United States Patent [19]

McAusland

[11] **3,797,841**

[45] **Mar. 19, 1974**

[54] **SAFETY BINDING**

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[73] Assignee: **Anderson & Thompson Ski Co.**, Seattle, Wash.

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[21] Appl. No.: **259,003**

[52] **U.S. Cl.** **280/11.35**

[51] **Int. Cl.** **A63c 9/086**

[58] **Field of Search**.....280/11.35 R, 11.35 C, 280/11.35 D, 11.35 B, 11.35 G, 280/11.35 Y, 11.35 N

[56] **References Cited**

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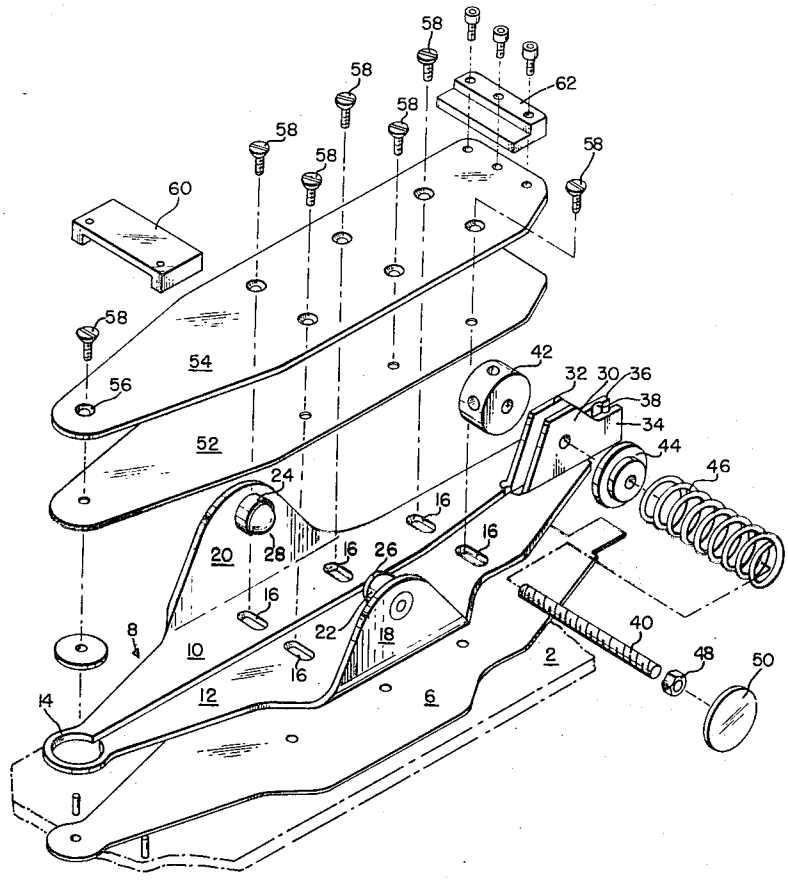
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Primary Examiner—Robert B. Reeves
Assistant Examiner—Larry Martin

[57] **ABSTRACT**

A safety binding assembly for attachment to a ski for interaction with a ski boot, including a standardized cam means mounted to the bottom of the boot whereby the identical binding mechanism will be used regardless of the size of the boot. The binding itself includes a bifurcated plate having upstanding ears adapted to interact with the cam upon the boot and biasing means continuously urging the two legs of the plate to a proximate relationship. A second plate overlies a first plate to prevent the first plate from becoming inoperative due to compact snow and ice as well as providing a smooth, safe surface. For securement of the boot to or removal from the ski, the biasing means is overridden allowing the legs of the bifurcated plate to be separated sufficiently to allow removal of the boot mounted cam.

4 Claims, 5 Drawing Figures



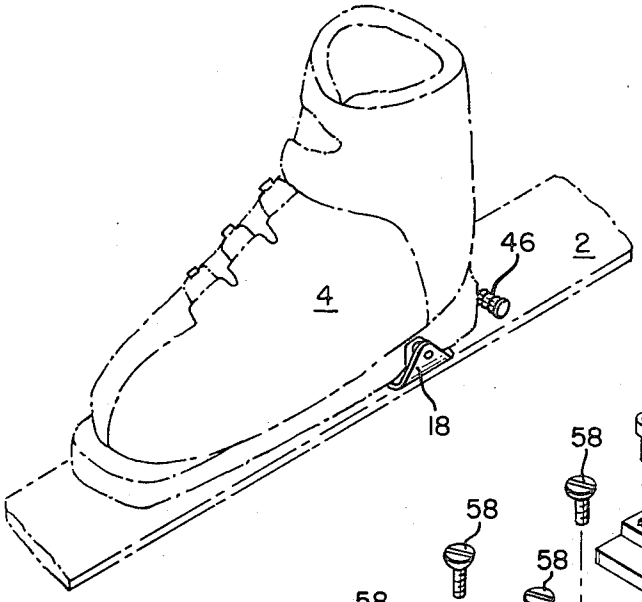

4
46
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FIG. 1

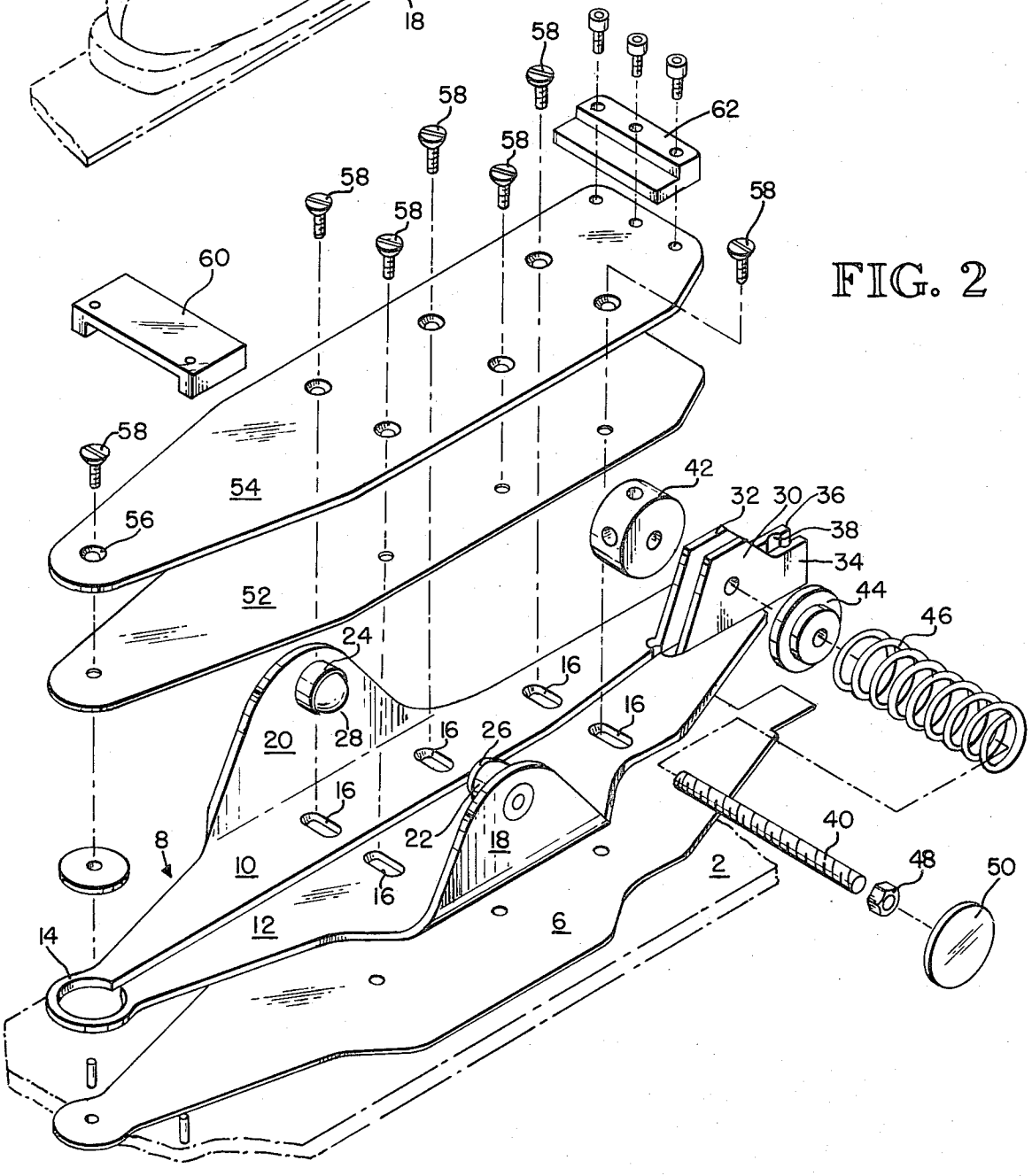

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FIG. 2

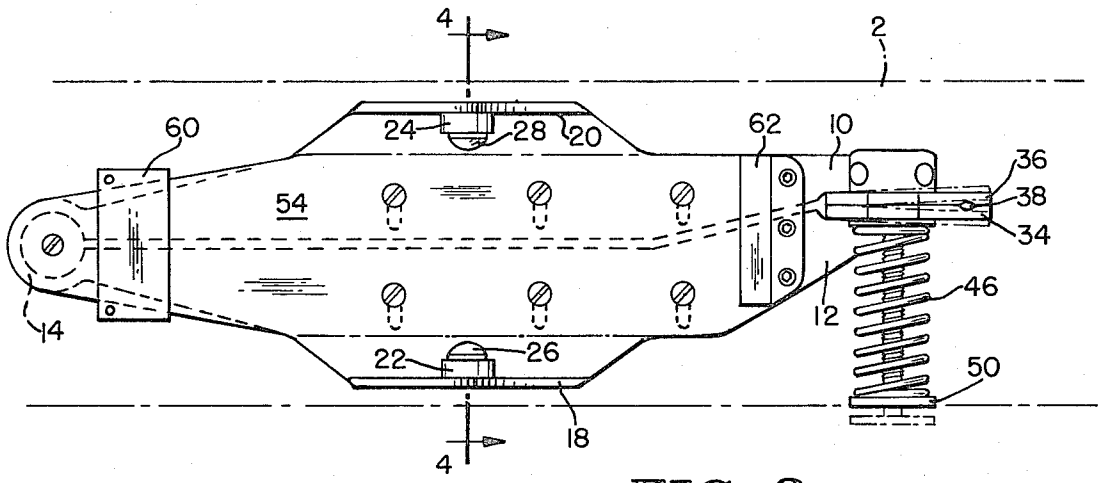


FIG. 3

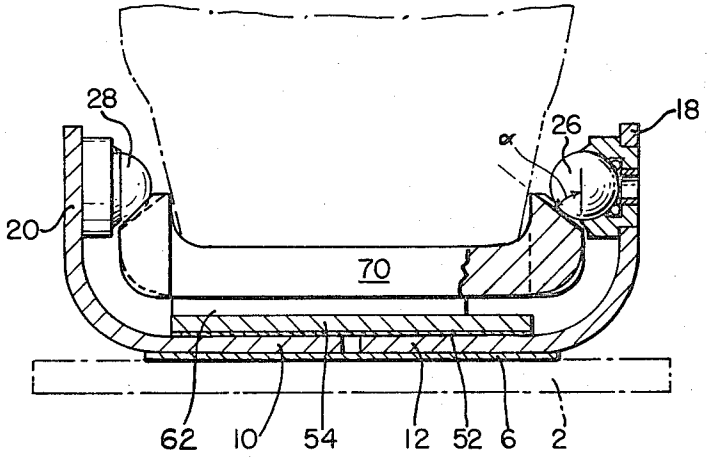


FIG. 4

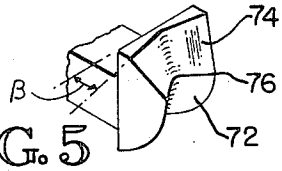


FIG. 5

SAFETY BINDING

BACKGROUND OF THE INVENTION

There are many safety bindings or harnesses adapted for use on downhill skis on the market. These devices include fingers for gripping a plate mounted upon the bottom of the ski boot such as disclosed in U.S. Pat. No. 3,578,359 granted to Edmund on May 11, 1971, devices for gripping the sides of the boot or sides of the heel such as disclosed in U.S. Pat. Nos. 3,494,628 and 3,140,877 granted to Spademan on Feb. 10, 1970 and July 14, 1964, respectively as well as many other mechanisms adapted to releasably secure the boot.

The prior art safety bindings recognize the fact that it is necessary for the skier to have a rigid connection between his boot and his ski to assure control of the ski in operation, however, the ski boot must be released from the ski under conditions of extreme stress when the skier is likely to be injured if he remains fixed to his skis. Attempts at safety bindings, prior to those described in the patents hereinabove noted, have included heel and toe pieces, the feeling being that it was necessary to secure both ends of the boot to the ski to assure positive control. The more current bindings, as illustrated in the above noted patents, recognize the fact that the bottom of the ski boot is a rigid piece of material, often reinforced with a metallic plate, whereby, if one portion of the boot is fixed relative to the ski the remainder of the boot will likewise remain fixed because of the impossibility of relative movement thereof.

Further, it is recognized that for proper control the attachment or securement between the boot and the ski must be behind the point where the foot would normally bend when the skier is in a proper skiing position. When in a skiing position the skier keeps his weight forward, keeping a downward pressure on the front of the skis. This forward bending tends to raise the heel of the boot and thus it is accepted that the securement must be in the after portion of the boot itself.

One of the problems with the prior art ski bindings has been the complexity of the mechanism that has been necessary to hold the skis securely during the downhill run and yet provide the ability to release in the event of a fall or severe twist. As these bindings are continuously subjected to snow and ice they tend to become clogged and therefore difficult to operate or at the extreme inoperative and therefore dangerous.

Another problem with the prior art ski bindings is that the attachment to the boot, although sometimes eliminating the necessity of precise fitting, have included portions which tended to catch and capture the snow when walking to the ski area prior to putting on the skis thus requiring that the binding be cleaned prior to mounting the skis.

With the above noted problems and prior art in mind, it is an object of the present invention to provide a safety type ski binding for use upon skis wherein the mechanism is simple and easily secured to both the ski and boot and yet provides suitable adjustability for skiing and release prior to injury.

It is another object of the present invention to provide a safety binding for mounting upon skis wherein the mechanism is extremely simple and the means for securement to the boot is uniform whereby the size of the boot is not relevant. The skis and boots may be readily intechanged with other parties and no adjustment is required excepting the release force which is preset.

It is still another object of the present invention to provide a safety binding wherein the binding mechanism is extremely simple and is of such construction that it is virtually impossible for snow to become lodged within the binding and hinder proper operation of the binding.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic representation of a boot as mounted upon the inventive binding mechanism.

FIG. 2 is an exploded view showing the details of construction of the inventive safety binding.

FIG. 3 is a plan view showing the relative parts of the portion of the safety binding attached to the ski in assembled condition.

FIG. 4 is a sectional view through the binding along lines 4—4 of FIG. 3.

FIG. 5 is a fragmentary view showing the details of the cam portion of the boot mounted securing device.

DETAILED DESCRIPTION OF THE DRAWINGS

As can be seen in FIG. 1, the inventive binding is secured to a ski 2 and has a boot 4 mounted therein. When in operative condition the binding has very little mechanism that is exposed to the elements. The only portions which are uncovered are the ears and the biasing means as to be described in greater detail hereinafter.

The basic elements of the present inventive binding can be best seen in FIG. 2 wherein there is depicted in phantom a ski 2. For purposes which will be better understood hereinafter there is a sheet of Teflon or other lubricating material 6 mounted to the top of the ski 2 and adapted to underlie a bifurcated plate 8. Bifurcated plate 8 has a pair of generally planar rearwardly extending legs 10, 12 joined at their forward end by means of a continuous resilient loop 14. Along the flat surface of legs 10 and 12 are a plurality of slots 16 extending generally perpendicular to the line of separation between legs 10 and 12 to allow relative outward movement of the legs 10 and 12. Approximately midway along the length of the legs 10 and 12 at the outside edge of each is an upstanding ear 18, 20 having an inwardly extending socket 22, 24 having a ball 26, 28 captured therein. It is to be understood that ears 18 and 20 are appropriately flared or curved outwardly to permit the boot to release when subjected to excessive forward or twisting pressures without subjecting the boot to abrasive contact with the ear. Contact between the boot and the ear will firstly cause damage to the boot surface and secondly if the contact is significant enough or abrupt, the restricted motion may well cause damage to the skier's leg, the result which the present binding is designed to prevent. To assure that the boot will be promptly released, the balls 26, 28 must be free to rotate and so may well be mounted with smaller balls to lessen the frictional contact as is illustrated in FIG. 4.

The after portion of the bifurcated plate terminates in an upwardly extending ear 30, 32 upon the interior edge of each of the legs 10, 12. Ears 30, 32 are adapted to be put into close contact when in use and have a rearwardly extending tail 34, 36 and each includes a vertical channel 38 for purposes to be hereinafter described.

A coaxial bore extends through the ears **30, 32** and is adapted to have pass therethrough without significant interference a threaded rod **40** which is then secured into a threaded nut **42.** The opposite side of the ears **30, 32** from nut **42** includes a bearing plate **44** abutting ear **30,** a compression spring **46** and a cap nut and washer **48** and **50** respectively. When assembled the threaded rod **40** is threadably engaged with nut **42** and nut **42** is rotated compressing spring **46** between bearing plate **44** and washer **50.** The required inwardly directed bias for holding the boot in place is controlled by the compression of spring **46** and is described in greater detail hereinafter.

Overlying the bifurcated plate **8** is a second Teflon or other lubricating sheet **52.** Mounted above and substantially coextensive with the Teflon sheet **52** is upper, boot contacting plate **54.** Plate **54** is of an elongated configuration tapering to a point at the forward portion and terminating in a squared off after portion. Plate **54** includes a plurality of holes **56** to receive threaded elements **58** which extend through sheet **52,** bifurcated plate **8,** sheet **6** and are secured in the ski **2.**

The threaded elements **58** secure the plate **54** in a stable position and yet because of the slots **16** allow the bifurcated plate to have two legs **10** and **12** move relative to each other as described hereinafter. The forward portion of the binding when secured to the ski has an overlying toe plate **60** preferably of Teflon or some other lubricating yet wear resistant surface. This plate **60** is adapted to be contacted by the toe of the boot and allow some relative movement therebetween thus preventing injury to the user. The after portion of the binding has an overlying tail block **62** which, similarly to the toe block, would be fabricated of Teflon or like material and is secured to the ski and adapted to contact the heel of the boot.

As can be seen in FIG. **3** when the binding is mounted to the ski a boot is placed into or removed from the binding by properly locating the toe portion of the boot and forcing the boot downwardly such that it is locked as will be described with respect to FIG. **4.** To remove the boot from the ski, the wearer need only insert the tip of the ski pole in the groove **38** and apply an outward pressure compressing the spring **46** and releasing the boot. Since there is relative movement between plate **8** and the ski **2** as well as plate **54** the purpose for the two lubricating sheets **6** and **52** can be seen.

As seen in FIG. **4,** the upwardly extending ears **18** and **20** and their inwardly protruding ball and socket combinations **22, 26** and **24, 28** respectively are adapted to cooperate with a boot mounted element **70** which is adapted to extend beneath and be secured above the boot just forwardly of the instep.

Referring now to FIG. **5** the outboard ends of the element **70** which is secured to the boot comprises a multi-faceted cam which is adapted to interact with balls **26** and force the legs **10** and **12** bifurcated plate to spread when the boot is either entering or leaving the binding. The lower cam surface **72** is slightly channeled to hold the boot and ball in proper relative position. The upper surface of the cam **74** is likewise contoured but tapers in the opposite direction to tend to hold the boot in place in the binding once it is placed therein. In order for the boot to be moved out of the binding, the cam **74** must compress the spring **46** sufficiently that the ball will pass over the high point **76** and thus allow the boot to be released.

Referring now to FIGS. **4** and **5,** the critical angles may be seen which allow the boot to release without excessive strain being placed upon the wearer's leg. The angle *x* as seen in FIG. **4** must be shallow enough to permit the boot to be released upon a forward movement of the boot. It has been found that an angle of approximately 45° is sufficient to hold the boot in position and yet release prior to damage to the leg. The angle B, as designated in FIG. **5,** is approximately 13° and allows the boot to be released following a twisting pressure.

As explained above, the present binding is of simple construction and allows easy adjustability as to the amount of force necessary to remove the boot from the binding. Further, the present binding allows the operator or wearer to easily remove his feet from the binding by simply inserting his ski pole into the provided groove **38** and compress the spring **46** allowing release thereof.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A safety binding assembly for attachment to a ski and interaction with a ski boot serving as the only means for securing the boot to the ski comprising;

a first elongated bifurcated plate for attachment to the ski in a fashion which permits movement of one leg relative to the other but prevents movement longitudinally of the ski, said plate including a first upstanding ear having an inwardly projecting portion upon the outside edge of each leg in opposed relationship and a second upstanding ear upon the inside edge of each leg at the aftermost end of the leg, said second upstanding ears being in opposed contiguous relationship, a second elongated plate adapted to overlie the first plate between the first set of ears and terminate forwardly of the second set of ears,

biasing means yieldingly continuously urging the upstanding ears of the first plate into a contiguous relationship whereat the legs are proximate each other, and

means mounted upon a ski boot for interaction with the first set of upstanding ears, said means being rigid, of a fixed predetermined length and having an outwardly projecting portion configured to interact with the inwardly projecting portion of the ears, resisting movement in all directions but releasing the boot upon the application of excessive pressure which overrides the biasing means and moves the ears outwardly.

2. A safety binding as in claim **1** wherein the first set of upstanding ears includes inwardly projecting roller means and the boot mounted means has a complementary cam surface.

3. A safety binding as in claim **1** wherein the biasing means is a spring of the compression type and is held in position by an adjustable member extending from one ear through the second ear and terminates in a compression plate.

4. A safety binding as in claim **1** wherein the second set of ears has a vertical channel between the ears whereby the wearer may insert the tip of a ski pole and separate the ears for release of the boot.

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