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Betschart, Jr.

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[54] **SELF-RELEASING SKI-BINDING**

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[30] **Foreign Application Priority Data**

Aug. 11, 1971 Switzerland 11783/71

[52] **U.S. Cl.** ..... **280/11.35 K**

[51] **Int. Cl.** **A63c 9/08**

[58] **Field of Search** ..... 280/11.35 K, 11.35 R

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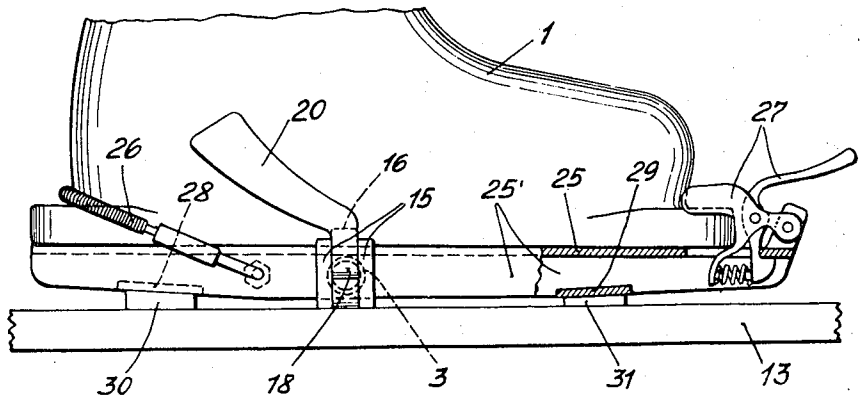
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Assistant Examiner—David M. Mitchell
Attorney, Agent, or Firm—Markva & Smith

[57] **ABSTRACT**

A self-releasing ski binding, for securing a shoe to a ski, comprises first and second coupling means, said first coupling means being provided centrally along the shoe and said second coupling means being disposed at an opposed position on the ski, said first coupling means being resiliently latched to said second coupling means, said second coupling means including means for manual disengagement from said first coupling means.

9 Claims, 7 Drawing Figures



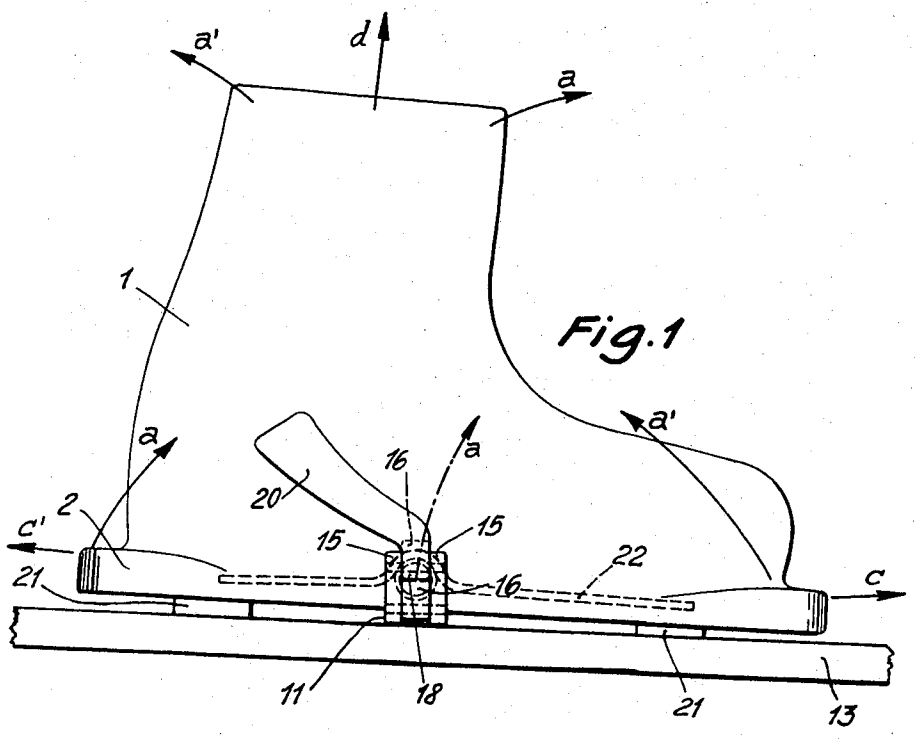

a'
d
a
1
a
a'
2
c'
20
16
a
15
15
22
c
21
16
11
18
21
13

Fig.1

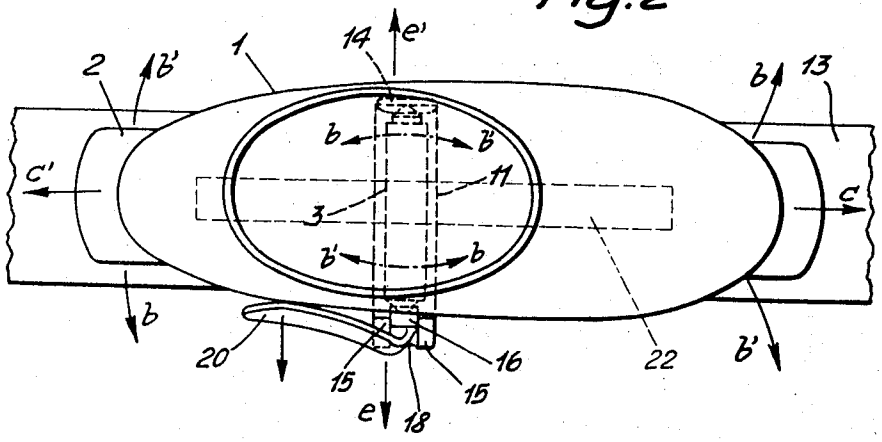

2
b'
1
14
e'
b
13
b
b'
c'
11
3
c
b'
b
b
20
16
22
b'
15
15
e
18

Fig.2

Fig.4

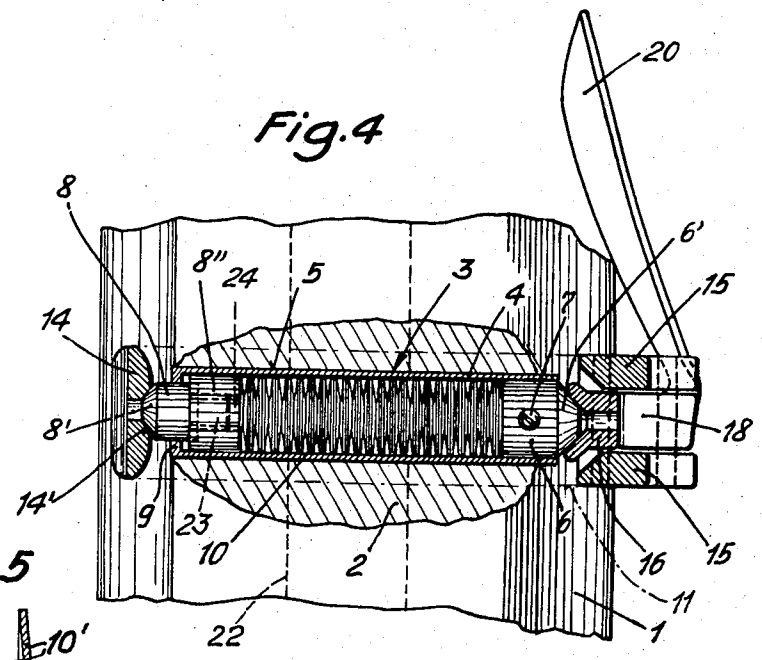
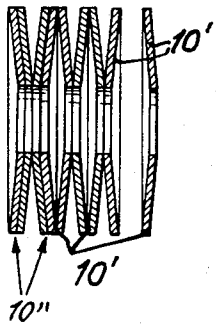


Fig.5



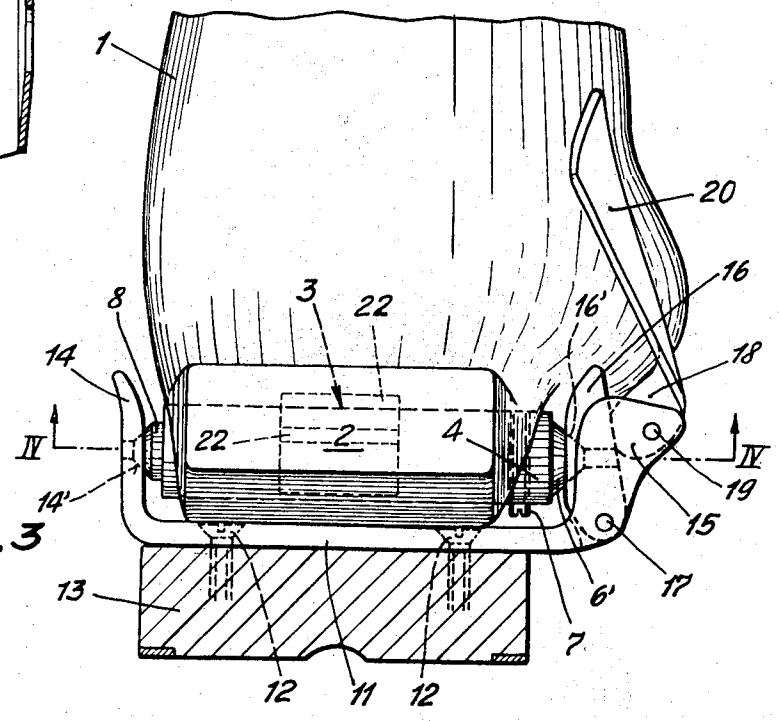


Fig.3

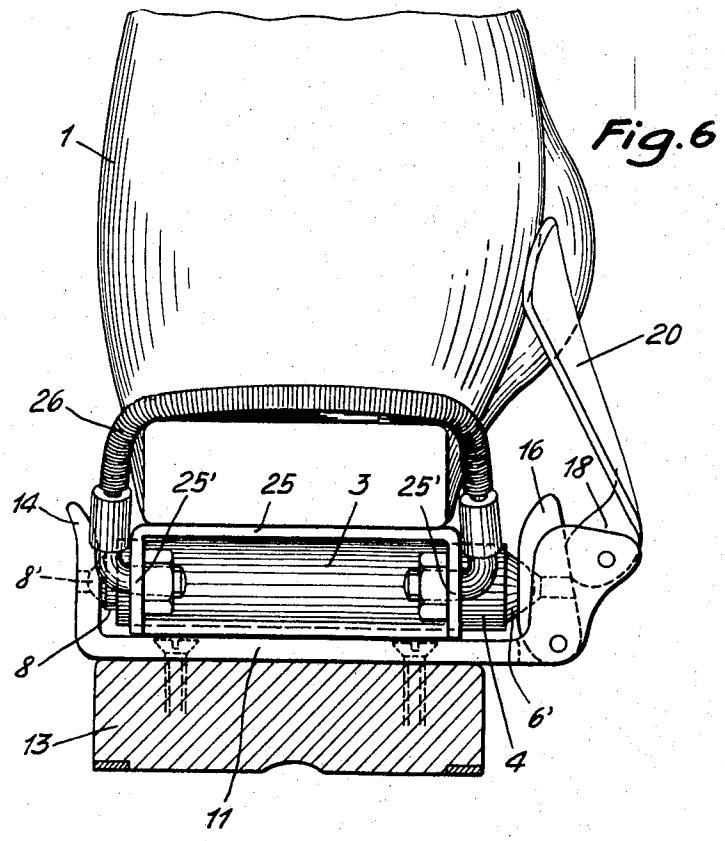

1
20
26
16
18
25'
25
3
25'
14
8'
8
13
11
6'
4

Fig.6

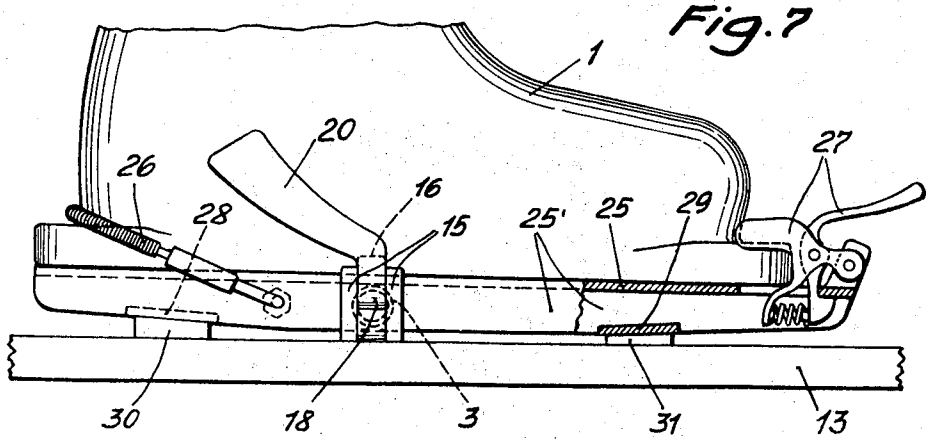

1
20
27
26
28
16
15
25'
25
29
30
18
3
31
13

Fig.7

SELF-RELEASING SKI-BINDING

This is a division of application S.N. 195,136, filed Nov. 3, 1971, now U.S. Pat. No. 3,779,570.

The known ski bindings which are self-releasing in a fall have supporting means engaging at the front and back of the ski shoe and which operate together with the release mechanism. These supporting means which are spacially separated from each other therefore require a correspondingly complicated and relatively expensive release mechanism, which has to operate reliably in the stress of turning as well as in a forward fall and therefore require a separate adjustment according to the individual strain caused by the skier is necessary.

The present invention relates to a self-releasing ski binding which differs from the known bindings of that kind in that coupling means, which are connected to each other elastically and powerfully, are arranged in the centre part of the ski shoe, one portion being fixed to a sole part of the ski shoe and the other oppositely to the ski, whereby for release the coupling means react to certain turning momenta caused by falls during skiing, and furthermore that there is provided an operating member which stands in an operating connection to one of the coupling means and by means of which the coupling can be released at will by hand.

Embodiments of the invention are, shown by way of example in the drawing, wherein:-

FIG. **1** is a side view of the self-releasing ski binding, seen from the outer face of the shoe, in a first example of construction;

FIG. **2** is a plan view corresponding to FIG. **1**;

FIG. **3** is a view of the self-releasing ski binding from the back;

FIG. **4** is a view from below of the ski binding, with part shown in section along the line IV—IV in FIG. **3**;

FIG. **5** shows single discs of the springs put together pair-wise, and seen in axial section and on a larger scale;

FIG. **6** is a view of the ski binding from the back in a second example of construction, and

FIG. **7** a side view thereof with part in section.

1 is the ski shoe in whose sole part **2** a cylindrical latching member **3** is incorporated in a horizontal transverse position near the middle of its length. The latching member **3** has a hollow cylinder **4** which passes through the sole of the shoe **2** in a transverse throughhole **5.** In one end of the hollow cylinder **4** there is inserted a conical pin **6** which is provided with a slightly rounded frustum of a cone **6'** which protrudes at one end of the hollow cylinder. The hollow cylinder **4** is tightly connected to the main steel plate **22** of the sole of the sole part **2** by welding or screwing on. **7** is a locking screw, accessible from below, which connects the hollow cylinder with the conical pin **6.** The other end of the hollow cylinder **4** has a longitudinally movable conical pin **8** which has on its outer part a slightly rounded frustum of a cone **8'** and which, by its inner end and by an axially threaded bolt **23,** is connected in a screw-adjustable manner with a piston **8''** which can move in the hollow cylinder **4** and has an axial threaded hole **24.** The piston **8''** is secured against coming out of the hollow cylinder **4** by a flange **9** which narrows the opening of the hollow cylinder, and it also bears against a pressure spring, **10.** By a screw adjustment of the release momentum of the ski binding is possible. The pressure spring **10** is assembled from conical ring discs or conical spring washers made of spring steel sheet metal (FIG. **5**). The ring discs **10'** are joined together in pairs or in bundles **10''** i.e. matched according to shape. A comparatively soft springing can be achieved by the ring discs **10'** which support themselves in pairs with their concave sides against each other. At the end regions of the pressure spring **10** some ring discs can be assembled in bundles as at the left part at **10''** in FIG. **5,** whereby a more exact fit of the spring length to the length of the hollow cylinder is possible and simultaneously a harder springing can be achieved. By the partly pair-wise and partly bundled joining of the ring discs **10'** a coarse adjustment of the springing to a softer or harder release of the ski binding is possible.

To the latching member **3** there is coupled a fitting **11** in the form of a U-bow which is fixed on the upper part of the ski **13** by means of two screws **12,** as shown by FIG. **3.** Of the upwards pointing side pieces **14, 15,** one forms a latch jaw **14** with a hollow conical holding seat **14'** in which the rounded frustum of a cone **8'** of the latching member seats. The other side piece **15** of the fitting **11** forms a bearing fork in which a latch jaw **16** is journalled to pivot about an axle pin **17.** The latch jaw **16** has a hollow conical holding seat **16'** in which the rounded frustum of a cone **6'** of the latching member **3** engages. The pivotable latch jaw **16** is adjacent to an eccentric **18** of a tension lever **20** which is pivotable in the bearing fork **15** around a pivot pin **19.** In the swung-in position of the tension lever **20** the latch jaw **16** is in a locking position. After the tension lever **20** is swung out, the latch jaw **16** is pivotable into its release position whereby the binding can be opened at will and rapidly.

In abnormal use of the binding through forward or backward falls in the direction of the arrow *a* or *a'* in FIG. **1,** or through twisting of the foot during a fall in the direction of arrows *b* or *b'* in FIG. **2,** or in other directions *c*, *c'*, *d*, *e*, *e'*, there is a disengagement of the latching member **3** from the latch jaws **14, 16** due to the sprung conical pin **8** of the latching member **3** as soon as the twisting momentum exceeds a certain adjustable magnitude.

The sole **2** of the shoe lying against the fitting **11** by its articulation part allows also a securing of the ski shoe position by inserting two spacers **21** and gives it a forward tilted position. By a longitudinal displacement of the spacers **21** the tilting of the release can be adjusted to the front or to the back.

The manufacturing costs of the above described ski binding are low and mounting on to new or old skis can be carried out quickly. Also, the skis are not weakened by a number of holes for receiving fixing screws in the region of the ski binding. In case the ski binding should not open during falls, the tension lever is, as a rule, always reachable by the hand in order to effect uncoupling or release at will.

In order to avoid the incorporation of the latching member **3** into the bottom part of the ski shoe the above described self-releasing ski binding can also be provided with an auxiliary base plate **25** which serves as a carrier of a conventional non-self-releasing ski binding as well as accepting the latching member **3** of the self-releasing ski binding.

In the constructional example illustrated in FIGS. **6** and **7** a base plate **25** is provided with a known holding member **26** at the back and with a similarly operable holding member **27** at the front. The base plate **25** has

a U-shaped cross section whereby the profiled flanges **25'** which point downwards are connected to each other by a crosspiece **28** at the back, and by a crosspiece **29** at the back. These crosspieces **28, 29** serve to seat plate **25** onto two spacing pieces **30, 31** arranged on the ski. The use of this base plate **25** with the abovementioned simple ski binding which is arranged thereon, allows the incorporation of the latching member **3** and therewith makes the self-releasing ski binding dependent on the ski shoe **1.**

The fitting **11** with the integral latch jaw **14** and the bearing fork **15** with the usual latch jaw **16** and the eccentric tension lever **20** is also in this construction fixed on the ski **13,** while the latching member **3** engages through the profile flanges **25'** of the fitting **11** in corresponding holes and is connected firmly by welding, hard soldering or screwing onto the fitting **11.**

I claim:

1. The combination comprising a ski, a base member for supporting a ski boot, means for securing a ski boot to said base member and a binding for connecting said base member to said ski, said binding comprising:

a. an elongated passage in said base member extending between opposite sides thereof,

b. a piston slidable in said passage,

c. stop means preventing said piston from sliding out one end of said passage,

d. a pin having a frusto-conical surface normally extending from said one end of said passage,

e. means adjustably mounting said pin on said piston such that the axial distance between said frusto-conical surface on said pin and said piston may be varied,

f. a plug removably secured in the end of said passage member opposite said one end, said plug having a frusto-conical surface extending radially from said opposite end of said passage,

g. a plurality of conical spring washers arranged within said passage and extending between said plug and said piston biasing said piston towards said stop means, and

h. fitting means arranged on said ski including a pair of spaced conical recesses therein for receiving said conical surfaces of said pin and plug,

i. whereby the axial distance between said frusto-conical surface of said pin and plug may be changed by adjusting said pin mounting means and the biasing pressure applied to said piston may be changed by removing said plug and rearranging said spring washers relative to each other.

2. The combination of claim **1** wherein said means adjustably mounting said pin on said piston comprise an externally threaded shaft on one of said pin and piston and an externally threaded bore on the other of said pin and piston.

3. The combination as defined in claim **2** wherein at least a portion of said spring washers is arranged in pairs, the concave surfaces of each pair facing each other, and the convex faces of adjacent washers, one from each pair, facing each other.

4. The combination as defined in claim **3** wherein a further portion of said spring washers is arranged with the convex face of one washer contiguous to the concave face of an adjacent washer whereby the bias pressure applied to said piston is increased.

5. The combination as defined in claim **4** wherein said fitting means comprises a pair of latching jaws, one of said latching jaws being pivotally mounted, one of said spaced conical recesses being located in each of said latching jaws, and cam means including a lever arranged to abut against said pivotal jaw for selectively retaining said jaw in engaging position.

6. The combination as defined in claim **5** wherein said fitting means comprises a U-shaped member secured to the upper part of said ski, said U-shaped member including said latching jaw.

7. The combination as defined in claim **1** wherein said base member has an inverted U-shaped transverse section and comprises an annular member containing said elongated passage.

8. The combination as defined in claim **1** further comprising means spacing said base member from said ski while secured thereto by said binding.

9. A base member for use with a ski and for supporting a ski boot, said base member comprising:

a. means for securing a ski boot thereto,

b. an elongated passage extending between opposite sides thereof,

c. a piston slidable in said passage,

d. stop means preventing said piston from sliding out one end of said passage,

e. a pin having a frusto-conical surface normally extending from said one end of said passage,

f. means adjustably mounting said pin on said piston such that the axial distance between said frusto-conical surface on said pin and said piston may be varied,

g. a plug removably secured in the end of said passage opposite said one end, said plug having a frusto-conical surface extending radially from said opposite end of said passage, and

h. a plurality of conical spring washers arranged within said passage and extending between said plug and said piston biasing said piston towards said stop means,

i. whereby said conical surfaces of said pin and plug may be received in a pair of spaced conical recesses in fitting means arranged on said ski and the axial distance between said frusto-conical surfaces of said pin and plug may be changed by adjusting said pin mounting means and the bias pressure applied to said piston may be changed by removing said plug and rearranging said spring washers relative to each other.

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