Feb. 25, 1964 H. ECKEL 3,122,380

SKI BINDING

Filed July 31, 1961 2 Sheets-Sheet 1

Fig. 1

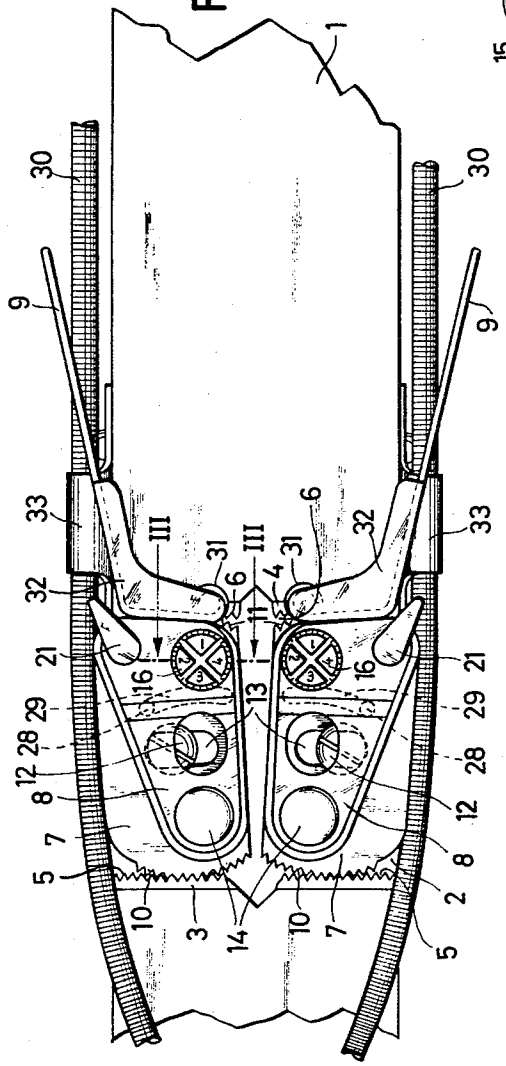


Fig. 3

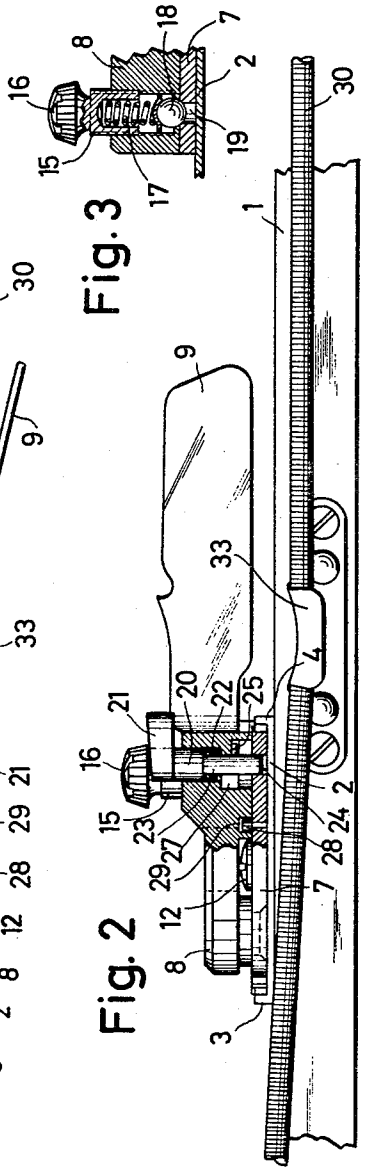


Fig. 2

INVENTOR

HEINRICH ECKEL

by Walter S. Bleston

ATTORNEY

Feb. 25, 1964 H. ECKEL 3,122,380

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Filed July 31, 1961 2 Sheets-Sheet 2

Fig. 5

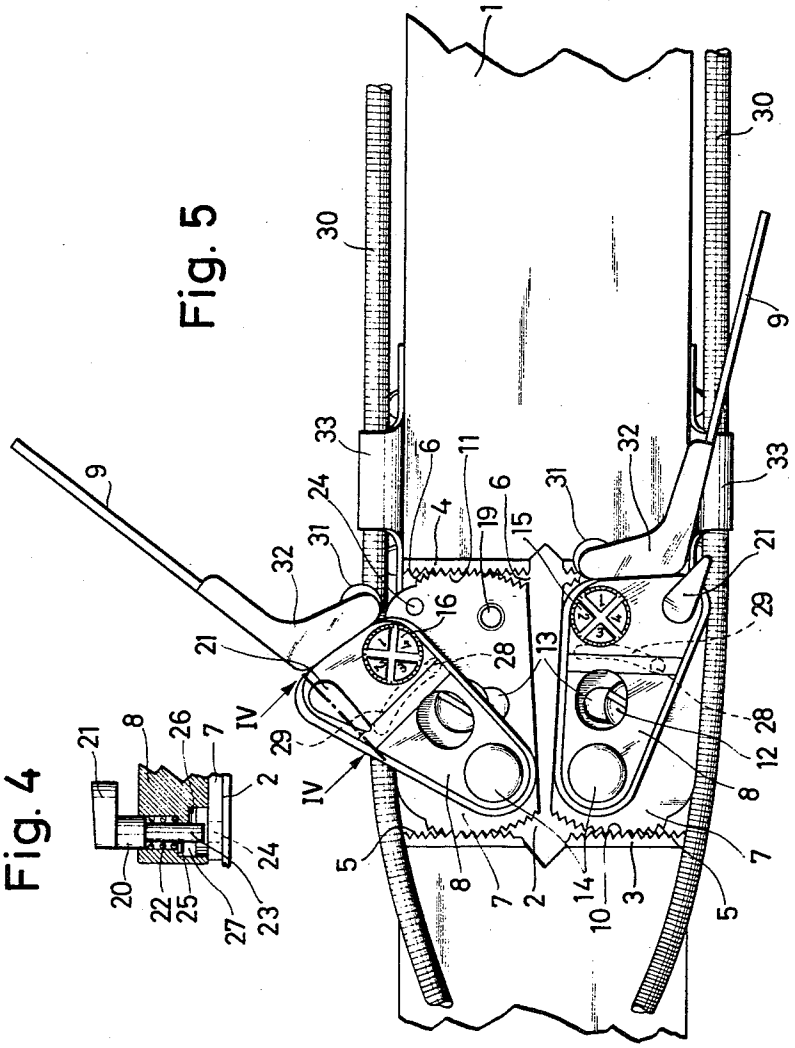


Fig. 4

INVENTOR
HEINRICH ECKEL
by Walter S. Ilerton
ATTORNEY

United States Patent Office

3,122,380
Patented Feb. 25, 1964

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3,122,380

SKI BINDING

Heinrich Eckel, 235 Dachauer Strasse,
Munich 19, Germany

Filed July 31, 1961, Ser. No. 127,981
Claims priority, application Germany Aug. 6, 1960
10 Claims. (Cl. 280—11.35)

This invention relates to a safety ski binding comprising two jaws which bear laterally against the ski boot and which are each pivotal about a perpendicular axis in front of the ski boot and which are each subject to the action of a click-stop mechanism which secures the jaw in the position in which it holds the ski boot fast on the ski and enables the jaw to swing out with respect to the ski only after a certain lateral pressure exerted on the jaw by the ski boot has been exceeded.

Numerous safety ski bindings have already been disclosed which are equipped with pivotal stop parts for the front edge of the ski boot. In some of these known safety bindings the stop parts are subjected to the action of a click-stop mechanism, which enables the stop parts to be swung laterally with respect to the ski and hence the ski boot to be released from the ski only after a certain lateral pressure on the stop parts has been exceeded. These known safety bindings, however, are suitable only for downhill races, since they do not afford the ski boot a sufficiently firm lateral hold such as is required in general usage, for example, during an ascent or a long run.

There is, therefore, a need for a safety ski binding suitable both for downhill races and for general usage, e.g. ski tours. Although safety bindings have already been disclosed which can be used in both cases, these bindings are not completely satisfactory. They comprise two jaws which bear laterally against the ski boot and which are each fastened on the ski so as to pivot about a vertical axis and are each subject to the action of a click-stop mechanism which holds the jaw in the initial position on the ski and which enables the jaw to be swung out with respect to the ski only after a certain lateral pressure on one jaw has been exceeded.

These safety bindings have the disadvantage that they do not have any mechanism to enable the pivoting movement of the jaws to be put completely out of operation in a simple manner for general usage. Another disadvantage is that in order to adapt the position of the jaws to the width and shape of the ski boot the jaw surfaces which serve for the lateral engagement of the boot have bearing surfaces which are adapted to be fastened in different positions on special pivoting plates which, together with a cover plate, participate in the pivoting movement of the jaw part. The result of this is that the ski boot occupies a relatively high position on the ski and this has an unfavorable effect on ski guidance. Moreover, this known arrangement of adapting the jaws to the shape of the ski boot is complicated.

The object of the invention is to provide a safety ski binding which is suitable for touring and which is simple and inexpensive to manufacture and obviates the above disadvantages. To this end, according to the invention, the pivot pin for each binding jaw is fastened on its own bearer plate. The plates are fastened in front of the toe of the ski boot and are adjustable relative to each other, transversely to the longitudinal axis of the ski and in

2

different angular positions. The plates are equipped with curved rows of teeth at their front and rear edges which engage corresponding rows of teeth disposed on the ski and extending transversely to the longitudinal axis of said ski. The arresting element of a click-stop mechanism mounted behind the pivot pin on the jaw is normally pressed under spring pressure into an opening of the corresponding bearer plate, and a releasable locking device is provided for preventing the jaws from swinging outwards with respect to the bearer plates.

With this construction of a safety ski binding, the means for adapting the position of the side jaws to the shape of the ski boot (these side jaws being required in the case of touring in order to hold the ski boot laterally) are situated completely in front of the ski boot so that the latter can bear directly on the ski. This results in an extremely simple and compact arrangement of the binding, since the bearer plates which are situated in front of the boot and which serve for adjustment of the binding carry not only the pivoting jaws but also the necessary parts of the click-stop mechanism and of the locking mechanism. A further effect of the arrangement according to the invention is that the pivot axes of the binding jaws are situated so far in front of the toe of the ski boot that the ski boot can be completely released from the ski even if the jaw is pivoted through only a small angle.

The rows of teeth on the ski which engage in the rows of teeth in the bearer plates which carry the pivoting jaws and which have the opening of the click-stop mechanism and one part of the locking device may be constructed in known manner on the raised edges of a baseplate on which the bearer plates are adapted to be clamped in any desired position of engagement of the teeth by means of a screw which passes through a slot in the bearer plate and is screwed into a screwthreaded bore in the baseplate. The locking device advantageously has an opening in the bearer plate, into which opening a locking pin of said device situated in the pivoting jaw is adapted to be engaged.

Further details and advantages of the invention will be apparent from the following description of one exemplified embodiment which is illustrated in the accompanying drawings wherein:

FIG. 1 is a plan view of the safety binding showing it fitted to a ski;

FIG. 2 is a side view corresponding to FIG. 1, with the jaw locking device shown in section in the position of engagement;

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

FIG. 4 is a cross section through a locking device of the binding, the section being taken on the line IV—IV of FIG. 5; and

FIG. 5 is a view similar to FIG. 1 but showing the binding with one of its jaws in the swung-out position.

In the example illustrated in the drawings, the safety binding, which is fastened on the middle part 1 of a ski, comprises a baseplate 2 with raised front and rear edges 3, 4. These edges have rows of teeth 5, 6 which are directed towards one another. The baseplate 2, which is fastened on the ski by means of screws (not shown), carries two bearer plates 7 for respective elongated binding jaws 9, said bearer plates serving, in use, to hold a

ski-boot fast laterally. The bearer plates 7 are each substantially in the form of an approximate rectangle and at opposite ends they have curved rows of teeth 10, 11 which are situated opposite one another and which are intended to engage in the rows of teeth 5, 6 of the baseplate 2.

Thus, the bearer plates 7 can be adjusted to different angular positions with respect to one another and to different distances from one another between the two rows of teeth 5 and 6 and hence can be adapted to the shape and size of the ski boot. They are fastened on the baseplate 2 by means of screws 12 which pass through elongated slots 13 in the bearer plates 7 and engage in internally screwthreaded bores in the baseplate 2. In their front regions, the bearer plates 7 each carry a pivot pin 14, on which the respective jaw 9 is rotatably mounted. The pivot pins 14 are arranged so as to be at such a distance in front of the ski boot toe on the ski that the free end portions of the jaws 9 will fully release the ski boot when swung out through a small angle after the maximum side pressure that can be taken by the click-stop mechanisms has been exceeded, so that the boot can slide side-ways from the ski without any obstruction from the jaws 9. The jaws 9 are so constructed as to partially engage around the front part of the ski boot and bear against the side surfaces of the sole of the boot in the clamping position over substantially a quarter of the length of the said boot. In the exemplified embodiment illustrated, they advantageously consist of stampings which are adapted to the contour of the sole edge and which, for example, are connected by screws or rivets to respective castings 8 which accommodate the corresponding pivot pins 14 for the jaws and have parts of a click-stop mechanism, a jaw locking mechanism and of an arrangement for limiting the jaw pivoting movement. This results in a compact construction and a closed arrangement of all the said parts, so that the safety binding is substantially insensitive to the penetration of snow and to icing up.

The click-stop mechanism consists of a hollow screw 15, with a cross-slotted head 16 (see FIG. 3). The hollow screw 15 is rotatable in an internally screwthreaded bore of the casting 8 and accommodates a helical spring 17 which presses through the medium of a small plate against a ball 18 which engages in a bore 19 of the bearer plate 7. The pressure of the helical spring 17 resulting in the engagement of the ball 18 in the bore 19 can be varied by turning the hollow screw 15 up and down in the casting 8. It is thus possible to carry out any desired adjustment of the maximum lateral pressure that can be taken by the click-stop mechanism and at which the jaw 9 is just held in its arrested position. When this force is exceeded, the ball 18 is forced out of the bore 19 and into the bore of the casting 8 against the action of the compression spring 17, whereupon the jaw 9 swings laterally outwards.

A jaw locking device (see FIGS. 2 and 4) which serves, when required, to prevent the jaw 9 from swinging out even when the maximum lateral pressure that the click-stop mechanism can take is exceeded, consists of a bolt 20 which is axially slidable in a respective bore in the casting 8 and which has a wing-type head or manipulator 21. This bolt 20 can be slid axially against the pressure of a helical spring 22 until its reduced-diameter end 23, which serves as a locking pin, engages in a bore 24 in the respective bearer plate 7 and thus prevents any pivoting movement of the jaw 9. The locking pin 23 can be secured in its engaged position by a transverse pin 25, which projects radially on one side, engaging in a detent groove 26 on the underside of the bore, which is widened in that region, as shown in FIG. 2. It is therefore only necessary to press the bolt 20 down slightly, against the action of the spring 22, in order to move the transverse pin 25 out of its arrested position in the detent groove 26, and then to turn the bolt 20 by means of the head 21 through about 180° in order to bring the locking pin 23 into a position in which the spring 22 automatically lifts it out of its locking position into the position shown in FIG. 4, in which the transverse pin 25 engages in a radial groove 27.

In order to limit the rotary movement of the two jaws 9 in the inward and outward directions, a pin 28 is fastened in each of the two bearer plates 7. The head of this pin 28 engages in an arcuate opening 29 on the underside of the casting 8.

The jaw locking device is put into operation for touring competitions or the like. On such ski tours, during the ascent, the conventional heel retaining cable 30 is disengaged from the rear one of the two usual lateral hook retainers 33 to enable the heel of the boot to be lifted from the ski. In this case it is necessary for the front part of the ski boot to be held on the ski in such manner as to be adequately immovable laterally by means of fixed binding jaws. In the safety binding according to the invention, this is effected by pressing the bolt 20 down so as to engage the locking pin 23 into the bore 24 in the bearer plate 7. For downhill racing, this locking of the jaw is released, so that if a ski suddenly becomes laterally deflected, for example as a result of striking an obstacle, it is possible for at least one of the two jaws 9 to pivot out of its arrested position as a result of exceeding the maximum torque that the click-stop mechanism can take, and thereby enable the ski boot to be released from the ski binding. Since in these conditions the jaws 9 swing a considerable way forward in the safety binding according to the invention, immediate and complete release of the ski boot is ensured.

To prevent the jaws 9 from being forced apart by the wedge effect exerted on the jaws 9 by the ski boot which is pressed forward by the cable 30, without additional torque being exerted on the jaw by a sudden lateral deflection of the ski during downhill racing, a projection 31 in the form of a nose is provided on each jaw 9 and abuts against the front surface of the sole of the ski boot. The distance of these projections from each other is somewhat less than the distance between the pivot axes of the jaws 9. The projections 31 may, however, be so constructed as to ensure that the ski boot bears thereon over an appropriate area. In this case, each projection 31 should extend towards the adjacent projection of the other jaw to an extent such that these two projections are each a shorter distance from the central longitudinal line of the ski than the jaw pivot axes.

As a result of this positioning of the projections 31, when the ski boot is pressed against them an inwardly directed torque is exerted on the jaws 9 and this counteracts the wedge effect exerted by the ski boot.

In its front region, each jaw 9 may also have a top lug 32 which is curved outwards horizontally and which engages over the sole of the boot in the region of its front corner.

I claim:

1. A ski binding comprising a baseplate for fastening to a ski and providing, at two opposite ends thereof, confronting rows of teeth, a pair of bearer plates secured to said baseplate and each having at opposite ends curved rows of teeth engaging with said confronting rows of teeth of said baseplate, whereby said bearer plates are adjustable laterally of said baseplate and angularly relative to one another, a pair of jaws pivotally mounted one on each of said bearer plates so as to enable them to grip a ski boot therebetween, a click-stop mechanism acting between each said jaw and its respective bearer plate to prevent swinging movement of the respective jaw except when a certain pressure on said jaw is exceeded, and releasable locking means operable to prevent swinging movement of each said jaw relative to its bearer plate, said locking means comprising, for each said jaw, an axially slidable locking pin carried by said jaw and engageable, by axial sliding, into an aperture in the respec-

tive bearer plate and retaining means for retaining said locking pin engaged in said aperture.

2. A ski binding comprising a baseplate for fastening to a ski and having, at two opposite ends thereof upstanding edges, confronting rows of teeth on said upstanding edges, a pair of bearer plates disposed on said baseplate between said upstanding edges, a respective screw extending through a slot in each said bearer plate and into said base plate to secure said bearer plates to said base plate each said bearer plate having at opposite ends curved rows of teeth engaging with said confronting rows of teeth of said baseplate, whereby said bearer plates are adjustable laterally of said baseplate and angularly relative to one another, a pair of jaws pivotally mounted one on each of said bearer plates so as to enable them to grip a ski boot therebetween, a click-stop mechanism acting between each said jaw and its respective bearer plate to prevent swinging movement of the respective jaw except when a certain pressure on said jaw is exceeded, each said click-stop mechanism comprising a ball disposed in a hole in the respective jaw and engageable in a recess in said respective bearer, a spring acting on said ball to urge it into said recess and adjustable screw means acting on said spring and permitting variation of the pressure of said spring on said ball, and releaseable locking means operable to prevent swinging movement of each said jaw relative to its bearer plate, said locking means comprising, for each said jaw, an axially slidable locking pin carried by said jaw and engageable, by axial sliding, into an aperture in the respective bearer plate, and retaining means for retaining said locking pin engaged in said aperture.

3. A ski binding comprising, in combination:

(*a*) bearer plate means;

(*b*) fastening means for securing said bearer plate means to a ski;

(*c*) a pair of jaws pivotally mounted on said bearer plate means for gripping a ski boot therebetween;

(*d*) two click-stop mechanisms respectively connecting said jaws with said bearer plate means to prevent swinging movement of the respective jaw except when a certain pressure on said jaw is exceeded; and

(*e*) two releasable locking means operable to prevent swinging movement of a respective jaw relative to said bearer plate means, said locking means each including

(1) an axially slidable locking pin carried by said jaw and engageable by axial sliding into an aperture in said bearer plate means, and

(2) retaining means for retaining said locking pin engaged in said aperture.

4. A ski binding comprising, in combination:

(*a*) a base plate;

(*b*) a pair of bearer plates adjustably secured to said base plate;

(*c*) a pair of elongated jaws, each jaw having a free end portion and another end portion pivoted to a respective bearer plate for movement of said free end portion toward and away from a clamping position, said free end portions extending rearwardly of the respective bearer plates, and said free end portions when in the clamping position thereof being adapted to laterally clamp a boot therebetween;

(*d*) abutment means on at least one of said jaws intermediate the ends thereof for abutment against the toe portion of a boot clamped between said free end portions;

(*e*) a click-stop mechanism on each of said other end portions and engaging the respective bearer plate to prevent pivotal movement of the corresponding free end portion from said clamping position thereof under a pressure smaller than a predetermined pressure; and

(*f*) releasable locking means on said other end portion of each jaw for locking said jaws to the respective bearer plates against pivotal movement.

5. A ski binding as set forth in claim 4, wherein said free end portions when in said clamping positions thereof extend longitudinally substantially in a common direction, and said abutment means are adapted to abut against the toe portion of a clamped boot in said common direction.

6. A ski binding as set forth in claim 4, wherein each click-stop mechanism includes a spring loaded ball carried by the respective other end portion, and the respective bearer plate is formed with a recess adapted to be engaged by said ball under spring pressure.

7. A ski binding as set forth in claim 6, further comprising means for adjusting the spring pressure acting on said ball.

8. A ski binding comprising, in combination:

(*a*) a base plate;

(*b*) a pair of bearer plates adjustably secured to said base plate;

(*c*) pivot means on each bearer plate, said pivot means having respective spaced axes;

(*d*) a pair of elongated jaws, each jaw having a free end portion and another end portion secured to a respective one of said pivot means for movement of said free end portion toward and away from a clamping position, said free end portions extending rearwardly of the respective bearer plates, and said free end portions when in the clamping position thereof being adapted to laterally clamp a boot therebetween;

(*e*) abutment means on each of said jaws longitudinally intermediate said end portions for abutment against the toe portion of a boot clamped between said free end portions, said abutment means being spaced from each other a distance smaller than the spacing of said axes when said free end portions are in the respective clamping positions thereof;

(*f*) a click-stop mechanism on each of said other end portions and engaging the respective bearer plate to prevent pivotal movement of the corresponding free end portion from said clamping position thereof under a pressure smaller than a predetermined pressure; and

(*g*) releasable locking means on said other end portion of each jaw for locking said jaws to the respective bearer plates against pivotal movement.

9. A ski binding comprising, in combination:

(*a*) a base plate;

(*b*) a pair of bearer plates adjustably secured to said base plate;

(*c*) a pair of elongated jaws, each jaw having a free end portion and another end portion pivoted to a respective bearer plate for movement of said free end portion toward and away from a clamping position, said free end portions when in the clamping position thereof being adapted to laterally clamp a boot therebetween;

(*d*) abutment means on the free end portion of at least one of said jaws for abutment against the toe portion of a boot clamped between said free end portions;

(*e*) a click-stop mechanism on each of said other end portions and engaging the respective bearer plate to prevent pivotal movement of the corresponding free end portion from said clamping position thereof under a pressure smaller than a predetermined pressure; and

(*f*) releasable locking means for locking each of said jaws to the respective bearer plate against pivotal movement, the locking means for each jaw including an axially slidable locking pin carried by the other end portion of said jaw and engageable by axial sliding with an aperture in the respective bearer plate.

10. A ski binding as set forth in claim 9, wherein said locking means further includes retaining means for retaining said locking pin engaged by said aperture.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,122,380 February 25, 196

Heinrich Eckel

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the heading to the printed specification, line 6, for "Aug. 6, 1960" read -- Aug. 8, 1960 --.

Signed and sealed this 14th day of July 1964.

(SEAL)

Attest:

ESTON G. JOHNSON
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents