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(54) **ADJUSTABLE HINGE FOR DOORS OR WINDOWS**

(57) An adjustable hinge (10) for doors or windows, of the type comprising
- a containment body (11),
- a pintle supporting block (12) inserted in a corresponding seat (25) defined in the containment body (11),
- a pintle (13),

characterized in that it comprises:

- means (15) for adjusting the angular trim of the pintle supporting block (12) with respect to the containment body (11) about a rotation axis (19) that is parallel to the axis (16) of the pintle (13),
- means (17) for adjusting the position of the pintle supporting block (12) with respect to the containment body (11) in a direction that is parallel to the axis (16) of the pintle (13),
- means (18) for adjusting the center distance (20) between the rotation axis (19) and the axis (16) of the pintle (13),

the containment body (11) comprising two half-shells (21, 22) which are closed onto each other so as to define the seat (25) for the pintle supporting block (12).

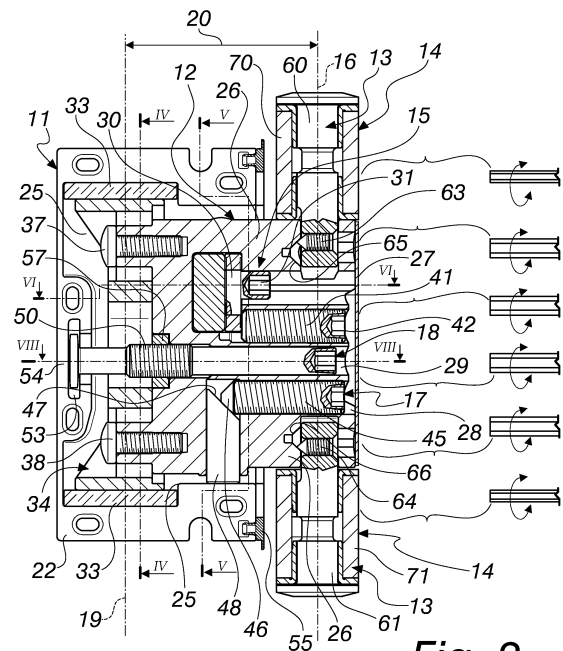


Fig. 3

Description

[0001] The present invention relates to an adjustable hinge for doors or windows.

[0002] Adjustable hinges for doors or windows are currently known and widespread and usually comprise:

- a containment body
- a pintle supporting block inserted in a corresponding seat defined in said containment body
- means for adjusting the angular trim of said pintle supporting block with respect to said containment body about a rotation axis that is parallel to the axis of said pintle,
- means for adjusting the position of said pintle supporting block with respect to said containment body in a direction that is parallel to said axis of said pintle,
- means for adjusting the center distance between said rotation axis and said axis of said pintle.

[0003] The containment body is constituted by a single part inside which the seat for the pintle supporting block is defined.

[0004] The adjustment means, usually controlled by threaded elements or cam elements that can be rotated by means of a corresponding Allen wrench or screwdriver, usually can be accessed from one side of the containment body that is accessible only when the containment body is not inserted in its seat of the jamb.

[0005] Such adjustable hinges of a known type, while being appreciated and widespread, suffer some drawbacks.

[0006] A first drawback resides in that the containment body provided in one piece makes it very complicated and laborious to assemble inside it the pintle supporting block and the elements that define the adjustment means, since part of the elements of the adjustment means must be preassembled on the pintle supporting block, then the pintle supporting block must be inserted within the containment body with an operation of insertion by translation, and finally the remaining elements of the means for adjustment and articulation of the pintle supporting block with respect to the containment body are inserted transversely.

[0007] Such a sequence of operations is onerous both in terms of time and in terms of labor and is ill-suited to be automated, to the full detriment of the final cost of the product.

[0008] Another limitation of adjustable hinges of the known type resides in that the adjustments can be performed only when the hinge is extracted from its seat in the jamb, and accordingly it is not possible to perform adjustments with the hinge in the position for use.

[0009] The aim of the present invention is to provide an adjustable hinge for doors or windows that is capable of obviating the cited drawbacks and limitations of the background art.

[0010] Within this aim, an object of the invention is to

provide a hinge that is simpler and quicker to assemble than hinges of the known type.

[0011] Another object of the invention is to provide a hinge the adjustment means of which are accessible even with the hinge inserted in the jamb.

[0012] A further object of the invention is to provide a hinge that can be managed easily by an installation technician intuitively and by using tools of a known type, such as Allen wrenches and screwdrivers.

[0013] This aim, as well as these and other objects that will become better apparent hereinafter, are achieved by an adjustable hinge for doors or windows, of the type comprising

- a containment body,
- a pintle supporting block inserted in a corresponding seat defined in said containment body,
- a pintle,
- characterized in that it comprises:
 - means for adjusting the angular trim of said pintle supporting block with respect to said containment body about a rotation axis that is parallel to the axis of said pintle,
 - means for adjusting the position of said pintle supporting block with respect to said containment body in a direction that is parallel to said axis of said pintle,
 - means for adjusting the center distance between said rotation axis and said axis of said pintle,

said containment body comprising two half-shells which are closed onto each other so as to define said seat for said pintle supporting block.

[0014] Further characteristics and advantages of the invention will become better apparent from the description of four preferred but not exclusive embodiments of the hinge according to the invention, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a top view of a hinge according to the invention;

Figure 2 is a front view of a hinge according to the invention,

Figure 3 is a sectional side view of the hinge according to the invention;

Figure 4 is a sectional view, taken along the line IV-IV of Figure 3;

Figure 5 is a sectional view, taken along the line V-V of Figure 3;

Figure 6 is a sectional view, taken along the line VI-VI of Figure 3 in a first configuration for use;

Figure 7 is a sectional view, taken along the line VI-VI of Figure 3, in a second configuration for use;

Figure 8 is a sectional view, taken along the line VIII-VIII of Figure 3;

Figure 9 is a sectional side view of a hinge according to the invention in a second embodiment;

Figure 10 is a sectional side view of a hinge accord-

ing to the invention in a third embodiment;
Figure 11 is a sectional side view of a hinge according to the invention in a fourth embodiment.

[0015] With reference to the figures, an adjustable hinge for doors or windows according to the invention is designated generally, in the first embodiment, by the numeral 10.

[0016] The hinge 10 is of the type that comprises

- a containment body 11, to be inserted in a corresponding seat 25 defined on a frame of a door or window,
- a pintle supporting block 12, inserted in a corresponding seat defined in the containment body 11,
- a pintle 13,
- an element 14 for connection to a leaf, hinged by means of the pintle 13 to the containment body 11.

[0017] The hinge 10 comprises:

- means 15 for adjusting the angular trim of the pintle supporting block 12 with respect to the containment body 11 about a rotation axis 19 that is parallel to the axis 16 of the pintle 13,
- means 17 for adjusting the position of the pintle supporting block 12 with respect to the containment body 11 in a direction that is parallel to the axis 16 of the pintle 13,
- means 18 for adjusting the center distance 20 between the rotation axis 19 and the axis 16 of the pintle 13.

[0018] In particular, the containment body 11 comprises two half-shells 21 and 22 which are closed onto each other so as to define the seat 25 for the pintle supporting block 12.

[0019] In particular, in the present constructive example, the pintle supporting block 12 has a part 26 that protrudes from the containment body 11 and on said protruding part 26 there are the corresponding openings 27, 28 and 29, respectively for access to the angular trim adjustment means 15, to the means 17 for adjusting position in a direction that is parallel to the axis 16 of the pintle 13, and to the means 18 for adjusting the center distance 20.

[0020] The means 15 for adjusting the angular trim of the pintle supporting block 12 with respect to the containment body 11 about a rotation axis 19 that is parallel to the axis 16 of the pintle 13 comprise, as clearly visible in Figures 3, 6 and 7, an eccentric element 30 with a hexagonal socket 31 for an adjustment Allen wrench; by maneuvering the eccentric element 30, the pintle supporting block 32 is rotated about the rotation axis 19, as shown in Figures 6 and 7.

[0021] Rotation about the axis 19 is allowed by the presence, inside the containment body 11, of two opposite calibrated shims 32 and 33, an upper one 32 and a

lower one 33 in the configuration for use of the hinge 10, on which a slider element 34, coupled to the pintle supporting block 12, is free to slide in constant resting contact.

[0022] The slider element 34 is therefore extended from one calibrated shim 32 to the other shim 33 in the direction of the rotation axis 19, and its side walls 35 and 36 have a profile that is curved or composed of a broken line, so as to determine a rotation axis 19.

[0023] The pintle supporting block 12 is coupled to the slider element 34 by means of a pair of screws 37 and 38 that are screwed in corresponding holes to the inner part of the pintle supporting block 12, the screws 37 and 38 passing through corresponding slots 39 and 40 that are defined on the slider element 34 and are extended in the direction of the rotation axis 19.

[0024] The slots 39 and 40 have a transverse dimension that is substantially equal to the diameter of the thread of the screws 37 and 38; in this manner, the coupling of the screws 37 and 38 with the slots 39 and 40 allows the pintle supporting block to translate in the direction of the rotation axis 19 with respect to the slider element 34 but not to translate transversely with respect to it; this coupling causes the integral rotation of the slider element 34, which slides against the calibrated shims 32 and 33, with the pintle supporting block 12 as a consequence of the rotation of the eccentric element 30.

[0025] The angular position of the pintle supporting block 12 is stabilized by means of the screwing of a locking grub 41, which can be accessed by means of a front hole 42 on the protruding part 26 of the pintle supporting block 12.

[0026] The means 17 for adjusting the position of the pintle supporting block 12 with respect to the containment body 11 in a direction that is parallel to the axis 16 of the pintle 13 comprise an adjustment grub 45 with a frustum-shaped tip 46, which can be accessed from the opening 28 on the protruding part 26 of the pintle supporting block 12, screwed into a corresponding through hole inside the opening 28; the frustum-shaped tip 46 of the adjustment grub 45 encounters an inclined plane 47 that is defined on the free end of an insert 48, which is inserted in the pintle supporting block 12 and rests with the opposite end against the inner surface of the containment body 11.

[0027] The rotation of the adjustment grub 45, for example by means of an Allen wrench, produces the movement in the direction of the rotation axis 19, or of the axis 16 of the pintle, of the pintle supporting block 12.

[0028] The means 18 for adjusting the center distance 20 between the rotation axis 19 and the axis 16 of the pintle 13 comprise an adjustment screw 50 that is extended so as to pass through the pintle supporting block 12 over its entire depth, as shown in Figures 3 and 8.

[0029] At a first end, the adjustment screw 50 has a hexagonal socket 51 for the rotation of the adjustment screw 50 by means of an Allen wrench, while the opposite end has an expanded head 52 adapted to be inserted with play in an engagement seat 53 that is defined on

the rear wall 54 of the containment body 11, where it is understood that the containment body 11 has a rear wall 54 preset to remain within the seat for the hinge 10 in the frame of the door or window, and a front cover 55 from which the pintle supporting block 12 exits.

[0030] The adjustment screw 50 is provided with a threaded portion 56.

[0031] The threaded portion 56 is screwed to an internally complementarily threaded plate 57 that is inserted in a corresponding slot in the pintle supporting block 12, as clearly visible again in Figures 3 and 8.

[0032] The adjustment screw 50 is locked in the direction of the depth of the pintle supporting block 12 and therefore its rotation determines a proportional translation in the direction of the axis of the adjustment screw 50 of the pintle supporting block 12.

[0033] The engagement seat 53 is sized so as to prevent the extraction of the expanded head 52 in the direction of the axis of the adjustment screw 50 and so as to allow the movement of the expanded head 52 in the direction of the rotation axis 19 and in the direction, at right angles to both of the preceding directions, of the thickness of the containment body 11.

[0034] The hinge 10 also has friction means for the pintle 13.

[0035] The pintle 13 comprises two opposite coaxial hinge pivots 60 and 61, which are locked to the protruding part 26 of the pintle supporting block 12 by means of corresponding locking and friction screws 63 and 64 with a mushroom-shaped head.

[0036] Between the mushroom-shaped head and the protruding part 26 of the pintle supporting block 12 there are the hinge portions 70 and 71 of the element 14 for fixing to a leaf, which are crossed by the hinge pivots 60 and 61.

[0037] The screws 63 and 64 in fact are provided with conical tips that are pressed against corresponding conical surfaces 65 and 66 defined on the protruding part 26 and arranged so that by screwing the screws 63 and 64 the hinge pivots 60 and 61 are pulled toward the inside of the protruding part 26 of the pintle supporting block 12, with consequent compression of the hinge portions 70 and 71 between the mushroom-shaped heads of the hinge pivots 60 and 61 and the protruding part 26 of the hinge supporting block 12.

[0038] The screws 63 and 64 also have a break-in prevention function, preventing the extraction of the hinge pivots 60 and 61.

[0039] In a second embodiment of the hinge according to the invention, designated by the numeral 110 in Figure 9, the means 115 for adjusting the angular trim of the pintle supporting block 112 with respect to the containment body 111 about a rotation axis 119 that is parallel to the axis 116 of the pintle 113 comprise an eccentric element 130 with a hexagonal socket 131 for an adjustment Allen wrench; by maneuvering the eccentric element 130, the rotation of the pintle supporting block 112 about the rotation axis 119 is achieved.

[0040] Rotation about the axis 119 is allowed by a pivot 180, which passes through two corresponding through holes 181 and 182 defined in the pintle supporting block 112.

5 **[0041]** The pivot 180 is defined by a male portion 183 with a first translation preventing head 184 and a female portion 185 that is preset to be screwed axially to the male portion 183, provided with a second translation preventing head 186.

10 **[0042]** The opposite translation preventing heads 184 and 186 prevent the translation of the pivot 180 in the direction of its axis 119, but are arranged within corresponding seats 187 and 188 that are defined on the inner surface of the containment body 111 and have such dimensions as to allow their translation in the direction of the depth of the containment body 111, i.e., the direction of the axis of the adjustment screw 150, said direction being substantially horizontal in the configuration for use of the hinge 110.

20 **[0043]** The adjustment screw 150 passes through a slotted opening 190 defined in the pivot 180.

[0044] The threaded portion of the adjustment screw 150 is screwed to a corresponding threaded hole provided in a bushing 192 that is arranged so as to surround coaxially the pivot 180.

25 **[0045]** In a third embodiment of the hinge according to the invention, designated by the reference numeral 210 in Figure 10, the means 215 for adjusting the angular trim of the pintle supporting block 212 with respect to the containment body 211 about a rotation axis 219 that is parallel to the axis 216 of the pintle 213 comprise an eccentric element 230 with a hexagonal socket 231 for an adjustment Allen wrench; by maneuvering the eccentric element 230, the pintle supporting block 212 is rotated about the rotation axis 219.

30 **[0046]** Rotation about the axis 219 is allowed by the presence, inside the containment body 211, of a slider element 234, which is coupled to the pintle supporting block 212 and supports, screwed coaxially on opposite sides, two screws 295 and 296 with respective heads 297 and 298 that rest in corresponding seats 287 and 288 defined on the inner surface of the containment body 211.

35 **[0047]** The seats 287 and 288 have such dimensions as to allow their translation in the direction of the depth of the containment body 211, i.e., the direction of the axis of the adjustment screw 250, said direction being substantially horizontal in the configuration for use of the hinge 210.

40 **[0048]** The slider element 234, as described above for the first embodiment of the hinge according to the invention 10, has, in a manner similar to what is visible in Figures 6 and 7, side walls 35 and 36 with a profile that is curved or composed of a broken line, so as to determine the rotation axis 219.

45 **[0049]** The pintle supporting block 212 is coupled to the slider element 234 as described for the first embodiment of the hinge according to the invention 10, i.e., by

means of a pair of screws 237 and 238 that are screwed in corresponding holes to the inner part of the pintle supporting block 212, the screws 237 and 238 passing through corresponding slots 239 and 240 that are defined on the slider element 234 and are extended in the direction of the rotation axis 219.

[0050] In a fourth embodiment of the hinge according to the invention, designated by the reference numeral 310 in Figure 11, the means 315 for adjusting the angular trim of the pintle supporting block 312 with respect to the containment body 311 about a rotation axis 319 that is parallel to the axis 316 of the pintle 313 comprise an eccentric element 330 with a hexagonal socket 331 for an adjustment Allen wrench; by maneuvering the eccentric element 330, the rotation of the pintle supporting block 312 about the rotation axis 319 is achieved.

[0051] Rotation about the axis 319 is allowed by the presence, inside the containment body 311, of a slider element 334, which is coupled to the pintle supporting block 312, which, with a resting portion 395, rests at a corresponding seat 388 that is defined on the inner surface of the containment body 311 and supports, on the opposite side, a screw 396 which is screwed thereon and the head 397 of which rests in a corresponding seat 387 that is also defined on the inner surface of the containment body 311.

[0052] The seats 387 and 388 have such dimensions as to allow the translation of the resting portion 395 and of the opposite socket 397 of the screw 396 in the direction of the depth of the containment body 311, i.e., the direction of the axis of the adjustment screw 350, said direction being substantially horizontal in the configuration for use of the hinge 310.

[0053] The slider element 334, as described above for the first embodiment and for the third embodiment of the hinge according to the invention 10 and 210 respectively, has, in a manner similar to what is visible in Figures 6 and 7, side walls 35 and 36 that have a profile that is curved or composed of a broken line, so as to determine the rotation axis 319.

[0054] In practice it has been found that the invention achieves the intended aim and objects.

[0055] In particular, the invention provides a hinge that is simpler and quicker to assemble with respect to hinges of the known type, thanks to the containment body 11, which is composed of two half-shells 21 and 22, this structure allowing to insert the components of the pintle supporting block 12 and the other components within the containment body 11 with operations that are simple and can be automated easily, and then to close the containment body 11 by coupling the two half-shells 21 and 22 to then join them by way of known means, which are not shown for the sake of simplicity, such as threaded elements.

[0056] Furthermore, the invention provides a hinge the adjustment means of which are accessible even with the hinge inserted in the jamb, since the adjustment means are all accessible from the protruding part 26 of the pintle

supporting block 12.

[0057] Furthermore, the invention provides a hinge that can be managed easily by an installation technician intuitively and by using tools of a known type, such as Allen wrenches and screwdrivers.

[0058] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0059] In practice, the components and materials used, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to requirements and to the state of the art.

[0060] The disclosures in Italian Patent Application No. PD2014A000074 from which this application claims priority are incorporated herein by reference.

[0061] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An adjustable hinge (10) for doors or windows, of the type comprising

- a containment body (11),
- a pintle supporting block (12) inserted in a corresponding seat (25) defined in said containment body (11),
- a pintle (13),

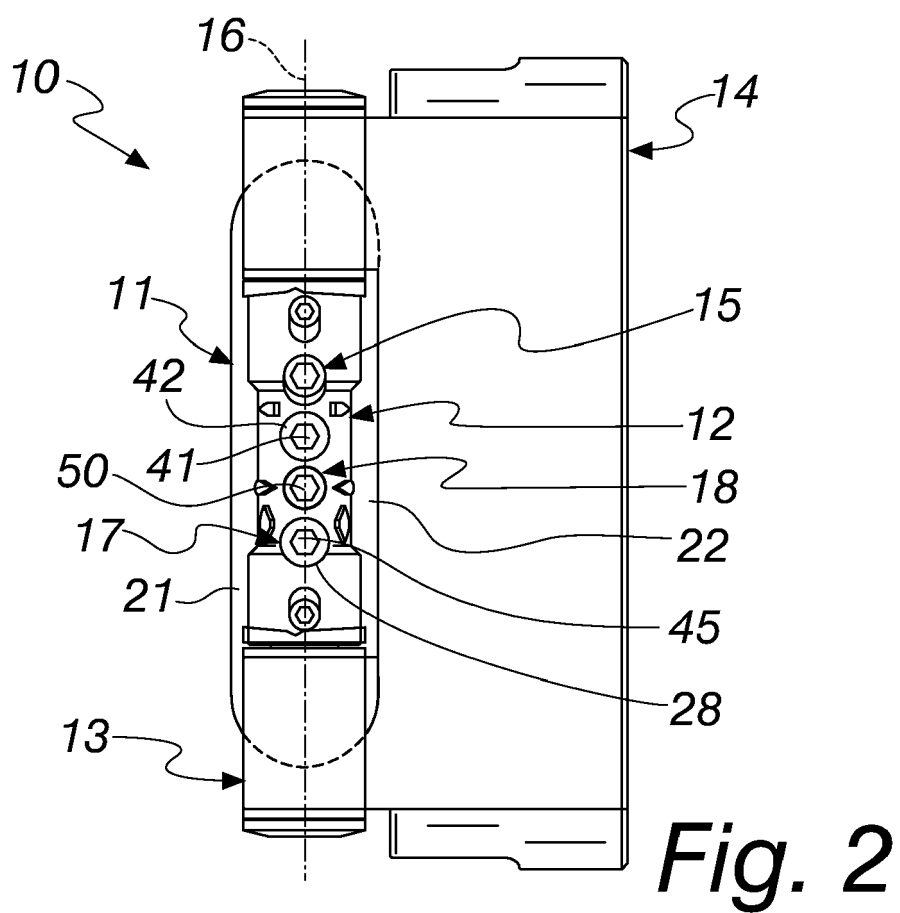
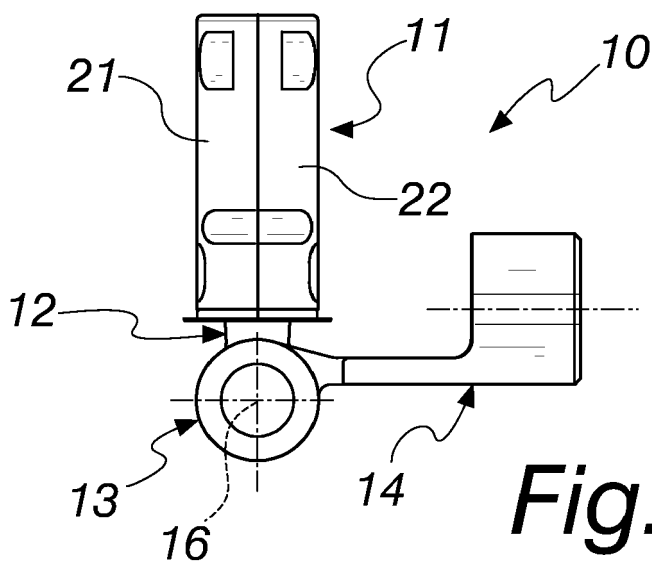
characterized in that it comprises:

- means (15) for adjusting the angular trim of said pintle supporting block (12) with respect to said containment body (11) about a rotation axis (19) that is parallel to the axis (16) of said pintle (13),
- means (17) for adjusting the position of said pintle supporting block (12) with respect to said containment body (11) in a direction that is parallel to said axis (16) of said pintle (13),
- means (18) for adjusting the center distance (20) between said rotation axis (19) and said axis (16) of said pintle (13),

said containment body (11) comprising two half-shells (21, 22) which are closed onto each other so as to define said seat (25) for said pintle supporting block (12).

2. The adjustable hinge according to claim 1, **characterized in that** said pintle supporting block (12) has

- a part (26) thereof that protrudes from the containment body (11), on said protruding part (26) there being the corresponding openings (27, 28, 29) for access to said angular trim adjustment means (15), to said means (17) for adjusting the position in a direction that is parallel to the axis (16) of the pintle (13), and to said means (18) for adjusting said center distance (20).
3. The hinge according to claims 1 and 2, **characterized in that** said means (15) for adjusting the angular trim of said pintle supporting block (12) with respect to said containment body (11) about a rotation axis (19) that is parallel to the axis (16) of said pintle (13) comprise an eccentric element (30), which, by operating it, produces the rotation of the pintle supporting block (12) about the rotation axis (19).
 4. The hinge according to claim 3, **characterized in that** rotation about the axis (19) is allowed by the presence, within the containment body (11), of two opposite calibrated shims (32, 33), an upper one (32) and a lower one (33) in the configuration for use of the hinge (10), on which a slider element (34) coupled to the pintle supporting block (12) can slide freely in constant resting contact.
 5. The hinge according to one or more of the preceding claims, **characterized in that** said slider element (34) is extended from one calibrated shim (32) to the other (33) in the direction of the rotation axis (19) and its side walls (35, 36) have a profile that is curved or composed of a broken line.
 6. The hinge according to one or more of the preceding claims, **characterized in that** said pintle supporting block (12) is coupled to the slider element (34) by means of a pair of screws (37, 38), which are screwed in corresponding holes to the inner part of the pintle supporting block (12), said screws (37, 38) passing through corresponding slots (39, 40) that are defined in the slider element (34) and are extended in the direction of the rotation axis (19), the slots (39, 40) having a transverse dimension that is substantially equal to the diameter of the thread of the screws (37, 38).
 7. The hinge according to one or more of the preceding claims, **characterized in that** said means (17) for adjusting the position of said pintle supporting block (12) with respect to said containment body (11) in a direction that is parallel to said axis (16) of said pintle (13) comprise an adjustment grub (45) with a frustum-shaped tip (46), which can be accessed from the opening (28) on the protruding part (26) of the pintle supporting block (12) and is screwed into a corresponding through hole inside said opening (28), said frustum-shaped tip (46) of said adjustment grub (45) encountering an inclined plane (47) that is defined on the free end of an insert (48) that is inserted in the pintle supporting block (12) and rests with its opposite end against the inner surface of the containment body (11).
 8. The hinge according to one or more of the preceding claims, **characterized in that** said means (18) for adjusting the center distance (20) between said rotation axis (19) and said axis (16) of said pintle (13) comprise an adjustment screw (50) that is extended so as to pass through the pintle supporting block (12) for its entire depth, at a first end said adjustment screw (50) having a head with a hexagonal socket (51) for the rotation of said adjustment screw (50), the opposite end having an expanded head (52) adapted to be inserted with play in an engagement seat (53) defined in a rear wall (54) of the containment body (11), said adjustment screw (50) having a threaded portion (56) that is screwed to a plate (57) that is threaded complementarily internally and is inserted in a corresponding slot in the pintle supporting block (12).
 9. The hinge according to one or more of the preceding claims, **characterized in that** said engagement seat (53) is sized so as to prevent the extraction of the expanded head (32) in the direction of the axis of the adjustment screw (50) and so as to allow the movement of said expanded head (52) in the direction of the rotation axis (19) and in the direction, at right angles to both preceding directions, of the thickness of said containment body (11).
 10. The hinge according to one or more of the preceding claims, **characterized in that** it is provided with friction means for the pintle (13).



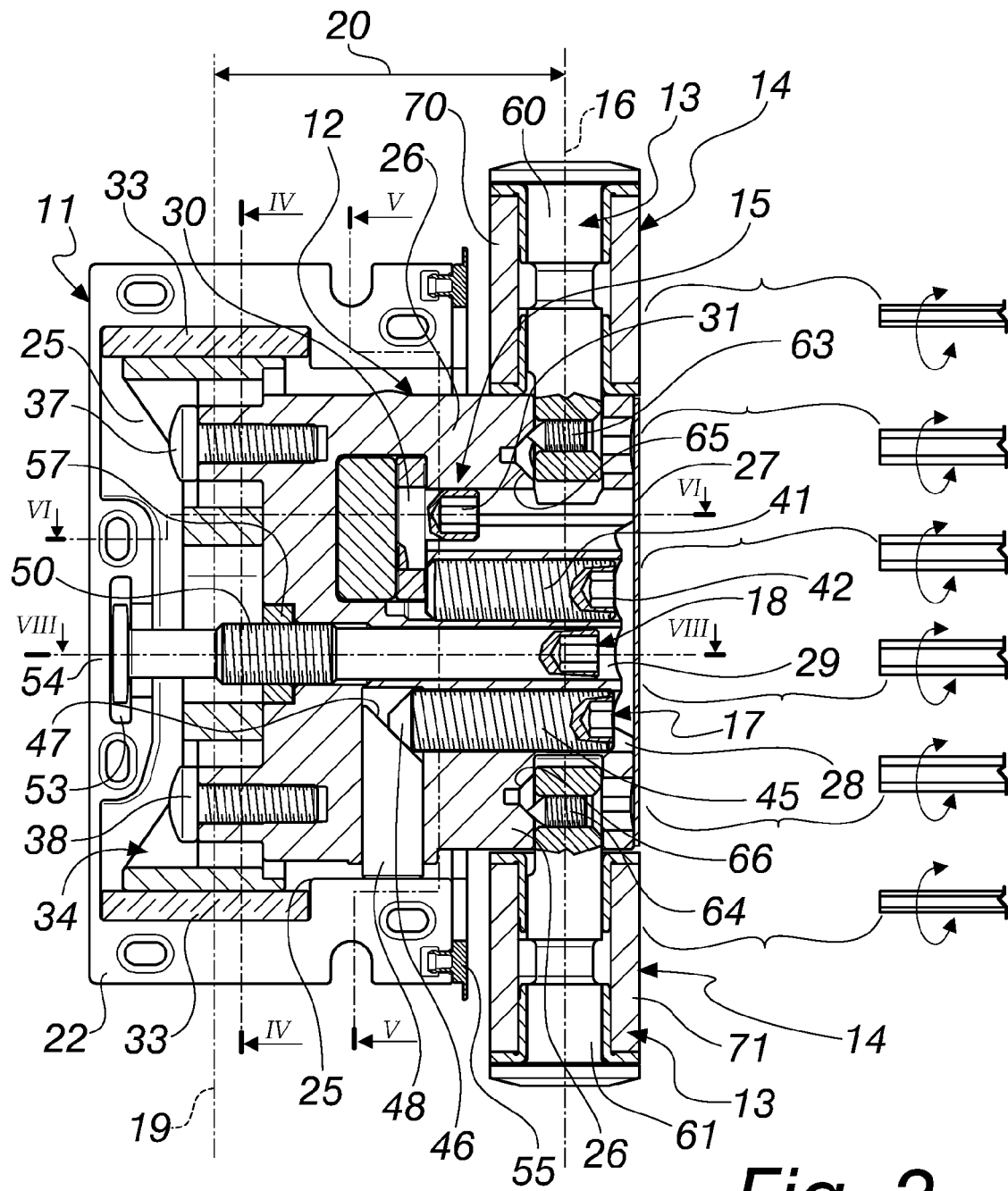


Fig. 3

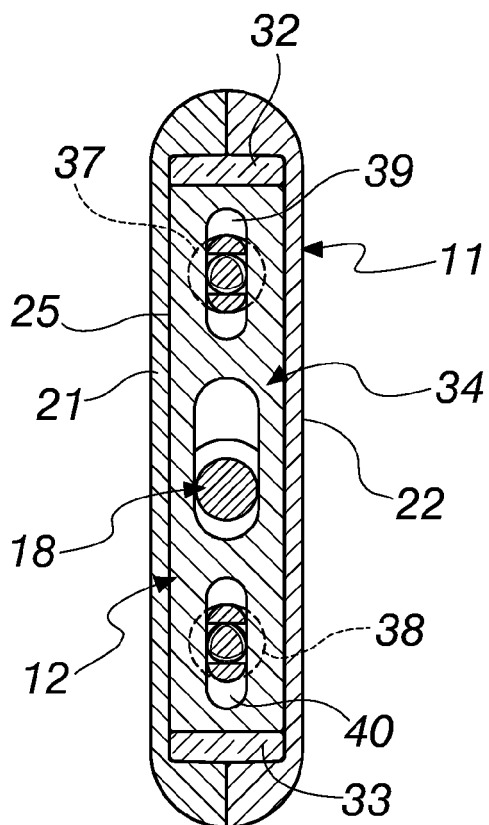


Fig. 4

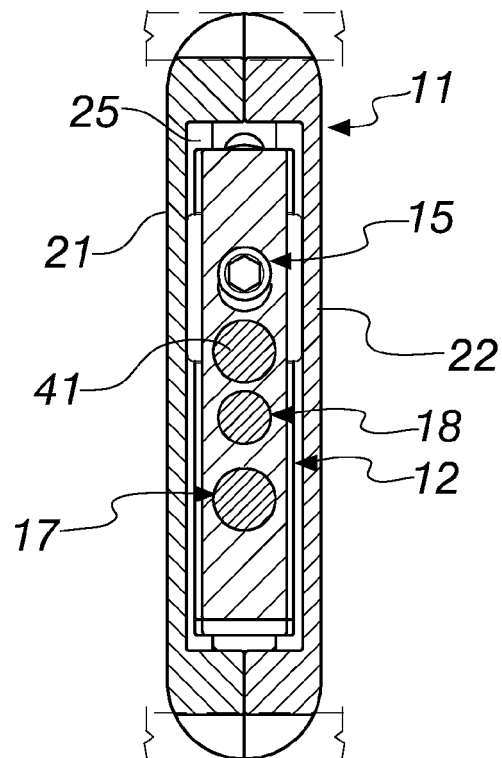


Fig. 5

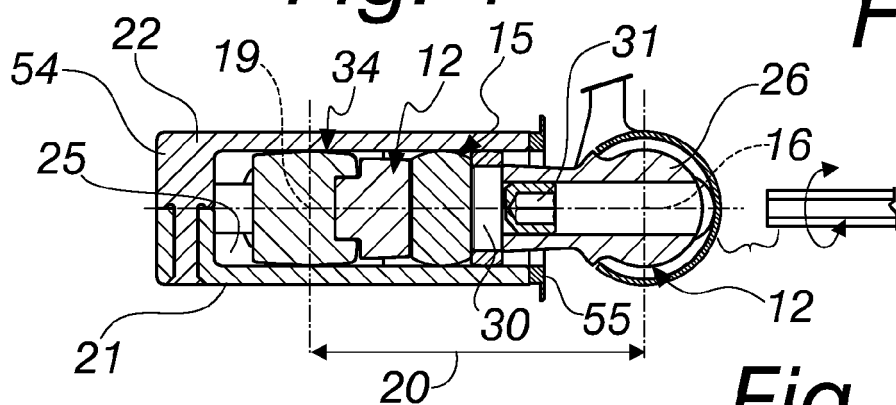


Fig. 6

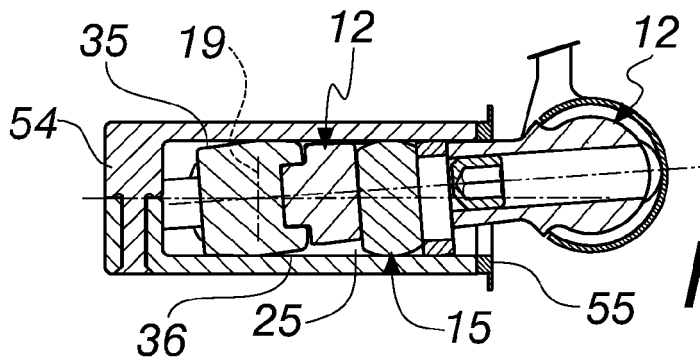


Fig. 7

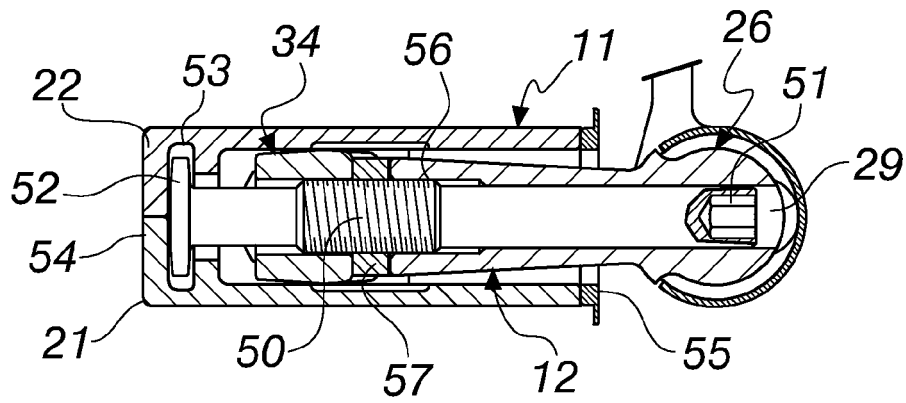


Fig. 8

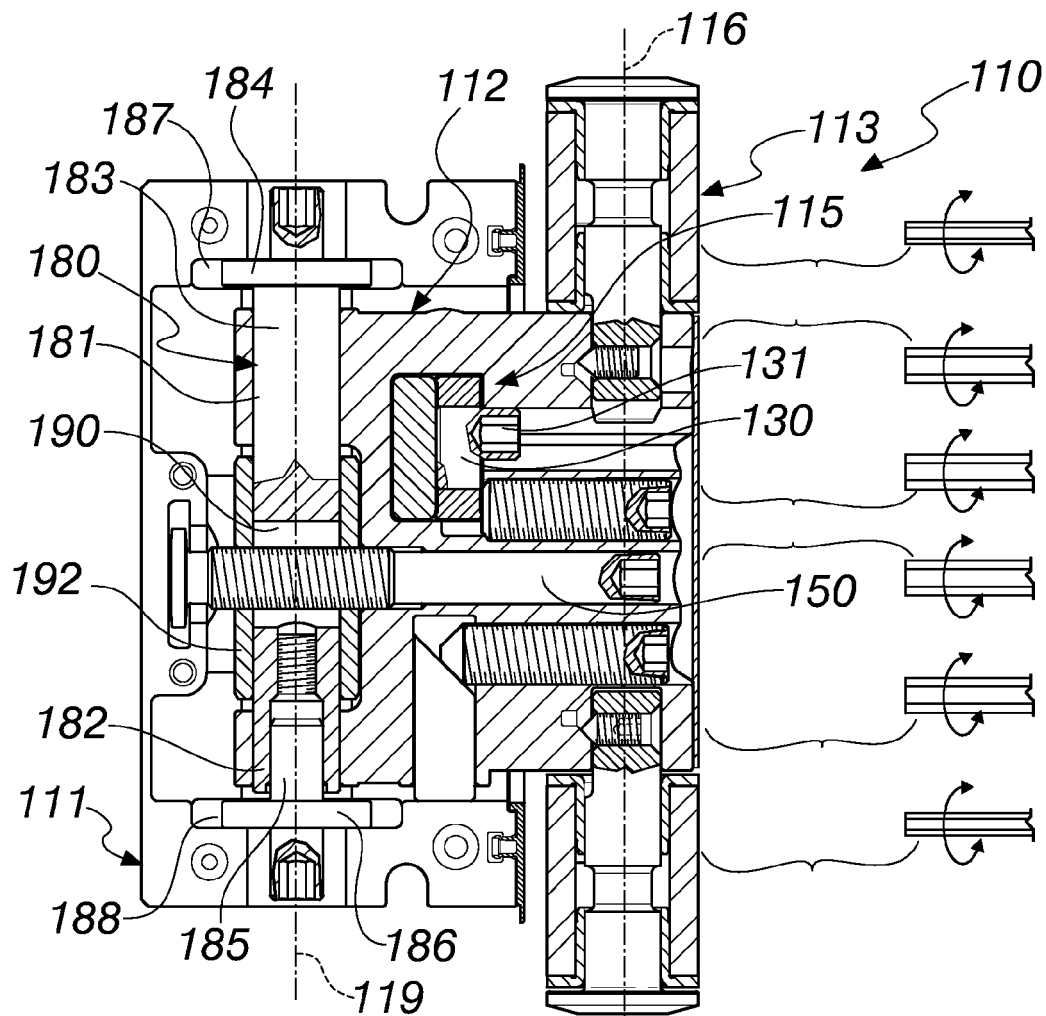


Fig. 9

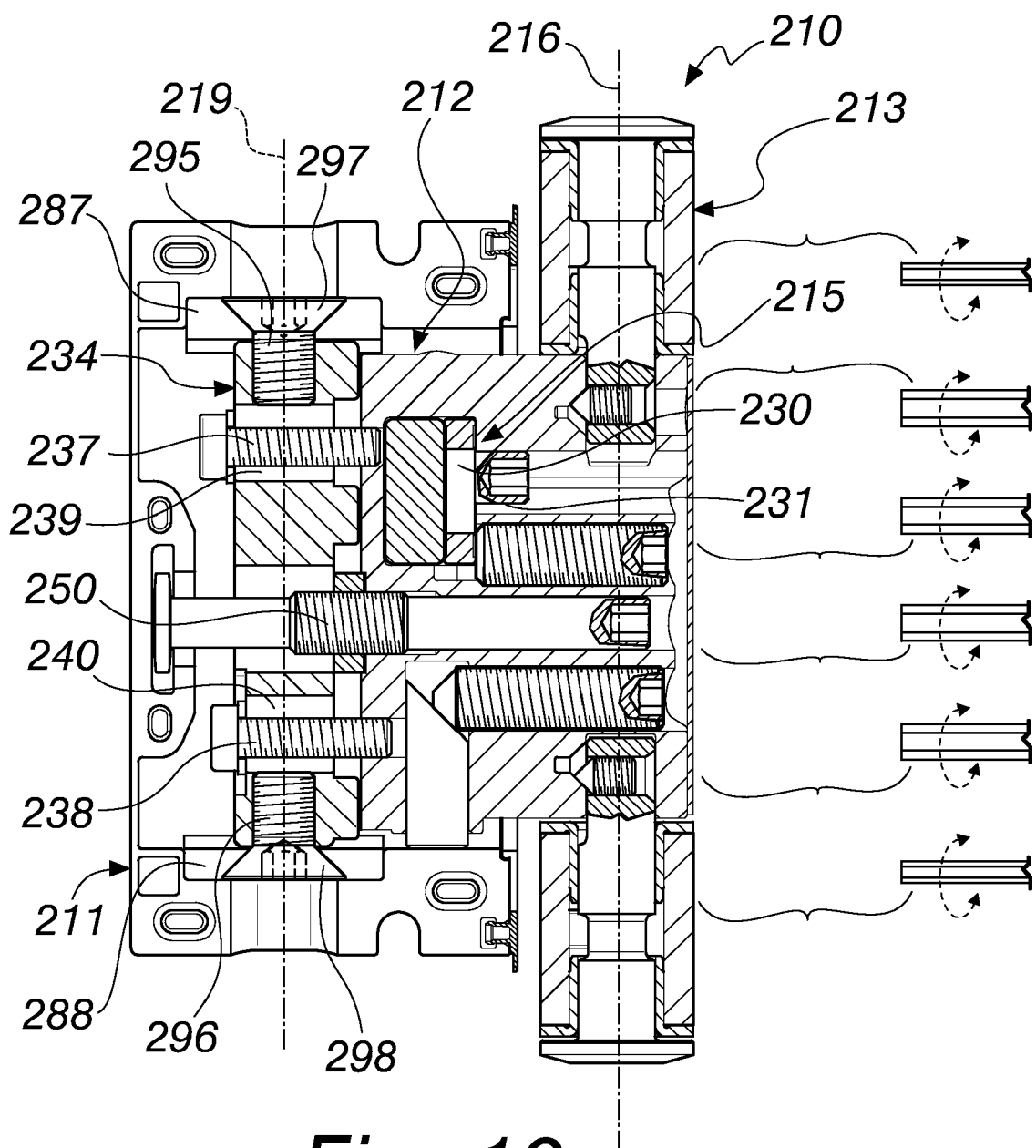
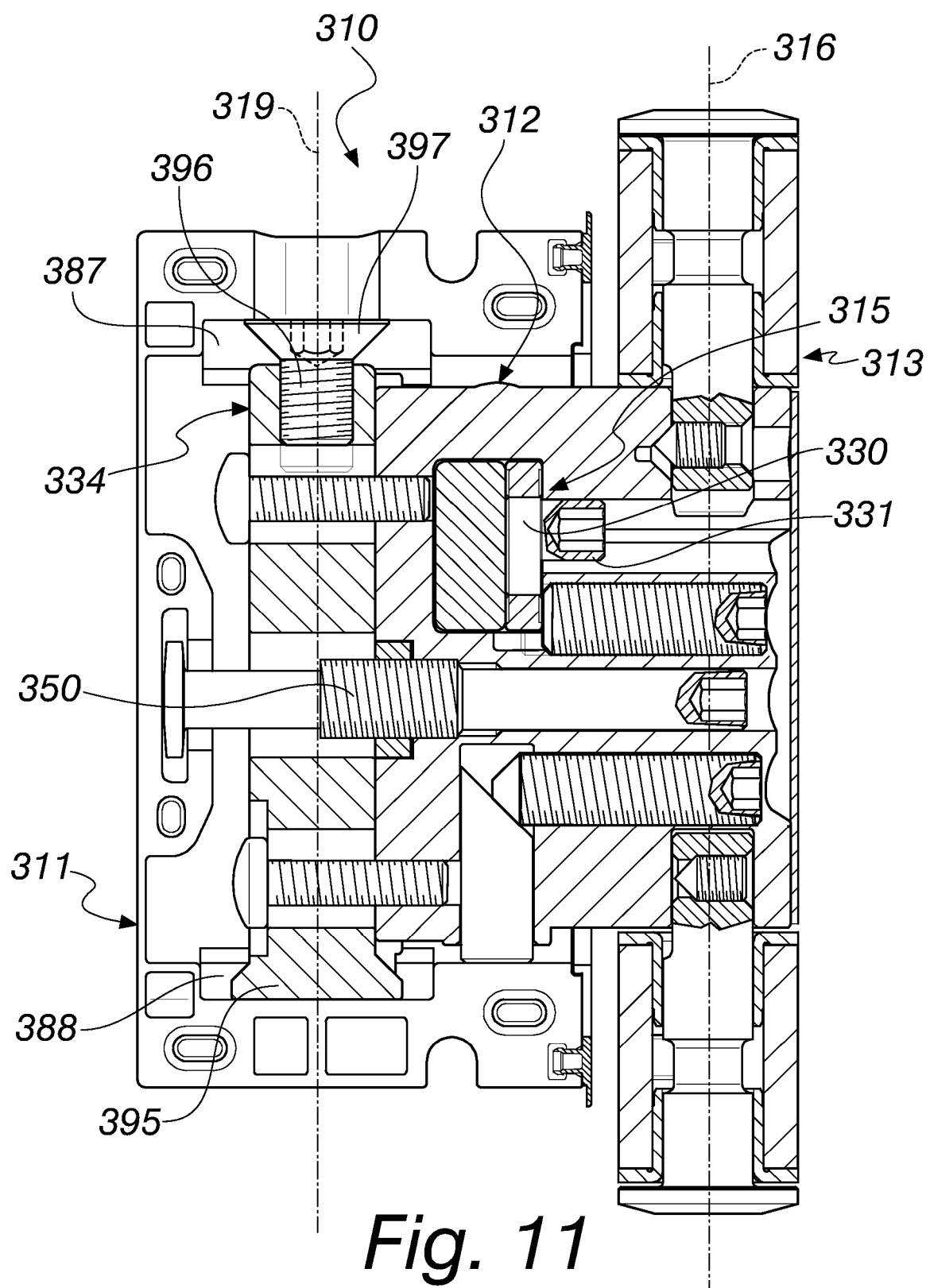


Fig. 10





EUROPEAN SEARCH REPORT

Application Number
EP 15 16 0006

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 20 2011 107495 U1 (MACO TECHNOLOGIE GMBH [AT]) 4 February 2013 (2013-02-04)	1,10	INV. E05D7/04
Y	* paragraph [0033] - paragraph [0052];	2,3,7	
A	figures 1-8 *	8	
Y	WO 02/086263 A1 (SFS INTEC HOLDING AG [CH]; OESTERLE HELMUT [AT]) 31 October 2002 (2002-10-31) * page 7, paragraph 4 - page 8, paragraph 3; figures 11-14 *	2,3,7	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 May 2015	Examiner Guillaume, Geert
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			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 16 0006

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
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13-05-2015

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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