

[54] **MEANS AND TECHNIQUES FOR
RELEASABLY SECURING SKI BOOTS
TO SKIS**

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[58] Field of Search.....280/11.35

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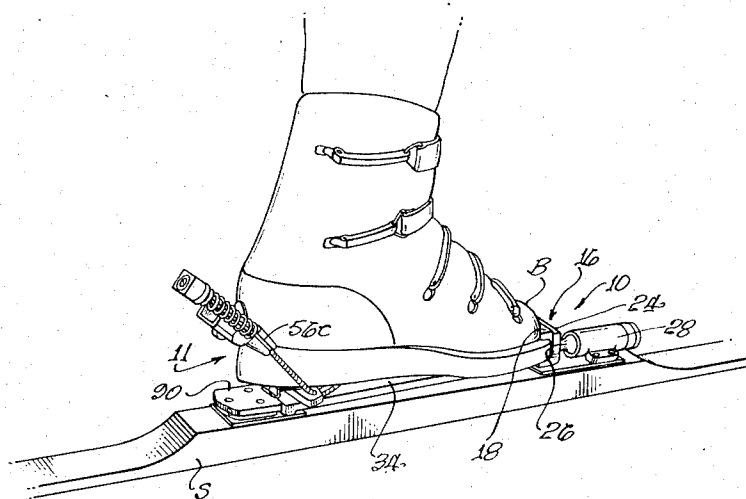
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[57] **ABSTRACT**

Ski bindings involve an attachment to the toe portion of a ski boot in the nature of a cam socket which is releasably engageable with a spring-urged plunger on a ski. Such plunger presses such boot attachment into releasable engagement with a forward end of an elongated plate which has a length commensurate to the length of a boot and which mounts a cam block on its rearwardmost portion. Such cam block is normally received within an adjustable abutment mounted on the ski. The plate carries a spring-urged stirrup having a portion engageable with the top portion of the boot heel to normally press the boot into engagement with the plate. When abnormal forces are developed, as in mishaps, the boot is released from the ski, depending upon the direction of the force, either at the toe portion or at the spring-urged stirrup. This automatic release at the stirrup is preadjusted using an adjustable screw.

10 Claims, 2 Drawing Figures



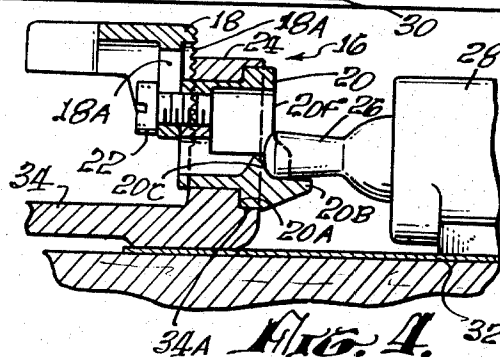
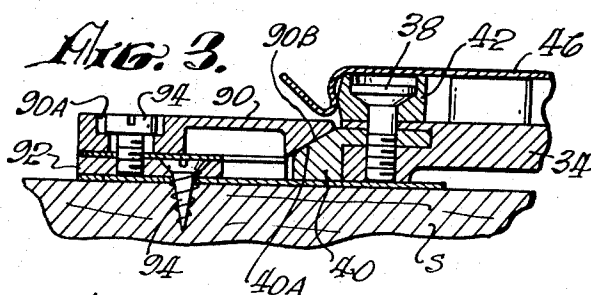
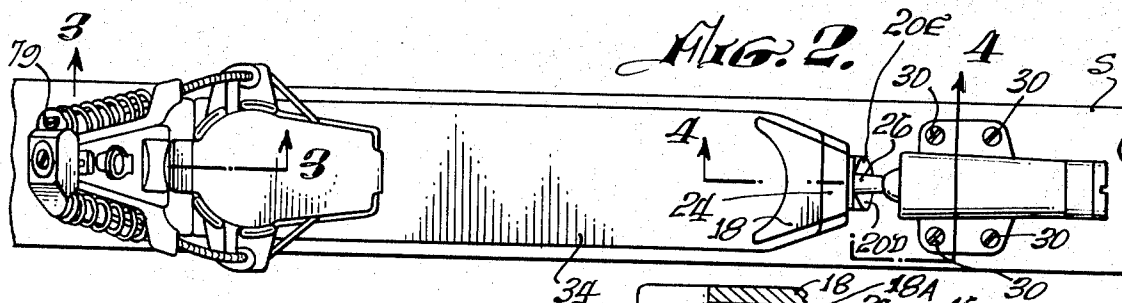
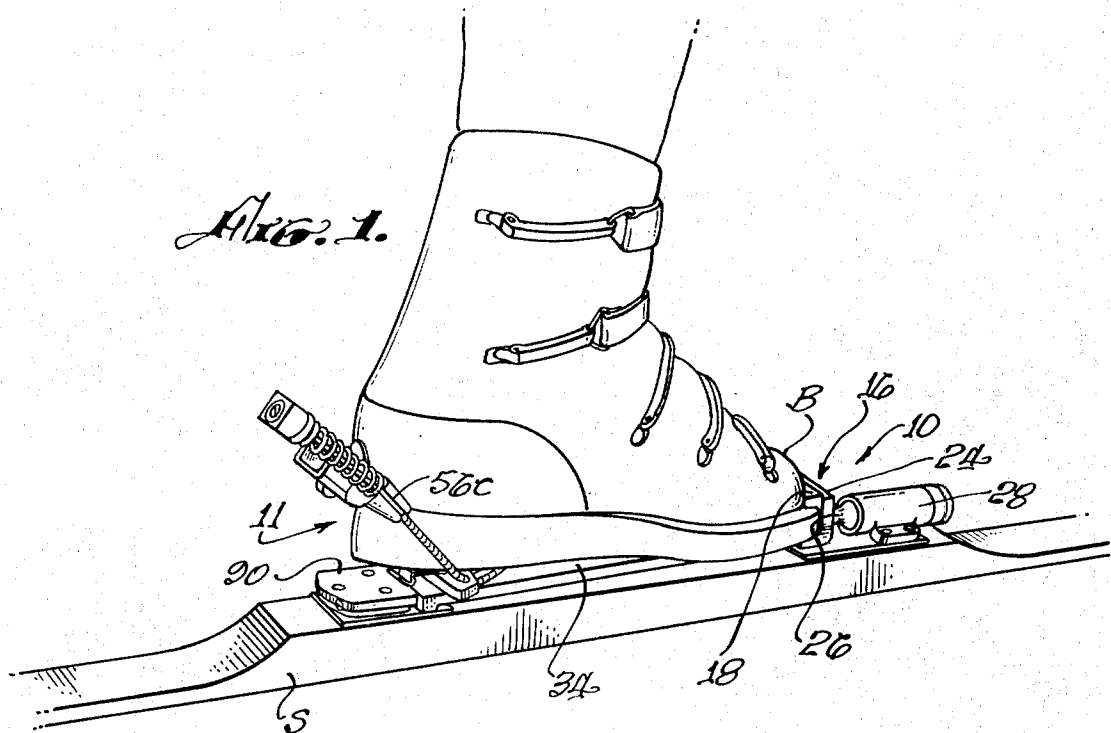
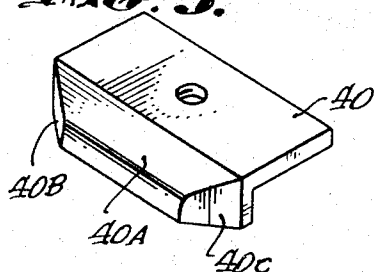
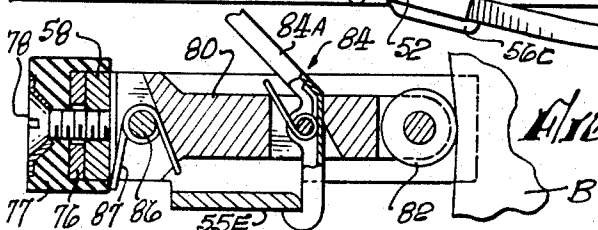
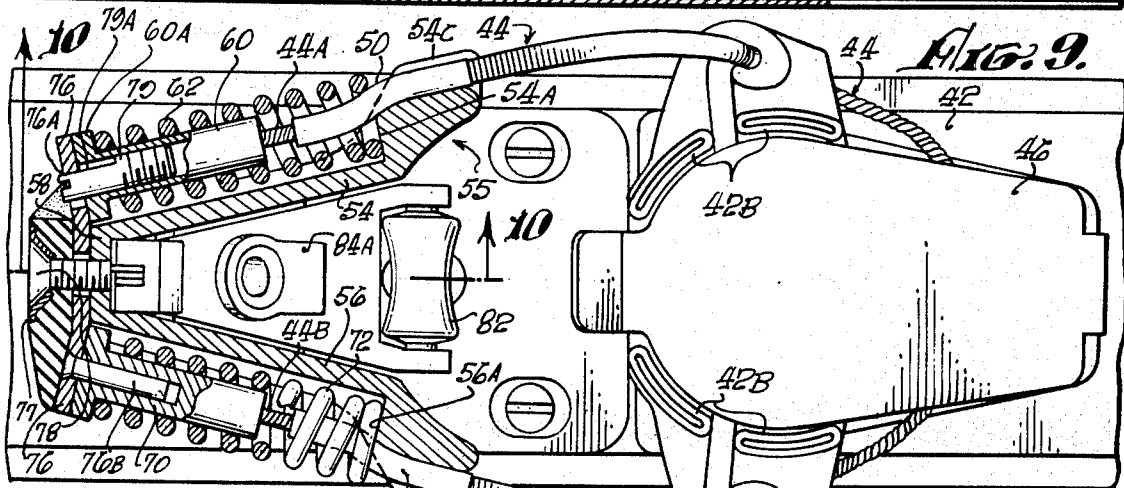
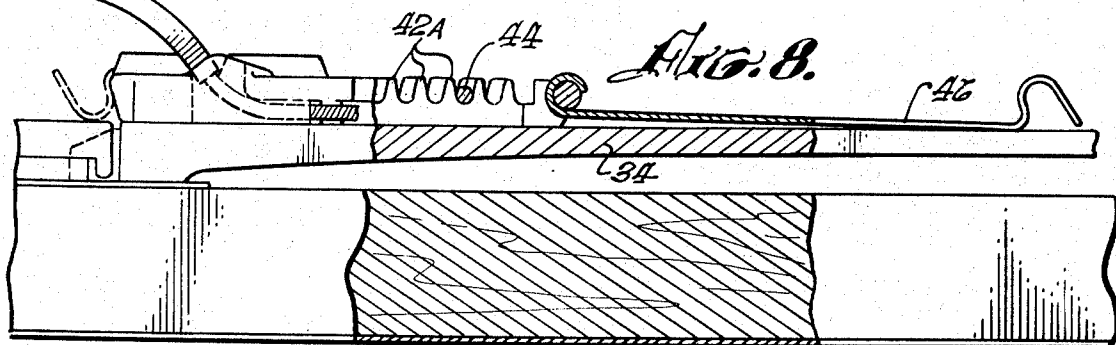
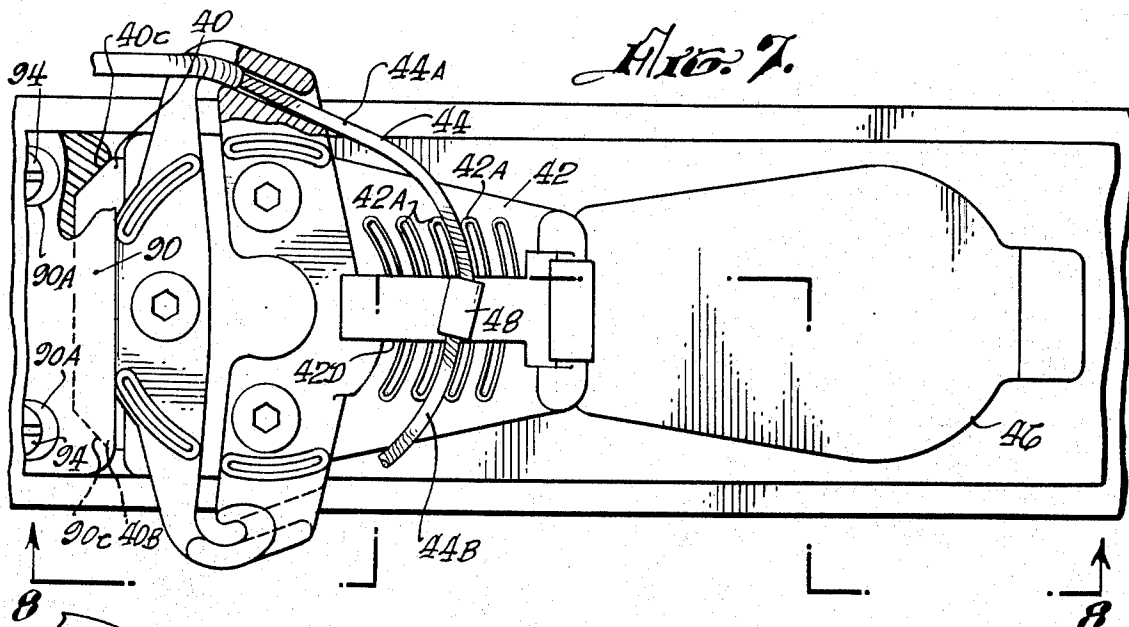


Fig. 5.





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MEANS AND TECHNIQUES FOR RELEASABLY SECURING SKI BOOTS TO SKIS

BACKGROUND OF THE INVENTION

The present invention relates to ski bindings and more generally to means and techniques for releasably securing ski boots to skis.

At present, there are a multitude of ski bindings available. Each binding consists of a toe and a heel release unit which cooperate to release a ski boot, which is normally firmly held therebetween when abnormal forces are applied at the toe and/or heel units. Although many of the present ski bindings provide an acceptable margin of safety against injury to the skier, there is a continuing search for even better and safer ski bindings.

SUMMARY OF THE INVENTION

In the interest of safety and reliableness the present invention provides a new combination of elements involving generally releasable means at the toe portion of a boot, at the heel portion and also upon release of a spring-urged stirrup, depending upon the intensity and direction of those forces which might be considered detrimental to the safety of a skier.

It is therefore an object of the present invention to provide a new combination of elements which provides more consistent reliable release of boots from skis under various abnormal conditions.

A specific object of the present invention is to provide means and techniques of this character which assures release of a boot from a ski under more abnormal conditions than heretofore.

Another specific object of the present invention is to provide an improved combination that provides new and improved results and which, if desired, may be assembled from available elements in accordance with novel teachings of the present invention.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. This invention itself, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best understood by reference to the following description taken in connection with the accompanying drawings in which:

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing a ski boot releasably secured by a toe piece device and a heel clamping device to a ski in accordance with the present invention.

FIG. 2 is a top plan view with the ski boot removed.

FIGS. 3 and 4 are sectional views taken substantially as indicated by lines 3—3 and 4—4 in FIG. 2.

FIGS. 5 and 6 are perspective views of the cam element of the heel clamping device and toe piece device respectively.

FIGS. 7 and 8 are top and side views respectively of a portion of the heel clamping device with a cover member in open position in each FIG.

FIG. 9 is a view like FIG. 7 with the cover member in closed position and also shows details of the heel engaging roller and spring actuated means for pressing the roller into engagement with the boot heel.

FIG. 10 is a sectional view taken substantially on line 10—10 in FIG. 9.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The ski bindings involve a toe piece clamping device 10 and a heel clamping device 12 each mounted on a conventional ski S.

The boot B of conventional construction has its heel portion unaltered but its toe portion is fitted with a socket structure 16 which for present purposes may be considered an integral part of the boot since it is not intended to and in fact does not become detached from the boot in skiing operations.

The socket structure 16 includes a generally arcuate support member 18 which partially embraces the forwardmost portion of the boot sole and is secured thereto by suitable fastening means (not shown).

Adjustably secured to such support member 18 is a socket member 20 using a bolt 22 passing through an elongated adjustment slot 18A in member 18 and threaded in socket member 20. To aid in maintaining alignment of this adjustment the socket member 20 mounts a toothed element 24 which engages like teeth 18A on the support structure 18. By these means the socket member 20 may be adjusted in a vertical direction with respect to the end portion of a spring urged pin or plunger 26 which is slidably mounted in its housing 28, such housing 28 being secured to the ski S by four screws 30 passing through aligned apertures in housing 28 and plate 32.

The coaction between the bulbous end of pin 26 and socket member 20 is of importance and is now described in relation to FIGS. 4 and 6. The socket member 20 has a shouldered portion 20A which engages and seats on a forward ledge portion 34A of a heavy elongated plate 34 having a length substantially equal to the length of the boot. The socket member 20 is formed with an apron portion 20B which extends rearwardly and terminates in an arcuate cam surface 20C against which the bulbous end of pin 26 is normally pressed by compression spring means (not shown) in housing 28. Two other cam surfaces, namely: angularly disposed cam surfaces or faces 20D and 20E are on opposite side of the cam surface 20D and are contiguous therewith so that under certain conditions the bulbous end of plunger 26 may ride along such surfaces for automatic disengagement of the pin 26 from the socket member 20. To permit and facilitate initial normal positioning as shown in FIG. 4 the socket member 20 is provided with an enlarged aperture portion 20F into which the bulbous pin or plunger 26 may temporarily extend when and as the boot with the socket member 20 thereon is being pivoted and located with respect to its ultimate seat 34A. It will be seen that once seated the spring-urged pin or plunger 26 tends to preserve such seated condition wherein the pin 26 then urges the socket member 20 rearwardly against the shouldered plate 34 which for the present purpose may be considered as being stationary although it may be removed or detached from the ski under abnormal conditions as described later.

The construction thus far described at the toe portion of the boot may, for example, be of the character sold under the name Gertsch.

The heel clamping device 12 now described in detail may, for example, be of the character sold under the name Marker and is now described in connection with FIGS. 3, 5, 7-10.

Mounted on plate 34 using screws 38 as seen in FIG. 3 is a forwardly disposed base plate 42 and a rearwardly disposed cam block 40, such base plate 42 having a series of spaced upstanding ridges 42A thereon between any selected two of which a cable 44 extends to provide an initial adjustment for spring tension developed as described later. Once the particular base ridge 42A is selected for engagement with cable 44, a cover member 46 pivotally mounted on such base plate 42 is then moved from its open position shown in FIGS. 7 and 8 to its closed position shown in FIG. 9 wherein it frictionally engages a series of four arcuate shaped ridges 42B on base plate 42 to retain such cover 46 in closed condition and at the same time to provide a solid surface upon which the heel of the boot may normally rest.

The previously mentioned cable 44 comprises two sections 44A, 44B each having adjacent ends secured together by a crimping clamp 48 disposed between and engageable with walls of large slotted portion 42D of base plate 42 within which, with the aid of cover member 46, the crimping clamp 48 is retained.

The cable section 44A, like cable section 44B, extends through corresponding guide sleeves 50, 52 in a generally V-shaped structure 55 having divergent leg sections 54, 56 and a central joining section 58. One end of cable section 44A extends within and is secured to a cylindrical element 60 having

a flanged portion 60A serving as a seat for one end of a coil compression spring 62 having one of its ends bearing on seat 60A and the other one of its ends bearing on a flat face 54A of member 54 which is slotted at 54C to permit lateral movement of cable 44A through such opening 54C under certain conditions. Likewise the other cable section 44B is secured to a similar spring seat 70 with a prestressed spring 72 exerting a pressure between seat 70 and face 56A on member 56. Also, such member 56 may be slotted at 56C to permit movement of cable 44B therethrough under certain conditions but in some instances the slot 56C may be too narrow to permit lateral movement of the cable section 44B therethrough.

The spring seats 60 and 70 each bears against a metal plate or strap 76 which together with a rubber or plastic cover element 77 is secured by screw 78 to the metal frame portion 58. This plate 76 has secured thereto spring seat 70. Also plate 76 has an elongated apertured portion 76A through which an adjustable screw 79 extends, this screw 79 being threaded in the spring seat 60 and having a flattened portion 79A engageable with a like flattened portion at the end of slotted portion 76A so that once the screw 79 is adjusted it is secured by the contact between flattened faces.

Pivotaly secured to this V-shaped structure 55, as seen in FIGS. 9 and 10, is a modified plate 80 having thereon a heel engaging roller 82 and a finger operated latching mechanism 84, the plate 80 being pivoted on pivot pin 86 around which a prestressed torque spring 87 is disposed to urge the plate 80 upwardly in a counterclockwise direction in FIG. 10. This spring-urged plate 80, however, may be retained in a downward latched position by the hooked end of the pivoted latch member 84A engaging a cross-piece 55E of structure 55.

The previously mentioned cam block 40 secured to plate 34 as seen in FIG. 3 cooperates with a stationary but adjustable element 90 which is adjustably secured to a plate 92 by a series of screws 94 passing through elongated adjustment slotted portions 90A, the plate 92 being secured to the ski S by screws 94.

In accordance with important aspects of the present invention, the cam block 40 as seen in FIGS. 5 and 7 has an upper angular cam surface 40A and a pair of side angular cam surfaces 40B and 40C cooperating respectively with surfaces 90B, 90C, 90D on stationary element 90.

It will be seen that these faces 90B, 90C and 90D of element 90 define an opening into which the cam block 40 may be inserted for normal retention therein subject to being dislodged therefrom under abnormal conditions as described later.

In the use of the ski bindings preparatory to inserting the boot, the plate 34 is mounted such that the cam block 40 thereon has its cam surfaces positioned within the stationary element 90 as shown in FIG. 3. The person wearing the boot B having the socket structure 20 thereon manipulates his foot such that the pin 26 first enters the enlarged socket opening 20F after which there is pivotal movement with respect to the plate 34 such that the socket portion 20 becomes seated as shown in FIG. 4 in which case the spring-urged pin 26 exerts a force tending to maintain the cam block 40 in its position shown in FIG. 3. The person then proceeds to operate the heel clamping device 11 by positioning the roller 82 above and in engagement with the boot heel using the self-latching element 80 during which the coil springs 62 and 72 are compressed. These springs as seen in FIG. 1 provide a force on the boot heel which tends to press the heel against the plate 34.

From the preceding description, it will be understood that the composite arrangement provides many safety features and provides consistent, reliable release of a skier's boot from a ski when an abnormally large force is applied from any one of a myriad of possible directions during mishaps. At the same time, firm engagement of boot to ski is provided by the herein-described binding under normal skiing conditions. This is so because of the three forwardly disposed cam surfaces 20B, 20D, 20E and three rearwardly disposed cam surfaces 40A, 40B and 40C, which under abnormal conditions permit release of the boot from the ski and also because the spring

seat 60 may become detached from its normal engagement with plate 76 when the abnormal forces are such to cause the head of adjustable screw 79 to be completely withdrawn through and from the plate apertured portion 76A. In the latter case the conditions for such automatic release may be preadjusted by manual adjustment, i.e. positioning of the screw element 79 in its threaded spring seat 60. Preferably this adjustment involving screw 79 is located at the inside of the boot as shown. It will also be appreciated that when the spring seat 60 thus becomes detached that the cable portion 44A may move laterally through the slotted portion 54C which is sufficiently wide for that purpose.

It will be further observed that when large lateral forces are applied to the toe portion there is disengagement at the socket structure either by the bulbous pin end riding over the cam surface 20D, 20E or by disengagement with plate 34. Also application of abnormal force directly to and in line with the boot toe or instep could result in further compression of the springs of stirrup structure 55 to allow the boot to be moved backwardly independently of plate 34 to permit disengagement of the socket structure 20 from the plate ledge 34A. In this latter application of force it is possible under certain conditions for the spring urged stirrup means 11 becoming unlatched or the cables passing through one of the side openings 54C, 56C such that in any case the stirrup means becomes effective to maintain the boot pressed against plate member 34. Also, it is clear that application of forces laterally to the heel portion could cause disengagement of the cam block 40 from the abutment means 90 with sliding movement occurring along one of the cam surfaces 40B, 40C. Also forces applied between the boot and ski and perpendicular to the plane of the ski could result in disengagement of the cam block by sliding movement accomplished at the cam surface 40A.

While the particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention in its broader aspects and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

1. In combination, ski bindings including: a socket structure for fastening to the toe portion of a ski boot;
- a spring-urged plunger within a housing member which is mountable on a ski for cooperation with said socket structure;
- an elongated plate member having a length commensurate with a ski boot and having its forward portion contactable with a portion of said socket structure;
- said plate member terminating near its rearward portion in a cam block;
- abutment means for mounting on a ski and having an inner portion in engagement with said cam block to normally retain said rearward plate member portion;
- spring-urged stirrup means mounted on said plate member and having a portion thereof engageable with the upper portion of a boot heel to urge the same downward against said plate member;
- said plunger having a bulbous end portion normally contactable with a central arcuate cam surface on said socket structure to press said portions of said plate member and said socket member and said socket structure together;
- said socket structure having a pair of angularly disposed cam surfaces between which said arcuate cam surface is disposed for contact with said plunger end when abnormal forces are present to allow detachment of said plunger from said socket structure;
- said cam block having a downwardly and rearwardly centrally disposed cam surface normally pressed into engagement with said abutment means and a pair of angularly disposed cam surfaces between which said centrally disposed cam surface is disposed to facilitate detachment of said cam block from said abutment means when abnormal forces are present.

2. In combination

an attachment for a ski boot;

spring-urged means mountable on a ski and releasably engageable with said attachment;

abutment means mountable on a ski;

a plate member having a length commensurate with the length of a ski boot and having its forward portion releasably engageable with said attachment and having its rear portion releasably engageable with said abutment means;

and spring-urged means mounted on said plate member engageable with the back of said boot to resiliently press the same against said plate member.

3. The combination as set forth in claim 2 in which said spring-urged means is a bulbous plunger insertable into an enlarged cavity of said attachment and engageable with a cam surface disposed between two lateral cam surfaces.

4. The combination as set forth in claim 2 in which said abutment means provides a cavity portion and said plate member includes a cam block insertable in said cavity portion.

5. The combination as set forth in claim 4 in which said abutment means is adjustable.

6. The combination as set forth in claim 2 in which said spring-urged means includes a stirrup structure, cables ex-

tending from said plate member through openings in said structure to a corresponding spring seat which engages one end of a corresponding spring to compress the same, a spring-urged pivoted plate on said structure and having a portion engageable with the back of a boot, latching means for latching said pivoted plate with respect to said stirrup structure.

7. The combination as set forth in claim 6 in which said stirrup openings has at least one lateral opening through which said cable may move laterally.

8. The combination as set forth in claim 1 in which said spring-urged stirrup means includes a member attached to said plate member, a spring seat, and a releasable connection between said member and said spring seat, said releasable connection being manually adjustable to automatically release upon the occurrence of abnormal forces of corresponding different intensity.

9. The combination as set forth in claim 2 in which said spring-urged means includes a member attached to said plate member, a spring seat, and a releasable connection between said member and said spring seat.

10. The combination as set forth in claim 9 including manually adjustable means adjustable to adjust that force required to release said releasable connection.

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