

[54] **SKI SAFETY BINDING**

[72] Inventor: Reinhold Sommer, Essen, Germany

[73] Assignee: Hans Muller, Kettwig, Germany

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Primary Examiner—Benjamin Hersh

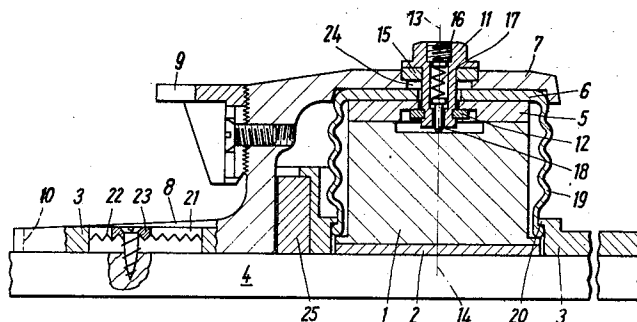
Assistant Examiner—Robert R. Song

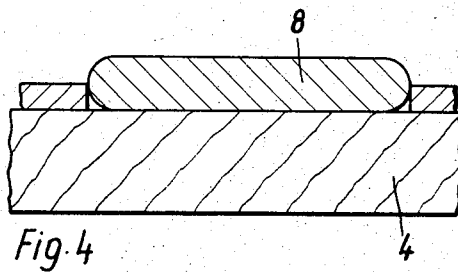
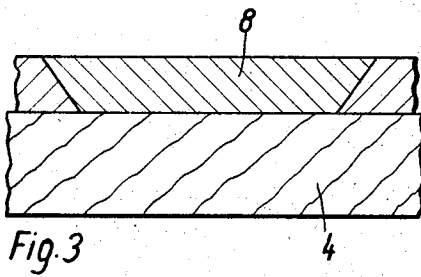
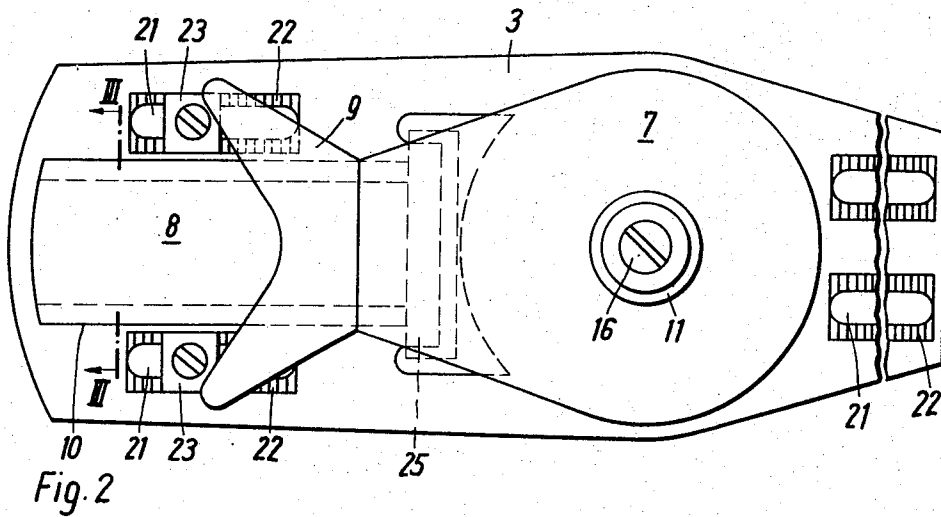
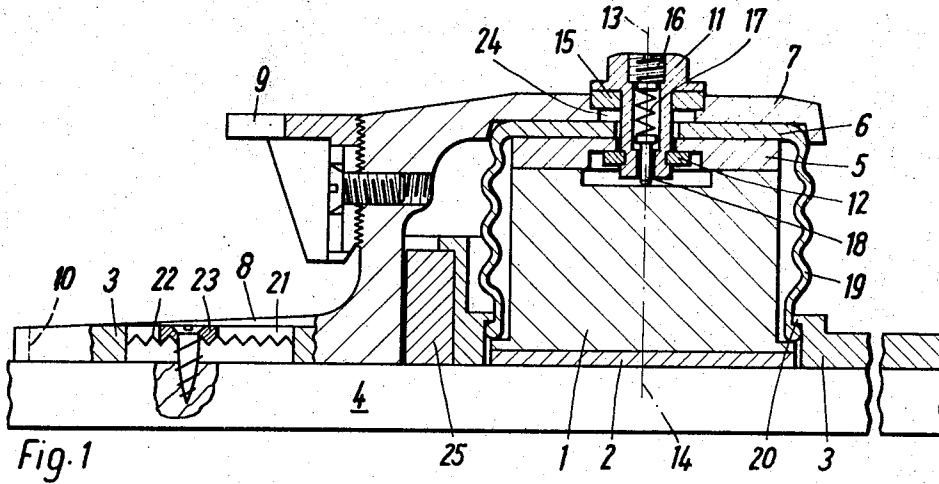
Attorney—Walter Becker

[57] **ABSTRACT**

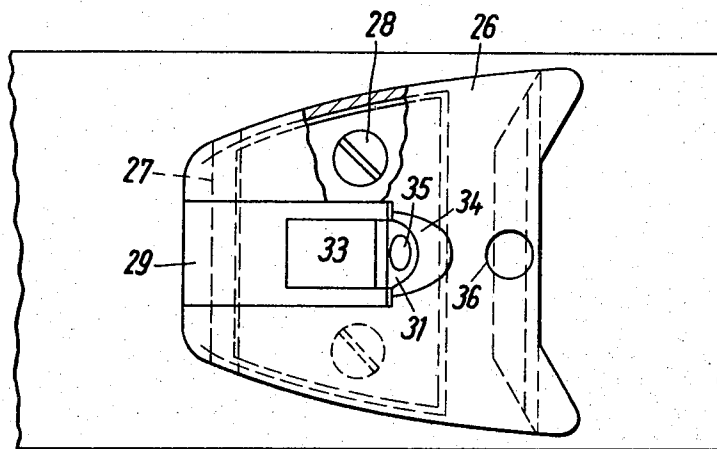
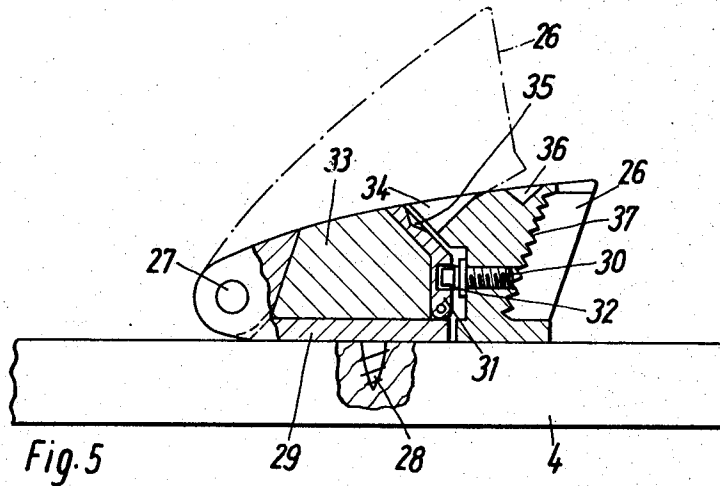
A ski safety binding for connection to a ski board with heel holding means for clamping the heel of a ski boot, in which magnetic means supported by base plate means cooperate with a soft iron plate which has connected thereto heel grasping means comprising tongue means for supporting a ski boot from below and also comprising a clamping member for grasping a ski boot heel from behind and holding the same in position.

10 Claims, 6 Drawing Figures





Inventor:
Reinhold Sommer
 By *August Becker*



Inventor:
Reinhold Sommer
 By *Walter Becker*

SKI SAFETY BINDING

The present invention relates to a ski safety binding in which holding means comprising a magnet and a soft iron plate cooperating therewith are arranged within the region of the heel while mechanical holding means are provided within the region of the tip of the ski boot.

It is an object of the present invention to improve a ski safety binding of the above mentioned type.

With ski safety bindings of the above mentioned type it may happen that a tilting moment acts upon the magnet or the soft iron plate so that between the magnet and the soft iron plate a wedge-shaped air gap will form. Furthermore, with the magnetic holding means in open position, foreign bodies may deposit upon the connecting surface which foreign bodies, if not carefully removed, will likewise form an air gap. The connecting force of a magnet will, however, be fully effective only when the contacting surfaces of the magnet and the soft iron plate engage each other without an air gap therebetween.

The above mentioned object and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 illustrates a longitudinal section through magnetic heel holding means according to the invention.

FIG. 2 is a top view of the heel holding means of FIG. 1.

FIG. 3 represents a section taken along the line III—III of FIG. 2.

FIG. 4 is a section similar to that of FIG. 3 through a modified heel holding means according to the invention.

FIG. 5 diagrammatically illustrates a side view of a mechanical boot tip holding means according to the invention.

FIG. 6 shows a top view of the boot tip holding means of FIG. 5.

The ski safety binding according to the present invention is characterized primarily in that the magnetic holding means is equipped with a tongue which extends below the sole of the ski boot and which together with an angle member forms a U-shaped clamp, said angle member extending over a portion of the heel of the ski boot. In this way the occurrence of tilting moments is prevented.

In order to make sure that the holding means can be adjusted for any size of a ski boot, the angle member engaging the heel is adjustable relative to the tongue.

According to a further feature of the invention, the tongue is arranged in a recess provided in the base plate of the magnetic holding means whereby a lateral slipping of the ski boot is prevented.

The U-shaped clamp formed by the tongue and the angle member is expediently by means of a bolt connected to the magnet or the soft iron plate in such a way that the axis of the bolt is in alignment with the axis of the magnet so that the point of attack of the force tending to open the magnetic holding means will always be located in the center of the magnet. The bolt has its lower end provided with a thread or with a groove for a spring ring.

In order to assure that the above referred to force can always act only perpendicularly so that only the vertical component of the force will become effective,

an elastic disc is arranged below the head of the bolt, said disc acting in the manner of a ball joint. Furthermore, the elastic disc is adapted to absorb shocks. The elastic disc will prevent the soft iron plate from detaching itself from the magnet in response to the occurrence of short, shock-like forces which act in a direction counter to the holding force of the magnet.

According to a further development of the invention, the bolt is hollow and has its upper portion provided with an inner thread receiving a screw while below said screw there is provided a pressure spring which through the intervention of a pin exerts a pressure upon the magnet which pressure is directed counter to the direction of the magnetic force. In this way, the effective magnetic force may be varied. The stronger the pressure exerted by the pressure spring, the weaker will become the effective magnetic holding force. By exchanging the pressure spring, the holding force may be selected precisely in conformity with the holding force necessary for the respective skier.

The magnetic holding force may also be controlled by exchanging the soft iron plate. When purchasing the ski safety binding according to the invention, the salesman will determine the thickness of the soft iron plate in conformity with the requirements of the respective buyer so that accidents due to an incorrect adjustment of the release force can no longer occur. In order to keep the structural height constant, the thinner soft iron plates are supplemented by a plate of non-magnetizable material the thickness of which is so selected that the space between the soft iron plate and the elastic intermediate layer is completely filled.

The clamping member of the magnetic holding means is provided with a longitudinal bore for the passage of a bolt which establishes the connection between the U-shaped clamp formed by the tongue and the angle member on one hand and the magnet or soft iron plate on the other hand. In this way a certain displacement of the clamping member relative to the magnet or soft iron plate is possible. Such displacement may occur when skiing through a dip in the terrain inasmuch as the ski will bend in such circumstances.

According to a further development of the invention, an elastic abutment member is inserted into the base plate. The end of the tongue rests against said abutment member so that a shortening of the distance between the magnet and the mechanical holding means when skiing through a dip will be compensated for.

In order to close off the magnetic system with regard to the outside in a dust-free manner, the magnet and the soft iron plate are surrounded by an elastic sleeve which expediently has the shape of a bellows. When lifting the soft iron plate off the magnet, the soft iron plate and the structural elements which are connected thereto and pertain to the magnetic holding means are connected by means of said bellows to the base plate so that additional devices, such as a catching line or the like, will not be necessary.

For connection to the ski, the base plate is provided with a plurality of oblong openings the longitudinal axis of which extends in the direction of the longitudinal axis of the ski. By a simple displacement of the base plate, the holding means can be adjusted for any desired shoe or boot size.

In order to prevent an accidental displacement of the base plate, the latter is laterally of the oblong openings at its top side provided with grooves which in the direction of the longitudinal axis of the ski are located one behind the other and which are engaged by the teeth of a washer.

In order to avoid to have to open the magnetic holding means each time when it is intended to detach the ski boot from the ski, the holding means for the tip of the shoe is provided with a jaw which by means of a horizontal shaft extending in a direction perpendicular to the shoe is pivotally arranged on a support which by means of screws is connected to the ski and which is adapted to be locked in its lowermost position by means of a pin. In this way the bellows of the magnetic holding means is protected so that it has a nearly unlimited life.

One end of the pin is screwed into the jaw while its other end engages a bore of a lever pivotally connected to the support while the lever rests against an elastic block inserted into the support. In response to the exertion of a pressure upon the lever, the lever will yield while the elastic block is compressed so that the pin is freed. Expediently, the lever is within the region of a recess in the jaw provided with a depression for insertion of a ski stick so that the skier can loosen the ski binding while standing up.

In order to allow the skier while standing up also to close the jaw, the top side of the jaw is provided with a depression for insertion of a ski stick.

That surface of the jaw which faces toward the ski boot is inclined so that an adjustment of the jaw in conformity with the thickness of the sole of the respective ski boot is not necessary. In order to furnish a safe hold for the ski boot, the surface facing the boot is roughened, for instance, knurled.

Referring now to the drawings in detail, the holding means for the heel portion according to FIGS. 1 and 2 comprises a magnet 1 which rests on an elastic support 2 and by means of a base plate 3 is connected to the ski board, and furthermore comprises a soft iron plate 5 which through the intervention of an elastic intermediate layer 6 is connected to a clamping member 7 having fixedly connected thereto a tongue 8 while an angle member 9 is adjustably connected to said clamping member 7. The tongue 8 and the angle member 9 form a U-shaped clamp which may be adapted to the thickness of the heel of a ski boot. Tongue 8 is arranged in a recess 10 of the base plate 3. The connection between the soft iron plate 5 and the clamping member 7 is effected by a bolt 11 which has its lower end provided with a groove for a spring ring 12. Bolt 11 is so arranged that its axis 13 is in alignment with the axis 14 of the magnet 1. An elastic disc 15 is arranged below the head of bolt 11. The hollow bolt 11 has its upper portion provided with an inner thread into which is screwed a screw 16. Below screw 16 there is provided a pressure spring 17 which through the intervention of a pin 18 exerts a pressure on the magnet 1 which pressure is directed counter to the adhering force. The pressure spring 17 is exchangeable. An oblong hole 24 is provided in the clamping member 7 for passing the bolt 11 therethrough. Inserted into the base plate 3 is an elastic abutment member 25 against which rests the end of tongue 8.

Magnet 1 and soft iron plate 5 are surrounded by an elastic sleeve 19 which forms a bellows. The lower end of sleeve 19 is clamped between the magnet 1 and a collar 20 of base plate 3, whereas the upper end of sleeve 19 is clamped between the soft iron plate 5 and the elastic intermediate layer 6. However, also the upper end of sleeve 19 itself may form an elastic intermediate layer 6.

The base plate 3 is provided with oblong holes 21. Laterally of said holes 21, the base plate 3 is provided with grooves 22 engaged by teeth of washers 23.

FIGS. 3 and 4 illustrate possible cross-sectional shapes of tongue 8. However, also other cross-sectional shapes are feasible. In order to prevent a lateral displacement of tongue 8, a ball, a pin or the like may be inserted in the ski board 4, and tongue 8 may be provided with a bore for receiving that portion of the ball, pin or the like which protrudes from the ski board 4.

According to the binding or holding means illustrated in FIGS. 5 and 6 for the tip of the ski boot, a jaw 26 is by means of a bolt 27 arranged on a support 29 which is fastened to the ski board 4 by means of screws 28 so that the jaw 26 can be folded into the dot-dash line position (FIG. 5). The locking of the jaw 26 in its lower position is effected by a pin 30 which has one end screwed into the jaw 26 and has its other end engaging a bore of a lever 31 which is pivotally connectable to the support 29.

A nut 32 screwed onto the pin 30 prevents the pin 30 from being accidentally loosened. An elastic block 33 is inserted into the support 29. Against the said block rests a lever 31 which, however, may also be connected to the block 33, for instance, by being cemented thereto. Within the range of a recess 34 provided in the jaw 26, lever 31 is provided with a depression 35. A ski stick may be inserted by the skier into the said depression 35 so that the lever 31 can be pressed downwardly and the pin 30 is freed while the jaw 26 can be folded into the dot-dash line position. Jaw 26 has its upper side likewise provided with a depression 36 which serves for closing the jaw 26 by means of the ski stick. That surface 37 of jaw 26 which faces toward the ski boot is inclined. The surface 37 is furthermore roughened, for instance, knurled.

It is, of course, to be understood that the present invention is, by no means, limited to the particular showing in the drawings but also comprises any modifications within the scope of the appended claims.

What I claim is:

1. A ski safety binding for connection to a ski board which comprises heel holding means for holding the heel of a ski boot; said heel holding means including base plate means for connection to a ski board, magnetic holding means supported by said base plate means, soft iron plate means associated with said magnetic holding means and adapted to be magnetically secured thereby though capable of being opened from all directions while tilting moments are hindered from being effective on said magnetic holding means, heel grasping means for grasping the heel of a ski boot, and connecting means connecting said heel grasping means at one end thereof to said soft iron plate means, said heel grasping means comprising tongue means rigidly connected to the other end thereof for supporting a ski boot from below and also comprising a mechanical

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clamping member connected to said other end and positioned above said tongue means for tightly grasping a ski boot heel therebetween, and means provided in the forward portion of said base plate for restricting a lateral movement of said tongue means to permit only vertical lifting off of said magnetic holding means so that tilting moments cannot arise and so that always the entire holding force of said magnetic holding means must be overcome before the binding opens and that further opening of the binding occurs as a result of each loading that is too strong independently thereof from which direction the loading arises.

2. A ski safety binding according to claim 1, in which said base plate means is provided with a longitudinal recess having said tongue means held therein, width of said tongue means corresponding to width of the recess having at least some side offset therebetween so that upon encountering too strong lateral loading there occurs pressing out and simultaneous vertical lifting of said tongue means out of the recess.

3. A ski safety binding according to claim 2, in which said tongue means and said clamping member together form a clamp of U-shaped cross-section in the plane of symmetry of said base plate means perpendicularly to the top and bottom surfaces thereof, and bolt means substantially coaxial with said magnetic means and connecting said clamp to said soft iron plate means.

4. A ski safety binding according to claim 3, which includes elastic washer means interposed between said clamp and said bolt means.

5. A ski safety binding according to claim 3, in which said clamp is provided with a longitudinal hole for introducing said bolt means therethrough.

6. A ski safety binding according to claim 1, in which said base plate means for connection to a ski board is provided with longitudinal bores extending in the longitudinal direction of said base plate means and provided with transverse groove means, and which includes toothed washer means having the teeth thereof in engagement with said groove means, and screw means extending through said washer means for connecting the same to a ski board.

7. A ski safety binding for connection to a ski board which comprises heel holding means for holding the

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heel of a ski boot, said heel holding means including base plate means for connection to a ski board, magnetic means supported by said base plate means, soft iron plate means associated with said magnetic means and adapted to be magnetically held thereby, heel grasping means for grasping the heel of a ski boot, and connecting means connecting said heel grasping means to said soft iron plate means, said heel grasping means comprising tongue means for supporting a ski boot from below and also comprising a clamping member for grasping a ski boot heel from behind and holding the same in position, hollow bolt means forming said connecting means and extending through said soft iron plate means, the outer end of said bolt means having an inner thread, detachable screw means in threaded adjustable engagement with said inner thread, slidable pin means arranged within said hollow bolt means and having one end in engagement with said magnetic means, and spring means interposed between said screw means and said pin means and continuously urging the latter toward said magnetic means.

8. A ski safety binding according to claim 7, which includes elastic sleeve means enclosing said soft iron plate means and said magnetic means.

9. A ski safety binding according to claim 8, in which said elastic sleeve means forms a bellows.

10. A ski safety binding for connection to a ski board which comprises heel holding means for holding the heel of a ski boot, said heel holding means including base plate means for connection to a ski board, magnetic means supported by said base plate means, soft iron plate means associated with said magnetic means and adapted to be magnetically held thereby, heel grasping means for grasping the heel of a ski boot, and connecting means connecting said heel grasping means to said soft iron plate means, said heel grasping means comprising tongue means for supporting a ski boot from below and also comprising a clamping member for grasping a ski boot heel from behind and holding the same in position, said base plate means being provided with a longitudinal recess having said tongue means held therein, and elastic abutment means inserted in said longitudinal recess and forming an abutment for said tongue means.

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