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(71) Applicant: **TE sistemi s.r.l.**
47841 Cattolica RN (IT)

(72) Inventor: **Tegtmeier, Dietrich**
32584 Loehne (DE)

(74) Representative: **Negrini, Elena**
Agazzani & Associati S.r.l.
Studio Ing. Giampaolo Agazzani
Via dell'Angelo Custode 11/6
40141 Bologna (IT)

(54) Fixing device for a plate or panel

(57) A fixing device for at least a plate or panel (2) comprises matching means (4) for a first face (3) of a perimetrical portion of the plate or panel (2).

The device (1) comprises at least a fixing means (5) having a first longitudinal edge (6) with connecting means (7, 8) for the matching means (4) and a second longitudinal edge (9) having a joint (10) for sealing means (11) fit to match a second face (12) of said perimetrical portion of the plate or panel (2).

Such fixing means (5) is moreover provided with longitudinal housing means (13), interposed between the longitudinal first (6) and second (9) edges, and fit for housing an expansion means (14).

In a fixing condition, the expansion means (14) into the housing means (13) causes at least a light deformation of the fixing means (5) in consequence of that the joint (10) and the respective sealing means (11) translate at least slightly towards the second face (12) of the perimetrical portion of plate or panel (2) so becoming locked and fixed between matching means (4) and sealing means (11).

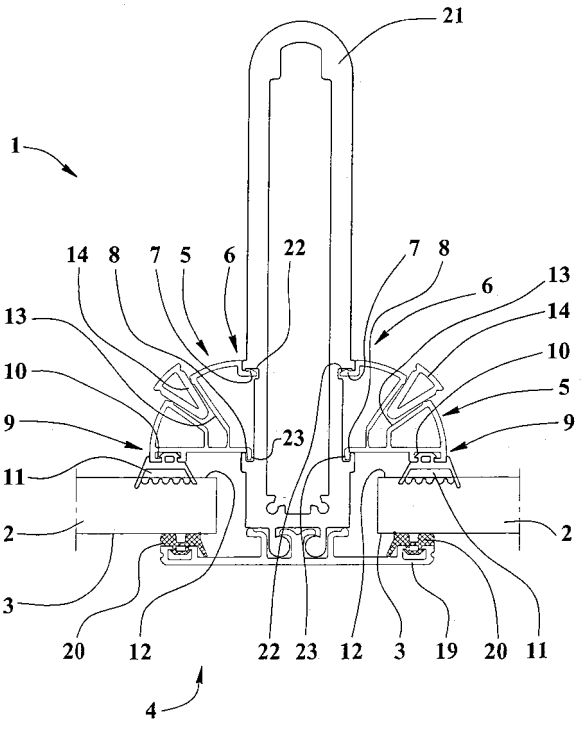

FIG.1

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Description

[0001] The present invention relates to doors, windows, canopies and device for fastening plate or panel on chassis and structures, particularly suitable to carry out roofs or glass canopies, windows, doors, glazing panels and the like.

[0002] To carry out roofs, canopies and glazing panels, there are known glass snapping fastener means fit to be positioned on support beams and to house the edges of glasses, plates or panels. Said known snapping fastener means require the insertion of a sealing, for example made of rubber material, between the glass fastener means and glasses or plates.

[0003] A disadvantage of said glass fastener means consists in that the essential insertion of seals particularly on roofs, canopies or inclined or horizontal glazing panel is very difficult to carry out and presents risks of incomplete fastening and water infiltrations due to meteoric reason between the sealing and the glass or plate. Furthermore, the insertion of the sealing requires a lot of time increasing the risks for operators and the installation costs.

[0004] An object of the present invention is to propose a fixing device for a plate or panel which can be applied in very simple and fast manner.

[0005] Other object is to propose a device fit to provide a mechanical fixing and a sealing which are reliable and safe against the atmospheric agents.

[0006] The characteristics of the invention are underlined in following with particular reference to the enclosed drawings, in which:

- figure 1 shows a transversal sectional view of the fixing device for a plate or panel of the present invention;
- figures 2 and 3 show sectioned, enlarged views and in various scales of respective elements of figure 1;
- figure 4 shows a transversal sectioned view of a first variant of the device of figure 1;
- figure 5 shows a transversal sectioned view of a second variant of the device of figure 1.

[0007] With reference to figures 1-3, numeral 1 indicates plates or panel of the fixing device for a plate or panel of the present invention.

[0008] The plate or panel 2 can consist of one glass plate, in a double glass, in a polycarbonate panel, made of organic glass or other material also opaque such as aluminium, in a solar or photovoltaic panel collector and others. The device comprises matching means 4 of elongated shape and fit, in correspondence of each longitudinal side, to support and to match with a first face 3 a perimetrical portion of plate 2. In a horizontal or inclined installation of the plate, for example in order to carry out a roof, the first face 3 is the lower face. Generally, said first face 3 is preferably the inner face with respect to the installation of the device.

[0009] The device 1 comprises also, for each side of the matching means 4, a fixing means 5 having a first longitudinal edge 6 supporting connection means 7, 8 for the matching means 4.

[0010] A second longitudinal edge 9 of the fixing means 5 supports a joint 10 for sealing means 11 fit to match the second face 12 of said plate portion, opposite to the third face 3.

[0011] Said fixing means 5 is furthermore provided with a longitudinal housing 13 interposed between the longitudinal edges, first 6 and second 9, and fit to house an expansion means 14.

[0012] Said expansion means 14 has bigger dimensions than the dimensions of the housing means 13 previously to the insertion of the expansion means 14.

[0013] In a fixing condition of the plate to the device 1, the insertion of the expansion means 14 in the housing means 13 causes a deformation of the fixing means 5, in consequence thereof, the joint 10 and the respective sealing means 11, translate at least slightly in direction of the second face 12 of the perimetrical portion of the plate or the panel 2 which is tighten and fixed between the matching means 4 and the sealing means 11.

[0014] The housing means 13 consists in a kind of longitudinal groove with sidewalls 15 slightly divergent towards the outside of the same groove. Said sidewalls 15 of the housing means form an angle ranging from 16° to 24°, preferably about 20°.

[0015] The expansion means 14 is list shaped with two inclined plug walls 16. Said two inclined plug walls 16 of the expansion means 14 form an angle B ranging from 20° to 31°, preferably of about 25,8°.

[0016] The housing means 13 and the expansion means 14 have respective joint means 17, 18 fit for mutually engaging the expansion means 14 into the housing means 13 in the fixing condition.

[0017] The joint means 17 of the housing means 13 consist in longitudinal ribbings obtained in the respective sidewalls 15 of housing means 13 and the joint means 18 of expansion means 14 consist in longitudinal grooves obtained in the inclined plug walls 16 of the expansion means 14 or vice versa.

[0018] The transversal sections of joint means 17, 18 are approximately "V" shaped opened of approximately 90° and with bisectors orthogonal to the surface of the respective wall 15, 16.

[0019] The matching means 4 comprise longitudinal hooking means 19 provided with lateral seats for hooking of finding means 20 fit to find the first face 3 of the perimetrical portion of the lateral plates 2.

[0020] The matching means 4 comprise also first support means 21 fit to support at least the same device and the plates or panels 2. Such support means have a transversal section approximately rectangular shaped with two opposite main sides.

[0021] The hooking means 19 are fixed downstream to the corresponding first support means 21 whose main sidewalls are almost perpendicular and adjacent to the

lateral plates or panels 2.

[0022] Each main sidewall of first support means 21 has two longitudinal retention seats 22, 23 for the connecting means 7, 8 of the fixing means 5.

[0023] The connection of fixing means 5 to a sidewall of first support means can be made inserting the inferior connecting means 8 in the seat of inferior housing 23 and approaching and embedding the superior connecting means 7 in the seat of the superior housing 22. The shape of connecting means and the seats of housing means is such that the superior ones easily resist to compression stress while the inferior ones resist to traction stress to which they are subjected due to the deformation of fixing means 5 and due to the pressure exercised on plate 2.

[0024] The transversal section of fixing means 5 approximately is sector shaped with sector of 90° of circumference.

[0025] The hooking means 19 are directly fixed to the first support means 21 through respective concave complementary portions and convex longitudinally insertable one into the other.

[0026] The fixing means 5 is made of deformable metallic or synthetic material, such as PVC, preferably of steel or aluminium alloy.

[0027] The fixing means 5 consist of section having walls at least one of which, cooperating to delimit the housing means 13, is deformable in order to allow the deformation, needed for blocking panel or plate, without breaking the fixing means 5.

[0028] The expansion means 14 is of synthetic material or relatively rigid natural material, as for example of aluminium choker, aluminium alloy or ferrous or full plastic or choker metal.

[0029] The sealing means 11 and matching means 20 comprise at least respective contact portions with the plate 2 made of impermeable and elastically deformable material, preferably of rubber or silicon.

[0030] A possible operation of the device 1 provide to position the edge of a plate 2 between sealing 11 and stop means 20 and to force the expansion means 14 into the housing means 13 until the mutual engagement of the respective joint means 17, 18 so blocking mechanically and by sealing the plate or panel 2 to the device.

[0031] The first variant of the device, illustrated in figure 4, differs from the above disclosed embodiment because the first support means 21 are carried out in two separate parts and interconnected through interchanging adapters 24 fit to modify the distance between sealing means 11 and stop means 20 in order to adapt the device 1 to plates or panels 2 of various thickness.

[0032] In alternative the invention provides that the adapter means 24 are insertable between first support means 21 and hooking means 19.

[0033] In third variant of figure 5, the device 1 comprises second support means 25 fixed opposed to first support means 21, to the same support means 21 and to the hooking means 19. These latter are made in two separate lateral portions and mutually connected and connected to first support means 21 through the second support means 25 acting also as hardening of the device.

[0034] The position of hooking means 19 is determined by their matching with transversal beams, not illustrated.

[0035] An advantage of the present invention is to supply a fixing device for plate or panel applicable in extremely simple and fast way. Other advantage is to supply a device for a mechanical fixing and stable and sure sealing against atmospheric agents.

Claims

1. Fixing device for at least a plate or panel (2), comprising matching means (4) for a first face (3) of a perimetrical portion of the plate or panel (2); said device (1) is **characterized in that** comprises at least a fixing means (5) having a first longitudinal edge (6) with connecting means (7, 8) for the matching means (4) and a second longitudinal edge (9) having a joint (10) for sealing means (11) fit to match a second face (12) of said perimetrical portion of the plate or panel (2); such fixing means (5) being moreover provided with longitudinal housing means (13), interposed between the longitudinal first (6) and second (9) edges, and fit for housing an expansion means (14); in a fixing condition, the expansion means (14) into the housing means (13) causes at least a light deformation of the fixing means (5) in consequence of that the joint (10) and the respective sealing means (11) translate at least slightly towards the second face (12) of the perimetrical portion of plate or panel (2) so becoming locked and fixed between matching means (4) and sealing means (11).

2. Device according to claim 1, **characterized in that** the expansion means (14) has at least dimensions slightly bigger than the dimensions of the housing means (13) before the insertion of the expansion means (14), in order to obtain the deformation by inserting of expansion means (14) into the housing means (13).

3. Device according to claim 1, **characterized in that** the housing means (13) comprises a longitudinal grove with slightly divergent sidewalls (15) outwardly the grove and the expansion means (14) is list shaped with two inclined plug walls (16).

4. Device according to claim 3, **characterized in that** the sidewalls (15) of the housing means form an angle (A) ranging between 16° and 24°, preferably of approximately 20°, and the two inclined plug walls (16) of the expansion means (14) form an angle (B) ranging between 20° and 31 °, preferably of approximately 25,8°.

5. Device according to claim 1, **characterized in that**

the housing means (13) and the expansion means (14) have respective joint means (17, 18) mutually engaging in order to block the expansion means (14) in the housing means (13) in the fixing condition.

6. Device according to claims 4 and 5, **characterized in that** the joint means (17) of the housing means (13) consist of longitudinal ribbings made in the respective sidewalls (15) of the housing means (13) and **that** the joint means (18) of the expansion means (14) consist of longitudinal groves carried out in the inclined plug walls (16) of the expansion means (14) or vice versa.

7. Device according to claim 1, **characterized in that** the matching means (4) comprises at least longitudinal hooking means (19) for stop means (20) matching the first face (3) of the perimetrical portion of plate or panel (2).

8. Device according to claim 1, **characterized in that** the matching means (4) comprises at least first support means (21) at least fit to support the device itself and the plate or panel (2).

9. Device according to claims 7 and 8, **characterized in that** the hooking means (19) of the matching means (4) are fixed to the respective first support means (21) which has at least a wall almost perpendicular and adjacent to at least a plate or panel (2) and having housing seats (22, 23) for the connecting means (7, 8) of fixing means (5).

10. Device according to claim 9, **characterized in that** the first support means (21) has two opposite walls each having respective housing seats (22, 23) for the connection means (7, 8) of at least two fixing means (5) for plates (2) to both sides of first support means.

11. Device according to claim 9, **characterized in that** the transversal section of fixing means (5) is sector shaped with sector of 90° of circumference.

12. Device according to claim 9, **characterized in that** the hooking means (19) are directly fixed to first support means (21) through respective concave and convex complementary portions and longitudinally insertable one into the others.

13. Device according to claim 7, **characterized in that** at least the fixing means (5) is made of metallic material or synthetic deformable material and the expansion means (14) is made of synthetic or natural material, the sealing means (11) and the stop means (20) comprise at least respective portions made of impermeable and elastically deformable material, preferably of rubber or silicon.

14. Device according to claim 9, **characterized in that** comprises adapter means (24) of the first support means (21) or between these latter and the hooking means (19) designed to modify the distance between sealing means (11) and stop means (20) in order to adapt the device to plates or panels (2) of various thickness.

15. Device according to claim 7 or claim 14, **characterized in that** comprises second support means (25), which are fixed opposite to the first support means (21), to the same support means (21) and/or to the hooking means (19).

16. Device according to any of the preceding claims, **characterized in that** the plate or the panel (2) comprises at least one between glass plate, double glass, polycarbonate panel, organic glass panel or panel of other opaque material, such as aluminium, solar or photovoltaic collector panel and others.

17. Device according to any of the preceding claims, **characterized in that** the fixing means (5) is a section having walls at least one of which, cooperating to delimit the housing means (13), is deformable.

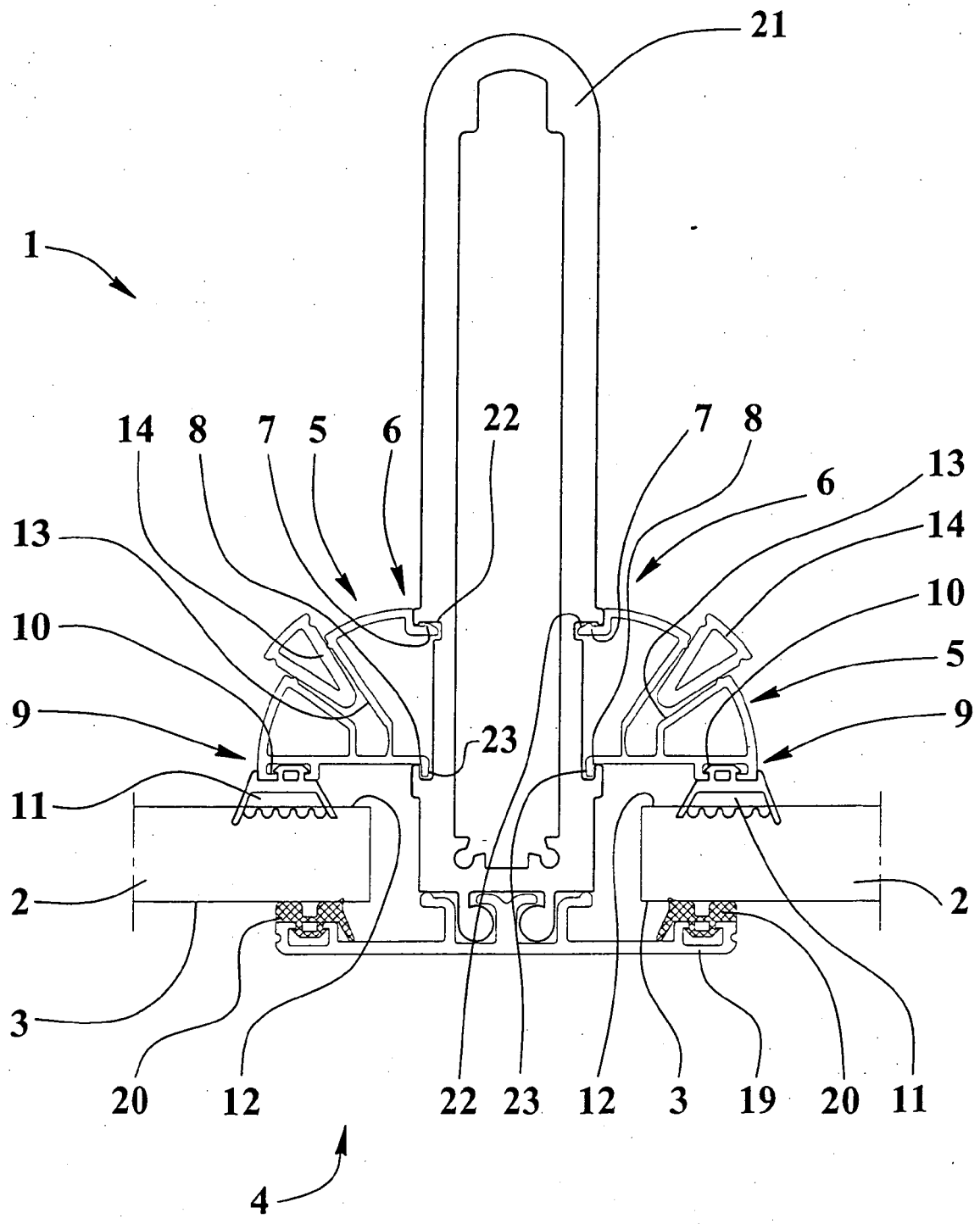
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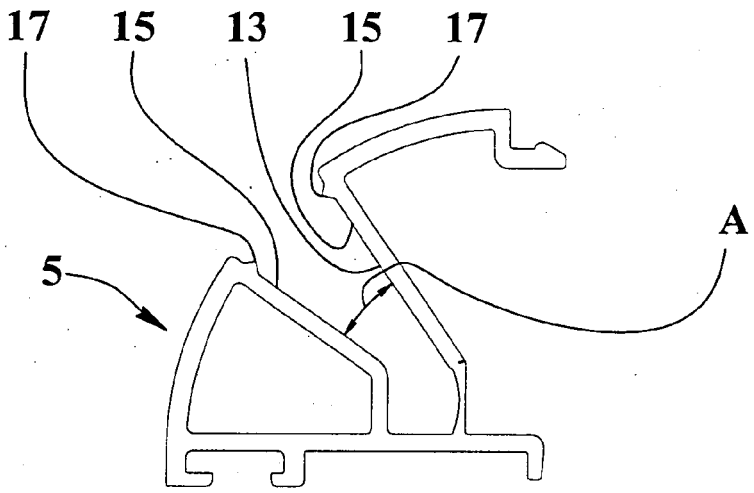
FIG.1

FIG.2



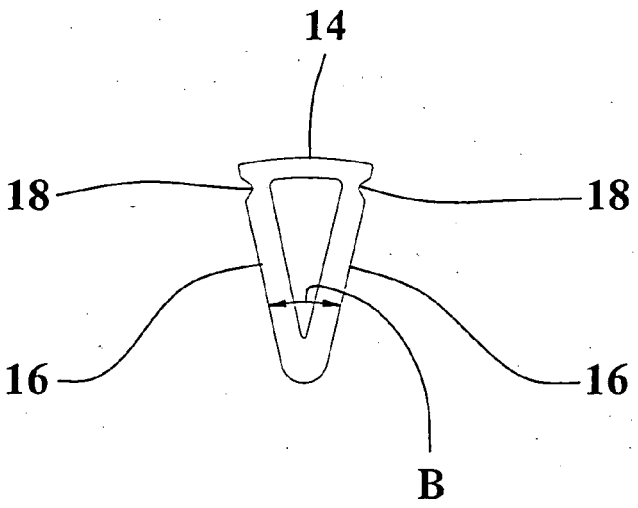


FIG.3

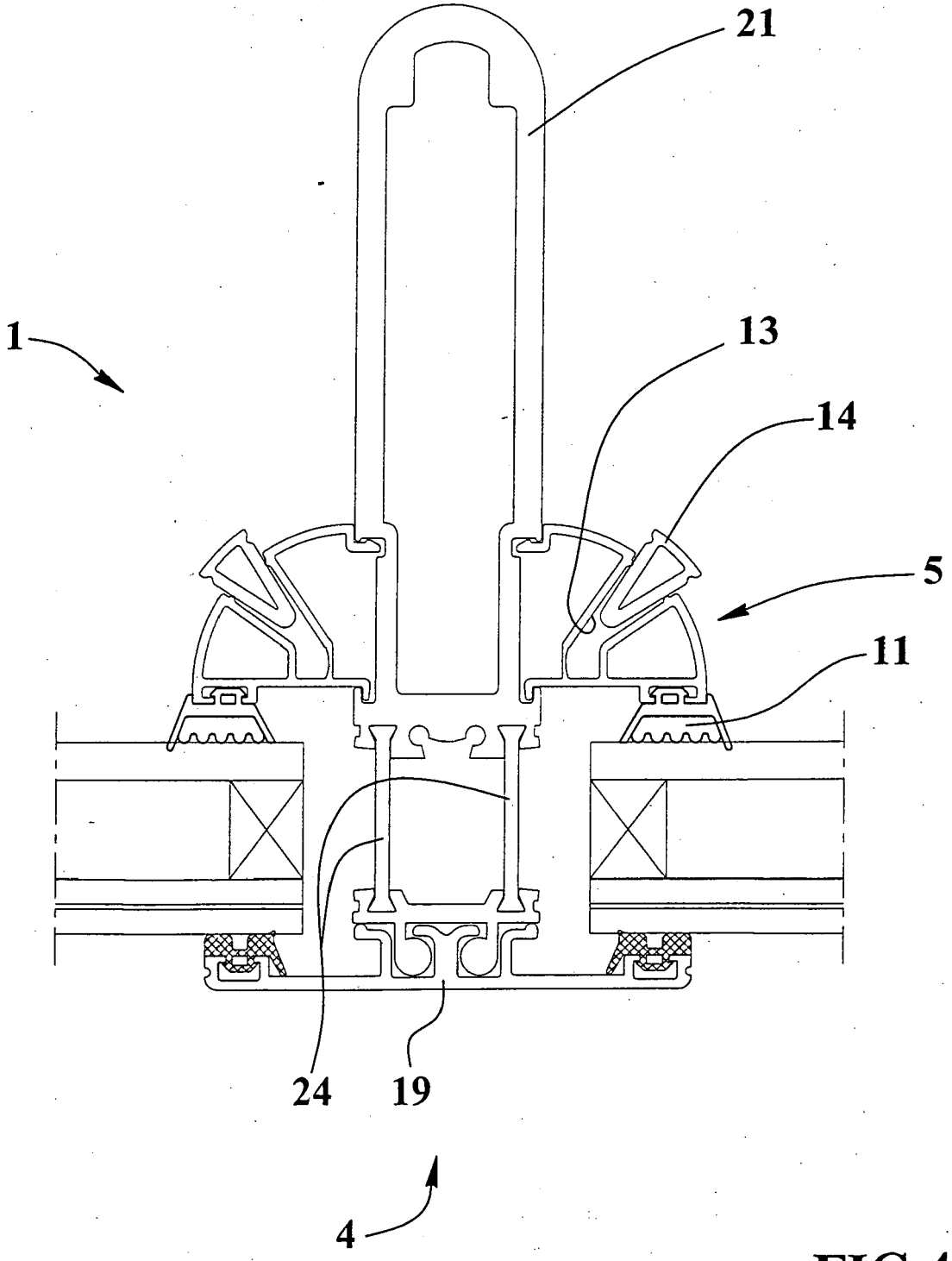


FIG.4

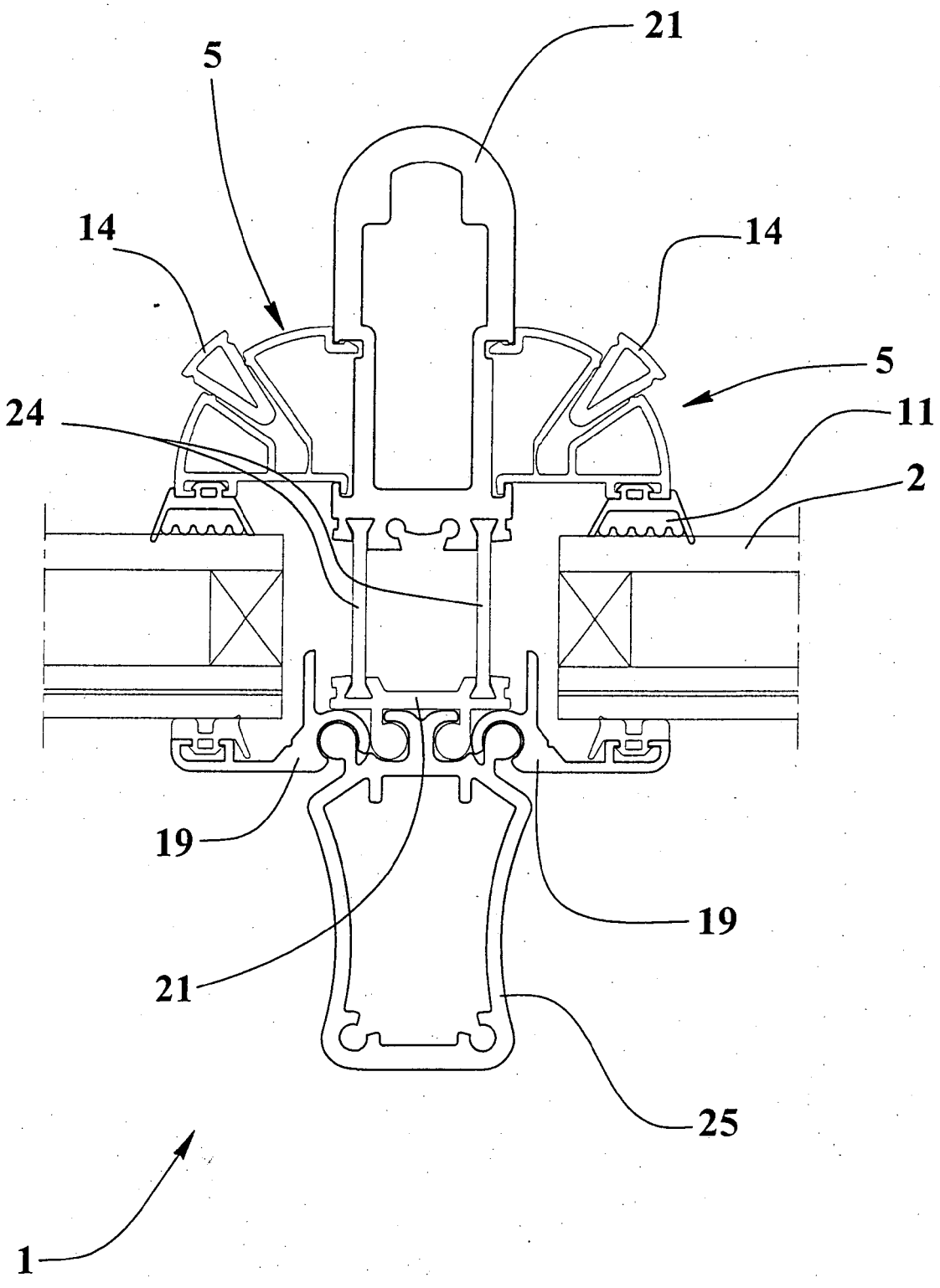


FIG.5