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(71) Applicant: **Gretsch Unitas Limited**
Coventry, West Midlands CV5 6UR (GB)

(72) Inventors:
- **Rossall, Robert**
  Coventry, CV5 6UR (GB)
- **Golder, Simon**
  Coventry, CV5 6UR (GB)

(74) Representative: **Wilson Gunn**
Charles House
148/9 Great Charles Street
Birmingham B3 3HT (GB)

(54) A RECIPROCATING, SLIDING ENGAGEMENT MECHANISM FOR A WINDOW OR DOOR

(57) A reciprocating, sliding engagement mechanism for a window or door comprising at least one moveable leaf mounted relative to at least one fixed surround frame member and at least one actuator for locking or latching the at least one moveable leaf relative to the at least one fixed surround frame member, the mechanism comprising a first hook configuration face mounted relative to the at least one fixed surround frame member, and extending towards the at least one moveable leaf, a second hook configuration face mounted relative to the at least one moveable leaf, and extending towards the at least one fixed surround frame member, the second hook configuration slidably movable relative to the first hook configuration between a first position in which the first hook configuration and the second hook configuration are juxtaposed to secure the at least one moveable leaf relative to at least one fixed surround frame member and a second position in which the first hook configuration and the second hook configuration are separated from one another, by operation of the at least one actuator.

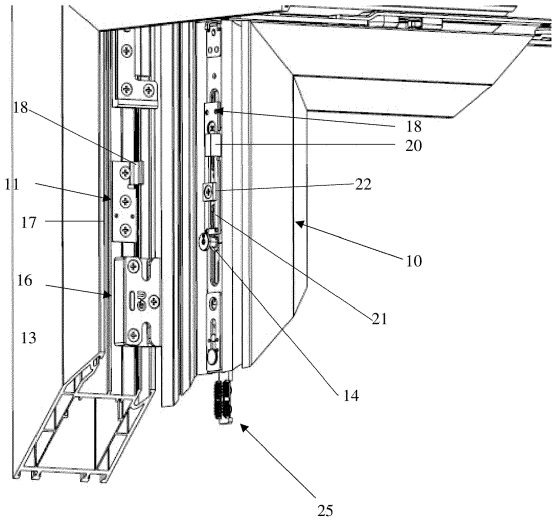

Figure 3

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Description

Technical Field of the Invention

[0001] The present invention relates generally to pivoting windows or doors and more particularly a reciprocating, sliding engagement mechanism to protect or support or reinforce a hinge assembly of the pivoting window or door.

Background to the Invention

[0002] Traditionally, any type of hinge protection has been created as one or more static components that come into close proximity when the window or door is closed. In situations where more than one static component is provided, the static components will typically sit together, within clearance of each other. If an abusive load is applied the components lock together providing additional support.

[0003] However, with the clearances needed to allow the window or door to be opened and closed, the security or support provided is often limited.

[0004] Chinese Utility Model No. 213980379U discloses a safe support hinge which may comprise a sliding support structure and a hook part which may ensure connection with an external profile cavity.

[0005] Chinese Utility Model No. 216197325U discloses a door lock device comprising a first and second locking piece which may be driven to move away from or towards each other by a driving mechanism so that the locking parts on the first locking piece and the second locking piece may be locked with the plurality of locking hook parts on the locking plate.

[0006] It will therefore be an advance in the art to provide an engagement mechanism which allows the components of the mechanism to be close together when in an engaged condition to provide increased security or support, but also to allow separation of the components to allow the window or door to be opened and closed easily.

Summary of the Invention

[0007] According to a broad embodiment, there is provided a reciprocating, sliding engagement mechanism for a window or door comprising at least one moveable leaf mounted relative to at least one fixed surround frame member and at least one actuator for locking or latching the at least one moveable leaf relative to the at least one fixed surround frame member, the mechanism comprising:

a) A first hook configuration face mounted relative to the at least one fixed surround frame member, and extending towards the at least one moveable leaf;

b) A second hook configuration face mounted relative to the at least one moveable leaf, and extending towards the at least one fixed surround frame member,

the second hook configuration slidably movable relative to the first hook configuration between a first position in which the first hook configuration and the second hook configuration are juxtaposed to secure the at least one moveable leaf relative to at least one fixed surround frame member and a second position in which the first hook configuration and the second hook configuration are separated from one another, by operation of the at least one actuator.

[0008] Providing a reciprocating, sliding engagement mechanism for a window or door with these features allows the respective hook configurations to slide between a first position in which the respective hook configurations are positioned near one another to secure the at least one moveable leaf relative to at least one fixed surround frame member and the second position in which the first hook configuration and the second hook configuration are separated from one another, by operation of the at least one actuator.

[0009] In the second position, the first hook configuration and the second hook configuration are fully separated, linearly, from one another to allow operation of the moveable leaf.

[0010] The "movable leaf" may preferably be a movable sash of a window or door.

[0011] The terms ‘inner’ and ’outer’ are used to refer to position relative to the centre of the window or door, as opposed to ‘room side’ and ’outside’ which are directions relative to the opening direction of the window or door.

[0012] In the context of the present invention, the juxtaposition of the first hook configuration and the second hook configuration in the first position, may be considered to be an "engaged" condition. In this engaged condition, the first hook configuration and second hook configuration may be located adjacent to one another but not in an abutting engagement. When in the first position, the first hook configuration is typically located relative to the second hook configuration in which the respective hook configurations are positioned in an interlocked condition, positioning them close to one another but spaced apart by a clearance gap. The respective hook configurations can then engage one another if an abusive load is applied to the movable leaf.

[0013] The second hook configuration undergoes a sliding movement between the first position and the second position and vice versa. The movement will typically be a reciprocating movement. The movement may preferably be driven by the at least one actuator of the window or door.

[0014] The at least one actuator of the window or door is typically a handle or similar used to latch and unlatch the window or door. Operation of the at least one actuator

into the unlatched condition will preferably move the second hook configuration into the second position. Similarly, operation of the at least one actuator into the latched condition will preferably move the second hook configuration into the first position.

[0015] Preferably, the movement of the second hook configuration between the first position and second position operates regardless of the number of positions of the at least one actuator. For example, the actuator of some windows has only two positions, namely a latched condition and an unlatched condition. However, some windows such as tilt and turn windows which open on two axes and also tilt open when required, have three positions, namely a latched position and two unlatched positions. Hinges are preferably provided at one side of the fixed surround frame to allow the movable leaf to swing open normally when the actuator is in a first unlatched position and the movable leaf may also be tilted from the bottom with the top angled into the room when the actuator is in a second unlatched position. Usually, turning the actuator handle of a tilt and turn window through 90° allows the movable leaf to swing open normally hinged from one side, and turning the actuator handle of a tilt and turn window through 180° allows the movable leaf to tilt from the bottom with the top angled into the room. In both of the unlatched positions, the second hook configuration of the invention will preferably be in the second position allowing movement of the movable leaf. In the latched position, the second hook configuration of the invention will preferably be in the first position.

[0016] The at least one actuator may be associated with a drive mechanism comprising one or more drive bars of a window or door to latch and unlatch the window or door. The drive mechanism is preferably mounted to the movable leaf of the window or door. The drive mechanism or a part thereof may be mounted on the hinged side edge of the movable leaf.

[0017] A single drive bar may be provided. More than one drive bar may be provided. Where more than one drive bar is provided, there may be at least one upper drive bar and at least one lower drive bar. All of the drive bars may preferably be moved by operation of the at least one actuator. Where there is an upper drive bar and a lower drive bar, the upper drive bar is driven upwardly and the lower drive bar driven downwardly when the at least one actuator is operated and vice versa. The upper drive bar and lower drive bar may be moved in either direction into the latched position and into the opposite direction into the unlatched position.

[0018] The or each drive bar may be elongate. Each drive bar may preferably have at least one latching pin or member associated therewith, to latch and unlatch the window or door relative to the fixed surround frame. The latching pin may have an enlarged head at the end of an elongate shank. A receiving opening may be provided on a latch body, which is face mounted on at least one fixed surround frame member. Operation of the at least one actuator will typically move the or each drive bar, which in turn moves the associated latching pin between the latched and unlatched positions.

[0019] The reciprocating sliding engagement mechanism for a window or door of the present invention may be provided adjacent to but spaced slightly from the latch body of the latch mechanism of the window or door. More than one reciprocating, sliding engagement mechanism may be provided on each window or door.

[0020] The reciprocating, sliding engagement mechanism of an embodiment comprises a first hook configuration which is face mounted relative to the at least one fixed surround frame member and extends towards the at least one movable leaf.

[0021] The first hook configuration may preferably be fixed in position relative to the at least one fixed surround frame member. The first hook configuration is preferably not movable.

[0022] The first hook configuration is preferably face mounted. The first hook configuration may comprise a planar plate used to mount the first hook configuration relative to the at least one fixed surround frame member. One or more openings may be provided in the planar plate to receive fasteners, such as screws for instance, to fix the planar plate directly to the at least one fixed surround frame member. Any number of fasteners may be provided.

[0023] The first hook configuration preferably includes at least one hook member extending from the preferred planar plate. The or each hook member may extend from the plate at an angle. Preferably, the or each hook member extends from the planar plate perpendicularly. The or each hook member is preferably substantially C-shaped. A portion of the or each hook member may be formed integrally with the planar plate and then curves away from the plane of the planar plate. The hook member preferably terminates in a free end which is spaced from the plane of the planar plate. A separation gap may be defined between the free end of the or each hook member and the root of the hook member on the planar plate.

[0024] The or each hook member may be approximately between one quarter and one half of the length of the planar plate.

[0025] The or each hook member may preferably extend toward the outer side edge of the movable leaf when the movable leaf is in the closed condition.

[0026] The reciprocating, sliding engagement mechanism of an embodiment comprises a second hook configuration which is face mounted relative to the at least one moveable leaf and extends towards the at least one fixed surround frame member.

[0027] The second hook configuration may preferably be movable relative to the at least one moveable leaf.

[0028] The second hook configuration is preferably face mounted to an outer side edge of the at least one moveable leaf. The second hook configuration is preferably oriented to face the inner side edge of the at least one fixed surround frame member.

[0029] The second hook configuration may be mounted for movement with a drive bar of a latch mechanism of the window or door.

[0030] The second hook configuration may comprise a planar plate used to mount the second hook configuration relative to the at least one moveable leaf. One or more openings may be provided in the planar plate to receive fasteners, such as screws for instance, to fix the planar plate directly to the outer side edge of the at least one moveable leaf. Any number of fasteners may be provided.

[0031] The second hook configuration preferably includes at least one hook member extending from the preferred planar plate. The or each hook member may extend from the plate at an angle. Preferably, the or each hook member extends from the planar plate perpendicularly. The or each hook member is preferably substantially C-shaped. A portion of the or each hook member may be formed integrally with the planar plate and then curve away from the plane of the planar plate. The hook member may terminate in a free end which is spaced from the plane of the planar plate. A separation gap may be defined between the free end of the or each hook member and the root of the hook member on the planar plate.

[0032] The or each hook member may be approximately between one eighth and one half of the length of the planar plate.

[0033] The or each hook member of the second hook configuration may preferably extend toward the inner side edge of the fixed surround frame member when the movable leaf is in the closed condition.

[0034] An elongate slot opening may be provided in the planar plate of the second hook configuration. The elongate slot may be coaxial with the direction of reciprocal movement of the second hook configuration.

[0035] A guide member or assembly may be provided relative to the elongate slot. The guide member may be releasably securable in position relative to the moveable leaf, for example using a fastener such as a screw or similar. The guide member may have a body which is larger than the periphery of the elongate slot to restrain the planar plate of the second hook configuration into the reciprocal, sliding movement. The guide member may be releasably secured in position relative to the moveable leaf to act as a limit stop for the second hook configuration. The guide member may also function as a fixing point for the second hook configuration local to the juxtaposed hook members when the window or door is closed, and the second hook configuration is in the first position.

[0036] The reciprocating, sliding engagement mechanism of an embodiment is preferably mounted to the window or door adjacent to any latching arrangement of the window or door. In arrangements in which a pair of opposed drive bars are provided, one upper drive bar and one lower drive bar, each with a latching pin, a reciprocating, sliding engagement mechanism may be provided above the latching pin of the upper drive bar and below the latching pin of the lower drive bar.

[0037] In use, the second hook configuration is preferably slidably movable relative to the first hook configuration between a first position in which the first hook configuration and the second hook configuration are juxtaposed to secure the at least one moveable leaf relative to at least one fixed surround frame member and a second position in which the first hook configuration and the second hook configuration are separated from one another, by operation of the at least one actuator.

[0038] Although it may be preferable for the second hook configuration to be movable and the first hook configuration to be fixed in position, the reverse could be used, in which the first hook configuration is movable and the second hook configuration to be fixed in position, or both the first hook configuration and the second hook configuration may be movable although this would add to complexity.

Detailed Description of the Invention

[0039] In order that the invention may be more clearly understood one or more embodiments thereof will now be described, by way of example only, with reference to the accompanying drawings, of which:

Figure 1 is an axonometric view of a fixed surround frame member and a moveable window leaf (open) with a reciprocating, sliding engagement mechanism of an embodiment in a separated condition.

Figure 2 is an axonometric view of the configuration illustrated in Figure 1 in the juxtaposed condition.

Figure 3 is a partial view of an upper corner of a fixed surround frame member and a moveable window leaf (open) with a reciprocating, sliding engagement mechanism of an embodiment in a separated condition.

Figure 4 is a view of the configuration illustrated in Figure 3 from slightly below.

Figure 5 is a section view from above of the configuration illustrated in Figure 3 when the moveable window leaf is closed showing the relative positions of the first and second hook configurations.

[0040] An embodiment of a reciprocating, sliding engagement mechanism for a window or door is illustrated in the Figures.

[0041] Importantly in relation to the Figures, the moveable leaf 10 of a window or door is illustrated in the unlatched and ajar condition, to show the relative positions

of the first hook configuration 11 and the second hook configuration 12 and to see their component parts. In use, the moveable leaf 10 of the window or door would be fully closed, bringing the inner face of the fixed surround frame member 13 and the outer face of the moveable leaf 10 closer together and preferably parallel as well as locating the planar plates of the respect hook formations parallel to one another, and spaced apart.

[0042] Only the side frame members of the moveable leaf 10 and fixed surround frame are illustrated to show the working components. The window or door will normally have an actuator handle (not shown) for latching the moveable leaf relative to the fixed surround frame member.

[0043] The illustrated mechanism comprises:

a) A first hook configuration 11 face mounted relative to the fixed surround frame member 13, and extending towards the moveable leaf 10; and

b) A second hook configuration 12 face mounted relative to the moveable leaf 10 and extending towards the fixed surround frame member 13.

[0044] In use, the second hook configuration 12 is slidably movable relative to the first hook configuration 11, between a first position shown in Figures 2 and 5 in which the first hook configuration 11 and the second hook configuration 12 are juxtaposed to secure the moveable leaf 10 relative to the fixed surround frame member 13 and a second position shown in Figures 1, 3 and 4, in which the first hook configuration 11 and the second hook configuration 12 are separated from one another.

[0045] In the second position, the first hook configuration 11 and the second hook configuration 12 are fully separated from one another to allow operation of the moveable leaf 10.

[0046] As shown in Figures 1 and 2 in particular, the second hook configuration 12 undergoes a sliding movement between the first position and the second position and vice versa. The movement is a reciprocating movement, driven by the actuator of the window or door.

[0047] The actuator (not shown) is preferably associated with a drive mechanism comprising one or more drive bars of a window or door, to latch and unlatched the window or door. The drive mechanism is preferably mounted to the movable leaf 10 of the window or door, on the hinged side edge of the movable leaf 10.

[0048] Each drive bar may be elongate and has a latching pin 14 associated therewith, to latch and unlatched the window or door relative to the fixed surround frame 13. As illustrated, the latching pin 14 has an enlarged head at the end of an elongate shank. A receiving opening 15 is provided on a latch body 16, which is face mounted on the fixed surround frame member 13. Operation of the actuator can then move the drive bar which moves the associated latching pin 14 between the latched and unlatched positions relative to the latch body 16.

[0049] The reciprocating sliding engagement mechanism shown is provided adjacent to, but spaced slightly from the latch body 16 of the latch mechanism of the window or door.

[0050] The reciprocating, sliding engagement mechanism of an embodiment comprises a first hook configuration which is face mounted relative to the at least one fixed surround frame member and extends towards the at least one movable leaf.

[0051] The first hook configuration 11 of the illustrated embodiment is fixed in position relative to the fixed surround frame member 13.

[0052] As shown, the first hook configuration 11 is face mounted. The first hook configuration 11 comprises a planar plate 17 used to mount the first hook configuration 11 relative to the fixed surround frame member 13. Openings are provided in the planar plate 17 to receive fasteners such as screws as shown, to fix the planar plate 17 directly to the fixed surround frame member 13.

[0053] The first hook configuration 11 also includes a hook member 18 extending from the planar plate 17. The hook member 18 of the illustrated embodiment is substantially C-shaped. A portion of the hook member 18 is formed integrally with the planar plate 18 and then curves away from the plane of the planar plate 18 and terminates in a free end which is spaced from the plane of the planar plate 18. A separation gap is defined between the free end of the hook member 18 and the root of the hook member 18 on the planar plate 17. The free end of a hook member of the second hook configuration 12 moves into this separation gap when moved into the first position.

[0054] The hook member 18 is approximately one quarter of the length of the planar plate 18.

[0055] The hook member 18 is oriented toward the outer side edge of the movable leaf 10 when the movable leaf 10 is in the closed condition.

[0056] The second hook configuration 12 is movable relative to the moveable leaf 10.

[0057] The second hook configuration 12 is face mounted to an outer side edge of the moveable leaf 10. The second hook configuration is oriented to face the inner side edge of the fixed surround frame member 13.

[0058] The second hook configuration 11 comprises a planar plate 19 used to mount the second hook configuration 12 relative to the moveable leaf 10. One or more openings are provided in the planar plate 19 to receive fasteners such as screws to fix the planar plate 19 directly to the outer side edge of the moveable leaf 10.

[0059] The second hook configuration 11 of the illustrated embodiment is mounted for movement with a drive bar 25 of a latch mechanism of the window or door. The drive bar 25 is positioned in a channel in the edge of the movable leaf 10 and covered in the illustrated embodiment by a faceplate against which an inner face of the planar plate of the second hook configuration 12 rides during movement.

[0060] The second hook configuration 12 includes a hook member 20 extending from the planar plate 19. The

hook member 20 is also substantially C-shaped. A portion of this hook member 20 is formed integrally with the planar plate 19 and then curves away from the plane of the planar plate 19 and terminates in a free end spaced from the plane of the planar plate 19. A separation gap is defined between the free end of the hook member 20 and the root of the hook member 20 on the planar plate 19. The free end of the hook member 18 of the first hook configuration 11 is received in the separation gap of the hook member 20 of the second hook configuration 12.

[0061] As shown, this hook member 20 is also approximately one quarter of the length of the planar plate 19.

[0062] The hook member 20 of the second hook configuration 12 extends toward the inner side edge of the fixed frame member 13 when the movable leaf 10 is in the closed condition.

[0063] In the embodiment illustrated, an elongate slot opening 21 is provided in the planar plate 19 of the second hook configuration 12. The elongate slot 21 of the illustrated embodiment is coaxial with the direction of reciprocal movement of the second hook configuration 12. A guide member 22 is provided relative to the elongate slot 21. The guide member 22 is releasably securable in position relative to the moveable leaf 10, for example using a fastener such as a screw or similar. The guide member 22 has a body which is larger than the periphery of the elongate slot 21 to restrain the planar plate 19 of the second hook configuration 12 into the reciprocal, sliding movement. The guide member 22 is releasably secured in position relative to the moveable leaf 10 to act as a limit stop for the second hook configuration 12. The guide member 22 also functions as a fixing point for the second hook configuration 12 local to the juxtaposed hook members 18, 20 when the window or door is closed, and the second hook configuration 12 is in the first position.

[0064] As shown in the Figures, the reciprocating, sliding engagement mechanism of an embodiment is preferably mounted to the window or door adjacent to any latching arrangement of the window or door. In arrangements in which a pair of opposed drive bars are provided, one upper drive bar and one lower drive bar, each with a latching pin 14, a reciprocating, sliding engagement mechanism may be provided above the latching pin 14 of the upper drive bar and below the latching pin of the lower drive bar.

[0065] In use, the second hook configuration 12 is preferably slidably movable relative to the first hook configuration 11 between a first position in which the first hook configuration 11 and the second hook configuration 12 are juxtaposed to secure the moveable leaf 10 relative to fixed surround frame member 13 and a second position in which the first hook configuration 11 and the second hook configuration 12 are separated from one another.

[0066] The one or more embodiments are described above by way of example only. Many variations are possible without departing from the scope of protection afforded by the appended claims.

Claims

1. A reciprocating, sliding engagement mechanism for a window or door comprising at least one moveable leaf mounted relative to at least one fixed surround frame member and at least one actuator for locking or latching the at least one moveable leaf relative to the at least one fixed surround frame member, the mechanism comprising:

   a) A first hook configuration face mounted relative to the at least one fixed surround frame member, and extending towards the at least one moveable leaf;
   b) A second hook configuration face mounted relative to the at least one moveable leaf, and extending towards the at least one fixed surround frame member,

   the second hook configuration slidably movable relative to the first hook configuration between a first position in which the first hook configuration and the second hook configuration are juxtaposed to secure the at least one moveable leaf relative to at least one fixed surround frame member and a second position in which the first hook configuration and the second hook configuration are separated from one another, by operation of the at least one actuator.

2. A reciprocating, sliding engagement mechanism as claimed in claim 1 wherein in the second position, the first hook configuration and the second hook configuration are fully separated from one another to allow operation of the moveable leaf.

3. A reciprocating, sliding engagement mechanism as claimed in any one of the preceding claims wherein the first hook configuration is fixed in position relative to the at least one fixed surround frame member.

4. A reciprocating, sliding engagement mechanism as claimed in any one of the preceding claims wherein the first hook configuration comprises a planar plate to mount the first hook configuration relative to the at least one fixed surround frame member and optionally wherein a portion of the or each hook member is formed integrally with the planar plate, curves away from a plane of the planar plate and terminates in a free end which is spaced from the plane of the planar plate with a separation gap defined between the free end of the or each hook member and a root of the hook member on the planar plate.

5. A reciprocating, sliding engagement mechanism as claimed in any one of the preceding claims wherein the second hook configuration comprises a planar plate to mount the second hook configuration relative to the at least one moveable leaf and optionally

wherein a portion of the or each hook member is formed integrally with the planar plate, curves away from a plane of the planar plate and terminates in a free end which is spaced from the plane of the planar plate with a separation gap defined between the free end of the or each hook member and a root of the hook member on the planar plate.

6. A reciprocating, sliding engagement mechanism as claimed in claim 5 further comprising an elongate slot opening provided in the planar plate of the second hook configuration and optionally wherein the elongate slot is coaxial with a direction of reciprocal movement of the second hook configuration.

7. A reciprocating, sliding engagement mechanism as claimed in claim 6 further comprising a guide member or assembly provided relative to the elongate slot and optionally wherein the guide member is releasably securable in position relative to the moveable leaf.

8. A reciprocating, sliding engagement mechanism as claimed in claim 7 wherein the guide member has a body which is larger than a periphery of the elongate slot to restrain the planar plate of the second hook configuration into the reciprocal, sliding movement.

9. A window or door system comprising a moveable leaf hinged within a fixed surround frame and the reciprocating, sliding engagement mechanism as claimed in any one of the preceding claims mounted adjacent to a latching arrangement of the window or door.

10. A window or door system as claimed in claim 9 wherein the latching arrangement comprises at least one drive bar associated with the at least one actuator, each drive bar having a latching pin or member associated therewith, to latch and unlatch the window or door relative to the fixed surround frame, and the second hook configuration is mounted for movement with the at least one drive bar.

11. A reciprocating, sliding engagement mechanism as claimed in claim 10 wherein operation of the at least one actuator moves the at least one drive bar which moves the associated latching pin between the latched and unlatched positions and contemporaneously moves the second hook configuration between the first position and second position respectively.

12. A reciprocating, sliding engagement mechanism as claimed in any one of claims 9 to 11 wherein the second hook configuration is mounted on a hinged side edge of the movable leaf.

13. A reciprocating, sliding engagement mechanism as claimed in any one of claims 9 to 12 wherein the reciprocating sliding engagement mechanism is provided adjacent to, but spaced from a latch body of a latch mechanism of the window or door.

14. A reciprocating, sliding engagement mechanism as claimed in any one of claims 9 to 13 wherein the second hook configuration extends toward an inner side edge of the at least one fixed surround frame member when the movable leaf is in the closed condition.

15. A reciprocating, sliding engagement mechanism as claimed in claim 14 wherein the first hook configuration extends toward an outer side edge of the at least one movable leaf when the movable leaf is in the closed condition.

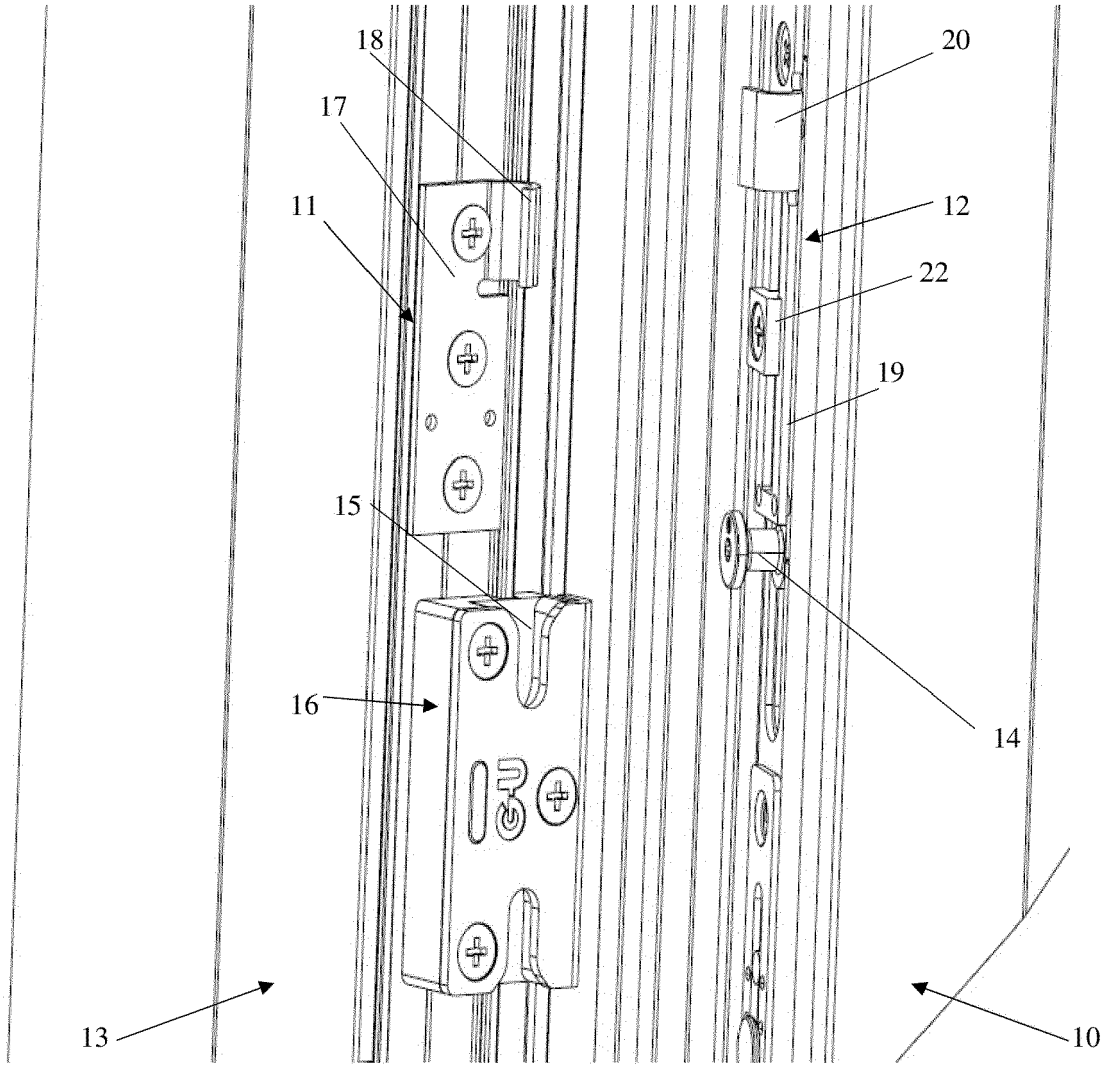

Figure 1

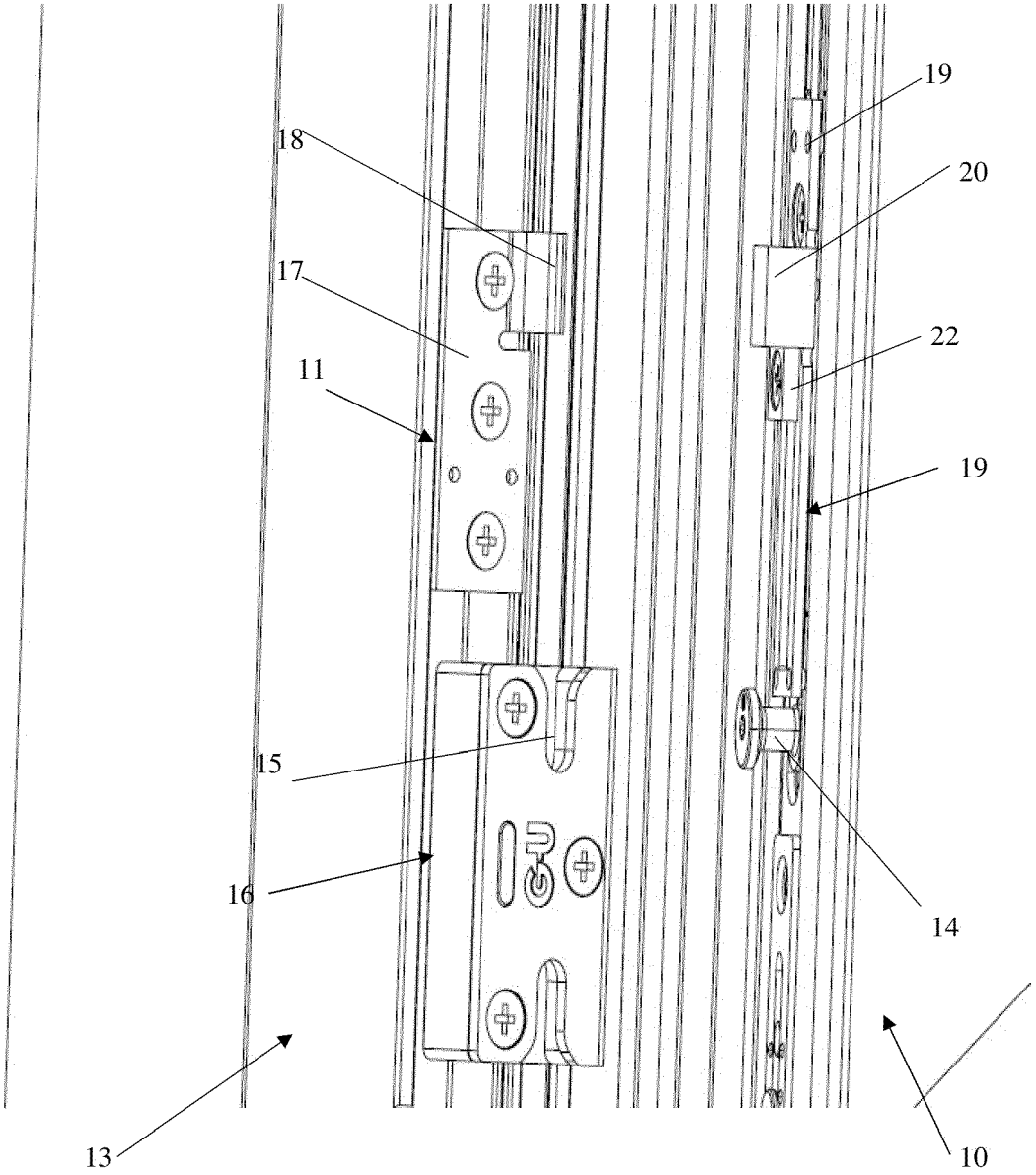

Figure 2

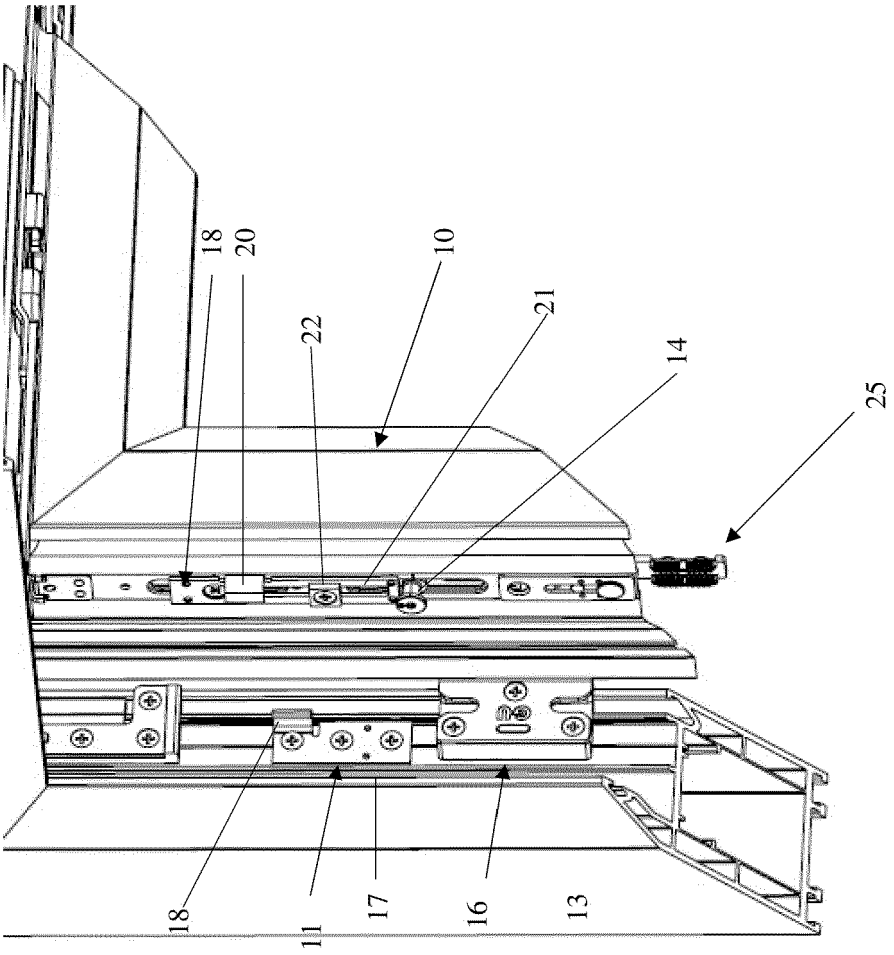

Figure 3

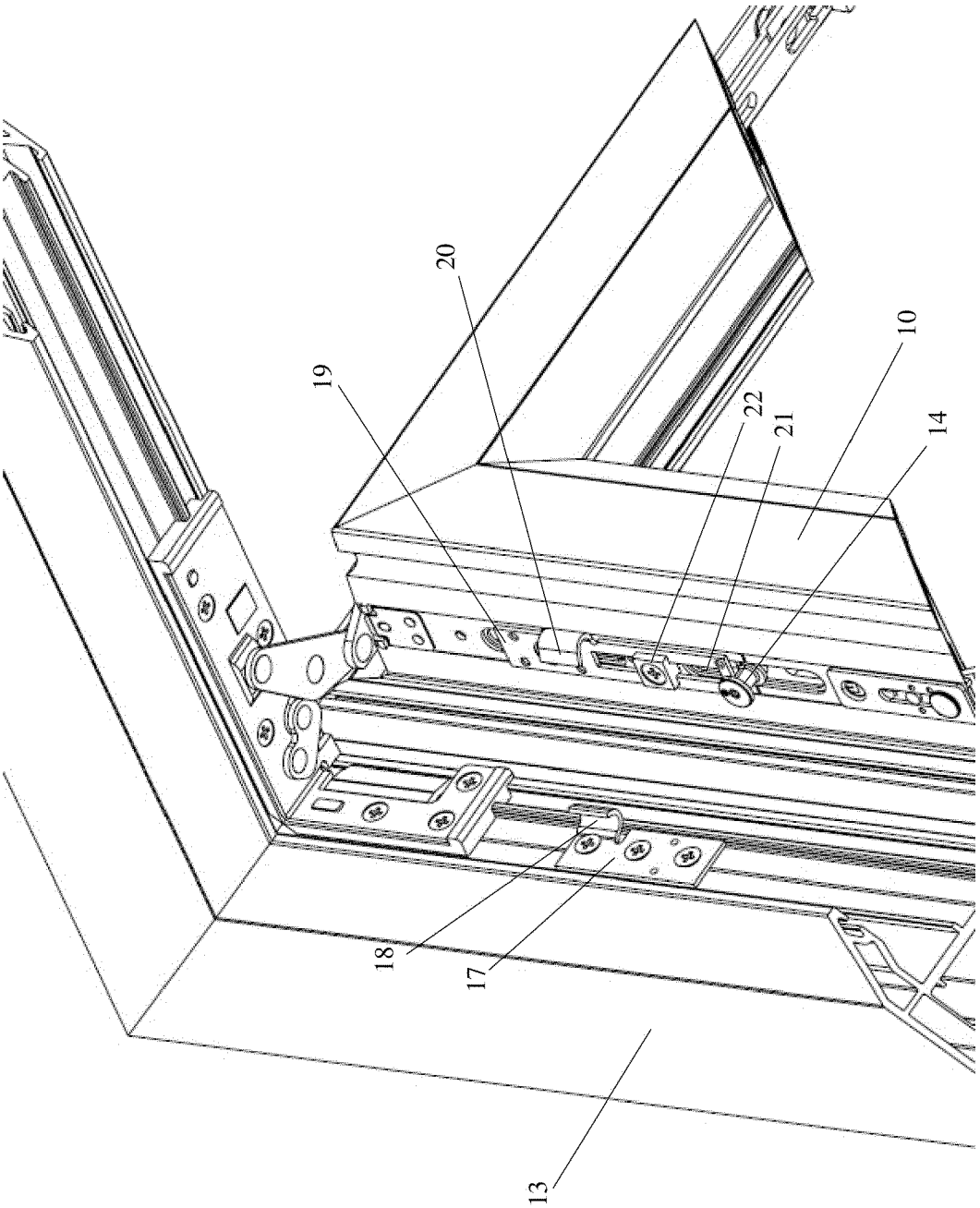

Figure 4

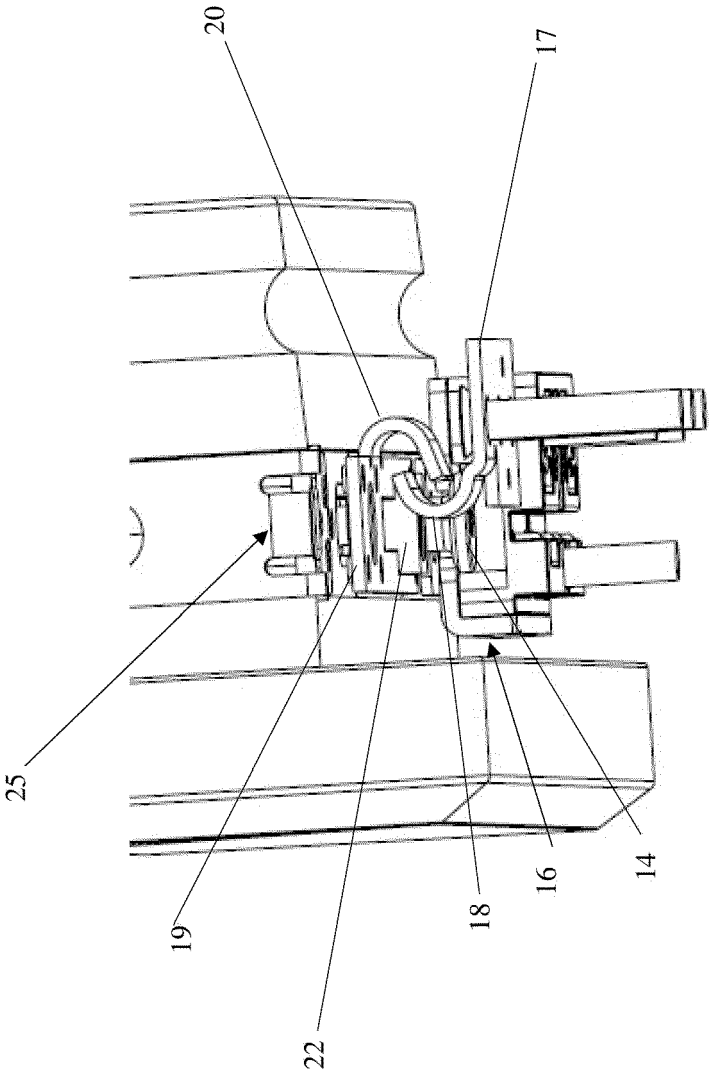

Figure 5

Europäisches Patentamt
European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 23 18 7469

DOCUMENTS CONSIDERED TO BE RELEVANT

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