(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 095 936 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
23.11.2016 Bulletin 2016/47

(51) Int Cl.:
E05C 17/32 *(2006.01)*

(21) Application number: **16170770.8**

(22) Date of filing: **23.05.2016**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **22.05.2015 GB 201508816**

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(54) WINDOW RESTRICTOR

(57) This invention relates to a window restrictor (10), and in particular to a window restrictor for a hinged window of a healthcare facility. The window restrictor (10) has a first mounting part (12) adapted for mounting to one of the window and its surrounding frame (14) and a second mounting part (20) adapted for mounting to the other of the window and its surrounding frame. A first restrictor member (22) is pivotably connected to the first mounting part (12) and a second restrictor member (24) is pivotably connected to the second mounting part (20), the first and second restrictor members also being pivotably connected together. The first and second restrictor members are movable between a closed condition and an opened condition, the first and second mounting parts being closer together in the closed condition than in the opened condition. The first restrictor member (22) is connected to the first mounting part (12) by way of a locking element (30) which can be released from the first mounting part, the window restrictor (10) having a key-operated locking means (32) for releasing the locking element (30) from the first mounting part to permit full opening movement of the window.

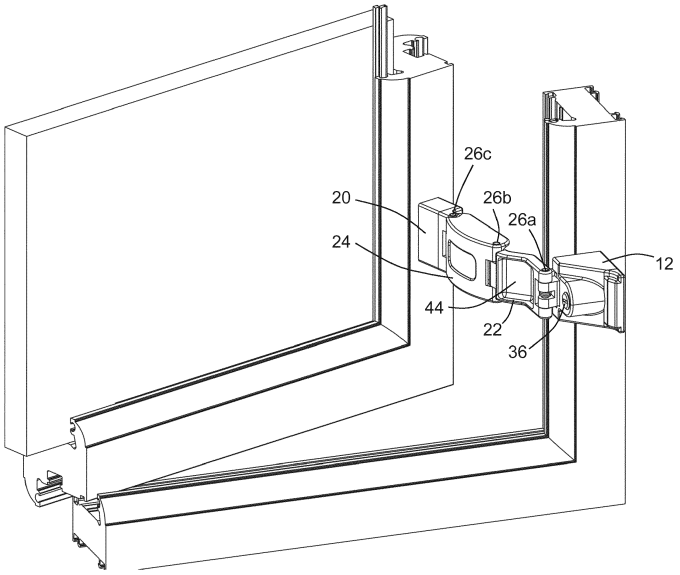

Fig.2

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Description

FIELD OF THE INVENTION

[0001] This invention relates to a window restrictor, and in particular to a window restrictor for a hinged window of a healthcare facility.

BACKGROUND OF THE INVENTION

[0002] Opening windows are in widespread use in domestic and commercial buildings. The windows are openable primarily to provide ventilation into a room of the building, but they also allow the egress of occupants during a fire for example.

[0003] Hinged windows in particular are mounted upon butt hinges or friction stays to pivot about a hinge axis (it being recognised that the hinge axis moves as a window supported on friction stays is opened), the axis being either vertical or horizontal depending upon the fitment of the window. Hinged windows are typically arranged to pivot outwardly relative to the room or building in which they are fitted.

[0004] The hinged window is securable in its closed position by way of an operating handle, the handle perhaps having a cockspur which can engage a keep mounted upon the frame surrounding the window. Also, the operating handle can engage a gearbox such as an espagnolette gearbox which can drive shoot bolts and/or additional locking elements into engagement with additional keeps. To open the window it is necessary to rotate the operating handle, typically through an angle of around 90°.

[0005] To make the window more secure, it is known to provide a lockable handle, i.e. the handle carries a lock which requires the insertion and rotation of the correct key in order to permit the handle to be rotated and the window to be opened.

[0006] It is often desired to allow only partial opening movement of the window, i.e. sufficient to enable ventilation but also to prevent the passage of a person through the opened window. This might be required in high-rise buildings for example where a person (for example a child) may fall out of a fully opened window. This is also a concern in healthcare facilities where it is desired to prevent a patient from leaving the facility through the window.

[0007] This disadvantage has been addressed by the use of safety catches or window restrictors which permit only partial opening of a window, in particular to a position in which the window opening provides ventilation but is too small for a person to pass therethrough. A window restrictor for a hinged window is described in our UK patents 2 263 934 and 2 391 901.

[0008] Window restrictors, including those described in UK patents 2 263 934 and 2 391 901, can be disabled when desired so as to permit full opening of the window. Disabling of the restrictor may require the use of a key so that only persons having access to the key can open the window sufficiently to allow a person to pass through the window.

[0009] Whilst the known restrictors can in principle be used on most buildings, there is a particular concern in healthcare facilities that the known restrictors may not be able to prevent a determined person from overcoming a locked restrictor, either by exerting sufficient force to allow greater opening movement of the window, or by using tools to disable or remove the restrictor.

[0010] The UK Department of Health has recognised this potential problem in its published design guidance for the windows and associated hardware of health buildings, which at page 7 states: "[t]his guidance recognises that window restrictors tested to current British Standards may be inadequate in preventing a determined effort to force a window beyond the 100 mm restriction. The relevant tests for restrictors cited in BS EN 14351-1 and BS EN 13126-5 have been developed to prevent accidental falling from windows. BS EN 14351-1 recommends that restrictors must be able to hold a window in place for 60 seconds when a static load of 350 newtons is applied to that window". The document goes on to state: "[h]owever, these static loads may not be sufficient to prevent determined patients who want to force a window beyond its 100 mm restriction. None of the British and European Standards deal with deliberate attempts to defeat the restrictor using impact forces, which may be the situation encountered in hospitals and care homes".

[0011] The UK Department of Health has therefore identified the requirement for a window restrictor which can operate effectively despite attempts to deliberately defeat the restrictor.

SUMMARY OF THE INVENTION

[0012] It is an object of the present invention to seek to provide a window restrictor which is suitable for use on a window in a hospital, care home or other healthcare facility. Notwithstanding its primary utility in relation to healthcare facilities, it will be appreciated that the restrictor can be used on other establishments (domestic and commercial), as desired.

[0013] According to the invention, there is provided a window restrictor for an opening window, the window restrictor having:

a first mounting part adapted for mounting to one of the window and its surrounding frame;

a second mounting part adapted for mounting to the other of the window and its surrounding frame;

a first restrictor member pivotably connected to the first mounting part;

a second restrictor member pivotably connected to the second mounting part, the first and second restrictor members being pivotably connected together, the first and second restrictor members being movable between a closed condition and an opened

condition, the first and second mounting parts being closer together in the closed condition than in the opened condition;

the first restrictor member being connected to the first mounting part by way of a locking element, the locking element being releasable from the first mounting part;

the first mounting part having a key-operated locking means for releasing the locking element from the first mounting part.

[0014] By mounting the respective mounting parts in appropriate positions upon the window and surrounding frame, it can be arranged that the first and second restrictor members are in their closed condition when the window is closed. The opening movement of the window is restricted by the restrictor members moving to their opened conditions. The length of the restrictor members determines the maximum distance by which the window may be opened in its restricted position, and (in the UK) is ideally 89 mm in accordance with the Department of Health guidance.

[0015] In order to permit full opening movement of the window, the key-operated locking means is activated to release the locking element from the first mounting part.

[0016] Desirably, the first and second restrictor members are inflexible. Desirably also, the first and second restrictor members are inextensible, where "inextensible" is to be interpreted as "substantially inextensible", or "inextensible under the expected forces". Thus, it is appreciated that even rigid components can be extended if sufficient force is applied and/or if sufficiently accurate measurements are made; the term "inextensible" does not exclude members which can be extended by extreme force or to a degree which is insignificant in practice. The term is therefore to be interpreted as a practical limitation rather than a literal limitation.

[0017] Preferably, the first mounting part and the second mounting part are adapted for surface mounting upon the window and surrounding frame. It is noted that many of the known window restrictors are designed for fitment into the gap between the window and frame so that they are not visible when the window is closed (and are only partially visible when the window is opened). Such window restrictors are therefore suited to domestic applications where a clean and unencumbered appearance of the window is desirable. The limited size of the gap into which these window restrictors must be installed places a practical limitation upon their size and strength. Surface mounting avoids that limitation but is less aesthetically pleasing. In a healthcare facility, however, aesthetic considerations are less significant than security considerations. Also, a clearly visible restrictor might have additional benefits in dissuading a person from seeking to overcome the restrictor.

[0018] Preferably, the first mounting part is secured by first fixings to the window or frame, and the second mounting part is secured by second fixings to the other of the window and frame. Preferably also, the first fixings and the second fixings are inaccessible when the restrictor is in the closed condition (where "inaccessible" in this context refers to the lack of access by a tool for the removal of the fixings). Making the fixings inaccessible reduces the likelihood that a person will seek to disable the restrictor by removing one or both of the mounting parts from the window and/or frame.

[0019] Desirably, the first and/or second fixings are not visible when the restrictor is in the closed condition. Making the fixings not visible further reduces the likelihood of a person seeking to tamper with the fixings.

[0020] Desirably also, the fixings are inaccessible (and ideally not visible) when the restrictor is in its opened condition. In such embodiments, even if the window is opened to its restricted position the fixings are less likely to be tampered with.

[0021] Preferably, the key-operated locking means has a lock body with a keyhole. Preferably also the keyhole (and ideally the lock body) is not accessible, and ideally not visible, when the restrictor is in its closed condition (where "inaccessible" in this context refers to the lack of access by a key or by a tool which might be used to seek to force the lock body to rotate). Making the keyhole inaccessible reduces the likelihood that the locking means will be tampered with when the restrictor is in the closed condition.

[0022] Ideally, the restrictor cannot be moved from its opened condition to its closed condition unless the key is removed from the lock body. Such embodiments require the user to remove the key before the window is closed, so avoiding the possibility that the key is inadvertently left in place when the window is closed. The user is therefore less likely to forget to remove the key when the window is closed.

[0023] Ideally, the locking element has a locking nose and the first mounting part has a catch which cooperates with the locking nose to secure the locking element to the first mounting part. Ideally the catch is spring biased and the locking nose and/or catch is tapered so that the key is not required to secure the locking element to the first mounting part. Accordingly, if full opening movement of the window is required the restrictor can be disabled by the user with the correct key; the restrictor can subsequently be re-enabled by attaching the locking element to the first mounting part without use of the key.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0024] The invention will now be described in more detail, by way of example, with reference to the accompanying drawings, in which:

Fig.1 shows a perspective view of part of a window and its surrounding frame fitted with a window restrictor according to the present invention in the closed condition;

Fig.2 shows the window and frame of Fig.1 with the restrictor in its opened condition;

Fig.3 shows a close-up view of the restrictor of Fig. 2 with a key inserted into the lock body;

Fig.4 shows the view of Fig.3 with the restrictor disabled;

Fig.5 shows another view of an enabled restrictor with the key left in position;

Fig.6 shows a view of the restrictor with a cover part removed;

Fig.7 shows a cross-sectional view through the components of the restrictor in its enabled condition;

Fig.8 shows a view as Fig.7 with the restrictor in its disabled condition;

Fig.9 shows a view as Fig.8 with the catch in its securing position; and

Fig.10 shows a view similar to that of Fig.8 of an alternative embodiment of restrictor having a dead locking facility.

DETAILED DESCRIPTION

[0025] The window restrictor 10 of the present invention has a first mounting part 12 which in this embodiment is mounted to a frame 14 surrounding the opening window 16. The second mounting part 20 of the restrictor 10 is mounted to the window 16. It will be understood that in another (less preferred) embodiment the first mounting part could be mounted to the window and the second mounting part could be mounted to the frame.

[0026] The window 16 is a hinged window with the hinge axis being substantially vertical as drawn and at the opposing side of the window to that to which the restrictor 10 is fitted (the hinge axis of the window not being shown in Fig.1). Whilst it would be possible to fit the restrictor to a sliding window that is not preferred as the restrictor 10 has been designed specifically for use with hinged windows.

[0027] A first restrictor member 22 (see Fig.2) is pivotably connected to the first mounting part 12 and a second restrictor member 24 is pivotably connected to the second mounting part 20. The first and second restrictor members 22, 24 are pivotably connected together, all of the pivoting connections having respecting pivot pegs 26a,b,c as shown. It will be understood that during movement of the window 16 between its closed position of Fig. 1 and its restricted position of Fig.2, the first and second restrictor members 22, 24 pivot relative to one another (and to their respective mounting part) between the closed condition of Fig.1 and the opened condition of Fig. 2.

[0028] As is made clear by a comparison of Figs. 3 and 4, the first restrictor member 22 is attached to the first mounting part 12 by way of a locking element 30, the locking element being releasable from the first mounting part 12 upon activation of a key-operated locking means 32. Specifically, insertion of the correct key 34 into the lock body 36, and rotation of the key through an angle of approximately 180°, allows the locking element 30 to be released from the recess 40 of the first mounting part 12 in which it is secured.

[0029] It will be seen from Fig.1 that in the closed condition the second restrictor member 24 covers much of the first restrictor member 22, and also covers much of the first mounting part 12. Importantly also, the restrictor members 22, 24 cover the lock body 36 and its keyhole. It is therefore very difficult to tamper with the lock body 36, which tampering might be attempted in an effort to disable the restrictor by a person not having the correct key 34.

[0030] It will be understood that the restrictor 10 is not lockable in the closed condition, and as far as the restrictor 10 is concerned the window 16 may be moved between its closed and restricted positions of Figs. 1 and 2 as often as desired without access to the key 34. The figures do not show all of the window and frame, however, and it will be understood that the window will also have a conventional operating handle which in a healthcare facility will itself typically be key-lockable. Accordingly, only an authorised person having access to the correct key for the operating handle can open the window 16; an unauthorised person will not be able to open the window in order to gain access to the lock body 36.

[0031] Fig.5 demonstrates another advantage of the restrictor members 22,24 overlying the lock body 36, namely that the restrictor 10 cannot be moved to its closed condition unless the key 34 is removed from the lock body 36. Thus, Fig.5 shows the position in which the solid wall 44 of the first restrictor member 22 fouls the head of the key 34 (in other embodiments the first restrictor member can have an opening and the second restrictor member can have a wall which covers (and fouls) the key). It is preferably arranged that the key 34 prevents the restrictor 10 being moved to a position in which the window 16 can be closed, so that unless the key is removed the window 16 cannot be closed. Even if the window can be closed, however, it is readily apparent from Fig.5 that the key cannot inadvertently be left in the lock body 36.

[0032] Fig.6 shows the cover part 46 which is a part of the first mounting part 12 and serves to obscure the first fixing screws 48. The cover part 46 clips into place over the fixing screws 48, as seen in Figs. 3-5. In the closed condition of the restrictor 10 as see in Fig.1, the cover part 46 is itself partially obscured and cannot be removed, so that access to the fixing screws 48 is not available unless the window 16 is opened and the cover part 46 is

removed.

[0033] Importantly, the first fixing screws 48 are located towards the "back" of the first mounting part 12. In the fitted condition the fixing screws 48 are therefore located away from the window opening of the frame 14. This permits the fixing screws 48 to avoid any formations which are located immediately adjacent the window opening (such as the rounding 50 shown in Fig. 9), which rounding is typical of many frame profiles. Moving the fixing screws 48 as far from the window opening as possible reduces the likelihood that the fixing screws 48 will secure the first mounting part 12 at anything other than a flat region of the frame 14.

[0034] Figs. 5 and 6 also show some of the second fixing screws 52 for the second mounting part 20. It will be seen from Fig.1 that the second fixing screws 52 are totally obscured and inaccessible when the restrictor 10 is in its closed condition. It will be understood from Fig. 3 that the second fixing screws 52 are also almost fully obscured and almost fully inaccessible when the window is in its restricted position. Full access to the fixing screws 52 is only available when the locking element 30 has been released from the first mounting part 12, and the window 16 is opened, as seen in Fig.4.

[0035] The sectional views of Figs. 7-9 show the operation of the locking means 30 of the restrictor 10. In Fig.7 the restrictor 10 is enabled and the window 16 (not seen) has been opened substantially to its restricted position. The key 34 has been inserted into the lock body 36. In known fashion, the key engages one or more locking plates or locking discs (not shown) within the lock body 36 and insertion of the correct key will permit the lock body 36 to rotate within its recess in the first mounting part 12. The end of the lock body 36 carries an eccentric boss 54, and as the key 34 is rotated (through approximately 180°) from the inactive position of Fig.7 to the active position of Fig.8 the eccentric boss drives a lock member 56 to move to the right as drawn. The lock member 56 engages catch 60 which is mounted to pivot between secured and released positions within the first mounting part 12. The catch 60 in its secured position of Fig.7 engages the locking nose 62 of the locking element 30.

[0036] The catch 60 is biased by a compression spring 64 to rotate clockwise as drawn (towards its secured position), the spring 64 being compressed as the catch 60 is driven to pivot anti-clockwise by the body 56.

[0037] As shown in Fig.8, the key 34 can be rotated to an active position in which the eccentric boss 54 causes the catch 60 to move to its released position to release the locking nose 62, whereby the locking element 30 can be removed from the first mounting part 12, permitting full unrestricted opening of the window 16.

[0038] Importantly, the key 34 cannot be removed from the lock body 36 when the lock body is in the active position of Fig.8; to remove the key 34 it is necessary to rotate the lock body 36 back to its inactive position of Figs. 7 and 9. During such rotation, the spring 64 extends and drives the catch 60 to pivot clockwise to the secured position of Fig.9.

[0039] It will be seen that both of the catch 60 and the locking nose 62 have a tapered lead-in so that the restrictor 10 can be re-enabled without requiring the use of the key. Specifically, as the locking nose 62 is inserted into the recess 40 the locking nose 62 forces the catch 60 to pivot anti-clockwise as drawn to its released position, compressing the spring 64. When the locking nose 62 reaches the position of Fig.7 the spring 64 drives the catch 60 to rotate clockwise to secure the locking nose as shown in Fig.7. Thus, whilst the key 34 is shown in Fig.9, it will be understood that the key could be removed before the locking nose 62 is pressed into the recess 40.

[0040] The sectional view of Fig. 10 shows the operation of an alternative embodiment. Specifically, the embodiment of Fig.10 had a dead locking function. As described above, the embodiment of Figs. 7-9 incorporates a spring 64 to move the catch 60 to its secured position. The lock member 56 of that embodiment is therefore driven by the eccentric boss 54 in one direction only, namely from the secured position to the released position. In the embodiment of Fig.10, the lock member 156 is extended as compared to the earlier embodiment, and cooperates with the eccentric boss 54 to be positively driven in both directions. Also, the lock member 156 cooperates with the catch 60 to positively drive the catch to rotate both anticlockwise and clockwise into its released and secured positions respectively. The embodiment of Fig. 10 has no spring and the catch 60 is moved solely by rotation of the lock body 36 (by way of the eccentric boss 54 and the lock member 156).

[0041] In the embodiment of Fig. 10, the restrictor cannot be re-enabled without the key 34. Specifically, after the locking element 30 has been inserted into the recess 40 the key 34 is rotated to rotate the lock body 36 and the eccentric boss 54 (through approximately 180°), which moves the lock member 156 to the left as viewed and causes the catch 60 to pivot clockwise as drawn to its secured position (not shown, but similar to the secured position shown in Fig.7).

[0042] It will be understood that in order to allow the catch 60 to move from its secured position to its released position (and to release the locking element 30), it is necessary that the lock body 36 is rotated (through approximately 180°).

[0043] Alternatively stated, without rotation of the lock body 36 the lock member 156 prevents the catch 60 from moving from its secured position to its released position. This is a particularly desirable feature of the dead locking embodiment of Fig.10. With the embodiment of Figs. 7-9, for example, it might be possible for a sufficiently high load to be applied to the locking element 30 to overcome the bias of the spring 64 and forcibly rotate the catch 60 to release the locking element 30. The embodiment of Fig.10 is much more secure against such attempts to forcibly release the locking element 30 because the lock member 156 and lock body 36 operate together to pos-

itively resist the unauthorised release of the locking element.

[0044] The eccentric boss 54 and the catch 60 are given the same reference numerals in Fig.10 since they are identical to those components in the embodiment of Figs. 7-9. It will be understood, however, that the form of the eccentric boss, and the form of the catch member, could differ between these two embodiments. In particular, there is no requirement for the catch 60 to have a tapered lead-in. The structure and operation of the embodiment of Fig. 10 is otherwise similar to that of the embodiments of Figs. 7-9 and only the relevant differences have been discussed.

[0045] It will be seen from Fig.1 in particular that the window restrictor 10 is a relatively large component and is clearly visible upon the window. Whilst many restrictors made for the windows of domestic dwellings are substantially unobstrusive (and largely invisible), the highly-visible nature of the restrictor 10 is believed to be an advantage in healthcare facilities as it is expected to dissuade persons from seeking to disable or remove the restrictor.

Claims

1. A window restrictor (10) for an opening window (16), the window restrictor having:

a first mounting part (12) adapted for mounting to one of the window and its surrounding frame (14);
a second mounting part (20) adapted for mounting to the other of the window and its surrounding frame;
a first restrictor member (22) pivotably connected to the first mounting part (12);
a second restrictor member (24) pivotably connected to the second mounting part (20), the first and second restrictor members being pivotably connected together, the first and second restrictor members being movable between a closed condition and an opened condition, the first and second mounting parts being closer together in the closed condition than in the opened condition;
the first restrictor member (22) being connected to the first mounting part (12) by way of a locking element (30) which can be released from the first mounting part;
the window restrictor (10) having a key-operated locking means (32) for releasing the locking element (30) from the first mounting part.

2. A window restrictor according to claim 1 in which the first and second restrictor members (22, 24) are inextensible.

3. A window restrictor according to claim 1 or claim 2 in which the key-operated locking means (32) is mounted to the first mounting part (12).

4. A window restrictor according to any one of claims 1-3 in which the first mounting part (12) is secured to the window (16) or frame (14) by first fixings (48), and the second mounting part (20) is secured to the other of the window (16) and frame (14) by second fixings (52), the first fixings and/or the second fixings being inaccessible when the first and second restrictor members (22, 24) are in the closed condition.

5. A window restrictor according to claim 4 in which the first (48) and/or second fixings (52) are not visible when the first and second restrictor members (22, 24) are in the closed condition.

6. A window restrictor according to claim 4 or claim 5 in which the first (48) and/or second fixings (52) are inaccessible when the first and second restrictor members (22, 24) are in the opened condition.

7. A window restrictor according to any one of claims 1-6 in which the key-operated locking means (32) has a lock body (36) with a keyhole, the keyhole being inaccessible when the first and second restrictor members (22, 24) are in the closed condition.

8. A window restrictor according to claim 7 in which the keyhole is obscured when the first and second restrictor members (22, 24) are in the closed condition.

9. A window restrictor according to claim 8 in which the keyhole is obscured by the first and/or second restrictor members (22, 24) when in their closed condition.

10. A window restrictor according to any one of claims 7-9 in which the first and second restrictor members (22, 24) cannot be moved to the closed condition whilst a key (34) is located in the lock body (36).

11. A window restrictor according to any one of claims 7-10 in which the lock body (36) is rotatable between active and inactive positions by way of a key, and in which the key is not removable from the lock body in its active position.

12. A window restrictor according to any one of claims 1-11 in which the locking element (30) has a locking nose (62) and the first mounting part (12) has a movable catch (60) which cooperates with the locking nose to secure the locking element to the first mounting part.

13. A window restrictor according to claim 12 in which the movable catch (60) is biased by a resilient member (64) towards a secured position, and in which

the locking nose (62) and/or catch (60) is tapered to enable securement of the locking nose and catch without use of a key.

14. A window restrictor according to claim 11 in which the lock body (36) is connected to the movable catch (60) by way of a lock member (156), the movable catch being positively driven to move between a secured position and a released position by rotation of the lock body (36).

15. A window restrictor according to any one of claims 1-14 in which the first restrictor member (22) is pivotably connected to the locking element (30).

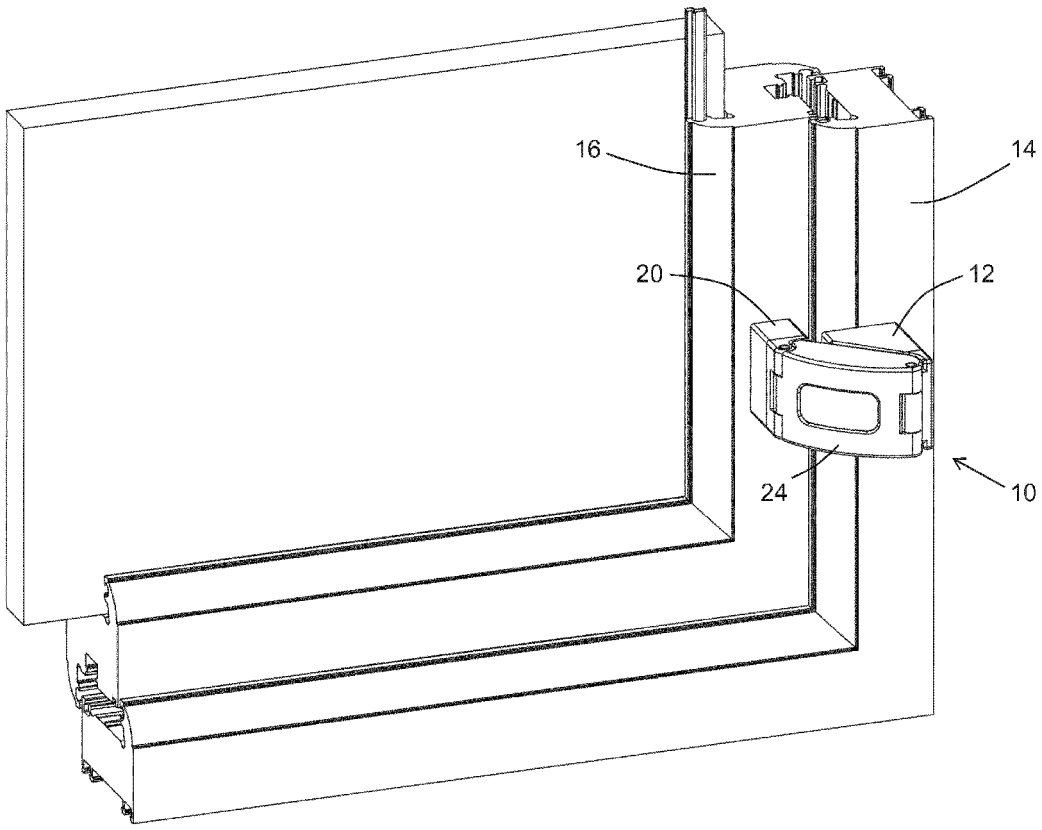

Fig.1

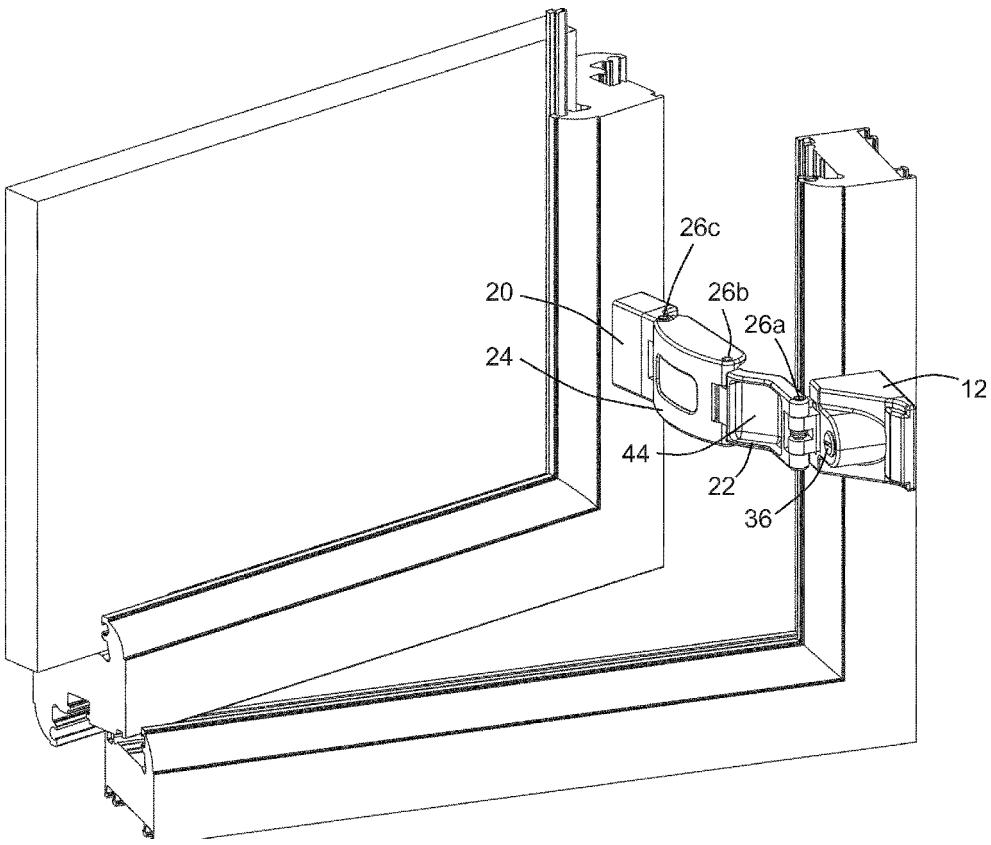

Fig.2

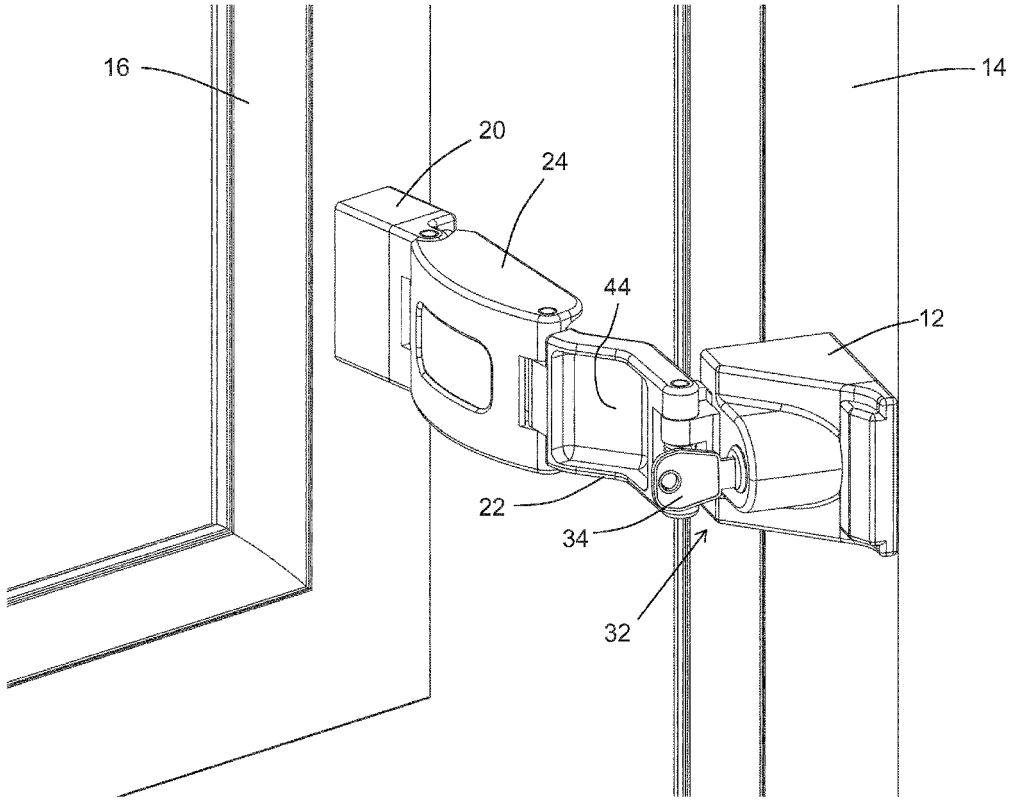

Fig.3

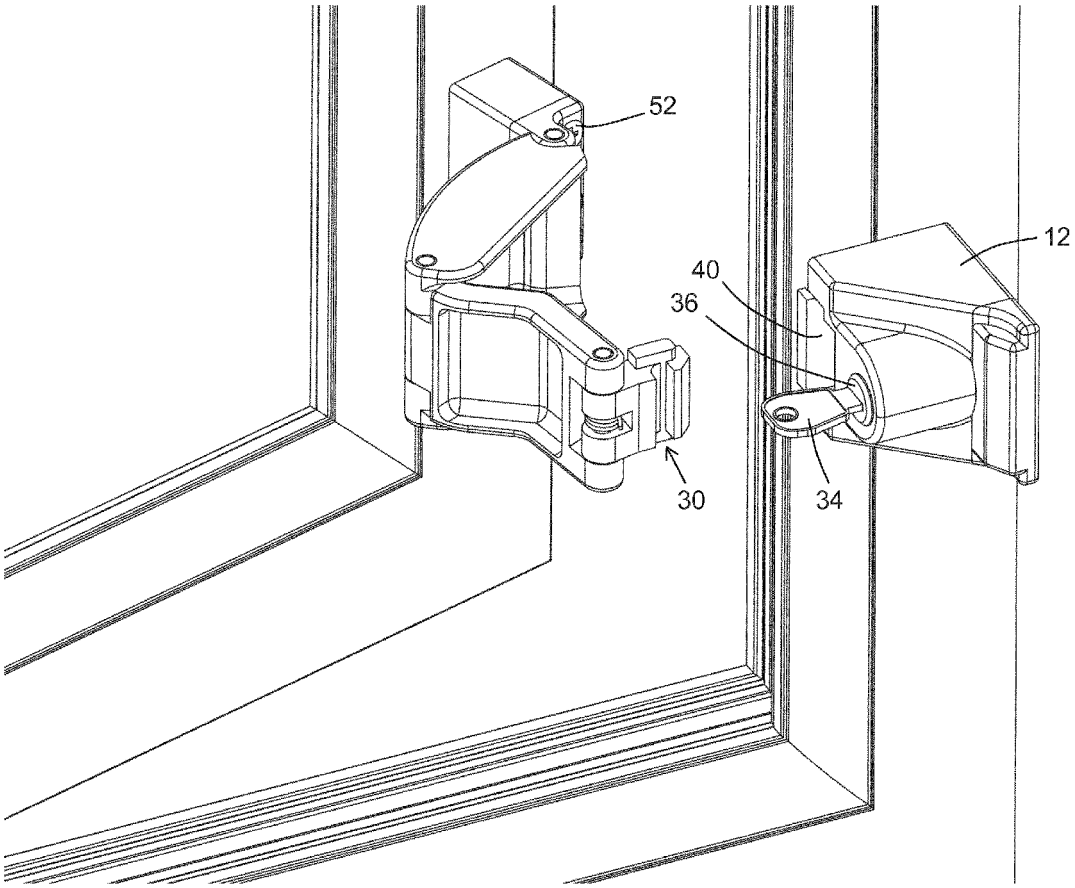

Fig.4

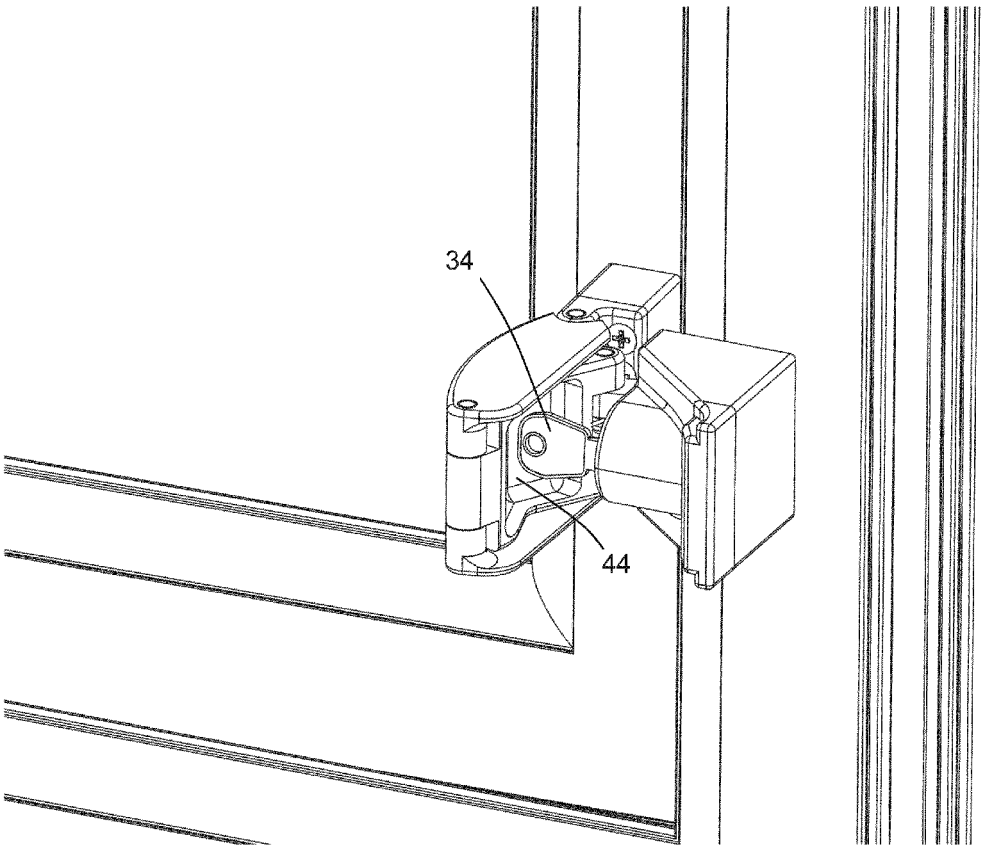

Fig.5

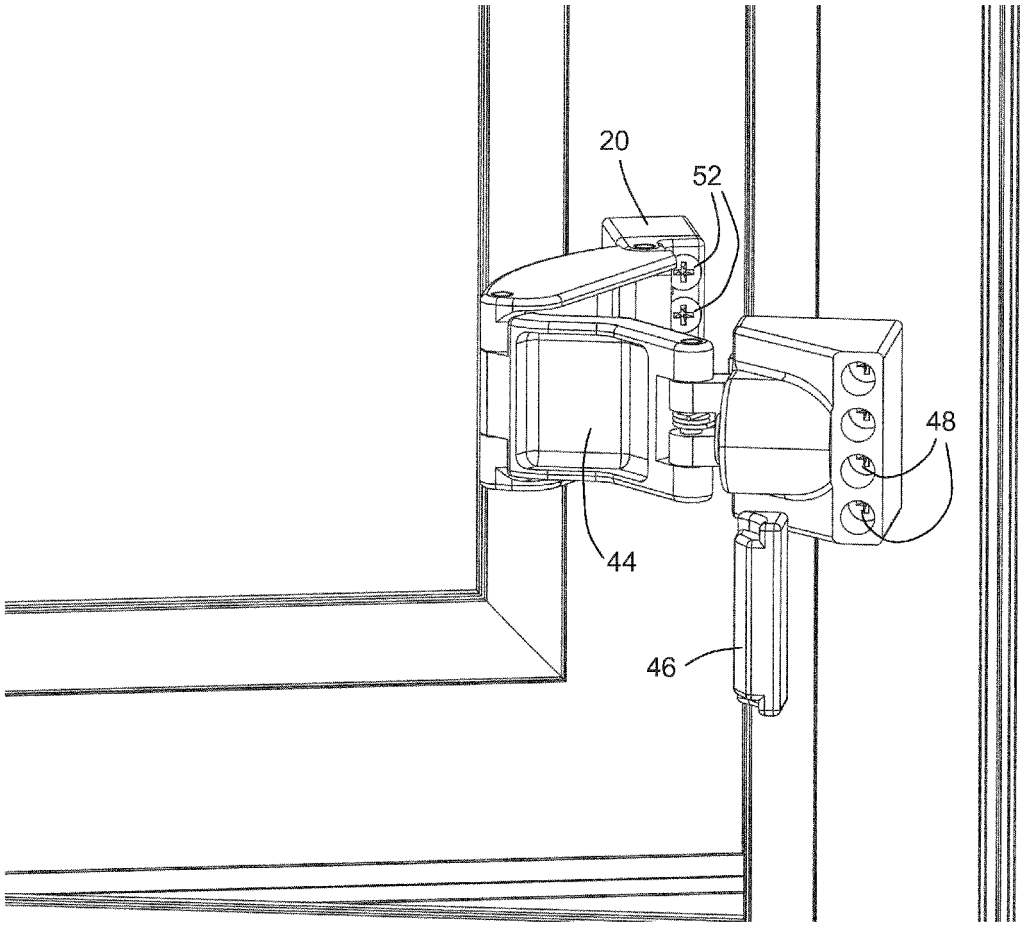

Fig.6

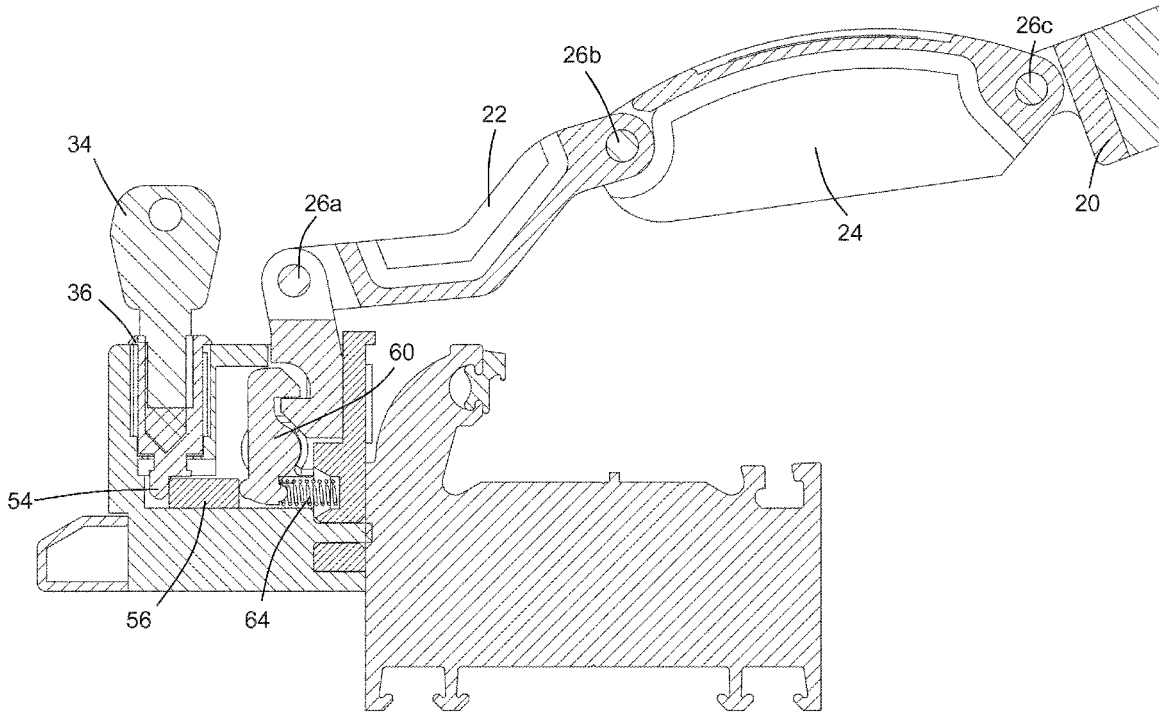

Fig.7

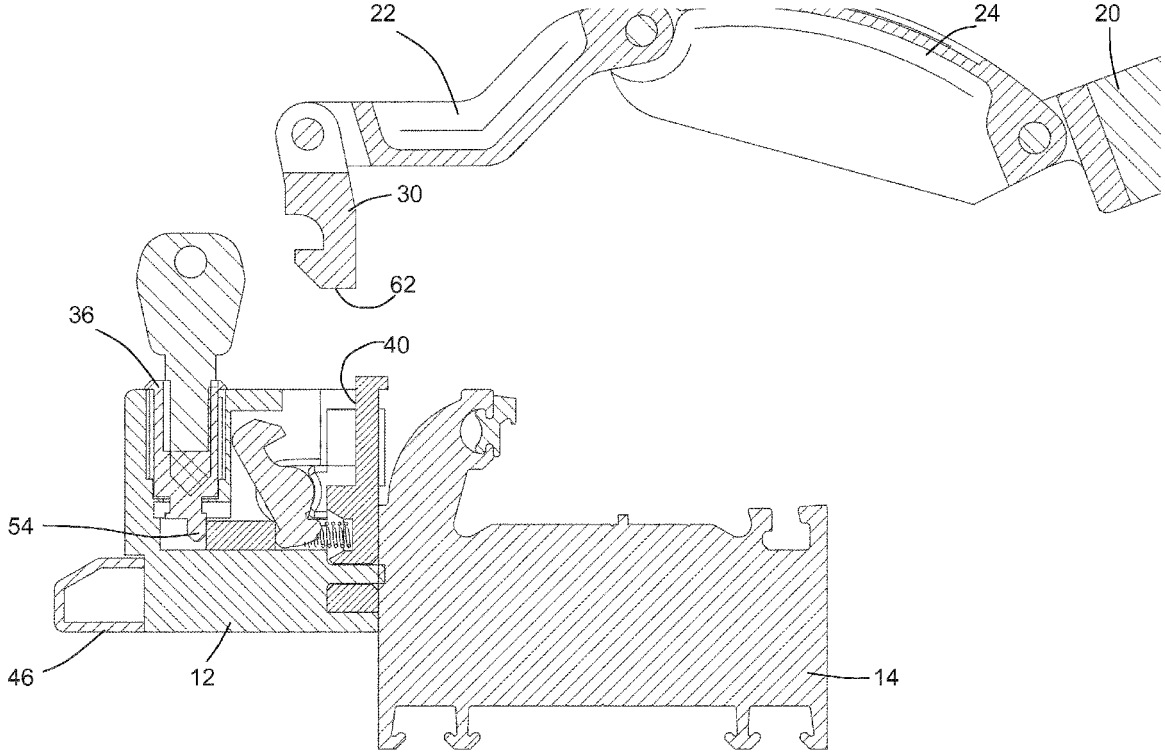

Fig.8

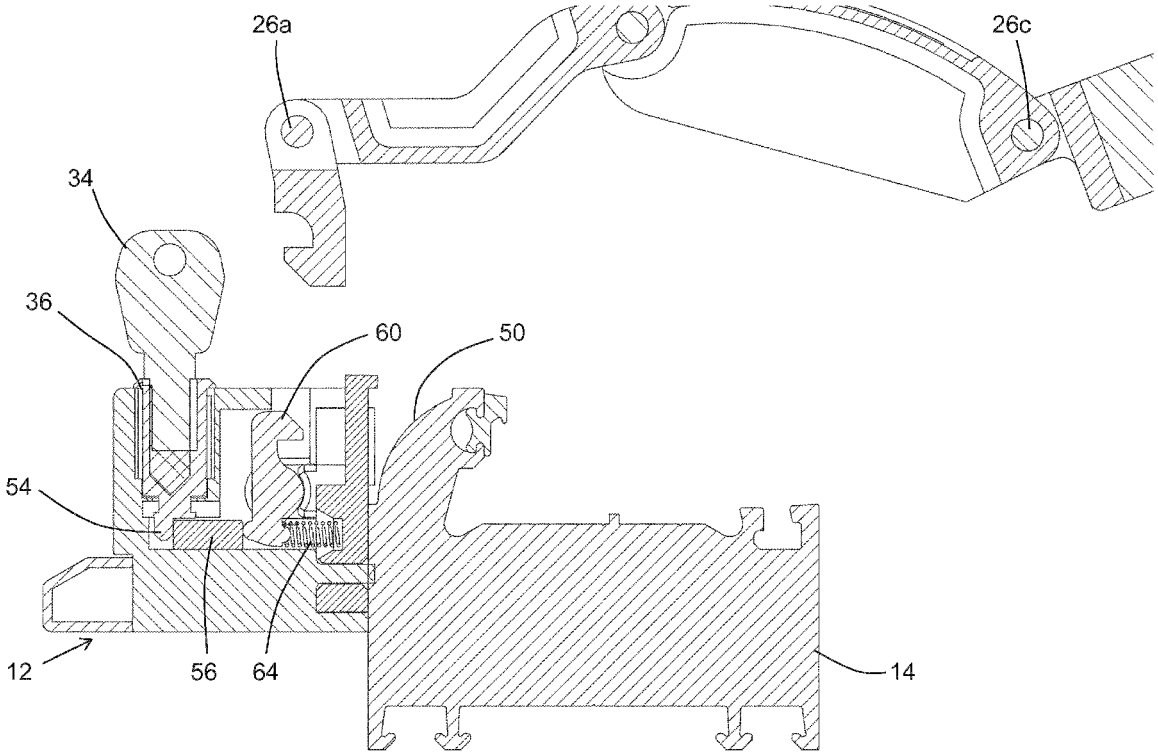

Fig.9

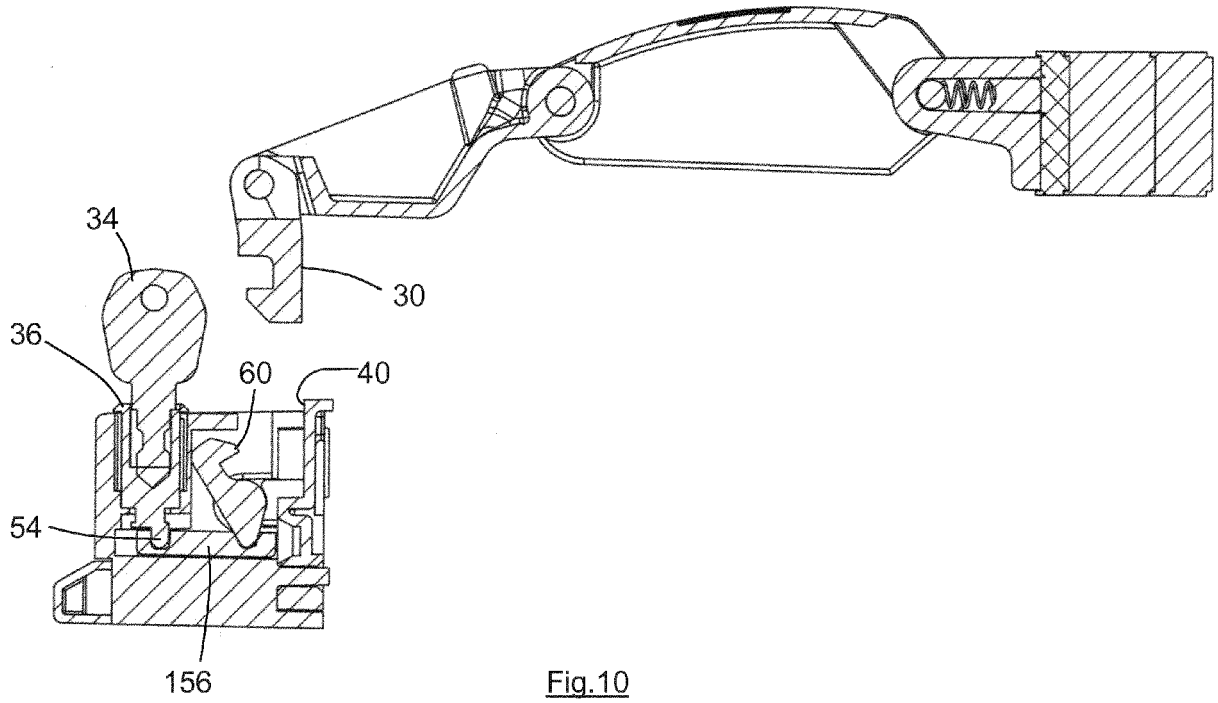

Fig.10

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EUROPEAN SEARCH REPORT

Application Number
EP 16 17 0770

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 October 2016	Goddar, Claudia

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