April 10, 1962 B. E. BERLENBACH 3,029,085

TOE HOLD FOR SKIS

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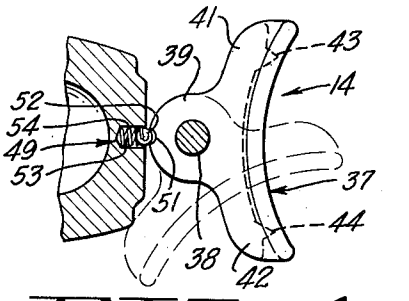


FIG. 4

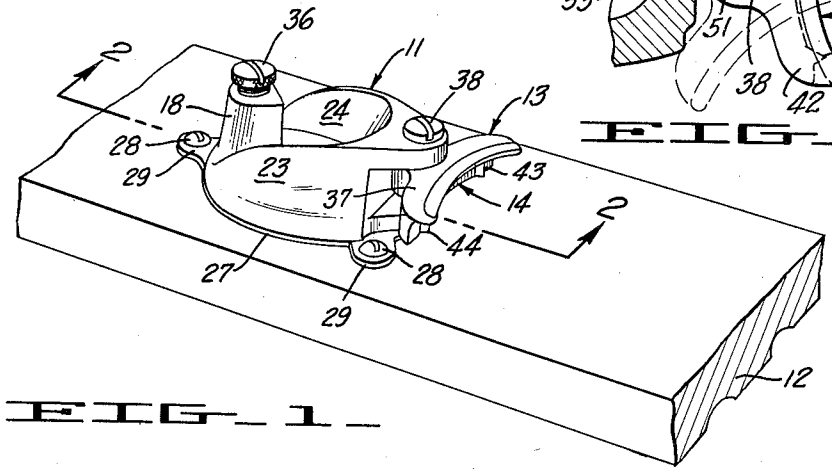


FIG. 1

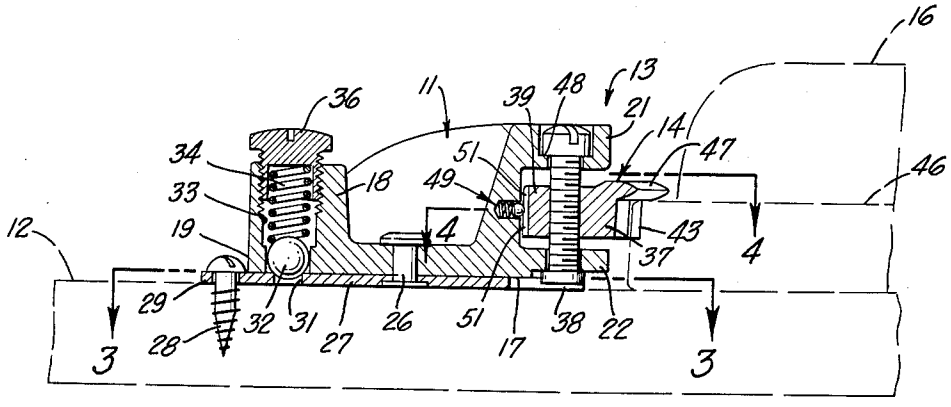


FIG. 2

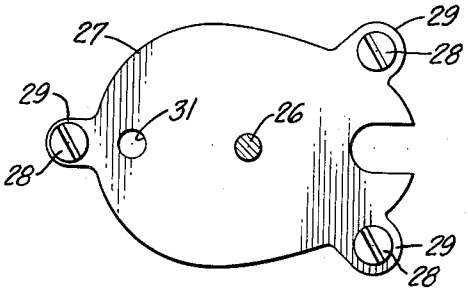


FIG. 3

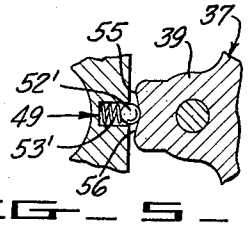


FIG. 5

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TOE HOLD FOR SKIS

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The present invention relates to bindings for fastening skis to the feet of the wearer, and more particularly to improvements in devices for holding the toe of the ski boot on the ski runner.

This toe holding device is intended for use with heel holds such as the safety binding shown in applicant's Patent No. 2,698,757, entitled Safety Binding for Ski Runners.

The bindings are designed to urge the ski boot forwardly on the ski runner and against a toe hold device which secures the toe of the ski boot to the ski runner under normal operating conditions.

In case of emergency, such as a fall suffered by the skier, safety requires that the ski boot toe be automatically released from the ski runner. This is accomplished in my above-mentioned patent by mounting the toe hold on a pivot and holding it against rotation by yieldable means so that a severe side thrust will cause the toe hold to rotate and permit the toe of the boot to disengage to one side or the other.

In my previous patent, the toe of the boot was held in position by a single tongue engaged between spaced flanges on a bracket affixed to the toe of the boot. Lateral thrust, in excess of the amount resisted by the setting of the yielding means, caused the toe hold to pivot. This permitted the tongue and engaged boot toe to swing away from the centerline of the ski, allowing the boot to free itself from the ski runner.

To increase the holding effect of the toe hold, a wide cleat was evolved which had laterally extending wings formed to engage the boot toe at fairly widely spaced points. With such a cleat fixedly mounted on the toe hold it was found that the boot would not swing free in the manner desired.

As the toe hold pivoted, the wing would sweep across the centerline of the ski in an arc having the pivot point as its center. Because of this, the wing would, of necessity, move backwardly of the ski. In order to do this, the ski boot would have to be moved backward also. With the weight of the skier on the boot, and the heel being held against rearward movement by the binding, the boot could not readily be moved backward the required amount to allow the toe to swing free.

The toe hold of the present invention overcomes the difficulties inherent in the use of the laterally spaced wings by forming them on a separate toe-engaging cleat which is pivoted upon the rotatable portion of the toe hold. Thus, when the boot is urged to the left as viewed from above, the toe hold body will turn in a clockwise direction. The separate toe-engaging cleat can swing in the opposite or counter-clockwise direction with the net effect that the sidewise movement of the boot toe is prevented solely by yieldable means.

Where the cleat is freely swingable on the body, it will function as described in freeing the ski boot toe, but it presents certain problems in putting the ski back on. Normally, the boot toe is engaged with the toe hold and the bindings are then secured around the heel. It has proven difficult under actual skiing conditions to reach down and hold the cleat at right angles to the centerline of the ski while the toe is engaged. The present invention incorporates a yieldable detent means to hold the cleat in toe-receiving position during the remounting operation.

It is, therefore, an object of the present invention to

provide a toe hold for skis which will firmly engage and securely hold the toe of the ski boot in operating position upon the ski runner, but will automatically release the boot in case of severe side thrust such as would be occasioned by a skier losing his balance and falling in the snow, the amount of force necessary to cause release being independently adjustable.

Another object of the present invention is the provision, in a toe hold of the character described, of boot engaging portions spaced on opposite sides of the centerline of the ski runner.

A still further object of my invention is to provide a toe hold of the character described in which the toe-engaging portion is swingable laterally of the ski runner, but is normally held in operative central position by a yieldable means which will automatically release such portion for its swinging movement upon application of a side thrust sufficient to cause rotation of the toe hold.

A still further object is the provision of a toe hold as set forth which is biased to return automatically to its normal running position upon disengagement from the ski boot toe.

Further objects and advantages of my invention will appear as the specification proceeds, and the new and useful features of the same will be fully defined in the claims hereto attached.

The preferred form of my invention is illustrated in the accompanying drawings, forming part of this application, in which:

FIGURE 1 is a perspective view of a toe hold constructed in accordance with my invention and shown mounted in operative position upon a fragmentary portion of a ski runner;

FIGURE 2, a longitudinal cross-sectional view of a toe hold taken substantially on the plane of line 2—2 of FIGURE 1;

FIGURE 3, a plan sectional view taken substantially on the plane of line 3—3 of FIGURE 2;

FIGURE 4, a fragmentary plan sectional view taken on the plane of line 4—4 of FIGURE 2; and

FIGURE 5, a plan sectional view taken similarly to that of FIGURE 4, but illustrating a modified form of detent mechanism used to achieve a self-centering action.

While I have shown only the preferred forms of my invention, I wish to have it understood that various changes or modifications may be made within the scope of the claims attached hereto without departing from the spirit of the invention.

Referring to the drawing in detail, my toe hold comprises in its principal features, a body member **11** adapted for mounting upon a ski runner **12** with freedom of turning movement, and toe anchoring means **13** swingably mounted on the body member **11** and having a portion **14** formed for engagement with the toe of a ski boot **16** resting on the runner.

The present toe hold is adapted for use with any heel binding which will urge the ski boot forwardly against the toe hold. These bindings usually engage the heel of the boot and, by means of spring tension, urge the boot against the toe hold. One such heel binding is disclosed in my aforementioned patent, No. 2,698,757, although the present toe hold may be used with any heel binding possessing the described characteristics.

The body member **11** may be of any suitable material and is here shown in the form of a metal casting having a flat lower face **17** and a streamline boss **18** rising from its front end **19**. The rear end of the body **11** extends upwardly and is formed with a pair of vertically spaced rearwardly extending bosses **21** and **22** which support the toe-anchoring means **13**. A pair of curved strengthening and stiffening webs **23** and **24** connect the bosses **21** and **22** to the balance of the body member.

Located centrally of the body member 11 is a pivot pin 26 secured to and extending vertically from the base plate 27 and journaled in the body member. The base plate 27 is attached, as by screws passing through ears 29, to the ski runner 12. Side thrust upon the rear end of the body member 11 will cause it to pivot around pin 26.

The body member 11 is held from such pivoting during normal operation of the skis by a yieldable means connecting the body member and base plate 27 and holding them against relative movement until a certain degree of side thrust is reached. This means here consists of a spring loaded detent carried by the body member in boss 18 and engageable with a seat provided by a hole 31 in the base plate 27.

As here shown, the detent consists of a ball 32 slidable in a bore 33 formed in boss 18 and a spring 34 compressed in the bore and urging the ball downwardly against the base plate 27.

The amount of downward pressure on the detent ball 32 is adjustable so as to allow the body member 11 to rotate at a predetermined side thrust. This is accomplished by compressing the spring 34 between the ball 32 and a screw 36 threaded into the upper end of the bore 33.

To increase the amount of side pressure which the detent will resist without allowing the body member 11 to turn, the screw 36 is rotated to further compress the spring 34. Rotation of the screw 36 in the opposite direction reduces the amount of side thrust necessary to cause rotation.

The toe-anchoring means 13 includes a toe-engaging member in the form of a cleat 37 which is pivotally mounted upon a pin 38 carried by the bosses 21 and 22 at the rear end of the body member 11.

Cleat 37 consists of a hub portion 39, containing a vertical opening for the pin 38, and wing portions 41 and 42 extending outwardly from the hub.

Firm, non-slip engagement of the cleat 37 with the toe of the boot is provided by forming vertical ridges 43 and 44 at the outer ends of wings 41 and 42. These ridges are adapted to bite into the forward end of the sole 46 of the ski boot 16. If desired, mating grooves may be provided in the soles or in members attached thereto (not shown).

Overlying the ridges and extending along the length of the wings is a horizontal flange 47 which fits over the upper edge of the sole 46 to hold the latter against vertical displacement.

Preferably, the cleat 37 is formed to present a concave face to the rear for engagement by the boot sole, as shown in FIGURES 1 and 4. Thus, the sole is engaged principally, if not entirely, by the ridges 43 and 44. While a single ridge has been shown at each end of the cleat, more than one may be employed to good effect.

To accommodate the toe hold to different thicknesses of boot soles, the cleat 37 is adjustable vertically toward and away from ski runner 12. This is here accomplished by providing the pin 38 in the form of a screw threadably engaged in the hub 39 of cleat 37.

The openings in the bosses 21 and 22 are slightly larger than the outside diameter of the screw threads to permit free turning, and the upper boss is counter-drilled to provide a shoulder 48 against which the screw head 49 will bear.

The lower end of the pin is enlarged after assembly and bears against the lower side of boss 22 to hold the pin against vertical movement upwardly. Rotation of the screw 38 will then cause the cleat 37 to rise or descend, depending upon the direction of rotation.

In accordance with the present invention, the cleat 37 is normally held in the correct toe-engaging position by a means which will permit the cleat to swivel when sufficient side thrust is exerted to cause the body member 11 to pivot. This means preferably consists of a detent 49 and a seat 51 carried by the body member 11 and cleat 37.

The detent 49 may be mounted in either the cleat 37 or the body member 11, but preferably in the latter, as shown in FIGURE 2, and consists of a ball 52 and a spring 53 mounted in a horizontal bore 54 in the body member 11 facing the hub 39 of cleat 37.

The detent seat 51 comprises a depression formed in the hub 39 in position to engage with the ball 52 when the cleat is in correct centered position illustrated in FIGURE 4. Because of the vertical adjustment of the cleat provided by threaded pin 38, the seat 51 is in the form of a vertical groove so that a seat will be provided at all vertical positions.

A modified form of detent is illustrated in FIGURE 5. This detent is designed to automatically return the cleat 37 to correct toe-inserting position and consists of forming the sides 55 and 56 of the groove 51 as sloping walls. The pressure exerted upon the ball 52' by spring 53' bears at an angle against such walls tending to return the cleat to operating position.

In use, the toe hold of the present invention is attached to the ski runner in the correct position and the body member 11 and cleat 37 are centered so that their respective detents are engaged with their seats. The height of the cleat 37 is adjusted by rotating the screw 38 until the forward end of boot sole 46 will just fit under the cleat flange 47.

The boot toe is engaged with the cleat 37 and the heel binding or heel hold operated to secure the boot in place. Adjustment of the amount of side force necessary to cause the body member 11 to pivot and release the boot toe is effected by turning screw 36.

When the pre-set amount of side thrust is exceeded, the retaining effect of the detent will be overcome and the body member 11 will swivel. As this occurs, the cleat 37 will swivel in the opposite direction enough to permit the boot toe to move sidewise of the ski without having to force the boot backwardly. In this connection, it is noted that the detent engaging the cleat 37 is not as strong as that preventing rotaiton of body member 11.

Remounting of the skis is accomplished in the same manner as described for the initial mounting, the detent 49 serving to hold the cleat 37 in correct position.

I claim:

1. A toe hold for a ski boot, comprising a body member adapted for pivotal mounting on a ski runner for rotation about an axis perpendicular to the runner, means on said body cooperative with means mounted on said ski for holding said body member in at least one definite position and for yieldingly resisting rotation of the body member, a pin carried by said body member in parallel spaced relation to said axis, a toe-engaging member formed for engagement with the toe of a ski boot, said toe-engaging member having a central section pivoted on said pin and having a generally vertical face in close proximity to said body member, and cooperative means on the body member and on the vertical face of said central section for yieldingly holding the toe-engaging member against rotation.

2. A toe hold for a ski boot as defined in claim 1 in which the yielding means for holding the toe-engaging member against turning movement is of less intensity than the yielding means for holding the body member against rotation.

3. A toe hold for a ski boot as defined in claim 1 and wherein said means for yieldably holding the toe-engaging member and the means for yieldably holding the body member against rotation comprise spring-loaded detents.

4. A toe hold for a ski boot as defined in claim 1 in which the pin and the toe-engaging member have cooperative means for raising and lowering the toe-engaging member and in which the yielding means for holding the toe-engaging member against turning movement is

made to allow of the raising and lowering of the toe-engaging member.

5. A toe hold for a ski boot as defined in claim 1 in which the said cooperative means includes means for automatically returning the toe-engaging member from any sidewise excursion.

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