

Jan. 6, 1959

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SAFETY SKI BINDING

2,867,447

Filed Aug. 15, 1955

2 Sheets-Sheet 1

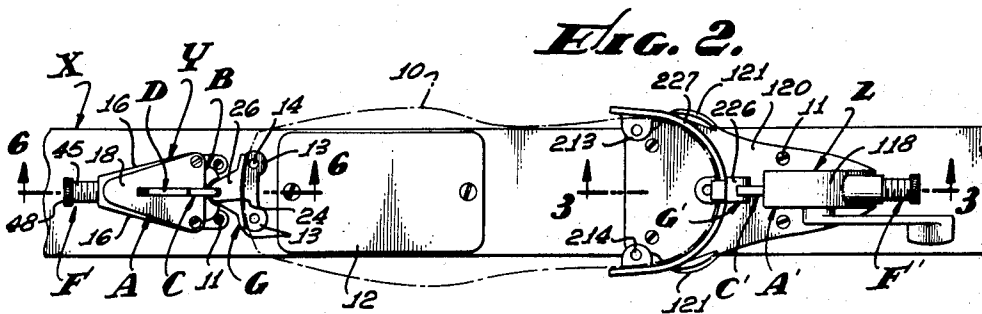
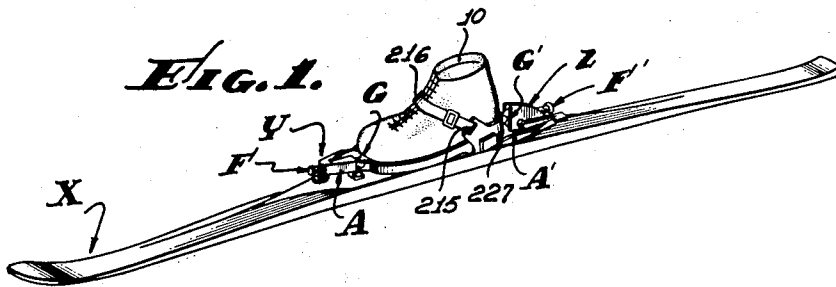
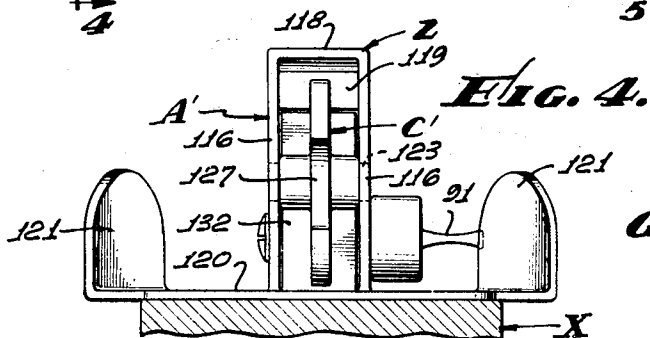
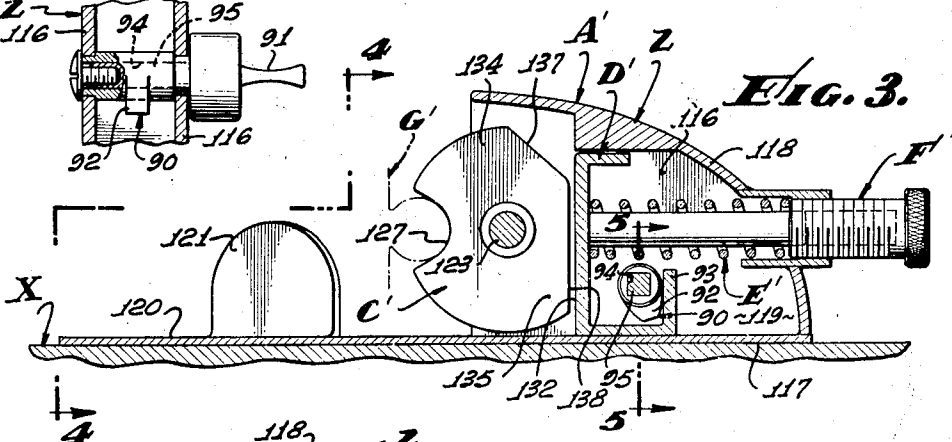
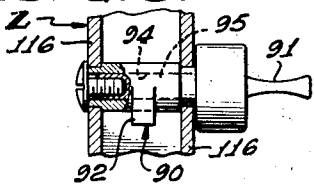


Fig. 5.



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2,867,447

SAFETY SKI BINDING

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Application August 15, 1955, Serial No. 528,200

5 Claims. (Cl. 280—11.35)

This invention relates to a safety ski binding and is particularly concerned with a boot or foot releasing mechanism for skis, it being a general object of the invention to provide an adjustable apparatus for application to skis in order to bind the boot or foot to the ski so that it is releasable when excessive strains are applied.

The sport of skiing is widespread and various devices and systems have been provided to release the boot or foot of the skier from the ski when excessive strains are encountered. However, such devices are apparently not altogether satisfactory since injury to persons still occur when using such devices. The devices referred to are not universal in action, and, therefore, release the boot or foot only under certain conditions. It is, therefore, an object of this invention to provide a ski binding having universal action. That is, a binding that is sensitive to release in a horizontal as well as in a vertical plane.

Another object of this invention is to provide a toe binding that is adjustable to release at the desired pressure and in a horizontal as well as vertical plane. For example, the binding provided by this invention releases the toe of the boot from either side of the ski and from the top thereof.

It is still another object of this invention to provide a heel binding that is adjustable to release at the desired pressure in a vertical plane. For example, the heel binding releases the boot so that it is free to move upwardly from the top of the ski.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of my invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a perspective drawing of a typical ski and the bindings provided by the present invention. Fig. 2 is an enlarged detailed plan view of the bindings and the ski shown in Fig. 1. Fig. 3 is an enlarged sectional view taken as indicated by line 3—3 on Fig. 2. Fig. 4 is a view taken as indicated by line 4—4 on Fig. 3. Fig. 5 is a sectional view of a portion of the structure taken as indicated by line 5—5 on Fig. 3. Fig. 6 is an enlarged detailed sectional view taken as indicated by line 6—6 on Fig. 2. Fig. 7 is a sectional view taken as indicated by line 7—7 on Fig. 6. Fig. 8 is a view taken as indicated by line 8—8 on Fig. 6, and Figs. 9 and 10 are perspective views illustrating the toe and heel fittings that I have provided and which are applied to the boot of the skier and which cooperate with the binding elements that are applied to the skis in accordance with the invention.

The present invention has to do with releasably securing the boot or foot of the skier to the ski in a manner that is safe in that the boot is automatically released from the ski at a set predetermined pressure. With the binding that I have provided, the mechanisms in the toe and heel of the boot are individually adjustable and can be set to release at a point which is below the danger point

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so that the skier's person is protected from injury. The binding that I have provided may be the same for each ski, right or left, and in the drawings I have illustrated the typical ski X utilizing the binding of the present invention which involves, generally, a toe binding Y and a heel binding Z. The boot 10 as shown in Fig. 1 of the drawings is secured to the central portion of the ski X by means of the bindings Y and Z. The bindings Y and Z are held in place on the ski X by means of screw fasteners 11 or the like and a suitable sole plate 12 may be provided to occur between the bindings Y and Z as clearly shown in Fig. 2.

The toe binding Y that I have provided involves, generally, a housing A, a horizontal cam B, a vertical cam C, a cam follower D operating the cams B and C, a pressure exerting means E, an adjusting means F and a toe lug G. The pressure exerting means E is a variable means and is under control of the adjusting means F, and the toe lug G is adapted to be secured to the boot 10 at the toe thereof to project forwardly therefrom and to be engaged with the cams B and C.

In Fig. 9 of the drawings, I have illustrated a typical toe lug G that involves a forwardly projecting vertically disposed circular wall 25 engageable with the cam B and a top horizontally disposed flat wall 26 engageable with the cam C. Suitable laterally extending ears 13 are provided on the lug G and are provided with openings 14 to receive screw fasteners or the like for securing the lug G to the toe of the boot 10.

The housing A of the binding Y may vary widely in size and proportioning, and as shown, is generally triangular in plan configuration having a vertically disposed rear wall 15, forwardly converging side walls 16 and a bottom 17. A cover plate 18 fits over the top of the housing A. As shown in Fig. 7 of the drawings, a chamber 19 is established within the walls of the housing for enclosing the mechanism of the binding Y and suitable flanges 10 are provided with openings 21 to receive the fasteners 11 for securing the binding Y to the ski X. In practice, the binding Y is secured to the ski so that the rear wall 15 thereof is at the toe end of the boot 10.

In accordance with the invention, the binding Y is adapted to release the boot 10 under pressure in a horizontal plane. In Figs. 6, 7, and 8, of the drawings, I have illustrated the horizontal cam B that is pivotally carried by the housing A on a vertical axis to swing in a horizontal plane. A vertically disposed pivot pin 22 projects from the bottom 17 and rotatably carries the cam B that projects rearwardly from the housing A to engage with the wall 25 of the lug G. The cam B is provided with an arcuately shaped concave recess 24 to fit with the lug G, and it will be apparent that the cam is free to rotate in a horizontal plane to the end that the lug is shiftable from side to side and engages in the recess 24.

In accordance with the invention, the binding Y is adapted to release the boot 10 under pressure in a vertical plane. In Figs. 6, 7, and 8 of the drawings, I have illustrated the vertical cam C that is pivotally carried by the housing on a horizontally disposed axis to swing in a vertical plane. A horizontally disposed pivot pin 23 is carried by the housing A, preferably by the plate 18 thereof, and rotatably carries the cam C that projects rearwardly from the housing to engage with the wall 26 of the lug G. The cam C is provided with a downwardly faced shoulder 27 engageable with the wall 26 of the lug and it will be apparent that the cam C is free to rotate in a vertical plane to the end that the lug G is shiftable vertically and engages with the shoulder 27.

The cams B and C above described project from the

housing A to extend from the chamber 19 to the exterior of the housing through slots 28 and 29 respectively that are provided in the walls of the housing.

The cam follower D that I have provided to operate the cams B and C, is shiftable longitudinally of the housing A and is carried in the chamber 19. As illustrated, the follower D is guided in the chamber 19 and is provided with ears 30 that are slidably engaged in guideways 31 so that the follower D is free to shift forwardly and rearwardly in the housing. The follower D is characterized by a flat vertically disposed cam engaging face 32 that faces rearwardly.

As clearly shown in Figs. 6 and 7 of the drawings, the cam B has a pair of follower engaging lobes 34 and 35 and the cam C has a follower engaging lobe 36. The cam lobes 34, 35, and 36 are at the forward sides of the cams and have flat faces 37, 38, and 39, respectively, engageable with the follower face 32 to normally position the parts as shown throughout the drawings. The lobes 34 and 35 occur one at each side of the cam B with the faces 37 and 38 joined together at the center of the cam to form a straight line so that with the faces 37 and 38 engaged with the face 32, the parts are positioned as shown in Fig. 7. The lobe 36 occurs at the top of the cam C above the pivotal axis thereof with the face 39 engaged with the face 32 when the parts are positioned as shown in Fig. 6. From the foregoing, it will be apparent that the lateral or upward movement of the lug G will tend to rotate the cams B or C to cause the follower D to shift forward by action of the lobes 34, 35, and 36 on the follower face 32.

The pressure exerting means E is provided to bias the follower D in order to yieldingly urge the follower into pressure engagement with the lobes of the cams B and C. The means E is preferably a spring means and as shown, involves a compression spring 40 carried on a guide 41 that projects forwardly from the follower D. A suitable spacer 42 establishes the desired initial spacing tension as circumstances require.

The adjusting means F is provided to set the pressure exerting means E and is preferably a simple screw means involving a shiftable abutment 45 in the form of a screw threaded into the housing A at the forward end thereof. The abutment 45 has a rear end face 46 that acts to stop and position the forward end of the spring 40. The abutment 45 is threaded into an opening 47 in the housing A and has an operator 48 accessible at the exterior of the housing so that it is engageable by the skier to adjust the mechanism to the desired releasing pressure.

The heel binding Z that I have provided involves, generally, a housing A', a vertical cam C', a cam follower D', operating the cam C', a pressure exerting means E, and adjusting means F', and a heel lug G'. The elements, A', C', D', E', F', and G' of the binding Z correspond generally with the elements, A, C, D, E, F, and G, above described in connection with the binding Y. However, since the binding Z is applied to the opposite end of the boot 10, variations are employed in order to gain the desired features of operation.

In Fig. 10 of the drawings, I have illustrated a typical heel lug G' that involves a rearwardly projecting part with a horizontally disposed circular wall 226 engageable with the cam C'. The lug G' is shown carried by a band 227 that extends around the rear of the heel of the boot 10, there being ears 213 provided with openings 214 to receive screw fasteners or the like for securing the lug G' to the heel of the boot 10. The band 227 is also provided with openings 215 to receive straps 216 that may be employed to extend over the top of the boot to hold the boot down (see Fig. 1). It will be observed that the straps 216 anchor the boot

and foot of the skier directly to the lug G' and to the binding mechanism that is secured to the ski.

The housing A' of the binding Z has vertically disposed side walls 116, a bottom 117, and a top 118. The side walls 116 are spaced parallel walls while the bottom 117 is a flat horizontally disposed element supported by the ski X. The top 118 may be arcuate, as shown, to extend rearwardly and downwardly where it joins with the bottom 117. In the preferred form of the invention, the bottom 117 has a forward extension 120 provided with spaced side ears 121 for laterally positioning the heel of the boot 10. In practice, the binding Z is secured to the ski X by the fasteners 11 so that the forward end of the housing A' is at the heel end of the boot 10.

In accordance with the invention, the binding Z is adapted to release the boot 10 under pressure in a vertical plane. In Figs. 3 and 4 of the drawings, I have illustrated the vertical cam C' that is pivotally carried by the housing A' on a horizontal axis to swing in a vertical plane. A horizontally disposed pivot pin 123 is carried by the housing A' between the side walls 116 thereof and rotatably carries the cam C' which projects forwardly from the housing A' to engage with the wall 226 of the lug G'. The cam C' is provided with a forwardly opening recess 127 engageable with the wall 226 of the lug G'. It will be apparent that the cam C' is free to rotate in a vertical plane on a horizontal axis and engages the cam. The cam C' projects from the open front end of the housing A'.

The cam follower D' is provided to operate the cam C' and is shiftable longitudinally of the body A' and is carried in a chamber 119 within the housing. As illustrated, the follower D' is rectangular in cross sectional configuration and occupies the chamber 119 to engage with parallel portions of the top and bottom walls thereof to be guided thereby. The follower D' is characterized by a flat vertically disposed cam engaging face 132 that faces forwardly and as clearly shown in Fig. 3 of the drawings, the cam C' has two adjacent lobes 134 and 135, each with a flat follower engaging face 137 and 138, respectively. The lobe 135 is related to the recess 127, or is positioned diametrically opposite the recess 127, to hold the said recess in a down position when engaged with the follower (as shown) while the lobe 134 is positioned above the lobe 135 so that when the lobe 134 is engaged by the follower D' the recess 127 is in an up position. With the faces 137 and 138 related as shown, there is a raised portion between the lobes of the cam C' that resists movement of the cam between the two positions above referred to.

The pressure exerting means E' and the adjusting means F' may be identical with the means E and F hereinabove described.

In addition to the foregoing elements, the binding Z may also involve a follower shifting cam 90 and a manually operable lever 91. The cam 90 is rotatably carried between the walls 116 of the housing and has a lobe 92 engageable with a projection 93 on the follower D' so that when the cam 90 is rotated, the lobe acts against the projection 93 to shift the follower D' rearwardly and away from the cam C'. A keyed or polygonal opening 94 extends through the cam 90 and the lever 91 is provided with a keyed or polygonal shaft 95 that extends through the cam so that when the lever is lifted or depressed as the case may be, the cam is rotated to shift the follower D'. It will be apparent that the shaft 92 may be inserted through the cam 90 from either side thereof in order to provide both right and left hand installations of the lever.

From the foregoing, it will be apparent that I have provided an extremely simple and reliable ski binding which has universal action in that the boot 10 of the skier is releasable both at the toe and heel thereof and in both horizontal and vertical planes. With the structure described, pressure of the boot and lugs against the bind-

ing mechanisms does not affect the releasing characteristics thereof. The toe and heel of the boot are individually releasable at any desired predetermined pressure, depending upon the setting of the pressure exerting means that I have provided. In practice, the cams of the binding Y are tightly engaged by the follower in order to eliminate play. However, the cam of the heel binding may be held spaced from the follower in order to establish the desired amount of play allowing the heel of the boot to be raised slightly from the ski. When it is desired to release the boot or foot from the binding, it is merely necessary to operate the cam 90 so that the cam C' is free to rotate. As the lug G' leaves the heel binding, the cam C' may be left in a position with the lobe 134 engaged with the follower 132 to the end that the recess is in an up position to again receive the lug G' when the skier wishes to re-enter the binding. That is, the skier merely steps into the binding by first placing the toe lug G in place and then putting his weight on the heel lug G'.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims:

Having described my invention, I claim:

1. In combination, a toe binding for releasably securing the toe of a boot to a ski, and including, a toe lug projecting from the boot, a housing carried by the ski adjacent the toe end of the boot, a horizontally disposed cam rotatably carried by the housing on a vertical perpendicular axis and with a recess engaged with the lug, and a spring biased follower with a flat face and operating the cam, said cam having laterally spaced lobes with straight aligned faces engaging said follower face to normally position the recess to retain the toe of the boot in position on the ski, and a heel binding for releasably securing the heel of the boot to the ski and including, a heel lug projecting from the boot, a housing carried by the ski adjacent the heel end of the boot, a vertically disposed cam rotatably carried by the housing on a horizontal transverse axis and with a recess engaged with the lug, and a spring biased follower with a flat face engaged with the cam, said cam having a lobe with a face engaging said follower face to normally position the recess to retain the heel of the boot in position on the ski.

2. In combination, a toe binding for releasably securing the toe of a boot to a ski, and including, a toe lug projecting from the boot, a housing carried by the ski adjacent the toe end of the boot, a vertically disposed cam rotatably carried by the housing on a horizontal transverse axis and with a recess engaged with the lug, a horizontally disposed cam rotatably carried by the housing on a vertical perpendicular axis and with a recess engaged with the lug, each cam having a lobe, and a spring biased follower with a flat face engaged with said lobes to resist turning of the cams, and a heel binding

for releasably securing the heel of the boot to the ski and including, a heel lug projecting from the boot, a housing carried by the ski adjacent the heel end of the boot, a vertically disposed cam rotatably carried by the housing on a horizontal transverse axis and with a recess engaged with the lug and having a lobe, and a spring biased follower with a flat face engaged with said lobe to resist turning of the cam, said lobe being engaged by the follower to normally position the cam to retain the heel of the boot in position on the ski.

3. A binding for releasably securing a boot to a ski, including, a lug projecting from the boot, a housing carried by the ski adjacent one end of the boot, a cam rotatably carried by the housing on a vertical perpendicular axis and with a recess engaged with the lug, and a spring biased follower with a flat face and operating the cam, said cam having laterally spaced lobes with straight aligned faces engaging said follower face to normally position the recess to retain the boot in position on the ski.

4. A binding for releasably securing a boot to a ski, including, a lug projecting from the boot, a housing carried by the ski adjacent the end of the boot, a vertically disposed cam rotatably carried by the housing on a horizontal transverse axis and with a recess engaged with the lug, a horizontally disposed cam rotatably carried by the housing on a vertical perpendicular axis and with a recess engaged with the lug, each cam having a lobe, and a spring biased follower with a flat face engaged with said lobes to resist turning of the cams.

5. A binding for releasably securing a boot to a ski, including, a lug projecting from the boot, a housing carried by the ski adjacent the end of the boot, a vertically disposed cam rotatably carried by the housing on a horizontal transverse axis and with a recess engaged with the lug, a horizontally disposed cam rotatably carried by the housing on a vertical perpendicular axis and with a recess engaged with the lug, and a spring biased follower with a flat face and operating the cams, each of said cams having lobes engaging said follower face to normally position the cams to retain the boot in position on the ski.

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