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(54) **A TOE-PIECE OF A SKI BINDING FOR SKI MOUNTAINEERING**

VORDERBACKEN EINER SKIBINDUNG FÜR SKITOUREN

BUTÉE AVANT DE FIXATION DE SKI DE RANDONNÉE

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(73) Proprietor: **ATK SPORTS S.R.L.**
41042 Fiorano Modenese (MO) (IT)

(72) Inventors:
• **INDULTI, Davide**
41042 Fiorano Modenese (MO) (IT)
• **INDULTI, Giovanni**
41042 Fiorano Modenese (MO) (IT)

(74) Representative: **Dall'Olio, Christian et al**
INVENTION S.r.l.
Via delle Armi, 1
40137 Bologna (IT)

(56) References cited:
EP-A1- 2 769 755 EP-A1- 3 050 601
EP-A1- 3 300 778

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Description

[0001] The present invention relates to the technical sector concerning ski mountaineering bindings, with particular reference to a toe-piece of the ski binding.

[0002] ITMO20070365 describes a toe-piece of a ski binding for ski mountaineering, which comprises: a base which is fixable to a ski; a first jaw which is coupled in a revolute pair to the base so as to rotate with respect to a first axis of rotation which is parallel to the axis of the ski when the base is fixed to the ski; a second jaw which is rotatably coupled in a revolute pair to the base with respect to a second axis of rotation which is parallel to the first axis of rotation; a first pin which is borne by the first jaw for inserting in a first lateral hole fashioned in a tip of a ski boot; a second pin which is borne by the second jaw for inserting in a second lateral hole opposite the first lateral hole fashioned in the tip of the ski boot; an activating lever which is coupled in a revolute pair to the base with respect to a third axis of rotation which is perpendicular to the first axis of rotation; a joint which is activatable by the activating lever and which in turn comprises a first portion of joint, which is connected to the first jaw, and a second portion of joint, which is connected to the second jaw and which is coupled to the first portion of joint; a first spring which is interposed between the first jaw and the first portion of joint; a first pin seat fashioned in the first jaw; a second pin seat fashioned in the first portion of joint; a first pin which is arranged slidably between the first pin seat and the second pin seat, and which is arranged at the axis of the first spring to maintain the first spring in guide; a second spring interposed between the second jaw and the second portion of joint; a third pin seat fashioned in the second jaw; a fourth pin seat fashioned in the second portion of joint; a second pin which is slidably arranged between the third pin seat and the fourth pin seat, and which is arranged at the axis of the second spring to maintain the second spring in guide.

[0003] A drawback of this toe-piece of the ski binding consists in the fact that during use snow inserts between the joint and the ski, where it might get compacted and thus might be an obstacle to the correct functioning of the toe-piece of the ski binding.

[0004] EP3300778A1 discloses an apparatus which is provided for holding a footwear toe to a snow travel aid. The apparatus comprises jaws that grasp the toe while permitting pivotal movement of the footwear about the toe in forward and rearward directions and is for use with a heel holder that provides for lateral release. The apparatus comprises one or more resilient elements for biasing the jaws whereby the jaws are biased towards a closed position throughout the operational range of motion of the jaws. In various embodiments, the apparatus is adapted for generally horizontal, forward and rearward translation relative to a longitudinal axis of the snow travel aid, selectively by a user. In various embodiments, the apparatus is provided with a lock for inhibiting opening of the jaws, the lock comprising one or more resilient ele-

ments which provide resilience while inhibiting opening of the jaws.

[0005] EP3050601A1 discloses a toe-piece for an alpine ski binding, comprising: a plate fixable to a ski; a first jaw and a second jaw, arranged on the plate in such a way as to be opposite one another and each comprising an external end provided with a pin for engaging a hole of a ski boot; wherein an internal end of the second jaw is solidly constrained to the plate; and wherein the first jaw is hinged to the plate at the relative internal end with respect to an axis so as to be mobile between a first position, in which the first jaw and the second jaw are in an open configuration and the relative pins disengage from the corresponding hole of the ski boot; and a second position in wherein the first jaw and the second jaw are in a closed configuration and the relative pins can engage the corresponding hole of the ski boot. The toe-piece further comprises first elastic means associated to the first jaw.

[0006] The aim of the present invention consists in at least limiting the above-mentioned drawback.

[0007] The above aim is attained by a toe-piece of a ski binding for ski mountaineering, according to claim 1.

[0008] The quantity of snow that inserts between the joint and the ski is advantageously smaller. In fact, in the prior art the snow was able to pass between the turns of the springs, while with the invention the first spring is closed by the first jaw and the first portion of joint. Further, the lateral walls that rise from the base flank both frontally and posteriorly the first jaw, the first portion of joint, the second portion of joint and the second jaw in such a measure as to at least limit the passage of snow. Further, the height of the lateral walls at least partially closes the gap between the lateral walls, on one side, and the first jaw, the first portion of joint, the second portion of joint and the second jaw, on the other side.

[0009] 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 view from above of a toe-piece of the ski binding for ski mountaineering object of the present invention, in a configuration ready to receive a ski boot and according to a first embodiment of the invention;
- figures 2 and 3 are two perspective views of the toe-piece of the ski binding of figure 1;
- figure 4 is the same perspective view of figure 2 in which some parts have been shown in exploded view;
- figure 5 is a frontal view of the toe-piece of the ski binding of figure 1, in which a ski has been schematically illustrated in a broken line;

- figure 6 is a lateral view of the toe-piece of the ski binding of figure 1;
- figure 7 is a view of section VII-VII of figure 6;
- figure 8 is a view of section VIII-VIII of figure 6;
- figure 9 is a view from above of the toe-piece of the ski binding of figure 1, but in a descent configuration in which the ski boot, not illustrated, is hooked to the pins;
- figures 10 and 11 are two perspective views of the toe-piece of the ski binding of figure 9;
- figure 12 is a frontal view of the toe-piece of the ski binding of figure 9 in which a ski boot has been illustrated in a broken line and in which a ski is further schematically illustrated in a broken line;
- figure 13 is a lateral view of the toe-piece of the ski binding of figure 9 in which the ski boot has been illustrated in a continuous line;
- figure 14 is the view of section XIV-XIV of figure 13;
- figure 15 is a view of section XV-XV of figure 13;
- figure 16 is a perspective view of the toe-piece of the ski binding for ski mountaineering, object of the present invention, in a configuration ready to receive a ski boot and according to a second embodiment of the invention;
- figure 17 is a section view alike to figure 8 but relating to the toe-piece of the ski binding of figure 16;
- figure 18 is a perspective view of the toe-piece of the ski binding of figure 16, but in a descent configuration in which the ski boot, not illustrated, is hooked to the pins;
- figure 19 is a section view alike figure 15 but relating to the toe-piece of the ski binding of figure 18 and in which the ski boot has not been illustrated;
- figure 20 is a perspective view of the toe-piece of the ski binding for ski mountaineering, object of the present invention, in a configuration ready to receive a ski boot and according to a third embodiment of the invention;
- figure 21 is a section view alike to figure 8 but relating to the toe-piece of the ski binding of figure 20;
- figure 22 is a perspective view of the toe-piece of the ski binding of figure 20, but in a descent configuration in which the ski boot, not illustrated, is hooked to the

pins;

- figure 23 is a section view alike figure 15 but relating to the toe-piece of the ski binding of figure 22 and in which the ski boot has not been illustrated.

[0010] With reference to the appended tables of drawings, reference numeral (1) denotes in its entirety a toe-piece of the ski binding for ski mountaineering according to the present invention, comprising: a base (2) which is fixable to a ski (30); a first jaw (11) which is rotatably coupled to the base (2) with respect to a first axis of rotation (R1) which is parallel to the axis of the ski (30) when the base (2) is fixed to the ski (30); a second jaw (12) which is rotatably coupled with the base (2) with respect to a second axis of rotation (R2) which is parallel to the first axis of rotation (R1); a first pin (21) which is borne by the first jaw (11) for inserting in a first lateral hole (31) made in a tip of a ski boot (40); a second pin (22) which is borne by the second jaw (12) for inserting in a second lateral hole (32) fashioned in the tip of the ski boot (40); an activating lever (3) which is rotatably coupled to the base (2); a joint (4) which is activatable by the activating lever (3) and which comprises: a first portion of joint (41) which is connected to the first jaw (11); and a second portion of joint (42) which is connected to the second jaw (12) and which is coupled to the first portion of joint (41); first elastic means (51) which comprise a first spring (51) interposed between the first jaw (11) and the first portion of joint (41). The first portion of joint (41) is provided with a first spring seat (61) for receiving a first end of the first spring (51). Further: the first jaw (11) is provided with a second spring seat (62) for receiving a second end of the first spring (51); the first jaw (11) and the first portion of joint (41) are telescopically coupled to one another, so as to allow a relative sliding between the first jaw (11) and the first portion of joint (41) when the activating lever (3) activates the joint (4), at least one between the first jaw (11) and the first portion of joint (41) comprising a tubular telescopic coupling portion (see for example figure 8, in which it can be clearly observed that the first jaw (11) is provided with the tubular portion so as to realise the telescopic coupling); the first spring (51) is enclosed by the first jaw (11) and by the first portion of joint (41). Further, the toe-piece of the ski binding (1) comprises a first lateral wall (71), a second lateral wall (72) and a third lateral wall (73). The first lateral wall (71): is solidly constrained to the base (2); extends between the activating lever (3) and the first axis of rotation (R1) in a transversal direction, preferably perpendicular, to the first axis of rotation (R1); it extends in height with respect to the ski (30), when the base (2) is fixed to the ski (30), in a measure such as to at least partially close the gap (70) between the first lateral wall (71), on one side, and the first jaw (11) and the first portion of joint (41), on the other side; and is flanked to the first jaw (11) and to the first portion of joint (41) in such a measure as to at least limit, preferably prevent, the passage of snow during the use of the toe-piece of a ski binding (1).

The second lateral wall (72): is solidly constrained to the base (2); it extends between the activating lever (3) and the second axis of rotation (R2) in a transversal direction, preferably perpendicular, to the first axis of rotation (R1); extends in height with respect to the ski (30), when the base (2) is fixed to the ski (30), in a measure such as to at least partially close the gap (70) between the second lateral wall (72), on one side, and the second jaw (12) and the second portion of joint (42), on the other side; and is flanked to the second jaw (12) and to the second portion of joint (42) in such a measure as to at least limit, preferably prevent, the passage of snow during the use of the toe-piece of a ski binding (1). The third lateral wall (73): is arranged posteriorly to the first lateral wall (71) and to the second lateral wall (72) with respect to the tip of the ski (30) when the base (2) is fixed to the ski (30); is solidly constrained to the base (2); extends between the first axis of rotation (R1) and the second axis of rotation (R2), preferably perpendicular, in a transversal direction to the first axis of rotation (R1); extends in height with respect to the ski (30), when the base (2) is fixed to the ski (30), in a measure such as to at least partially close the gap (70) between the third lateral wall (73), on one side, and the first jaw (11), the first portion of joint (41), the second portion of joint (42) and the second jaw (12), on the other side; and is flanked to the first jaw (11), to the first portion of joint (41), to the second portion of joint (42) and to the second jaw (12) in such a measure as to at least limit, preferably prevent, the passage of snow during the use of the toe-piece of a ski binding (1).

[0011] The first lateral wall (71) is preferably an integral part of the base (2).

[0012] The second lateral wall (72) is preferably an integral part of the base (2).

[0013] The third lateral wall (73) is preferably an integral part of the base (2).

[0014] A ski (30) is schematically illustrated in a broken line only, in figures 5 and 12.

[0015] The activating lever (3) can be arranged parallel to the first axis of rotation (R1).

[0016] The activating lever (3) can be centred with respect to the halfway line of the toe-piece of the ski binding (1).

[0017] The first jaw (11) is preferably coupled in a revolute pair to the base (2), so as to rotate with respect to the first axis of rotation (R1); in this case, only the first portion of joint (41) can slide with respect to the first jaw (11). The second jaw (12) is preferably coupled in a revolute pair to the base (2), so as to rotate with respect to the second axis of rotation (R2).

[0018] The first lateral hole (31) and the second lateral hole (32) as illustrated in figures 14 and 15.

[0019] The ski boot (40) is illustrated in figures 12-15.

[0020] The activating lever (3) is preferably rotatably coupled to the base (2) with respect to a third axis of rotation (R3) which is transversal, preferably perpendicular, to the first axis of rotation (R1) and thus towards the axis of the ski (30) when the base (2) is fixed to the ski

(30).

[0021] The activating lever (3) is preferably rotatably coupled in a revolute pair to the base (2), so as to rotate with respect to the third axis of rotation (R3).

[0022] The activating lever (3) can form, at a first end, a fork (5) having a first prong (81) and a second prong (82) (see for example figure 19) which are arranged at different heights with respect to the ski (30), when the base (2) is fixed to the ski (30), so that the first prong (81) can contact the joint (4) to push it towards the ski (30), if the activating lever (3) is rotated in a first rotation direction (S1) (see in particular figure 13, in which the ski boot (40) presses on the activating lever (3), determining the rotation in the first rotation direction (S1)), and so that the second prong (82), nearer the ski (30) with respect to the first prong (81), can contact the joint (4) to push it away from the ski (30), if the activating lever (3) is rotated in a second rotation direction, opposite the first rotation direction (S1).

[0023] The toe-piece of a ski binding (1) preferably comprises a blocking lever (6) which is rotatably coupled to the activating lever (3) with respect to a fourth axis of rotation (R4) which is transversal, preferably perpendicular, to the first axis of rotation (R1), so as to block the position of the activating lever (3). The blocking lever (6) is preferably rotatable in a revolute pair to the activating lever (3), so as to rotate with respect to the fourth axis of rotation (R4). The activating lever (3) can rotatably couple to the blocking lever (6) at a second end, opposite the first end, see for example figure 2.

[0024] The first spring (51) can be a compression spring.

[0025] The second end of the first spring (51) is opposite the first end of the first spring (51).

[0026] The first lateral wall (71) and the second lateral wall (72) are preferably aligned to one another.

[0027] Preferably: a first jaw (11) comprises a first portion of jaw (110) which extends between the first axis of rotation (R1) and the first portion of joint (41), covering the space between the first lateral wall (71) and the third lateral wall (73); the first portion of joint (41) extends covering the space between the first lateral wall (71) and the third lateral wall (73); the second portion of joint (42) extends to cover the space between the second lateral wall (72) and the third lateral wall (73); the second jaw (12) comprises a second portion of jaw (120) which extends between the second axis of rotation (R2) and the second portion of joint (42), to cover the space between the second lateral wall (72) and the third lateral wall (73).

[0028] Still more preferably, the external walls (100) of the first portion of jaw (110), of the first portion of joint (41), of the second portion of joint (42) and of the second portion of jaw (120), which face in an opposite direction with respect to the tip of the ski (30) (see for example figure 2), when the base (2) is fixed to the ski (30), form a continuous surface in order at least to limit the passage of snow.

[0029] According to a first embodiment, the toe-piece

of the ski binding (1) comprises second elastic means (52) which comprise a second spring (52) interposed between the second jaw (12) and the second portion of joint (42). Further: the second portion of joint (42) is provided with a third spring seat (63) for receiving a first end of the second spring (52); the second jaw (12) is provided with a fourth spring seat (64) for receiving a second end of the second spring (52); the second jaw (12) and the second portion of joint (42) are telescopically coupled to one another, so as to allow a relative sliding between the second jaw (12) and the second portion of joint (42) when the activating lever (3) activates the joint (4), at least one from between the second jaw (12) and the second portion of joint (42) comprising a tubular telescopic coupling portion (see for example figure 8, in which it can be clearly observed that the second jaw (12) is provided with the tubular portion so as to realise the telescopic coupling); the second spring (52) is enclosed by the second jaw (12) and by the second portion of joint (42).

[0030] The second spring (52) can be a compression spring.

[0031] The second end of the second spring (52) is opposite the first end of the second spring (52).

[0032] Figures from 1 to 15 illustrate the first embodiment. In particular, figures 1-8 show a configuration ready to receive the ski boot: the first pin (21) and the second pin (22) are sufficiently moved away from one another in order to allow the tip of the ski boot (40) to insert between the pins and press on the activating lever (3): in turn, the activating lever (3), by means of the first prong (81), presses on the joint (4), leading to the consequent transition of the toe-piece of the ski binding to a descent configuration, figures 9-15, in which the ski boot (40) is hooked to the first pin (21) and to the second pin (22). Starting from the descent configuration, as is known, the skier can activate the blocking lever (6) to block the activating lever (3) and walk uphill (the ascent configuration is not illustrated).

[0033] Instead, figures 16-19 and 20-23 show a second and third embodiment, respectively, in which the second elastic means (52) have not been used. In this case the second jaw (12) and the second portion of joint (42) are connected to one another to form a single body, see for example figure 23.

[0034] The joint (4) preferably comprises a pin (7); further, the first portion of joint (41) and the second portion of joint (42) are coupled to one another by means of the pin (7).

[0035] The first portion of joint (41) preferably comprises a first pin seat (91) for rotatably coupling to the pin (7), and the second portion of joint (42) comprises a second pin seat (92) for rotatably coupling to the pin (7).

[0036] The pin (7) preferably has a cylindrical shape; further, the first pin seat (91) forms a first portion of cylindrical wall in order to realise a form coupling with the pin (7), see for example figure 8; the second pin seat (92) forms a second portion of cylindrical wall in order to

realise a form coupling with the pin (7).

[0037] The first embodiment illustrated in figures 1-15 uses the pin (7).

[0038] In alternative, figures 20-23: the first portion of joint (41) comprises a third portion of cylindrical wall (93); the second portion of joint (42) comprises a fourth portion of cylindrical wall (94); the third portion of cylindrical wall (93) and the fourth portion of cylindrical wall (94) are directly coupled to one another realising a form coupling.

[0039] It is specified that also the third embodiment of figures 20-23 might, alternatively, use the pin (7) according to what is indicated in the foregoing and with what is illustrated in figures 1-19.

[0040] Likewise, the first embodiment illustrated in figures 1-15 and the second embodiment illustrated in figures 16-19 might, alternatively, not use the pin (7) and use a direct coupling between the first portion of joint (41) and the second portion of joint (42), as explained in the foregoing with reference to figures 20-23 and to the third portion of cylindrical wall (93) and the fourth portion of cylindrical wall (94).

[0041] 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 toe-piece of a ski binding (1) for ski (30) mountaineering, comprising:

- a base (2) which is fixable to a ski (30);
- a first jaw (11) which is rotatably coupled to the base (2) with respect to a first axis of rotation (R1) which is parallel to the axis of the ski (30) when the base (2) is fixed to the ski (30);
- a second jaw (12) which is rotatably coupled to the base (2) with respect to a second axis of rotation (R2) which is parallel to the first axis of rotation (R1);
- a first pin (21) which is borne by the first jaw (11) for inserting in a first lateral hole (31) made in a tip of a ski boot (40);
- a second pin (22) which is borne by the second jaw (12) for inserting in a second lateral hole (32) fashioned in the tip of the ski boot (40);
- an activating lever (3) which is rotatably coupled to the base (2);
- a joint (4) which is activatable by the activating lever (3) and which comprises:

- a first portion of joint (41) which is connected to the first jaw (11); and a second portion of joint (42) which is connected to the second jaw (12) and which is coupled to the first portion of joint (41);

first elastic means (51) which comprise a first spring (51) interposed between the first jaw (11) and the first portion of joint (41); wherein

the first portion of joint (41) is provided with a first spring seat (61) in order to receive a first end of the first spring (51);

the first jaw (11) is provided with a second spring seat (62) for receiving a second end of the first spring (51);

the first jaw (11) and the first portion of joint (41) are telescopically coupled to one another, so as to allow a relative sliding between the first jaw (11) and the first portion of joint (41) when the activating lever (3) activates the joint (4), at least one between the first jaw (11) and the first portion of joint (41) comprising a tubular telescopic coupling portion; **characterised in that** the first spring (51) is enclosed by the first jaw (11) and by the first portion of joint (41);

it comprises a first lateral wall (71) which: is solidly constrained to the base (2); extends between the activating lever (3) and the first axis of rotation (R1) in a transversal direction to the first axis of rotation (R1); it extends in height with respect to the ski (30), when the base (2) is fixed to the ski (30), in a measure such as to at least partially close the gap (70) between the first lateral wall (71), on one side, and the first jaw (11) and the first portion of joint (41), on the other side; and is flanked to the first jaw (11) and to the first portion of joint (41) in such a measure as to at least limit the passage of snow during the use of the toe-piece of a ski binding (1);

it comprises a second lateral wall (72) which: is solidly constrained to the base (2); it extends between the activating lever (3) and the second axis of rotation (R2) in a transversal direction to the first axis of rotation (R1); it extends in height with respect to the ski (30), when the base (2) is fixed to the ski (30), in a measure such as to at least partially close the gap (70) between the second lateral wall (72), on one side, and the second jaw (12) and the second portion of joint (42), on the other side; and is flanked to the second jaw (12) and to the second portion of joint (42) in such a measure as to at least limit the passage of snow during the use of the toe-piece of the ski binding (1); it comprises a third lateral wall (73) which: is arranged posteriorly to the first lateral wall (71) and to the second lateral wall (72) with respect to the tip of the ski (30) when the base (2) is fixed to the ski (30); is solidly

constrained to the base (2); it extends between the axis of rotation (R1) and the second axis of rotation (R2) in a transversal direction to the first axis of rotation (R1); it extends in height with respect to the ski (30), when the base (2) is fixed to the ski (30), in a measure such as to at least partially close the gap (70) between the third lateral wall (73), on one side, and the first jaw (11), the first portion of joint (41), the second portion of joint (42) and the second jaw (12), on the other side; and is flanked to the first jaw (11), to the first portion of joint (41), to the second portion of joint (42) and to the second jaw (12) in such a measure as to at least limit the passage of snow during the use of the toe-piece of the ski binding (1).

2. The toe-piece of the ski binding (1) of the preceding claim, wherein: it comprises second elastic means (52) which comprise a second spring (52) interposed between the second jaw (12) and the second portion of joint (42); the second portion of joint (42) is provided with a third spring seat (63) for receiving a first end of the second spring (52); the second jaw (12) is provided with a fourth spring seat (64) for receiving a second end of the second spring (52); the second jaw (12) and the second portion of joint (42) are telescopically coupled to one another, so as to allow a relative sliding between the second jaw (12) and the second portion of joint (42) when the activating lever (3) activates the joint (4), at least one from between the second jaw (12) and the second portion of joint (42) comprising a tubular telescopic coupling portion; the second spring (52) is enclosed by the second jaw (12) and by the second portion of joint (42).
3. The toe-piece of the ski binding (1) according to claim 1 or 2, wherein: the first jaw (11) comprises a first portion of jaw (110) which extends between the first axis of rotation (R1) and the first portion of joint (41), to cover the space between the first lateral wall (71) and the third lateral wall (73); the first portion of joint (41) extends to cover the space between the first lateral wall (71) and the third lateral wall (73); the second portion of joint (42) extends to cover the space between the second lateral wall (72) and the third lateral wall (73); the second jaw (12) comprises a second portion of jaw (120) which extends between the second axis of rotation (R2) and the second portion of joint (42), to cover the space between the second lateral wall (72) and the third lateral wall (73).
4. The toe-piece of the ski binding (1) of any one of the preceding claims, wherein the external walls (100) of the first portion of jaw (110), of the first portion of joint

(41), of the second portion of joint (42) and of the second portion of jaw (120), which face in an opposite direction with respect to the tip of the ski (30), when the base (2) is fixed to the ski (30), form a continuous surface in order at least to limit the pas- 5 sage of snow.

5. The toe-piece of the ski binding (1) of any one of the preceding claims, wherein: the joint (4) comprises a pin (7); and the first portion of joint (41) and the second portion of joint (42) are coupled to one another by means of the pin (7). 10
6. The toe-piece of the ski binding (1) of the preceding claim, wherein: the first portion of joint (41) comprises a first pin seat (91) for rotatably coupling to the pin (7), and the second portion of joint (42) comprises a second pin seat (92) for rotatably coupling to the pin (7). 15
7. The toe-piece of the ski binding (1) of the preceding claim, wherein: the pin (7) has a cylindrical shape; the first pin seat (91) forms a first portion of cylindrical wall in order to realise a form coupling with the pin (7); the second pin seat (92) forms a second portion of cylindrical wall in order to realise a form coupling with the pin (7). 20 25
8. The toe-piece of the ski binding (1) of any one of claims from 1 to 4, wherein: the first portion of joint (41) comprises a third portion of cylindrical wall; and the second portion of joint (42) comprises a fourth portion of cylindrical wall; the third portion of cylindrical wall and the fourth portion of wall are directly coupled to one another realising a form coupling. 30 35

Patentansprüche

1. Ein Vorderbacken einer Skibindung (1) für Skitouren (30), umfassend: 40
 - eine Basis (2), die an einem Ski (30) befestigt werden kann;
 - einen ersten Backen (11), der drehbar mit der Basis (2) in Bezug auf eine erste Rotationsachse (R1) gekoppelt ist, welche parallel zur Achse des Skis (30) verläuft, wenn die Basis (2) am Ski (30) befestigt ist; 45
 - einen zweiten Backen (12), der drehbar mit der Basis (2) in Bezug auf eine zweite Rotationsachse (R2) gekoppelt ist, welche parallel zur ersten Rotationsachse (R1) verläuft; 50
 - einen ersten Bolzen (21), der vom ersten Backen (11) getragen wird, um in ein erstes seitliches Loch (31) einzusetzen, das in der Spitze eines Skischuhs (40) angebracht ist; 55
 - einen zweiten Bolzen (22), der vom zweiten

Backen (12) getragen wird, um in ein zweites seitliches Loch (32) einzusetzen, das in der Spitze des Skischuhs (40) angebracht ist; einen Betätigungshebel (3), der drehbar mit der Basis (2) gekoppelt ist; ein Gelenk (4), das durch den Betätigungshebel (3) aktivierbar ist und folgendes umfasst: einen ersten Gelenkteil (41), der mit dem ersten Backen (11) verbunden ist; und einen zweiten Gelenkteil (42), der mit dem zweiten Backen (12) verbunden ist und mit dem ersten Gelenkteil (41) gekoppelt ist; ein erstes elastisches Mittel (51), das eine erste Feder (51) umfasst, die zwischen dem ersten Backen (11) und dem ersten Gelenkteil (41) angeordnet ist; wobei der erste Gelenkteil (41) mit einem ersten Federsitz (61) ausgestattet ist, um ein erstes Ende der ersten Feder (51) aufzunehmen; der erste Backen (11) ist mit einem zweiten Federsitz (62) ausgestattet, um ein zweites Ende der ersten Feder (51) aufzunehmen; der erste Backen (11) und der erste Gelenkteil (41) sind teleskopisch miteinander gekoppelt, um ein relatives Gleiten zwischen dem ersten Backen (11) und dem ersten Gelenkteil (41) zu ermöglichen, wenn der Betätigungshebel (3) das Gelenk (4) aktiviert, wobei mindestens einer zwischen dem ersten Backen (11) und dem ersten Gelenkteil (41) einen röhrenförmigen teleskopischen Kopplungsteil umfasst; **dadurch gekennzeichnet, dass** die erste Feder (51) durch den ersten Backen (11) und den ersten Gelenkteil (41) eingeschlossen ist; sie umfasst eine erste Seitenwand (71), die: fest mit der Basis (2) verbunden ist; sich zwischen dem Betätigungshebel (3) und der ersten Rotationsachse (R1) in einer Querrichtung zur ersten Rotationsachse (R1) erstreckt; sich in der Höhe in Bezug auf den Ski (30) erstreckt, wenn die Basis (2) am Ski (30) befestigt ist, in einem Maß, das ausreicht, um zumindest teilweise den Spalt (70) zwischen der ersten Seitenwand (71) auf der einen Seite und dem ersten Backen (11) und dem ersten Gelenkteil (41) auf der anderen Seite zu schließen; und dem ersten Backen (11) und dem ersten Gelenkteil (41) in einem solchen Maß anliegt, dass der Durchgang von Schnee während der Verwendung des Vorderbackens der Skibindung (1) zumindest begrenzt wird; sie umfasst eine zweite Seitenwand (72), die: fest mit der Basis (2) verbunden ist; sich zwischen dem Betätigungshebel (3) und der zweiten Rotationsachse (R2) in einer Querrichtung zur ersten Rotationsachse (R1) erstreckt; sich in der Höhe in Bezug auf den Ski (30) erstreckt,

- wenn die Basis (2) am Ski (30) befestigt ist, in einem Maß, das ausreicht, um zumindest teilweise den Spalt (70) zwischen der zweiten Seitenwand (72) auf der einen Seite und dem zweiten Backen (12) und dem zweiten Gelenkteil (42) auf der anderen Seite zu schließen; und dem zweiten Backen (12) und dem zweiten Gelenkteil (42) in einem solchen Maß anliegt, dass der Durchgang von Schnee während der Verwendung des Vorderbackens der Skibindung (1) zumindest begrenzt wird; sie umfasst eine dritte Seitenwand (73), die: hinter der ersten Seitenwand (71) und der zweiten Seitenwand (72) in Bezug auf die Spitze des Skis (30) angeordnet ist, wenn die Basis (2) am Ski (30) befestigt ist; fest mit der Basis (2) verbunden ist; sich zwischen der ersten Rotationsachse (R1) und der zweiten Rotationsachse (R2) in einer Querrichtung zur ersten Rotationsachse (R1) erstreckt; sich in der Höhe in Bezug auf den Ski (30) erstreckt, wenn die Basis (2) am Ski (30) befestigt ist, in einem Maß, das ausreicht, um zumindest teilweise den Spalt (70) zwischen der dritten Seitenwand (73) auf der einen Seite und dem ersten Backen (11), dem ersten Gelenkteil (41), dem zweiten Gelenkteil (42) und dem zweiten Backen (12) auf der anderen Seite zu schließen; und dem ersten Backen (11), dem ersten Gelenkteil (41), dem zweiten Gelenkteil (42) und dem zweiten Backen (12) in einem solchen Maß anliegt, dass der Durchgang von Schnee während der Verwendung des Vorderbackens der Skibindung (1) zumindest begrenzt wird.
2. Der Vorderbacken der Skibindung (1) nach dem vorhergehenden Anspruch, wobei: sie umfasst ein zweites elastisches Mittel (52), das eine zweite Feder (52) umfasst, die zwischen dem zweiten Backen (12) und dem zweiten Gelenkteil (42) angeordnet ist; der zweite Gelenkteil (42) ist mit einem dritten Federsitz (63) ausgestattet, um ein erstes Ende der zweiten Feder (52) aufzunehmen; der zweite Backen (12) ist mit einem vierten Federsitz (64) ausgestattet, um ein zweites Ende der zweiten Feder (52) aufzunehmen; der zweite Backen (12) und der zweite Gelenkteil (42) sind teleskopisch miteinander gekoppelt, um ein relatives Gleiten zwischen dem zweiten Backen (12) und dem zweiten Gelenkteil (42) zu ermöglichen, wenn der Betätigungshebel (3) das Gelenk (4) aktiviert, wobei mindestens einer zwischen dem zweiten Backen (12) und dem zweiten Gelenkteil (42) einen röhrenförmigen teleskopischen Kopp- lungsteil umfasst; die zweite Feder (52) ist durch den zweiten Backen (12) und den zweiten Gelenkteil (42) eingeschlossen.
 3. Der Vorderbacken der Skibindung (1) nach An- spruch 1 oder 2, wobei: der erste Backen (11) um- fasst einen ersten Backenteil (110), der sich zw- ischen der ersten Rotationsachse (R1) und dem ersten Gelenkteil (41) erstreckt, um den Raum zw- ischen der ersten Seitenwand (71) und der dritten Seitenwand (73) abzudecken; der erste Gelenkteil (41) erstreckt sich, um den Raum zwischen der ersten Seitenwand (71) und der dritten Seitenwand (73) abzudecken; der zweite Gelenkteil (42) er- streckt sich, um den Raum zwischen der zweiten Seitenwand (72) und der dritten Seitenwand (73) abzudecken; der zweite Backen (12) umfasst einen zweiten Backenteil (120), der sich zwischen der zweiten Rotationsachse (R2) und dem zweiten Ge- lenkteil (42) erstreckt, um den Raum zwischen der zweiten Seitenwand (72) und der dritten Seitenwand (73) abzudecken.
 4. Der Vorderbacken der Skibindung (1) nach einem der vorhergehenden Ansprüche, wobei die äußeren Wände (100) des ersten Backenteils (110), des ers- ten Gelenkteils (41), des zweiten Gelenkteils (42) und des zweiten Backenteils (120), die in eine der Spitze des Skis (30) entgegengesetzte Richtung weisen, wenn die Basis (2) am Ski (30) befestigt ist, eine durchgehende Fläche bilden, um den Durchgang von Schnee zumindest zu begrenzen.
 5. Der Vorderbacken der Skibindung (1) nach einem der vorhergehenden Ansprüche, wobei: das Gelenk (4) einen Bolzen (7) umfasst; und der erste Gelenk- teil (41) und der zweite Gelenkteil (42) durch den Bolzen (7) miteinander gekoppelt sind.
 6. Der Vorderbacken der Skibindung (1) nach dem vorhergehenden Anspruch, wobei: der erste Ge- lenkteil (41) einen ersten Bolzensitz (91) umfasst, um rotierend mit dem Bolzen (7) gekoppelt zu wer- den, und der zweite Gelenkteil (42) einen zweiten Bolzensitz (92) umfasst, um rotierend mit dem Bol- zen (7) gekoppelt zu werden.
 7. Der Vorderbacken der Skibindung (1) nach dem vorhergehenden Anspruch, wobei: der Bolzen (7) eine zylindrische Form hat; der erste Bolzensitz (91) bildet einen ersten Teil einer zylindrischen Wand, um eine Formschlussverbindung mit dem Bolzen (7) zu realisieren; der zweite Bolzensitz (92) bildet einen zweiten Teil einer zylindrischen Wand, um eine Formschlussverbindung mit dem Bolzen (7) zu realisieren.
 8. Der Vorderbacken der Skibindung (1) nach einem der Ansprüche 1 bis 4, wobei: der erste Gelenkteil (41) einen dritten Teil einer zylindrischen Wand um- fasst; und der zweite Gelenkteil (42) einen vierten Teil einer zylindrischen Wand umfasst; der dritte Teil der zylindrischen Wand und der vierte Teil der zy-

lindrischen Wand direkt miteinander gekoppelt sind, wodurch eine Formschlussverbindung realisiert wird.

Revendications

1. Une butée avant d'une fixation de ski (1) pour ski (30) de randonnée, comprenant :

une base (2) fixable à un ski (30) ;
 une première mâchoire (11) couplée de manière rotative à la base (2) par rapport à un premier axe de rotation (R1) qui est parallèle à l'axe du ski (30) lorsque la base (2) est fixée au ski (30) ;
 une deuxième mâchoire (12) couplée de manière rotative à la base (2) par rapport à un deuxième axe de rotation (R2) qui est parallèle au premier axe de rotation (R1) ;
 une première broche (21) portée par la première mâchoire (11) pour insérer dans un premier trou latéral (31) réalisé dans la pointe d'une chaussure de ski (40) ;
 une deuxième broche (22) portée par la deuxième mâchoire (12) pour insérer dans un deuxième trou latéral (32) réalisé dans la pointe de la chaussure de ski (40) ;
 un levier d'activation (3) couplé de manière rotative à la base (2) ;
 une articulation (4) activable par le levier d'activation (3) et comprenant : une première partie de l'articulation (41) connectée à la première mâchoire (11) ; et une deuxième partie de l'articulation (42) connectée à la deuxième mâchoire (12) et couplée à la première partie de l'articulation (41) ;
 un premier moyen élastique (51) comprenant un premier ressort (51) interposé entre la première mâchoire (11) et la première partie de l'articulation (41) ; dans lequel la première partie de l'articulation (41) est pourvue d'un premier siège de ressort (61) pour recevoir une première extrémité du premier ressort (51) ;
 la première mâchoire (11) est pourvue d'un deuxième siège de ressort (62) pour recevoir une deuxième extrémité du premier ressort (51) ;
 la première mâchoire (11) et la première partie de l'articulation (41) sont couplées télescopiquement l'une à l'autre, permettant ainsi un glissement relatif entre la première mâchoire (11) et la première partie de l'articulation (41) lorsque le levier d'activation (3) active l'articulation (4), au moins l'une entre la première mâchoire (11) et la première partie de l'articulation (41) comprenant une portion de couplage télescopique tubulaire ; **caractérisée en ce que** le premier ressort (51) est enfermé par la première mâchoire (11) et par la première partie de

l'articulation (41) ;

elle comprend une première paroi latérale (71) qui : est solidement fixée à la base (2) ; s'étend entre le levier d'activation (3) et le premier axe de rotation (R1) dans une direction transversale au premier axe de rotation (R1) ; s'étend en hauteur par rapport au ski (30), lorsque la base (2) est fixée au ski (30), dans une mesure suffisante pour au moins partiellement fermer l'espace (70) entre la première paroi latérale (71), d'une part, et la première mâchoire (11) et la première partie de l'articulation (41), d'autre part ; et est adjacente à la première mâchoire (11) et à la première partie de l'articulation (41) dans une mesure suffisante pour au moins limiter le passage de la neige pendant l'utilisation de la butée avant de la fixation de ski (1) ;
 elle comprend une deuxième paroi latérale (72) qui : est solidement fixée à la base (2) ; s'étend entre le levier d'activation (3) et le deuxième axe de rotation (R2) dans une direction transversale au premier axe de rotation (R1) ; s'étend en hauteur par rapport au ski (30), lorsque la base (2) est fixée au ski (30), dans une mesure suffisante pour au moins partiellement fermer l'espace (70) entre la deuxième paroi latérale (72), d'une part, et la deuxième mâchoire (12) et la deuxième partie de l'articulation (42), d'autre part ; et est adjacente à la deuxième mâchoire (12) et à la deuxième partie de l'articulation (42) dans une mesure suffisante pour au moins limiter le passage de la neige pendant l'utilisation de la butée avant de la fixation de ski (1) ;
 elle comprend une troisième paroi latérale (73) qui : est disposée à l'arrière de la première paroi latérale (71) et de la deuxième paroi latérale (72) par rapport à la pointe du ski (30) lorsque la base (2) est fixée au ski (30) ; est solidement fixée à la base (2) ; s'étend entre le premier axe de rotation (R1) et le deuxième axe de rotation (R2) dans une direction transversale au premier axe de rotation (R1) ; s'étend en hauteur par rapport au ski (30), lorsque la base (2) est fixée au ski (30), dans une mesure suffisante pour au moins partiellement fermer l'espace (70) entre la troisième paroi latérale (73), d'une part, et la première mâchoire (11), la première partie de l'articulation (41), la deuxième partie de l'articulation (42) et la deuxième mâchoire (12), d'autre part ; et est adjacente à la première mâchoire (11), à la première partie de l'articulation (41), à la deuxième partie de l'articulation (42) et à la deuxième mâchoire (12) dans une mesure suffisante pour au moins limiter le passage de la neige pendant l'utilisation de la butée avant de la fixation de ski (1).

2. La butée avant de la fixation de ski (1) selon la

- revendication précédente, dans laquelle : elle comprend des deuxième moyens élastiques (52) qui comprennent un deuxième ressort (52) interposé entre la deuxième mâchoire (12) et la deuxième partie de l'articulation (42) ; la deuxième partie de l'articulation (42) est pourvue d'un troisième siège de ressort (63) pour recevoir une première extrémité du deuxième ressort (52) ; la deuxième mâchoire (12) est pourvue d'un quatrième siège de ressort (64) pour recevoir une deuxième extrémité du deuxième ressort (52) ; la deuxième mâchoire (12) et la deuxième partie de l'articulation (42) sont couplées télescopiquement l'une à l'autre, permettant ainsi un glissement relatif entre la deuxième mâchoire (12) et la deuxième partie de l'articulation (42) lorsque le levier d'activation (3) active l'articulation (4), au moins l'une entre la deuxième mâchoire (12) et la deuxième partie de l'articulation (42) comprenant une portion de couplage télescopique tubulaire ; le deuxième ressort (52) est enfermé par la deuxième mâchoire (12) et par la deuxième partie de l'articulation (42).
3. La butée avant de la fixation de ski (1) selon la revendication 1 ou 2, dans laquelle : la première mâchoire (11) comprend une première portion de mâchoire (110) qui s'étend entre le premier axe de rotation (R1) et la première partie de l'articulation (41), pour couvrir l'espace entre la première paroi latérale (71) et la troisième paroi latérale (73) ; la première partie de l'articulation (41) s'étend pour couvrir l'espace entre la première paroi latérale (71) et la troisième paroi latérale (73) ; la deuxième partie de l'articulation (42) s'étend pour couvrir l'espace entre la deuxième paroi latérale (72) et la troisième paroi latérale (73) ; la deuxième mâchoire (12) comprend une deuxième portion de mâchoire (120) qui s'étend entre le deuxième axe de rotation (R2) et la deuxième partie de l'articulation (42), pour couvrir l'espace entre la deuxième paroi latérale (72) et la troisième paroi latérale (73).
4. La butée avant de la fixation de ski (1) selon l'une quelconque des revendications précédentes, dans laquelle les parois externes (100) de la première portion de mâchoire (110), de la première partie de l'articulation (41), de la deuxième partie de l'articulation (42) et de la deuxième portion de mâchoire (120), qui font face à une direction opposée par rapport à la pointe du ski (30), lorsque la base (2) est fixée au ski (30), forment une surface continue afin de limiter au moins le passage de la neige.
5. La butée avant de la fixation de ski (1) selon l'une quelconque des revendications précédentes, dans laquelle : l'articulation (4) comprend une broche (7) ; et la première partie de l'articulation (41) et la deuxième partie de l'articulation (42) sont couplées l'une à l'autre par l'intermédiaire de la broche (7).
6. La butée avant de la fixation de ski (1) selon la revendication précédente, dans laquelle : la première partie de l'articulation (41) comprend un premier siège de broche (91) pour un couplage rotatif avec la broche (7), et la deuxième partie de l'articulation (42) comprend un deuxième siège de broche (92) pour un couplage rotatif avec la broche (7).
7. La butée avant de la fixation de ski (1) selon la revendication précédente, dans laquelle : la broche (7) a une forme cylindrique ; le premier siège de broche (91) forme une première portion de paroi cylindrique afin de réaliser un couplage de forme avec la broche (7) ; le deuxième siège de broche (92) forme une deuxième portion de paroi cylindrique afin de réaliser un couplage de forme avec la broche (7).
8. La butée avant de la fixation de ski (1) selon l'une quelconque des revendications 1 à 4, dans laquelle : la première partie de l'articulation (41) comprend une troisième portion de paroi cylindrique ; et la deuxième partie de l'articulation (42) comprend une quatrième portion de paroi cylindrique ; la troisième portion de paroi cylindrique et la quatrième portion de paroi cylindrique sont directement couplées l'une à l'autre, réalisant un couplage de forme.

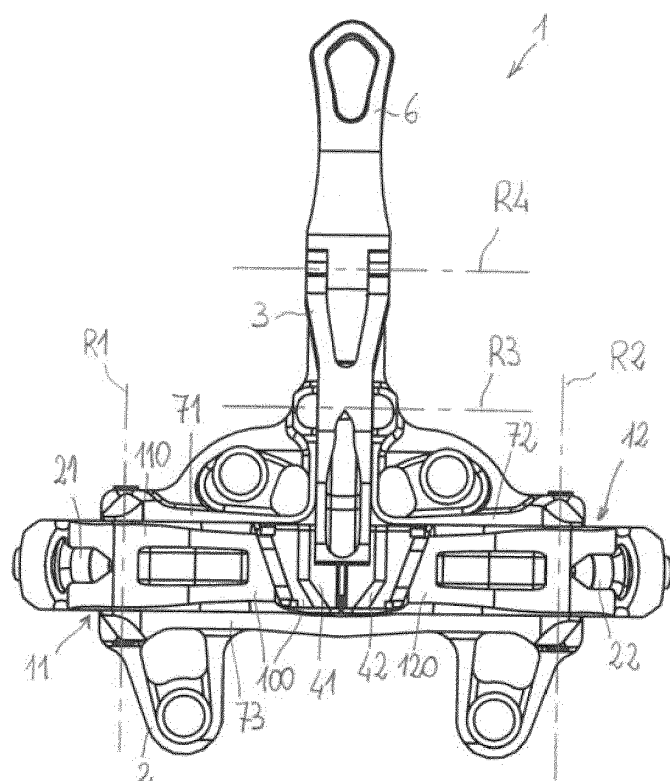


FIG 1

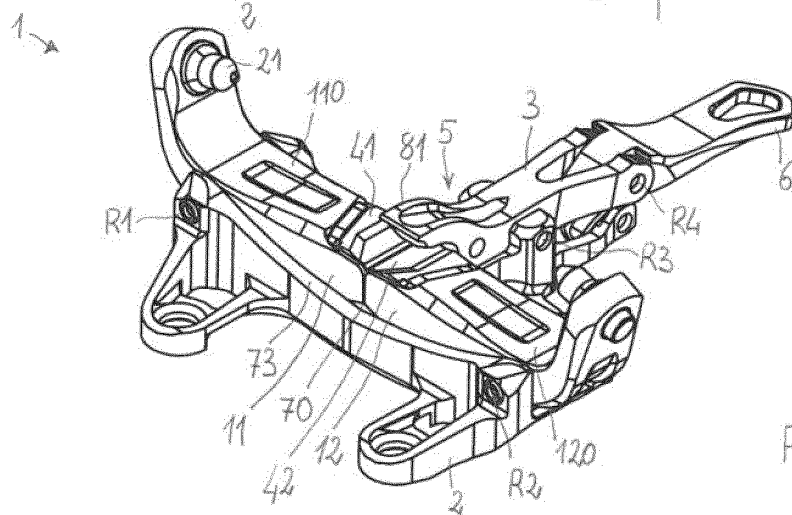


FIG 2

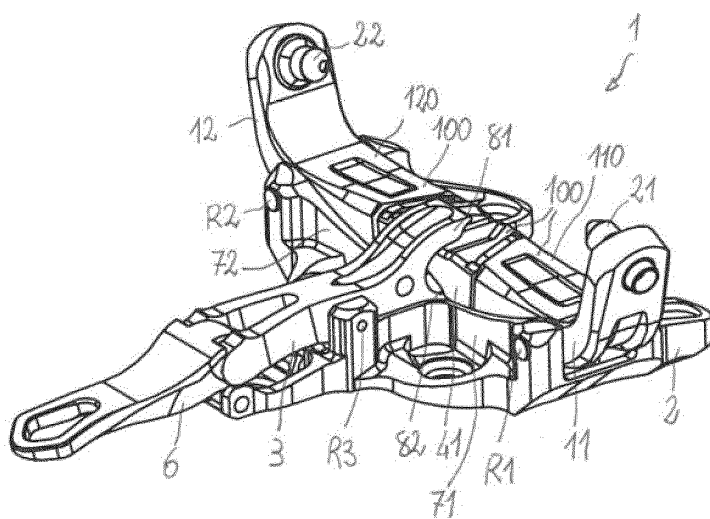
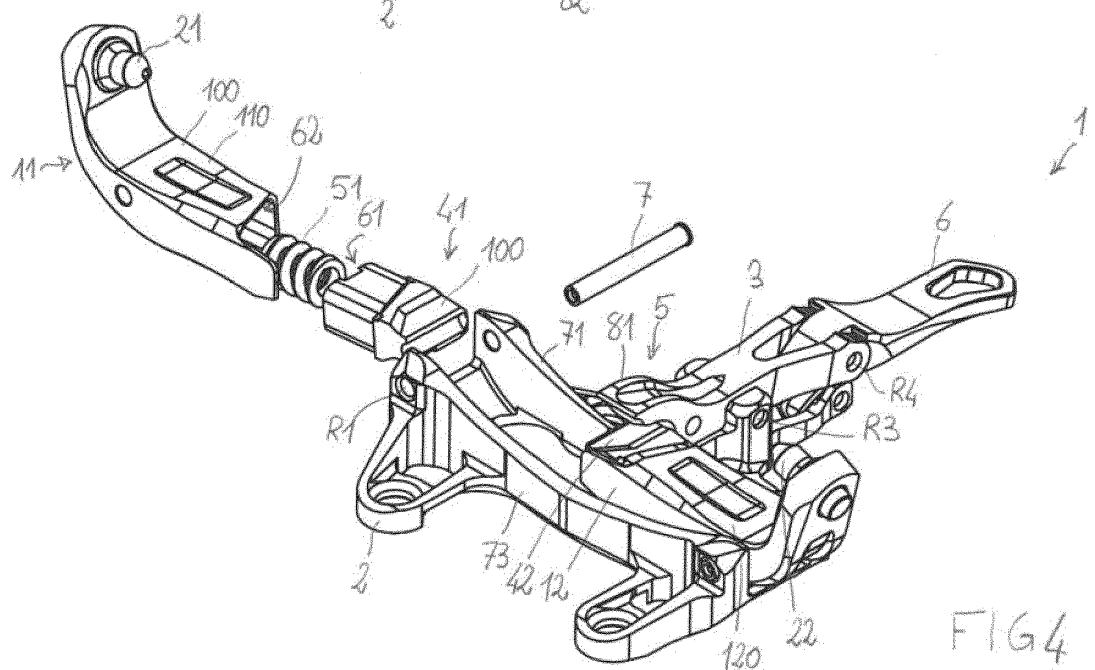
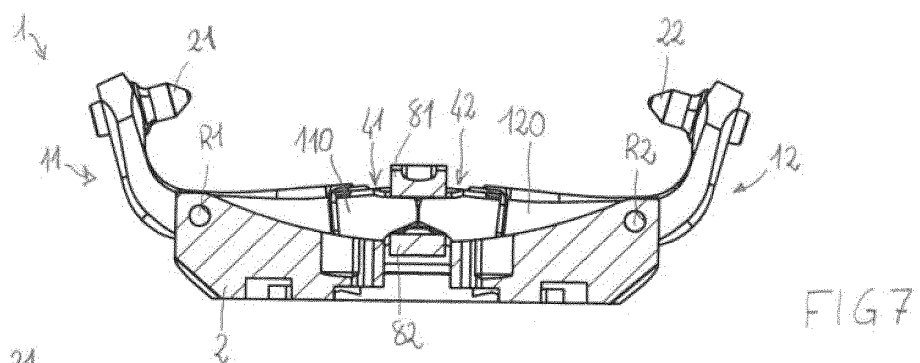
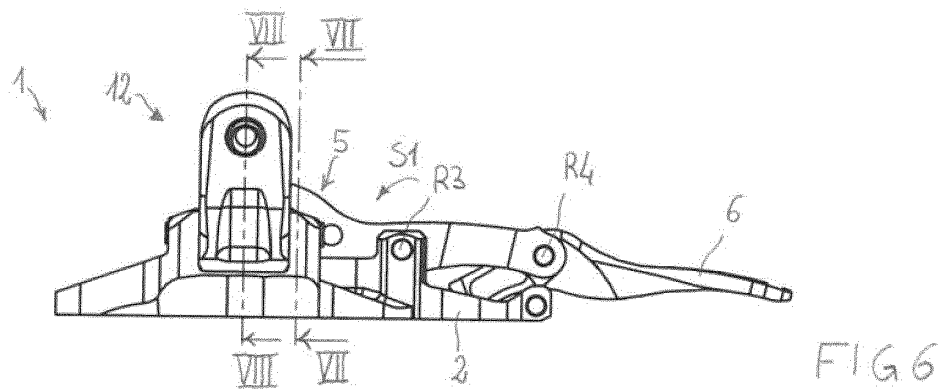
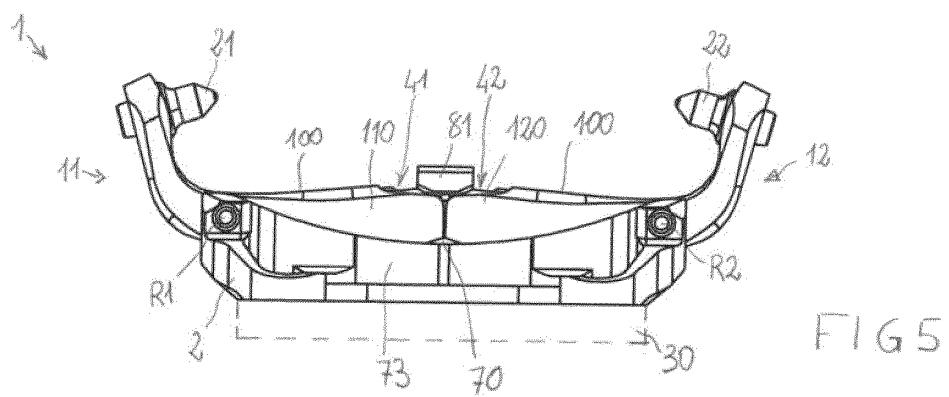
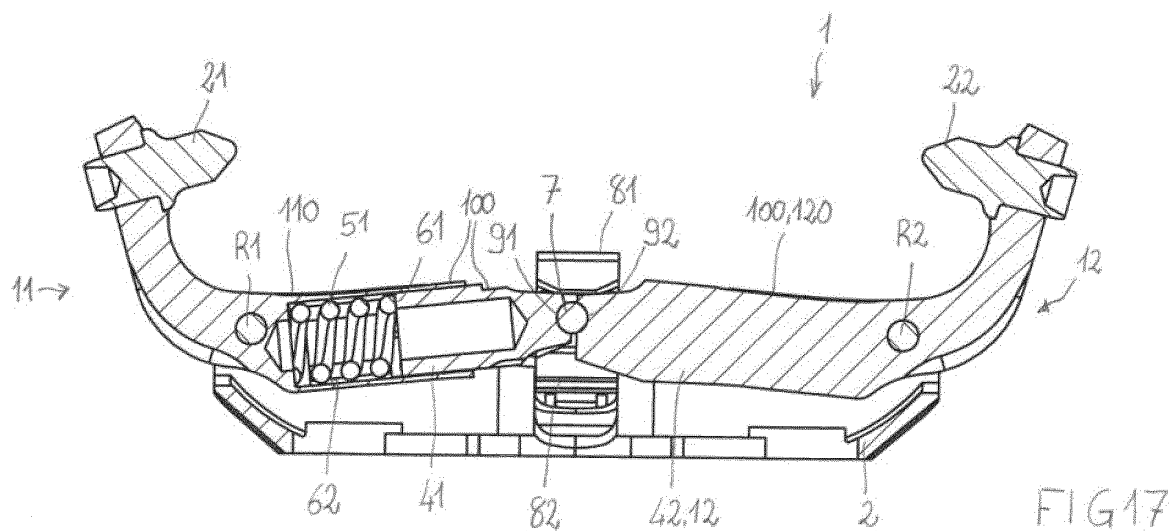
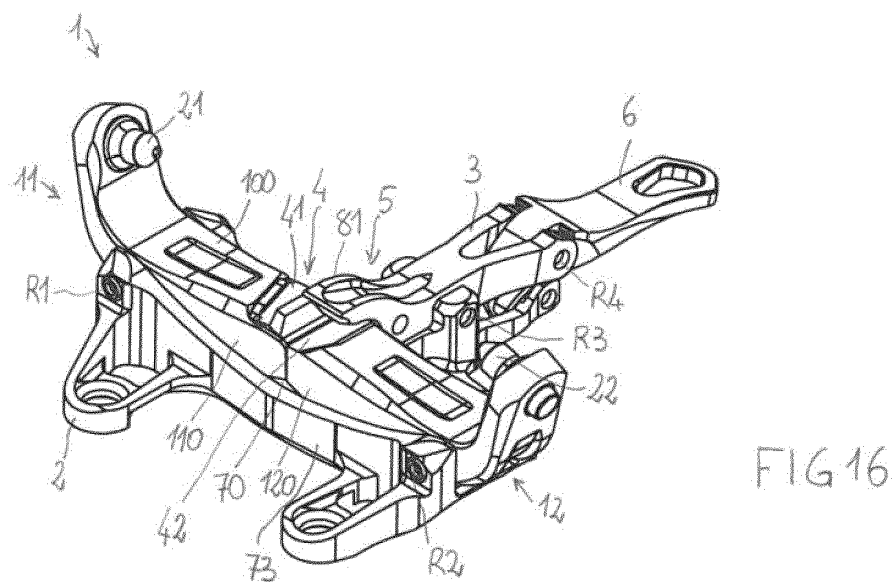
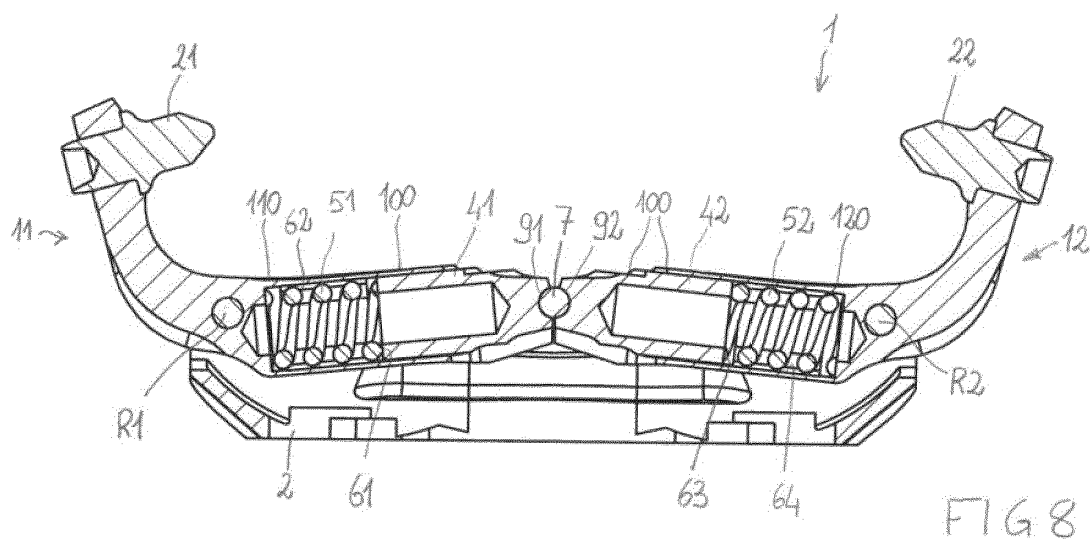


FIG 3





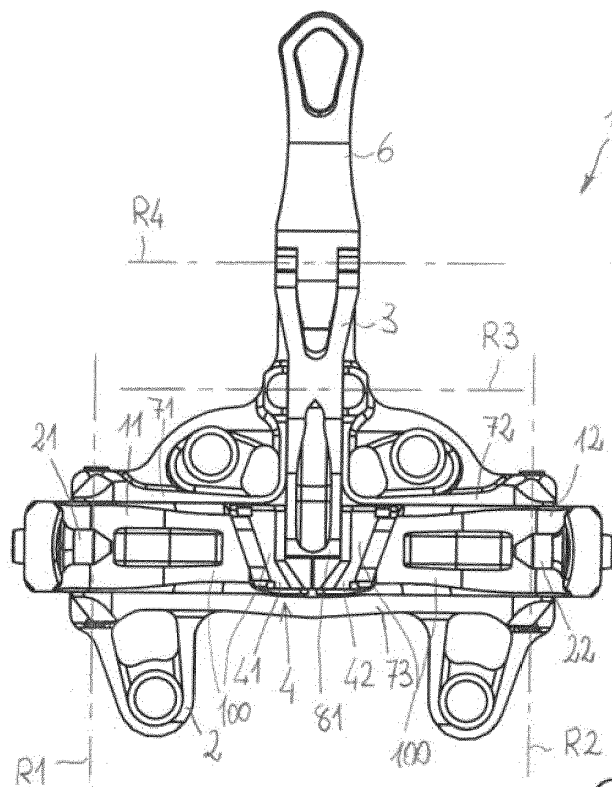


FIG 9

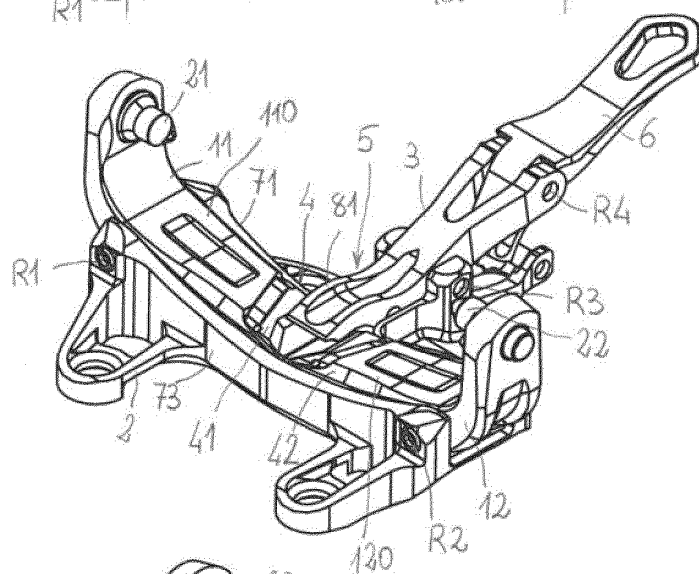


FIG 10

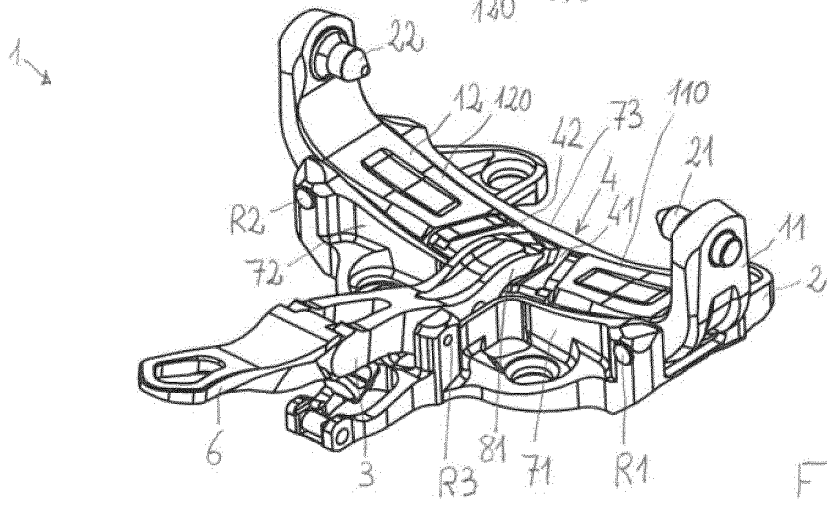


FIG 11

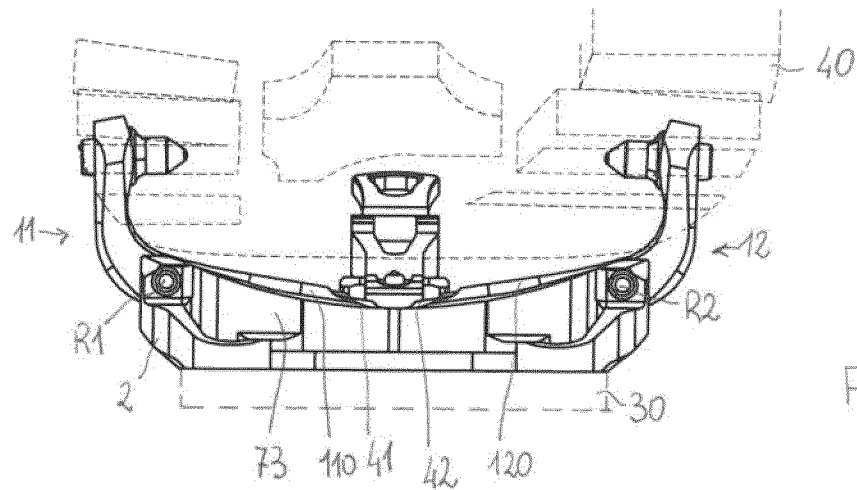


FIG 12

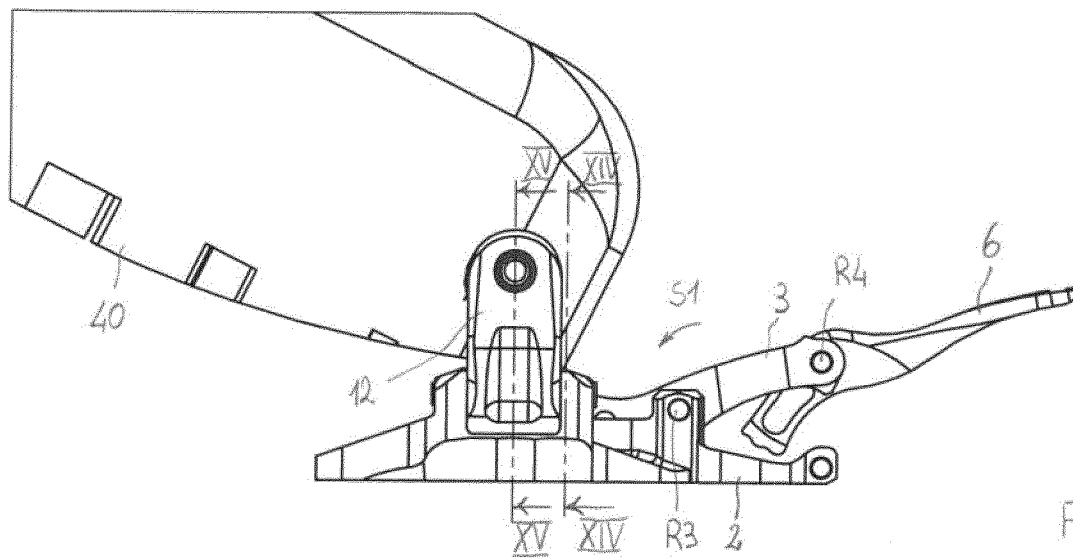


FIG 13

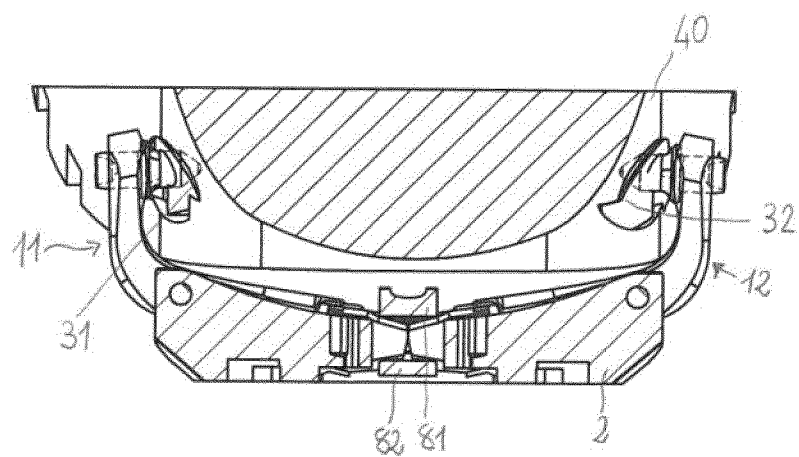
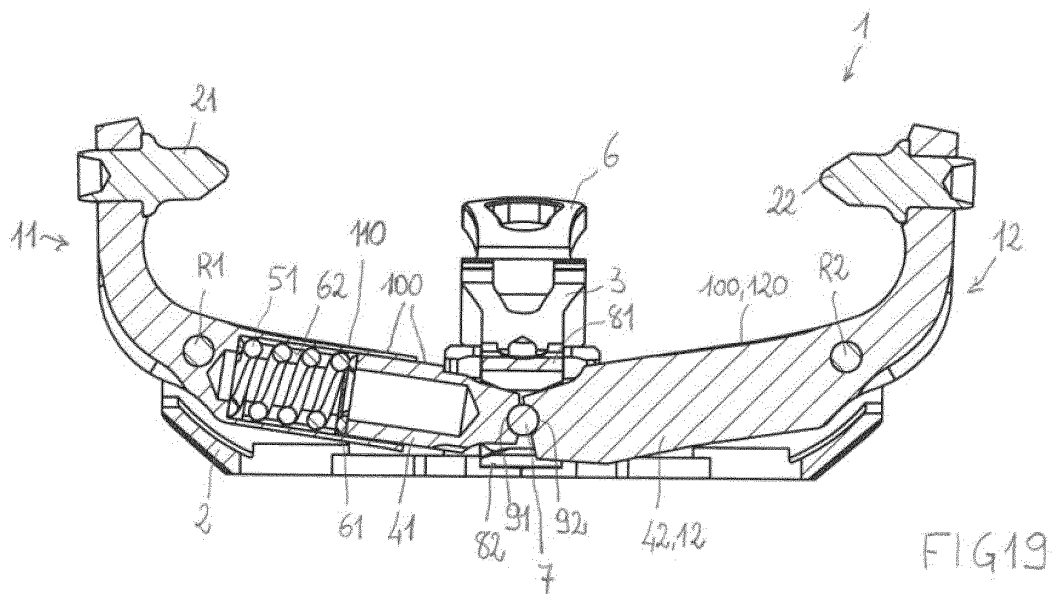
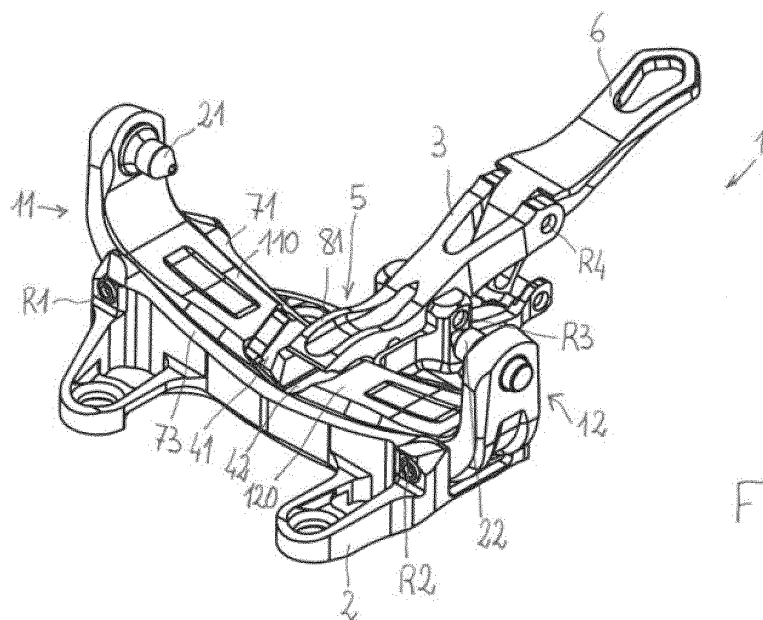
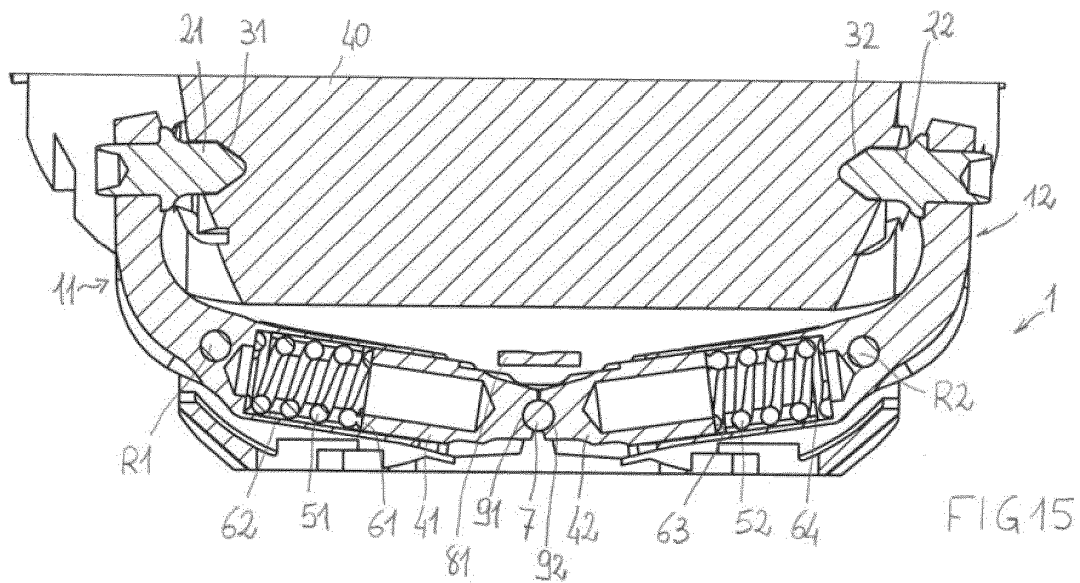


FIG 14



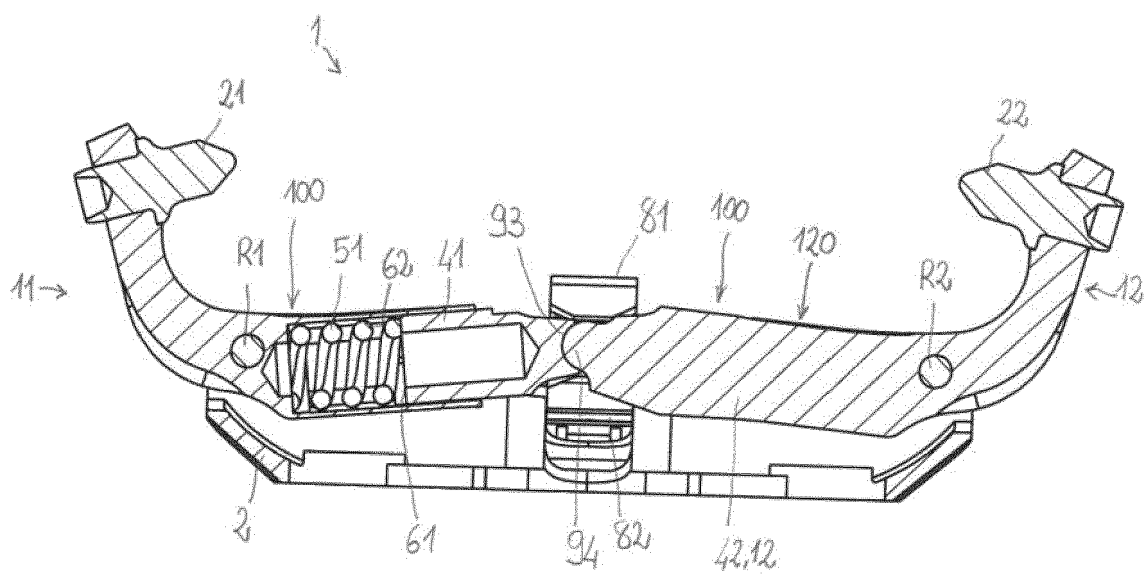
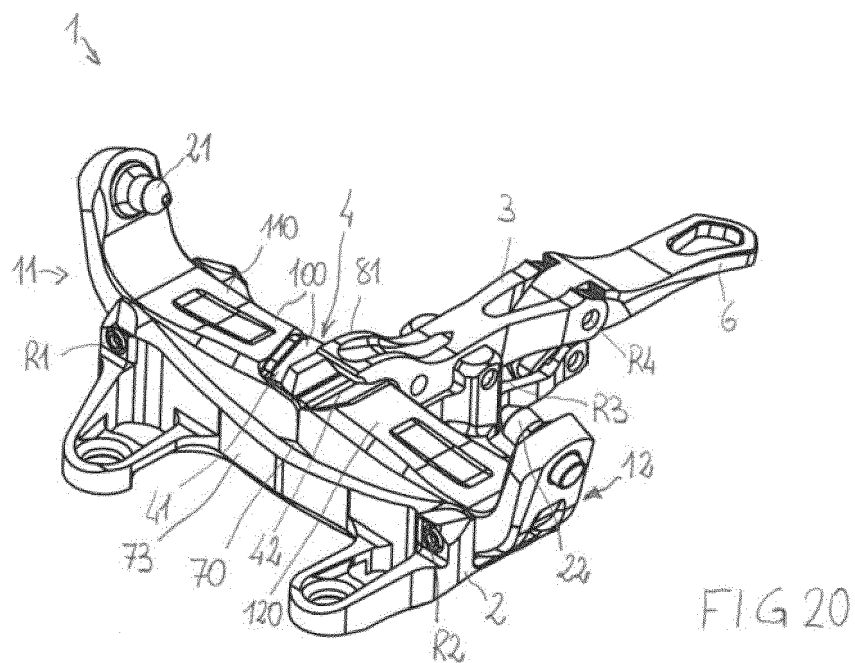


FIG 21

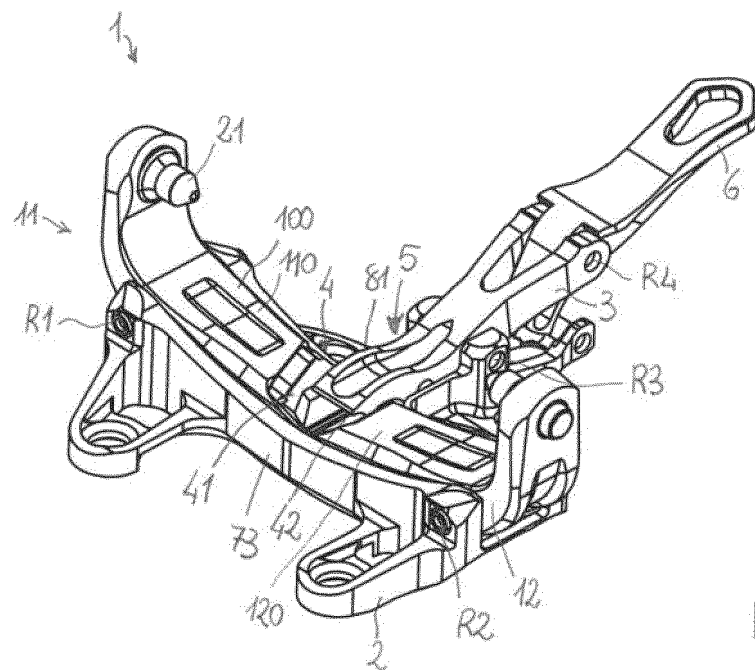


FIG 22

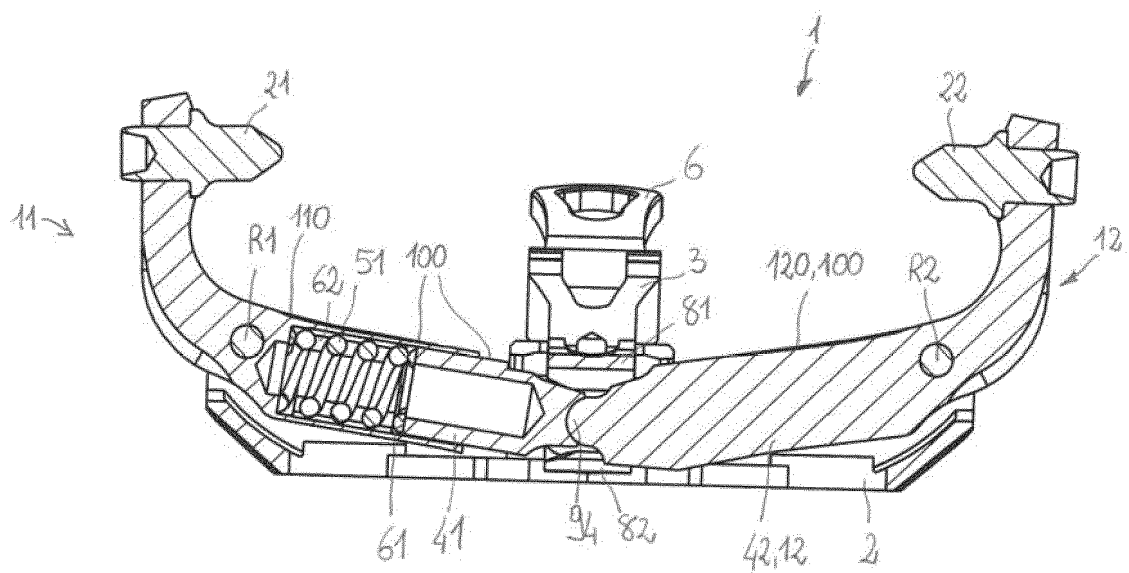


FIG 23

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 3300778 A1 [0004]
- EP 3050601 A1 [0005]