April 16, 1957 D. W. EMERSON 2,788,981

STRAIN RELEASABLE SKI BINDING

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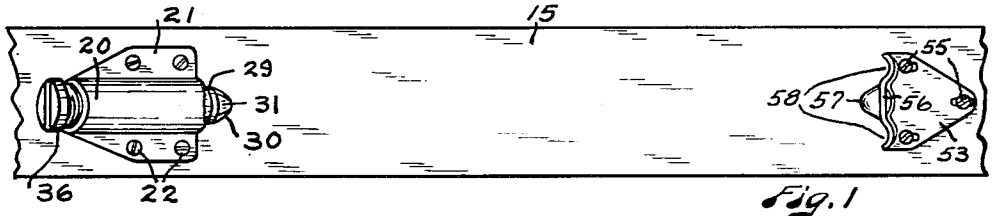


Fig. 1

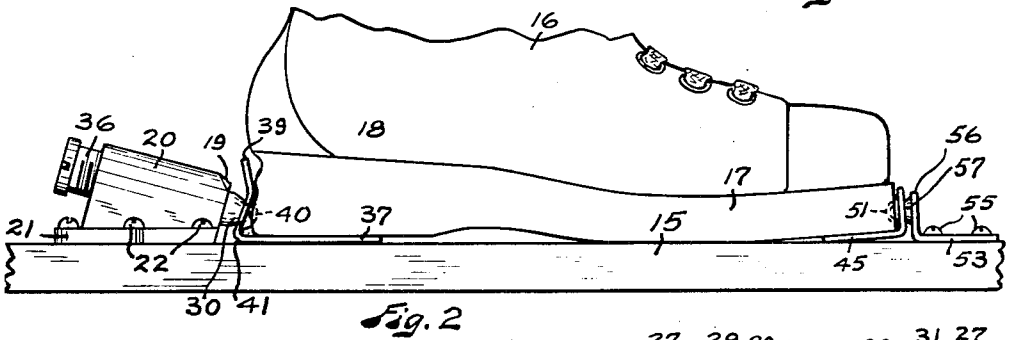


Fig. 2

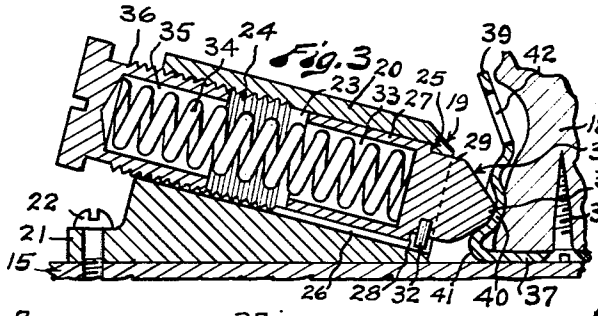


Fig. 3

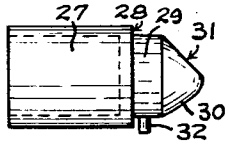


Fig. 4

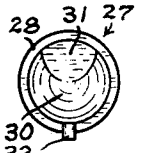


Fig. 5

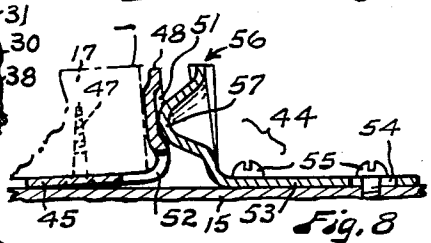


Fig. 8

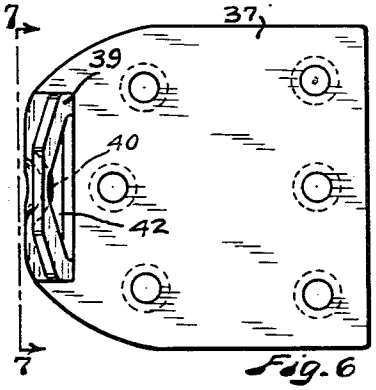


Fig. 6

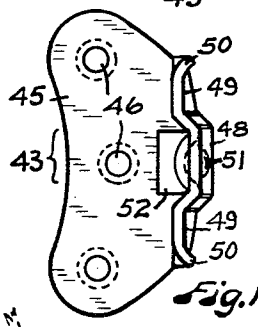


Fig. 10

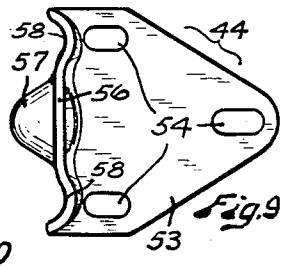


Fig. 9

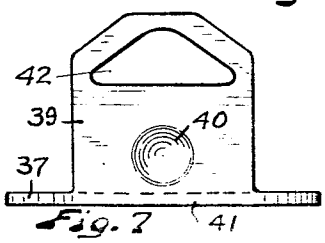


Fig. 7

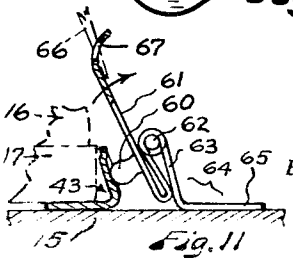


Fig. 11

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STRAIN RELEASABLE SKI BINDING

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3 Claims. (Cl. 280—11.35)

This invention relates to a strain releasable ski binding and an object of this invention is to provide a ski binding which will attach the ski boot of a user to a ski firmly enough to satisfy all of the requirements of ordinary use but which will be released by strain exerted in substantially any direction before said strain becomes great enough to seriously injure the leg or ankle or foot of the user.

Another object is to provide ski binding means capable of efficiently binding both the heel and the toe portion of a ski boot to a ski but which will be released by excess upward strain at the heel of the boot or excess upward strain at the toe of the boot or by excessive torsion in either direction thereby safeguarding the user against injury by any and all of the strains usually encountered in skiing.

Another object is to provide a ski binding which can be adjusted so that it will be released by a greater or lesser strain depending on the requirements of the user.

Another object is to provide a ski binding comprising a heel block attached to a ski and supporting a movable and adjustably spring loaded heel engaging member having a bullet shaped forward end portion positioned to engage within a backwardly facing rounded concave depression in a heel plate on a ski boot so that the heel plate can be quickly and easily snapped into engagement with the heel engaging member and will be disengaged therefrom by either an upward or torsional strain before the strain becomes great enough to injure the user.

Another object is to provide ski binding means which is simple in construction and not expensive to manufacture, which is free from straps, cables and like devices requiring manual manipulation, and which functions in such a manner as to make it possible for a person who is wearing the ski boots to quickly and easily engage said boots with the skis or disengage said boots from the skis without bringing the hands directly into contact with the ski binding means.

Other objects of the invention will be apparent from the following description taken in connection with the accompanying drawings.

Figure 1 is a top plan view of a ski equipped with ski binding means constructed in accordance with this invention.

Fig. 2 is a fragmentary side elevation of said ski and ski binding means and further showing a fragment of a ski boot having toe and heel plates and held by the ski binding means.

Fig. 3 is a longitudinal vertical sectional view, with parts broken away, and on a larger scale than Figs. 1 and 2, showing the binding means used for the heel portion of the ski boot.

Fig. 4 is a detached side elevational view of a movable heel holding member or plunger used in the heel binding means.

Fig. 5 is a front end view of said heel holding member.

Fig. 6 is a detached top plan view of a heel plate to be used on a ski boot.

Fig. 7 is a rear view of said heel plate looking in the direction of broken line 7—7 of Fig. 6.

Fig. 8 is a longitudinal vertical sectional view showing the binding means used for the toe portion of a ski boot.

Fig. 9 is a detached top plan view of a toe holding member which is adapted to be rigidly attached to a ski.

Fig. 10 is a detached top plan view of a toe plate which is adapted to be rigidly attached to the toe portion of a ski boot.

Fig. 11 is a view partly in side elevation and partly in section on a smaller scale than Figs. 4 to 10 inclusive and showing a quickly releasable toe holding member of a modified form as it may appear when engaged with the toe plate of a ski boot.

Like reference numerals designate like parts throughout the several views.

In the drawings 15 indicates a fragment of a ski and 16 a fragment of a ski boot having a sole 17 and heel 18 all of conventional construction. The binding means used at the heel of the boot comprises a heel block or housing 20 having a base flange 21 which can be rigidly attached, as by screws 22, to the ski 15. The heel block 20 has a bore or passageway 23 which is inclined downwardly, preferably at an angle of about twenty degrees from the rear end, shown at the left in the drawings, toward the right end of said block. The rear end portion of the bore 23 has internal threads 24. The forward end portion of said bore has an internal shoulder 25. Preferably a longitudinally extending keyway 26 is provided within said bore 23. A cylindrical heel holding member or plunger 27 is slidably disposed within the bore 23 and has an external shoulder 28 which engages the shoulder 25 and limits the forward movement of the heel holding member 27 in the heel block 20. A part 29 of reduced diameter protrudes from the forward end of the heel holding member 27 and terminates in a rounded heel plate engaging portion 30 which is shaped like the nose of a bullet except that it has an inclined flat top surface 31. A key member 32, herein shown as a round pin, is rigid with the heel holding member 27 and operates in the keyway 26 thus keeping the flat surface 31 of the bullet shaped part 30 always uppermost.

The heel holding member 27 has a tubular recess 33 which receives one end of a compression spring 34. The other end of the spring 34 extends into a recess 35 in a spring abutment member 36 by which the spring 34 is adjustably supported. The spring abutment member 36 is threaded into the heel block 20 and serves to adjust the compression of the spring 34.

A flat normally horizontal part 37 of a heel plate is secured by screws 38 to the heel 18 of the shoe. The rear edge of the heel plate part 37 has an upwardly extending integral member 39 and such member 39 is provided with a rearwardly facing rounded concave depression 40 which is adapted to receive the rounded nose of the bullet shaped member 30. A rounded bend 41 is formed at the junction of the two integral heel plate parts 37 and 39 and this rounded part 41 reacts against the flat inclined surface 31 of the member 30 and retractively moves the member 30 when it is pressed downwardly on said surface 31 in engaging the ski boot with the ski. Preferably the uppermost forward corner of the heel block 20 has a beveled edge 19 to help guide the rounded heel plate part 41 down onto the inclined surface 31 if the heel plate comes down on top of the heel block 20. Preferably a strap receiving opening 42 is provided in the upright heel plate 39 above the concave depression 40.

The toe binding means herein disclosed comprises two parts, namely, a toe plate 43 attachable to the ski boot 16 and a toe holding member 44 attachable to the ski 15. The toe plate 43 comprises a flat base part 45 having holes 46, Fig. 10 to receive screws 47 by which the

toe plate may be secured to a ski boot sole 17. Said toe plate further comprises an integral upright part formed of a medial portion 48 and two side or wing portions 49, said wing portions 49 being offset rearwardly relative to the medial portion 48. The upper corners 50 of the wing portions 49 are bent forwardly, as shown, and the wing portions 49 with the forwardly bent corners 50 cooperate with the metal tip of a ski pole in facilitating detachment of the ski boot from the ski, as hereinafter explained. The medial upright toe plate portion 48 has a forwardly facing rounded concave depression 51 formed therein and this depression 51 is preferably elongated in a vertical direction, as illustrated in Fig. 8. Preferably the toe plate 43 has a recess 52 at the location where the upright part 48 joins the base 45. This recess 52 helps to guide the toe plate into engagement with the toe holding member 44 in applying the boot to the ski and said recess 52 is desirable for structural reasons.

The toe holding member 44 comprises a flat base part 53 having longitudinally extending slots 54 to receive screws 55 by which said toe holding member may be adjustably secured to the ski 15. Said toe holding member also includes an integral upright part 56 having a rearwardly facing bullet shaped toe plate engaging member 57 formed therein and positioned to engage within the forwardly facing concave recess 51 in the toe plate 43. Preferably each lateral edge portion of the upright part 56 is bent to form therein a rearwardly facing trough shaped upright groove 58 for the reception of the tip of a ski pole to be used in detaching the ski boot from the ski while the boot is on the foot.

In the use of this ski binding the heel plates and toe plates are permanently attached to the ski boots and the heel blocks 20 and toe holding members 44 are permanently attached to the skis in the correct positions and at the correct distance apart to properly fit and engage with the chosen ski boots, depending on the size of the ski boots. The slots 54 in the base 53 of the toe holding member allow for some adjustment of this member without changing the location of the screws 55 on the skis. Also the heel plate engaging part 29, 30 is long enough to allow some clearance between the upright heel plate member 39 and the heel block 20. The heel holding member 27 with its bullet shaped part 30 is free to move rearwardly against the pressure of the spring 34 and the compression force of this spring can be adjusted.

To engage the ski boot with the ski the user places the foot on the ski with the rounded concave toe plate recess 51 fitting over the protruding part 57 of the upright toe plate holding member 45 and the rounded corner part 41 of the heel plate resting on the inclined flat surface 31 of the movable member 27. He then puts enough weight on the heel portion of the ski boot to force the heel downwardly onto the ski, in which position the member 30 will fit into the concave rounded depression 40 of the heel plate and the boot and ski will be effectively bound together. The spring 34 permits release of the toe binding means as well as the heel binding means in the event either is subjected to a strain great enough to compress the spring 34. This release will occur in the event of an excessive upward strain on the toe portion of the boot or on the heel portion of said boot or in the event of an excessive side or torsional or twisting strain or in the event of a combination of such excessive strains. The spring 34 is constructed and adjusted so that it will not release under the strains ordinarily experienced in skiing but will release before any of these strains becomes great enough to injure the legs or ankles or feet of the user of the skis. The user can easily and quickly detach the skis from the ski boots by inserting the metal tip portion of a ski pole in one of the grooves 58 between the toe holding member 44 and one of the wings 49 of the toe plate 43 and prying the toe plate and toe holding member apart. The backset of the wings 49 and the curved corner portions 51 of said wings facilitate the use of the tip portion of a ski pole in this way. This provides for quick and easy release from the skis without applying the hands directly to the ski bindings.

Fig. 11 shows a modified form of toe holding member including a movable mounted ball or bullet shaped part 60 adapted to cooperate with the toe plate 44 and seat within the recess 51 thereof. The ball 60 is secured to an arm 61. The arm 61 is pivotally supported by a pivot pin 62 with the arm extending in two opposite directions from said pin 62. The pin 62 is mounted in the upper end portion of an upwardly extending part 63 of an L shaped bracket 64. The base part 65 of the bracket 64 rests on and is rigidly secured to the ski 15. The part 63 is inclined toward the ski boot. When the ball 60 is engaged within the recess 51 the lower and shorter end portion of the arm 61 will rest against the upright bracket part 63 and will function as a stop. Also the ball 60 will be below the level of the pivot pin 62, substantially as shown, and excessive upward strains on the toe of the boot will not ordinarily cause the device to release by pivoting about the pin 62 but said device will be released by excessive strains in the same manner as the previously described binding means shown in Figs. 1 to 10 inclusive. The user can release the boot from the toe binding means shown in Fig. 11 by inserting the tip portion 66 of a ski pole, shown by broken lines, in an opening 67 in the curved upper end portion of the arm 61 and rotatively moving said arm 61 in the direction indicated by the arrow.

The foregoing description and accompanying drawings clearly disclose a preferred embodiment of this invention but it will be understood that changes in structure may be made within the scope and spirit of the appended claims.

I claim:

1. In a strain releasable ski binding for securing a ski boot to a ski, the ski boot having a sole provided with a forwardly facing concave toe depression and a heel provided with a rearwardly facing concave heel depression; a rearwardly facing releasable toe holding member of bullet nose shape rigidly attached to the ski and positioned to releasably engage within said toe depression; a heel block attached to the ski in rearwardly spaced relation from the toe holding member, said heel block having a tubular bore which is inclined downwardly from its rear toward its forward end; a heel holding member movable in said tubular bore and having a protruding forward end portion of bullet nose shape positioned to releasably engage within said heel depression, said protruding forward end portion being flattened on its top side providing an inclined flat surface for engagement by the heel part of the ski boot in the application of the boot to the ski; a longitudinal groove in the wall of the bore of said heel block; a key rigid with said heel holding member slidably movable in said groove preventing rotary movement of the heel holding member in the tubular bore; a compression spring urging said heel holding member toward the ski boot; and a screw adjustably supporting said spring.

2. In a strain releasable ski binding for securing a ski boot to a ski, said boot having a heel plate rigid with the heel thereof and provided with a rearwardly facing concave rounded depression; a heel block attached to the ski, said heel block having a tubular bore extending entirely therethrough and inclined downwardly from its rear toward its forward end; the rear end portion of said bore being internally threaded and said bore having an internal shoulder adjacent its forward end and said bore having a longitudinal keyway; a heel holding member movably supported in said tubular bore, said heel holding member having a bullet shaped end portion protruding from the forward end of said tubular bore, said bullet shaped end portion having a flattened upper surface engageable by the heel plate on the boot, said heel holding member having a shoulder engaging

the stop shoulder in said bore; a key member rigid with said heel holding member and operating in the longitudinal keyway in said bore preventing rotary movement of said heel holding member in said bore and maintaining said flattened upper surface of said bullet shaped end portion always uppermost; a spring in said bore; and an adjustable spring abutment member threaded into said heel block adjustably supporting said spring, said heel plate being releasable from said plunger by upward and transverse strains on the heel portion of the ski boot.

3. In a strain releasable ski binding for securing a ski boot to a ski, said boot having an L shaped toe plate rigid with the front end of the sole thereof and provided with a medially positioned forwardly facing convex rounded depression and said ski boot having an L shaped heel plate rigid with the heel thereof and provided with a medially positioned rearwardly facing rounded depression, each of said L shaped plates being rounded at the location of its right angle bend and the concave depression in each of said plates being unobstructed at least from below and from the two lateral sides; a rearwardly facing toe holding member rigidly secured to a ski and having a part of bullet nose shape positioned to engage within the recess in said toe plate; a heel block attached to the ski, said heel block having a tubular bore extending entirely therethrough and inclined downwardly from its rear end toward its forward end; the rear end portion of said bore being internally threaded and said bore having an internal shoulder adjacent its forward end and said bore having a longitudinally extending keyway in the wall thereof and the uppermost corner portion of said heel block being chamfered off providing a beveled surface positioned to be engaged by the rounded angle bend portion of said heel

plate in applying the boot to the ski; a heel holding member longitudinally movable in said tubular bore, said heel holding member having a bullet shaped end portion protruding from the forward end of said tubular bore, said bullet shaped end portion having a flattened inclined upper surface engageable by the rounded bend portion of the heel plate on the boot and said heel holding member having a shoulder engaging the stop shoulder in said bore limiting forward movement of said heel holding member; a transversely protruding key pin rigid with said heel holding member and operating in the longitudinal keyway in said bore preventing rotary movement of said heel holding member in said bore and maintaining said flattened upper surface of said bullet shaped end portion always uppermost; a compression spring in said bore urging said heel holding member forwardly; and a tubular adjustable spring abutment member threaded into said heel block receiving and adjustably supporting said spring, the boot being releasable from the ski by upward and transverse strains.

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