Nov. 21, 1961 H. MARKER 3,009,710

SKI-BINDING DEVICES

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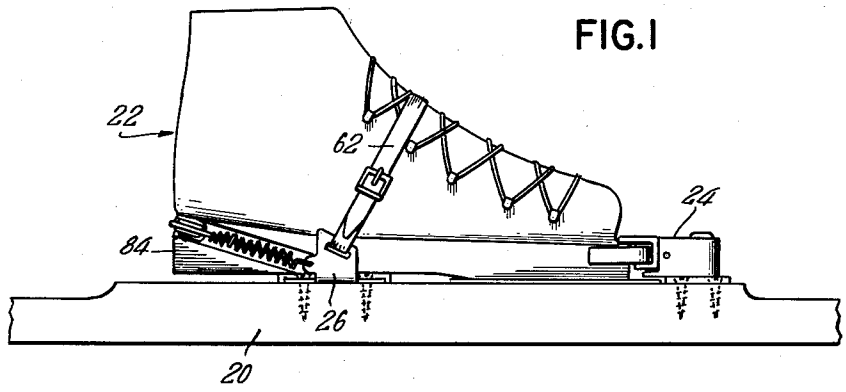
FIG. 1



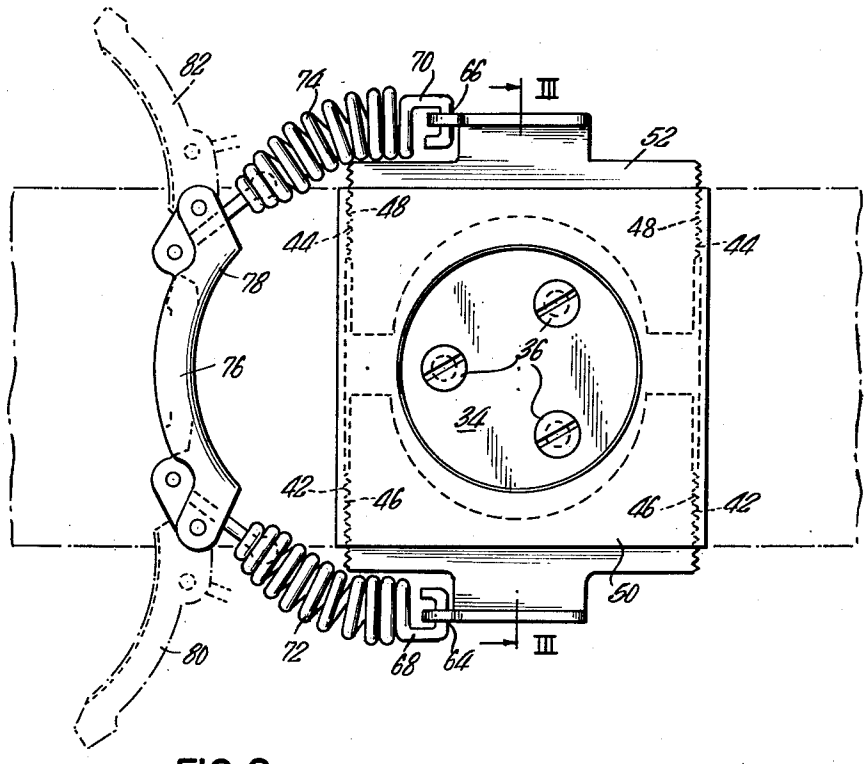


FIG. 2

INVENTOR.
HANNES MARKER.
BY Leon M. Stracher
ATT.

Nov. 21, 1961 H. MARKER 3,009,710

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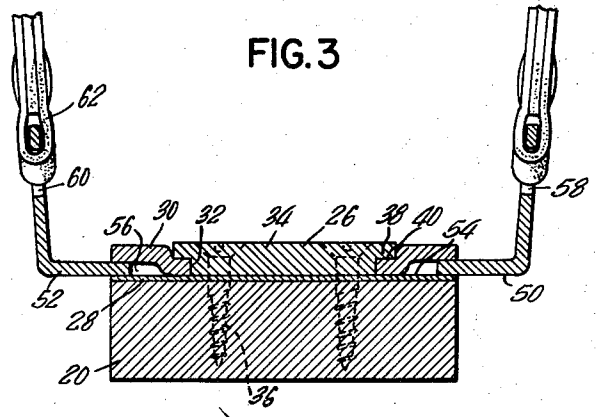
FIG. 3



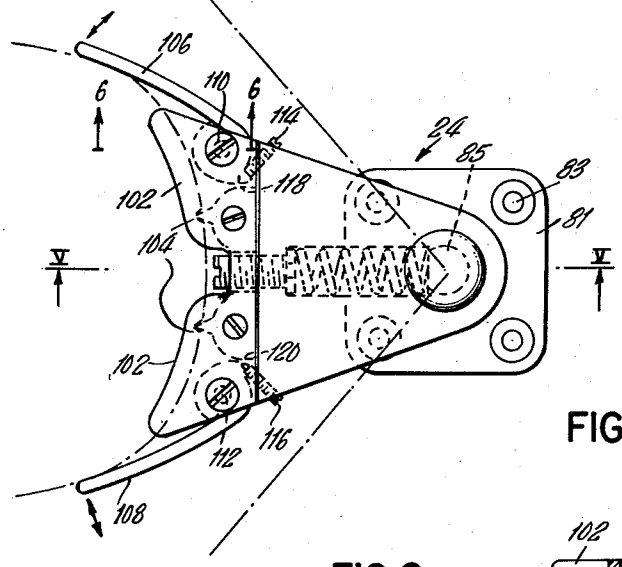
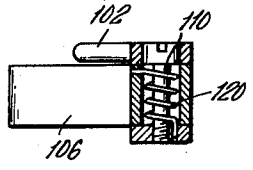


FIG. 4

FIG. 6



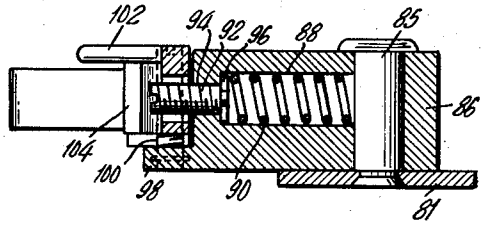


FIG. 5

INVENTOR.
HANNES MARKER
BY
Glenn H. Steward
AGT.

Nov. 21, 1961 H. MARKER 3,009,710

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FIG. 7

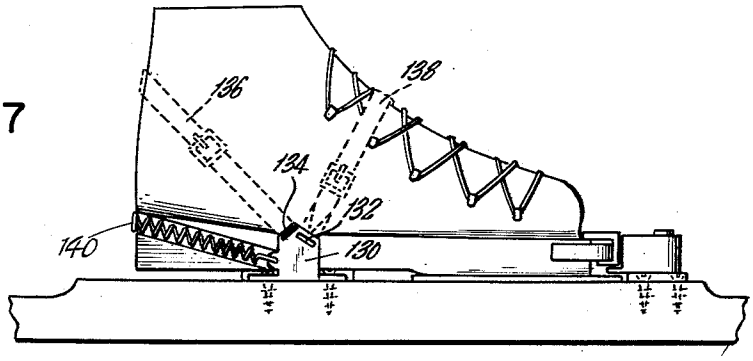
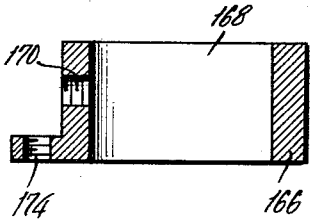


FIG. 10



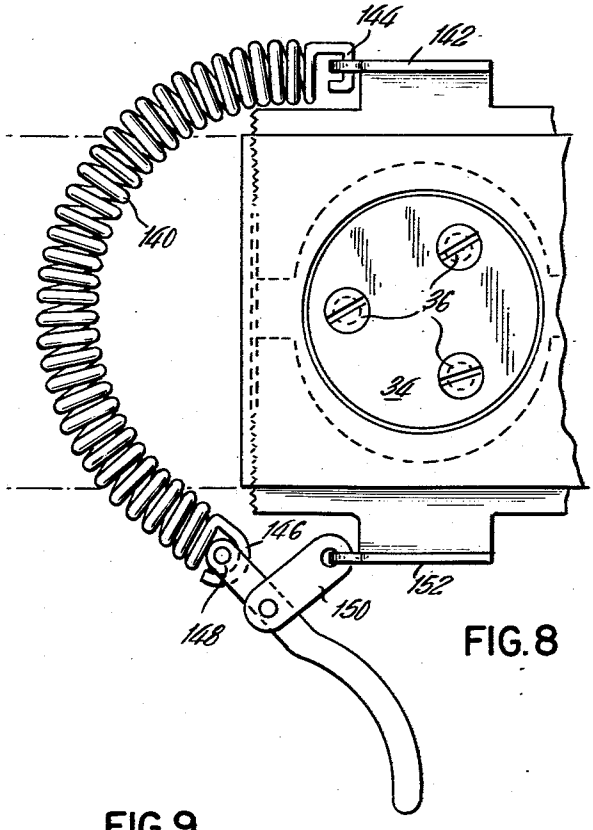


FIG. 8

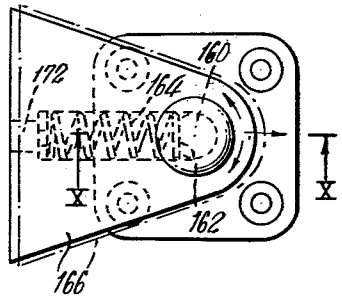


FIG. 9

INVENTOR.
HANNES MARKER
BY Leon M. Strauss ATT.

United States Patent Office 3,009,710 Patented Nov. 21, 1961

3,009,710

SKI-BINDING DEVICES

Hannes Marker, Garmisch-Partenkirchen, Germany

Filed May 26, 1958, Ser. No. 737,889
2 Claims. (Cl. 280—11.35)

This invention relates to ski-binding devices.

It is one of the primary objects of the present invention to provide means contributing to a highly efficient ski binding, which is simple in construction, easy to operate, while the safety conditions thereof are greatly enhanced.

It is another object of the present invention to provide means conducive to a highly efficacious ski binding structure, which is provided with a front and side release mechanism which will not "freeze up" and permits heel swivelling and toe release in a positive manner.

An additional object of the invention resides in the provision of means affording guiding engagement between the toe portion of a ski boot and a toe mounting means of a ski binder, the toe mounting means being provided with prongs for securely biting into the toe of the boot and being further provided with guides for engagement on either side of the front of a ski boot, which guides are adjustable for different size ski boots.

The construction of this invention features an arrangement of a toe mounting means and a rear mounting means forming a ski binding which cooperate with each other to permit release of a ski boot when the ski boot is subjected to at least predetermined torsional stresses, both the toe mounting means and the rear mounting means affording resilient constraint to a ski boot while both the toe mounting means and the rear mounting means have parts arranged for pivotal action.

A yet further object of the invention resides in the provision of means affording both a vertical and size adjustment for the toe mounting means of a ski binding so that various sizes of ski boots can be securely held in place.

Still another object of the invention resides in the provision of means affording an opportunity to the user to adjust the predetermined torsional stress where heel swivelling and toe release will result, thus allowing the ski binding to be used by persons of differing physical characteristics while providing equal protection for all the users thereof.

Yet a further object of the invention resides in the provision of means ensuring ready adaptation of the novel safety ski binding to various lengths and widths of ski boots.

It is still a further object of the invention to provide means envisioning correct centering of the boot with respect to front release mechanism and without necessitating any armature or other accessories on the boot sole to coact with said binding, the latter being readily adjustable to the thickness of the sole of the boot or the toe configuration of the latter.

Yet another object of the invention is to provide means contributing to a sturdy and dependable ski binding structure which requires a minimum of manipulations to bring about firm attachment of the boot to such structure and without impairing its safety conditions.

It is still a further object of the invention to provide means facilitating a sufficiently flexible ski binding structure, which may be used with maximum safety in racing, as well as by average skiers.

These and other objects of the invention will become further apparent from the following detailed description, reference being made to the accompanying drawings showing preferred embodiments of the invention.

FIG. 1 is a side elevational view of an embodiment of

the invention including toe mounting means and rear mounting means;

FIG. 2 is an enlarged plan view of an embodiment of the rear mounting means in accordance with the concept of the invention;

FIG. 3 is an enlarged vertical sectional view as taken along the plane of line III—III of FIG. 2;

FIG. 4 is an enlarged plan view of an embodiment of toe mounting means;

FIG. 5 is an enlarged vertical elevational view of the toe mounting means as taken along the plane of line V—V in FIG. 4;

FIG. 6 is an enlarged partial sectional detail view illustrating the means provided for adjusting the guide means in detail;

FIG. 7 is a side elevational view of a modified form of ski binding, illustrating modified forms of toe mounting means and rear mounting means;

FIG. 8 is a plan view on an enlarged scale of the modified form of rear mounting means;

FIG. 9 is a plan view on an enlarged scale of a modification of the toe mounting means; and

FIG. 10 is a vertical sectional view of the toe mounting means as taken along the plane of line X—X in FIG. 9.

With continuing reference to the accompanying drawings wherein like reference numerals designate similar parts throughout the various views, reference numeral **20** is used to generally designate a ski of any particular desired type, shape and size, to which the ski binding comprising the present invention is adapted to be secured for holding a ski boot generally indicated at **22** in position on the ski **20**, yet which because of the novel coaction between the toe mounting means and the rear mounting means serves to release the ski boot from the ski when severe lateral torsional stresses are applied on the ski boot, thereby preventing injury to the skier during falls, tumbles and other mishaps.

The invention contemplates the use of a toe binding means **24** and a rear binding means **26** both of which resiliently engage the ski boot **22** and have parts mounted for pivotal action with respect to the ski boot **22** so as to release the ski boot when the ski boot is subjected to at least predetermined torsional stresses.

Referring now more particularly to the rear binding means **26** as seen best in FIGS. 2 and 3, it will be noted that there is positioned on the ski **20** a base plate **28** which extends nearly the full width of the ski **20**.

Positioned on the base plate **28** is a mushroom-shaped swivel plate **30** having a central opening **32** into which a bearing plate **34** extends, screws **36** extending through the bearing plate and through the base plate **28** into the ski **20** to hold the bearing plate **34** and hence the swivel plate **30** in position.

The bearing plate **34** is provided with a flange **38** which engages within an annular recess **40** in the swivel plate **30** to hold the swivel plate on the ski while permitting rotation or pivotal action thereof. The swivel plate **30** has the ends thereof provided with teeth as at **42** and **44**, respectively, which teeth are engaged by corresponding teeth **46** and **48** formed on angle members **50** and **52**, respectively. The angle members **50** and **52** fit into recesses **54** and **56** formed between the base plate **28** and the swivel plate **30**, and are retained in an adjusted position by means of the toothed relationship between the angle members **50** and **52** and the swivel plate **30** so that the angle members **50** and **52** pivot or swivel with the swivel plate **30**. The angle members **50** and **52** are provided with eyes as at **58** and **60** to which a leather strap **62**, see FIG. 1, can be secured.

Further, smaller eyes **64** and **66** are provided for the angle members **50** and **52** for reception of ends **68** and

70 of springs 72 and 74 to whose other ends a three-piece tightener 76 is terminally secured. The springs 72 and 74 are thus pivoted to angle members 50 and 52.

The tightener 76 includes a central section 78 having end cam members 80 and 82 pivoted thereto so that when the cam members 80 and 82 are moved from the open position, as is shown in phantom lines in FIG. 2, to the closed position, as is shown in solid lines in FIG. 2, the springs 72 and 74 together with the tightener 76 will securely embrace the heel portion 84 of the ski boot. The pivotal relationship of the springs 72 and 74 relative to angle members 50 and 52 permits better adjustment of the tightener 76.

Referring now to FIGS. 4 to 6, wherein there is shown an embodiment of the toe mounting means 24, it will be noted that the toe mounting means includes a toe plate 81 secured as by screws or other fasteners through openings 83 in the toe plate to the ski 20. The toe plate includes a stud or pivot pin 85 which extends through the toe plate 81 and through a front body 86 to pivotally mount the body 86 on the toe plate 81.

The front body 86 is provided with a central recess 88 for reception of a spring 90 which bears against the pivot pin 85. A spring adjustment threaded member 92 is threadedly engaged as at 94 within the body 86 and has a head 96 engaging the spring 90 to resiliently urge the spring against the pin 85 to normally retain the body 86 against rotation relative to the plate 81. However, when sufficient force is applied laterally on the body 86 so as to overcome inertia and the resistance of the spring 90, the body may pivot.

The body includes a lip 98 in which vertical adjustment members 100 are threadedly engaged. The vertical adjustment members engage and retain vertical retainer members as at 102 in overlying position relative to the toe of the ski boot, preferably at the intersection of the last with the sole of the boot.

Prongs 104 are also adjustably provided for penetrating into the toe portion of the boot and particularly the front sole portion to securely hold the boot in place. A pair of side guides 106 and 108 which are outwardly swingable are pivotally held in place as at 110 and 112, and are adjusted by means of adjustment screws 114 and 116, which are threadedly engaged in the body and which engage stops 118 and 120 in the form of shoulders provided on the guides 106 and 108 adjacent the pivotal mountings thereof.

It is to be noted that each of the guides is provided with a spring as at 120 normally urging the guides against the sole of the shoe with the adjustment screws 114 and 116 providing means whereby the guides are arranged for accommodating various sizes of ski boots.

Referring now to FIGS. 7 to 10, it will be seen that in FIG. 7 there is shown a modified arrangement wherein the annular member 130 is provided with slots as at 132 and 134 to accommodate straps such as are indicated at 136 and 138, which can be fastened across the rear portion thereof or across the instep of the boot. Further, both straps can be utilized, if found necessary.

In addition, a modified form of resilient means for engaging the boot is employed. This includes a spring 140, which is secured to the angle member 142 at one end 144 thereof, the other end 146 being secured to a tightener 148 whose link 150 is secured to an angle member 152. The angle members 142 and 152 may be of configuration shown either in FIG. 1 or FIG. 7.

As shown in FIG. 10, in lieu of the cylinder-shaped stud 85, a stud 160 may be employed which has a flattened edge 162 against which the spring 164 applies, thus enabling the positive prevention of rotation of the front body 166 until a predetermined stress has been applied. Of course, the stud 85 can be provided with a flattened portion similar to the flattened portion 162.

Further, as shown in FIG. 10, the front body 166 may be of a different configuration having an opening 168 extending vertically therethrough and further provided with a threaded aperture 170 for reception of the adjusting screw 172, which corresponds to the adjustment screw 92, and with other threaded apertures as at 174 for reception of adjustment means corresponding to the adjustment members 100 of FIG. 5. The advantage of the opening 168 is that same permits displacement of front body 166 forwardly with respect to stud 160.

In operation, after adjusting the angle plates 50 and 52 or the respective angle plates of the other modified form of the invention to correspond to the size of the boot worn by the skier, the leather strap 62 or the leather strap 136 or 138, or both, are fastened in place. Then the tightener is actuated bringing the resilient holding means into engagement with the rear portion of the sole of the boot. The front guides 106 and 108 having already been adjusted and the prongs 104 having bitten into the sole of the boot, the retainers 102 will firmly hold the front of the boot in place.

Should the boot become subject to severe lateral stresses, the sole of the boot may pivot through operation of the swivel plate 30 while as soon as sufficient force has been applied and inertia overcome, the toe mounting means 24 will pivot completely, releasing as may be necessary the toe of the ski boot, thus saving the skier from severe injury.

Thus, it can be seen that there has been defined a ski binding for attaching a ski boot to a ski while permitting release of the ski boot when the ski boot is subject to at least a predetermined torsional stress, which includes toe mounting means 24 and rear mounting means 26, which cooperate with each other to prevent injury to a skier. The toe mounting means includes a novel pivot means as at 85, or 160 for rotatably mounting the toe mounting means on the ski.

There is provided means associated with the toe mounting means including the prongs 104 and the retainer lip 102 for holding the toe in position together with spring means 90 for adjusting the amount of torsional stresses necessary to cause the pivot action of the toe mounting means. Spring-clamping means including tighteners and springs and without any straps are provided for engaging the heel of the boot, and any suitable simple leather straps may further be employed.

Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A ski binding comprising toe mounting means and rear mounting means cooperating to permit release of a ski boot when subject to predetermined torsional stresses, said toe mounting means including a front body, pivot means connected to said front body for pivotally mounting said front body to permit said front body to pivot laterally in case of excessive torsional stress thereon, horizontally extending spring means adjustably associated with and engaging said pivot means and being disposed within said front body to resiliently hold said front body against pivoting laterally, means attached to said front body for securely holding the toe of a ski boot thereto comprising a pronged member vertically adjustably secured to said front body and including prongs for biting into a toe portion of a ski boot, guide means pivotally adjustably attached to said pronged member and including a pair of arcuate guide fingers for engaging the sides adjacent a toe of a ski boot, said rear mounting means including a base plate, a swivel plate rotatable on said base plate, said swivel plate having an annular stepped portion forming an annular recess between said swivel plate and said base plate, a pair of angle members having portions disposed in said recess and connected to said swivel plate for rotation therewith, a spring attached directly to each of said angle members, and tightening

means terminally attached directly to said springs for drawing said springs together, said angle members and said swivel plate having cooperating toothed portions for adjusting the position of said angle members, whereby said rear mounting means can receive ski boots of differing sizes.

2. A ski binding comprising toe mounting means and rear mounting means cooperating to permit release of a ski boot when subjected to predetermined torsional stresses, said toe mounting means including a front body, pivot means connected to said front body for pivotally mounting said front body to permit said front body to pivot laterally in case of excessive torsional stress thereon, horizontally extending spring means adjustably associated with and engaging said pivot means and said front body to resiliently hold said front body against pivoting laterally, means attached to said front body for securely holding the toe of a ski boot thereto comprising a pronged member vertically adjustably secured to said front body and including prongs for biting into a toe portion of a ski boot, guide means pivotally adjustably attached to said pronged member and including a pair of arcuate guide fingers for engaging the sides adjacent a toe of a ski boot, said rear mounting means including a base plate, said base plate having a peripheral flange, a swivel plate having a central opening and having an inner depressed portion extending about the periphery of said opening, said flange overlying said depressed portion,

means extending through said base plate for fastening said base plate to the ski and for rotatably holding said swivel plate on the ski, a pair of angle members connected to said swivel plate for rotation therewith, a spring directly attached to each of said angle members, and tightening means directly attached to said springs for drawing said springs together.

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