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(54) Heel binding assembly for a boot on a ski

(57) The invention concerns a rear binding element for a boot provided to be mounted on a ski and for releasably holding the rear of the boot. The element comprises a base plate (30), a foot rest plate (31) provided to receive the pressure from the boot, a jaw (6) movable along a substantially vertical upright (8), against the action of a return spring (17, 18) housed inside the upright. It is characterized by the fact that the upright bearing the jaw has at its base a pivot (35) movable in rotation around an axis substantially perpendicular to the plane defined by the base plate (30) and the foot rest plate (31) on either side of a centered position where the jaw is aligned with a longitudinal direction defined by the ski when the element is assembled on the ski, and that a return spring (42) pulls the pivot back into its centered position.

The invention also concerns a binding assembly comprising a rear element (2) associated with a front element (3) and a connecting strip (4) connecting the two elements.

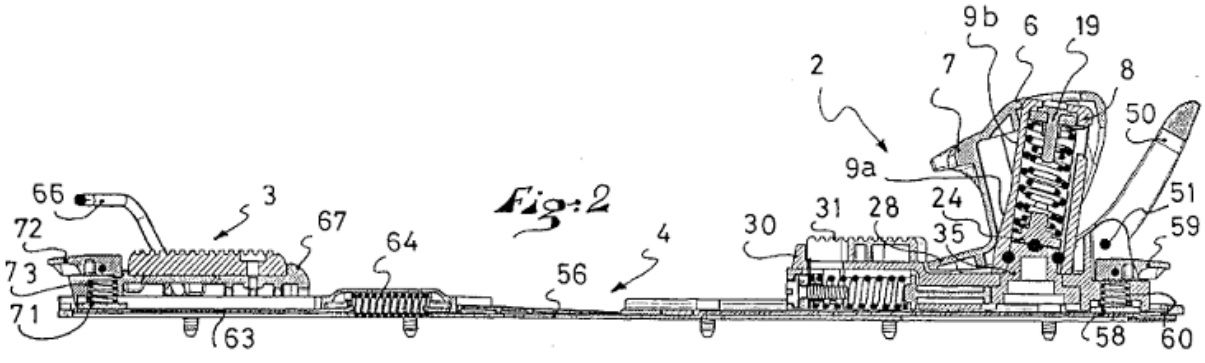

Fig. 2

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EP 1 027 908 A1

Description

[0001] The invention concerns a heel binding element for a boot on a ski, which is capable of releasing the boot in the event of excessive stress.

[0002] The invention also concerns a heel binding assembly for a boot on a ski comprising such an element.

[0003] In the domain of Alpine skiing, known from the patent application published under number DE 31 43 974 is a heel binding element for a boot comprising a movable jaw for binding the boot guided in a housing along an approximately vertical direction. The jaw is pulled back downwards by a return spring, and is moved depending on the stresses of the boot. Beyond a specific vertical upwards path, the guide means of the jaw allow it to be tipped backwards, which allows the release of the boot.

[0004] Another binding element of the same type is described in patent application published under number WO 96/23559.

[0005] Such a device gives satisfactory results. Moreover, its construction is simple. However, the jaw only reacts to stresses with a vertical component, and since it is guided inside a housing, it would be complicated to allow it to release the boot in other directions.

[0006] In order to ensure the release of the boot along a lateral direction in particular, it is necessary to associate with said rear element a front binding element that has a laterally movable jaw against the return force exerted by a spring.

[0007] One of the purposes of the invention is to propose a binding element of this type that releases the boot in the event of excessive stresses in directions other than the vertical direction.

[0008] Another purpose of the invention is to propose a rear binding element that can be associated with a simplified front binding element.

[0009] Another purpose of the invention is to propose a binding assembly where the release functions of the boot are concentrated in the rear binding element, and thus simpler and more economical to produce.

[0010] Other purposes and advantages of the invention will be seen from the following description.

[0011] The heel binding element of a boot according to the invention is proposed for being mounted on a ski and for releasably binding the heel of a boot. The element comprises a base plate, a foot rest plate provided to support the boot, a jaw movable along a substantially vertical upright, against the action of a return spring housed inside the upright. It is characterized by the fact that the upright bearing the jaw has at its base a pivot movable in rotation around an axis substantially perpendicular to the plane defined by the base plate and the foot rest plate, on either side of a centered position where the jaw is aligned with a longitudinal direction defined by the ski when the element is assembled on the ski, and that a return spring pulls the pivot back into its centered position.

[0012] The binding assembly according to the invention comprises a front binding element provided to hold the front end of a boot and a rear binding element provided to hold the heel end of the boot, the rear element comprising a base plate, a foot rest plate provided to support the boot, a job movable along a substantially vertical upright, against the action of a return spring housed inside the upright it is characterized by the fact that the upright bearing the jaw has at its base a pivot movable in rotation around a an axis substantially perpendicular to the plane defined by the base plate and the foot rest plate, on either side of a centered position where the jaw is aligned with a longitudinal direction defined by the ski when the element is assembled on the ski, and that a return spring pulls the pivot back into its centered position.

[0013] The invention will be better understood with reference to the following description and to the appended drawings which form an integral part thereof.

[0014] Figure 1 is a view in perspective of the binding assembly according to the invention.

[0015] Figure 2 is a view in longitudinal cross-section of the assembly of figure 1.

[0016] Figure 3 is an exploded view in perspective of the binding assembly of figure 1.

[0017] Figure 4 is a view in longitudinal cross-section of the jaw.

[0018] Figures 5 to 8 show diagrammatically the different phases of the opening movement of the jaw.

[0019] Figures 9 and 10 are relative to a variant of embodiment.

[0020] Figure 1 represents in perspective a binding assembly 1 of a boot on a ski, which comprises a binding element 2 of the rear of the boot and a binding element 3 of the front of the boot.

[0021] Said front and rear elements are connected by a connecting part 4.

[0022] The rear element comprises a jaw 6 with a sole clamp 7 provided to hold the rear end of a ski boot.

[0023] The jaw 6 is broadly recessed at the rear and bottom, which laterally defines two cheeks 6a and 6b. It is borne by an approximately vertical upright 8 which penetrates into the recess. The upright 8 is cylindrical overall. At the front of the upright 8 is a ramp 9. Preferably, the ramp has two facets, a lower facet 9a slightly inclined with respect to the general direction of the upright. This facet begins at the base of the upright and rises progressively towards the

interior of the upright while widening. Approximately halfway up the upright, it is extended upwards by a second facet 9b which is substantially parallel to the general direction of the upright.

[0024] The jaw is designed to slide along the upright. The upright itself is hollow and encloses a means of spring loading the jaw in the lower position of retaining the boot.

[0025] In the illustrated embodiment, the means of guiding the jaw along the upright comprise a guide tip 10 located in the upper part of the jaw at the level of its recess. The jaw is supported with said tip against the upper facet 9b of the upright. Towards the bottom, the jaw also has a transverse pin 12 which passes through orifices 13 of the cheeks of the job. The pin 12 also passes through an oblong orifice 15 located at the base of the upright. The orifice 15 has its larger dimension oriented along the general direction of the upright. Its length is at least equal to the distance of travel of the jaw along the upright.

[0026] The upright is hollow. In the illustrated embodiment, it encloses two return springs 17, 18 nested one inside the other. A single spring could also be appropriate. The springs are held at the top by a screw-nut adjustment assembly 19 which is supported at the top of the upright. Said adjustment assembly also includes an indicator index 20 visible through a window 21 located at the rear of the upright. The screw head is accessible from the exterior through an orifice located at the top of the upright, and an opening located in the upper part of the jaw.

[0027] Towards the bottom, the springs 17 and 18 are supported against a piston 24. The piston is guided in the hollow of the upright 8. Under pressure from the springs, the piston is pressed downwards against the pin 12 anchored in the cheeks of the jaw. Preferably, the piston 24 has on its lower face a transverse groove which serves to house the upper part of the pin.

[0028] It can be seen from the foregoing that the jaw can rise along the upright 8 against the return force opposing it by the springs 17 and 18. The guide tip 10 then travels along the upper facet 9b of the upright.

[0029] This is illustrated in figures 5 and 6.

[0030] In the absence of a boot, in its extreme lower position, the jaw also presses against the lower facet 9a.

[0031] According to the illustrated embodiment, the guide means also comprises two shoulders projecting inside each of the cheeks of the jaw. Only the shoulder 25 inside the cheek 6b is visible in the figures.

[0032] The upright has in the upper part of each its sides an edge created by hollowing of the upright above the edge. Only the edge 26 provided for cooperating with the shoulder 25 is visible in the figures.

[0033] The edges are slightly descendent towards the rear of the upright. On the front, they are unobstructed and each has an engagement nose. Only the engagement nose 27 of the edge 26 is visible.

[0034] The shoulders and the edges are provided to cooperate in the following way.

[0035] When the nose 10 of the jaw travels over the facet 9b as shown in figures 5 and 6, the shoulders 25 of the cheeks are freed in front of the edges 26.

[0036] When the stress exerted by the boot on the sole clamp increases and the nose 10 reaches the top of the facet 9b, the shoulders 25 of the cheeks reach the engagement nose 27 of the edges and are supported thereupon. This is illustrated in figure 7. The nose 10 is then moved beyond the top of the upright. Once past the threshold of the engagement nose, the shoulders 25 follow the edges 26. The jaw then tips backwards around the pin 12, which causes the release of the boot and cessation of the stress. Once the boot is released, the jaw is moved back downwards by the springs, i.e. the shoulders 25 rest against the edges 26, which maintains the jaw in the tipped backwards position in a position ready for engagement. In this position, as represented in figure 8, the anterior face of the jaw also rests against the facets 9a and 9b of the upright.

[0037] Preferably, as is represented in the figures, the upright is slightly inclined backwards in the direction of an extension of the ski. This facilitates the escape of the ski boot in case of a fall. In the illustrated embodiment, the general direction of the upright is inclined about 8° with respect to a vertical direction perpendicular to the plane defined by a ski.

[0038] In a known manner, the jaw has in its lower part an engagement pedal 28. Upon engagement of the boot, the boot presses on said pedal, which causes the jaw to travel a path opposite the one that is just been described.

[0039] The upright 8 is mounted on a base 30 which has at the front a footrest plate 31 provided to receive the rear of the boot. The base 30 is itself mounted slidably in a longitudinal direction along a slide rail 32 secured to the ski. In the illustrated embodiment, the slide rail is overlaid with a cover 33.

[0040] According to the invention, the jaw is not only movable in the direction of an extension of the ski, but it can also pivot around a vertical direction. According to the embodiment described, the upright 8 is securely connected to a pivot 35 housed in a cavity of the base 30. The pivot is guided in the cavity of the base so as to be able to turn around an axis substantially perpendicular to the plane defined by the ski. However, once the base plate is mounted on its slide rail the pivot has no freedom of

movement in the vertical direction due to the tight clearance.

[0041] The assembly between the pivot and the upright is done by any appropriate means. For example, the pivot has an upper end piece which is engaged in the central cavity of the upright, and the assembly is secured by two transverse pins 37 and 38 which are engaged at the base of the upright and which are housed in grooves of the pivot. The upright and the pivot could be produced from one single part.

[0042] The pivot is free to turn with respect to the base, but an elastic return means opposes its moving away from a centered position where the jaw is aligned with the longitudinal direction of the ski.

[0043] To do this, the pivot has at the front a flat surface 40 against which a second piston 41 is pressed, under the action of a spring 42. The second piston 41 and the spring 42 are housed in a cavity of the base 30. A screw-nut adjustment assembly 43 enables the adjustment of the return force that the pivot must overcome to allow the lateral rotation of the jaw. The screw-nut assembly is held in the cavity of the base by a thrust block 44 embedded in the base. The screw head of the adjustment assembly is accessible through the thrust block.

[0044] In the event the boot on the jaw applies stress with a lateral component, the assembly formed by the jaw, the upright and the pivot turn relative to the base against the opposite force of resistance by the spring 42. Beyond a sufficient rotation, the boot is released laterally and the spring 42 pulls the jaw back into the centered position. The inclination of the pivot towards the rear contributes to facilitating the escape of the boot in this case and in the event of combined forward-twisting falls.

[0045] Thus, the retaining element is capable of releasing the jaw in a vertical direction and in a lateral direction. In the embodiment that has just been described, the different movements of the jaw depend on the adjustment of the two springs or groups of different springs, in this instance, the springs 17 and 18 of one side, and the spring 42 of the other side. This is not a limitation.

[0046] According to the variant of figure 9, the pivot 48 can be moved downwards over a specific amplitude with respect to the base 45. When the boot is present, it causes a slight raising of the jaw, which drives the upright and the pivot upwards by means of the return spring 49. The pivot 48 and the base 45 are connected by an assembly of ramps that cause the lowering of the pivot and of the upright with the rotation of the jaw around the axis of the pivot. This movement is countered by the compression of the spring 49 which ensures the elastic return of the jaw into the centered position. In the illustrated embodiment, the pivot has at its base a flared "V" shaped ramp 47 in which a cog 46 of the base plate is engaged. Figure 9 represents the assembly in the centered position. Figure 10 represents said assembly after rotation of the jaw. The upright and the pivot are lowered because of the ramp 47.

[0047] Thus, according to this variant, the jaw is tensioned by only one spring for all of its movements. Other variants of construction implementing a single spring are also possible.

[0048] Once the boot is engaged, as can be seen in figure 10, the rear binding element moves back with respect to the lock 52, which clears the thrust block 52a with respect to the pivot and allows the V-shaped ramp to carry out its function.

[0049] In the illustrated embodiment, advantageously the length adjustment lock 52 forms a vertical thrust block 52a downwards for the pivot 48 until the boot is fully engaged.

[0050] With reference again to figures 1 to 3, a lever 50 is provided for the intentional opening of the jaw. The lever is located behind the jaw, and is articulated around an axis 51 located in the rear part of the base 30. The lever 50 has, in front of the axis 51, two arms 53 and 54 which are engaged beneath the cheeks of the jaw. Swinging the lever backwards causes the movement of the jaw along the upright and its tilting into the open position of figure 8.

[0051] According to the illustrated embodiment, the base plate 30 is slidably mounted along the slide rail 32. The base plate is held at the front of the binding assembly by a metal strip 56. The strip is engaged beneath the base plate, and has a series of notches 57 at the rear. A lock 58 provided with teeth is articulated at the rear of the base plate. The lock 58 is maneuvered by a lever 59, and is pulled into the engagement position of the notches of the slide rail by a spring 60. The lock immobilizes the base plate relative to the blade. The series of notches 57 enables the longitudinal position of the base plate to be adjusted along the rear end of the strip.

[0052] Towards the front, the strip 56 is attached to a plate 63 located beneath the front binding element and secured to the ski by any appropriate means, such as screws. A compression spring 64 is interposed between the front end of the strip and the plate. The spring is compressed with the backward movement of the strip and of the rear binding element. This ensures the compression of the boot between the binding elements, and allows the backward movement of the rear element in line with the ski. The plate 63 has a cover 65.

[0053] According to the illustrated embodiment, the front binding element 3 is of the non-actuatable type. It has a toe binding 66 provided to hold the front end of the boot. The binding is hooked to a base plate 67, which in turn is slidably mounted along the plate 63 which is configured as a slide rail. The base plate 67

has a footrest plate 68 mounted on top of it for receiving the front end of the boot 73.

[0054] An assembly similar to that of the rear element enables the longitudinal position of the base plate along the plate to be adjusted. The plate 63 has a series of notches 70. A lock 71 provided with teeth cooperates with the notches 70. The lock is maneuvered by a lever 72, and is pulled into engagement position by a spring.

[0055] Advantageously, the levers 72 and 59 have similar modes of operation, and they are each located at one end of the assembly formed by the two binding elements in an opposite direction, with the free end of the lever 59, 72 oriented outwards. A simultaneous adjustment of the longitudinal position of the two binding elements is therefore done very easily by lifting the two levers with one finger of each hand and then moving the two base plates.

[0056] The different elements that have been described are made of any appropriate material, particularly metal, or plastic whether reinforced with fibers or not.

[0057] Naturally, the present description is only provided by way of example, and other implementations of the invention could be adopted without going beyond the scope thereof.

[0058] In particular, the rear binding element could be associated with another type of front element, particularly an actuatable type element.

[0059] Instead of being located on the front, the spring that allows the elastic return of the rear element could be located at the rear base plate as illustrated in figures 9 and 10. The rear base plate could also be immobile, the elastic compression function of the boot being accomplished by the front binding element.

[0060] The construction of the upright and of the pivot could also be different. In particular these two elements could be produced from one single part.

Claims

1. Heal binding element for a boot provided to be mounted on a ski and for releasably holding the rear of the boot, the element comprising a base plate (30), eight footrest plate (31) provided to receive the pressure of the boot, a jaw (6) movable along a substantially vertical upright (8), against the action of a return spring (17, 18) housed inside the upright, characterized by the fact that the upright bearing the jaw has at its base a pivot (35, 48) movable in rotation around an axis substantially perpendicular to the plane defined by the base plate (30) and the footrest plate (31), on either side of a centered position where the jaw is aligned with a longitudinal direction defined by the ski when the element is assembled on the ski, and that a return spring (42) pulls the pivot back into its centered position.

2. Element according to claim 1, characterized by the fact that the return spring of the pivot is different from the return spring of the jaw.

3. Element according to claim 2, characterized by the fact that the pivot (35) has at its base a flat surface (40), that the return spring (42) is housed in the base plate and that it presses a piston (41) against the flat surface.

4. Element according to claim 1 characterized by the fact that the return spring of the pivot is the same spring as the one that pulls back the jaw.

5. Element according to claim 4, characterized by the fact that the pivot (48) is vertically movable downwards, that it has a V-shaped ramp (47) open upwards, and that a cog (46) of the base plate is seated in the ramp.

6. Element according to any one of the preceding claims, characterized by the fact that the upright (8) has on the front a ramp (9) against which a tip (10) of the jaw is borne.

7. Element according to any one of the preceding claims, characterized by the fact that the upright (8) laterally has edges (26) slightly inclined downwards towards the rear, against which shoulders (25) of the jaw are pressed beyond a specific path of movement of the jaw along the upright.

8. Element according to claim 1, characterized by the fact that the lever (50) is articulated on the base plate, that the jaw has two lateral cheeks (6a) and that the lever has two arms (53, 54) engaged beneath the cheeks of the jaw.

9. Assembly for binding a boot on a ski provided to be mounted on a ski and to releasably hold the boot, the assembly comprising a front binding element (3) provided for holding the front end of a boot and a rear binding element (2) provided for holding the rear end of the boot, the rear element comprising a base plate (30), a footrest plate (31) provided for receiving the pressure of the boot, a jaw (6) movable along a substantially vertical upright (8), against the action of a return spring (17, 18) housed inside the upright, characterized by the fact that the upright bearing the jaw has at its base a pivot (35, 48) movable in rotation around

an axis substantially perpendicular to the plane defined by the base plate (30) and the footrest plate (31), on either side of a centered position where the jaw is aligned with a longitudinal direction defined by the ski when the element is assembled on the ski and that a return spring (42) pulls the pivot back into its centered position.

10. Assembly according to claim 9, characterized by the fact that the base plate (30) of the rear binding element (2) is slidable along a slide rail (32) provided to be secured to the ski, that the front binding element has a plate (63) provided to be secured to the ski, that the rear base plate is immobilized relative to the strip by a lock (58), and that the front end of the strip is attached to the plate (63).

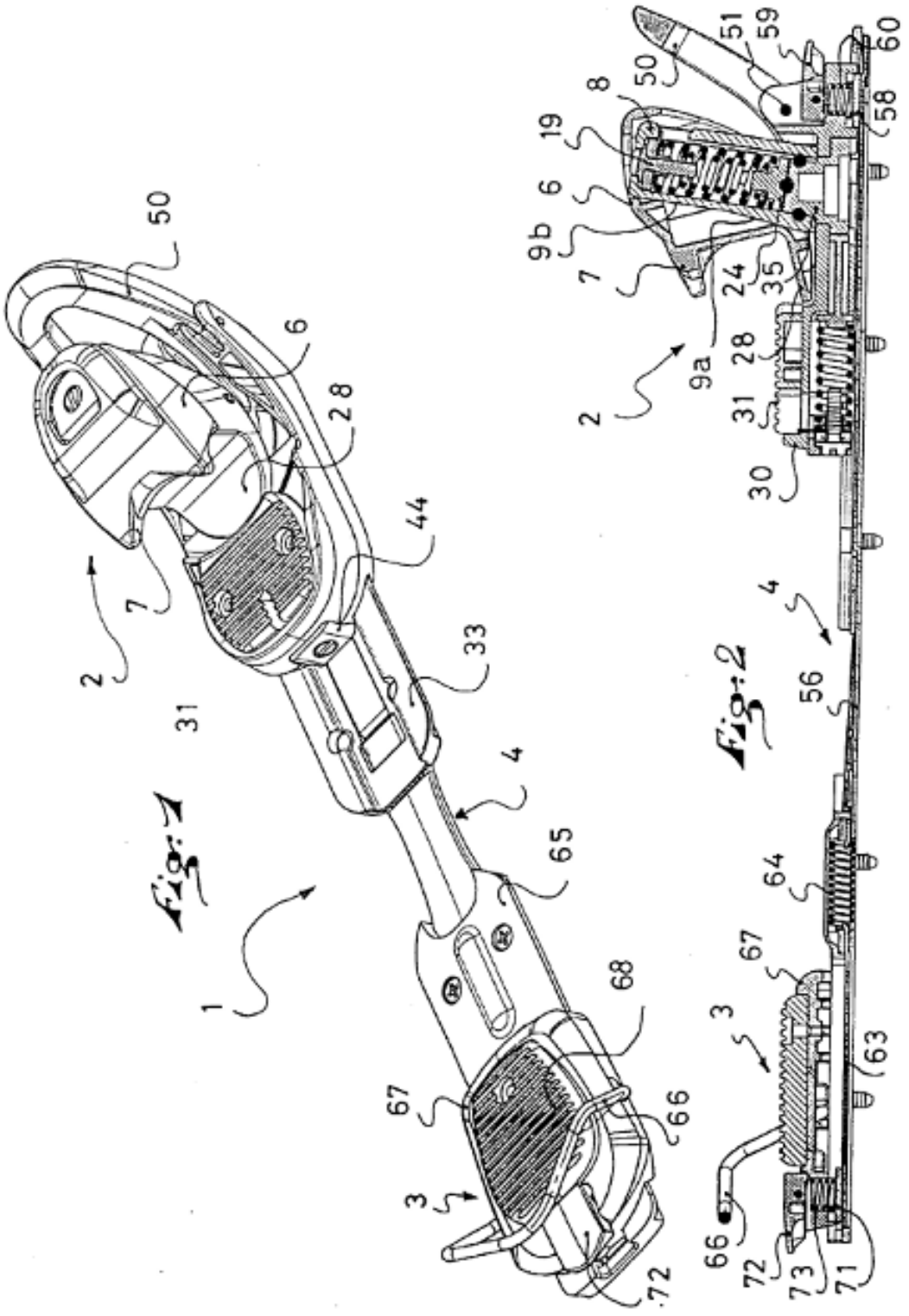
11. Assembly according to claim 10, characterized by the fact that a spring (64) is interposed between the front end of the strip and the plate (63).

12. Assembly according to claim 9, characterized by the fact that the front binding element (3) is of the non-actuatable type.

13. Assembly according to claim 9, characterized by the fact that the front binding element comprises a base plate (67) movable along the plate (63).

14. Assembly according to claim 13, characterized by the fact that a lock (71) of the base plate (67) cooperates with a series of notches (70) of the plate (63) and enables the longitudinal position of the base plate (67) to be adjusted along the plate.

15. Assembly according to claims 10 and 14, characterized by the fact that the locks (58, 71) of the front and rear binding elements are controlled by levers (59, 72) located at the ends of the assembly, and that the free ends of the levers are oriented outwards.



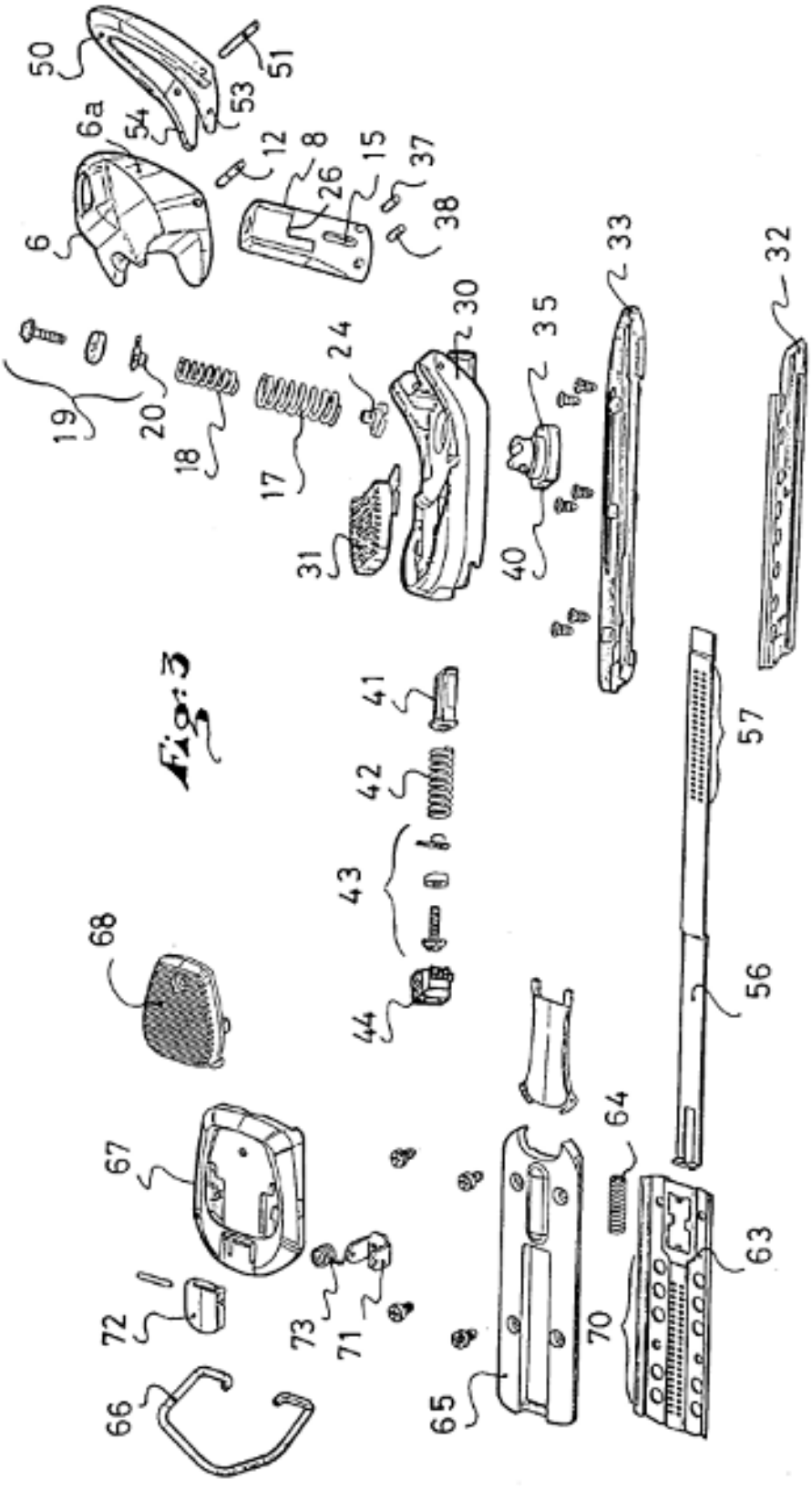
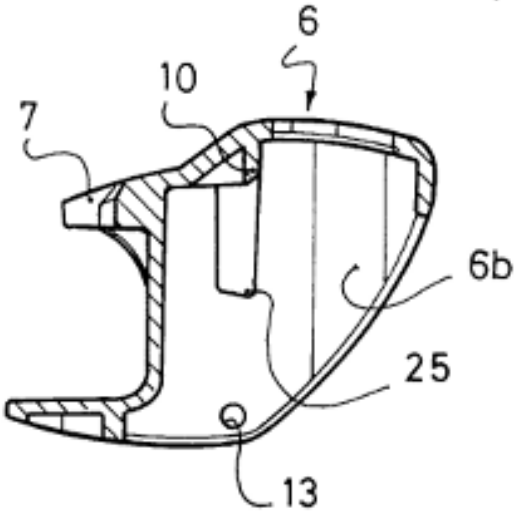


Fig. 3

Fig: 4



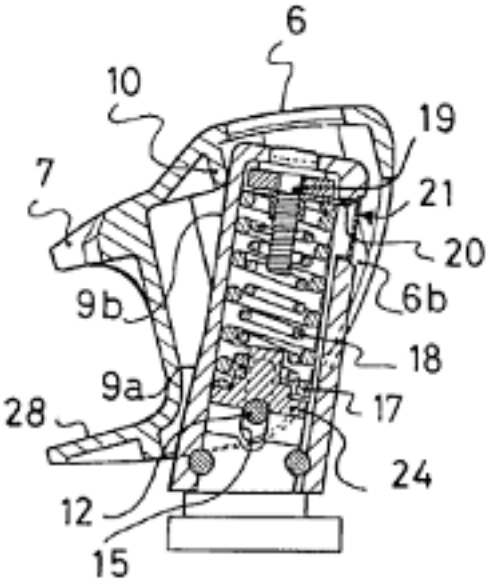


Fig:5

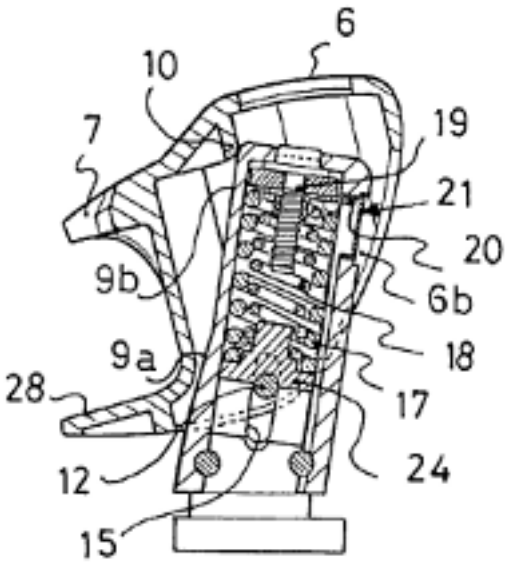


Fig:6

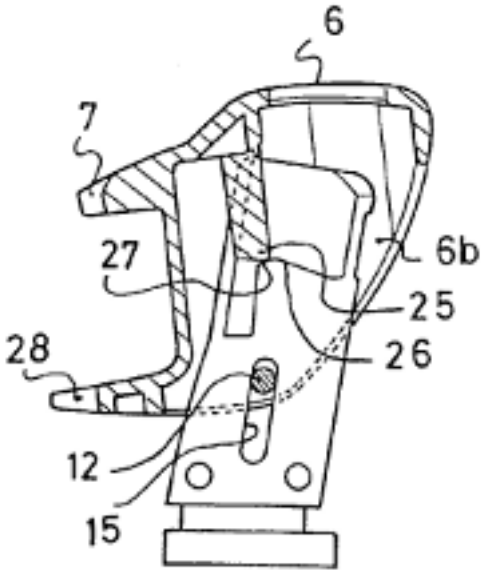


Fig:7

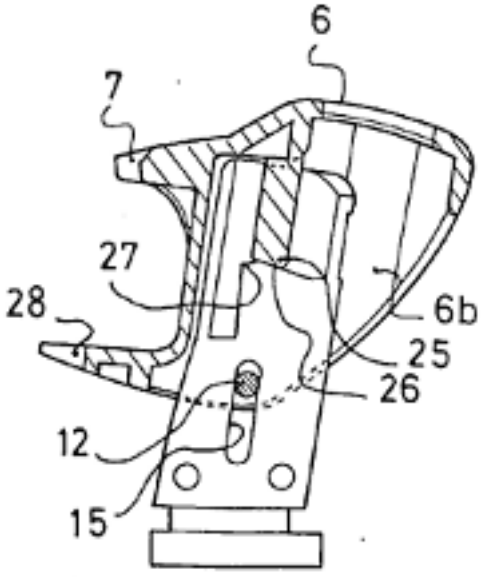


Fig:8

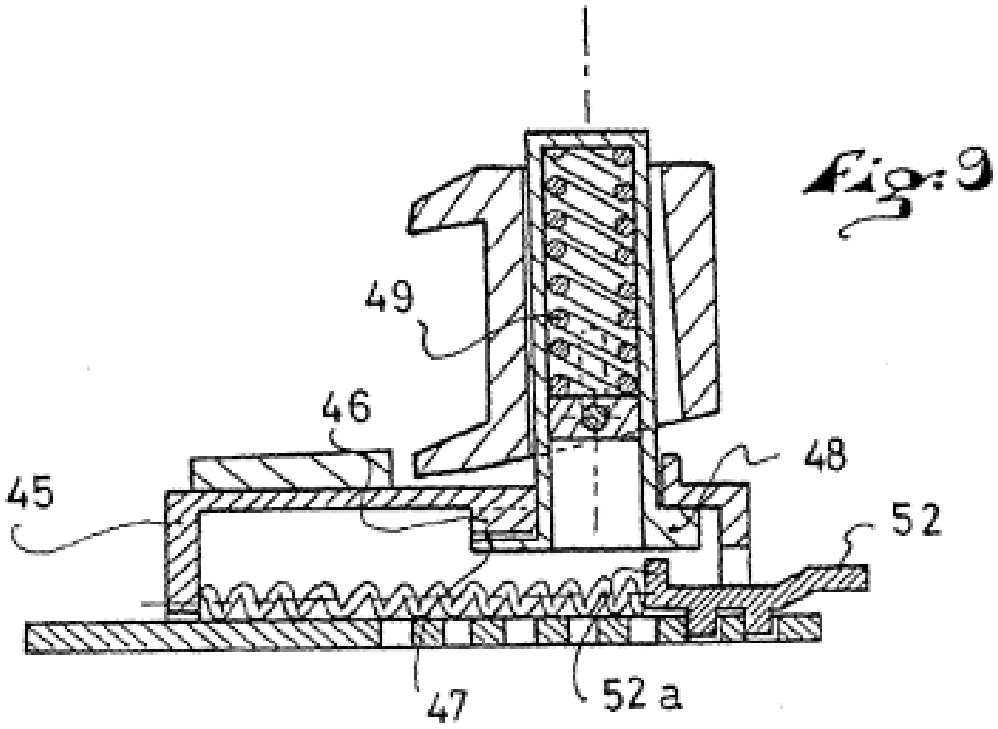


Fig: 9

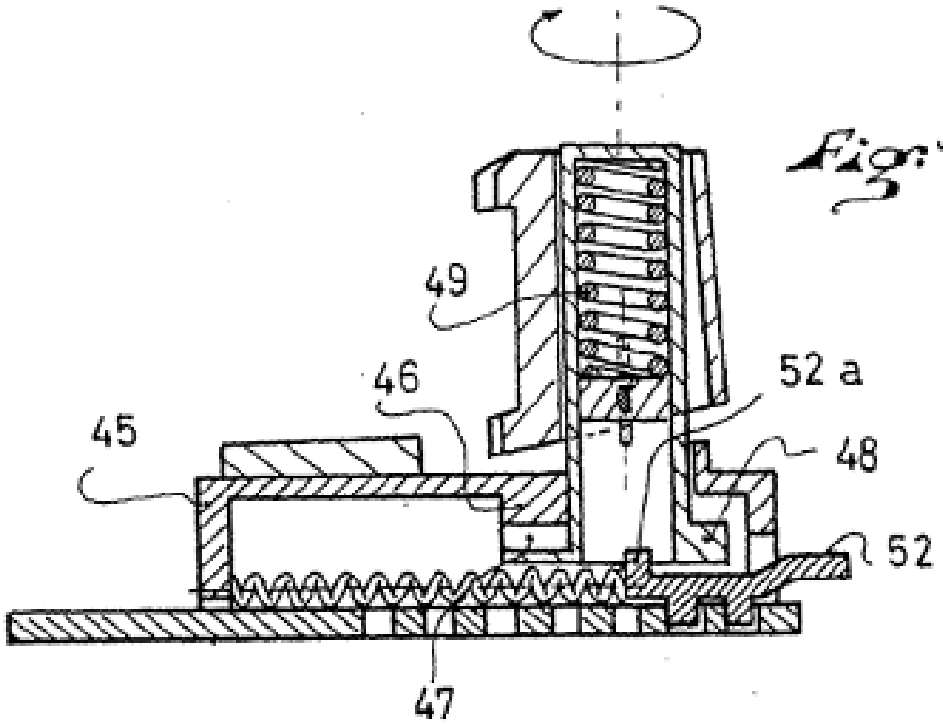


Fig: 10

[logo] **European Patent Office**

EUROPEAN SEARCH REPORT

Application number

EP 00 10 0047

DOCUMENTS CONSIDERED TO BE PERTINENT			
Category	Citation of the document with indication, if needed, of the pertinent parts	Claim concerned	CLASSIFICATION OF THE APPLICATION (Int. Cl.7)
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This report was prepared for all claims			

Place where search was performed	**Date of completion of search**	**Examiner**
THE HAGUE	May 25, 2000	Steegman, R

CATEGORY OF DOCUMENTS CITED

X: particularly pertinent in and of itself
Y: particularly pertinent in combination with another document of the same category
A: technological background
O: unwritten disclosure
P: interim document

T: theory or principle on which the invention is based
E: prior patent document, but published on or after the date of filing
D: cited in the application
L: cited for other reasons
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EPO FORM 1503 03.82 (P04C02)

APPENDIX TO THE PRELIMINARY SEARCH REPORT RELATIVE TO EUROPEAN PATENT APPLICATION No. EP 00 10 0047

The present appendix indicates the members of the family of patents that are related to the patent documents cited in the European search report cited above.
Said members are contained in the computer file of the European Patent Office as of 05-25-2000.
The information furnished is provided for guidance and does not engage the responsibility of the European Patent Office or the French Government.

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EPO FORM PO460

For more information about this appendix, see Official Journal of the European Patent Office, No. 12/82

AFFIDAVIT OF ACCURACY

I, John Dawson, hereby declare under penalty of perjury as follows:

1. I am fluent in both English and French, and I have experience translating technical documents between the two languages.

2. I am the translator of the attached English translation of the attached Patent Publication No. EP 1 207 908 A1, entitled "Heel Binding Assembly for a Boot on a Ski," published August 16, 2000.

3. I certify that the attached English translation, to the best of my knowledge and belief, is a true and accurate translation.

4. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

John Dawson

John Dawson, Certified Translator

Location: 615 Dickson Street, Saint Louis, MO 63122, USA

Date: 11 April 2017

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