

12 **EUROPEAN PATENT APPLICATION**

21 Application number: 84107680.5

51 Int. Cl.⁴: **A 63 C 9/20**

22 Date of filing: 03.07.84

30 Priority: 08.07.83 IT 2232483 U
26.01.84 IT 1933684

43 Date of publication of application:
16.01.85 Bulletin 85/3

84 Designated Contracting States:
AT CH DE FR LI SE

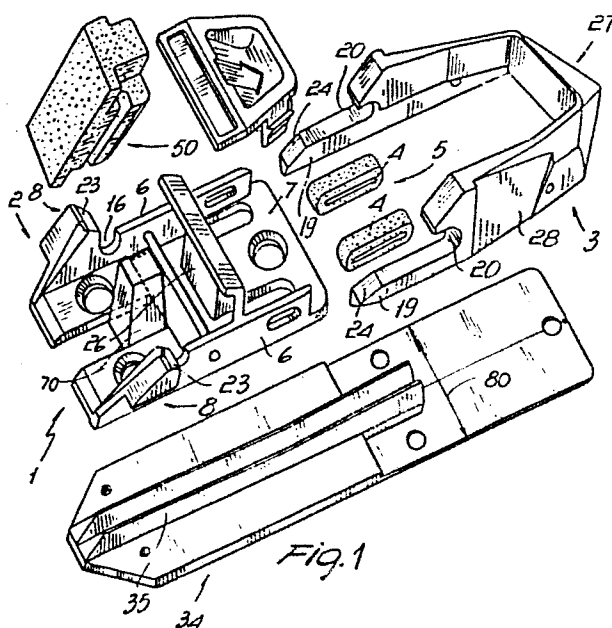
71 Applicant: **Callegari, Mario**
Via Anassillide 80
I-31030 Biadene (Treviso)(IT)

72 Inventor: **Callegari, Mario**
Via Anassillide 80
I-31030 Biadene (Treviso)(IT)

74 Representative: **Modiano, Guido et al,**
MODIANO, JOSIF, PISANTY & STAUB Modiano &
Associati Via Meravigli, 16
I-20123 Milan(IT)

54 **Ski binding particularly for cross-country skiing.**

57 The invention is concerned with a ski binding (1) particularly useful for cross-country skiing, which comprises an element (2) for fastening a ferrule (3) to a ski body having substantially orthogonal sides to the mounting plane thereof. The ferrule (3) is slidably associated with the fastening element (2) against the bias of a rubber band (4) pair, a ferrule guiding means (60) being provided to allow it to slide in a parallel direction to the mounting plane.



"SKI BINDING PARTICULARLY FOR CROSS-COUNTRY SKIING"

This invention relates to a ski binding particularly for cross-country skiing.

As is known, a skier's gait or stride in cross-country skiing is favored by a relative pivotal movement between the ski boot and ski.

Also known is that ski bindings for such an application generally comprise a ferrule which is secured directly on the ski body and adapted to receive an engaging device carried on the toe end of the ski boot to provide releasable engagement between the ferrule and boot, thereby enabling connection of the ski to the skier's foot.

Such prior ski bindings generally include shoe engaging members mounted on elastic blades, which involves shifting of the boot point of attachment to the ski, thus adversely affecting directional control of the latter and resulting in a proportion of flex being entrusted to the sole of the boot, which can no longer be formed with stiffening ribs to ensure resistance against torsional stresses.

Such drawbacks are partly overcome by employing ferrules having engagement plates journalled thereon and being attached to the boot sole; however, such engagement plate ferrules fail to solve the problem of the distance of the boot point of pivotal connection to the ski, and their construction requires the use of valuable materials in order for the engagement elements between the sole and ferrule to be adequately strong and reliable.

Furthermore, prior binding designs are liable to jamming in use owing to snow and water getting in between the component parts, to make the ski latching and unlatching from the boot more difficult.

5 Conventional ski bindings usually comprise an either permanently or removably attached elastic pad which is sufficiently rigid to enable ski control by the skier, but involves a continued effort by the skier in his/her stride.

10 Commercially available ski bindings generally lack self-lubricating features and require as a result regular maintenance, which when not carried out periodically, can adversely affect the correct operation of the bindings.

15 Accordingly the task of this invention is to obviate such prior problems by providing a ski binding particularly for cross-country skiing, which can significantly attenuate a skier's toil, while enabling him/her to retain complete control on the skis during
20 effectuation of the skiing stride.

Within that task it is an object of the invention to provide a ski binding which includes an elastic pad adapted to bias the ski to its normal position, that is, to a constantly parallel position to the skier's boot.

25 It is a further object of the invention to provide a ski binding which is suitably configured to prevent seepage of snow or water to its inside.

Still another object of this invention is to provide a ski binding which can perform correctly at

all times by virtue of its self-lubricating, antifreeze, and ice-breaking features.

According to one aspect of the invention the above task and objects as well as yet other objects are achieved by a
5 ski binding particularly for cross-country skiing, characterized in that it comprises a ferrule slidably associated, against the bias of an elastic means, with a fastening element to the ski, said fastening element having substantially orthogonal sides to its mounting
10 plane and a means of guiding said ferrule in its sliding movement parallel to said mounting plane.

Further features and advantages of the invention will be more clearly understood from the following description of a preferred, but not exclusive, embodi-
15 ment thereof, to be read in conjunction with the accompanying illustrative drawings, where:

Figure 1 is an exploded perspective view of the ski binding according to this invention;

Figure 2 is a top plan view of the ski binding
20 of this invention;

Figure 3 is a side elevation view of the ski binding of this invention;

Figure 4 is a perspective view of a modified embodiment of the elastic block according to the
25 invention;

Figures 5 and 6 are exploded perspective views of the bottom portion of the ski binding adhering on a ski body, in accordance with this invention;

Figure 7 is a sectional view showing schematically
30 the inventive ski binding as being engaged with a ski boot;

Figure 8 shows the ski binding of this invention during disengagement of the ski boot;

Figure 9 is an exploded perspective view of another modified embodiment of the ski binding
5 according to the invention; and

Figures 10 to 13 show a further embodiment of the grooves for engagement with metal inserts of quadrangular configuration.

With reference to the drawing views, a ski binding
10 according to the invention is generally designated with the reference numeral 1, and comprises essentially a fastening element 2 to be mounted on the body of a ski, not shown in the drawing, which has a ferrule 3
slidably associated therewith against the bias of an
15 elastic means 5 including two rubber bands 4.

The fastening element 2 has on each of its sides 6, which are substantially orthogonal to the mounting plane 7 thereof, a guide means 60 for guiding the ferrule sliding movement parallelly to said mounting
20 plane.

More specifically, the guide means comprises a wing extension 8 advantageously cooperating with at least one guide element 9 which includes a peg 10 carried orthogonally on the sides 6 and engaging at
25 its end portions in two slots 12 formed through the sides 6 of the fastening element 2 and in two holes 13, formed each through the ferrule 3;

The rubber bands 4, in particular, are held in a biased condition inside the ski binding by the peg 10 and
30 by a rod 14 spaced in a parallel relationship from the

peg 10 and engaging in two holes 15 as formed on the sides 6.

5 The sides 6 are each provided with a groove 16 adjacent to the wing 8 and configured to securely receive the ends of a metal insert 17 which protrude laterally from the toe end of a sole of a boot 18. The grooves 16 may also have configurations other than the round one, for example, as shown in Figures 10 to 13 where substantially quadrangular configurations are illustrated which, by engaging with a metal insert 10 mounted at the boot toe end and having a complementary shape, will inhibit relative rotation between the binding and boot and only serve the function of making the latter rigid with the ski, allocating an amount of flex during the skier's stride to the sole of the 15 boot itself.

The ferrule 3 has a pair of arms 19 pointing in the same direction and extending respectively adjacent to the sides 6 for sliding movement therealong, which arms comprise each one surface portion 20, at the 20 ferrule facing end, advantageously configured to engage with a snap-in action with a respective one of the grooves 16 to define an engagement seat 22 for the end of the metal insert 17.

Each wing extension 8 is formed, on the side 25 facing the ferrule, with a bevel 23 which defines, together with the inclined surface 24 of each arm 19, a lead-in region effective to favor the introduction of the metal insert 17 into the seat 22, thanks to said insert generating a sliding action between the 30 fastening element 2 and ferrule 3 against the bias of the two rubber bands 4.

Thus, the wing extensions 8 allow for a sliding movement, along the sides 6, of the two arms 19, while holding them securely and cooperating with the guide element 9 to prevent them from moving, together
5 with the ferrule as a whole, upwardly with respect to the fastening element 2.

The sides, in combination with the mounting surface 2, define a seat 25 adapted to accommodate a small elastic block 50, preferably made of rubber,
10 which engages releasably in the seat 25 and can be readily replaced with other elastic blocks from a range having advantageously different elastic characteristics according to the ski weight, thereby to bias it to a parallel position to the boot at the
15 end of each stride by the skier and enable the latter to ski with less effort.

The block 50 engages on the rod 14 to form an elastic reaction device between the toe end of the boot sole and a wall 26 fastened to the surface 7 and
20 eliminate any play between the boot and binding. This may be accomplished, for example, by interposing between two sides of said block, presenting a longitudinal groove therebetween, an adjustment screw which, as a function of the extent of its penetration
25 into the groove, enables the two sides to be moved to and away from each other so as to take up any play which may have developed between the boot toe end and binding, even after prolonged operation of the block. Furthermore, the block allows, in the course of the
30 skier's stride, the metal insert held in the seat 22 to originate a force tending to cause the ferrule to

slide relatively to the fastening element and prevent formation of ice therebetween while permitting self-lubrication of the entire binding; this movement enables, moreover, the two wings 8 to eject from the arms
5 19 any snow in skiing, thus ensuring at all times optimum working conditions for the binding as the boot is pivoted about its hinge axis. On the seat 25, there may be provided a block 70 of truncated pyramid shape which, by engaging in a specially
10 provided seat in the boot toe end, would cooperate with the side wings in holding the boot guided.

The ferrule 3 has the surface portion 27, remote from the arms 19, advantageously formed with a point, and precisely, formed with its two side surfaces
15 slightly inclined and converging toward an apex, and defining with the latter a downward sloping top surface which encourage snow to slip off the ferrule while skiing. Furthermore, the ferrule, during its back and forward movement relatively to the fastening
20 element 2 rigid with the ski body, will break, and hence remove, any ice formation which may have built up on the binding front in skiing.

The ferrule 3 has on each side at least one dimple 28 which facilitates, when necessary, manual
25 displacement of the ferrule relatively to the fastening element.

The ferrule 3 is provided at the top with a small cover plate 29 having a recess 30 suitably shaped to engage with the tip 32 of a ski pole, not shown in the
30 drawing, in order to avoid the need for the skier to

bend forward, when releasing the binding, to apply the required pressure for sliding the ferrule.

Formed on the plate 29 is a depressed surface 33 of arrow-like configuration for leading the tip 32 of the ski pole into the recess 30 and visually indicating
5 the direction in which the ferrule is being moved relatively to the fastening element.

A further embodiment of the cover plate 29 provides for the elimination of the recess 30 therefrom, in
10 which the tip 32 of the ski pole engaged, so that the binding is now released by applying, either manually or through the tip of any small stick, a pressure to the plate 29, which on being depressed will allow the ferrule 3 to slide relatively to the fastening element
15 2.

Another embodiment would provide for the binding to be released by means of a lever pivoted eccentrically on the ferrule which, when rotated, moves the ferrule relatively to the fastening element 2 and
20 disengages the boot from the binding.

The fastening element is provided at the bottom, adjacently to the ski body, with a plate 34 which, in combination with the fastening element itself, defines a fairing effective to prevent snow and water
25 from seeping into the binding.

The closure plate 34 extends along the ski body and has, at a middle position thereof, two large longitudinal ribs 35 which engage releasably in two corresponding grooves provided on the boot sole to
30 perform a ski banking prevention function, thereby

the skier can constantly exert proper directional control of the ski without requiring any additional means on the bindings.

The closure plate 34, moreover, is suitably
5 configured to also serve the function of a template, it being provided with a balance line 60 to facilitate drilling of the holes in the ski body for engagement by the mounting screws of the fastening element 2. In a further embodiment, the ski binding may be configured
10 as shown in Figure 9, and comprises a ferrule 113 slidably associated against or with the bias of an elastic means, specifically a spring 122, with a fastening element 111.

The sides 110a and 110b are each formed with
15 respective grooves 109a and 109b, and substantially orthogonal to a mounting plane 112 and parallel to each other to define a seat 113 accommodating the boot block whereacross a pin having free ends is passed.

From the ferrule 113, there extends a pair of
20 arms 115a and 115b, respectively, pointing in the same direction and lying adjacently to a corresponding side of the fastening element, which are each provided, on the side facing the grooves, with an engagement seat 116 purposely configured to snap-action engage with
25 the free ends of the pin as the latter engages in the grooves.

Also provided is a guide means adapted to allow the ferrule to be moved substantially parallel to the mounting plane.

30 The guide means preferably comprises first and

second pegs, respectively indicated at 118 and 119, carried orthogonally on the sides, which engage with slots 120 and 121, respectively, provided the former on the arms 115a and 115b, and the latter on the snap-
5 action body.

The coil spring 122 is located between the fastening element and ferrule to hold the seats 116 in a condition of interaction with the grooves, so as to allow for the snap-action engagement of the free
10 ends of the pin.

The spring 122 is inserted into a cavity 123, wherein there engages a screw adjustment element 124 to change the spring load, the spring acting against the pin 119 to adjust the binding release force.

15 The sides have at their rear ends, that is the ends next to the boot, enlarged portions defining corresponding guide butts, 125a and 125b, which act laterally on the boot block and cooperate in preventing the boot from leaning out relatively to the ski.

20 The top ends of the butts 125a and 125b have, on the remote side from the mounting plane and at each groove, a bevel 126 which, in cooperation with a similar bevel 127 at the end of each arm, causes, upon the free ends of the pin being pressed thereon,
25 disengagement of the arms from the grooves, thus enabling snap-action engagement of the pin.

Advantageously, the seat accommodates an elastic pad 128, preferably made of rubber, which releasably engages with the seat to be readily replaceable with
30 other like pads having different elastic properties

according to the skill and weight of the skier, as well as to the preformance expected of the bindings.

The pad 128 can have seating regions for the guide means in the form of a bore 129 therethrough.

5 The pad is interposed directly to form an elastic reaction device between a front wall of the block and a crosspiece or bridge 132 attached to the surface 112 to oppose movements of the pad as the latter is compressed by the block by the boot rotating about the
10 axis of the pin embedded therein.

 The crosspiece is perforated to facilitate adjustment of the device 124; it should be further noted that the snap-action body has, at the remote end from the ski, a pressure region 135 provided with a
15 means promoting the grip on the snap-action device, such as crosswise extending grooves, knurled surfaces, and the like, and formed at an intermediate portion thereof is a recess 136 adapted to engage with the tip of a ski pole, not shown, to prevent the skier's need,
20 on releasing the binding, for bending and exerting the required pressure to slide the snap-action device.

 The operation of the device according to the invention may be appreciated from the foregoing description and illustration, in particular by making
25 reference to Figures 7 and 8 it may be seen that by resting the free ends of the pin 17 in the grooves 16 and applying a slight pressure, thanks to the provision of the bevel 23 and inclined surface 24, a force component extending substantially parallel to the
30 mounting plane is generated which causes the ferrule

to move relatively to the fastening element and the elastic bands 4 to be put under tension.

On the free ends of the pin moving into the engagement seat 22, the bias applied by the elastic bands 4 will return the ferrule to its original
5 position, thereby locking the pin in the position reached while holding it in pivotal or fixed engagement with the binding.

During the skiing stride, a dual holding form is generated holding the boot to the binding, which
10 is due both to the configuration of the boot toe and to the free ends of the pin embedded therein, thanks to which the engagement of the boot in the two large longitudinal ribs provided on the closure plate will occur in a highly accurate manner thereby propagation
15 of the stresses directed by the two heel guides toward the boot hinge point takes place to enable the skier, in his/her stride, to achieve best results for a minimum of effort.

A further advantage of the inventive binding is
20 that by providing the closure plate below the binding, any water or snow seepage into the binding can be prevented, thus achieving good efficiency and prevention of likely jamming conditions due to the formation of ice between mutually moving parts.

25 The invention as disclosed is susceptible to many modifications and changes without departing from the purview of the instant inventive concept. As an example, the two elastic bands 4 may be connected directly to one portion of the elastic block, as shown

in Figure 4, so as to eliminate, for example, the holding rod 14.

Furthermore, all of the details may be replaced with technically equivalent elements.

CLAIMS

1 1. A ski binding particularly for cross-country
2 skiing, characterized in that it comprises: a fastening
3 element (2) having substantially orthogonal sides (6)
4 to its mounting plane on the ski, a ferrule (3) slidably
5 associated against the bias and by the action of an
6 elastic means (5) with said fastening element (2), and
7 a guide means (60) provided on said fastening element
8 (2) to enable sliding of said ferrule (3) parallelly to
9 said mounting plane.

1 2. A ski binding according to Claim 1, characterized
2 in that said guide means (60) comprises at least one
3 wing extension (8) slidably engaging with each of a
4 pair of arms (19) extending in the same direction from
5 said ferrule (3) and respectively adjacently to said
6 sides (6), said at least one wing extension cooperating
7 with at least one guide element (9) interposed between
8 said fastening element (2) and said ferrule (3) to
9 prevent it from moving away from said mounting
10 plane.

1 3. A ski binding according to Claims 1 and 2,
2 characterized in that it comprises, on each of said
3 sides (6), a groove (16) adjacent to said at least one
4 wing extension (8).

1 4. A ski binding according to one or more of the
2 preceding claims, characterized in that each of said
3 arms (19) has on its side facing said ferrule (3) a
4 surface portion adapted for snap-action coupling to
5 said at least one groove (16) and defining an engage-
6 ment seat for a metal insert (17) rigid with the boot

7 (18) toe end.

1 5. A ski binding according to one or more of the
2 preceding claims, characterized in that said at least
3 one wing extension (8) has a bevel (23) formed on the
4 side facing said ferrule (3) and defining, in coopera-
5 tion with a corresponding inclined surface (24) on
6 said ferrule (3), a lead-in region for the introduction
7 of said metal insert (17) into said at least one groove.

1 6. A ski binding according to one or more of the
2 preceding claims, characterized in that said sides (6)
3 define, with said mounting plane (2), a seat (25)
4 accommodating an elastic block (50).

1 7. A ski binding according to one or more of the
2 preceding claims, characterized in that said elastic
3 block (50) is adapted to cooperate in contact with one
4 sole portion of a boot incorporating said metal insert
5 (17) to generate a sliding force on said ferrule (3)
6 along said fastening element (2).

1 8. A ski binding according to one or more of the
2 preceding claims, characterized in that said ferrule
3 (3) has a pointed surface portion (27) remote from
4 said arms (19).

1 9. A ski binding according to one or more of the
2 preceding claims, characterized in that said ferrule
3 (3) has on each side at least one dimple (28) for its
4 manual displacement relatively to said fastening
5 element (2).

1 10. A ski binding according to one or more of the
2 preceding claims, characterized in that said elastic
3 means (5) comprises at least one elastomeric element.

1 11. A ski binding according to one or more of the
2 preceding claims, characterized in that said fastening
3 element (2) comprises a closure plate (34) on its
4 portion adjacent to the ski and extending therealong.

1 12. A ski binding according to one or more of
2 the preceding claims, characterized in that said
3 closure plate (34) is formed, at a middle portion
4 thereof, with at least one large longitudinal rib (35)
5 adapted to be releasably engaged by at least one
6 corresponding groove provided on the sole of said
7 boot, said plate having, in the proximity of the
8 mounting holes thereof, at least one line for correctly
9 positioning the binding on the ski.

1 13. A ski binding according to one or more of the
2 preceding claims, characterized in that said seat
3 provided in a middle portion thereof has at least
4 one block cooperating with said wing extensions to
5 guide said boot.

1 14. A ski binding according to one or more of the
2 preceding claims, characterized in that said at least
3 one elastomeric element is rigidly connected to said
4 elastic block.

1 15. A ski binding according to one or more of the
2 preceding claims, characterized in that said ferrule (3)
3 has a cover plate (29) formed with a recess (30) for
4 engagement by the tip (32) of a ski pole.

1 16. A ski binding according to one or more of the
2 preceding claims, characterized in that said plate (29)
3 has a depressed surface of arrow-like configuration
4 for leading said tip into said recess.

- 17 -

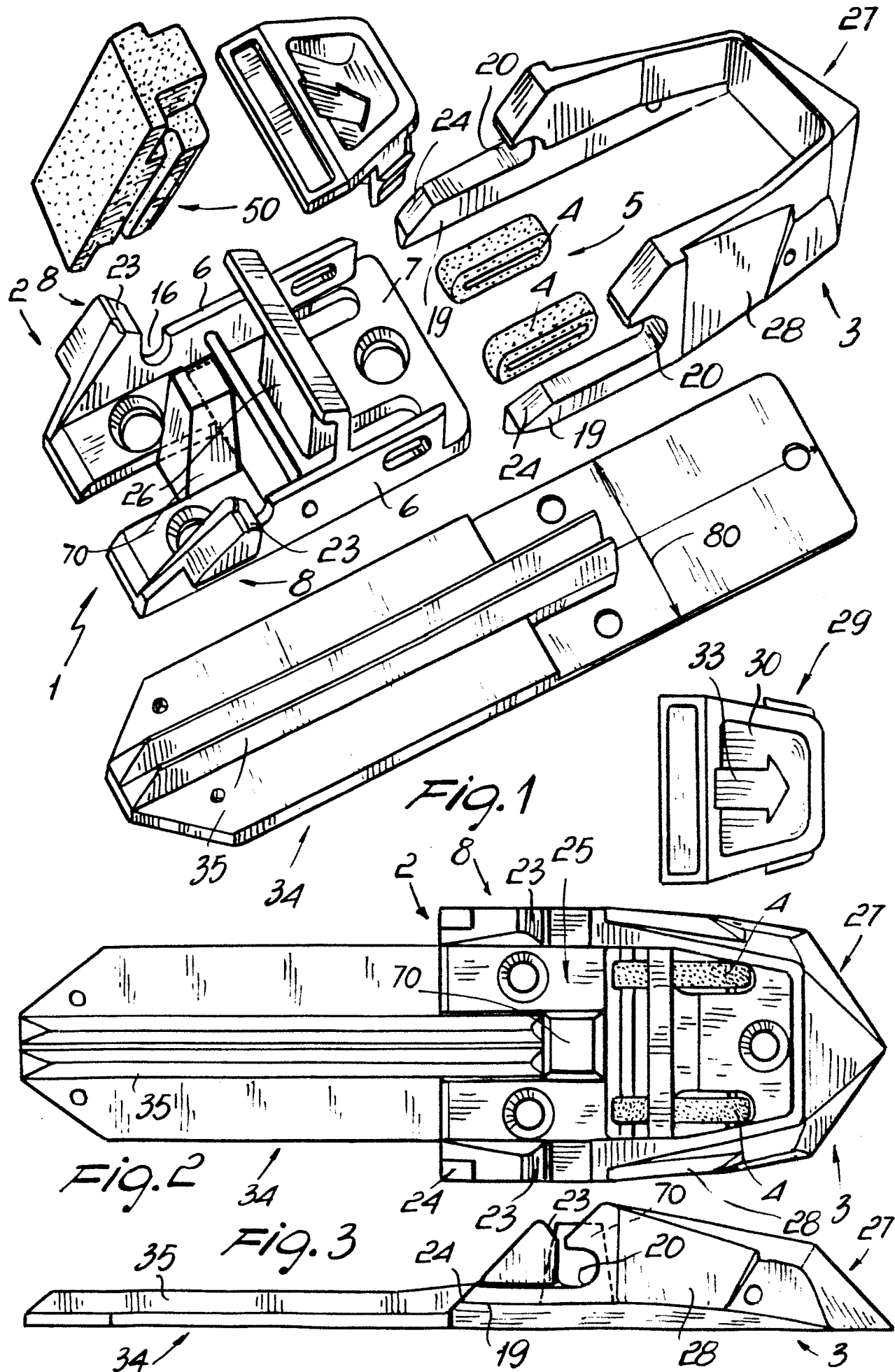
1 17. A ski binding according to Claim 3,
2 characterized in that said grooves
3 (109a,109b) cooperate with a snap means (116) or body
4 slidably associated with said fastening element
5 (111) and cooperating with guiding means (118,119)
6 arranged between said snap means (116) and said
7 fastening element (111).

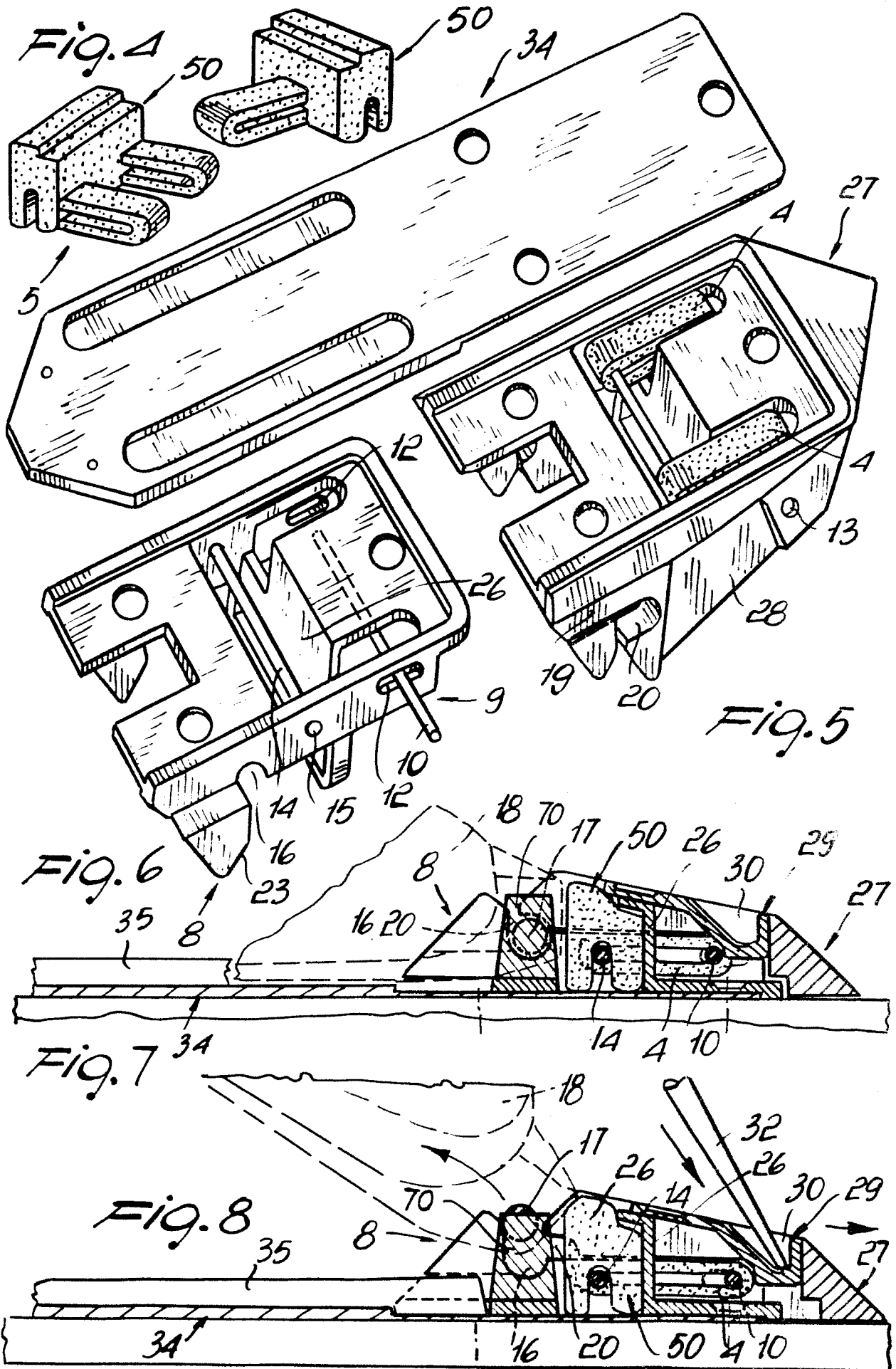
1 18. A ski binding according to Claim 6 , character-
2 ized in that said sides (110a,110b) are provided, at
3 their rear end portions, with enlarged portions defining
4 guide butts (125a,125b) acting laterally on the boot
5 block.

1 19. A ski binding according to Claim 2, character-
2 ized in that there are provided, at the end portions
3 of said ferrule (113) arms (115a,115b) facing said
4 grooves (109a,109b), bevels (127) causing said snap
5 means to disengage said arms (115a,115b) from said
6 grooves (109a,109b) as said pin is pressed thereon.

1 20. A ski binding according to Claim 17, character-
2 ized in that said snap means or body is provided with
3 a pressure region (135) having a slanted surface to
4 said fastening surface (111) and facing said grooves.

1 21. A ski binding according to Claim 20,
2 characterized in that in said pressure region (135)
3 there are provided grooves, knurled surfaces and the
4 like.





0131234

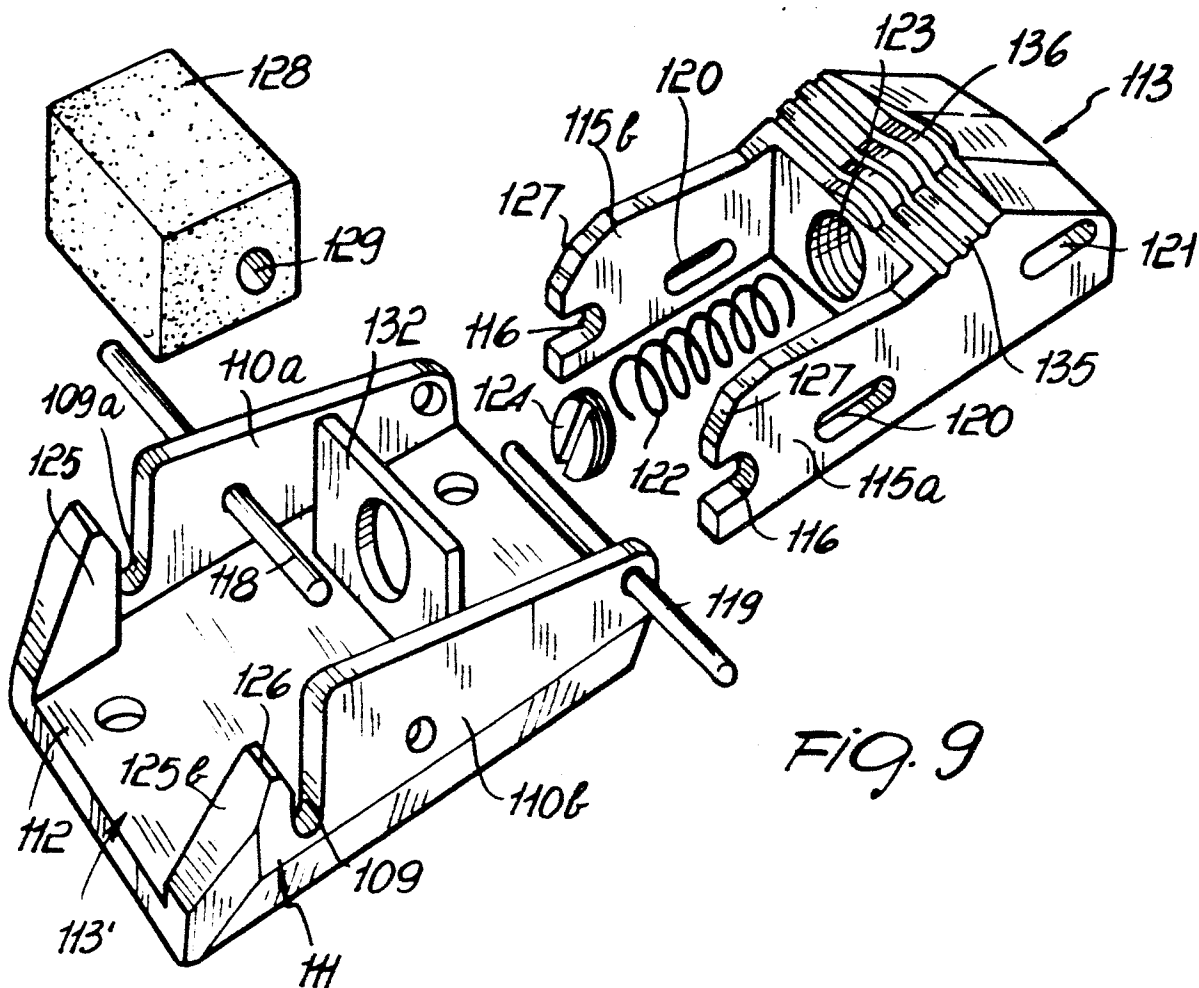


Fig. 9

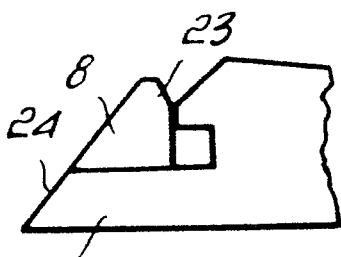


Fig. 10

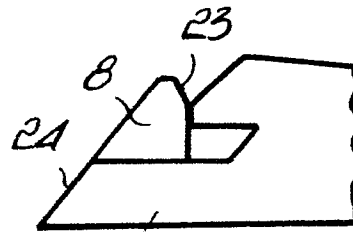


Fig. 11

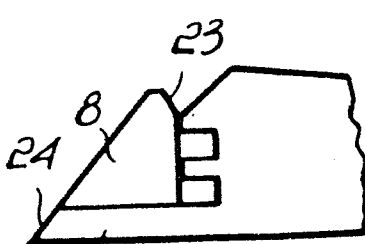


Fig. 12

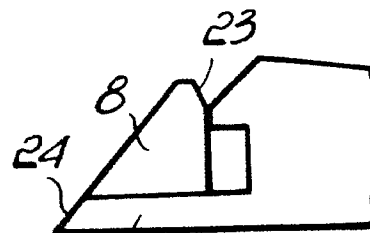


Fig. 13