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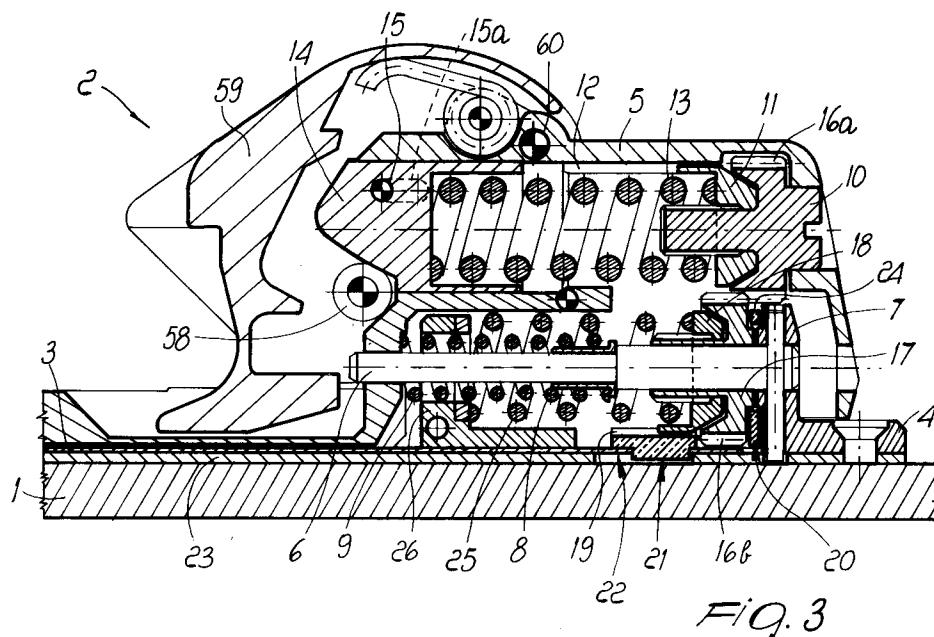
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AT CH DE FR IT LI(71) Applicant: **NORDICA S.p.A**
Via Piave, 33
I-31044 Montebelluna (Treviso)(IT)(72) Inventor: **Baggio, Giorgio**
Via Lamarmora 30**I-35018 San Martino di Lupari, (Padova)(IT)**Inventor: **Battistella, Mirco****Via Termine 14****I-31030 Breda di Piave, (Treviso)(IT)**Inventor: **Gorza, Roberto****Via C. Rizzarda 15****I-32032 Feltre, (Belluno)(IT)**(74) Representative: **Alagem Modiano, Lara S. et al**
c/o Modiano, Josif, Pisanty & Staub Via
Meravigli 16
I-20123 Milano(IT)(54) **Ski binding.**

(57) A ski binding including a toe unit (50) and a heel unit (2). A first screw (10) and a second screw (17) interact with a first (13) and a second (25) springs in the heel unit. A rod (3) can slide axially with respect to the ski following a rotation imparted to the toe unit

to operatively connect the toe unit to the heel unit. A support (20) is rigidly associated with the rod and interacts with the second screw (17); its function is to contrast, through the second spring (25), the movement of the rod.

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The present invention relates to a ski binding.

Known safety bindings usable for skis are currently usually constituted by a heel unit and a toe unit, both of which are associated with the ski and allow the coupling of the usually standard ends of a ski boot.

Each of said heel and toe units therefore has adapted and distinct adjustment means for the correct engagement, release and securing of the boot.

However, this solution forces the skier to perform separate operations in order to achieve optimum adjustments both on the heel unit and on the toe unit.

As a partial solution to this disadvantage, an Austrian patent, filed on June 12, 1981 with the application number 2622/81, is known; said patent discloses a binding which comprises a front engagement element and a rear engagement element as well as adjustment means interposed therebetween.

Even this solution, however, has disadvantages: first of all said adjustment means are subject to considerable stress, which leads to their rapid wear.

Secondly, said adjustment means do not specifically vary the degree of securing of the toe and heel units at the end of the boot but essentially allow to adjust the distance between the heel unit and the toe unit according to the size of the boot.

Finally, it should be stressed that there are rigid elements, such as bars, for connecting the adjustment means and the supports for the heel and toe units; said rigid elements stiffen the ski in the region affected by the bindings, limiting its flexibility.

The aim of the present invention is therefore to eliminate the disadvantages described above in known types by providing a safety binding which allows the skier to rapidly and simply adjust the release of the front and rear engagement means.

Within the above aim, an important object is to provide a ski binding which allows an optimum accommodation of the means for adjusting the release of the front and rear engagement means.

Another important object is to provide a ski binding which is structurally simple and compact and is composed of a reduced number of components.

Another object is to provide a ski binding which can be easily and rapidly assembled.

Not least object is to provide a ski binding which associates with the preceding characteristics that of being reliable and safe in use.

This aim, these objects and others which will become apparent hereinafter are achieved by a ski binding, which comprises at least one front engagement means, constituted by a toe unit, and a rear engagement means, constituted by a heel unit,

and separate means for controlling and adjusting the release load of said heel and toe units, said means being accommodated within said heel unit and respectively comprising a first screw and a second screw which interact with a first and a second elastically deformable elements, characterized in that it comprises means for transmitting the efforts from said toe unit to said release load control and adjustment means of said heel and toe units, constituted by a rod which can slide axially with respect to said ski following a rotation of said toe unit, a support being rigidly associated with said rod and interacting with said second screw in contrast with said second elastically deformable element.

Further characteristics and advantages of the invention will become apparent from the detailed description of two particular but not exclusive embodiments, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a sectional view of the toe and heel units, taken along the longitudinal median axis;

figure 2 is a sectional view taken along the plane II-II of figure 1;

figure 3 is a sectional view of the rear engagement means, taken along a longitudinal median axis;

figure 4 is a detail view, similar to the preceding one, of the movement which can be imparted to the slider upon a rotation of the first and second screws;

figure 5 is a detail view, similar to the preceding one, of the movement which can be imparted to the slider and to the second screw following a translatory motion, performed axially with respect to the ski, of the rod connected to the front engagement means;

figure 6 is a view, similar to that of figure 1, of a second embodiment.

With reference to the above figures, the safety binding, particularly usable for skis 1, comprises a rear engagement means, indicated by the reference numeral 2, and a front engagement means, indicated by 50.

The front engagement means 50 is constituted by a toe unit 51 to which it is possible to impart a rotation, at least with respect to an axis 52 which is perpendicular to the ski 1, which actuates the movement, performed axially with respect to the ski 1, of a rod 3 an end whereof affects the rear engagement means 2.

The front engagement means 50 in fact comprises a plate or spacer 53 which is rigidly associated with the ski 1 and to which a U-shaped profiled element 54 is pivoted centrally with respect to its own base; the toe unit 51 is pivoted between the wings of said profiled element 54 about an axis which is transverse to said ski 1.

The rod 3 extends between the toe unit 51 and the rear engagement means 2, and a lug 55 protrudes from said rod and is accommodated within a cavity 56 defined in said toe unit 51.

The lug 55 has a tab 57 which is inclined with respect to the plane of arrangement of the ski 1 so as to form an acute angle in the direction of the tip of said ski; said tab assumes, in the region directed toward the rear engagement means 2, a triangular configuration with a rounded vertex.

A similar configuration is assumed by the cavity 56 at the tab 57, so as to transmit, upon a rotation of the toe unit 51, an axial movement to the lug 55 and thus to the rod 3.

The rear engagement means 2 is constituted by a heel unit which comprises a first body 4, which is associated with the ski 1, and a second body 5, which can slide with respect to the first body 4.

The sliding between the first and second bodies is allowed by virtue of the presence of a pivot 6 which is arranged axially with respect to the heel unit and is rigidly associated, at one end, with a first tab 7 which protrudes rearward with respect to the first body 4; said pivot is slidingly associated, at its other end, in an adapted seat defined on the second body 5.

In particular, the presence of a sleeve 8 rigidly associated with the pivot 6 allows, together with an elastic contrast element 9 interposed between said sleeve and said second body, to achieve said sliding.

The rear engagement means 2 furthermore comprises a first screw 10 which can be accessed from the outside of the second body 5 and the stem whereof interacts with a complementarily threaded first slider 11 which is guided, in its axial movement with respect to said second body 5, by a first guide 12 which is defined thereon.

Said first slider 11 compresses a first elastically deformable element, which is constituted by a first spring 13 which interacts with an adapted cam 14 which is slidingly guided within the second body 5 by a dowel 15 which is arranged transversely to said second body within a guiding slot 15a defined longitudinally on said second body 5.

The cam 14 interacts, in a known manner, with a roller 58 which is transversely coupled to, or associated with, the jaw 59 which is pivoted to the second body 5 by means of the pivot 60.

In the particular embodiment, the head of the first screw 10 has a first toothed ring 16a which transmits a rotary motion to a second toothed ring 16b defined on the head of a second screw 17.

Said second screw has a hollow stem which is slidingly associated with the pivot 6 and is externally threaded; a complementarily threaded second slider 18 is associated with said stem and is guided,

in its axial movement with respect to the pivot 6, by a second guide 19 which is defined on a wing of an L-shaped support 20.

Said support 20 has, at the wing on which the second guide 19 is defined, a raised portion 21 which protrudes downward, toward the underlying ski 1, within an adapted recess 22 defined on a spacer plate 23 which is provided with a sliding seat for the rod 3.

Said recess allows the movement of the raised portion 21 toward the toe unit associated with the ski.

The raised portion 21 is furthermore keyed at the rod 3, so as to be rigidly associated with the movements thereof.

The wing 24 of the support 20 which is perpendicular to the ski 1 is interposed between the tab 7, which protrudes from the first body 4, and the head of the second screw 17.

This allows the wing 24 to interact with said second screw 17, pushing it following a movement imparted to the support 20 by the rod 3, in contrast with a second elastically deformable element constituted by a second spring 25 which is coaxial to the pivot 6 and abuts with a second tab 26 which protrudes from the first body 4.

The use of the safety binding is as follows: initially, in order to adjust the release load, a rotation is imparted, by means of adapted tools, to the first screw 10, causing the translatory motion of the first slider 11.

Said slider compresses the first spring 13 and simultaneously, by virtue of the coupling between the first ring 16a and the second ring 16b, a rotation is imparted to the second screw 17 and causes, in turn, the movement of the second slider 18 axially with respect to the pivot 6; said second slider compresses the second spring 25.

This condition is illustrated in figure 2.

If a stress which can possibly lead to a release is imparted on the toe unit, the consequent rotation undergone by said toe unit is converted into an axial movement of the rod 3, which imparts an equal motion to the support 20 by means of the raised portion 21.

This situation entails the simultaneous traction, by means of the wing 24 of the support 20, of the first screw 17, which can slide axially with respect to the pivot 6 rigidly with the second slider 18, as illustrated in figure 3.

The presence of the second spring 25 contrasts said traction, thus allowing to control and adjust the release of the toe unit.

It has thus been observed that the invention has achieved the intended aim and objects, a binding having been provided which has centralized adjustments in a single location, said binding being structurally simple and compact.

It is in fact possible to use a very small toe unit, since the adjustment and the control of the degree of release thereof is assigned to components arranged inside the heel unit.

The accommodation of said components in the heel unit in any case allows to maintain, for said heel unit, a compact structure with a good seal, since the means for controlling and adjusting the toe unit release load have a reduced number of components and a simple construction; by virtue of this, the fixed body of the heel unit has a stronger structure and small openings.

The ski binding according to the invention is susceptible to numerous modifications and variations, all of which are within the scope of the same inventive concept.

Figure 6 illustrates a second embodiment for a safety binding, wherein specifically the rear engagement means 102 is again constituted by a heel unit which comprises a first body 104, which is associated with the ski 101, and a second body 105, which can slide with respect to the first body 104.

Sliding between said first and second bodies is again allowed by virtue of the presence of a pivot 106 which is arranged axially with respect to the heel element and has, at one end, a head 127 which is freely rotationally associated with a first tab 107 which protrudes rearward with respect to the first body 104; at its other end, said pivot is slidingly associated in an adapted seat defined on the second body 105.

The rear engagement means 102 furthermore comprises a first screw 110, which can be accessed from the outside of the second body 105, the stem whereof interacts with a complementarily threaded first slider 111 which is suitable for compressing a first elastically deformable element, constituted by a first spring 113, which interacts with an adapted cam which is retained in position within the second body 105 by an appropriate dowel which is arranged within an appropriate guiding slot defined on said second body 105.

The pivot 106 has a first portion 128 which is adjacent to the head 127 and is solid or hollow and has a polygonal cross-section.

A complementarily shaped second screw 117 is associated at, and coaxially to, said first portion 128 of the pivot 106; said screw 117 is externally threaded, and a complementarily threaded second slider 118 is in turn associated therewith.

The binding furthermore comprises an L-shaped support 120 which has a wing adjacent to the ski 101 and a wing 124 which is interposed between the tab 107, which protrudes from the first body 104, and the second screw 117.

A raised portion 121 protrudes toward the ski 101 at the wing adjacent to said ski and is slidingly

arranged within an adapted seat 122 which is defined on a spacer 123 provided with a sliding seat for the rod 103.

Said seat 122 allows the movement of the raised portion 121 toward the toe unit associated with the ski.

The raised portion 121 is furthermore keyed at the rod 103 so as to be rigid with the movements thereof.

The support 120 furthermore interacts with the second screw 117 in contrast with a second elastically deformable element, constituted by a second spring 125, which is coaxial to the pivot 106.

This solution, too, allows to contrast a movement of the rod 103 by means of the compression of the second spring 125 by virtue of the traction imparted to the second slider 118 by the second screw 117 due to the interaction with the wing 124 of the support 120.

In this solution, the adjustment of the degree of release of the front and rear engagement means can occur separately by acting on the first screw 110 and on the head 127.

The materials and the dimensions which constitute the individual components of the safety binding can also naturally be the most appropriate according to the specific requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Ski binding comprising at least one front engagement means (50), constituted by a toe unit, and a rear engagement means (2,102), constituted by a heel unit, and separate means for controlling and adjusting the release load of said heel and toe units, said means being accommodated within said heel unit and respectively comprising a first screw (10,110) and a second screw (17,117) which interact with a first (13,113) and a second (25,125) elastically deformable elements, characterized in that it comprises means for transmitting the efforts from said toe unit to said release load control and adjustment means of said heel and toe units, constituted by a rod (3) which can slide axially with respect to said ski following a rotation of said toe unit, a support (20) being rigidly associated with said rod and interacting with said second screw in contrast with said second elastically deformable element.

2. Binding according to claim 1, characterized in that said second screw (17,117) is hollow and is slidably associated with a pivot (6,106), the rotation of said second screw imparting a trans-
latory motion to a slider (18,118), in contrast
with said second elastically deformable ele-
ment, axially with respect to said ski. 5

3. Binding, according to claim 2, wherein said heel unit, constituted by a first body (4,104) and a second body (5,105), which can slide with respect to said first body by virtue of the presence of a pivot (6,106) which is arranged axially with respect to said heel unit and is rigidly associated, at one end, with a first tab (7,107) which protrudes rearward with respect to said first body, said pivot being slidably associated, at its other end, in an adapted seat defined on said second body, characterized in that said first screw interacts with a comple-
mentarily threaded first slider (11,111) which is
guided, in its axial movement with respect to
said second body, by a first guide (12) defined
thereon, said first slider compressing a first
elastically deformable element, constituted by
a first spring, which interacts with an adapted
cam (14) which is retained in position within
said second body by a dowel (15) which is
arranged transversely to said second body
within a guiding slot (15a) defined on said
second body. 10 15 20 25 30

4. Binding according to claim 3, characterized in that the head of said first screw has a first
toothed ring (16a) which transmits a rotary
motion to a second toothed ring (16b) defined
on the head of said second screw (17). 35

5. Binding according to claim 4, characterized in that said second screw has a hollow stem
which is slidably associated with said pivot,
said stem being externally threaded, a comple-
mentarily threaded second slider (18) being
associated with said stem, said second slider
being guided, in its axial movement with re-
spect to said pivot, by a second guide (19)
defined on a wing of an L-shaped support (20). 40 45

6. Binding according to claim 5, characterized in that said support (20) has, at said wing on
which said second guide is defined, a raised
portion (21) which protrudes downward, toward
said underlying ski, within an adapted recess
(22) defined on a spacer (23) which is provided
with a seat for the sliding of said rod. 50 55

7. Binding according to claim 6, characterized in that said raised portion (21), which can slide
toward the tip of said ski, is keyed at said rod.

8. Binding according to claim 7, characterized in that the wing of said support which is per-
pendicular to said ski is interposed between
said first tab, which protrudes from said first
body, and the head of said second screw.

9. Binding according to claim 8, characterized in that said support interacts with said second
screw, pushing it following a movement im-
parted to said support by said rod in contrast
with a second elastically deformable element,
constituted by a second spring (25), which is
coaxial to said pivot and abuts against a sec-
ond tab (26) which protrudes from said first
body.

10. Binding according to claim 9, characterized in that a lug (55) protrudes from said rod (3)
below said toe unit and is accommodated with-
in a cavity (56) defined on said toe unit (51),
said lug having a tab (57) which is inclined with
respect to the plane of arrangement of said ski
so as to form an acute angle toward the tip of
said ski, said tab assuming, in the region di-
rected toward said heel unit, a triangular con-
figuration with a rounded vertex, said configu-
ration being matched on said cavity so as to
allow the transmission, upon a rotation of said
toe unit, of an axial movement to said lug and
said rod.

11. Binding according to one or more of the pre-
ceding claims, characterized in that said pivot
(106) has a head (127) which is freely
rotationally associated with said first tab (107)
which protrudes rearward with respect to said
first body (104) and is slidably associated, at
its other end, in an adapted seat defined on
said second body (105).

12. Binding according to claim 11, characterized in that said pivot (106) has a first portion (128)
which is adjacent to said head and has a
polygonal cross-section.

13. Binding according to claim 12, characterized in that a complementarily shaped and externally
threaded second screw (117) is associated at,
and coaxially to, said first portion of said pivot,
a complementarily threaded second slider
(118) being in turn associated with said second
screw.

14. Binding according to claim 13, characterized in that it comprises an L-shaped support (120)
which has one wing adjacent to said ski (101)

and the other wing (124) interposed between said first tab (107), which protrudes from said first body, and said second screw (117).

15. Binding according to claim 14, characterized in that a raised portion (121) protrudes toward said ski at said wing of said support which is adjacent to said ski and is slidably arranged within an adapted seat (122) defined on a spacer (123) which has a sliding seat for said rod (103), said raised portion being keyed at said rod, said support interacting with said second screw (117) in contrast with a second elastically deformable element constituted by a second spring (125) which is coaxial to said pivot.

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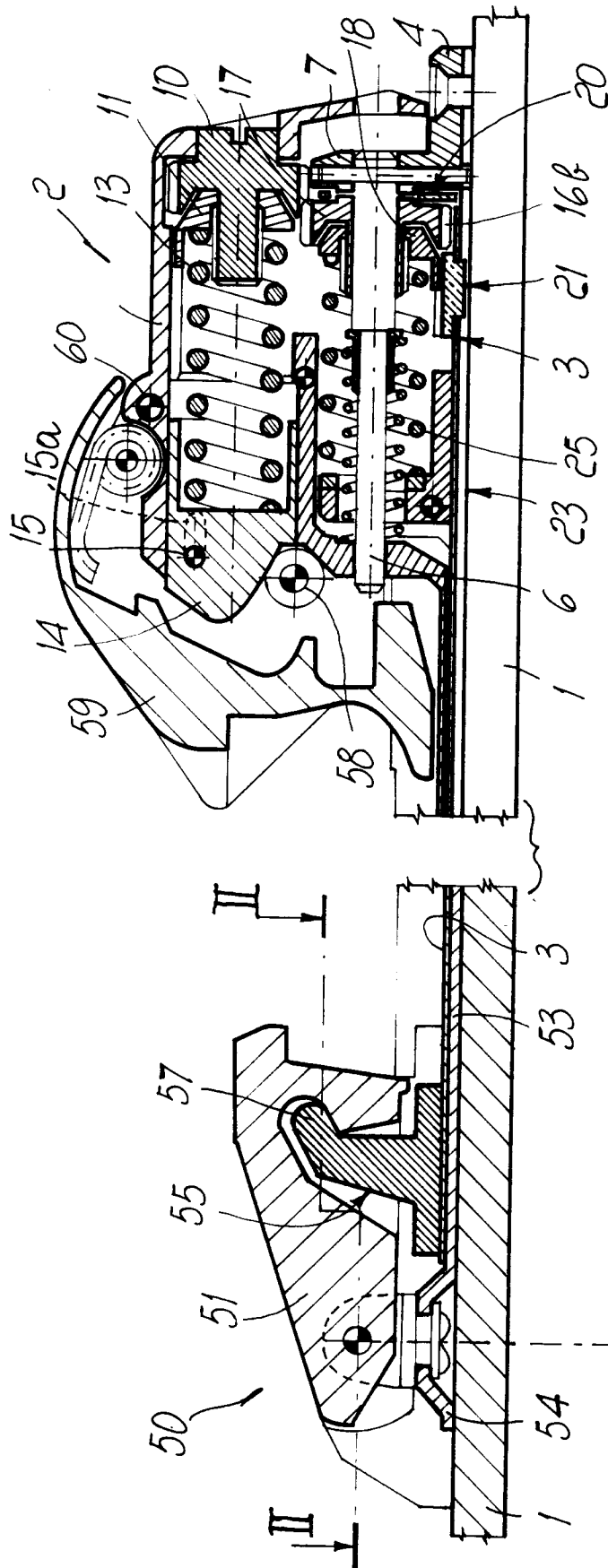


FIG. 1

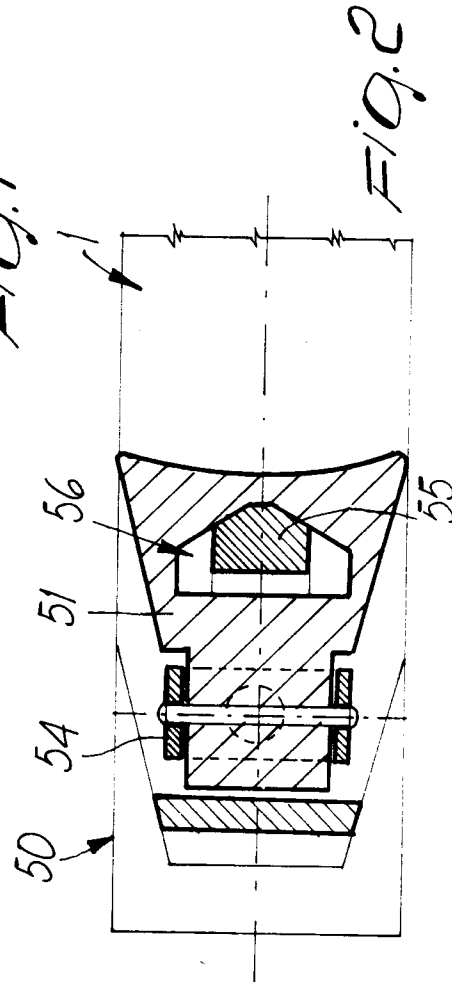


FIG. 2

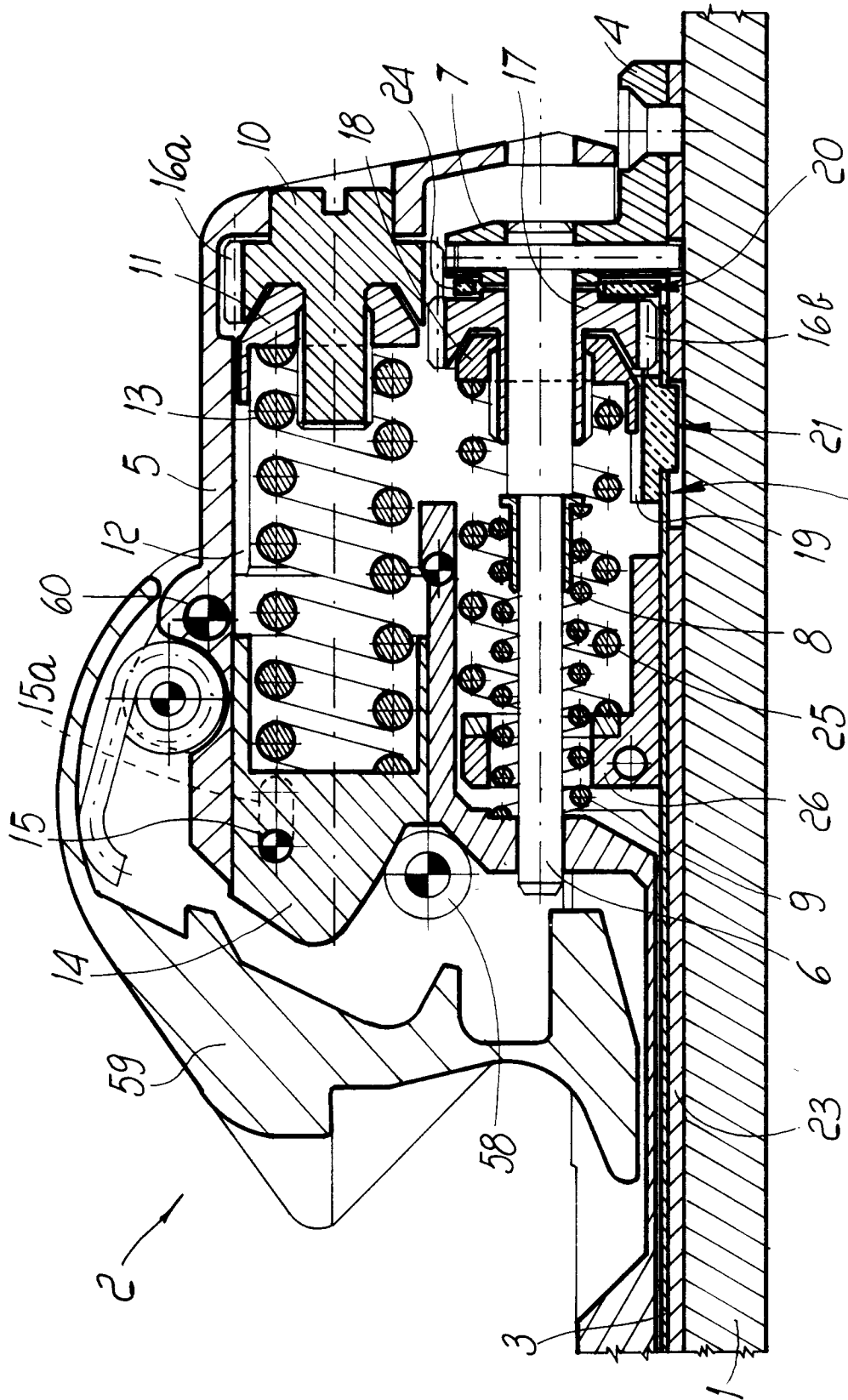
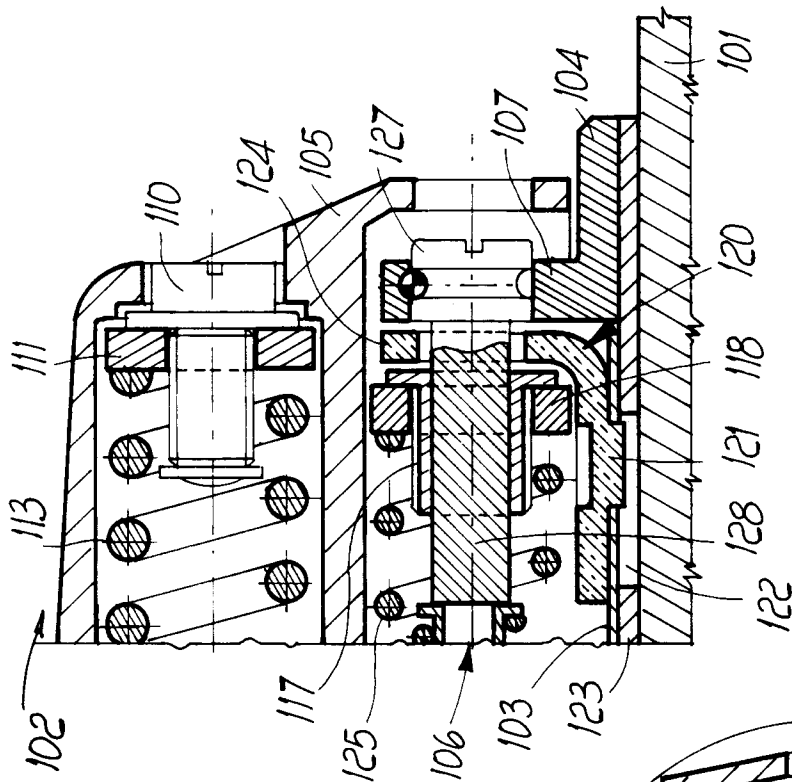
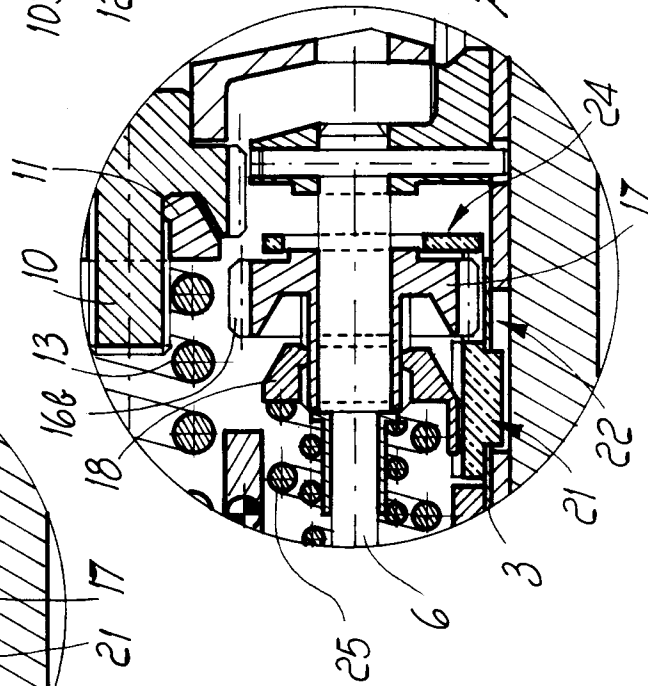
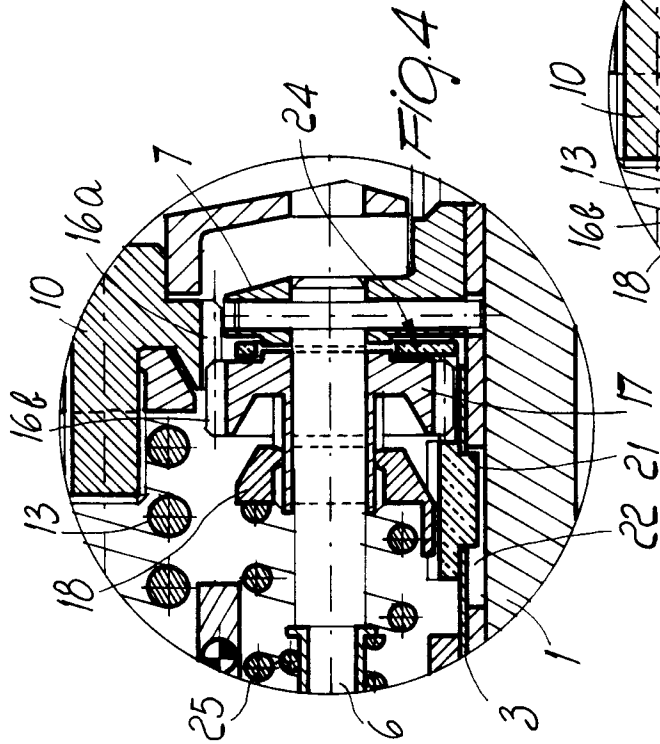


FIG. 3





European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 91 11 6957

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	FR-A-2 501 514 (ESS GMBH SKIBINDUNGEN) * page 2, line 16 - page 3, line 4 * * figures * ---	1-3	A63C9/00
A	DE-A-2 635 686 (KIRSCH) * claims 1-6; figures * ---	1-3	
A, O	AT-A-371 349 (TYROLIA) * figures * ---	1-3	
P, X	EP-A-0 424 846 (NORDICA) * figures 3-5 * ---	1-3	
P, X	EP-A-0 441 251 (NORDICA) * figures * ---	1-3	
P, A	FR-A-2 654 636 (SALOMON) * figures * -----	1-3	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A63C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20 NOVEMBER 1991	Examiner GODOT T.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			