

- [54] **SKI BINDING APPARATUS AND METHOD
OF MOUNTING**
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280/11.35 T**
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11.35 D, 11.35 E, 11.35 Z, 11.35 V**

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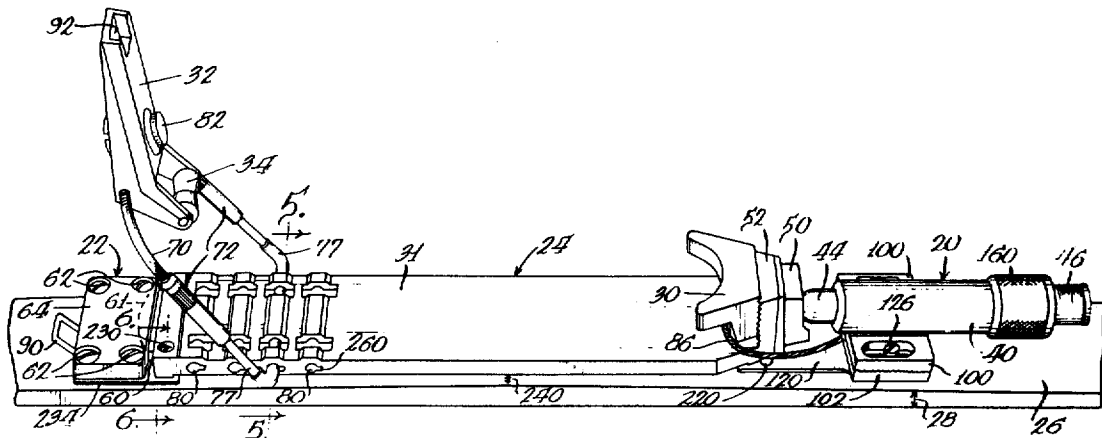
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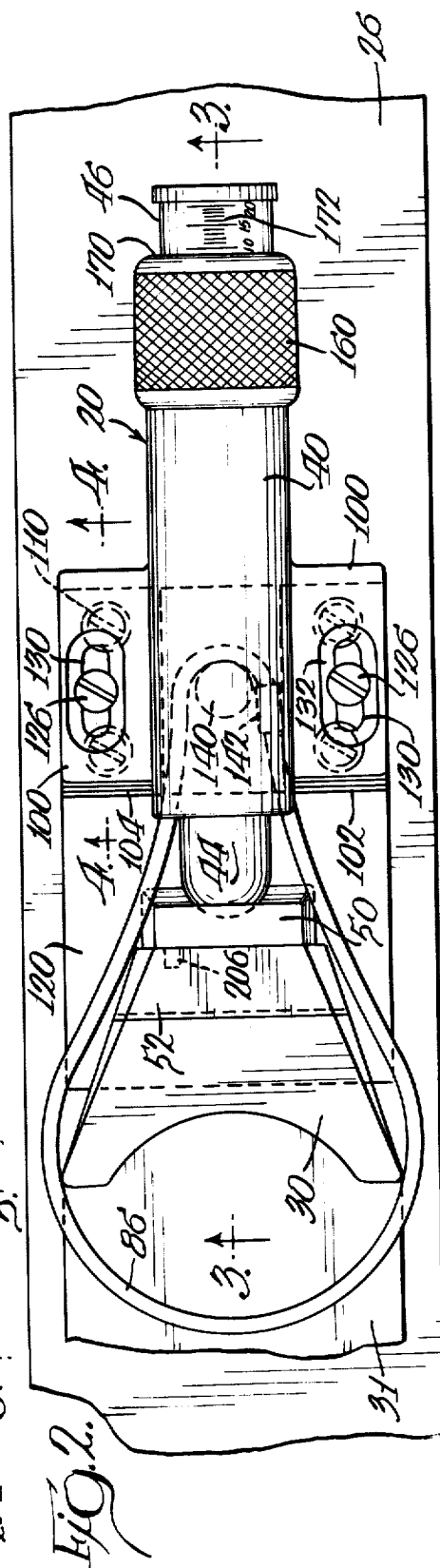
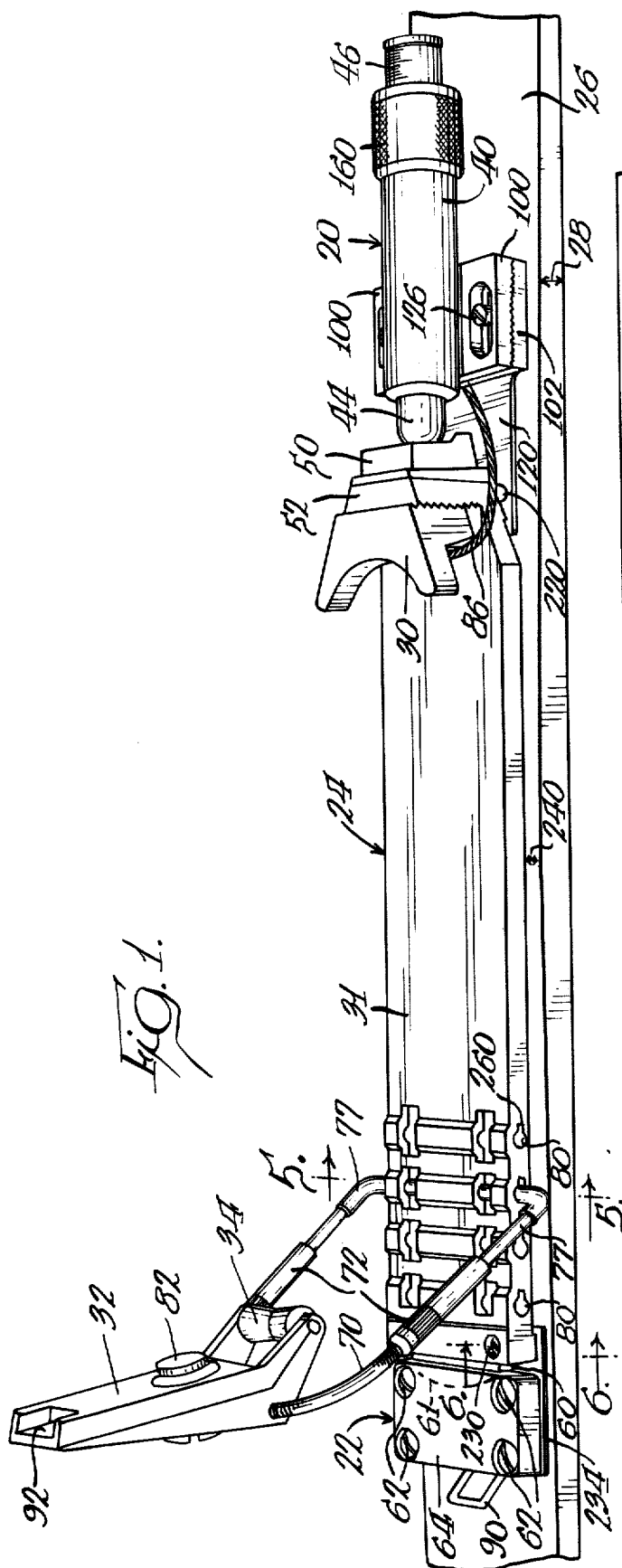
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[57] **ABSTRACT**

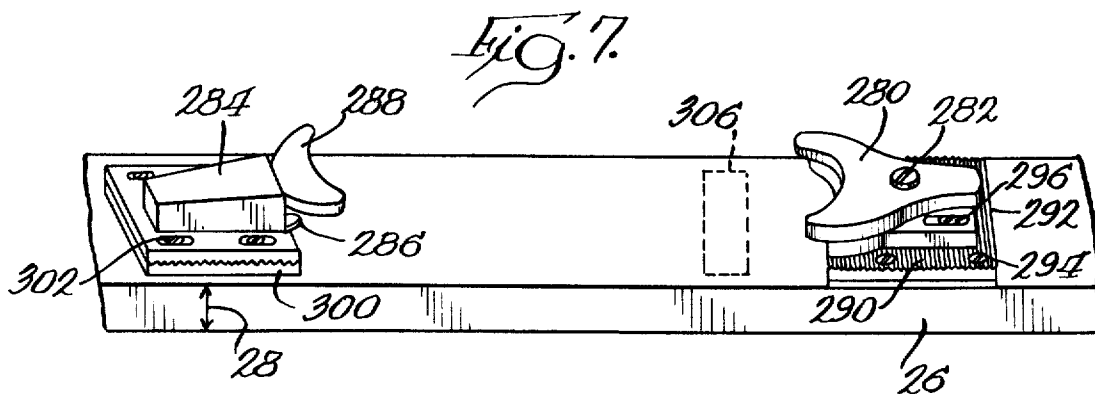
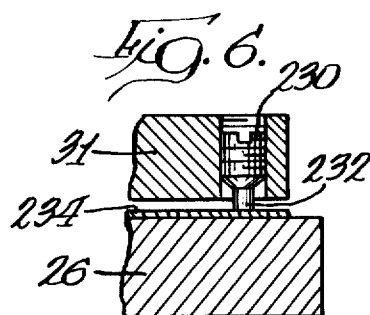
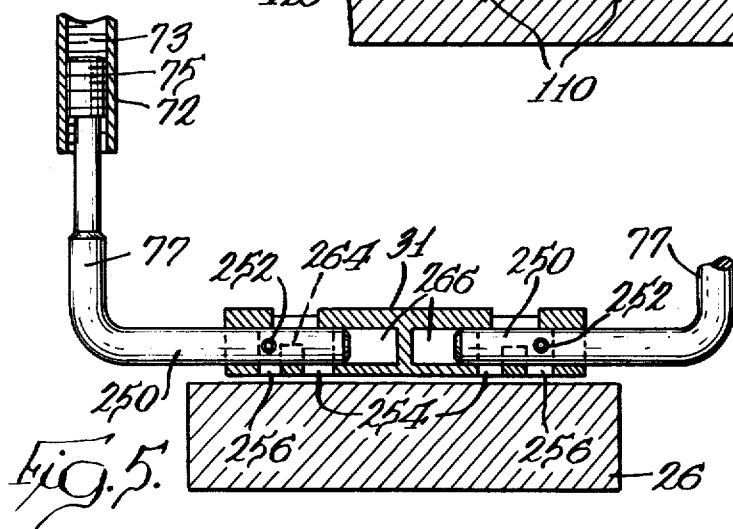
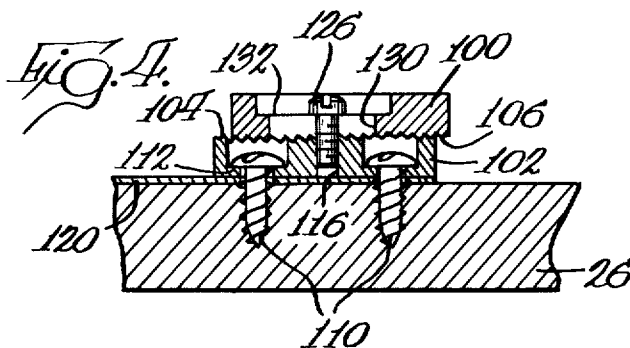
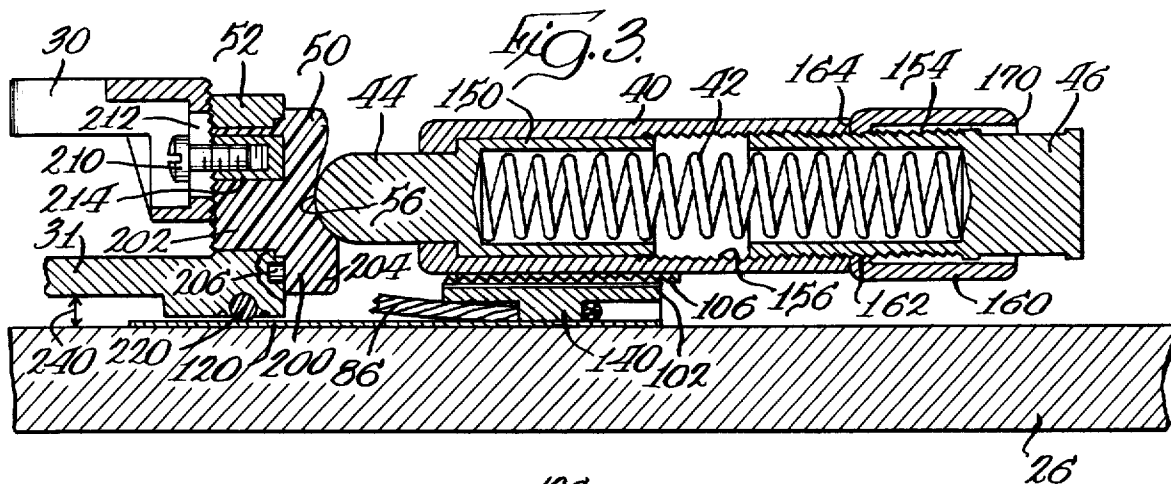
A spring biased toe unit urges a sole plate against a rear heel retainer plate. The sole plate includes a heel lever for releasably locking a ski boot heel, and having arms cooperating with adjustment holes to provide length and width adjustments. The toe unit includes a lower serrated plate, which may be factory mounted and allows flat shipment of a ski with a partially pre-mounted ski binding, and a detachable upper serrated housing which mates with the lower plate at selectable longitudinal detented positions. The upper housing, attached after shipment of the premounted ski, includes a spring biased release pin with pressure settings selectable by movement of an adjustment screw, and a lock sleeve for locking the adjustment screw and cooperating therewith to visually indicate spring pressure.

19 Claims, 7 Drawing Figures





SHEET 2 OF 2



SKI BINDING APPARATUS AND METHOD OF MOUNTING

BACKGROUND OF THE INVENTION

This invention relates to ski bindings having improved adjustable means for adapting the bindings to a particular ski boot.

Mounting a ski binding to a ski generally requires the use of templates, or careful measurements which, if not properly made, may result in defeating the safety release function of the binding, or in degraded performance. For these reasons, bindings are generally mounted by experienced personnel in a ski shop or in a specialty ski binding mounting shop. Many problems could be eliminated if a ski manufacturer could pre-mount a ski binding directly at a ski factory. This would be especially advantageous, for example, when skis are purchased as a part of a rental package program. However, the bulk of a mounted ski binding increases the cost of shipping the product.

Although some ski bindings have used detachable parts, and thus could be partially mounted at a ski factory, the lower parts secured to a ski have been unduly bulky, and generally have had extending posts of sufficient height to require special shipping containers for the skis. Furthermore, the upper parts have not provided for a plurality of detented mounting positions to compensate for manufacturing tolerances and substantially different boot sizes. During skiing, considerable forces are exerted against a ski binding, and prior release bindings which provide some longitudinal adjustments have a tendency to work loose and cause inadvertent release.

Most ski bindings provide for adjustable release pressure by movement of a screw which changes the pressure of a compressed spring bearing against a release pin. During skiing, forces which are generated can dislodge the adjustment screw and undesirably change the preset release pressure. To overcome this problem, some ski bindings have provided a limited number of detented pressure settings, even though such structure is not as versatile as a continuous pressure adjustment. Bindings with release pressure adjustments which are easily changed while on a ski slope have been too likely to change settings due to normal skiing forces. Release units which have been satisfactory in holding a preset pressure often incorporate an internal adjustment structure, or are otherwise difficult to change on a ski slope.

Other problems have existed with the adjustable elements of a ski binding. A quick release type heel hold-down lever, which is movable to compensate for ski boots of different longitudinal and lateral dimensions, has not been provided without unnecessary weakening of the arm structure for retaining the heel lever. Other problems have occurred due to wear of the sliding elements which allow release, and wear or undesirable movement of elements which mate therewith.

SUMMARY OF THE INVENTION

In accordance with the present invention, the problems noted above with respect to prior ski bindings have been overcome. The applicant's toe release unit is comprised of two detachable parts, the lower part being a substantially flat plate which can be pre-mounted at a ski factory, along with a heel retainer

plate. Since both the lower mounting plate and the rear heel retainer plate have a height substantially less than the height of a typical ski, the ski with premounted plates can be shipped in the original ski shipping container, with the remaining parts of the ski binding being shipped separately. After shipment, the upper part of the toe release unit is readily attachable to the lower plate at any one of several detented longitudinal positions. Each position is detented by clamping together opposed serrated surfaces. Substantially different boot sizes can be accommodated by changing the length of the sole plate which extends between the toe and heel units.

The pressure setting of the release unit is externally adjustable by rotation of an adjustment screw extending through a lock sleeve which locks the adjustment screw and, with the lock sleeve, provides a visual indication of the release pressure. On a ski slope, the release pressure can be readily changed by releasing the lock sleeve, adjusting the pressure screw, and then re-locking the new release setting.

Various adjustable elements of the ski binding have been improved over prior ski binding having similar adjustments. For example, a heel hold-down lever is longitudinally and laterally adjustable, without weakening the strength of retainer arms which couple the heel lever to a sole plate.

One object of this invention is the provision of an improved ski binding having a detachable release unit which allows factory mounting of critical elements, flat shipment of premounted skis, and final assembly along a plurality of detented mounting positions.

Another object of this invention is the provision of a ski binding having an improved spring biased release unit with a lock sleeve for selectively locking a pressure adjustment and for cooperating therewith to form a visual pressure indicator.

Other objects and features of the invention will be apparent from the following description, and from the drawings. While illustrative embodiments of the invention are shown in the drawings and will be described in detail herein, the invention is susceptible of embodiment in many different forms and it should be understood that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiments illustrated.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a ski binding using a sole plate, and which incorporates the present invention;

FIG. 2 is a top plan view of the toe portion of the binding of FIG. 1;

FIG. 3 is a sectional view of the toe release unit and cooperating sole plate, taken along lines 3—3 of FIG. 2;

FIG. 4 is another sectional view of the toe release unit, taken along lines 4—4 of FIG. 2;

FIG. 5 is a sectional view of the retaining structure for the heel hold-down lever, taken along lines 5—5 of FIG. 1;

FIG. 6 is a sectional view of one of the bearing adjustment screws for the sole plate, taken along lines 6—6 of FIG. 1; and

FIG. 7 is an alternate embodiment of the invention, as incorporated in a ski binding having a pivoted toe release unit and a step-in heel release unit.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1, a ski binding is illustrated which includes a toe release unit 20, a heel retainer unit 22, and a sole plate unit 24 mounted on a ski 26 having a minimum ski height 28 adjacent the ski binding. Sole plate unit 24 includes a toe ear bracket 30 which is adjustable in height and is set for the thickness of the extending toe portion of a ski boot. The ski boot is releasably secured to a sole plate 31 by a heel lever 32 having a roller 34 which bears against the extending heel portion of the ski boot to clamp it firmly against the sole plate 31.

Toe release unit 20 includes a tubular housing 40 containing a helical pressure spring 42, see FIG. 3, which bears against a release pin 44. The pressure of spring 42 against release pin 44 is variable by movement of an adjustment screw 46 which controls the compressed length of the helical spring 42.

Release pin 44 mates with a release socket or indent 50 mounted within an integral upstanding ear 52 of the sole plate 31. The release indent 50 has a concave arcuate surface contour 56 which controls the pressure necessary to retract the axially restrained pin 44 sufficiently into housing 40 to clear the indent 50 and hence release the sole plate unit 24 from retention on the ski 26.

The pressure of the release pin 44 against the pin indent 50 urges the sole plate unit 24 rearwardly and thus urges a beveled tongue 60 at the rear of the sole plate 31 into engagement with an inclined recess 61 in heel plate 22. The heel plate 22 is mounted to ski 26 by a plurality of screws 62 located in countersunk bores so that an uppermost surface 64 of the plate 22 is flat and has no elements extending thereabove.

Heel lever 32 rotatably grips a cable 70 which terminates in a pair of cylindrical fine adjustment sleeves 72 each having an internal thread 73, see FIG. 5, which engages a screw head 75 attached to an arm 77 movable between a plurality of gross adjustment cylindrical holes 80 formed in the sole plate 31. To longitudinally position the heel lever 32 for a particular ski boot, the ski boot is placed on the sole plate 31 with the toe of the boot under the toe ear bracket 30. The arms 77 are moved between the holes 80 to provide a gross adjustment which places roller 34 of the heel lever immediately adjacent or touching the heel extension of the ski boot. Further longitudinal adjustment is done by rotating the sleeves 72, so that when heel lever 32 is raised, it locks the rear of the boot to the sole plate 31. An adjusting screw 82 controls the distance that lever 32 is offset from the rear of the ski boot.

During skiing, an excessive force on the ski binding will cause the sole plate unit 24 to be released from the release pin 44 and/or from the heel retainer unit 22. The sole plate unit, however, remains attached to the ski boot. A front safety cable 86 retains the sole plate unit 24 to the toe release unit 20, and hence to the ski 26, during a release. A rear safety strap, affixed around the ski boot, may be attached to a ring 90 which is secured to the rear heel unit 22, thus providing two point fixation which prevents the ski 26 from windmilling in a fall.

To reinsert the sole plate unit after a release, the beveled tongue extension 60 of the sole plate 31 is placed in the recess 61 in the rear retainer. The pin indent 50 is placed vertically over the release pin 44, and the skier exerts downward pressure which causes the release pin 44 to retract into the housing 40 and then snap outwardly into the concave pin socket 56. To step out of the entire binding after skiing, the skier places the tip of his ski pole in a recess 92 and exerts downward and outward pressure against the heel lever. The skier can now step out of the ski binding, leaving the sole plate unit 24 retained to the toe and heel units.

The details of the toe release unit 20 will now be described. The tubular housing 40 has extending flanges 100 which detachably mount the upper spring biased release pin assembly to a lower plate 102 which is fixedly secured to the ski 26. The lower plate 102 has an upper surface 104 which is ribbed, toothed, or serrated. This serrated surface meshes with a corresponding ribbed, toothed or serrated lower surface 106 of the flanges 100. Lower plate 102 is secured to ski 26 by four screws 110 having heads which abut a recessed shoulder 112 formed by holes countersunk from the upper surface 104. Between each pair of countersunk holes, an internally located lock means is provided, such as threaded vertical bore 116 which extends from the uppermost surface 104 to a lower ski mounting surface. A polished stainless steel plate 120 is clamped between the lower plate 102 and the ski 26. The polished plate extends rearwardly to form a bearing surface for the sole plate 31 in order to reduce friction during a release.

Each flange 100 is detachably secured to the lower plate 102 by an extending screw 126 which passes through an elongated slot 130 in the flange 100 and into engagement with the lock means, as the threaded bore 116 of the lower plate 102. The slot 130, best seen in FIG. 2, has a rim 132 which is recessed in the flange, for support of the head of the screw 126.

Lower plate 102 has a hollow central channel surrounding a cylindrical knob 140 which extends downwardly into the channel and adjacent or abutting plate 120 to hold a safety cable 86. The safety cable is formed by a length of metal cable whose ends are joined together by a coupling 142, forming a loop which is captured within plate 102 by the knob 140. If desired, a similar structure may be used to retain the ring 90 to the heel retainer unit 22.

The lower plate 102 and the heel retainer plates 64 may be mounted directly to a ski which is to be shipped. The upper surface 104 of the lower plate 102 is substantially flat, and has no extending elements which would require a shipping container of larger size than is normally used to ship the skis without any ski binding attached thereto. The height of the pair of plates 102 and 64 is substantially less than the minimum height 28 of the ski. This construction allows a ski manufacturer to ship the ski 26 with the critical parts of the ski binding premounted due to attachment of the lower plate 102 and the heel plate 64. The remainder of the ski binding may be shipped in a separate container.

After receipt, the upper housing assembly 40 may be mounted to the lower plate 102 by means of the screws 126. The longitudinal position of the upper housing 40 is adjusted so that pin 44 mates with the indent 50 of a sole plate unit 24. Any desired range of release pres-

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asures can be provided by mounting the upper assembly closer to indent 50, thereby forcing pin 44 to be retracted into its housing by preselected distances corresponding to preselected minimum release pressures. As screws 126 are tightened, the serrated or ribbed surfaces 104 and 106 mesh to prevent the forces present during skiing from changing the longitudinal position of the upper release unit. In effect, the serrated or ribbed surfaces, which are in a plane parallel with the axis of the release pin, form a plurality of spaced positions which are detented with respect to the direction of stress along the axis of the release pin.

Release pin 44 is formed by a cylindrical rod extending through a circular bore in the front of the tubular housing 40, and which terminates at one end in a round tip engaging concave socket 56 and at the other end in an internal tubular sleeve 150. The outside diameter of sleeve 150 frictionally engages the inside diameter of a smooth tubular cavity or bore within the housing 40. The sleeve 150 has a longitudinal extent which is a substantial portion of the length of the interior bore, thereby forming a long bearing surface which prevents motion transverse to the longitudinal axis of the pin. The helical spring 42 has one end disposed within the sleeve 150.

Pressure adjustment screw 46 has a longitudinally extending threaded screw surface 154 which meshes with an internal threaded surface 156 of the interior bore. Manual rotation of screw 46 changes the compressed length of the pressure spring 42, thereby varying the pressure setting at which the release pin 44 will retract sufficiently to release the sole plate unit 24. To prevent an inadvertent change in the pressure setting, a lock sleeve 160 surrounds the screw 46. The sleeve 160 has a knurled outer surface and a smooth interior except at one end in which a threaded surface 162 meshes with the screw surface 154. When lock sleeve 160 is rotated into engagement with a stop surface 164 of the tubular housing 40, the sleeve 154 serves as a lock not which prevents rotation of the adjustment screw 46. When a skier desires to change the pressure setting, the lock sleeve 154 is rotated out of engagement with the stop surface 164, allowing screw 46 to be rotated to increase or decrease the pressure of spring 46.

The pressure setting on the release pin is visually indicated by the amount of the screw 46 which extends or is exposed beyond a reference end surface 170 of lock sleeve 160. If desired, a scale 172 may be formed on screw 46, as by placing a series of concentric circles thereon so that the number of exposed concentric circles is inversely proportional to spring pressure.

The structure of the sole plate unit 24 adjacent the toe retainer unit 20 is illustrated in detail in FIG. 3. Indent 50 comprises an enlarged head portion 200 and a reduced diameter neck portion 202 which is snugly fit within a circular bore in the integral ear 52. The concave surface 56 is unsymmetrical so that lateral release (to either side of the release pin 44) requires less pressure than upward release at the toe, by extending the socket 56 further towards the toe unit in the area below the center axis of the pin 44. This is desirable since normal skiing pressures on the toe unit are greater in a vertical than in a lateral direction.

To aid in entering the binding after a release, the head 200 has a center guide recess 204. When the skier centers the guide recess 204 on the pin 44 and presses downwardly, pin 44 will properly snap into the concave

socket 56 located thereabove. To prevent the unsymmetrical concave socket 50 from rotating about the axial direction, and thus changing the release pressure required along various release axes, the head 200 includes an extending finger 206 which is snugly received within a cylindrical bore in the front of the sole plate 31. The finger 206 is offset from the center line of the binding, as seen in FIG. 2.

Toe ear bracket 30 is vertically adjustable in height to compensate for the varying thicknesses of ski boot soles. An adjustment screw 210 extends through an elongated vertical slot 212 in the ear bracket 30 and into engagement with an internally threaded metal insert 214 located in a bore of the neck 202. The surface of ear 52 is ribbed to mate with corresponding ribs on ear bracket 30, to prevent vertical slippage after screw 210 is tightened.

To reduce friction during a release, a Teflon bar 220 is swaggered in the bottom of the sole plate 31. At the opposite heel end of the sole plate 31, a pair of final adjustment screws 230, see FIG. 6, have a Teflon coated shank 232 which rests on a polished stainless steel plate 234 clamped to ski 26 by the heel retainer plate 64. The screws 230 are adjusted to raise the sole plate 31 so that the beveled surface 60, see FIG. 1, is snugly in engagement with the inclined recess 61 formed in the heel retainer plate 64.

When so adjusted, the sole plate 31 is located at a height 240 above the upper ski surface which is a minimum of one-eighth inch or more. This allows the ski 26 to flex between the toe bearing surface (Teflon bar 220) and the heel bearing surface (shanks 232 of screws 230), since the release pin 44 can retract into and extend out of the housing 40 as required to compensate for any change in length caused by curvature of the ski. Improved skiing performance can result, especially with fiberglass skis having cracked edges which allow even stress distribution over the entire length of the ski. Prior sole plate bindings in which a sole plate abuts or is closely spaced to the ski, and non-sole plate type bindings in which the substantially rigid sole of a ski boot rests on or immediately near the ski, have prevented flexure between the toe and heel retaining assemblies.

FIG. 5 illustrates in detail the ski boot width adjust structure for the heel lever retaining arms 77. Each arm 77 has an end rod 250 at right angles to the fine adjustment sleeve 72. A pin 252 extends outward from the rod 250, and is retained within a pair of inner channels 254 or within a pair of outer channels 256, corresponding to a narrow or larger width ski boot, respectively.

When arm 77 is to be inserted into a new hole 80, the pin 252 is aligned with a slot 260, see FIG. 1, formed in the sole plate 31 to allow access to the channels. After insertion, the heel lever 32 is rotated backward to a heel engaging position (as illustrated in FIG. 1). The pin 252 then prevents the arm 77 from being withdrawn, since the pin is not aligned with the slot 260. If a ski boot of lesser width is to be accommodated, the arm 77 is manipulated so as to rotate the pin 252 up and over a center divider 264 which separates the outer channel 256 from the inner channel 254. Again, when the heel lever is returned to its heel engaging position, the pin 252 abuts the divider 264 and prevents the arm 77 from being withdrawn.

The hole 80 extends beyond the inner channel 254 and into an interior cylindrical bore 266 formed by

walls in the center of the sole plate 31. Rod 250 extends beyond pin 252 a sufficient distance so that its end extends into the bore 266 whenever the pin 252 is captured in either of the channels 254 or 256. This forms an inner support for the rod 250, distributing any forces to the sole plate which forms bearing surfaces on both sides of the pin 252. Heretofore, sole plate type bindings which have provided for width adjustment have not distributed the stress on both sides of a retaining pin such as 252. To the contrary, substantially all forces have had to be borne by the outermost section of the sole plate.

Many features of the applicant's invention can be applied to ski bindings which do not use a sole plate. In FIG. 7, for example, certain of the features have been applied to a ski binding using a rotatable toe unit 280, which pivots about an axis 282, and a step-in heel unit 284. The heel unit 284 includes a heel lever 286 against which the sole of a ski boot is placed in order to force a holddown lever 288 downwardly over the upper extension of the heel. As is well known, an excessive stress such as may occur in a forward fall will cause the holddown lever 288 to pop upward, releasing the heel of the ski boot.

In accordance with the present invention, the pivoted toe unit 280 and step-in heel unit 284 incorporate the detachable premounted plate system and mounting method previously described. The toe unit 280 has a lower ribbed surface which meshes with an upper ribbed surface 290 on a lower plate 292, which may be similar to plate 102. Plate 292 is attached to ski 26 through a plurality of recessed screws 294, similar to screws 110. The lower plate 282 includes internally threaded bores into which screws 296 from the toe unit 280 extend in order to clamp the toe unit to the lower plate at a desired longitudinal position. Screws 296 are located in elongated slots, similar to slot 130.

The mounting for heel step-in unit 284 is substantially the same as the toe unit 280. Namely, a lower plate 300 is mounted to ski 26, in the same manner as plate 292, and has a ribbed upper surface which engages a lower ribbed surface of the heel unit 284. A plurality of screws 302 clamp the upper heel unit 284 to the lower plate 300, in the same manner as screw 296. Each screw 302 is located in an elongated slot which allows longitudinal adjustment of the step-in heel unit 284.

Either or both of the plates 292 and 300 may include a post, similar to posts 140, for the purpose of securing a safety strap to the ski 26. If desired, a bearing plate 306 may be mounted at a location corresponding to the ball of a skier's foot, in order to support the ski boot above the surface of the ski 26. The plate 306 could be replaced, however, by any known type of anti-friction device. Other changes will be apparent to those skilled in the art.

I claim:

1. A ski binding for releasably securing a ski boot to a ski, comprising:

lower plate means having an uppermost surface, a recessed shoulder surface, a lower mounting surface which abuts said ski, screw means engaging said shoulder surface for securing said lower plate means to said ski, internal lock means located between said upper and lower surfaces, an open channel extending through the lower plate means, safety loop means disposed in and external to said chan-

nel for retaining the ski binding to the ski boot when the release pressure is exceeded, said lower plate means further including extension means located in said channel for capturing said safety loop means therein,

spring biased pressure means for securing said ski boot to the ski until a release pressure is exceeded, extending means engagable with said internal lock means to detachably secure said spring biased pressure means to said lower plate means, and

said lower plate means and said spring biased pressure means including longitudinal adjust means for establishing a plurality of spaced detent positions for said spring biased pressure means relative to said lower plate means, said extending means engaging said internal lock means to secure said spring biased pressure means to said lower plate means at any preselected one of said plurality of spaced detent positions.

2. A ski binding for releasably securing a ski boot to a ski, comprising:

housing means having a housing threaded surface, a release element disposed at least partly within said housing means and movable to a release position to allow release of the ski boot,

pressure spring means disposed at least partly within said housing means for urging said release element away from said release position,

a cylindrical adjustment screw having a hollow interior with said spring means being disposed at least partly within the hollow interior, said cylindrical adjustment screw having an adjustment threaded surface engaging said housing threaded surface and a head portion extending external to said housing means and manually rotatable for rotating said adjustment threaded surface to vary the pressure of said spring means,

a lock member for selectively preventing and allowing movement of said cylindrical adjustment screw, including a tubular sleeve having a substantial longitudinal extent with an interior spaced from said adjustment threaded surface except for a short extent of an interior lock thread in engagement with said adjustment threaded surface, at least a portion of the lock member being external to said housing means and manually rotatable for rotating said interior lock thread to move an end of said tubular sleeve into engagement with said housing means, thereby preventing movement of said cylindrical adjustment screw.

3. A ski binding for releasably securing a ski boot to a ski, comprising:

housing means having a housing threaded surface and wall means defining an opening contiguous with a cylindrical cavity,

a release pin extending through said opening for coupling to the ski boot and an integral cylindrical sleeve disposed within said cylindrical cavity, said sleeve having a substantial longitudinal extent in sliding engagement with said wall means to confine said release pin for movement solely in a longitudinal direction to a release position to allow release of the ski boot,

pressure spring means disposed at least partly within said cylindrical sleeve for urging said release pin away from said release position,

a cylindrical adjustment screw having a hollow interior with said spring means being disposed at least partly within the hollow interior, said cylindrical adjustment screw having an adjustment threaded surface engaging said housing threaded surface and a head portion extending external to said housing means and manually rotatable for rotating said adjustment threaded surface to vary the pressure of said spring means,

a lock member for selectively preventing and allowing movement of said adjustment screw, including lock thread means in engagement with the threaded surface of one of said housing means and cylindrical adjustment screw, a stop surface movable with rotation of said lock thread means, at least a portion of the lock member being external to said housing means and manually rotatable for rotating said lock means to move said stop surface against the other of said housing means and cylindrical adjustment screw to prevent movement of said cylindrical adjustment screw,

sole plate means with means for releasably securing the ski boot to the sole plate means and arcuate surface socket means in mating engagement with said release pin, the arcuate surface forcing said release pin to extract into said housing means due to movement of said sole plate means, the arcuate surface being nonsymmetrical in order to vary the release pressure necessary for different angles of release, and finger means extending between said socket means and said sole plate means for preventing rotation of said socket means.

4. A ski binding for releasably securing a ski boot to a ski, comprising:

lower plate means having an uppermost surface, a recessed shoulder surface, a lower mounting surface which abuts the ski, screw means engaging said shoulder surface for securing said lower plate means to the ski, internal securing means located between said upper and lower surfaces,

housing means having a housing threaded surface and a flange, longitudinal adjust means for establishing a plurality of different longitudinal positions for said housing means with respect to said lower plate means, and extending means extending from said flange and into engagement with said internal securing means to detachably secure said housing means to said lower plate means at a preselected one of said longitudinal positions,

a release element disposed within said housing means and movable to a release position to allow release of the ski boot,

pressure spring means disposed within said housing means for urging said release element away from said release position,

an adjustment member at least partly external to said housing means and manually rotatable for rotating an adjustment threaded surface which engages said housing threaded surface to move said adjustment member and thereby vary the pressure of said spring means,

a lock member at least partly external to said housing means and manually rotatable for rotating a lock thread means which engages the threaded surface of one of said housing means and adjustment member to move a stop surface against the other of said

housing means and adjustment member to prevent movement of said adjustment member.

5. A ski binding for releasably securing a ski boot to a ski, comprising:

housing means having a housing threaded surface, means to secure the housing means to the ski, a release element disposed within said housing means and movable to a release position, pressure spring means disposed within said housing means for urging said release element away from said release position,

an adjustment member at least partly external to said housing means and manually rotatable for rotating an adjustment threaded surface which engages said housing threaded surface to move said adjustment member and thereby vary the pressure of said spring means,

a lock member at least partly external to said housing means and manually rotatable for rotating a lock thread means which engages the threaded surface of one of said housing means and adjustment member to move a stop surface against the other of said housing means and adjustment member to prevent movement of said adjustment member, and

sole plate means having ear means for supporting one end of the ski boot and lever means for securing the other end of the ski boot to said sole plate means, socket means mated with said release element to release said sole plate means when said release element is moved to the release position, said lever means having arm means laterally adjustable for different width ski boots, first bearing means defining an opening to allow passage of said arm means, second bearing means defining an opening to allow passage of said arm means, channel means located between said first and second bearing means for establishing a plurality of locked positions for said arm means, said arm means being located within both of said first and second bearing means for all of said plurality of locked positions.

6. A ski binding for releasably securing a ski boot to a ski, comprising:

sole plate means releasably securable to the ski boot and including lever means for securing an offset portion of the ski boot to said sole plate means, said lever means having

a pair of arms received on opposite sides of said sole plate means and laterally adjustable to accommodate different width ski boots,

a pair of apertures on the opposite sides of said sole plate means for receiving said pair of arms therein, at least one of said apertures including

a first bearing surface for supporting a first portion of the arm received therein, a second bearing surface laterally spaced from said first bearing surface for supporting a second portion of the arm received therein, width means located between said spaced first and second bearing surfaces for establishing a plurality of locked positions for said arm, the first and second portions of the arm being supported by both said first and second bearing surfaces, respectively, for all of said plurality of locked positions, and

release means for releasably securing said sole plate means to said ski.

7. The ski binding of claim 6 wherein each arm includes a lock element located between the first and sec-

ond portions of the arm, said width means establishing a plurality of lateral positions each of which maintains said lock element within the associated lateral position to establish a particular width adjustment.

8. The ski binding of claim 7 wherein said width means comprises a divider for establishing an outer channel and an inner channel corresponding to said plurality of locked positions, the lock element comprises an extending element which is captured between the divider and the first or second bearing surface to maintain the arm in said outer or inner channel.

9. The ski binding of claim 8 wherein the arm received in said at least one aperture is generally circular in cross section, said one aperture includes a generally circular opening for passing said arm and a slot contiguous with said circular opening for passing said lock element, said arm being manipulated so as to pass the lock element through said slot and over said divider when said lock element is to be captured in said inner channel.

10. The ski binding of claim 6 wherein said sole plate means includes a plurality of said pair of apertures, each pair of apertures being longitudinally spaced along said sole plate means, said pair of arms being removable from one of said pair of apertures and insertable into a different of said pair of apertures to longitudinally move said lever means with respect to said sole plate means.

11. The ski binding of claim 10 wherein said lever means includes an adjustment sleeve for connecting said pair of arms to a heel lever, the rotation of said adjustment sleeve lengthening the distance to the heel lever, thereby forming a fine length adjustment in supplement to the coarse length adjustment provided by said plurality of pair of apertures.

12. A ski binding for releasably securing a ski boot to a ski, comprising:

a lower plate having an upper ribbed surface, an internally threaded bore in the plate, a shoulder surface recessed in the plate below the upper ribbed surface, and screw means engaging the recessed shoulder surface for fixedly securing the lower plate to said ski; and

a release assembly detachable from the lower plate including a housing containing a spring biasing a release element which secures the ski boot to the ski until a release pressure is exceeded, a flange on the housing having at least one longitudinal slot and a lower ribbed surface which mates with the upper ribbed surface on the lower plate to provide a plurality of spaced detent positions for the release assembly relative to the lower plate, and a screw member extending through the longitudinal slot and into engagement with the internally threaded bore to secure the release assembly to the lower plate at any preselected one of the plurality of spaced detent positions established by the ribbed surfaces.

13. The ski binding of claim 12 wherein said housing comprises a cylindrical tube having a threaded surface, an adjustment screw having a threaded surface engaging the threaded surface of said cylindrical tube and rotatable to adjust the release pressure of said spring, and a lock sleeve engaging one of said threaded surfaces and movable to selectively lock and release said adjustment screw.

14. The ski binding of claim 12 including sole plate means for releasably securing the ski boot thereto and having at one end a socket in mating engagement with the release element and at the opposite end a sole plate mating surface, a retainer plate fixedly securable to the ski adjacent said opposite end and having a retainer mating surface in engagement with the sole plate mating surface, one of said mating surfaces comprising a tongue extending into a recess which corresponds to the other mating surface, the pressure of the release element urging the sole plate means against the retainer plate to force the tongue into engagement with the recess.

15. The ski binding of claim 14 wherein the retainer plate has a relatively flat upper surface, a recessed shoulder, and a screw means mountable against the shoulder for fixedly securing the retainer plate to the ski, the height of both the retainer plate from the upper surface to said ski and the height of the lower plate from the ribbed upper surface to said ski being less than the height of said ski to allow premounting of a portion of the ski binding without adding substantially to the height of the ski when containing the premounted portion.

16. The ski binding of claim 12 wherein the housing comprises a cylindrical wall surrounding a cylindrical cavity contiguous with an opening, the release element comprises a cylindrical sleeve disposed within the cylindrical cavity and having a substantial longitudinal extent in sliding engagement with the cylindrical wall to confine the cylindrical sleeve for movement solely in a longitudinal direction, the end of the cylindrical sleeve extending through the opening for releasable connection with the ski boot.

17. The ski binding of claim 16 wherein said cylindrical sleeve has a hollow central interior terminating in an end surface, and the spring is elongated and disposed within the hollow central interior with one end thereof bearing against the end surface.

18. A ski binding for releasably securing a ski boot to a ski, comprising:

sole plate means releasably securable to the ski boot including a socket having an enlarged head defining a nonsymmetrical arcuate surface, a reduced neck extending from the enlarged head, and an integral finger extending from the enlarged head and spaced from the reduced neck, an upright ear on the sole plate means and having a mounting aperture for receiving the neck of the socket and an offset aperture spaced from the mounting aperture for receiving the finger to prevent rotation of the socket; and

a release unit mountable on the ski including a release pin biased into mating engagement with the nonsymmetrical arcuate surface on the enlarged head of the socket, the nonsymmetrical arcuate surface forcing the release pin to retract out of engagement with the socket with different release pressures for different angles of release.

19. The ski binding of claim 18 wherein the release unit confines the release pin for movement solely in a longitudinal direction coaxial with a center line extending through the release pin and the arcuate surface on the head, the finger being offset from the center line.

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