(19) Europäisches Patentamt
European Patent Office
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(11) **EP 3 130 732 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
15.02.2017 Bulletin 2017/07

(51) Int Cl.:
E05D 3/18 *(2006.01)* ***E05D 7/04*** *(2006.01)*

(21) Application number: **16181038.7**

(22) Date of filing: **25.07.2016**

(84) Designated Contracting States:
AL 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 RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **31.07.2015 IT UB20152697**

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(54) **ADJUSTABLE RETRACTABLE HINGE**

(57) An adjustable retractable hinge (2) for articulating a door to a fixed structure, characterized in that it comprises:
- a first body (4), with a corresponding first containing housing (8), intended to be inserted within a corresponding first cavity obtained either in said fixed structure or in said door,
- a second body (6), which is made in one piece, and a second containing housing (10), which houses said second body (6) and which is intended to be embedded in a corresponding second cavity obtained either in said door or in said fixed structure,
- three arms (52, 54, 56), shaped as a rocker and associated to said bodies (4, 6) so as to allow the rotation of the door with respect to said fixed structure, said three arms comprising two substantially equal outer arms (54,56), articulated to the first body (4) and sliding along guides obtained in the second body (6), and a central arm (52), articulated to the second body (6) and sliding along guides obtained in the first body (4),
and in that said second body (6) comprises:
- a central portion (28), facing said central arm (52) and interposed between the outer arms (54,56), and provided with a single fixing and adjustment element (41), which causes the movement of said second body (6) in the direction of the either greater or lesser insertion depth of the corresponding second containing housing (10),
- guiding means (21,24) for said movement of said second body (6) in the direction of its insertion in the corresponding second containing housing (10), said guiding means (20, 21,24) being arranged symmetrically with respect to said adjustment element (41).

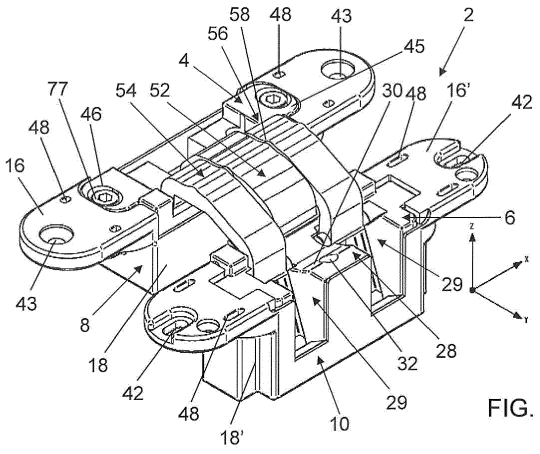

FIG. 1

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Description

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

[0002] It is well known that hinges are made of particular components used for articulating two elements to each other and, in the case in hand, a door (of a wardrobe or a door leaf) to a fixed structure or jamb (of a wardrobe or a door leaf).

[0003] Among the hinges, those of the so-called "retractable" type are also known, which hinges are invisible when the door is closed, on one hand, and allow to perform rotation movements of the door up to approximately 180°, on the other. In particular, they comprise two bodies which are embedded in the thickness of the door and of the jamb and are connected to each other by a pair of arms which allow indeed the rotation of a body with respect to each other, and thus of the door, with respect to the jamb. Each of the two arms is articulated to the other in a zone comprised between the two ends and has one end articulated to one of the two hinge bodies and the other sliding along the other body.

[0004] Among the retractable hinges, those of the adjustable type are also known, which hinges comprise two flanged containers or "cups", which are embedded in the thickness of the door and of the jamb and which define an accommodating housing for the respective hinge bodies, which are connected to each other by the pair of articulated arms. The adjustment of the hinge is generally obtained by virtue of the relative mobility of each hinge body within the respective cup.

[0005] However, the traditional adjustable retractable hinges are not fully satisfactory because in order to adjust the distance that the two hinge bodies must have in facing condition, i.e. the distance between door and jamb when the door it closed, it is necessary to operate on two different adjustment screws, which raise each hinge body or make them either protrude from or retract into the corresponding cup. It is easy to understand that such an operation is rather complicated because it requires to conveniently balance the action on two different adjustment screws.

[0006] Generally, the traditional hinges have a rather limited range and therefore the housing cavity of the cup in the door is not centered with respect to its thickness but is instead slightly displaced towards its outer surface. Consequently, the door can be articulated only on one side of the jamb, i.e. either the right side or the left side, but cannot be articulated to either one of them as chosen.

[0007] Currently, instead, the market requires a door the hinge of which can be fitted indifferently either on the right or on the left with respect to the jamb, and in order to do this the cavity must be obtained in the center with respect to the thickness of the door, i.e. in equally distanced position between the two opposite edges which define the thickness of the door. However, in such an installation mode, the traditional hinges having a rather limited rotation range do not allow a complete 180° opening of the door with respect to the jamb.

[0008] JP2007 177427 describes a hinge in which the two bodies which are accommodated within the containing cups consist of two separate parts, and in particular consist of an intermediate sliding element and a supporting element for the hinge articulation arms. The high number of components (at least six) makes the construction of this hinge particularly complicated. Furthermore, in order to adjust the assembly defined by said intermediate element and by the supporting element for the articulation arms in the direction of their greater or lesser insertion depth within the corresponding containing cup, it is necessary to loosen the two engagement screws positioned on the opposite ends of said supporting element, and only after having performed this operation is it possible to operate on the central adjustment screw. This makes the adjustment slower and more complicated because it is necessary to operate on three different elements, i.e. on the two engagement screws and on the central adjustment screw, in sequence.

[0009] It is the object of the invention to make an adjustable hinge which may be installed in a cavity obtained in centered position with respect to the thickness of the door, and which allows a complete 180° opening of the door with respect to the jamb at the same time.

[0010] It is another object of the invention to make an adjustable retractable hinge which is more compact and smaller than the similar traditional hinges.

[0011] It is another object of the invention to make a hinge which can be installed and adjusted in simple, easy, quick and accurate manner with respect to the jamb in all directions.

[0012] It is another object of the invention to make a hinge in which it is sufficient to operate on a single element to adjust the direction of its greater or lesser depth.

[0013] It is another object of the invention to make an adjustable hinge with a reduced number of components.

[0014] It is another object of the invention to make a hinge which is simple and rapid to assemble. It is another object of the invention to make an adjustable hinge which allows a greater range with respect to the traditional ones.

[0015] It is another object of the invention to make an adjustable hinge of much lower cost than the similar traditional hinges.

[0016] It is another object of the invention to make an adjustable hinge which is aesthetically pleasing when seen once installed in the jamb and in the door.

[0017] It is another object of the invention to make an adjustable hinge which has an alternative characterization, both in construction and functional terms, with respect to the traditional hinges.

[0018] These objects, taken individually and in any combination thereof, as well as others which will result from the following description, are achieved according to the invention by a perfected hinge having the features of claim 1.

[0019] The present invention is further explained with some preferred embodiments given by way of non-limit-

ing example only with reference to the accompanying drawings, in which:

figure 1 is a perspective view from the top of the hinge according to the invention,
figure 2 is a plan view thereof,
figure 3 is an exploded perspective view thereof, and
figure 4 is a longitudinal section thereof taken along IV-IV in figure 2,
figure 5 is a longitudinal section thereof taken along V-V in figure 2, and
figure 6 is a cross section thereof taken along IV-IV in figure 2.

[0020] As can be seen in the figures, the hinge 2 according to the invention comprises two hinge bodies 4,6 accommodated in two containing housings 8,10, both cup-shaped, respectively.

[0021] The second hinge body 6 is made in one piece, which is separate from the containing housing 10, within which said second body is accommodated. Preferably, the first hinge body 4 is also made in one piece, which is separate from the containing housing 8, within which said first body is accommodated.

[0022] The two containing housings 8,10 are intended to be embedded in a first housing recess and a second housing recess (not shown), obtained in a jamb and in the door, which must be articulated to the jamb, respectively.

[0023] It is worth noting that hereinafter, "closed" condition of the hinge means the condition in which the door is closed and coplanar with the jamb and the two hinge bodies 4,6, inserted in the respective containing housings 8,10, are facing each other.

[0024] "Open" condition of the hinge, instead, means the condition in which the door is completely open and is on a different, but parallel plane with respect to the jamb and the two hinge bodies 4,6, inserted in the respective containing housings 8,10, are facing each other.

[0025] Furthermore, it is worth noting that hereinafter length means the development of the hinge body 4,6 along the direction (axis X) parallel to the articulation axis of the hinge 2, width means the development of the hinge body along the direction (axis Y) orthogonal to the previous one and parallel to the thickness of the door or the jamb, and height/depth means the development of the hinge body along the embedding direction (axis Z) thereof in the door or jamb.

[0026] The two containing housings 8,10 have substantially the same shape which comprises two flat end flanges 16,16' mutually separated by a substantially parallelepiped-shaped internally hollow portion 18,18'.

[0027] Within the hollow portion 18' of the containing housing 10, i.e. the hollow portion of the containing housing intended to be embedded in the door, there are provided guiding means 20 for the corresponding body 6 intended to be accommodated in said housing 10.

[0028] More in detail, these guiding means 20 comprise two protruding and parallel appendixes 21 which develop from the bottom 23 of the hollow portion 18' at the ends thereof.

[0029] These appendixes 21 work as guides for corresponding elongated cavities 24 obtained in other appendixes 25 of the body 6; in particular, the shape of the elongated cavities 24 and the corresponding appendixes 21 is such as to facilitate the insertion of the body 6 in the accommodation housing 10, as well as to allow the guided sliding along axis Z of said body 6 with respect to said housing 10 during the step of adjusting.

[0030] The body 6 has a raised central zone 28 interposed between two hollow zones 29. Conveniently, this central raised zone 28 has an upper base 30 with a conformation substantially complementary to the outer surface of a central arm 52, described below, which in the closed hinge condition is intended to rest on said upper base 30 of said raised central zone 28. This makes the hinge particularly compact also when it is in the closed condition.

[0031] Furthermore, in the central raised zone 28 of the body 6, which is intended to be constrained to the door, an element is provided for adjusting its movements along axis Z, following the either greater or lesser insertion depth thereof in the corresponding accommodation housing 10.

[0032] In particular, this adjustment element comprises a screw 41 which is accommodated in a flared hole 32 obtained in said central zone 28 parallel to axis Z and is prevented from performing axial movements within its housing by a pair of parallel pins 42 inserted in specific holes 34, made in the side surface of the body itself parallel to axis Y.

[0033] The adjustment of the depth (i.e. along axis Z) of the body 6 in the accommodation housing 10 is obtained by screwing the threaded portion of the screw 41 into an appropriate threaded hole 35 obtained on the bottom 23 of the accommodation housing itself.

[0034] Advantageously, the same adjustment element 41, which allows to adjust the depth of the body 6 within its accommodation housing 10, also guarantees the fixing and the coupling of the body 6 to its housing 10.

[0035] The connection between the two bodies 4 and 6 is obtained by means of three rocker-shaped arms, of which one central 52 and two outer 54, 56.

[0036] In particular, the central arm 52:

- has a pair of cylindrical side appendixes 53 at a first end for articulating to the body 6 by means of a pin 62; the length of each appendix 53, excluding the part which engages in the body 4, is substantially equal to the lateral development (i.e. along axis X) of the central portion of each of the two outer arms 54,56;
- slides with the other end along a pair of facing guides 65, obtained in the body 4 and engaged by a pair of end appendixes 64, provided in the arm itself,
- is articulated by its central portion to the outer arms

54,58 at a common pin 56.

[0037] Correspondingly, the two outer arms 54 and 56:

- are articulated by an end to the body 4 by means of a pin 66, which crosses the corresponding appendixes 55 protruding laterally inwards from each arm and having overall length substantially equal to the lateral development (i.e. along axis X) of the central portion of the central arm 52,
- slide with appendixes 60, protruding laterally from the other end, along a pair of facing guides 67, obtained in the side walls which delimit the hollow zones 29 of the body 6,
- are articulated by the central portion to the central arm 52 at said common pin 58.

[0038] When the door rotates with respect to the jamb from the closing condition to the opening condition, the arms 52, 54, 56 of the hinge 2 rotate about the various articulation pins 62, 66, 58, while the respective appendixes 60 and 64 slide along the corresponding guides 67 and 65.

[0039] Conveniently, the length of the raised central zone 28 of the body 6 (i.e. the development along axis X) is substantially equal to the lateral development of the central portion of the central arm 52 (i.e. without the two side appendixes 53), while the length of each hollow zone 29 is substantially equal to the lateral development (i.e. along axis X) of the respective central portion of the outer arm 54,56.

[0040] Preferably, the guides 67, obtained in the body 6, of the appendixes 60 of the outer arms 54, 56 have a pattern with a first stretch 70 inclined and open at the top. This is particularly advantageous because it facilitates the assembly of the hinge, in particular by facilitating the insertion of the arms 54, 56 from the upper base 30 of the body 6.

[0041] Advantageously, the first stretch 70 then extends along a second stretch 72, which is laterally inclined in opposite manner with respect to the direction of development of the first. In particular, the first stretch 70 and the second stretch 72 are consecutive and, more in detail, as shown in fig. 6, the direction of development of the second stretch 72 defines an obtuse angle with the direction of development of the first stretch 70.

[0042] Such a conformation of the guides 67 is particularly advantageous because it implies that, during the step of opening and closing of the door 14, the door is subjected to a particular composite movement, which avoids the interference with the vertical edge of the jamb 12

[0043] Preferably, the height of the body 6, intended to be accommodated in the housing 10 to be applied to the door, is greater than the height of the other body 4, while the width of the latter is advantageously smaller than the housing 8 which accommodates it, in order to limit the adjustment movements along direction Y within the housing itself.

[0044] Furthermore, on the flange 16' of the containing housing 10 first slots 42 are obtained, which can be crossed by screws for stably fixing the body itself in the respective recess obtained in the jamb. These first slots 42 develop along direction X and allow to adjust the position of the housing 10 in the embedding cavity made in the door, and thus to adjust the door in this direction.

[0045] Substantially circular holes 43, which can be crossed by screws for stably fixing the body itself in the respective embedding cavity made in the door, are obtained on the flange 16 of the containing housing 8 intended to be embedded in the housing.

[0046] Appendixes 45 are conveniently defined in the body 4, in which appendixes second slots 46' are obtained, which can be crossed by screws 77 for stably fixing the body itself in the respective containing housing 8. Furthermore, a cam 76 is provided in the body 4, which cam can be accessed from the upper base of the body itself, cooperates with a corresponding cavity 79 obtained on the bottom of the containing housing 8 and with its rotation adjusts the position of said body 4 with respect to its housing 8 along direction Y.

[0047] Substantially, in order to adjust hinge 2 along axis Y, firstly the fixing screws 77 are slightly loosened and then the cam 76 is turned by operating on its upper accessible end until the body 4 moves in its containing housing 8 along axis Y by the desired extent.

[0048] Furthermore, third slots 48 are obtained on the flange 16, 16' of both containing housings 8, 10 of the two bodies 4, 6, which slots can be engaged by corresponding appendixes obtained in covering masks 50 of the recesses for their interlocking coupling.

[0049] In an embodiment not shown here, the body 4, i.e. the body intended to be coupled in the cavity obtained in the jamb, may be made in one piece with its corresponding containing housing 8.

[0050] Conveniently, in this case, there are neither the fixing screws 77 nor the cam 76, and additionally, instead of the circular holes 43, slots are obtained which develop along the direction Y and which allow to adjust the position of the body 4, made in one piece with its corresponding housing 8, in the embedding cavity made in the jamb and to thus adjust the hinge along this direction.

[0051] In the embodiment shown and described above, the body 6 is intended to be inserted in the cavity obtained in the door, while the body 4 is intended to be inserted in the cavity obtained in the jamb, however it is understood that, in an alternative embodiment not shown here, the body 6 may be inserted in the cavity obtained in the jamb, while the body 4 may be inserted in the cavity obtained in the door. In other words, in such an alternative embodiment, the configuration is substantially reversed with respect to the one described and shown above.

[0052] From the above it is apparent that the retractable adjustable hinge according to the invention is more advantageous than the traditional retractable adjustable hinges, because:

- it is smaller in size,
- it has a greater range, the dimensions and materials being equal,
- it consists of a reduced number of components and, therefore, is simpler and easier to use, and thus also less expensive,
- it allows to adjust the hinge easily and rapidly, eliminating the risk of lateral waving, because the adjustment of the body in its containing housing is obtained by operating on a single point, at a central screw, which thus causes a pure and uniform translation movement of the body itself along the side guides, which are equally distanced with respect to the central screw,
- it is simple and rapid to assemble,
- it has a considerable articulation range, thus allowing a greater distance between the respective containing housings when they are in side-by-side configuration (i.e. when the door is open and turned by 180° with respect to the jamb); in particular, this allows to mill the embedding cavity of the hinge in the door in position equally distanced from the two front surfaces, and thus allows to articulate the door itself both on the right side and on the left side of the door.

[0053] In particular, the retractable adjustable hinge according to the invention differs from JP2007 177427 in that:

- the respective bodies, which are accommodated within the corresponding containing cups, are made in one piece and advantageously this considerably simplifies the manufacturing and assembly of the hinge itself,
- the adjustment of the depth of the body within its containing housing is obtained exclusively by operating on the adjustment screw provided at the central portion of the body itself, without any need to loosen further fixing screws, which indeed are not provided; this allows to speed up and considerably simplify such an adjustable operation,
- the adjustment of the depth of the body in its containing housing is obtained by means of a single adjustable element, which is also the only element for fixing said body to said housing.

Claims

1. An adjustable retractable hinge (2) for articulating a door to a fixed structure, **characterized in that** it comprises:

- a first body (4), with a corresponding first containing housing (8), intended to be inserted within a corresponding first cavity obtained either in said fixed structure or in said door,
- a second body (6), which is made in one piece, and a second containing housing (10), which houses said second body (6) and which is intended to be embedded in a corresponding second cavity obtained either in said door or in said fixed structure,
- three arms (52, 54, 56), shaped as a rocker and associated to said bodies (4, 6) so as to allow the rotation of the door with respect to said fixed structure, said three arms comprising two substantially equal outer arms (54,56), articulated to the first body (4) and sliding along guides obtained in the second body (6), and a central arm (52), articulated to the second body (6) and sliding along guides obtained in the first body (4),

and **in that** said second body (6) comprises:

- a central portion (28), facing said central arm (52) and interposed between the outer arms (54,56), and provided with a single fixing and adjustment element (41), which causes the movement of said second body (6) in the direction of the either greater or lesser insertion depth of the corresponding second containing housing (10),
- guiding means (21,24) for said movement of said second body (6) in the direction of its insertion in the corresponding second containing housing (10), said guiding means (20, 21,24) being arranged symmetrically with respect to said adjustment element (41).

2. A hinge according to claim 1, **characterized in that**:

- said first cavity, within which said first containing housing (8) with said first body (4) is intended to be inserted, is obtained in said fixed structure, and **in that** said second cavity, within which said second containing housing (10) with said second body (6) is intended to be inserted, is obtained in said door, or
- said first cavity, within which said first containing housing (8) with said first body (4) is intended to be inserted, is obtained in said door, and **in that** said second cavity, within which said second containing housing (10) with said second body (6) is intended to be inserted, is obtained in said fixed structure.

3. A hinge according to one or more of the preceding claims, **characterized in that** said first body (4):

- is made in one piece with said corresponding first containing housing (8), or
- is made separately from said first containing housing (8) and is accommodated and adjustable within the latter.

4. A hinge according to one or more of the preceding claims, **characterized in that** said guiding means (20) comprise two protruding and parallel appendixes (21) obtained either in the second containing housing (10) or in the second body (6), which work as guides for corresponding elongated cavities (24) obtained either in the second body (6) or the containing housing (10), said two appendixes (21) and said two elongated cavities (24) being arranged symmetrically with respect to said adjustment element (41).

5. A hinge according to one or more of the preceding claims, **characterized in that** said adjustment element (41) also works as single fixing element of said second body (6) to the corresponding containing housing (10, 8).

6. A hinge according to one or more of the preceding claims, **characterized in that** said central zone (28) is raised and has an upper base (30) with conformation substantially complementary to the outer surface of said central arm (52).

7. A hinge according to one or more of the preceding claims, **characterized in that**, in said second body (6), the raised central zone (28) is interposed between two hollow zones (29), each of which faces one of said two outer arms (54, 56).

8. A hinge according to one or more of the preceding claims, **characterized in that** said adjustment element comprises a screw (41) accommodated in a flared hole (32), which is obtained in said central zone (28) and which develops parallel to the direction of insertion of the second body (6) in its containing housing (10), said screw being retained within said hole by a pair of pins (42) arranged perpendicularly with respect to said direction of insertion.

9. A hinge according to one or more of the preceding claims, **characterized in that** said central arm (52):

- has, at a first end, a pair of side appendixes (53) which extend laterally towards the outside and are articulated to the second body (6),
- has, at the other end, a pair of end appendixes (64) sliding along guides (65) obtained in the first body (4),
- is articulated by its central portion to the external arms (54,56) at a common pin (58),

and **in that** said two outer arms (54, 56):

- have, at a first end, appendixes (55) which protrude laterally inwards and which are articulated to the first body (4),
- have, at the other end, end appendixes (60) which slide along guides (67) obtained in the second body (6),
- are articulated by their central portion to the central arm (52) at said common pin (58).

10. A hinge according to one or more of the preceding claims, **characterized in that**:

- each of said side appendixes (53) of said central arm (52) protrudes laterally outwards for a stretch of length substantially equal to the side development of the central portion of each outer arm (54, 56),
- said appendixes (55) of said outer arms (54, 56) protrude laterally inwards for a stretch, the overall length of which is substantially equal to the side development of the central portion of said central arm (52).

11. A hinge according to one or more of the preceding claims, **characterized in that**:

- the length of said raised central zone (28) of the second body (6) is substantially equal to the side development of the central portion of said central arm (52),
- the length of each hollow zone (29) is substantially equal to the side development of the central portion of each outer arm (54,56).

12. A hinge according to one or more of the preceding claims, **characterized in that** said guides (67), obtained in the second body (6), for the sliding of said outer arms (54, 56) have a pattern with a first stretch (70) open on top to facilitate the insertion thereof.

13. A hinge according to one or more of the preceding claims, **characterized in that** said guides (67), obtained in the second body (6), for the sliding of said outer arms (54, 56), have a first stretch (70) and a second stretch (72) which are rectilinear and consecutive and **in that** the direction of development of the second stretch (72) defines an obtuse angle with the direction of development of the first stretch (70).

14. A hinge according to one or more of the preceding claims, **characterized in that** said containing housings (8, 10) comprise slots (42, 43) which can be crossed by screws for fixing inside the respective cavities obtained in the jamb and/or in the door, said slots (42, 43) developing in the direction which allows the adjustment movement of each of said housings (8, 10) within the respective cavity.

15. A hinge according to one or more of the preceding claims, **characterized in that** said first body (4) comprises:

- slots (46) which can be crossed by screws (77) for stably fixing said first body (4) within the respective containing housing (8),
- a cam (76), which can be accessed from the upper base of said first body (4) and which cooperates with a corresponding cavity (79) obtained in the corresponding first containing housing (8) to adjust, by rotating, the position of said first body (4) within its housing (8) along a direction perpendicular with respect to that of the greater or lesser insertion depth of the second body (6) within said second housing (10).

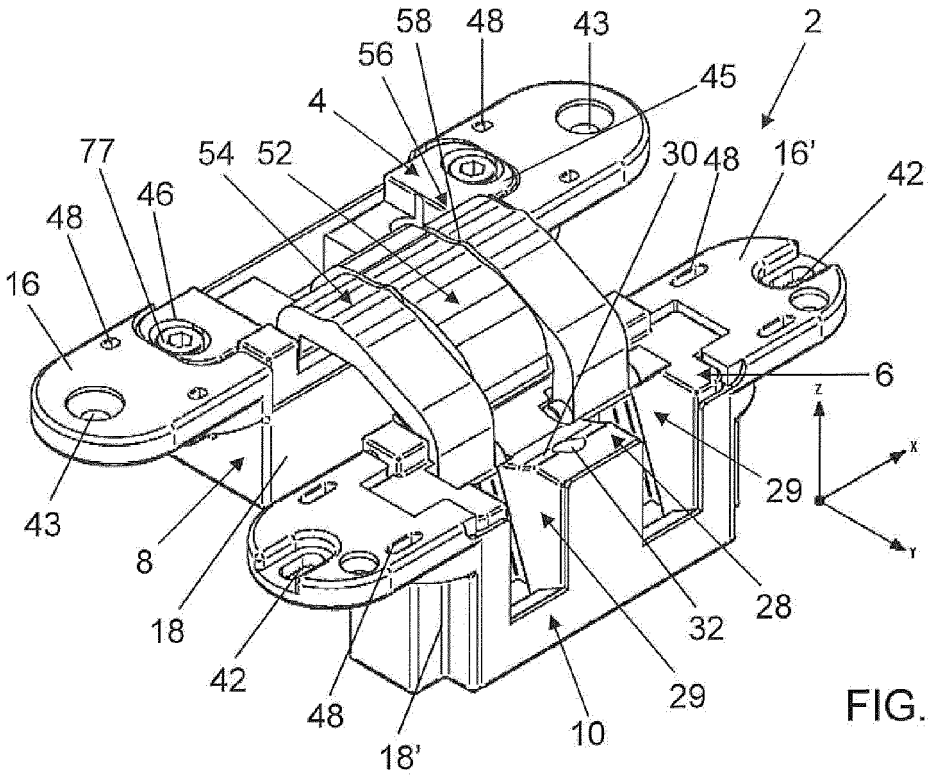
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FIG. 1

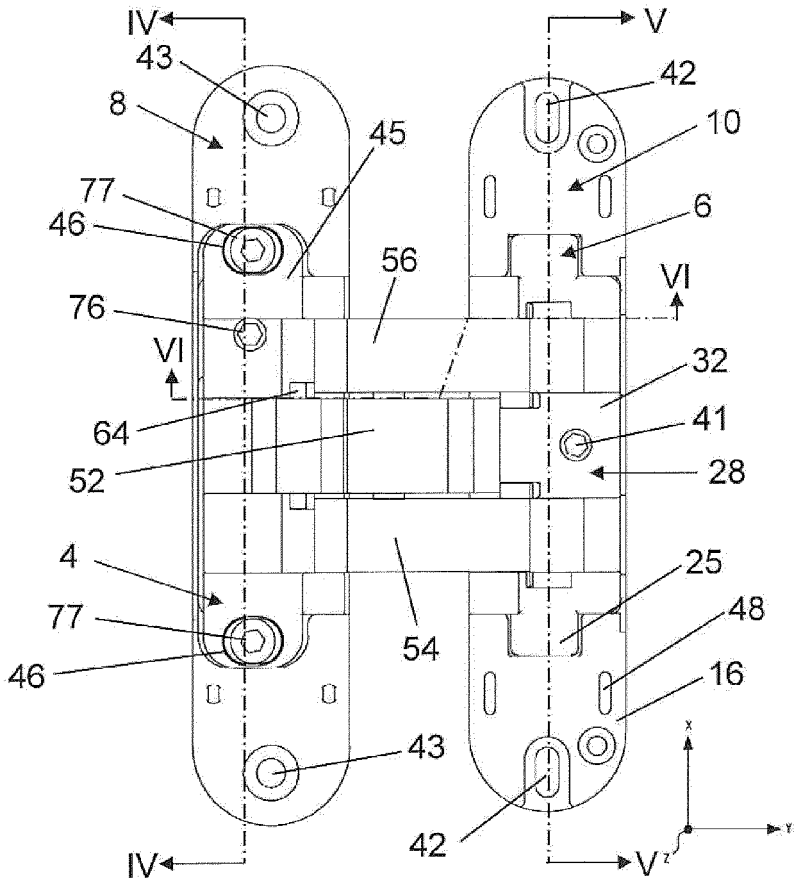
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FIG. 2

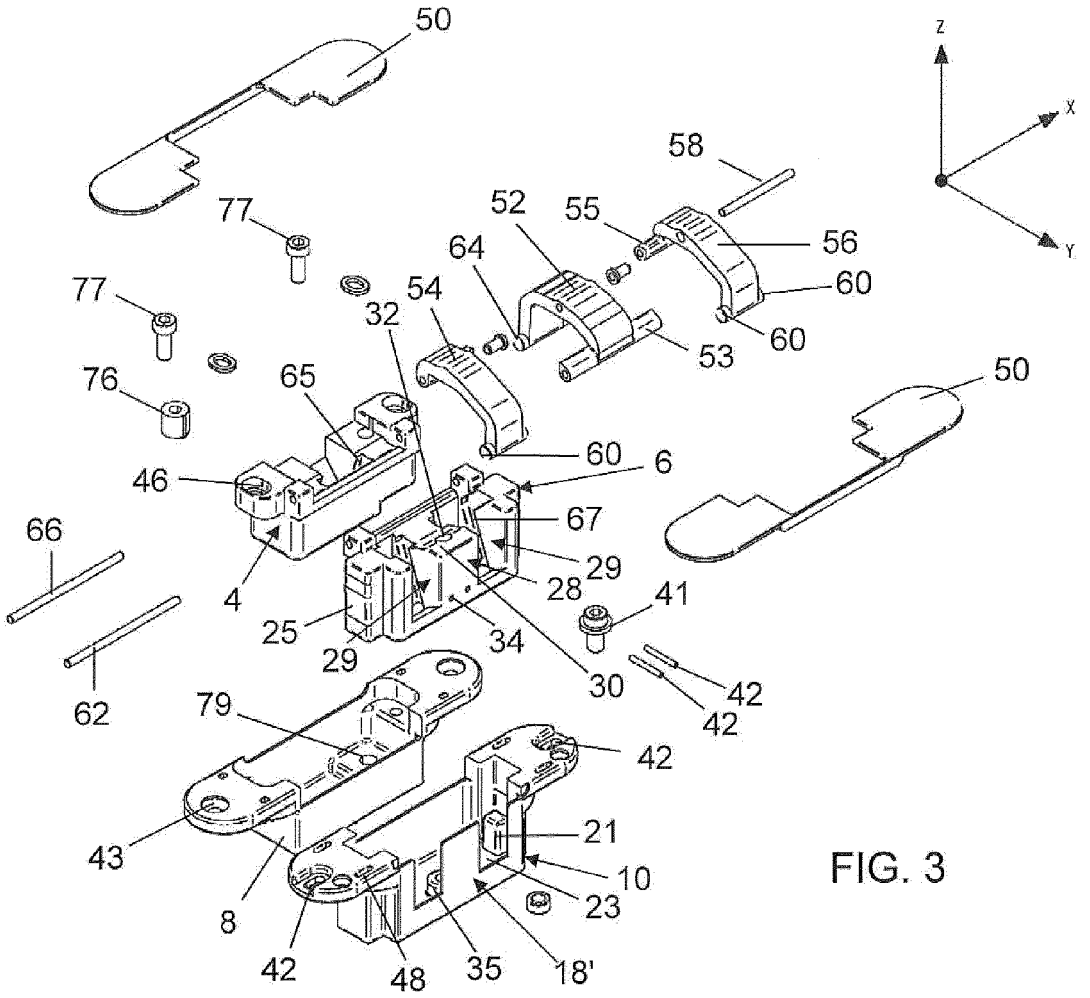
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FIG. 3

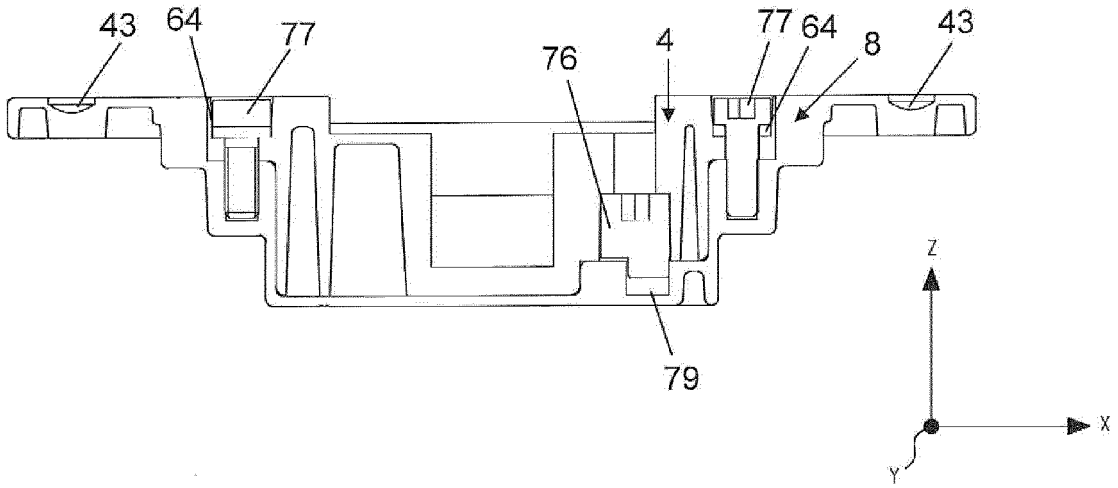
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FIG. 4

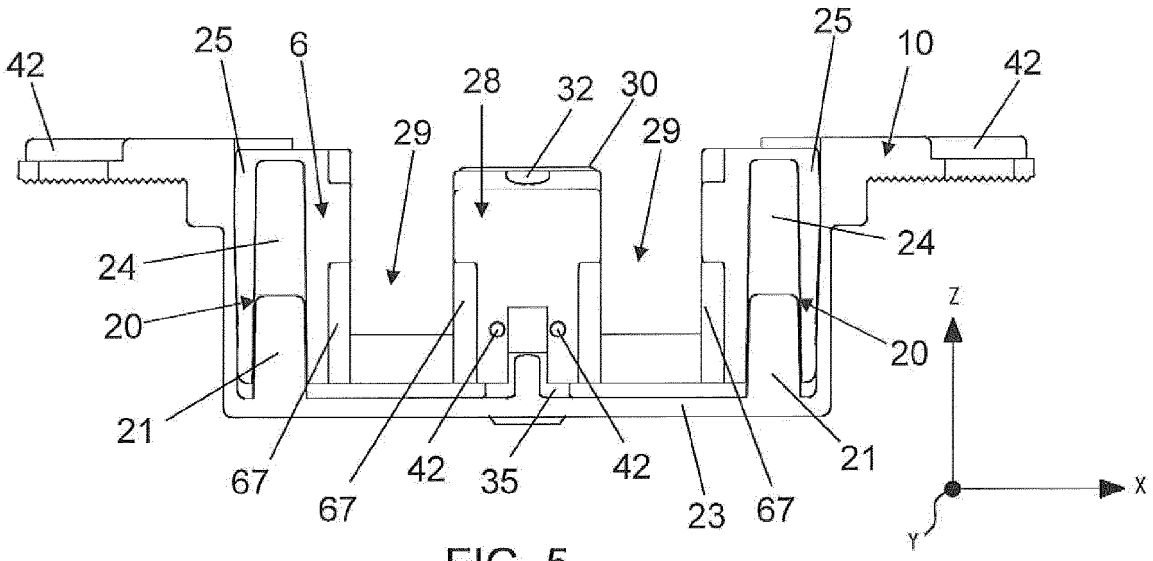
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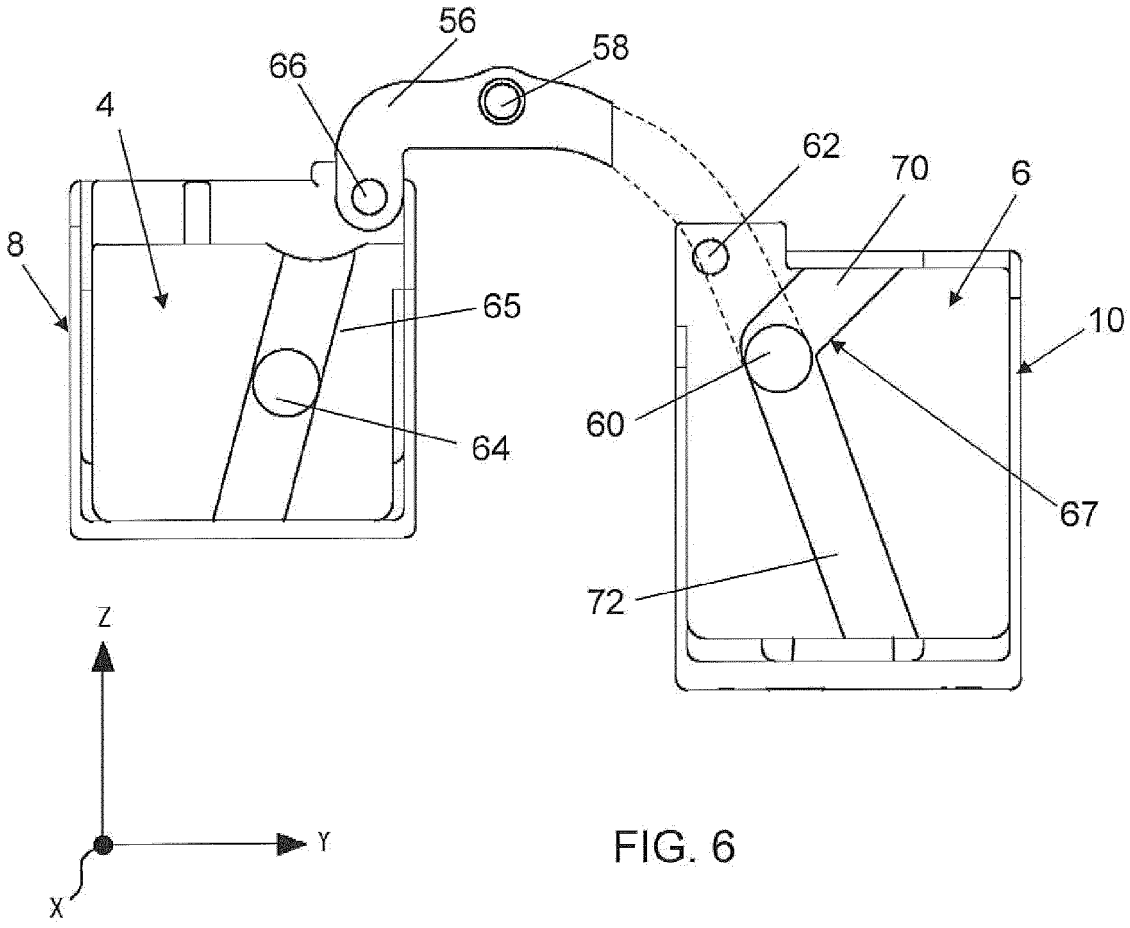
FIG. 5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Y
X

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 16 18 1038

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,D	JP 2007 177427 A (NISHIMURA PLASTICS PACKAGING) 12 July 2007 (2007-07-12)	1-4,6,7, 9,11,14, 15	INV. E05D3/18 E05D7/04
Y	* abstract; figures 5-7,9 *	5,8,10, 12,13	

Y	EP 1 063 376 A2 (KOBLENZ SPA [IT]) 27 December 2000 (2000-12-27) * paragraph [0024]; figures 1-4 *	5	

Y	DE 44 35 541 A1 (HEINE & SOHN ANUBA BESCHLAEGE [DE]) 11 April 1996 (1996-04-11) * column 3, line 8 - line 14; figures 1,2 *	8	

Y	DE 10 2011 051190 B3 (EMKA BESCHLAGTEILE [DE]) 26 July 2012 (2012-07-26) * paragraph [0017] - paragraph [0019]; figure 1 *	10,12	
	-----		TECHNICAL FIELDS SEARCHED (IPC)
Y	BE 687 137 A (PRÄMETA PRÄZISIONSMETALL-U.KUNSTSTOFFERZEUGNISSE) 20 March 1967 (1967-03-20) * figures 4,5 *	13	E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 January 2017	Guillaume, Geert

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

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10-01-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2007177427 A	12-07-2007	JP 4855775 B2	18-01-2012
		JP 2007177427 A	12-07-2007
EP 1063376 A2	27-12-2000	AT 243803 T	15-07-2003
		CA 2307242 A1	25-12-2000
		CN 1279332 A	10-01-2001
		DE 20023445 U1	13-05-2004
		DE 60003494 D1	31-07-2003
		DE 60003494 T2	19-05-2004
		EP 1063376 A2	27-12-2000
		ES 2200805 T3	16-03-2004
		IT RN990022 U1	27-12-2000
		US 6487755 B1	03-12-2002
DE 4435541 A1	11-04-1996	NONE	
DE 102011051190 B3	26-07-2012	CN 103764931 A	30-04-2014
		DE 102011051190 B3	26-07-2012
		EP 2721236 A1	23-04-2014
		WO 2012175548 A1	27-12-2012
BE 687137 A	20-03-1967	AT 279416 B	10-03-1970
		BE 687137 A	20-03-1967
		CH 458976 A	30-06-1968
		NL 6613242 A	22-03-1967
		SE 327650 B	24-08-1970

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

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Patent documents cited in the description

- JP 2007177427 A **[0008] [0053]**