Aug. 20, 1963 R. L. HALL 3,101,201

SKI BINDING

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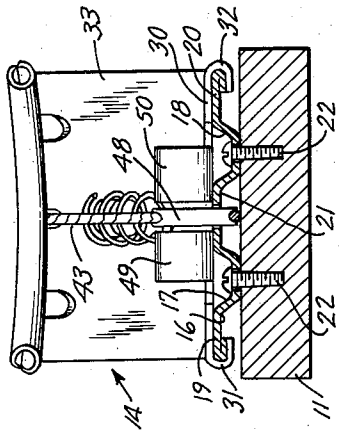


FIG. 4

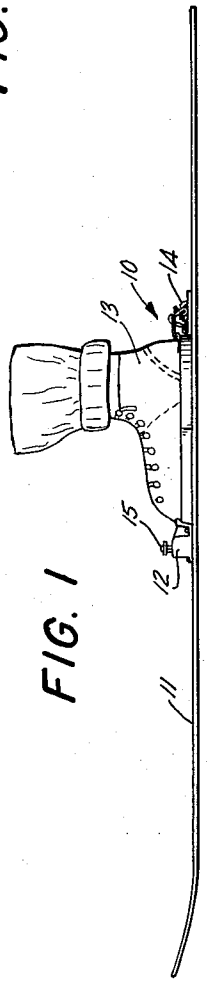


FIG. 1

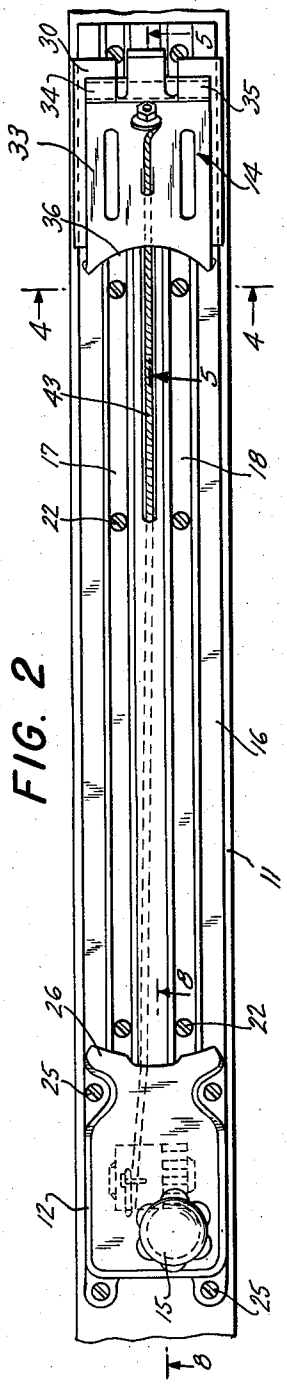


FIG. 2

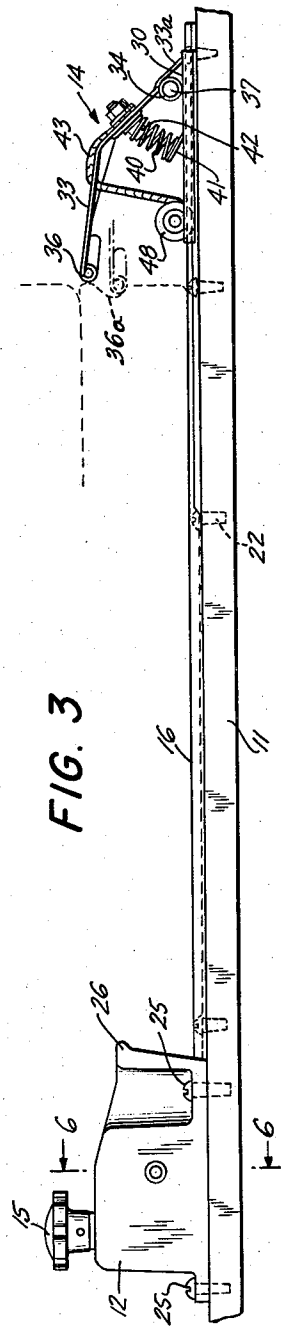


FIG. 3

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SKI BINDING

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FIG. 6

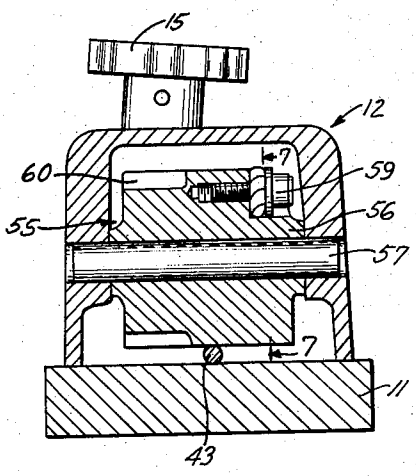


FIG. 7

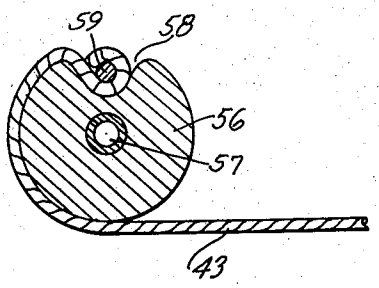
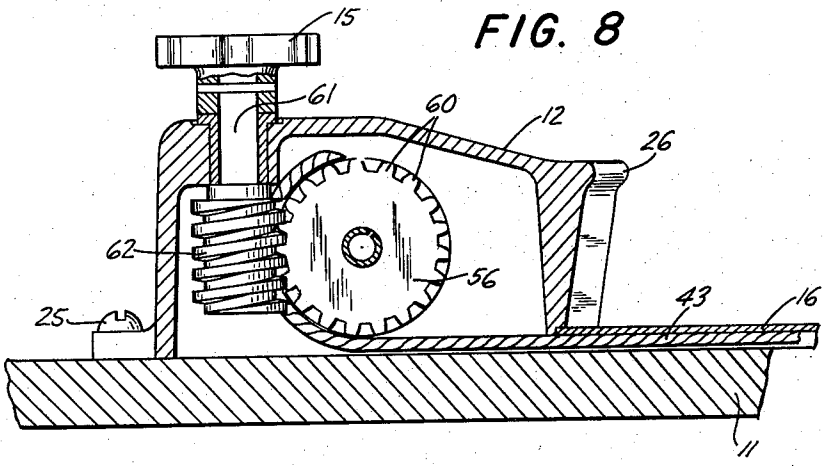


FIG. 8



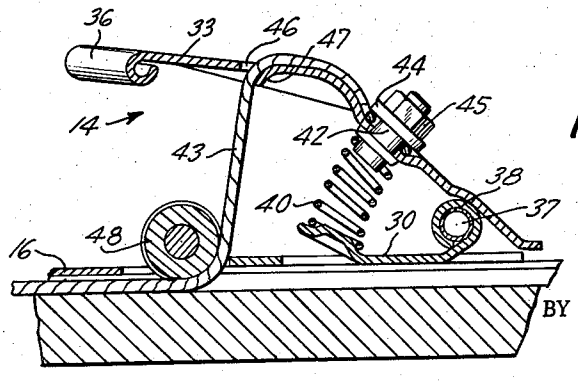


FIG. 5

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SKI BINDING

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3 Claims. (Cl. 280—11.35)

The present invention relates to a ski binding for attaching a ski to the boot of a skier, and more particularly to an improved binding which facilitates quick adjustment to boots of different sizes.

While the ski binding of the present invention may be used in place of conventional bindings, it is particularly adapted for use on rental skis. Skis are rented to transients at many winter resorts, and it has been proposed to rent skis to skiers for use on artificial ski slopes provided in city buildings which simulate skiing on natural ski slopes. Conventional ski bindings are quite complicated and not adapted for adjustment to fit shoes of a different size each time the skis are used as they require extensive manipulation, trial and readjustment to suit the individual skier. Furthermore, if the binding is too loose the ski is apt to fall off and if too tight it will not release in an emergency.

One of the objects of the present invention is to provide an improved ski binding which may be manually adjusted to boots of different sizes by an unskilled person in a minimum period of time.

Another object is to provide a ski binding of the type indicated which facilitates adjustment for shoes of different sizes and retains its clamping engagement when once adjusted.

Another object is to provide a manually adjustable ski binding which is of relatively simple and compact construction, economical to manufacture and one which is reliable in operation.

These and other objects will become more apparent from the following description and drawings in which like characters denote like parts throughout the several views. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings:

FIGURE 1 is a side elevational view of a ski incorporating the novel binding of the present invention and shown clamped to the ski boot of a wearer;

FIGURE 2 is an enlarged plan view of the ski binding illustrated in FIGURE 1 and showing the forward toe clamp, rearward heel clamp and manually operable knob for adjusting the heel clamp;

FIGURE 3 is a side elevational view of the binding illustrated in FIGURE 2 and showing the pivotally mounted heel clamp and the cable for adjusting the binding and rocking the heel clamp into binding engagement with the boot;

FIGURE 4 is a transverse sectional view taken on line 4—4 of FIGURE 2 to show the heel clamp slidably mounted on a ski plate;

FIGURE 5 is an enlarged view of the heel clamp to show its pivotal mounting and the cable for adjusting the heel clamp longitudinally as well as vertically with respect to the ski plate;

FIGURE 6 is a transverse sectional view taken on line 6—6 of FIGURE 3 to shown the winch for reeling the cable to adjust the heel clamp relative to the toe clamp;

FIGURE 7 is a transverse sectional view taken on line 7—7 of FIGURE 6 to show the drum of the winch for reeling the cable in end elevation; and

FIGURE 8 is a longitudinal sectional view taken on line 8—8 of FIGURE 2 to show the worm and wheel for operating the cable winch.

Referring now to the drawings, FIGURE 1 illustrates the ski binding **10** of the present invention applied to a ski **11**. The ski binding **10** comprises a front abutment **12** for clamping engagement with the toe of a ski boot **13** and a movable heel clamp **14** for engagement with the heel of a boot. The movable heel clamp **14** is slid forwardly toward the abutment **12** and into clamping engagement with the heel of the boot and downwardly toward the ski **11** by a manually operable member illustrated in the form of a knob **15**.

As shown more in detail in FIGURES 2 to 5, the binding **10** includes a ski plate **16** having longitudinally extending ribs **17** and **18** arranged in laterally spaced relation and engaging the top of the ski. As will be observed in FIGURE 4, the plate **16** has flanges **19** and **20** projecting laterally from and a bridge **21** extending between the depressed ribs **17** and **18** and the flanges and the bridge are spaced from the top of the ski, see FIGURE 4. Plate **16** is attached to the ski **11** by means of spaced screws **22** extending through the depressed ribs **17** and **18** and into the ski. In the illustrated embodiment as viewed in FIGURE 4, the outer edges of the flanges **19** and **20** are turned back on themselves at the edges to strengthen the flanges and provide a bearing surface.

Front abutment **12** is in the form of a hollow casting seated on the ski **11** at the forward end of the plate **16** and attached to the ski by suitable means, such as screws **25**. The abutment **12** has a clamping shoulder **26** projecting rearwardly therefrom for clamping engagement with the toe of boot **13**. As shown in FIGURE 2, the toe clamp **26** is of a shape to conform to the curvature of the toe of a boot and is positioned at a height above the ski plate **16** to engage the upper edge of the sole of a ski boot. As will be observed in FIGURE 3, the rearward edge of the abutment **12** forming the toe clamp **26** projects rearwardly from an upwardly and rearwardly projecting side of the casting to cam the sole of the boot downwardly toward the top of the ski **11**.

The heel clamp **14** comprises a base plate **30**, of sheet metal or the like, mounted to slide on the ski plate **16**. To this end, the base plate **30** of the heel clamp **14** overlies the ski plate **16** with its sides folded downwardly and inwardly to form grooves **31** and **32** overlying the side edges of the flanges **19** and **20** with a sliding fit. Thus, the base plate **30** of heel clamp **14** is adapted to slide along the ski plate **16** longitudinally of the ski. Heel clamp **14** also includes a jaw member **33** extending upwardly and then forwardly from sliding base plate **30** and having hinged bearings **34** and **35** at one end and a clamping shoulder **36** at its opposite end. A hinge pin **37**, see FIGURE 3, extends through the bearings **34** and **35** on the pivoted clamping jaw **33**, see FIGURE 2, and through a bearing **38** on the base plate **30**, see FIGURE 5, to hingedly mount the jaw **33** for rocking movement. The end of the jaw **33** on which clamping shoulder **36** is formed has the material rolled back on itself to reinforce the shoulder and is formed to provide a rounded contour corresponding to the heel of the boot to be clamped. Shoulder **36** of jaw **33** is adapted to clamp a boot between its heel and upper, or engage a rounded groove **36***a* sometimes provided in the heel of ski boots, as shown diagrammatically in FIGURE 3.

As shown in FIGURES 3 and 5, the jaw **33** of heel clamp **14** is rocked clockwise on its pivot pin **37** by a spring **40** and this clockwise rocking is limited by the tailpiece **33***a* engaging the base plate **30**. Spring **40** acts between an abutment **41** on the base plate **30** and a stud **42** projecting through the upwardly inclined portion of the heel clamp. Jaw **33** of heel clamp **14** is moved downwardly against the action of the spring by a cable **43**.

As shown most clearly in FIGURE 5, the end of the cable **43** is attached to the clamping jaw **33** of the heel clamp **14** by a washer **44** and nut **45** screwed onto a threaded projecting end of stud **42**. Cable **43** then extends forwardly over the top of the jaw **33** and then downwardly through an opening **46** therein and the cable is guided through the opening by a depressed tongue **47** on the jaw. The cable **43** extends downwardly under a pulley or guide roller **48** mounted to rotate in bearings **49** and **50** on the base plate **30**, see FIGURE 4. Cable **43** then extends forwardly under the ski plate **16** in the space between the bridge **21** and the top of the ski **11**, as shown in FIGURES 2, 4 and 5.

Heel clamp **14** is slid longitudinally of the ski plate **16** toward the toe clamp **26** by means of a winch **55** to clamp a booth therebetween, see FIGURES 6 to 8. Winch **55** comprises a drum **56** mounted on a shaft **57** journaled in the sides of the hollow abutment **12**. Drum **56** has a recess **58** at one end to accommodate a screw **59** for clamping the end of the cable **43** thereto. The peripheral edge of the drum **56** opposite recess **58** is formed to provide spur gear teeth **60**. As shown in FIGURE 8, a vertical shaft **61** is journaled in the hollow abutment **12** and has a worm **62** at one end in meshing engagement with the gear teeth **60**. The opposite end of the shaft **61** projects upwardly from the abutment housing **12** and has knob **15** fixedly mounted thereon. One form of the invention having now been described in detail, the mode of operation is explained as follows:

When a ski **11** is to be applied to a boot **13**, the knob **15** of the binding is turned in one direction to unreel the cable **43** and the heel clamp **14** is pulled rearwardly away from the toe clamp **12**. The boot is then placed on the ski with the toe adjacent the toe clamp **26** of the abutment **12** and the heel of the boot forwardly of the heel clamp **14**. Knob **15** then is turned in the opposite direction to reel in the cable **43** and tighten the clamp. Rotation of the knob **15**, see FIGURE 8, is transmitted through the shaft **61** and worm **62** mounted thereon to turn the drum **56** of the winch **55** to reel the cable **43** thereon. As the cable **43** is drawn forwardly it pulls the heel clamp **14** forwardly as a unit, with the base plate **30** sliding on the ski plate **16**, until the clamping shoulder **36** engages the heel of the boot **13**. Continued rotation of the knob **15** then tightly clamps the boot between the toe and heel clamps **26** and **36** and pulls the pivoted jaw **33** downwardly against the action of the spring **40** into tight engagement with, for example, the recessed edge **36***a* of the heel of the boot to tightly clamp the boot between the heel clamp jaw and ski plate **16**. When the knob **15** is released the worm and wheel **62** and **60** interlock to prevent loosening of the cable so that the boot will remain firmly clamped in position on the ski.

When it is desired to remove a ski, the knob **15** is turned to releasing position which unwinds the cable **43** from winch **55** and releases the heel clamp **14** which may be slid manually from engagement with the heel of the boot **13**. Due to the simplicity of the adjustment, the ski binding **10** of the present invention is adapted to be easily and quickly adjusted to boots of different sizes merely by turning the knob **15** manually. Thus, the binding of the present invention facilitates the attachment of a ski to a boot by unskilled persons having different sized feet.

It will now be observed that the present invention provides a ski binding which may be manually adjusted and clamped to boots of different sizes by an unskilled person in a minimum period of time. It will further be observed that the present invention provides a ski binding which may be easily and quickly adjusted by manually turning a knob and which will not be released except intentionally when once adjusted. It will still further be observed that the present invention provides a ski binding which is of relatively simple and compact construction that may be economically manufactured, and one which is reliable in operation.

While a single embodiment of the invention is herein illustrated and described, it will be understood that changes may be made in the construction and arrangement of elements without departing from the spirit or scope of the invention. Therefore, without limitation in this respect, the invention is defined by the following claims:

1. A ski binding for attaching a ski to the boot of a skier comprising a front abutment on the ski having a rearward projection for clamping engagement with the toe of the boot, a ski plate having depending ribs contacting the ski and fastened thereto to provide a central bridge and side flanges spaced from the ski, a heel clamp having a base plate mounted to slide on said ski plate and having grooves at its edges cooperating with the side flanges of the ski plate, a clamping jaw having one end pivotally connected to the sliding member and an abutment at its free end shaped to conform to the contour of the heel of the boot, a pulley mounted to rotate on the member below the clamping jaw, a spring acting between the member and pivoted jaw for rocking the jaw upwardly with respect to the plate, a cable connected to the jaw intermediate its ends and extending around the pulley and forwardly under the plate to a position forwardly of the toe clamp, and manually operable means for pulling the cable forwardly whereby to move the slide forwardly until the free end of the clamping jaw engages the heel of the boot to clamp the boot between the jaw and toe clamp and between the jaw and ski plate.

2. A ski binding in accordance with claim 1 in which the manually operable means is a winch having a winding drum to which the cable is attached and axially extending gear teeth on its periphery, a shaft having a worm in meshing engagement with the gear teeth on the drum, and a knob on the shaft for turning the worm.

3. A ski binding in accordance with claim 1 in which the clamping jaw extends upwardly and forwardly, the end of the cable being attached to the jaw adjacent its pivot and extending upwardly and forwardly over the jaw and then downwardly through and forwardly under the ski plate to the winch.

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