April 19, 1966 D. S. CHISHOLM 3,246,907

MAGNETIC SKI BINDING OR HARNESS

Filed Jan. 7, 1964

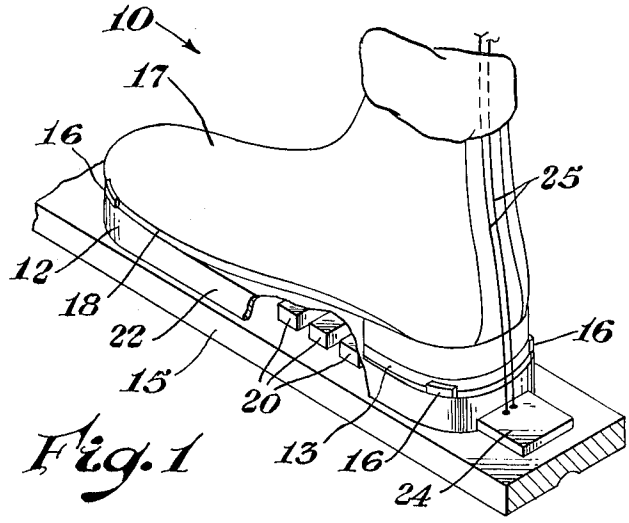

Fig. 1

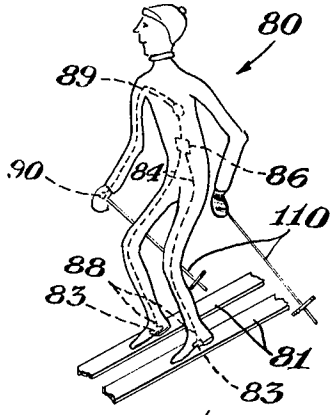

Fig. 4

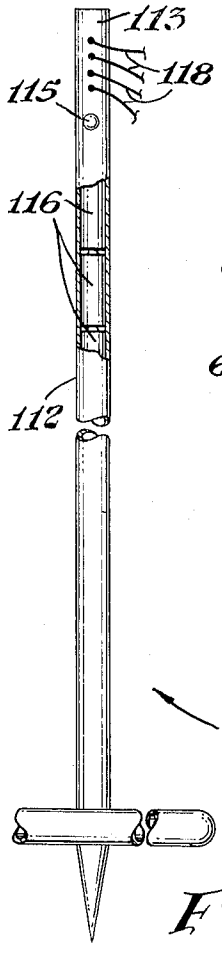

Fig. 6

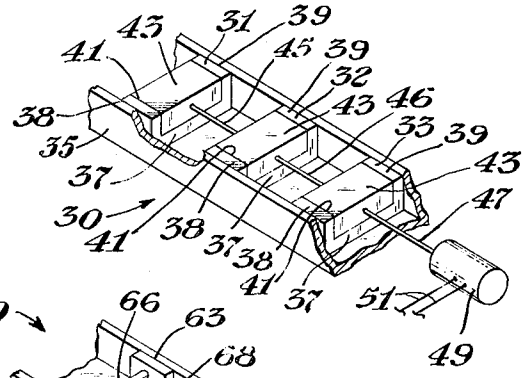

Fig. 2

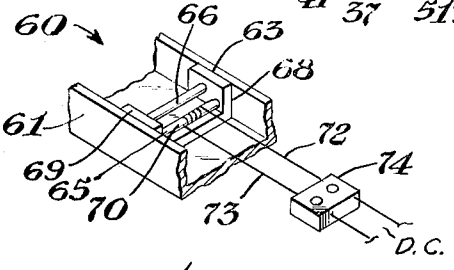

Fig. 3

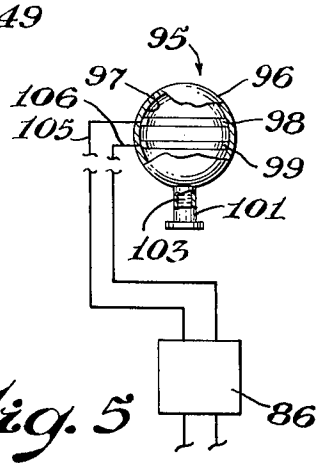

Fig. 5

INVENTOR.
Douglas S. Chisholm
BY
AGENT

United States Patent Office 3,246,907
Patented Apr. 19, 1966

3,246,907

MAGNETIC SKI BINDING OR HARNESS

Douglas S. Chisholm, 3400 Applewood, Midland, Mich.

Filed Jan. 7, 1964, Ser. No. 336,225
3 Claims. (Cl. 280—11.35)

This invention relates to an improved ski binding or harness and it more particularly relates to an improved magnetic ski binding.

In skiing many types of harnesses and bindings are used to secure the boot or boots to the skis. Some of the harnesses are adapted to permit a heel to be raised while with others the boot is more or less rigidly secured to the ski. Various types of mechanical harnesses of the latter type have been provided which vary from a rigid unyielding attachment of the boot to the ski, to harnesses which rigidly secure the boot to the ski until a more or less predetermined force has been applied thereto and the boot is released from the ski. As a safety measure such a reliable quick breakaway harness is extremely desirable in order to prevent injury to the skier if he should fall forward. Oftentimes with harnesses that fail to release, a broken ankle or leg is the unhappy result. Many of the mechanical break-away harnesses or bindings do not offer the skier full assurance of release particularly when ice or snow fouls the mechanism, though the binding may be released under certain conditions, under a pressure or force that is substantially greater than is obtained under ideal conditions. Oftentimes, under undesirable conditions, such as, when a skier is falling or loses control on a slope it is desirable that he disengage himself from the skis and fall in a controlled manner without having the skis secured to his feet. This will permit the skis to be abandoned cleanly and not offer a hazard to the falling skier.

It is the object of this invention to provide an improved ski harness.

A further object of this invention is to provide a ski harness by which a skier may readily disengage himself from his skis.

A further objoect of this invention is to provide a ski harness which is simple and rugged in construction, efficient and reliable in operation.

Still another object of the invention is to provide an improved ski harness whose operation is not readily affected by ice and snow.

These features and other benefits in accordance with the present invention are achieved by a device for securing skis to boots comprising a shoe member, and a ski member, a variable strength permanent magnet on one of the members and a coooperating magnetic armature on the other of the members, said members being so constructed and arranged as to prevent the two members from sliding in relationship to each other when in cooperative engagement. The magnetic attraction between the permanent magnet and the armature serves to retain the shoe member in association with the ski member and in cooperative combination with the variable strength permanent magnet is a means to vary the strength of the magnet.

Further benefits and advantages of the present invention will become more apparent from the following specification when taken in conjunction with the drawing wherein:

FIGURE 1 is a representation of a ski boot in which a portion of a ski broadly illustrates the cooperation between the shoe member, the ski member and the means to vary the strength of the magnet.

FIGURE 2 depicts one embodiment of the invention and illustrates an arrangement of variable permanent magnets and means to vary the strength thereof.

FIGURE 3 is an alternate arrangement of a variable magnet and associated control.

FIGURE 4 is a schematic representation of a skier utilizing the harness and associated control circuitry of the invention.

FIGURE 5 is a detailed illustration of a control switch utilized by the skier of FIGURE 4.

FIGURE 6 is a representation of a ski pole particularly adapted for use with the harness of the invention.

In FIGURE 1 there is illustrated a representation of a ski harness of the present invention generally designated by the reference numeral **10**. The harness **10** comprises a ski member **12** having in cooperative combination a boot member **13**. The ski member **12** is affixed to a ski **15**. The ski member **12** has boot retainers **16**. The ski member **12** is secured to a boot **17**, in a location generally parallel to and below the sole **18** of the boot **17**. The ski member **12** is comprised of a plurality of variable strength permanent magnet members **20** disposed largely within a protective housing **22**, a magnetic strength controlling device **24** is positioned adjacent the housing **22** and is in cooperative conjunction with the variable strength magnet members **20**, and the actuating means **25** is led to a location remote from the ski and to one or more control points not illustrated in FIGURE 1.

In FIGURE 2 there is illustrated a schematic arrangement of variable strength permanent magnets for use within the variable strength permanent element or member of the present invention. The assembly is designated by the reference numeral **30**. The assembly **30** comprises a plurality of variable strength permanent magnets **31**, **32** and **33**. The magnets **31**, **32** and **33** are positioned in fixed relationship to each other within a non-magnetic housing **35**. The variable strength magnets **31**, **32** and **33** comprise channel members **37** which are of a low energy magnetic material such as mild steel. Each of the channels **37** has poles **38** and **39**. The channel members **37** define between their poles **38** and **39** a channel or space **41**. A slug or magnet **43** is disposed within the channel **41** in such a manner that it is a sliding fit. The slugs **43** of the variable strength magnets **31**, **32**, and **33** are joined to the adjacent slugs by means of the push rods **45** and **46**. The slug **43** of the magnet **33** has affixed thereto a position rod **47** which is in operative communication with a motion producing device **49**. The motion producing device **49** has in operative association therewith control means **51**. Magnets such as the magnets **31**, **32** and **33** are well known in the art and several embodiments thereof are described in United States Letters Patent 3,079,535. A generally similar type of magnet is described in United States Letters Patent 3,079,191.

In operation of the embodiment of the invention generally depicted in FIGURES 1 and 2, an armature member is affixed to the sole of the boot, such as the boot **17**. The boot is then positioned upon the magnet member as illustrated, and affixed to the ski **15** by activating the control device or linear actuator, or the slugs within the variable strength magnet are moved into the desired position to maintain the boot against it, as shown in the arrangement of FIGURE 2 wherein the slug is positioned wholly within the channel. The boot is prevented from sliding by means of the retainers **16**. Thus by increasing or decreasing the strength of the magnets the boot may be firmly drawn against the ski and maintained in that position, or released therefrom at the wearer's will.

In FIGURE 3 there is illustrated an alternate magnet assembly generally designated by the reference numeral **60**. The assembly **60** comprises a retaining means **61** having disposed therein a plurality of variable strength magnets **63**. The magnets **63** comprise a first member **65** and a second member **66**. The first member **65** and

second member 66 are made of a material having a high coercivity. At the terminal ends of members 65 and 66 are disposed armatures 68 and 69. The armatures 68 and 69 are of a soft material, that is one having a relatively low coercivity. On the members 65 is disposed a coil or winding 70, the coil 70 forming a continuous electrical circuit with the leads 72 and 73 which in turn lead to the reversing switch 74, beneficial because of the characteristics of these magnets. The switch may be of the double-pole double-throw instantaneous variety, that is to make contact the switch must have an external force applied to it to make contact and the force maintained to maintain contact. Magnets such as the magnets 63 are well known in the art and are described in United States Letters Patent 3,089,064. The magnet arrangement of FIGURE 3 beneficially is employed in applications where mechanical motion within the housing is undesired where full electrical control of the ski harness is desired.

Beneficially the embodiment of FIGURE 3 generally is the most convenient to fabricate and provides the highest degree of reliability in the function of the variable magnet assembly, in that, a relatively small amount of power is required to turn the magnet "on or off." A pulse or current in the proper direction through the coils 70 serves to turn the magnet on or off and it will remain in that condition until a pulse of current is sent through in the opposite direction. In locations where a reliable supply of electrical energy is available, that is, there is no danger of a lack of a current source, this embodiment is most convenient. The embodiment illustrated in FIGURE 2 has the significant advantage of manual operability. A skier is not always near a suitable source of power if his portable power supply fails. In emergency the slugs may be positioned by hand and the boots released from the skis.

In FIGURE 4 there is schematically illustrated an advantageous embodiment of the invention being utilized by a skier designated by the reference numeral 80. The skier 80 has a pair of skis 81, and each of the skis 81 has a variable strength magnet assembly 83 affixed thereto. Each of the assemblies 83 is connected to an electrical control harness 84 which in turn is connected to an electrical power supply 86. The power supply 86 provides on demand a current to the control harness sufficient to deactivate the variable strength magnet assembly 83 and causes release of the ski boot 88. The power supply 86 is controlled by means of a gravity operated switch 89 and a manual switch 90. The switches 89 and 90 may be either in series or parallel depending on the function desired by the individual skier.

An embodiment of a suitable gravity operated switch is illustrated in FIGURE 5 designated by the reference numeral 95. The switch 95 comprises a housing 96, the housing 96 being constructed from an electrically nonconductive material and defining a surface 97 therein. On the inner surface 97 are provided a pair of spaced electrically conductive bands 98 and 99 extended preferably about the cavity. The housing 96 defines a variable volume side arm 101 within which is disposed a conductive liquid 103, such as, mercury. The conductive bands 98 and 99 are connected to contact a pair of leads 105 and 106 which control a power supply 86.

In FIGURE 6 there is illustrated a ski pole particularly designated by the reference numeral 110 particularly adapted and utilized in the arrangement illustrated in FIG. 4. The ski pole 110 comprises a hollow shaft 112. A handle portion 113 has a manual operated switch 115 disposed therein. Disposed within the hollow shaft 112 is a source of electric power 116. Beneficially the power source is comprised of a plurality of batteries 116 wherein the energy from the batteries is controlled by the switch 115 and this energy is transmitted to the variable strength magnets either directly or indirectly via a control mechanism and the electrical leads 118.

Ski harnesses constructed in accordance with the present invention are found to be reliable, readily operated and provide a ready means for engaging or disengaging ski boots from skis.

Although the present invention has been described utilizing the variable strength magnet affixed to the ski it is readily understood a variable strength magnet is easily affixed to the boot and the armature affixed to the ski. Such an arrangement generally is dependent on the desires of the skier using the equipment.

The armature member may be a solid plate such as a plate of mild steel or alternately it may comprise a plurality of magnetically insulated members in a rigid or flexible matrix so constructed or arranged that each of the individual magnet armature pieces engage both pole faces of the variable strength magnets and the armature pieces have a dimension which corresponds to the overall dimension of the pole pieces, the pole pieces being disposed in plurality of generally parallel planes, thus permitting the armature member to interlock with the variable strength magnet member in such a manner that sliding of one member on the other is prevented.

As is apparent from the foregoing specification, the present invention is capable of being embodied with various alterations and modifications which may differ particularly from those that have been described in the preceding specification and description. For this reason, it is to be fully understood that all of the foregoing is intended to be merely illustrative and is not to be construed or interpreted as being restrictive or otherwise limiting of the present invention, excepting as it is set forth and defined in the hereto appended claims.

I claim:

1. A device for securing skis to boots comprising a shoe member and a ski member, a variable strength permanent magnet on one of the members and a cooperating magnetic armature on the other of the members, the members being so constructed and arranged as to prevent the two members from sliding in relationship to each other when in cooperative engagement, a means to vary the strength of the magnet in cooperative combination with the variable strength permanent magnet, an electrical power source operatively connected by electrical leads to the means to vary the strength of the magnet and to an electrical switch, to thereby selectively retain the shoe member in association with the ski member and the electrical leads and switch being adapted to be worn upon a skier.

2. The device of claim 1 wherein the means to vary the strength of the variable strength permanent magnet is in cooperative association with a gravity operated electrical switch.

3. The apparatus of claim 1 wherein the variable strength permanent magnet is affixed to the ski.

References Cited by the Examiner

UNITED STATES PATENTS

1,672,700	6/1928	Vass.	
2,276,826	3/1942	Crowther	280—11.35
2,754,497	7/1956	Wolpert	200—61.52 X
2,805,296	9/1957	Newell	200—61.47
2,965,982	12/1960	Saffir.	
3,013,624	12/1961	De Remer et al.	200—61.52 X
3,079,191	2/1963	Engelstadt et al.	294—65.5
3,079,535	2/1963	Schultz	317—201
3,089,064	5/1963	De Bennetot	317—123

FOREIGN PATENTS

651,868	4/1951	Great Britain.
442,431	12/1948	Italy.
523,923	4/1955	Italy.

BENJAMIN HERSH, *Primary Examiner.*

MILTON L. SMITH, *Examiner.*