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(54) **3-D ADJUSTABLE HINGE FOR DOOR OR WINDOW**

(57) A hinge for mounting a door-panel or window sash to a frame is provided with enhanced security features. The hinge includes a frame part and a door or sash part connected by a hinge pin. The door or sash part includes a door or sash mounting plate and a door or sash side hinge barrel is connected to the door or sash mounting plate. The frame part includes a frame plate fixedly attached to a frame side hinge barrel, at least one lateral adjustment screw threadingly engaged in an opening in the frame plate, and a gasket pressure adjustment opening in the frame plate, as well as a frame part main block having a cavity that extends in from a first surface of the frame part main block for receiving the frame plate. Mounting holes extend from the first surface through a second, opposite surface of the frame part main block. Hinge adjustment screws and openings as well as locking screw openings. The locking screw openings are aligned with the mounting holes and receive locking screws to block access to the mounting screws after installation. In a closed position of the hinge, the door or sash mounting plate covers the third surface. This prevents access to the locking screws as well as the adjustments for lateral positioning and gasket pressure adjustment when the door or window sash is in a closed position.

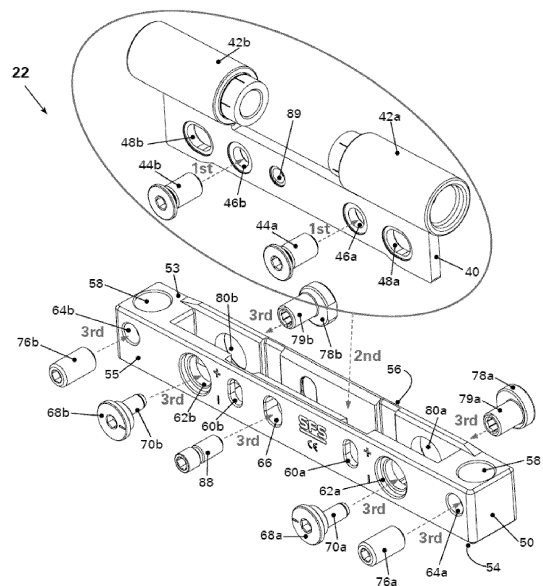


Fig. 4

Description

BACKGROUND

[0001] The present invention relates to a door or window hinge, and more particularly to a hinge used for a door or window of largely plastic construction, such as those formed from PVC, and which allows for adjustments in 3 directions.

[0002] Window sashes or doors made of plastic normally have a frame surrounding the sash or door panel and a jamb in which the frame fits. The frames of the window sashes and doors, as well as the frames that surround them are made of hollow plastic profiles, such as PVC, which may be reinforced with an internal metal hollow profile. It is desirable to form the parts that connect the hinge to be fastened to the door panel or window sash so that they are visible only as little as possible at the hinge knuckle where the hinge parts pivot relative to one another. It is also very important to avoid door/window gasket cutting during hinge installation because this compromises door/window thermal and acoustic insulation performance. Further, the hinge must allow for adjustment in all 3 directions in a simple and convenient manner such that a precise side-to-side and up-and-down alignment of the door panel or sash parallel to the corresponding frame can be achieved for proper positioning as well as an in-and-out adjustment for proper sealing.

[0003] US 8,413,299 discloses one known arrangement for a hinge for doors and windows that is particularly adapted for plastic doors and windows. However, there are certain drawbacks to this known hinge related to the safety features to prevent unauthorized disassembly of the hinge.

[0004] It would be desirable to provide hinge of the above-noted type that provides enhanced safety features within a low profile envelope area on both the door or window sash side as well as the frame side. It would also be desirable to provide for simplified installation and adjustment.

SUMMARY

[0005] A hinge for mounting a door-panel or window sash to a frame is provided that addresses the issues noted above. The hinge includes a frame part adapted to be fixed to the frame and a door or sash part adapted to be fixed to the door or sash. A hinge pin pivotally connects the frame part and the door or sash part together for movement about an axis relative to one another. The door or sash part includes a door or sash mounting plate and a door or sash side hinge barrel connected to the mounting plate. The frame part includes a frame plate fixedly attached to a frame side hinge barrel, at least one lateral adjustment screw threadingly engaged in an opening in the frame plate, and a gasket pressure adjustment opening in the frame plate. The frame part further in-

cludes a frame part main block having a cavity that extends in from a first surface of the frame part main block for receiving the frame plate and the at least one lateral adjustment screw. Mounting holes extend from the first surface through a second, opposite surface of the frame part main block, with the mounting holes having a larger diameter at the first surface. At least one lateral adjustment screw access opening extends from the third surface, which extends between the first and second surfaces, to the cavity and the at least one lateral adjustment screw opening is aligned with a corresponding one of the at least one lateral adjustment screw. A gasket pressure adjustment bush opening extends in from the third surface of the frame part main block in a position aligned with the gasket pressure adjustment opening in the frame plate. First locking screw openings are also located in the third surface in positions at least partially aligned with the mounting holes. A second locking screw opening is also provided in the third surface in a position to contact the frame plate to put it in tension after completing adjustments. A bush with an eccentric pin is provided and is located in the gasket pressure adjustment bush opening, and the eccentric pin is located in the gasket pressure adjustment opening in the frame plate to allow a gasket pressure adjustment between the frame plate and the frame part main block. A closing screw is located in the frame side hinge barrel that is adapted to adjust an axial position of the frame part relative to the door or sash part (hinge height adjustment). A hinge pin locking screw extends through the door or sash side hinge barrel and engages the hinge pin to prevent hinge pin removal and hinge disassembly when hinge is in a closed position. First locking screws are located in the locking screw openings that are adapted to block access to mounting screws used to attach the frame part to the frame. For security purposes, in a closed position of the hinge, the door or sash mounting plate covers the third surface. This prevents access to the first and second locking screws as well as the adjustments for lateral positioning and gasket pressure adjustment when the door or window sash is in a closed position since they are covered by the door or sash mounting plate.

[0006] In one embodiment, the frame plate includes a second frame side hinge barrel, spaced apart from the first frame side hinge barrel, and the door or sash side hinge barrel is located between the first and second frame side hinge barrels.

[0007] In one embodiment, the hinge further includes a counter bush located in a counter bush opening extending in from a fourth surface of the frame part main block, aligned with the gasket pressure adjustment bush in the third surface of the frame part main block, and the eccentric pin is supported by the counter bush.

[0008] In a preferred arrangement, there is a second gasket pressure adjustment bush opening in the third surface of the frame part main block and a second gasket pressure adjustment opening in the frame plate, and a second bush with a second eccentric pin is located in the

second gasket pressure adjustment bush opening and the eccentric pin is located in the second gasket pressure adjustment opening.

[0009] In one embodiment, the hinge further includes a second counter bush located in a second counter bush opening extending in from a fourth surface of the frame part main block, aligned with the second gasket pressure adjustment bush opening in the third surface of the frame part main block, and the second eccentric pin is supported by the second counter bush.

[0010] In one preferred arrangement, the at least one lateral adjustment screw comprises first and second lateral adjustment screws threadingly engaged in openings in the frame plate, and the at least one lateral adjustment screw opening comprises first and second lateral adjustment screw openings that are aligned with corresponding ones of the first and second lateral adjustment screws.

[0011] In one embodiment, the hinge further includes aesthetic caps that engage over the frame side hinge barrel(s) and the door or sash side hinge barrel.

[0012] In one preferred arrangement, the hinge further includes at least one, and preferably two, positioning pins on a second surface of the frame part main block.

[0013] In one embodiment, the hinge further includes at least one, and preferably two, door or sash positioning pins on the mounting flange.

[0014] Preferably, the first locking screws are locking grub screws.

[0015] In one preferred arrangement, the hinge includes a frame part locking screw extending in from the third surface that is adapted to lock the frame plate in a fixed position relative to the frame part main block.

[0016] For all of the arrangements contemplated, a same tool engagement recess is located in the head of the adjustment screws and locking screws. This same tool engagement recess can be, for example, a cross-slot, a Phillips®, hex, Torx® drive, a square drive, or any other suitable tool engagement recess.

BRIEF DESCRIPTION OF THE DRAWING(S)

[0017] The foregoing summary as well as the following detailed description will be best understood when read in conjunction with the appended drawings. In the drawings:

Figure 1 is a perspective view of a hinge in accordance with an embodiment of the invention.

Figure 2 is an exploded view of the hinge shown in Figure 1.

Figure 3 is an exploded view of the hinge shown in Figure 1 with an assembly sequence indicated.

Figure 4 is an exploded perspective view of the frame part for the hinge shown in Figure 1.

Figure 5 is a perspective view of the hinge shown in Figure 1 with the lateral adjustment screws being indicated for adjustment.

Figure 6A-6C show three different movements

based on the lateral adjustment screws.

Figure 7 is a perspective view of the hinge shown in Figure 1 with the gasket pressure adjustment cams being indicated.

Figures 8A-8C show different adjustments of the gasket pressure adjustment.

Figure 9 is a perspective view of the hinge shown in Figure 1, partially disassembled, showing a closing screw which adjusts an axial position of the door or sash part of the hinge relative to the frame part of the hinge (height adjustment).

Figures 10A-10C show different axial (height) adjustments using the closing screw.

Figure 11 is a perspective view of the hinge shown in Figure 1 with the frame part locking screw being indicated which locks a position of the frame plate relative to the frame part main block once adjusted.

Figure 12 is a perspective view showing locking screws installed in locking screw openings that block access to the mounting screws in the frame part.

Figure 13 is a cross-section view taken along line 13-13 in Figure 12 showing the locking screw in a position to block access to the mounting screw used to attach the hinge frame part to the frame.

Figure 14 is a perspective view of the hinge shown in Figure 1 showing the hinge pin locking screw being installed in order to engage and hold the hinge pin in position.

DETAILED DESCRIPTION

[0018] Certain terminology is used in the following description for convenience only and is not limiting. "Axially" refers to a direction along the axis of the hinge pin. A reference to a list of items that are cited as "at least one of a, b, or c" (where a, b, and c represent the items being listed) means any single one of the items a, b, or c, or combinations thereof. The terminology includes the words specifically noted above, derivatives thereof and words of similar import.

[0019] Referring to Figures 1-5, 6A-6C, 7, 8A-8C, 9, 10A-10C, and 11-14, a hinge 20 for mounting a door or window sash 12 to a frame 14 (both indicated in Figure 6A) is shown. The hinge 20 includes a frame part 22 that is adapted to be fixed to the frame 14 as well as a door or sash part 24 that is adapted to be fixed to the door or sash 12. A hinge pin 26 pivotally connects the frame part 22 and the door or sash part 24 together for movement about an axis relative to one another. As shown in detail in Figures 2 and 3, the hinge pin 26 includes a center groove 28 used for retention.

[0020] The hinge 20 is specifically adapted for use in connection with plastic door or window sashes and frames, formed for example from PVC, and provides a low profile protrusion of the hinge while allowing for 3-dimensional mechanical adjustments between the door or sash part 24 and frame part 22 in order to allow for proper centering of a door or window 12 in a frame 14

as well as proper sealing upon closing. All 3-dimensional adjustments are mechanical adjustments (they are made by screwing or unscrewing screw(s) or grub-screw(s)) and they are configured to always allow the use of the same tool, for example, the same Allen-key. Further, as explained in detail below, the hinge 20 also provides a number of security features.

[0021] As shown in Figures 1-3, the door or sash part 24 of the hinge 20 includes a door or sash mounting plate 30 having mounting holes 32 that are used for connection to the door or sash 12. A door or sash side hinge barrel 34 is connected to the door or sash mounting plate 30. This connection can be made by welding or brazing. Preferably, both the door or sash mounting plate 30 and the door or sash side hinge barrel 34 are formed of metal and may be stamped, machined, cast, or otherwise formed. As shown in Figures 2 and 3, a safety screw hole 36 is provided in the door or sash side hinge barrel 34.

[0022] Referring to Figures 2-4, the frame part 22 includes a frame plate 40 that is fixedly attached to a frame side hinge barrel 42A. Preferably, the frame plate 40 includes a second frame side hinge barrel 42B that is spaced apart from the first frame side hinge barrel 42A, and the door or sash side hinge barrel 34 is located between the first and second frame side hinge barrels 42A, 42B. At least one and preferably two lateral adjustment screws 44A, 44B, which are shown in detail in Figure 4, are threadingly engaged in openings 46A, 46B in the frame plate 40. A gasket pressure adjustment opening 48A and preferably two gasket pressure adjustment openings 48A, 48B are also provided in the frame plate 40, as shown in detail in Figure 4.

[0023] Preferably, the frame plate 40 as well as the frame side hinge barrels 42A, 42B are formed of metal and can be stamped or pressed from sheet metal, machined, cast, or otherwise formed. Bushings may be provided in hinge barrels 42A, 42B as well.

[0024] Still with reference to Figure 4, the frame part 22 further includes a frame part main block 50 which has a cavity 52 that extends in from a first surface 53 of the frame part main block 50 for receiving the frame plate 40 and the at least one lateral adjustment screw 44A and preferably both lateral adjustment screws 44A, 44B. As shown in Figure 4, preferably the frame part main block 50 also includes a second surface 54, opposite the first surface 53 as well as a third surface 55 that extends between the first and second surfaces 53, 54 on one side and a fourth surface 56 that extends between the first and second surfaces 53, 54 on the other side, opposite to the third surface 55. Preferably, the overall shape of the frame part main block 50 is a rectangular solid, with the first and second surfaces 53, 54 being parallel, and the third and fourth surfaces 55, 56 also being parallel, with the cavity 52 as well as various other openings, discussed below, being formed in the rectangular solid.

[0025] Frame part mounting holes 58 extend from the first surface 53 through a second opposite surface 54 of the frame part main block 50. These mounting holes 58

have a larger diameter of the first surface 53 than at the second surface 54 as can be seen from Figure 1 in comparison to Figure 4. This allows a screw head of the mounting screw 16 to be inserted through the mounting hole 58 in the first surface 53 and dropped into a recessed position, shown in detail in Figure 13, where the mounting screw head is retained and only the shank of the mounting screw 16 extends through the second surface 54 for connection to the frame 14.

[0026] Referring again to Figure 4, at least one lateral adjustment screw access opening 60A is provided extending through the third surface 55 to the cavity 52. The at least one lateral adjustment screw access opening 60A is aligned with a corresponding one of the at least one lateral adjustment screw 44A, 44B located in the frame plate 40. Preferably, there are first and second lateral adjustment screws 44A, 44B threadingly engaged in openings 46A, 46B in the frame plate 40, and there are corresponding first and second lateral adjustment screw access openings 60A, 60B that are aligned with the corresponding ones of the first and second lateral adjustment screws 44A, 44B in order to allow access for adjustment after the hinge 20 is installed.

[0027] Still with reference to Figure 4, a gasket pressure adjustment bush opening 62A extends in from the third surface 55 of the frame part main block 50 into the cavity 52 in a position aligned with the gasket pressure adjustment opening 48A in the frame plate 40. Preferably, a second gasket pressure adjustment bush opening 62B is also provided in the third surface 55 of the frame part main block 50 and extends into the cavity 52.

[0028] As shown in Figures 2-4, first locking screw openings 64A, 64B are located in the third surface 55 in positions at least partially aligned with the mounting holes 58, and a second locking screw opening 66 is provided in the third surface 55 in a position to contact the frame plate 40. Preferably, the second locking screw opening 66 is an access opening which allows access to a frame part locking screw 88 which is threadingly engaged in the frame plate 40 after assembly with the frame part main block 50 and is used to lock the frame plate 40 in a fixed position relative to the frame part main block 50 once all adjustments are made. The frame part locking screw 88 preferably engages in a hole 89 in the frame plate 40, shown in Figure 4.

[0029] Still with reference to Figure 4, a bush 68A with an eccentric pin 70A is located in the gasket pressure adjustment bush opening 62A and the eccentric pin 70A is located in the gasket pressure adjustment opening 48A to allow a gasket pressure adjustment between the frame plate 40 and the frame part main block 50. Preferably, a counter bush 78A is located in a counter bush opening 80A that extends in from the fourth surface 56 of the frame part main block 50 and is aligned with the gasket pressure adjustment bush opening 62A in the third surface 55 of the frame part main block 50. The eccentric pin 70A is supported by the counter bush 78A. As shown in detail in Figure 4, the counter bush 78A can include a

hollow eccentric pin 79A that receives the eccentric pin 70A of the bush 68A and the combination of the eccentric pin 70A and the hollow eccentric pin 79A form a cam surface which engages in the gasket pressure adjustment in the frame plate 40 in order to allow adjustment. In the preferred embodiment, a second gasket pressure adjustment bush opening 62B is provided in the third surface 55 of the frame part main block 50, spaced apart from the gasket pressure adjustment opening 48A and a second bush 68B with a second eccentric pin 70B is located in the second gasket pressure adjustment bush opening 62B. The second eccentric pin 70B is located in the second gasket pressure adjustment opening 48B of the frame plate 40. Further, as shown in Figure 4 preferably a second counter bush 78B is located in a second counter bush opening 80B that extends in from the fourth surface 56 of the frame part main block 50 and is aligned with the second gasket pressure adjustment bush opening 62B in the third surface 55. The second eccentric pin 70B is supported by the second counter bush 78B or preferably, by a second hollow eccentric pin 79B that extends from the second counter bush 78B, and the second eccentric pin 70B is engaged in the second hollow eccentric pin 79B which together form the cam surface that is engaged in the second gasket pressure adjustment opening 48B in the frame plate 40. Thus, the frame part 22 includes two gasket pressure adjustment elements provided by the bushes 68A, 68B which each include a tool engagement surface in order to allow for adjustment. The counter bushes 78A, 78B may optionally also include tool engagement surfaces.

[0030] Referring to Figures 3 and 9, a closing screw 72 is located in the frame side hinge barrel 42A, located at the bottom of the hinge 20 in the position of use. The closing screw 72 is adapted to adjust an axial position of the frame part 22 relative to the door sash part 24 by being tightened or loosened in order to move the door or sash part hinge barrel 34 up or down relative to the frame side hinge barrel 42A in the axial direction (hinge height adjustment).

[0031] As shown in detail in Figure 3, a hinge pin locking screw 74 extends through the doors or sash side hinge barrel 34 and engages the hinge pin 26, preferably in the groove 28, in order to lock the hinge pin 26 axially in position when the frame part 22 and door or sash part 24 are assembled.

[0032] As shown in Figure 4, first locking screws 76A, 76B are provided in the locking screw openings 64A, 64B that are adapted to block access to the mounting screws 16 used to attach the frame part 22 to the frame 14. See Figure 13.

[0033] As can be understood from a review of the Figures and in particular as shown in Figure 6A, in a closed position of the hinge 20, the door or sash mounting plate 30 covers the third surface 55 and thus blocks access to the first locking screws 76A, 76B, the lateral adjustment screws 44A, 44B, the gasket pressure adjustment bushes 68A, 68B, as well as the frame part locking screw 88.

This provides for enhanced safety in that access is only available to these elements when a door or sash 12 that is held to the frame 14 by the hinge 20 is in an open position. Accordingly, access through the door or window which could have previously been accomplished by hinge disassembly is prevented for doors or windows mounted using the present hinge 20.

[0034] Referring to Figures 1-3, in the preferred embodiment aesthetic caps 82A, 82B, 82C may engage over the frame side hinge barrels 42A, 42B as well as the door sash side hinge barrel 34. These are for aesthetic purposes only and provide for a cleaner overall appearance of the hinge 20.

[0035] As shown in Figures 1, 6A-6C and 8A-8C, at least one and preferably two positioning pins 84A, 84B are provided on the second surface 54 of the frame part main block 50. This acts as an assembly aid for positioning of the frame part main block 50 on the frame 14. Further, as shown in Figure 1, preferably positioning pins 86A, 86B are also provided on the door or sash mounting plate 30 for the door or sash part 24 which allow for positioning of the door or sash part 24 on a door or window sash 12 prior to installing the mounting screws 16.

[0036] Preferably, the first locking screws 76A, 76B are locking grub screws and may have a cross-slot, a Phillips®, hex, Torx® drive, a square drive, or any other suitable tool engagement recess located in the end of the screw shaft. Preferably, the same tool engagement recess is located in each of the adjustment screws as well as the locking screws that are used in order to allow for more convenient adjustment using a single tool.

[0037] Referring to Figures 5, 6A-6C, 7, 8A-8C, 9 and 10A-10C, the adjustment of the hinge 20 will be described. Referring to Figures 5 and 6A-6C, the lateral adjustment is made by adjusting the at least one and preferably both lateral adjustment screws 44A, 44B, which can be accessed through the lateral adjustment screw access opening(s) 60A, 60B. Figure 6A shows a nominal position of the hinge. Figure 6B shows the hinge having a lateral adjustment in the direction indicated as X to the left in the Figure while 6C shows a lateral adjustment in the direction indicated as X to the right in the Figure in order to properly laterally center the door or window sash 12 in the frame 14.

[0038] Figure 7 shows the gasket pressure adjustment via the gasket pressure adjustment bushes 68A, 68B which are used to move the door or sash mounting plate 30 in or out in the Z direction, indicated in Figures 8B and 8C relative to the frame part main block 50. This moves the door or window sash 12 in or out relative to the opening in the frame 14 so that more or less pressure can be applied by the gasket(s) for sealing the opening (see the arrangement of the door or window 12 relative to the opening in the frame 14 shown in Figure 6A).

[0039] Finally, as shown in Figs. 9 and 10A - 10C, an axial adjustment in the Y direction is achieved by removing the cap 82A from the frame side hinge barrel 42A and loosening or tightening the closing screw 72 in order to

shift the door or sash part 24 in the Y direction relative to the frame part 22. Figure 10A shows the hinge 20 with the frame part 22 and the door sash part 24 in a nominal axial position while Figure 10B shows the door or sash part 24 raised in the Y direction, corresponding to the axial direction and Figure 10C shows the door or sash part 24 lowered relative to the frame part 22.

[0040] Once all adjustments have been made to the position of the hinge 20 for proper positioning of the door or window 12 in the frame 14, the frame part locking screw 88 is tightened as shown in Figure 11, which locks the frame plate 40 in a fixed position relative to the frame part main block 50.

[0041] As shown in Figure 12, after mounting of the hinge 20, the first locking screws 76A, 76B are installed in the locking screw opening 64A, 64B and block access to the mounting screws 16. See also Figure 13.

[0042] Finally, as shown in Figure 14, the hinge pin locking screw 74 is tightened in order to lock the hinge pin 26 in position. This prevents the hinge pin 26 from being pressed out since the hinge pin locking screw 74 preferably engages into the center groove 28 of the hinge pin 26.

[0043] Using the hinge 20, even if the caps 82A, 82B that engage over the frame side hinge barrels 42A, 42B are removed, access for disassembly of the hinge for ill-intentioned purposes is prevented. The first locking screws 76A, 76B prevent access to the mounting screws 16 in the mounting holes 58 and the hinge pin locking screw 74 prevents the hinge pin 26 from being driven out. Further, as the door or sash part mounting plate 30 covers the third side 55 of the frame part main block 50, which includes all of the adjustment screws/bushes as well as the first locking screws 76A, 76B, security is greatly enhanced.

[0044] Having thus described various embodiments of the hinge in detail, it is to be appreciated and will be apparent to those skilled in the art that many physical changes, only a few of which are exemplified in the detailed description above, could be made in the apparatus without altering the inventive concepts and principles embodied therein. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore to be embraced therein.

Claims

1. A hinge for mounting a door or window sash to a frame, the hinge comprising:

a frame part adapted to be fixed to the frame;
a door or sash part adapted to be fixed to the door or sash;

a hinge pin that pivotally connects the frame part and the door or sash part together for movement about an axis relative to one another;
the door or sash part including:

a door or sash mounting plate; and
a door or sash side hinge barrel connected to the door or sash mounting plate;

the frame part including:

a frame plate fixedly attached to a frame side hinge barrel, at least one lateral adjustment screw threadingly engaged in an opening in the frame plate, and a gasket pressure adjustment opening in the frame plate;

a frame part main block including a cavity that extends in from a first surface of the frame part main block for receiving the frame plate and the at least one lateral adjustment screw, mounting holes that extend from the first surface through a second opposite surface of the frame part main block, the mounting holes having a larger diameter at the first surface, a third surface that connects the first and second surfaces, at least one lateral adjustment screw access opening extending through the third surface to the cavity, the at least one lateral adjustment screw opening being aligned with a corresponding one of the at least one lateral adjustment screw, a gasket pressure adjustment bush opening extending in from the third surface of the frame part main block in a position aligned with the gasket pressure adjustment opening in the frame plate, first locking screw openings in the third surface located in positions at least partially aligned with the mounting holes and a second locking screw opening in the third surface in a position to contact the frame plate;

a bush with an eccentric pin, the bush is located in the gasket pressure adjustment bush opening and the eccentric pin is located in the gasket pressure adjustment opening to allow a gasket pressure adjustment between the frame plate and the frame part main block;

a closing screw in the frame side hinge barrel that is adapted to adjust an axial position of the frame part relative to the door or sash part;

a hinge pin locking screw extending through the door or sash side hinge barrel and engages the hinge pin;

first locking screws in the locking screw openings that are adapted to block access to mounting screws used to attach the frame part to the

- frame; and
wherein in a closed position of the hinge, the door or sash mounting plate covers the third surface.
2. The hinge of claim 1, wherein the frame plate includes a second frame side hinge barrel, spaced apart from the first frame side hinge barrel, and the door or sash side hinge barrel is located between the first and second frame side hinge barrels. 10
 3. The hinge of claim 1, further comprising a counter bush located in a counter bush opening extending in from a fourth surface of the frame part main block, aligned with the gasket pressure adjustment bush opening in the third surface of the frame part main block, and the eccentric pin is supported by the counter bush. 15
 4. The hinge of claim 3, wherein there is a second gasket pressure adjustment bush opening in the third surface of the frame part main block and a second gasket pressure adjustment opening in the frame plate, and a second bush with a second eccentric pin is located in the second gasket pressure adjustment bush opening and the second eccentric pin is located in the second gasket pressure adjustment opening. 20 25
 5. The hinge of claim 4, further comprising a second counter bush located in a second counter bush opening extending in from the fourth surface of the frame part main block, aligned with the second gasket pressure adjustment bush opening in the third surface of the frame part main block, and the second eccentric pin is supported by the second counter bush. 30 35
 6. The hinge of claim 1, wherein the at least one lateral adjustment screw comprises first and second lateral adjustment screws threadingly engaged in openings in the frame plate, and the at least one lateral adjustment screw access opening comprises first and second lateral adjustment screw access openings that are aligned with corresponding ones of the first and second lateral adjustment screws. 40 45
 7. The hinge of claim 1, further comprising caps that engage over the frame side hinge barrel and the door or sash side hinge barrel. 50
 8. The hinge of claim 1, further comprising at least one positioning pin on a second surface of the frame part main block.
 9. The hinge of claim 1, further comprising at least one door or sash positioning pin on the door or sash mounting plate. 55
 10. The hinge of claim 1, wherein the first locking screws are locking grub screws.
 11. The hinge of claim 1, further comprising a frame part locking screw extending in from the third surface that is adapted to lock the frame plate in a fixed position relative to the frame part main block.

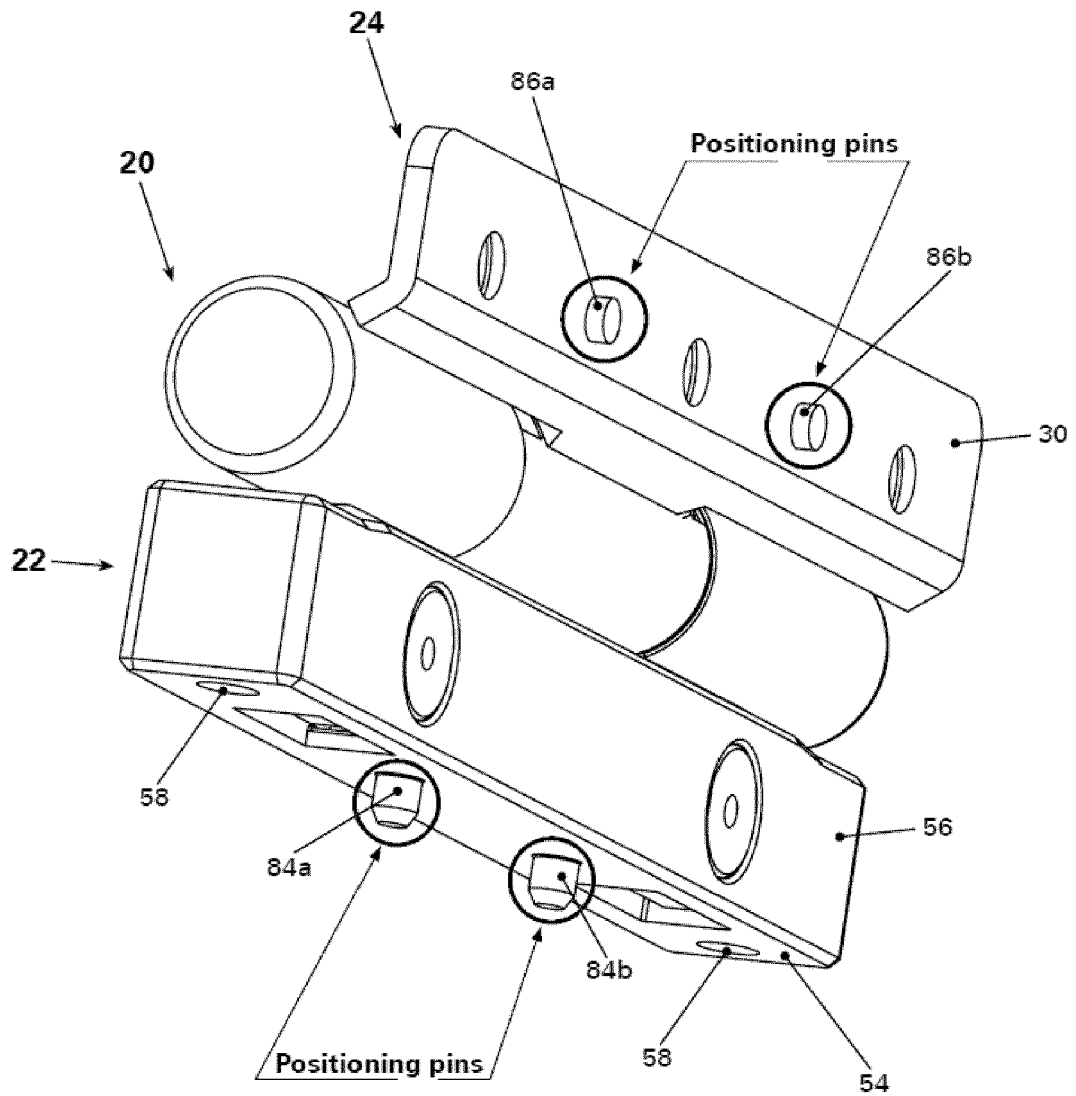


Fig. 1

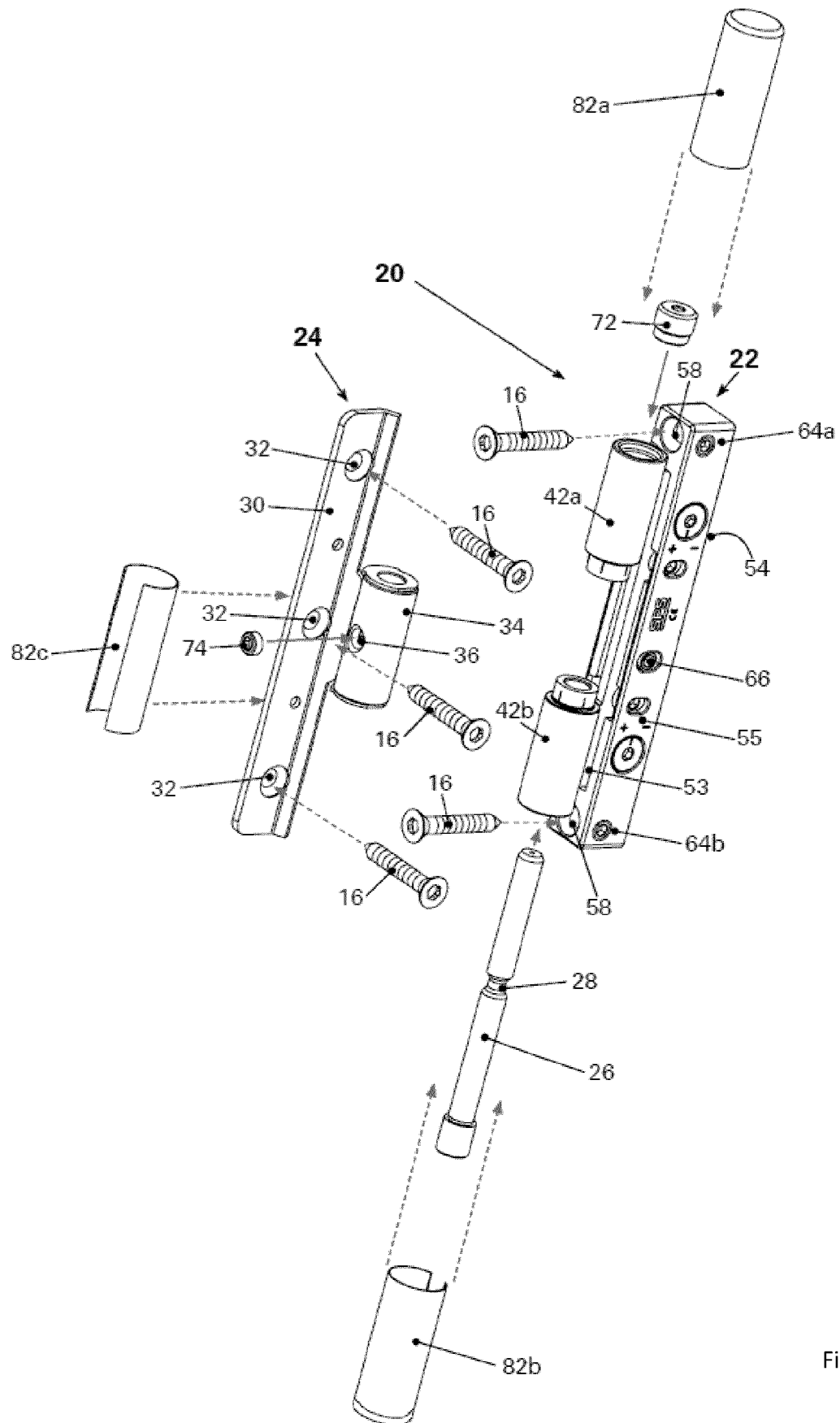


Fig. 2

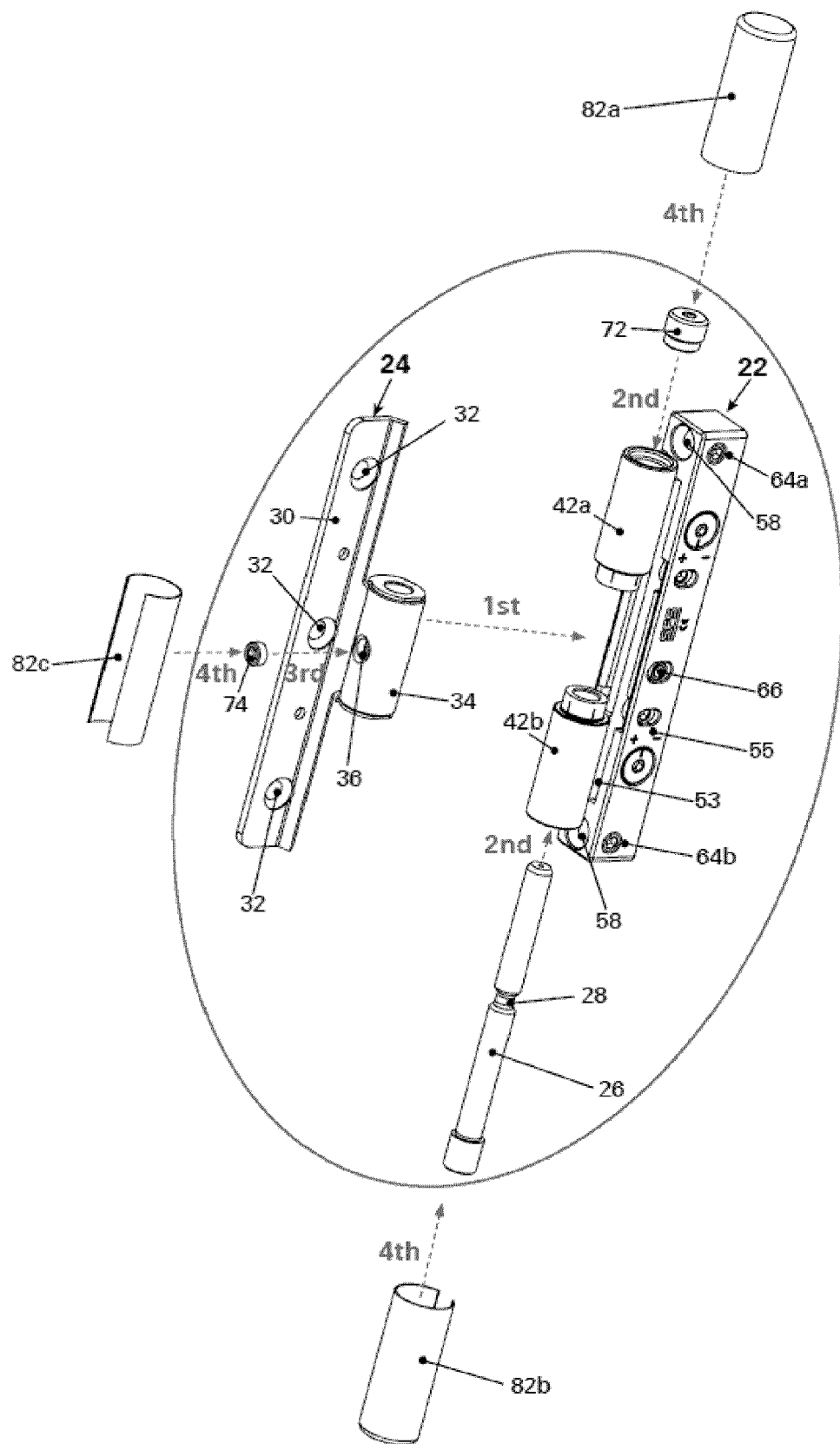


Fig. 3

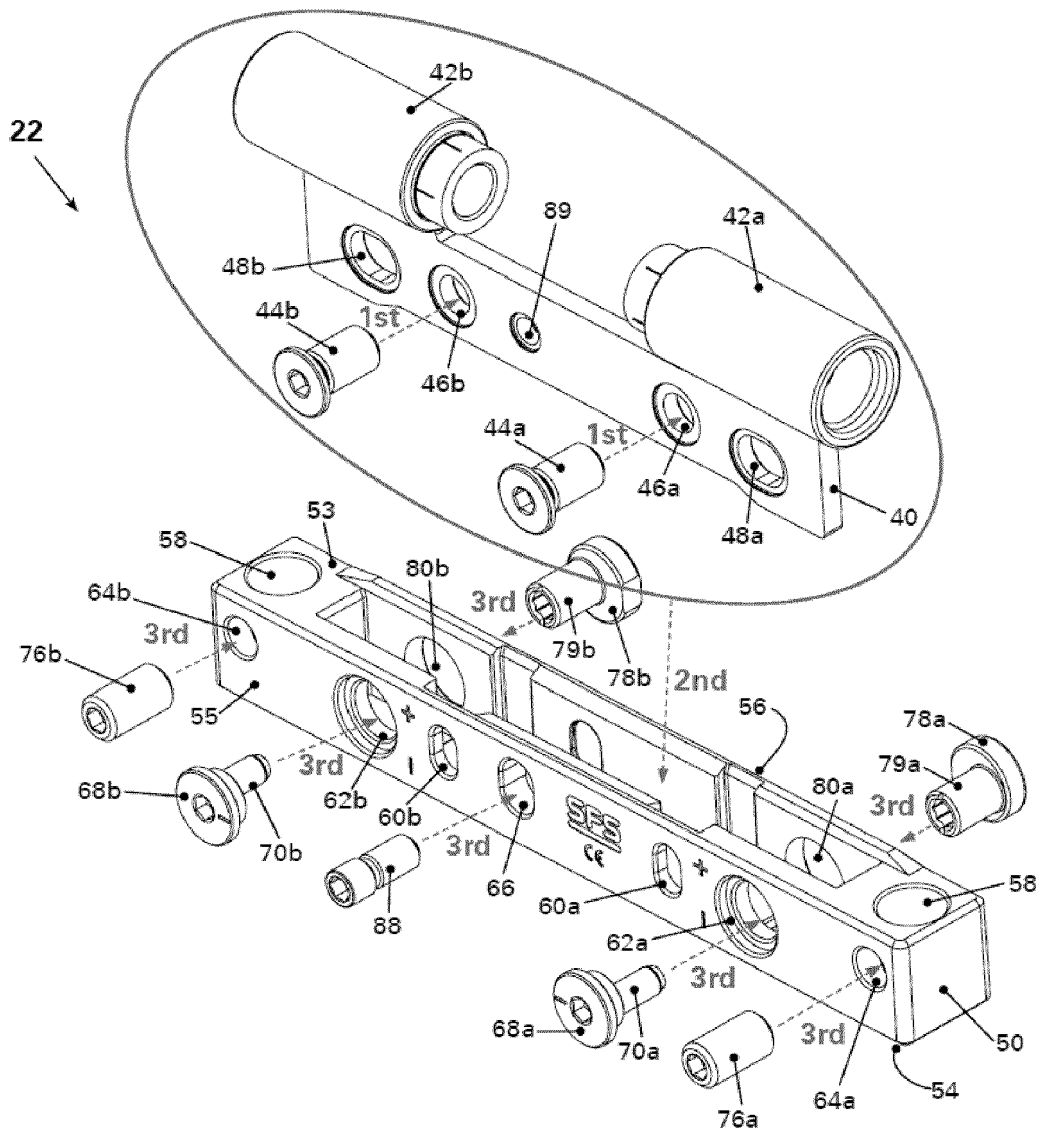
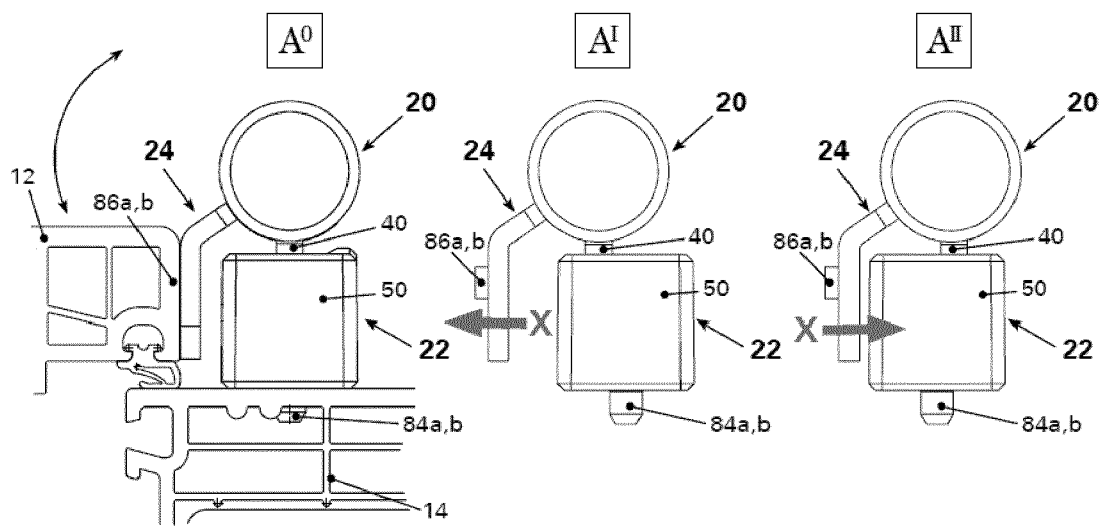
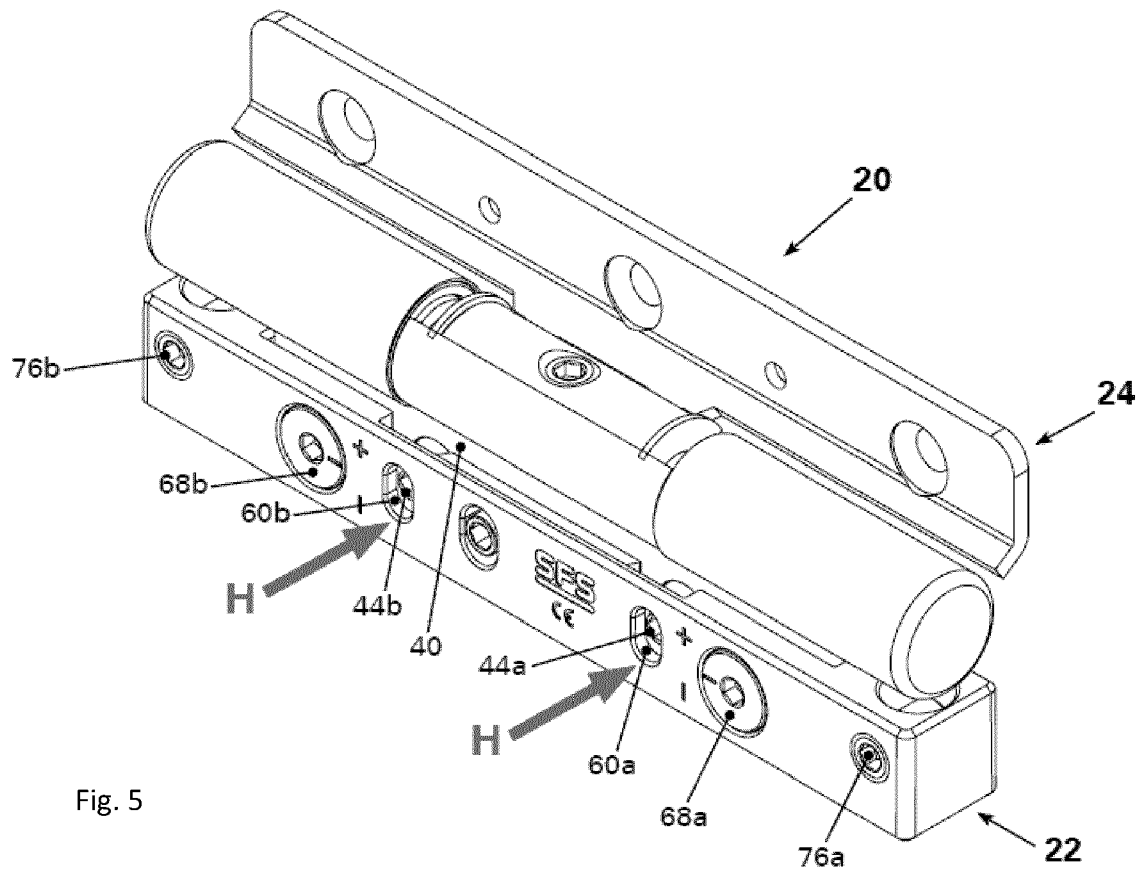
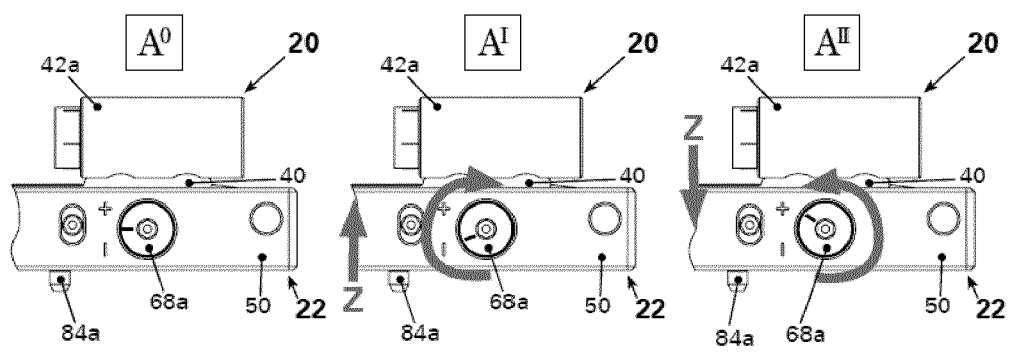
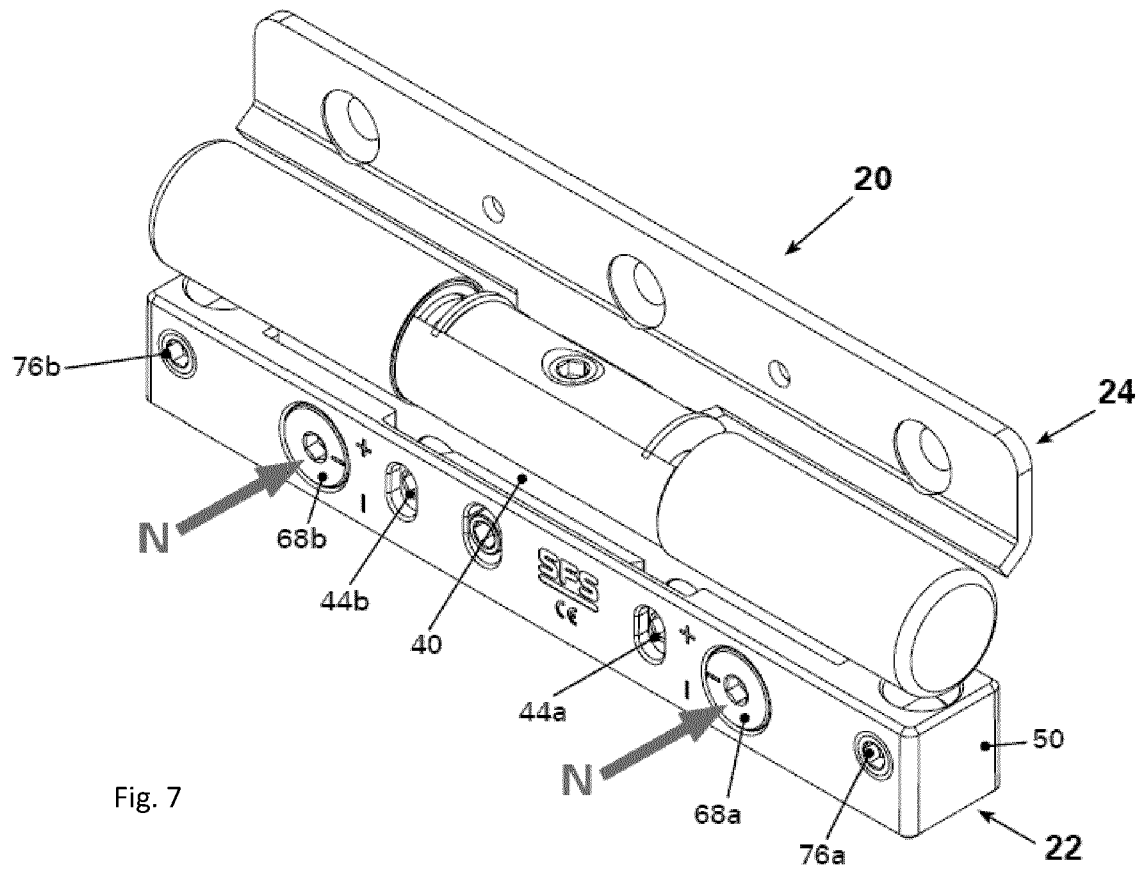


Fig. 4





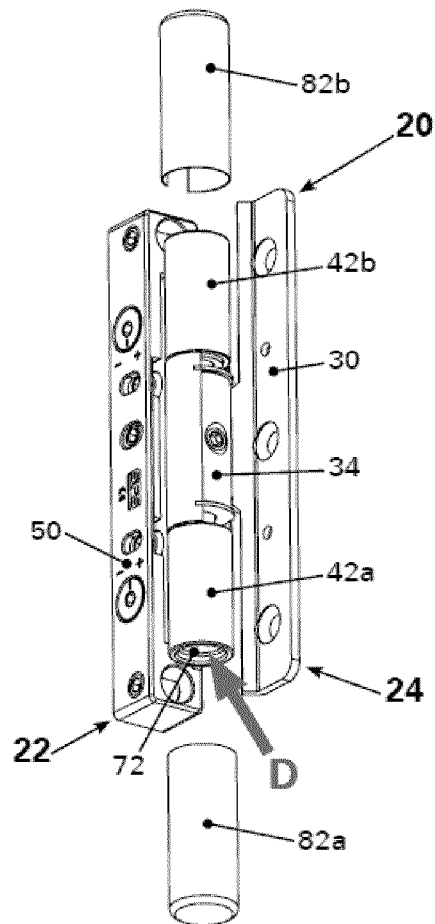


Fig. 9

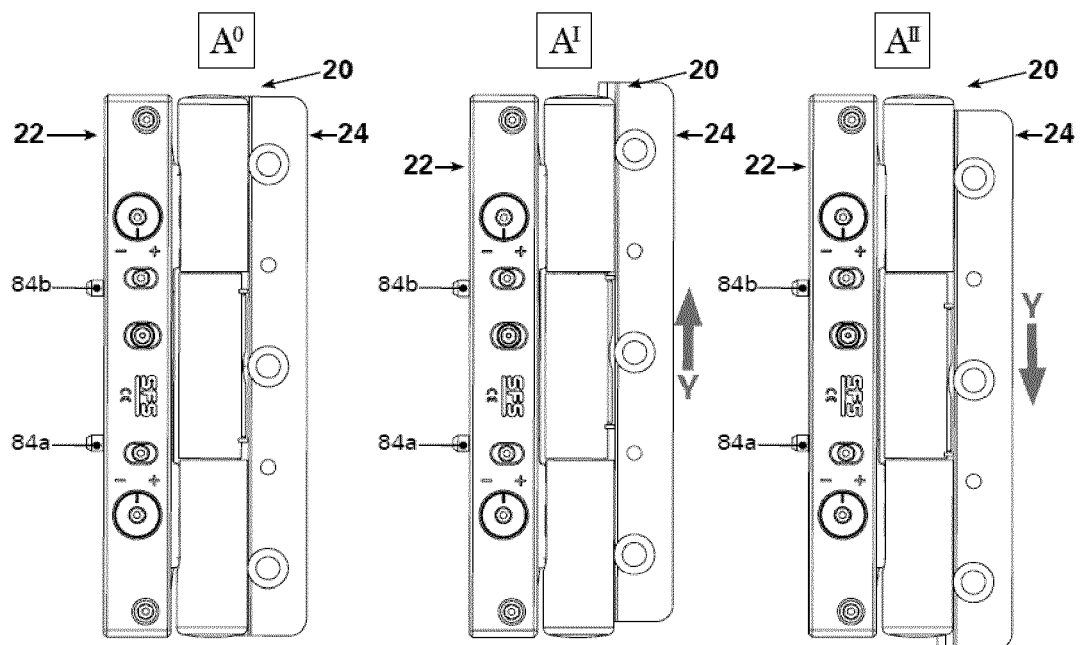


Fig. 10A

Fig. 10B

Fig. 10C

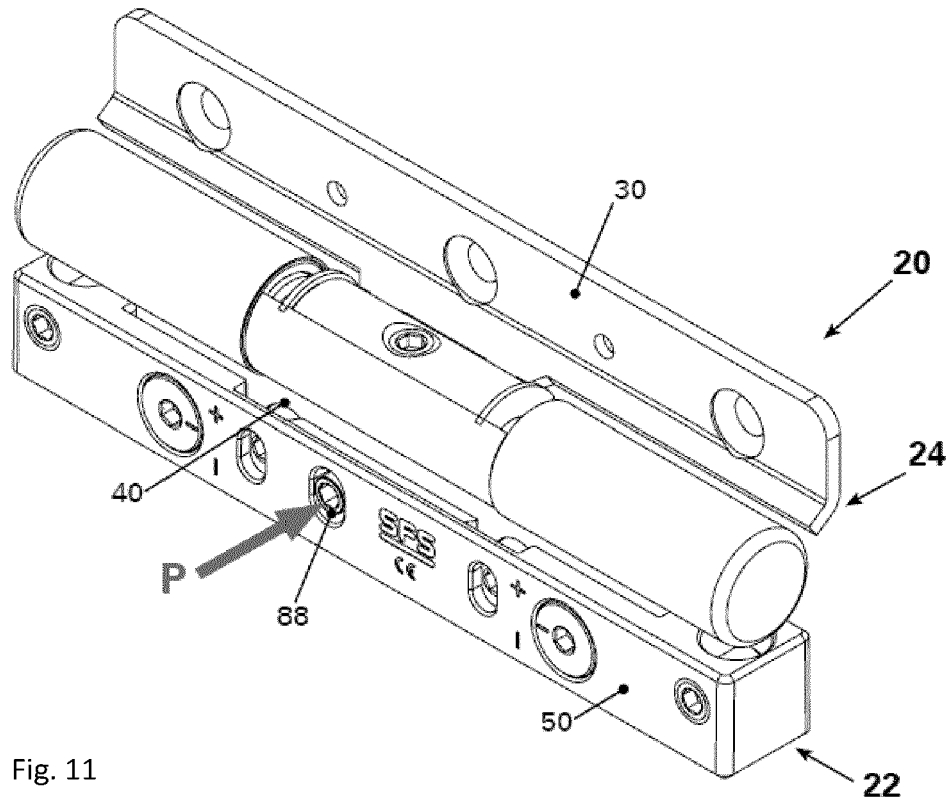


Fig. 11

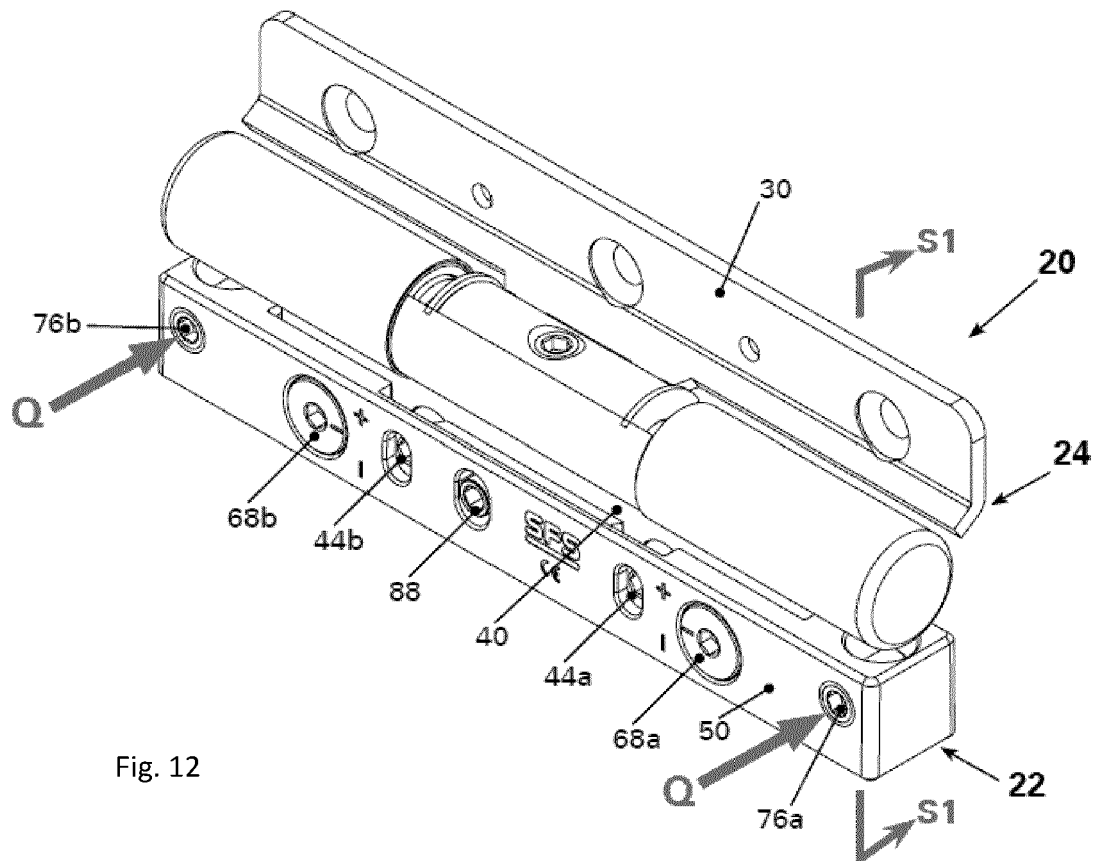


Fig. 12

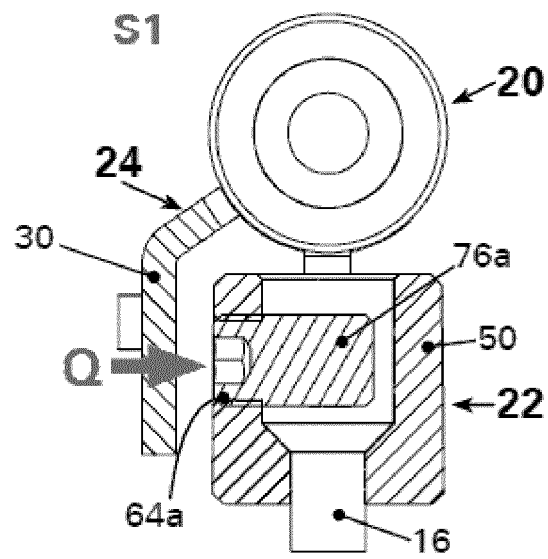


Fig. 13

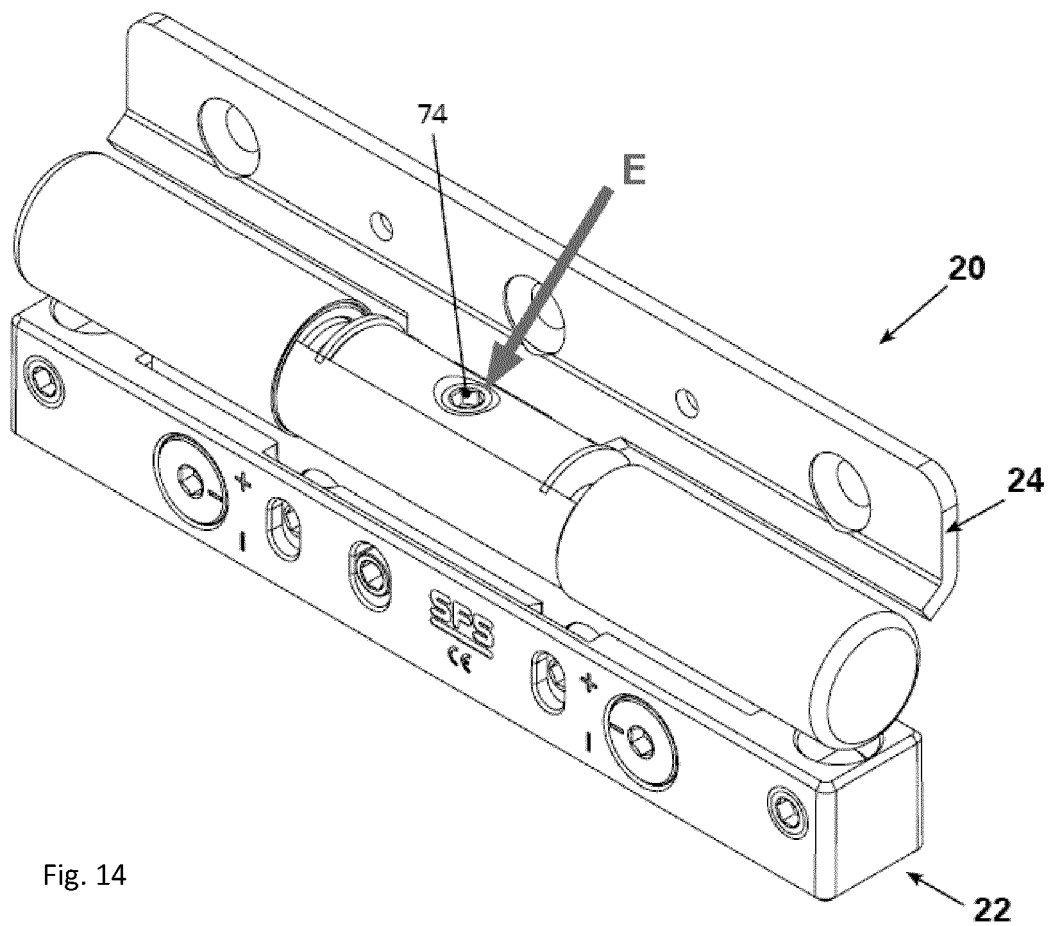


Fig. 14



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Place of search The Hague		Date of completion of the search 29 April 2020	Examiner Witasse-Moreau, C
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