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(54) REAR PORTION OF A SKI MOUNTAINEERING BINDING

(57) A rear portion of a ski mountaineering binding (1) is described, comprising: a heel-piece (2) comprising: a base (5); a turret (6); and a heel raiser (7) which is rotatably borne by the turret (6) so as to assume an operating position (OP), in which the heel raiser (7) can restingly receive the heel (8) of a ski boot (9), and a non-operating position (NOP); a brake (3) for a ski which comprises: a first braking portion (11) which is movable to assume a first braking position (21) and a first non-active position (31); first elastic means (41) acting on the first braking portion (11), in order to exert a force tending to bring the first braking portion (11) into the first braking position (21);
connecting means (4) which connect the blocking lever (7) to the brake (3) and which are configured in such a way that: when the blocking lever (7) is in the operating position (OP) the connecting means (4) are under tension so that the first braking portion (11) is stably maintained in the first non-active position (31); and when the blocking lever (7) is in the non-operating position (NOP) the connecting means (4) are slackened so that the first braking portion (11) can reach, or remain, in the first braking position (21).

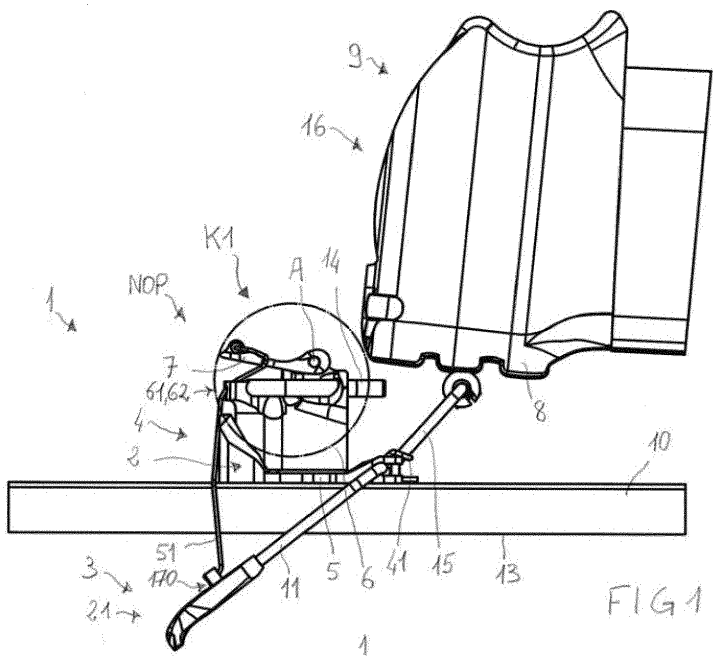

FIG 1

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Description

DESCRIPTION OF THE INVENTION

[0001] The present invention relates to the technical sector of ski mountaineering bindings for skiing downhill and walking uphill, with particular reference to a rear portion of a ski mountaineering binding comprising a heel-piece and a brake for a ski.

[0002] A rear portion of a ski mountaineering binding, of a known type, comprises a heel-piece and a brake for a ski.

[0003] The heel-piece comprises: a base fixed to a ski; a turret which is constrained to the base and which rises from the base; two hooking pins for hooking the heel to a ski boot; and a heel raiser which is rotatably borne by the turret so as to assume an operating position, in which the heel raiser can restingly receive the heel of a ski boot, and a non-operating position in which the heel raiser can be orientated towards the tail of the ski. To ski downhill the heel raiser is moved into the non-operating position, and hooks the heel of the ski boot to the two hooking pins. To ski uphill the ski boot is unhooked from the heel-piece and the heel raiser is moved into the operating position.

[0004] The brake comprises: a first braking portion which is movable to assume a first braking position, so that when the brake is fixed to the ski the first braking portion is lowered to drag on the layer of snow covering the terrain and thus brake the ski, and a first non-active position, so that when the brake is fixed to the ski the first braking portion is raised; first elastic means acting on the first braking portion, for exerting a force tending to bring the first braking portion into the first braking position; an activating lever which is connected to the first braking portion and which is arranged so as to be pressed by the heel of the ski boot when the heel raiser is in the non-operating position, so as to maintain the first braking portion in the first non-active position.

[0005] Then, to ski downhill the heel of the ski boot maintains the first braking portion in the first non-active position; if the heel-piece automatically unhooks the ski boot (for example following an impact or fall) the first braking portion moves into the first braking position and this brakes the ski.

[0006] The rear portion of ski mountaineering binding also includes a blocking device of the brake which acts on the first braking portion as long as it stays in the first non-active position. This is necessary in order to walk uphill.

[0007] A rear portion of ski binding of the above-described type has, however, some drawbacks which are linked to the relative blocking device of the brake. In fact, the blocking device of the brake has a not-inconsiderable weight, if compared to the other elements making up the rear portion of ski mountaineering binding, and its functioning is not always intuitive.

[0008] The aim of the present invention consists in obviating the above-mentioned drawbacks.

[0009] The above aim is attained by a rear portion of a ski mountaineering binding, according to claim 1.

[0010] The blocking lever and the connecting means advantageously carry out the same function as the blocking device described in the foregoing, but the weight thereof is lower. Further, the functioning of the blocking lever and the connecting means is very intuitive, which makes a human error improbable.

[0011] The blocking lever is preferably a heel raiser for walking uphill, which, when it is in the operating position, can restingly receive the heel of a ski boot.

[0012] It is therefore advantageously possible to further reduce the overall weight of the rear portion of a ski binding, as the blocking lever is now integrated into the heel raiser; further, the operation is still more intuitive as the user must limit him or herself to activating the heel raiser in known ways, i.e. by bringing the heel raiser into the operating position only if he or she wishes to walk uphill.

[0013] Alternatively, the blocking lever and the heel raiser can both coexist, in the sense that they can for example be flanked to one another.

[0014] 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:

- figure 1 is a lateral view of the rear portion of the ski mountaineering binding, object of the present invention and according to a first embodiment of the invention, in a configuration ready to receive the ski boot, as well as of the rear portion of a ski boot;
- figures 2, 3 are respectively the rear view and the view from above of the rear portion of a ski binding according to figure 1;
- figure 4 is a larger-scale view of detail K1 of figure 1;
- figure 4A is a larger-scale view from above of detail K1bis of figure 3;
- figure 5 is a lateral view of the rear portion of a ski mountaineering binding and of the rear portion of a ski boot of figure 1, in a ski descent configuration;
- le figures 6, 7 are respectively a rear view and a view from above of the rear portion of a ski binding according to figure 5;
- figure 6A is a front view of the rear portion of a ski binding according to figure 5, in which the ski boot has been omitted;
- figure 6B is a larger-scale view of detail K2 of figure 6A;

- figure 8 is a larger-scale view of detail K3 of figure 5;
- figure 9 is a lateral view of the rear portion of the ski mountaineering binding and of the rear portion of a ski boot of figure 1, in an uphill walking configuration;
- figures 10, 11 are respectively the rear view and the view from above of the rear portion of a ski binding according to figure 9;
- figure 10A is the front view of the rear portion of a ski binding according to figure 9, in which the ski boot has been omitted;
- figure 10B is a larger-scale view of detail K4 of figure 10A;
- figure 12 is a larger-scale view of detail K5 of figure 9;
- figure 13 is a lateral view of the rear portion of the ski mountaineering binding which differs from the one of figure 1 only due to the fact that it used a further heel raiser, in an uphill walking configuration; also illustrated is a rear portion of a ski boot;
- figures 14, 15 are respectively the rear view and the view from above of the rear portion of a ski binding according to figure 13;
- figure 14A is a front view of the rear portion of a ski binding according to figure 13, in which the ski boot has been omitted;
- figure 14B is a larger-scale view of detail K6 of figure 14A;
- figure 16 is a larger-scale view of detail K7 of figure 13;
- figure 17 is a lateral view of the rear portion of the ski mountaineering binding, object of the present invention and according to a second embodiment of the invention, in a configuration ready to receive the ski boot, as well as of the rear portion of a ski boot;
- figures 18, 19 are respectively the rear view and a view from above of the rear portion of a ski binding according to figure 17;
- figure 20 is a larger-scale view of detail K8 of figure 17;
- figure 20A is a larger-scale view from above of detail K8bis of figure 19;
- figure 21 is a in longitudinal section view of a rear portion of the ski mountaineering binding, object of the present invention and according to a third embodiment of the invention, in a configuration ready to receive the ski boot, as well as of the rear portion of a ski boot;
- figures 22, 23 are respectively the rear view and the view from above of the rear portion of a ski binding according to figure 21;
- figure 22A is the front view of the rear portion of a ski binding according to figure 21, in which the ski boot has been omitted;
- figure 24 is a larger-scale view of detail K9 of figure 21;
- figure 25 is a longitudinal section view of a rear portion of the ski mountaineering binding and of the rear portion of a ski boot of figure 21, in a ski descent configuration;
- figures 26, 27 are respectively the rear view and the view from above of the rear portion of a ski binding according to figure 25;
- figure 26A is the front view of the rear portion of a ski binding according to figure 25, in which the ski boot has been omitted;
- figure 28 is a larger-scale view of detail K10 of figure 25;
- figure 29 is a longitudinal section view of a rear portion of the ski mountaineering binding and of the rear portion of a ski boot of figure 21, in an uphill walking configuration;
- figures 30, 31 are respectively the rear view and the view from above of the rear portion of a ski binding according to figure 29;
- figure 30A is the front view of the rear portion of a ski binding according to figure 29, in which the ski boot has been omitted;
- figure 32 is a larger-scale view of detail K11 of figure 29;
- figure 33 is a view from above of the rear portion of the ski mountaineering binding, object of the present invention and according to a fourth embodiment, in a configuration ready to receive the ski boot;
- figure 34 is a view according to section plane XXXIV-XXXIV of figure 33;
- figure 35 is a larger-scale view of detail K12 of figure 34;

- figure 36 is a view according to section plane XXXVI-XXXVI of figure 33;
- figure 37 is a view from above of the rear portion of the ski mountaineering binding of figure 33 and of a rear portion of a ski boot, in a ski descent configuration;
- figure 38 is a view according to section XXXVIII-XXXVIII of figure 37;
- figure 39 is a larger-scale view of detail K13 of figure 38;
- figure 40 is a view according to section plane XL-XL of figure 37;
- figure 41 is a view from above of the rear portion of the ski mountaineering binding of figure 33, in an uphill walking configuration;
- figure 42 is a view according to section XLII-XLII of figure 41;
- figure 43 is a larger-scale view of detail K14 of figure 42;
- figure 44 is a larger-scale view of a detail of section XLIV-XLIV of figure 41.

[0015] With reference to the appended tables of drawings, reference numeral (1) denotes in its entirety a rear portion of the ski mountaineering binding according to the present invention, comprising a heel-piece (2), a brake (3) for a ski, a blocking lever (7) and connecting means (4). The heel-piece (2) comprises: a base (5) for being fixed to a ski (10); a turret (6) which is constrained to the base (5) and which rises from the base (5). The brake (3) is fixable to the ski (10) and comprises: a first braking portion (11) which is movable to assume a first braking position (21), so that when the brake (3) is fixed to the ski (10) the first braking portion (11) is lowered to drag on the layer of snow covering the terrain and thus brake the ski (10), and a first non-active position (31), so that when the brake (3) is fixed to the ski (10) the first braking portion (11) is raised; first elastic means (41) acting on the first braking portion (11), in order to exert a force tending to bring the first braking portion (11) into the first braking position (21). The blocking lever (7) is rotatably borne by the turret (6) so as to assume an operating position (OP) and a non-operating position (NOP). The connecting means (4) connect the blocking lever (7) to the brake (3) and are configured in such a way that: when the blocking lever (7) is in the operating position (OP) the connecting means (4) are under tension so that the first braking portion (11) is stably maintained in the first non-active position (31); and when the blocking lever (7) is in the non-operating position (NOP) the connecting means (4) are slackened so that the first braking portion (11) can reach, or remain, in the first braking position (21).

[0016] The connecting means (4) preferably directly connect the blocking lever (7) to the brake (3).

[0017] The blocking lever (7) is preferably identified in a heel raiser (7) for walking uphill, which is arranged in such a way that when the blocking lever (7) is in the operating position (OP) it can restingly receive the heel (8) of a ski boot (9).

[0018] When the blocking lever (7) is in the non-operating position (NOP), it preferably does not interfere with the heel (8) of the ski boot (9) (figures 1, 5, for example).

[0019] The turret (6) can rotate with respect to the base (5), can translate with respect to the base (5) or can roto-translate with respect to the base (5). In a case in which the turret (6) rotates with respect to the base (5), it is preferable for it to rotate with respect to a first hinge axis (which, looking at for example figure 1, is vertical) which is substantially perpendicular to ski (10) when the heel-piece (2) is fixed to the ski (10).

[0020] The turret (6) preferably rises from the base (5) according to an axis of extension (which, looking at for example figure 1, is vertical) which is perpendicular to the ski (10) when the heel-piece (2) is fixed to the ski (10).

[0021] The heel-piece (2) can comprise a plurality of heel-pieces (7, 70) (see for example figures 13-16, where two heel-pieces are provided). In this case, the blocking lever (7) is identified as a heel raiser (7), in order to move by a portion uphill, the heel raiser (7) which is connected to the connecting means (4) will in each case be in the operating position (OP) (for example figures 13, 16), even if the heel raiser (7) effectively in use is another.

[0022] The brake (3) is preferably borne by the heel-piece (2) (as in the drawings). It is possible, however (solution not illustrated) for the brake to be detached from the heel-piece and fixed directly to the ski.

[0023] The first elastic means (41) can comprise a torque spring (figure 6A for example shows two torque springs).

[0024] The term "slackened", referring to the connecting means, is taken to mean a lower tension.

[0025] In the first non-active position (31) the first braking portion (11) is preferably raised above the rest surface (13) of the ski (10) (for example figure 6A), so as not to interfere with the layer of snow (not illustrated) covering the terrain.

[0026] In the second non-active position (32) the second braking portion (12) is preferably raised above the rest surface (13) of the ski (10), so as not to interfere with the layer of snow covering the terrain (for example figure 6A).

[0027] The heel-piece (2) can comprise two hooking pins (14) for hooking the ski boot (9) at the rear part (16) thereof.

[0028] The heel-piece (2) can comprise a first endrun stop which abuts the blocking lever (7) when the blocking lever (7) is in the operating position (OP). The first endrun

stop can be defined by the hooking pins (14) of the heel-piece (2) (for example figure 10B).

[0029] The heel-piece (2) can comprise a second endrun stop which abuts the blocking lever (7) when the blocking lever (7) reaches the non-operating position (NOP). The second endrun stop can be defined by the conformation of the turret (6) (for example figures 1, 4).

[0030] The connecting means (4) preferably comprise a first wire (51) which connects the blocking lever (7) to the brake (3).

[0031] The first wire (51) is preferably flexible so as to adhere to the surfaces against which it rests (for example figure 24).

[0032] The first wire (51) can have a circular, square or rectangular section.

[0033] The first wire (51) can be a cable, a cord or a rope.

[0034] The first wire (51) can be made of steel braid, made of braided kevlar, or made of composite fibre such as polyethylene with high molecular weight (ultra high molecular weight polyethylene, UHMWPE), such as dyneema®.

[0035] The rear portion of a ski mountaineering binding (1) preferably comprises second elastic means (42) which are interposed between the blocking lever (7) and the turret (6), and which are dimensioned to exert a force which: is lower than the force necessary in order to bring the blocking lever (7) towards the operating position (OP) when the first braking portion (11) is in the first braking position (21); is sufficient to bring the blocking lever (7) towards the operating position (OP)) when the first braking portion (11)) is in the first non-active position (31).

[0036] The second elastic means (42) can comprise a torque spring (for example figure 6B).

[0037] The brake (3) preferably comprises an activating lever (15) which is connected to the first braking portion (11) and which is arranged so as to be pressed by the heel (8) of the ski boot (9) when the brake (3) and the heel-piece (2) are fixed to the ski (10) and when the blocking lever (7) is in the non-operating position (NOP), so as to maintain the first braking portion (11) in the first non-active position (31) (for example, compare figures 1-4 and 5-8 to one another).

[0038] The brake (3) can comprise a second braking portion (12) which is movable to assume a second braking position (22) (for example figures 1-4, 4A), so that when the brake (3) is fixed to the ski (10) the second braking portion (12) is lowered to drag on the layer of snow covering the terrain and thus brake the ski (10), and a second non-active position (32) (for example figures 5-16), so that when the brake (3) is fixed to the ski (10) the second braking portion (12) is raised; the first elastic means (41) can also act on the second braking portion (12) (for example figure 6A), so as to exert a force tending to bring the second braking portion (12) into the second braking position (22); the activating lever (15) can also be connected to the second braking portion (12) so that when pressed by the heel (8) of the ski boot (9) the first braking portion (11) is maintained in the first non-active position (31) and the second braking portion (12) is maintained in the second non-active position (32).

[0039] When the second braking portion (12) is also included, the second elastic means (42) can be dimensioned to exert a force which: is lower than the force necessary in order to bring the blocking lever (7) towards the operating position (OP) when the first braking portion (11) is in the first braking position (21) and the second braking portion (12) is in the second braking position (22) (for example figures 1-4); is sufficient to bring the blocking lever (7) towards the operating position (OP) (for example figures 5-8) when the first braking portion (11) is in the first non-active position (31) and the second braking portion (12) is in the second non-active position (32).

[0040] The brake (3) is preferably configured to that when it is fixed to the ski (10) the first braking portion (11) and the second braking portion (12) are arranged on opposite sides of the same ski (10) (figures 2, 3, for example).

[0041] The first braking portion (11) and the second braking portion (12), when present, can be wire-shaped. Further, the relative section can be circular.

[0042] The blocking lever (7) is preferably rotatably coupled to the turret (6) by a second hinge axis (A).

[0043] There follows a general description of a first embodiment, with reference to figures 1-16.

[0044] The first wire (51) is coupled to the first braking portion (11) at a relative first end thereof and is coupled to the blocking lever (7) at a relative second end.

[0045] During use the brake (3) and the heel-piece (2) are preferably arranged in such a way that when the blocking lever (7) is in the operating position (OP) the first elastic means (41), through the first braking portion (11) and the first wire (51), generate a torque on the blocking lever (7) which tends to maintain the blocking lever (7) stably in the operating position (OP).

[0046] The connecting means (4) can also comprise a second wire (52), which at a relative first end is coupled to the second braking portion (12) and which at a relative second end is coupled to the blocking lever (7).

[0047] In particular, the first wire (51), can be fixed or anchored (through the hole or hook) to the first braking portion (11) and/or to the blocking lever (7). For example, both the first braking portion (11) and the blocking lever (7) can be provided with an anchoring hole (170) (figures 1, 4A), while the first wire (51) can be provided, at the ends thereof, with broadenings (17) having a greater diameter than the anchoring hole (170): therefore, once the first wire (51) is threaded through the anchoring holes (170) it remains anchored to both the first braking portion (11) and the blocking lever (7). Likewise, the second wire (12) can be fixed or anchored to the second braking portion (12) and/or to the blocking lever (7). For example, both the second braking portion (12) and the blocking lever (7) can be provided with an anchoring hole (170), while the second wire (12) can be provided, at the ends thereof, with broadenings (17) having a greater diameter

than the anchoring hole (170): therefore, once the second wire (12) is threaded through the anchoring holes (170) it remains anchored to both the second braking portion (12) and the blocking lever (7).

[0048] The second wire (52) can be identical, by shape and/or dimensions, to the first wire (51).

[0049] During use the brake (3) and the heel-piece (2) are preferably arranged in such a way that when the blocking lever (7) is in the operating position (OP) the first elastic means (41), both through the first braking portion (11) and the first wire (51) and through the second braking portion (12) and the second wire (52), generate a torque on the blocking lever (7) which tends to maintain the blocking lever (7) stably in the operating position (OP).

[0050] Further, during use the brake (3) and the heel-piece (2) are arranged in such a way that when the blocking lever (7) is in the operating position (OP) (figures 9-12 or figures 13-16), then: the second hinge axis (A) is interposed, according to a lateral view (figure 9) of the rear portion of a ski mountaineering binding (1), on one side, between the first end of the first wire (51) and the first end of the second wire (52), and, on the other side, between the second end of the first wire (51) and the second end of the second wire (52); and at least one from between the first wire (51) and the second wire (52) is maintained below the second hinge axis (A).

[0051] Both the first wire (51) and the second wire (52) are preferably maintained below the second hinge axis (A) when the blocking lever (7) is in the operating position (OP).

[0052] The above-considered lateral view can also be in section. The relative position of the second hinge axis (A) with respect to the first end of the first wire (51) and with respect to the second end of the second wire (52) can be observed also by detecting the position of the second hinge axis (A) and of the first end of the first wire (51) and of the second end of the second wire (52) along an axis parallel to the axis of the ski (10), i.e. by detecting the positions thereof along a Cartesian axis parallel to the axis of the ski (10).

[0053] The heel-piece (2) is preferably provided with a first guide hole (61) which is a through-hole and which is positioned so as to guide the first wire (51); the first wire (51) passes through the first guide hole (61).

[0054] The heel-piece (2) is preferably also provided with a second guide hole (62) which is a through-hole and which is positioned so as to guide the second wire (52); the second wire (52) passes through the second guide hole (62).

[0055] This reduces the possible outwards deviating of the first wire (51) and the second wire (52) during use.

[0056] Further, by correctly choosing the length of the first wire (51) and the second wire (52), it is possible to make sure that when the blocking lever (7) is in the operating position (OP), the consequent tensioning of the first wire (51) and the second wire (52) tends to displace in an inwards direction (and thus towards the axis of the ski (10)) respectively the first braking portion (11) and the second braking portion (12) which is located in the first non-active position (31) and in the second non-active position (32) (compare figure 11 and figure 3).

[0057] When the blocking lever (7) is in the operating position (OP), both the first wire (51) and the second wire (52) can assume the shape of a polygonal line.

[0058] Both the first guide hole (61) and the second guide hole (62) are preferably arranged in a more internal position with respect to the first braking portion (11) and to the second braking portion (12), respectively.

[0059] Both the first guide hole (61) and the second guide hole (62) are preferably retracted with respect to the second hinge axis (A) of the blocking lever (7) (fig. 1). Still more preferably, both the first guide hole (61) and the second guide hole (62) are arranged at the rear part of the heel-piece (2) (fig.1).

[0060] Owing to the action of the second elastic means (42), the first wire (51) and the second wire (52) are maintained tensed, see figure 5. According to figure 5, the blocking lever (7) rests on the rear part (16) of the ski boot (9), after the ski boot (9) (figures 1-4) has hooked to the hooking pins (14) of the heel-piece (2); the second elastic means (42) can be dimensioned so that the blocking lever (7) does not reach to rest on the rear part (16) of the ski boot (9).

[0061] The blocking lever (7) is identified in a heel raiser, see figures 1-16.

[0062] There follows a description of the functioning of the rear portion of a ski mountaineering binding (1), according to figures 1-12.

[0063] Figures 1-4 show the rear portion of the ski mountaineering binding (1) in the configuration ready to receive the ski boot (9): the first braking portion (11) is in the first braking position (21), the second braking portion (12) is in the second braking position (22), and the blocking lever (7) is in the non-operating position (NOP). As can be seen in figures 1-3, the first wire (51) and the second wire (52) are tensed, so that they assume a controlled and predictable position. The force exerted by the second elastic means (42) is not sufficient to bring the blocking lever (7) into the operating position (OP) and in fact the first braking portion (11) and the second braking portion (12) remain stably respectively in the first braking position (21) and in the second braking position (22). The blocking lever (7) is orientated towards the tail of the ski (10), assuming a non-operating position (NOP) which can be defined as the "first non-operating position (NOP)" which does not interfere with the heel (8) of the ski boot (9).

[0064] Once the ski boot (9) has hooked to the hooking pins (14) of the heel-piece (2) and the relative heel (8) presses on the activating lever (15), figures 5-8, the first braking portion (11) and the second braking portion (12) move respectively into the first non-active position (31) and into the second non-active position (32). The force exerted by the second elastic means (42) is sufficient to bring the blocking lever (7) towards the operating position

(OP); in reality, the blocking lever (7) cannot in this case reach the operating position (OP) due to the presence of the ski boot (9), against which it rests. This position can be defined as the "second non-operating position" (NOP) of the blocking lever (7) which does not interfere with the heel (8) of the ski boot (9) (in fact, as already specified, the blocking lever (7) rests only on the rear part (16) of the ski boot (9)). As can be seen in figures 5-7, in this case too the first wire (51) and the second wire (52) are tensed, so that they assume a controlled and predictable position. The rear portion of a ski mountaineering binding (1) is therefore located in a ski descent configuration, as the skier can now ski downhill.

[0065] In order to walk uphill, figures 9-12, the ski boot (9) unhooks from the heel-piece (2) in order to newly return to the configuration ready for receiving the ski boot (9). Thereafter, the blocking lever (7) is brought into the operating position (OP), so that the first braking portion (11) and the second braking portion (12) respectively move into the first non-active position (31) and into the second non-active position (32), where they stably remain. The rear portion of a ski mountaineering binding (1) is therefore positioned in an uphill walking configuration, as the skier can now walk ("touring") uphill by resting the heel (8) of the ski boot (9) on the blocking lever (7). As can be seen in figures 9-12, in this case too the first wire (51) and the second wire (52) are tensed, so that they assume a controlled and predictable position.

[0066] Figures 13-16 are like figures 9-12, with the sole difference that a further heel raiser (70) is used. So that the rear portion of a ski mountaineering binding (1) remains stably in the uphill walking configuration, it is necessary for the blocking lever (7), which in the figures is identified in a heel raiser, is also brought into the operating position (OP), even when it is the further blocking lever (70) which functions as a rest for the heel (8) of the ski boot (9), as can be seen for example in figure 13.

[0067] There follows a general description of a second embodiment, which is similar to the first embodiment: for this reason in the following there will be only a description of the differences, to avoid repeating the common characteristics (for example: activating lever (15), second elastic means (42)). For this reason, figures 17-20 are alike to figures 1-4 and only the former are appended, relative to the case in which the rear portion of the ski mountaineering binding (1) is in the configuration ready to receive the ski boot (9).

[0068] At a first end thereof, the first wire (51) is coupled to the first braking portion (11), and at a relative second end is coupled to the second braking portion (12); the blocking lever (7) is coupled to the first wire (51) at a relative portion of wire (18), figure 20A.

[0069] In particular, the first wire (51), can be fixed or anchored (through the hole or hook) to the first braking portion (11), to the second braking portion (12) and to the blocking lever (7). For example, the first braking portion (11) (figure 17), the second braking portion (12) (figure 19) and the blocking lever (7) (figure 20A) can be provided with at least an anchoring hole (170), while the first wire (51) can be provided, at the ends thereof, with broadenings (17) having a greater diameter than the anchoring hole (170): therefore, once the first wire (51) is threaded through the anchoring holes (170) of the first braking portion (11), of the second braking portion (12) and of the blocking lever (in the illustrated case the blocking lever comprises two anchoring holes, see figure 20A) it remains anchored to the first braking portion (11) to the second braking portion (12), and to the blocking lever (7) by means of the portion of wire (18).

[0070] Therefore, the first wire (51) can slide along the anchoring holes (170) included in the blocking lever (7). This is particularly advantageous during the automatic unhooking of the heel-piece (2) from the ski boot (9) during a descent (for example following a fall or an impact with an obstacle), due to the fact that the rotation of the heel-piece (2) with respect to the first hinge axis thereof enables the first wire (51) to slide, preventing undesired tensioning of the first wire (51), which might cause the first braking portion (11) or the second braking portion (12) to assume an unexpected and unpredictable position during the braking action.

[0071] During use the brake (3) and the heel-piece (2) are preferably arranged in such a way that when the blocking lever (7) is in the operating position (OP) the first elastic means (41), both through the first braking portion (11) and the first wire (51) and through the second braking portion (12) and the first wire (51), generate a torque on the blocking lever (7) which tends to maintain the blocking lever (7) stably in the operating position (OP).

[0072] During use the brake (3) and the heel-piece (2) are arranged in such a way that when the blocking lever (7) is in the operating position (OP): the second hinge axis (A) is interposed, according to a lateral view, on one side, between the first end of the first wire (51) and the second end of the first wire (51), and, on the other side, between the portion of wire (18) of the first wire (51) which slides through the anchoring holes (170); and the first wire (51) is maintained below the second hinge axis (A).

[0073] The heel-piece (2) is preferably provided with a first guide hole (61), which is a through-hole and which is positioned so as to guide the first wire (51) between the first end of the first wire (51) and the blocking lever (7), and with a second guide hole (62), which is a through-hole and which is positioned so as to guide the first wire (51) between the second end of the first wire (51) and the blocking lever (7); the first wire (51) passes both through the first guide hole (61) and through the second guide hole (62).

[0074] The description of the functioning of the rear portion of a ski mountaineering binding (1) according to this second embodiment is alike to the above with reference to the first embodiment, to which reference is made.

[0075] There follows a general description of a third embodiment, with reference to figures 21-32.

[0076] The first wire (51) connects the blocking lever

(7) to the activating lever (15).

[0077] During use the brake (3) and the heel-piece (2) are preferably arranged in such a way that when the blocking lever (7) is in the operating position (OP) the first elastic means (41), through the activating lever (15) and the first wire (51), generate a torque on the blocking lever (7) which tends to maintain the blocking lever (7) stably in the operating position (OP).

[0078] As already specified, the presence of the second elastic means (42) is preferable though not necessary.

[0079] The turret (6) is preferably provided with an internal guide channel (101) for receiving the first wire (51) and for enabling the first wire (51) to slide. In this way the first wire (51) assumes predetermined and predictable positions.

[0080] In the illustrated example the internal guide channel (101) is formed by several parts, see for example figure 24.

[0081] At a first end (102) thereof the internal guide channel (101) preferably opens at the top part (103) of the turret (6) and at a second end (104) thereof opens on a front side (105) of the turret (6), which is facing towards the front part of the ski (10) when the base (5) of the heel-piece (2) is fixed to the ski (10).

[0082] The coupling of the first wire (51) to the blocking lever (7) and to the activating lever (15) and the shape and position of the internal guide channel (101) are preferably such that during use the first wire (51) is substantially maintained on a first plane which is perpendicular to the ski (10) when the base (5) of the heel-piece (2) is fixed to the ski (10). Further, the blocking lever (7) is rotatable with respect to the second hinge axis (A) which is perpendicular to the first plane; the activating lever (15) is rotatable with respect to a hinge axis which is perpendicular to the first plane. Thus force components which are transversal to the first plane are lacking: this is advantageous as there is less friction and it is thus possible to have a smaller sizing of the first elastic means and the second elastic means (when present); the force that the user needs to exert to rotate the blocking lever (7) is also lower. Thus, the rear portion of the ski mountaineering binding (1) can weigh less and be more reliable.

[0083] The first wire (51) can be provided, at the ends thereof, with broadenings (17).

[0084] The activating lever (15) can comprise a plate (150) which will be pressed by the heel (8) of the ski boot (9). The plate (150) can be provided with a first threaded hole (151) for receiving a first screw (152) and a seat (153) for restingly receiving a broadening (17) of the first end of the first wire (51) (for example figure 24). The plate (150) can be conformed in such a way that, once the broadening (17) of the first end of the first wire (51) is inserted in the seat (153), the screwing-in of the first screw (152) into the threaded hole (151) determines the fixing of the first end of the first wire (51) to the plate (150).

[0085] Likewise, the blocking lever (7) can be provided with a second threaded hole (154) which is positioned so that the screwing-in or unscrewing of a second screw (155) into the second threaded hole (154) can determine the fixing or releasing of the second end of the first wire (51) with respect to the blocking lever (7).

[0086] There follows a description of the functioning of the rear portion of a ski mountaineering binding (1), according to figures 21-32.

[0087] Figures 21-24 show the rear portion of the ski mountaineering binding (1) in the configuration ready to receive the ski boot (9): the first braking portion (11) is in the first braking position (21), the second braking portion (12) is in the second braking position (22), and the blocking lever (7) is in the non-operating position (NOP). The force exerted by the second elastic means (not visible in the figures) is not sufficient to bring the blocking lever (7) is in the operating position (OP) and in fact the first braking portion (11) and the second braking portion (12) remain stably in the above-mentioned first braking position (21) and second braking position (22), respectively. The blocking lever (7) is orientated towards the tail of the ski (10), assuming, as mentioned, a non-operating position (NOP) which can be defined as the "first non-operating position" (NOP) which does not interfere with the heel (8) of the ski boot (9).

[0088] Once the ski boot (9) has hooked to the hooking pins (14) of the heel-piece (2) and the relative heel (8) presses on the plate (150) of the activating lever (15), figures 25-28, the first braking portion (11) and the second braking portion (12) move respectively into the first non-active position (31) and into the second non-active position (32). The force exerted by the second elastic means is sufficient to bring the blocking lever (7) towards the operating position (OP); in reality, the blocking lever (7) does not in this case reach the operating position (OP). This position can be defined as the "second non-operating position" (NOP) of the blocking lever (7) which does not interfere with the heel (8) of the ski boot (9). The rear portion of a ski mountaineering binding (1) is therefore positioned in a ski descent configuration, because the skier can now ski downhill.

[0089] In order to walk uphill, figures 29-32, the ski boot (9) unhooks from the heel-piece (2) in order to newly return to the configuration ready for receiving the ski boot (9). Thereafter, the blocking lever (7) is brought into the operating position (OP), so that the first braking portion (11) and the second braking portion (12) are brought respectively into the first non-active position (31) and into the second non-active position (32), where they stably remain. The rear portion of a ski mountaineering binding (1) is therefore positioned in an uphill walking configuration, as the skier can now walk ("touring") uphill by resting the heel (8) of the ski boot (9) on the blocking lever (7).

[0090] Figures 33-44 show a fourth embodiment which differs from the third embodiment only because of the second elastic means (42). In this case, the second elastic means (42) comprise two flanked compression springs, see figures 37, 41.

[0091] It is understood that the above has been de-

scribed 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 rear portion of a ski mountaineering binding (1), comprising:

a heel-piece (2) in turn comprising: a base (5) in order to be fixed to a ski (10); and a turret (6) which is constrained to the base (5) and which rises from the base (5);
a brake (3) for a ski which is fixable to the ski (10) and which comprises: a first braking portion (11) which is movable to assume a first braking position (21), so that when the brake (3) is fixed to the ski (10) the first braking portion (11) is lowered to drag on the layer of snow covering the terrain and thus brake the ski (10), and a first non-active position (31), so that when the brake (3) is fixed to the ski (10) the first braking portion (11) is raised; first elastic means (41) acting on the first braking portion (11), in order to exert a force tending to bring the first braking portion (11) into the first braking position (21);

characterised in that:

it comprises a blocking lever (7) which is rotatably borne by the turret (6) so as to assume an operating position (OP) and a non-operating position (NOP);
it comprises connecting means (4) which connect the blocking lever (7) to the brake (3) and which are configured in such a way that: when the blocking lever (7) is in the operating position (OP) the connecting means (4) are under tension so that the first braking portion (11) is stably maintained in the first non-active position (31); and when the blocking lever (7) is in the non-operating position (NOP) the connecting means (4) are slackened so that the first braking portion (11) can reach, or remain, in the first braking position (21).

2. The rear portion of a ski mountaineering binding (1) according to the preceding claim, wherein the connecting means (4) comprise a first wire (51) which connects the blocking lever (7) to the brake (3).

3. The rear portion of a ski mountaineering binding (1) of claim 2, wherein: the brake (3) comprises an activating lever (15) which is connected to the first braking portion (11) and which is arranged so as to be pressed by the heel (8) of the ski boot (9) when the brake (3) and the heel-piece (2) are fixed to the ski (10) and when the blocking lever (7) is in the non-operating position (NOP), so as to maintain the first braking portion (11) in the first non-active position (31); and the first wire (51) connects the blocking lever (7) to the activating lever (15).

4. The rear portion of a ski mountaineering binding (1) of any one of the preceding claims, wherein the turret (6) is provided with an internal guide channel (101) for receiving the first wire (51) and for enabling the first wire (51) to slide.

5. The rear portion of a ski mountaineering binding (1) of any one of the preceding claims, wherein at a first end (102) thereof the internal guide channel (101) opens at the top part (103) of the turret (6) and at a second end (104) thereof opens on a front side (105) of the turret (6), which is facing towards the front part of the ski (10) when the base (5) of the heel-piece (2) is fixed to the ski (10).

6. The rear portion of a ski mountaineering binding (1) of any one of the preceding claims, wherein: the coupling of the first wire (51) to the blocking lever (7) and to the activating lever (15) and the shape and position of the internal guide channel (101) are such that during use the first wire (51) is substantially maintained on a first plane which is perpendicular to the ski (10) when the base (5) of the heel-piece (2) is fixed to the ski (10); the blocking lever (7) is rotatable with respect to an hinge axis (A) which is perpendicular to the first plane; the activating lever (15) is rotatable with respect to a hinge axis which is perpendicular to the first plane.

7. The rear portion of a ski mountaineering binding (1) of any one of claims from 3 to 6, wherein during use the brake (3) and the heel-piece (2) are arranged in such a way that when the blocking lever (7) is in the operating position (OP) the first elastic means (41), through the activating lever (15) and the first wire (51), generate a torque on the blocking lever (7) which tends to maintain the blocking lever (7) stably in the operating position (OP).

8. The rear portion of a ski mountaineering binding (1) of claim 2, wherein the first wire (51) is coupled to the first braking portion (11) at a relative first end thereof and is coupled to the blocking lever (7).

9. The rear portion of a ski mountaineering binding (1) of any one of the preceding claims, wherein the blocking lever (7) is identified in a heel raiser (7) for walking uphill, which is arranged in such a way that when the blocking lever (7) is in the operating position (OP) it can restingly receive the heel of a ski boot.

10. The rear portion of a ski mountaineering binding (1) of any one of the preceding claims, comprising second elastic means (42) which are interposed between the blocking lever (7) and the turret (6), and which are dimensioned to exert a force which: is lower than the force necessary in order to bring the blocking lever (7) towards the operating position (OP) when the first braking portion (11) is in the first braking position (21); is sufficient to bring the blocking lever (7) towards the operating position (OP) when the first braking portion (11) is in the first non-active position (31).

11. The rear portion of a ski mountaineering binding (1) of any one of the preceding claims, wherein: the brake (3) comprises a second braking portion (12) which is movable to assume a second braking position (22), so that when the brake (3) is fixed to the ski (10) the second braking portion (12) is lowered to drag on the layer of snow covering the terrain and thus brake the ski (10), and a second non-active position (32), so that when the brake (3) is fixed to the ski (10) the second braking portion (12) is raised; the first elastic means (41) also act on the second braking portion (12), so as to exert a force tending to bring the second braking portion (12) into the second braking position (22); the activating lever (15) is also connected to the second braking portion (12) so that when pressed by the heel (8) of the ski boot (9) the first braking portion (11) is maintained in the first non-active position (31) and the second braking portion (12) is maintained in the second non-active position (32).

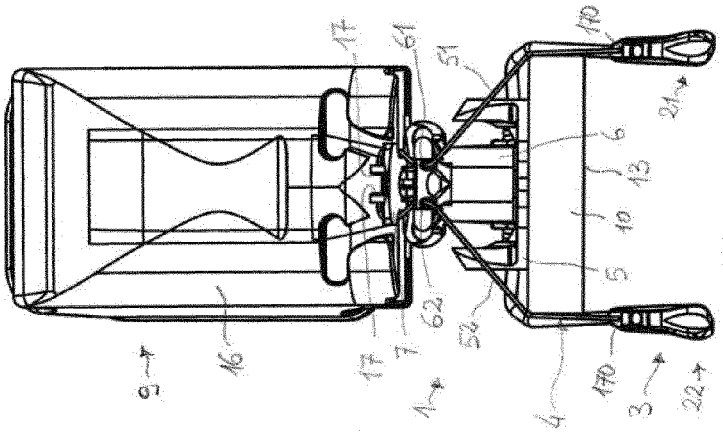

FIG 2

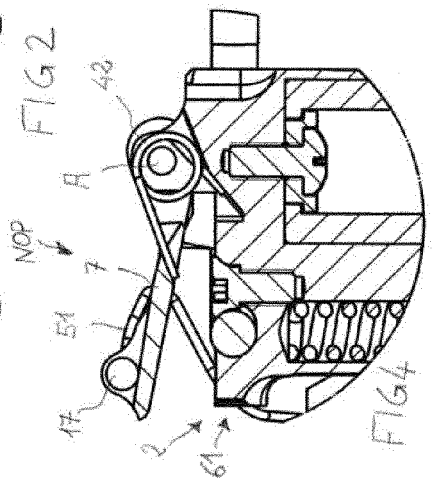

FIG4

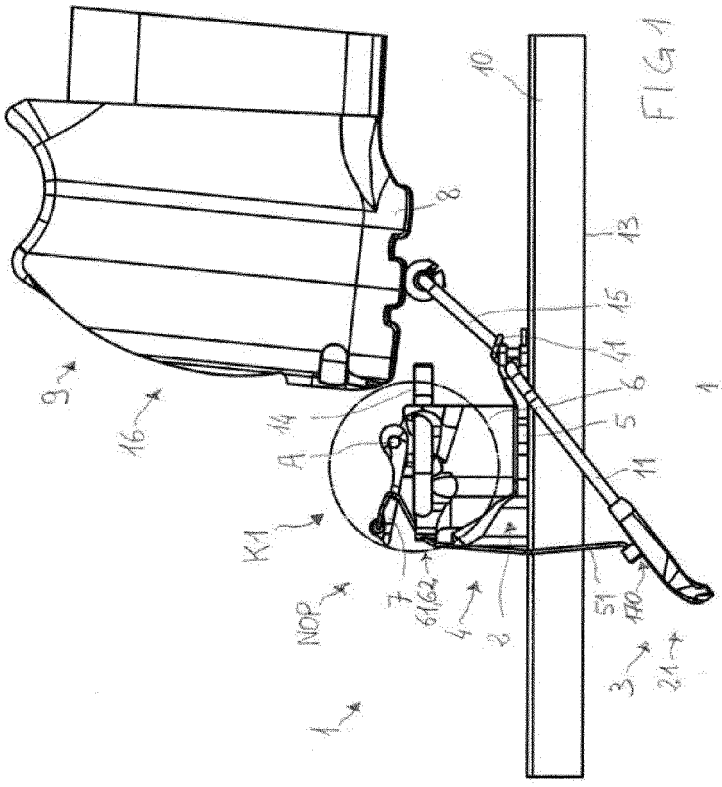

FIG 1

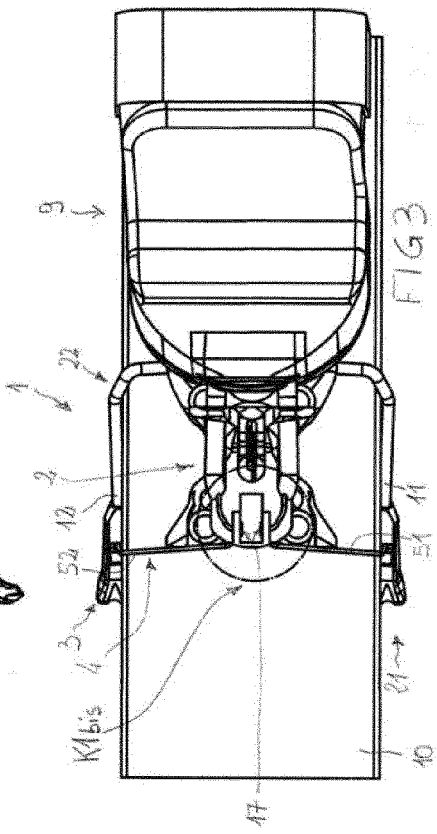

FIG 3

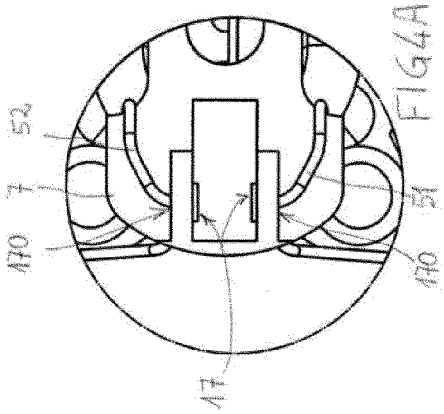

FIG4A

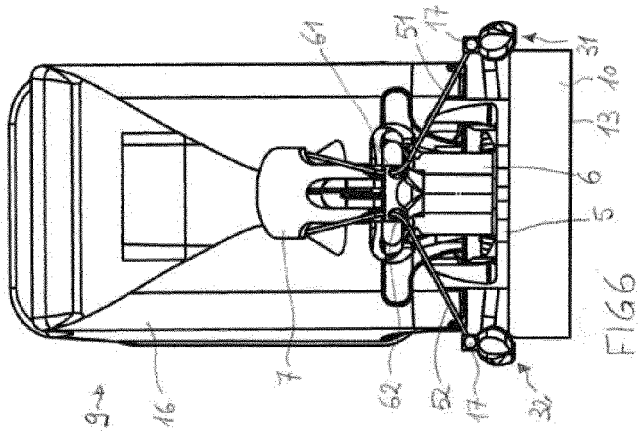

FIG6

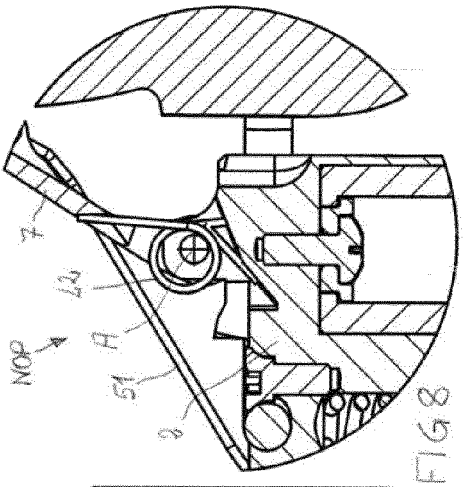

FIG8

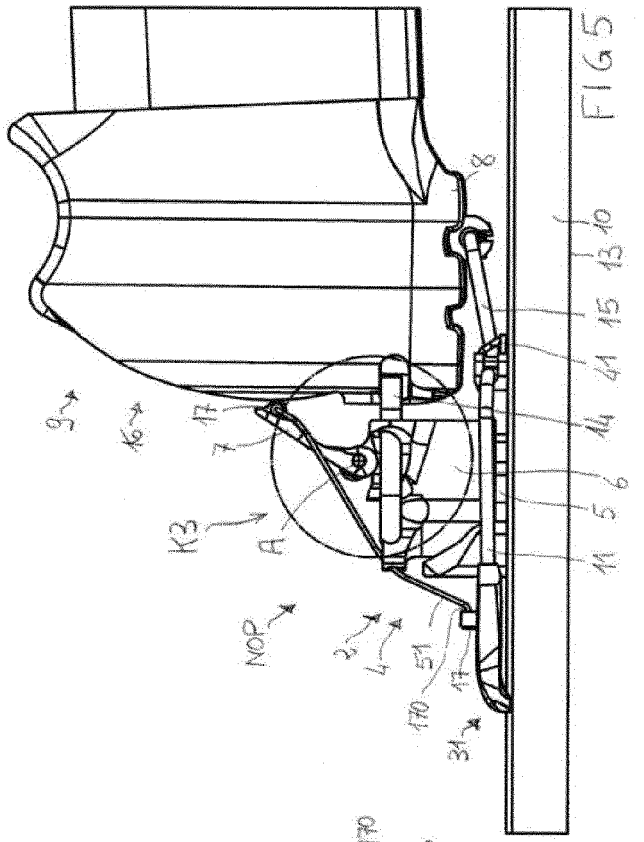

FIG5

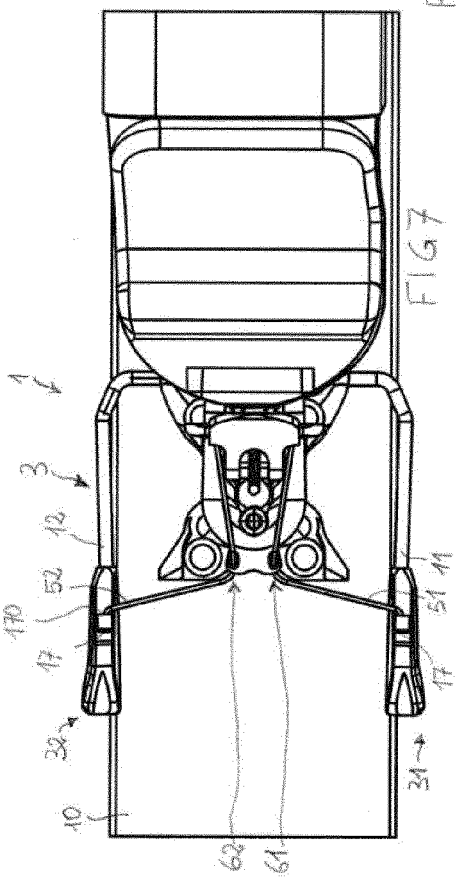

FIG7

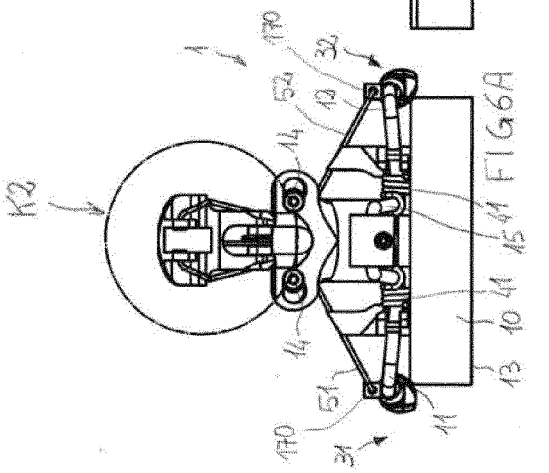

FIG6A

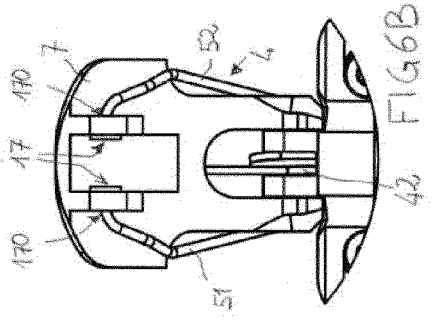

FIG6B

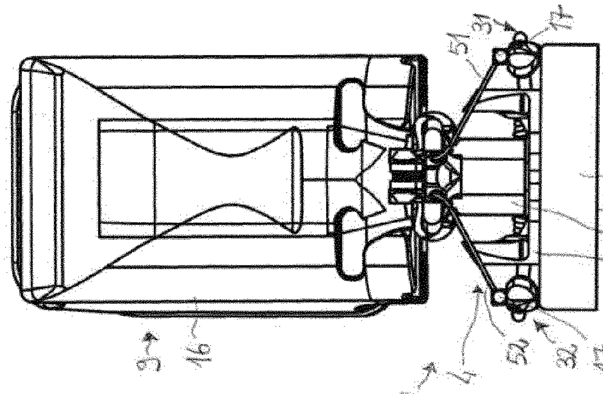

FIG 10

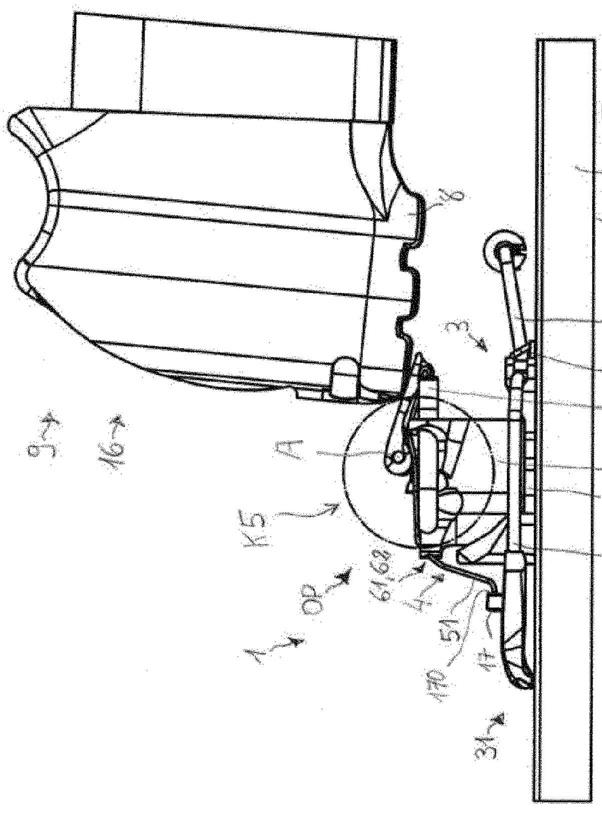

FIG 9

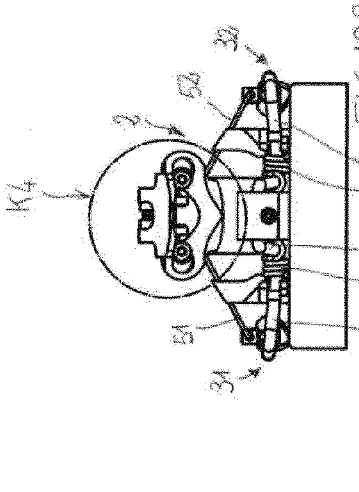

FIG 10A

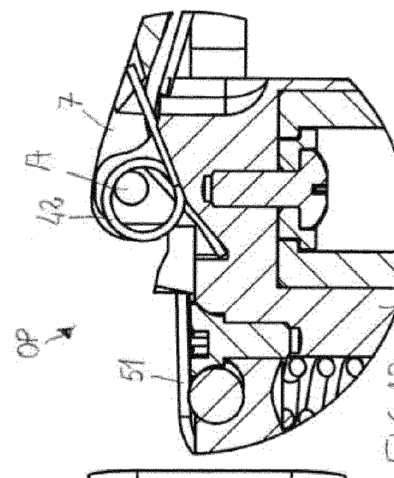

FIG 12

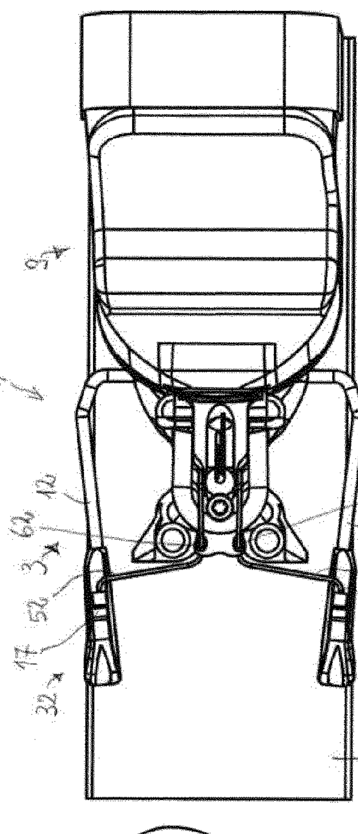

FIG 11

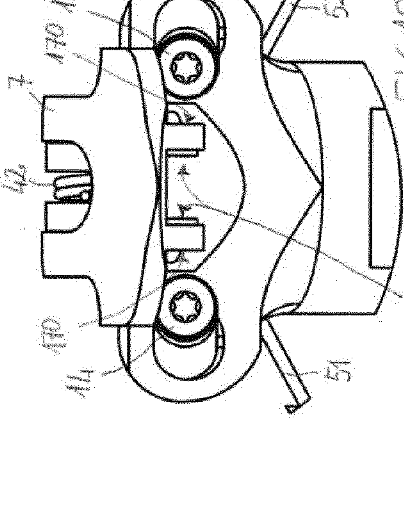

FIG 10B

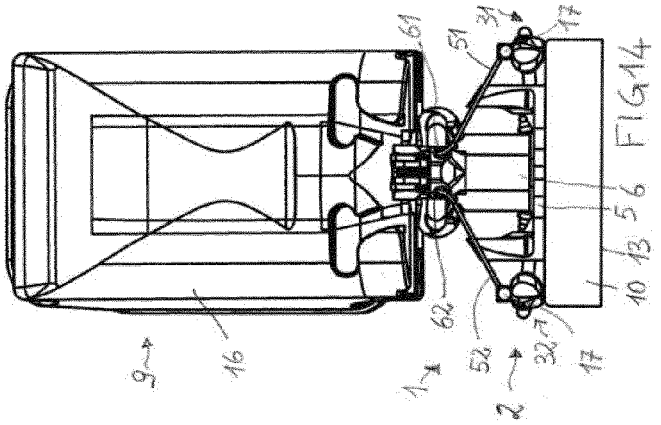

FIG14

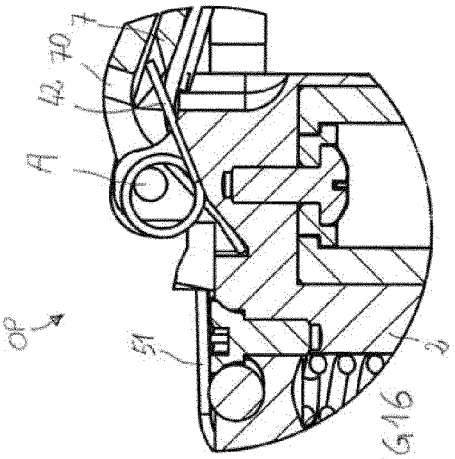

FIG16

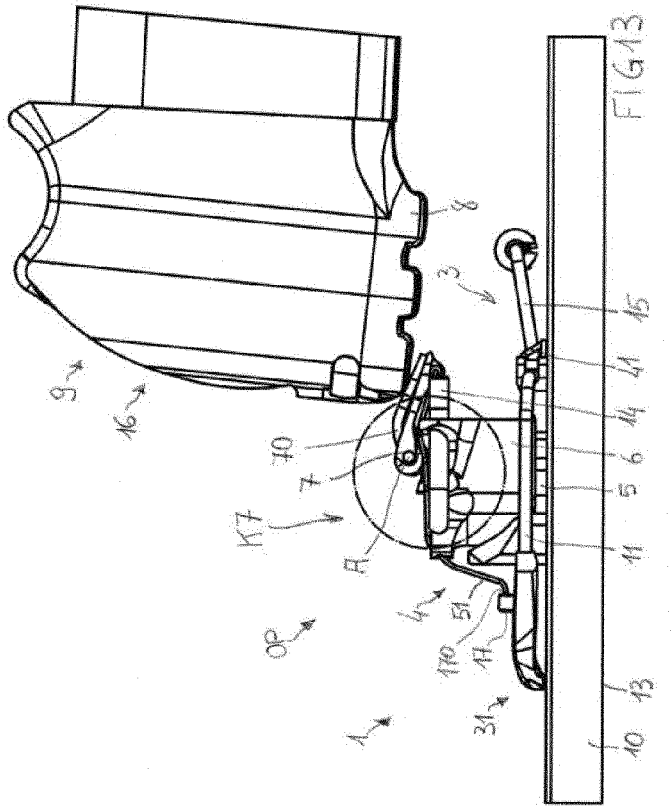

FIG13

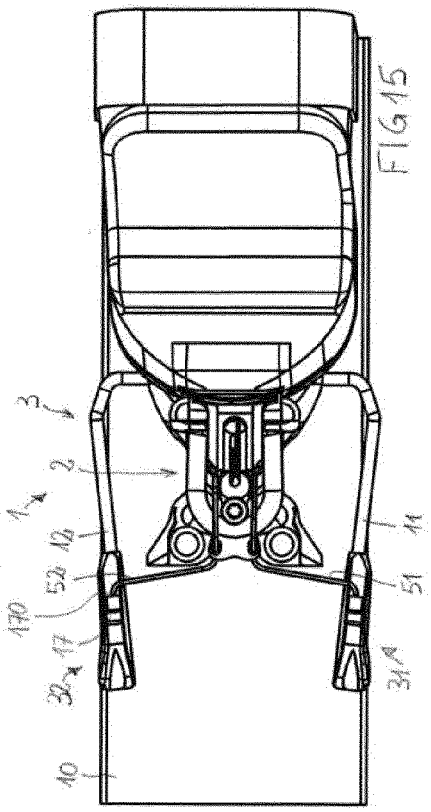

FIG15

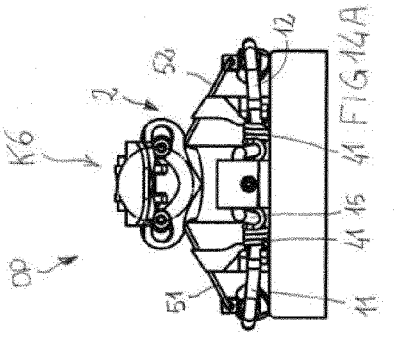

FIG14A

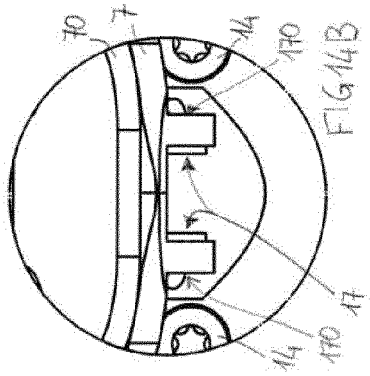

FIG14B

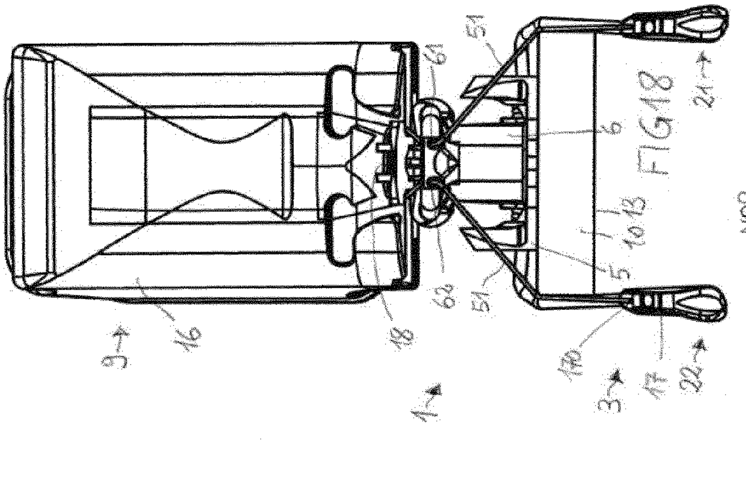

FIG18

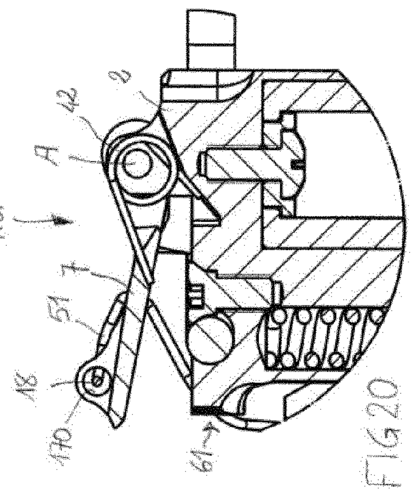

FIG20

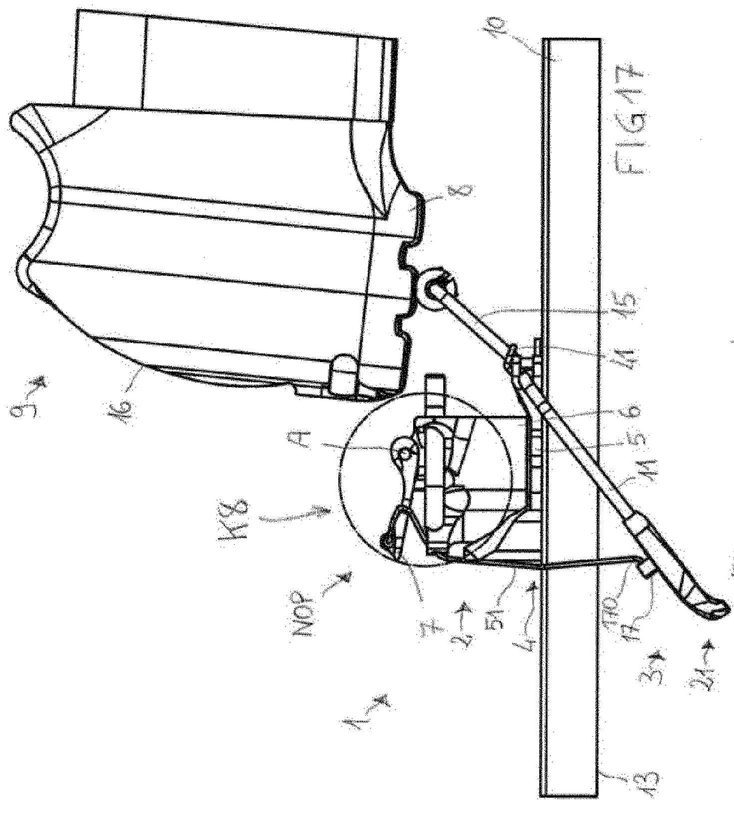

FIG17

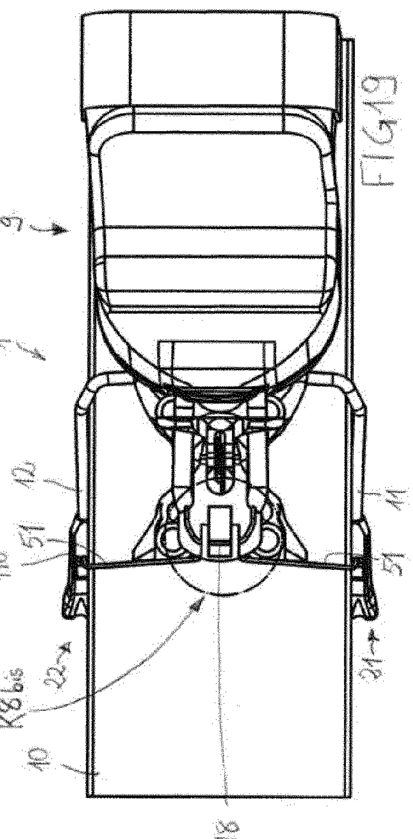

FIG19

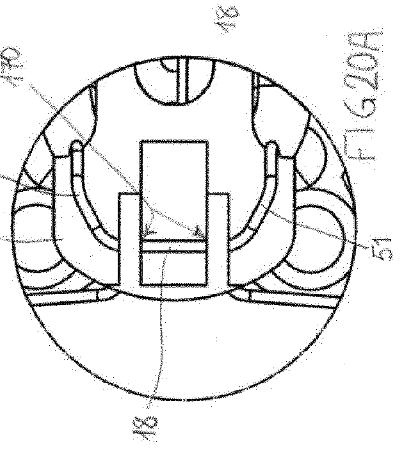

FIG20A

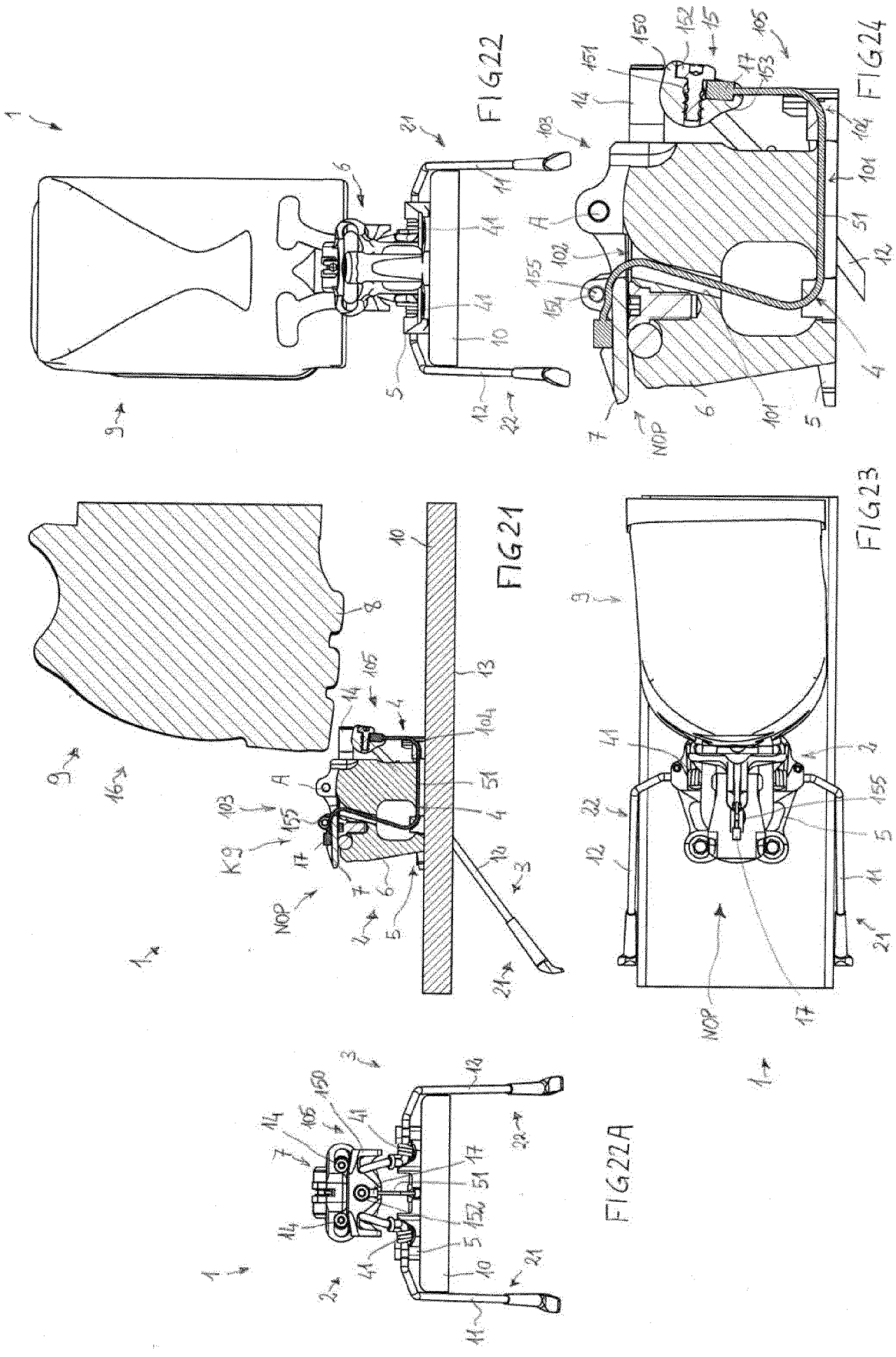
FIG22
FIG24
FIG21
FIG23
FIG22A

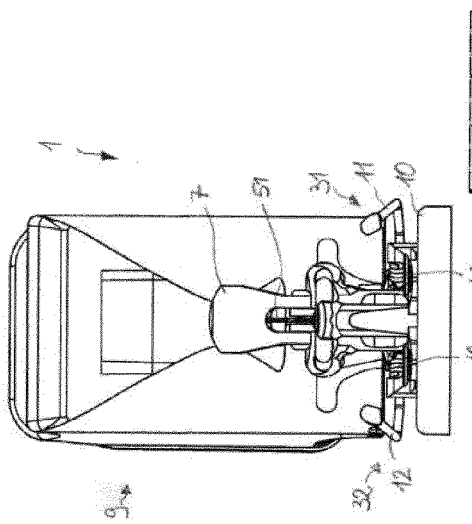

FIG26

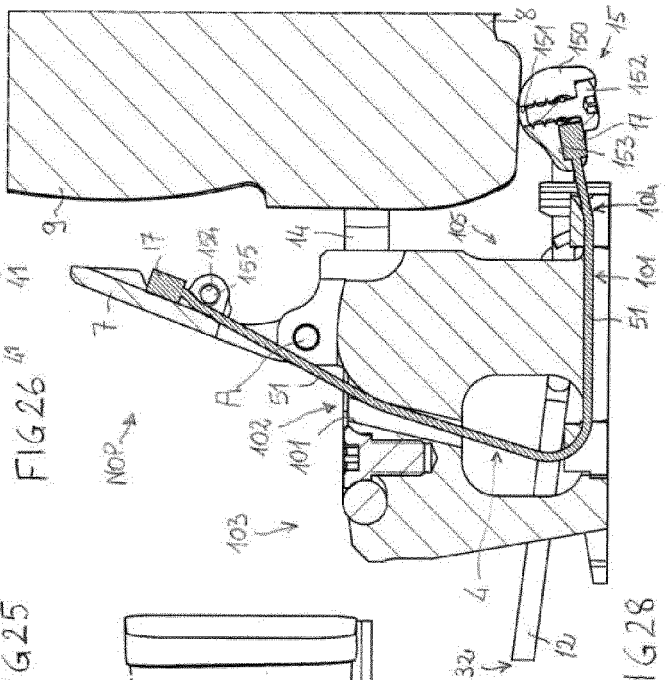

FIG28

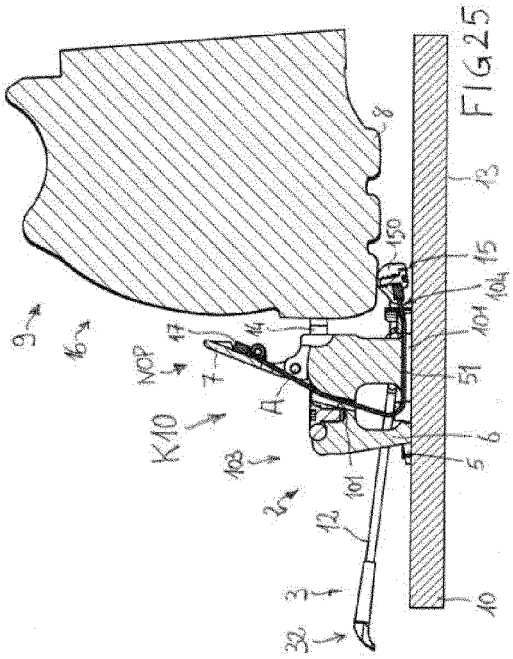

FIG25

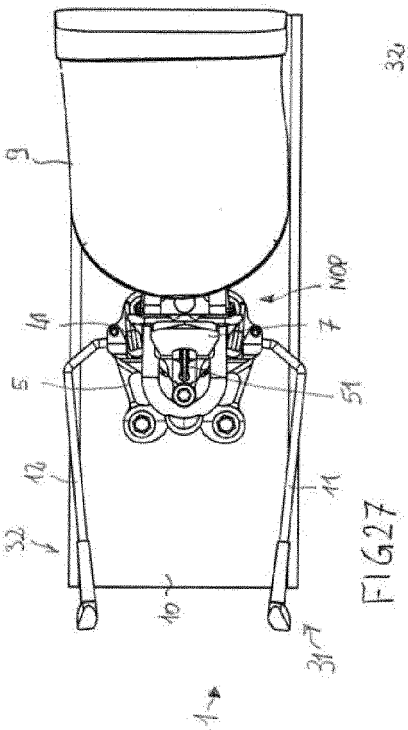

FIG27

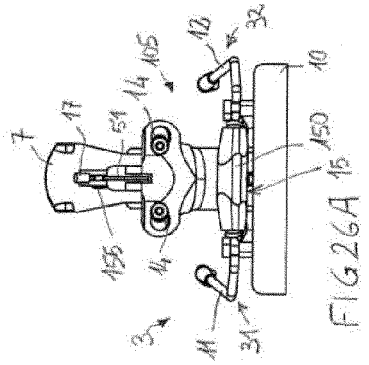

FIG26A

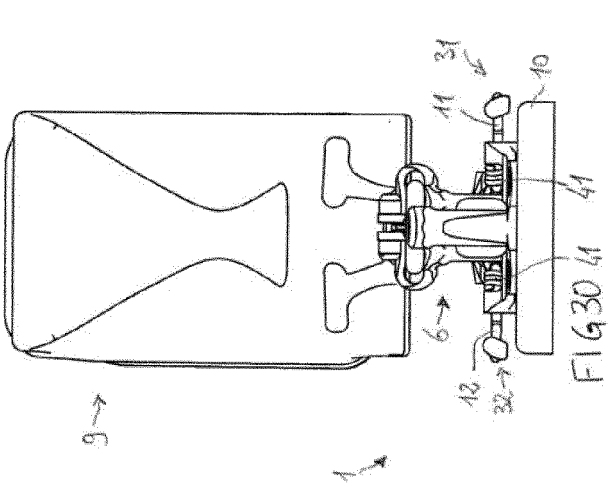

FIG30

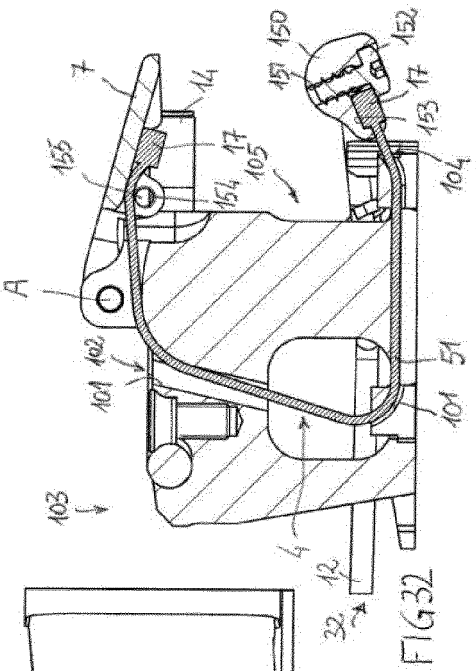

FIG32

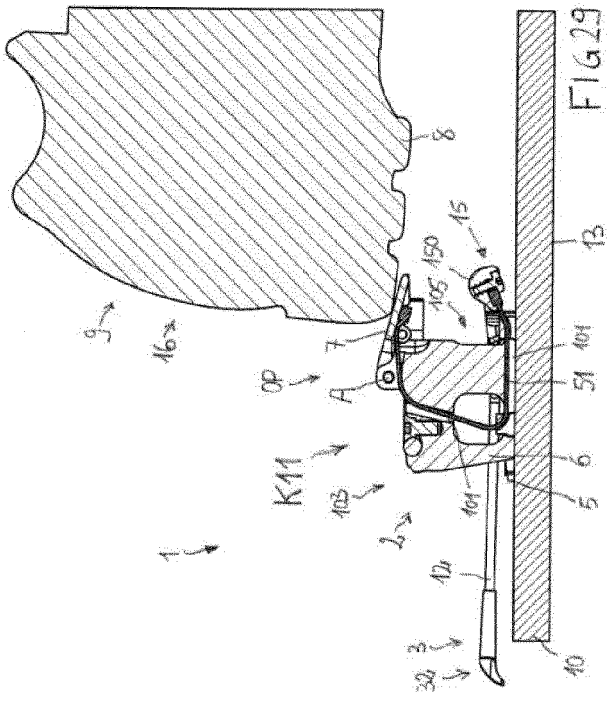

FIG29

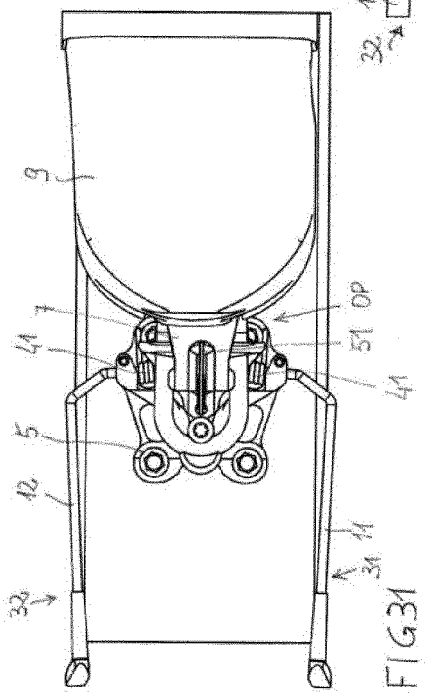

FIG31

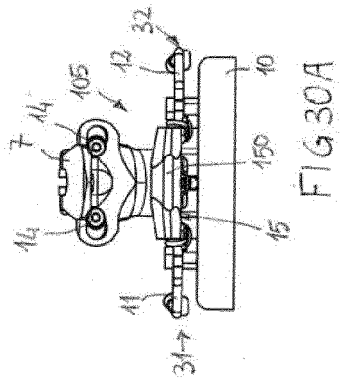

FIG30A

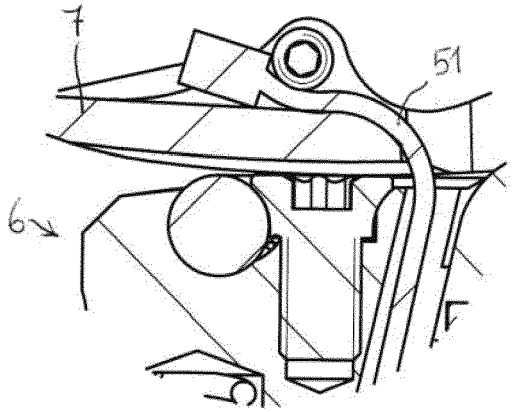

FIG36

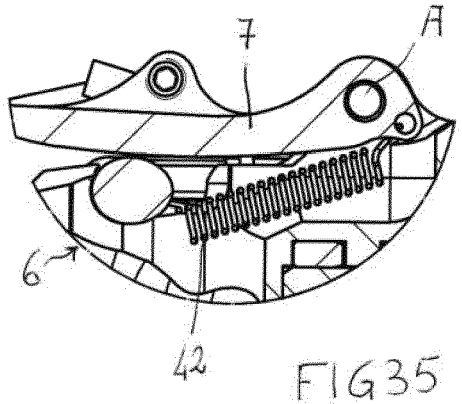

FIG35

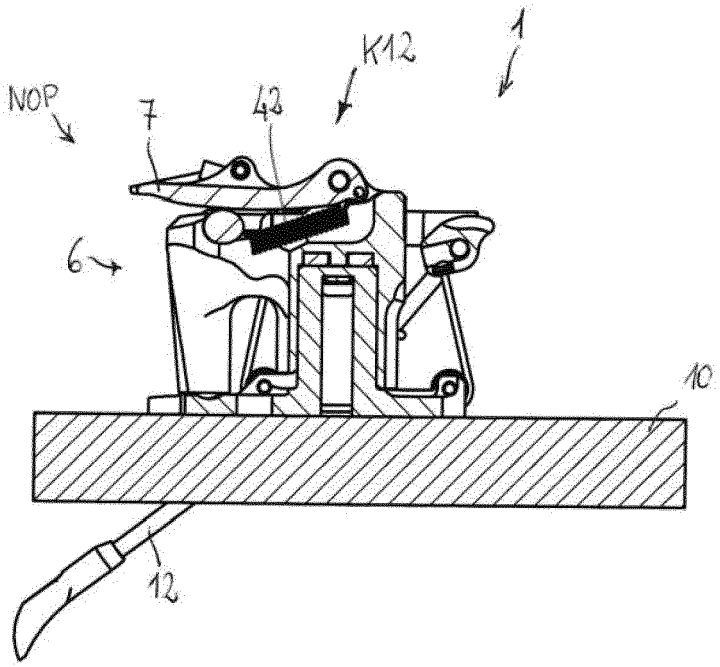

FIG34

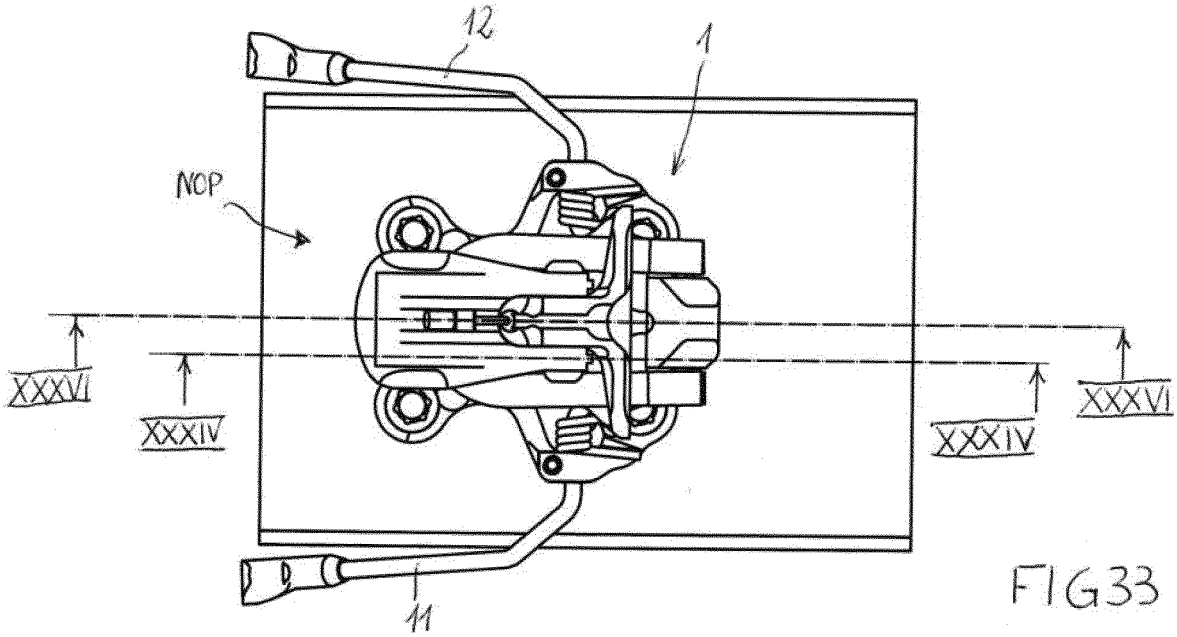

FIG33

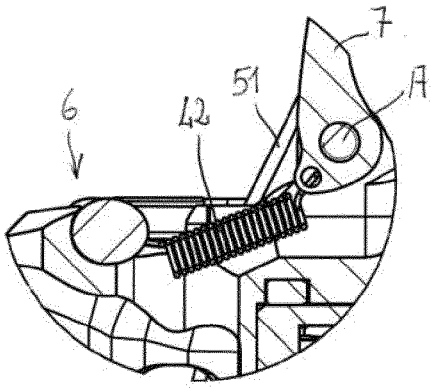

FIG39

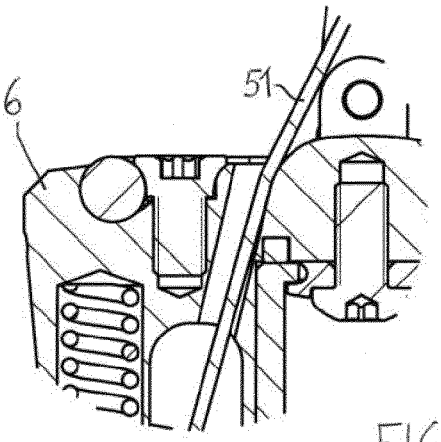

FIG40

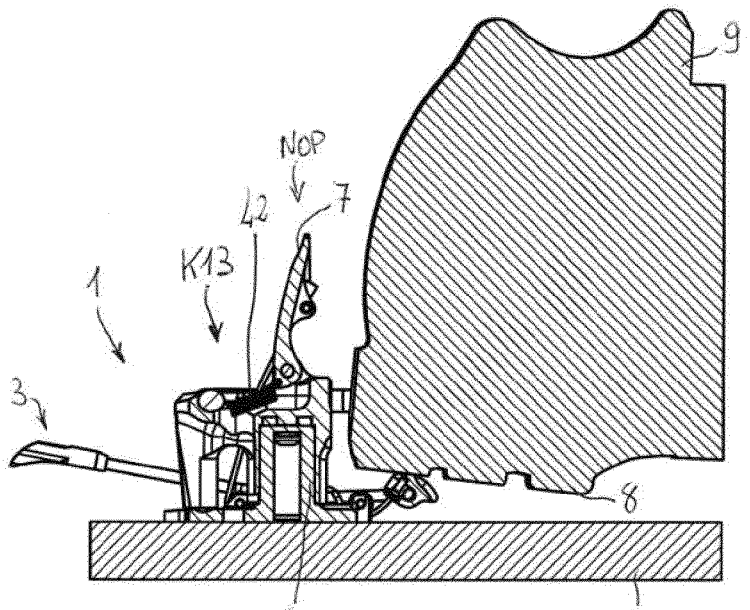

FIG38

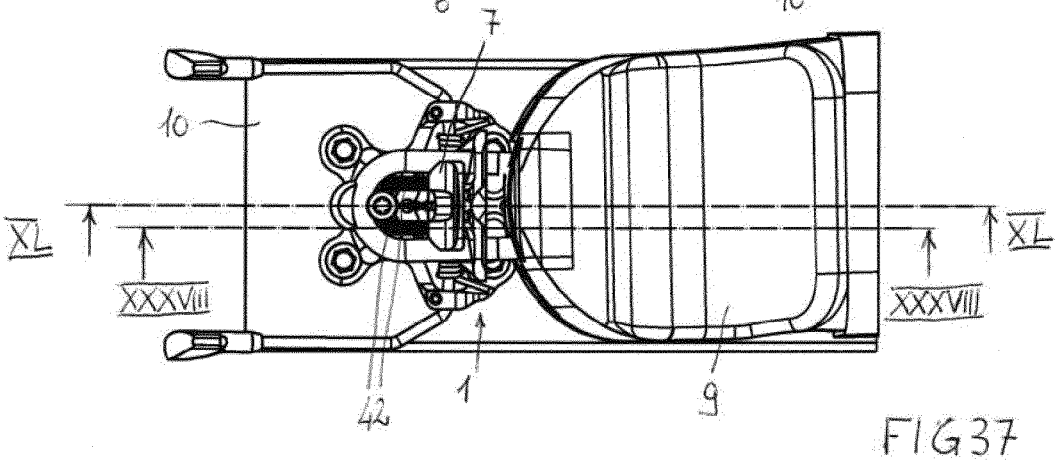

FIG37

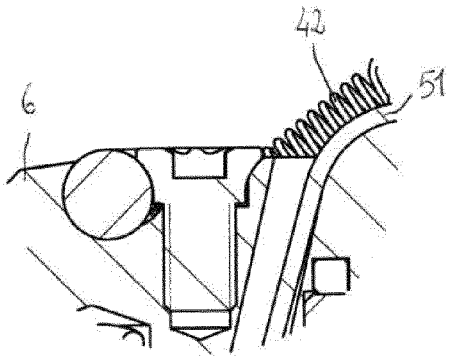

FIG44

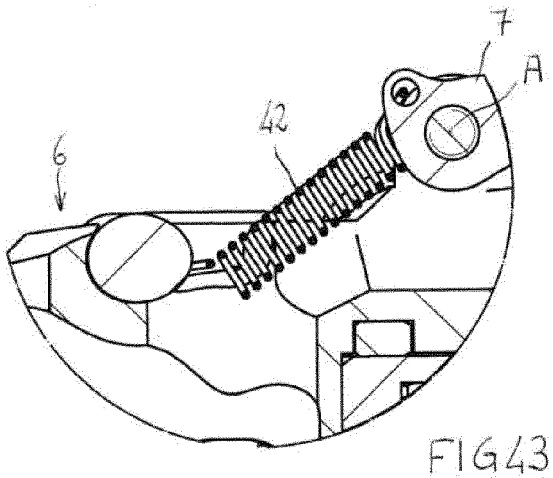

FIG43

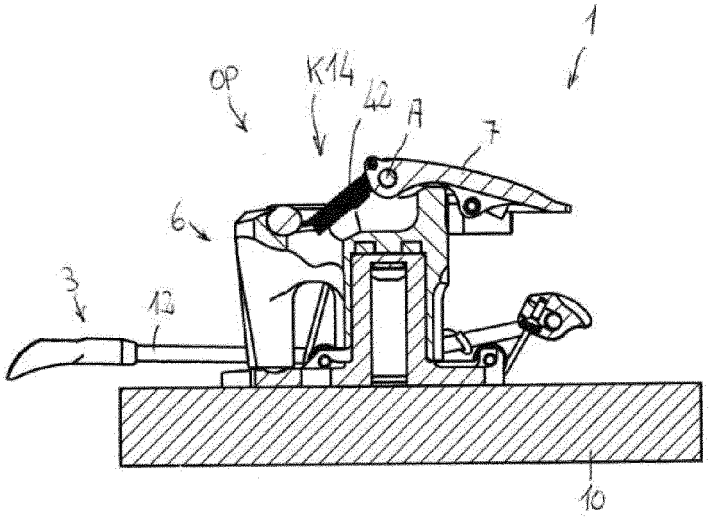

FIG42

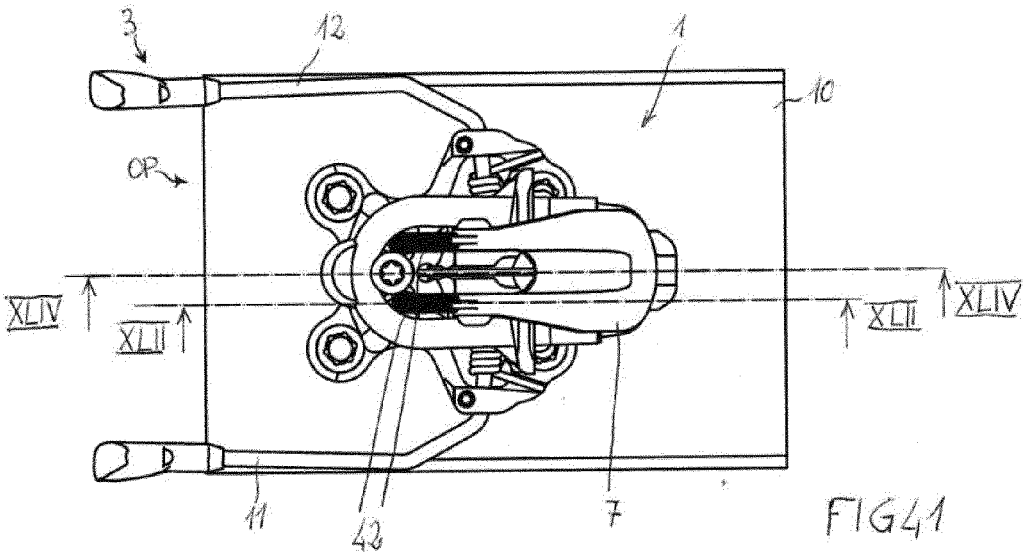

FIG41

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EUROPEAN SEARCH REPORT

Application Number
EP 22 18 0362

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	EP 3 437 703 A1 (ROSSIGNOL SA [FR]) 6 February 2019 (2019-02-06) * paragraphs [0001], [0020], [0028], [0033] - [0036]; figures 2-15 *	1-11	INV. A63C7/10 A63C9/08 A63C9/086
A	DE 34 33 504 A1 (STOCKINGER ERWIN) 20 March 1986 (1986-03-20) * abstract; figures 2,3 *	1-11	
A	DE 23 05 830 A1 (SAUTER GERHARD) 8 August 1974 (1974-08-08) * page 1 - page 2; figures 1,2 *	1-11	
A	EP 0 417 400 A2 (TMC CORP [CH]) 20 March 1991 (1991-03-20) * column 3, line 34 - line 58; figures 1-4 *	1-11	

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A63C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 October 2022	Lux, Ralph

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