

[54] **RELEASABLE SKI BINDING**  
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[57] **ABSTRACT**

A ski binding is held in normal operating position by releasable, mechanical parts and is preferably urged into such position by resilient means. A rotatable electric motor is mounted in association with such ski binding and is provided with suitable means responding to activation of the motor for withdrawing said mechanical parts against said resilient means out of holding position. Said motor may be activated in any convenient manner, as manually by the closing of a switch by the skier or by remote control or automatically in response to bio-electrical currents within the muscles of the skier.

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**13 Claims, 7 Drawing Figures**

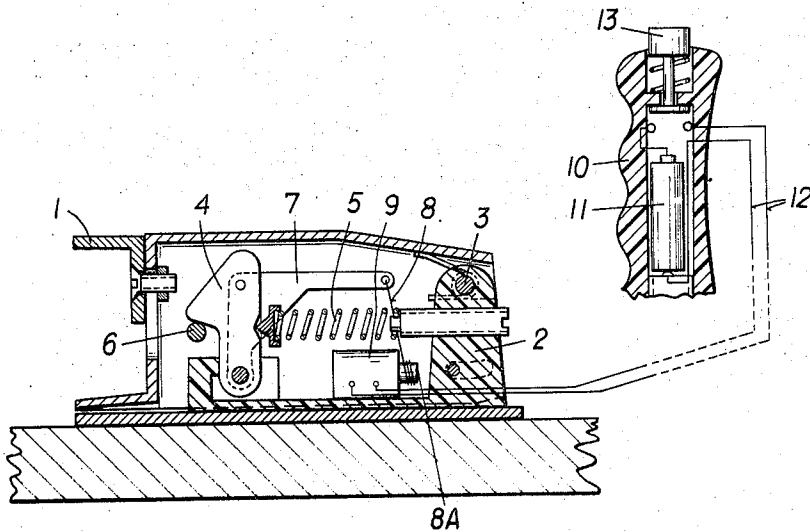


FIG. 1

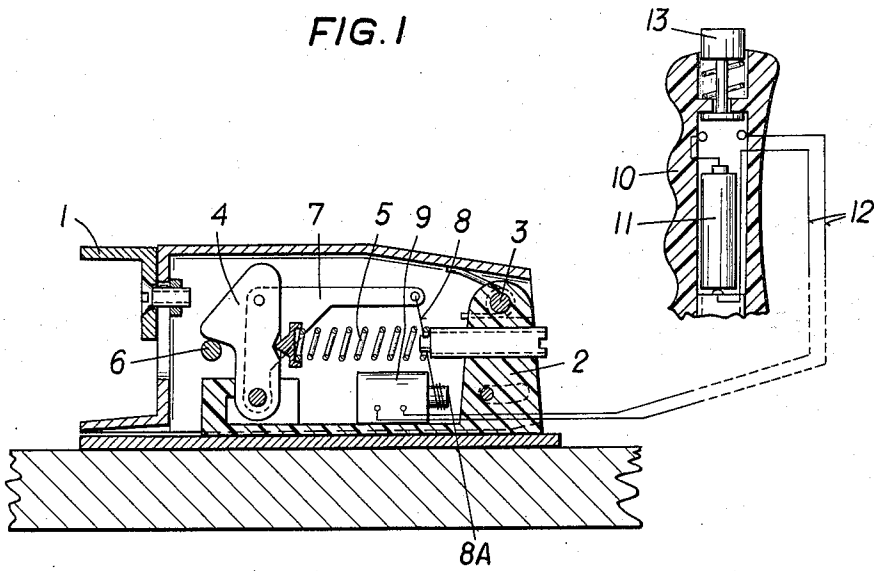
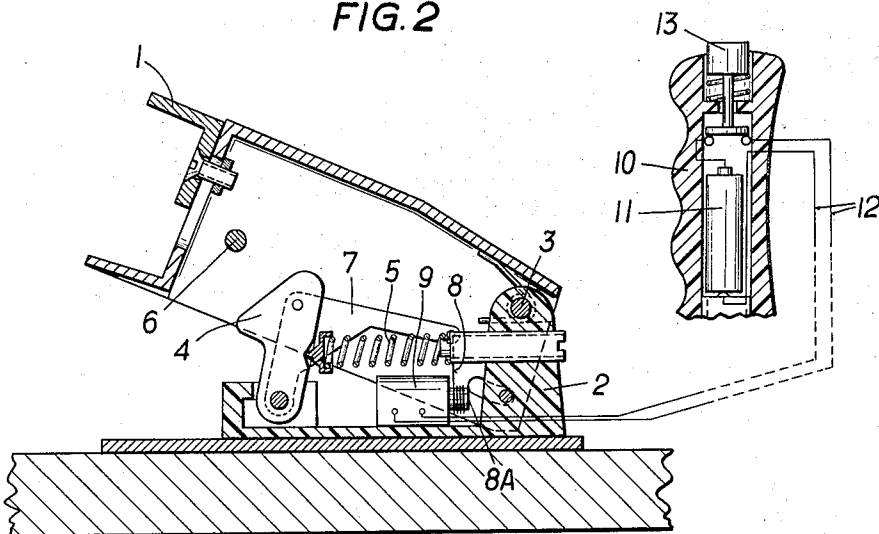
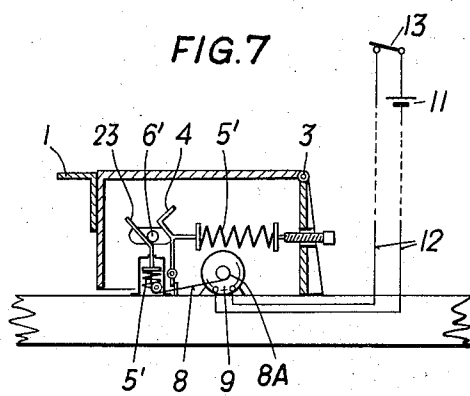
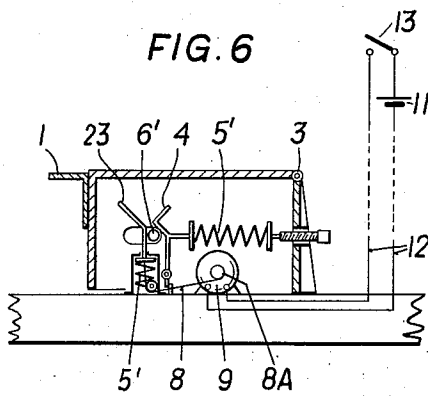
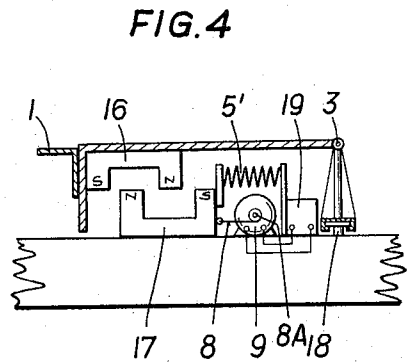
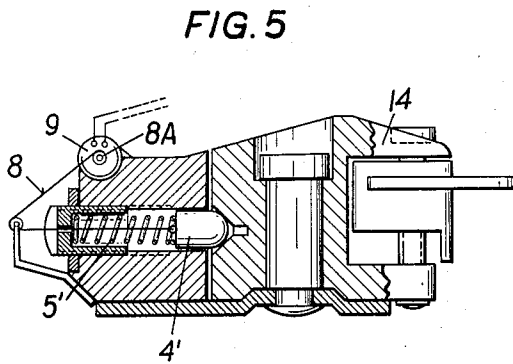
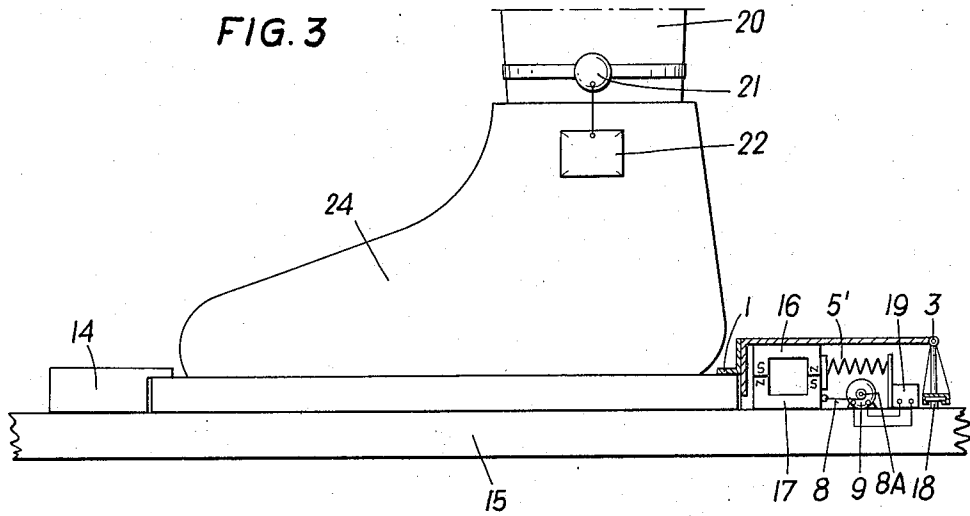


FIG. 2





## RELEASABLE SKI BINDING

The invention relates to a ski binding in which the sole holder is held in its operating position by a releasable connection, for example by a lock.

Ski bindings are known which can be opened at the will of a user or automatically through a wire control or through a wireless remote control. In such known devices an electromagnet has usually been provided for operating the release mechanism.

As in many other technical fields, those working with ski binding designs continuously try to make the individual parts of the bindings as small as possible. Hence, a major purpose of the present invention is to provide in place of the electromagnet another suitable element which will perform the same functions but has substantially smaller dimensions. This purpose is attained by providing an electric motor for releasing the connection, or lock. This is possible since an electric motor which provides the same power output as an electromagnet is substantially smaller in its dimensions.

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

FIGS. 1 and 2 are cross-sectional views of two positions of a heel binding according to the invention.

FIG. 3 illustrates the arrangement of the ski boot on the ski which is held by means of a schematically illustrated heel binding.

FIG. 4 schematically illustrates the heel binding according to FIG. 3 in a release position.

FIG. 5 illustrates a jaw.

Finally FIGS. 6 and 7 illustrate in two positions a further schematized exemplary embodiment.

According to FIGS. 1 and 2, the sole holder 1 is provided pivotably about the axis 3 which is supported in the base member 2 and is held in the position of use illustrated in FIG. 1 by the locking member 4 which is constructed as a control cam. The spring 5 urges the locking member 4 over, for engagement with, the locking element 6 which comprises a pin connected to the sole holder 1.

The locking member 4 has a rearwardly extending arm 7, the end of which is engaged by a release line 8 which can be wound upon a drum 8A operated by a rotatable electric motor 9. A battery 11 is provided in the ski pole handle 10 to operate the electric motor 9, whereby the circuit can be closed through the lines 12 by the switch 13.

If the circuit is closed, as by depressing the switch 13 in the ski pole handle 10 (FIG. 2), then the electric motor 9 winds up the release line 8 on to the drum 8A, by which the locking member 4 is pivoted through the arm 7 so that the locking element 6 is released and the sole holder 1 can swing upwardly. If the switch 13 is released, the circuit is disconnected. The spring 5 then again presses the locking member 4 forwardly.

In FIG. 3, the ski boot 24 is held between a front binding part 14 and a rear binding part on the ski 15. The rear binding part has two permanent magnets 16, 17. The permanent magnet 16 is mounted on the sole holder 1 which can be pivoted about the axis 3 upwardly and about the axis 18 sidewardly. The other permanent magnet 17 is supported movably in a longitudinal direction of the ski and is connected to the electric motor 9 through the line 8. The electric motor 9 is cou-

pled to a receiver 19 which may be a radio, sonic or other impulse receiver of any desired type.

One or more sensors 21 are arranged on the foot 20, or on any other part of the body of the skier, which sensors absorb the bioelectrical currents of the muscles and when properly energized emit an energy impulse through the sender 22 to the receiver 19. In this case the electric motor 9 is activated and the permanent magnet 17 is pulled backwardly by the line 8 against the force of the spring 5' so that a position is obtained as illustrated in FIG. 4. This diminishes the force holding the sole holder 1 in the position of use, said force diminishing to zero if and when the movement of the permanent magnet attains the position of FIG. 4. Further, if the movement of the permanent magnet 17 is even greater, the corresponding pole faces of both magnets 16 and 17 approach a position of opposition to one another thus causing a repulsion to occur which automatically opens the sole holder 1.

In FIG. 5, a swivel jaw 14 is releasably held in the central position by a locking member 4' normally held in locking position by the spring 5'. This locking member 4' is similarly connected to an electric motor 9 through a release line 8. The electric motor 9 can be operated in any desired manner at the will of a user or automatically by means of wire or wireless control to withdraw the locking member 4' against the force of the spring 5' and release the swivel jaw.

FIGS. 6 and 7 illustrate schematically a similar construction as FIGS. 1 and 2. The locking member 4, which is loaded by the spring 5, engages over the locking element 6' which is connected to the jaw 1 and thus retains the sole holder in the position of use on the ski. This embodiment differs from that of FIGS. 1 and 2 in that the locking element 6' is movably supported in a slotted hole of the sole holder 1 and is prevented from movement by a stop 23.

The stop 23 is urged by a spring 5' into the position illustrated in FIG. 6 and is connected to the electric motor 9 through a release line 8. The electric motor 9 can be energized from battery 11 through wires 12 by closing the switch 13.

If the circuit is closed by depressing the switch 13, the electric motor 9 acts through line 8 to pull the stop 23 downwardly against the spring 5'. The locking element 6' is now freely movable in the slot of the sole holder 1 so that practically no force acts against the upward swinging of the sole holder about the axis 3. When the switch 13 is again opened, the spring 5' again urges the stop 23 upwardly.

The invention is not limited to the illustrated exemplary embodiments. There are a number of further possible embodiments which lie within the scope of the invention. For example the electric motor could be connected to the locking member with a mechanical gearing or the like instead of with a flexible line. Also a later installation into known safety ski bindings is possible since, as mentioned above, such an electric motor requires only a very small amount of space.

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.

I claim:

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 relative to said base between a boot engaging and a boot release position and movable lock means defining a threshold force value for releasably holding said ski boot engaging member in said boot engaging position when forces are applied to said ski binding by said ski boot which are below said threshold force value and permitting a release of said ski boot when forces are applied to said ski binding which are above said threshold force value, the improvement comprising:

electrical rotary driven means having a rotary output and electrical power source means therefor; connecting means for mechanically connecting said rotary output to said releasable lock means; and switching means for controlling the supply of electrical power from said electrical power source means to said electrical rotary driven means to effect a rotation of said rotary output and a mechanical movement of said movable lock means and thereby a release of said ski binding from said boot engaging position separate from said forces applied by said ski boot to said ski binding.

2. The improvement according to claim 1, wherein electrical rotary driven means is a stationary electrical motor having said rotary output and drum means mounted thereon for rotation therewith; and

wherein said connecting means comprises a flexible cable wound on said drum means at one end and being connected to said movable lock means at the other end, a rotation of said drum means effecting a winding of said cable onto said drum means and a resulting mechanical movement of said movable lock means.

3. The improvement according to claim 2, wherein said releasable lock means comprises a movable locking member movable between first and second positions and engaging a portion of said ski boot engaging member when in said first position, resilient means for urging said locking member toward said first position; and

wherein said other end of said cable is connected to said locking member whereby a rotation of said drum means effects a winding of said cable onto said drum means and a resulting movement of said locking member to said second position against the urging of said resilient means to thereby release said releasable ski binding.

4. The improvement according to claim 3, wherein said ski boot engaging member is pivotally mounted on said base for movement about a horizontal axis.

5. The improvement according to claim 3, wherein said ski boot engaging member is pivotally mounted on said base for movement about a vertical axis.

6. The improvement according to claim 3, wherein said ski boot engaging member is pivotally mounted on said base for movement about both a horizontal axis and a vertical axis.

7. The improvement according to claim 3, wherein said locking member is pivotal about a horizontal axis.

8. The improvement according to claim 3, wherein said locking member is reciprocally slidable along a horizontal axis.

9. The improvement according to claim 2, wherein said releasable lock means comprises a pair of normally aligned permanent magnets each having pole faces of opposite polarity, one of said permanent magnets being secured to one of said base and said ski boot engaging member, the other of said permanent magnets being slidably mounted to the other of said base and said ski boot engaging member for reciprocating movement; and

wherein said other end of said cable is connected to said other permanent magnet whereby a rotation of said drum means effects a winding of said cable onto said drum means and a resulting movement of said other permanent magnet so that said pole faces become unaligned to thereby release said releasable ski binding.

10. The improvement according to claim 9, including resilient means for urging said other permanent magnet to said normally aligned arrangement.

11. The improvement according to claim 1, wherein said electrical power source means comprises a battery; and

wherein said switching means is a normally open switch mounted in a ski pole.

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

13. The improvement according to claim 1, including means for adjusting said threshold force value.

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