

Feb. 18, 1958

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2,823,922

SAFETY BINDING FOR A SKI

Filed May 10, 1954

3 Sheets-Sheet 1

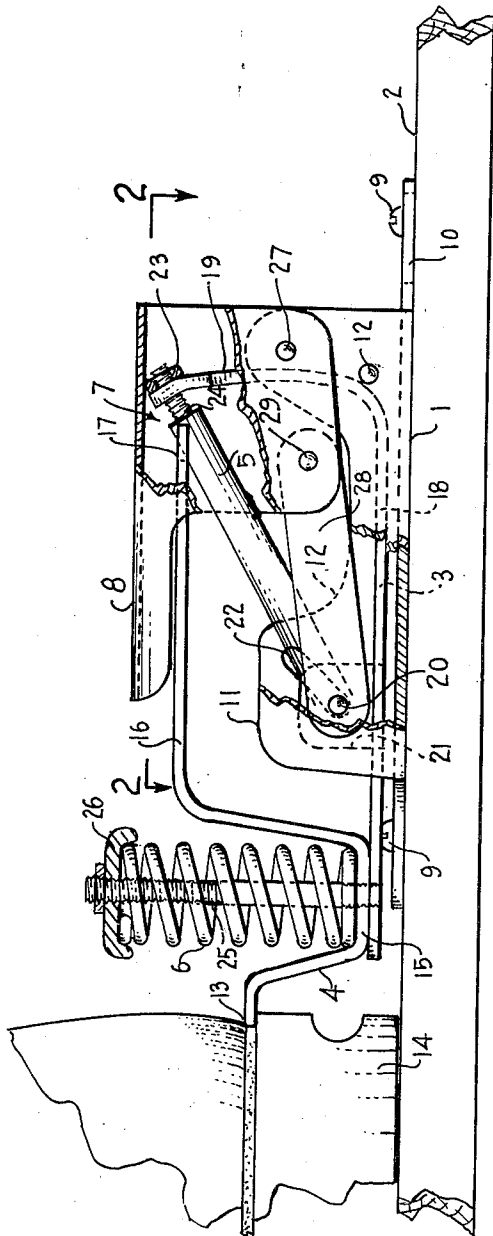


Fig. 1.

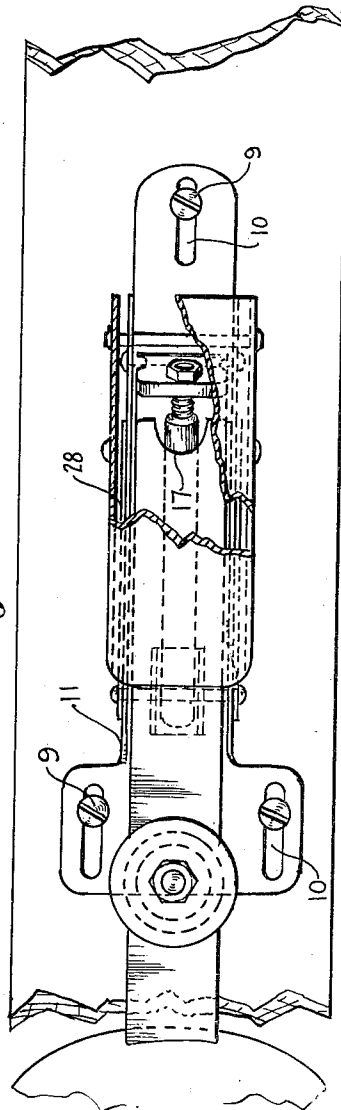


Fig. 2.

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3 Sheets-Sheet 2

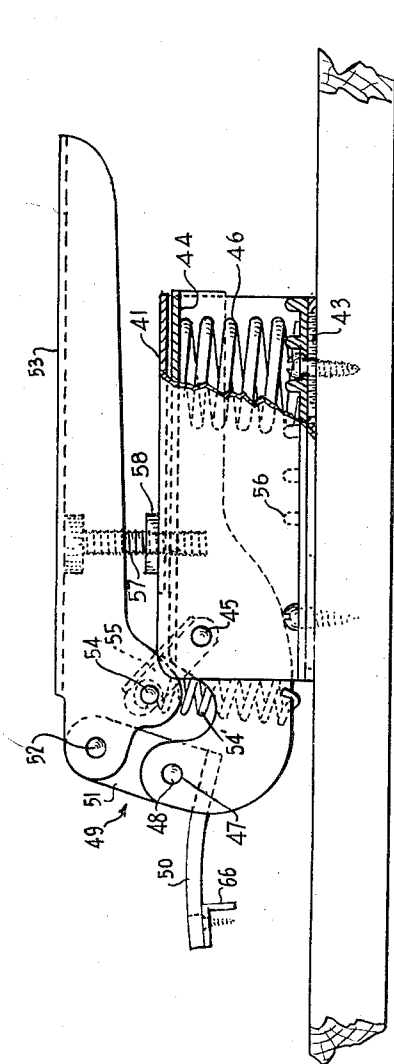


Fig. 3.

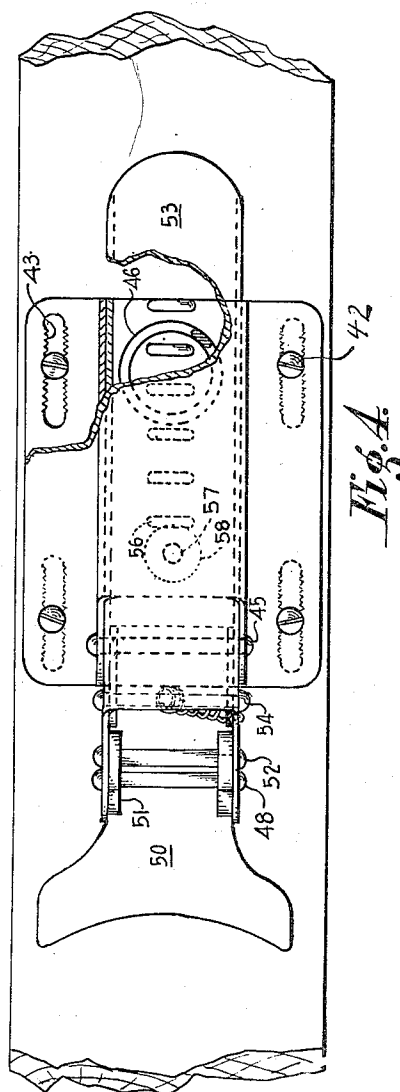


Fig. 4.

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3 Sheets-Sheet 3

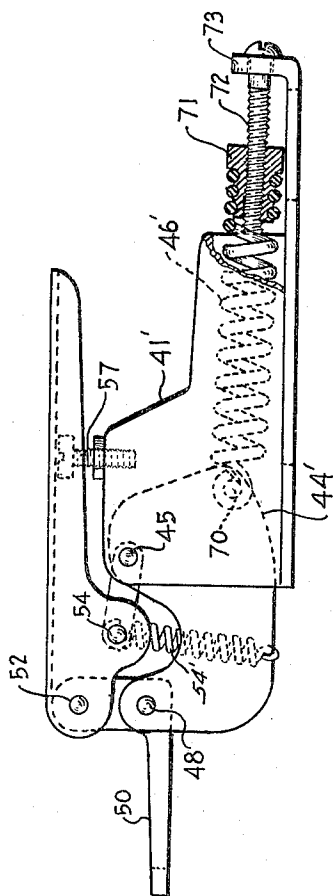


Fig. 6.

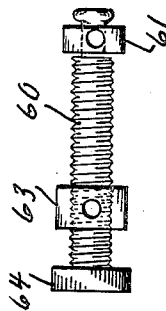


Fig. 5.

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SAFETY BINDING FOR A SKI

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Application May 10, 1954, Serial No. 428,699

5 Claims. (Cl. 280—11.35)

The present invention relates to improvements in a safety binding for a ski, and its principal object is to provide a binding for anchoring the heel of the skier to the runner with freedom of a desired amount of vertical play for normal skiing operations and also with freedom of complete release in response to abnormal stress, such as might be occasioned by the skier falling forward.

It is further proposed, in the present invention, to provide means in a binding of the character described in which the up and down play of the boot on the runner is limited to a desired degree, and in which means are provided for adjusting the degree of play allowed.

It is still further proposed to provide means for independently adjusting the boot releasing means to become active in response to a pre-determined upward pressure, the two adjustments being independent of each other.

It is additionally proposed to provide for manually controlled means for locking the binding upon the heel and for releasing the binding from the heel.

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

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

Figure 1 shows a side view of one form of my ski binding, parts being broken away;

Figure 2, a plan view of the same, with portions broken away;

Figure 3, a side view of a second form of my ski binding, with parts broken away;

Figure 4, a plan view of the second form, with portions broken away;

Figure 5, a detail view of an extensible link adapted to be used in the form of Figure 3; and

Figure 6, a side view of a further modification of the invention.

While I have shown only the preferred forms of the invention, it should be 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, and first to the form shown in Figures 1 and 2, my binding comprises in its principal features, a housing 1 adapted for fastening upon a ski runner indicated at 2, an anchoring assembly including a leaf spring 3, an anchoring bar 4, a brace 5 supporting the rear end of the anchoring bar, a main spring 6 bearing on the anchoring bar, cooperative means indicated at 7 for releasably supporting the rear end of the brace, and a handle 8 for engaging the anchoring bar with the heel of the boot and for releasing the bar.

The housing 1 is made in the form of a flat plate adapted for securing upon the runner by means of suitable screws 9, the screws extending through lengthwise slots 10 to allow the position of the plate on the runner to be adjusted.

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The plate has two flanges 11 rising from opposite sides thereof, the flanges being curved downwardly in their central portions to provide registering saddles, indicated at 12.

The anchoring bar 4 is in the form of a flat strip of rigid metal of a width slightly less than the spacing between the flanges 11 and is shaped to present a forward tongue 13 adapted for fitting upon the projecting portion of the boot heel, indicated at 14, or a suitable bracket fitted upon the heel, a deep pocket 15 behind the tongue, and a horizontal section 16 extending rearwardly of the pocket, the rear end of the bar having a recess 17 formed therein.

The leaf spring 3 is also made in the form of a bar corresponding in width to that of the anchoring bar and is made of slightly springy material. It comprises a horizontal section 18 adapted to lie flat on the bottom of the housing and has an upward curve presenting a forwardly inclined section 19, the extreme upper end rising to a point slightly higher than the rear end of the anchoring plate and slightly spaced therefrom.

The horizontal portion 18 of the leaf spring lies in the bottom of the housing, with its forward end disposed between said bottom and the pocket 15 in the anchoring bar.

The leaf spring is suspended from a pin 20 extending through ears 21 rising from the leaf spring, the pin being adapted to ride in rearwardly inclined slots 22 in the side flanges of the housing 1 and to come to rest in the lower ends of the slots.

The brace 5, which preferably is made circular in cross-section, and of sturdy build, has its lower end pivoted to the pin 20 and extends upwardly at a rearward incline, to a point rearwardly of the rear end of the anchoring plate section 16 and forwardly of the upper end of the rear section 19 of the leaf spring. Its upper section is supported by a screw 23 threaded through the upper end of said section 19 and engaging in a cavity 24 provided in the end of the brace 5.

The strength of the support may be adjusted by adjustment of the screw, which in turn, adjusts the tension of the leaf spring.

The rear end of section 16 of the anchoring bar is made to rest on the rear end of the brace through the recess 17.

The front end of the leaf spring 3, opposite the pocket 15, has a bolt 25 rising therefrom, the bolt rising through the bottom of the pocket and having the coiled spring 6 mounted thereon, with a nut 26 threaded on the upper end of the bolt for tensioning the spring to urge the bottom of the pocket to bear on the forward end of the leaf spring 3.

It will be understood that, in the structure thus far described, the leaf spring 3, the toe-anchoring plate 4, the brace 5 and the spring 6 form a floating unit suspended from the pin 20, which latter is adapted to ride in the slots 22.

When the pin 20 is in the bottom of the slots, the horizontal section 18 of the leaf spring lies flat on the bottom of the housing, and the pin is normally held in this position by a toggle-joint including the handle 8, which is pivoted in the rear portions of the flanges of the housing, as at 27, and a link 28 pivoted to the handle as at 29 and to the pin 20, the pivot 29 being arranged to cross the dead center between the end pivots when the handle is depressed. The handle is preferably formed to provide a hood over the housing.

In operation, the skier, after the binding has been properly positioned on the ski runner, pulls up on handle 8, thereby causing the pin 20 to move upward in the slots 22, which upward movement is accompanied by an upward movement of the entire anchoring unit in-

cluding the leaf spring 3, the anchoring bar 4, the brace 5, and the spring 6.

After positioning his boot heel underneath the tongue 13, the skier throws the handle 8 forward, thereby locking the anchoring unit, substantially as shown in Figure 1.

During ordinary skiing, the tongue 13 of the anchoring bar 4 has a certain amount of up and down play, the bar working against the spring 6 and using its rear end 17 for a pivot. The tension of spring 6 may be adjusted by means of the nut 26.

In case of abnormal stresses, as when the skier falls forward, the compression of the spring becomes such that it will yield no further, and in that case the bottom end of the spring becomes the pivot for the anchoring bar, causing the rear end of the anchoring bar to bear down on the brace 5, which latter, being held only by the screw 23, will yield at a predetermined pressure, causing the entire anchoring unit to collapse, and to free the boot. The pressure required for complete release depends upon the position of the screw 23, which adjusts the release mechanism to respond to any pressure desired.

The modified form of my invention illustrated in Figures 3 and 4, operates on substantially the same principle and produces substantially the same result.

In this form the housing 41 is shown as consisting of a channel or tunnel adapted for securing upon the ski runner by means of screws 42 passing through suitable apertures provided in lateral flanges 43.

A second channel 44 is pivoted in the upper front portion of the housing, as at 45, and has a major portion extending horizontally through the housing, with a coil spring 46 bearing on the channel to force the same upward.

A minor portion of the channel 44 extends forwardly of the housing and forms a bearing 47 for a pin 48 on which is supported a bell crank lever 49 presenting a normally forward extending anchoring tongue 50, and a normally upward projecting arm 51.

The arm 51 carries a pin 52, which is normally held against backward swing movement by means of a toggle-joint including a handle 53, having a front end pivoted to pin 52, and carrying a pivot pin 54 disposed slightly below the center-line connecting pivots 45—52, when the handle is disposed horizontally over the housing. A link 55 connects pivots 45 and 54, to complete the toggle-joint. A spring 54' may be used to bias the pivot 54 across center.

It will be understood that, as long as the toggle-joint holds, the inverted channel 44, the bell crank lever 49 and the handle 53 form a rigid unit swingable on pivot 45. Any normal upward pressure brought to bear on the heel anchoring member 50 operates against the spring 46 within the housing, which latter spring yields sufficiently to allow of normal up and down play of the heel anchoring member.

If, however, the pressure becomes excessive, as in a forward fall of the skier, and the spring approaches the limit of compression, then the upward pressure on the anchoring tongue will cause the pivot 52 to swing backward, accompanied by a backward movement of pivot 54 across dead center and a breaking of the toggle-joint, with the result that the heel anchoring tongue completely releases the heel.

To adjust the spring pressure to allow of a desired degree of up and down play, I provide means for adjusting the position of the spring along the length of the channel. For this purpose I provide a series of ribs 56 in the bottom of the housing, each two neighboring ribs being adapted to support the spring thereon. The closer the spring is moved toward the pivotal center, the less its efficiency.

The handle 53 is guided by an adjustable bolt 57, which is screwed into the top of the housing and has a head bearing against the underface of the handle. The bolt may be locked in adjusted position by a lock nut 58.

This bolt allows the normal position of the handle to be adjusted which results in adjustment of the central pivot 54 of the toggle-joint with respect to the center line of pivots 45 and 52.

The further pivot 54 is made to cross the center-line, the greater will be the pressure required to cause it to turn back over the center-line, so that the bolt 57 becomes a means for adjusting the safety feature to a predetermined degree of pressure, independently of the pressure of spring 46.

The links 55, which in Figure 3 are shown as plain straps, may be made extensible, as shown in Figure 5.

In this form of my invention, each link comprises a threaded shank 60 having one end formed with a neck revolvable in the pin 61 (representing the pivot pin 45 and having an enlarged central portion to accommodate the neck), and having an intermediate portion threaded into a pin 63 (representing the pivot 54), the central portion of the pin being enlarged, as shown, to receive the shank.

The free end of the shank carries a head 64, by means of which it may be turned for advancing or retracting the pivot 63 with respect to the pivot 61. Thus, where this form is used and substituted for the plain links 55, the effective length of the links may be changed, with a corresponding change in the overall length of the toggle-joint, with the result that the arm 51 of the anchoring member 49 may be moved for adjusting the angularity of the anchoring tongue 50 and the effective height thereof with respect to the surface of the ski runner.

The heel of the boot may be provided with a suitable metal bracket 66 forming a firm ledge for the anchoring tongue.

In operation, this form of my invention works substantially on the same principle as the first form.

In normal operation, the entire anchoring means forms a rigid unit pivotally suspended from the pin 45, the toggle-joint being locked. Heel pressure brought to bear on the anchoring tongue works against the spring 46, which allows of limited normal play of the heel with respect to the runner.

When the spring 46, due to abnormal upward pressure on the tongue 50, is compressed to near its limit, the pivot 48 becomes relatively fixed and the bell crank lever 49 swings on the pivot, forcing the pivot 52 backward, with the result that the pivot 54 is also crowded backward, and the toggle-joint is broken, to cause both the anchoring toe and the handle to swing upward and to clear the boot.

The form shown in Figure 6 is substantially similar to that of Figure 3, and corresponding numerals have been applied. The only difference lies in the spring arrangement.

The inverted channel 44' is shortened to extend only partly into the housing 41', and its rear end is acted on by a horizontal spring 46', the front end of which is anchored to the channel 44', as at 70, while its rear end is anchored to a nut 71, which in turn is mounted on a screw 72, the head of which bears against a flange 73 rising from the rear end of the housing.

The spring serves as a pull-spring yieldingly opposing upward movement of the tongue 50, and its tension may be adjusted by operation of the screw 72.

I claim:

1. A safety binding for a ski, comprising a housing having means for securing the same upon a ski, a lever pivoted in the front portion of the housing and having a rear end extending into the housing and a front end projecting forwardly of the housing, a heel anchoring member pivoted in the front end of the lever and having an arm projecting upwardly, a spring bearing on the rear end of the lever to urge the anchoring member downward, a handle having a front end pivoted to the upper end of said arm and having a rear end extending substantially horizontally over the housing in normal position, a link

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pivoted to the lever pivot, and a pivotal connection between the free end of the link and the handle and normally disposed approximately between the arm pivot and the lever pivot to provide a toggle joint adapted to be broken by an upward swing of either the anchoring member or the handle.

2. A safety binding for a ski, comprising a housing having means for securing the same upon a ski, a lever pivoted in the front portion of the housing and having a rear end extending into the housing and a front end projecting forwardly of the housing, a heel anchoring member pivoted in the front end of the lever and having an arm projecting upwardly, a spring bearing on the rear end of the lever to urge the anchoring member downward, a handle having a front end pivoted to the upper end of said arm and having a rear end extending substantially horizontally over the housing in normal position, a link pivoted to the lever pivot, and a pivotal connection between the free end of the link and the handle and normally disposed approximately between the arm pivot and the lever pivot to provide a toggle joint adapted to be broken by an upward swing of either the anchoring member or the handle, the housing having means for adjusting the normal position of the handle to in turn adjust the position of the central pivot of the toggle joint with respect to its outer pivots.

3. A safety binding for a ski, comprising a housing having means for securing the same upon a ski, a lever pivoted in the front portion of the housing and having a rear end extending into the housing and a front end projecting forwardly of the housing, a heel anchoring member pivoted in the front end of the lever and having an arm projecting upwardly, a spring bearing on the rear end of the lever to urge the anchoring member downward, a handle having a front end pivoted to the upper end of said arm and having a rear end extending substantially horizontally over the housing in normal position, and a toggle joint connection between the upper end of the arm, the lever pivot and an intermediate portion of the handle for normally holding the anchoring member in heel engaging position, the toggle joint being adapted to be broken by an upward swing of either the handle or the anchoring member.

4. A safety binding for a ski comprising a housing having means for securing the same upon a ski, a lever pivoted in the front portion of the housing and having a rear end extending into the housing and a front end projecting forwardly of the housing, a heel anchoring member pivoted in the front end of the lever and having

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an arm projecting upwardly, a spring bearing on the rear end of the lever to urge the anchoring member downward, a handle having a front end pivoted to the upper end of said arm and having a rear end extending substantially horizontally over the housing in normal position, and a toggle joint connection between the upper end of the arm, the lever pivot and an intermediate portion of the handle for normally holding the anchoring member in heel engaging position, the toggle joint being adapted to be broken by an upward swing of either the handle or the anchoring member, and the housing and the handle having cooperative means for adjusting the normal position of the central pivot of the toggle joint.

5. A safety binding for a ski, comprising a housing having means for securing the same upon a ski, a lever pivoted in the front portion of the housing and having a rear end extending into the housing and a front end projecting forwardly of the housing, a heel anchoring member pivoted in the front end of the lever and having an arm projecting upwardly, a spring bearing on the rear end of the lever to urge the anchoring member downward, a handle having a front end pivoted to the upper end of said arm and having a rear end extending substantially horizontally over the housing in normal position, and a toggle joint connection between the upper end of the arm, the lever pivot and an intermediate portion of the handle for normally holding the anchoring member in heel engaging position, the toggle joint being adapted to be broken by an upward swing of either the handle or the anchoring member, and the toggle joint having means for adjusting the overall length thereof whereby the angle of the anchoring member may be adjusted.

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