

# United States Patent [19]

Smolka et al.

[11] 3,774,922  
[45] Nov. 27, 1973

[54] SKI BINDING

[75] Inventors: Thomas Gordon Smolka, Wien-Mauer; Gottfried Schweizer, Wien, both of Austria  
[73] Assignee: Gertsch AG, Zug, Switzerland  
[22] Filed: Feb. 7, 1972  
[21] Appl. No.: 224,137

[30] Foreign Application Priority Data

Feb. 18, 1971 Austria..... A 1393

[52] U.S. Cl..... 280/11.35 M  
[51] Int. Cl..... A63c 9/08  
[58] Field of Search ..... 280/11.35 M;  
292/251.5

[56] References Cited

UNITED STATES PATENTS

3,246,907 4/1966 Chisholm ..... 280/11.35 M  
2,253,252 8/1941 Smith..... 292/251.5 X  
3,318,610 5/1967 Kulick ..... 280/11.35 M  
3,353,835 11/1967 Sommer ..... 280/11.35 M  
3,367,672 2/1968 Tonozzi et al..... 280/11.35 M

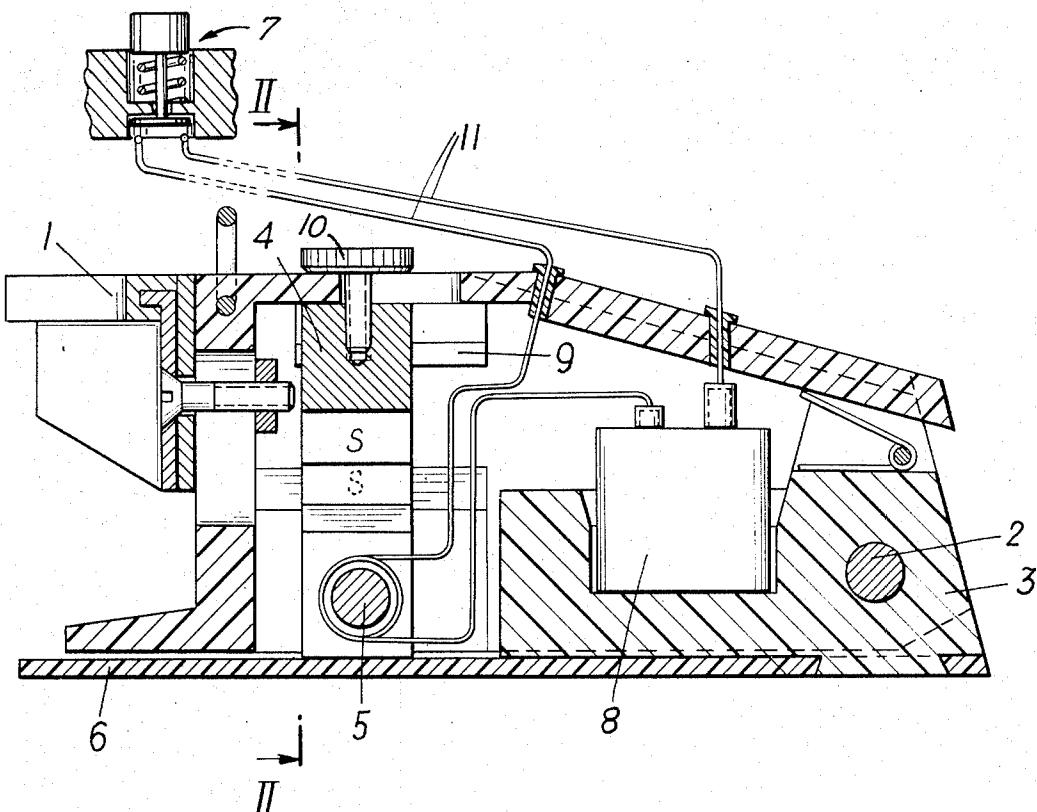
3,528,672 9/1970 Wunder..... 280/11.35 T

Primary Examiner—Kenneth H. Betts  
Assistant Examiner—Milton L. Smith  
Attorney—Woodhams, Blanchard & Flynn

[57] ABSTRACT

Safety ski binding with magnetic release assisting means. A permanent magnet is fixed to one portion of a releaseable ski binding and an electromagnet is affixed to another portion thereof, which other portion moves away from the first portion during a release operation. Thus so long as the electromagnet is de-energized the permanent magnet operates thereagainst and holds the ski binding closed. However upon energization of the electromagnet, same is energized at such polarity as to repel the poles of the permanent magnet and the ski binding is permitted to open. Energization of the electromagnet may be by the conscious closure of a switch by the user, by remote control such as radio, or by sensing the bio-electro circuits of the leg muscles of the user when same are subjected to tension to initiate closure of such switch.

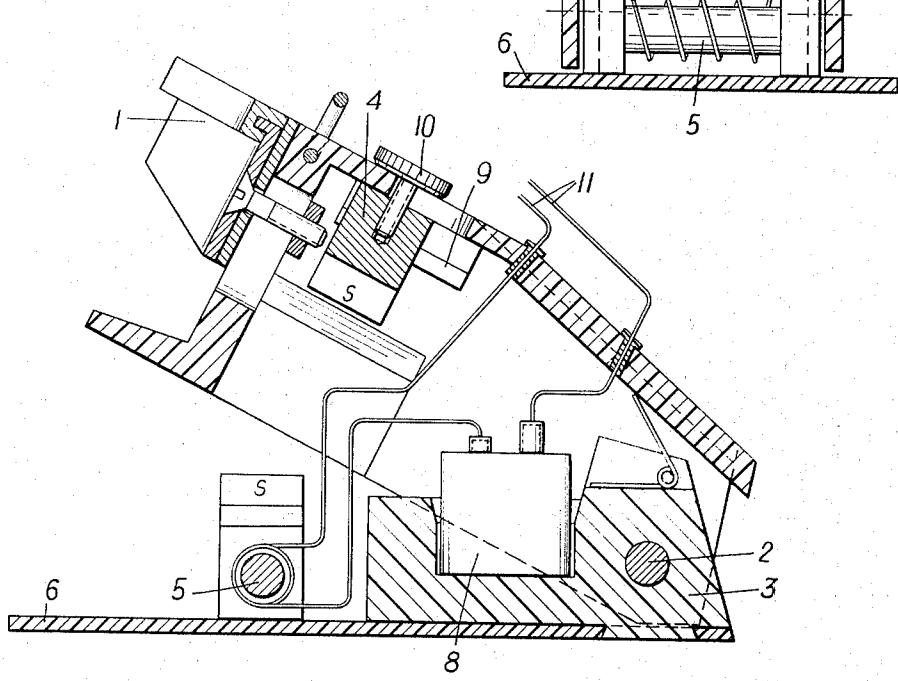
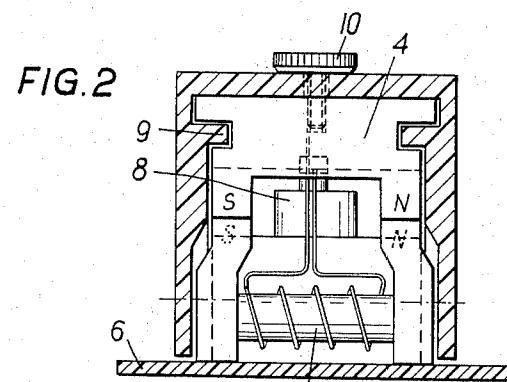
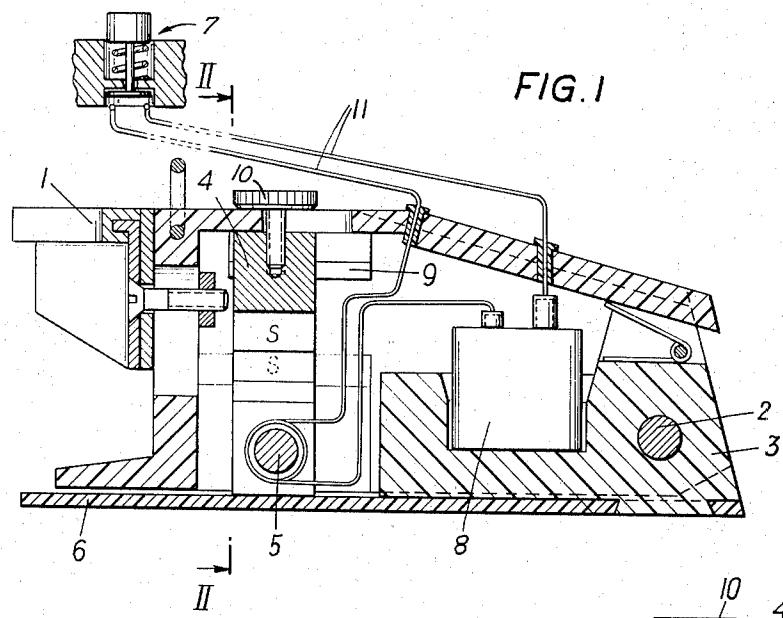
9 Claims, 7 Drawing Figures



PATENTED NOV 27 1973

3,774,922

SHEET 1 OF 2



PATENTED NOV 27 1973

3,774,922

SHEET 2 OF 2

FIG. 4

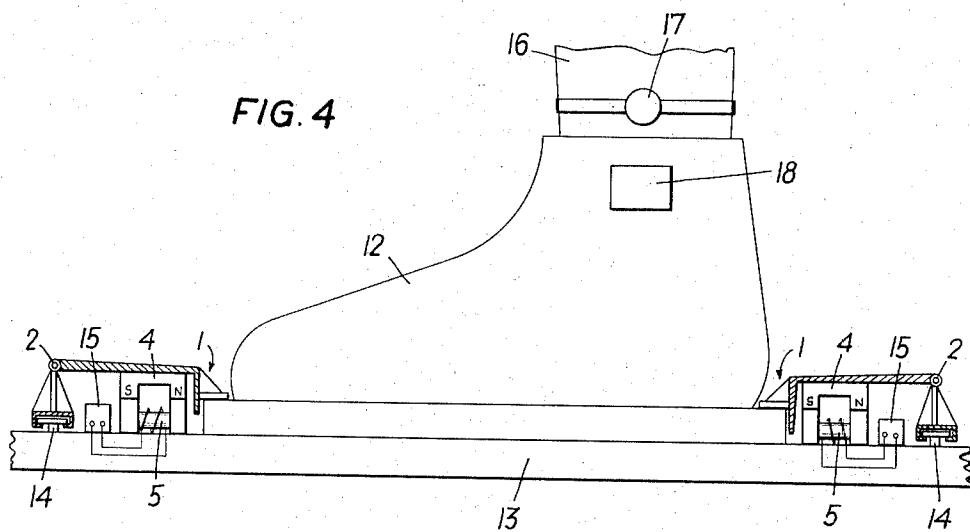


FIG. 6

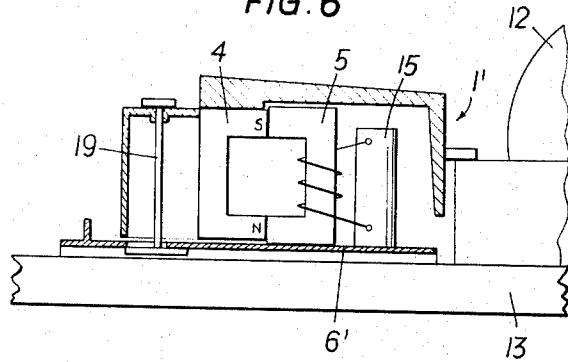


FIG. 5

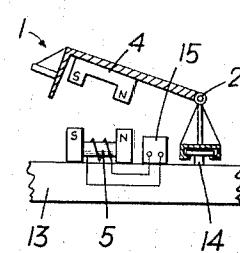
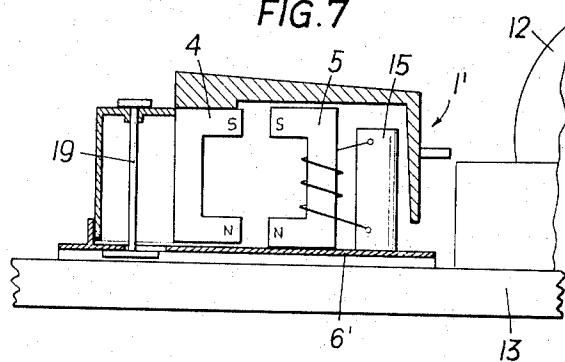


FIG. 7



## SKI BINDING

The invention relates to a ski binding which has at least one magnetic system. The known ski bindings which are equipped with a magnetic system operate substantially either to overcome the magnetic force directly during release or to utilize a magnet to free a lock.

The purpose of the present invention is to make an improvement in which the magnetic field which is effective during operation becomes repellent during release. This purpose is attained by positioning a permanent magnet with at least one of its poles resting on at least one pole of an electromagnet, the polarities being such that when energized the electromagnet forms with respect to the permanent magnet at least one like pole which thus repels the permanent magnet. The result is that during a release the poles of the electromagnet oppose the poles of the permanent magnet and in this manner the two magnets are caused to move apart.

The subject matter of the invention is illustrated in several exemplary embodiments in the drawings, in which:

FIG. 1 illustrates a heel binding equipped according to the invention,

FIG. 2 is a cross-sectional view along the line II—II of FIG. 1,

FIG. 3 illustrates the heel binding according to FIG. 1 in open condition,

FIG. 4 is the arrangement on the ski of a ski boot between schematized ski binding parts which are equipped according to the invention,

FIG. 5 illustrates a binding part according to FIG. 4 in open condition,

FIG. 6 and 7 schematically illustrate a jaw construction in two positions.

As will be seen in FIGS. 1 to 3, the sole holder 1 is supported pivotably about the axis 2 on the base member 3. Furthermore a permanent magnet 4 is connected to the sole holder 1, which permanent magnet rests with its poles on the poles of the electromagnet 5. The electromagnet is in this embodiment secured on the base plate 6 and is connected to a circuit which is energized by a battery 8 and interrupted by a switch 7.

The sole holder 1 is held by a permanent magnet 4 in the condition of use, which is illustrated in FIG. 1. In order to adjust the holding force, the permanent magnet 4 is movable along the guide 9 and can be fixed by the screw 10. The circuit can, when danger appears, be closed through the lines 11 by means of the switch 7 which can be arranged in the ski pole, in the clothing or the like of the user. The electromagnet is thus energized and magnetic poles created on its ends. The magnetic poles are so arranged that the poles of electromagnet 5 oppose corresponding poles of the permanent magnet 4 and this generates a repelling force there between. This opens the binding (FIG. 3) and releases the ski boot.

According to FIG. 4, the ski boot 12 is held on the ski 13 between a front and a rear binding part which are both of the same construction. Each of these bindings has a permanent magnet 4 which is secured on the sole holder 1 which can be pivoted upwardly about the axis 2 and sidewardly about the axis 14 when the magnetic force of the permanent magnet 4 is overcome. The permanent magnet 4 rests with its poles on the poles of an electromagnet 5 which is turned off in con-

dition of use. This electromagnet is coupled to a receiver 15.

One or more sensors 17 are arranged on the foot 16 or on any other part of the body of the user, which sensors absorb the bio-electrical currents of the muscles and pass an impulse, when needed, to the receiver 15 through the transmitter 18. This energizes the coil of the electromagnet 5 so that poles appear on said electromagnet of such polarity as to oppose the corresponding poles of the permanent magnet. Thus, the permanent magnet is repelled and the binding opens as illustrated in FIG. 5.

In the construction according to FIGS. 6 and 7, again an electromagnet 5 is opposite a permanent magnet 4. When the electromagnet is energized, again like poles of the electromagnet and the permanent magnet coincide and the permanent magnet is repelled. This moves the clamp part 1' along the base plate 6' and the boot 12 is released. A release to the side is also possible because the clamp part 1' can be pivoted laterally about the axis 19. However, the magnetic force must be overcome, in the position of FIG. 6. In the position of FIG. 7, the clamp part 1' can be moved freely.

The invention is not limited to the illustrated exemplary embodiments. A number of further modifications are possible and same lie within the scope of the invention. For example, it would be possible to equip a front cable tensioning means according to the invention.

Although a particular preferred embodiment of the invention has been disclosed in detail for illustrative purposes, it will be recognized that variations or modifications of the disclosed apparatus, including the rearrangement of parts, lie within the scope of the present invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a releasable ski binding for holding a ski boot on a ski, said releasable ski binding having a base secured to said ski, a ski boot engaging member supported for movement toward and away from said ski boot and a permanent magnet secured to at least one of said base and said ski boot engaging member for normally holding said ski boot engaging member in engagement with said ski boot, the improvement comprising:

means defining an electromagnet secured to the other of said base and said ski boot engaging member and electrical power source means for supplying electrical power thereto, said electromagnet generating first a magnetic pole upon having said electrical power supplied thereto, said permanent magnet having a second magnetic pole of the same polarity as said first magnetic pole, said permanent magnet being magnetically coupled to said electromagnet means when said electromagnet means is unenergized; and

switching means for selectively controlling the supply of said electrical power to said electromagnet means, said switching means, when effecting an energization of said electromagnet means, effecting a generation of said first magnetic pole to effect a positive repelling or separating of said permanent magnet from said electromagnet means and a release of said ski boot engaging member from engagement with said ski boot.

2. The improvement according to claim 1, wherein said electromagnet means is secured to said base.

3. The improvement according to claim 1, wherein said power source means is a battery; and wherein said switching means comprises a normally open switch for electrically connecting said battery to said electromagnet means.

4. The improvement according to claim 1, wherein said switching means comprises a transmitter for generating an electrical signal in response to a fall condition and receiver means responsive to said signal to effect an electrical connection of said power source means to said electromagnet means.

5. The improvement according to claim 1, wherein said permanent magnet and said electromagnet means both have pole faces; and

wherein said pole faces engage each other.

6. The improvement according to claim 1, wherein said ski boot engaging member includes first means for pivotally securing same to said ski about a generally horizontal axis transverse of the longitudinal axis of said ski.

20

7. The improvement according to claim 6, wherein said ski boot engaging member includes second means for slidably supporting same for movement relative to said ski and parallel thereto.

8. The improvement according to claim 1, wherein said ski boot engaging member includes first means for pivotally securing same to said ski about a generally vertical axis and second means for slidably supporting said ski boot engaging member for movement relative to said ski and parallel thereto to facilitate said separating movement between said ski boot engaging member and said permanent magnet.

9. The improvement according to claim 1, including adjustment means for adjusting the position of said permanent magnet relative to said electromagnet means to facilitate an adjustment of the holding force between said permanent magnet and said ski boot engaging member.

\* \* \* \* \*

25

30

35

40

45

50

55

60

65

UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3 774 922 Dated November 27, 1973

Inventor(s) Thomas Gordon Smolka and Gottfried Schweizer

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 49; after "electromagnet" insert --means--.

line 50; change "first a" to --a first--.

line 57; delete "selectively".

Signed and sealed this 5th day of November 1974.

(SEAL)

Attest:

McCOY M. GIBSON JR.  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents