

(19)



(11)

EP 1 598 510 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
18.02.2009 Bulletin 2009/08

(51) Int Cl.:
E05D 7/00 (2006.01)

(21) Application number: **05425311.7**

(22) Date of filing: **11.05.2005**

(54) **An adjustable door hinge**

Ein verstellbares Türscharnier

Une charnière de porte réglable

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR**

(30) Priority: **18.05.2004 IT BO20040316**

(43) Date of publication of application:
23.11.2005 Bulletin 2005/47

(73) Proprietor: **GSG INTERNATIONAL S.p.A.
40054 Budrio (Bologna) (IT)**

(72) Inventor: **Lambertini, Marco
40068 San Lazzaro di Savena (Bologna) (IT)**

(74) Representative: **Lanzoni, Luciano
Bugnion SpA
Via Goito 18
40126 Bologna (IT)**

(56) References cited:
EP-A2- 0 992 647

EP 1 598 510 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The present invention relates to an adjustable door hinge, in particular for heavy metal door units, that is to say, reinforced door units that are heavier than standard interior door units.

[0002] The hinges used for door units of this type (that is, exterior door units, gates, etc) must also satisfy special security requirements and, in this aspect too, differ from those usually used on standard door units (for interiors).

[0003] These hinges must have a larger and stronger structure, not only because they have to support the heavy weight of the door but also because the screws used to fix the hinges have to be covered by special tamper-proof plates.

[0004] Further, precisely because of the special applications they are used for, these hinges must be carefully adjusted so as to better adapt the position of the mobile frame of the door unit relative to the fixed frame.

[0005] The hinges normally consist of two hinge bodies, usually of aluminium or an aluminium alloy, one attachable to the mobile frame of the door unit and one attachable to the fixed frame, and a steel hinge pin that can be inserted into respective through holes in the two hinge bodies with interposed centring bushes (usually made of self-lubricating plastic). At the centre of the hinge pin there is a collar, made as a single piece with the hinge pin itself, and larger in diameter than the through holes in the hinge bodies so as to prevent the pin from coming out of the holes in the hinge bodies (see also patent IT-1.221.237 to the same Applicant).

[0006] The hinge bodies have flaps by which the hinge is secured to the door unit and which are crossed, perpendicularly to the hinge pin, by robust screws whose heads are accommodated in respective recesses made in the hinge flaps themselves. On the outside of the screw heads, the hinge flaps present guides defining seats for respective caps that slide in a direction parallel with the hinge pin. The caps fully cover the screw heads and form a surface that smoothly connects both with the cylindrical portion of the hinge in which the hole that accommodates the respective bush is made, and with the free end of the hinge flap extending from the cylindrical portion and including the cap guides.

[0007] The above mentioned bushes usually consist of a cylindrical element closed at one end and a collar located at the open end. They also have an axial hole, offset relative to the longitudinal axis of the cylindrical element, and a series of protrusions or teeth, usually located on the outside of the bush and designed to fit in respective grooves made inside the holes in the hinge bodies so as to secure the bush-pin assembly in a stable position relative to the cylindrical element.

[0008] The shape of the bushes enables the axis of the hinge pin to be moved relative to the axis of the hole that accommodates the bush-pin assembly, thereby adjusting the position of the mobile frame of the door unit relative to the fixed frame.

[0009] To adjust, however, the door must be lifted so that the teeth come free of the respective grooves of one or both hinge bushes and can be placed in the new position. This operation is awkward and impractical not only because of the considerable weight of the door unit but also because the first adjustment is hardly ever exactly the right one, which means that installers are obliged to repeat this wearying task several times.

[0010] Another disadvantage connected with the use of this type of hinge is that the mobile frame of the door unit can be adjusted only to a certain number of fixed positions depending on the number of grooves in the bushes and in the holes in the hinge body, whereas the market for products of this kind is more and more oriented towards hinges that can be adjusted more accurately through a system that enables the bush-pin assembly to be moved more smoothly so that the door can be adjusted to exactly the right position.

[0011] To overcome the above mentioned disadvantages of prior art, the Applicant devised an adjustable door hinge with the features of the preamble of claim 1 and disclosed in patent EP 992.647, in which the bush has an outer radial protrusion that engages in a matching notch made in the inside surface of the hole in the hinge body so as to form a pivot point that allows a pendular movement of the bush in both directions as one with the pin it accommodates, this pendular movement being produced by an adjustment device actuated from the outside. This adjustment device comprises a screw positioned transversally with respect to the pin and bush and designed to engage with the pin or the bush or both.

[0012] This solution, although it overcomes many of the drawbacks of prior art, is not free of disadvantages.

[0013] In particular, to permit reversibility between hinges for left- or right-hand opening doors, it is necessary to completely dismantle and then reassemble all the components of the hinge.

[0014] In other words, the hinge is supplied ready-assembled, for example for right-hand opening doors, and when a left-hand opening door has to be installed, the installer must completely dismantle all the components of the hinge (including bushes, pin, adjustment screw system, and so on), turn them by 180° and then reassemble them in the new position.

[0015] This is, obviously, a time-consuming operation which slows down door installation.

[0016] The present invention has for an aim to overcome the above mentioned disadvantages by providing a hinge for door units that has a simple structure and that is practical and easy to install.

[0017] Another aim of the invention is to provide a hinge that is extremely easy to adjust.

[0018] The technical characteristics of the invention according to the aforementioned aims may be easily inferred from the contents of the appended claims, especially claim 1, and preferably any of the claims that depend, either directly or indirectly, on claim 1.

[0019] Further, the advantages of the invention are ap-

parent from the detailed description which follows, with reference to the accompanying drawings which illustrate preferred embodiments of the invention provided merely by way of example without restricting the scope of the inventive concept, and in which:

- Figure 1 is a front elevation view, with some parts cut away, of an adjustable door hinge according to the present invention;
- Figure 2 is a side elevation view of the hinge of Figure 1 in a fully-assembled configuration;
- Figure 3 illustrates the hinge of Figure 2 in a plan view from above;
- Figure 4 is a cross-section through line IV-IV of Figure 2;
- Figure 5 is a top plan view, with some parts cut away and others transparent in order to better illustrate others, of a detail of the hinge shown in the illustrations listed above;
- Figure 6 is a schematic front elevation view of a detail of the hinge shown in the illustrations listed above;
- Figure 7 is a cross-section through line VII-VII of Figure 6;
- Figure 8 is a cross-section through line VIII-VIII of Figure 7;
- Figure 9 is a perspective exploded view, with some parts cut away, of an adjustable door hinge according to prior art.

[0020] With reference to the accompanying Figures from 1 to 8, the numeral 1 denotes a hinge according to the present invention, used in particular for "heavy" doors, such as exterior doors, main front doors, gates, etc.

[0021] With reference to Figure 1, the hinge, labelled 1 in its entirety, comprises a first body 2 and a second body 3 attachable, respectively, to a mobile frame of a door unit and to a fixed frame of a door unit (not illustrated since they are of well known type and do not fall within the scope of this invention) by means of respective flaps 4 and 5 that accommodate respective screw fixing means (also not illustrated).

[0022] As illustrated in Figure 4, the hinge 1 comprises a pin 6 for joining the two hinge bodies 2 and 3. The pin 6 has a central axis A6 and can be inserted, with interposed first and second bushes cylindrical centring bushes 7 and 8, respectively upper and lower, into respective axial through holes 9 and 10 made in the first and second hinge bodies 2 and 3 and extending along respective longitudinal axes A9, A10.

[0023] The bushes 7, 8 have respective central axes A7, A8 which, when the bushes 7, 8 themselves are fitted inside the holes 9, 10 in the hinge bodies 2, 3, are parallel with the respective axes A9, A10 of the holes 9, 10 and coincide with the axis A6 of the pin 6.

[0024] The bush 8 is not illustrated or described in detail since it is of known type and does not strictly form part of the present invention.

[0025] As shown in Figure 5, the upper bush 7 comprises a first and a second radial protrusion 11 and 12 extending longitudinally parallel with the central axis A7.

[0026] The first and second protrusions 11, 12 of the upper bush 7 are located diametrically opposite each other and are shaped symmetrically about a plane passing through the above mentioned axis A7 of the bush 7 itself represented by a dashed line P in Figure 5.

[0027] The hole 9 made in the upper hinge 1 body 2 comprises an inside face 9a in which there is a first recess 13 extending longitudinally for the entire axial extension of the hole 9 and in a direction parallel with the axis A9 of the hole 9 itself.

[0028] The first recess 13 has an inside surface that is substantially defined by a cylindrical sector.

[0029] Again with reference to Figure 5, the inside face 9a of the hole 9 has a second recess 14 also extending for the entire axial extension of the hole 9 and in a direction parallel with the first recess 13.

[0030] The second recess 14 has a central section positioned diametrically opposite the first recess 13.

[0031] The coupling between the bush 7 and the pin 6 is accomplished by a grooved profile 15 which constitutes hinge 1 engagement and locking means 16 designed to prevent the pin 6 and the bush 7 from rotating relative to each other about the axis A6.

[0032] As illustrated in Figures 4, 7 and 8, the bush 7 has a blind hole 17 in which an upper portion 6a of the pin 6 is inserted. The grooved profile 15 is made between the blind hole 17 and the upper portion 6a of the pin 6.

[0033] With reference in particular to Figures 5 and 8, the hinge 1 comprises, between the first upper bush 7 and the related hole 9, an element 18 for adjusting the position of the hinge pin 6. The adjustment element 18 is threaded so that it can be screwed into the pin 6 or the bush 7 or both. As explained in detail below, the adjustment element 18 thus operates between the hole 10 and the assembly formed by the bush 7 and the pin 6, in such a way as to enable this assembly to move within the hole 9 while keeping the pin axis A6 parallel with the axis A9 of the hole 9.

[0034] In the embodiment illustrated in the accompanying drawings, the adjustment element 18 is screwed into the bush 7, which has a matching threaded hole made in it.

[0035] Alternatively, in another embodiment that is not illustrated, the adjustment element 18 may be screwed into a threaded hole made in the pin 6 and leading to the outside through appropriate openings made in the bush 7.

[0036] Advantageously, in the latter case, the openings in the bush are originally smaller in diameter than the adjustment element 18 so that when the hinge is installed they are deformed in such a way as to produce a self-locking action between the adjustment element 18 and the upper bush 7.

[0037] During use, the threaded adjustment element 18 is screwed into the bush 7 before the pin 6-bush 7

assembly is inserted into the hole 9. In this way, the element 18 goes all the way inside the hole 9 and its end 18a is in contact with the curved inside face 9a of the hole 9, while its second end 18b partly faces a slot 19.

[0038] With reference to Figures 6 and 8, the slot 19 is arc-shaped, passes through the side wall of the hinge body 2 and is smaller in size than the second end 18b of the adjustment element 18. Through the slot 19, therefore, the adjustment element 18 can be moved in both directions from outside the hinge body 2, using a customary tool that is not illustrated.

[0039] Turning the threaded adjustment element 18 clockwise or anticlockwise causes the pin 6-bush 7 assembly to move within the hole 9. As the adjustment element 18 is turned clockwise or anticlockwise, it cannot move backwards or forwards along its longitudinal axis since its ends are stopped by the inside face 9a of the hole 9.

[0040] Consequently, when the adjustment element 18 is turned, it is the pin 6-bush 7 assembly that moves in or out relative to the adjustment element, thus varying its position within the hole 9.

[0041] In practice, the pin 6-bush 7 assembly is made to perform a pendular movement defined by the rotation of the assembly itself about an instantaneous axis of rotation R defined by the engagement of the protrusion 11, 12 with the first recess 13 (see arrows F, Figure 5).

[0042] In other words, the engagement of the protrusion 11, 12 in the first recess 13 instantaneously defines an axis of rotation R parallel with the central axis A7 of the bush and the pin 6-bush 7 assembly is made to rotate instantaneously about the axis A7 by the rotation of the adjustment element 18.

[0043] In the preferred embodiment illustrated in the accompanying drawings, and as clearly shown in Figure 5, the first recess 13 has an inside surface 13a defined and delimited by a cylindrical sector.

[0044] Again with reference to the preferred embodiment illustrated, the first and second protrusions 11, 12 each have two rounded portions 20, shown more clearly in the drawings only on the protrusion 12, these rounded portions 20 being designed to engage with the cylindrical sector of the inside surface 13a of the first recess 13, thereby forming a substantially cylindrical joint between the hinge body 2 and the bush 7 attached to the pin 6.

[0045] The slot 19, through which the adjustment element 18 can be operated, is then closed by an appropriate tamper-proof plate 21 which also covers the securing screws (not illustrated) inserted in suitable through holes 22 (shown in Figure 1) made in the flap 4 of the upper hinge body 2. Similarly, the lower hinge body 3, once assembled, is covered by a tamper-proof plate 23 that covers respective through holes 24. The plates 21 and 23 are clearly illustrated in Figures 2 and 3.

[0046] Caps 25 are provided to cover the free ends of the holes 9 and 10 in the hinge bodies 2 and 3.

[0047] Figure 9 illustrates a prior art hinge comprising a bush 7 having only one protrusion 11. The parts of the

prior art hinge of Figure 9 that are the same as those of the hinge according to the present invention are denoted by the same reference numbers.

[0048] As may be inferred from Figure 9, the prior art hinge, once assembled for example for a right-hand opening door, is not immediately reversible to another configuration for use on a left-hand opening door.

[0049] Thus, with prior art hinges like the one shown in Figure 9, even if the lower bush 8 is removed and refitted after turning the lower hinge body 3, it is also necessary to unscrew the threaded adjustment element 18, take the bush 7 off the pin 6, put it back on the pin upside down, screw the threaded adjustment element 18 in with its second end or head 18b positioned at the end of the hole where its first end or tip 18a was previously, turn the hinge body 2 upside down and refit it on the pin 6-bush 7 assembly.

[0050] The operations of unscrewing the threaded adjustment element 18 and then turning the bush 7 upside down are necessary to keep the head end 18b of the adjustment element 18 accessible through the slot 19 even in the new configuration, so as to be able to adjust the hinge as described above.

[0051] Advantageously, in the hinge 1 according to the invention, the presence of the second protrusion 12 eliminates the need for many of the operations described above to adapt the hinge 1 to a right- or left-hand opening door.

[0052] In other words, once the lower hinge body 3 has been turned upside down about a respective horizontal direction (perpendicular to the reference plane of Figure 2), it is sufficient to refit the pin 6 and bush 7 assembly on the hinge body 3, turn the assembly through 180° about the axis A6 and refit the upper hinge body 2 upside down on this assembly.

[0053] Advantageously, therefore, the substantially symmetrical shape of the bush 7 and the presence of the second recess 14 to accommodate the protrusion 11 or 12 that is not engaged in the first recess 13, considerably simplifies and shortens the procedure for changing the configuration of the hinge 1 from one suitable for a right-hand opening door to one suitable for a left-hand opening door and vice versa.

[0054] Thus, the new hinge configuration makes it possible to fit the bush 7 and the pin 6 together to form a single assembly whether the adjustment element 18 is in place or not.

[0055] As shown in Figure 7, for example, the pin 6 may have a portion 6a, housed in the bush 7, with threading 6f that enables it to be screwed into the threaded seat 7f made in the bush 7 itself.

[0056] In another embodiment (see Figure 4) the portion 6a of the pin 6 may be stably housed in the seat 7a in the bush 7 by means of an interference fit.

[0057] The hinge according to the invention therefore achieves the preset aims thanks to a very simple structural modification, that is to say, the twin protrusion, which does not affect the basic structure of the hinge but which

allows the hinge to be quickly and precisely adapted for right- or left-hand opening doors by means of a "setting" that is much faster than in previous solutions.

Claims

1. An adjustable door hinge of the type comprising at least:

- a first body and a second body (2, 3) equipped with respective securing flaps (4, 5);
- a hinge pin (6) which has a central axis (A6) and which can be at least partly inserted into respective holes (9, 10) made in the hinge bodies (2, 3) ;
- at least one respective centring bush (7) with an approximately cylindrical shape interposed between the pin (6) and at least one of the holes (9, 10), the bush (7) presenting a first substantially radial protrusion (11), said protrusion (11) extending longitudinally parallel with the central axis (A6);
- a first recess (13) made on an inside face (9a) of one of the holes (9, 10), this first recess (13) being designed to engage with the first protrusion (11);
- an adjustment element (18) for varying the position of the hinge pin (6) inside the hole (9), the adjustment element (18) being able to be actuated from the outside of the hole (9) and operating between the pin (6) and the hole (9) in such a way as to allow the pin (6) to perform a pendular movement defined by the rotation of the pin (6) about an instantaneous axis of rotation (R) defined by the engagement of the protrusion (11) with the recess (13), wherein the bush (7) has a second substantially radial protrusion (12) located diametrically opposite the first protrusion (11) and a second recess (14) is made in the inside face (9a) of the hole (9), the hinge being **characterised in that** the second protrusion (12) is designed to also engage with the first recess (13) instead of the first protrusion (11), the protrusion (11, 12) that is not engaged with the first recess (13) being positioned inside the second recess (14) which extends radially in such a way as to allow the protrusion (11, 12) itself to move during the pendular movement.

2. The hinge according to claim 1, **characterised in that** the first recess (13) has an inside surface (13a) defined at least partly by a cylindrical sector.
3. The hinge according to claim 2, **characterised in that** the first and second protrusions (11, 12) each comprise at least one rounded portion (20) designed to engage with the inside surface (13a) at the cylin-

drical sector, thereby forming a substantially cylindrical joint between the hinge body (2) and the bush (7) attached to the pin (6).

4. The hinge according to any of the foregoing claims from 1 to 3, **characterised in that** it comprises engagement and locking means (16) between the pin (6) and the bush (7), said means (16) being designed to prevent the pin (6) and the bush (7) from rotating relative to each other about the axis (A6).
5. The hinge according to any of the foregoing claims from 1 to 4, **characterised in that** the bush (7) has a longitudinal blind hole (17) for accommodating a portion of the pin (6).
6. The hinge according to claim 5, **characterised in that** the adjustment element (18) is threaded and can be screwed into a matching threaded hole made in the bush (7).
7. The hinge according to any of the foregoing claims from 1 to 6, **characterised in that** the bush (7) and the pin (6) are fitted together stably to form a single assembly whether the adjustment element (18) is in place or not.
8. The hinge according to claim 7, **characterised in that** a portion (6a) of the pin (6) housed in the bush (7) has threading (6f) that enables it to be screwed into the threaded seat (7f) made in the bush (7) itself.
9. The hinge according to claim 7, **characterised in that** the pin (6) comprises a portion (6a) that can be stably housed in the seat (7a) in the bush (7) by means of an interference fit.

Patentansprüche

1. Verstellbares Türscharnier der Art, die mindestens Folgendes beinhaltet:
 - einen ersten Scharnierkörper und einen zweiten Scharnierkörper (2, 3), die mit entsprechenden Befestigungslappen (4, 5) ausgestattet sind;
 - einen Scharnierzapfen (6), der eine Mittelachse (A6) aufweist und der zumindest teilweise in entsprechende Löcher (9, 10) eingeführt werden kann, die in den Scharnierkörpern (2, 3) ausgefertigt sind;
 - zumindest eine entsprechende Zentrierbuchse (7) mit annähernd zylindrischer Form, die zwischen dem Zapfen (6) und zumindest einem der Löcher (9, 10) angeordnet ist, wobei die Buchse (7) einen ersten im Wesentlichen radialen Vorsprung (11) aufweist und sich der genannte Vor-

- sprung (11) in Längsrichtung parallel zur Mittelachse (A6) erstreckt;
 - eine erste Vertiefung (13) auf einer Innenfläche (9a) eines der Löcher (9, 10), wobei diese erste Vertiefung (13) für den Eingriff mit dem ersten Vorsprung (11) vorgesehen ist;
 - ein Einstellelement (18) zur Änderung der Position des Scharnierzapfens (6) in dem Loch (9), wobei das Einstellelement (18) von außerhalb des Lochs (9) betätigt werden kann und zwischen dem Zapfen (6) und dem Loch (9) derart wirkt, dass es dem Zapfen (6) ermöglicht, eine Pendelbewegung auszuführen, die durch die Drehung des Zapfens (6) um eine momentane Drehachse (R) bestimmt ist, welche durch das Eingreifen des Vorsprungs (11) in die Vertiefung (13) definiert ist, worin die Buchse (7) einen zweiten im Wesentlichen radialen Vorsprung (12) aufweist, der diametral entgegengesetzt zum ersten Vorsprung (11) angeordnet ist, und eine zweite Vertiefung (14) in der Innenfläche (9a) des Lochs (9) angefertigt ist, wobei das Scharnier **dadurch gekennzeichnet ist, dass** der zweite Vorsprung (12) dafür ausgelegt ist, auch in die erste Vertiefung (13) einzugreifen, und zwar anstelle des ersten Vorsprungs (11), wobei der Vorsprung (11, 12), der jeweils nicht in Eingriff mit der ersten Vertiefung (13) steht, in der zweiten Vertiefung (14) angeordnet ist, die sich radial derart erstreckt, dass sie die Bewegung des Vorsprungs (11, 12) während der Pendelbewegung ermöglicht.
2. Scharnier nach Anspruch 1, **dadurch gekennzeichnet, dass** die erste Vertiefung (13) eine Innenoberfläche (13a) aufweist, die zumindest teilweise durch ein zylindrisches Segment gebildet wird.
3. Scharnier nach Anspruch 2, **dadurch gekennzeichnet, dass** der erste und zweite Vorsprung (11, 12) jeweils zumindest einen abgerundeten Abschnitt (20) beinhalten, der für den Eingriff mit der Innenoberfläche (13a) an dem zylindrischen Segment ausgelegt ist, um eine im Wesentlichen zylindrische Verbindung zwischen dem Scharnierkörper (2) und der am Zapfen (6) angebrachten Buchse (7) zu bilden.
4. Scharnier nach einem der vorgehenden Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** es Eingriffs- und Verriegelungsmittel (16) zwischen dem Zapfen (6) und der Buchse (7) beinhaltet, wobei diese Mittel (16) so ausgelegt sind, dass sie verhindern, dass der Zapfen (6) und die Buchse (7) relativ zueinander um die Achse (A6) drehen können.
5. Scharnier nach einem der vorgehenden Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Buchse

(7) ein längliches Sackloch (17) zur Aufnahme eines Abschnitts des Zapfens (6) aufweist.

6. Scharnier nach Anspruch 5, **dadurch gekennzeichnet, dass** das Einstellelement (18) mit Gewinde versehen ist und in eine passende Gewindebohrung in der Buchse (7) eingeschraubt werden kann.
7. Scharnier nach einem der vorgehenden Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** die Buchse (7) und der Zapfen (6) fest zusammengepasst sind, um eine einzige Baugruppe zu bilden, unabhängig davon, ob sich das Einstellelement (18) in seiner Aufnahme befindet oder nicht.
8. Scharnier nach Anspruch 7, **dadurch gekennzeichnet, dass** ein Abschnitt (6a) des Zapfens (6), der in der Buchse (7) aufgenommen wird, mit einem Gewinde (6f) versehen ist, das es ermöglicht, ihn in eine mit Gewinde versehene Aufnahme (7f) einzuschrauben, mit der die Buchse (7) versehen ist.
9. Scharnier nach Anspruch 7, **dadurch gekennzeichnet, dass** der Zapfen (6) einen Abschnitt beinhaltet (6a), der durch Presspassung fest in eine Aufnahme (7a) in der Buchse (7) aufgenommen werden kann.

Revendications

1. Une charnière de porte réglable du type comprenant au moins :
- un premier corps et un deuxième corps (2, 3) dotés de platines de fixation (4, 5) respectives ;
 - une broche d'articulation (6) qui présente un axe central (A6) et peut être au moins partiellement introduite dans des trous (9, 10) respectifs réalisés dans les corps de charnière (2, 3) ;
 - au moins une douille de centrage (7) respective, de forme approximativement cylindrique, interposée entre la broche (6) et au moins un des trous (9, 10), la douille (7) présentant une première saillie (11) essentiellement radiale, ladite saillie (11) s'étendant longitudinalement et parallèlement à l'axe central (A6) ;
 - une première rainure (13) réalisée sur une face intérieure (9a) d'un des trous (9, 10), cette première rainure (13) étant destinée à venir en prise avec la première saillie (11) ;
 - un élément de réglage (18) destiné à faire varier la position de la broche d'articulation (6) à l'intérieur du trou (9), l'élément de réglage (18) pouvant être actionné de l'extérieur du trou (9) et agissant entre la broche (6) et le trou (9) de manière à permettre à la broche (6) d'effectuer un mouvement pendulaire défini par la rotation

- de la broche (6) elle-même autour d'un axe de rotation (R) instantané défini par la mise en prise de la saillie (11) avec la rainure (13), où la douille (7) présente une deuxième saillie (12) essentiellement radiale qui est diamétralement opposée à la première saillie (11) et une deuxième rainure (14) est réalisée dans la face intérieure (9a) du trou (9), la charnière étant **caractérisée en ce que** la deuxième saillie (12) est destinée, elle aussi, à venir en prise avec la première rainure (13) à la place de la première saillie (11), la saillie (11, 12) qui n'est pas en prise avec la première rainure (13) étant positionnée à l'intérieur de la deuxième rainure (14) qui s'étend radialement de manière à permettre à la saillie (11, 12) elle-même de se déplacer pendant le mouvement pendulaire.
2. La charnière selon la revendication 1, **caractérisée en ce que** la première rainure (13) a une surface intérieure (13a) définie au moins partiellement par un secteur cylindrique.
3. La charnière selon la revendication 2, **caractérisée en ce que** les première et deuxième saillies (11, 12) comprennent chacune au moins une portion arrondie (20) destinée à venir en prise avec la surface intérieure (13a) au niveau du secteur cylindrique, formant ainsi un joint essentiellement cylindrique entre le corps de charnière (2) et la douille (7) associée à la broche (6).
4. La charnière selon l'une quelconque des revendications précédentes de 1 à 3, **caractérisée en ce qu'elle** comprend des moyens (16) de mise en prise et de blocage entre la broche (6) et la douille (7), lesdits moyens (16) étant destinés à empêcher la broche (6) et la douille (7) de tourner l'une par rapport à l'autre autour de l'axe (A6).
5. La charnière selon l'une quelconque des revendications précédentes de 1 à 4, **caractérisée en ce que** la douille (7) présente un trou borgne (17), longitudinal, destiné à loger une partie de la broche (6).
6. La charnière selon la revendication 5, **caractérisée en ce que** l'élément de réglage (18) est fileté et peut être vissé dans un trou taraudé complémentaire réalisé dans la douille (7).
7. La charnière selon l'une quelconque des revendications précédentes de 1 à 6, **caractérisée en ce que** la douille (7) et la broche (6) sont associées ensemble de façon stable afin de former un ensemble unique, que l'élément de réglage (18) soit en place ou non.
8. La charnière selon la revendication 7, **caractérisée en ce qu'une** partie (6a) de la broche (6) logée dans la douille (7) présente un filetage (6f) qui en permet le vissage dans un logement taraudé (7f) réalisé dans la douille (7) elle-même.
9. La charnière selon la revendication 7, **caractérisée en ce que** la broche (6) comprend une partie (6a) qui peut être logée de façon stable dans un logement (7a) de la douille (7) par emboîtement serré.

FIG. 1

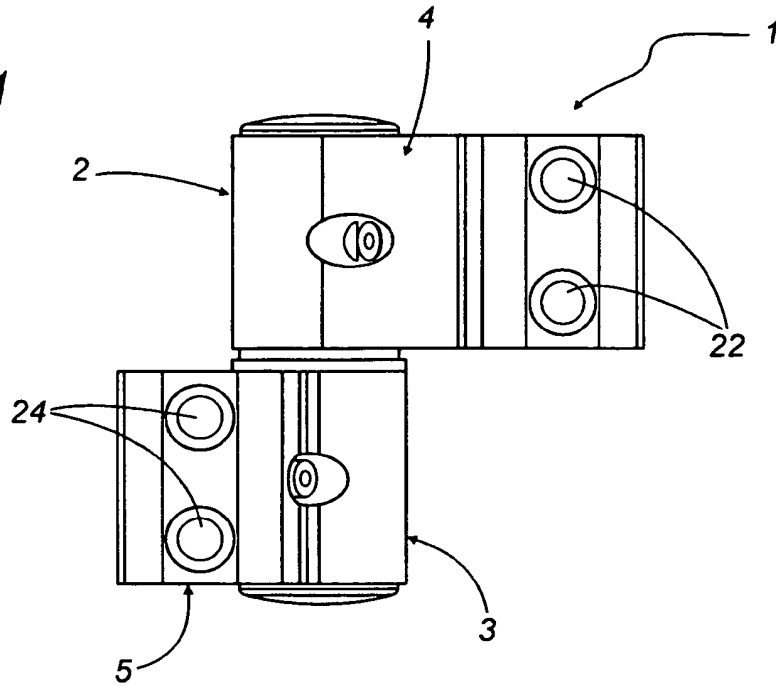
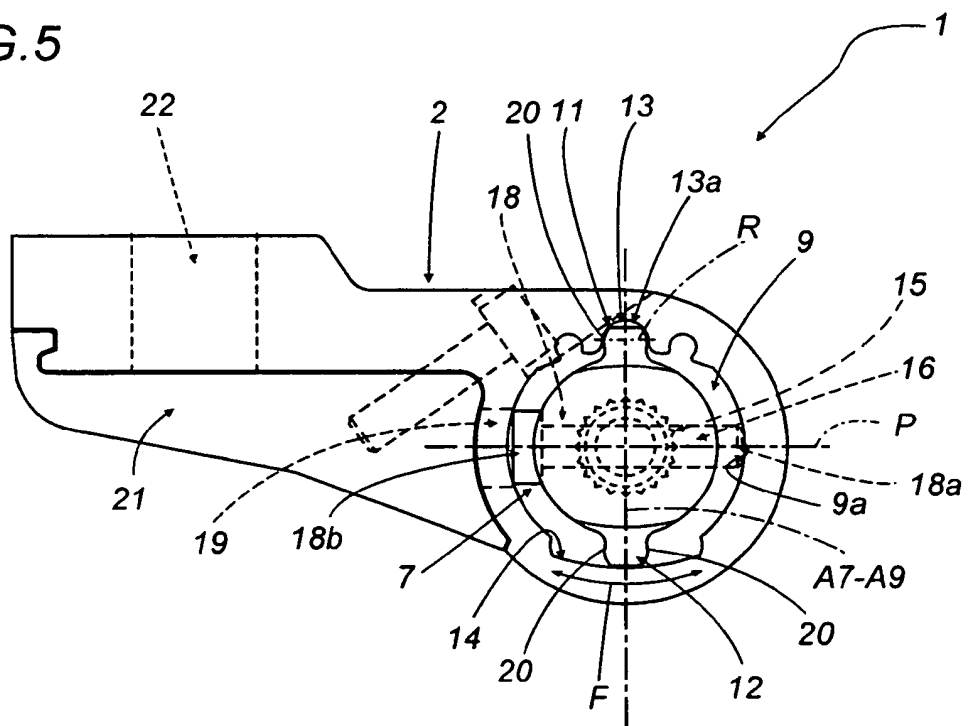


FIG. 5



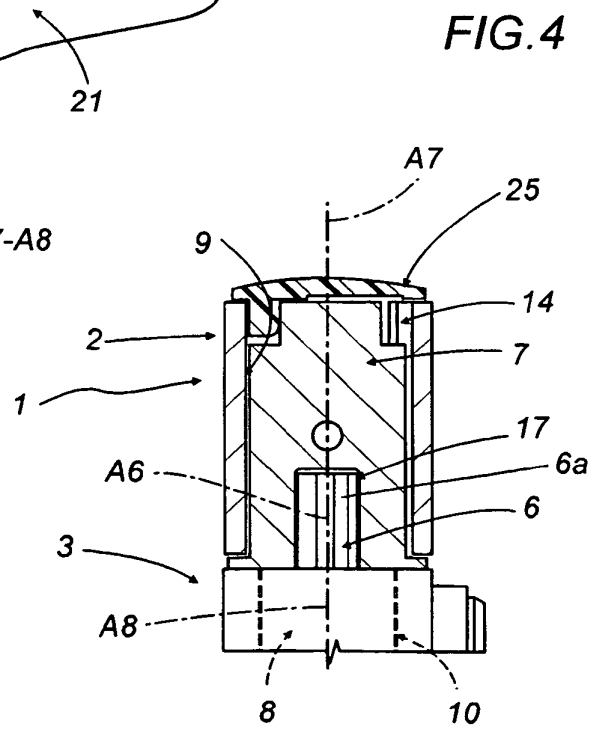
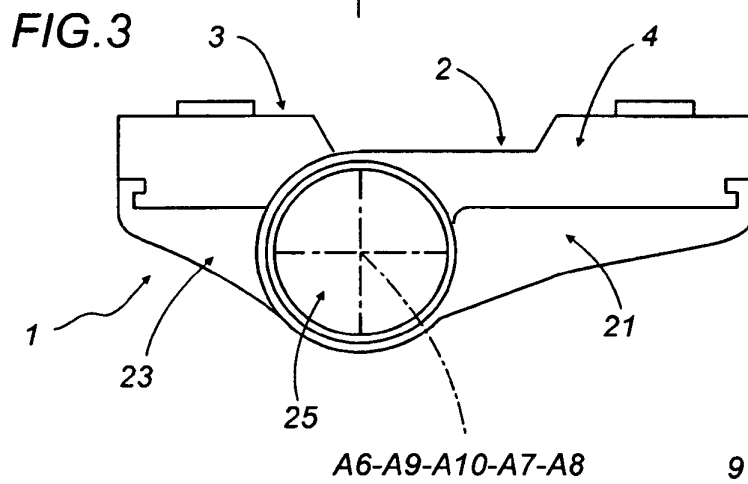
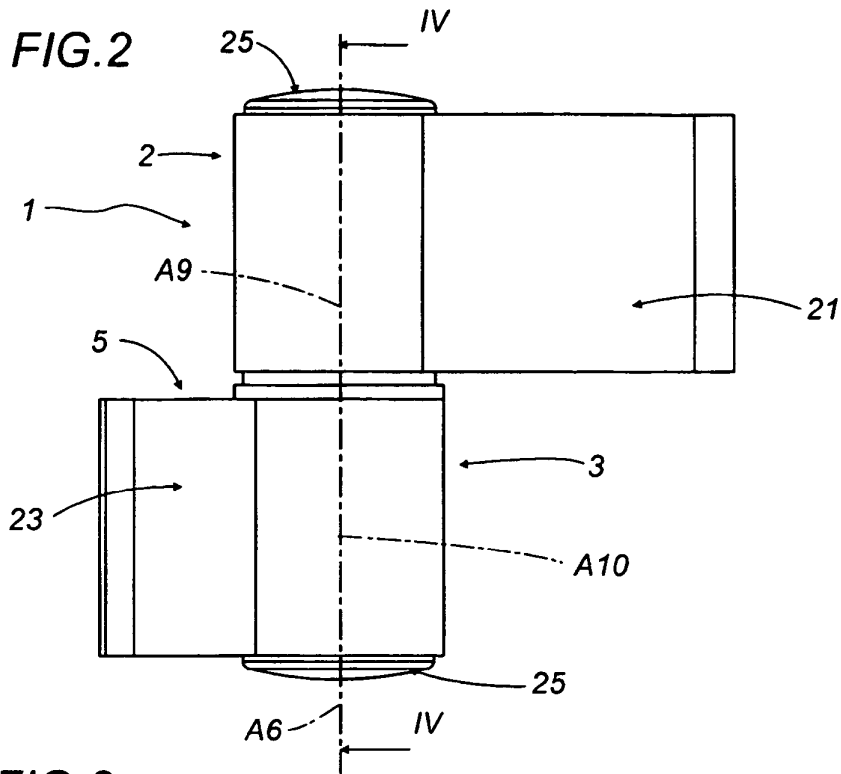


FIG.6

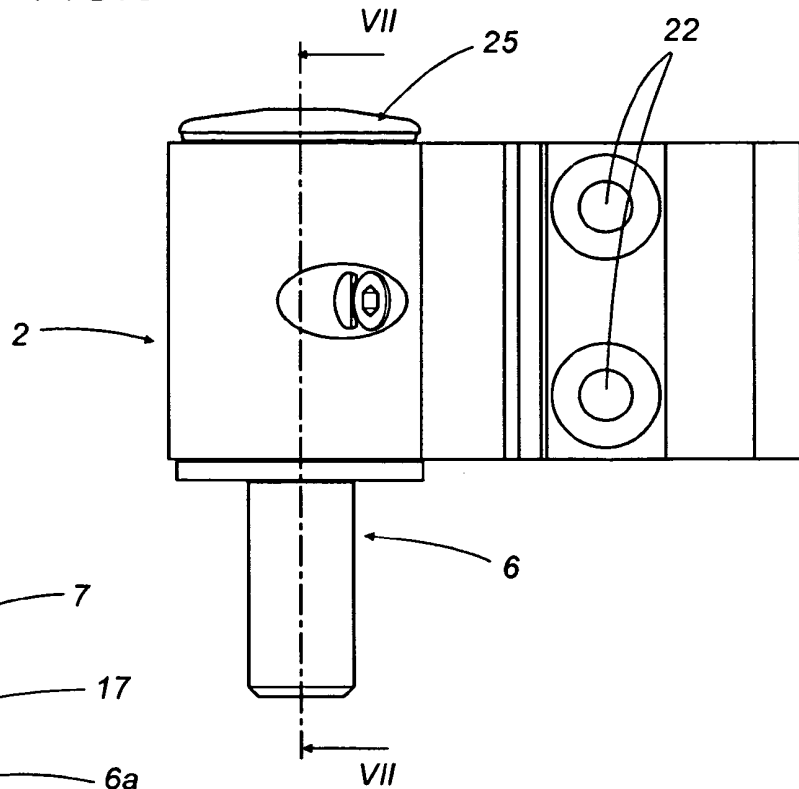


FIG.7

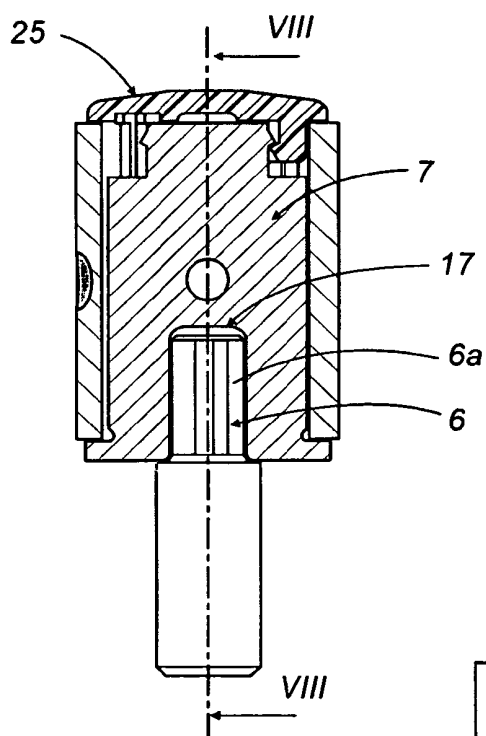


FIG.8

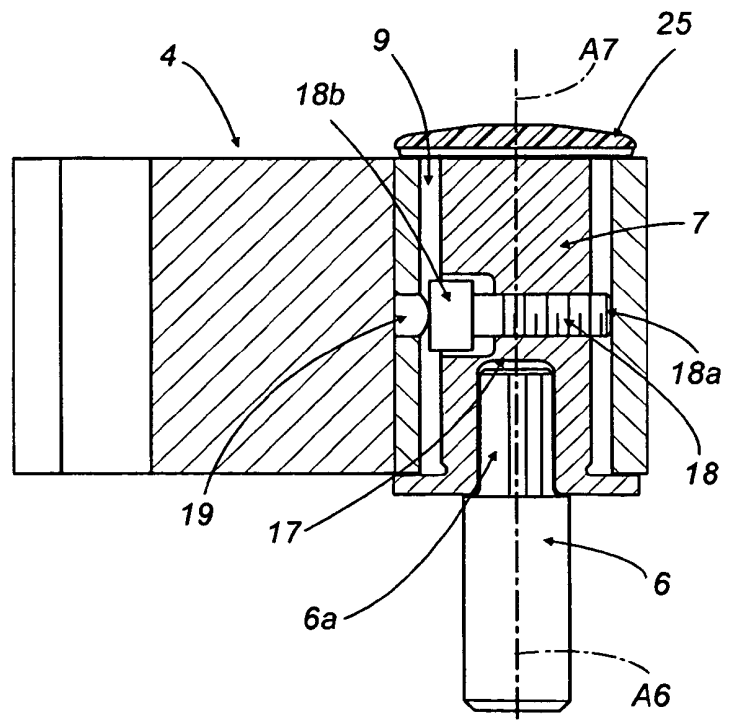
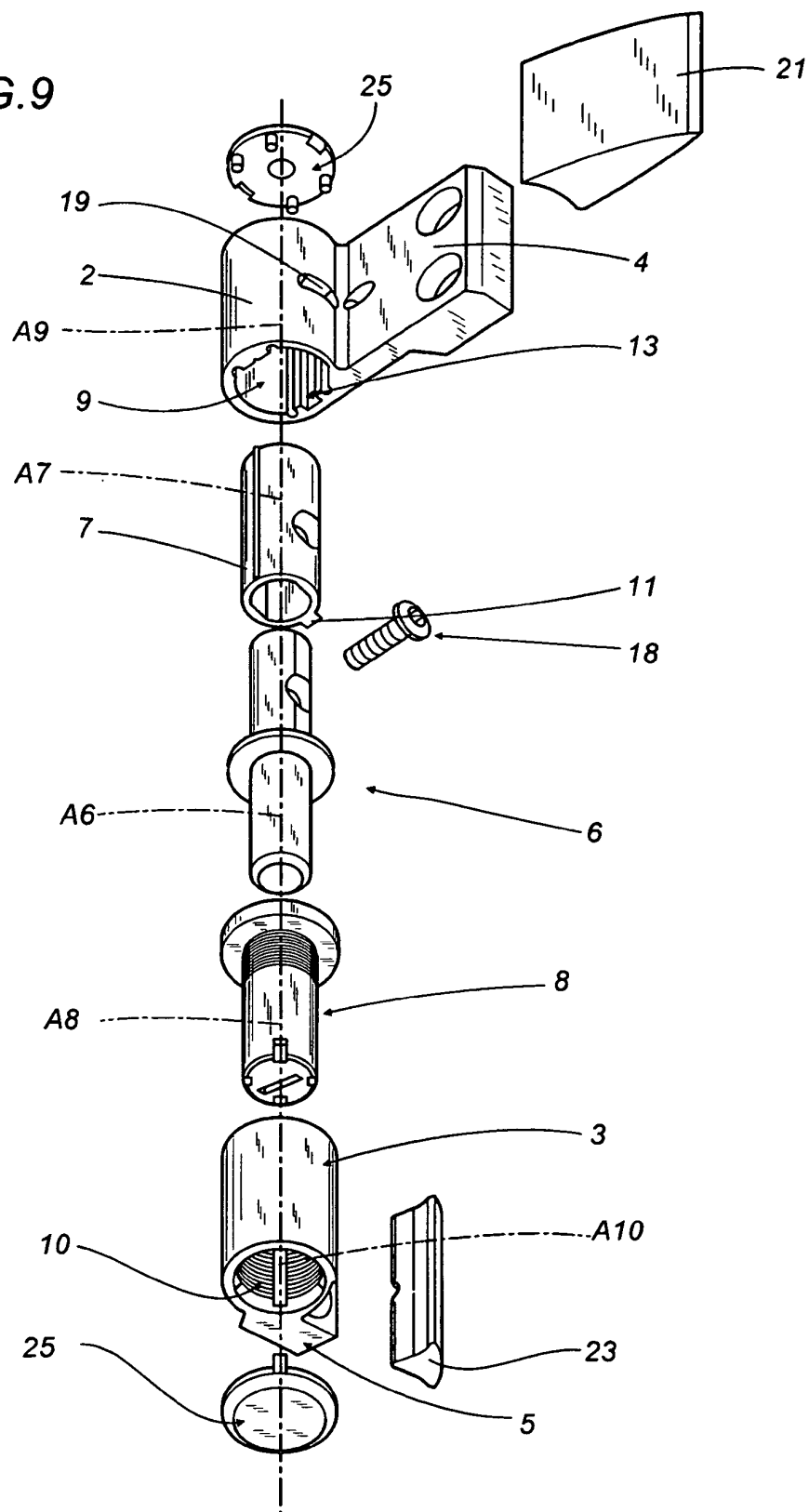


FIG.9



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- IT 1221237 [0005]
- EP 992647 A [0011]