Jan. 11, 1966 E. A. MILLER 3,228,708

CLAMPING JAWS FOR SKI BINDINGS

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FIG. 1

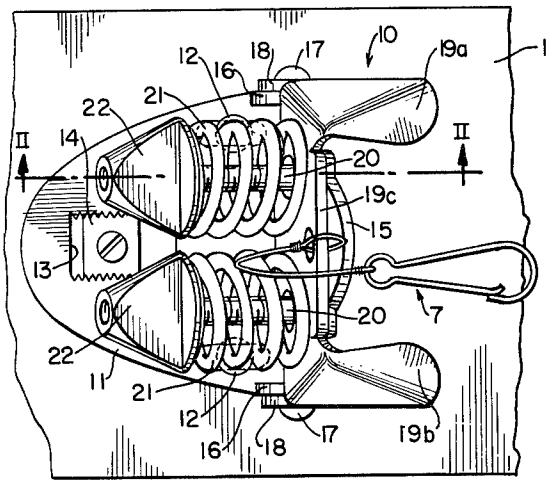


FIG. 2

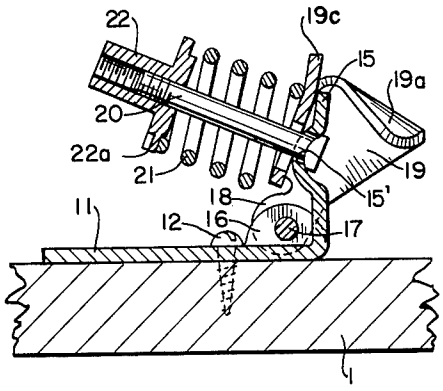


FIG. 3

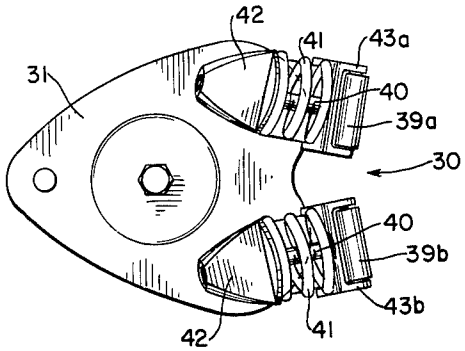
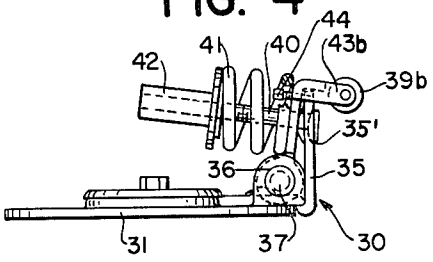


FIG. 4



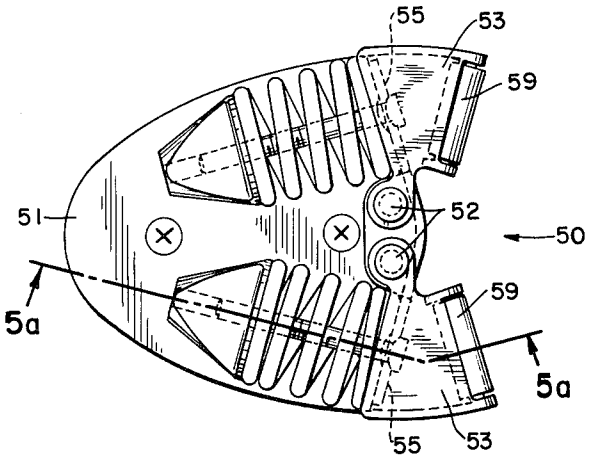


FIG. 5

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FIG. 5a

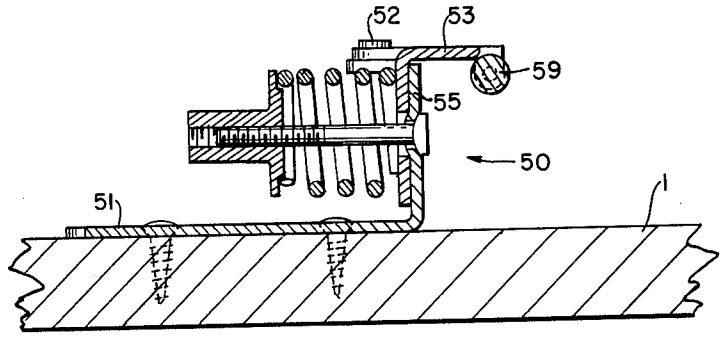


FIG. 6

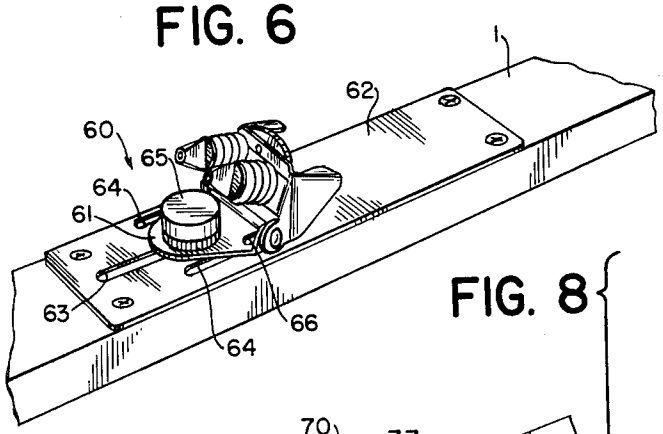


FIG. 8

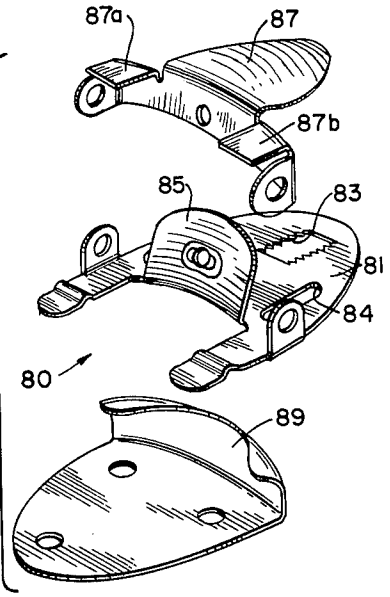
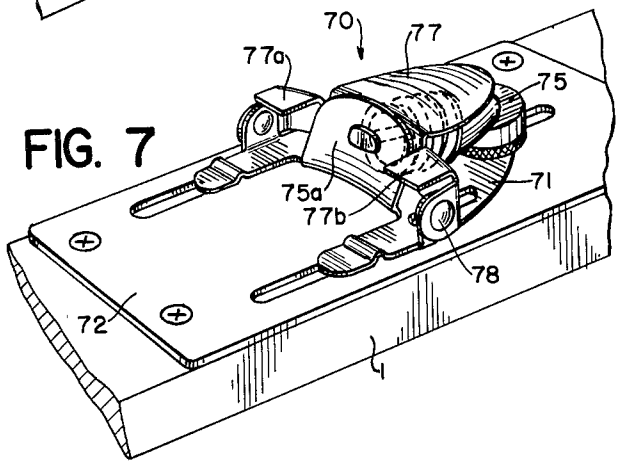


FIG. 7



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CLAMPING JAWS FOR SKI BINDINGS

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Claims priority, application Germany, Apr. 20, 1960, M 34,712
4 Claims. (Cl. 280—11.35)

The present invention relates to ski bindings, and more particularly to so-called front-release or toe bindings and also to heel units incorporating the same inventive features, although adapted for use with any kind of thong, cable or heel units, and vice versa.

Hitherto known ski bindings present several disadvantages. One of the most prominent drawbacks is that these bindings only flip out to the left or right and present a "break apart" action, while they do not provide protection against shearing and rolling stresses occurring in the course of skiing. Most release bindings must be snapped back together after they have been released. If the binding becomes clogged with snow, this may present considerable difficulties, particularly if the user wears heavy gloves.

Another noticeable disadvantage of known ski bindings is that they usually grip the sole of the ski boot in the middle and thus allow an unwanted rocking movement which, sometimes, lets the user "ski out" from the binding. Due to these and other inherent characteristics of hitherto known binding systems, they either did not release the skier's boot, resulting in serious accidents, or they released even when it was not necessary at all.

For this reason, releasing bindings have been in disfavor for slalom and down-mountain skiing, where the non-releasing types had to be used so as to avoid the ski coming off the boot too easily. The fixed toe units mostly used for slalom, on the other hand, hold the boot off the ski about a quarter of an inch.

These and other disadvantages and difficulties of conventional ski bindings are intended to be overcome by the present invention. One of its major objectives is to provide ski bindings which offer positive touch control over the ski while they also allow a progressive or slow, yet absolutely safe release if abnormal conditions are met.

The new bindings offer, in all of the various embodiments, the so-called roll release, not found in any other type of binding, which lets the foot literally roll out sideways. The new bindings also allow lateral shear which works both at slow and high speeds while other bindings only operate on impact. The bindings also pull out backwards or straight up; this is often required when skiers are locked in the snow. The three types of release functions, viz. roll, shear and pull, are possible separately and also simultaneously. Since the new bindings are capable of releasing at all angles, a composite release, e.g. combined shear and roll, is also possible.

Another objective is to provide novel type ski bindings equally well suitable for racing, slalom and down-mountain use. The bindings according to the present invention are intended to offer the same "feel" for slalom as for regular skiing. In giant slalom, for example, a release binding was unheard of, and the skiers had to experience quite a difference in the control of the skis between the normally used release and the toe-iron type of (non-releasing) bindings. It is thus an objective of the present invention to provide universally adaptable release-type ski bindings.

A further objective is to provide simple ski bindings, easy to manufacture, to install and to use, having a minimum number of simple parts and adaptable to a wide variety of skiing tasks. Accordingly, it is also an objective to provide ski bindings which are equally suitable as

toe units and as heel units, also adapted for use with a variety of dissimilar thong, cable, and other types of attachments and counter-parts.

One of the characteristic features of a preferred embodiment of the new ski bindings is the provision of one or more jaws or engaging plates, horizontally or vertically swingable with respect to the ski, which provide a frontal engagement with the ski boot. The boot is gripped at the two outside corners by appropriately shaped and bent jaw members allowing all three of the above-mentioned releasing actions. The engaging members are provided in alternative embodiments with bent jaw portions, rollers and the like.

Another important feature is the use of one or more springs provided around floating pins and attached to a stationary base member; this principle has never before been applied in ski toe units.

A further feature is the provision of a cover-shaped lever above the biasing spring or springs, adapted to assist in opening the ski bending, or in putting back a thong-type connection after it has released. It should be emphasized, however, that even without the provision of the cover-shaped lever the novel ski binding can easily be put back by using the ski pole to open the front unit, so that the thong latch system need not be operated.

Other objects, features and advantages of the invention will become more fully apparent from the following description and the appended claims, reference being made to the accompanying drawings, in which:

FIG. 1 is a top view of one embodiment of the new front release ski binding according to the invention;

FIG. 2 is a sectional view taken along line II—II of FIG. 1;

FIG. 3 is a top view of an alternative embodiment having independently operating rollers;

FIG. 4 is a partial side view of one of the rollers shown in FIG. 3;

FIG. 5 is a top view of another variant of the new ski binding having vertically suspended swinging units;

FIG. 5*a* is a sectional view taken along the lines 5*a*—5*a* of FIG. 5.

FIG. 6 is a perspective view of a so-called racing unit, similar in construction to that of FIGS. 1 and 2 but providing longitudinal adjusting facility along the ski;

FIG. 7 is a perspective view of a heel unit having the same longitudinal adjustment as shown in FIG. 6; and

FIG. 8 is an exploded view of three major elements of a heel unit similar to that shown in FIG. 7 but adapted for fixed attachment to the ski.

FIGS. 1 and 2 show the first embodiment of the ski binding according to the invention, denoted **10** and attached to a ski **1**. A base or ski plate **11** is secured to the ski, e.g. by means of screws **12**. For a longitudinal adjustment of the plate **11**, an adjustment slot **13** may be provided, accommodating an adjustment tab **14**. The hole for the screw holding the tab **14** against the serrated edges of the slot **13** is counter-sunk to allow horizontal play. The slot and tab arrangement is particularly advantageous if the front binding is intended to be displaced along the ski. In this case, the ski plate **11** may be extended rearwardly (that is, to the right side of FIGS. 1 and 2) to cover the area on which the ski boot rests; a simple lengthwise slot with a screw may be provided in the rear portion of plate **11** (not shown).

The rear end of plate **11** is bent upwards to form support plate **15**. The L-shaped corners of plates **11** and **15** have lateral flanges **16** traversed by a bolt **17**. On this bolt are pivotally secured the lower flanges **18** of a cup-shaped jaw member **19**. The member **19** has two lateral, inwardly bent portions **19***a*, **19***b* and a slightly raised central portion **19***c*.

The support plate **15** has two openings **15'** which accommodate the ends of bolts **20**. Each bolt is surrounded by a compression spring **21**. The other, threaded ends of bolts **20** are provided with nuts **22** having profiled portions **22***a* for accommodating the outer ends of the springs. Thus, the jaw-member portion **19***c* is urged by the springs **21** against the support plate **15**. Owing to their special shape, the heads of bolts **20** cannot rotate in the openings **15'**. The pretensioned springs regulate the force with which the jaw portions **19***a*, **19***b* hold the front portion of a ski boot (not shown).

When the stress between the boot and the jaw portions surpasses a predetermined limit, the jaw member **19** is moved against the springs so that the boot edge becomes released. The springs **21** are notched to prevent turning or shifting while skiing. The knobs **22** are adapted for being adjusted with a special socket-type driver. This eliminates unwanted tampering. The slightly curved recess between the upper central portions of members **15** and **19***c* is adapted to take up the tip of a ski pole when the skier desires intentionally to open the binding, or to put the binding back on the boot (e.g., in case of using thongs).

At **7**, a cable or strap is shown, attached by means of a small ring to an aperture in member **19***c*, by means of which the binding and consequently the ski proper may be attached to an eye on the boot (not shown) so as to prevent the ski from running away.

It will be evident to those skilled in the art that instead of the two springs and bolts as shown, only one or even three similar system may be used, acting on the jaw member **19** in a manner similar to that shown in the embodiment of FIGS. 1 and 2. The action is more uniform if two spring systems are provided, because one spring might tend to bind by putting pressure on the jaw sideways, particularly in a roll release, with wedging action resulting.

In any event, the angle of incidence between the jaw member and the support plate is very important so as to hold down the boot toe into the binding even if it tends to curl upwards towards its front. The jaw member pulls such curved soles flat by virtue of the frontal engagement. It is understood that the boot automatically centers in the binding so that no adjustment is necessary. Upon release, the elements automatically return to their initial position.

FIGS. 3 and 4 show an alternative embodiment **30** of the new ski binding provided with independently operating lateral rollers. A base plate **31** carries two separate lateral, upwardly bent support plates **35**. The openings **35'**, bolts **40**, springs **41** and nuts **42** are similar to their respective counterparts **15'** and **20–22** of the binding shown in FIGS. 1, 2. Lateral flanges **36** of the L-shaped plates **31** and **35** carry, by means of a transverse bolt **37**, rocking members **43***a*, **43***b* each carrying a respective roller **39***a*, **39***b* adapted to engage the ski boot in a manner similar to that of jaw **19**. Here, each roller acts independently from the other so that lateral roll and upward pull-out releases, and combinations thereof, are even safer than with the previous binding.

In FIG. 4, a small bolt **44** is shown concealed inside the spring **41**. This bolt can be adjusted to hold the rocking members **43***a*, **43***b* forward or back over the ski boot sole as desired. The bolt will thus allow the pieces to come together or to remain apart as desired. For the sake of clarity, the bolt **44** has not been shown in FIG. 3; also, the ski and the elements by which the base plate is fastened to the latter have been omitted.

Another variant of the new ski binding is shown in FIGS. 5 and 5*a*, where the unit **50** comprises a base plate **51** and upwardly bent support-plate portions **55**. Substantially in the rear center of the base plate, two vertical pivots **52** are provided for angularly bent support members **53**. These members both have a forward, vertical plate portion engaged by a spring system as shown in the previous embodiments while a rearward, upper portion carries a roller **59** similar to rollers **39** of FIGS. 3, 4. This binding gives independent corner release and allows the boot to move forward as it moves out horizontally. The binding does not require a plate on the boot; vertical adjustment is attained through the use of shim plates.

A so-called racing unit **60** is shown in FIG. 6. The binding mechanism itself, operating with two spring systems, is identical with that disclosed in connection with FIGS. 1, 2. However, an intermediate plate **62** is screwed to the ski **1** and has longitudinal slots **63**, **64**. The center slot **63** accommodates a bolt with a bottom oblong head (not shown) guided along a groove routed in the ski to prevent turning. The upper end of the bolt is threaded and carries a knurled knob **65** by which the adjustment and subsequent locking can be performed. The lateral slots **64** slidingly hold solid rivets (not shown) which connect them to coextensive slots **66** of a base plate **61** which carries the ski binding.

FIG. 7 shows a heel unit **70**, identical in principle with the toe unit of FIGS. 1, 2 but used at the rear of the boot rather than at its front and having only one spring system (shown in dotted lines). This binding also has an intermediate plate **72** under the base plate **71**, like in FIG. 6. Longitudinal adjustability is provided by a knob **75** and the cooperating elements which are also similar to the previously described arrangement. A cover-shaped lever **77** is shown above the spring system, which has forward lateral jaw extensions **77***a*, **77***b*. The lever **77** is hinged at **78** to a support plate **75***a* which carries the spring system in a way described and illustrated in the previous embodiments (e.g. plate **15** of FIGS. 1 and 2). The heel unit may be released by simply pushing down the lever **77** toward the ski **1**, whereupon the extensions **77***a*, **77***b* become disengaged from the boot heel.

FIG. 8 is an exploded view of a complete heel unit **80** similar to that shown in FIG. 7, but adapted for fixed attachment to the ski. A cover-shaped lever **87** is shown which is rolled around on both sides to give more complete protection to the spring system. The lateral jaw extensions **87***a*, **87***b* are angled for a better grip on the boot plate. The L-shaped base and support plate **81**, **85** has an adjustment slot **83** with serrated edges similar to slot **13** of FIGS. 1, 2; in cooperation with lateral slots **84** (similar to slots **66** of FIG. 6), slot **83** serves for the longitudinal adjustment of the plate **81** on the ski. The lowermost member of FIG. 8 is a boot plate **89** which is screwed unto the heel of the ski boot. Its corners are also angled to match them to the jaw extensions **87***a*, **87***b* by which they are engaged.

It is understood that the cover-shaped members **77**, **87** of FIGS. 7, 8 could also be used in the embodiments shown in FIGS. 1 and 2, 3 and 4, 5, or 6. Similarly, other design features and details may be borrowed from one modification and used in the other since the basic principle is identical. The described embodiments have been shown as preferred variants without intention to limiting the claims to these particular designs.

It should be understood, of course, that the foregoing disclosure relates only to preferred embodiments of the invention and that it is intended to cover all changes and modifications of the examples described which do not constitute departures from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A releasing-type front unit for ski bindings, comprising a base plate secured to and substantially coextensive with a portion of the ski, said base plate having a portion substantially perpendicular to said ski, located in front of the skier's boot and having two bores therein; boot engaging means on said base-plate portion, including two lateral, adjacent jaws separately and pivotally attached to said base-plate portion, said jaws being each provided with a roller for holding a respective lateral frontal boot

portion firmly in contact with said ski; two biasing means on said base-plate portion, each including a floating pin passing through a respective bore of the base-plate portion and pivotable thereat with one end, a compression spring surrounding said pin for urging the respective jaw toward said boot, and an adjustable knob threadedly secured to the other end of said pin, allowing a predetermined releasing force to be adjusted for said engaging means, so that the latter can move away from either lateral boot portion and release the boot from its contact with said ski if extraneous stresses acting on said boot exceed the force of the respective biasing means.

2. A releasing-type front unit for ski bindings, comprising a base-plate secured to and substantially coextensive with a portion of the ski, said base plate having an upright portion located in front of and surmounting a frontal portion of the skier's boot; upper boot engaging means on said base-plate portion in front of the skier's boot, including two jaws separately and pivotally attached to said base-plate portion, said jaws being each provided with a roller for engaging said frontal boot portion from above and holding it in contact with said ski; two biasing means pivotally attached to said base-plate portion, including separate spring means for each of said jaws, on the side of said base-plate portion facing away from said boot, and acting substantially parallel with each other in the direction of said ski, so that either side of said boot is releasable independently from the other if extraneous stresses acting on said boot exceed the force of said biasing means.

3. A front unit according to claim 2, wherein said jaws are pivotable about axes substantially perpendicular to said base plate, and wherein said spring means act at locations outward from said axes.

4. A releasing-type ski binding comprising a toe unit and a heel unit, each of said units comprising a base plate secured to and substantially coextensive with a portion of the ski, said base plates having each a portion substantially perpendicular to said ski, one of them in front of the skier's boot and the other behind the same, each base-plate portion having two bores therein; each of said units further comprising boot engaging means on the respective base-plate portions, each including a pair of lateral jaws separately and pivotally attached to the respective base-plate portion, said jaws being each provided with a roller for holding respective lateral front and rear boot portions in firm contact with said ski; a pair of biasing means for each unit, each including a floating pin passing through a respective bore of the respective base-plate portion and pivotable thereat with one end, a compression spring surrounding said pin for urging the respective jaw toward said boot, and an adjustable knob threadedly secured to the other end of said pin, allowing a predetermined releasing force to be adjusted for each engaging means, so that all jaws can move away independently from the respective lateral boot portions, in substantially opposite directions between said engaging means, and release the respective end of said boot from its contact with said ski if extraneous stresses acting on said boot exceed the force of the respective biasing means.

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