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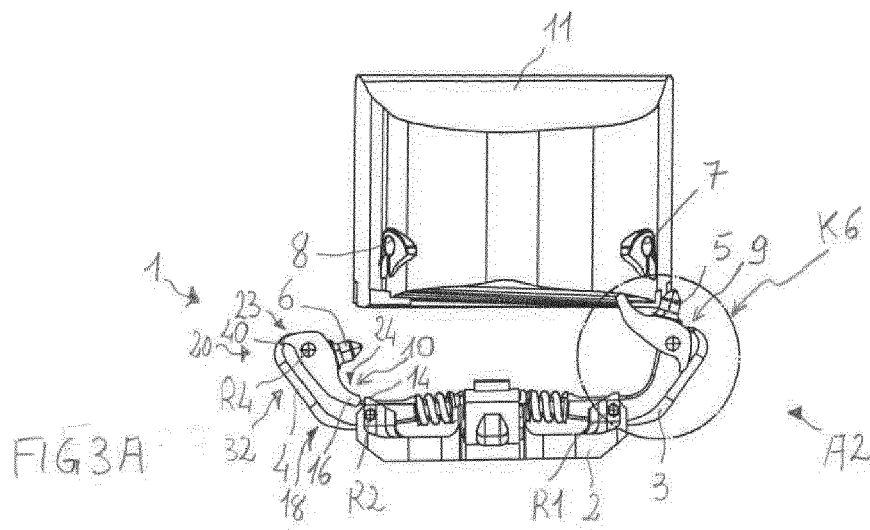
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(54) **A TOE-PIECE OF A SKI BINDING**

(57) A toe-piece of a ski binding (1), comprising: a member (2); a first jaw (31) which in turn comprises: a first main body (3) which is rotatably coupled to the member (2), for rotating between an internal position and an external position; a first hooking pin (5) for inserting in a first hole (7) fashioned in a ski boot (11); a second jaw (32) which in turn comprises: a second main body (4) which is rotatably coupled to the member (2), for rotating between an internal position and an external position; a second hooking pin (6) for inserting in a second hole (8) fashioned in the ski boot (11); the toe-piece of the ski binding (1) being configured so as:

to assume a hooked configuration of the ski boot (A1), wherein the first main body (3) is in the internal position and the second main body (4) is in the internal position, with the consequence that the first hooking pin (5) and the second hooking pin (6) are at a first distance from one another so as to insert in the first hole (7) and the second hole (8) of the ski boot (11) when the ski boot (11) is neared to the toe-piece of the ski binding (1); so as to assume an unhooked configuration of the ski boot (A2), wherein the first main body (3) is in the external position and the second main body (4) is in the external position, with the consequence that the first hooking pin

(5) and the second hooking pin (6) are at a second distance from one another, greater than the first distance, for enabling the ski boot (11), once unhooked, to distance from the toe-piece of the ski binding (1). The toe-piece of the ski binding (1) comprises a first arm (9) which is rotatably coupled to the first main body (3) so as to rotate between a internal position and an external position, and which bears the first hooking pin (5). The toe-piece of the ski binding (1) is configured in such a way that: in the hooked configuration of the ski boot (A1) and in the unhooked configuration of the ski boot (A2) the first arm (9) is in the internal position; starting from the hooked configuration of the ski boot (A1) and in a case of a stress leading to the unhooked configuration of the ski boot (A2), the movement of the ski boot (11) can determine, by means of the coupling between the first hooking pin (5) and the first hole (7), the rotation of the first arm (9) into the external position so that the first hooking pin (5) reaches a distance from the second hooking pin (6) which is greater than the second distance, thus facilitating the distancing of the ski boot (11) from the toe-piece of the ski binding (1).



Description

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

[0002] A toe-piece of a ski binding of known type comprises: a base which is fixable to a ski; a first jaw which is rotoidally coupled to the base, for rotating between an internal position and an external position; a first hooking pin, borne by the first jaw, for inserting in a first hole fashioned in a ski boot; a second jaw which is rotoidally coupled to the base, for rotating between an internal position and an external position; a second hooking pin which is borne by the second jaw, for inserting in a second hole fashioned in the ski boot. The toe-piece of the ski binding is configured so as: to assume a hooked configuration of the ski boot, wherein the first jaw is in the internal position and the second jaw is in the internal position, with the consequence that the first hooking pin and the second hooking pin are at a first distance from one another, for being inserted in the first hole and the second hole of the ski boot, when the ski boot is neared to the toe-piece of the ski binding; to assume an unhooked configuration of the ski boot, wherein the first jaw is in the external position and the second jaw is in the external position, with the consequence that the first hooking pin and the second hooking pin are at a second distance from one another, greater than the first distance, for enabling the ski boot, once unhooked, to be distanced from the toe-piece of the ski binding.

[0003] During skiing activity, in particular during a descent where the toe-piece of the ski binding is in the hooked configuration of the ski boot, if there is a stress (an impact or a fall, for example) on the ski boot or on the ski, the toe-piece of the ski binding must unhook, thus passing into the unhooked configuration of the ski boot and enabling the ski boot to distance from the toe-piece of the ski binding and, therefore, from the ski. This occurs only in some cases, as notwithstanding the fact that the first hooking pin and the second hooking pin reach the second distance and theoretically enable the ski boot to distance, the ski boot might instead remain hooked to the first hooking pin or the second hooking pin, which would therefore remain internally of the first hole or the second hole, which might constitute a hazard for the well-being of the skier.

[0004] The aim of the present invention consists at least in attenuating the above-mentioned drawback.

[0005] The above aim is attained with a toe-piece of a ski binding according to claim 1.

[0006] In the toe-piece for the ski binding of the present invention, if during skiing activity a stress leads to an unhooked configuration of the ski boot and the ski boot remains, notwithstanding, hooked to the first hooking pin, the ski boot causes the rotation of the first arm and thus the first hooking pin, thus easily disengaging from the toe-piece of the ski binding and advantageously safeguarding the well-being of the skier.

[0007] Specific embodiments of the invention will be described in the following part of this application, according to what is set down in the claims and with the aid of the accompanying tables of drawings, in which:

- figures 1A, 1B, 1C are respectively a frontal, lateral and plan view of a front portion of a ski boot and a toe-piece of a ski binding according to the present invention, in a first operating configuration;
- figures 1D, 1E, 1F are respectively a view of section A-A of figure 1C, larger-scale detail K1 of figure 1D and larger-scale detail K2 of figure 1A;
- figures 2A, 2B, 2C are respectively a frontal, lateral and plan view of a front portion of the ski boot and the toe-piece of a ski binding according to the present invention, in a second operating configuration;
- figures 2D, 2E, 2F are respectively a view of section A-A of figure 2C, larger-scale detail K3 of figure 2D and larger-scale detail K4 of figure 2A;
- figures 3A, 3B, 3C are respectively a frontal, lateral and plan view of a front portion of the ski boot and the toe-piece of a ski binding according to the present invention, in a second operating configuration;
- figures 3D, 3E, 3F are respectively a view of section A-A of figure 3C, larger-scale detail K5 of figure 3D and larger-scale detail K6 of figure 3A.

[0008] With reference to the appended figures, reference numeral (1) denotes in its entirety a toe-piece of a ski binding according to the invention, comprising: a member (2); a first jaw (31) which in turn comprises: a first main body (3) which is rotatably coupled to the member (2), for rotating between an internal position (figures 1A-1F) and an external position (figures 2A-2F, 3A-3F); a first hooking pin (5) for inserting in a first hole (7) fashioned in a ski boot (11); a second jaw (32) which in turn comprises: a second main body (4) which is rotatably coupled to the member (2), for rotating between an internal position (figures 1A-1F) and an external position (figures 2A-2F, 3A-3F); a second hooking pin (6) for inserting in a second hole (8) fashioned in the ski boot (11). The toe-piece of the ski binding (1) is configured such as: to assume a hooked configuration of the ski boot (A1) (figures 1A-1F), wherein the first main body (3) is in the internal position and the second main body (4) is in the internal position, with the consequence that the first hooking pin (5) and the second hooking pin (6) are at a first distance from one another so as to insert in the first hole (7) and the second hole (8) of the ski boot (11) when the ski boot (11) is neared to the toe-piece of the ski binding (1); so as to assume an unhooked configuration of the ski boot (A2) (figures 2A-2F, 3A-3F), wherein the first main body (3) is in the external position and the second

main body (4) is in the external position, with the consequence that the first hooking pin (5) and the second hooking pin (6) are at a second distance from one another, greater than the first distance, for enabling the ski boot (11), once unhooked, to distance from the toe-piece of the ski binding (1). Further, the toe-piece of the ski binding (1) comprises a first arm (9) which is rotatably coupled to the first main body (3) so as to rotate between a internal position (figures 1A-1F, 2A-2F) and an external position (figures 3A-3F), and which bears the first hooking pin (5). The toe-piece of the ski binding (1) is further configured in such a way that: in the hooked configuration of the ski boot (A1) and in the unhooked configuration of the ski boot (A2) the first arm (9) is in the internal position; starting from the hooked configuration of the ski boot (A1) and in a case of a stress leading to the unhooked configuration of the ski boot (A2), the movement of the ski boot (11) can determine, by means of the coupling between the first hooking pin (5) and the first hole (7), the rotation of the first arm (9) into the external position so that the first hooking pin (5) reaches a distance from the second hooking pin (6) which is greater than the second distance, thus facilitating the distancing of the ski boot (11) from the toe-piece of the ski binding (1) (compare figures 2A-2F and figures 3A-3F).

[0009] The member (2) can be a base fixable to a ski (not illustrated) or can be a slide (solution not illustrated) which can slide with respect to a base fixable to a ski.

[0010] The first main body (3) is preferably coupled rotoidally to the member (2), by means of a first axis of rotation (R1) (figure 1A, 1F for example). The first axis of rotation (R1) can be parallel to the ski when the toe-piece of the ski binding (1) is coupled to the ski.

[0011] The second main body (4) is preferably coupled rotoidally to the member (2), by means of a second axis of rotation (R2). The second axis of rotation (R2) can be parallel to the ski when the toe-piece of the ski binding (1) is coupled to the ski.

[0012] The first arm (9) is preferably coupled rotoidally to the first main body (3), by means of a third axis of rotation (R3) which can be parallel to the first axis of rotation (R1).

[0013] When the first arm (9) is in the internal position it is preferably substantially aligned to the first main body (3) (figures 1F, 2F) and when the first arm (9) is in the external position it is transversal to the first main body (3) (figure 3F).

[0014] The member (2) preferably comprises a first catch (13) and wherein the first arm (9) comprises a first abutment (15), the toe-piece of the ski binding (1) being configured so that: when the first main body (3) is in the internal position and the first arm (9) is in the internal position, the first stop (13) prevents the first arm (9) from reaching the external position, as it can abut the first abutment (15) (see in particular figure 1F); when the first main body (3) is in the external position and the first arm (9) is in the internal position, the first arm (9) can reach the external position (in succession figures 2F and 3F). The

first catch (13) advantageously prevents, in the hooked configuration of the ski boot (A1), an accidental unhooking of the ski boot (11).

[0015] The first main body (3) preferably comprises a first intermediate portion (17) at which the rotatable coupling between the first main body (3) and the member (2) takes place, and a first external portion (19) at which the rotatable coupling between the first main body (3) and the first arm (9) takes place; further, the first arm (9) comprises a first end portion (21) at which the rotatable coupling between the first main body (3) and the first arm (9) takes place.

[0016] The toe-piece of the ski binding (1) preferably comprises first elastic means (27) which are interposed between the first main body (3) and the first arm (9) for maintaining the first arm (9) in the internal position. Alternatively, the first elastic means can be replaced with magnetic means (solution not illustrated), comprising a first magnet on-board the first arm (9) and a second magnet on-board the first main body (3), for maintaining the first arm (9) in the internal position.

[0017] More in detail, the first elastic means (27) can comprise a first spring (33) and the first main body (3) can be provided with a first housing (35) for receiving the first spring (33). Further, the toe-piece of the ski binding (1) can comprise a first sphere (37) which contacts the free end of the first spring (33) in order to receive, from the first spring (33), a corresponding elastic thrust. The first arm (9) can comprise a first hooked portion (39) at the relative first end portion (21), in order to abut the first sphere (37) (see figures 1E, 2E, 3E).

[0018] The first arm (9) preferably comprises a second end portion (22), which bears the first abutment (15). The second end portion (22) can have the shape of an appendage (see figures 1F, 2F for example).

[0019] The first hooking pin (5) can be fixed to an intermediate portion of the first arm (9).

[0020] The second jaw (32) preferably comprises a second arm (10) which is coupled rotatably to the second main body (4) so as to rotate between an internal position (figures 1A-1F, 2A-2F) and an external position (not illustrated but alike to the external position assumed by the first arm (9), figures 3A-3F), and which bears the second hooking pin (6); the toe-piece of the ski binding (1) being configured so that: in the hooked configuration of the ski boot (A1) and in the unhooked configuration of the ski boot (A2) the second arm (10) is in the internal position; starting from the hooked configuration of the ski boot (A1), and in a case of a stress leading to the unhooked configuration of the ski boot (A2), the movement of the ski boot (11) can determine, by means of the coupling between the second hooking pin (6) and the second hole (8), the rotation of the second arm (10) into the external position (as mentioned, not illustrated) so that the second hooking pin (6) reaches a distance from the first hooking pin (5) which is greater than the second distance, thus facilitating the distancing of the ski boot (11) from the toe-piece of the ski binding (1).

[0021] The second arm (10) is preferably coupled rotoidally to the second main body (4), by means of a fourth axis of rotation (R4) which can be parallel to the second axis of rotation (R2).

[0022] When the second arm (10) is in the internal position it is preferably substantially aligned to the second main body (4) and when the second arm (10) is in the external position it is transversal to the second main body (4).

[0023] The member (2) preferably comprises a second catch (14) and the second arm (10) comprises a second abutment (16), the toe-piece of the ski binding (1) is configured so that: when the second main body (4) is in the internal position and the second arm (10) is in the internal position, the second stop (14) prevents the second arm (10) from reaching the external position, as it can abut the second abutment (16); when the second main body (4) is in the external position and the second arm (10) is in the internal position, the second arm (10) can reach the external position. The second catch (14) advantageously prevents, in the hooked configuration of the ski boot (A1), an accidental unhooking of the ski boot (11).

[0024] The second main body (4) preferably comprises a second intermediate portion (18) at which the rotatable coupling between the second main body (4) and the member (2) takes place, and a second external portion (20) at which the rotatable coupling between the second main body (4) and the second arm (10) takes place; further, the second arm (10) comprises a third end portion (23) at which the rotatable coupling between the second main body (4) and the second arm (10) takes place.

[0025] The toe-piece of the ski binding (1) preferably comprises second elastic means (28) which are interposed between the second main body (4) and the second arm (10) for maintaining the second arm (10) in the internal position. Alternatively the second elastic means can be substituted by second magnetic means comprising a third magnet on-board the second arm (10) and a fourth magnet on-board the second main body (4), for maintaining the second arm (10) in the internal position.

[0026] More in detail, the second elastic means (28) can comprise a second spring (34) and the second main body (4) can be provided with a second housing (36) for receiving the second spring (34). Further, the toe-piece of the ski binding (1) can comprise a second sphere (38) which contacts the free end of the first spring (34) in order to receive, from the second spring (34), a corresponding elastic thrust. The second arm (10) can comprise a second hooked portion (40) at the relative third end portion (23), in order to abut the second sphere (38) (see figures 1D, 2D, 3D).

[0027] The second arm (10) preferably comprises a fourth end portion (24), which bears the second abutment (16). The fourth end portion (24) can have the shape of an appendage (see figures 1A, 2A, 3A).

[0028] The second hooking pin (6) can be fixed to an intermediate portion of the second arm (10).

[0029] In the following the functioning of the toe-piece

of the ski binding (1) is described, in a case in which a stress takes place that, starting from the hooked configuration of the ski boot (A1) (figures 1A-1F) leads to the unhooked configuration of the ski boot (A2) (figures 2A-2F, 3A-3F).

[0030] Figures 1A-1F show the toe-piece of the ski binding (1) in the hooked configuration of the ski boot (A1): in fact, the first main body (3) is in the internal position and the second main body (4) is in the internal position, the first arm (9) is in the internal position, the second arm (10) is in the internal position, the first hooking pin (5) is inserted in the first hole (7) of the ski boot (11) and the second hooking pin (6) is inserted in the second hole (8) of the ski boot (11). The first hooking pin (5) and the second hooking pin (6) are at the first distance from one another. The first catch (13) and the second catch (14) prevent an accidental unhooking of the ski boot (11), due to the fact that they prevent respectively the first arm (9) and the second arm (10) from reaching the relative external position, as it can abut the first abutment (15) and the second abutment (16).

[0031] Figures 2A-2F illustrate a case in which there is a stress that leads to the unhooked configuration of the ski boot (11): in fact, the first main body (3) is in the external position and the second main body (4) is in the external position, the first arm (9) is in the internal position, the second arm (10) is in the internal position, the first hooking pin (5) is inserted in the first hole (7) of the ski boot (11) and the second hooking pin (6) is inserted in the second hole (8) of the ski boot (11) (figure 2A). The first hooking pin (5) and the second hooking pin (6) are at the second distance from one another, but notwithstanding this the ski boot (11) is still hooked to the first hooking pin (5), which can be a hazard for the well-being of the skier. The first catch (13) and the second catch (14) do not however prevent respectively the first arm (9) and second arm (10) from reaching the relative external position: in fact, any rotational movement of the first arm (9) or the second arm (10) would not respectively lead the first abutment (15) and the second abutment (16) to intercept the first catch (13) and the second catch (14).

[0032] Subsequently, figures 3A-3F, the ski boot (11) determines the rotation of the first arm (9) which thus is brought into the external position (fig.3A), which causes the effective unhooking of the ski boot (11) from the toe-piece (1) and thus the subsequent distancing of the ski boot (11) from the toe-piece of the ski binding (1).

[0033] The above is understood to have been described by way of non-limiting example, so that any eventual constructional variants are understood to fall within the scope of the present technical solution, as claimed in the following.

Claims

1. A toe-piece of a ski binding (1), comprising:

a member (2);
 a first jaw (31) which in turn comprises: a first main body (3) which is rotatably coupled to the member (2), for rotating between an internal position and an external position; a first hooking pin (5) for inserting in a first hole (7) fashioned in a ski boot (11);
 a second jaw (32) which in turn comprises: a second main body (4) which is rotatably coupled to the member (2), for rotating between an internal position and an external position; a second hooking pin (6) for inserting in a second hole (8) fashioned in the ski boot (11);
 the toe-piece of the ski binding (1) being configured so as:

to assume a hooked configuration of the ski boot (A1), wherein the first main body (3) is in the internal position and the second main body (4) is in the internal position, with the consequence that the first hooking pin (5) and the second hooking pin (6) are at a first distance from one another so as to insert in the first hole (7) and the second hole (8) of the ski boot (11) when the ski boot (11) is neared to the toe-piece of the ski binding (1); so as to assume an unhooked configuration of the ski boot (A2), wherein the first main body (3) is in the external position and the second main body (4) is in the external position, with the consequence that the first hooking pin (5) and the second hooking pin (6) are at a second distance from one another, greater than the first distance, for enabling the ski boot (11), once unhooked, to distance from the toe-piece of the ski binding (1);

characterised in that:

it comprises a first arm (9) which is rotatably coupled to the first main body (3) so as to rotate between a internal position and an external position, and which bears the first hooking pin (5);
 the toe-piece of the ski binding (1) is configured in such a way that: in the hooked configuration of the ski boot (A1) and in the unhooked configuration of the ski boot (A2) the first arm (9) is in the internal position; starting from the hooked configuration of the ski boot (A1) and in a case of a stress leading to the unhooked configuration of the ski boot (A2), the movement of the ski boot (11) can determine, by means of the coupling between the first hooking pin (5) and the first hole (7), the rotation of the first arm (9) into the external position so that the first

hooking pin (5) reaches a distance from the second hooking pin (6) which is greater than the second distance, thus facilitating the distancing of the ski boot (11) from the toe-piece of the ski binding (1).

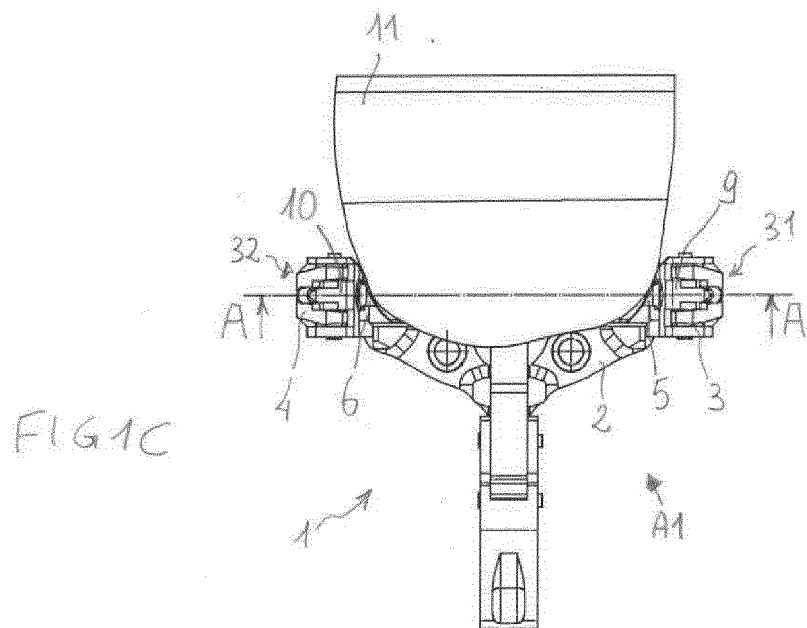
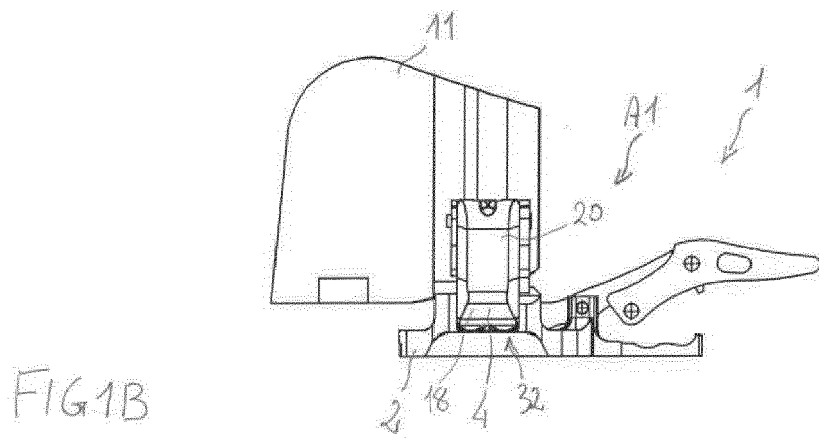
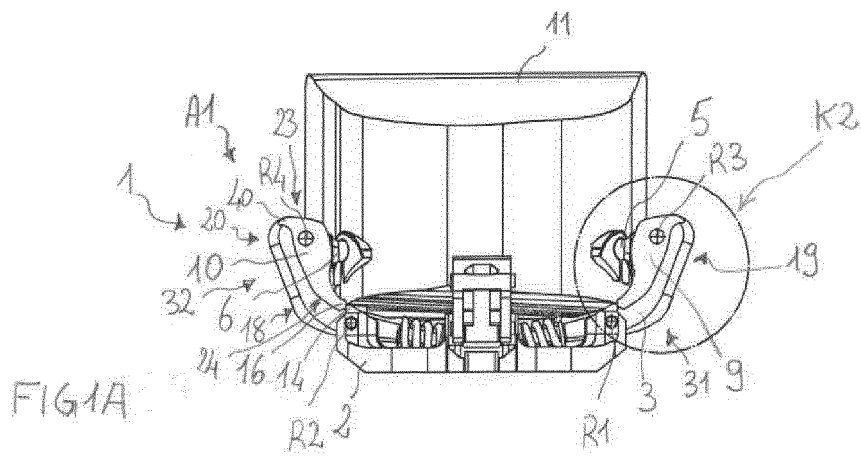
2. The toe-piece of a ski binding (1) of the preceding claim, wherein when the first arm (9) is in the internal position it is substantially aligned to the first main body (3) and wherein when the first arm (9) is in the external position it is transversal to the first main body (3).
3. The toe-piece of a ski binding (1) of claim 1 or 2, wherein the member (2) comprises a first catch (13) and wherein the first arm (9) comprises a first abutment (15), the toe-piece of the ski binding (1) being configured so that: when the first main body (3) is in the internal position and the first arm (9) is in the internal position, the first catch (13) prevents the first arm (9) from reaching the external position, as it can abut the first abutment (15); when the first main body (3) is in the external position and the first arm (9) is in the internal position, the first arm (9) can reach the external position.
4. The toe-piece of a ski binding (1) of any one of the preceding claims, wherein: the first main body (3) comprises a first intermediate portion (17) at which the rotatable coupling between the first main body (3) and the member (2) takes place, and a first external portion (19) at which the rotatable coupling between the first main body (3) and the first arm (9) takes place; and the first arm (9) comprises a first end portion (21) at which the rotatable coupling between the first main body (3) and the first arm (9) takes place.
5. The toe-piece of a ski binding (1) of any one of the preceding claims, comprising first elastic means (27) which are interposed between the first main body (3) and the first arm (9) for maintaining the first arm (9) in the internal position.
6. The toe-piece of a ski binding (1) of any one of the preceding claims, wherein the second jaw (32) comprises a second arm (10) which is coupled rotatably to the second main body (4) so as to rotate between an internal position and an external position, and which bears the second hooking pin (6); the toe-piece of the ski binding (1) being configured so that: in the hooked configuration of the ski boot (A1) and in the unhooked configuration of the ski boot (A2) the second arm (10) is in the internal position; starting from the hooked configuration of the ski boot (A1), and in a case of a stress leading to the unhooked configuration of the ski boot (A2), the movement of the ski boot (11) can determine, by means of the

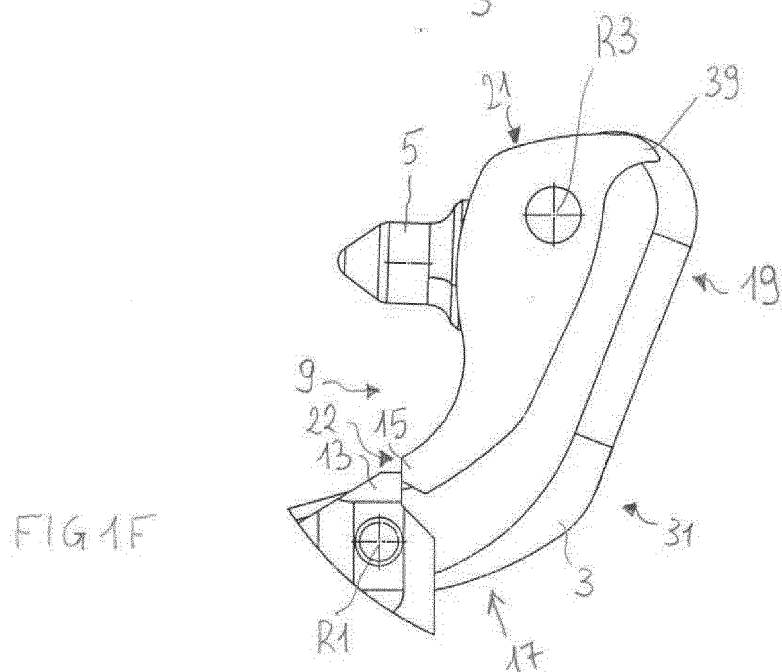
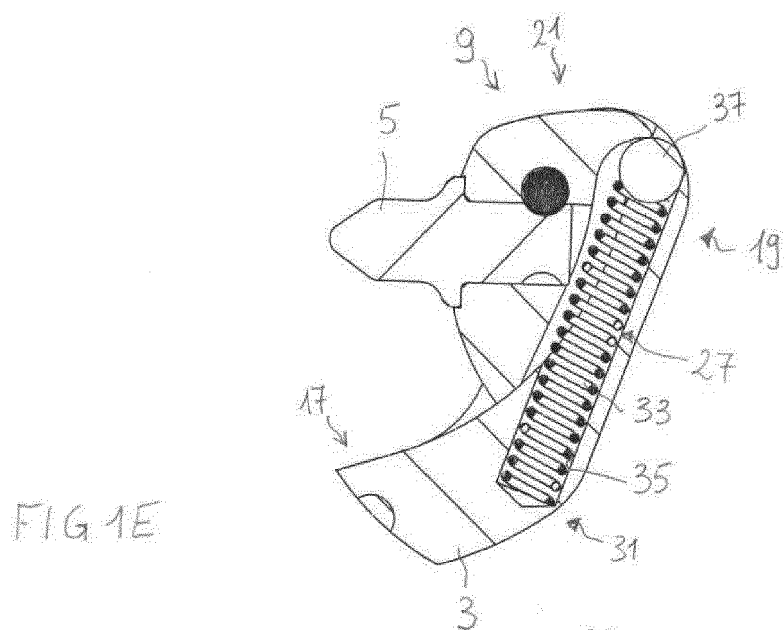
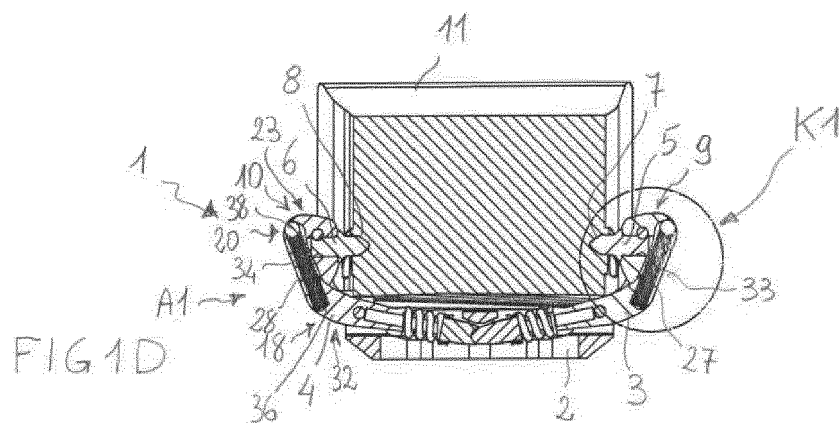
coupling between the second hooking pin (6) and the second hole (8), the rotation of the second arm (10) into the external position so that the second hooking pin (6) reaches a distance from the first hooking pin (5) which is greater than the second distance, thus facilitating the distancing of the ski boot (11) from the toe-piece of the ski binding (1).

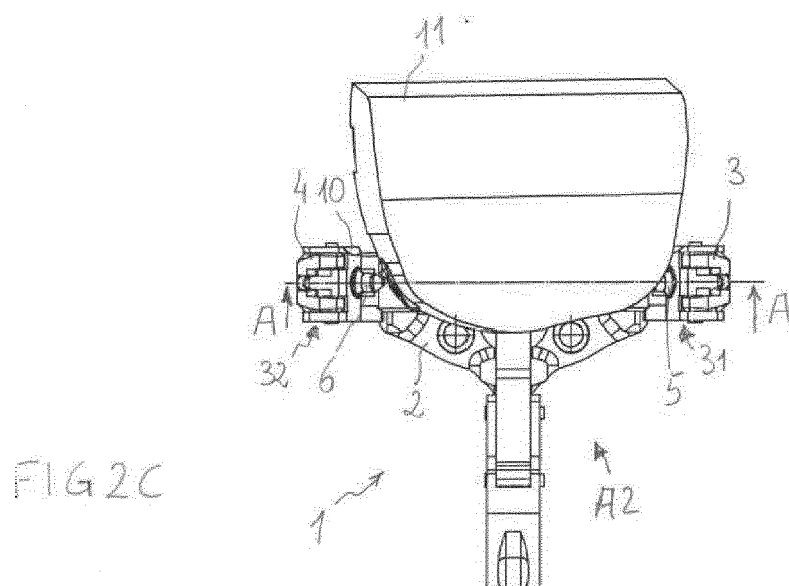
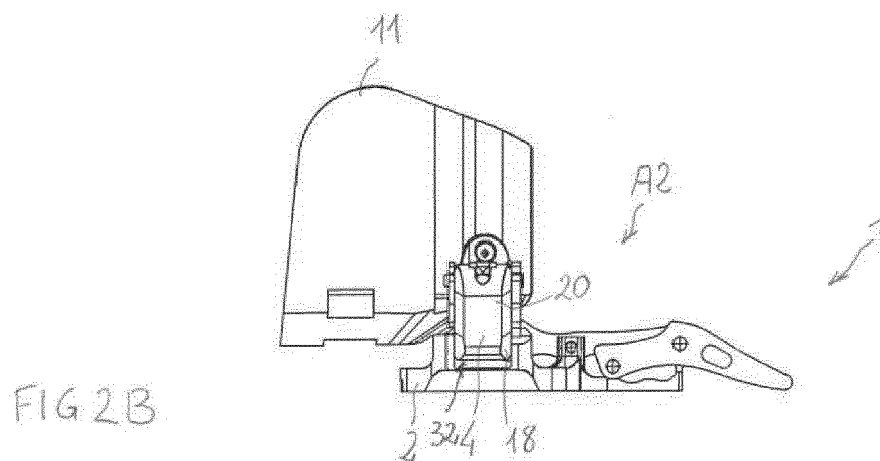
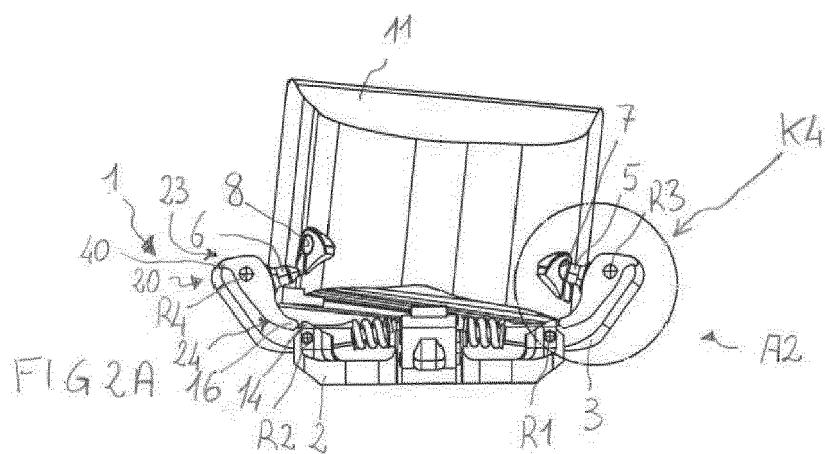
7. The toe-piece of a ski binding (1) of the preceding claim, wherein when the second arm (10) is in the internal position it is substantially aligned to the second main body (4) and wherein when the second arm (10) is in the external position it is transversal to the second main body (4).
8. The toe-piece of a ski binding (1) of claim 6 or 7, wherein the member (2) comprises a second catch (14) and wherein the second arm (10) comprises a second abutment (16), the toe-piece of the ski binding (1) being configured so that: when the second main body (4) is in the internal position and the second arm (10) is in the internal position, the second catch (14) prevents the second arm (10) from reaching the external position, as it can abut the second abutment (16); when the second main body (4) is in the external position and the second arm (10) is in the internal position, the second arm (10) can reach the external position.
9. The toe-piece of a ski binding (1) of any one of the preceding claims from 6 to 8, wherein: the second main body (4) comprises a second intermediate portion (18) at which the rotatable coupling between the second main body (4) and the member (2) takes place, and a second external portion (20) at which the rotatable coupling between the second main body (4) and the second arm (10) takes place; and the second arm (10) comprises a third end portion (23) at which the rotatable coupling between the second main body (4) and the second arm (10) takes place.
10. The toe-piece of a ski binding (1) of any one of the preceding claims, comprising second elastic means (28) which are interposed between the second main body (4) and the second arm (10) for maintaining the second arm (10) in the internal position.

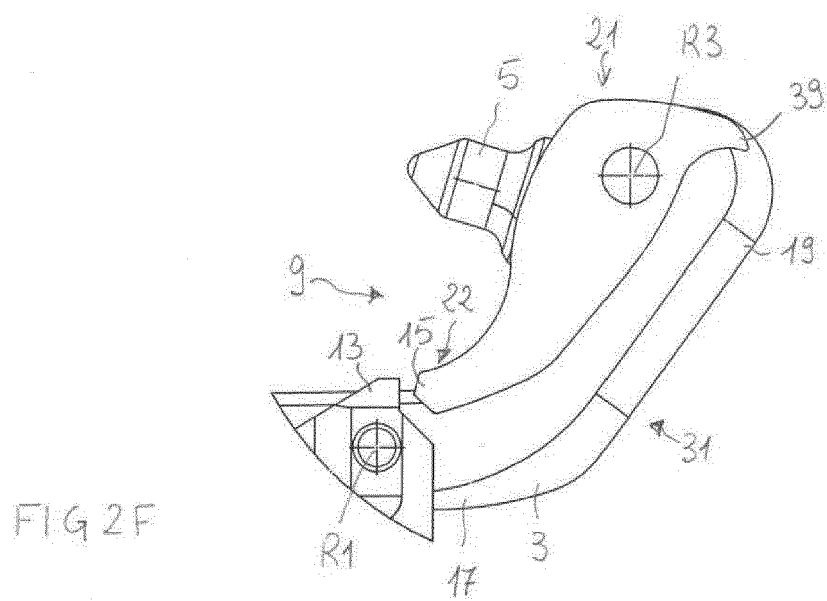
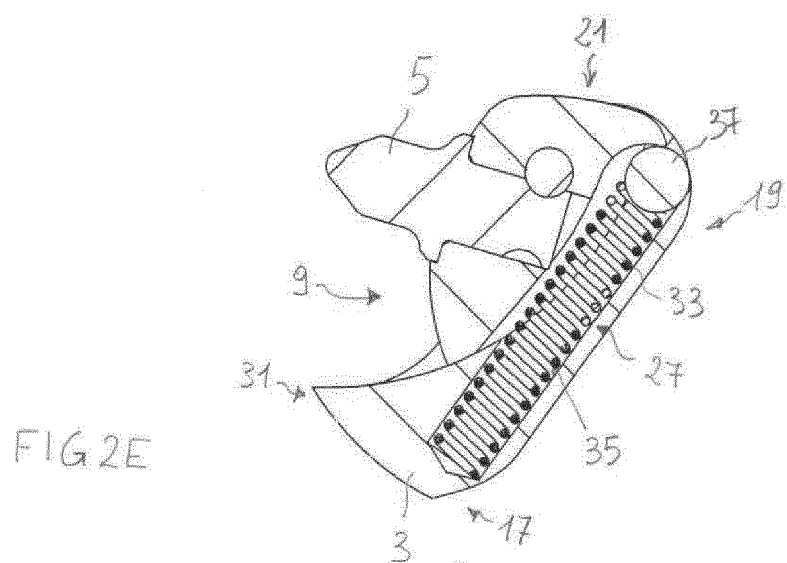
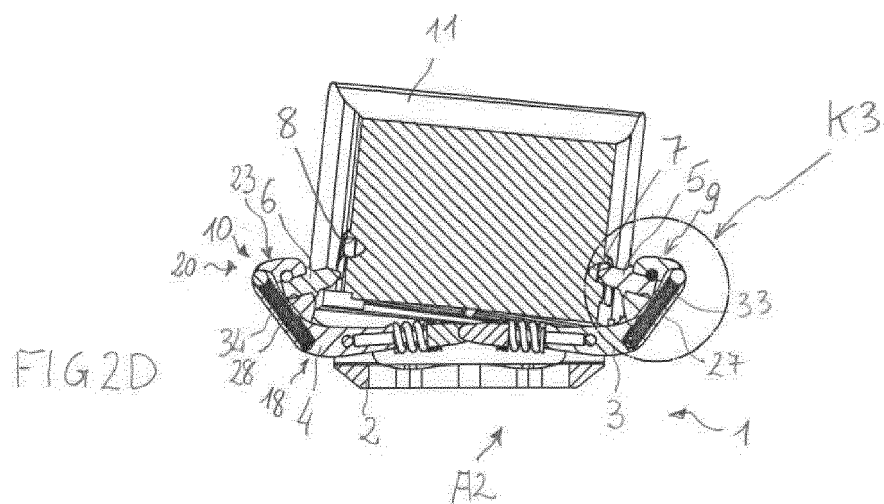
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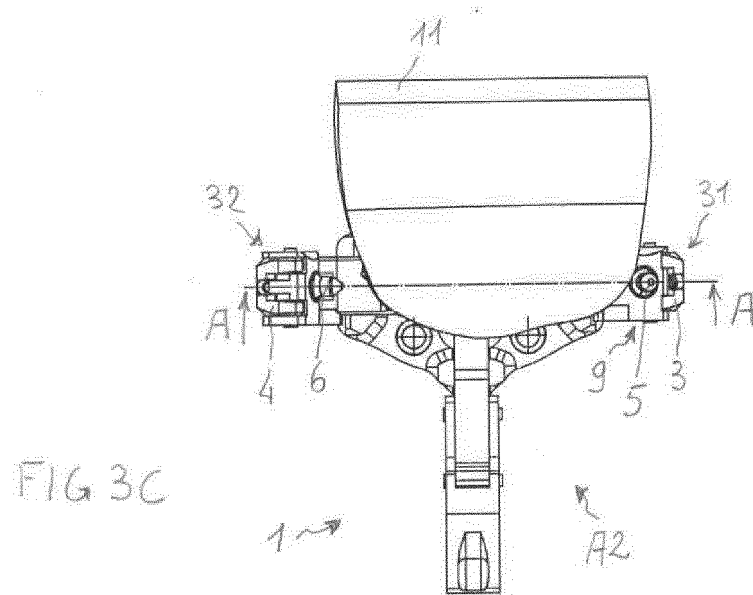
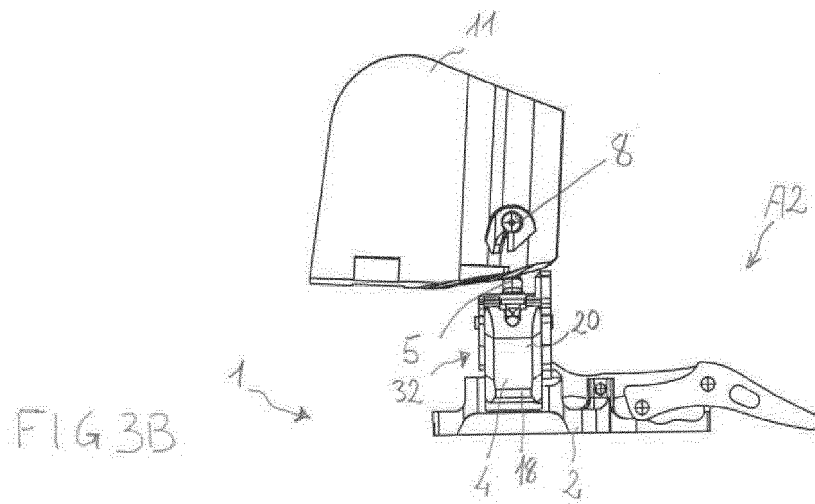
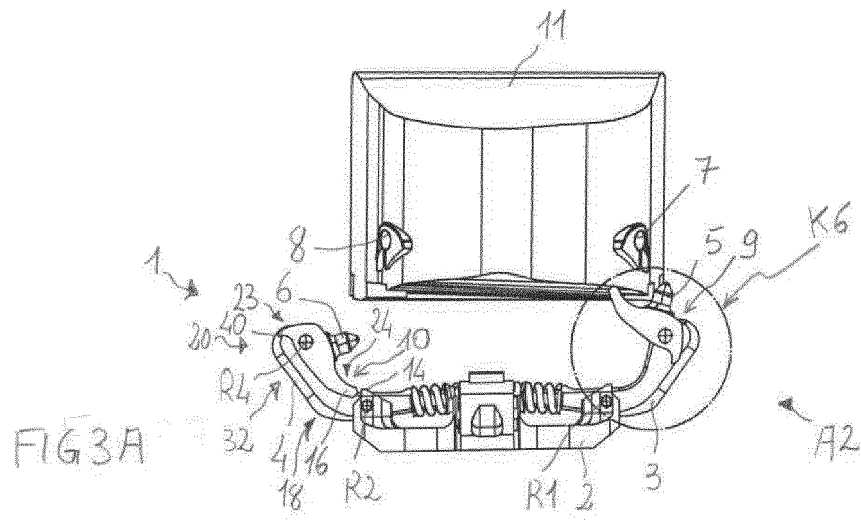
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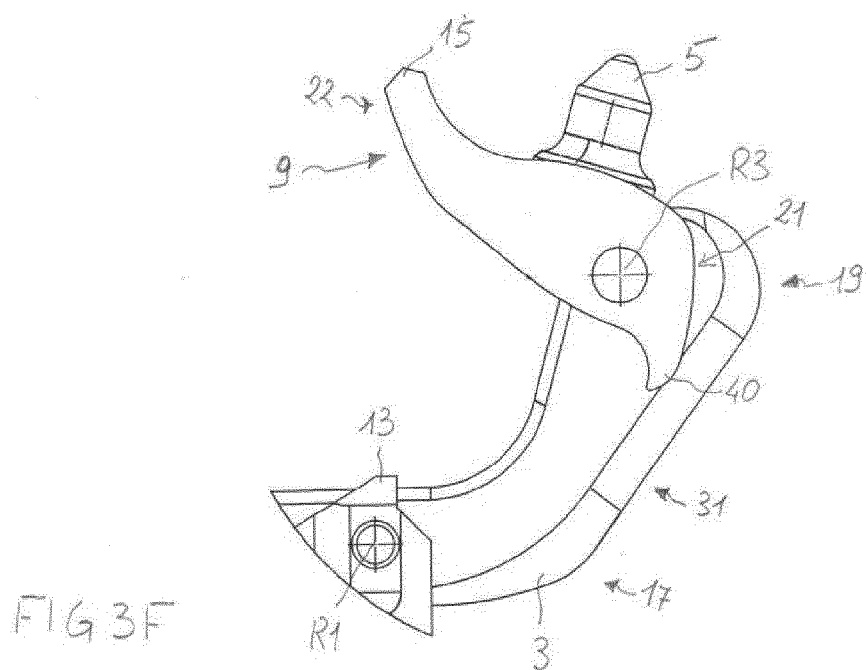
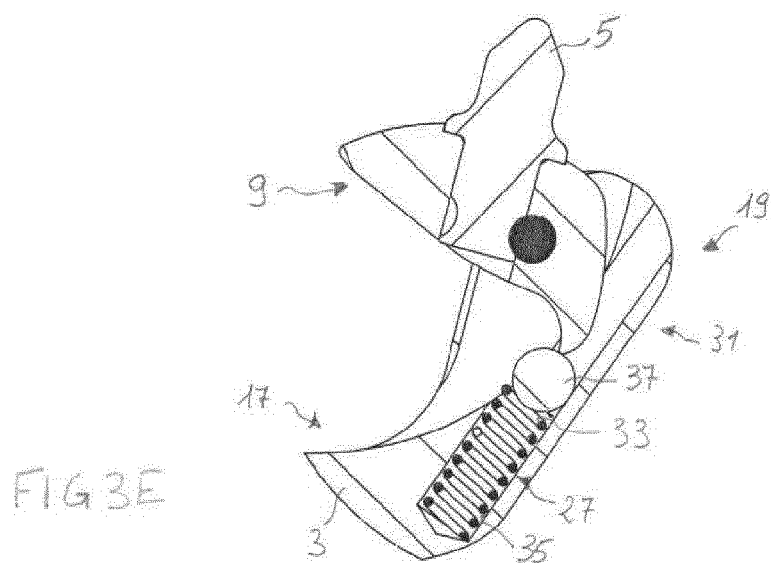
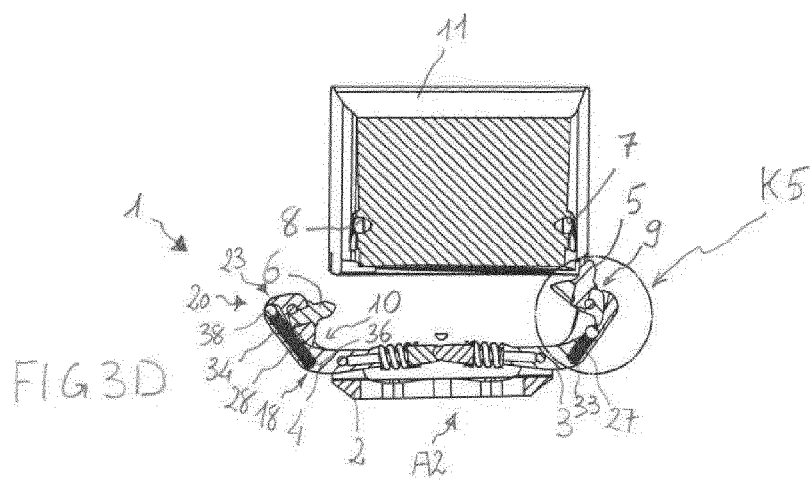














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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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