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(54) Toe piece for a mountaineering ski binding

Vorderbacken für eine Skitour Bindung

Butée avant de fixation de ski de randonnée

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Description

[0001] The present invention relates to the special technical sector of attachments for Alpine skiing, in particular the toe piece of the attachments.

[0002] The toe piece of the invention comprises a plate, destined to be blocked to a ski, to which the central parts of two right-angled jaws are hinged, facing and symmetrical with respect to the longitudinal plane of symmetry of the plate.

[0003] Pins, one for each jaw, project from the internal surfaces of the upper sides of the jaws, which pins face one another and are arranged on a transversal plane.

[0004] The heads of the lower sides of the jaws are connected, with an interposing of springs, to a hinge that is symmetrical with respect to the transversal plane.

[0005] The hinge-spring assembly defines, for the two jaws, two open and closed end configurations, to which corresponding relatively high and low positions for the hinge.

[0006] An intermediate point of a main lever is hinged to the plate, according to a transversal axis, a fork-shaped end of which main lever engages the hinge.

[0007] A safety lever is scissor-hinged by means of a transversal pin to the portion of the main lever situated, with respect to the hinge point, on an opposite side with respect to the fork.

[0008] Elastic means associated to the levers (see IT 1.378.791 by the same Applicant,) tend to induce them to open.

[0009] The hinge is constituted by two elements, respectively male and female; each of the elements exhibits two transversally-orientated flanked holes.

[0010] Holes are made in the heads of the lower sides of the jaws, the axes of which are arranged on the transversal planes on which lie the corresponding axes of the holes realized in the relative element of the hinge; the plugs functioning as a guide for the previously-interposed springs between the head and the element are freely inserted in the holes of the head of a jaw and in the corresponding holes of the relative element.

[0011] The edges of the holes made in the heads and the male and female element of the hinge are advantageously countersunk so as to prevent out-of-axis movements of the springs during the use of the toe-piece.

[0012] The means enabling defining the open and closed configurations of the jaws comprise:

a hinge, constituted by two elements;

at least four springs;

at least four guide pins for the springs.

[0013] Holes must also be provided in the heads of the jaws and the elements of the hinge.

[0014] The pins, springs and elements must be assembled such as to connect the jaws to the hinge-spring assembly.

[0015] The above means are constituted by a not-insignificant number of elements, include a series of operating steps (the realising of the holes) and an assembly which is quite complex; all of which impacts on the cost and overall weight of the toe-piece.

[0016] Document WO 2009/121187 describes a toe-piece for Alpine skiing comprising, according to the prior art, two jaws provided with corresponding pins for coupling with a ski boot, and a plurality of springs, associated to the jaws, such as to define an open and a closed configuration for the jaws.

[0017] Document EP 2.392.388 describes an attachment for Alpine skiing comprising a plate, a pair of jaws to which a plurality of springs is associated, and a pair of levers for enabling passage of the jaws from a closed position to an open position, and vice versa.

[0018] The aim of the invention is to provide a toe-piece which obviates the drawbacks in the prior art, and in which the means mutually connecting the lower heads of the jaws, such as to define for the jaws the end open and closed configurations, are constituted by a limited number of components, obtainable with technological operations which do not require perforating steps, which components are simply and rapidlyassemblable, and are such as to have a lower weight with respect to the means of the prior art while carrying out the same functions.

[0019] A further aim of the invention is to provide a toe-piece which beyond satisfying the preceding aim is also functional and reliable.

[0020] The above aims are attained according to the independent claims.

[0021] Advantageous and further technical-functional aspects are defined in the dependent claims.

[0022] The characteristics of the invention are evidenced in the following with reference to what is illustrated in the appended tables of drawings, in which:

figure 1 illustrates, in a perspective exploded view and in larger scale, the toe-piece of the invention;

figures 2A, 2B illustrate, in a larger scale, two perspective views of the toe-piece of figure 1, respective in the open and closed configuration;

figure 3 is a view from above of the toe-piece of figure 2A;

figure 4 is a view of section IV-IV of figure 3;

figure 5 is a plan view of the toe-piece of figure 2B;

figure 6 is the view of section VI-VI of figure 5;

figure 7 is a perspective exploded view in larger scale of the toe-piece of the invention in a variant embodiment thereof;

figures 8 and 9 illustrate two lateral views of the toepiece of figure 7, respectively in the closed and open configurations;

figures 8A and 9A illustrate, in larger scale, respectively detail K of figure 8 and detail H of figure 9.

[0023] With reference to the figures, 1 denotes a plate destined to be blocked (using the holes 2 realised therein) to a ski, not illustrated.

[0024] The plate laterally forms opposite pairs of prominences 4 which support longitudinal pins 4A with which the central parts of two right-angled jaws 3A, 3B are hinged, and are symmetrically orientated with respect to a longitudinal plane.

[0025] Relative pins 7A, 7B, facing inwards, are blocked to the inner surfaces of the upper sides 6A, 6B of the jaws.

[0026] The heads of the lower sides of the jaws are concavelyprofiled such as to define relative seatings S1, S2 that are symmetrical with respect to the longitudinal plane; the mutual distance between the surfaces delimiting the seatings decreases, proceeding from upstream towards downstream, i.e. in the sense of the arrow F (figures 2A, 2B).

[0027] The seatings are destined to receive, in a complementary coupling, lateral walls P1, P2 of a wedge-shaped component 10.

[0028] Upstream (with respect to the arrow F) of the supports of the prominences 4,the plate 1 exhibits a further pair of supports 8 which sustain a transversal pin 9 to which an intermediate point of a longitudinally-arranged main safety lever 11 is hinged; the internal end of the lever has a fork 12 shape, which engages the wedge-shaped component 10.

[0029] The fork 12 contains elastic means 13; the internal abutment 12A of the fork constitutes an abutment for an end of the elastic means, the remaining end thereof interacts with the larger base 10A of the wedge-shaped component 10.

[0030] With the portion of the main safety lever situated on the opposite side, with reference to the pin 9, by means of a transversal pin 14a safety lever 15 hinges in a scissor fashion to the interested portion of the fork 12.

[0031] In the illustrated example, a spring 16 is associated to the pin 14, which spring tends to mutually open the levers 11, 15.

[0032] The safety lever 15 comprises an internal lower part 150 (i.e. facing towards the jaws) and an upper external part 151 (i.e. facing towards the end of the toepiece).

[0033] The lower internal part 150 of the safety lever 15 bears a transversal pin 17 which idly supports a wheel 18 provided such as to interact with the upper surface of the plate and, if required, with a tooth 19 conformed thereby (see figure 4).

[0034] The heads of the jaws 3A, 3B and the wedge-shaped element 10 identify a hinge, constituted by a female part and a male part.

[0035] The female part comprises the truncoconical path defined by the seatings S1, S2 fashioned in the heads of the jaws; the male part is constituted by the walls P1, P2 of the wedge-shaped component, the heads of the walls P1, P2 being orientated in a trunconical fashion.

[0036] The spring 13 stabilises the coupling of the male part with the female part; the wedge-shaped component can make axial sliding motions, opposed or facilitated by the spring.

[0037] In figure 2B, the wedge-shaped component 10 is in the high position A (open configuration of the jaws).

[0038] With the passage of the component 10 from the high position A to the low position B (figure 2A, closed configuration of the jaws), the distance between the heads of the jaws first reduces and then newly increases as soon as the aligning of the lower sides 5A, 5B of the jaws is passed through.

[0039] On reduction of the distance, and due to the stress exerted by female part on the male part, the component 10 slides towards the spring in opposition to the elastic reaction (increased by the sliding) of the spring; once the alignment of the sides 5A, 5B has been passed, the component, 10, by action of the spring 13, slides in an opposite direction to the preceding direction.

[0040] These technical-functional aspects also occur with the passage of the wedge-shaped component 10 from the low position B to the high position A.

[0041] Besides enabling the sliding movements (which are small), the spring 13 stabilises in each operating situation, i.e. the open and closed configurations of the jaws and the passage between the configurations, the coupling between the female part and the male part of the hinge.

[0042] A variant is included which comprises the male part in the heads of the jaws (with the seatings S1, S2 curved externally) and, obviously, the female part of the component 10, i.e. with the walls P1, P2 having seatings for the whole extension thereof and recessed in an inwards direction.

[0043] A possible alternative is obtained by realising the male part and the female part constituted by two sections, for example a section in which a wall P1 and the complementary seating S1 are obtained as in the accompanying figures, while the remaining part P2 and the seating S2 exhibit profiles according to the above-mentioned variant.

[0044] In a further variant the walls P1, P2 are realised with a prismatic profile, and the seatings S1, S2 are complementary to the profiles; for example the profile of the walls P1, P2 are spire-shaped, with the vertex facing externally, or in a split polygonal shape.

[0045] In a further variant (not illustrated) a spherical component is used, subject to a spring, the housing of which is defined by two seatings fashioned in the heads of the jaws; obviously this spherical component is inserted in the fork 12 of the main lever 11.

[0046] The operating means mutually connecting the heads of the jaws and which are functionally associated to the fork 12 of the main lever 11 are constituted by a wedge-shaped component 10 and by a spring 13; the only operations required consist in operations on the heads of the lower sides of the jaws such that they can be coupled with the component 10.

[0047] With respect to the prior art, the solution provided enables considerably reducing the number of the elements, which translates into a simplification of the assembly thereof, in a reduction of costs and in a reduction of the overall weight of the toe-piece.

[0048] In a further variant, illustrated in figures 7, 8, 9, 8A and 9A, the component 10 comprises two longitudinal projections 101 arranged at the relative upper surface (i.e. the surface of the component 10 opposite the plate 1 when the toe-piece is in use).

[0049] The longitudinal projections 101 are conformed such as to embrace the lateral edge of the wedge-shaped component 10 which is opposite the safety lever 15 (see in particular figure 7).

[0050] The internal part 150 of the safety lever 15 comprises two portions, parallel to one another, which extend from the external part 151 of the safety lever 15, and between which the main lever 11 is positioned and hinged (see figure 7).

[0051] According to the variants, each portion of the internal wall 150 comprises a first appendage 152, which faces the wedge-shaped component 10, and a second appendage 153. In detail, in the illustrated figures, the internal part 150 of the safety lever 15 forms an upturned C-shaped profile, and the first appendage 152 and the second appendage 153 are arranged at the ends of the C.

[0052] In particular, the first appendage 152 of each portion is conformed such as to couple with a corresponding longitudinal projection 101 arranged on the wedge-shaped component 10 when the safety lever 15 is in the relative operating configuration (i.e. when the jaws are in the relative closed position, and the toe-piece is therefore in use).

[0053] Specifically, in the illustrated variant, each longitudinal projection 101 exhibits a part having a curved profile (the part embracing the lateral edge of the wedge-shaped component 10), and each first appendage 152 exhibits a part with a recess complementarily-shaped to the curved profile of the longitudinal projection 101, such as to enable a reciprocal coupling (see in particular figures 8A and 9A).

[0054] Further in this variant the plate 1 bears two wheels 100 arranged such that they are each abutted by a second appendage 153 of the safety lever 15. In particular, the wheels 100 are borne idle by corresponding pins 111 (transversal, in the case illustrated in the figures) fixed to the plate 1, provided with appropriate holes. In this way, with particular reference to figures 8 and 9, each second appendage 153 abuts the corresponding wheel 100 in each situation, i.e. both when the jaws are in the open configuration thereof and when they are in the relative closed position.

[0055] This variant advantageously significantly increases the stability of the toe-piece (and in particular the safety lever 15) when in use, i.e. when the jaws are in the relative closed position.

[0056] The foregoing has been described by way of example; any constructional variants are understood to fall within the protective scope of the invention as claimed in the following claims.

Claims

1. A toe piece for an alpine ski bindings, comprising: a plate (1) destined to be blocked to a ski; two right-angled jaws (3A, 3B), central parts of which are hinged to the plate according to parallel longitudinal axes such as to be opposite the jaws, lower sides of which (5A, 5B) are facing towards an inside of the plate (1); two pins (7A, 7B), one per jaw, constrained to the internal surfaces of the upper sides (6A, 6B) of the jaws such as to be opposite and facing internally of the plate; operating means connecting the heads of the lower sides of the jaws such as to define therefor two extreme configurations, respectively open and closed; a main lever (11) of which an intermediate point is articulated to the plate according to a transversal axis (9), perpendicular to the articulation axes of the jaws with the plate, and end of the main lever, fork-shaped (12) functionally cooperating with the operating means; a safety lever (15) articulated, by means of a transversal pin (14), to the portion of the main lever situated, with respect to the transversal axis thereof, on an opposite side with respect to the fork, the safety lever being conformed such as to interact with the plate (1) at the closed configuration of the jaws; **characterised in that** the operating means comprise: a component (10) positioned internally of the fork and coupled with at least a housing defined by seatings fashioned in the heads of the lower sides of the jaws; elastic means interposed between the component and an abutment (12A) provided in the fork, destined to compress the component against the surfaces delimiting the seatings.

2. The toe piece of claim 1, **characterised in that** the component is wedge-shaped, lateral walls (P1, P2) of which couple with the corresponding seatings (S1, S2) realised in the heads of the lower sides of the jaws.

3. The toe piece of claim 2, **characterised in that** the component, at lateral walls thereof, has a truncoconical profile.

4. The toe piece of claim 3, **characterised in that** the lateral walls (P1, P2) of the wedge-shaped compo-

nent (10) are symmetrical with respect to the longitudinal plane of symmetry of the jaws.

5. The toe piece of claim 3 or 4, **characterised in that** the lateral walls (P1, P2) of the wedge-shaped component (10) are curved in an external direction, and **in that** the corresponding seatings (S1, S2) fashioned in the heads are complementarily recessed with respect to the lateral walls.

6. The toe piece of claim 3 or 4, **characterised in that** the lateral walls (P1, P2) of the wedge component (10) are recessed, and **in that** the corresponding seatings (S1, S2) fashioned in the heads are curved externally, complementarily to the lateral walls.

7. The toe piece of any one of the preceding claims, **characterised in that** the transversal section of the wedge-shaped component (10) decreases proceeding from upstream towards downstream of the toe piece.

8. The toe piece of claim 3 or 4, **characterised in that** the lateral walls (P1, P2) of the wedge component (10) exhibit prismatic profiles, and **in that** the seatings (S1, S2) are complementarily-shaped with respect to the profiles.

9. The toe piece of claim 3 or 4, **characterised in that** the seatings (S1, S2) exhibit prismatic profiles, and **in that** the lateral walls (P1, P2) are conformed such as to couplingly receive the prismatic profiles.

10. The toe piece of claim 1, **characterised in that** the component has a spherical profile.

11. The toe piece of any one of the preceding claims, wherein the component (10) comprises a two longitudinal projections (101) arranged at the upper surface of the component (10); wherein the safety lever (15) comprises an internal part (150) and an external part (151); the internal part (150) comprising in turn two portions which extend from an external part (151) of the safety lever (15), and between which the main lever (11) is positioned; each portion of the internal part (150) comprising a first appendage (152), which faces the wedge-shaped component (10), conformed such as to couple with a corresponding longitudinal projection (101) when the jaws are in the relative closed position.

12. The toe piece of the preceding claim, wherein each longitudinal projection (101) exhibits a part with a curved profile, and each first appendage (152) exhibits a part with a recess that is complementary to the curved profile of the longitudinal projection (101), in order to enable a reciprocal coupling thereof.

13. The toe piece of claim 11 or 12, wherein each portion of the internal part (150) further comprises a second appendage (153); and wherein the plate (1) bears two wheels (100) arranged such as each to be abutted by a second appendage (153) of the safety lever (15) both when the jaws are in the open configuration thereof, and when the jaws are in the closed position thereof.

14. The toe piece of the preceding claim, wherein the wheels (100) are borne idle by corresponding pins (111) fixed to the plate (1).

15. The toe piece of claim 13 or 14, wherein the internal part (150) of the safety lever (15) forms an upturned C-shaped profile, and the first appendage (152) and the second appendage (153) are arranged at ends of the C-shaped profile.

Patentansprüche

1. Vorderbacken für eine Alpinskibindung, Folgendes beinhaltend: eine Platte (1), die zur Befestigung an einem Ski bestimmt ist; zwei rechtwinklige Backen (3A, 3B), deren Mittelteile derart scharnierbeweglich entlang paralleler Längsachsen an der Platte angelenkt sind, so dass die Backen einander gegenüberliegen, deren Unterseiten (5A, 5B) der Innenseite der Platte (1) zugewandt sind; zwei Dorne (7A, 7B), einer je Backe, die an den Innenoberflächen der Oberseiten (6A, 6B) der Backen festgelegt sind, so dass sie gegenüberliegend und der Innenseite der Platte zugewandt angeordnet sind; Betriebsmittel, welche die Köpfe der Unterseiten der Backen verbinden, um für diese zwei Endlagenkonfigurationen, genauer gesagt eine geöffnete und eine geschlossene Konfiguration zu definieren; einen Haupthebel (11), der an einem mittleren Punkt scharnierbeweglich an der Platte entlang einer quergerichteten Achse (9) angelenkt ist, die perpendikular zu den Scharnierachsen zwischen Backen und Platte ist, wobei ein Ende des Haupthebels, das in Form einer Gabel (12) ausgebildet ist, mit den Betriebsmitteln funktional zusammenwirkt; einen Sicherheitshebel (15), der mit einem Querstift (14) gelenkig mit dem Abschnitt des Haupthebels verbunden ist, der, bezogen auf dessen Querachse, auf einer der Gabel entgegengesetzten Seite liegt, wobei der Sicherheitshebel derart geformt ist, dass er mit der Platte (1) in der geschlossenen Konfiguration der Backen zusammenwirkt; **dadurch gekennzeichnet, dass** die Betriebsmittel Folgendes beinhalten: eine Komponente (10), die im Innern der Gabel untergebracht und mit zumindest einer Aufnahme gekoppelt ist, die durch Sitze gebildet wird, die in den Köpfen der Unterseiten der Backen ausgebildet sind; federelastische Mittel, die zwischen der Komponente und einem in der Ga-

bel vorgesehenen Anschlag (12A) angeordnet sind und dafür bestimmt sind, die Komponente gegen die Begrenzungsflächen der Sitze zu drücken.

2. Vorderbacken nach Anspruch 1, **dadurch gekennzeichnet, dass** die Komponente in Form eines Keils ausgebildet ist, dessen Seitenwände (P1, P2) mit den entsprechenden Sitzen (S1, S2) gekoppelt werden, die in den Köpfen der Unterseiten der Backen ausgebildet sind.

3. Vorderbacken nach Anspruch 2, **dadurch gekennzeichnet, dass** die Komponente an ihren Seitenwänden ein kegelstumpfförmiges Profil aufweist.

4. Vorderbacken nach Anspruch 3, **dadurch gekennzeichnet, dass** die Seitenwände (P1, P2) der keilförmigen Komponente (10) symmetrisch zu der längsgerichteten Symmetrieebene der Backen sind.

5. Vorderbacken nach Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** die Seitenwände (P1, P2) der keilförmigen Komponente (10) nach außen gekrümmt sind, und dadurch, dass die an den Köpfen ausgebildeten entsprechenden Sitze (S1, S2) komplementär zu den Seitenwänden ausgespart sind.

6. Vorderbacken nach Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** die Seitenwände (P1, P2) der keilförmigen Komponente (10) ausgespart sind, und dadurch, dass die an den Köpfen ausgebildeten entsprechenden Sitze (S1, S2) komplementär zu den Seitenwänden nach außen gekrümmt sind.

7. Vorderbacken nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Querschnitt der keilförmigen Komponente (10) von stromaufwärts nach stromabwärts hin entlang der Vorderbacken abnimmt.

8. Vorderbacken nach Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** die Seitenwände (P1, P2) der keilförmigen Komponente (10) prismatische Profile aufweisen, und dadurch, dass die Sitze (S1, S2) komplementär zu den Profilen geformt sind.

9. Vorderbacken nach Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** die Sitze (S1, S2) prismatische Profile aufweisen, und dadurch, dass die Seitenwände (P1, P2) so geformt sind, dass sie die prismatischen Profile eingreifend aufnehmen.

10. Vorderbacken nach Anspruch 1, **dadurch gekennzeichnet, dass** die Komponente ein kugelförmiges Profil aufweist.

11. Vorderbacken nach einem der vorhergehenden Ansprüche, worin die Komponente (10) zwei längsgerichtete Vorsprünge (101) aufweist, die an der oberen Oberfläche der Komponente (10) angeordnet sind; worin der Sicherheitshebel (15) einen inneren Teil (150) und einen äußeren Teil (151) beinhaltet; wobei der innere Teil (150) wiederum zwei Teilabschnitte aufweist, die sich von dem äußeren Teil (151) des Sicherheitshebels (15) aus erstrecken und zwischen denen der Haupthebel (11) angeordnet ist; wobei jeder Teilabschnitt des inneren Teils (150) einen ersten Fortsatz (152) beinhaltet, welcher der keilförmigen Komponente (10) zugewandt und derart geformt ist, dass er mit einem entsprechenden längsgerichteten Vorsprung (101) in Eingriff tritt, wenn die Backen die entsprechende geschlossene Stellung einnehmen.

12. Vorderbacken nach dem vorhergehenden Anspruch, worin jeder längsgerichtete Vorsprung (101) einen Teil mit einem kurvenförmigen Profil aufweist und jeder erste Fortsatz (152) einen Teil mit einer Aussparung aufweist, die komplementär zu dem kurvenförmigen Profil des längsgerichteten Vorsprungs (101) geformt ist, um zu ermöglichen, dass die beiden Teile miteinander in Eingriff treten können.

13. Vorderbacken nach Anspruch 11 oder 12, worin jeder Teilabschnitt des inneren Teils (150) ferner einen zweiten Fortsatz (153) beinhaltet; und worin die Platte (1) zwei Räder (100) trägt, die so angeordnet sind, dass sie von dem zweiten Fortsatz (153) des Sicherheitshebels (15) anschlagend berührt werden können, sowohl wenn die Backen ihre geöffnete Konfiguration einnehmen, als auch wenn die Backen ihre geschlossene Stellung einnehmen.

14. Vorderbacken nach dem vorhergehenden Anspruch, worin die Räder (100) antriebslos auf entsprechenden Stiften (111) gelagert sind, die an der Platte (1) befestigt sind.

15. Vorderbacken nach Anspruch 13 oder 14, worin der innere Teil (150) des Sicherheitshebels (15) ein nach oben gedrehtes C-förmiges Profil aufweist und der erste Fortsatz (152) und der zweite Fortsatz (153) an den Enden des C-förmigen Profils angeordnet sind.

Revendications

1. Une butée avant de fixation de ski alpin, comprenant: une plaque (1) destinée à être bloquée à un ski; deux mâchoires à angle droit (3A, 3B), dont les parties centrales sont articulées à la plaque selon des axes longitudinaux parallèles de manière à être opposées auxdites mâchoires, dont les côtés inférieurs (5A, 5B) sont orientés vers l'intérieur de la plaque (1) ; deux broches (7A, 7B), une par mâchoire, assujet-

ties aux surfaces intérieures des côtés supérieurs (6A, 6B) des mâchoires de manière à être opposées et orientées vers l'intérieur de la plaque ; des moyens opérationnels reliant les têtes des côtés inférieurs des mâchoires de manière à définir pour celles-ci deux configurations limites, respectivement ouverte et fermée ; un levier principal (11) dont un point intermédiaire est articulé à la plaque selon un axe transversal (9), perpendiculaire aux axes d'articulation des mâchoires avec la plaque, et une extrémité dudit levier principal, en forme de fourche (12), coopérant fonctionnellement avec les moyens opérationnels ; un levier de sécurité (15) articulé, au moyen d'une broche transversale (14), à la portion du levier principal située, par rapport à l'axe transversal de celui-ci, sur un côté opposé par rapport à la fourche, ledit levier de sécurité étant conformé de manière à interagir avec la plaque (1) dans la configuration fermée des mâchoires ; **caractérisée en ce que** les moyens opérationnels comprennent : un composant (10) positionné à l'intérieur de la fourche et accouplé avec au moins un logement défini par des emplacements réalisés dans les têtes des côtés inférieurs des mâchoires ; des moyens élastiques interposés entre ledit composant et une butée (12A) prévue dans la fourche, destinés à comprimer ledit composant contre les surfaces délimitant lesdits emplacements.

2. La butée avant selon la revendication 1, **caractérisée en ce que** le composant a la forme d'un coin, dont les parois latérales (P1, P2) s'accouplent avec les emplacements (S1, S2) correspondants réalisés dans les têtes des côtés inférieurs des mâchoires.

3. La butée avant selon la revendication 2, **caractérisée en ce que** le composant, au niveau de ses parois latérales, a un profil troncoconique.

4. La butée avant selon la revendication 3, **caractérisée en ce que** les parois latérales (P1, P2) du composant en forme de coin (10) sont symétriques par rapport au plan longitudinal de symétrie des mâchoires.

5. La butée avant selon la revendication 3 ou 4, **caractérisée en ce que** les parois latérales (P1, P2) du composant en forme de coin (10) sont incurvées vers l'extérieur, et **en ce que** les emplacements (S1, S2) correspondants réalisés dans les têtes sont creusés de façon complémentaire par rapport auxdites parois latérales.

6. La butée avant selon la revendication 3 ou 4, **caractérisée en ce que** les parois latérales (P1, P2) de l'élément en forme de coin (10) sont creusées, et **en ce que** les emplacements (S1, S2) correspondants réalisés dans les têtes sont incurvés extérieurement, de façon complémentaire auxdites parois latérales.

7. La butée avant selon l'une quelconque des revendications précédentes, **caractérisée en ce que** la section transversale du composant en forme de coin (10) décroît en allant d'amont en aval de la butée avant.

8. La butée avant selon la revendication 3 ou 4, **caractérisée en ce que** les parois latérales (P1, P2) du composant en forme de coin (10) présentent des profils prismatiques, et **en ce que** les emplacements (S1, S2) sont conformés de façon complémentaire à ces profils.

9. La butée avant selon la revendication 3 ou 4, **caractérisée en ce que** les emplacements (S1, S2) présentent des profils prismatiques, et **en ce que** les parois latérales (P1, P2) sont conformées de manière à recevoir en accouplement lesdits profils prismatiques.

10. La butée avant selon la revendication 1, **caractérisée en ce que** le composant a un profil sphérique.

11. La butée avant selon l'une quelconque des revendications précédentes, dans laquelle le composant (10) comprend deux saillies longitudinales (101) disposées au niveau de la surface supérieure dudit composant (10) ; dans laquelle le levier de sécurité (15) comprend une partie intérieure (150) et une partie extérieure (151) ; la partie intérieure (150) comprenant à son tour deux portions qui s'étendent à partir de ladite partie extérieure (151) du levier de sécurité (15), et entre lesquelles le levier principal (11) est positionné ; chaque portion de la partie intérieure (150) comprenant un premier appendice (152), qui est orienté vers le composant en forme de coin (10), et conformé de manière à s'accoupler avec une saillie longitudinale (101) correspondante quand les mâchoires sont dans la position fermée relative.

12. La butée avant selon la revendication précédente, dans laquelle chaque saillie longitudinale (101) présente une partie ayant un profil courbe, et chaque premier appendice (152) présente une partie ayant un creux qui est complémentaire au profil courbe de la saillie longitudinale (101), de manière à permettre leur accouplement réciproque.

13. La butée avant selon la revendication 11 ou 12, dans laquelle chaque portion de la partie intérieure (150) comprend en outre un deuxième appendice (153) ; et dans laquelle la plaque (1) supporte deux galets (100) disposés de manière à servir de butée audit deuxième appendice (153) du levier de sécurité (15) à la fois quand les mâchoires sont dans leur configuration ouverte et quand les mâchoires sont dans

leur position fermée.

14. La butée avant selon la revendication précédente, dans laquelle les galets (100) sont supportés, libres, par des broches (111) correspondantes fixées à la plaque (1).

15. La butée avant selon la revendication 13 ou 14, dans laquelle la partie intérieure (150) du levier de sécurité (15) forme un profil en « C » retourné, et le premier appendice (152) et le deuxième appendice (153) sont disposés au niveau des extrémités du profil en « C ».

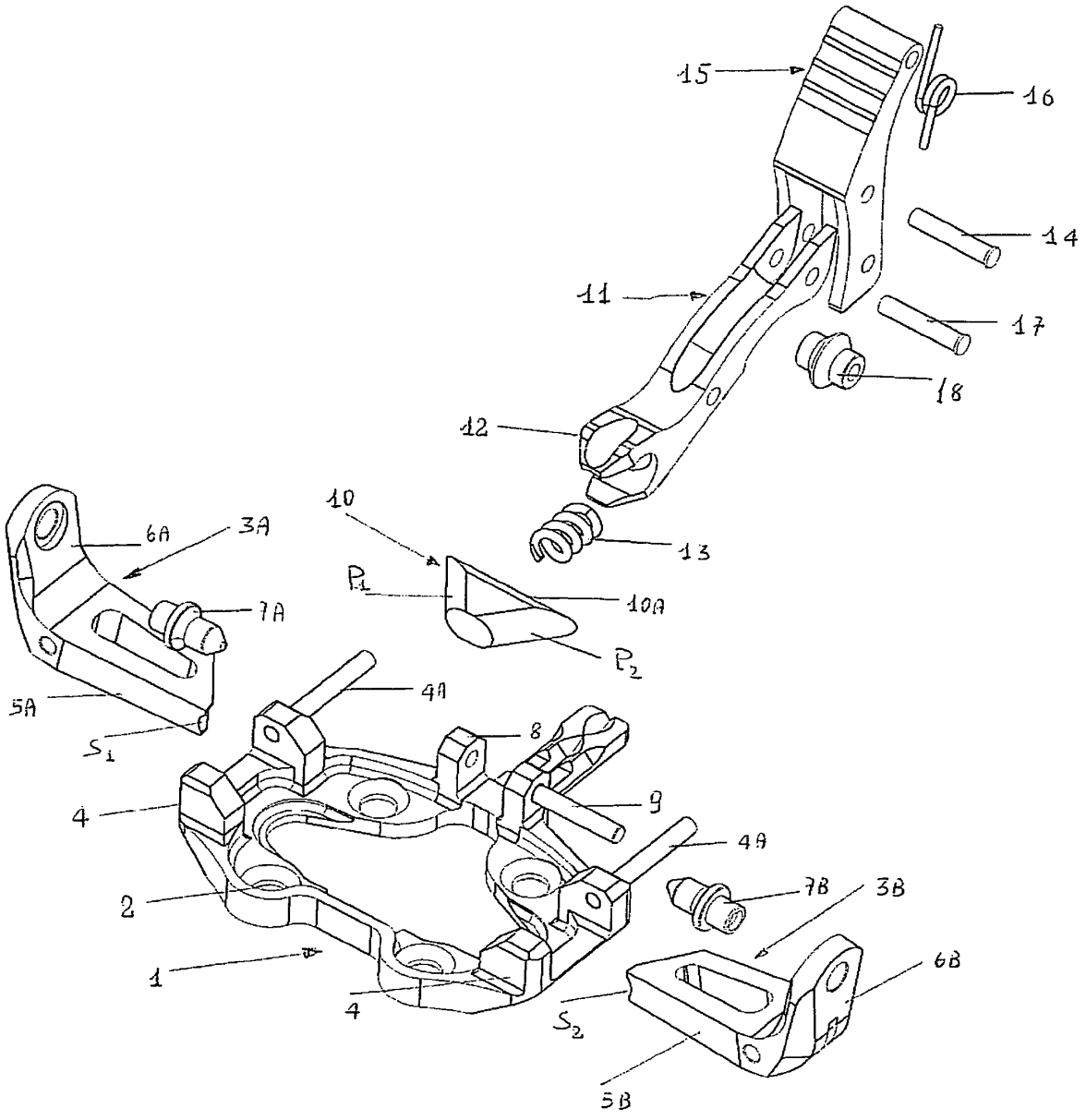

15
16
14
11
17
18
12
10
13
P1
10A
P2
6A
3A
7A
5A
S1
4A
8
9
4
4A
2
7B
3B
1
6B
4
S2
5B

Fig. 1

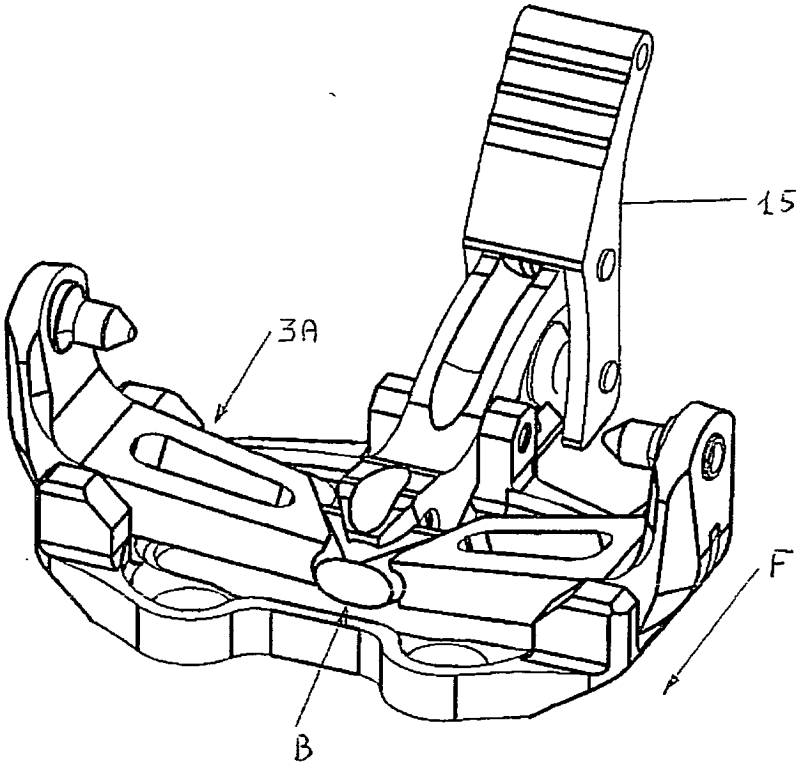


Fig. 2A

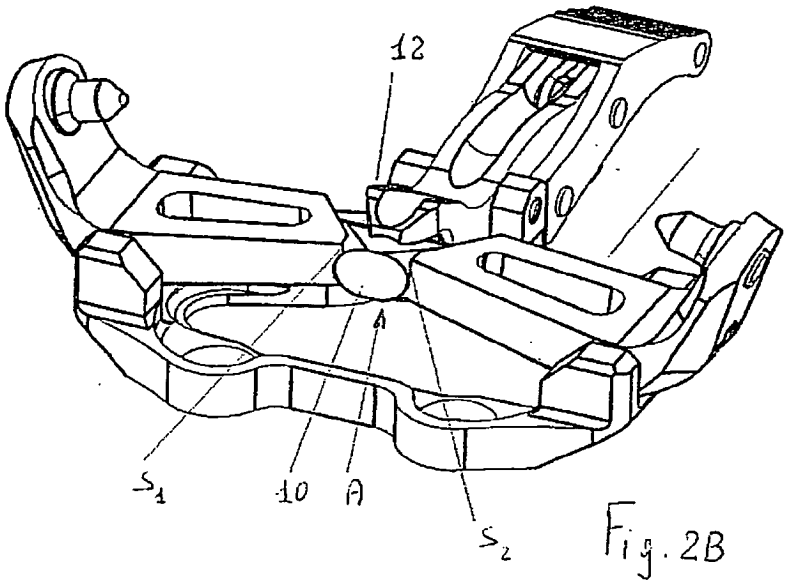


Fig. 2B

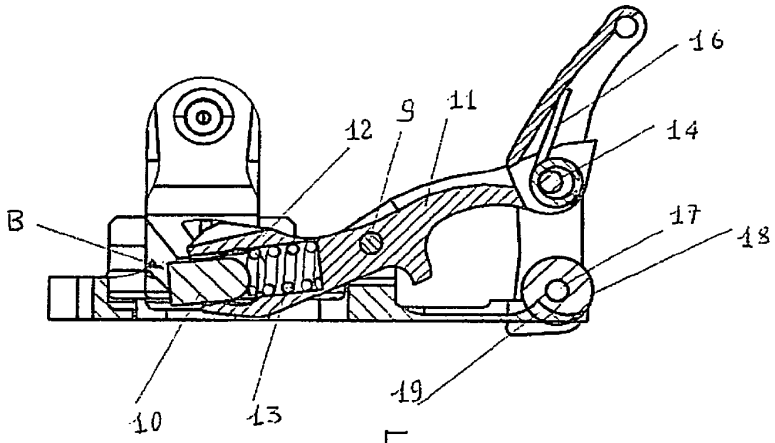


Fig. 4

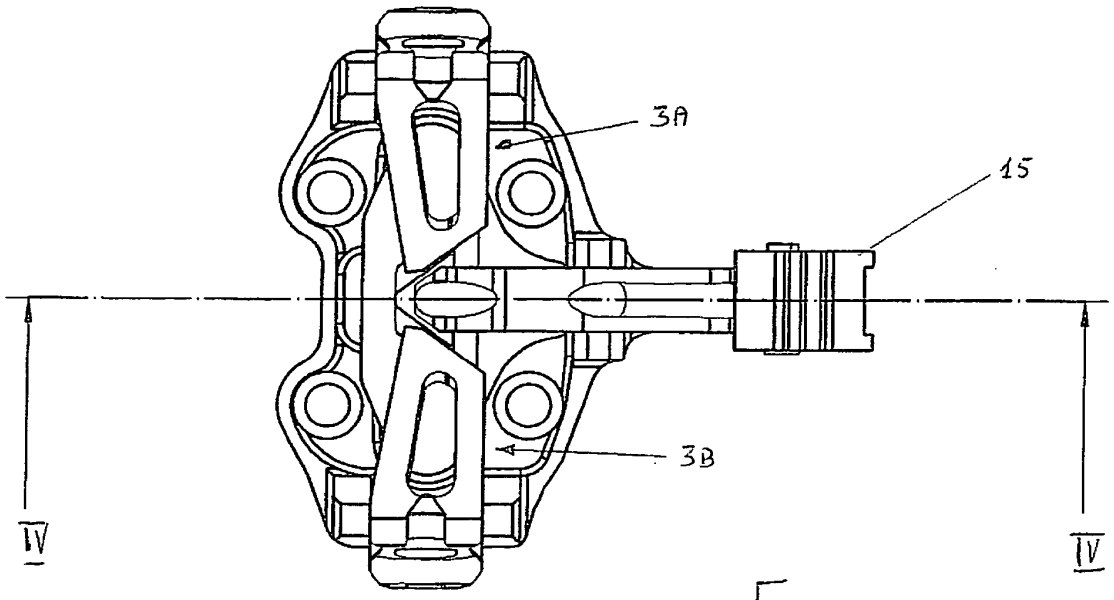


Fig. 3

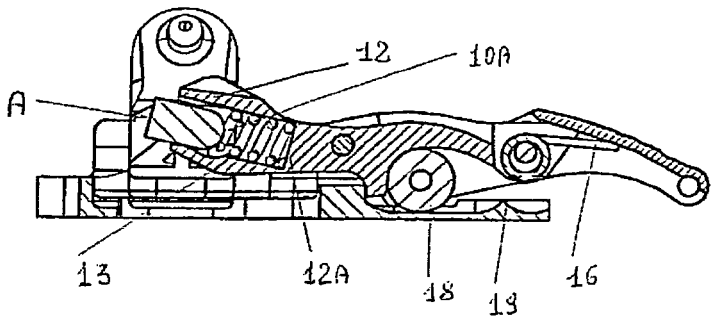


Fig. 6

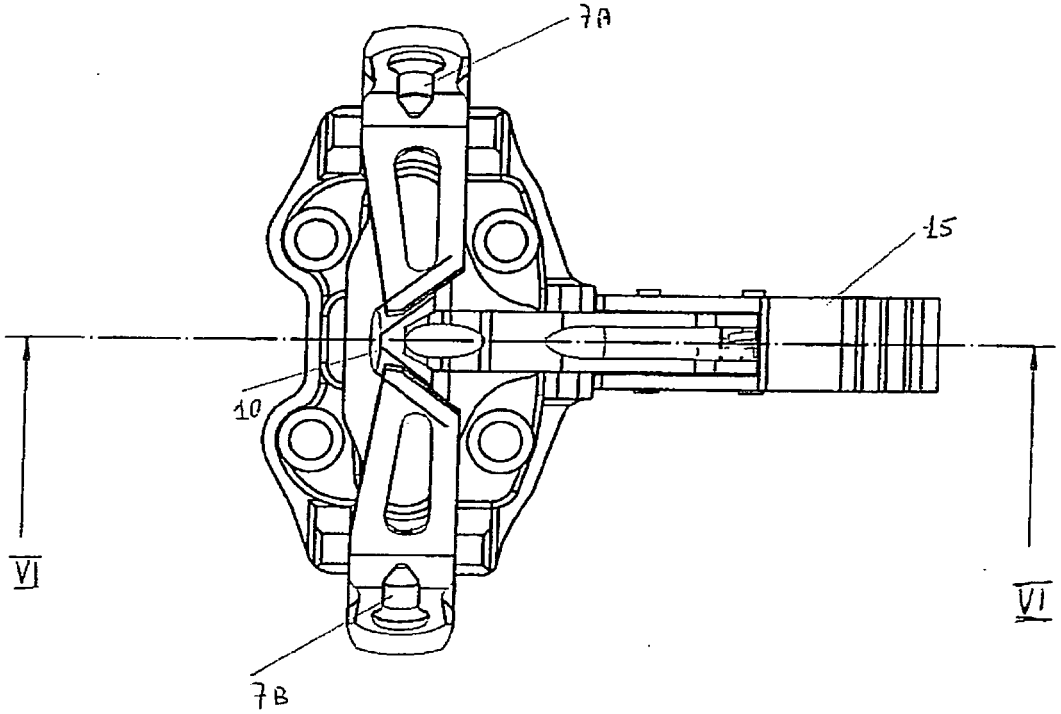


Fig. 5

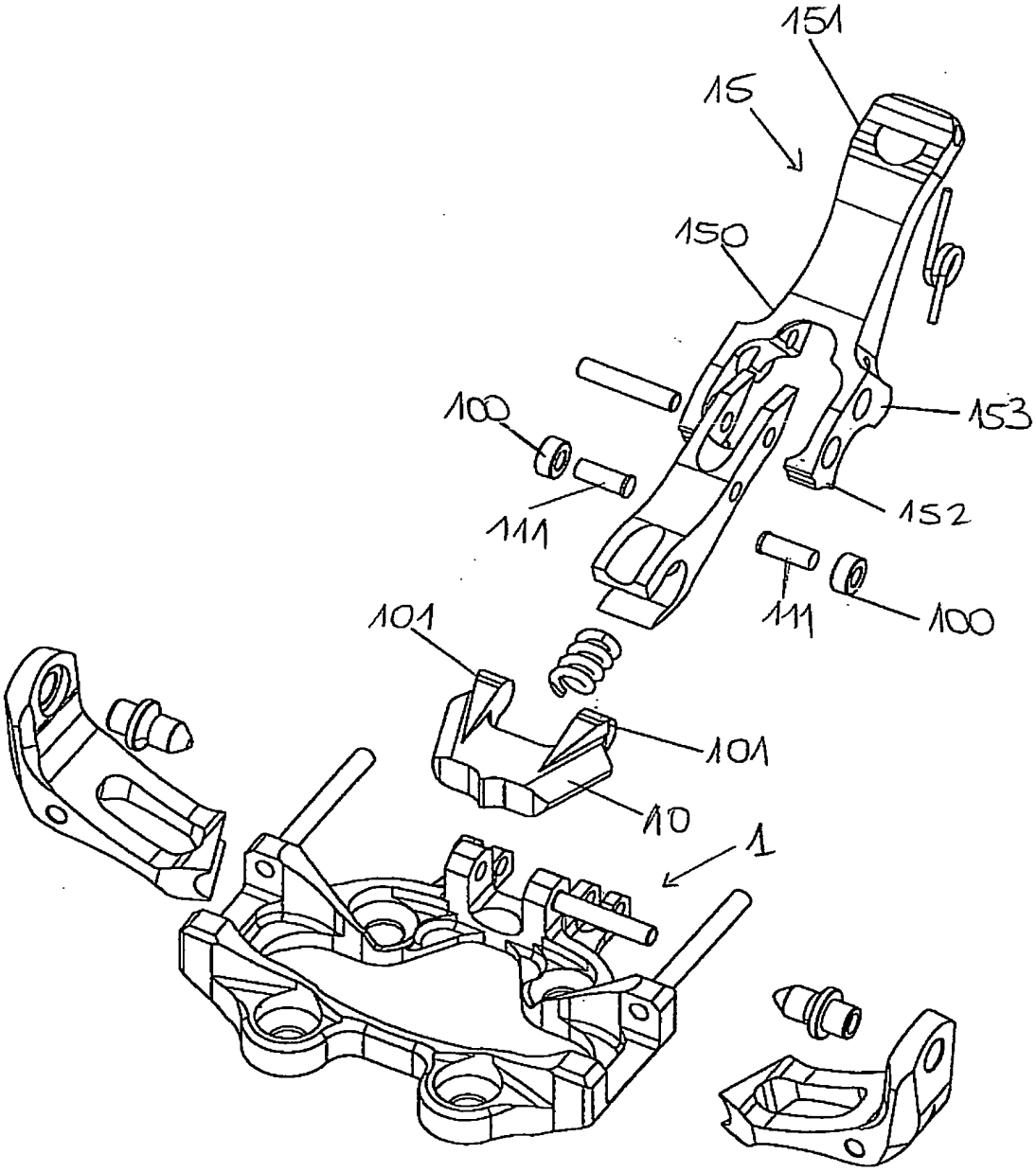


FIG. 7

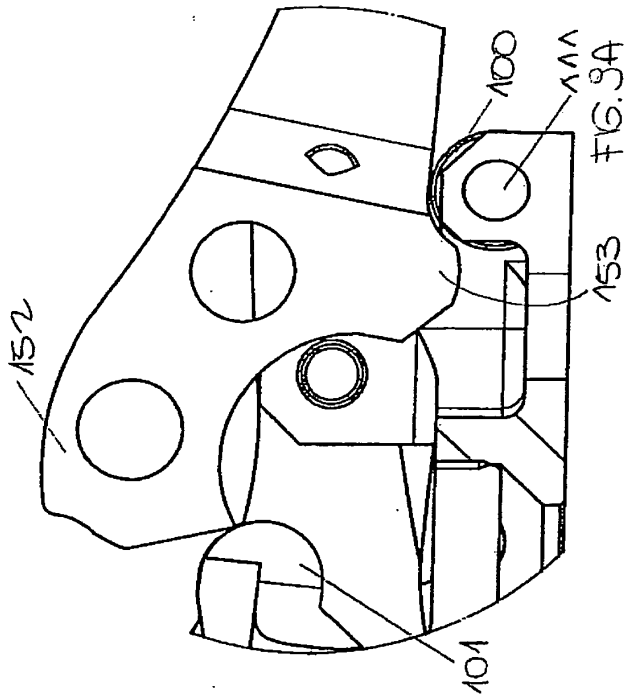


FIG. 9A

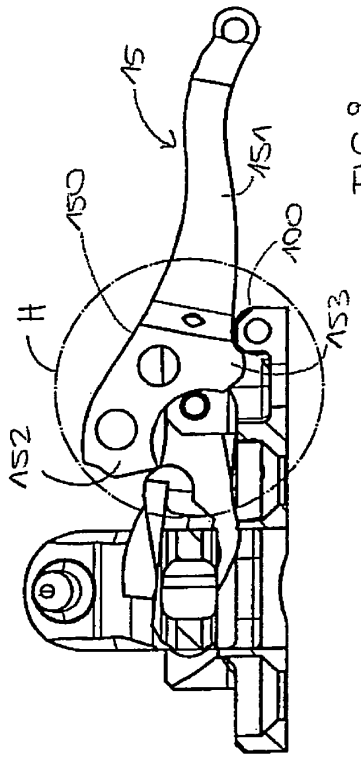


FIG. 9

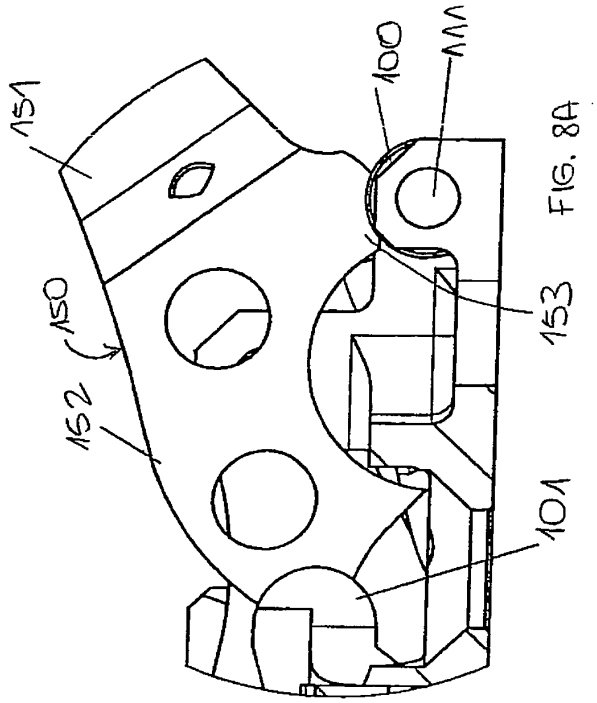


FIG. 8A

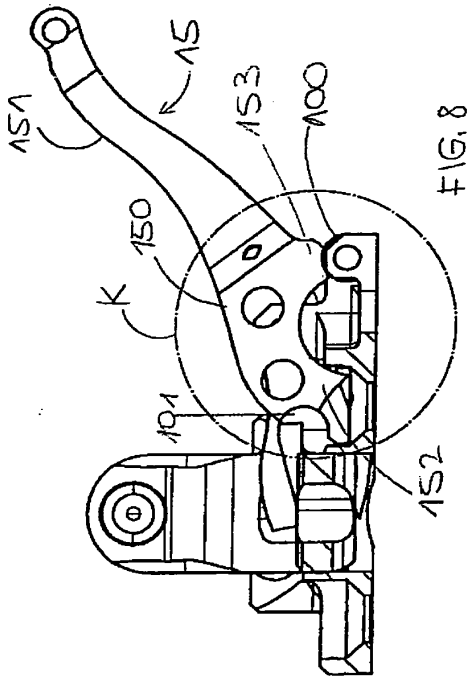


FIG. 8

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- WO 2009121187 A **[0016]**
- EP 2392388 A **[0017]**