

July 14, 1964

R. G. SPADEMAN

3,140,877

SAFETY BINDING

Filed March 26, 1962

2 Sheets-Sheet 1



Fig. 1

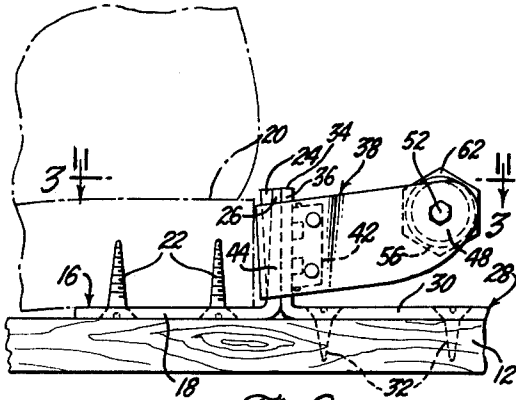


Fig. 2

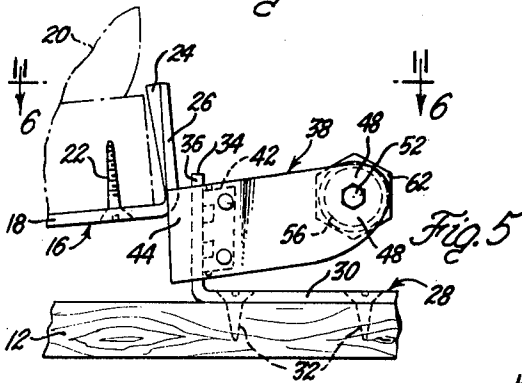


Fig. 3

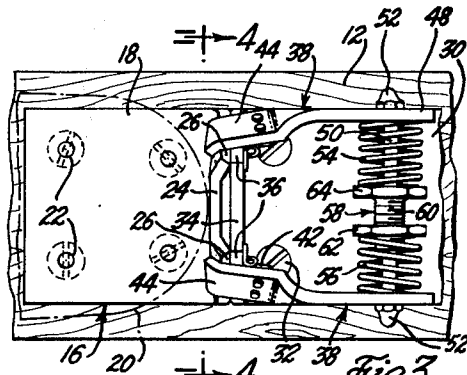


Fig. 4

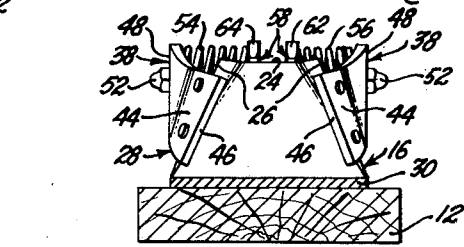


Fig. 5

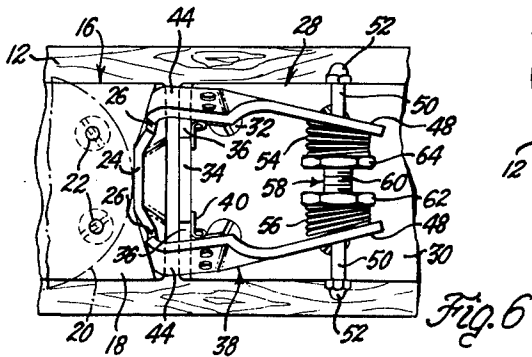


Fig. 6

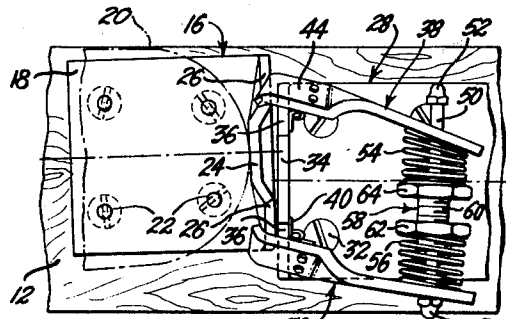


Fig. 7

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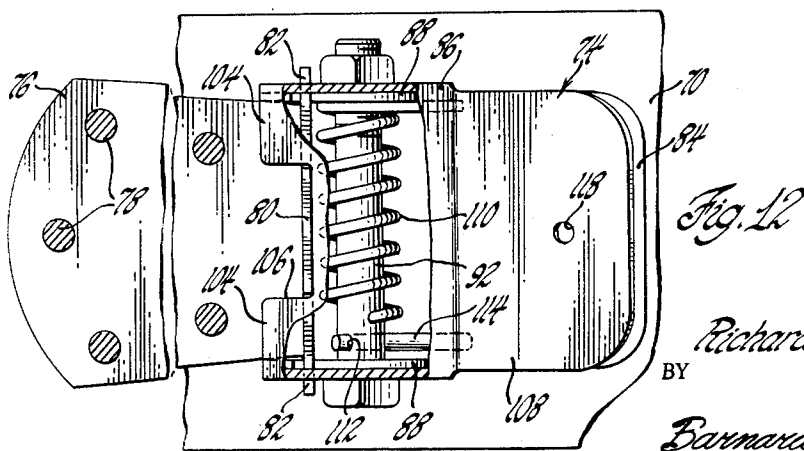
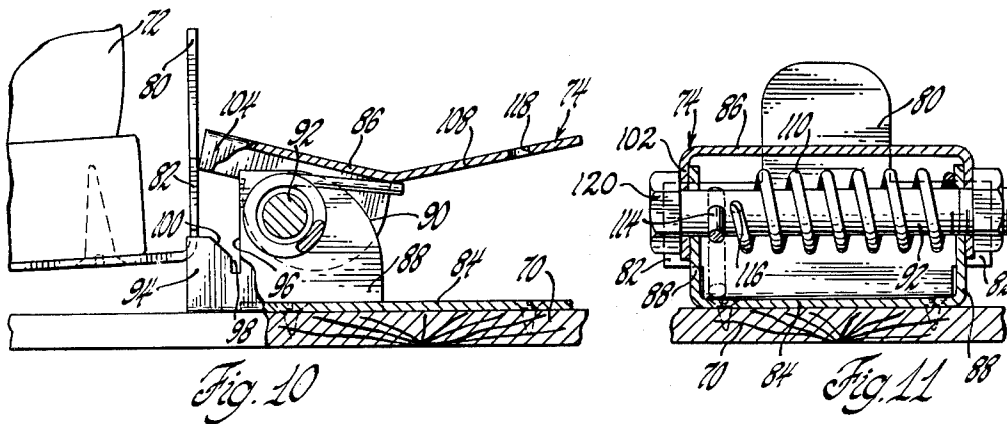
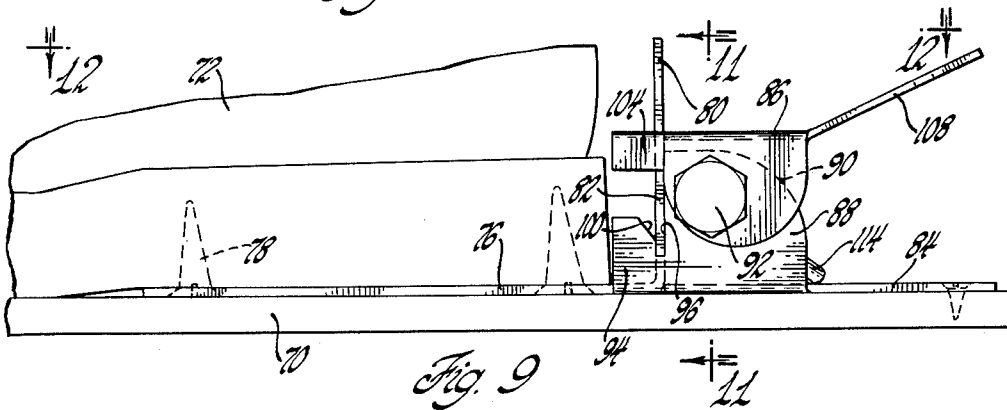
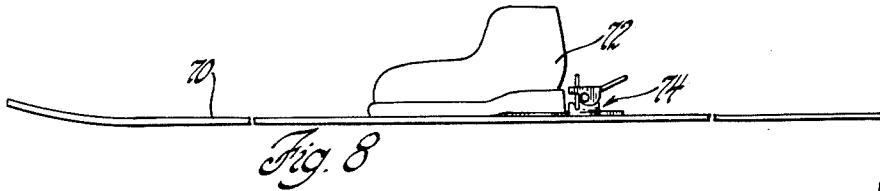
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2 Sheets-Sheet 2



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3,140,877

**SAFETY BINDING**

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23 Claims. (Cl. 280—11.35)

The present invention relates to a new and improved ski binding through which a skier's boot is releasably secured to a ski. More specifically, the present binding is of the type referred to as a safety binding which is intended to release the skier from his skis in such a way as to prevent or minimize injury due to a fall or the assumption of any position likely to cause injury to the skier were he otherwise to remain fixed to his skis.

The present application is a continuation-in-part of Serial No. 126,267, Spademan, filed July 24, 1961, and now abandoned.

Safety bindings or harnesses particularly adapted for use with downhill type skis have long been known and have assumed many forms. In fact, today a skier has many varieties from which to choose in selecting an automatically releasable or safety type ski binding. In common up to the present time, all known types of safety bindings are adapted to engage and retain the ski boot to the ski through both heel and toe fittings. Such bindings are variously known as heel and/or toe release safety bindings depending on whether the binding is adapted to release either or both the heel or toe during an incipient fall condition.

The main problem with all safety bindings is to provide an arrangement which will, under normal conditions, rigidly retain the skier's boots to the skis so as to permit essentially no relative movement between the ski boot and the ski and, at the same time, permit the ski boot to be released from the ski under conditions when the skier is likely to be injured if he remains fixed to his skis. As a consequence, it has been heretofore presumed to be necessary to provide ski bindings, safety or not, which have engaged both the heel and toe of the ski boot in order to properly retain the boot upon the ski.

Applicant has developed a highly unique ski binding which enables the ski boot to be secured to the ski solely through a mechanism adapted to cooperate with the heel of the ski boot and without the necessity of providing a toe fastening device. By virtue of applicant's unique ski binding, a great simplification and reduction in the number of parts is achieved with a consequent material reduction in the cost of an acceptable ski binding of the safety or releasable type.

In part, applicant's radical departure from previously known types of ski bindings is based on the recognition of the fact that the relatively rigid sole construction of a downhill ski boot may be used as a means for contributing to the simplification of a safety ski binding. It is fundamental in downhill skiing that there be essentially no movement possible between the skier's boots and his skis. To this end, downhill ski boots are made of an extremely stiff construction intended to make relative bending between the lower leg and the foot virtually impossible. Such ski boot construction also includes the use of a stiff, usually steel, plate running essentially the length of the boot between the upper boot and the sole or imbedded in the sole. In this way virtually no flexing of the boot sole is possible.

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Thus for practical purposes, a downhill ski boot can be considered to be a substantially rigid member. Being rigid then, it is only necessary to secure one portion of the boot to the ski in which event the entire ski boot is similarly connected to the ski. The difficulty arises in finding a practical mechanism through which the boot may be secured to the ski without positively engaging both the heel and toe of the boot as has been done in the past.

In developing the present ski binding, it was first necessary to recognize that a toe connection or binding alone would be unusable since it is imperative in downhill skiing that the heel of the boot be held in tight engagement with the ski. It is the pressure exerted through the heel that enables skis to be turned. For proper control, it is also necessary that the skier keep his weight forward to keep pressure on the front of the skis. This forward pressure also tends to lift the heel which could not be properly resisted by a toe binding alone.

Thus, applicant developed his unique mechanism which eliminates the necessity for a toe connection or binding.

A study of presently available ski bindings also revealed that none could be used by simply employing the heel connection without the coacting toe connection.

It is, therefore, an object of the present invention to provide a simplified mechanism for operatively engaging only the heel of the ski boot to releasably retain the boot upon a ski. It is a further object of the invention to provide such a heel engaging mechanism which will under normal skiing conditions rigidly retain the ski boot upon the ski and at the same time permit the boot to automatically detach from the ski under twisting or falling conditions which are likely to cause injury to the skier unless he is released from his ski.

More particularly, it is an object of the present invention to provide a plate member secured to the heel of a ski boot and which heel plate includes an upstanding portion spaced rearwardly of said boot heel. A clamping device is secured to the ski and which device includes means extending forwardly to engage the upstanding portion of the heel plate to prevent said heel plate from moving forwardly relative to said device. At least a portion of said forwardly extending means is pivotally supported and resiliently biased into engagement with the heel plate to resist upward movement of the heel plate relative to the clamping device.

One modification of the subject ski binding comprises a first plate member fixed to the bottom of the heel of the ski boot and includes a tapered portion extending upwardly and to the rear of the heel so as to be generally perpendicular to the upper surface of the ski, a second similarly shaped plate member secured to the ski and also including a similarly tapered upwardly extending portion adapted to be disposed proximate to said corresponding first plate portion, and means for clampingly connecting said plate members so as to normally restrain said boot against movement in any direction relative to said ski. Said clamping means and tapered plate portions are so constructed and arranged that said plates may be automatically separated when the load thereon exceeds a predetermined value.

The clamping means in the first modification includes a pair of spring biased arms pivotally mounted on the tapered portion of said second plate. The forward edges of these arms are adapted to clamp about the tapered

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portion of the heel plate and resiliently wedge the same to prevent the latter's upward movement.

In a second modification of the invention, a base plate member is fixed to the ski and includes a portion which extends forwardly of a heel plate and releasably interlocks therewith. A spring biased clamp plate is pivotally supported on the base plate and resiliently maintains the interlocked relationship between the base and heel plates.

The details as well as other objects and advantages of the present invention will be apparent from a perusal of the detailed description which follows.

In the drawings:

FIGURE 1 illustrates a ski boot mounted on a ski by the subject ski binding device;

FIGURE 2 is an enlarged elevational view of the ski binding mechanism;

FIGURE 3 is a view along lines 3—3 of FIGURE 2;

FIGURE 4 is a view along lines 4—4 of FIGURE 3;

FIGURE 5 is a side elevational view showing the boot in a partially released condition occasioned by the lifting of the heel of the ski boot;

FIGURE 6 is a view along line 6—6 of FIGURE 5;

FIGURE 7 shows the mechanism permitting a twisting release of the boot from the ski;

FIGURE 8 is a side elevational view of a modification of the subject invention;

FIGURE 9 is an enlarged view of the device of FIGURE 8;

FIGURE 10 shows the device of FIGURE 9 with the ski boot released from the binding;

FIGURE 11 is a view along line 11—11 of FIGURE 9;

FIGURE 12 is a view along line 12—12 of FIGURE 9.

Referring to FIGURE 1, a rigid or stiff type downhill ski boot 10 is adapted to be mounted on ski 12 through a releasable binding mechanism indicated generally at 14. As best seen in FIGURES 2 through 5, mechanism 14 includes a first plate member 16 including a base or horizontal portion 18 adapted to be rigidly secured to heel 20 of boot 10 through suitable screw members 22. In this way, plate 16 becomes an integral extension of the boot. Plate 16 also includes a portion 24 which extends slightly rearwardly of heel 20 and projects upwardly generally parallel to the rear of the heel so as to be perpendicularly related to the upper or top surface of ski 12. The side edges 26 of upstanding portion 24 of heel plate 16 are upwardly tapered the purpose of which will be explained after describing other of the mechanism pertinent to such an understanding.

A second plate member 28 corresponding generally in size and shape to plate member 16 includes a horizontal base portion 30 suitably apertured to permit screws 32 to secure said plate to ski 12. Plate member 28 includes a similar upstanding portion 34 having correspondingly tapered edges 36. When ski boot 10 is suitably mounted on ski 12 upstanding portions 24 and 34 of plate members 16 and 28 are adapted to be disposed in abutting relation such that the respective base portions 18 and 30 extend in opposite directions generally along the longitudinal axis of the ski.

A pair of identical arm members 38 are pivotally supported on upstanding portion 34 of ski plate 28. Due to the identical nature of arms 38, it will suffice to merely describe the details of construction and mounting of one of these members. A hinge member includes a first hinge plate 40 fixed through suitable rivets, or the like, to plate portion 34 such that the hinge axis is displaced slightly to the rear of one of the side edges 36 but parallel thereto. A second hinge plate 42 is similarly fixed to arm 38.

Arm 38 includes a forwardly extending portion 44 which is bent or curved inwardly so that the leading edge 46 is parallel to edge 26 of ski plate portion 24. Edge 46 of forwardly extending portion 44 is bent sufficiently inwardly so as to be transversely inwardly displaced relative to edge 26 when forwardly extending portion 44 abuts against edge 26 whereby the arms hookingly or clampingly engage plate portion 24.

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Arm 38 includes a rearwardly extending portion 48 of considerably longer length relative to the hinge axis than forwardly extending portion 44. Each of the arms 38 is suitably apertured to loosely receive a stud member 50 having head portions 52 adapted to retain the stud to the arms.

As best seen in FIGURE 3 a pair of coil spring members 54 and 56 are supported on stud 50. One end of each of the respective spring members 54 and 56 seats against arm 38 while the other end of the spring seats against an adjusting device 58. Device 58 is provided for the purpose of adjusting the force necessary to overcome the respective springs and in turn to rotate arms 38 about their hinge axes.

Adjusting device 58 includes an externally threaded member 60 loosely supported on stud 50 and having a spring seat or flange portion 62 formed at one end thereof. The periphery of portion 62 is formed as a nut to permit convenient gripping with a suitable tool. A flat nut member 64, corresponding generally in shape and size to flange portion 62, is threadably mounted on member 60 and provides a seat for the other end of spring 54. By threading nut 64 relative to member 60 and thereby changing the distance between the nut and nut flange 62, the force with which springs 54 and 56 respectively urge arms 38 outwardly may be varied. For instance, by threading nut 64 away from flange 62 the force of springs 54 and 56 will be increased, in turn, requiring a greater external force in order to move the arms 38 inwardly to compress said springs.

In order to mount boot 10 on ski 12, the heel of the ski boot is moved generally into position so as to align and dispose boot plate portion 24 proximate ski plate portion 34. Next, arms 38 are engaged and squeezed inwardly pivoting the arms about their hinge axes and moving the forward portions 44 of the arms outwardly permitting heel plate portion 24 to be moved into abutting relationship with ski plate portion 34. With the boot plate thus positioned, arms 38 may be released permitting forward portions 44 thereof to clampingly retain the ski boot on the ski as indicated in FIGURE 1.

While a ski boot may attempt to move in almost an infinite number of directions relative to a ski, for present purposes it will suffice to say that a ski binding must resist the effort of the heel or toe of the boot to lift relative to the ski as well as the effort of the boot to twist generally about an axis perpendicular to the center line of the ski and passing generally through the ankle bone. The clamping relationship between the forwardly extending portion 44 of arms 38 about portion 24 of heel plate 16 will restrain the boot against twisting until, as indicated in FIGURE 7, the twisting force exceeds the combined outward force of spring 54 and inward force of spring 56. In this event, edge 26 of portion 24 will cause the forward edge 46 of arm 38 to cam the arm and rotate the same in a clockwise direction about its axis thereby releasing the boot. A twist in the opposite direction will, of course, create the same type of action with the other arm.

The significance of the tapered relationship of upstanding portions 24 and 34 will now be appreciated. As best visualized by referring to FIGURE 4, any tendency of ski boot heel portion 20 and heel plate portion 24 to move upwardly will be resisted by the wedge action of the inner ends 44 of arms 38. Thus the resiliently outwardly biased arms 38 will resist the upward thrust of heel plate 16 until such time as such thrust exceeds the force of springs 54 and 56 and, as illustrated in FIGURES 5 and 6, at which point the boot will be released.

Likewise, any tendency of the toe of the boot to lift relative to ski 12 would be resisted by arms 38 until such time as the upward toe thrust causes the heel plate portion 24 to cam arms 38 thereby compressing associated springs 54 and 56 to release the boot.

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The various other types of boot movement relative to the ski will be combinations of twisting and/or heel or toe lifting. Accordingly, binding mechanism 14 release-action will be a combination of the various movements described.

Reference is now made to the modification of the subject invention shown in FIGURES 8 through 12. A ski is indicated generally at 70 having a boot 72 releasably mounted thereon through a mechanism 74.

A plate 76 is secured to the heel portion of boot 72 through suitable screw means 78. The base or bottom portion of heel plate 76 extends rearwardly beyond the boot heel and is formed to provide an upstanding portion 80 rearwardly spaced from the boot. In this particular modification, the upstanding portion 80 of the heel plate is generally formed as an inverted T as best seen in FIGURE 11.

Upstanding portion 80 includes transversely extending wing portions 82 disposed proximate though slightly vertically spaced above the rear edge of the base portion of heel plate 76. The vertical spacing of wing portions 82 is generally sufficient to permit the ski boot heel to sit flat on ski 70 when the heel plate is positioned within mechanism 74.

Releasable binding mechanism 74 comprises a ski plate member 84 and a pivotal lever member 86. Ski plate 84 includes a flat longitudinally extending base portion secured to ski 70 through suitable screw means. Ski plate 84 also includes a pair of identical upstanding portions 88 extending upwardly from the side edges of the ski plate. Upstanding portions 88 are formed generally at the forward end of ski plate 84.

Since upstanding portions 88 of ski plate 84 are identical, it will suffice to merely describe one of such portions. The upper rear edge 90 of portion 88 is arcuately curved to prevent interference with pivoted lever 86 when said lever is rotated. Upstanding portions 88 also include aligned openings within which a stud 92 is supported and which stud, in turn, rotatably supports lever 86.

Upstanding portion 88 is notched and formed near the front edge thereof so as to receive the wing portions 82 of heel plate 76. The manner in which upstanding portion 88 is notched is important to the proper operation of mechanism 74. In addition to providing notches within which wing portions 82 may be received, each upstanding portion 88 includes a forwardly extending portion 94 which is disposed intermediate the boot heel and upstanding portion 80 of the heel plate 76 when the ski boot 72 is releasably secured to mechanism 74. Actually, forwardly extending portion 94 and the main body of upstanding portion 88 coact to form the notch means within which heel plate wing portions are adapted to be disposed.

Upstanding portion 88 includes a generally vertical forward edge 96, FIGURE 10, which forms the rear wall of the notch formed between upstanding portion 88 and forwardly extending portion 94 of the ski plate. The forward edge of the notch includes a lower portion 98 parallel to edge 96 and a forwardly inclined portion 100. The configuration of the heel plate retaining notch formed in ski plate 84 is best seen in FIGURES 9 and 10. Further, and as best seen in FIGURE 11, the movable lever supporting portion of ski plate 84, and including upstanding portions 88, is generally of a U-shaped configuration.

As seen in FIGURE 11, lever 86 also includes a U-shaped cross section which is, however, inverted with relation to the corresponding portion of ski plate 84. In other words, lever 86 includes a pair of identical downwardly extending trunnion members 102 having holes formed therein which are adapted to be aligned with the corresponding holes in portions 88 of ski plate 84 and through which stud shaft 92 extends to pivotally support the lever.

As best seen in FIGURES 9 and 12, pivotal lever 86 includes a pair of forwardly extending side portions

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104 which form an intermediate forwardly opening notch 106. The rear edge of notch 106 is generally vertically aligned with vertical edges 96 of ski plate portions 88. The forwardly extending portions 104 of lever 86 are disposed generally above forwardly extending ski plate portions 94 and extend generally longitudinally forwardly the same distance from the rotative axis of said lever as do said ski plate portions 94.

The rear end of pivotal lever 86 includes an upwardly inclined portion 108 which is provided to give the user sufficient leverage to rotate the lever against the force of a coil spring 110 coaxially mounted on shaft 92.

Shaft 92 includes a diametral hole 112 formed there-through near one end thereof and proximate to one of the upstanding portions 88 of the ski plate. One end of a pin member 114 is frictionally retained within shaft opening 112. The other end of pin 114 engages the base portion of ski plate 84 and prevents shaft 92 from being rotated in a clockwise direction, as viewed in FIGURES 9 and 10. A second diametral hole 116 is provided in shaft 92 proximate the first hole 112. One end of coil spring 110 is anchored within second hole 116. The other end of coil spring 110 includes a straight or linear portion which is adapted to bias against pivotal lever 86. Again as viewed in FIGURES 9 and 10, spring 110 is coiled so that when installed it is put under a torsion loading such that it ends to uncoil and urge lever 86 in a counterclockwise direction.

The manner in which heel plate 76 is positioned and retained within mechanism 74 will now be considered. When the user is ready to mount his skis, he may insert the tip of his ski pole within an opening 118 formed within the rearwardly extending portion 108 of lever 86 or otherwise engage said lever to depress or rotate the rear end of said lever toward said ski. In so doing, and as perhaps best seen in FIGURE 10, the forwardly extending portions 104 of the lever will be rotated in a clockwise direction away from the forwardly extending portions 94 of the ski plate to provide a sufficiently large opening therebetween to permit the user to insert the heel plate within mechanism 74 so that wing portions 82 are positioned within the notches in ski plate 84. When the heel plate is thus positioned, lever 86 may be released whereby spring 110 will rotate the same in a counterclockwise direction until the forwardly extending portions 104 engage the upper edge of heel plate wing portions 82 to releasably lock the heel plate in position.

As thus positioned, forwardly extending portions 94 of ski plate 84 extend upwardly behind and engage the front face of upstanding portion 80 of the heel plate. As seen in FIGURES 9 and 10, with wing portions 82 seated within the ski plate notches, the ski boot is retained by notch edge 98 against longitudinal movement relative to mechanism 74. At the same time, forwardly extending portions 104 of lever 86 are urged in a counterclockwise direction by spring 110 to retain the heel plate within the aforesaid notches and thereby resist lifting of the ski boot heel. Similarly, since notches of ski plate 84 are transversely spaced and disposed proximate the outer edges of said plate, heel plate 76 and hence ski boot 72 are retained against pivoting in a horizontal plane parallel to the top surface of ski 70 due to wings 82 abutting against the vertical notch edges 96 and 98.

To prevent the skier from rocking back on his heel or otherwise lifting the toe of the ski boot relative to ski 70, upstanding portion 80 and wings 82 of heel plate 76 respectively abut against notch 106 of lever 86 and vertical edges 96 of each of the upstanding portions 88 of ski plate 84.

Thus, it is seen that heel plate 76 is retained against fore and aft longitudinal movement as well as twisting movement by coacting with the notches of ski plate 84, against relative rearward pivoting by its abutting relationship with ski plate edges 96 and lever notch 106,

and against lifting by the spring biased action of lever 86.

The manner in which mechanism 74 will release the ski boot 72 from ski 70 will now be considered. It has been found that all forward falls and substantially all sideward falls, likely to injure the skier if not released from his ski, are accompanied by a lifting of the ski boot heel relative to the ski. As will subsequently become more apparent, this slight heel lift is utilized to condition mechanism 74 for release during incipient fall conditions.

On a straight forward fall, e.g. the skier falls toward his ski tips, the skier will tend to pivot about the tip of his ski boots thereby causing the boot heel to lift with sufficient force to cause heel plate wing portions 82 to rotate lever 86 in a clockwise direction against the force of spring 110 until said wing portions are clear of the bottom edges of forwardly extending portions 94 and 104 respectively of ski plate 84 and lever 86 thereby releasing the ski boot from mechanism 74 as seen in FIGURE 10.

More specifically, a predetermined amount of heel lift, e.g. exceeds the depth of notch edge 98, must take place to position at least one of the heel plate wing portions 82 on an inclined edge 100 of the notch before mechanism 74 will be conditioned to permit the boot to be released during a side or twisting fall. Once one heel plate wing portion 82 is lifted above notch edge 98 further twisting or sidewise movement of the boot will cause the wing portion to cam up inclined edge 100 until the boot heel is released from mechanism 74.

It is well known that any safety binding operating against a spring force should include some means for adjusting the spring force to accommodate the varying weights of skiers and also to permit an individual skier to adjust the force necessary to release his boot from a binding. In general, a more accomplished skier will set the spring force to hold the boot and ski together during higher loads than will a beginner. In other words, a beginner will normally want his boots to be released from his skis more readily due to the greater frequency of falls and also the lesser control of his falls.

One manner of adjusting the force of spring 110 is to engage head 120 of shaft 92 with a suitable tool and to rotate the shaft in a counterclockwise direction, as viewed in FIGURES 9 and 10. This shaft rotation will lift pin 114 sufficiently from ski plate 84 to permit the pin to be removed from shaft hole 112. Shaft 92 may now be wound either counterclockwise to increase or clockwise to decrease the force of spring 110. With one diametral hole, as shown, shaft 92 will have to be rotated at least through 180° to vary the spring force. If finer adjustments are desired more diametral holes may be provided at varying angles. In other words, another such hole disposed at a right angle to hole 112. In this case shaft 92 could be rotated through 90° to permit a smaller change in the force of spring 110.

It is further apparent that various additional structural modifications may be made in the subject ski binding within the intended scope of the invention as set forth in the hereinafter appended claims.

I claim:

1. A ski binding mechanism comprising a boot plate member, said boot plate member including a base portion, and an upstanding portion projecting generally perpendicularly from one end of said base portion, said upstanding portion including upwardly and inwardly tapering side edges, a ski plate member, and clamping means associated with said ski plate for releasably engaging the upstanding portion of said boot plate, said clamping means comprising a pair of arms having upwardly and inwardly inclined surfaces corresponding in shape to the tapering edges of said boot plate, each of said surfaces terminating in an inwardly bent portion adapted to overlap one of said side edges, spring means biasing said arms toward each other whereby said upstanding boot plate portion is wedged between said arms.

2. A ski binding mechanism comprising a heel plate member, said heel plate member including a base portion, and an upstanding portion projecting generally perpendicularly from one end of said base portion, said upstanding portion including upwardly and inwardly tapering side edges, a ski plate member, and clamping means associated with said ski plate for releasably engaging the upstanding portion of said heel plate, said clamping means comprising a pair of arms having upwardly and inwardly inclined surfaces corresponding in shape to the tapering edges of said heel plate, each of said surfaces terminating in an inwardly bent portion adapted to overlap one of said side edges, spring means biasing said arms toward each other whereby said upstanding heel plate portion is wedged between said arms, said heel plate edges being adapted to cam said arm surfaces outwardly to release said heel plate member from said clamping means.

3. A ski binding mechanism as set forth in claim 2 which includes means for adjusting the force with which said arms are biased toward each other.

4. A ski binding mechanism comprising a boot plate member, said boot plate member including a base portion normally disposed in a horizontal plane, and an upstanding portion projecting generally perpendicularly from one end of said base portion, said upstanding portion including upwardly and inwardly tapering side edges, a ski plate member, said ski plate member including a base portion normally disposed in a horizontal plane and an upstanding portion projecting perpendicularly from one end of said base portion, the upstanding portion of said ski plate including upwardly and inwardly tapered edges corresponding to the edges of the upstanding portion of said boot plate, said boot and ski plates being adapted to be aligned so that the respective upstanding portions are in abutting relation, and clamping means associated with said ski plate for releasably engaging the upstanding portion of said heel plate, said clamping means comprising a pair of arms respectively pivotally mounted proximate the upwardly tapered edges of said ski plate member so that the pivotal axes of said arms are respectively parallel to the associated edge, each arm including a forwardly extending portion which terminates in an inwardly bent portion, and spring means for biasing said arms so as to cause the inwardly bent portions of said arms to hookingly engage with the upstanding portion of said heel plate.

5. A ski binding mechanism comprising a heel plate member, said heel plate member including a base portion, and an upstanding portion projecting generally perpendicularly from one end of said base portion, said upstanding portion including upwardly and inwardly tapering side edges, a ski plate member, said ski plate member including a base portion and an upstanding portion projecting perpendicularly from one end of said base portion, the upstanding portion of said ski plate including upwardly and inwardly tapered edges corresponding to the edges of the upstanding portion of said heel plate, said heel plate and ski plates being adapted to be aligned so that said upstanding portions are in abutting relation, and clamping means associated with said ski plate for releasably engaging the upstanding portion of said heel plate, said clamping means comprising a pair of arms respectively pivotally mounted proximate the upwardly tapered edges of said ski plate member, each arm including a portion extending forwardly of the pivotal axis, and spring means for biasing said arms so as to cause the forwardly extending portions of said arms to releasably engage with the upstanding portion of said heel plate.

6. A ski binding for releasably connecting a ski boot to a ski, said boot being releasably retained to said ski by a device adapted to engage said boot only through the heel portion thereof, said device comprising a heel plate member including a base portion secured to the heel of said boot, said heel plate also including a portion disposed rearwardly of the heel portion of said boot and

projecting upwardly in a direction generally perpendicular to the sole of said boot, the upstanding portion of said heel plate including upwardly and inwardly tapered edges, a ski plate member including a base portion adapted to be secured to the upper surface of said ski and generally aligned with the base portion of said heel plate member in the direction of the longitudinal axis of said ski, said ski plate including an upstanding portion disposed generally perpendicularly to the upper surface of said ski and adapted to be disposed in abutting relationship with the upstanding portion of said ski plate, the upstanding portion of said ski plate including upwardly and inwardly tapered edges corresponding to said edges of the heel plate, a pair of arms respectively pivotally mounted proximate the edges of said ski plate member, each of said arms including a forwardly extending portion adapted to hook behind the upstanding portion of said heel plate intermediate said upstanding portion and the heel of said boot, and spring means for biasing said arms to resiliently retain said forwardly extending portions thereof in hooking engagement with the upstanding portion of said heel plate.

7. A ski binding as set forth in claim 6 in which each of said arms includes a portion extending rearwardly of its pivotal axis, and further in which said spring means includes a stud member loosely connected between said rearwardly extending arm portions, coil spring means surrounding said stud member and biasing said latter arm portions outwardly, said stud member including head portions to limit relative movement between the stud and said arms.

8. A ski binding as set forth in claim 8 which includes means for adjusting the force of said coil spring means.

9. A ski binding as set forth in claim 7 in which the coil spring means comprises a pair of coil members aligned along the stud member, and means disposed intermediate the coil spring member to adjust the force of said members.

10. A ski binding as set forth in claim 9 in which the force adjusting means comprises a first element slidably mounted on the stud member and including an externally threaded portion, said element including a seat for one of said coil spring members, and a nut member threadably mounted on the threaded portion of said first element, said nut member including a seat for the other coil spring member, said nut member being axially adjustable relative to said first element to change the force of said springs.

11. A ski binding mechanism coacting only with the heel portion of a ski boot to releasably retain the boot upon a ski and being the only means by which said ski boot is retained on said ski, said mechanism comprising a plate member adapted to be secured to the heel of a ski boot, said plate member including an elevated portion proximate said boot heel, a clamping device adapted to be fixed to the ski, said device including spring actuated means to releasably interlock with the elevated portion of the heel plate to resist longitudinal and vertical movement of the heel plate away from the clamping device.

12. A ski binding mechanism as set forth in claim 11 in which said releasable interlock means includes a pair of transversely spaced members extending forwardly beyond and engaging said heel plate member to retain said heel plate against linear movement away from the clamping device.

13. A ski binding mechanism as set forth in claim 11 in which said clamping device includes a first plate member adapted to be fixed to the ski, a second plate member pivotally supported upon the first plate member, said first plate member including a portion extending forwardly of said elevated heel plate portion to prevent the heel plate from moving longitudinally away from said first plate member, said second plate member including a portion extending forwardly of said upstanding heel plate portion, and spring means biasing said second plate

member whereby the forwardly extending portion thereof engages and resists upward movement of the heel plate member.

14. A ski binding mechanism as set forth in claim 13 which includes a transverse shaft member supported by said first plate member, said spring means comprising a torsion spring coiled about said shaft and biasing said second plate member into engagement with said heel plate.

15. A ski binding mechanism as set forth in claim 14 in which said torsion spring includes a free end biasing against said second plate member, the other end of said spring being anchored to said shaft, and means coacting with said first plate member and said shaft to vary the force of said spring.

16. A ski binding mechanism as set forth in claim 15 in which said spring force adjusting means comprises a pin member removably disposed within a diametral opening through said shaft, one end of said pin member engaging said first plate member to prevent spring induced rotation of said shaft.

17. A ski binding mechanism as set forth in claim 11 in which said clamping device includes a first plate member adapted to be fixed to the ski, said first plate member including upwardly opening notch means disposed transversely thereof, a part of said upstanding heel plate portion extending within said notch means, a second plate member pivotally supported on said first member, and spring means biasing said second plate to releasably retain said heel plate portion within the notch means.

18. A ski binding mechanism as set forth in claim 17 in which said notch means includes a pair of longitudinally spaced parallel edges between which said heel plate part is adapted to be disposed.

19. A ski binding mechanism as set forth in claim 18 in which the forward one of said parallel edges terminates in a forwardly and upwardly inclined surface.

20. A ski binding comprising a clamping device engaging only the heel portion of a ski boot to releasably retain the boot upon a ski, a heel plate member including a base portion, an elevated portion formed on the base portion, said elevated portion including front and rear faces bounded by side edges, said clamping device being adapted to be secured rearwardly proximate said heel plate, said clamping device including means extending forwardly to engage the front face of said elevated portion, at least a part of the forwardly extending means being pivotally supported relative to the remainder of said device, and spring means biasing said pivotally supported part into engagement with said heel plate to resiliently resist upward movement of the heel plate relative to the clamping device.

21. A ski binding mechanism coacting with the heel portion of a ski boot to releasably retain the boot upon a ski and being the only means by which said boot is retained on said ski, said mechanism comprising a plate member adapted to be secured to the heel of a ski boot, said plate member including an elevated portion proximately spaced from said boot heel, a clamping device adapted to be fixed to the ski, said device including spring actuated means to releasably interlock with the elevated portion of the heel plate to resist longitudinal and vertical movement of the heel plate away from the clamping device.

22. A ski binding mechanism as set forth in claim 21 in which the elevated portion of the heel plate member includes front and rear surfaces, said rear surface being proximate said clamping device, said releasable interlock means including a pair of transversely spaced member extending forwardly to engage both front and rear faces of said upstanding portion to retain said heel plate against linear movement relative to the clamping device.

23. In combination with a ski and a ski boot, a ski binding mechanism coacting only with the heel portion of said ski boot to releasably retain said ski boot upon said ski under downhill skiing conditions, said mechanism being the only means by which said ski boot is

retained upon said ski, and said mechanism including resiliently actuated means operable to resist longitudinal and vertical movement of said ski boot away from said ski.

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,140,877

July 14, 1964

Richard G. Spademan

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 27, for "ends" read -- tends --; column 9, line 32, for the claim reference numeral "8" read -- 7 --; column 10, line 67, for "member" read -- members --.

Signed and sealed this 12th day of January 1965.

(SEAL)

Attest:

ERNEST W. SWIDER  
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