

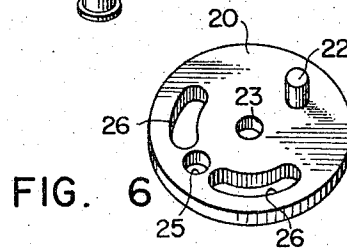
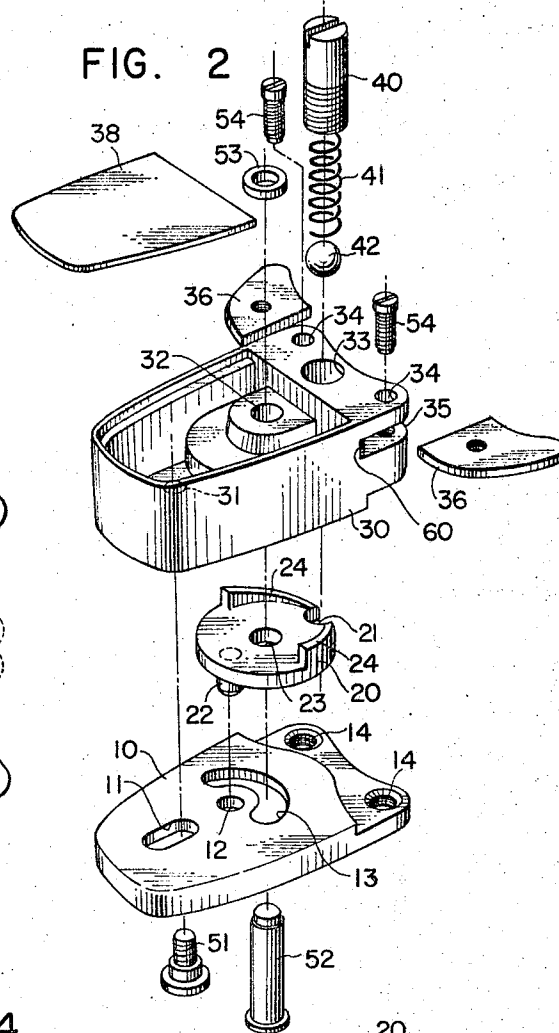
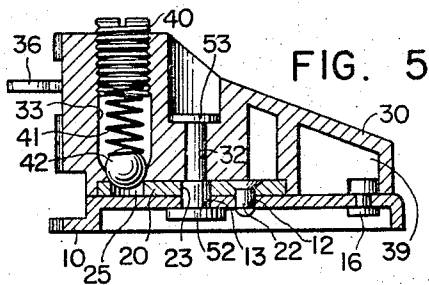
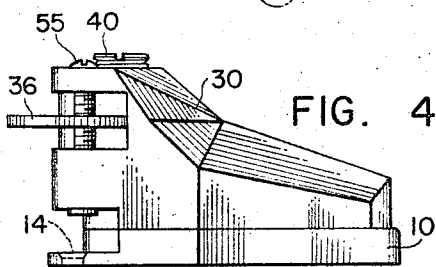
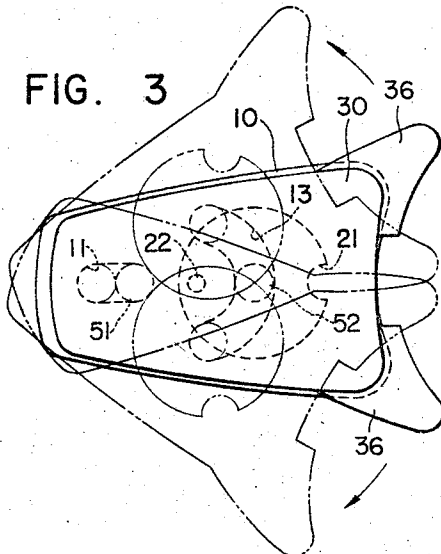
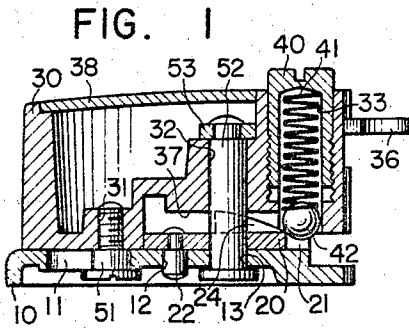
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3,421,772

SKI BOOT TOE FIXTURE

Filed Nov. 21, 1967



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SKI BOOT TOE FIXTURE

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11 Claims

ABSTRACT OF THE DISCLOSURE

A "safety binding" ski boot toe fixture is provided having a toe-fitting member. The toe fixture will not only be turned sideways but also advanced along the ski (away from the heel fixture) to positively disengage the toe of a ski boot when a dangerously large side force is applied to the toe. Once the toe-fitting member disengages the toe, it will be almost automatically, i.e., with little force, returned to its original centered position by the increased pressure of a spring. The same spring tends to retain the toe-fitting member in its normal centered position. The pressure of the spring can be properly adjusted in accordance with the weight and skill of the skier.

Description

The invention described herein relates to "safety binding" ski equipment and more particularly to a toe fixture for removably fastening the toe of a ski boot to a ski. Such a toe fixture is attached to each ski together with a cooperating heel fixture.

Conventional toe fixtures have toe-fitting members which are rotatably pivoted to a base, the base being attached to the ski. Such toe-fitting members are only turned sideways to disengage the toe of the ski boot when a dangerous and unreasonable side force is applied to the toe, for example, as a result of severe falls. In such conventional toe fixtures, however, the toe of a ski boot will not positively be freed from the ski. This is because such toe-fitting members will merely be turned sideways. The opening between the sideways turned toe-fitting members and the heel fixture may not be large enough to disengage the boot, which remains firmly attached to the ski. An injury to the skier, such as a bone fracture, may still occur.

It is an objective of the present invention to provide a ski boot toe fixture which will positively disengage the toe of a ski boot before the skier may be injured.

It is another objective of the present invention to provide a ski boot toe fixture wherein a toe-fitting member will be, with little force, returned to its normal centered position after disengaging the toe.

It is a further objective of the present invention to provide a ski boot toe fixture wherein the retaining force on the toe of the ski boot can be properly adjusted depending on the weight and skill of the skier.

It is still a further objective of the present invention to provide a ski boot toe fixture wherein the retaining force on the toe of the ski boot can be properly adjusted depending on the weight and skill of the skier.

It is still a further objective of the present invention to provide a ski boot toe fixture wherein a toe-engaging member may be engaged with the toe of the ski boot irrespective of the sizes of the ski boot.

In accordance with the present invention, a ski boot toe fixture comprises, in combination, a base, a turning disc and a toe-fitting member. The turning disc is interposed between the base and the toe-fitting member. The base has a slot in its fore part (toward the front of the ski and away from the heel fixture) and a hole substan-

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tially in its center. An arched slot partly surrounds the hole. The turning disc has a central hole and an eccentric stud which is pivoted in the central hole of the base. The toe-fitting member is rotatably attached with a pin penetrating through the arched slot of the base and a central hole of the turning disc. The toe-fitting member rotates about a pin or bolt which is through the slot in the base. The turning disc has a circumferential concavity in its rear (opposite the eccentric stud) and circumferential projections extending around increasingly and symmetrically high right and left from the concavity. These projections extend substantially half around the disc. Alternatively, the turning disc has two arched slots, instead of the circumferential projections, and a ball-fitting hole, instead of the concavity, interposed between the arched slots. A spring is fitted within the rear central portion of the toe-fitting member. A ball is interposed under compression, in the normal state, between the spring and the concavity in the disc. The spring is pressed and retained with a screw bolt.

When an unreasonable force, in excess of the pressure of the spring pressing the ball down into the concavity, is applied sideways to the toe, the toe-fitting member will be not only turned sideways but also advanced along the ski, i.e., away from the heel fixture. This is because the turning radius of the toe-fitting member is relatively larger than that of the turning disc. The ball, during such sideways motion, will be rolled up from the concavity onto the sloping faces of the circumferential projections and against the pressure of the spring, until at last the boot is freed from the ski. Once the toe-fitting member disengages the boot, it will be, with little force, returned to its original central position with the help of the increased pressure of the spring. The pressure of the spring is adjustable, with the screw bolt, the adjustment depending on the weight and skill of the skier.

With reference to the alternative turning disc, the ball is interposed under compression, in the normal state, between the spring and the ball-fitting hole. When the disc is turned, the ball will be rolled up over either of the partitions between the ball-fitting hole and the arched slots, and then onto one of the arched slots. In the case of this turning disc, however, a hand operation of returning the disc to the normal, i.e., original, state will be required.

The toe-fitting member has two toe-engaging pieces respectively fitted within its rear shelf regions. The toe-engaging pieces are adjustable in their height with screw bolts so that they may be adjusted to just engage with the toe of the ski boot.

In order to make it easier to understand the other objectives and features of the present invention, a detailed explanation shall be made in the following with reference to the accompanying drawing, in which:

FIG. 1 is a vertical sectioned side view of the first embodiment according to the present invention;

FIG. 2 is a perspective exploded view of the embodiment illustrated in FIG. 1 prior to its assembly;

FIG. 3 is a plan view of the same, showing mutual relations between a base, a turning disc and a toe-fitting member when the toe-fitting member is turned in both directions;

FIG. 4 is a side view of the second embodiment according to the present invention;

FIG. 5 is a vertical sectioned side view of the second embodiment illustrated in FIG. 4; and

FIG. 6 is a perspective view of a turning disc of the embodiment in FIGS. 4 and 5 as seen from the back.

With reference to FIGS. 1 and 2, reference numeral 10 denotes a flat base plate which is adapted to be attached to the ski with fixing holes 14. Screws (not shown) fit through the holes 14 and screw into the ski. The base 10

has a slot 11 made in the fore part thereof (toward the front of the ski and away from the heel fixture) and a hole 12 and an arched slot 13.

Reference numeral 20 denotes a disc plate rotatably pivoted with a stud pivot 22 which is fitted into the hole 12. The disc plate 20 has a concavity 21, semi-circular in shape, and a central hole 23. The disc plate 20 has circumferential projections 24 (shoulders) extending around increasingly high right and left from the concavity 21.

Reference numeral 30 denotes a frame of the toe-fitting member. The frame 30 is rotatably pivoted around a bolt 51 penetrating through its hole 31 and passing through the slot 11 of the base 10. The slot 11 permits movement of the frame away from the heel fixture in the event of a release of the toe fixture. The frame 30 has a hole 32. The frame 30 is rotatably fixed with a pin 52 penetrating through its hole 32, the arched slot 13 of the base plate 10 and the central hole 23 of the disc 20.

In the normal centered state, i.e., when the toe of the boot is engaged, the slot 11, the stud pivot 22, the central hole 24 and the concavity 21 are all in alignment. An annular metal fitting 53 is fixed to the end portion of the pin 52. The frame 30 has a hole 33 into which a screw bolt 40 is screwed. Bolt 40 presses down and retains a ball 42 in the concavity 21, in the normal state, through a spring 41 fixed to the lower end of the screw bolt 40. The pressure of the spring is adjustable by means of the screw bolt 40. The frame 30 has in its rear shelf regions 35 toe-engaging pieces 36 which are fixed with screws 54. The toe-engaging pieces 36 are adjustable in their height, with the screws 54, so that they may just engage with the toe of the ski boot. Elastic members 60 are respectively interposed under compression between the toe-engaging pieces 36 and the vertical inside walls of the rear shelf regions 35. These elastic members 60 are adapted to prevent looseness of the screws 54 caused by oscillation in the course of skiing, and therefore displacement of the toe-engaging pieces 36. These elastic members are preferably of rubber. The frame 30 has a raised bottom 37 and a cover 38. The raised bottom 37 is designed so as to avoid the contact between the frame 30 and the disc plate 20.

In operation, as shown in FIG. 3, the toe-fitting member 30 will be turned in either direction as indicated by the arrows when an unreasonable dangerous side force is applied, and at the same time will be advanced toward the front of the ski, as shown in dashed line. When the toe-fitting member is turned, the ball 42 will be rolled up from the concavity 21 onto the sloping faces of the circumferential projections 24 against the pressure of the spring 41. Once the toe-fitting member disengages the toe, the increased pressure of the spring 41 will tend to bring the disc plate 20 and the frame 30 back to its original position.

The second embodiment of FIGS. 4 and 5 is similar in most of its part to the embodiment of FIG. 1 and the similar parts are labeled with the same corresponding reference numerals.

In this embodiment, the base 10 has a guiding pin 16 rotatably and slidably fitted within a slender region (a slot) 39 of the frame 30. A ball-fitting hole 25 is provided, instead of the concavity 21 of the first embodiment. The disc plate 20 has two arched slots 26. Except for these differences, this embodiment of FIGS. 4 and 5 is the same as the above-described embodiment of FIGS. 1-4.

In operation, in the embodiment of FIGS. 4 and 5, under excessive side pressure the frame 30 will be turned and advanced (away from the heel fixture) to disengage the toe of the ski boot. The ball 42 will be rolled against the pressure of the spring 41 over the partitions formed between the ball-fitting hole 25 and the arched slots 26 and then into either of the arched slots.

After the frame 30 disengages the toe, the operation of returning the frame by hand to its normal position will be required. This embodiment is more simplified in structure than the preceding embodiment.

In the embodiment of FIGS. 1-4, the pivot stud 22 may be on the base plate 10 and that stud may pivot in an eccentric hole in the disc plate 20. As another example, a pin may replace the slot 11 in base plate 10, the pin being attached to the base and being positioned in a slot in the frame 30.

I claim:

1. A ski boot toe fixture comprising, in combination, a base adapted to be attached to a ski, having a slide means in its fore part, which fore part is adapted to be positioned toward the front of said ski, a first pivot means positioned substantially in the center of the said base and an arched slot partly around said first pivot means,
2. a turning member having a hole substantially in its center and means to eccentrically pivot said turning member on said first pivot means of said base,
3. a toe-fitting member rotatably and slidably fixed to said slide means of said base, a pin through said arched slot of said base and said central hole of the turning member and rotatably connected with said toe-fitting member, and pressing means fitted within the rear part of said toe-fitting member and adapted to normally press on said base.
2. A ski boot toe fixture as claimed in claim 1, wherein the turning member is a turning disc having a circumferential concavity.
3. A ski boot toe fixture as claimed in claim 2, wherein the turning member has circumferential projections extending at least partly around right and left from the concavity and becoming increasingly high.
4. A ski boot toe fixture as claimed in claim 3, wherein the pressing means are a spring, a ball interposed under compression, in the normal state, between the spring and said concavity and, in the disengaging state, between the sloping faces of said circumferential projections and the spring, and means to retain the spring and to adjust the pressure of said spring.
5. A ski boot toe fixture as claimed in claim 1, wherein the slide means is a slot in the base and the toe-fitting member carries a pin which fits in the said slot.
6. A ski boot toe fixture as claimed in claim 2, wherein the means to eccentrically pivot the disc on the base is an eccentric stud on the turning member which pivotally fits in a hole in the base.
7. A ski boot toe fixture as claimed in claim 1, wherein the toe-fitting member has a rear shelf region and toe-engaging members fitted within said rear shelf region and means to adjust the height of said toe-engaging members so that they may just engage with the toe of the ski boot.
8. A ski boot toe fixture as claimed in claim 1, wherein the toe-fitting member has a cover and a raised bottom adapted to avoid the contact between the toe-fitting member and the turning member.
9. A ski boot toe fixture as claimed in claim 1, wherein the turning member has arched slots and a ball-fitting hole interposed between said arched slots.
10. A ski boot toe fixture as claimed in claim 1, wherein the toe-fitting member has a slot in its fore part and the base has a guiding pin rotatably and slidably fitted within the slot.
11. A ski boot toe fixture as claimed in claim 7, wherein the toe-fitting member has elastic members respectively fitted to the vertical inside walls of said rear shelf regions.

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