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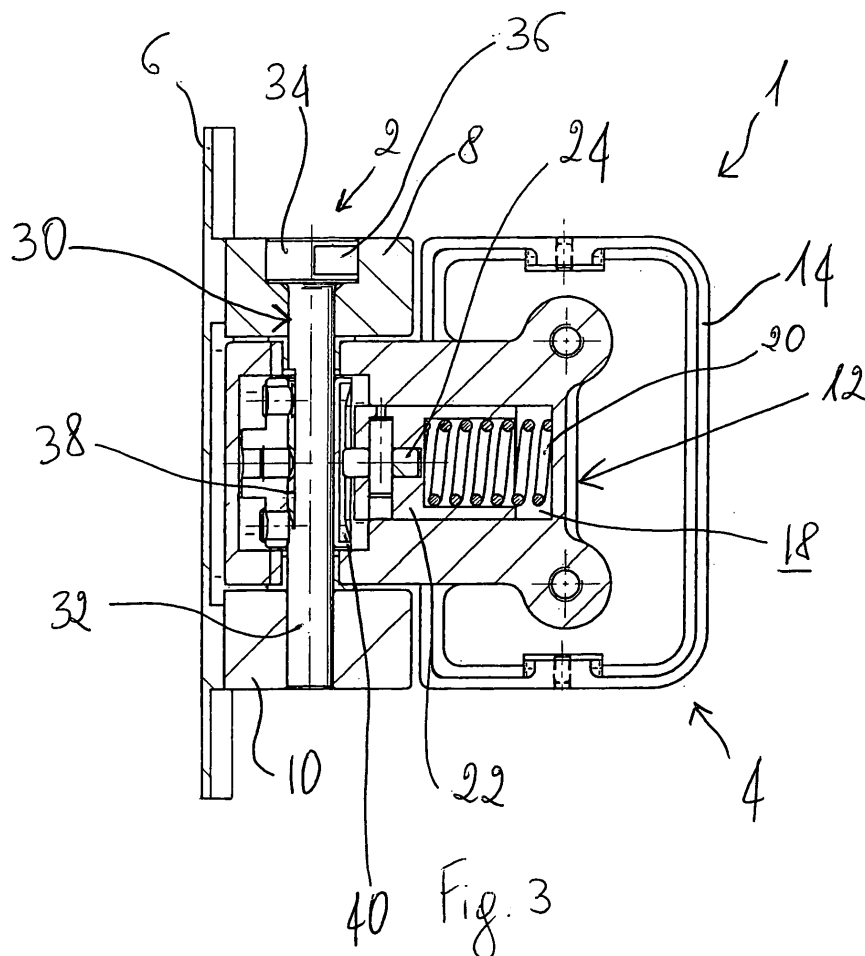
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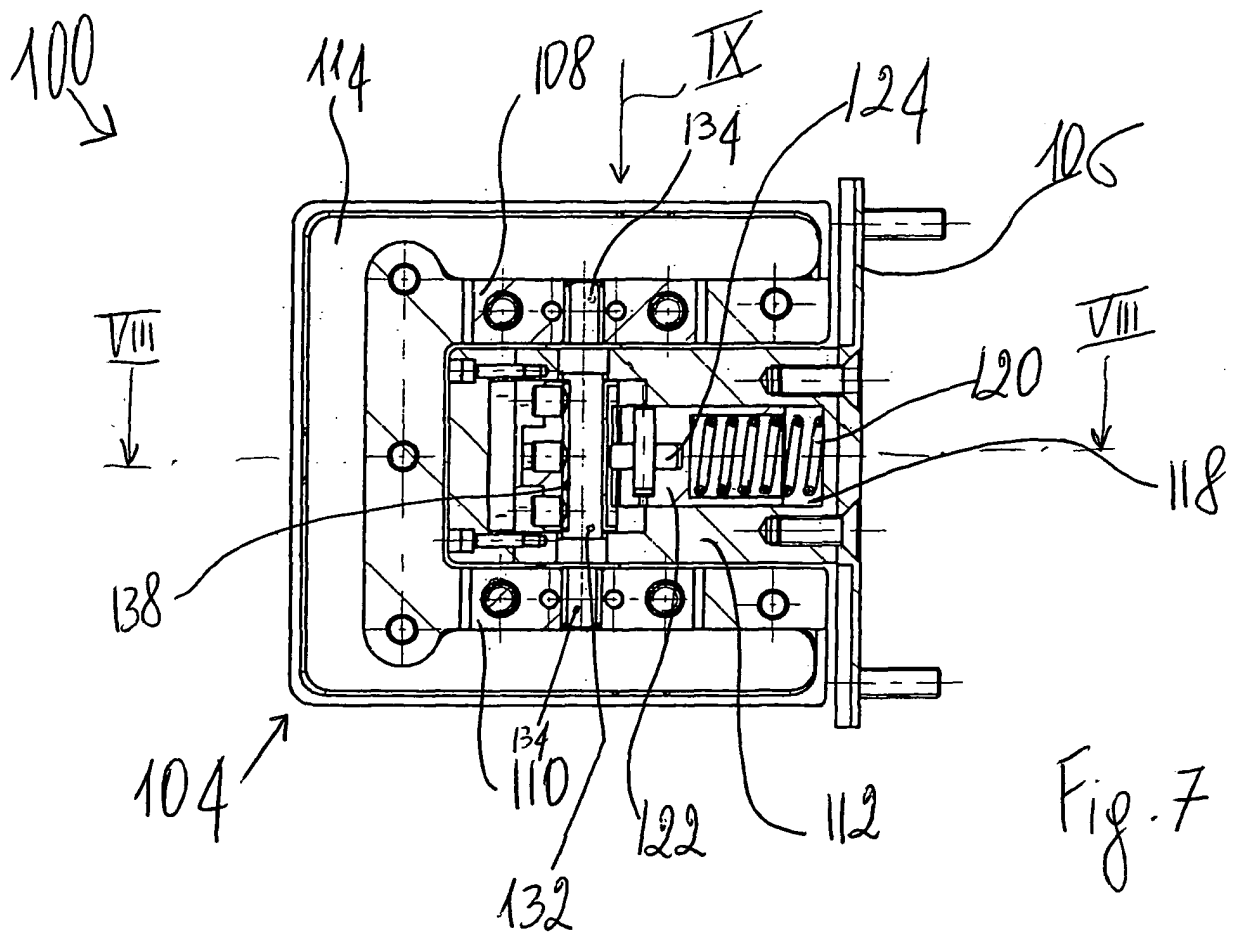
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(54) **Hinge for glass door**

(57) The object of the present invention is a hinge for glass door provided with adjustment means that cooperate with a pin for varying the axis of rotation of the mobile

body of the hinge relative to the fixed body thereof, for fitting the shutter perfectly in vertical without having to use the usual shims inserted between the plate and the frame jamb.





Description

[0001] . The object of the present invention is a hinge for a glass door.

[0002] . As known, glass doors are especially used for the access to blocks of flats, hotels, shops, firms and commercial activities in general, due to the luminosity they give to the environment.

[0003] . Such places are generally very crowd and so, to prevent the door from remaining open, they are provided with a system that allows the automatic closing thereof.

[0004] . There are some pneumatic systems that allow the automatic closing and/or opening of the glass doors. As it can be understood, such systems exhibit a high installation cost and need periodical maintenance.

[0005] . On the other hand, the most widespread system is that of automatic hinges, which uses hinges to attach the glass slab that acts as shutter to the frame, provided with a spring mechanism, generally a cam, which automatically pulls the door shutter from an open configuration to the closed configuration.

[0006] . There are several solutions of automatic hinges for glass doors.

[0007] . One solution is disclosed, for example, in the European patent application No. 04425704, by the same Applicant.

[0008] . The assembly of such hinges exhibits some problems.

[0009] . The jamb of the frame the shutter must be hinged to is almost never perpendicular to the floor, or as said in the jargon, "it diverts relative to the vertical".

[0010] . In mounting the hinge it is therefore necessary to make up for such inclination so that the hinge axis, which at the end of the assembly will coincide with the axis of rotation of the slab, is perfectly vertical.

[0011] . At present, such problem is solved by inserting some shims between the hinge fixed body and the frame jamb, so as to make up for the deviation of the jamb surface from the vertical.

[0012] . As it can be understood, such a solution requires a difficult mounting work. However, the end result is almost never optimal, that is, the hinge remains "out of axis", if not thanks to the intervention of very skilled fitters.

[0013] . Moreover, it should be noted that a shutter fitted out of axis implies an abnormal operation of the same hinge, which is subject to abnormal twisting and bending which, as time goes by, and with a frequent use of the door, tend to accentuate the shift and to wear and break some portions of the hinge itself.

[0014] . Most of the times, the end user associates such breakages to a poor quality of the hinge, unaware of the fact that the cause actually is an improper fitting.

[0015] . The object of the present invention is to meet the above needs while solving the disadvantages mentioned above.

[0016] . The features and advantages of the hinge ac-

cording to the present invention will appear more clearly from the following description of some embodiment variations, made by way of an indicative non-limiting example with reference to the annexed drawings, wherein:

[0017] . - figure 1 shows a side view of a hinge according to the present invention, in accordance with a first embodiment variation;

[0018] . - figure 2 shows a section view of the hinge of figure 1, obtained according to the section line II - II in figure 1;

[0019] . - figure 3 shows a section view of the hinge of figure 1, obtained according to the section line III - III in figure 2;

[0020] . - figure 4 shows a section view of a portion of the hinge of figure 1, obtained according to the section line IV - IV in figure 1;

[0021] . - figure 5 shows a three-dimensional view of a pin of the hinge of figure 1;

[0022] . - figure 6 shows a perspective view of the hinge of figure 1;

[0023] . - figure 7 shows a section view of a hinge according to the present invention, in accordance with a further embodiment variation;

[0024] . - figure 8 shows a section view of the hinge of figure 7, obtained according to the section line VIII - VIII in figure 7;

[0025] . - figure 9 shows a view of the hinge of figure 7, according to the observation direction IX in figure 7, and

[0026] . - figure 10 shows a perspective view of the hinge of figure 7.

[0027] . With reference to figures 1 to 6, reference numeral 1 globally indicates a hinge for glass door suitable for hinging a shutter to a jamb of a frame of said door for moving said door from an open configuration to a closed configuration and vice versa.

[0028] . Hinge 1 comprises a fixed body 2 suitable for being fixed to the door jamb, and a mobile body 4 suitable for being fixed to the door shutter.

[0029] . The fixed body 2 is hinged to the mobile body 4.

[0030] . In other words, said hinge 1 comprises hinging means suitable for hinging said mobile body 4 to said fixed body 2 to enable a relative rotation thereinbetween about a vertical axis X.

[0031] . The fixed body 2 comprises a plate 6 suitable for being attached to the door jamb, for example through at least one fixing screw.

[0032] . Moreover, said fixed body 2 comprises a first flange 8 and a second flange 10, axially spaced from one another, attached to said plate 6.

[0033] . The mobile body 4 comprises a housing box 12 seated, at least partly, between said first flange 8 and said second flange 10.

[0034] . Said mobile body 4 further comprises a pair of wings 14, 16 suitable for locking the door shutter.

[0035] . At least one of said wings 14, 16 is attached to the portion of said housing box 12, protruding from said flanges 8, 10.

[0036] . The housing box 12 exhibits an inside space 18 suitable for seating a thrust unit comprising a spring 20, a piston 22 and a disc 24.

[0037] . Piston 22 is constantly influenced by said spring 20 at a first end thereof, since said spring is put in compression between a wall of said housing box 12, and turnably supports said disc 24 at the opposite end.

[0038] . The hinging means comprise a pin 30 that cooperates with said fixed body 2 and with said mobile body 4.

[0039] . Pin 30 comprises a stem 32 that cooperates with the fixed body 2, and in particular with the first flange 8 and with the second flange 10, and a head 34.

[0040] . Head 34 exhibits at least one levelling 36, and, preferably, two levellings 36, perpendicular to one another.

[0041] . Moreover, stem 32 exhibits an active attachment portion 38, for example consisting of a groove 40 having axial extension.

[0042] . Moreover, hinge 1 comprises a cam element 40, integral to pin 30, and therefore to fixed body 2, since said pin is integral to the fixed body.

[0043] . In particular, said cam element 40 is attached to said pin through attachment means, for example a plurality of dowels that operate on said active attachment portion 38 of pin 30.

[0044] . The cam element 40 comprises a cam surface, constantly in abutment with disc 24 of the thrust unit, such that said cam surface exhibits at least one normal direction upon the contact with said disc, said normal direction not passing through the centre of said disc.

[0045] . Said thrust unit and said cam element 40 make up a preferred embodiment of automatic return means suitable for constantly influencing said mobile body 4 for automatically moving said door from said open configuration to said closed configuration, suitable for generating, in said open configuration of the door, a return action suitable for moving the door from said open configuration to said closed configuration.

[0046] . Moreover, said automatic return means also form connecting means between said mobile body 4 and said pin 30, since the action of spring 20 on box 12 carries out an action that pulls said box 12 towards said pin 30.

[0047] . It should be noted that preferably, the cam element 40 is in proximal position relative to plate 6, whereas the thrust unit is in distal position.

[0048] . Moreover, hinge 1 comprises at least one adjustment screw that through said first flange 8, is suitable for operating on said head 34 of pin 30, changing the arrangement of the axis thereof.

[0049] . In particular, said hinge comprises two adjustment screws that operate on said levellings 36 of head 34 of pin 30. In other words, said levellings 36 form active adjustment portions of said pin 30.

[0050] . Since box 12 grips said pin 30, a variation of the arrangement of the axis of pin 30 generates a variation in the arrangement of the mobile body 4.

[0051] . As it can be understood, hinge 1 is therefore

provided with adjustment means cooperating with said hinging means for varying the axis of rotation of the mobile body 4 relative to the fixed body 2.

[0052] . With reference to figures 7 to 10, the description of a variation of embodiment of the hinge according to the present invention is given hereinafter.

[0053] . A hinge 100 comprises a fixed body 102 and a mobile body 104.

[0054] . The mobile body 104 comprises a first wing 114, shaped as a "U", which is attached to a first connecting block 108 and a second connecting block 110, axially spaced from one another.

[0055] . The fixed body 102, comprising a plate 106 and hinged to the mobile body 104, comprises a housing box 112, attached to said plate 6.

[0056] . Box 112 is seated between said connecting blocks 108, 110 of the mobile body.

[0057] . The housing box 112 exhibits an inside space 118 suitable for seating a thrust unit comprising a spring 120, a piston 122 and a disc 124.

[0058] . Piston 122 is constantly influenced by said spring 120 at a first end thereof, since said spring is put in compression between a wall of said housing box 112, and turnably supports said disc 124 at the opposite end.

[0059] . Hinge 100 further comprises a pin 130 that cooperates with said fixed body 102 and with said mobile body 104.

[0060] . Pin 130 comprises a stem 132 that cooperates with the fixed body 102, and two end portions 134, each cooperating with the connecting blocks 108, 110.

[0061] . Moreover, stem 132 exhibits an active attachment portion 138, for example consisting of a groove having axial extension.

[0062] . Moreover, hinge 100 comprises a cam element 140, integral to pin 130, and therefore to the mobile body 104.

[0063] . In particular, said cam element 140 is attached to said pin 130 through attachment means, for example a plurality of dowels that operate on said active attachment portion 138 of pin 130.

[0064] . Said thrust unit and said cam element 140 form a preferred example of the automatic return means.

[0065] . In particular, said cam surface of the cam element 140 is constantly in abutment with said disc 124 of the thrust unit.

[0066] . Moreover, said automatic return means also form connecting means between said fixed body 102 and said pin 130, since the action of spring 120 on box 112 carries out an action that pulls said box 112 towards said pin 130.

[0067] . Moreover, hinge 100 comprises at least one adjustment screw that through said first connecting block 108, is suitable for operating on said end portions 134 of pin 130, changing the arrangement of the axis thereof. It should be noted that said end portions 134 of pin 130 make up active adjustment portions.

[0068] . Since the first wing 114 of the mobile body 104 cooperates with the end portions 134 of pin 130, by op-

erating on said adjustment screws it is possible to vary the relative arrangement between said first wing 114 and said pin 130, thus varying the axis of rotation of the shutter.

[0069] . Hinge 100 further comprises a second wing 116, made integral to said first wing 114 to cover the connecting blocks 108, 110, the cam element 140 and the thrust unit.

[0070] . As it can be understood, hinge 100 is therefore provided with adjustment means cooperating with said hinging means for varying the axis of rotation of the mobile body 104 relative to the fixed body 102.

[0071] . Moreover, plate 106 exhibits a recess 150 suitable for allowing the rotation of the mobile body 104, and in particular of the first wing 114 and of the second wing 116 connected to one another, relative to the fixed body 102, avoiding a structural interference with said plate 106.

[0072] . It should be noted that preferably, the thrust unit is proximal to plate 6, whereas the cam element 40 is distal.

[0073] . Innovatively, the hinge according to the present invention allows an automatic return of the shutter of the door and at the same time, the adjustment of the axis of rotation of the shutter.

[0074] . Advantageously, moreover, the hinge is very soft in use. In other words, said hinge changes from the closed configuration to the open configuration through a not strong applied action.

[0075] . It should be noted that such softness is particularly accentuated in the variation wherein the thrust unit is proximal to the plate of the fixed body, whereas the cam element is distal from said plate, by virtue of a lever effect that sets and that makes the spring action less burdensome.

[0076] . Advantageously, moreover, the hinge exhibits a much longer life than the usual hinges, as proved by the repeated tests carried out on opening and closing of said hinges.

[0077] . According to an even further advantageous aspect, the cam element and the other functional parts are hidden.

[0078] . Advantageously, moreover, especially in the variation with cam element proximal to the plate and distal thrust unit, the hinge exhibits a high safety level since it is not possible or it is difficult to introduce parts of the body, such as the fingers of a hand fingers, between moving parts.

[0079] . It is clear that a man skilled in the art may make several changes and adjustments to the hinges described above in order to meet specific and incidental needs, all falling within the scope of protection defined in the following claims.

Claims

1. A hinge (1, 100) for glass door suitable for hinging a

shutter to a jamb of a frame of said door for moving said door from an open configuration to a closed configuration and vice versa, wherein said hinge comprises:

- a fixed body (2, 102) suitable for being attached to the door jamb;
 - a mobile body (4, 104) suitable for being attached to the door shutter;
 - hinging means suitable for hinging said mobile body to said fixed body for allowing a relative rotation thereinbetween, wherein said hinging means comprise a pin (30, 130) that cooperates with said fixed body and said mobile body;
 - automatic return means suitable for constantly influencing said mobile body for automatically moving said door from said open configuration to said closed configuration, wherein said return means comprise a cam element (40, 140) and a thrust unit, each alternately integral to said fixed body or to said mobile body and constantly in abutment with one another for generating, in said open configuration of the door, a return action suitable for moving the door from said open configuration to said closed configuration;
- said hinge being **characterised in that** said hinge further comprises adjustment means cooperating with said hinging means for varying the axis of rotation of the mobile body (4, 104) relative to the fixed body (2, 102).

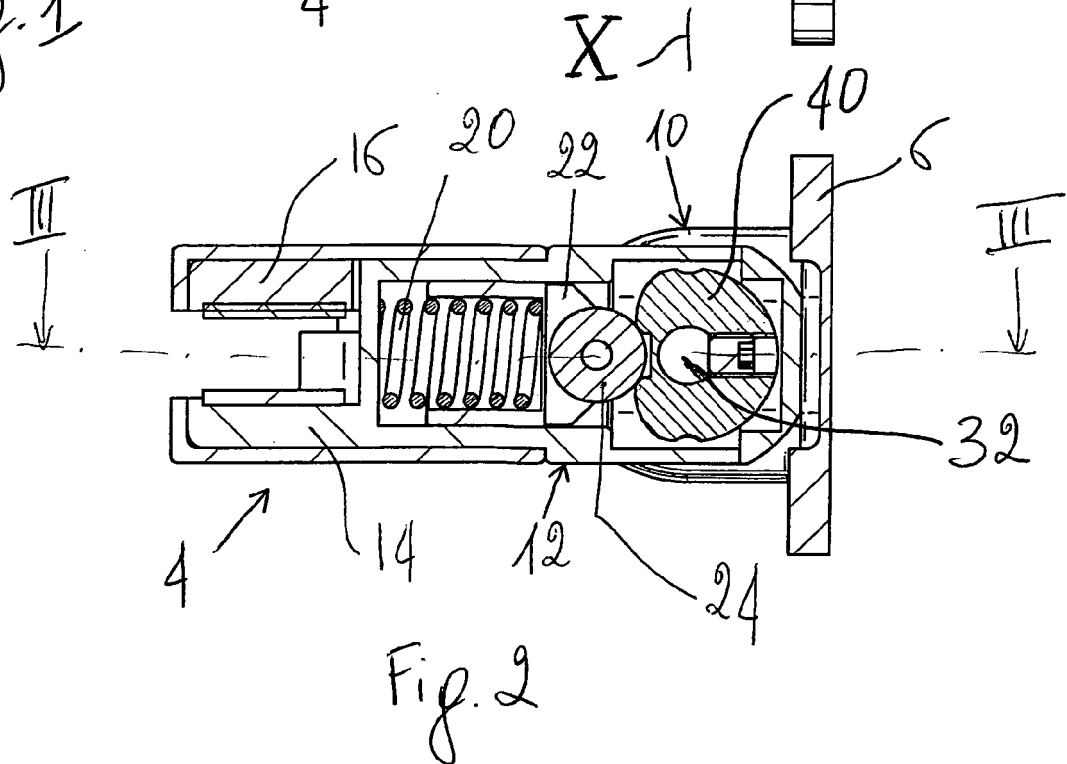
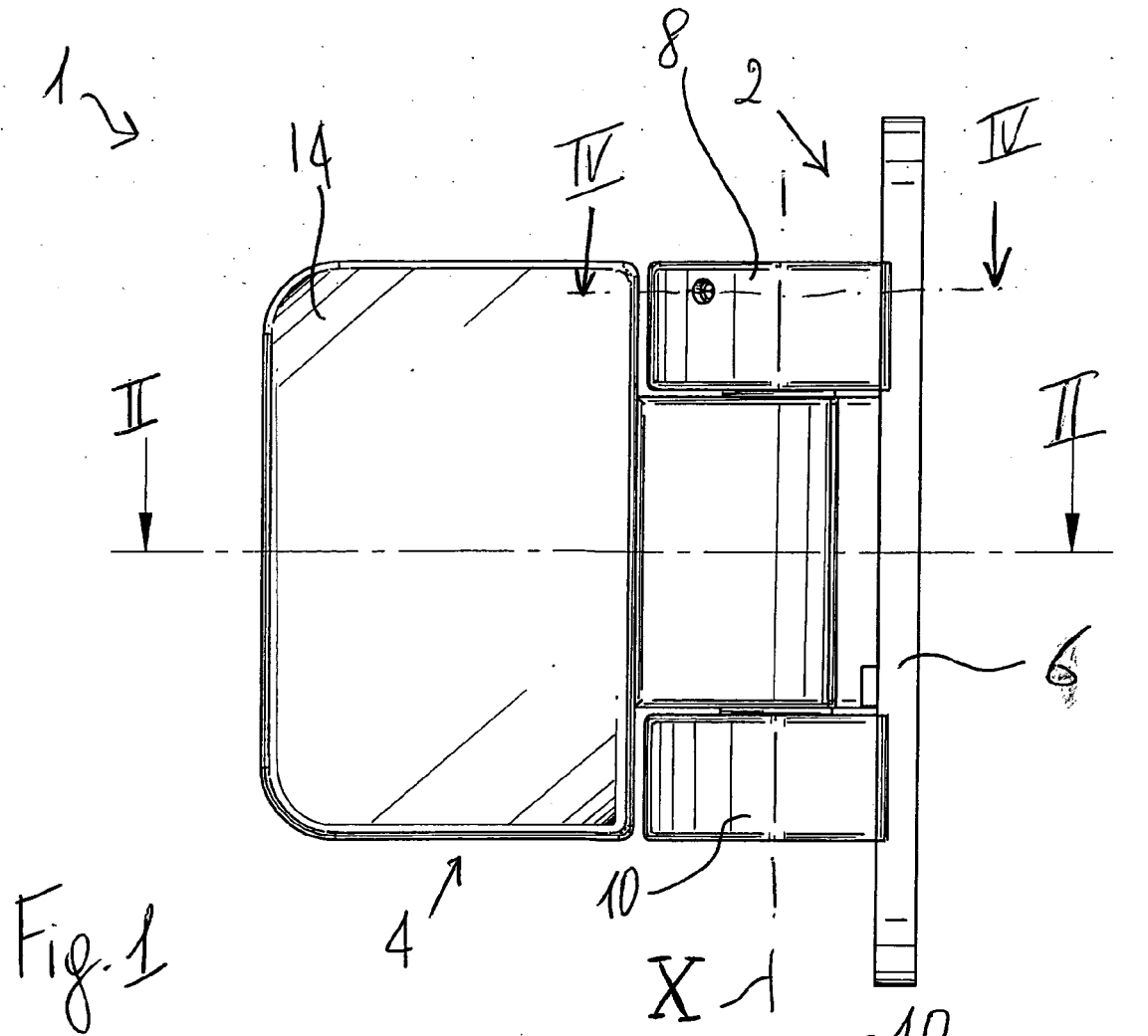
2. A hinge according to claim 1, wherein said adjustment means directly operate on said hinging means in a configuration of hinge fitted to the jamb, the arrangement of said fixed body not being changed when said adjustment means are operated.
3. A hinge according to claim 1 or 2, wherein said cam element (40, 140) is integral to said pin (30, 130).
4. A hinge according to claim 1 or 2, wherein said pin comprises an active adjustment portion (36, 134) and an active attachment portion (38, 138), said active adjustment portion being suitable for being influenced by said adjustment means and said active attachment portion being suitable for being influenced by said attachment means for attaching the cam element (40, 140) to the pin (30, 130).
5. A hinge according to any one of the previous claims, wherein said cam element (40, 140) is integral to said mobile body (4, 104) and said thrust unit is seated into said fixed body (2, 102).
6. A hinge according to claim 5, wherein said adjustment means are seated on said mobile body (104).
7. A hinge according to claim 6, wherein said adjust-

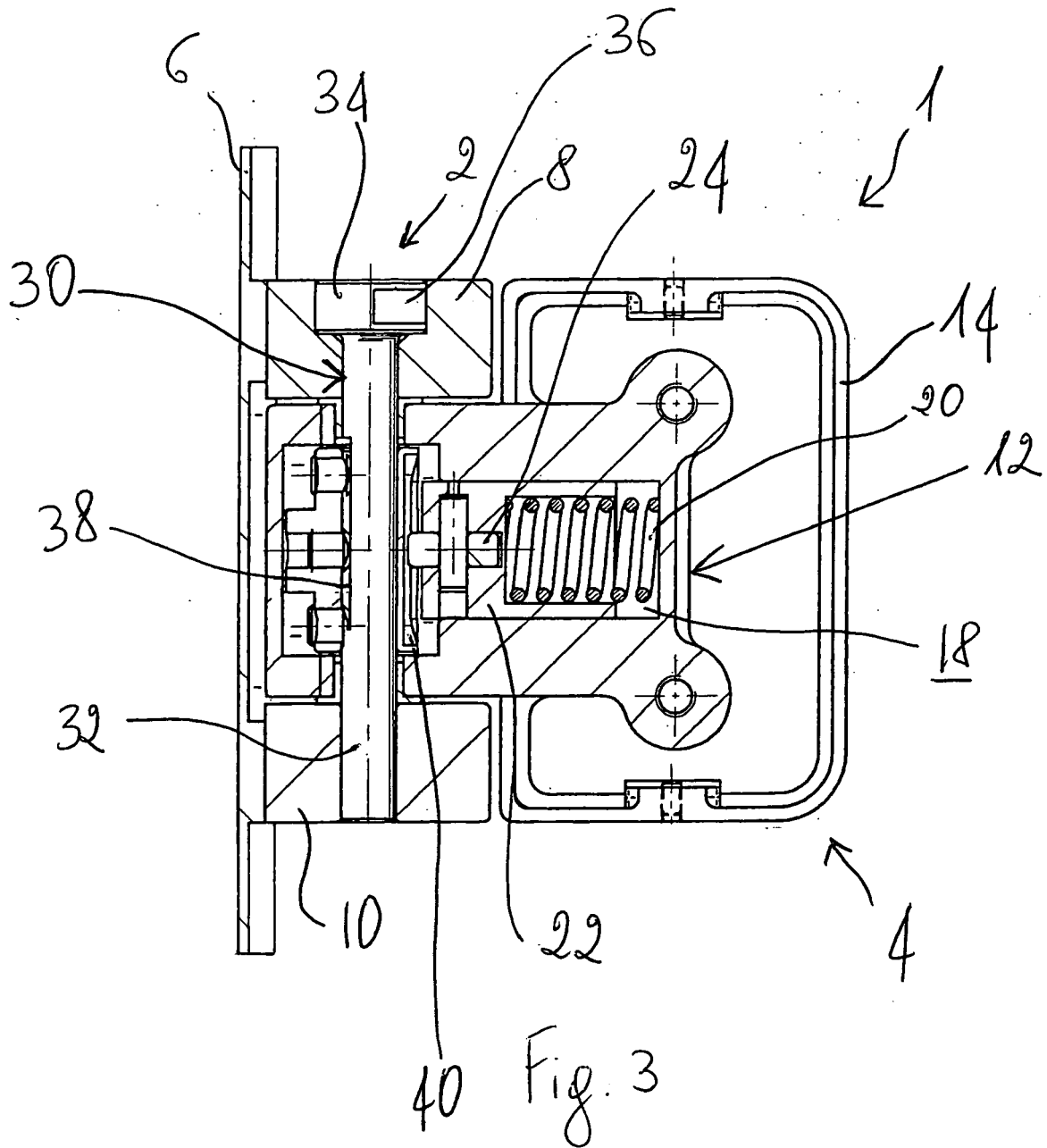
ment means comprise at least one connection block (108) attached to the mobile body (104), inside which there is seated said adjustment portion (134) of the pin (130), and at least one adjustment screw that, through said block, is suitable for operating on said adjustment portion for varying the axis of rotation of the mobile body (104) relative to the fixed body (102).

8. A hinge according to claim 7, comprising two adjustment blocks (108, 110), axially spaced from one another, between which there is arranged a connecting box (112) of the fixed body (104), in said box (112) there being seated said thrust unit. 10
9. A hinge according to any one of claims 1 to 4, wherein said cam element (40) is integral to said fixed body (4). 15
10. A hinge according to claim 9, wherein said fixed body (4) comprises a first flange (8) and a second flange (10), axially spaced, and wherein said pin (30) comprises a stem (32), that crosses said flanges (8, 10), and a head (34) seated in said first flange (8). 20
11. A hinge according to claim 10, wherein said adjustment means comprise at least one adjustment screw that, through said first flange (8), is suitable for operating on said head (34) of the pin (30). 25
12. A hinge according to claim 11, wherein said head (34) comprises at least one levelling (36) on which said adjustment screw acts. 30
13. A hinge according to any one of claims 9 to 12, wherein between said first (8) and second (10) flange there is arranged a connecting box (12) of said mobile body (4), in said box (12) there being seated said thrust unit. 35
14. A hinge according to any one of the previous claims, wherein said thrust unit comprises a spring (20, 120), a piston (22, 122) and a disc (24, 124), wherein said piston is constantly influenced by said spring at an end portion and turnably seats said disc at the other end portion, said disc being constantly in abutment with said cam element (40, 140). 40 45
15. A hinge according to claim 14, wherein said cam element (40, 140) comprises a cam surface, constantly in abutment with said disc (24, 124), such that said cam surface exhibits at least one normal direction upon the contact with said disc not passing through the centre of said disc. 50
16. A hinge according to any one of the previous claims, wherein said fixed body (2) comprises a plate (6) attached to the door jamb and said cam element (40) is proximal to said plate (6) whereas said thrust unit 55

is distal from said plate (6).

17. A hinge according to any one of claims 1 to 15, wherein said fixed body (2) comprises a plate (6) attached to the door jamb and said thrust unit is proximal to said plate (6) whereas said cam element is distal from said plate (6).





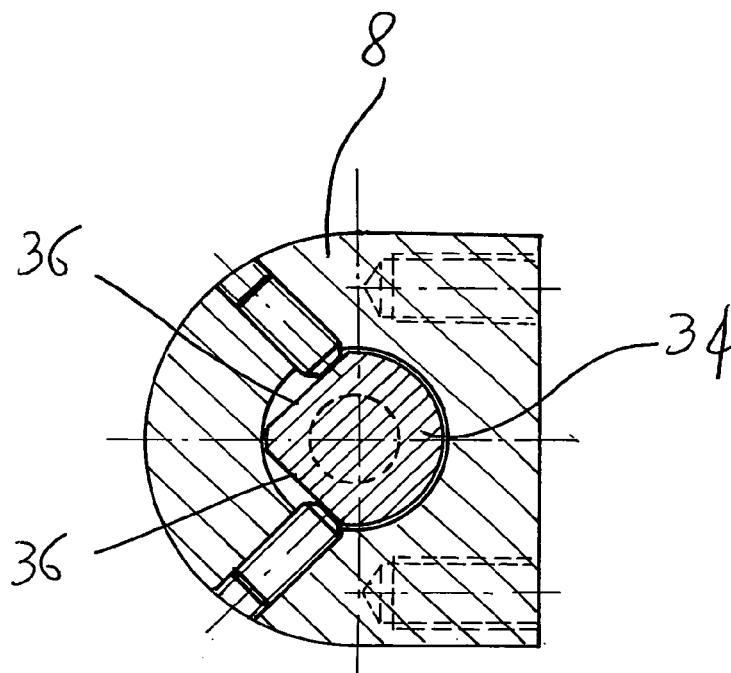
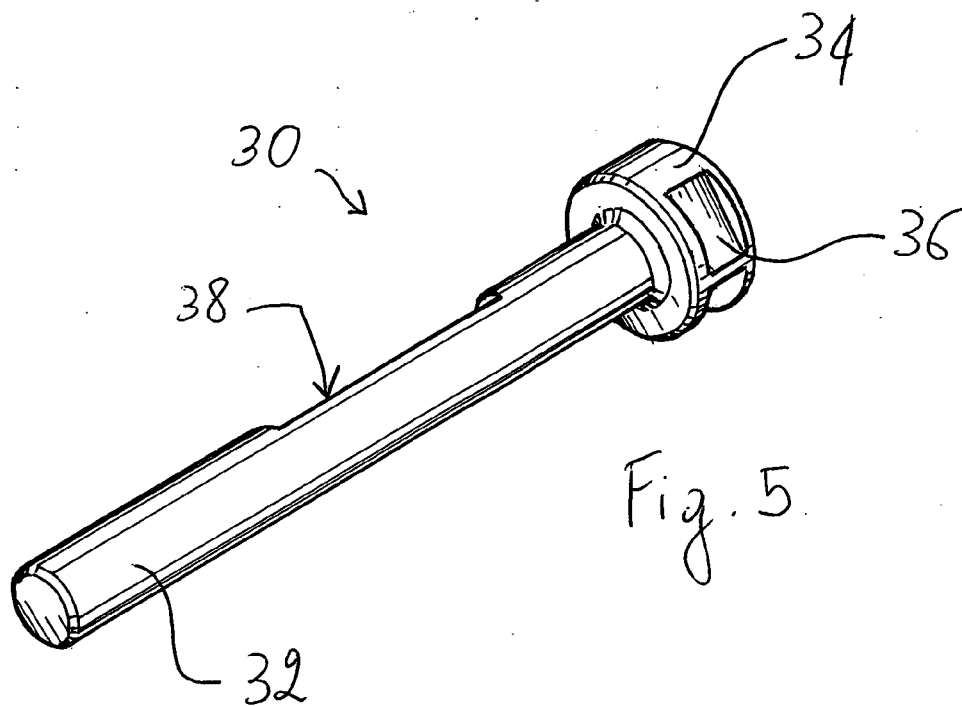


Fig. 4

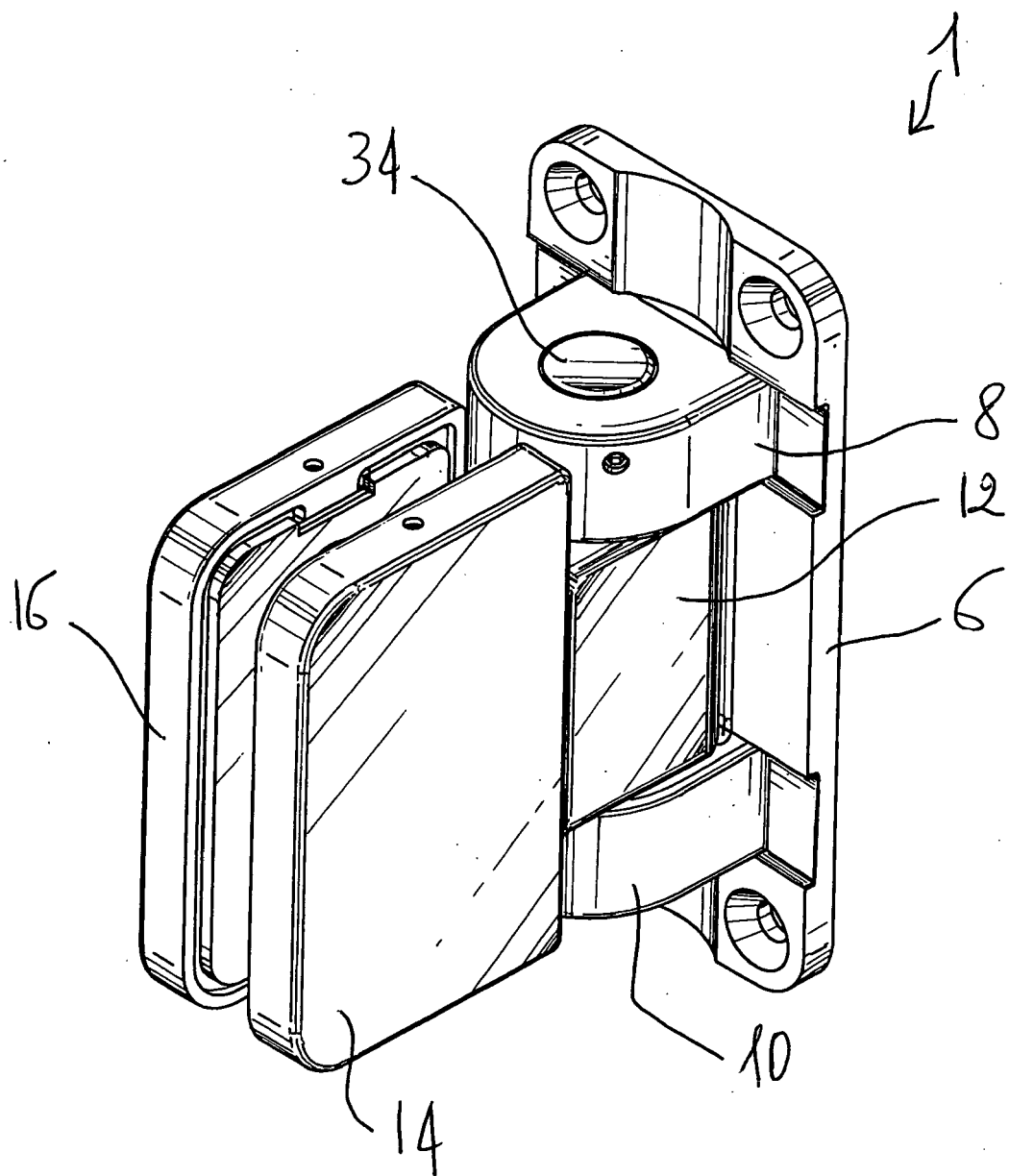
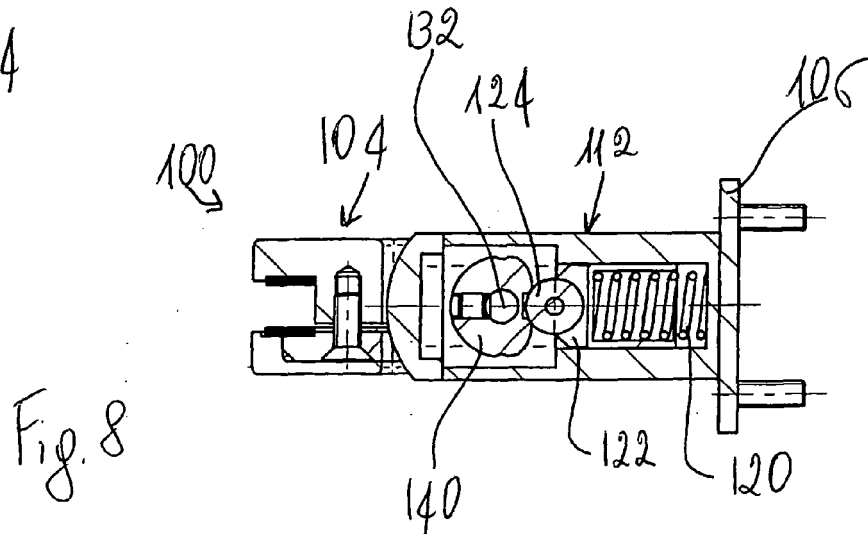
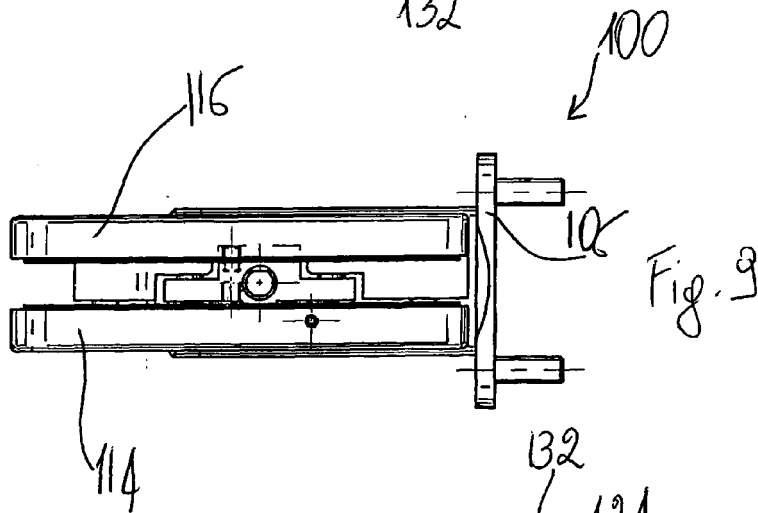
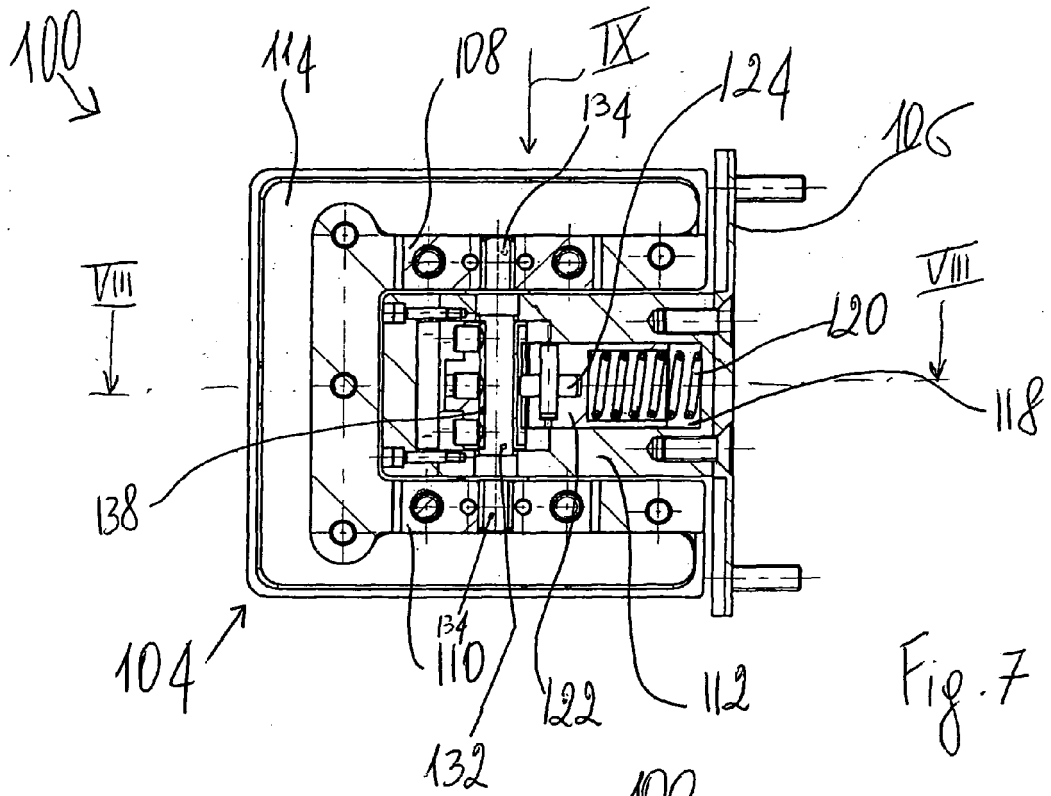


Fig. 6



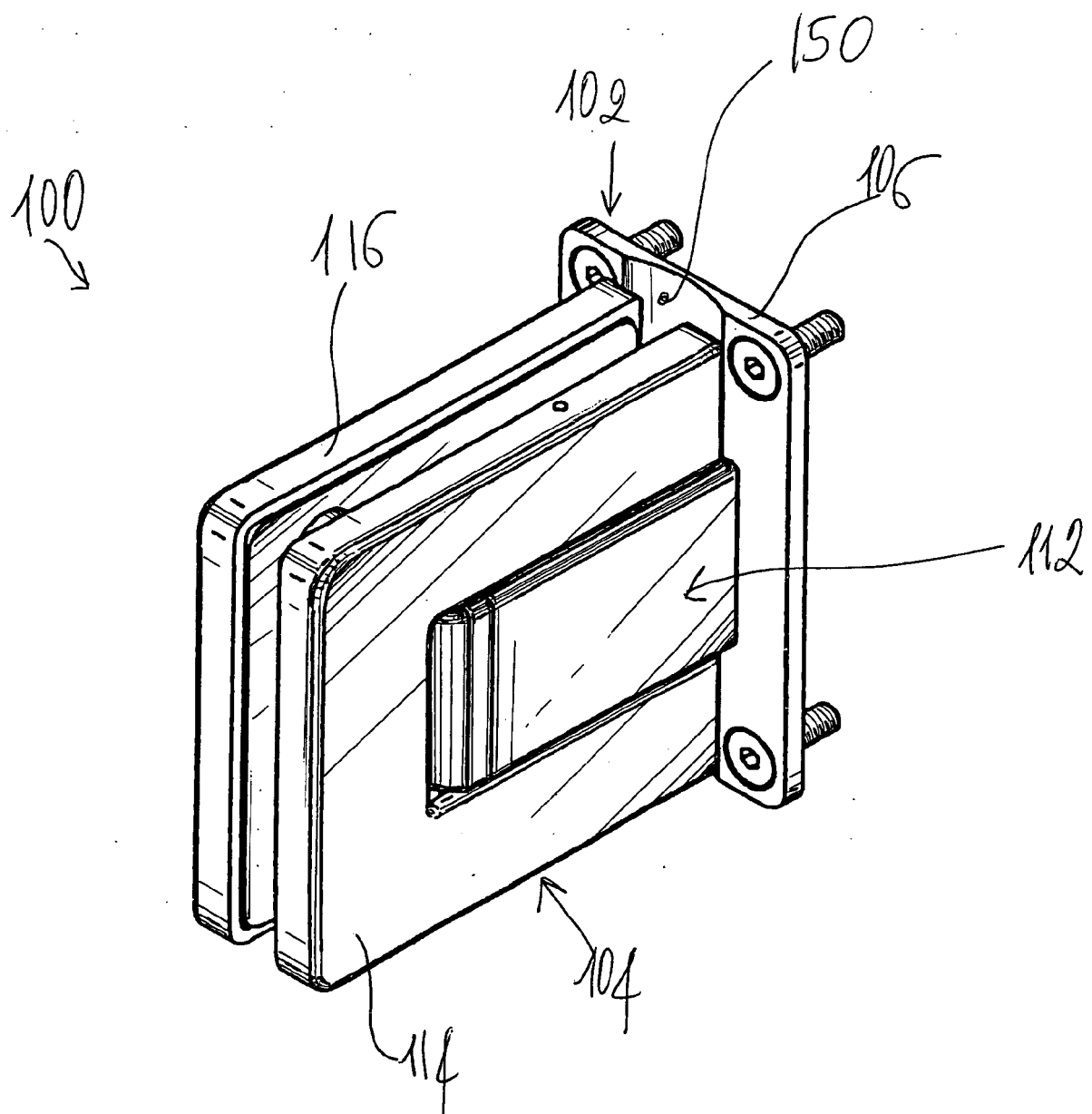


Fig. 10



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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2004/206007 A1 (CHIANG FANNY) 21 October 2004 (2004-10-21)	1-3, 5-13,17	E05D5/02 E05D5/10 E05D11/10
Y	* paragraph [0033] - paragraph [0042] *	4	
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A	* column 4, line 21 - line 48 * * column 7, line 14 - column 8, line 5 * * figures *	1-3,5,9, 14-17	
X	----- US 2005/120632 A1 (CHIANG FANNY) 9 June 2005 (2005-06-09)	1-3,9,17	
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A	----- US 5 765 263 A (BOLINAS ET AL) 16 June 1998 (1998-06-16)	4	TECHNICAL FIELDS SEARCHED (IPC) E05D
	* column 8, line 12 - line 16 * * column 8, line 35 - line 52 * * figures *		
A	----- DE 17 08 409 B1 (SIEGAS METALLWARENFAB) 7 October 1971 (1971-10-07)	4	
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	* column 1, line 48 - line 50 *		
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		20 February 2006	Van Kessel, J
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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