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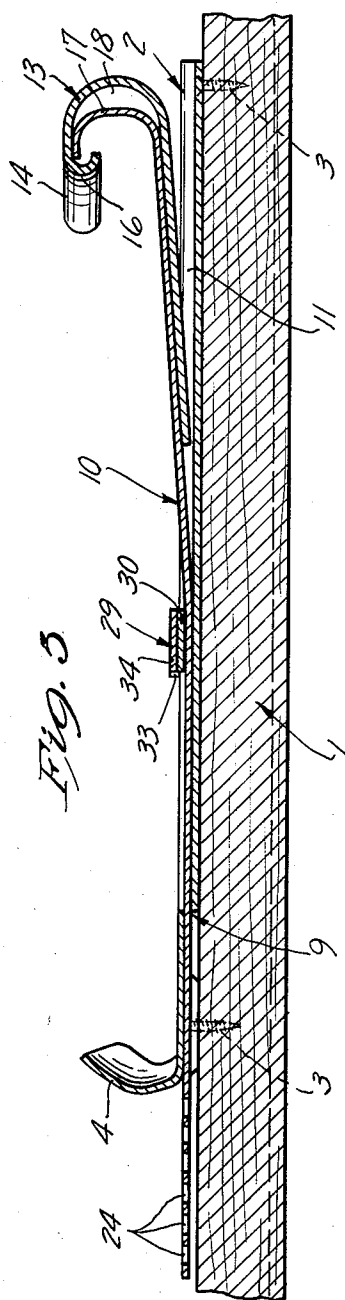
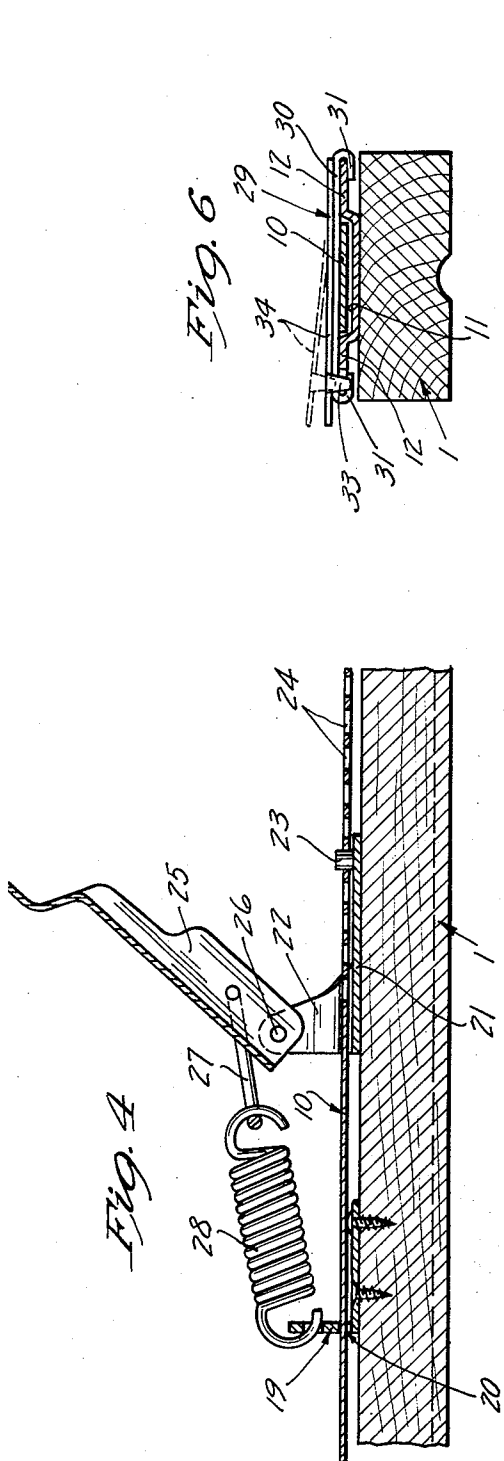
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SKI BINDING PROVIDED WITH HEEL CONTROL DEVICE

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2 Sheets-Sheet 2



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SKI BINDING PROVIDED WITH HEEL CONTROL DEVICE

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Continuation of application Serial No. 236,336, July 12, 1951. This application October 8, 1953, Serial No. 384,850

2 Claims. (Cl. 280—11.35)

My present invention relates to improvements in devices or apparatus for detachably securing skis to the boots or shoes of skiers; the term shoe being used herein in a generic sense to include conventional shoes and boots, specially designed ski shoes and boots, or any other foot gear which might be worn by a skier.

This application is a continuation of my pending application, Serial No. 236,336, filed July 12, 1951, and entitled "Ski Binding," now abandoned.

A number of important objectives of the instant invention are as follows:

1. The provision of a highly efficient ski binding involving a minimum number of parts and capable of being manufactured at relatively low cost.

2. The provision of an improved ski binding structure whereby installation problems are simplified.

3. The provision of an improved ski binding structure or apparatus which is readily adjustable by the skier to fit shoes of widely-varying sizes.

4. The provision of an improved ski binding whereby a skier's shoe may be securely bound to a ski without the use of conventional straps, cables or harnesses.

5. The provision of an improved ski binding, whereby the skier's shoe will be so positively secured against lateral movements with respect to the ski as to insure positive lateral steering action of the ski while, at the same time, allowing a natural or desired degree of vertical heel movement, sometimes referred to as foot action.

A still further important objective of the invention is the provision of a ski binding of the general class described wherein the degree of vertical heel movement of the skier's shoe may be readily controlled by a simple adjustment to best meet the requirements for different kinds of skiing, such, for example, as cross-country skiing, climbing, down-hill skiing and jumping.

The above and numerous other highly important objects and advantages of the invention will be made apparent from the following specification, claims and appended drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a fragmentary view in side elevation of a conventional ski incorporating one of my improved bindings and showing the binding in operative relation to a skier's shoe, and with the heel of the ski shoe in slightly elevated position;

Fig. 2 is a view in side elevation substantially corresponding to Fig. 1 but showing the ski shoe or boot by dotted lines and with its heel portion returned to its lowered position;

Fig. 3 is a plan view of the parts shown in Figs. 1 and 2, with the skier's shoe or boot removed;

Fig. 4 is an enlarged fragmentary longitudinal sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a similarly-enlarged longitudinal sectional view taken on the line 5—5 of Fig. 3; and

Fig. 6 is a similarly-enlarged transverse sectional view taken on the line 6—6 of Fig. 3.

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In the drawings, the longitudinally intermediate portion of a conventional ski is indicated as an entirety by 1. A preferred form of my improved ski binding is illustrated in the drawings, and this comprises a base or floor plate, indicated as an entirety by 2. This base plate 2 is elongated in the direction of the length of the ski 1 and is adapted to be, and is shown as being, rigidly secured to the upper longitudinally intermediate portion of the ski 1, by means of anchoring screws 3 or the like passed through suitable receiving apertures in the base plate. In its preferred form illustrated, the base plate is somewhat longer than the longest ski shoe contemplated and is of a width approximately equaling that of, but preferably somewhat less than, the width of the ski 1, and is formed at its front end portion to provide an upstanding rigid shoe toe engaging abutment in the form of a clamping jaw 4. By reference to the drawings, it will be seen that the toe clamping jaw 4 is forwardly recessed to provide a sort of shoe toe receiving socket, the configuration and proportions of which are such as to embrace sufficient front, upper and side surfaces of the shoe to prevent lateral displacement of the shoe toe therefrom when the latter is forwardly pressed into the jaw 4. In Figs. 1 and 2, a conventional ski shoe is indicated as an entirety by 5, the sole of the shoe by 6, the heel of the shoe by 7, and the tip or toe portion of the shoe by 8.

The base plate 2 is formed adjacent its front end portion to provide a guideway or guide passage 9, which is immediately adjacent the upper surface of the ski 1, is forwardly and rearwardly directed, and is adapted to snugly but longitudinally slidably receive a long vertically flexible laterally rigid tongue 10. Rearwardly of the guideway or passage 9, the base plate 2 is formed to define a longitudinally extending upwardly opening guide channel 11, which is aligned with the guideway 9 of the base plate and is adapted to snugly but slidably receive the rearwardly projecting portion of the tongue 10, which latter will be seated in said channel 11 when it is in its normal lowered position, shown best in Fig. 2. By reference now particularly to Figs. 1 through 3 and 6, it will be seen that the channel 11 of the base plate 2 is bounded at its sides by laterally outwardly projecting longitudinally extending marginal guide flanges 12, which are spaced somewhat above the upper surface of the ski 1.

The vertically flexible laterally rigid tongue 10 projects both rearwardly and forwardly of the guide channel 9 and is provided at its rear end portion with an upstanding shoe heel engaging abutment in the form of a forwardly directed and rearwardly recessed heel engaging abutment in the form of a clamping jaw 13, the recessed portion 14 of which is shaped to be received snugly in the segmental or arcuate recess 15 of a conventional ski shoe or boot 5. It will be seen that when the tongue portion 14 of the heel clamping jaw 13 is seated in the anchoring channel 15 of a conventional ski shoe or boot 5, and retained therein under clamping pressure, that the heel 7 of the ski shoe will be positively locked in the jaw 13 against vertical displacement therefrom. Also, it will be noted that the tongue portion 14 of the heel clamping jaw 13 is rearwardly recessed at 16 (see Figs. 1, 2, 3 and 5), so as to receive the shoe heel 7 and embrace back and side portions thereof to thereby positively lock the shoe heel 7 therein against lateral displacement. In the preferred embodiment of the invention illustrated, the laterally rigid vertically flexible tongue 10 is formed of relatively thin spring steel and the heel clamping jaw 13 thereof is formed by a somewhat heavier spring steel element, which is welded, riveted, or otherwise rigidly secured to the rear end portion of the tongue 10 to provide a relatively rigid rearward extension thereof. In the preferred arrangement illustrated, the extreme rear

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end portion of the tongue 10 is curled upwardly within the heel clamping jaw 13, as at 17, to reinforce said jaw 13 and to cooperate therewith in defining a strap passage 18. When my improved ski binding is used in connection with conventional ski shoes or boots having heel anchoring recesses 15, auxiliary anchoring expedients, such as straps, will not be necessary. However, when my improved ski binding is used in connection with ordinary shoes or other foot gear, not equipped with such anchoring recesses 15 or their equivalents, for reception of the heel clamping jaw 13, heel anchoring straps will then become necessary and these may be inserted through the passage 18 of the heel clamping jaw 13 and wrapped around the instep portion of the skier's shoe or the like.

Mounted on the ski in forwardly spaced relation to the toe clamping jaw 4 of the base plate 2 is an upstanding anchoring lug or element 19, which defines a guideway acting passage 20, aligned with the guideway 9 of the base plate 2, and which is adapted to slidably receive the forwardly projecting transversely or laterally narrowed front portion of the tongue 10. The guideway passage 20 of the anchoring lug or element 19 cooperates with the guideway 9 of the base plate 2 to positively restrain the tongue 10 against lateral shifting movements with respect to the base plate 2 and an associated ski, so as to provide positive steering control of the ski when a skier's shoe is clamped between the toe and heel clamping jaws 4 and 13, respectively.

Longitudinally slidably mounted on the front end portion of the tongue 10 intermediate the toe clamping jaw 4 and the guide lug 19 is a slide 21, which underlies the said tongue 10 and is provided with a laterally spaced pair of upstanding anchoring lugs 22 embracing the opposite sides or edges of the tongue 10. The bottom portion of this slide 21 is provided with an upstanding anchoring detent in the nature of a pin 23, which is adapted to be received in any selected one of a series of cooperating anchoring apertures 24 in the tongue 10. For the purpose of releasing the detent 23 from the enlarged recess or aperture 24, it is merely necessary to upwardly flex the associated portion of the vertically flexible tongue 10.

A toggle lever 25 is pivoted at 26 to the anchoring lugs 22 of the slide 21. The longitudinally intermediate portion of the toggle lever 25 is yieldingly connected to the anchoring lug 19 by a link 27 and coil tension spring 28.

In order to control the vertical flexibility of the heel portion of the tongue 10, there is provided a control element or device 29, which, in its preferred form illustrated, comprises a slide bar 30 extending transversely across and between the marginal guide flanges 12 of the base plate 2 and over the rearward portion of the tongue 10. At its opposite ends, the slide bar 30 is bent around and under the guide flanges 12, as shown best at 31 in Fig. 6, so as to become positively but nevertheless slidably anchored to the base plate 2. If maximum vertical flexibility or heel action is desired, the control element 29 will be shifted to a position slidably forwardly of the rear end of the guideway 9 of the base plate 2. When no heel action or vertical flexibility is desired, the control element 29 will be shifted to an extreme rear position, not shown, but which will positively restrain the heel clamping jaw equipped rear end of the tongue 10 against vertical movements with respect to the base plate 2. Of course, varying degrees of vertical heel action or flexibility intermediate the extremes mentioned may be obtained by shifting the control element 29 to various different intermediate positions.

It is, of course, desirable to provide means for positively locking the cross bar 30 of the control element 29 against accidental shifting movements from different adjusted positions. In the preferred embodiment of the invention illustrated, this is accomplished by providing in one of the marginal guide flanges 12 of the base plate

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2 a longitudinally spaced series of locking recesses or notches 32 adapted to be selectively but releasably engaged by a locking detent 33 (see particularly Fig. 6) carried by a spring arm 34 overlying the cross bar 30 of the control element 29 and anchored thereto at the end portion thereof opposite the detent 33.

Operation

Adjustment of my improved ski binding to ski shoes or gear of greatly varying lengths or sizes may be quickly and easily accomplished by the skier by merely withdrawing the detent 23 of slide 21 from an enlarged tongue recess or aperture 24, sliding the tongue 10 to the proportion to accommodate a particular shoe, and then releasably locking the slide 21 in its newly adjusted position by inserting the detent 23 thereof through a suitably located cooperating recess or aperture 24 in the tongue 10.

The skier's shoe is placed over the rear end portion of the tongue 10 and between the toe and heel clamping jaws 4 and 13, respectively, thereof, with the toggle lever 25 in its released position, shown in Fig. 4. Now in order to draw the toe and heel clamping jaws 4 and 13, respectively, into tight but yielding clamping engagement with the toe and heel portions of the skier's shoe 5 or the like, the skier will simply move the toggle lever 25 from its inoperative released position of Fig. 4 to its operative self-locking position of Figs. 1, 2 and 3, which will place the spring 28 under tension and cause the same to exert a yielding forward pulling force upon the heel clamping jaw-equipped tongue 10. Of course, a varying degree of yielding clamping pressure force applied to the skier's shoe through the toe and heel clamping jaws 4 and 14, respectively, may be varied to suit any particular demand by a slight adjustable shifting action of the slide 21 to the tie bar 10.

As explained before, widely varying degrees of heel action are desirable for different types of skiing and any such requirement or desire can be amply met by adjustably shifting the control element 29 to vary the vertical flexibility of the heel clamping jaw-equipped rear end portion of the vertically flexible but laterally rigid tongue 10. However, it is important to note that in all positions of the tongue 10, the skier's shoe 5 or the like will be positively retained against lateral movements with respect to the base plate 2 and the ski 1 to allow positive lateral steering action of the ski or skis without resorting to auxiliary devices.

The following further advantages of my improved ski binding as described above are as follows, to wit:

(A) While lateral rigidity between the skier's shoe 5 and the ski 1 is inherent in the improved structure in all positions of the slide bar 30 of the control element 29, such lateral rigidity is, nevertheless, progressively increased as the slide bar 30 of the control element 29 is progressively moved rearwardly over the tongue 10. This is, of course, due to the fact that as the slide bar 30 is moved progressively rearwardly, the vertical heel action is correspondingly reduced and a greater proportion of the tongue 10 is positively locked in the receiving channel 11 of the base plate.

(B) In ski bindings, it is highly desirable, from a safety point of view, that the skier's foot be released from the ski under excessive lateral pressure, such as is occasioned by falling. This safety feature is inherent in my improved ski binding wherein the toe and heel portions of the skier's shoe are automatically releasable from the toe and heel clamping jaws or abutments 4 and 13, respectively, under predetermined lateral pressure determined by the tautness of spring 28, which latter is, of course, adjustably controlled by placing the detent 23 in different selected receiving apertures or orifices 24.

What I claim is:

1. In a ski binding, an elongated base plate adapted to be secured to the longitudinally intermediate portion

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of a ski and having at its front end portion a forwardly recessed toe clamping jaw for receiving a portion of a shoe to retain the same against upward and lateral displacement therefrom, a laterally rigid vertically flexible tongue slidably mounted on and disposed longitudinally of the base plate with its front end portion extending forwardly of the toe clamping jaw and its rear end portion extending rearwardly of said jaw, said base plate defining a rearwardly and forwardly directed guideway adjacent its front end portion slidably receiving the longitudinally intermediate portion of said tongue and embracing upper and laterally spaced side portions thereof, said tongue being provided at its rear end portion with an upstanding forwardly directed and rearwardly recessed shoe-heel clamping jaw, the base plate defining an upwardly opening longitudinally extended channel in which the rearwardly extending portion of the tongue is seated and also defining outwardly directed marginal flanges at its opposite longitudinal edges, means comprising a spring for yieldingly connecting the tongue to an associated ski so as to yieldingly clamp a shoe between said clamping jaws, said tongue flexing vertically to allow elevation of a skier's shoe with relation to the base plate, and means adjustably regulating the degree of vertical flexibility of the heel clamping jaw-equipped rear end portion of the tongue with relation to the base plate, said means comprising a control element in the nature of a cross bar extending across the base plate and tongue and longitudinally slidably interlocked with the marginal flanges of the base plate, a series of locking recesses in and spaced along one of the said longitudinal flanges of the base plate, and a spring-pressed detent carried by said cross bar and engageable in said locking recesses to lock the control element in different adjusted positions.

2. In a ski binding, an elongated base plate adapted to be secured to the longitudinally intermediate portion of a ski and having at its front end portion a shoe-toe engaging abutment, a laterally rigid vertically flexible tongue slidably mounted on and disposed longitudinally of the base plate with its front end portion extending forwardly of the toe engaging abutment and its rear end portion extending rearwardly of said abutment, said base plate defining a rearwardly and forwardly directed guide-

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way adjacent its front end portion slidably receiving the longitudinally intermediate portion of said tongue and embracing upper and laterally spaced side portions thereof, said tongue being provided at its rear end portion with a shoe-heel engaging abutment, the base plate defining an upwardly opening longitudinally extended channel in which the rearwardly extending portion of the tongue is seated and also defining outwardly directed marginal flanges at its opposite longitudinal edges, means comprising a spring for yieldingly connecting the tongue to an associated ski so as to yieldingly clamp a shoe between said abutments, said tongue flexing vertically to allow elevation of a skier's shoe with relation to the base plate, and means adjustably regulating the degree of vertical flexibility of the heel abutment-equipped rear end portion of the tongue with relation to the base plate, said means comprising a control element in the nature of a cross bar extending across the base plate and tongue and longitudinally slidably interlocked with the marginal flanges of the base plate, a series of locking recesses in and spaced along one of the said longitudinal flanges of the base plate, and a spring-pressed detent carried by said cross bar and engageable in said locking recesses to lock the control element in different adjusted positions.

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