Jan. 12, 1965 F. MALONE 3,165,328

MAGNETIC SKI BINDING

Filed Dec. 14, 1962

2 Sheets-Sheet 1

Fig. 1

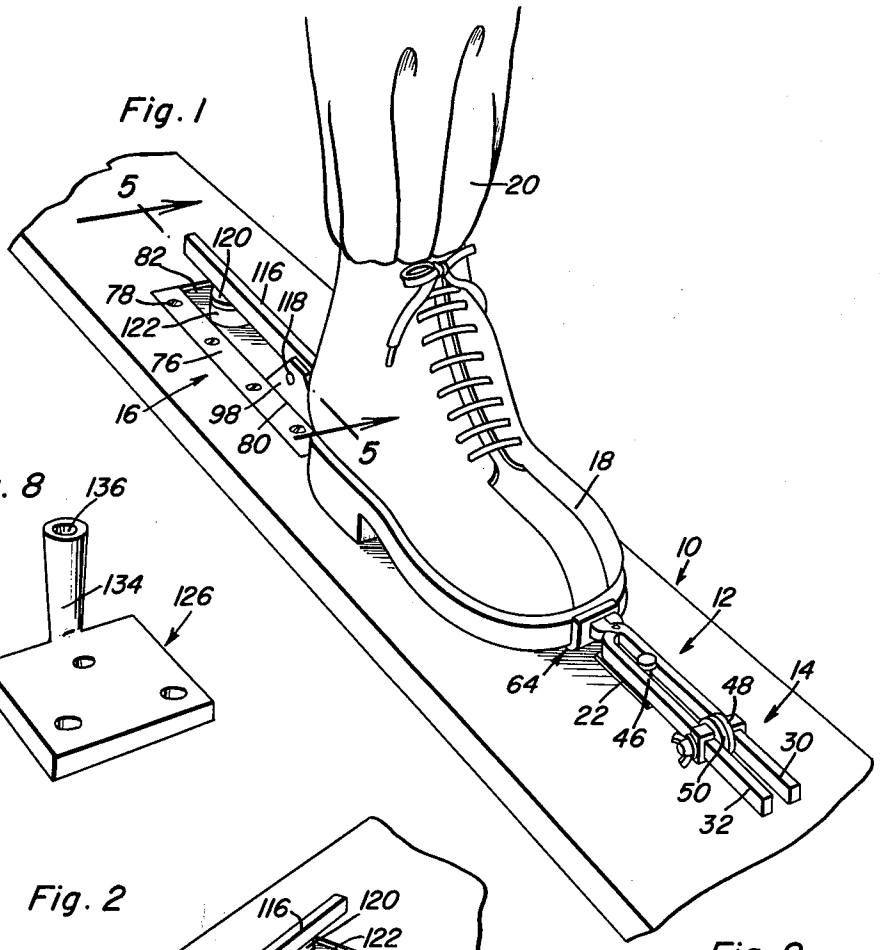


Fig. 8

Fig. 2

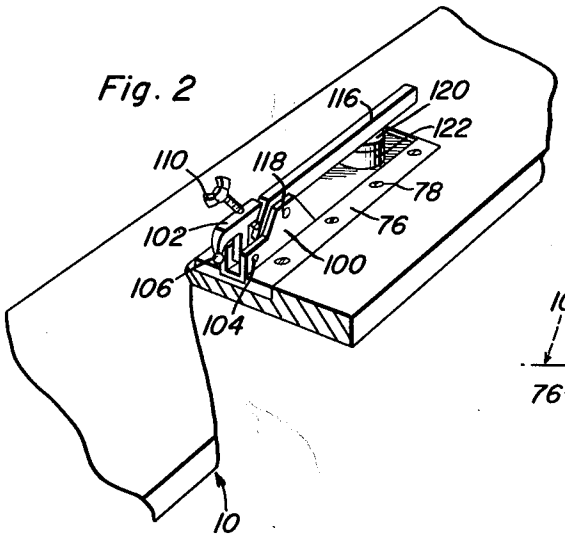
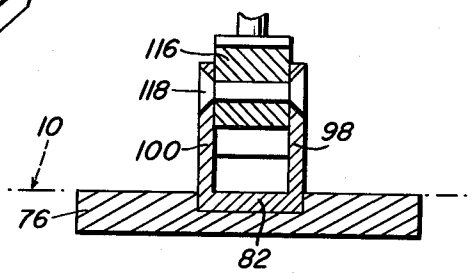


Fig. 9



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MAGNETIC SKI BINDING

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Fig. 3

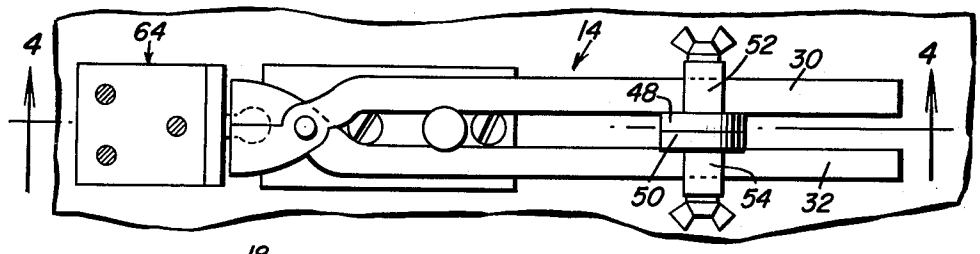


Fig. 4

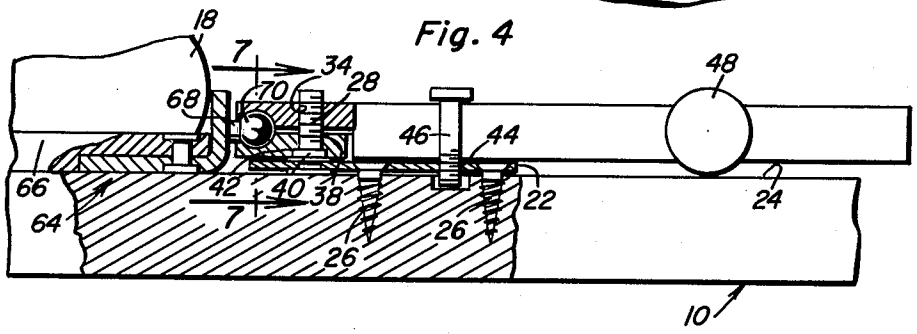


Fig. 5

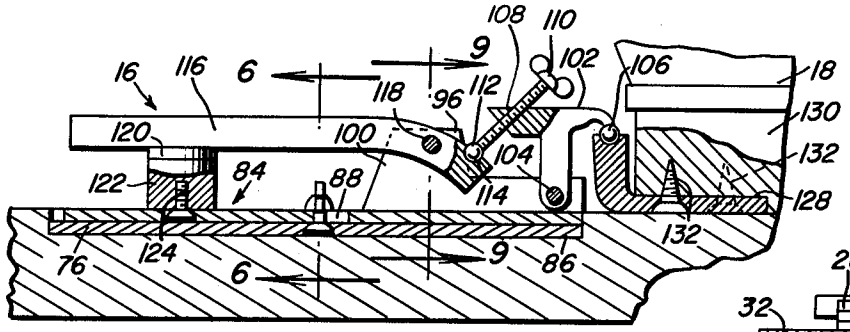


Fig. 6

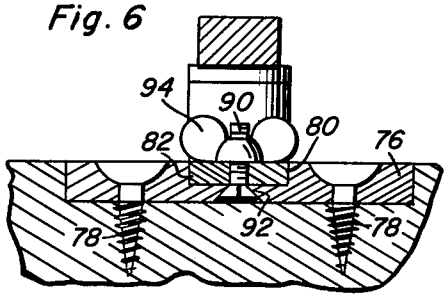
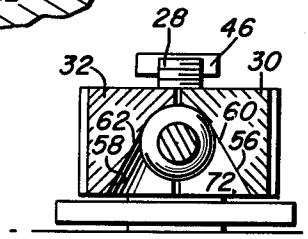


Fig. 7



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United States Patent Office 3,165,328 Patented Jan. 12, 1965

3,165,328

MAGNETIC SKI BINDING

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Filed Dec. 14, 1962, Ser. No. 244,610
10 Claims. (Cl. 280—11.35)

This invention relates to a novel and useful magnetic ski binding and more specifically to a ski binding constructed in a manner whereby a ski boot worn by a skier may be indirectly magnetically secured in the proper position relative to a ski worn by the skier.

For quite some time there has been a great amount of emphasis on the use of ski bindings which will allow a ski boot to become separated from a ski whenever abnormal forces are acted upon a ski boot by the ski secured thereto. It is very important that a skier's skis be fixedly secured to his ski boots in order that each and every movement imparted to the ski boots by the feet of the skier therein will also be imparted to the skis secured to the ski boots without any slack or lost motion between the ski boot and the ski. However, heretofore only the most expensive ski bindings were capable of even closely approaching the ultimate in providing a means whereby the ski is fixedly secured to the ski boot and yet may be readily detached from the ski boot as soon as abnormal forces are acted upon a ski boot by the skis.

It is accordingly the main object of this invention to provide a ski binding which will fixedly secure a ski to a ski boot and yet enable the ski and the boot to readily separate in all instances where a force is applied to the ski boot over and above the requirements of normal skiing.

A further object of this invention is to provide a magnetic ski binding which will, without the use of springs or a friction catch, enable the skis to be fixedly secured to a pair of ski boots and yet be readily separable from the boots.

Another object of this invention is to provide a ski binding which will be extremely reliable and consistent in operation.

Still another object of this invention is to provide a ski binding in accordance with the preceding objects which may be readily adjusted to compensate for different size boots.

Still another object of this invention is to provide a ski binding which may be quickly secured to a ski boot.

Yet another object of this invention is to provide a ski binding in accordance with the preceding objects which will enable the toe of a boot secured to a ski to be readily detached from the ski upon an abnormal amount of pressure atempting to force the toe of the ski boot away from the upper surface of the ski and movement of the toe of the ski boot laterally of the ski.

A further object of this invention is to provide a ski binding in accordance with the preceding objects which will enable the heel portion of a ski boot to be readily separated from the ski upon the application of abnormal forces urging the heel of the boot to be lifted relative to the upper surface of the ski to which it is secured.

A final object of this invention to be specifically enumerated herein is to provide a magnetic ski binding in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part thereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a fragmentary perspective view of a ski shown with a ski boot secured thereto by means of the ski binding of the instant invention;

FIGURE 2 is a fragmentary perspective view of the ski showing the rear portion of the ski binding, portions of the ski being broken away and shown in section;

FIGURE 3 is a fragmentary top plan view of the forward portion of the ski binding shown secured to the ski and with the toe plate for the ski boot operatively associated therewith;

FIGURE 4 is a fragmentary longitudinal vertical sectional view taken substantially upon the plane indicated by the section line 4—4 of FIGURE 3;

FIGURE 5 is a fragmentary enlarged longitudinal vertical sectional view taken substantially upon the plane indicated by the section line 5—5 of FIGURE 1;

FIGURE 6 is an enlarged transverse vertical sectional view taken substantially upon the plane indicated by the section line 6—6 of FIGURE 5;

FIGURE 7 is an enlarged fragmentary transverse vertical sectional view taken substantially upon the plane indicated by the section line 7—7 of FIGURE 4;

FIGURE 8 is a perspective view of the heel plate for the ski boot providing the connection between the rear portion of the ski binding and the ski boot; and

FIGURE 9 is an enlarged transverse vertical sectional view taken substantially upon the plane indicated by the section line 9—9 of FIGURE 5.

Referring now more specifically to the drawings, the numeral 10 generally designates a conventional type of ski which is shown in FIGURE 1 having the ski binding of the instant invention secured thereto. The ski binding is generally referred to by the reference numeral 12 and includes a forward portion generally referred to by the reference numeral 14 and a rear portion generally referred to by the reference numeral 16. From FIGURE 1 of the drawing it may be seen that the ski boot 18 of a skier 20 is secured to the upper surface of the ski 12.

With attention now directed more specifically to FIGURES 1, 3, 4 and 7 of the drawings it may be seen that the forward portion 14 includes a mounting plate 22 which is secured to the upper surface 24 of the ski 10 in any convenient manner such as by screw fasteners 26.

An externally threaded shank 28 is secured through the mounting plate 22 and projects upwardly therefrom. A pair of levers 30 and 32 are provided with threaded bores 34 and 38 in which the threaded shank 28 is threadedly engaged. It may be seen that the threaded shank 28 includes a shoulder portion 40 which is received in a counterbore 42 formed in the lower end of the bore 38.

It will be noted that the height of the levers 30 and 32 may be adjusted merely by rotating both of the levers about the shank 28. Further, inasmuch as the lever 32 is disposed lowermost, the threads in the bores 34 and 38 and on the shank portion 28 are left-handed threads thereby moving the lever 32 slightly away from the mounting plate 22 as the longer arm of the lever 32 is swung in a clockwise direction as shown in FIGURE 3 of the drawings to the release position.

The mounting plate 22 has a threaded bore 44 formed therein and an abutment shank 46 which is externally threaded on its lower end is threadedly engaged in the bore 44 and projects upwardly between the longer ends of the levers 30 and 32. A pair of permanent magnets 48 and 50 are secured to the levers 30 and 32, respectively, by means of clamp assemblies 52 and 54. The clamp assemblies 52 and 54 may be adjustably positioned longitudinally of the levers 30 and 32.

The short ends of the levers 30 and 32 include recesses 56 and 58 which open downwardly and toward each

other. The recesses 56 and 58 are communicated with each other when the levers 30 and 32 are positioned as viewed in FIGURE 3 of the drawings and it may be seen that the recesses 56 and 58 include upwardly convergent side surfaces 60 and 62. It will further be noted from FIGURE 4 of the drawings that the recesses 56 and 58 are communicated with the free ends of the short arms of the levers 30 and 32 in which they are formed.

A toe plate generally referred to by the reference numeral 64 is provided and may be recessed in and secured to the under portion of the forward end of the sole 66 of the ski boot 18. The toe plate 64 includes a horizontally disposed shank 68 which projects outwardly therefrom and terminates at its free end in a spherical projection 70 receivable in the downwardly opening pocket 72 defined by the recesses 56 and 58.

When the spherical projection 70 is secured in the pocket 72 and the levers 30 and 32 are positioned as viewed in FIGURE 3 of the drawings, the long ends of the levers 30 and 32 may be urged away from the abutment shank 46 upon an upward force being directed against the toe of the boot 18. Additionally, either one of the levers 30 and 32 may have its long end urged away from the other lever upon lateral movement of the toe of the boot 18 toward the short end of that lever. Thus, it may be seen that the permanent magnets 48 and 50 releasably retain the toe portion of the boot 18 in a fixed position relative to the ski 10 but in a manner enabling the boot 18 to be readily disengaged from the forward portion 14 of the binding 12.

With attention now directed more specifically to FIGURES 2, 5, 6, 8 and 9 of the drawings, it may be seen that the rear portion 16 of the ski binding 12 also includes a mounting plate generally referred to by the reference numeral 76 which is recessed in the upper surface 24 of the ski 10 and secured in the recess by means of threaded fasteners 78. The mounting plate 76 has a longitudinally extending upwardly opening groove 80 formed therein in which the base 82 of a mount generally referred to by the reference numeral 84 is disposed.

The base 82 is somewhat shorter than the recess 86 in which the mounting plate 76 is secured and is provided with a longitudinal slot 88 through which a fastener 90 secured through an opening 92 formed in the mounting plate 76 is secured by means of a wing nut 94. In this manner, the base 82 may be adjustably positioned longitudinally of the ski 10.

The base 82 includes a bifurcated portion 96 including a pair of furcations 98 and 100. A T-shaped lever 102 is pivotally secured between the furcations 98 and 100 by means of the pivot pin 104 and includes a spherical projection 106 on one end and is provided with a threaded bore 108 on the other end in which an adjusting screw 110 is threadedly engaged. One end of the adjusting screw 110 is provided with a spherical projection 112 seated in a recess 114 formed in one end of a second lever 116 which is pivotally secured between the furcations 98 and 100 by means of a pivot pin 118. The other end of the lever 116 has a permanent magnet 120 secured thereto and a permanent magnet 122 is secured to the base 82 by means of a fastener 124.

It may be seen from FIGURES 5 and 8 of the drawing that a heel plate is provided and generally referred to by the reference numeral 126 and that the heel plate 126 may be secured in a suitable recess 128 formed in the heel 130 of the boot 18 by means of fasteners 132. The heel plate 126 includes an upright portion 134 having a semi-spherical recess 136 formed in its upper end. The semi-spherical recess 136 seatingly receives the spherical projection 106. Accordingly, it may be seen that the heel of the boot 18 may be fixedly secured to the ski 10 by the seating engagement of the projection 106 in the recess 136 and the adjustment of the screw 110 to cause both the projections 106 and 112 to be seatingly disposed in their respective recesses 136 and 114, respectively. In this manner, the permanent magnets 120 and 122 will prevent upward movement of the long end of the lever 116 which would in turn enable the end of the lever 102 provided with a projection 106 to move away from the upper surface of the ski 10 to release the heel portion of the boot 18.

Accordingly, it may be seen that the boot 18 may have its toe portion and heel portion fixedly secured to the ski 10 in a manner whereby either the toe or heel portion of the boot 18 may be readily disengaged from the binding 12. As soon as either the heel or toe portion of the boot 18 is disengaged from the binding 12 the other end of the boot 18 will, of course, also be free to be released from engagement with the binding 12.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A magnetic ski binding for attaching a ski boot to a ski, said ski binding including lever means comprising a pair of crossed levers, mounting means adapted to pivotally secure said levers to a ski for rotation about an upstanding axis disposed generally normal to the upper surface of said ski and disposed intermediate the opposite ends of said levers with corresponding ends of said levers generally paralleling the longitudinal axis of said ski, one pair of corresponding ends of said pair of levers defining a pair of recesses opening downwardly and toward each other and communicated with said one pair of ends and adapted to receive an enlarged projection on the end of a shank supported from the toe portion of a ski boot, said mounting means including abutment means engageable with the other ends of said levers for preventing movement of each of said other ends in a direction toward the other of said ends beyond a predetermined point, and magnetic means carried by said other ends magnetically attracting said other ends toward each other.

2. The combination of claim 1 wherein said magnetic means includes means for adjustably positioning said magnetic means longitudinally of said other ends of said levers.

3. The combination of claim 1 wherein said mounting means comprises a mounting plate adapted for securement to the upper surface of a ski and to which the lower end of a threaded shank is secured, said levers having threaded bores formed therein in which said threaded shank is threadedly engaged thereby pivotally securing said levers to said mounting plate.

4. The combination of claim 3 wherein said abutment means is removably secured to said plate and projects upwardly therefrom between said other pair of corresponding ends of said levers.

5. A magnetic ski binding for attaching a ski boot to a ski, said ski binding including first lever means including a lever, mounting means to which said lever is pivotally secured and adapted to pivotally secure said lever to a ski for rotation about an axis extending transversely thereof, one end of said lever defining an abutment member adapted for seated engagement with an abutment portion supported from the heel portion of a ski boot on said ski, and magnetic means operatively supported from the other end of said lever means magnetically attracted toward a portion of said mounting means, and adapted to prevent movement of said heel away from said ski, second lever means comprising a pair of crossed levers, mounting means adapted to pivotally secure said levers to a ski for rotation about an upstanding axis disposed generally normal to the upper surface of said ski and disposed intermediate the opposite ends of said levers

with corresponding ends of said levers generally paralleling the longitudinal axis of said ski, one pair of corresponding ends of said pair of levers defining a pair of recesses opening downwardly and toward each other and communicated with said one pair of ends and adapted to receive an enlarged projection on the end of a shank supported from the toe portion of a ski boot, said mounting means including abutment means engageable with the other ends of said levers for preventing movement of each of said other ends in a direction toward the other of said ends beyond a predetermined point and magnetic means carried by said other ends magnetically attracting said other ends toward each other.

6. A magnetic ski binding for attaching a ski boot to a ski, said ski binding including an elongated mounting member adapted to be secured to the upper surface of the ski, a pair of elongated levers, means pivotally mounting said levers to said member for rotation about axes extending transversely of said member and said levers and with said levers longitudinally aligned and disposed above said member, one end of one of said levers remote from the other lever defining a downwardly facing abutment member adapted for seated engagement with an upwardly facing abutment portion supported from the heel portion of the ski boot on said ski, and magnetic means operatively connected with the remote end of said other lever magnetically attracting said remote end in one direction toward a portion of said mounting member magnetically resisting movement of said remote end of said other lever away from said ski, the adjacent ends of said levers including abutment portions in overlapped relation and disposed in abutting engagement with each other with the adjacent end of said one lever overlapping the adjacent end of said other lever whereby an upward thrust on said one end of said one lever will be transmitted through said levers to said remote end of said other lever as an upward thrust thereon resisted by said means magnetically resisting movement of said remote end of said lever away from said ski.

7. The combination of claim 6 wherein one of said levers includes means for angularly adjustably positioning the abutment portion thereof relative thereto.

8. The combination of claim 6 including a mounting plate adapted for securement to the upper surface of a ski, means securing said mounting member to said plate for adjustable positioning therealong laterally of the axes of rotation of said levers.

9. The combination of claim 6 including second lever means comprising a pair of crossed levers, mounting means adapted to pivotally secure said levers to a ski for rotation about an upstanding axis disposed generally normal to the upper surface of said ski and disposed intermediate the opposite ends of the levers with the corresponding ends of said levers generally paralleling the longitudinal axis of said ski, one pair of corresponding ends of said pair of levers defining a pair of recesses opening downwardly and toward each other and communicated with said one pair of ends and adapted to receive an enlarged projection on the end of a shank supported from the toe portion of a ski boot, said mounting means including abutment means engageable with the other ends of said levers for preventing movement of each of said other ends in a direction toward the other of said ends beyond a predetermiend point and magnetic means carried by said other ends magnetically attracting said other ends toward each other.

10. A magnetic ski binding for attaching a ski boot to a ski, said ski binding including lever means comprising a pair of crossed levers, mounting means adapted to pivotally secure said levers to a ski for rotation about an upstanding axis disposed generally normal to the upper surface of said ski and disposed intermediate the opposite ends of said levers with corresponding ends of said levers generally paralleling the longitudinal axis of said ski, one pair of corresponding ends of said pair of levers defining a pair of recesses opening downwardly and toward each other and communicated with said one pair of ends and adapted to receive an enlarged projection on the end of a shank supported from the toe portion of a ski boot, said mounting means including abutment means engageable with the other ends of said levers for preventing movement of each of said other ends in a direction toward the other of said ends beyond a predetermined point, said other ends including magnetic means magnetically attracting said other ends toward each other.

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