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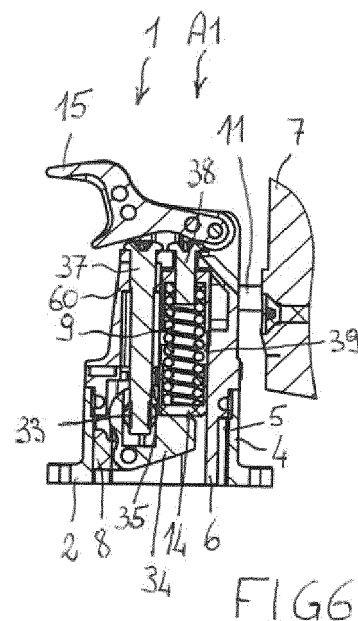
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(54) **A HEEL-PIECE OF A SKI BINDING**

(57) A heel-piece (1) of a ski binding (3) is described, which can be suitable for ski mountaineering or for Alpine skiing, comprising: a base (2); an annular wall (4) which extends from the base (2) and which comprises an internal side (5); a support (6) which is rotatably borne by the annular wall (4); at least a first hooking and unhooking terminal (11) which is borne by the support (6); a clutch member (8); elastic means (9) which are borne by the support (6); a rocker arm (10) which is rotatably borne by the support (6). The annular wall (4) comprises a first seat (21) arranged on the relative internal side (5). The clutch member (8) is borne by the rocker arm (10). The elastic means (9) are arranged so as to press against the rocker arm (10) in such a way that the clutch member (8) in turn presses against the internal side (5) of the annular wall (4). The heel-piece (1) is designed in such a way that starting from a ski descent configuration (A1), wherein the at least a first hooking and unhooking terminal (11) is hooked to the rear portion (7) of the ski boot and the clutch member (8) engages in the first seat (21), so that it is possible to ski downhill, a first unhooking torque acting on the first hooking and unhooking terminal (11) and greater than a predetermined first threshold value can determine a rotation of the support (6) against the action of the elastic means (9), with a consequent: disengagement of the clutch member (8) from the first seat (21) and a sliding of the clutch member (8) along the internal side (5) of the annular wall (4); and the unhooking of the at least a first hooking and unhooking terminal (11)

from the rear portion (7) of the ski boot.



Description

[0001] The present invention relates to the technical sector concerning ski bindings, with particular reference to a heel-piece for an Alpine ski or ski mountaineering binding.

[0002] ITBO20110033A1 describes a heel-piece of an Alpine ski binding, which comprises: a base fixable to a ski, which has a guide channel and a seat which is arranged along the guide channel and which has a groove shape; an annular wall which extends from the base, by a side of the guide channel; a support which is rotatably borne by the annular wall; a pair of hooking and unhooking pins, which are borne by the support and which is suitable for hooking to the rear portion of a ski boot and for unhooking from the rear portion of the ski boot; a clutch member, in particular a sphere, which is arranged in the guide channel and which is conformed to engage in the seat and slide along the guide channel; elastic means, in particular a compression spring, which are interposed between the support and the sphere, so as to elastically press the sphere against the guide channel. The heel-piece is designed in such a way that starting from a ski descent configuration, in which the hooking and unhooking pins are hooked to the rear portion of the ski boot and the clutch member engages in the seat, an unhooking torque acting on the hooking and unhooking pins and greater than a predetermined threshold value can determine a rotation of the support against the action of the elastic means, with a consequent disengagement of the clutch member from the seat and the unhooking of the hooking and unhooking pins from the rear portion of the ski boot.

[0003] The aim of the present invention consists in designing a heel-piece that is as more compact.

[0004] The above aim is attained by a heel-piece of a ski binding, according to claim 1.

[0005] Differently to the prior art, in which the clutch member was external of the annular wall, now the clutch member faces the internal side of the annular wall, being thus internal of the annular wall. This advantageously enables realising a more compact heel-piece.

[0006] Specific embodiments of the invention will be described in the following part of the present description, according to what is set down in the claims and with the aid of the accompanying tables of drawings, in which:

- figures 1-4 are respectively a view from below, lateral, from above and in perspective view of a rear portion of a ski boot and a heel-piece of a ski binding, in particular for practising ski mountaineering, object of the present invention, in a ski descent configuration and according to a first embodiment; a portion of ski fixed to the base has been shown only in figure 2;
- figure 5 is a view of section V-V of figure 2;
- figure 6 is a view of section VI-VI of figure 5;
- figures 7-10 are alike to figures 1-4 with the differ-

ence that they show an instant in which a first type of unhooking of the heel-piece from the ski boot is taking place, following the action of an unhooking torque acting on the hooking and unhooking pins of the heel-piece and which exceeds a first threshold value;

- figure 11 is a view alike to that of figure 8, but taken from a different angle and with some parts removed;
- figure 12 is a view of section XII-XI I of figure 11;
- figures 13-16 are alike to figures 1-4 with the difference that they show two successive instants (see the rear portion of ski boot, respectively in a continuous line and a dotted line) in which a second type of unhooking of the heel-piece from the ski boot is taking place, following the action of an unhooking torque acting on the hooking and unhooking pins of the heel-piece and which exceeds a second threshold value;
- figure 17 is a view of section XVII-XVII of figure 14;
- figure 18 is a view of section XVIII-XVIII of figure 17;
- figures 19-22 are alike to figures 1-4, with the difference that they refer to an uphill skiing configuration;
- figure 23 is a view of section XXIII-XXIII of figure 20;
- figure 24 is a view of section XXIV-XXIV of figure 23;
- figures 25-29 show the heel-piece of figure 1 respectively in a perspective view taken from the front, in a perspective view taken from the rear, in a perspective view taken from below, in a view from below in a frontal view;
- figures 30, 31 are respectively the section views of figures 25, 26;
- figures 32, 33, 34 are two perspective views of the heel-piece of figure 1, from which a progressively increasing number of characteristics have been omitted so that the remaining characteristics are more clearly visible;
- figure 35 is a view of section XXXV-XXXV of figure 29, from which some characteristics have been removed so that the remaining characteristics are more clearly visible;
- figure 36 is a perspective view of section XXXV-XXXV of figure 29, from which some characteristics have been removed so that the remaining characteristics are more clearly visible;
- figure 37 is a rear view of the heel-piece of figure 1, from which some characteristics have been removed so that the remaining characteristics are more clearly visible;
- figures 38-39 are alike respectively to figures 28, 29, with the difference that they show an instant in which a first type of unhooking is taking place already illustrated in figures 7-12;
- figure 40 is a view alike to that of figure 39, but taken from a different angle;
- figure 41 is the view of section XXXXI-XXXXI of figure 40, from which some characteristics have been removed so that the remaining characteristics are more clearly visible;

- figure 42 is the perspective view of section XXXXI-XXXXI of figure 40, from which some characteristics have been removed so that the remaining characteristics are more clearly visible;
- figure 43 differs from the view of figure 40 in that it is taken from the rear and in that some characteristics have been removed so that the remaining characteristics are more clearly visible;
- being the same view as in figure 40, from which some characteristics have been removed so that the remaining characteristics are more clearly visible;
- figures 44-48 are alike respectively to figures 28, 29, 35, 36, 37 with the difference that they show an instant in which a second type of unhooking is taking place already illustrated in figures 13-18;
- figures 49-54 are alike respectively to figures 25, 30, 27, 32, 33, 34 but relate to a second embodiment of the heel-piece object of the present invention;
- figures 55-60 are alike respectively to figures 25, 30, 27, 32, 33, 34 but relative to a third embodiment of the heel-piece object of the present invention;
- figures 61-65 are respectively alike to figures 25, 30, 27, 32, 33 but relative to a fourth embodiment of the heel-piece object of the present invention;
- figure 66 is a view alike to that of figure 65, but taken from a different angle;
- figures 67-71 are respectively alike to figures 25, 30, 27, 32, 33 but relative to a fifth embodiment of the heel-piece object of the present invention.

[0007] With reference to the appended tables of drawings, reference numeral (1) denotes in its entirety a heel-piece of a ski binding, object of the present invention, comprising: a base (2) which is fixable to a ski (3); an annular wall (4) which extends from the base (2) and which comprises an internal side (5); a support (6) which is rotatably borne by the annular wall (4); at least a first hooking and unhooking terminal (11) which is borne by the support (6) and which is suitable for hooking to the rear portion (7) of a ski boot and for unhooking from the rear portion (7) of the ski boot; a clutch member (8); elastic means (9) which are borne by the support (6); a rocker arm (10) which is rotatably borne by the support (6). Further: the annular wall (4) comprises a first seat (21) arranged on the relative internal side (5); the clutch member (8) is borne by the rocker arm (10), faces the internal side (5) of the annular wall (4) and is conformed so as to engage in the first seat (21) and to slide along the internal side (5) of the annular wall (4); the elastic means (9) are arranged so as to press against the rocker arm (10) in such a way that the clutch member (8) in turn presses against the internal side (5) of the annular wall (4); the heel-piece (1) is designed in such a way that starting from a ski descent configuration (A1) (see figures 1-6), in which the at least a first hooking and unhooking terminal (11) is hooked to the rear portion (7) of the ski boot (figure 2) and the clutch member (8) engages in the first seat (21) (figure 1), for it to be possible to ski downhill, a first

unhooking torque acting on the at least a first hooking and unhooking terminal (11) and greater than a predetermined first threshold value can determine a rotation of the support (6) against the action of the elastic means (9), with a consequent: disengagement of the clutch member (8) from the first seat (21) and a sliding of the clutch member (8) along the internal side (5) of the annular wall (4); and the unhooking of the at least a first hooking and unhooking terminal (11) from the rear portion (7) of the ski boot (figures 7-12).

[0008] The heel-piece (1) can be suitable for an Alpine ski binding, (figures 1-66), or for an Alpine ski binding (3), (figures 67-71).

[0009] The base (2) can have fixing holes (13) (as in the figures: see for example figure 4). The base (2) can be fixed directly (figure 2) or indirectly (solution not illustrated) to the ski (3), for example by means of an intermediate element which enables adjusting the position of the heel-piece (1) along the ski (3) according to the dimensions of the ski boot.

[0010] The annular wall (4) is preferably solidly constrained to the base (2). The annular wall (4) can be an integral part of the base (2) (as shown in the figures), i. e. in a single body with the base (2).

[0011] The annular wall (4) is preferably conformed in such a way that when the base (2) is fixed to the ski (3) (directly or indirectly, as mentioned), then the annular wall (4) emerges perpendicularly from the base (2) and, therefore, from the ski (3).

[0012] The support (6) preferably comprises a casing (60) which surmounts the annular wall (4); the casing (60) and the annular wall (4) close internally thereof the rocker arm (10), the clutch member (8) and the elastic means (9).

[0013] The heel-piece (1) can have a single hooking and unhooking terminal (first hooking and unhooking terminal (11), figures 67-71) or two hooking and unhooking terminals (first hooking and unhooking terminal (11) and second hooking and unhooking terminal (12), figures 1-66). The first hooking and unhooking terminal (11) and the second hooking and unhooking terminal (12) can respectively be a first hooking and unhooking pin (11) and a second hooking and unhooking pin (12) (figure 25 for example).

[0014] According to a first aspect of the invention, which is optional, the clutch member (8) can comprise a wedge-shaped portion and be coupled in a revolute pair to the rocker arm (10) (figures 1-48, 55-60), so as to optimise the adherence against the first seat (21) (and against the second seat (22), when included; see below).

[0015] Alternatively, according to a second aspect of the invention, which is optional, the clutch member (8) can be a sphere rotatably borne by the rocker arm (10) (see figures 49-54), or an element solidly constrained to the rocker arm (10), for example in single body with the rocker arm (10), for example having a hemispherical shape (see figures 61-71).

[0016] The elastic means (9) are preferably a compres-

sion spring (figure 6 for example). The elastic means (9) can comprise a beaker-shaped element (14) (figure 34 for example) for abutting the rocker arm (10). If the elastic means (9) are a compression spring, then an end of the compression spring can be housed in the beaker-shaped element (14).

[0017] The rocker arm (10) can comprise a rocker abutment (36) for contacting the elastic means directly or indirectly (in a case in which the elastic means are a compression spring and a beaker-shaped element (14) is included).

[0018] The first seat (21) can have a matching shape to at least a portion of the clutch member (8) (figure 1 for example).

[0019] The portion of annular wall (4) on which the clutch member (8) can slide can have the shape of a portion of cylinder (figure 6 for example), with the exception that: in the first seat (21); and in proximity of the first seat (21), where it can form corresponding connecting surfaces (figure 1 for example) between the first seat (21) and the same portion of cylinder.

[0020] According to a third aspect of the invention, which is optional, the support (6) comprises a first sliding guide (31)(figure 32) and a second sliding guide (not visible in the figures), which is opposite the first sliding guide (31); the rocker arm (10) comprises a hub (33)(figures 30, 31) and a rotary part (34)(figures 33, 34); the hub (33) comprises at the relative ends respectively a first skate (41), which slidably couples with the first sliding guide (31) (figures 32, 33), and a second skate (42), which slidably couples with the second sliding guide and which is opposite the first skate (41); the hub (33) comprises a threaded hole (35) (figures 30, 31); the rotary part (34) of the rocker (10) comprises the rocker abutment (36) and bears the clutch member (8) (fig.34); the elastic means (9) are arranged to press on the rocker abutment (36) (figure 34); the heel-piece (1) comprises an adjustment screw (37) (figure 33), which is borne by the support (6) and which couples with the threaded hole (35) of the hub (33) (figure 31), so that the rotation of the adjustment screw (37) makes possible the translation of the rocker (10) with respect to the support (6), with a consequent adjustment of the degree of compression of the elastic means (9) and therefore of the first threshold value.

[0021] According to a fourth aspect of the invention, which is optional, the annular wall (4) comprises a second seat (22) (figures 1-54) which is arranged on the relative internal side (5) and which is moved away from the first seat (21); the clutch member (8) is conformed to engage in the second seat (22) and to slide along the internal side (5) of the annular wall (4), between the first seat (21) and the second seat (22); when the at least a first hooking and unhooking terminal (11) is unhooked from the rear portion (7) of the ski boot, a manual rotation of the support (6) can bring the clutch member (8) to engage in the second seat (22); the heel-piece (1) is designed to assume an uphill walking configuration (A2), so that it is possible to walk uphill, when the at least a first hooking

and unhooking terminal (11) is unhooked from the rear portion (7) of the ski boot and the clutch member (8) engages in the second seat (22) (figures 19-24). In this case, the heel-piece (1) is suitable for an Alpine ski binding.

[0022] The first seat (21) and the second seat (22) can be distanced by an angle of 180 degrees, see figure 1 for example.

[0023] The following contains descriptions of further characteristics of the invention with reference to a first embodiment, illustrated in figures 1-48.

[0024] In particular, the at least a first hooking and unhooking terminal (11) comprises a first hooking and unhooking pin (11) and a second hooking and unhooking pin (12) (figure 3). Further, the heel-piece (1) comprises: a first coupling element (51) and a second coupling element (52); comprises a first rotary arm (61) which at an end thereof is coupled in a revolute pair to the support (6), for example by a first pin (71) (figure 33), and which at the other end bears, on opposite sides, the first hooking and unhooking pin (11) and the first coupling element (51) (figures 32, 33); comprises a second rotary arm (62) which at an end thereof is coupled in a revolute pair to the support (6), for example by a second pin (72) (figure 33), and which at the other end bears, on opposite sides, the second hooking and unhooking pin (12) and the second coupling element (52); comprises a translating element (53) which is provided with a first coupling profile (81) (figures 33, 34) to couple with the first coupling element (51) and a second coupling profile (82) to couple with the second coupling element (52); the elastic means (9) are interposed between the rocker (10) and translating element (53), so that the first coupling profile (81) and the second coupling profile (82) are maintained in contact respectively with the first coupling element (51) and the second coupling element (52); the first hooking and unhooking pin (11), the second hooking and unhooking pin (12), the first rotary arm (61), the second rotary arm (62), the first coupling element (51), the second coupling element (52) and the translating element (53) are designed in such a way that a reciprocal moving away of the first hooking and unhooking pin (11) and the second hooking and unhooking pin (12), for example due to an impact during a ski descent which induces a force tending to distance the ski boot perpendicularly from the ski (3) (figures 13-18 and 44-48), is elastically opposed by the elastic means (9).

[0025] The first hooking and unhooking pin (11) can be in a single body with the first coupling element (51); likewise, the second hooking and unhooking pin (12) can be in a single body with the second coupling element (52).

[0026] The first coupling element (51) and the second coupling element (52) can both have a cylindrical shape (figure 33).

[0027] The translating element (53) can be indicated by a plane of symmetry.

[0028] The translating element (53) can comprise a first wing (91), which is provided with a concavity which

identifies the first coupling profile (81), and a second wing (92), which is provided with a concavity which identifies the second coupling profile (82): the reciprocal moving away of the first hooking and unhooking pin (11) and the second hooking and unhooking pin (12) causes the sliding of the first hooking and unhooking pin (11) along the ascending portion of the first coupling profile (81) and the sliding of the second hooking and unhooking pin (12) along the ascending portion of the second coupling profile (82), with a consequent translation of the translating element (53) towards the rocker abutment (36) and the compression of the elastic means (9) (compare figures 37 and 48 to one another).

[0029] The heel-piece (1) can comprise a guide screw (38) for keeping the compression spring (9) in axis, while the translating element (53) can be provided with a through-hole (39): the compression spring (9) can partially enter on one side of the through-hole (39), while the guide screw (38) can enter on the opposite side of the through-hole (39) so as to keep the compression spring (9) in axis. The guide screw (38) can screw into a threading (not visible in the figures) of the support (6), so as to be solidly constrained to the support (6).

[0030] The casing (60) can be provided with a first slot (101) and a second slot (102), to allow the passage respectively of the first hooking and unhooking pin (11) and the second hooking and unhooking pin (12), as well as reciprocally nearing and distancing them.

[0031] The heel-piece (1) can comprise a heel lifter (15), which is engageable when the heel-piece (1) is in the uphill walking configuration (A2). A heel lifter (15) can be borne rotatably by the support (6).

[0032] The figures show: the presence of the adjustment screw (37) for regulating the degree of compression of the elastic means (9), according to the third aspect of the invention; that the clutch member (8) comprises a wedge-shaped portion, according to the first aspect of the invention; the presence of the second seat (22), according to the fourth aspect of the invention.

[0033] Figures 1-6 and 25-37 illustrate the heel-piece (1) in the ski descent configuration (A1). The rear portion (7) of the ski boot can be provided with a plate (16) which in turn is provided with a first housing (111) for the first hooking and unhooking pin (11) and a second housing (112) for the second hooking and unhooking pin (12): figure 5 shows that the first housing (111) is receiving the first hooking and unhooking pin (11) and that the second housing (112) is receiving the second hooking and unhooking pin (12). Thus, the first hooking and unhooking pin (11) and the second hooking and unhooking pin (12) are hooked to the rear portion (7) of the ski boot.

[0034] Figures 7-12 and 38-43 illustrate the heel-piece (1) in the ski descent configuration (A1) when a first type of unhooking from the ski boot is taking place, following the action of a first unhooking torque acting on the first hooking and unhooking pin (11) and on the second hooking and unhooking pin (12) and such as to exceed a first threshold value. This unhooking torque can be generated

following an impact or a fall during the skiing activity. As can be deduced, the ski boot rotates with respect to the toe-piece of the ski binding (not illustrated) so that the rear portion (7) of the ski boot exerts the first unhooking torque on the first hooking and unhooking pin (11) and the second hooking and unhooking pin (12), so that the rotation of the support (6) takes place against the action of the elastic means (9), with a consequent: disengagement of the clutch member (8) from the first seat (21) and a sliding of the clutch member (8) along the internal side (5) of the annular wall (4); and the unhooking of the first hooking and unhooking pin (11) and the second hooking and unhooking pin (12) from the rear portion (7) of the ski boot.

[0035] Figures 13-18 and 44-48 illustrate the heel-piece (1) in the ski descent configuration (A1) when a second type of unhooking from the ski boot is taking place, following the action of an unhooking torque which has at least a component that is perpendicular to the ski (3), which acts on the first hooking and unhooking pin (11) and on the second hooking and unhooking pin (12) and which exceeds a second threshold value. This unhooking torque can be generated following an impact or a fall during the skiing activity. As can be deduced, the ski boot lifts with respect to the ski (3) so that the rear portion (7) of the ski boot exerts the unhooking torque on the first hooking and unhooking pin (11) and on the second hooking and unhooking pin (12), with a consequent reciprocal moving away of the first hooking and unhooking pin (11) and of the second hooking and unhooking pin (12) in opposition to the action of the elastic means (9) (figure 48).

[0036] Figures 19-24 illustrate the heel-piece (1) in the uphill walking configuration (A2).

[0037] In order to reach an uphill walking configuration (A2) starting from the ski descent configuration (A1) it is sufficient to unhook the rear portion (7) of the ski boot from the first hooking and unhooking pin (11) and from the second hooking and unhooking pin (12), to manually rotate the support (6) until the clutch member (8) engages in the second seat (22), and, if so desired, to rotate the heel lifter (15) so that it can offer a support for the heel of the ski boot during the uphill walk, or on the plane, (figure 20). The heel-piece (1) is therefore suitable for an Alpine ski binding.

[0038] Figures 49-54 illustrate a second embodiment of the invention. The only difference with respect to figures 1-48 consists in the fact that the clutch member (8) is a sphere rotatably borne by the rocker arm (10), according to the second aspect of the invention. The heel-piece (1) is therefore suitable for an Alpine ski binding.

[0039] Figures 55-60 illustrate a third embodiment of the invention. In this case no adjustment screw (37) is present to regulate the degree of compression of the elastic means (9), according to the third aspect of the invention; therefore, the rocker arm (10) can be a single body provided with a third pin (73) and a fourth pin (74) for coupling in a revolute pair to the support (6), see figures

58, 59.

[0040] The clutch member (8) is a sphere rotatably borne by the rocker arm (10), according to the second aspect of the invention.

[0041] Further, the second seat (22) is not present, according to the fourth aspect of the invention. However, the heel-piece (1) can equally reach an alternative uphill walking configuration (A2), in a case in which, starting from the ski descent configuration (A1), the user needs only to rotate the heel lifter (15) towards the first hooking and unhooking pin (11) and the second hooking and unhooking pin (12) (this position of the heel lifter (15) is not shown in figures 55-60): in this case, the heel lifter (15) can be arranged above, possibly with contact, of the first hooking and unhooking pin (11) and of the second hooking and unhooking pin (12), thus offering a support for the heel of the ski boot during the uphill wall, or on a plane. The heel-piece (1) is therefore suitable for an Alpine ski binding.

[0042] The following are descriptions of further characteristics of the invention with reference to a fourth embodiment, illustrated in figures 61-65.

[0043] The elastic means (9) are not interposed between the rocker arm (10) and the support (6) (see figure 62).

[0044] The heel-piece (1) can comprise a U-shaped spring (40) which is borne by the support (6) and has ends that respectively form the first hooking and unhooking pin (11) and the second hooking and unhooking pin (12). This U-shaped spring (40) elastically opposes the reciprocal moving away of the first hooking and unhooking pin (11) and the second hooking and unhooking pin (12). Therefore, the U-shaped spring (40) intervenes when the second type of unhooking takes place.

[0045] According to these figures: there is no adjustment screw (37) present for regulating the degree of compression of the elastic means (9), according to the third aspect of the invention; the clutch member (8) is a sphere rotatably borne by the rocker arm (10), according to the second aspect of the invention; the second seat (22) is absent, according to the fourth aspect of the invention.

[0046] As already explained in the foregoing with reference to the third embodiment, the heel-piece (1) is still able to reach the alternative uphill walking configuration (A2). The heel-piece (1) is therefore suitable for an Alpine ski binding.

[0047] The following contains descriptions of further characteristics of the invention with reference to a fifth embodiment, illustrated in figures 67-71.

[0048] In particular, the at least a first hooking and unhooking terminal (11) is coupled in a revolute pair to the support (6), so as to assume a hooked position (illustrated in the figures), in which it can be hooked to the rear portion (7) of the ski boot, and an unhooked position (not illustrated), in which it is unhooked from the rear portion (7) of the ski boot; the heel-piece (1) comprises an unhooking lever (43) which is solidly constrained (for example in single body, as in the illustrated example) to the at least

a first hooking and unhooking terminal (11), to manually bring the at least a first hooking and unhooking terminal (11) into the unhooked position; the elastic means (9) are interposed between the rocker (10) and the unhooking lever (43), so that the at least a first hooking and unhooking terminal (11) is maintained in the hooked position and so that the reaching of the unhooked position requires applying manual application of a second unhooking torque on the unhooking lever (43).

[0049] The support (6) preferably comprises an endrun stop (44) (fig.70) for the at least a first hooking and unhooking terminal (11), so as to define the hooked position.

[0050] In the illustrated figures: no adjustment screw (37) is present to regulate the degree of compression of the elastic means (9), according to the third aspect of the invention; the clutch member (8) is a sphere rotatably borne by the rocker arm (10), according to the second aspect of the invention; the second seat (22) is not present, according to the fourth aspect of the invention.

[0051] In this case the heel-piece (1) is suitable for an Alpine ski binding (3).

[0052] It is understood that the above has been described by way of non-limiting example and that any technical-functional variants are considered to fall within the protective scope of the present technical solution, as claimed in the following.

Claims

1. A heel-piece (1) of a ski binding (3), wherein:

it comprises a base (2) which is fixable to a ski (3);

it comprises an annular wall (4) which extends from the base (2) and which comprises an internal side (5);

it comprises a support (6) which is rotatably borne by the annular wall (4);

it comprises at least a first hooking and unhooking terminal (11) which is borne by the support (6) and which is suitable for hooking to the rear portion (7) of a ski boot and for unhooking from the rear portion (7) of the ski boot;

it comprises a clutch member (8);

it comprises elastic means (9) which are borne by the support (6);

characterised in that:

the annular wall (4) comprises a first seat (21) arranged on the relative internal side (5);

it comprises a rocker arm (10) which is rotatably borne by the support (6);

the clutch member (8) is borne by the rocker arm (10), faces the internal side (5) of the annular wall (4) and is conformed to engage in the first seat (21) and to slide along the

- internal side (5) of the annular wall (4);
the elastic means (9) are arranged so as to press against the rocker arm (10) in such a way that the clutch member (8) in turn presses against the internal side (5) of the annular wall (4);
the heel-piece (1) is designed in such a way that starting from a ski descent configuration (A1), in which the at least a first hooking and unhooking terminal (11) is hooked to the rear portion (7) of the ski boot and the clutch member (8) engages in the first seat (21), so that it is possible to ski downhill, a first unhooking torque acting on the at least a first hooking and unhooking terminal (11) and greater than a predetermined first threshold value can determine a rotation of the support (6) against the action of the elastic means (9), with a consequent: disengagement of the clutch member (8) from the first seat (21) and a sliding of the clutch member (8) along the internal side (5) of the annular wall (4); and the unhooking of the at least a first hooking and unhooking terminal (11) from the rear portion (7) of the ski boot.
2. The heel-piece (1) of the preceding claim, wherein: the support (6) comprises a casing (60) which surmounts the annular wall (4); the casing (60) and the annular wall (4) close internally thereof the rocker arm (10), the clutch member (8) and the elastic means (9).
3. The heel-piece (1) of any one of the preceding claims, wherein:
- the support (6) comprises a first sliding guide (31) and a second sliding guide, which is opposite the first sliding guide (31);
the rocker arm (10) comprises a hub (33) and a rotary part (34);
the hub (33) comprises at the relative ends respectively a first skate (41), which slidably couples with the first sliding guide (31), and a second skate (42), which slidably couples with the second sliding guide and which is opposite the first skate (41);
the hub (33) comprises a threaded hole (35);
the rotary part (34) of the rocker arm (10) comprises a rocker arm abutment (36) and bears the clutch member (8);
the elastic means (9) are arranged to press on the rocker arm abutment (36);
the heel-piece (1) comprises an adjustment screw (37), which is borne by the support (6) and which couples with the threaded hole (35) of the hub (33), so that the rotation of the adjust-

ment screw (37) makes possible the translation of the rocker arm (10) with respect to the support (6), with a consequent adjustment of the degree of compression of the elastic means (9) and therefore of the first threshold value.

4. The heel-piece (1) of any one of claims from 1 to 3, wherein:

the at least a first hooking and unhooking terminal (11) comprises a first hooking and unhooking pin (11) and a second hooking and unhooking pin (12);
it comprises a first coupling element (51) and a second coupling element (52);
it comprises a first rotary arm (61) which at an end thereof is coupled in a revolute pair to the support (6) and which at the other end bears, on opposite sides, the first hooking and unhooking pin (11) and the first coupling element (51);
it comprises a second rotary arm (62) which at an end thereof is coupled in a revolute pair to the support (6) and which at the other end bears, on opposite sides, the second hooking and unhooking pin (12) and the second coupling element (52);
it comprises a translating element (53) which is provided with a first coupling profile (81) to couple with the first coupling element (51) and a second coupling profile (82) to couple with the second coupling element (52);
the elastic means (9) are interposed between the rocker arm (10) and translating element (53), so that the first coupling profile (81) and the second coupling profile (82) are maintained in contact respectively with the first coupling element (51) and the second coupling element (52);
the first hooking and unhooking pin (11), the second hooking and unhooking pin (12), the first rotary arm (61), the second rotary arm (62), the first coupling element (51), the second coupling element (52) and the translating element (53) are designed in such a way that a reciprocal moving away of the first hooking pin and of the second hooking pin from one another is elastically opposed by the elastic means (9).

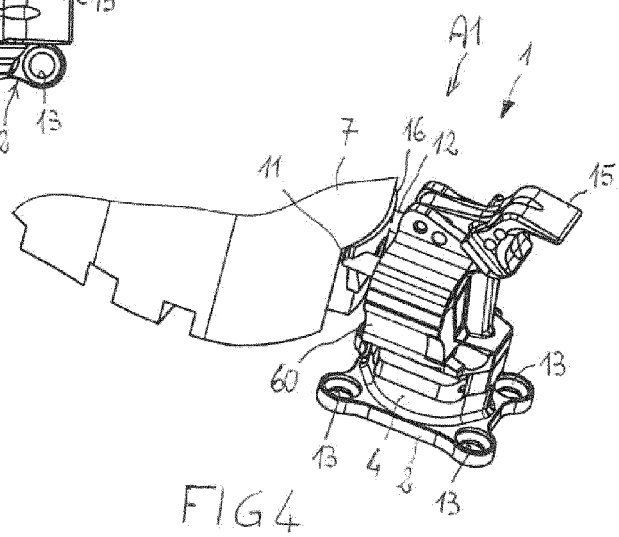
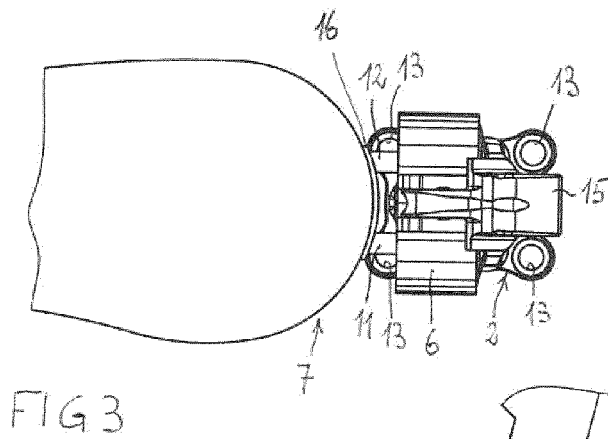
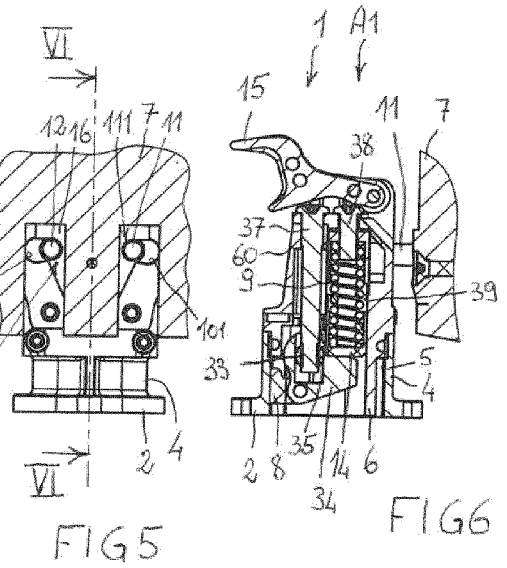
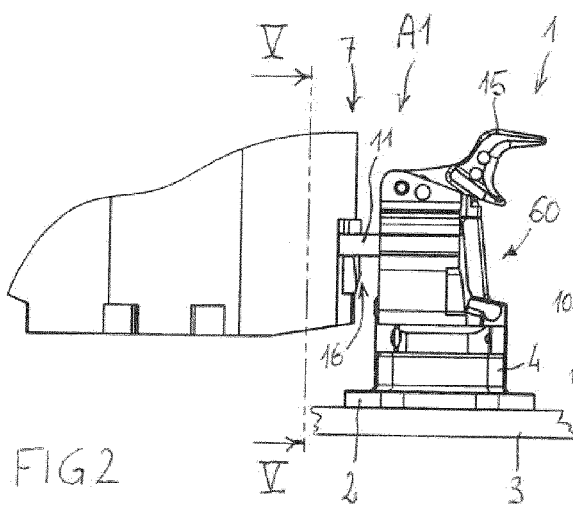
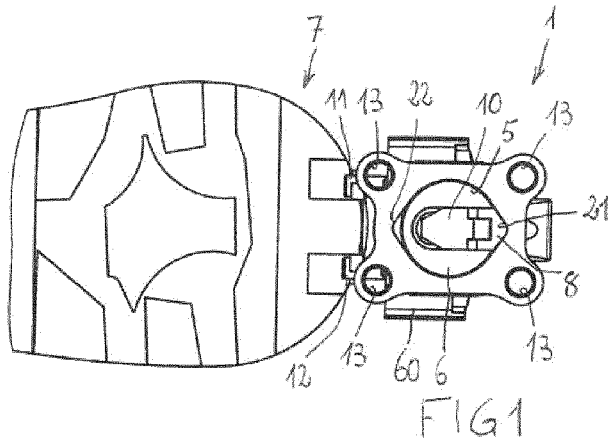
5. The heel-piece (1) of any one of claims from 1 to 3, wherein the elastic means (9) are interposed between the rocker arm (10) and the support (6).
6. The heel-piece (1) of any one of the preceding claims, wherein: the annular wall (4) comprises a second seat (22) which is arranged on the relative internal side (5) and which is moved away from the first seat (21); the clutch member (8) is conformed so as to engage in the second seat (22) and to slide along the internal side (5) of the annular wall (4),

between the first seat (21) and the second seat (22);
 when the at least a first hooking and unhooking terminal (11) is unhooked from the rear portion (7) of the ski boot, a manual rotation of the support (6) can bring the clutch member (8) to engage in the second seat (22); the heel-piece (1) is designed to assume an uphill walking configuration (A2), so that it is possible to walk uphill, when the at least a first hooking and unhooking terminal (11) is unhooked from the rear portion (7) of the ski boot and the clutch member (8) engages in the second seat (22).

7. The heel-piece (1) of any one of claims from 1 to 3, wherein: the at least a first hooking and unhooking terminal (11) is coupled in a revolute pair to the support (6), so as to assume a hooked position, in which it can be hooked to the rear portion (7) of the ski boot, and an unhooked position, in which it is unhooked from the rear portion (7) of the ski boot;

it comprises an unhooking lever which is solidly constrained to the at least a first hooking and unhooking terminal (11), to manually bring the at least a first hooking and unhooking terminal (11) into the unhooked position;
 the elastic means (9) are interposed between the rocker arm (10) and the unhooking lever, so that the at least a first hooking and unhooking terminal (11) is maintained in the hooked position and so that the reaching of the unhooked position requires manual application of a second unhooking torque on the unhooking lever.

8. The heel-piece (1) of the preceding claim, wherein the support (6) comprises an endrun stop for the at least a first hooking and unhooking terminal (11), such as to define the hooked position.



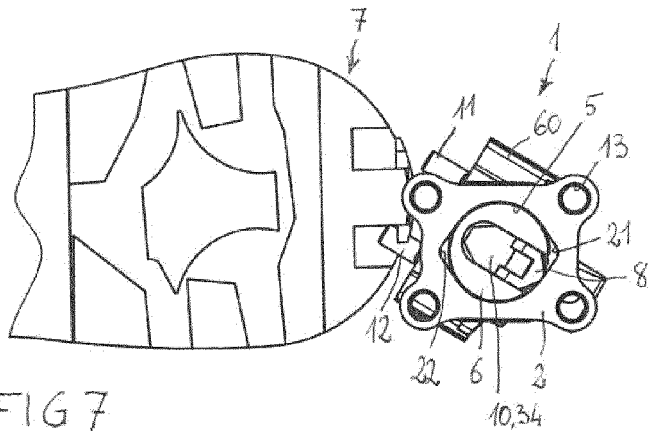


FIG 7

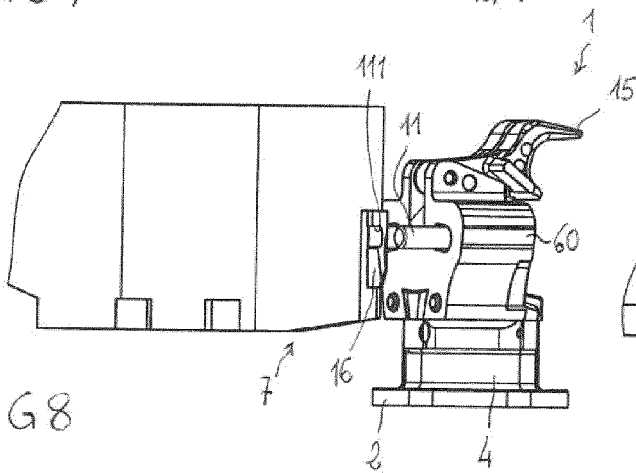
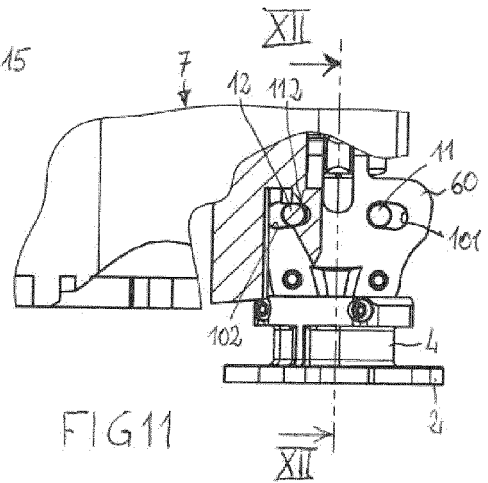


FIG 8



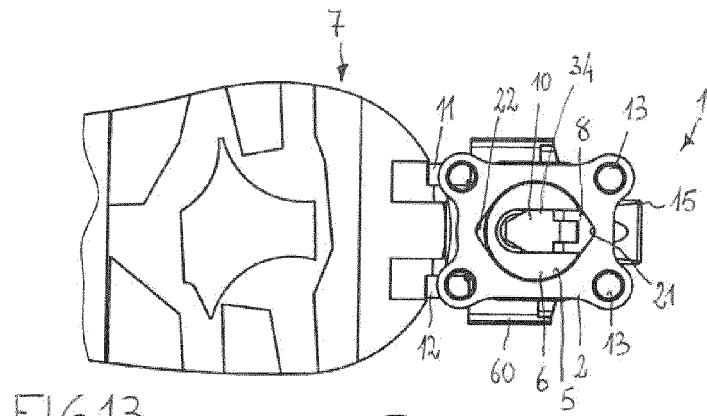


FIG 13

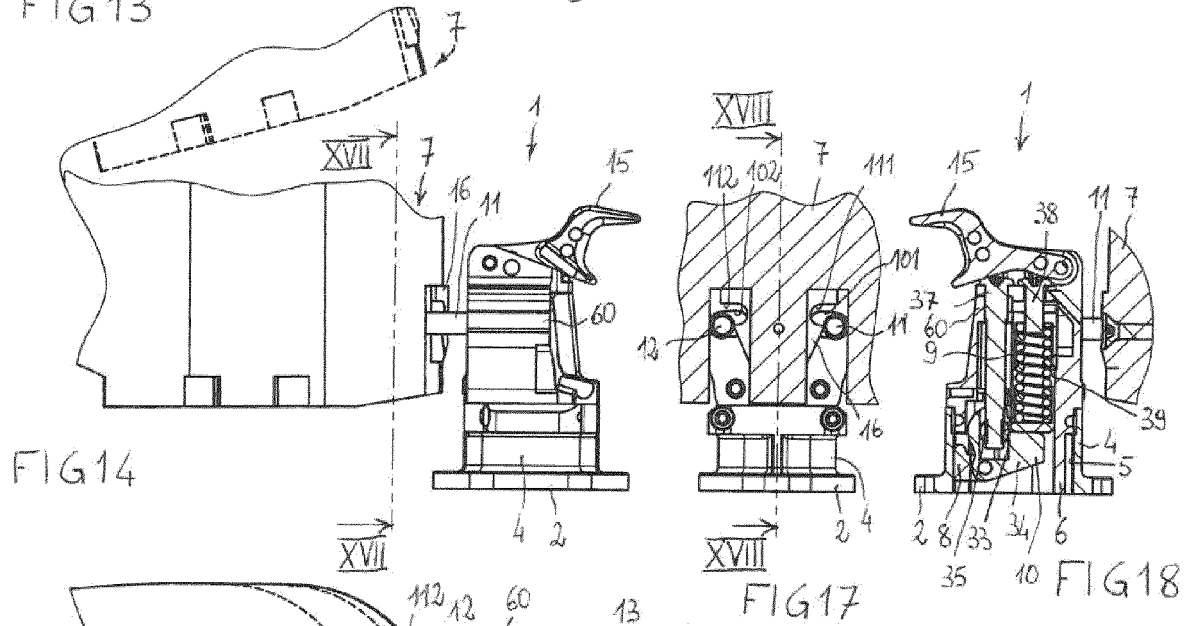


FIG 14

FIG 17

FIG 18

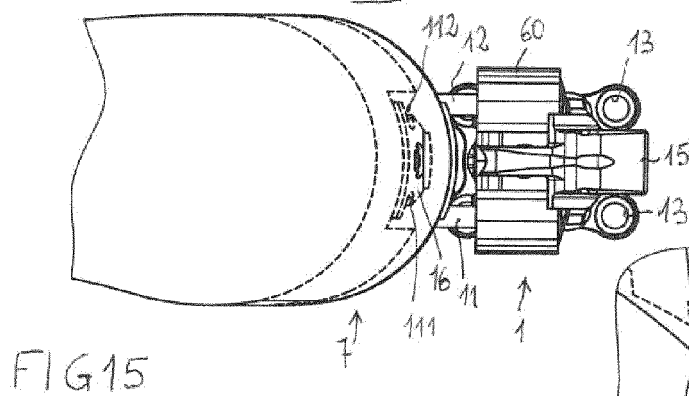


FIG 15

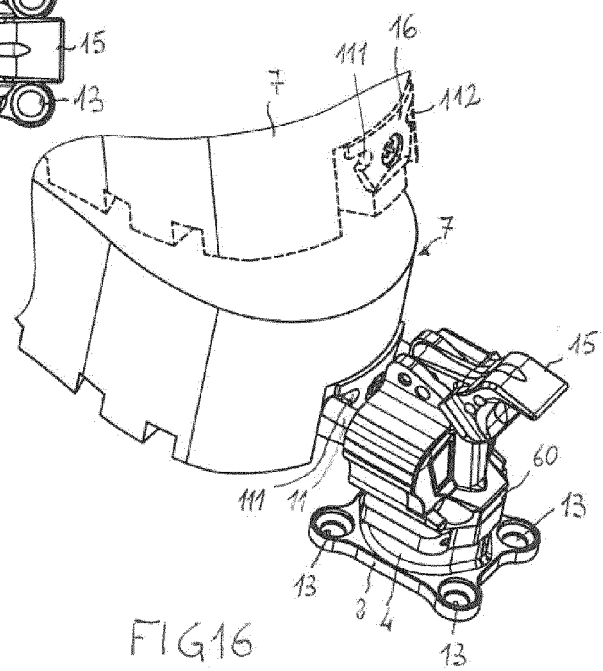
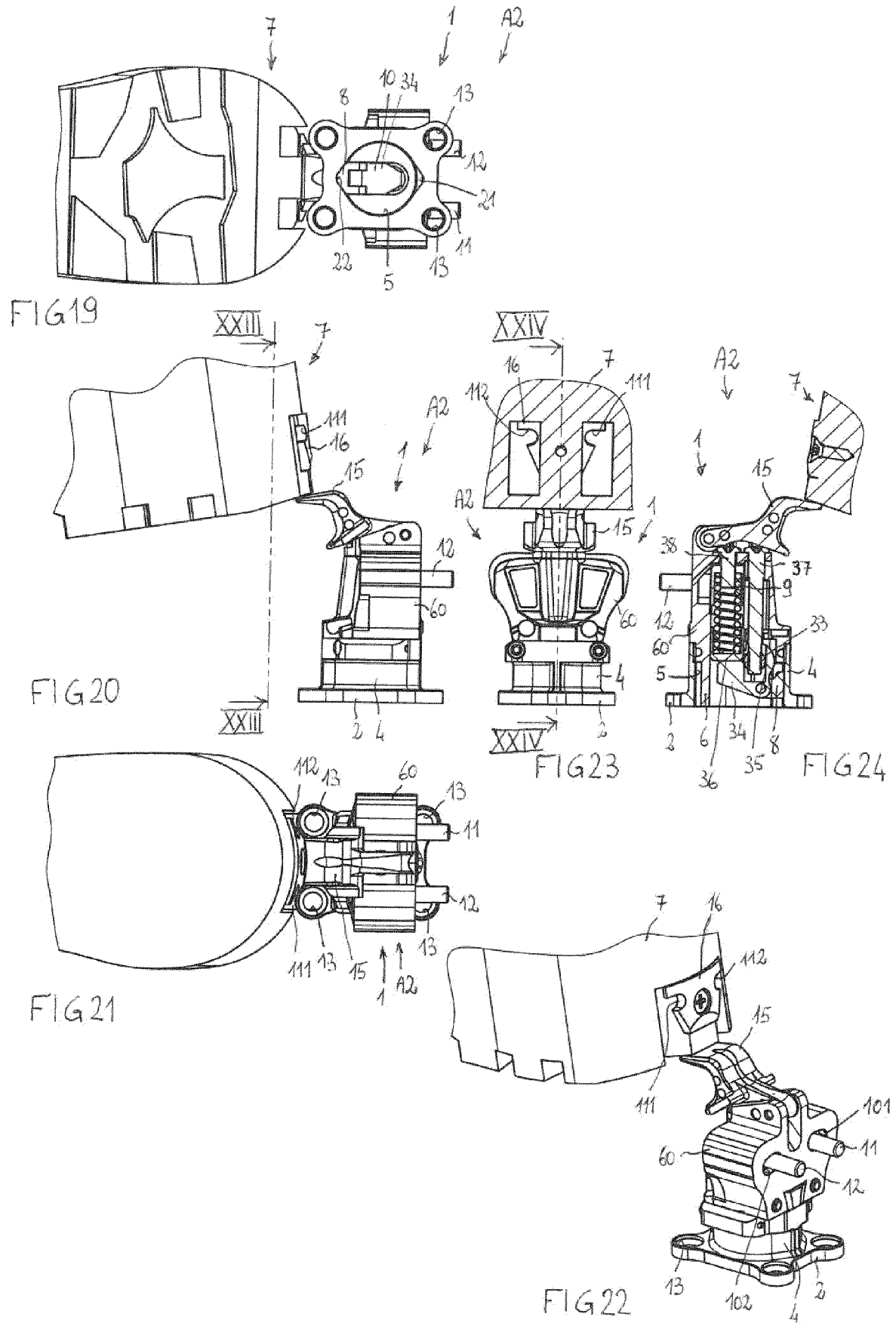
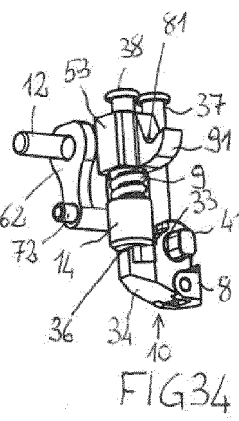
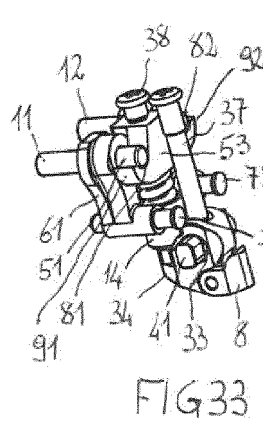
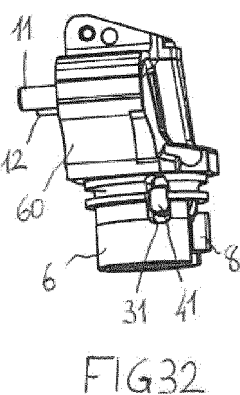
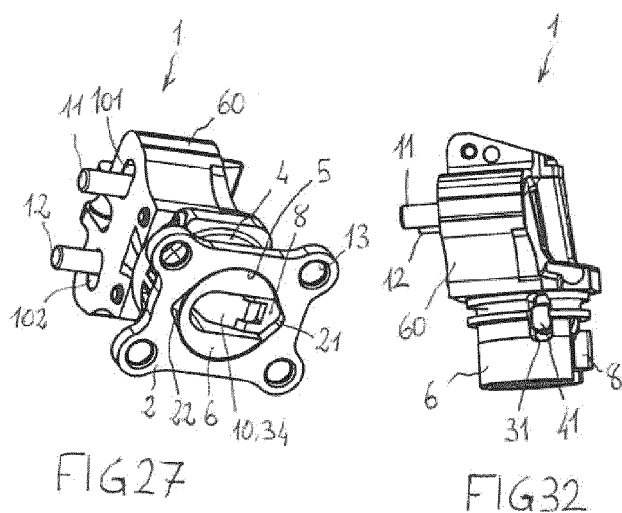
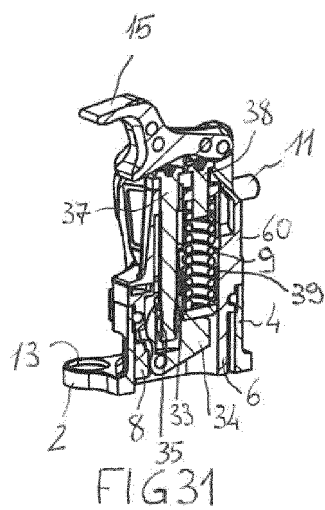
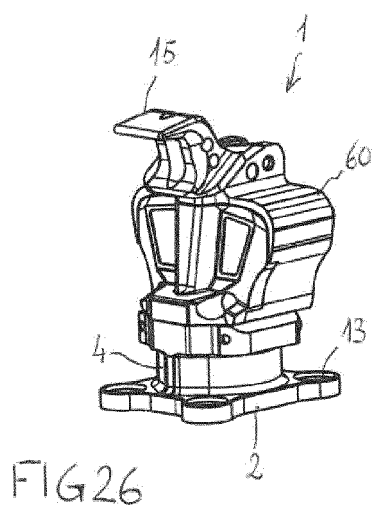
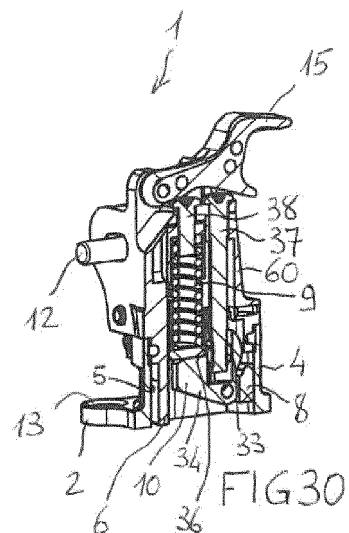
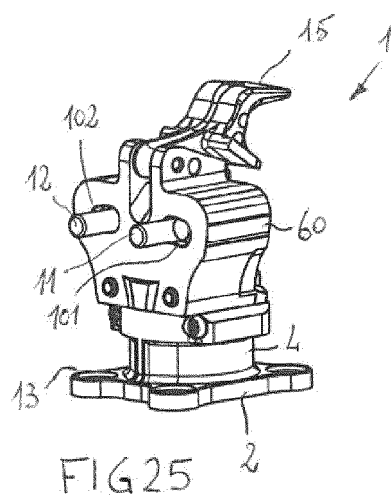


FIG 16





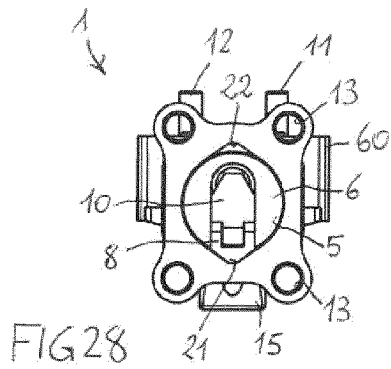


FIG 28

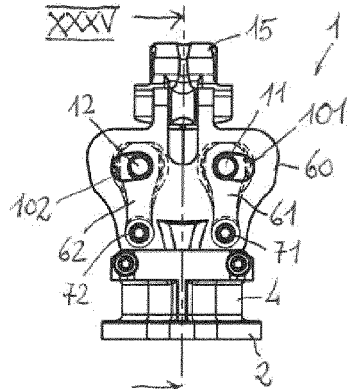


FIG 29

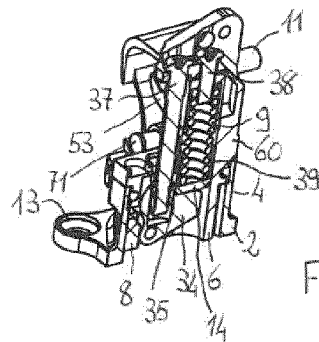


FIG 36

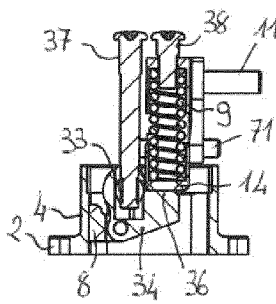


FIG 35

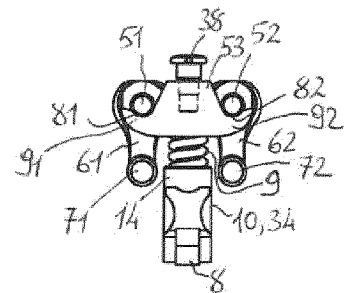


FIG 37

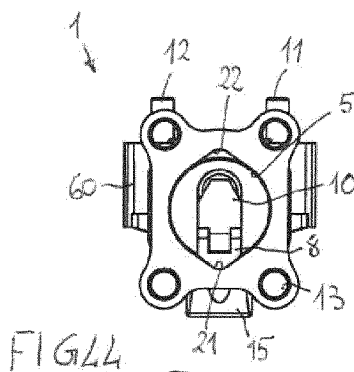


FIG 44

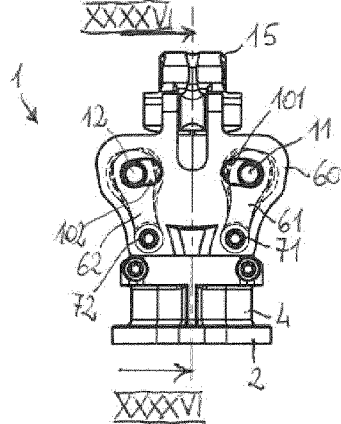


FIG 45

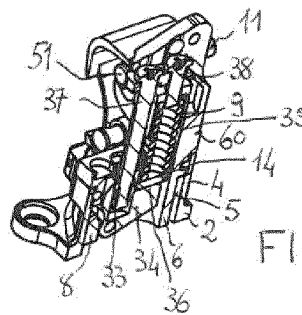


FIG 47

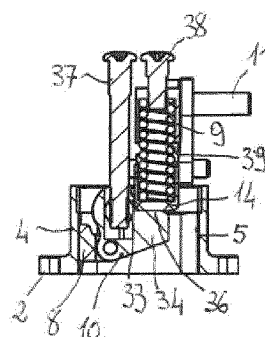


FIG 46

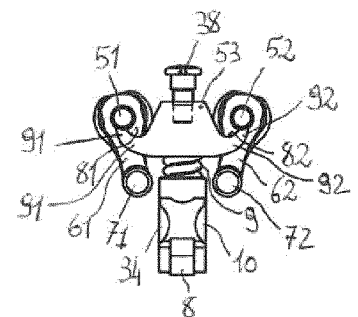
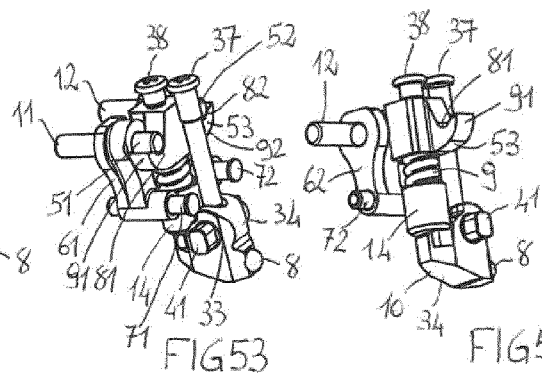
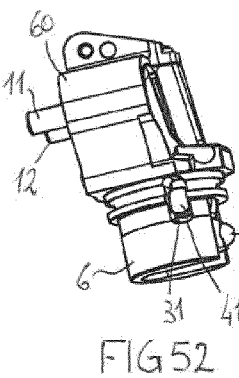
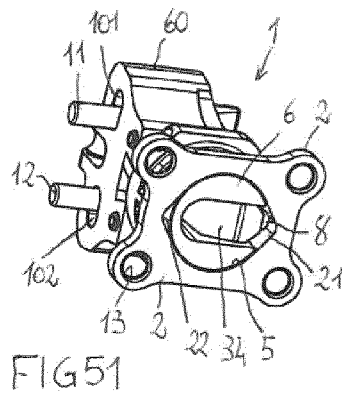
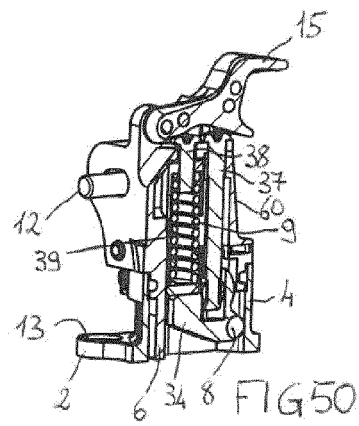
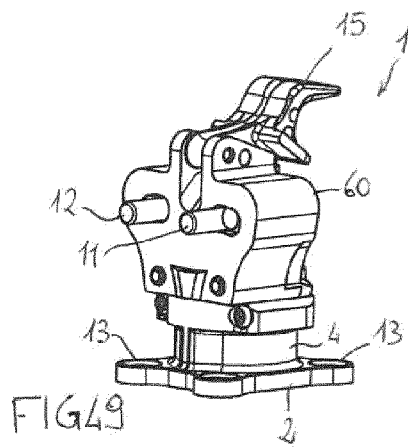
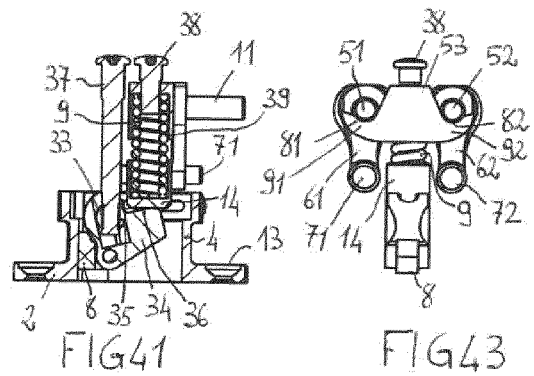
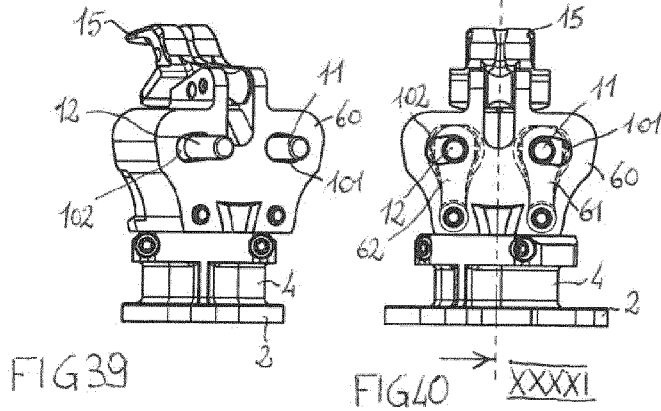
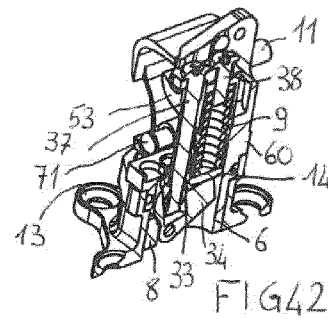
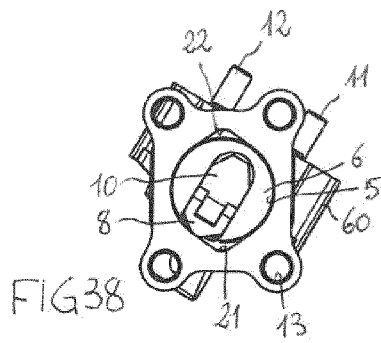
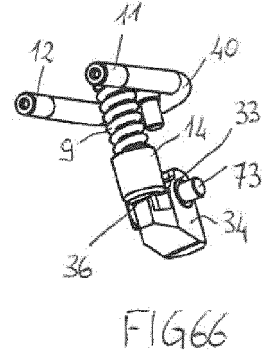
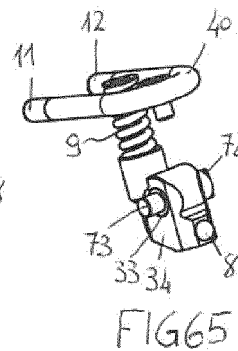
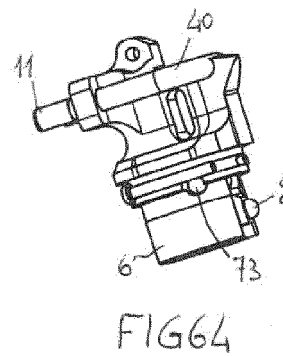
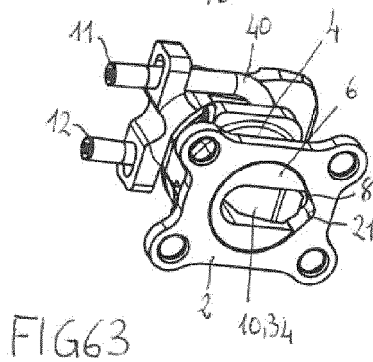
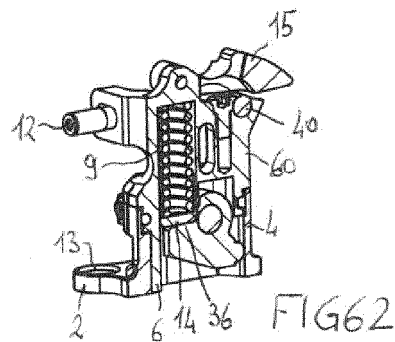
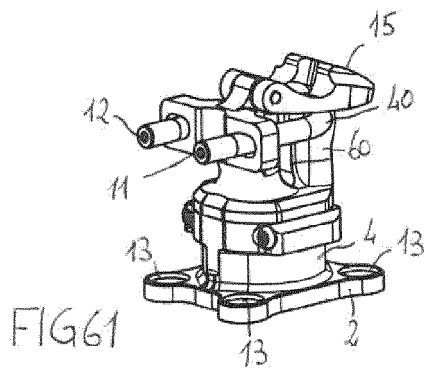
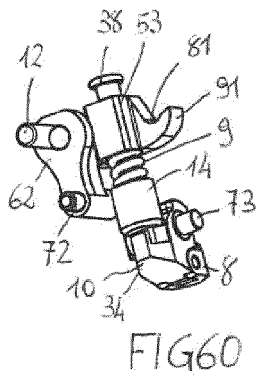
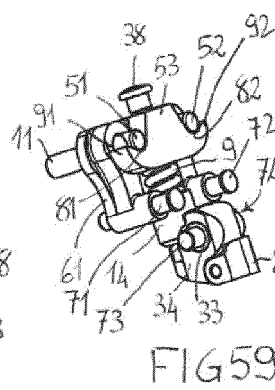
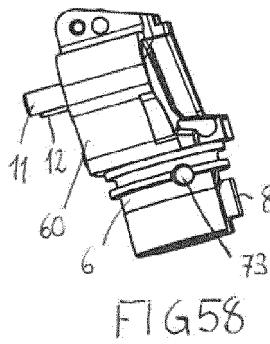
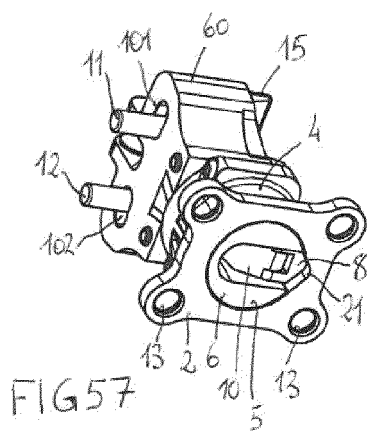
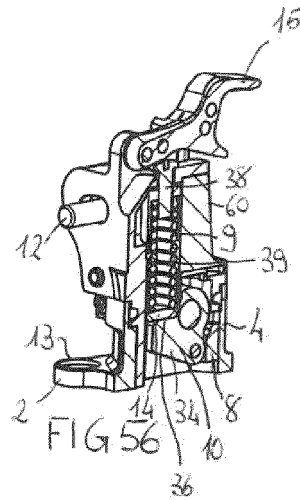
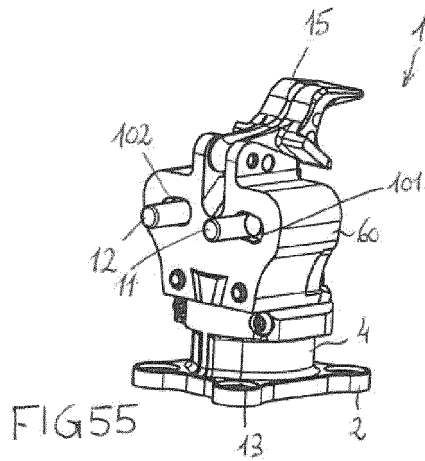
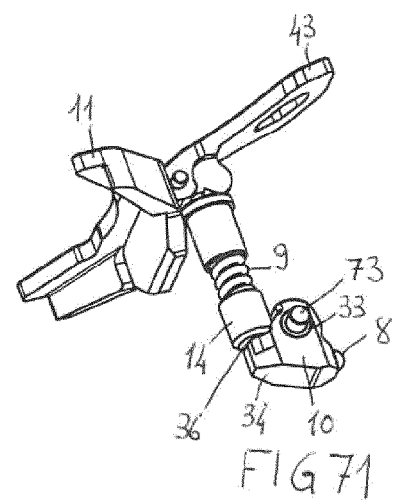
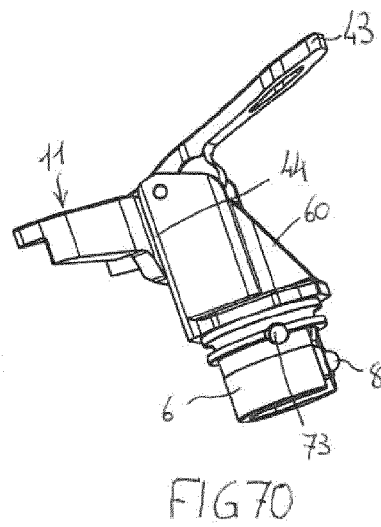
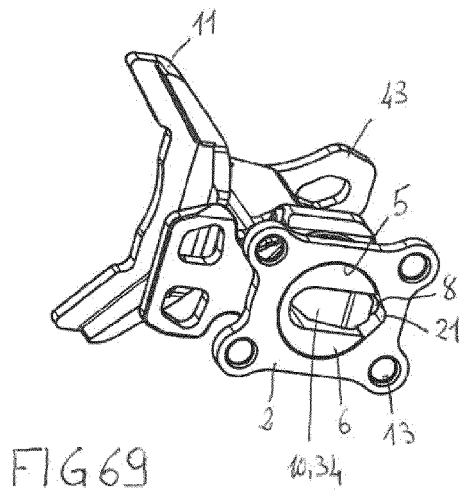
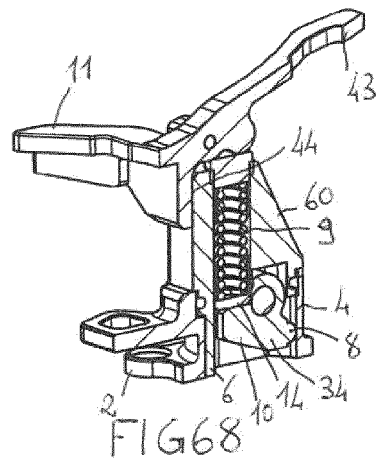
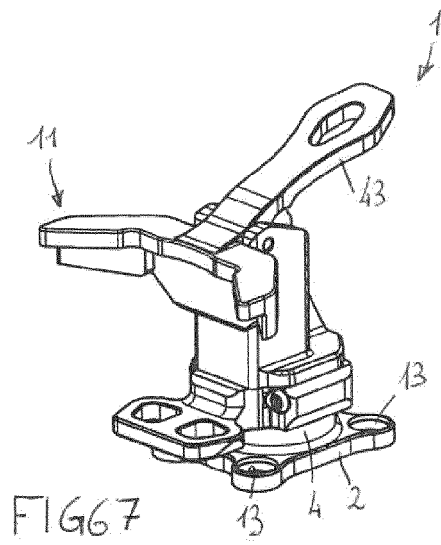


FIG 48









EUROPEAN SEARCH REPORT

Application Number

EP 23 18 2197

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 8 919 805 B2 (GIORDANI ROBERTO [IT]; TASCI S R L [IT]) 30 December 2014 (2014-12-30) * column 5, line 10 - column 5, line 33; figures 1,7 *	1-8	INV. A63C9/086 A63C9/085 A63C9/084 A63C9/08 A63C9/00
A	FR 3 043 565 A1 (THE M EQUIPMENT [FR]) 19 May 2017 (2017-05-19) * page 6, line 17 - page 5, line 27; figures 1,6 *	1-8	
A	EP 3 702 005 A1 (FRITSCHI AG SWISS BINDINGS [CH]) 2 September 2020 (2020-09-02) * paragraphs [0097] - [0106]; figures 2,3a,3b *	1-8	
A	EP 2 345 463 A1 (ATK RACE SRL [IT]) 20 July 2011 (2011-07-20) * paragraphs [0015] - [0043]; figures 1,2 *	1-8	TECHNICAL FIELDS SEARCHED (IPC) A63C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 31 October 2023	Examiner Murer, Michael
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			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 23 18 2197

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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31-10-2023

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