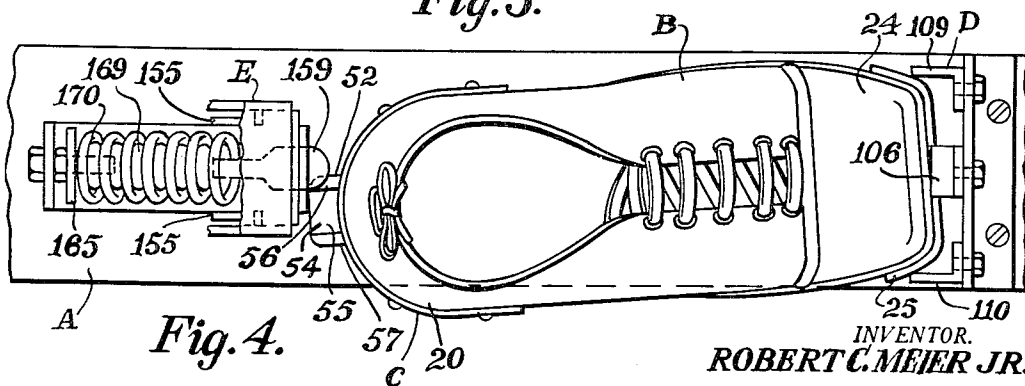
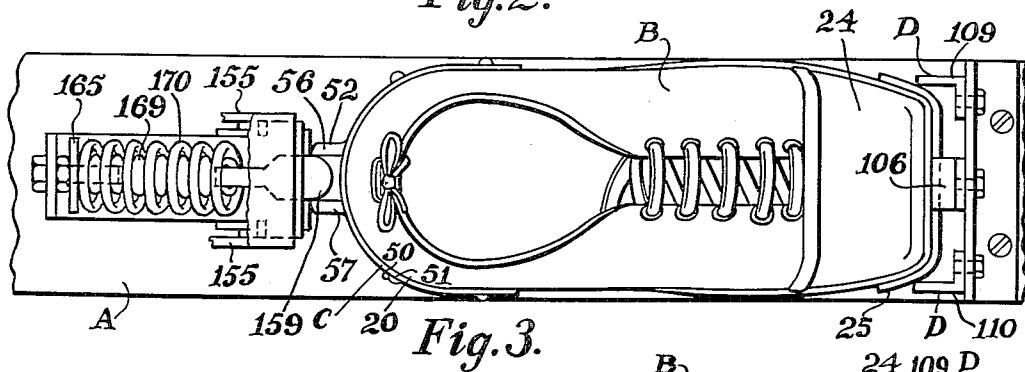
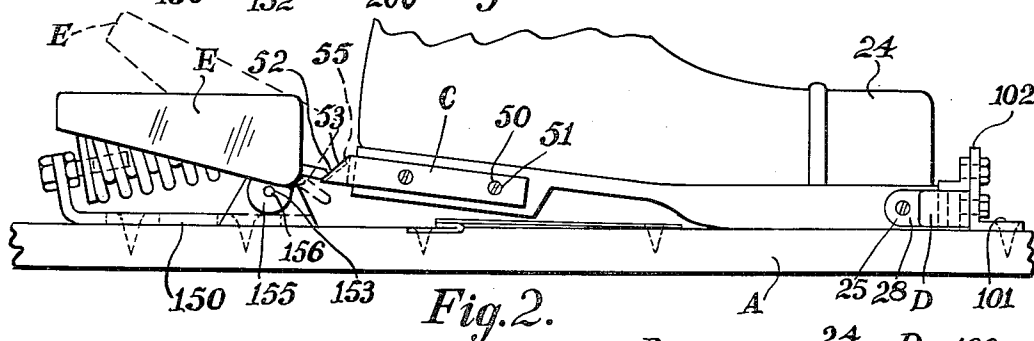
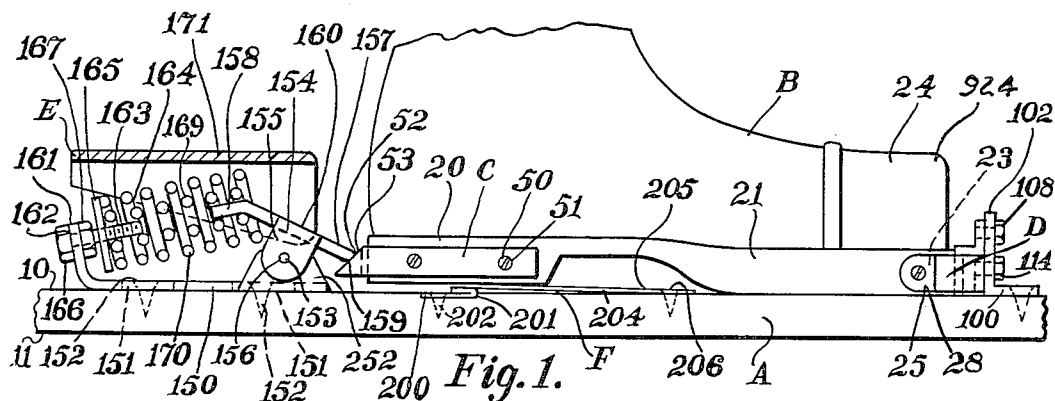


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2 Sheets-Sheet 1



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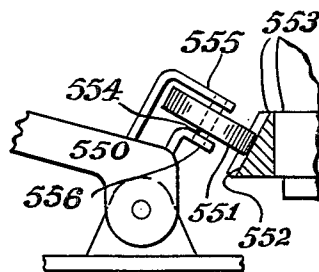
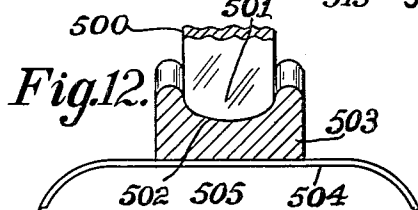
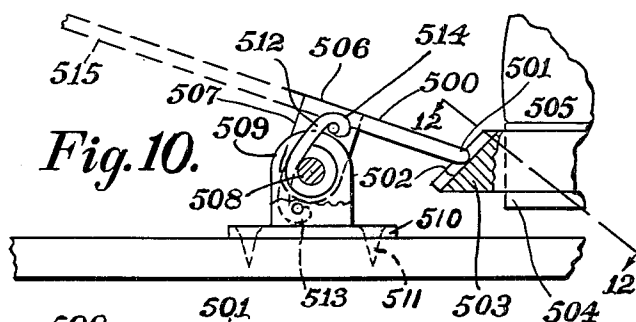
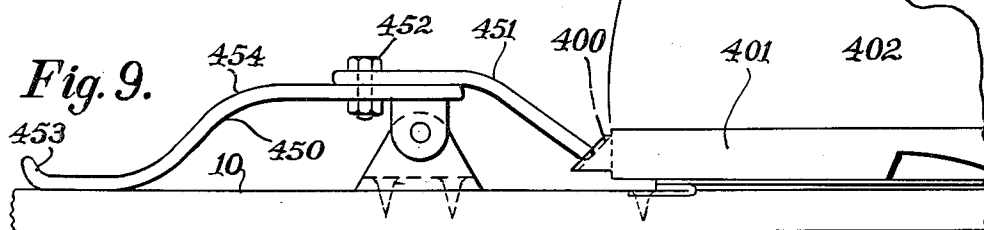
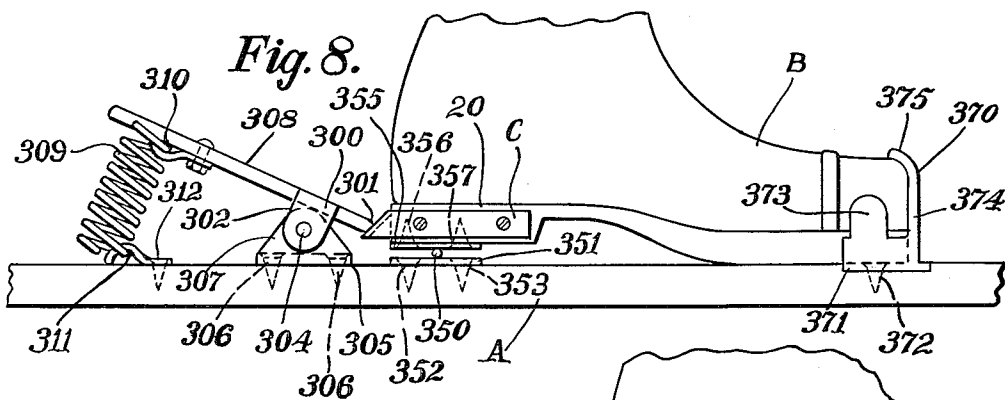
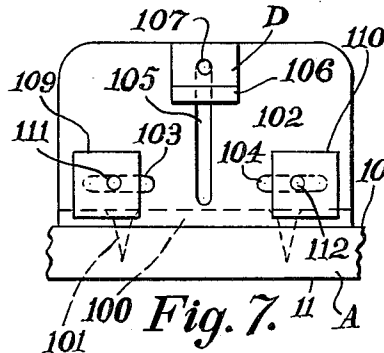
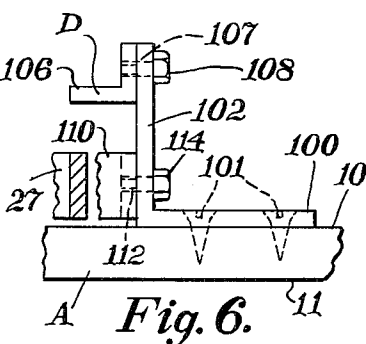
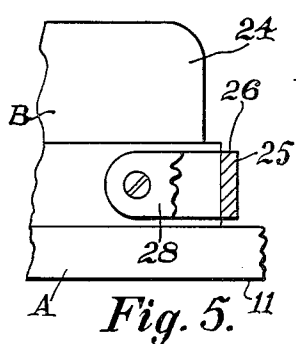
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2,745,672

AUTOMATICALLY RELEASABLE SKI BINDING

Filed Oct. 22, 1951

2 Sheets-Sheet 2



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AUTOMATICALLY RELEASABLE SKI BINDING

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11 Claims. (Cl. 280—11.35)

This invention relates to ski bindings and particularly to ski bindings adapted to release the ski boot from the ski under abnormal stresses and strains.

In downhill skiing it is important that the ski boot be rigidly secured to, and firmly pressed on the ski at both the toe and the heel. However, upon a fall, it is equally important that the ski binding be capable of releasing the connection of the boot to the ski to avoid breaking the bones in the skier's legs.

A number of release devices have heretofore been proposed such as those actuated when the heel of the boot rises to a predetermined angle above the ski, or those actuated only when the boot moves forwardly relative to the ski. To my knowledge there are no release devices which force the heel forwardly into the toe engaging jaws and downwardly against the ski but release the ski boot the instant it has been moved less than an inch sidewise or upwardly with a predetermined amount of force.

It is therefore the principal object of my device to provide a ski binding which forces the boot against the ski but releases the boot not only when the heel is forcibly moved upwardly but also when the heel is forcibly twisted sidewise of the ski.

Another object of my device is to provide a ski binding which releases by a sidewise force of about one half the upward releasing force, and continues to release in that proportion when adjusted for a light or heavy skier.

A further object of my invention is the provision of a spring pressed latch, located close behind and below the heel of the boot and arranged to trip and set the heel free of the ski by movement through an extremely short path such as one half inch or less.

Still further objects of my invention are to provide a ski binding for releasably connecting a ski boot to a ski which will operate even if the ski boot cannot move forwardly on the ski, which does not require redesign and reconstruction of the ski boot and which can be made at low cost and operated with ease by a novice or expert.

In the drawings, Fig. 1 is a side elevation of a ski boot and a portion of a ski showing the preferred form of my new ski binding.

Fig. 2 is a view similar to Fig. 1 showing the ski boot at the instant of release due to upward force on the heel.

Fig. 3 is a plan view of the device shown in Fig. 1.

Fig. 4 is a view similar to Fig. 3 showing the ski boot at the instant of release due to sidewise force on the heel.

Fig. 5 is a fragmentary enlarged side elevation partly in section showing the toe strip used in the preferred form of my invention.

Fig. 6 is an enlarged side elevation, and Fig. 7 is an enlarged rear elevation of the preferred form of toe engaging jaws used in my invention.

Fig. 8 is a view similar to Fig. 1 of a modified form of my device.

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Fig. 9 is a view similar to Fig. 1 of another modification of my device.

Figs. 10 and 11 are fragmentary side elevations of other modified forms of my latch and

Fig. 12 is a fragmentary enlarged plan view on line 12—12 of Fig. 10 showing the curved tip of the latch in the inclined curved channel of the spur.

In the following description and claims I use the term "spur" to mean an element that projects like a spur and which is secured to the heel or integral with the heel. I use the term "latch" to mean a movable element which holds something in place by entering a channel, notch, recess or cavity. I use the term "trip" to mean a device which automatically sets free one element from another, for example, my channeled spur from my spring-pressed latch.

In Figures 1-7 I show the preferred form of my ski binding for releasably connecting the ski boot B to the ski A. Ski boot B is of a well known type and includes an upper 24, a heel 20, a sole 21, a toe portion 23 of the sole 21, and a toe portion 924 of the upper 24. Ski A has an upper surface 10 and a lower surface 11 and may be of any well known type.

I provide toe-engaging jaws D, forwardly disposed of ski A, which cooperate with a metal strip 25, extending around the toe portion 23 of sole 21, to prevent forward, sidewise or upward movement of the toe of ski boot B relative to ski A. As best shown in Figs. 5, 6 and 7, jaws D include a metal plate 100, fixed to the upper surface 10 of ski A by suitable screws 101, and having an upstanding extension 102. A pair of aligned horizontal slots 103 and 104 are oppositely disposed below and on each side of a central, vertical slot 105 in the extension 102 of plate 100. A vertically movable L-shaped lug 106, is slidably mounted for positioning at the correct height in slot 105, by means of bolt 107 and nut 108, to engage the central portion 26 of strip 25. A pair of horizontally movable L-shaped lugs 109 and 110 are adjustably mounted for positioning at the correct transverse distance in their horizontal slots 103 or 104, by bolts 111, 112 and nuts such as 114 to engage the opposite sides 27, 28 of strip 25 or sole 21 of boot B. Lugs 109 and 110 thus prevent sidewise motion, lug 106 prevents upward motion and the extension 102 prevents forward motion of the toe of boot B and it will be apparent that the toe of boot B can easily be withdrawn from the rear of the toe engaging jaws D.

To the heel 20 of ski boot B, I attach by means of screws 50 a spur carrying member C including a curved metal strip having holes 51, 51 therein for screws 50. Projecting rearwardly from proximate the centre of member C is an integral protuberance or spur 52 provided with a rearwardly and downwardly inclined surface 53. As best shown in Fig. 4, a channel 54 extends longitudinally of surface 53 of protuberance 52 and is of arcuate or curved cross section to form an elongated, inclined recess 55, with raised shoulders 56 and 57 on each opposite side of the recess. The angle of inclination of channel 54 is preferably about 45°.

The preferred form of latch mechanism of my device is shown at E and includes a frame base plate 150, having longitudinal slots 151, 151 therein for the screws 152 by which it is slidably fixed to upper surface 10 of ski A. A pair of integral upstanding ears 252, 252 are provided for a horizontal pivot 153, transverse to the ski and located just behind and below the protuberance 52 of member C on boot B. A T-shaped latch 154, having a pair of depending ears 155, 155 is pivotally mounted at 156, 156 on pivot 153 and is provided with a forwardly extending arm 157 and a rearwardly extending arm 158. The tip 159, of arm 157 is curved to conform to the curved cross section of recess 55, and is engaged in the recess when in

latched position as shown in Figs. 1 and 3. Latch 154 thus extends from the tip 159 rearwardly and upwardly to a point 160 above the pivot 153 and then extends downwardly to the pivot 153.

An integral upstanding ear 161 is provided rearwardly of plate 150, having a hole 162 for the bolt 163 of a spring tongue 164 and spring plate 165 whereby the tongue and plate can be adjustably positioned by nuts 166, 167. Arm 158 of latch E is bent downwardly to form a spring tongue, corresponding to tongue 164, and both tongues are encircled by a coil spring 169 which in turn is encircled by a more powerful coil spring 170. An operating lever 171 is welded or otherwise secured to latch 154 partially covering springs 169, 170 and arranged to raise the tip 159 when downward pressure is applied to the upper surface of 171, for example by the foot of the operator.

As indicated in Fig. 1, my toe-engaging jaws D hold the forward part of ski boot B securely on ski A while the pressure of tip 159 of latch E exerted downwardly and forwardly on recess 55 of spur 52 by springs 169 and 170 holds the heel 20 of ski boot B securely on ski A for ordinary down hill running. In the event of an abnormal force tending to lift heel 20 from surface 10 of ski A and amounting to a predetermined force capable of compressing springs 169 and 170, such as 200 pounds, spur 52 rises against the pressure of the springs and causes tip 159 to disengage from recess 55 as shown in Fig. 2. The heel 20 is thus disengaged by the trip latch E upon rising only a comparatively short distance amounting to about half the height of inclined recess 55 and the ski boot B is released from connection with jaws D and ski A.

The curve of tip 159 and channel or recess 55, as shown in Fig. 4, is such that the curved shoulders 56 and 57 will also lift tip 159 and move sidewise out from under the same at a predetermined force exerted by heel 20 and spur 52. I have discovered that when, as suggested above, springs 169 and 170 are adjusted to yield and release channel 55 upon an upward force from the spur of about 200 pounds, the channel 55 and shoulders 56, 57 should be of such curve and height as to cause springs 169, 170 to yield and release upon a sidewise force from the spur of about one hundred pounds. This proportion of about two to one holds true for skiers of various weights and muscular strength, so that a ski binding as above described can have its springs 169, 170 so adjusted by nuts 166, 167 that it will release on an upward force of one hundred pounds or a sidewise force of fifty pounds.

I prefer to provide with my ski binding, an antifriction device F including a strip of metal 200 bent back upon itself at 201 and fixed transversely of ski A by screws 202 below the rear portion of heel 20. Also included in antifriction device F is a metal plate 204, positioned flatwise on ski A with its forward portion 205 pivoted for sidewise movement on a pivot 206 and its rearward portion 206 slidably contacting part 201 of strip 200, heel 20 rests on the rearward portion 206 of pivoted plate 204 and thus cannot freeze to the ski A as sometimes occurs with ordinary ski bindings.

In operation, a ski boot B, to which have been added my toe strip 25 and spur-carrying member C, is placed in the binding toe first in order that strip 25 will enter toe engaging jaws D. The other ski boot of the operator, is placed on operating lever 171 of latch E and downward pressure is exerted thereon to lift tip 159 against the pressure of springs 169, 170. Heel 20 is then lowered onto pivoted plate 204, bringing spur 52 into position whereby tip 159 of latch E may be released and engaged in recess 55.

The essence of my invention is the combination of toe engaging jaws, a recess or cavity with curved shoulders in the heel portion of the boot and a spring-pressed transversely pivoted trip latch having a curved tip engaged in the recess or cavity, the latch being arranged to trip at a predetermined amount of upward or sidewise pressure from the heel portion. In Figs. 8, 9, 10 and 12, I show

other embodiments of my invention all of which include the essentials of the above described combination.

In Fig. 8, a ski boot B is provided with a spur carrying member C and the latch 300 has a tip 301, depending arms such as 302, and a pivot 304, similar to latch E. A base plate 305 fixed to ski A by screws 306 includes a pair of upstanding arms such as 307 to support pivot 304. A rearwardly and upwardly extending lever 308 is integral with latch 300 and is adjustably engaged in the coils of spring 309 by a loop 310. Spring 309 is adjustably attached to ski A by a similar loop 311, fastened to the ski by a screw 312. Spring 309 can thus be revolved in the loops 310, 311 to provide various adjustments of pressure on lever 308.

Instead of antifriction device such as F, I may use a transverse metal bar 350, fixed to a base plate 351 and secured to ski A by screws 352 through holes 353 in plate 351. A metal heel plate 355 is fixed to heel 20 of boot B by screws 356 in holes 357 and plate 351 slides on bar 350 to permit easy sidewise movement. Instead of toe engaging jaws such as D, I may use a one piece toe member 370, having its base 371 secured to ski A by screws 372 and having a pair of upstanding side elements such as 373 and a central upstanding forward element 374, back turned at 375.

In Fig. 9, I show a longitudinal inclined recess 400 formed in the rear of a heel 401 of a ski boot 402, the recess 400 having a curved cross section and curved shoulders similar to recess 55 of spur 52. While such a recess will operate satisfactorily in my ski binding, it involves the making of a special heel of metal, or similar strong material, and I prefer to use a spur carrying member such as C which can be attached to ski boots of any type. In place of coil springs such as 169, 170 or 309 and in place of operating levers such as 171 or 308 I may provide a leaf spring 450, fixed to a latch such as 451 by suitable means such as rivets 452 and extending rearwardly and downwardly to an upturned portion 453 in contact with surface 10 of ski A. Downward pressure on spring 450, proximate point 454 releases latch 451 from recess 400 in the same manner as in the other embodiments illustrated herein.

In Fig. 10 I show a latch 500 having its tip 501 engaged in a recess 502 in a spur 503 on heel 504 of a ski boot 505. Latch 500 extends rearwardly and upwardly from tip 501 to a point 506 and thence a pair of downwardly depending arms such as 507 extend to a transverse pivot 508. Pivot 508 is supported in a pair of upstanding arms such as 509 on a base plate 510 secured to ski A by screws 511. A coil spring 512 encircles pivot 508 and one end thereof at 513 is secured to an arm such as 509 while the opposite end thereof, at 514, is secured to an arm such as 507 of latch 500. As indicated in dotted lines, I may also provide a lever 515 for latch 500 similar to lever 308 of latch 300.

In Fig. 11, I show a latch 550 which may be of any of the types illustrated in the drawings for example, that shown in Fig. 8, having a coil spring at the end of the operating lever. In place of a curved or arcuate tip such as 159, I show a roller 551 having its curved or arcuate surface engaged in the curved recess 552 of a spur such as 553. Roller 551 is revolvably mounted on a pivot 554 carried by arms 555 and 556 mounted on latch 550.

It is obvious that various changes and modifications can be made in the above embodiments of my invention without departing from the spirit of the invention as defined in the following claims.

For example, in Fig. 12, I show a cross sectional view of the curved tip 501 of a latch such as 500 engaged in a similarly curved recess 502 of a spur such as 503. This figure is typical of all of the embodiments of my device to illustrate the inclined channel and curved shoulders of the spur in relation to the curved tip of the latch.

It will be obvious that the curves shown in Fig. 12 are

typical only and can be varied to achieve varied releasing pressures without departing from the spirit of my invention.

I claim:

1. In a ski binding arranged to releasably connect a ski boot to a ski the combination of toe engaging jaws, fixed to said ski, adapted to permit only rearward movement of the boot toe relative to said ski; a metal spur, fixed centrally of the heel portion of said boot; a downwardly and rearwardly inclined upper surface on said spur; a concave channel of uniform curved cross section, extending longitudinally along the central portion of the inclined upper surface of said spur; a spring-pressed latch horizontally pivoted to said ski, slightly rearward of said spur, said latch extending rearwardly and upwardly from its free end to a point above said pivot and thence extending downwardly to said pivot and a convex tip, at the free end of said latch, curved to conform to and engaged in the curved concave channel of said spur.

2. A ski binding as specified in claim 1 wherein said latch is spring-pressed into engagement with the curved channel in said spur by a coil spring, said coil spring having its lower end fixed to said ski in rear of said pivot and thence extending forwardly and upwardly at an acute angle with its upper end operatively connected to said latch above said pivot for pressing said latch downwardly and forwardly around its pivot.

3. A ski binding as specified in claim 1 wherein the tip of said latch is a roller having a circumference conforming to the curved channel of said spur.

4. A ski binding as specified in claim 1 wherein the latch includes an extension of spring metal, extending rearwardly from a point above said pivot and thence downwardly into sliding engagement of its free end with the upper surface of said ski.

5. A combination as specified in claim 1 plus a narrow metal rib fixed transversely to said ski below the rear of said heel and an elongated heel supporting metal plate, vertically pivoted in the longitudinal centre line of the ski in front of said heel, and having its rear lower surface arranged to slide transversely on said metal rib.

6. A combination as specified in claim 1 plus a narrow metal bar of round cross section fixed transversely to said ski below the rear of said heel and a metal plate attached to said heel and adapted to slide transversely on said bar.

7. A ski binding as specified in claim 1 wherein the toe engaging jaws include an upstanding plate fixed transversely of the ski, said plate having two oppositely disposed transverse slots and a central vertical slot, and having a rearwardly extending lug adjustably positioned in each slot to form an upper jaw and oppositely disposed side jaws.

8. A ski binding for releasably connecting a ski boot to a ski, said binding comprising toe clamping means fixed to the boot toe portion of the ski for holding the

boot toe against movement relative to the ski except in a rearward direction and heel clamping means including a frame fixed to the boot heel portion of the ski, said frame having a pivot pin extending transversely of the ski, a rigid latch pivotally mounted at one end on said pivot pin and having a convexly curved terminal tip surface at a free end thereof, a spring operatively connected to said latch for continually urging the free end thereof around said pin as an axis of rotation in an arcuate path having both forward and downward components relative to said ski and an inclined surface having a concave groove with convex shoulders on each opposite side thereof formed at the rear centre of the heel portion of the boot, said groove conforming to the shape of the curved surface of said latch to receive the same and said groove and shoulders being inclined downwardly and rearwardly of said ski when the boot heel rests on the ski.

9. A ski binding as specified in claim 8 wherein said pivot pin is approximately at the level of said groove and said rigid latch extends upwardly and forwardly from said pivot pin and then extends downwardly and forwardly with the tip of its free end engaged proximate the top of said groove when the boot heel rests on the upper surface of the ski.

10. A ski binding as specified in claim 8 wherein said latch is of generally T shape and pivoted on said pivot pin at the base of the T, the terminal tip of one arm of said T having said convexly curved surface and the other arm of said T being constantly urged in an upward arc around said pin by said spring.

11. A ski binding as specified in claim 8 wherein the shoulders on each opposite side of said groove are shaped to lift the tip of said latch and slide from thereunder upon a laterally exerted force approximately one half the amount of the upwardly exerted force required to lift said latch and slide said groove from thereunder.

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