Oct. 17, 1939. V. Z. REED, JR 2,176,226

SKI BINDING

Filed July 23, 1938 2 Sheets-Sheet 1

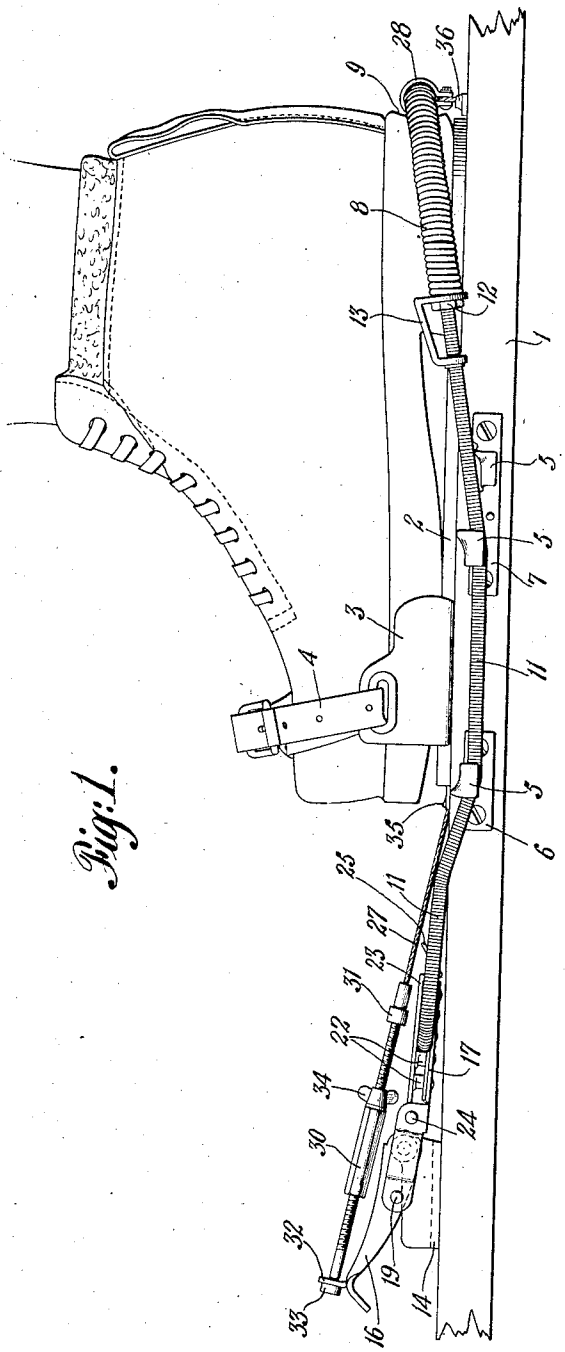


Fig. 1.

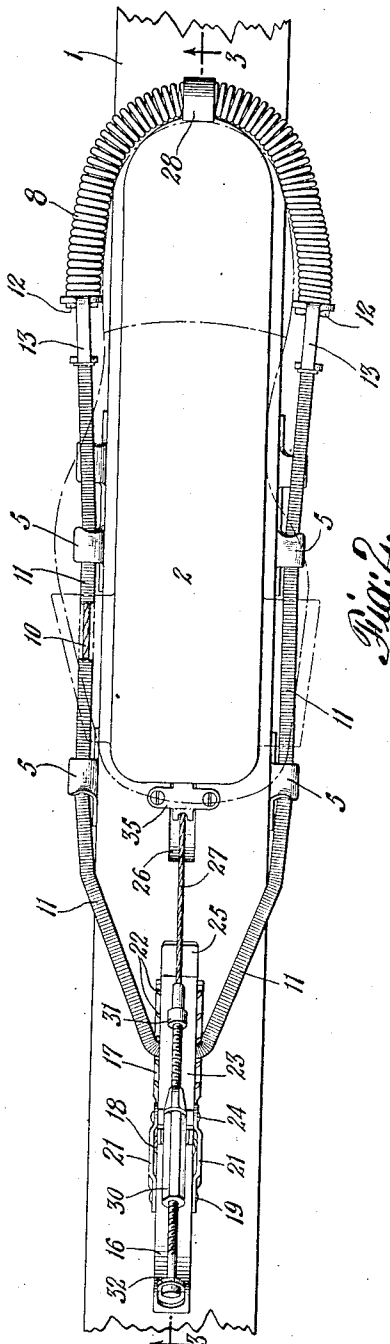


Fig. 2.

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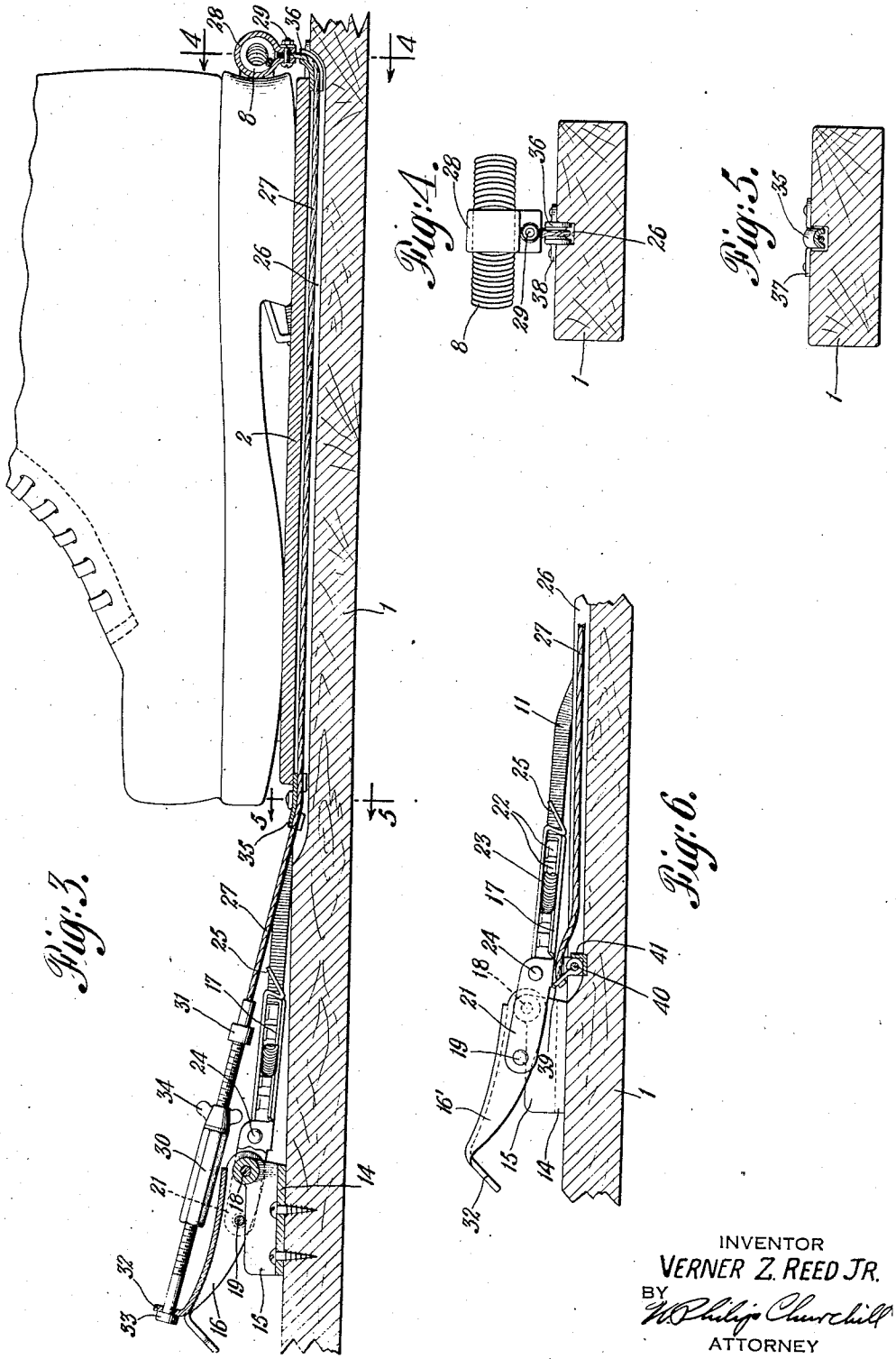


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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SKI BINDING

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Application July 23, 1938, Serial No. 220,869

9 Claims. (Cl. 280—11.35)

The invention relates to ski bindings or harness for attaching skis to the boots of the wearer and more particularly to automatic safety release means for such bindings.

A ski binding which has come into quite general use is that which is known as the "low-hitch" binding. It is so constructed as to resiliently urge the ski against the heel of the boot, while under certain conditions permitting lifting of the heel from the ski sufficiently to allow the desired maneuvering. The essential elements of this type of binding include a toe strap or other means for holding the toe of the boot, and a resilient cable connection which passes around the heel of the boot and thence under hooks or "hitches" to an anchorage near the toe of the boot or in advance of the toe. For ease of application and removal, the forward end of the cable may be attached to one arm of a toggle, which, when released, permits the heel-engaging portion of the connection to be freely positioned and thereafter drawn up tightly by straightening out the links of the toggle to a position just beyond dead center. This arrangement provides a very desirable form of binding and one whch has found considerable favor with many skiers. The ski is bound on very tightly and the heel of the boot is urged downwardly against the ski with considerable force, the amount of this force being adjustable to suit the needs of the wearer in accordance with the degree of tension applied by the toggle and the positioning of the hitches farther from or closer to the heel. The lifting of the rear of the ski against the heel of the boot, while advantageous from the standpoint of proper maneuvering, is such as to prevent the ski from being pulled clear of the boot in the event of a fall. There is thus a danger of injury to the wearer.

It has been proposed heretofore to provide a ski binding which will automatically release the ski under certain conditions, as applied to ski bindings other than those of the low-hitch type. It is an object of the present invention to provide automatic releasing means which are particularly applicable to low-hitch and similar bindings.

A further object is to provide automatic releasing means applicable to low-hitch bindings and which are so constructed and arranged as not to interfere with the normal action of such bindings, but which will completely release the boot from the binding when the heel is lifted a predetermined distance from the ski as may occur during a fall.

A further object is to provide a ski binding comprising means for normally engaging the heel of the boot, together with means for disabling the heel engaging means when the heel is raised above its normal position. A more particular object is to provide a binding of this type which incorporates means for applying pressure to resiliently urge the heel of the boot downwardly against the ski and which is released only when the heel is raised against the downward pressure for a predetermined distance. Other objects and advantages will appear as the description proceeds.

In the drawings, Fig. 1 is a side elevational view of a preferred embodiment of my binding as applied to a ski and boot with the parts shown in normal engaged position. Fig. 2 is a plan view of the same arrangement but with the boot and toe harness shown in dot-dash outline so as to reveal the remaining parts.

Fig. 3 is a central vertical sectional view, taken as indicated on the line 3—3 of Fig. 2, with the boot shown in elevation. Fig. 4 is a detail view on the line 4—4 of Fig. 3 illustrating the attachment of the releasing means to the resilient heel-engaging means. Fig. 5 is a detail sectional view taken on the line 5—5 of Fig. 3 showing the forward guide for the releasing means.

Fig. 6 is a vertical longitudinal sectional view illustrating another embodiment of the invention in which the releasing means operate on the rearward link of the toggle instead of on the forward link thereof.

In the embodiment shown in Figs 1 to 5 inclusive, there is shown a portion of a ski 1 to which may be secured in any convenient manner a foot plate 2. The plate 2 is provided at its forward end with upstanding flanges 3 to receive the toe of the boot, although, if desired, the toehold which is provided by the flanges 3 may be formed nstead by a separate member, or members, secured to the ski. A strap 4 extending through suitable apertures in the flanges 3 is arranged to pass over the toe of the boot in the usual manner. One or more hooks or "hitches" 5 are secured to each side of the ski. I have shown three of such hitches at each side of the ski, one formed on each forward hitch plate 6, and two on each rear hitch plate 7. A spring 8 or other resilient means is arranged to pass around the heel of the boot and to engage the usual groove 9 formed therein. A cable 10 is suitably secured to the ends of the spring 8. The cable 10 may be provided with the usual protective spring covering 11. The anchorage of the cable 10 to the spring 8 may be made by passing the cable ends through a sleeve 12 provided with a spiral groove on its outer surface engaging the inside of the spring

coil. The ends of the cable may be knotted or the strands separated and provided with a lead covering so as to retain them within the sleeves. Guides 13 may also be provided to prevent the cable from bending at its point of attachment.

In advance of the foot plate 2, there is secured to the top of the ski a bracket 14 (Fig. 3) having a pair of upstanding flanges 15. The cable 10 is secured to the bracket 14 through a toggle comprising the links 16 and 17. One end of the toggle link 16 is pivotally secured to the upstanding flanges 15 of the bracket by means of a pivot pin 18. The link 17 in turn is pivoted to the link 16 by a pin 19. The link 17 is bifurcated to provide a pair of arms 21 (Fig. 2) arranged to receive the link 16 between them. The pivot pin 19 extends through the arms 21 of the link 17. The forward loop of the cable 10 is secured to the link 17 in any convenient manner. This connection may be an adjustable one so as to make it possible to regulate the tension on the spring 8, as well as accommodate the binding to different sizes of boot. Thus the link 17 may be provided with a series of upstanding posts or flanges 22 around which the cable loop is adapted to pass. A cable retaining latch 23 may be provided to hold the cable in the selected groove between the flanges 22. In the construction shown, this latch 23 is pivotally secured to the arms 21 of the link at 24 and at its other end has a resilient hook 25 which releasably engages the end of the link. It will be understood that any other suitable toggle construction may be substituted for the one which I have selected for the purpose of illustration.

In accordance with my invention, the upper surface of the ski is provided with a longitudinal groove 26 extending below the foot plate 2 from front to back. The cable 27 of my automatic releasing means extends through this groove to connect the rear portion of the spring 8 with the toggle arm 16. The connection of the cable 27 to the spring 8 may be made in any convenient manner as by means of an attaching clip 28 which surrounds the spring and is clamped to the end of the cable by the bolt 29. The connection of the cable to the toggle arm 16 preferably comprises means for adjusting the length of the connection such as is afforded by the turnbuckle 30 to one end of which the cable 27 is anchored by means of a sleeve 31, and the other end of which is secured to an ear 32 which may be formed by an upstruck portion of the link. As shown, one end of the turn-buckle connection passes through an aperture in the ear 32 and is provided with an enlarged head 33 engaging the ear. The sleeve of the turn-buckle may be hexagonal, as shown, and there may also be provided a winged lock nut 34, facilitating adjustment and locking of the turn-buckle.

In addition to the structure already described, there may be provided a pair of guides 35 and 36 at either end of the plate 2. These guides provide stationary sheaves of the form clearly shown in Figs. 3, 4, and 5. They may be secured to the ski by means of lugs 37 and 38 as shown, or they may be attached to the plate 2, or be formed as an integral part thereof. The guides 35 and 36 provide rounded grooves extending in the directions of pull of the cable 27, and they serve to prevent the cable from being drawn over the sharp edges of the plate 2, thus minimizing wear.

The embodiment illustrated in Fig. 6 is the same as that which has already been described with the exception that the cable 27, instead of being connected to the link 16' of the toggle, is arranged to cooperate with the link 17 thereof. For this purpose the cable is attached to a releasing lever 39 which is pivotally secured at 40 to the ski, or to a bracket 41 secured thereto. The lever 39 is so arranged with respect to the link 17 of the toggle that when it is turned in a clockwise direction (as viewed in Fig. 6) by a pull on the cable 27, it raises the link 17 to release the toggle.

The operation of the binding which I have described is as follows. The link 16 or 16' is raised to bring the toggle past dead center position and release the cable 10 sufficiently to allow the toe of the boot to be inserted and the spring 8 drawn up over the heel into the groove 9 thereof. The link 16 or 16' is then pressed forwardly and downwardly into the position shown in the drawings, tensioning the spring 8, and providing means which applies pressure to urge the heel of the boot downwardly. This pressure is applied through the action of the cable 10 which is drawn under a pair of the rear hitches 5 below the level of the sole of the boot. In the drawings, I have shown the cable drawn under the forward pair of rear hitches 5 but it will be understood that it could be drawn under the rearward pair if it is desired to increase the downward pull on the heel. The degree of pull also is adjustable by changing the point of attachment of the forward loop of the cable to the link 17, this adjustment of course being effected before the boot is inserted and the tension applied. The length of the releasing cable 27 is then adjusted to provide the desired degree of slack. It should be understood that an adjustment similar to that provided by the turn-buckle 30 in the embodiment of Figs. 1 to 5 might be provided in conjunction with the embodiment illustrated in Fig. 6.

Assuming that there is a certain amount of slack in the cable 27 after the binding has been adjusted, it will be seen that the heel of the foot may be raised above the plate 2 to a certain extent before exerting any pull on the releasing cable. Any further elevation of the heel beyond this point, however, exerts a pull on the cable 27 to lift the link 16 (or in the embodiment of Fig. 6, the link 17) thereby bringing the toggle past dead center. Thereupon the toggle is immediately released permitting the heel to be lifted entirely clear of the spring 8 and in turn permitting the toe of the boot to be drawn from below the strap 4.

A further advantage of my improved binding resides in the ease with which the skis can be removed. When the skier wishes to dismount, it is merely necessary to cock the heels of the boots upwardly while throwing the weight forward, whereupon the toggle will be released and the skier can step clear of the binding without bending over to unlatch it.

If desired, the cable 27 may be adjusted so that very little or no slack is provided, whereupon the slightest elevation of the heel of the boot will trip the toggle and release the binding. It will thus be seen that the skier can adjust the binding so as to provide a release which is of a degree of sensitivity which meets his individual requirements. For example, an inexperienced skier might wish to have the automatic releasing means operate upon the slightest pull so as to more readily avoid the risk of injury in the event of falling. On the other hand, an experienced skier might wish to permit a substantial

amount of slack in the releasing cable so as to permit the heel to be raised quite a distance above the ski before the releasing means is operated.

While I have described the releasing means as being connected to the spring 8 of the heel engaging means, it will be apparent that it could be attached directly to the heel or to some other portion of the heel-engaging means which is responsive to raising of the heel.

The term "normal position" as used herein and in the appended claims with relation to the position of the heel is intended to refer to those positions of the heel which are desired during any given skiing conditions.

It will be understood that various modifications might be made in the mechanism which I have specifically described without departing from the principles of my invention. For example, it would be possible to have the heel engaging means comprise a strap or other element passing around the heel and connected to suitable spring means for exerting a pressure to urge the heel of the boot downwardly against the ski. Moreover, other forms of tensioning devices than the toggle mechanism disclosed might be employed in conjunction with my releasing mechanism. The terms and expressions which I have employed are used as terms of description and not of limitation, and I have no intention of excluding such equivalents of the invention disclosed, or of parts thereof, as fall within the spirit of the claims.

I claim:

1. A ski binding comprising means for engaging the toe of a boot, means for engaging the heel of the boot including a toggle connection to a member which is in fixed relationship to the first-mentioned means, and means for releasing the toggle responsive to raising of the heel a predetermined distance above its normal position.

2. A ski binding comprising means for engaging the toe of a boot, means for engaging the heel of the boot including a toggle connection to a member which is in fixed relationship to the first-mentioned means, means arranged for cooperation with the heel-engaging means for applying pressure to urge the heel of the boot downwardly, and means for releasing the toggle automatically responsive to raising of the heel a predetermined distance against the downward pressure.

3. A ski binding comprising means for engaging the toe of a boot, resilient means engaging the heel of the boot, the heel-engaging means including a cable arranged for connection to a toggle, means for hitching the cable below the level of the heel-engaging portion of the resilient means, and means independent of the pressure applied to the heel of the boot by the resilient means for automatically releasing the toggle when the heel is raised against the action of the resilient means.

4. A ski binding comprising means for engaging the toe of a boot, resilient means engaging the heel of the boot, the heel-engaging means including a cable arranged for connection to a toggle, means for hitching the cable below the level of the heel-engaging portion of the resilient means, means connecting the heel-engaging portion of the resilient means to one arm of the toggle and arranged so that when the heel is raised the toggle will be released and the heel-engaging means loosened.

5. A ski binding comprising means for engaging the toe of a boot, resilient means engaging the heel of the boot, the heel-engaging means including a cable arranged for connection to a toggle, means for hitching the cable below the level of the heel-engaging portion of the resilient means, and a cable arranged to pass underneath the boot, one end of the cable being arranged for connection to the heel-engaging portion of the resilient means and the other end arranged for connection to a member associated with the toggle.

6. A ski binding comprising means for engaging the toe of a boot, resilient means engaging the heel of the boot, the heel-engaging means including a cable arranged for connection to a toggle, means for hitching the cable below the level of the heel-engaging portion of the resilient means, a cable arranged to pass underneath the boot, one end of the cable being arranged for connection to the heel-engaging portion of the resilient means and the other end arranged for connection to a member associated with the toggle, and means for adjusting the length of the cable.

7. In a low-hitch ski binding comprising means for engaging the toe of a boot and resilient means for engaging the heel of the boot and applying pressure to urge it downwardly, a toggle connection from the heel-engaging means to a member which is in fixed relationship to the toe-engaging means, and an auxiliary connection from the heel of the boot to the toggle arranged to release the toggle upon lifting of the heel.

8. A ski binding comprising a foot plate, means for engaging the toe of a boot, a toggle arranged to be secured in a position in front of the foot plate, resilient means for engaging the heel of the boot, a flexible member for connecting the resilient means to the toggle, and a toggle release member arranged to pass underneath the foot plate to connect the toggle to the heel of the boot, the toggle and toggle release member being constructed and arranged to release the toggle upon lifting of the heel of the boot from the foot plate.

9. A ski binding comprising a foot plate, means for engaging the toe of a boot, a toggle arranged to be secured in a position in front of the foot plate, resilient means for engaging the heel of the boot, a flexible member for connecting the resilient means to the toggle, and a toggle release member comprising a flexible cable arranged to pass underneath the foot plate to connect the toggle to the heel of the boot, the toggle and toggle release member being constructed and arranged to release the toggle upon lifting of the heel of the boot from the foot plate.

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