

Feb. 26, 1963

H. DE PLACE

3,079,164

SAFETY KNOCK-OFF DEVICES FOR SKI BINDERS

Filed Aug. 16, 1960

3 Sheets-Sheet 1

Fig.1.

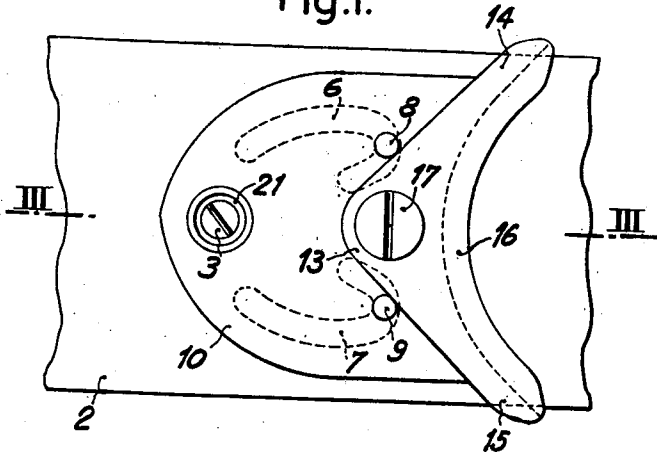


Fig.2.

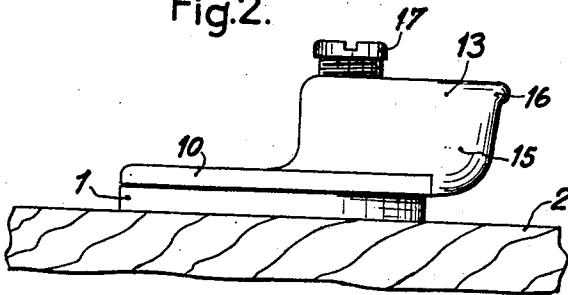
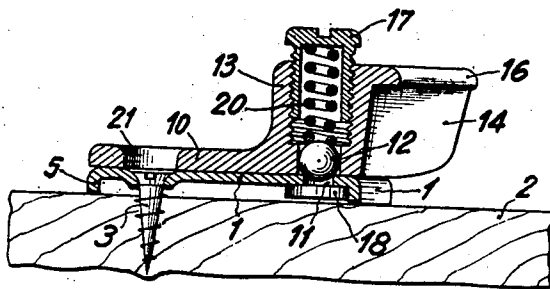


Fig.3.



Feb. 26, 1963

H. DE PLACE

3,079,164

SAFETY KNOCK-OFF DEVICES FOR SKI BINDERS

Filed Aug. 16, 1960

3 Sheets-Sheet 2

Fig. 4.

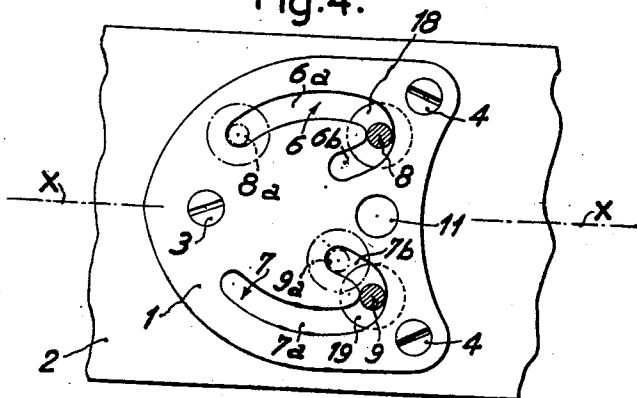


Fig. 5.

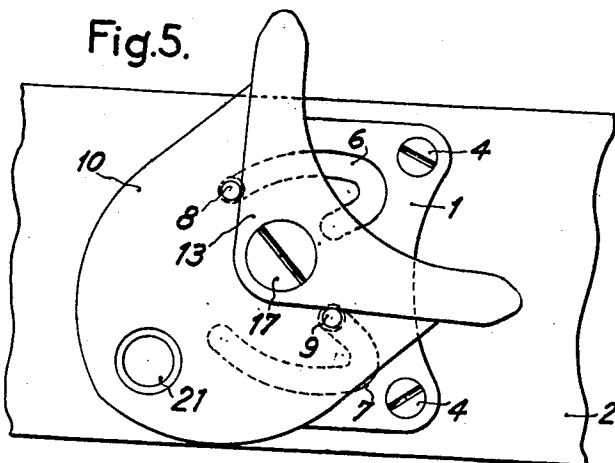
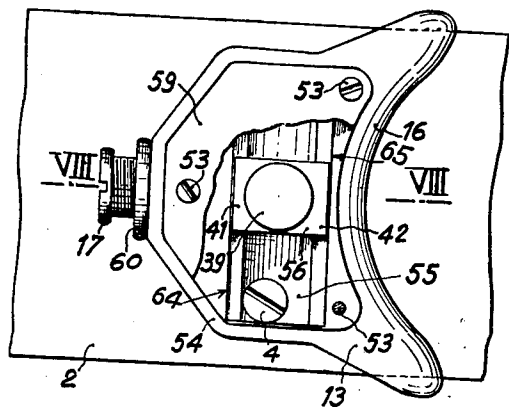


Fig. 6.



Feb. 26, 1963

H. DE PLACE

3,079,164

SAFETY KNOCK-OFF DEVICES FOR SKI BINDERS

Filed Aug. 16, 1960

3 Sheets-Sheet 3

Fig. 7

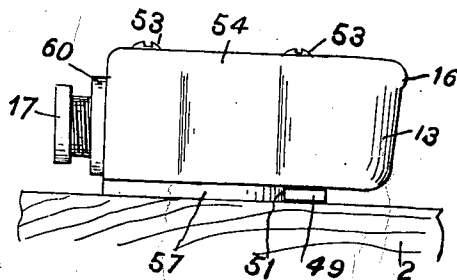


Fig. 8

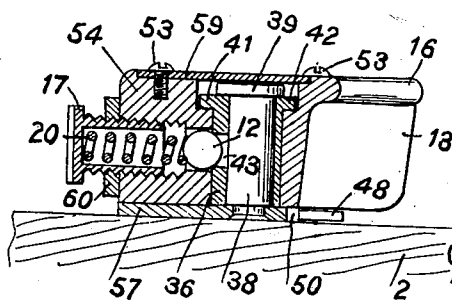
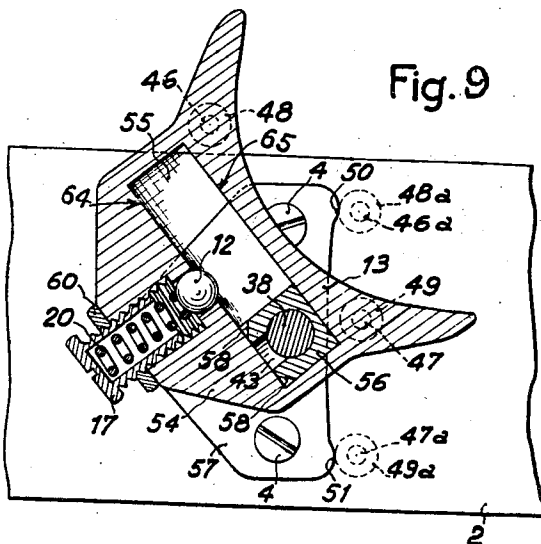


Fig. 9



1

3,079,164

SAFETY KNOCK-OFF DEVICES FOR SKI BINDERS

Henri de Place, 25 Rue du Montparnasse, Paris, France
Filed Aug. 16, 1960, Ser. No. 49,993
Claims priority, application France Aug. 21, 1959
7 Claims. (Cl. 280—11.35)

This invention relates in general to ski binders and particularly to a safety knock-off device therefor which is kept in its normal position by latch means comprising a releasable detent-positioning device and which is adapted to move on the ski, due to the provision of adequate guide members, in case of abnormal and dangerous transverse forces, and subsequently to pivot only then about a center of rotation which, according to the essential feature of this invention, instead of lying on the longitudinal center line of the jaw as in known arrangements, is somewhat shifted laterally in relation to this line on the side opposite to that from which the transverse thrust or force is applied by the toe end of the skier's boot, that is, on the side opposite to that where the release is to take place.

Under these conditions, as the surface area of the edge of the boot sole which contacts the jaw side opposite to that where the boot is released is close to the top dead center with respect to the center of rotation, its backward displacement is minimized or reduced to zero. This contact area may even move forward from the very beginning of the pivoting movement if it already lies beyond the top dead center.

On the other hand, the area of contact of the boot sole with the jaw face on the side where the boot release occurs is on the contrary considerably shifted and remote from the center of rotation. Therefore, the longitudinal and transverse pressures exerted by the sole on this jaw side produce a very substantial torque urging the device for rotation in the desired direction.

The device according to this invention comprises a member secured on the ski which constitutes a support, and a movable abutment member fitting on the front edge of the boot sole. This abutment member consists preferably of a concave jaw or shell having a smooth contact face in order not to damage the sole.

These two members are interconnected by at least one fastening and pivoting element rigid with one of them and adapted to move in the other member by means of adequate guide means, for example curved slots or cam faces when a force substantially transverse to the ski is applied to the toe end of the ski boot.

The abutment member is held in its normal operating position by at least one releasable detent positioning device, but in case of torsional forces exceeding predetermined limits the abutment member, by overcoming the resilient resistance of the detent positioning device, moves firstly in a substantially transverse direction relative to the member secured on the ski, and then angularly about a holding member somewhat shifted in relation to the longitudinal center line of the abutment member on the side opposite to that in which the toe end of the boot exerts its pressure.

The aforesaid holding and pivoting member may consist of pins or studs displaceable in adequate guiding portions of the other member. The axes of these pins or studs may be fixed either in relation to the abutment member or in relation to the support rigid with the ski, and in this case the guiding member or portions are provided either on the support secured on the ski or on the movable abutment member.

The movable abutment member may comprise for example two holding members acting in turn as pivot pins disposed preferably symmetrically on either side of its longitudinal center line. These pins are displaceable for

2

example in guide members, for example curved slots or cam faces formed in the member secured on the ski. The contours of these guide members are so designed that after an initial displacement in a substantially transverse direction of the two pins or studs the one located on the boot release side will perform a substantial forward movement while pivoting about the other pin or stud, preferably of cylindrical configuration, which will then either become fixed or move only very moderately forwardly. A releasable detent positioning member keeps the abutment member in its normal position.

The above-described arrangement may be inverted. The two holding pins or studs are made rigid with the support carried by the ski and the guide member (of which the contours are also inverted) formed in the movable abutment member.

However, when the abutment member pivots about a pin rigid with the ski, it is advantageous to use only a single pivot pin on which the boot-holding abutment member formed with a single guide portion is displaceable in a substantially transverse direction, at least initially, and about which this member can subsequently pivot. The initial movement of the abutment member is thus utilized for shifting laterally the axis of rotation with respect to its longitudinal center line, according to this invention.

A releasable detent positioning device keeps the abutment member in its normal position, the fixed axis of rotation lying in this case on its center line.

This invention is particularly concerned, but not exclusively, with certain forms of embodiment thereof which are described hereinafter by way of example with reference to the accompanying drawings, in which:

FIGURES 1 and 2 are a plan view and a side elevational view respectively of a first form of embodiment of a safety knock-off device constructed according to the invention and shown in its normal position;

FIGURE 3 is a vertical section taken on line III—III of FIG. 1;

FIGURE 4 is a plan view showing the fixed support secured on the ski;

FIGURE 5 is a plan view showing the device in its released position;

FIGURES 6 and 7 are plan view and a side elevational view respectively of another form of embodiment of a safety knock-off device constructed according to the teachings of this invention and shown in its normal position;

FIGURE 8 is a vertical section taken on line VIII—VIII of FIG. 6; and

FIGURE 9 is a horizontal section view illustrating the device in its released position.

In the embodiment shown in FIGS. 1 to 5, a hollow, shallow base 1 is secured on the upper surface of a ski 2 by a front screw 3 and two rear screws 4.

The base 1 has down-turned peripheral edges 5 to maintain the upper face of the base somewhat spaced above the ski top surface while sealing the inner space of the base. The base 1 has a top face formed with a pair of curved slots 6, 7 disposed symmetrically with respect to the longitudinal axis X—X and of hook-shaped configuration as illustrated. These slots are engaged by cylindrical pins 8, 9 respectively, which are rigid with a movable carrier support 10 carrying an abutment member 13 shaped to receive and hold the toe end of a ski boot sole. This abutment member is smooth and concave and will be referred to hereinafter as a "jaw."

The cylindrical pins 8, 9 are screwed or otherwise secured in the movable support 10 and are formed with relatively wide heads 18, 19 housed in the underside hollow space of the base 1. These heads are properly spaced from the movable support 10 by shoulders formed on the members 8, 9 and keep the movable support 10 and

3

jaw 13 freely pivotable, that is, without binding, on the base 1.

The base 1 is also provided near its rear edge with a cylindrical hole 11 lying on the longitudinal center line X—X.

The movable support 10 and jaw 13 consist preferably of a unitary or integral casting carrying a resilient detent positioning device of known type consisting for example of a ball 12 biased downwardly by a coil spring 20 of which the force applied is adjustable by means of a hollow screw 17 in which the spring is housed, as shown. This ball 12 normally engages the aforesaid central positioning hole 11 of the base 1 to keep the jaw in the desired position.

The movable support 10 is formed with a hole 21 for the passage of a screwdriver for tightening the screw 3.

The relatively wide, smooth and concave jaw 16 comprises two inclined sides 14, 15 for maintaining the boot sole positioned in the transverse direction and an upper flange 16 to prevent this sole from lifting upwardly.

This device operates as follows:

When, an abnormal torsional movement of the skier's foot is applied to the device, the toe end of the sole exerts on the jaw 13 a transverse force greater than the resilient force of the detent positioning device 12, 20, so that the ball 12 escapes from the positioning hole 11 and the cylindrical pins 8, 9 can travel freely in the curved slots 6, 7.

The curved slots have outer portions 6a, 7a (FIG. 4) which are longer than inner portions 6b; 7b thereof so that one of the cylindrical pins will travel a longer distance than the other pin in the forward direction and at a certain moment the jaw 13 will pivot laterally, thus freeing the ski boot.

FIGURE 5 illustrates the position of the jaw in the release position after pivotal movement of the jaw counterclockwise. Under these conditions, the cylindrical pins 8, 9 are moved to the positions 8a, 9a respectively, as shown in FIG. 4.

The cylindrical pin 9 may for example complete its travel before the other pin 8. In this case the pivoting movement is accomplished or completed in the form of a rotation about the cylindrical pin 9 now fixed in position 9a. The whole or part of the outer portions 6a, 7a of the guide slots are circular arcs having their centers coincident with the opposite cylindrical pin in its innermost position. In those portions of the outer sides 6a, 7a which correspond to circular arcs centered on the opposite pin (retained by the inner end of the inner portion 6b or 7b) of its slot, the outer edge of these slots may be dispensed with, if desired, for in this case the abutment member is properly guided by the inner edge alone.

The inner portions 6b, 7b of the slots may extend at right angles to the longitudinal axis of the ski, if desired. However, as shown in FIG. 4, it is preferable, as a rule, in order to free the sole and facilitate the release thereof, to form these inner portions of the slots likewise with a certain convergence in the forward direction, and even to shape these slots with a view to cause the cylindrical pin engaging one of their inner portions 6b, 7b to continue somewhat its forward movement during the pivoting movement of the jaw. In the embodiment illustrated and described herein the pins 8, 9, in the normal position of the device, lie at the rear vertex of the curve formed by each slot 6, 7. If desired, in their normal position these pins could be slightly shifted in relation to this vertex, for example outwardly, to facilitate the release movement, or on the contrary inwardly, to avoid untimely releases. Slots 6, 7 may also comprise rectilinear portions, notably in the vicinity of the point of contact with pins 8 and 9, in their normal position. Generally, the slots may have any shape enabling the boot-retaining member to be pivoted after a sufficient movement by pivoting about one of its pins 8, 9.

4

As the jaw movements consist of movements of rotation about an axis shifted in relation to the jaw center line, and as this axis itself is movable preferably forwardly, one of the jaw sides does not tend to move substantially backwardly by sliding on the sole. Therefore, frictional contacts between the sole and the inner face of the jaw are reduced to a minimum and the boot is released with the maximum facility.

In the second embodiment illustrated in FIGS. 6 to 9 of the drawings, a base plate 57 is secured on the ski by means of screws 4. This plate carries, on its longitudinal center line, a pivot pin 38 on which a rectangular block 56 is pivotally mounted. The jaw 13 has its rear shaped concave and is provided with edge 16 to hold the toe end of a ski boot sole. The jaw is rigid with a forward support portion 54 of adequate configuration which has formed therein a rectangular slot 55 whereby the support portion 54 may move transversely in relation to a block 56 pivoted on pin 38 and disposed in the slot.

The support portion 54 has fitted in its front part a resilient locking or detent-positioning device consisting as in the preceding embodiment of a ball 12 urged in the direction of the slot by a coil spring 20 housed in an adjustment hollow screw 17. A knurled lock nut 60 is provided for locking the device in the desired adjustment position namely in position for the jaw to hold the ski boot aligned with the longitudinal axis of the ski. The ball 12 engages a hole 43 formed in the block 56 to prevent the support portion 54 from moving transversely on the member 56 and pin 38 under normal operating conditions.

The block 56 is held in the proper axial position on the pin 38 by its head 39 which prevents the block from lifting. Projecting edges 41, 42 wider than member 56 in turn prevent the member 54 from lifting (see FIG. 8).

In the form of embodiment illustrated, the boot holding member consists of the smooth jaw 13. With a holding member of this character in combination with a locking device on the block 56 pivoted freely on pin 38 the jaw 13 itself could revolve, even in the normal position of the jaw, about the pin 38 by sliding on the sole edge in spite of its frictional engagement therewith, notably if the boot is moderately clamped against the jaw 13. To prevent any untimely pivoting of the jaw 13 as long as the support portion 54 is in its normal position on the pin 38, and also to facilitate the fitting of the boot in position, two small pins 46, 47 carrying bearing rollers 48, 49 are secured in the jaw 13. These rollers 48, 49 are adapted to engage the rounded ends 50, 51 of the rear edge of the fixed plate 57 to prevent the jaw 13, support portion 54 and block 56 from rotating about the pin 38 as long as the support portion 54 is held in its normal position by the ball 12. A cover plate 59 are secured on the support portion 54 by screws 53 protects the mechanism (in FIG. 6 this cover plate is broken away to show the inner arrangement).

In case of excessive torsional movement of the skier's leg the jaw 13 receives a transverse force greater than the limits set by means of the adjustment screw 17, the ball 12 escapes from hole 43, and the jaw support portion 54 moves transversely by sliding on the aforesaid rectangular block 56. One of the bearing rollers 48 or 49 will then clear the corresponding end 50 or 51 of plate 57. When the pin 38 has been shifted laterally to a sufficient extent in relation to the center line of jaw 13 and portion 54, the jaw 13 may pivot without difficulty, without pushing the boot rearwardly, and without producing any appreciable frictional contact between the sole and the jaw.

FIG. 9 shows in horizontal section the position of the component elements of the device after the pivoting movement about the shifted pin 38. The pins 46 and 47 with their bearing rollers 48 and 49 (not visible in FIG. 6 in their normal position) are shown in dotted lines in this position at 46a, 47a and 48a, 49a in FIG. 7.

To facilitate the resetting of the abutment member to

5

its normal position, two small cam faces 58 tapered toward each other are formed on the block 56 at the level of ball 12 which, by construction, cannot emerge completely from its cavity in forward part 54.

In the embodiments illustrated the smooth-faced jaw 13 described hereinabove may be replaced by a toothed jaw adapted to prevent the sole from sliding in relation thereto. In such embodiments, not shown, the locking members 46, 47, 48, 49 may be dispensed with.

Of course, any other releasable locking or detent-positioning device may resorted to to keep the jaw 13 and support portion 54 in the normal position of operation. Thus, notably, a locking device of the type illustrated in FIGS. 1 to 5 may be used for holding the support portion 54 against movement on the base plate 57, or a locking device holding the support portion directly on the pin 38 formed to this end with a hole, notch or flat face retaining a ball or a plunger may be used. In this case the locking members 46 through 49 may also be dispensed with, even if a smooth-faced jaw is used for retaining the toe end of the boot sole.

In the embodiment illustrated in FIGS. 6 to 9 of the drawings the support portion 54 is formed with a rectilinear transverse slot 55. To complete the transverse displacement of jaw 13 and support portion 54 with a forward displacement ensuring a quicker release of the skier's boot, the slot may have a curved contour, with its end curved rearwardly. The shape of the slot is immaterial if the member on which the jaw is caused to travel has only one line of contact with the edges 64 and 65 of the slots. Thus, for example, if the support portion 54 moves directly on the pin 38, the block 56 being dispensed with, the slot may be V-shaped. If on the contrary relatively wide bearing and sliding surfaces are to be maintained, the slot will be formed with a constant curvature.

A forward movement of the jaw 13 and support portion 54 to complete their transverse movement may also be obtained by providing for example in the normal position a sufficient clearance between the block 56 and the rear edge 65 of slot 55. However, in the normal position the jaw 13 and support portion 54 cannot move forward, as the bearing rollers 48 and 49 engage the ends 50 and 51 of the fixed plate 57. On the other hand, the member 56 is held in position by the pin 38 and the front edge 64 of slot 55. When the locking device is released and after a slight transverse movement of the support portion 54, one of the bearing rollers 48 or 49 clearing the corresponding end 50 or 51 of plate 57 while the other roller also moves slightly forward as a consequence of the rounded shape of these ends, the support portion 54 may move forwards until the rear edge 65 of slot 55 engages member 56.

Of course, the invention should not be construed as being limited to the arrangements and devices described and illustrated by way of example, for it is also concerned with any other embodiments wherein the abutment member pivots about an axis shifted laterally with respect to the longitudinal center for releasing the boot.

Furthermore, many modifications as to the shapes, dimensions, relative proportions and materials may be used in the embodiment described herein, without departing from the spirit and scope of the invention as set forth in the appended claims.

What I claim is:

1. A safety knock-off device for ski binding comprising, in combination, a jaw member shaped to hold the toe end of a ski boot against movement relative to said ski top surface and normally disposed in operation on a ski holding said ski boot aligned longitudinally with said ski top surface, support means for said jaw member connected thereto comprising means securable to the top surface of a ski, means connecting said jaw member with said support means comprising means defining guide means on said support means and at least one pivot pin received in said guide means, said guide means having a configura-

6

tion to insure an initial movement of said jaw member relative to said ski top surface substantially transverse to said ski surface in either direction and after which said jaw member may rotate about said pivot pin, said pivot pin then being situated laterally of the longitudinal center line of said jaw member in a direction opposite to that of said initial movement, and a releasable detent-positioning device operable to prevent said initial movement of said jaw member under normal conditions of operation, and having means to permit said initial movement in response to application of a force transverse to said ski top surface of a given sufficient value to overcome resistance of said detent-positioning device.

2. A safety knock-off device for ski binding comprising, in combination, a jaw member shaped to hold the toe end of a ski boot against movement relative to said ski top surface, and normally disposed in operation on a ski holding said ski boot aligned longitudinally with said ski top surface, support means for said jaw member connected thereto securable on the top surface of a ski, means connecting said jaw member with said support means comprising means defining guide means on said support means and a pair of pivot pins coactive with said guide means, each of said pivot pins engaging a respective guide means, said guide means having a configuration to insure an initial forward movement of said jaw member relative to said ski surface substantially transverse to said surface in either direction and after which said jaw member may rotate about the particular pivot pin which is then situated laterally of the longitudinal center line of said jaw member in a direction opposite to that of said initial movement, said guide means comprising means to limit the forward travel of said pivot pins and to limit the travel of the pin other than said one pin to a lesser forward travel than said one pivot pin, and a releasable detent-positioning device operable to prevent said initial movement of said jaw member under normal conditions of operation, and having means to permit said initial movement in response to application of a force transverse to said ski surface of sufficient value to overcome resistance of said detent-positioning device.

3. A safety knock-off device according to claim 2, in which said support means comprises a base and said guide means comprises a pair of curved slots on said base, each slot having a hook configuration, with a longer portion disposed outwardly of a shorter inner portion and said portions joining at a vertex disposed rearwardly of said portions, said pivot pins being disposed and maintained by said detent-positioning device in the vicinity of a respective vertex.

4. A safety knock-off device for ski binding comprising, in combination, a jaw member shaped to receive and hold the toe end of a ski boot against movement laterally and longitudinally relative to said ski top surface and normally disposed in operation on a ski holding said ski boot aligned longitudinally with said ski top surface, support means for said jaw member connected thereto comprising means securable to the top surface of a ski, means connecting said jaw member with said support means comprising means defining a guide slot on said support means and at least one pivot pin received in said guide slot, said guide slot extending transversely of said support means and having a configuration to insure an initial forward movement of said jaw member relative to said ski top surface substantially transverse to said ski top surface in either direction and after which said jaw member may rotate about said pivot pin, said pivot pin then being situated laterally of the longitudinal center line of said jaw member in a direction opposite to that of said initial movement, and a releasable detent-positioning device operable to prevent said initial movement of said jaw member under normal conditions of operation, and having means to permit said initial movement in response to application of a force transverse to said ski top surface

7

of sufficient value to overcome resistance of said detent-positioning device.

5. A safety knock-off device for ski binding according to claim 4, comprising, a block on said pin and slidable in said slot.

6. A safety knock-off device for ski binding according to claim 5, in which said detent-positioning device comprises means to hold said jaw from movement relative to said block and pin under normal conditions of operation.

7. A safety knock-off device for ski binding comprising, in combination, a jaw member shaped to receive and hold the toe end of a ski boot against movement laterally and longitudinally relative to said ski top surface and normally disposed in operation on a ski holding said ski boot aligned longitudinally with said ski top surface, support means for said jaw member connected thereto securable to the top surface of a ski, means connecting said jaw member with said support means comprising means defining guide means on said support means and at least one pivot pin received in said guide means, said guide means having a configuration to insure an initial forward move-

8

ment of said jaw member relative to said base member substantially transverse to said base member in either direction and after which said jaw member may rotate about said pivot pin, said pivot pin then being situated laterally of the longitudinal center line of said jaw member in a direction opposite to that of said initial movement, said pin being disposed to act as fulcrum for said jaw member, and a latching means operable to prevent said initial movement of said jaw member under normal conditions of operation, and having means to permit said initial movement in response to application of a force transverse to said base place of sufficient value to overcome resistance of said latching means.

References Cited in the file of this patent

UNITED STATES PATENTS

2,899,211	Salomon	Aug. 11, 1959
FOREIGN PATENTS		
959,356	France	Sept. 26, 1949
1,126,948	France	Aug. 6, 1956
1,204,369	France	Aug. 10, 1959