(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 189 600 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.05.2010 Bulletin 2010/21

(51) Int Cl.:
E05D 7/00 *(2006.01)* ***E05D 7/04*** *(2006.01)*

(21) Application number: **09176556.0**

(22) Date of filing: **19.11.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
AL BA RS

(30) Priority: **19.11.2008 IT TO20080855**

(71) Applicant: **Nova-Ferr S.r.l.**
10070 Grosso (TO) (IT)

(72) Inventor: **Ferraro, Luigi**
10070, Grosso (TO) (IT)

(74) Representative: **Robba, Pierpaolo**
Interpatent S.R.L.
Via Caboto 35
10129 Torino (IT)

(54) Adjustable hinge

(57) The present invention relates to an adjustable hinge for fixtures that comprise a first element and a second element rotating around a rotation axis relative to the first element. The hinge comprises a first component (11) arranged to be fastened to one element of the fixture, and a second component (12) arranged to rotate relative to the first component (11) by means of a pivot (15) inserted between the first and second components. The first component (11) is equipped with an adjustment system comprising an adjustment component (37) arranged to stop against said one element of the fixture and to adjust the position of the hinge along an axis transverse to the rotation axis, and locking means (43a, 43b) cooperating with a holding element or counterplate (45) to lock the hinge at a desired position upon the adjustment.

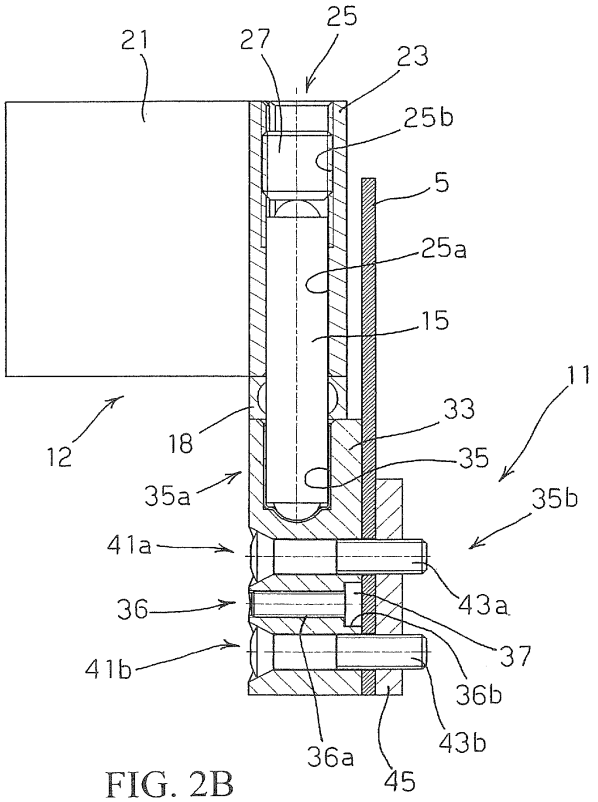

FIG. 2B

EP 2 189 600 A1

Description

Technical field

[0001] The present invention generally relates to an improved adjustable hinge.

[0002] More particularly, the present invention relates to an adjustable hinge that can be used for instance for mounting doors, and such a use is referred to hereinafter for the sake of easiness of description.

Prior art

[0003] Adjustable hinges, in particular adjustable hinges for mounting doors on frames, are known in the art.

[0004] Usually, prior art adjustable hinges are generally arranged to allow only an axial adjustment of the door they are fixed to, so that their use only allows adapting for instance the vertical position of the door relative to the frame. Thus, a problem common to the prior art hinges is that, in certain cases of frame or door defectiveness, it is impossible to obviate such defectiveness by means of the hinge only, and interventions on the door and/or the frame become necessary, with a resulting increase in time and costs.

[0005] Essentially, the Applicant has realised that in certain cases it is indispensable that the hinges allow a complete adjustment of the door position relative to the frame, and not only an axial adjustment.

Description of the invention

[0006] It is an object of the present invention to provide a hinge that solves the above-mentioned problems of the prior art.

[0007] The object is achieved by means of the improved adjustable hinge as claimed.

[0008] The present invention also concerns a method for making an improved adjustable hinge.

[0009] According to the invention, the hinge is applied to fixtures in which a first fixture element rotates relative to a second element about a rotation axis, and the hinge comprises, in a first hinge component, an adjustment system configured for adjusting the position of the hinge along an axis transverse to the rotation axis.

[0010] Document DE 44 47 468 actually discloses a hinge for rotatably securing the wing of a door or a window to a frame or fixture, which hinge allows varying the position along an axis transverse to the vertical rotation axis of the hinge.

[0011] Yet, the hinge disclosed in that document, where the elements for locking the adjusting system directly penetrate into the fixture element, has several drawbacks.

[0012] First, such a locking system suffers from the risk of becoming loosened, with a consequent loss of precision in the hinge adjustment.

[0013] Second, in order to obtain a fine adjustment of the hinge position, such a locking system requires extremely close working tolerances, which entail a non-negligible increase in the manufacturing costs.

[0014] Thanks to the fact that, in the system according to the invention, the elements for locking the adjusting system, instead of penetrating into the fixture element, cross it in order to engage a holding element or counterplate, said fixture element, once the hinge position has been properly adjusted, is steadily subjected to a compression force, so that the locking is firmer.

[0015] Moreover, thanks to such a compression effect on the fixture element, it is possible to have less restrictive working tolerances without compromising the proper hinge adjustment.

[0016] According to a preferred embodiment of the present invention, the hinge further includes adjustment means configured for adjusting the position of the first hinge component relative to a second hinge component along the rotation axis.

[0017] Preferably, the first hinge component further includes a pair of locking elements arranged to lock the position of the hinge relative to one of the fixture elements.

Brief description of the Figures

[0018] The above and other features and advantages of the present invention will become apparent from the following description of preferred embodiments thereof, made by way of non limiting example with reference to the accompanying drawings, in which elements denoted by a same or similar numerical reference correspond to elements having the same or similar function and construction, and in which:

- Fig. 1 is an overall view of an application of hinges according to the present invention;
- Figs. 2a, 2b and 2c show a first embodiment of the hinge according to the invention; and
- Fig. 3 shows a second embodiment of the hinge according to the invention.

Description of a preferred embodiment

[0019] Referring to Fig. 1, a hinge 10 according to the present invention can be applied to a fixture including for instance a door 7 and an upright 5 of a frame 6.

[0020] Hinge 10 includes a first component (lower hinge) 11 preferably arranged to be fastened to upright 5, a second component (upper hinge) 12, for instance in the form of a flat wing, preferably arranged to be fastened to door 7, and a pivot 15 configured for being introduced in known manner between the lower hinge 11 and the upper hinge 12 and for allowing the rotation of the first component relative to the second component about a rotation axis corresponding to the axis of pivot 15.

[0021] Preferably, a spacer 18, e.g. a spacer made of rubber, is also provided between the lower hinge 11 and

the upper hinge 12. Said spacer is arranged to make the mutual rotation of both components 11 and 12 easier, to become deformed if subjected to pressure and to prevent, at the same time, penetration of dust and/or humidity into hinge 10.

[0022] Upper hinge 12 has, for instance, a so-called mushroom profile and comprises an upper wing 21 arranged to be fastened, for instance, to door 7, and a body 23, for instance cylindrical, having a cavity 25 with cylindrical shape. In particular, cavity 25 is configured so as to have a smooth or non-threaded internal surface in a first zone 25a close to lower hinge 11, and a threaded surface in a second zone 25b opposite or distal with respect to the first zone 25a.

[0023] In correspondence of the second zone 25b, an adjustment element or dowel 27 is inserted, which is arranged to allow the axial adjustment of hinge 10, as a skilled in the art can readily understand. Actually, in use, by screwing/unscrewing (turning) dowel 27, the latter is arranged to press upon pivot 15 that in turn, by pressing against lower hinge 11, is arranged to make upper hinge 12 move up or down to an extent depending on the number and the direction of the turns imparted to dowel 27.

[0024] Lower hinge 11 has, for instance, a mushroom profile like the upper hinge and includes, at a first zone 35a close to upper hinge 12, a cavity 35 arranged to house, in known manner, pivot 15.

[0025] According to the invention, lower hinge 11 further includes, at a second zone 35b opposite or distal with respect to the first one 35a, a pair of holes 41a and 41b, respectively, for instance holes aligned along a longitudinal axis of the hinge, for instance an axis of symmetry E - E. The pair of holes is arranged to house, for instance, respective locking elements 43a and 43b, for instance round-headed screws, arranged to allow fastening or locking lower hinge 11 to upright 5.

[0026] In particular, according to the invention, locking elements 43a and 43b penetrate into holes 41a and 41b formed in lower hinge 11, cross upright 5 by passing through suitable holes correspondingly formed in said upright 5, and engage a holding element or counterplate 45 located on the opposite face of upright 5 with respect to hinge 11, so that said upright is sandwiched between said hinge 11 and said counterplate 45.

[0027] In this manner, when being screwed, locking screws 43a and 43b hold counterplate 45 and exert a traction thereon. Consequently, the sandwiched upright 5 is steadily subjected to a compression bias that ensures that it is kept in the proper position.

[0028] Always according to the invention, lower hinge 11 includes, at the second zone 35b, a hole 36, preferably arranged intermediate hole pair 41a and 41b and configured for housing an adjustment component 37, for instance an adjustment screw, arranged to allow adjusting hinge 10 along an axis transverse to the longitudinal axis, as it will be disclosed in detail below.

[0029] In particular, hole 36 has a threaded portion 36a and a spot-facing 36b. More particularly, spot-facing 36b is positioned in correspondence of a resting plane 38 of hinge 11 onto upright 5.

[0030] Adjustment component (adjustment screw) 37 has, at a first end, an adjustment element 37a1, for instance a hexagonal hollow for an Allen key, and a threaded bolt 37a2 in correspondence of threaded portion 36a. At a second end, said component has a head 37b1, preferably planar and with circular cross-section, in correspondence of spot-facing 36b.

[0031] Planar head 37b1 is arranged to project, in use, from resting plane 38, thereby exerting a pressure on upright 5 of frame 6 and displacing hinge 10 transversally to the upright.

[0032] As a skilled in the art can readily understand, the extent of projection of adjustment screw 37 can be controlled by acting on hollow 37a1, for instance by means an Allen key.

[0033] The operation of the hinge described above is as follows.

[0034] In a first step, for instance, upper wing 21 is secured to door 7 and lower hinge 11 is fastened to upright 5 by means of fastening or locking elements (screws) 43a and 43b and counterplate 45, as disclosed above.

[0035] In a second step, should a transversal adjustment of the hinge be necessary, for instance due to a not perfectly straight door, screws 43a and 43b screwed to plate 45 are loosened and adjustment screw 37 is tightened, for instance by means of an Allen key. Thus, adjustment screw 37, abutting against upright 5, exerts a pressure on the same upright 5, levers on it and moves hinge 10 away from upright 5, thereby modifying, as a skilled in the art can readily understand, the position of door 7 relative to upright 5 or, in other words, the verticality of the door relative to the upright.

[0036] In a third step, of course, the hinge is locked in the position attained as a result of the adjustment of adjustment screw 37, by screwing screws 43a and 43b to plate 45, so that the position of door 7 relative to frame 6 remains fixed.

[0037] As stated before, the peculiar structure of the locking means of the hinge according to the invention, and in particular the provision of counterplate 45, allows maintaining the hinge firmly locked in the position attained.

[0038] The simple operations described above allow therefore performing an adjustment transverse to the longitudinal axis of hinge 10 and independent of an axial adjustment, if any, which can be performed by using dowel 27, as described above.

[0039] In accordance with a first possible variant of the embodiment described herein and shown in the Figures, hole pair 41a and 41b provided in lower hinge 11 can be arranged along an axis parallel to the longitudinal axis of symmetry or even along an axis intersecting the longitudinal axis at a certain angle.

[0040] The skilled in the art will also appreciate that

holes 41a and 41b can even be made with a relative wide working tolerance, without thereby affecting the proper adjustment and the proper locking of the hinge.

[0041] In accordance with a second possible variant of the embodiment described, it is envisaged, as shown in Fig. 3, that hinge 10 is mounted so that the first component 11 is mounted in series with a further first component 11 arranged upside down. As a skilled in the art can readily understand, such an arrangement favours the possibility of effecting adjustments transverse to the longitudinal axis with respect to the possibility of effecting axial adjustments.

[0042] Hinge 10 as described and shown has a mushroom shape but, as a skilled in the art can readily understand, it may have any shape compatible with the described structure and functions. Similarly, the positions of the lower and upper hinges may be mutually exchanged, without thereby departing from the scope of what has been disclosed and claimed.

[0043] As a skilled in the art can readily understand, upper wing 21 of the hinge can be a right or a left wing depending on the application.

[0044] Of course, obvious changes and modifications can be made in the above description in respect of size, shape, materials and components, as well as in respect of the details of the illustrated construction and the operating manner, without departing from the scope of the invention as claimed in the following claims.

Claims

1. Adjustable hinge for fixtures that comprise a first element and a second element rotating around a rotation axis relative to the first element, the hinge comprising:

- a first component (11) arranged to be fastened to one element (5, 7) of the fixture elements;
- a second component (12) arranged to rotate relative to the first component (11) by means of a pivot (15) inserted between said first component (11) and said second component (12);

said hinge comprising an adjustment system (37, 43a, 43b, 45) for adjusting the position of the hinge along an axis transverse to said rotation axis, and being **characterised in that** said adjustment system comprises:

- an adjustment component (37) arranged to stop against said one element (5, 7) of the fixture;
- locking means (43a, 43b) arranged to lock the hinge at a desired position with respect to said one element (5, 7) of the fixture;
- a holding element (45) located on said one element (5, 7) of the fixture on the opposite side with respect to said first component (11) of the hinge;

said locking means passing through said first component (11) of the hinge and through said one element (5, 7) of the fixture in order to engage said holding element (45) and to hold on it.

2. Adjustable hinge according to claim 1, **characterised in that** said second component (12) of the hinge comprises adjustment means (27) configured for adjusting the position of the second component relative to the first component along the rotation axis.

3. Adjustable hinge according to claim 1 or 2, **characterised in that** said locking means (43a, 43b) comprise two screws alternatively aligned:

- along the rotation axis;
- along an axis parallel to the rotation axis; or
- along an axis incident to the rotation axis at a predetermined angle.

4. Adjustable hinge according to claim 1 or 2 or 3, **characterised in that** said adjustment component (37) is interposed between said locking means (43a, 43b).

5. Adjustable hinge according to any one of the previous claims, **characterised in that** said adjustment component (37) comprises:

- an adjustment element (37a1) at a first end, arranged to be used for adjusting the position of the adjustment component;
- a threaded bolt (37a2); and
- a head (37b1) at a second end, arranged to stop against said one element (5, 7) of the fixture.

6. Adjustable hinge according to any one of the previous claims, **characterised in that** said holding element is a counterplate (45).

7. Method of making an adjustable hinge for fixtures where one element of the fixture rotates around a rotation axis relative to another element of the fixture, the method comprising the steps of:

- making a first component (11) arranged to be fastened to one element (5, 7) of the fixture;
- making a second component (12) arranged to rotate relative to the first component (11) by means of a pivot (15) inserted between the first and second components;

and being **characterised by** the steps of:

- applying a holding element (45), arranged to be positioned on said one element (5, 7) of the fixture, at an opposite position with respect to said first component (11) of the hinge;
- applying an adjustment component (37) arranged to stop against said one element (5, 7) of the fixture;
- applying locking means (43a, 43b) arranged to pass through said first component (11) of the hinge and through said one element (5, 7) of the fixture through holes suitably made in said first component (11) of the hinge and in said one element (5, 7) of the fixture, so as to engage said holding element (45) and hold on it.

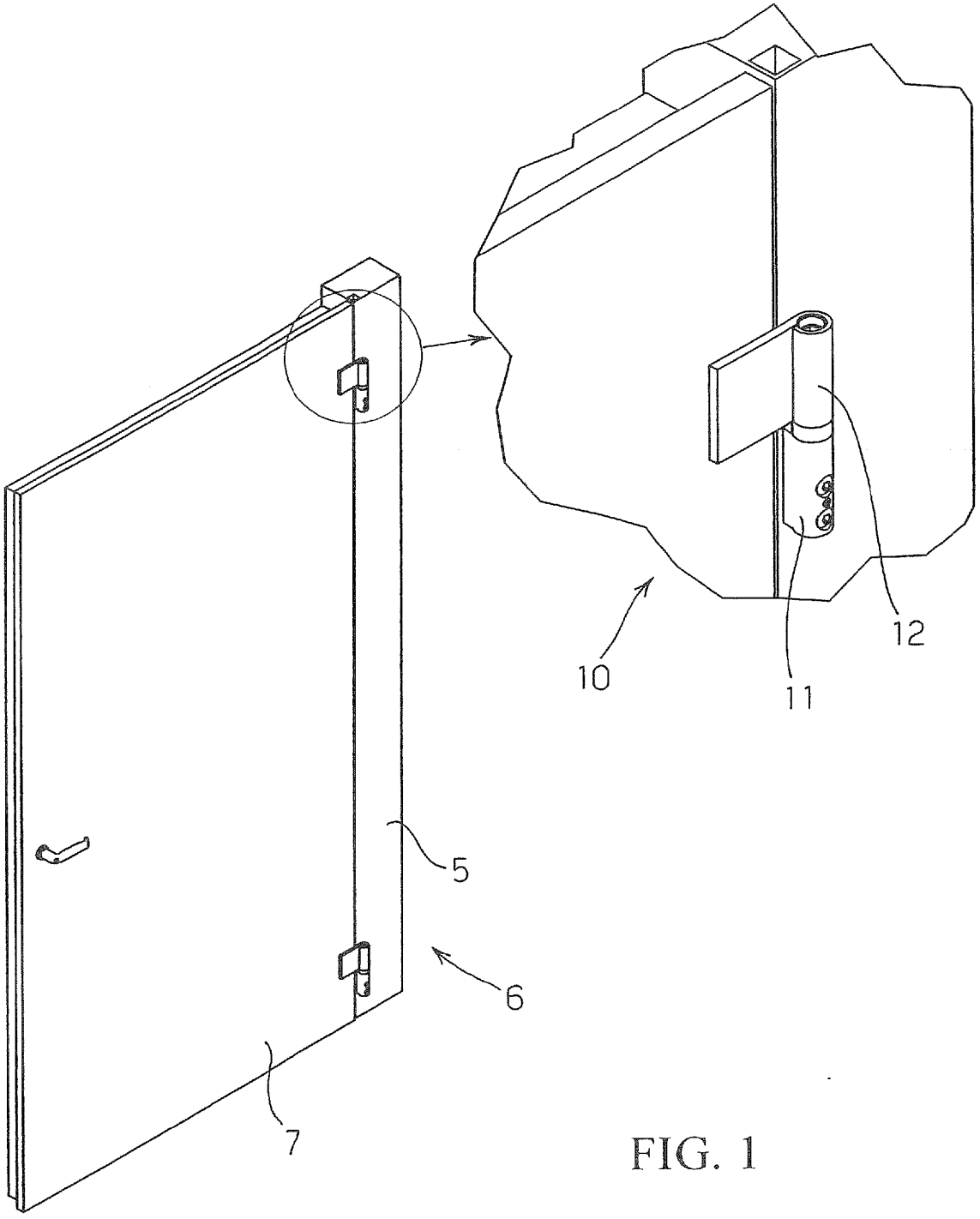

FIG. 1

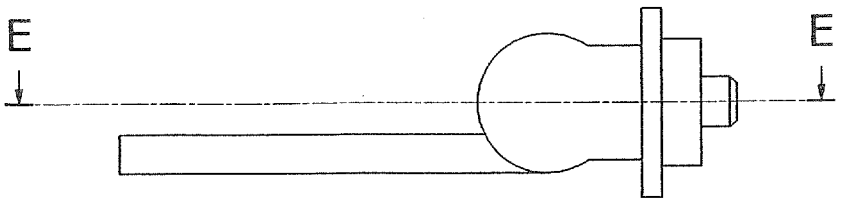
E
E

FIG. 2A

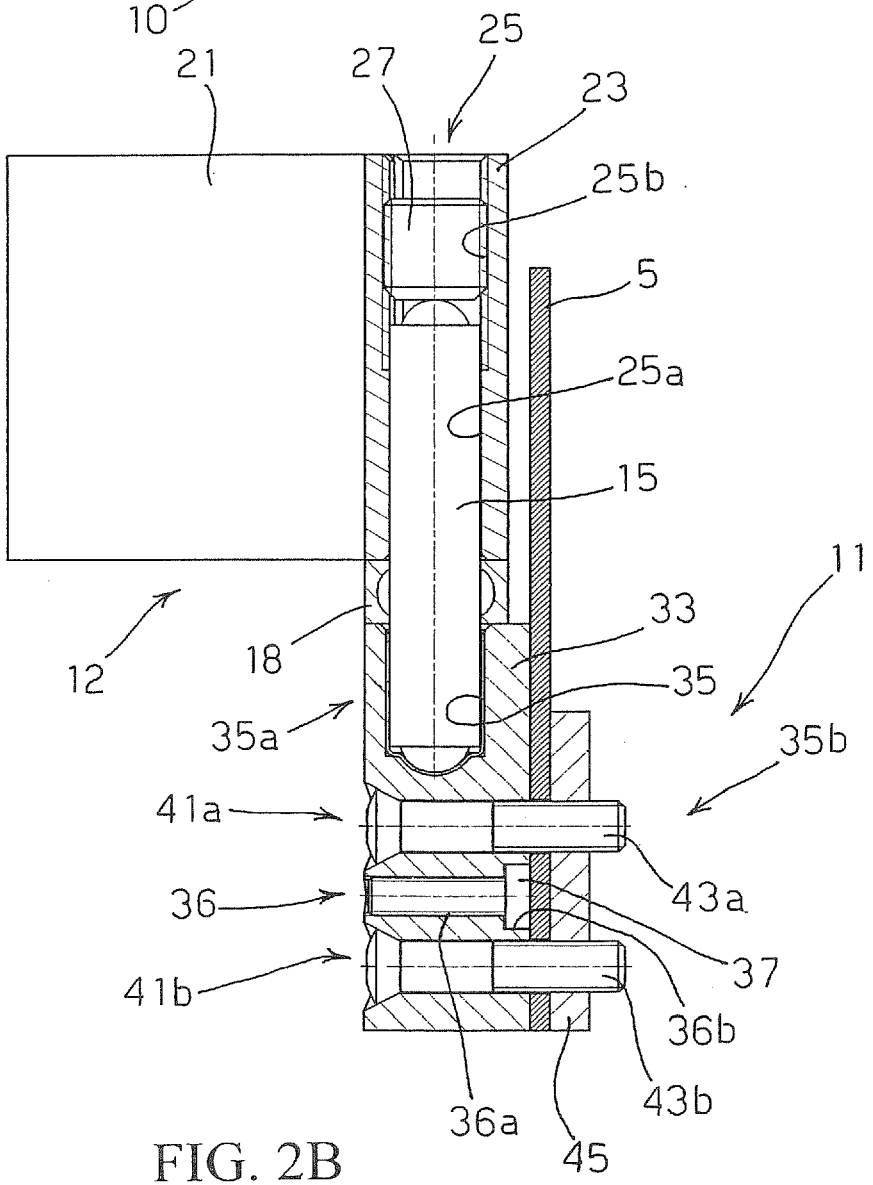
10
21
27
25
23
25b
5
25a
15
11
12
18
33
35
35a
35b
41a
43a
36
37
41b
36b
43b
36a
45

FIG. 2B

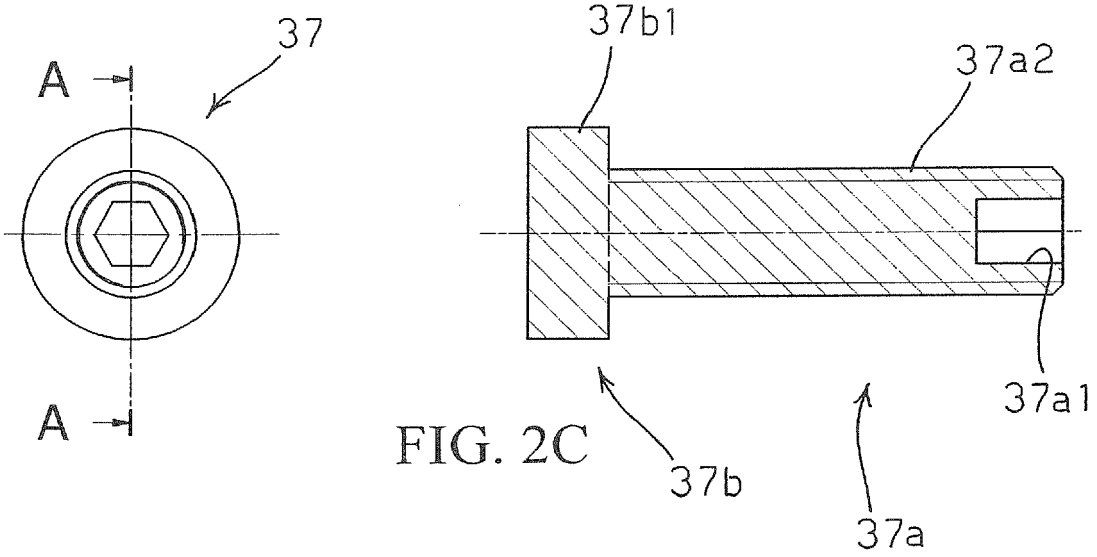

FIG. 2C

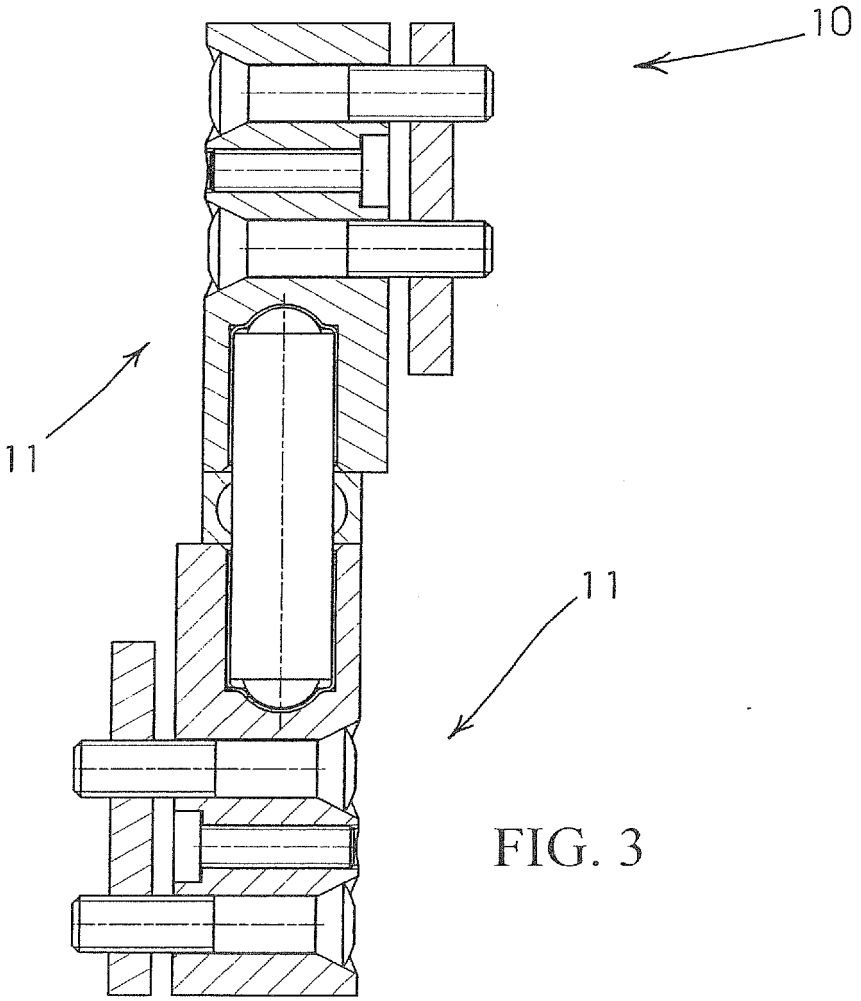

FIG. 3

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 09 17 6556

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 44 47 468 A1 (HEINE & SOHN ANUBA BESCHLAEGE [DE]) 26 October 1995 (1995-10-26)	1,3-7	INV. E05D7/00 E05D7/04
Y	* column 3, line 38 - column 4, line 3 * * column 4, lines 30-37; figures 2-3 *	2	
Y	US 4 785 498 A (BROTSCHI OTHMAR [CH]) 22 November 1988 (1988-11-22) * figures *	2	
A	US 310 033 A (COLLAMORE R.) 30 December 1884 (1884-12-30) * page 1, lines 70-81; figures *	3	

TECHNICAL FIELDS SEARCHED (IPC)

E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	1 March 2010	Witasse-Moreau, C

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

1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 17 6556

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

01-03-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 4447468 A1	26-10-1995	NONE	
US 4785498 A	22-11-1988	AT 394081 B	27-01-1992
		CH 660205 A5	31-03-1987
		DE 3502175 A1	01-08-1985
US 310033 A		NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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

- DE 4447468 **[0010]**