

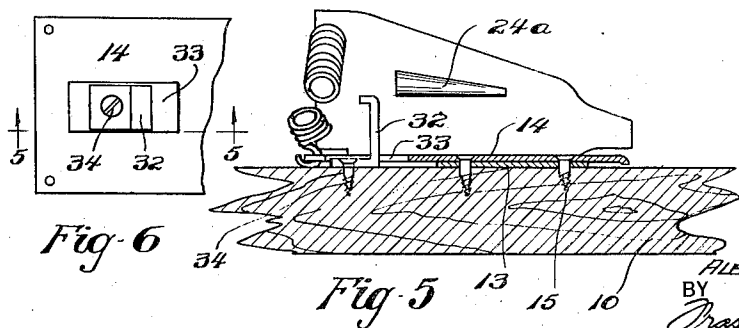
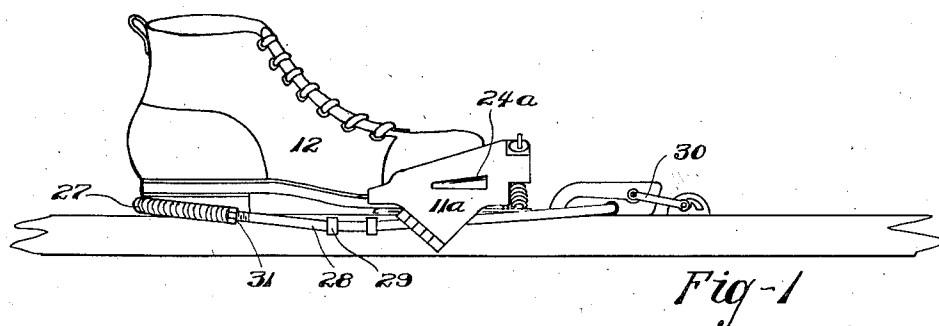
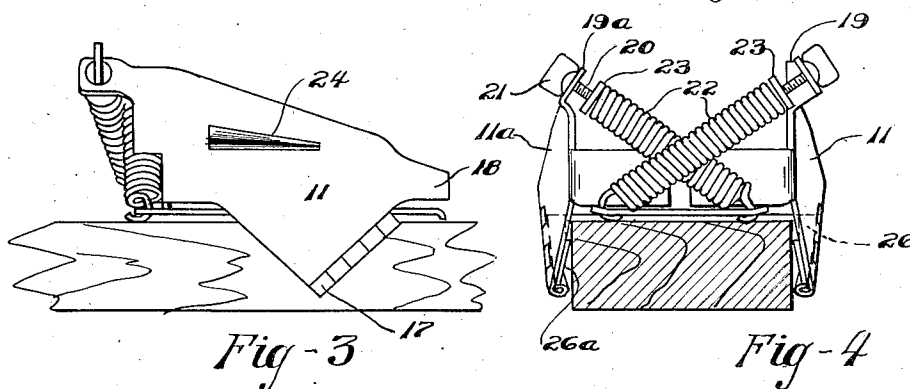
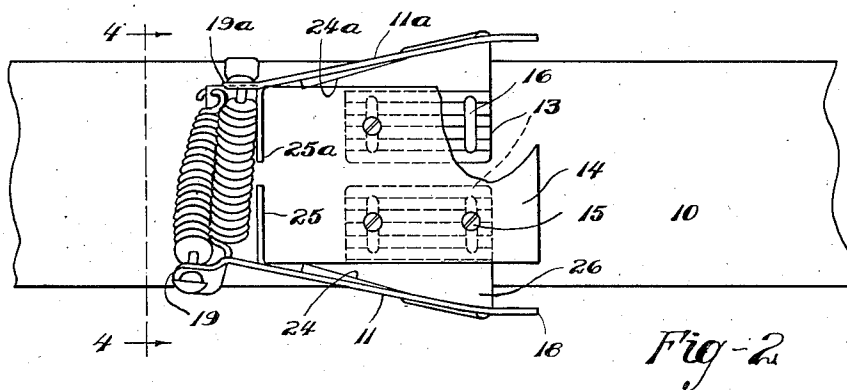
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2,373,128

SAFETY SKI BINDING

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SAFETY SKI BINDING

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9 Claims. (Cl. 280—11.35)

My present invention relates to safety ski bindings and aims to provide certain improvements therein.

Safety ski bindings, as heretofore made and used, have not for one reason or another proved to be entirely satisfactory to release the ski from a skier's boot under conditions where such release is desirable to prevent a bad sprain to the skier's ankle or a fracture of the skier's leg. The deficiencies of the prior safety bindings are due, wholly or in part, to the fact that said devices respond to the sidewise thrust generated primarily at the ball of the foot which gives rise to the opening of the clamping means or toe irons at the wrong time and, frequently, during the making of a perfectly normal turn.

My present invention seeks to provide a ski binding which will overcome the deficiencies aforementioned. In its underlying concept my invention primarily resides in the provision of an oblique pivotal mounting for the clamping means or toe irons, such that a greater force will be required to move a toe iron outwardly at the rear or ball of the foot portion than at the forward end. The advantage which flows from such an arrangement is that the ski in twisting relatively to the boot under severe stress will allow the toe of the boot to open one of the toe irons to release the ski from the boot whereas a sidewise thrust resulting from ordinary skiing activities will be resisted by the clamping means at the rear end thereof which is adjacent the hinges to retain the ski on the boot. My invention also contemplates other features of novelty which will become apparent from the detailed description which follows when considered in connection with the accompanying drawing wherein:

Fig. 1 is a side elevational view of a part of a ski having a boot secured to it by the binding device of the present invention.

Fig. 2 is a top plan view on a somewhat enlarged scale of the ski binding shown in Fig. 1, with parts thereof broken away and omitted.

Fig. 3 is a side elevational view of the ski binding showing the toe iron at the side of the ski opposite to that shown in Fig. 1.

Fig. 4 is a sectional view taken along the plane of the line 4—4 of Fig. 2.

Fig. 5 is a longitudinal sectional view taken along the plane of the line 5—5 of Fig. 6 and showing a modification of the boot-toe stop means shown in Fig. 2.

Fig. 6 is a fractional top plan view of the adjustable boot-toe stop means shown in Fig. 5.

Referring to the drawing and more particularly to Figs. 1 to 4 thereof, the numeral 10 represents a fractional part of a ski on the top face of which is mounted a ski binding of my present invention which comprises in part a pair of upwardly extending clamping members or toe irons 11 and 11a which are secured to the ski in such spaced relation as to define a forwardly tapering recess for receiving and holding the toe portion of a boot 12 against lateral movement on the ski. To accommodate boots of different width, the toe irons 11 and 11a are mounted on separate base plates 13 which may be adjustably secured to the ski by a cover plate 14 by screws 15 adapted to extend through transverse slots 16 in the cover plate. In order that the cover plate may securely hold the base plates in preadjusted position, the adjacent faces of the base plates and the cover plate are provided with longitudinally extending interfitting grooves and ribs.

Each of the clamping members or toe irons 11 and 11a is of generally elongate form and is hingedly mounted with respect to the side of the ski along an axis which extends obliquely downwardly from its rear forwardly, said hinged connection being formed at the rear edge of the toe iron as shown at 17. Above the hinge 17 each toe iron is formed with an extension or tongue 18 adapted to laterally flank the sole of the ski boot and at its forward upper end is formed with an offset projecting tongue or lug 19 or 19a which is perforated and receives freely therethrough the shank of a screw 20 having a winged head 21 for facilitating the manual turning of the screw. For normally urging each of the toe irons upwardly and inwardly about its hinged mounting, there is provided a coil tension spring 22, one end of which is formed with a loop which is hooked through an opening in the forward end of the cover plate 14 in proximity to the side edge thereof and the other end of which has a nut 23 affixed thereto and within which the screw 20 engages. From an inspection of Fig. 4 of the drawing, it will be apparent that the springs 22 cross one another and extend from the forward upper end of a toe iron to the transverse opposite side of the cover plate 14 on the ski. To provide for this crossed relationship of the springs, the tongue 19 on the toe iron 11 extends forwardly somewhat beyond the corresponding tongue 19a on the toe iron 11a. The toe irons 11 and 11a are provided or formed with suitable means for holding the toe of the boot so that it may not rise therein, and, as herein shown, the means for accomplishing this

are inwardly directed struck-up ribs 24 and 24a. The toe irons are also preferably formed with intumed tongues or lips 25 and 25a, the bottom edges of which contact the cover plate 14 for reinforcing and preventing the bending upwardly thereof by the force of the springs and for limiting the forward movement of the boot within the toe clamp.

For supporting the toe irons in the oblique hinged relation to the sides of the skis as aforementioned, the base plates 13 are preferably formed with lateral wings 26 extending beyond the sides of the ski and having downwardly and, preferably, outwardly directed flanges 26a, the rear edges of which are curled inwardly to form tubular portions complementary to those of the hinge 17 at the rear edge of the toe irons for accommodating hinge pins (not shown).

Conventional means may be employed for urging and holding the boot in cooperative relation to the toe irons, and, as herein shown, said means consist of a coil spring 27 looped around the heel of the boot and secured at its opposite ends to a pair of cables 28, of which only one is here shown, which cables extend along the opposite sides of the ski under clips 29 to some point forward of the toe clamping means where they are secured to a toggle 30 which serves as a convenient means for tightening the cables at the time that the ski is bound to the boot and, of course, for loosening the cables when the ski is to be removed. In order that some limited degree of adjustment for the ski binding be provided to accommodate boots of different sizes in length, the usual threaded connection 31 between the ends of the spring 27 and the adjacent ends of the cables 28 may be relied upon.

In Figs. 5 and 6 I have shown an alternate method of providing an adjustment for accommodating boots of different length. As shown in said figures, a stop member at the forward end of the binding is made adjustable longitudinally of the ski relatively to the toe clamp. This adjustable stop is in the form of an L-shaped member 32, the foot of which is longitudinally slidable in an elongate recess 33 in the forward end of the cover plate 14, there being a hole through the foot portion of the stop through which a screw 34 serves to anchor the adjustable stop in desired position within the recess 33.

In the operation of the ski binding hereinbefore described, the boot is secured to the ski by engaging the coil spring 27 around the heel of the boot 12, thus urging the toe portion into the forwardly tapering recess defined by the clamping members or toe irons 11 and 11a. The springs 22 are made strong and are tensioned to hold the toe irons in engagement with the extension sole of the boot to support the toe portion of the boot against lateral movement on the ski under such stresses that are encountered in ordinary ski activity. When, however, the skier trips or falls, thus tending to apply excessively greater stress to his legs and ankles, the pressure of the boot against the toe irons rises to a point where, if it overcomes the tension of the spring 22 of a particular toe iron, will cause said iron to swing about its oblique pivot to force said toe iron outwardly and downwardly, thus releasing the boot and allowing it to free itself from the ski under the urging force of the coil spring 27. The skier is thus immediately freed from a ski whenever a dangerous condition arises, and his legs and ankles are automatically relieved of the dangerous stress to which they might otherwise

be subjected. Under normal skiing activity, however, such as in making turns and the like, the lateral stress and sidewise thrust, which primarily takes place at approximately the ball of the foot, is directed against the rear of the toe irons, and, in view of the oblique arrangement of the hinge connection, such stress exerts on said toe irons but a minimum leverage action which is normally insufficient to turn it about its pivot to release the ski from the boot. Under excessive stress, such for example, as when the skier trips or falls, the forward or rear end of the ski may be subjected to an excessive lateral thrust, the force of which acting on the forward end of a toe iron provides a great leverage action with respect to the hinge and operates to open one or the other of the toe irons to release the foot from the ski.

Although I have shown and described a preferred embodiment of my invention, it is to be understood that I do not wish to be limited to the specific details of construction disclosed since these may be varied within the range of engineering skill without departing from the spirit of the invention as defined in the accompanying claims.

What I claim is:

1. In a safety ski binding, a toe clamp comprising a pair of upwardly extending clamping members each of which is hingedly mounted with respect to the sides of the ski along an axis which extends obliquely downwardly from its rear forwardly and spring means normally biasing said clamping members to hold them in an upwardly and inwardly extending position with respect to the top face of the ski.

2. In a safety ski binding, a toe clamp comprising a pair of upwardly extending clamping members each of which is hingedly mounted with respect to the sides of the ski along an axis which extends obliquely downwardly from its rear forwardly and independent spring means normally biasing each of said clamping members to hold them in an upwardly and inwardly extending position with respect to the top face of the ski.

3. A safety ski binding according to claim 2, wherein each of the spring means is a tension spring connecting the forward upper end of the clamping member to the transversely opposite side of the ski.

4. A safety ski binding according to claim 2, wherein each of the spring means is a tension spring connecting the forward upper end of the clamping member to the transversely opposite side of the ski and each of the springs being provided with manually operable means for varying the tension thereof.

5. A safety ski binding according to claim 2, wherein the hinged connection of each of the clamping members is at the rear thereof.

6. A safety ski binding according to claim 2, wherein each clamping member is hingedly connected to a base plate which is rigidly mounted on the ski and has a part extending laterally outwardly and downwardly with respect to the top face of the ski and the rear edge of said downwardly extending part constituting a part of the hinged connection for the clamping member.

7. A safety ski binding comprising a toe clamp having a pair of upwardly extending clamping members each of which is hingedly mounted with respect to the sides of the ski along an axis which extends obliquely downwardly from its rear forwardly and has inwardly directed means for engaging over the extension sole of a ski boot, spring

means biasing said clamping members to hold them in an upwardly and inwardly extending position with respect to the top face of the ski and stop means adjacent the forward end of the toe clamp for engaging the forward end of the extension sole of the ski boot.

8. A safety ski binding according to claim 7,

wherein the stop means are integrally formed on the clamping members.

9. A safety ski binding according to claim 7, wherein the stop means is adjustable longitudinally of the ski relatively to the toe clamp.

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