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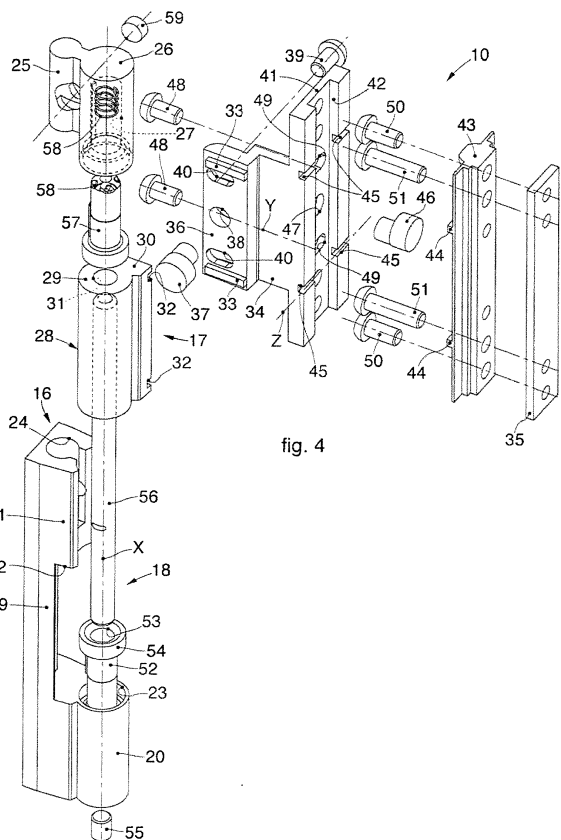
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(54) **HINGE FOR DOORS OR WINDOWS MADE WITH FRAME PROFILES**

(57) A hinge (10) for doors or windows (11) made using section bar elements (13, 15) to hinge a mobile element (12) of the door or window (11) with respect to a fixed structural element (14) of the door or window (11). The hinge (10) comprises a first hinging unit (16) configured to be attached to the fixed structural element (14), a second hinging unit (17) configured to be attached to the mobile element (12), and a pivoting member configured to articulate the two hinging units (16, 17) with respect to each other along a pivoting axis (X). The hinge (10) is also provided with adjustment means that allow to selectively move the mobile element (12) of the door or window (11) with respect to the fixed structural element (14) parallel to the pivoting axis (X) and in two directions perpendicular with respect both to each other and also to the pivoting axis (X).



Description

FIELD OF THE INVENTION

[0001] The present invention concerns a hinge for doors or windows made using section bar elements, for example made of metal such as aluminum or iron, or plastic material, such as for example PVC, to hinge to each other a mobile element of the door or window, or a panel, with respect to a fixed structural element, like the frame of the door or window. The hinge according to the present invention is provided with adjustment means that allow, during use, to adjust the position of the mobile element with respect to the fixed structural element in three directions, perpendicular to each other.

BACKGROUND OF THE INVENTION

[0002] In the field of doors or windows made with section bars, for example made of metal, such as aluminum or steel, or plastic material, such as for example PVC, different types of hinges are known, normally consisting of two hinging units, one of which is configured to be attached to the fixed frame of the door or window, while the other is configured to be attached to the mobile element of the door or window. A pivoting member connects the two hinging units to each other, to articulate them with respect to each other along a single hinging axis.

[0003] It is known that in hinges for doors or windows made using section bar elements, at least the hinging unit to be associated with the mobile element of the door or window must be configured so that it can be located, in the closed position, in the narrow space between the mobile element and the corresponding fixed frame of the door or window.

[0004] From the German patent publication DE-B3-102010017628, a hinge for doors or windows made using section bar elements is known, in which three adjustments are possible of the two hinging units along three axes perpendicular to each other, substantially as provided in the preamble to claim 1.

[0005] From the present Applicant's European patent application EP-A-2735679, a hinge is known that provides the possibility of adjusting the reciprocal position of the two hinging units along three axes perpendicular to each other, even if this known hinge cannot be used for doors or windows made with section bar elements.

[0006] One purpose of the present invention is to obtain a hinge for doors or windows made using section bar elements which is simple, efficient and inexpensive, and which at the same time allows easy and rapid assembly of the elements of the door or window on which it is installed.

[0007] Another purpose of the present invention is to obtain a hinge for doors or windows made using section bar elements which is also provided with adjustment means that allow to selectively adjust, during use, the position of the mobile element with respect to the corre-

sponding fixed structural element in three directions, each perpendicular with respect to the other two, and so that each adjustment can be carried out simply, continuously and rapidly, without needing to dis-assemble either the mobile element from the fixed structural element or the different components of the hinge.

[0008] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0009] The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0010] In accordance with the above purposes, a hinge according to the present invention for doors or windows made using section bar elements, and in particular to hinge a mobile element of the door or window with respect to a fixed structural element of the door or window, comprises a first hinging unit configured to be attached to the fixed structural element, a second hinging unit configured to be attached to the mobile element, a pivoting member configured to articulate the two hinging units with respect to each other along a pivoting axis, and first adjustment means configured to selectively move the second hinging unit with respect to the first hinging unit parallel to the pivoting axis. Moreover, the hinge comprises second adjustment means configured to selectively move the mobile element with respect to the fixed structural element in a first direction perpendicular to the pivoting axis and third adjustment means configured to selectively move the mobile element with respect to the fixed structural element in a second direction perpendicular both to the pivoting axis and also to the first direction.

[0011] In accordance with a first characteristic aspect of the present invention, the second hinging unit of the hinge comprises a pivoting element pivoted on the pivoting member and a connection element interposed between the pivoting element and the mobile element, wherein the connection element comprises a substantially L-shaped plate. Moreover, the pivoting element comprises at least one part with a substantially parallelepiped shape and the connection element comprises a first part facing the external surface of said part of the pivoting element and provided with first sliding means, for example consisting of blocks, sliding in corresponding first guide means, for example consisting of grooves, present in said part of the pivoting element and parallel to the first direction. Moreover, the connection element also comprises a second part, perpendicular to the corresponding first part and provided with a central groove, parallel to the pivoting axis and in which an intermediate element is disposed sliding, configured to be attached, during use, to the mobile element.

[0012] In accordance with another characteristic as-

pect of the present invention, the second adjustment means comprise a first eccentric element configured to cause the selective movement of the connection element with respect to the pivoting element in the first direction.

[0013] In accordance with another characteristic aspect of the present invention, the intermediate element is provided with second sliding means, for example consisting of blocks, disposed in a second direction, perpendicular both to the pivoting axis and also to the first direction, and sliding in corresponding second guide means, for example consisting of grooves, present in the second part of the connection element.

[0014] In accordance with another characteristic aspect of the present invention, the third adjustment means comprise a second eccentric element configured to cause the selective movement of the connection element with respect to the intermediate element in the second direction.

[0015] In accordance with another characteristic aspect of the present invention, the first hinging unit comprises a support element, substantially C-shaped and provided with a lower protuberance, an upper protuberance and a central niche.

[0016] In accordance with another characteristic aspect of the present invention, the lower protuberance is provided with a cylindrical cavity coaxial to the pivoting axis and in which the pivoting member is suitable to be inserted, and the upper protuberance is provided with a cavity parallel to the pivoting axis and slightly distant from it, into which a guide appendix of a closing element provided with an axial cylindrical cavity, is suitable to be inserted slidingly, which, during use, is coaxial to the pivoting axis.

BRIEF DESCRIPTION OF THE DRAWINGS

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

- fig. 1 is a first three-dimensional view of a hinge according to the present invention, shown installed in a door or window made with section bar elements and in a closed position;
- fig. 2 is a second three-dimensional view, from another angle, of the hinge in fig. 1 in a closed position;
- fig. 3 is a view from above of the hinge in fig. 1, in a closed position, with the section bar elements of the door or window on which it is mounted highlighted by hatching;
- fig. 4 is an exploded view of the disassembled components of the hinge in fig. 1;
- fig. 5 is a section view from V to V in fig. 3;
- fig. 6 is a third three-dimensional view of the hinge in fig. 1 in an open position, with the adjustment means in a first operating position;

- fig. 7 is a fourth three-dimensional view of the hinge in fig. 6 with the adjustment means in a second operating position;
- fig. 8 is a fifth three-dimensional view of the hinge in fig. 6 with the adjustment means in a third operating position;
- fig. 9 is a sixth three-dimensional view of the hinge in fig. 6 with the adjustment means in a fourth operating position.

[0018] It is clear that in the present description the terms horizontal, vertical, upward, downward, upper, lower, right and left, with their variations, have the sole function of illustrating the present invention better, with reference to the attached drawings, and must in no way be used to limit the scope or use thereof.

DETAILED DESCRIPTION OF ONE EMBODIMENT OF THE PRESENT INVENTION

[0019] With reference to fig. 1, a hinge 10 according to the present invention is shown installed on a door or window 11 to hinge a mobile element 12, which can be for example a door, a window or a panel, made with section bar elements 13, with respect to a fixed structural element 14, which can be for example the frame of the door or window 11 made with section bar elements 15. The section bar elements 13 and 15 can be made of aluminum for example, or other metal, or plastic material, such as PVC for example.

[0020] The hinge 10 comprises two hinging units 16 and 17, disposed coaxial to each other along a pivoting axis X, for example vertical, and a pivoting member 18 (fig. 4) configured to articulate the two hinging units 16 and 17 with respect to each other, as will be described hereafter in detail.

[0021] In particular, the first hinging unit 16 comprises a support element 19, substantially C-shaped and provided with a lower protuberance 20, an upper protuberance 21 and a central niche 22.

[0022] The lower protuberance 20 is provided with a cylindrical cavity 23, coaxial to the pivoting axis X, while the upper protuberance 21 is provided with a cavity 24 parallel to the pivoting axis X and slightly distant from it. In the cavity 24 a guide appendix 25 of a closing element 26 is suitable to be inserted slidingly, the closing element being provided with a cylindrical axial cavity 27 which, during use, is coaxial to the pivoting axis X.

[0023] The second hinging unit 17 comprises a pivoting element 28 having a first part 29, substantially cylindrical in shape, and a second part 30, substantially shaped like a parallelepiped. The first part 29 of the pivoting element 28 is provided with a through axial hole 31 and is configured to be disposed, during use, in the central niche 22 of the first hinging unit 16, coaxial to the pivoting axis X.

[0024] The second part 30 of the pivoting element 28 is provided with two first grooves 32 disposed in a first direction Y perpendicular to the pivoting axis X and in

which two corresponding first blocks 33 of a connection element 34 are slidingly inserted, the connection element 34 being disposed between the second part 30 of the pivoting element 28 and a plate 35 which, during use, is attached to the mobile element 12 of the door or window 11.

[0025] The connection element 34, to be able to be disposed adequately between the fixed structural element 14 and the mobile element 12, especially when the latter is in the closed position, consists of a metal plate, with a thickness comprised for example between about 1 mm and about 6 mm, and is substantially L-shaped.

[0026] In particular, the connection element 34 comprises a first part 36 facing the external surface of the second part 30 of the pivoting element 28 and provided with the two first blocks 33.

[0027] A first eccentric element 37, of a known type, is interposed between the first part 36 of the connection element 34 and the second part 30 of the pivoting element 28, and is partly housed in a through hole 38 of the first part 36 of the connection element 34. The selective rotation of the first eccentric element 37 causes the displacement of the connection element 34 and of the mobile element 12 associated with it, in a first direction Y.

[0028] Two first clamping screws 39 inserted in two corresponding eyelets 40 of the first part 36 of the connection element 34 are suitable to clamp the latter in the desired position.

[0029] Furthermore, the connection element 34 comprises a second part 41, perpendicular to the first part 36 and parallel to the plate 35. The second part 41 comprises a central groove 42, parallel to the pivoting axis X and in which an intermediate element 43 is slidingly disposed, interposed between the second part 41 and the plate 35.

[0030] The intermediate element 43 is provided with two second blocks 44, disposed in a second direction Z, perpendicular both to the pivoting axis X and also to the first direction Y, and sliding in two corresponding pairs of second grooves 45 made in the second part 41 of the connection element 34.

[0031] A second eccentric element 46, of a known type, is interposed between the second part 41 of the connection element 34 and the intermediate element 43, and is partly housed in a through hole 47 of the second part 41 of the connection element 34. The selective rotation of the second eccentric element 46 causes the displacement of the intermediate element 43 and of the mobile element 12 associated with it, in the second direction Z.

[0032] Two second clamping screws 48 inserted in two corresponding eyelets 49 of the second part 41 of the connection element 34 are suitable to clamp the intermediate element 43 with respect to the connection element 34 in the desired position.

[0033] Third clamping screws 50 are suitable to clamp the intermediate element 43 on the plate 35 and fourth clamping screws 51 are suitable to clamp the intermediate element 43 and the plate 35 on the mobile element 12 of the door or window 11.

[0034] The pivoting member 18 comprises a first cylindrical bushing 52 inserted in the cylindrical cavity 23 of the lower protuberance 20 and having a cylindrical seating 53 coaxial to the pivoting axis X, and an upper collar 54, which has an external diameter a little less than the internal diameter of the cylindrical cavity 23 and on which the lower part of the pivoting element 28 of the second hinging unit 17 rests. The first cylindrical bushing 52 is axially mobile, together with the pivoting element 28, by means of a lower threaded grub screw 55.

[0035] The pivoting member 18 also comprises a pin 56 having its lower part inserted into the cylindrical seating 53 of the first cylindrical bushing 52, the central part inserted into the through axial hole 31 of the block 28 and the upper part inserted in a second cylindrical bushing 57 which in turn is inserted in the cylindrical axial cavity 27 of the closing element 26. Inside the cylindrical axial cavity 27 an elastic element 58 is disposed, which in the example supplied here is a helical spring, which constantly thrusts downward the second cylindrical bushing 57, the pin 56 and the first cylindrical bushing 52.

[0036] When the pivoting member 18 is assembled, a fifth clamping screw 59 is suitable to keep the closing element 26 clamped in the corresponding cavity 24 of the upper protuberance 21, so that the pin 56 is coaxial to the pivoting axis X and so that the second hinging unit 17 and the mobile element 12 associated with it can rotate freely with respect to the first hinging unit 16 and the fixed structural element 14 to which the latter is attached.

[0037] The adjustment of the hinge 10 and hence of the mobile element 12 with respect to the fixed structural element 14 of the door or window 11 is obtained as follows, simply and functionally, without needing to disassemble the mobile element 12 from the fixed structural element 14.

[0038] A first adjustment along the pivoting axis X, which in the example shown here is vertical, is obtained simply by selectively screwing or unscrewing the lower threaded grub screw 55. In fact, screwing this displaces upward the pivoting member 18 and the associated second hinging unit 17, and also the mobile element 12, with respect to the first hinging unit 16 and the fixed structural element 14.

[0039] A second adjustment in the first direction Y (figs. 4, 6 and 7), which in the example shown here is horizontal, is obtained by loosening the two first clamping screws 39, by rotating the first eccentric element 37 clockwise or anti-clockwise, which causes the lateral displacement to the right or to the left of the connection element 34 with respect to the pivoting element 28, and the new clamping in the desired position, by screwing the first clamping screws 39.

[0040] A third adjustment in the second direction Z (figs. 4, 8 and 9), which in the example shown here is also horizontal, but perpendicular to the first direction Y, is obtained by loosening the two second clamping screws 48, by rotating the second eccentric element 46 clockwise or anti-clockwise, which causes the lateral displace-

ment to the right or to the left of the intermediate element 43 and the plate 35, and also of the mobile element 12 with respect to the connection element 34, and the new clamping in the desired position, by screwing the second clamping screws 48.

[0041] It is clear that each of the three adjustments described above can be carried out alone, in a pair or with any of the other two and/or in any order, depending on needs.

[0042] From the above description it is therefore clear that the hinge 10 comprises first adjustment means, consisting of the lower threaded grub screw 55, able to adjust the position of the second hinging unit 17 and the mobile element 12 in the direction of the pivoting axis X, second adjustment means consisting of the first eccentric element 37, able to adjust the position of the mobile element 12 in the first direction Y, perpendicular to the pivoting axis X, and third adjustment means consisting of the second eccentric element 46, able to adjust the position of the mobile element 12 in the second direction Z, perpendicular both to the pivoting axis X and also to the first direction Y.

[0043] It is also clear that modifications and/or additions of parts may be made to the hinge 10 as described heretofore, without departing from the field and scope of the present invention.

[0044] It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of hinge, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

1. Hinge for doors or windows (11) made using section bar elements (13, 15) to hinge a mobile element (12) of the door or window (11) with respect to a fixed structural element (14) of the door or window (11), comprising a first hinging unit (16) configured to be attached to said fixed structural element (14), a second hinging unit (17) configured to be attached to said mobile element (12), a pivoting member (18) configured to articulate said two hinging units (16, 17) with respect to each other along a pivoting axis (X), first adjustment means (55) configured to selectively move said second hinging unit (17) with respect to said first hinging unit (16) parallel to said pivoting axis (X), second adjustment means (37) configured to selectively move said mobile element (12) with respect to said fixed structural element (14) in a first direction (Y) perpendicular to said pivoting axis (X), and third adjustment means (46) configured to selectively move said mobile element (12) with respect to said fixed structural element (14) in a second direction (Z) perpendicular both to said pivoting

axis (X) and also to said first direction (Y), **characterized in that** said second hinging unit (17) comprises a pivoting element (28) pivoted on said pivoting member (18) and a connection element (34) interposed between said pivoting element (28) and said mobile element (12), **in that** said connection element (34) comprises a substantially L-shaped plate, **in that** said pivoting element (28) comprises at least one part (30) with a substantially parallelepiped shape, **in that** said connection element (34) comprises a first part (36) facing the external surface of said at least one part (30) of said pivoting element (28) and provided with first sliding means (33) sliding in corresponding first guide means (32) present in said at least one part (30) of said pivoting element (28) and parallel to said first direction (Y), **and in that** said connection element (34) also comprises a second part (41), perpendicular to said first part (36) and provided with a central groove (42), parallel to said pivoting axis (X) and in which an intermediate element (43) is disposed sliding, configured to be attached, during use, to said mobile element (12).

2. Hinge as in claim 1, **characterized in that** said plate has a thickness comprised between about 1 mm and about 6 mm.
3. Hinge as in claim 1 or 2, **characterized in that** said second adjustment means comprise a first eccentric element (37) configured to cause the selective movement of said connection element (34) with respect to said pivoting element (28) in said first direction (Y).
4. Hinge as in any claim hereinbefore, **characterized in that** said intermediate element (43) is provided with second sliding means (44) disposed in a second direction (Z), perpendicular both to said pivoting axis (X) and also to said first direction (Y), and sliding in corresponding second guide means (45) present in said second part (41) of said connection element (34).
5. Hinge as in any claim hereinbefore, **characterized in that** said third adjustment means comprise a second eccentric element (46) configured to cause the selective movement of said connection element (34) with respect to said intermediate element (43) in said second direction (Z).
6. Hinge as in any claim hereinbefore, **characterized in that** said first hinging unit (16) comprises a support element (19), substantially C-shaped and provided with a lower protuberance (20), an upper protuberance (21) and a central niche (22).
7. Hinge as in claim 6, **characterized in that** said lower protuberance (20) is provided with a cylindrical cavity (23) coaxial to said pivoting axis (X) and in which

said pivoting member (18) is suitable to be inserted,
and in that said upper protuberance (21) is provided
with a cavity (24) parallel to said pivoting axis (X)
and slightly distant from it, into which a guide appen- 5
dix (25) of a closing element (26) provided with an
axial cylindrical cavity (27) is suitable to be inserted
slidingly, which, during use, is coaxial to said pivoting
axis (X).

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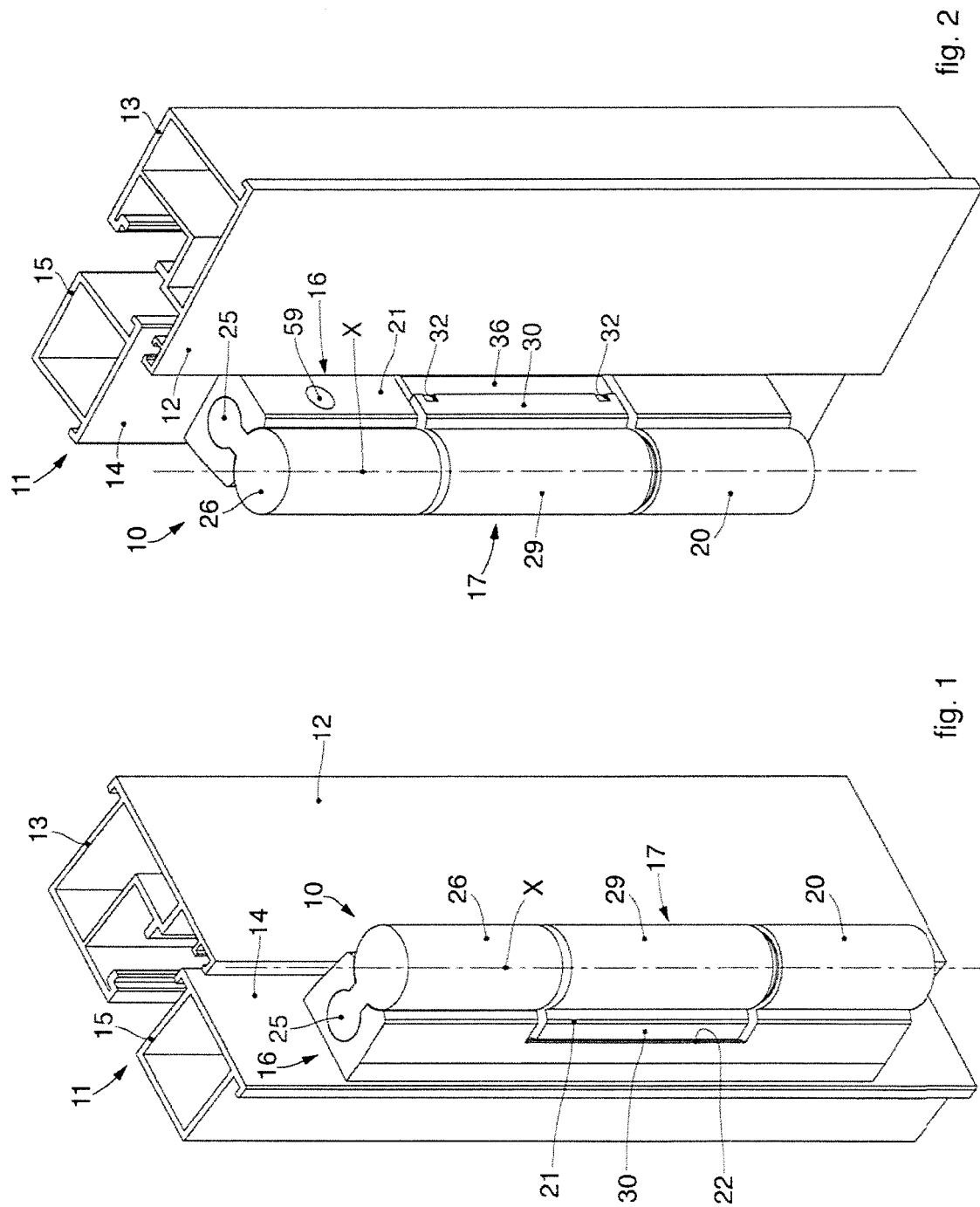
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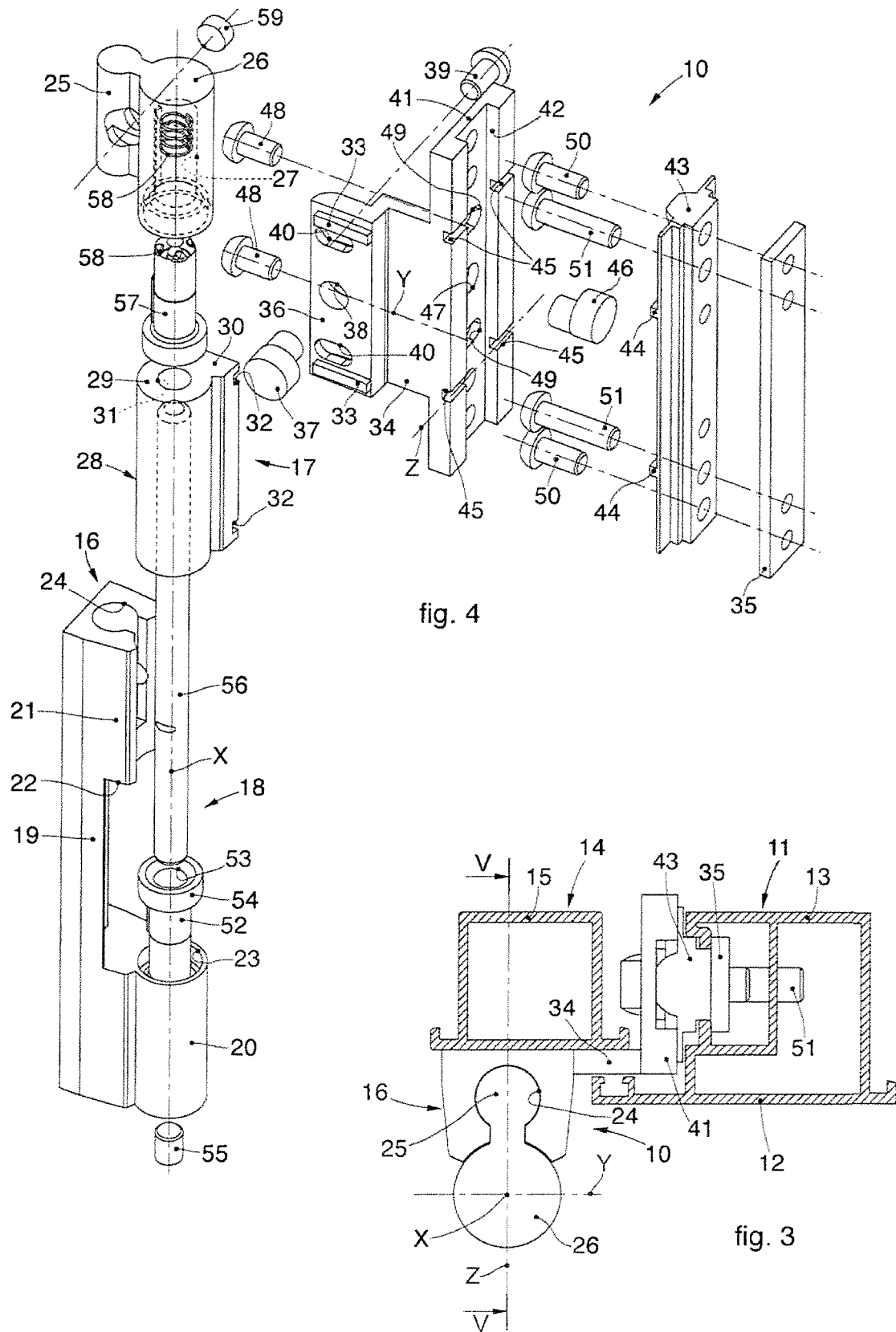
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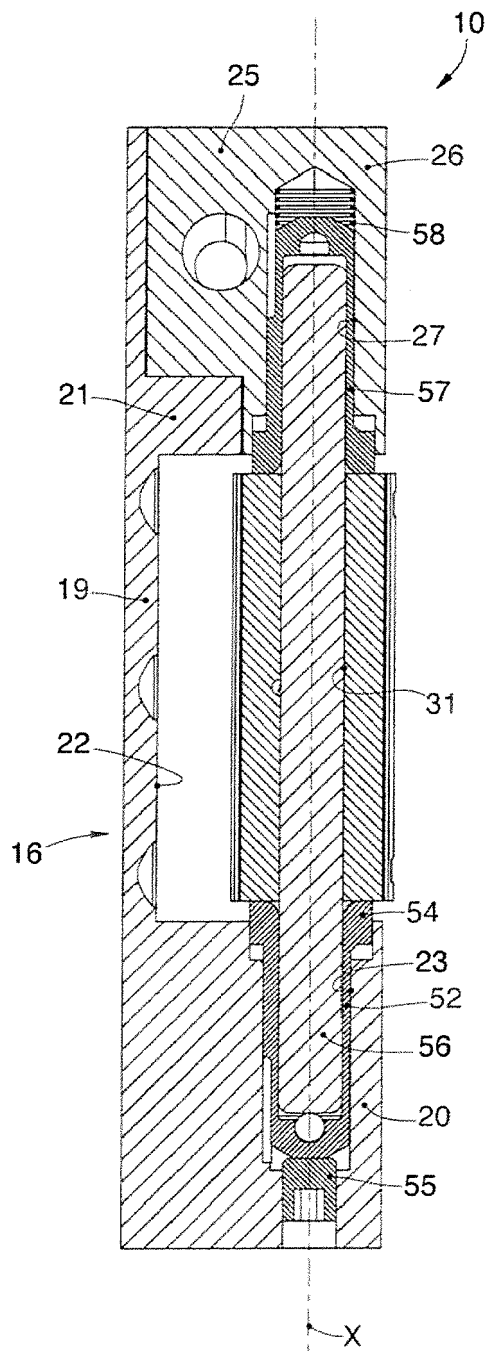


fig. 5

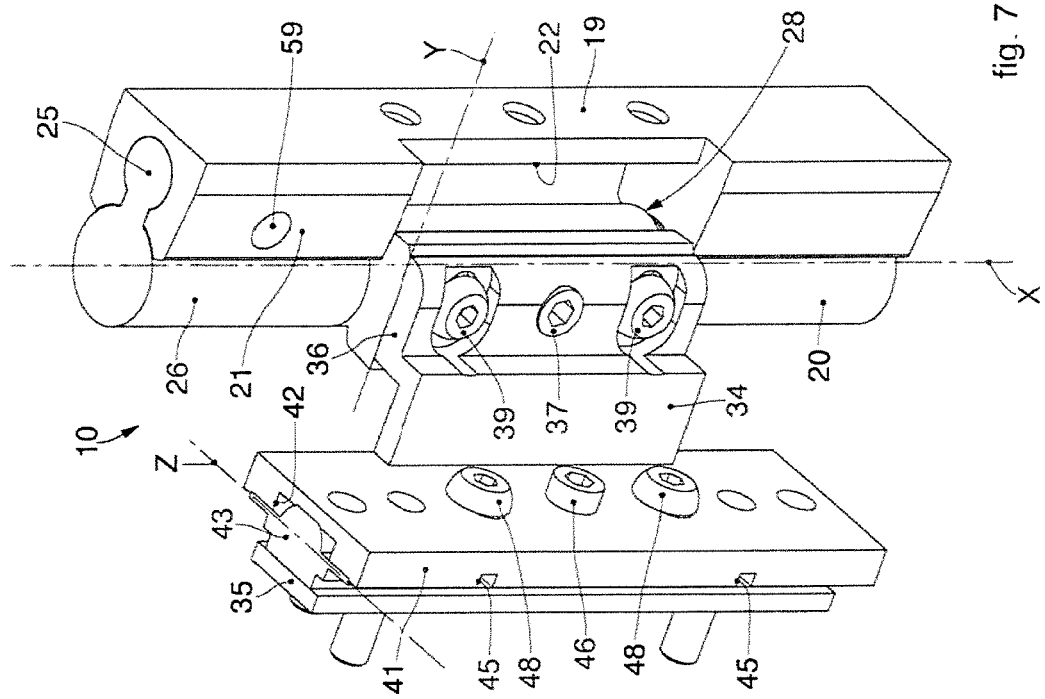


fig. 7

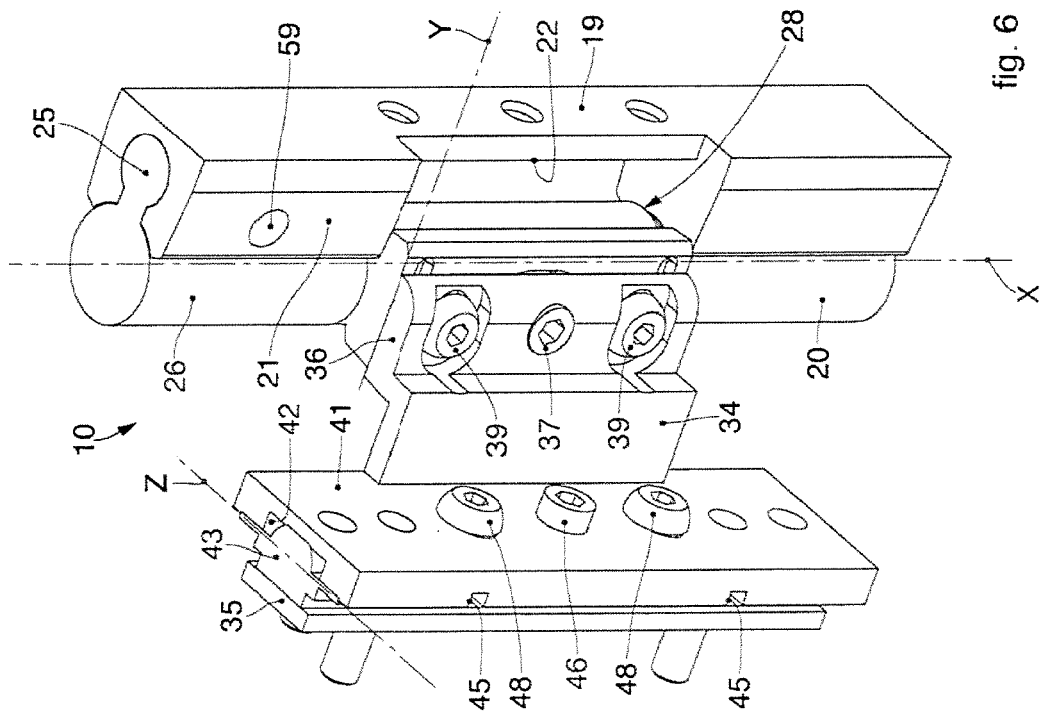
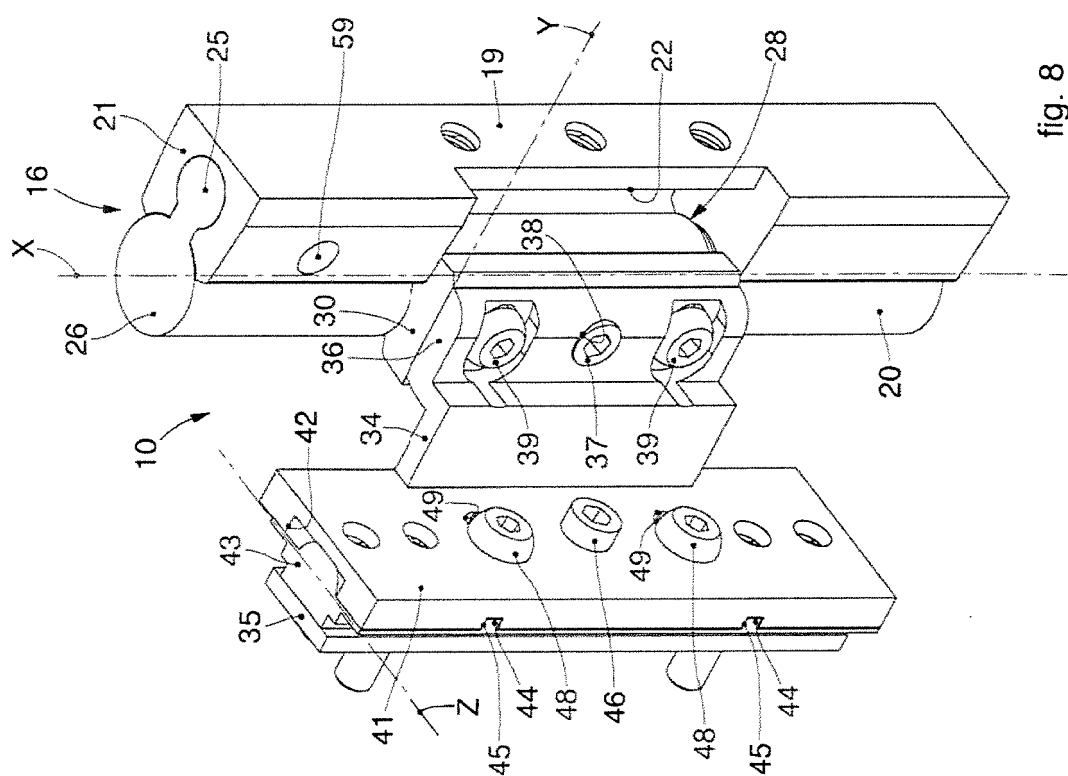
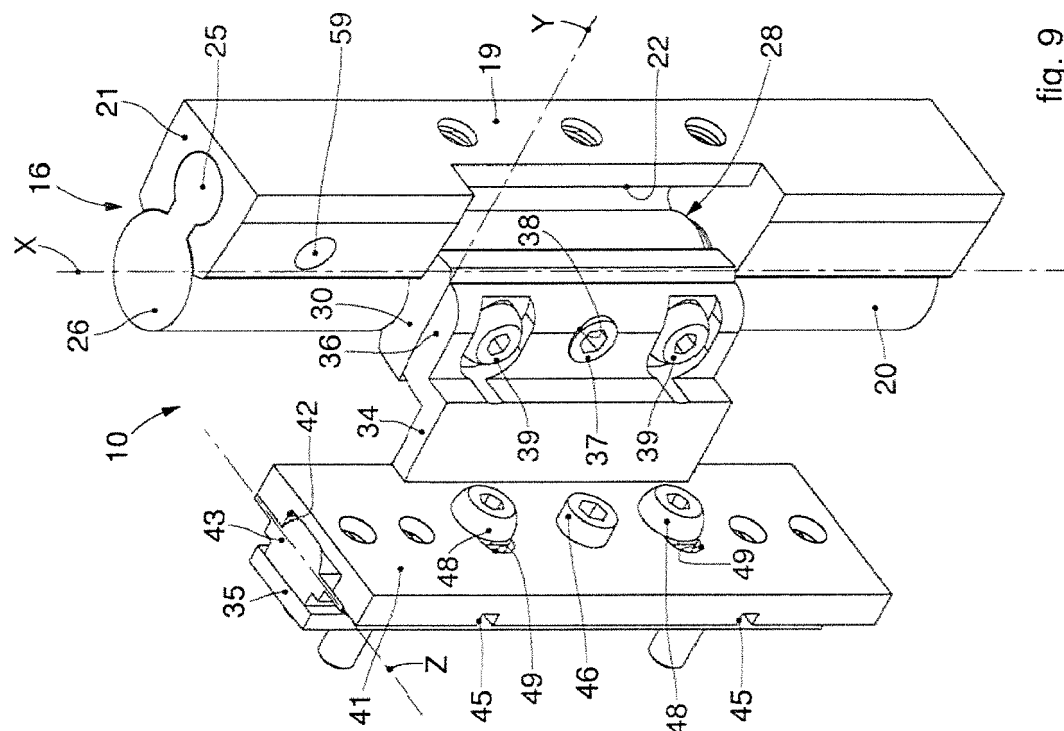


fig. 6



REFERENCES CITED IN THE DESCRIPTION

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