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(54) **SECURING DEVICE FOR SECURING A GLASS PANEL TO A PROFILE**

(57) The securing device for securing a glass panel to a profile comprises an enveloping structural profile (10) having an open longitudinal cavity (11) sized for receiving a portion adjacent to an edge (V1) of a glass panel (V), and a securing mechanism installed in the open longitudinal cavity (11) and operable by at least one tightening screw (40) for catching the portion adjacent to the edge (V1) of the glass panel (V) in the longitudinal cavity (11). The securing mechanism comprises clamping elements (22a, 22b) formed in respective symmetrical rockers (20a, 20b) arranged inside the longitudinal cavity (11) and articulated to the structural profile (10) such that they can symmetrically swing about respective axes of rotation (Ea, Eb) located adjacent to two respective side walls (12a, 12b) of the structural profile (10) through actuation of the tightening screw (40).

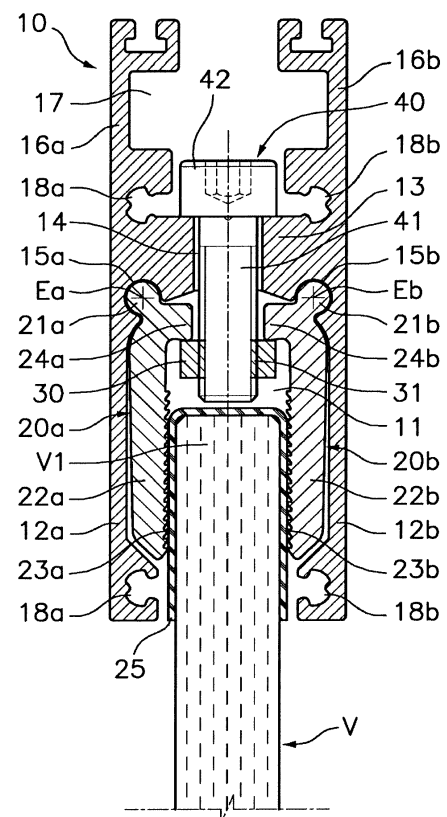


Fig. 1

Description

Field of the Art

[0001] The present invention relates to a securing device for securing a glass panel to a profile applicable primarily, although not exclusively, to the field of sliding doors or hinged doors provided with glazed door leaves without side posts.

Background of the Invention

[0002] Conventionally, the glass panel in glazed door leaves without side posts must be secured by means of silicones or other chemical compounds to an upper profile and/or to a lower profile made of extruded aluminum, for example.

[0003] Profiles with mechanical securing devices providing alternatives to the chemical solution are known, although some of them require tempered glass panels to allow specific mechanizations thereof. Other profiles with known mechanical securing devices have parts of a securing mechanism being visible from the outer part of the profile, ruining the esthetic quality of the assembly, or they do not assure a correct positioning of the glass panel in relation to the profile, for example, parallel placement of the larger planar faces of the glass panel with respect to outer faces of the profile, or they do not allow the profile to be symmetrical with respect to a central plane of the glass panel parallel to the larger planar faces thereof.

Brief Description of the Invention

[0004] The present invention provides a securing device for securing a glass panel to a profile, which acts by means of a mechanical system without having to use silicones or other chemical compounds.

[0005] The securing device for securing a glass panel to a profile according to the present invention comprises a structural profile having an open longitudinal cavity sized for receiving a portion adjacent to an edge of a glass panel, and a securing mechanism installed in said open longitudinal cavity and operable by one or more tightening screws for catching the mentioned portion adjacent to the edge of said glass panel in said longitudinal cavity.

[0006] The securing mechanism comprises a pair of symmetrical rockers arranged inside the longitudinal cavity and hinge devices through which said rockers can symmetrically swing about respective axes of rotation located adjacent to side walls of the profile, respectively. The mentioned rockers have respective clamping elements facing one another extending adjacent to said side walls, respectively, leaving enough space between them to receive said portion adjacent to the edge of the glass panel. The rockers are actuated by the one or more tightening screws for symmetrically pressing on larger oppos-

ing faces of the portion adjacent to the edge of the glass panel with the clamping elements.

[0007] The longitudinal cavity of the structural profile is defined by the two mentioned side walls and a transverse wall extending from one of said side walls to the other. Said transverse wall has one or more through holes through which threaded shanks of said one or more tightening screws are inserted. The transverse wall furthermore has a surface opposite the longitudinal cavity on which heads of the one or more tightening screws rest.

[0008] The rockers further comprise, for example, respective lever arms extending towards one another adjacent to said transverse wall, and a pressure member is arranged for making contact with said lever arms of the rockers on a side thereof opposite the transverse wall. The mentioned pressure member has one or more threaded holes in which said threaded shanks of the one or more tightening screws are coupled.

[0009] Thus, by applying a tightening torque to the one or more tightening screws, the pressure member is attracted to the transverse wall pushing the lever arms of the rockers towards the transverse wall, which causes the rockers to swing in opposite directions such that the clamping elements move towards the glass panel pressing against larger opposing faces of the portion adjacent to the edge of the glass panel.

[0010] By applying a suitable tightening torque, this securing mechanism is capable of gripping the glass panel with enough force to withstand stresses regulated by law and to prevent the glass panel from coming out due to its own weight when the profile is fixed to an upper edge of the glass panel and the glass panel is suspended from the profile. Furthermore, by loosening the one or more tightening screws, the glass panel can be easily uninstalled and replaced.

[0011] The clamping elements of the rockers preferably comprise respective corrugated contact surfaces pressing on the larger opposing planar faces of the portion adjacent to the edge of the glass panel. Optionally, a plastic sheath is arranged covering the portion adjacent to the edge of the glass panel, such that said plastic sheath is interposed between the clamping elements of the rockers and the glass panel. Both the corrugated contact surfaces and the plastic sheath improve gripping between rockers and the glass panel.

[0012] In one embodiment, the hinge devices comprise respective hinge elements projecting from the rockers and inserted in corresponding guide housings formed in the structural profile. The mentioned hinge elements and said guide housings are aligned with said axes of rotation of the rockers, respectively.

[0013] The structural profile preferably further comprises two additional side walls extending from the transverse wall in directions opposite the two side walls defining the cavity, and these two additional side walls together with the transverse wall define an additional cavity in which said heads of the one or more tightening screws are housed. Therefore, the additional side walls of the

structural profile conceal the heads of the one or more screws from being seen from side viewing points.

[0014] In a particular embodiment, the two additional side walls have outer planar surfaces coplanar with outer planar surfaces of the side walls, respectively. More particularly, these outer planar surfaces of the side walls and additional side walls are parallel to one another and parallel to the larger opposing planar faces of the glass panel in an operative situation.

[0015] Regardless of the embodiment of the outer surfaces of the structural profile, both the structural profile and the rockers are symmetrical with respect to a geometric mid-plane comprising the axes of the one or more through holes. In such case, and given that the clamping elements of the rockers symmetrically press on the glass panel, in an operative situation, the glass panel is centered in relation to said geometric mid-plane and with the larger opposing planar faces thereof parallel to the geometric mid-plane, regardless of the thickness of the glass panel within a range of pre-determined allowed thicknesses.

[0016] Some of the advantages of the securing device of the present invention in relation to other devices of the prior art are:

- One and the same type of profile allows supporting glasses having different thicknesses (for example, ± 2 mm with respect to the nominal dimension of the profile).
- It allows securing different types of glass panels, such as tempered glass, laminated glass, and laminated tempered glass, among others.
- All the mechanical elements forming the securing mechanism, such as clamps, screws and nuts, are concealed.
- The external shape and dimensions of the cross-section of the profile remain unchanged regardless of the thickness of the glass panel or of the tightening force necessary for securing it, which allows finishing the ends of the profile with decorative caps.

Brief Description of the Drawings

[0017] The foregoing and other features and advantages will be better understood based on the following detailed description of a merely illustrative and non-limiting embodiment with reference to the attached drawing in which:

Figure 1 is a cross-section view of a securing device for securing a glass panel to a profile according to an embodiment of the present invention.

Detailed Description of an Embodiment

[0018] Figure 1 shows a securing device for securing a glass panel to a profile according to an embodiment of the present invention, which comprises a structural pro-

file 10 having two side walls 12a, 12b, a transverse wall 13 extending from one of said side walls 12a, 12b to the other, and two additional side walls 16a, 16b extending from the transverse wall 13 in directions opposite the two side walls 12a, 12b, such that the structural profile 10 has a substantially H-shaped cross-section.

[0019] The two side walls 12a, 12b together with the transverse wall 13 define an open longitudinal cavity 11 sized for receiving a portion adjacent to an edge V1 of a glass panel V, and the two additional side walls 16a, 16b together with the transverse wall 13 define an additional cavity 17. The two additional side walls 16a, 16b have outer planar surfaces coplanar with outer planar surfaces of the side walls 12a, 12b, respectively, and these outer planar surfaces of the side walls 12a, 12b and additional side walls 16a, 16b are parallel to one another.

[0020] There is installed inside the open longitudinal cavity 11 a securing mechanism which is operable by tightening screws 40 for catching said portion adjacent to the edge V1 of said glass panel V in said longitudinal cavity 11. The securing mechanism comprises a pair of rockers 20a, 20b and a pressure member 30 which are arranged inside the longitudinal cavity 11, and the mentioned pressure member is coupled to said tightening screws 40 as described below.

[0021] The two rockers 20a, 20b have respective projecting hinge elements 21a, 21b which are inserted into corresponding guide housings 15a, 15b formed in the structural profile 10 in positions adjacent to the side walls 12a, 12b and to the transverse wall 13. These hinge elements 21a, 21b and these guide housings 15a, 15b are configured such that they allow relative rotation about respective axes of rotation Ea, Eb parallel to a longitudinal direction of the structural profile 10. Therefore, the rockers 20a, 20b can swing about respective axes of rotation Ea, Eb.

[0022] The two rockers 20a, 20b furthermore have respective clamping elements 22a, 22b extending adjacent to inner surfaces of the side walls 12a, 12b, respectively, and respective lever arms 24a, 24b extending towards one another in positions adjacent to said transverse wall 13. The mentioned clamping elements 22a, 22b are facing one another and leave enough space between them to receive the portion adjacent to the edge V1 of the glass panel V.

[0023] The mentioned pressure member 30 is arranged in a suitable position for making contact with both lever arms 24a, 24b of the rockers 20a, 20b on a side of the lever arms 24a, 24b opposite the transverse wall 13. The rockers 20a, 20b are in the form of rocker profiles extending along at least part of the structural profile 10, and the pressure member 30 is in the form of a flat bar extending entirely along the rocker profiles.

[0024] The transverse wall 13 of the structural profile 10 has a series of parallel through holes 14 separated from one another and comprised in the geometric mid-plane. The pressure member 30 has a series of threaded holes 31 aligned with the through holes 14 formed in the

transverse wall 13 of the structural profile 10. In fact, the structural profile 10, the rockers 20a, 20b and the pressure member 30 are symmetrical with respect to said geometric mid-plane.

[0025] The mentioned tightening screws 40 have threaded shanks 41 inserted into the through holes 14 formed in the transverse wall 13 of the structural profile 10, passing between the lever arms 24a, 24b of the rockers 20a, 20b and screwed in the threaded holes 31 formed in the pressure member 30, and heads 42 resting on a surface of the transverse wall 13 located on a side thereof opposite the longitudinal cavity 11.

[0026] The heads 42 of the tightening screws 40 are housed in the mentioned additional cavity 17 of the structural profile 10, such that no element of the securing mechanism is visible on the outer planar surfaces of the side walls 12a, 12b and additional side walls 16a, 16b, which are the esthetic surfaces of the structural profile 10.

[0027] The clamping elements 22a, 22b of the rockers 20a, 20b have respective corrugated contact surfaces 23a, 23b provided for pressing on the larger opposing planar faces of the portion adjacent to the edge V1 of the glass panel V. The portion adjacent to the edge V1 of the glass panel V is covered by a plastic sheath 25 that is interposed between the clamping elements 22a, 22b of the rockers 20a, 20b and the glass panel V.

[0028] The structural profile 10 has inner longitudinal grooves 18a, 18b defining, at the ends of the structural profile 10, openings provided for receiving screws (not shown) used for fixing decorative caps (not shown) closing the ends of the structural profile 10 and concealing the elements of the securing mechanism from being seen from end viewing points.

Claims

1. A securing device for securing a glass panel to a profile, including an enveloping structural profile (10) having an open longitudinal cavity (11) sized for receiving a portion adjacent to an edge (V1) of a glass panel (V), and a securing mechanism installed in said open longitudinal cavity (11) and operable by at least one tightening screw (40) for catching said portion adjacent to the edge (V1) of said glass panel (V) in said longitudinal cavity (11), **characterized in that** said securing mechanism comprises clamping elements (22a, 22b) formed in respective symmetrical rockers (20a, 20b) arranged inside the longitudinal cavity (11) and articulated to said structural profile (10) such that they can symmetrically swing about respective axes of rotation (Ea, Eb) located adjacent to two respective side walls (12a, 12b) of the structural profile (10) through actuation of said tightening screw (40).
2. The securing device according to claim 1, **characterized in that** the longitudinal cavity (11) of the

structural profile (10) is defined by said two side walls (12a, 12b) and a transverse wall (13) extending from one of said side walls (12a, 12b) to the other, where said transverse wall (13) has at least one through hole (14) through which a threaded shank (41) of said tightening screw (40) is inserted and a surface opposite the longitudinal cavity (11) on which the head (42) of the tightening screw (40) rests, said rockers (20a, 20b) being actuated by the tightening screw (40) for symmetrically pressing on larger opposing faces of the portion adjacent to the edge (V1) of the glass panel (V) with the clamping elements (22a, 22b).

3. The securing device according to claim 2, **characterized in that** the clamping elements (22a, 22b) of the rockers (20a, 20b) respectively extend adjacent to the side walls (12a, 12b) of the structural profile (10), and the rockers (20a, 20b) furthermore have respective lever arms (24a, 24b) extending towards one another adjacent to said transverse wall (13), and a pressure member (30) is arranged for making contact with said lever arms (24a, 24b) of the rockers (20a, 20b) on a side thereof opposite the transverse wall (13), said pressure member (30) having at least one threaded hole (31) in which said threaded shank (41) of the tightening screw (40) is coupled.
4. The securing device according to claim 1, 2 or 3, **characterized in that** said clamping elements (22a, 22b) comprise respective corrugated contact surfaces (23a, 23b) provided for pressing on larger opposing faces of the portion adjacent to the edge (V1) of the glass panel (V).
5. The securing device according to any one of the preceding claims, **characterized by** comprising a plastic sheath (25) covering the portion adjacent to the edge (V1) of the glass panel (V), said plastic sheath (25) being interposed between the clamping elements (22a, 22b) of the rockers (20a, 20b) and the glass panel (V).
6. The securing device according to claim 1, **characterized in that** the rockers (20a, 20b) comprise respective projecting hinge elements (21a, 21b) which are inserted into corresponding guide housings (15a, 15b) formed in the structural profile (10), said hinge elements (21a, 21b) and said guide housings (15a, 15b) defining hinge devices aligned with said axes of rotation (Ea, Eb), respectively.
7. The securing device according to any one of the preceding claims, **characterized in that** the structural profile (10) further comprises two additional side walls (16a, 16b) extending from the transverse wall (13) in directions opposite the two side walls (12a, 12b), where said two additional side walls (16a, 16b)

together with the transverse wall (13) define an additional cavity (17) in which said head (42) of the tightening screw (40) is housed.

8. The securing device according to claim 6, **characterized in that** the two additional side walls (16a, 16b) have outer planar surfaces coplanar with outer planar surfaces of the side walls (12a, 12b), respectively. 5
9. The securing device according to claim 7, **characterized in that** said outer planar surfaces of the side walls (12a, 12b) and additional side walls (16a, 16b) are parallel to one another. 10
10. The securing device according to any one of the preceding claims, **characterized in that** the structural profile (10) and the rockers (20a, 20b) are symmetrical with respect to a geometric mid-plane comprising the axis of the through hole (14). 15
11. The securing device according to any one of the preceding claims, **characterized in that** the rockers (20a, 20b) are in the form of rocker profiles, and the pressure member (30) is in the form of a flat bar, where the transverse wall (13) has several of said through holes (14) parallel to one another and comprised in a geometric mid-plane, and the pressure member (30) has several of said threaded holes (31) aligned with said through holes (14). 20
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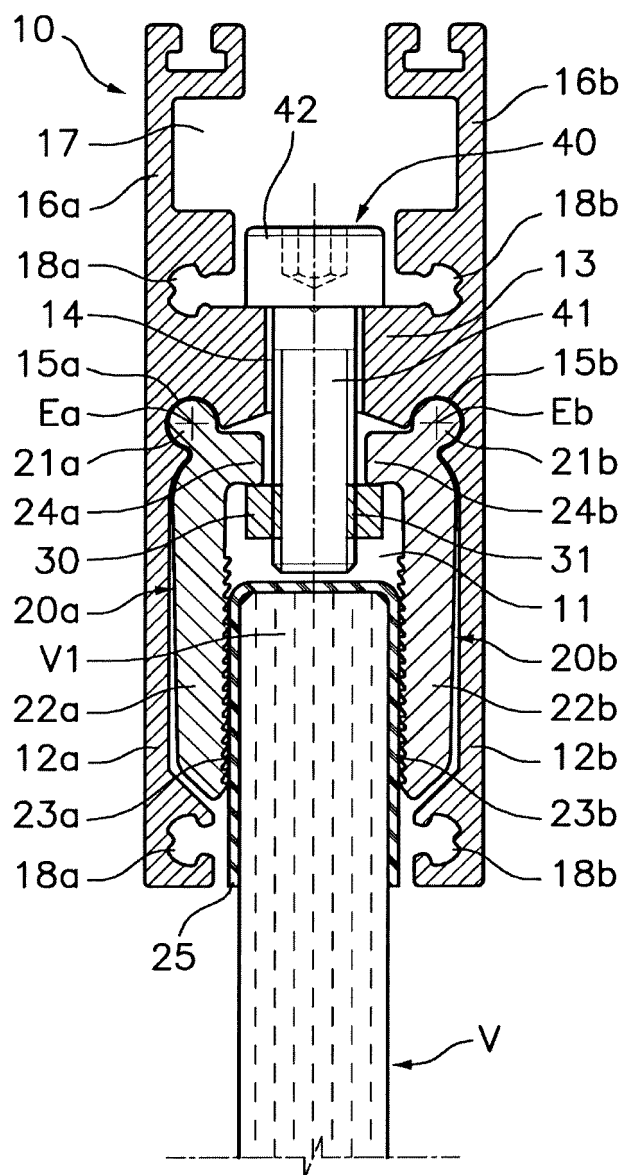


Fig. 1



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Application Number
EP 15 38 0007

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Place of search The Hague		Date of completion of the search 16 July 2015	Examiner Crespo Vallejo, D
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 15 38 0007

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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