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(71) Applicant: **OTLAV S.p.A**  
**31025 Santa Lucia di Piave (TV) (IT)**

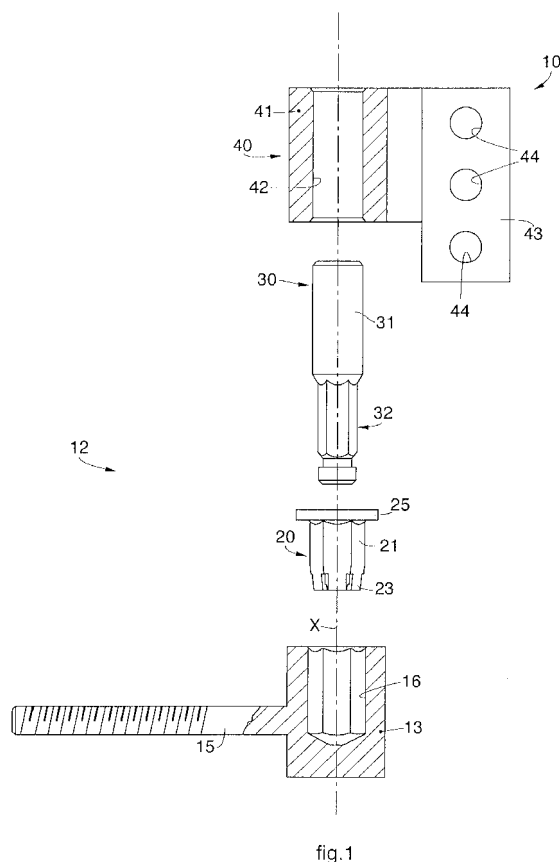
(72) Inventor: **Piccolo, Lorenzo**  
**31040 Giavera del Montello (TV) (IT)**

(74) Representative: **Petraz, Gilberto Luigi et al**  
**GLP S.r.l.**  
**Piazzale Cavedalis 6/2**  
**33100 Udine (IT)**

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(54) **Hinge for a door or window frame or furniture**

(57) Hinge for a door or window frame, or a piece of furniture, comprising a hinging element (12), of the male type, having a body (13) provided with a cavity (16), co-axial to a hinging axis (X), into which a bushing (20) is suitable to be inserted, having its own axial cavity (22) of a polygonal cross section and into which a pin (30) is adapted to be inserted which has a first cylindrical part (31) and a second part (32) provided with at least a zone (33) with a polygonal cross section, equal to that of the axial cavity (22) of the bushing (20). The bushing (20) also comprises stop teeth (23), adapted to cooperate with a circular throat (35) of the pin (30), which prevents the latter becoming axially free.



## Description

### FIELD OF THE INVENTION

**[0001]** The present invention concerns a hinge to articulate a mobile part, such as a door or panel of a door or window frame or a piece of furniture, with respect to a fixed structure.

### BACKGROUND OF THE INVENTION

**[0002]** From the patent N° 1.342.760 in the name of the Applicant, a hinge is known to support door or window frames in which a first hinging element is provided with an axial cavity of a cylindrical shape, into which a cylindrical pin can be axially inserted, and which is provided with a circular throat. A clamping ring, elastically deformable, is inserted both into the circular throat of the pin and into an annular seating made in the axial cavity, in order to prevent the pin from coming axially free from the latter. A second hinging element, of the female type, is provided with a cylindrical hole, into which the pin is suitable to be inserted.

**[0003]** One disadvantage of this known hinge is that the rotations of the second hinging element with respect to the first hinging element, above all when these are frequent, can also cause an undesired rotation of the pin with respect to the axial cavity, with consequent wear on the clamping ring which, in the long term, can cause an increase in the play between the pin and the axial cavity into which it is inserted, and therefore a misalignment between the fixed part and the mobile part of the door or window frame, or of the piece of furniture. Moreover, because of its rotations, the pin tends to come free from the axial cavity in which it is housed.

**[0004]** A further disadvantage of the known hinge is that, in order to make the annular seating in the axial cavity, several working steps are needed which are costly in themselves and which therefore increase the overall cost of the hinge.

**[0005]** From the German patent application for utility model DE-U-20317592 a hinge is known in which a hinging element of the male type comprises a body provided with a cavity conformed so as to have a substantially rectangular cross section and into which a bushing is suitable to be inserted. The lower part, hooked, of a pin having an upper cylindrical part is suitable to be inserted in the bushing. This hinge has the disadvantage that the pin has to be inserted obliquely into the bushing and then aligned with the pivoting axis.

**[0006]** From the German patent application for utility model DE-U-202006008400 a hinge is known provided with a pin having a cylindrical upper part and a shaped lower part, so that it cannot rotate with respect to a containing body. This hinge has the disadvantage however that it provides to use a transverse peg, difficult and complicated to mount, in order to keep the pin positioned with respect to the containing body.

**[0007]** Purpose of the present invention is to make a hinge to support the mobile part of a door or window frame or of a piece of furniture, which, as well as preventing the pin from coming axially free from its seating, also prevents the rotation thereof, and at the same time is economical, easy and quick to assemble and guarantees a safe and long-lasting functioning, under any conditions of use.

### 10 SUMMARY OF THE INVENTION

**[0008]** The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

**[0009]** In accordance with the above purposes, a hinge for a door or window frame or piece of furniture according to the present invention comprises a first hinging element or group, of the male type, having a body provided with a cavity conformed so as to have at least a cross section in which the peripheral points are at different distances from a hinging axis and in which a pin is suitable to be inserted, having at least a first cylindrical part, suitable to be inserted into a corresponding hole of a second hinging element or group, of the female type, and a second part provided with a zone also having a cross section in which the peripheral points are at different distances from the hinging axis. The first hinging element also comprises a bushing, suitable to be interposed between the body and the pin, and which is shaped externally so as to be able to be fitted into the cavity and is provided both with its own axial cavity having a cross section mating with that of the zone of the second part of the pin and into which precisely that zone of the pin is suitable to be inserted, and also with stop means, which are able to cooperate with the pin to prevent the latter from coming free from the bushing.

**[0010]** In accordance with a characteristic feature of the present invention, the bushing comprises a central part in which the axial cavity is made. Moreover, the stop means comprise a plurality of teeth, made at a first end of the central part and suitable to cooperate with a corresponding circular throat made in the second part of the pin.

**[0011]** In this way, after it has been inserted into the bushing, which happens axially, the pin of the first hinging element is perfectly coaxial to the hinging axis and can neither rotate, nor come axially free from the corresponding body which supports it.

**[0012]** The circular throat is preferably made between the zone of the pin, coupled with the axial cavity of the bushing, and one end of the second part of the pin.

**[0013]** The bushing also comprises a ring made at the opposite end to that where the stop teeth are disposed, and having a diameter bigger than the transverse size of the central part of the bushing, so that it is suitable to function, during use, as a spacer between the body of the first hinging element and the second hinging element.

**[0014]** Moreover, in order to guarantee that the pin does not rotate with respect to the bushing, the length of the axial cavity of the latter is greater than its transverse size.

**[0015]** According to another secondary characteristic of the present invention, the cross sections of the cavity of the body and of the central part of the bushing are both polygonal, for example hexagonal, and such as to allow the bushing to be fitted into the cavity of the body.

**[0016]** Moreover, the cross sections of the axial cavity of the central part of the bushing and of the zone of the second part of the pin are also polygonal, for example hexagonal, and have sizes such as to allow the axial insertion, with play, of the second part of the pin into the bushing, while still preventing their reciprocal rotation.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0017]** These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is an exploded and partially sectioned view of the elements which make up a hinge for door or window frames according to the present invention;
- fig. 2 is a view from above of a bushing of the hinge in fig. 1;
- fig. 3 is a lateral view of the bushing in fig. 2;
- fig. 4 is a section from IV to IV of fig. 2;
- fig. 5 is a front view of a pin of the hinge in fig. 1;
- fig. 6 is a longitudinal section of the hinge in fig. 1 in an assembled condition.

#### DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT

**[0018]** With reference to fig. 1 a hinge 10 for door or window frames or a piece of furniture according to the present invention comprises a first hinging element 12, of the male type, which in its turn comprises a body 13, made of metal and substantially cylindrical, from which a threaded stem 15 projects perpendicularly, which is suitable to be used to attach, in the known way, the hinging element 12 to a part, for example a fixed part, of a door or window frame, or piece of furniture, not shown in the drawings.

**[0019]** A blind cavity 16 is made in the body 13, coaxial to a hinging axis X and having a polygonal cross section, which in this case is hexagonal. Other shapes of non cylindrical cross sections, such as elliptical, oval or irregular, can be used as variants to the polygonal shape, provided that the peripheral points of the cavity 16 are at different distances from the hinging axis X.

**[0020]** The hinging element 12 also comprises a bushing 20 (figs. 1, 2, 3 and 4) made of plastic material, having a cross section mating with that of the cavity 16 and of

sizes such as to be fitted in the latter. In this case, the bushing 20 comprises a central part 21, of a tubular shape, with a substantially constant thickness, comprised, for example, between 1 mm and 2 mm, so that externally it has the shape of a hexagonal parallelepiped, coherent with the sizes of the cavity 16, and internally has its own axial through cavity 22, also with a hexagonal cross section. In this case, at the lower end of the central part 21, six stop teeth 23 are made, that is, one for each face of the central part 21, which are slightly inclined toward the inside of the axial cavity 22. More specifically and by way of example, the width of the axial cavity 22 (figs. 2 and 4) is about 10 mm and its length is about 20 mm.

**[0021]** Moreover, in its upper part the bushing 20 has a ring 25, the diameter of which is greater than the transverse size of the central part 21 and which is suitable to contact at the lower part the upper surface of the body 13 (fig. 6).

**[0022]** Into the axial cavity 22 of the bushing 20 a metal pin 30 (figs. 1, 5 and 6) is suitable to be at least partly inserted, and is shaped so as to have an upper part 31 cylindrical and a lower part 32 of smaller transverse sizes than the diameter of the upper part 31. In particular the lower part 32 comprises a zone 33 with a polygonal shape, mating with that of the axial cavity 22 of the bushing 20, a circular throat 35, suitable to accommodate the stop teeth 23, and a cylindrical end 36.

**[0023]** The hinge 10 also comprises a second hinging element 40 (figs. 1 and 6), of the female and known type, which in this case comprises, in its turn, a body 41, made of metal and substantially cylindrical, having a central through hole 42, also cylindrical and, during use, coaxial to the hinging axis X. A plate 43 is attached to the body 42, provided with holes 44 which can be used to attach the second hinging element 40 to a part, for example a mobile part, of the door or window frame or the piece of furniture when the first hinging element 12 is connected to the fixed part of the door or window frame, or the piece of furniture, or vice versa.

**[0024]** To assemble the first hinging element 12, first of all the hexagonal central part 21 of the bushing 20 is inserted, fitting it from above into the cavity 16, which is also hexagonal, of the body 13, until the ring 25 of the bushing 20 goes into contact with the upper surface of the body 13 (fig. 6).

**[0025]** Then, using the threaded stem 15, the body 13 is fixed, with the bushing 20 already fitted, to the fixed part of the door or window frame or piece of furniture.

**[0026]** After, the second hinging element 40 is disposed, previously fixed, in a known way, to the mobile part of the door or window frame, above the ring 25 of the bushing 20, so that the hole 42 is coaxial with the axial cavity 22 of the bushing 20 and therefore with the hinging axis X.

**[0027]** Then, the pin 30 is inserted from above, first into the hole 42 and then into the axial cavity 22 of the bushing 20, until the stop teeth 23, after being slightly

deformed elastically, are disposed elastically and permanently inside the circular throat 35. In this way the pin 30, thanks to the coupling between its hexagonal zone 33, and the corresponding axial cavity 22, which is also hexagonal, cannot rotate with respect to the bushing 20, and therefore not even with respect to the body 13, nor can it come axially free, because of the coupling of the stop teeth 23 of the bushing 20 with the lower edge of the circular throat 35.

**[0028]** Moreover, the upper part 31 of the pin 30 is thus positioned correctly and irremovably with respect to the hole 42 and to the hinging axis X.

**[0029]** In this operating condition the ring 25 of the bushing 20 also acts as a spacer between the two bodies 13 and 41 of the two hinging elements 12 and 40, respectively.

**[0030]** In this way the hinge 10 can be used without any problem and, in particular, without any possibility that the pin 30 can come free, or rotate with respect to the body 13, in which it is positioned with the interposition of the bushing 20.

**[0031]** It is clear that modifications and/or additions of parts may be made to hinge for door and window frames or furniture as described heretofore, without departing from the field and scope of the present invention.

**[0032]** It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of hinge, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

## Claims

1. Hinge for a door or window frame, or a piece of furniture, comprising a first hinging element (12), of the male type, having a body (13) provided with a cavity (16) conformed so as to have at least a cross section in which the peripheral points are at different distances from a hinging axis (X) and in which a pin (30) is adapted to be inserted, having at least a first cylindrical part (31), adapted to be inserted into a corresponding hole (42) of a second hinging element (40), of the female type, and a second part (32) provided with at least a zone (33) also having a cross section in which the peripheral points are at different distances from said hinging axis (X), in which said first hinging element (12) also comprises a bushing (20) which is shaped externally so that it can be fitted into said cavity (16) of said body (13) and comprises its own axial cavity (22) having a cross section mating with that of said zone (33) of said second part (32) of said pin (30) and into which at least said zone (33) of said second part (32) of said pin (30) is adapted to be inserted, and stop means (23), adapted to cooperate with said pin (30) to prevent the latter from

coming free from said bushing (20), **characterized in that** said bushing (20) comprises a central part (21) in which said axial cavity (22) is made, and **in that** said stop means comprise a plurality of teeth (23), made at a first end of said central part (21) and adapted to cooperate with a corresponding circular throat (35) made in said second part (32) of said pin (30).

2. Hinge as in claim 1, **characterized in that** said circular throat (35) is made between said zone (33) and one end (36) of said second part (32) of said pin (30).
3. Hinge as in claim 1 or 2, **characterized in that** said bushing (20) also comprises a ring (25) made at a second end of said central part (21), opposite said first end, and having a diameter bigger than the transverse size of said central part (21), said ring (25) being adapted to function, during use, as a spacer between said body (13) of said first hinging element (12) and said second hinging element (40).
4. Hinge as in claim 1, 2, or 3, **characterized in that** the length of said axial cavity (22) of said bushing (20) is bigger than its transverse size.
5. Hinge as in any claim hereinbefore, **characterized in that** the cross sections of said cavity (16) of said body (13) and of said central part (21) of said bushing (20) are both polygonal and such as to allow said bushing (20) to be fitted into said cavity (16) of said body (13).
6. Hinge as in any claim hereinbefore, **characterized in that** the cross sections of said axial cavity (22) of said central part (21) of said bushing (20) and of said zone (33) of said second part (32) of said pin (30) are polygonal and of sizes such as to allow the axial insertion with play of said second part (32) of said pin (30) into said bushing (20), while still preventing their reciprocal rotation.

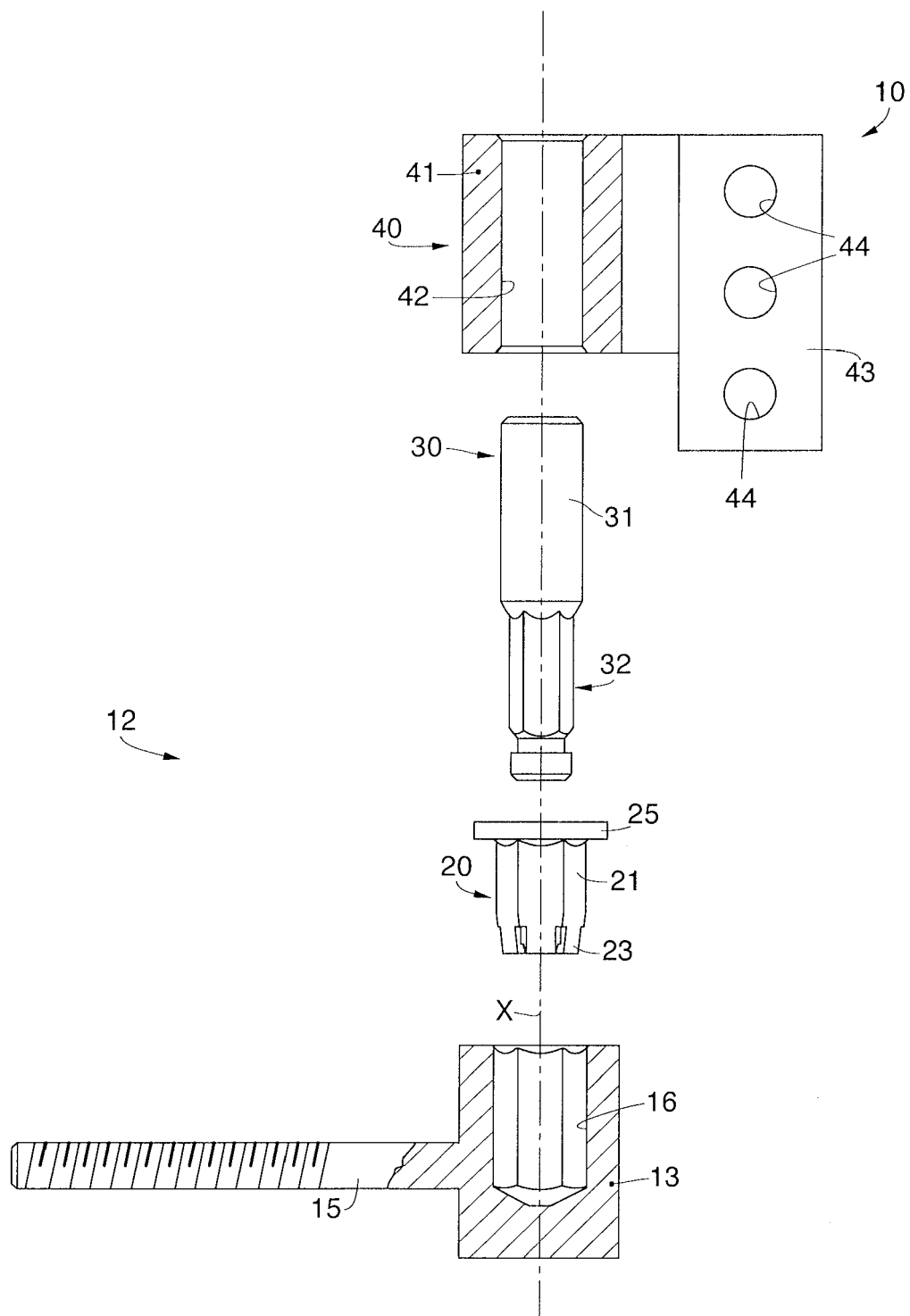


fig.1

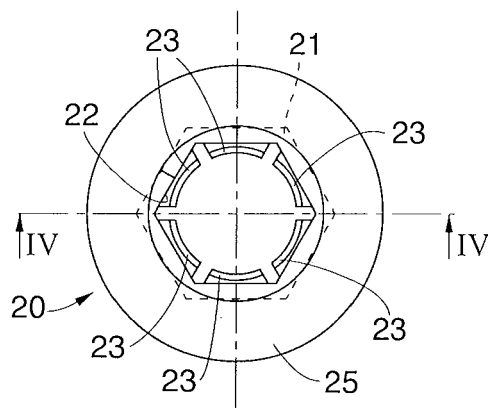


fig.2

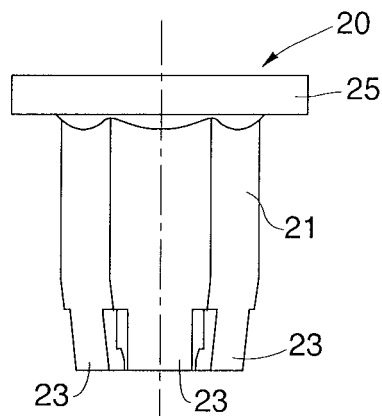


fig.3

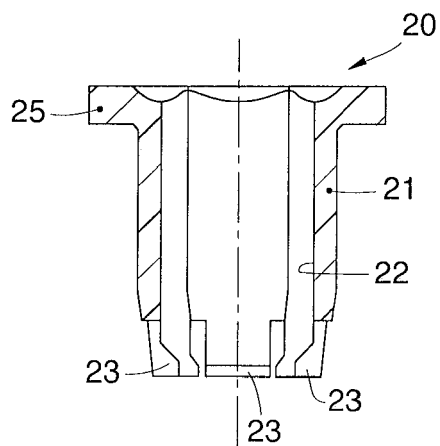


fig.4

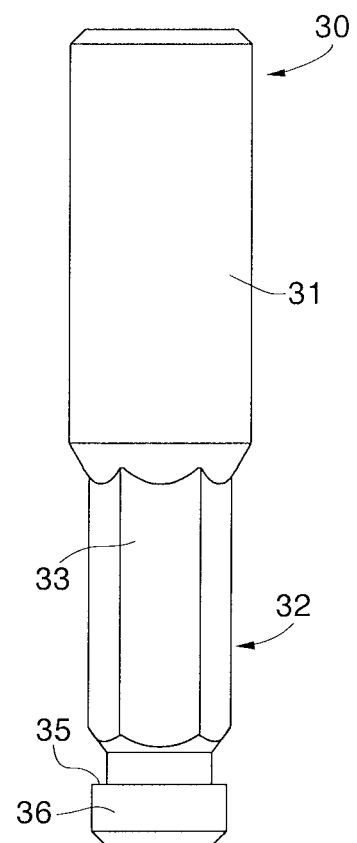


fig.5

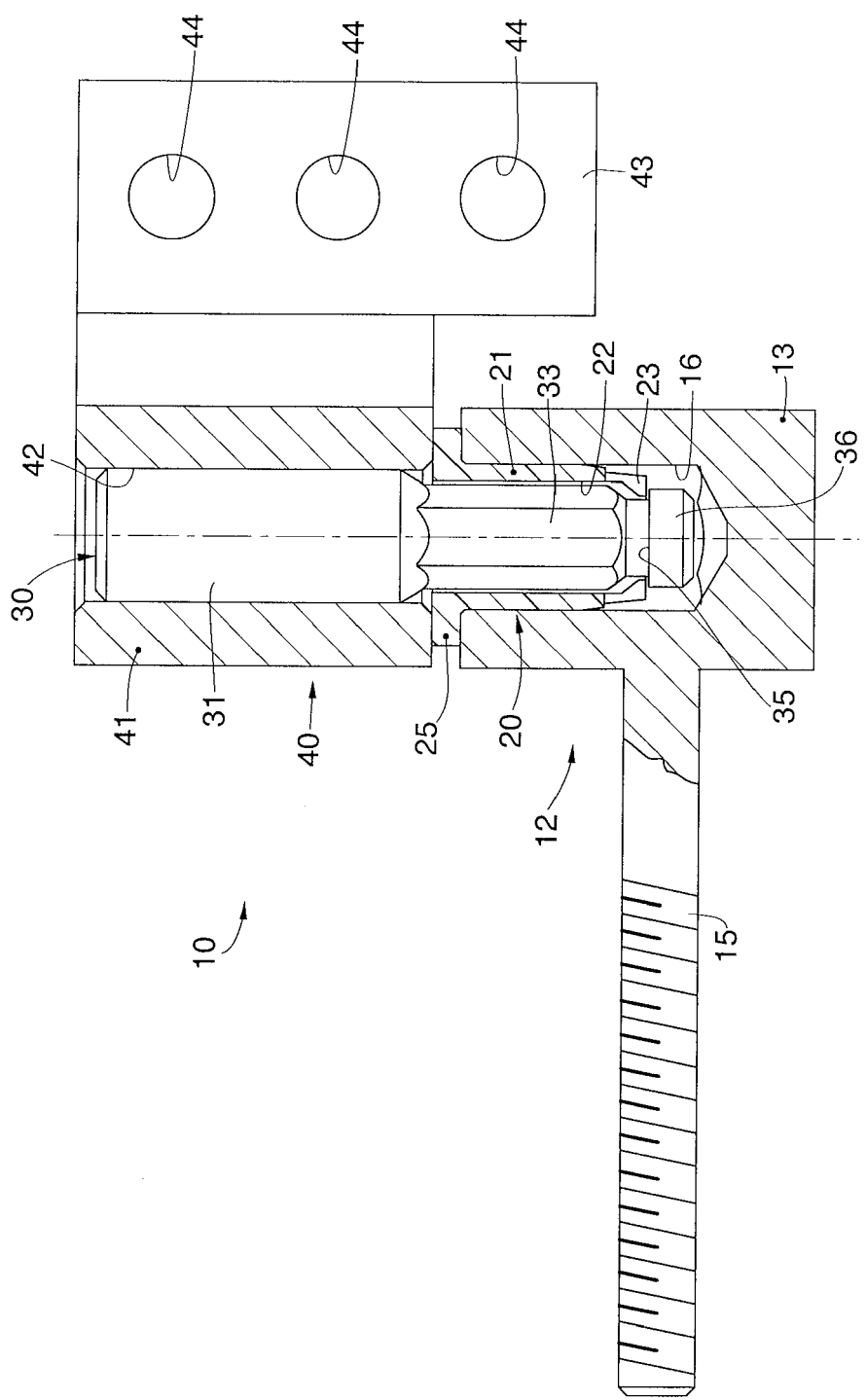


fig.6

**REFERENCES CITED IN THE DESCRIPTION**

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