



Oct. 21, 1969

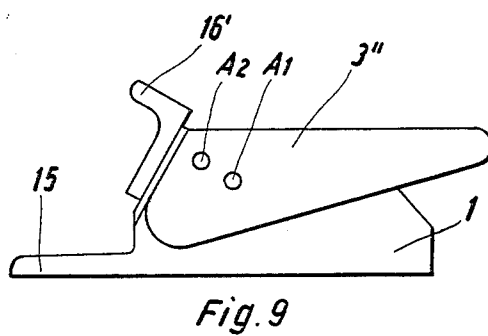
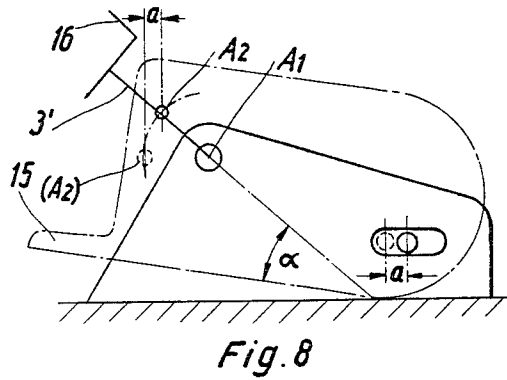
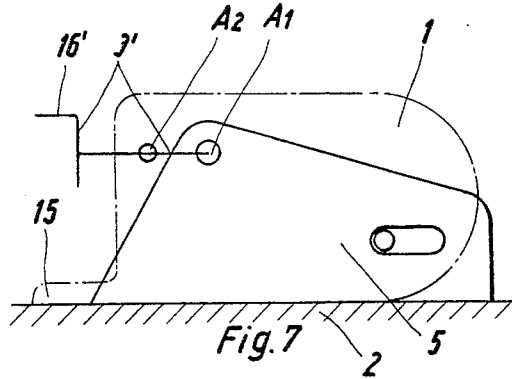
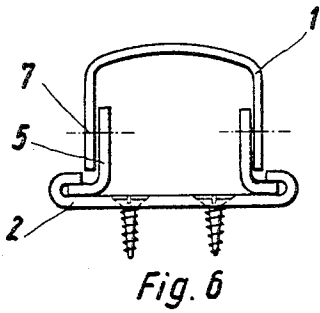
P. UNGER

3,473,816

STEP IN SAFETY BINDING FOR SKI

Filed Aug. 23, 1967

2 Sheets-Sheet 2



Inventor:  
PAUL UNGER  
BY Robert H. [Signature]  
AGT.

1

2

3,473,816

**STEP IN SAFETY BINDING FOR SKI**

Paul Unger, 113 Bruckwiesenstrasse, 8501 Altenberg,  
near Nuremberg, Germany

Filed Aug. 23, 1967, Ser. No. 662,721

Claims priority, application Germany, Aug. 27, 1966,

U 13,048

Int. Cl. A63c 9/08

U.S. Cl. 280—11.35

16 Claims

**ABSTRACT OF THE DISCLOSURE**

Ski binding supported on a ski for holding the ski boot on the ski where the housing which has a stepping plate or ledge projecting from the housing is longitudinally displaceable and releasable in response to pressure on the latch means and the release spring associated therewith.

**BACKGROUND OF THE INVENTION**

The invention relates to a ski binding which is adapted to be fastened to a ski for securing the ski boot which comprises a housing and a release means which in response to excessive load or pressure releases against spring tension and frees the ski boot. For such a binding it has been proposed among other things in applicant's disclosure, U.S. Patent No. 3,378,271 that the housing which carries the sole retainer, the pressure spring and the release means are pivotally connected as an assembly unit to a base plate or the like which is to be secured to the ski, that furthermore there is a joint connection between the release means and the housing and that the joint location is at a distance from the location where the unit is linked to the base plate or the like. In accordance with a preferred embodiment, in applicant's earlier disclosure the aforementioned unit, or the housing, is mounted at its end remote from the sole retainer for displacement with respect to the base plate, or the like, and is supported thereon.

The present invention concerns improvements of the arrangement in accordance with the earlier disclosure, particularly in that it is constructed as a heel release which engages the ski boot at the heel. Among other things, this binding is to be constructed in such a manner that it remains in position after release and is returned to the position of use only by hand or by inserting and stepping down on it with the ski boot. In accordance with a further object of the invention, the distance between the sole holder and the step surface is to be increased for the release position while keeping the dimensions of the safety binding approximately the same.

Accordingly, it is primarily proposed in accordance with the invention that the housing which is mounted on the base plate or the like for displacement in the longitudinal direction of the ski is secured against rising up of its rearward end from the base plate and that a latching device is provided which fixes the binding in open position and which is releasable by hand or by means of a foot step. By means of the latching device it is insured that either after a fall that causes the release or by manual fixing or setting, or setting by means of the ski pole, the binding components will retain the release position for the inserting of the ski boot. The securing of the rearward end of the housing against raising or upward swinging from the base plate prevents the unit from swinging about its joint connection at the base plate in the direction toward the forward end or point of the ski; as this would either make it impossible, or at least difficult in a ski safety binding of this type to introduce the ski boot in the binding.

The concept of keeping the structural components of

a heel binding in the released position by latching or inter-engagement and to release it by inserting the boot and stepping down is fundamentally known. In accordance with the proposed arrangement, however, this is realized with very simple means in a binding in accordance with the aforementioned earlier disclosure. In this connection, it is essential that the latch means in accordance with the invention can be produced without any noticeable additional expense. Thus, for example, a cut-up or a cut-up and associated notch will suffice. In addition to this, the binding in accordance with the earlier disclosure is already distinguished by its very simple construction and small number of the required structural components. Thus, in accordance with the invention a safety binding is provided which differs from known bindings that function similarly above all by its simplicity and robustness, as well as by its substantially smaller production costs. The outer dimensions of this binding are relatively small.

In accordance with a further proposal of the invention, the sole retainer that engages the heel of the ski boot is disposed on the release means, for example, a pivotal or swinging member. In this connection, however, the stepping surface which is engaged by the sole of the heel is provided on the housing. In this manner, the mouth or opening width of the binding in the released position is substantially increased with other outer dimensions remaining the same, and thus the inserting of the boot is facilitated. It is also an advantage for this purpose if the joint or linking place is located between the binding and the base plate approximately at the level and behind the joint location of the release device of the housing.

**BRIEF DESCRIPTION OF THE DRAWINGS**

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

FIG. 1 is a schematic side view of an automatic heel release device in accordance with the invention,

FIGS. 2, 3a, 3b, 4a, 4b are fragmentary views of different possible modifications of the latching means,

FIG. 5 is a longitudinal section of a different embodiment of the invention;

FIG. 6 is a view of some of the structural components of the embodiment of FIG. 5,

FIGS. 7 and 8 illustrate the arrangement in accordance with FIGS. 5 and 6 schematically in the retaining and release position and

FIG. 9 shows a further embodiment of the invention.

**DESCRIPTION OF THE INVENTION**

In the embodiment in accordance with FIG. 1, the housing 1 is mounted for displacement longitudinally of the ski on a support such as the plate 2 which may be a mounting plate, or also on the ski surface. The automatic heel release device comprises essentially the housing 1, the pressure spring (not shown) and the release means which in this example is in the form of a lever arm 3. In this embodiment the device is linked by means of the lever to the axle A1 presented by the base plate, particularly the side cheeks 5 thereof. In addition, the lever is pivotable with respect to the housing about the axle A2. In order to avoid repetition and for better understanding of the present disclosure, and its manner of operation, reference is made to the disclosure in U.S. Patent No. 3,378,271.

In accordance with the invention, means are provided which prevent that the housing 1 can swing in the direction of the stepping force as indicated by arrow A about the axle A1, or swing upwardly with its rearward part about axle A1. In accordance with this embodiment, the upwardly extending cheeks 5 of the base plate 2, or the like, are provided with horizontally extending slots 6 in

3

which the bolts or pins 7 of the housing are received and are displaceably guided.

The fixing of the binding in its released position (not illustrated) is achieved by a locking arrangement. In accordance with FIG. 2, this may be a leaf spring 8 fastened to the base plate which in the latched position illustrated in FIG. 2 receives the pin or bolt in back thereof with a snapping effect.

The locking means in other cases may also be between the release means and the housing or its pressure spring. FIGS. 3 and 4 show arrangements for this where the spring 9 in accordance with applicant's aforementioned disclosure Patent No. 3,378,271 acts by way of an abutment surface, for example, a sleeve 10 encompassing the end of the spring on a flattened surface of a bolt 11 of the lever 3. The bolt 11 is secured to the lever 3 for rotation therewith. In accordance with FIGS. 3a and 3b showing the retaining position and the release position, respectively, the latching is provided by a notch 12 in the abutment surface of the sleeve 10 and on the bolt 11 by a point or edge 14 defined by a cut-out portion, or an edge portion 14 which with the release enters into the notch 12 and is held there by the force of the spring 9.

In the embodiment of FIGS. 4a and 4b the bolt 11 is also provided with a cut-out 13 which defines an angle with the remaining part 11a of the surface. The abutment edge 14' of these two surfaces is disposed in the latched position at the level or below the axis A2. Thus, the surface 13 remains in this latching position under the effect of the spring 9 in the position indicated in FIG 4b.

It is understood that these latching or catch positions can also be obtained by pressing down the lever 3.

An extension 15 that projects forward is provided on the housing 1 which serves as a stepping and supporting member for the heel of the boot and above this extension the sole catch or holder 16 is disposed which engages the upper edge of the heel portion of the sole of the boot. Downward pressure on the extension 15 releases the existing latching whereupon the binding automatically assumes its retaining position under the effect of pressure spring 9.

A further embodiment of the invention is illustrated in FIGS. 5 to 8. In this embodiment a latch hook 17 is disposed between the pressure spring 9 and the rocking member 3' which corresponds to the lever arm 3 in FIG. 1. This latch hook is linked to the base plate 2, respectively its lateral cheeks 5 at 18. The hook 17 is not only at latch element, but by virtue of its cut out 19 which is engaged by spring 9, it replaces the sleeve 10 in the embodiments described above. The hook 17 extends with its projection or nose 20 over the linking connection A2 on the housing of the rocking element 3'. In this manner the rocking lever 3' and the housing 1 are latched against rearward and upward rocking or swinging, except when the release pressure or force becomes so great as to overcome the resisting force of spring 9.

Also in this case the housing 1 is guided at its rearward end in a slot 6 by a pin or bolt 7 in the lateral jaws or cheeks 5. Furthermore a formed or cast extension or stepping strip or ledge 15, as well as an adjusting or setting screw 21 are provided for changing the pressure force of spring 9.

The side jaws 5 of the base plate and the release member or lever 3' extend into the housing 1 and are pivotally connected with one another at pivot joint A1. Thus all parts forming an assembly unit are encased and protected against snow and ice. It is also possible to design the structure in a manner that the lateral jaws 5 of the assembly do not form a unit with the base plate but engage lateral guiding grooves in the base plate 2 and are clamped in place or are secured in a different manner as illustrated in FIG. 6.

4

In order to release this binding, i.e. unlatch the inter-engagement a contact lever 22 is provided. This lever 22 may, for example, be linked or pivotally connected to the pivot axis A2 of the release member 3'. However, this lever could also be pivotally connected to a different location, such as at the latch member or hook 17. The contact lever 22 abuts with its inner short lever arm (in this instance the distance between axle A2 and pin 23) against its counter part, and extends with its other lever arm 24 into an opening 25 in the housing 1.

In this embodiment the arrangement is such that the contact lever 22 is connected to the common pivot axis A2 of the parts 1, 3' and provided with pins 23. When pressure is applied to the end of lever arm 24 in the direction of the arrow, for example by placing the point of the ski pole on its lever 22, the lever rocks about the axis A2, whereby the pins 23 turn the latch member 17 clockwise against the pressure of the spring 9. As a consequence the nose or lug 20 frees axle A2 and the lever portion 3' is enabled to rock or swing together with housing 1 upwardly and rearwardly about the axle A1. As already mentioned a different manner of construction and connection of the contact lever 22 as well as of latch member 17 is possible in accordance with the general concept of the invention.

The embodiment explained above excels particularly in that with a completely encased or enclosed binding and with relatively small outer dimensions it makes possible the flawless release which requires only small compression forces. The distance between the axis A2 and the location 23 can be made so small in relation to the lever arm 24 that the lever relationship is 1:5 to 1:7 or under some conditions even less. In this manner correspondingly small release forces are obtained. A rocking member that projects upwardly and rearwardly out of the housing is avoided which in the event of falls can result in injuries to the skier.

It would also be possible, however, to construct the latch blade or hook 17 or the rocking lever part 3' at the same time also as a contact or pressure lever. Only in that event it is no longer possible to retain the favorable lever ratio mentioned above.

FIGS. 7 and 8 illustrate schematically the arrangement and position of the essential parts of this embodiment in the latched position (FIG. 7) and in the release position (FIG. 8) and where for greater clearness the contact lever 22 and the latch blade or hook 17 are omitted, while the housing is shown in dot and dash lines. In FIG. 8 the amount "a" is inserted by which after release the housing 1 as well as the lever 3' are displaced horizontally to the rear. At the same time the position of the pivot axis A2 is indicated in brackets in the retaining position in accordance with FIG. 7. The sole retainer 16' here is no longer on the housing but on the release member 3' (see also FIGS. 5 and 9), while the stepping plate 15 is still secured to the housing as before. With this, one can already obtain for a relatively small horizontal displacement "a" a rather large opening angle  $\alpha$  between the parts 15 and 16'. This facilitates the insertion of the boot in the opened binding because here the sole retainer rocks back substantially further than with the embodiments where it is rigidly secured to the housing. The foregoing comparison applies, of course, under the condition of the displacement path  $a$  being equal in each instance. A further advantage of the arrangement is that in spite of this large angle of opening, the housing is swung only somewhat in clockwise direction. For this increase of the mouth width or of the angle  $\alpha$  it is furthermore of advantage to provide the connecting pivot joint A1 approximately at the level and behind the linking connection A2. In this manner the linking connection A2 and consequently also the lever 3' can pass through a relatively wide opening path before it reaches dead point position.

The means described above and the arrangements for the increase of the angle  $\alpha$  can be provided in a safety binding in accordance with Patent No. 3,378,271 also without the latching arrangements etc. described heretofore.

FIG. 9 shows a rearwardly extending lever 3" similar to the arrangement in accordance with FIG. 1. Only in the embodiment of FIG. 9 the sole retainer 16' is secured to the lever 3" as in FIGS. 5-8 and the pivot connection A1 is approximately at the level and behind the pivot connection A2.

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 desire to protect by Letters Patent is set forth in the appended claims.

I claim:

1. A safety binding for retaining a ski boot, adapted to be fastened to a ski and comprising a support, a housing on said support, a sole retainer extending from said housing above said support, latching means disposed in said housing, said latching means including a biasing spring biased in the direction of said sole retainer and a release means disposed intermediate said sole retainer and said latching means operative to release said latching means and thereby said boot in response to excess forces applied against said release means, said housing defining together with said spring and said release means an assembly, a first pivot means between said assembly and said support linking said assembly to said support, and a second pivot means defining a connecting joint intermediate said housing and said release means, said second pivot means being disposed at a distance from said first pivot means and movable relative thereto, said housing being mounted on said support and displaceable longitudinally of the ski relative to said support, and guide means for the rearward portion of said housing associated with said support and operative to guide the sliding and oppose raising of said housing from said support, locking means operative to hold said binding in open position and a stepping member for the heel of a boot projecting forward of said housing.
2. A safety binding in accordance with claim 1, where said support is a base plate secured to the ski and having upwardly extending cheeks, and said guide means being disposed at the rearward end of said housing and said cheeks and comprising a slot in each cheek extending longitudinally of the ski and a pair of pins, one each extending laterally from each side of said housing into one said slot.
3. A safety binding in accordance with claim 2 where said stepping member projects from said housing below said sole retainer.
4. A safety binding in accordance with claim 3, where said latching means includes a lever associated with said release means having a bolt defining said second pivot means and extending transversely of said lever at one end thereof intermediate said housing and said spring.
5. A safety binding in accordance with claim 4, where said bolt presents a flat transverse engagement surface and where one end of said spring is disposed in an encompassing sleeve having a flat end surface presenting a corresponding configuration proximate said bolt for engagement by said engagement surface.
6. A safety binding in accordance with claim 4, where said bolt presents a pair of flat surfaces defining a transverse edge therebetween and where one end of said spring is disposed in an encompassing sleeve having a flat surface presenting a notch proximate said bolt for engagement by said transverse edge.
7. A safety binding in accordance with claim 2, where

said locking means is disposed proximate said guide means.

8. A safety binding in accordance with claim 7, where said locking means includes at least one snap spring operative to engage at least one said pin.

9. A safety binding in accordance with claim 3, where said sole retainer is connected to said latching means and said stepping plate is secured to said housing.

10. A safety binding in accordance with claim 9, where said first pivot means is disposed rearwardly of said second pivot means and generally at the same level as said second pivot means.

11. A safety binding in accordance with claim 1 including a pivotally supported latch hook having one end adapted on one side thereof to engage the proximate end of said spring and where said second pivot means is supported on a lever carrying said sole retainer and engages the other side of said latch hook in the closed position of said safety binding.

12. A safety binding in accordance with claim 11, where said latch hook is pivotally connected to said support and is provided with a nose for engagement with said spring.

13. A safety binding in accordance with claim 11, where said lever has one arm to which said second pivot means is fastened and another arm projecting over said housing for access from the exterior.

14. A safety binding in accordance with claim 13, where said one arm is substantially shorter than said other arm.

15. A safety binding in accordance with claim 11, where said support and said lever present cheeks extending into said housing and pivotally connected in said housing.

16. A safety binding for retaining a ski boot, adapted to be fastened to a ski and comprising a support, a housing on said support, a sole retainer extending from said housing above said support, latching means disposed in said housing, said latching means including a biasing spring biased in the direction of said sole retainer and a release means disposed intermediate said sole retainer and said latching means operative to release said latching means, said sole retainer and thereby said boot in response to excess forces applied against said release means, said housing defining together with said spring and said release means an assembly, a first pivot means between said assembly and said support linking said assembly to said support, and a second pivot means defining a connecting joint intermediate said housing and said release means, said second pivot means being disposed at a distance from said first pivot means, said housing being mounted on said support by retaining pin means between the rearward portion of said housing and said support operative to oppose raising of said housing from said support, locking means operative to hold said binding in open position and a stepping member for the heel of a boot projecting forward of said housing.

#### References Cited

##### UNITED STATES PATENTS

2,879,071 3/1959 King.  
3,173,701 3/1965 Beyl.

##### FOREIGN PATENTS

1,032,054 3/1953 France.  
1,299,447 6/1962 France.

BENJAMIN HERSH, Primary Examiner

J. A. PEKAR, Assistant Examiner