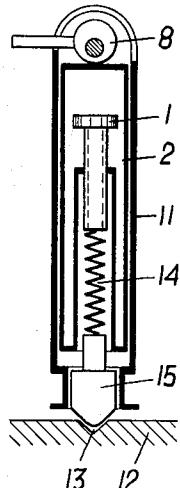


FIG. 2

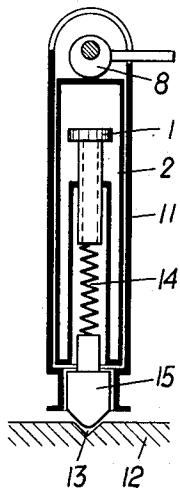


FIG. 3

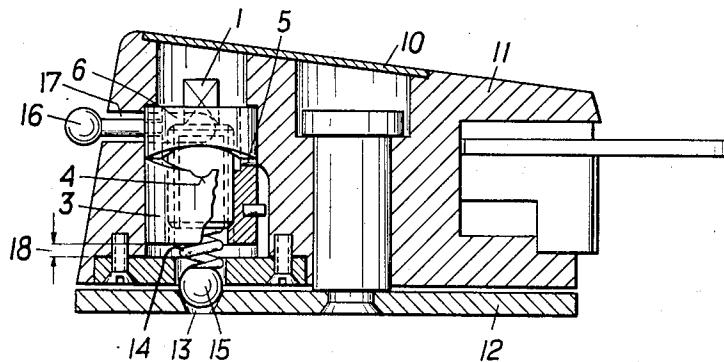
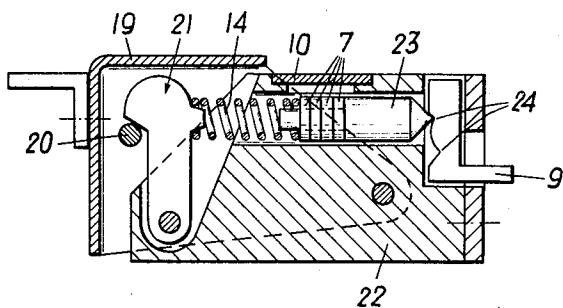


FIG. 5



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## SPRING LOCKING DEVICE

The invention relates to spring locking means particularly for safety ski bindings which has, for changing the effective locking force, an adjustable abutment for the spring.

In the known spring locking devices there is provided in most cases an abutment which can be adjusted either smoothly or stepwise in order to select the locking force as desired. For stepwise control, the abutment is supported on surfaces, notches or the like which are arranged at different height levels. However, the individual steps are necessarily relatively large. If the difference from one step to another is to be small, then either the control zone would be very small or the part which carries the steps, notches or the like would have to be very large and this is not possible for ski bindings.

A screw is usually used for the stepless adjustment and in such case the precision (fineness) of the adjustment depends on the inclination of the screw threads. If small adjustments are to be made, a reading of such a precision adjustment is not possible as a practical matter since one cannot read with a naked eye the exact value on a very small divided scale.

The purpose of the invention is to produce a further division for the individual adjustment possibilities of known locking mechanisms. This objective is achieved in such a manner that the structural part which carries the adjustable abutment is supported on a further adjusting member for the additional change of the effective locking force. With this, after a certain locking force has been chosen with the adjustable abutment, a precision adjustment can be made in the zone of the chosen adjustment with the additional adjusting member.

It happens often that the users of the bindings, who are often unskilled, do not choose the correct adjustment to correspond properly to the requirements. This situation can be served by the present invention by covering the adjustable abutment and by making access to same impossible unless a certain tool is used. The adjustment is then made only by a man skilled in the art corresponding to the requirements (weight, skier's capabilities, bone structure and the like). The user can now only make an adjustment in the precision adjustment zone of the additional adjusting member. Thus it is no longer possible for an unintended rough adjustment to be made by the skier or by third persons. The user can adjust the binding neither too rigidly nor too softly so that the binding does not remain closed during falls. Thus injuries are mostly minimized.

The subject matter of the invention is illustrated by the several embodiments in the drawings, in which:

FIGS. 1 and 2 schematically illustrate an embodiment of the invention in two positions.

FIGS. 3 and 4 illustrate a front swingable jaw at which the precision adjustment can also be taken in two different positions.

FIG. 5 illustrates a rear heel binding.

According to FIGS. 1 and 2, two structural parts 11 and 12 of a mechanical device are locked together. The structural part 12 has a locking recess 13 into which the locking element 15 is pressed by the spring 14. When a suitable force occurs, these two parts will unlock by compression of the spring 14. The force of the spring 14 can be adjusted accordingly by means of an adjusta-

ble device, such as a screw 1. The screw 1 is supported in the slide 2 which can be moved in its axial direction by the spring. In this instance, the screw is backed by a second adjustable device, such as an eccentric 8 which moves said screw, depending on the chosen setting, as desired toward the locking member and thus selectively compresses the spring.

The major locking force is adjustably provided by the screw 1 and the eccentric 8 is then used to make the suitable precision adjustment of the chosen rough adjustment. The extreme positions of the eccentric are illustrated in both figures; of course, other positions of the eccentric can also be chosen between these two extreme positions.

According to FIGS. 3 and 4, the swingable jaw 11 is releasably locked in a selected position with respect to the base plate 12. The locking spring 14 presses the locking element 15 into the locking recess 13 and is supported by its other end in the screw 1. The screw is positioned in the internal thread of a sleeve 3 which is movable in the axial direction of the spring 14. Said sleeve has at its upper front side a curved track with several locking recesses 4 which are engaged by lugs 5 of the rotatably supported adjusting member 6. An operating handle 16 which projects through a slot 17 is arranged on the adjusting member 6.

In the position illustrated in FIG. 3, the sleeve 3 is in its lowermost position. The adjusting member 6 can now be rotated by means of the operating handle. The position illustrated in FIG. 4 is then obtained. By this, the sleeve 3 moves upwardly with the screw 1 in the axial direction of the spring 14 so that the spring 14 is slightly relaxed. This movement can be readily recognized in that the space 18 in FIG. 4 has been enlarged slightly compared with that of FIG. 3.

The screw 1 is covered by a cover 10. This cover can be removed only by using a special tool. There is thus available to the skier only the possibility of making a precision adjustment with the operating handle 16 and unintended, major adjustment is not possible. Thus the danger of injury due to a release which takes place too easily or too late is considerably reduced. Of course, it is also possible to provide on the curved track of the sleeve 3 more than four locking recesses 4 so that more than two possibilities of precision adjustment are available.

In FIG. 5, a hold-down member 19 with the bolt 20 is locked by the locking lever 21 which is pivotably supported in the base member 22. The locking spring 14 is supported on one side on the locking lever 21 and on the other side on an abutment which consists of several exchangeable spacers 7. By removing the cover 10 one or more of the spacers 7 can be removed or added. Spacers 7 of different thicknesses can also be used. These spacers 7 are arranged on a bolt 23 which can alternately engage with its end locking recesses 24 of a slide 9.

By operating the slide, an additional adjustment in two different positions is obtained. Of course one could provide a slide with more than two locking recesses. In this construction, the cover can also be removed only with a predetermined tool so that the user cannot make a wrong rough adjustment.

Of course the invention is not limited to the illustrated exemplary embodiments. A number of modifica-

tions are contemplated which lie within the scope of the invention. Also an exchange of the individual parts illustrated in the construction is possible. For example in the construction of FIG. 5, in place of the slide an eccentric could be provided or, vice versa, a slide could be provided in FIGS. 1 and 2 in place of the eccentric. The rough adjustment can be carried out both stepwise and steplessly. The same is true for the precision adjustment of the invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a releasable ski binding device having a locking element and first adjustable means for altering the effective force of a spring, the force of which is to be overcome in order to release said ski binding device, said first adjustable means including adjustable abutment means and first adjusting means for adjusting said adjustable abutment means toward and away from said locking element, said spring being positioned between said adjustable abutment means and said locking element and under a pretension so that the magnitude of the pretension of said spring is altered during an adjustment of said first adjusting means, the improvement comprising:

second adjustable means for altering said effective force of said spring and thereby the force required to release said ski binding device, said second adjustable means including second adjusting means for adjusting said adjustable abutment means toward and away from said locking element, said second adjusting means including means for limiting its adjustment capability.

2. An improvement according to claim 1, wherein said second adjusting means comprises an eccentric member pivotably supported adjacent said adjustable abutment means and adapted to engage said adjustable abutment means during a pivoting thereof to move said adjustable abutment means toward and away from said locking device.

3. An improvement according to claim 1, wherein said adjustable abutment means comprises a hollow sleeve member adapted to move toward and away from said locking device; and

wherein said first adjusting means comprises an ex-

ternally threaded abutment member threadedly received in the interior of said hollow sleeve and is adapted to engage one end of and to adjust the pretension of said spring.

4. An improvement according to claim 3, wherein said hollow sleeve member includes means defining a first curved track having a plurality of first locking means spaced therealong, said abutment member including means defining a second curved track adapted to cooperate with said first curved track and having at least one second locking means adapted to cooperate with said first locking means to lock said abutment member in selected positions relative to said hollow sleeve.

5. An improvement according to claim 1, wherein said second adjusting means comprises a contoured slide member slidably supported adjacent said adjustable abutment means and adapted to engage said adjustable abutment means during a sliding thereof to move said adjustable abutment means toward and away from said locking device.

6. An improvement according to claim 1, wherein said first adjusting means comprises a plurality of exchangeable spacer members positioned between said adjustable abutment means and said spring.

7. An improvement according to claim 1, including means defining a housing for housing said first adjustable means, said second adjustable means and said spring and including means defining an opening therein and a cover for covering said opening to prevent unauthorized access to said first adjustable means, only said second adjustable means being accessible to the outside of said housing for adjustment by the user of said ski binding device.

8. A releasable ski binding device, comprising:  
a locking element;  
first adjustable means for altering the effective force of a spring which urges said locking element into a locked position, the force of said spring to be overcome in order to release said locking element and, therefore, said ski binding device;  
second adjustable means for altering said effective force of said spring and thereby the force required to release said ski binding device, said second adjustable means including means for limiting its adjustment capabilities, said second adjustable means being operatively nonrigidly connected to said locking element.

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