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Description

[0001] The invention relates to a building element according to the preamble of the appended claim 1. The invention relates to such building elements that contain frame profiles, either stationary frame profiles or frame profiles arranged in connection with a pivotable, for example glazed glazing element.

[0002] In glazed building elements metal frame profiles are utilized in which glass elements are attached by means of seals or the like. Such elements equipped with glass, in which the glass element is surrounded by a metal profile frame, can include for example doors, windows as well as stationary structures, such as facade structures. Hence, in this context the term building element refers either to an element that is installed separately to a building, or to a stationary part of a building, which can be constructed *in situ.* The glazed building element can be hinged pivotable in a stationary building element that contains a frame formed of frame profiles and surrounding the pivotable element.

[0003] Aluminium is a preferred metal raw material for frame profiles because of its workability (forming of profiles by means of extrusion), strength and light weight. Because of the relatively low melting temperature of aluminium when compared to steel, great deal of attention has been paid to the fire protection of such elements. Therefore different kinds of additional materials are utilized in order to protect the aluminium parts from heat, so that the aluminium parts would fulfil the requirements set by the desired fire-resistance class.

[0004] Another problematic property of aluminium is its good thermal conductivity. Because of this, so-called thermal breaks are commonly used in frame profiles, i.e. the frame profile is in a way constructed of two profile parts that are connected together by means of a structure with poorer thermal conductivity, for example by means of plastic strips. One of the profile parts is located on one side of the building element (in the case of an outer wall, door or a window, either outdoors or in-doors) and the other is located on the opposite side of the building element, the thermal breaks between the profile parts thus preventing the heat transmission through the building element at the location of the frame in a direction perpendicular to the plane of the building element. The thermal breaks can also be used in elements located in the interiors of buildings, because it is not desirable in general that heat is transmitted too easily between two spaces.

[0005] In the case of a glazed building element, the glass element is normally attached to the frame profile in such a manner that both profile parts have seals or the like that are pressed against the outer surfaces of the glass element from opposite sides.

[0006] In the case of a fire, the thermal breaks constitute the weakest point in the frame structure. The frame should endure a predetermined time in the fire. When the thermal breaks melt or burn off, the frame structure can no longer remain coherent, and for example the glass element is easily detached, which results in that the capability of the building element to function as a temporary fire-insulating structure is significantly impaired.

[0007] In the design of frame profiles, attention has up until present been paid primarily to the fastening points of the seals and the attachment of the thermal breaks. When the aim is to attach different parts or materials, the frame profiles must be equipped with the necessary parts either in connection with the manufacture, or they must be worked during installation.

[0008] As an example of frame profiles equipped with thermal breaks that can be used in glazed building elements in particular, it is possible to mention publications EP 590 236, EP 1 024 243 and DE 3438861. The first-mentioned publication discloses the placement of plate-like materials made of thermally swellable material on the surface of the profile and the latter two disclose special securing elements that connect the profile parts of the frame profile in case the thermal breaks are destroyed.

[0009] It is an aim of the invention to eliminate the aforementioned drawbacks and to present a building element that can be used in a versatile manner in fireproof structures for improved fire protection and/or fire resistance. Another aim of the invention to present a building element that can remain intact for a longer period of time in case of fire, even though some parts of the same are destroyed under the effect of heat. To attain this purpose, the glazed building element according to the invention is primarily characterized in what will be presented in the characterizing part of the appended claim 1.

[0010] Both profile parts of the building element contain at least one longitudinal so-called screw groove that opens up in the direction of the main plane of the element. The screw grooves can be located on both edges of the frame structure. Besides to screw down the fastening screws, it is possible to utilize the screw grooves to form fastening points for other elements or materials that improve the fire resistance properties of the structure.

[0011] To the frame profile of the building element it is possible to attach an additional fastener that is fastened to both profile parts connected by the thermal breaks. The same fastener can also be used for keeping the plate-like element in the building element, such as a glass element, in its place at its edge. Because the additional fastener has better heat resistance than the thermal breaks, it keeps the profile parts together, in other words holds the frame profile together, even if the thermal breaks were destroyed, and it can be utilized further to hold the plate-like element in its place in the frame profile.The additional fastener is, however, designed in such a manner that it does not significantly increase the heat conduction between the profile parts. The additional fasteners can for example be elements that are short in relation to the length of the frame profile, said additional fasteners being placed at set intervals throughout the length of the edge of the sheet-like element.

[0012] The additional fastener can be designed simple

in structure. The additional fastener may contain fastening parts protruding towards the profile parts, which fastening parts can be utilized for fastening the additional fastener to the screw grooves in the profile parts. It can also contain two projecting parts protruding towards the plate-like element, between which parts it is possible to clamp the edge of the element, said projecting parts thus forming a gripping part.

[0013] An especially advantageous structure is attained by manufacturing the additional fastener of a straight blank material. The fastening parts attachable to the profile parts and the possible projecting parts of the gripping part that are intended for the plate-like element can be formed by bending them of the same sheet-like blank on the opposite sides.

[0014] It is also possible to utilize the screw grooves to place the thermally swellable fire protection material substantially over the entire length of the frame profile. The edge of the profile looks tidy when the material is located in the grooves. A special advantage is attained by means of this solution because the material reacts faster to heat since it is surrounded by metal on three sides, the temperature of said metal rising rapidly in case of a fire. Thus, the expansion and sealing occurs faster.

[0015] Other advantageous embodiments of the invention are presented in the appended dependent claims and in the description hereinbelow.

[0016] In the following, the invention will be described in more detail with reference to the appended drawings, in which

Fig. 1 shows the structure of the hinge-side edge of a building element which is hinged pivotable, seen in a cross-section perpendicular to the frame profile,

Fig. 2 shows the structure of the opposite edge of the same building element in a similar view,

Fig. 3 shows a second point of the structure of Fig. 2,

Fig. 4 shows a third point of the structure of Fig. 3,

Fig. 5 shows the structure of a stationary building element in a section perpendicular to the frame profile,

Fig. 6 shows a cross-section of the frame profile alone without additional parts, and

Fig. 7 shows a perspective view of the frame profile and an additional fastener attached thereto.

[0017] Fig. 1 shows the structure of a building element that is hinged pivotable, and can be a door or a window, at the location of the frame profile 1 on the side of the hinge. The pivotable building element comprises a frame located in a particular plane, said frame surrounding a plate-like element that is parallel to this plane, which element is a glass element in the description hereinbelow. The plate-like element can also be another element, and the structures described hereinbelow can also be applied in other building elements than glazed building elements.

[0018] The metal frame profile 1 is fastened pivotably by means of a hinge 6 to the frame profile 1 of a stationary structure that is also made of metal. The stationary frame profile 1 forms a part of the frame structure surrounding the pivotable building element. To the frame profile 1 of the pivotable element, a glass element 2 is fastened in a known manner so that on both sides of the glass element 2 there are rigid sealing profiles 7 carrying seals. The edge of the glass element 2 is positioned between the sealing profiles 7, in which elastic seals 8 that are pressed against the outer surfaces of the glass element 2 from opposite sides are attached. The sealing profiles 7 are attached with a positively locking so-called snap coupling to the corresponding profile parts 3 that are interconnected with a thermal break structure 4. Here, the thermal break structure is composed of strips or the like that extend perpendicularly to the main plane of the glazed building element (plane of the glass element 2). The strips extend in the longitudinal direction of the frame profile and their thicker longitudinal edges are positioned within anchoring grooves located on the inwardly facing sides of the profile parts 3. There are two thermal break strips 4a, 4b, one close to the glass element 2 and the other close to the stationary frame profile 1. The thermal break structure may also contain several strips, but it is common to all thermal break structures to form a connecting structure between the profile parts 3, in which the heat-transfer coefficient is smaller when compared to a situation in which the thermal breaks were replaced with strips of identical cross-section and being of the same metal material as the profile parts 3. The thermal break strips 4a, 4b can be made of for example plastic, that is advantageously reinforced, for example of glass fibre reinforced polyamide or glass fibre reinforced resin.

[0019] As can be seen in Fig. 1, the stationary frame profile 1 also comprises profile parts 3 similar to the profile parts 3 of the frame profile of the pivotable structure, said profile parts being connected with a thermal break structure 4.

[0020] Fig. 1 also shows a securing element 9 located between the frame profile 1 and the stationary frame profile 1. A number of such securing elements are located at fixed intervals in the longitudinal direction of the frame profile. The securing elements do not constitute a part of the invention, and therefore they are not discussed in more detail in this context.

[0021] The profile parts 3 are hollow profiles having a rectangular general cross-section. The material of these parts is especially light metal, such as aluminium, of which the profile parts can be manufactured by means of extrusion. In the frame profile of the pivotable structure, the first shorter side of the cross-section of the profile part constitutes a section of the inner edge of the frame

profile that is located on the side of the glass element 2, and the other shorter side forms a section of the outer edge of the frame profile that will be positioned opposite to the stationary frame profile.

[0022] In the following, the structure of the frame profile 1 of the pivotable glazed building element is described in more detail.

[0023] Separate profile parts 3 that are attached together by means of the thermal break structure 4 are located on opposite sides of the main plane of the building element, i.e. when seen from the side of the space limited by the building element, one profile part 3 is located inside and the other one outside. The hinge 6 is fastened to one of the profile parts 3 of the frame profile.

[0024] Both profile parts 3 comprise a screw groove 10 that is included in the profile shape (uniform cross-sectional shape) and opens up in the direction of the plane of the glass element 2. The screw groove 10 in located inward (towards the thermal break structure) from a wide fastening groove 21 of the profile part that is intended for fastening the sealing profile 7. The screw groove 10 is thus located in the cross-section approximately at the corner of the rectangle. When the profile parts are connected together with the thermal break structure 4, the screw grooves 10 are located in the frame profile on both sides of the middle plane of the glass element 2 and inside the seal profiles 7. The screw grooves 10 are continuous grooves extending in the longitudinal direction of the profile part 3, and it is characteristic to them that screws screwed down therein fasten well, irrespective of the location in which they are placed in the longitudinal direction of the groove. To improve the fastening, the walls of the grooves have such a surface topography formed of successive notches in the depth direction that it holds a screw screwed therein at any point of the screw groove in its place by means of positive locking, but the walls can also be smooth-faced. The dimensions of the screw groove are typically such that its opposite walls are parallel to each other, and its depth is greater than its width (distance between the walls), typically at least 1.5 times the width, advantageously at least 2 times the width.

[0025] On the opposite side of the profile part 3, i.e. on the side of the outer edge of the assembled frame profile 1, there is also a screw groove 10 that opens in parallel with the plane of the glass element, but opens away from the glass element. In the assembled frame profile 1 of the pivotable building element these screw grooves open towards the opposite inner edge of the stationary frame profile 1. These screw grooves 10 are located, in a direction perpendicular to the plane of the glass element 2, approximately at the same point with the screw grooves 10 of the glass element side, thus opening in the opposite direction with respect to the latter. The screw grooves 10 open towards a space 14 that is limited by the surface of the inner edge of the opposite stationary frame profile 1 and in the direction perpendicular to the plane of the glass element by the projecting parts 13 functioning as extensions to the outer walls of the longer sides of the hollow profile parts 3, said projecting parts 13 comprising grooves which receive seals 11, which seal the space when the door is closed. On the side of the hinge 6, the space is sealed by the projecting part 13 of the profile part 3 in the frame profile 1 and its seal 11, and on the other side by the projecting part 13 of the profile part 3 located on the opposite side of the stationary frame profile 1 and its seal 11.

[0026] When the screw grooves 10 accommodate thermally swellable material, it is capable of filling the above-described space between the profile parts 1 and closing the space in a fire-proof manner in case of a fire. It is typical for such a fire protection material that it expands into a multiple volume when a given threshold temperature is attained, and as an example it is possible to mention a product available under the commercial name INTUMEX LSK. The fire protection material can be placed in the grooves as a continuous, band-like material. If profile parts 3 similar to the ones used in the pivotable frame profile 1 are used in the stationary frame profile 1 as well, the screw grooves 10 located therein also enter in contact with the aforementioned space 14, and are located opposite to the screw grooves of the pivotable frame profile 1, as shown in Fig. 1. Thus, it is also possible to use these screw grooves to place the above-described fire protection material, and they can function together with the opposite screw grooves 10, wherein better efficiency is attained.

[0027] Fig. 1 also shows how it is also possible to use the screw grooves filled with fire protection material to fasten screws 12 by means of which it is possible to fasten securing elements 9 and their counter elements to the outer edge of the pivotable frame profile 1 and to the inner edge of the stationary frame profile 1. The fire protection material can be located in the area between the screws 12 in the screw grooves 10.

[0028] When the screw grooves 10 are located on both edges of the profile part 3, two parallel continuous screw grooves 10 that extend over the entire length of the profile are each provided on both edges of the frame profile 1 after the profile parts 3 have been connected. These screw grooves can be used in an appropriate manner either to fasten special fasteners directly by pressing or to place materials or to screw up other parts belonging to the structure by means of screws.

[0029] As to Fig. 1, it can also be mentioned that the screw groove 10 extends in the profile part 3 in its depth direction, in other words parallelly to the longer sides of the profile part 3, from the outer surface constituting the shorter side of the profile part inside the fastening point (anchoring groove) of the thermal break strip 4a. Thus, it is possible to reduce the heat transmission even further, because the screw groove 10 increases the distance between the outer surface of the profile part 3 and the fastening point of the thermal break strip 4a in the metal material of the profile part.

[0030] The building element also includes an addition-

al fastener 5 having a better heat resistance than the thermal break structure 4. The additional fastener 5 is attached at least to both profile parts 3. Thus, the additional fastener 5 connects the profile parts 3 to each other in a manner that is independent of the thermal break structure 4. Hence, the cohesion of the profile parts 3 is not completely dependent on the thermal break strips. If the additional fastener 5 is designed in such a manner that the edge of the glass element 2 facing the frame profile is attached thereto, the glass element 2 also remains in the frame structure, even if for example the seals 8 and the parts 7 carrying the seals were damaged or destroyed.

[0031] The additional fastener 5 contains a gripping part 5a to which the edge of the glass element 2 is attached by means of a clamp connection. The gripping part 5a is composed of two projecting parts protruding towards the glass element, between which projecting parts the glass plate is clamped. The projecting parts are pressed against the outer surfaces of the glass element 2 in the area between the outer edge of the glass element and the seals 8. The additional fastener 5 is attached to both profile parts 3 by means of fastening parts 5b protruding in the opposite direction, i.e. towards the frame profile 1. The fastening parts 5b are shaped in such a manner that they are positively locked to the screw grooves 10 located in the profile parts 3 and opening towards the glass element 2. The end of the projecting part 5b is bent in the shape of a hook, so that it would be locked in the wall of the screw groove, in a suitable notch in its surface topography.

[0032] The thermal break 4a on the side of the glass element 2 does not have to be ensured similarly to the thermal break 4b located close to the outer edge of the frame profile 1 (because of the mounting of the securing element 9 located on the outer edge of the frame profile, said mounting fastening the profile parts 3 together at this edge). The additional fastener 5 that is located between the thermal break 4a of the inner edge of the frame profile 1 and the glass element 2 is thus especially advantageous for ensuring the cohesion of the frame profile.

[0033] Fig. 1 also shows that the additional fastener also contains a base part 5c located between the thermal break 4 and the outer edge of the glass element 2, perpendicularly to the main plane of the glazed building element (the plane of the glass element 2). Both ends of the base part 5c contain fastening parts 5b attached to the corresponding profile parts, and projecting parts protrude therefrom in the direction of the glass element 2, said projecting parts forming the gripping part 5a for the glass element.

[0034] Fig. 1 also shows an additional fastener 5 placed on the side of the outer edge of the stationary frame profile, said additional fastener taking hold of the screw grooves 10 and connecting the profile parts 3 similarly to the additional fastener located by the glass element, but this additional fastener only contains fastening parts 5b.

[0035] Fig. 2 show the structure of a pivotable, glazed building element at the location of a vertical frame profile 1 located on the opposite edge. Here, the assembly of the frame profile, the location of the screw groove 10, the attachment of the glass element 2 to the frame profile 1, the structure of the additional fastener 5 and the way it is attached to the glass element 2 and to the profile parts 3 located on both sides of the plane of said glass element, as well as the structure of the frame profile 1 and its screw grooves 10 are similar to those shown in Fig. 1.

[0036] Between the frame profile 1 of the pivotable element and the frame profile 1 of the stationary structure there are seals 11 that seal the door gap, said seals being attached to projecting parts 13 similar to the ones shown in Fig. 1. At the door gap, a closed space 14 is also formed, to which screw grooves that are filled with the intumescent fire protection material 15 whose properties have been discussed above, open up both from the stationary frame profile 1 and from the pivotable frame profile 1.

[0037] The screw grooves 10 located in the pivotable frame profile 1 and the screw grooves 10 located in the stationary frame profile can also be used for attaching the parts of a lock with screws to the outer edge of the pivotable frame profile 1 and to the inner edge of the stationary frame profile 1, respectively. In Fig. 2, the intumescent fire protection material 15 can be seen in the pivotable frame profile 1. Screws 12 are visible in the screw grooves 10 of the stationary frame profile, but the fire protection material can be located in the screw grooves in the section between the screws.

[0038] Figs. 3 and 4 show the structure of Fig. 2 at a different point in the longitudinal direction of the profiles. In Fig. 3, a fastener is 16 placed behind the thermal break strip 4b located at the outer edge of the pivotable profile 1, i.e. in the cavity between the thermal break strips 4a, 4b. The fastener is seated in the recesses formed on the outer surfaces of the profile parts 3 remaining inside the frame profile. At this point the fastener 16 keeps the profile parts 3 together, and it constitutes a part of the fastening system of a lock introduced between the profile part 3, the front panel and the fastening screw of said fastening system being also shown in the figure. Fig. 4 shows the intumescent material 15 in all screw grooves 10 that open up to the space 14.

[0039] Fig. 5 shows another glazed building element according to the invention, which in this case is a stationary structure, for example a stationary wall. Similarly to the pivotable building element, here the frame structure also surrounds a plate-like element, which in the description hereinbelow is a glass element, but the structures can also be applied to other elements besides glazed building elements. The profile parts 3 are connected with a thermal break structure 4 similar to the one shown in Figs 1 and 2. The glass elements 2 are fastened to both edges of the frame profile 1, at each edge by means of seals 8 positioned against the glass from opposite sides

of the glass element, said seals being placed in the seal parts 7. At each edge of the frame profile there are screw grooves 10 on both sides of the thermal break structure 4 and the above-described additional fasteners 5 to fasten the profile parts 3 together by this edge, and to ensure the attachment of the corresponding glass element 2. The structure of the frame profile 1 is mirror-symmetrical in relation to the symmetry plane perpendicular to the plane of the building element. In the structure of Fig. 5, there may be a glass element 2 only on one side, and the structure of the opposite side of the frame profile is thus similar to the structure of the stationary profile part shown in Fig. 1.

[0040] Fig. 6 shows the profile parts 3 of Fig. 5 that are connected together, without additional parts or materials. To form the frame profile 1, it is possible to utilize the profile parts 3 that have identical shapes and sizes, i.e. that are of the same profile.

[0041] Fig. 7 shows in perspective the structure of the additional fastener 5 and its attachment to both profile parts 3 for the sake of clarity without the glass element 2. As can be seen in the drawing, the material of the additional fastener 5 is a plate-like blank, and projecting parts forming the gripping part 5a of the glass element 5a, and fastening parts 5b of the profile parts are bent from both ends of said blank, wherein the unbent part in the middle forms the base part 5c. Because of the location of the screw grooves 10 and the glass element 2, the projecting parts forming the gripping part 5a are bent at a point closer to the middle, and the base part 5c extends straight on both sides thereof further towards the ends, and ends up in the fastening parts 5b bent to the other direction. The figure also shows that to reduce the heat transmission, the base part 5c may be provided with one or more areas having a weaker heat transmission capacity across the frame profile 1 than the material of the additional fastener 5. In this case the area is simply formed into an opening 20, which can be implemented in the blank material by means of simple manufacturing techniques. In the figure there are two openings 20 successively in the longitudinal direction of the frame profile 1.

[0042] Fig. 7 also shows that the range of the additional fastener 5 in the longitudinal direction of the frame profile 1 is quite small, wherein it does not significantly increase heat transmission between the profile parts 3. Such additional fasteners can be placed in separate pieces over the length of the frame profile spaced at fixed intervals, for example at intervals of approximately 25 to 30 cm.

[0043] As was mentioned above, the additional fastener 5 can also lack the gripping part 5a for the glass element. In this case it only contains fastening parts 5b bent on one side of the unbent base part 5c. Over the length of the frame profile it is also possible to place the aforementioned fasteners 5 of different types at suitable intervals, some of said fasteners only attaching the profile parts 3 together and some of them also attaching the glass element 2 to the frame structure, in addition to connecting the profile parts 3.

[0044] The better heat resistance of the additional fastener 5 compared to the thermal break structure 4 can be easily implemented by manufacturing the additional fastener 5 of a material that has a higher melting temperature, softening temperature or decomposition temperature than the material of the thermal break structure 4. Thus, the elevated temperature at which the thermal break loses its capability to retain the frame structure together either due to melting, softening or decomposition (e.g. burning), does not affect the additional fastener 5 in any of the aforementioned mechanisms in such a manner that the fastening capability of said additional fastener would be impaired. If the thermal break strips 4a, 4b are made of plastic, which is common because of the poor heat conductivity of plastic, the additional fastener 5 is thus advantageously made of metal, advantageously steel. An advantageous manufacturing material of the additional fastener 5 is stainless steel, which has poor heat conductivity, and especially if the glazed building element is an element isolating the outdoor air and the interior from each other, such as an entrance door, an openable outer window or a glazed outer wall, its resistance to corrosion is an advantageous feature. When the additional fastener 5 is manufactured of a blank by means of bending, the blank is thus made of a suitably thick metal plate, such as a steel plate, especially of a stainless steel plate.

[0045] Because of the design and fastening method of the additional fastener 5, it can be easily pressed down from outside said profile parts in its place in the profile parts 3 connected through the thermal break structure 4.

[0046] In the central chamber in the middle of the frame structure 1, remaining inside the profile parts 3 and the thermal break strips 4a, 4b, it is possible to place filling material that promotes the fire protection and prolongs the resistance of the profile parts 3 in case of a fire, especially by preventing the rising of temperature. This filling material is marked with broken lines 22 in Fig. 4. The material can be a thermally insulating material, and for example material that releases crystal water under heat, such as gypsum. If the screw grooves 10 are sufficiently deep, it is possible to extend the fastening parts 5b protruding from the base part of the additional fastener 5 to surround the filling material 22 on both sides and to keep the filling material 22 in its place by means of said fastening parts, even if the profile part 3 on the hotter side had melted. Thus, the filling material still will be present to protect the undamaged profile part 3 that has remained in the fire on the cooler side.

[0047] In Fig. 4, the filling material 22 is placed only in the central chamber, but there may also be filling material inside the cavities of the profile parts 3 in addition to the central chamber.

[0048] The invention is not restricted to the embodiments described above, but it can be modified on the basis of the inventive idea presented in the claims. Although the description hereinabove primarily describes

the screw grooves and additional fasteners provided in connection with the vertical frame profiles of the frame of a glazed building element and the stationary frame surrounding the same, there may be screw grooves and additional fasteners also in the other, horizontal frame profiles of the frame surrounding the glass element and the stationary frame surrounding this frame, if they are made of the profile parts 3 shown in Figs 1 to 3. The frame profiles in which the above-described screw grooves and additional fasteners are located, do not have to be completely vertical or horizontal, but they can also be positioned in an inclined position, depending on the structure of the building element and, in the case of stationary walls, also on architectural solutions. Similarly, it is possible to utilize the invention in such glazed building elements that isolate two spaces located in the interior of a building from each other, for example in pivotable doors or windows or in stationary partition walls that exist between two rooms, as well as in building elements isolating the outdoor air and the interior of a building from each other, i.e. in entrance doors, in openable windows and outer walls. The figures show a glass element composed of one glass plate, but it is also possible to use a double or multiple so-called insulating glass. The term glass element refers to all elements that are transparent and/or the purpose of which is to give a visual impression of a glass.

[0049] The glass element can be replaced with another element that isolates two spaces from each other and that has another purpose than to create a visual connection or a visual impression of a glass. Such a plate-like element can be for example a gypsum board clad with metal plates, which resists heat well and is especially suitable for fire-proof doors.

Claims

1. A building element comprising a frame profile (1) that constitutes a part of the frame located in the main plane of the element and comprises at least two profile parts (3) connected to each other by means of a thermal break structure (4) and located on different sides of the main plane of the element, **characterized in that** both profile parts (3) contain each at least one longitudinal screw groove (10) that opens up in the direction of the main plane of the element and further **in that** the frame profile (1) comprises at least one additional fastener (5) which has a better heat resistance than the thermal break structure (4), and which contains a base part (5c) and fastening parts (5b) protruding towards the profile parts (3), and which is fastened at least to both profile parts (3) by pressing down from outside said profile parts (3) so that the fastening parts (5b) fasten the additional fastener (5) to the screw grooves (10) in the profile parts (3) and the base part (5c) is located in the frame profile (1) outside the thermal break structure (4) and the additional fastener (5) connects the profile parts together in a manner that is independent of the thermal break structure (4).

2. The building element according to claim 1, **characterized in that** thermally swellable fire protection material (15) is placed in at least one screw groove (10).

3. The building element according to claim 1 or 2, **characterized in that** the screw groove (10) extends in the depth direction into the profile part (3) inside the fastening point of the thermal break structure (4).

4. The building element according to claim 1, 2 or 3, **characterized in that** the additional fastener (5) is also fastened to the edge of a plate-like element (2) attached to the frame profile (1).

5. The building element according to any of the foregoing claims 1 to 4, **characterized in that** the additional fastener (5) has a higher melting, softening or decomposition temperature than the thermal break structure (4).

6. The building element according to claim 5, **characterized in that** the additional fastener (5) is made of metal, advantageously of steel, most advantageously of stainless steel.

7. The building element according to any of the foregoing claims 4 to 6, **characterized in that** the additional fastener (5) comprises a gripping part (5a) that is attached to the edge of the plate-like element (2).

8. The building element according to any of the foregoing claims, **characterized in that** the additional fastener (5) comprises two fastening parts (5b) that are attached to profile parts (3) of their own, and to the screw grooves (10) therein by means of positive locking.

9. The building element according to claim 8, **characterized in that** the base part (5c) of the additional fastener (5) contains in its both ends fastening parts (5b) directed away from the base part, said fastening parts being positioned in the screw grooves (10) of the profile parts (3).

10. The building element according to claim 9, **characterized in that** projecting parts protrude from the base part (5c) in the direction of the plate-like element (2) attached to the frame profile, said projecting parts forming a gripping part (5a) for holding the plate-like element.

11. The building element according to claim 10, **characterized in that** the projecting parts are positioned

against the outer surfaces of the plate-like element (2).

12. The building element according to claim 9, 10 or 11, **characterized in that** the base part (5c) comprises one or several areas that reduce heat transmission between the profile parts (3), such as a thinner section or an opening (20).

13. The building element according to claim 10, 11 or 12, **characterized in that** the projecting parts forming the gripping part (5a) of the additional fastener and the fastening parts (5b) of the additional fastener that are attached to the profile parts (3) are formed of the same blank by bending to opposite directions.

14. The building element according to any of the foregoing claims, **characterized in that** there are two or several individual additional fasteners (5) on the same edge of the glass element (2) spaced within a distance from each other.

15. The building element according to any of the foregoing claims 8 to 14, **characterized in that** the fastening parts (5b) extend in the screw grooves (10) in the direction of the main plane of the element on both sides of a filling material (22) placed between the profile parts (3).

16. The building element according to any of the foregoing claims 2 to 15, **characterized in that** the screw groove or screw grooves (10) in which the fire protection material (15) is placed opens/open up into a space (14) situated between the frame profile (1) of a pivotable building element (1) and a stationary frame profile (1).

17. The building element according to any of the foregoing claims, **characterized in that** it comprises a plate-like element (2) parallel to the main plane of the element, said element being attached to the profile parts (3).

18. The building element according to claim 17, **characterized in that** it is a glazed building element, in which the plate-like element is a glass element (2).

19. The building element according to any of the foregoing claims, **characterized in that** it is an element that is hinged pivotable, such as a door or a window.

20. The building element according to any of the foregoing claims, **characterized in that** it is a stationary building element.

21. A structure composed of the pivotable building element according to claim 19 and the stationary building element according to claim 20, **characterized in that** thermally swellable fire protection material (15) is placed in screw grooves (10) and the screw grooves (10) in which fire protection material (15) is placed open up into a space (14) situated between the frame profile (1) of the pivotable building element (1) and the frame profile (1) of the stationary building element.

Patentansprüche

1. Bauteil umfassend ein Rahmenprofil (1), das einen Abschnitt des Rahmens bildet, der auf der Hauptebene des Bauteils angeordnet ist, und das zumindest zwei Profilabschnitte (3) umfasst, die durch ein thermisch isolierendes Element (4) miteinander verbunden sind, und die auf unterschiedlichen Seiten der Hauptebene des Bauteils angeordnet sind, **dadurch gekennzeichnet, dass** beide Profilabschnitte (3) jeweils zumindest eine längs verlaufende Gewindenut (10) aufweisen, die in Richtung zu der Hauptebene des Bauteils geöffnet ist, dass das Rahmenprofil (1) ferner zumindest ein zusätzliches Befestigungsmittel (5) umfasst, das eine bessere Wärmebeständigkeit aufweist als das thermisch isolierende Element (4), und das ein Grundelement (5c) und in Richtung der Profilabschnitte (3) ragende Befestigungselemente (5b) umfasst, und das an den zumindest zwei Profilabschnitten (3) durch Drücken von außerhalb der Profilabschnitte befestigt ist, so dass die Befestigungselemente (5b) das zusätzliche Befestigungsmittel (5) in den Gewindenuten (10) in den Profilabschnitten (3) befestigen, und das Grundelement (5c) in dem Rahmenprofil (1) außerhalb des thermisch isolierenden Elements (4) gelegen ist, und das zusätzliche Befestigungsmittel (5) die Profilabschnitte auf eine Weise, die selbständig von dem thermisch isolierenden Element ist, zusammenfügt.

2. Bauteil nach Anspruch 1, **dadurch gekennzeichnet, dass** in zumindest eine Gewindenut (10) thermisch expandierbares Brandschutzmaterial (15) eingebracht ist.

3. Bauteil nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** sich die Gewindenut (10) in Tiefenrichtung des Profilabschnitts (3) in den Befestigungspunkt des thermisch isolierenden Elements (4) hinein erstreckt.

4. Bauteil nach Anspruch 1, 2 oder 3, **dadurch gekennzeichnet, dass** das zusätzliche Befestigungsmittel (5) außerdem an dem Rand eines an dem Rahmenprofil (1) befestigten plattenförmigen Elements (2) angebracht ist.

5. Bauteil nach einem der vorangehenden Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** das zu-

sätzliche Befestigungsmittel (5) eine höhere Schmelz-, Erweichungs-, oder Zersetzungstemperatur aufweist als das thermisch isolierende Element (4).

6. Bauteil nach Anspruch 5, **dadurch gekennzeichnet, dass** das zusätzliche Befestigungsmittel (5) aus Metall, vorzugsweise aus Stahl, besonders bevorzugt aus Edelstahl, gefertigt ist.

7. Bauteil nach einem der vorangehenden Ansprüche 4 bis 6, **dadurch gekennzeichnet, dass** das zusätzliche Befestigungsmittel (5) ein an dem Rand des plattenförmigen Elements (2) befestigtes Klemmelement (5a) umfasst.

8. Bauteil nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** das zusätzliche Befestigungsmittel (5) zwei Befestigungselemente (5b) umfasst, die eigenständig an den Profilabschnitten (3) und durch Formschluss in den darin angeordneten Gewindenuten (10) befestigt sind.

9. Bauteil nach Anspruch 8, **dadurch gekennzeichnet, dass** das Grundelement (5c) des zusätzlichen Befestigungsmittels (5) an seinen beiden Enden von dem Grundelement weg gerichtete Befestigungselemente (5b) aufweist, wobei die Befestigungselemente in den Gewindenuten (10) der Profilabschnitte (3) positioniert sind.

10. Bauteil nach Anspruch 9, **dadurch gekennzeichnet, dass** die Vorsprünge von dem Grundelement (5c) in Richtung des an dem Rahmenprofil befestigten plattenförmigen Elements (2) ragen, wobei die Vorsprünge ein Klemmelement (5a) zum Halten des plattenförmigen Elements bilden.

11. Bauteil nach Anspruch 10, **dadurch gekennzeichnet, dass** die Vorsprünge anliegend an den Außenflächen des plattenförmigen Elements (2) angeordnet sind.

12. Bauteil nach Anspruch 9, 10 oder 11, **dadurch gekennzeichnet, dass** das Grundelement (5c) einen oder mehrere Bereiche, wie beispielsweise einen dünneren Abschnitt oder eine Öffnung (20), umfasst, die die Wärmeleitung zwischen den Profilabschnitten (3) reduzieren.

13. Bauteil nach Anspruch 10, 11 oder 12, **dadurch gekennzeichnet, dass** die Vorsprünge zum Bilden des Klemmelements (5a) des zusätzlichen Befestigungsmittels und der Befestigungselemente (5b) des zusätzlichen Befestigungsmittels, die an den Profilabschnitten (3) befestigt sind, durch Biegen in entgegengesetzte Richtungen aus dem selben Werkstück ausgebildet sind.

14. Bauteil nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** auf demselben Rand des Glaselements (2) zwei oder mehrere voneinander beabstandete einzelne zusätzliche Befestigungsmittel (5) vorgesehen sind.

15. Bauteil nach einem der vorangehenden Ansprüche 8 bis 14, **dadurch gekennzeichnet, dass** die Befestigungseletncntc (5b) auf beiden Seiten einer zwischen den Profilabschnitten (3) eingebrachten Füllmasse (22) in Richtung zu der Hauptebene des Bauteils in die Gewindenuten (10) hinein ragen.

16. Bauteil nach einem der vorangehenden Ansprüche 2 bis 15, **dadurch gekennzeichnet, dass** die Gewindenut bzw. die Gewindenuten (10), in die das Brandschutzmaterial (15) eingebracht ist, hin zu einem Raum (14) geöffnet ist bzw. sind, der zwischen dem Rahmenprofil (1) eines schwenkbaren Bauteils (1) und einem feststehenden Rahmenprofil (1) angeordnet ist.

17. Bauteil nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** es ein plattcnförmiges Element (2) umfasst, das parallel zu der Hauptebene des Bauteils liegt, wobei das Bauteil an den Profilabschnitten (3) befestigt ist.

18. Bauteil nach Anspruch 17, **dadurch gekennzeichnet, dass** es sich um ein verglastes Bauteil handelt, in dem das plattenförmige Element als Glaselement (2) ausgeführt ist.

19. Bauteil nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** es sich um ein schwenkbar eingehängtes Bauteil, wie zum Beispiel eine Tür oder ein Fenster, handelt.

20. Bauteil nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** es sich um ein feststehendes Bauteil handelt.

21. Struktur umfassend das schwenkbare Bauteil nach Anspruch 19 und das feststehende Bauteil nach Anspruch 20, **dadurch gekennzeichnet, dass** in den Gewindenuten (10) thermisch expandierbares Brandschutzmaterial (15) eingebracht ist und die Gewindenuten (10), in die das Brandschutzmaterial (15) eingebracht ist, hin zu einem Raum (14) geöffnet sind, der zwischen dem Rahmenprofil (1) des schwenkbaren Bauteils (1) und dem Rahmenprofil (1) des feststehenden Bauteils angeordnet ist.

Revendications

1. Elément de construction comprenant un profil de cadre (1) qui constitue une partie du cadre situé dans

le plan principal de l'élément et comprend au moins deux parties de profil (3) reliées ensemble au moyen d'une structure de rupture thermique (4) et situées sur des côtés différents du plan principal de l'élément, **caractérisé en ce que** les deux parties de profil (3) contiennent chacune au moins une rainure filetée longitudinale (10) qui s'ouvre dans la direction du plan principal de l'élément et en outre **en ce que** le profil de cadre (1) comprend au moins une fixation supplémentaire (5) qui a une résistance thermique meilleure que la structure de rupture thermique (4) et qui comprend une partie de base (5c) et des parties de fixation (5b) qui font saillie dans la direction des parties de profil (3), et qui est fixée au moins sur les deux parties de profil (3) par pressant de l'extérieur des parties de profil (3) aux rainures filetées (10) dans les parties de profil (3), et la partie de base (5c) se trouve dans le profil de cadre (1) en dehors de la structure de rupture thermique (4) et la fixation supplémentaire (5) relie les parties de profil d'une manière qui est indépendante de la structure de la rupture thermique (4).

2. Elément de construction selon la revendication 1, **caractérisé en ce que** un matériau de protection contre le feu gonflable thermiquement est placé dans au moins une rainure filetée (10).

3. Elément de construction selon la revendication 1 ou 2, **caractérisé en ce que** la rainure filetée (10) s'étend dans la direction de la profondeur dans la partie de profil (3) à l'intérieur du point de fixation de la structure de rupture thermique (4).

4. Elément de construction selon la revendication 1, 2 ou 3, **caractérisé en ce que** la fixation supplémentaire (5) est aussi fixée sur le bord d'un élément en forme de plaque (2) fixé sur le profil de cadre (1).

5. Elément de construction selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** la fixation supplémentaire (5) a une température de fusion, de ramollissement ou de décomposition supérieure à la structure de rupture thermique (4).

6. Elément de construction selon la revendication 5, **caractérisé en ce que** la fixation supplémentaire (5) est faite de métal, avantageusement d'acier, plus avantageusement d'acier inoxydable.

7. Elément de construction selon l'une quelconque des revendications 4 à 6, **caractérisé en ce que** la fixation supplémentaire (5) comprend une partie d'accrochage (5a) qui est fixée sur le bord de l'élément en forme de plaque (2).

8. Elément de construction selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la fixation supplémentaire (5) comprend deux parties de fixation (5b) qui sont fixées sur des parties de profil (3) par elles-mêmes, et sur les rainures filetées (10) dedans au moyen d'un blocage positif.

9. Elément de construction selon la revendication 8, **caractérisé en ce que** la partie de base (5c) de la fixation supplémentaire (5) contient dans ses deux extrémités des parties de fixation (5b) s'éloignant de la partie de base, lesdites parties saillantes étant positionnées dans les rainures filetées (10) des parties de profil (3).

10. Elément de construction selon la revendication 9, **caractérisé en ce que** les parties saillantes font saillie de la partie de base (5c) dans la direction de l'élément en forme de plaque (2) fixé sur le profil de cadre, lesdites parties saillantes formant une partie d'accrochage (5a) pour maintenir l'élément en forme de plaque.

11. Elément de construction selon la revendication 10, **caractérisé en ce que** les parties saillantes sont positionnées contre les surfaces extérieures de l'élément en forme de plaque (2).

12. Elément de construction selon la revendication 9, 10 ou 11, **caractérisé en ce que** la partie de base (5c) comprend une ou plusieurs régions qui réduisent la transmission thermique entre les parties de profil (3), comme une section plus fine ou une ouverture (20).

13. Elément de construction selon la revendication 10, 11 ou 12, **caractérisé en ce que** les parties saillantes formant la partie d'accrochage (5a) de la fixation supplémentaire et les parties de fixation (5b) de la fixation supplémentaire qui sont fixées sur les parties de profil (3) sont formées dans le même flanc par pliage dans des directions opposées.

14. Elément de construction selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il y a deux ou plusieurs fixations supplémentaires (5) individuelles sur le même bord de l'élément en verre (2) espacées à distance les unes des autres.

15. Elément de construction selon l'une quelconque des revendications 7 à 14, **caractérisé en ce que** les parties de fixation (5b) s'étendent dans les rainures filetées (10) dans la direction du plan principal de l'élément sur les deux côtés d'un matériau de remplissage (22) placé entre les parties de profil (3).

16. Elément de construction selon l'une quelconque des revendications 2 à 15, **caractérisé en ce que** la rainure filetée ou les rainures filetées (10) dans laquelle le premier matériau de protection contre le feu (15) est placé s'ouvre dans un espace (14) situé entre le

profil de cadre (1) d'un élément de construction (1) pouvant pivoter et d'un élément de construction (1) fixe.

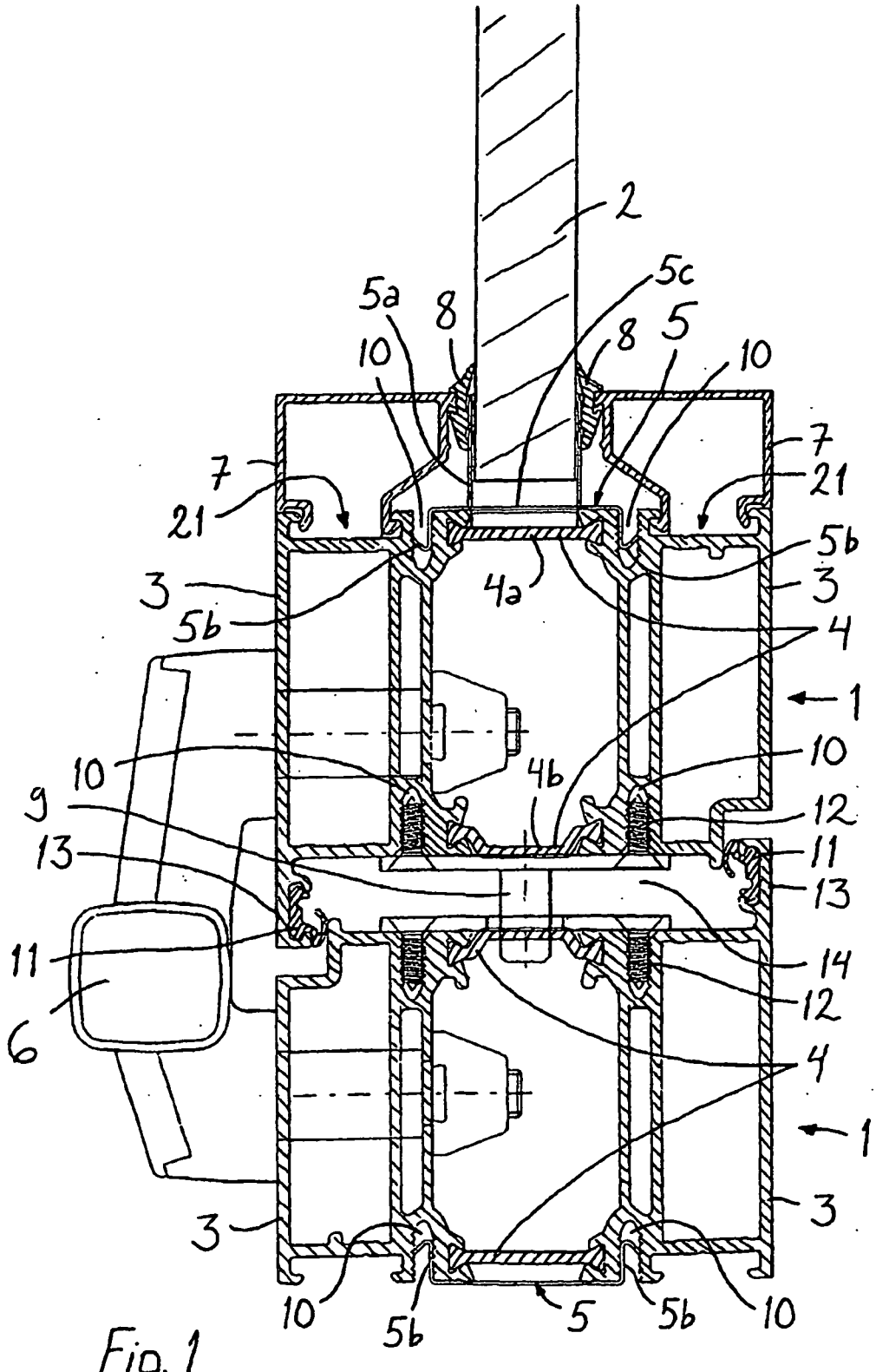
17. Elément de construction selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il comprend un élément en forme de plaque (2) parallèle au plan principal de l'élément, ledit élément étant fixé sur les parties de profil (3).

18. Elément de construction selon la revendication 17, **caractérisé en ce qu'**il est un élément de construction vitré, dans lequel l'élément en forme de plaque est une élément en verre (2).

19. Elément de construction selon l'une quelconque des revendications précédentes, **caractérisé en ce que** c'est un élément qui peut pivoter de manière articulée, comme une porte ou une fenêtre.

20. Elément de construction selon l'une quelconque des revendications précédentes, **caractérisé en ce que** c'est un élément de construction fixe.

21. Structure composée d'un élément de construction pouvant pivoter selon la revendication 19 et de l'élément de construction fixe selon la revendication 20, **caractérisé en ce qu'**un matériau de protection contre le feu gonflable thermiquement est placé dans les rainures filetées (10) et les rainures filetées (10) dans lesquelles le matériau de protection contre le feu (15) est placé s'ouvrent dans un espace (14) situé entre le profil de cadre (1) de l'élément de construction pouvant pivoter (1) et le profil de cadre (1) de l'élément de construction fixe.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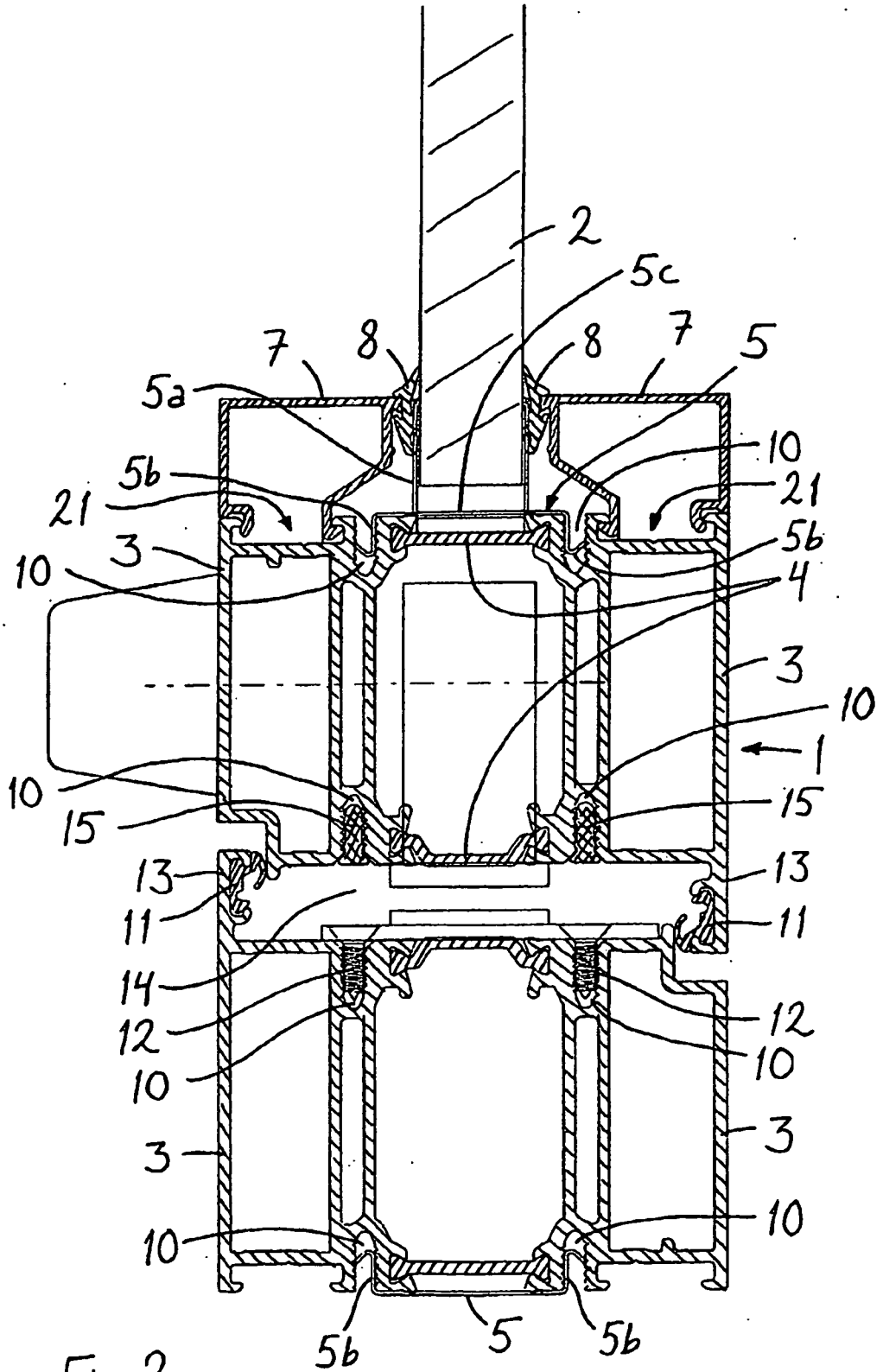
5a
8
5c
10
8
5
10
7
21
7
21
5b
3
4a
3
5b
4
1
10
4b
10
9
12
13
11
13
14
11
12
6
4
1
3
3
10
5b
5
5b
10

Fig. 1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5c
7
8
8
7
5
5a
10
5b
21
21
3
5b
10
4
3
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10
15
15
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12
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10
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10
10
5b
5
5b

Fig. 2

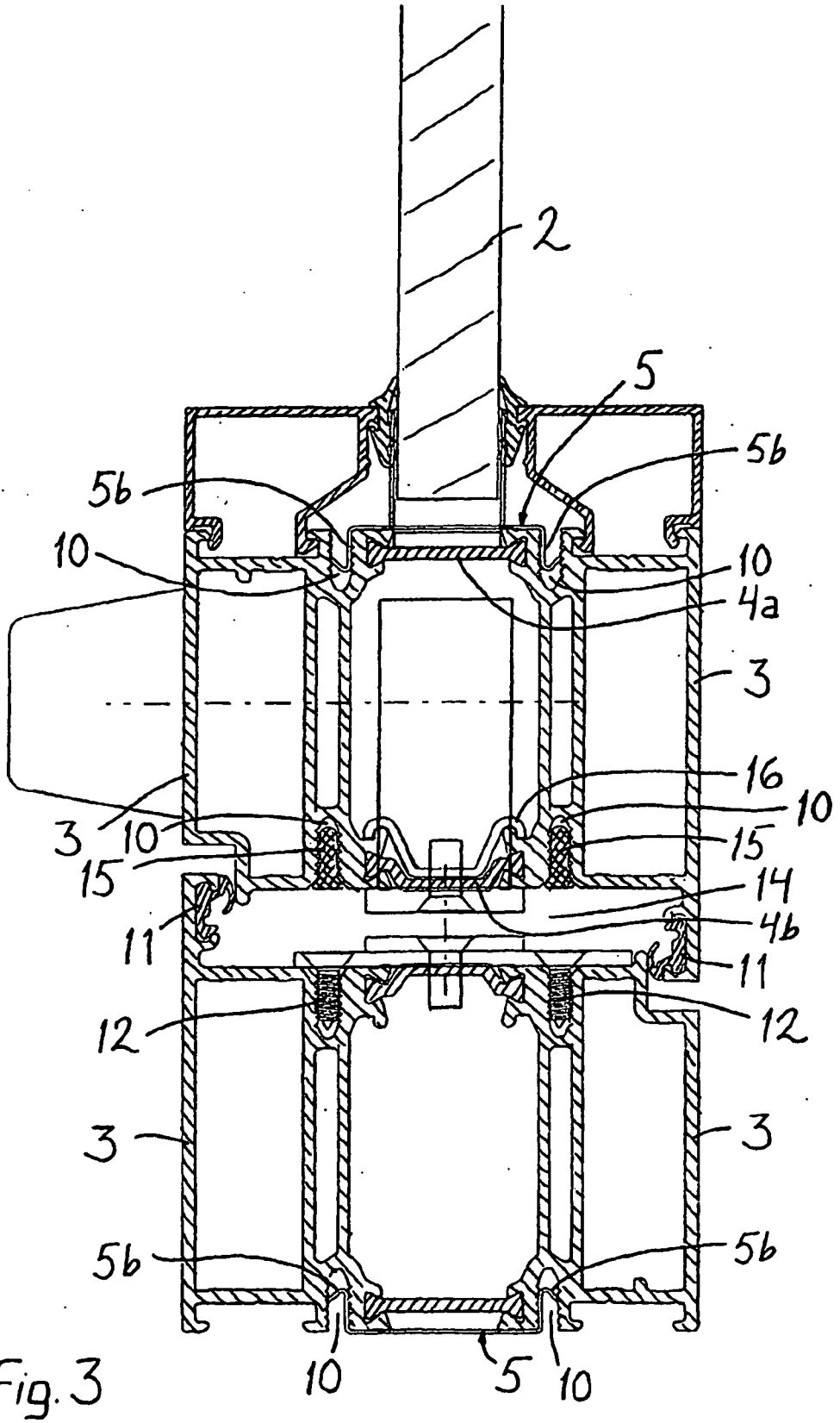

Fig. 3

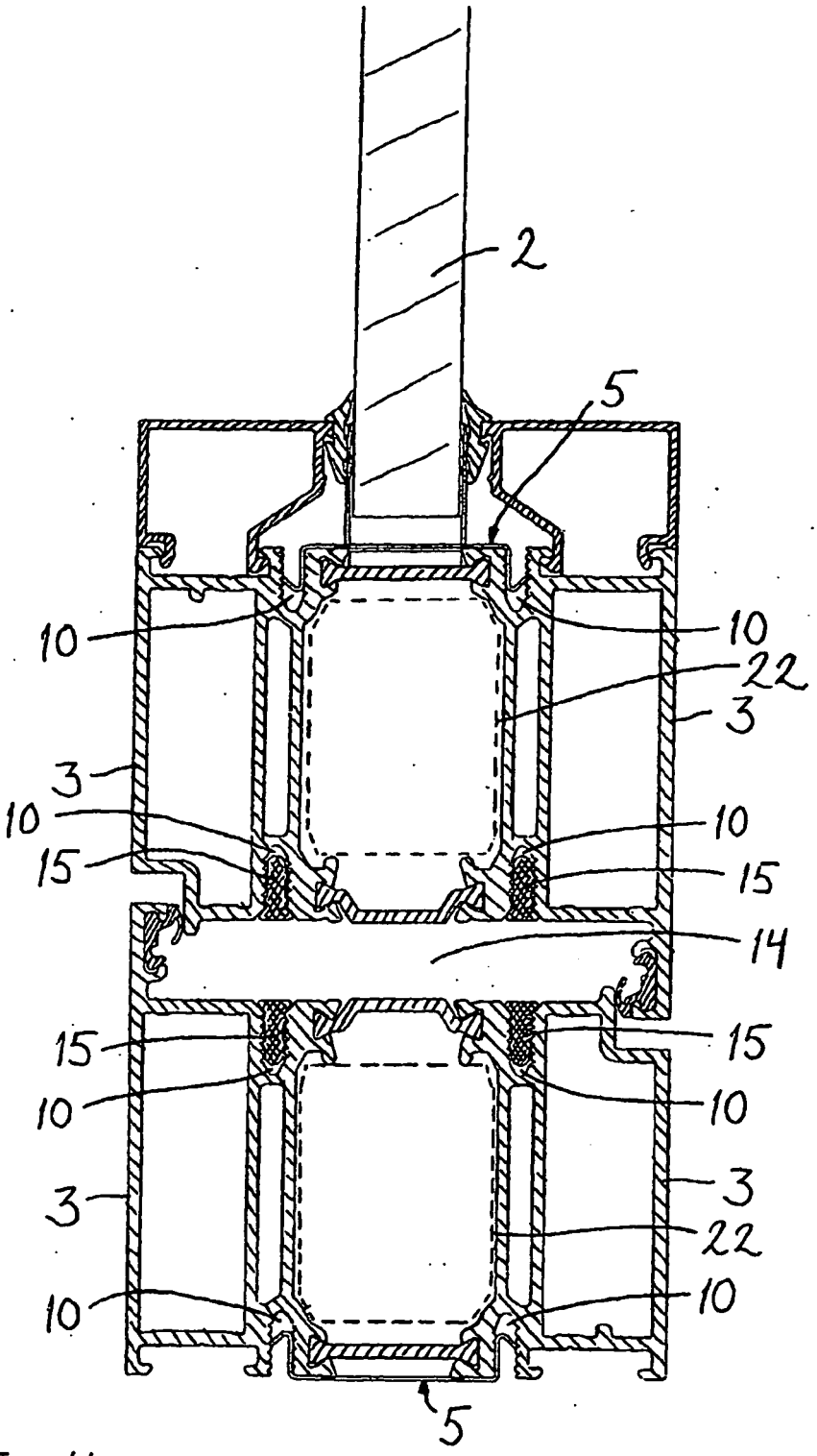

Fig. 4

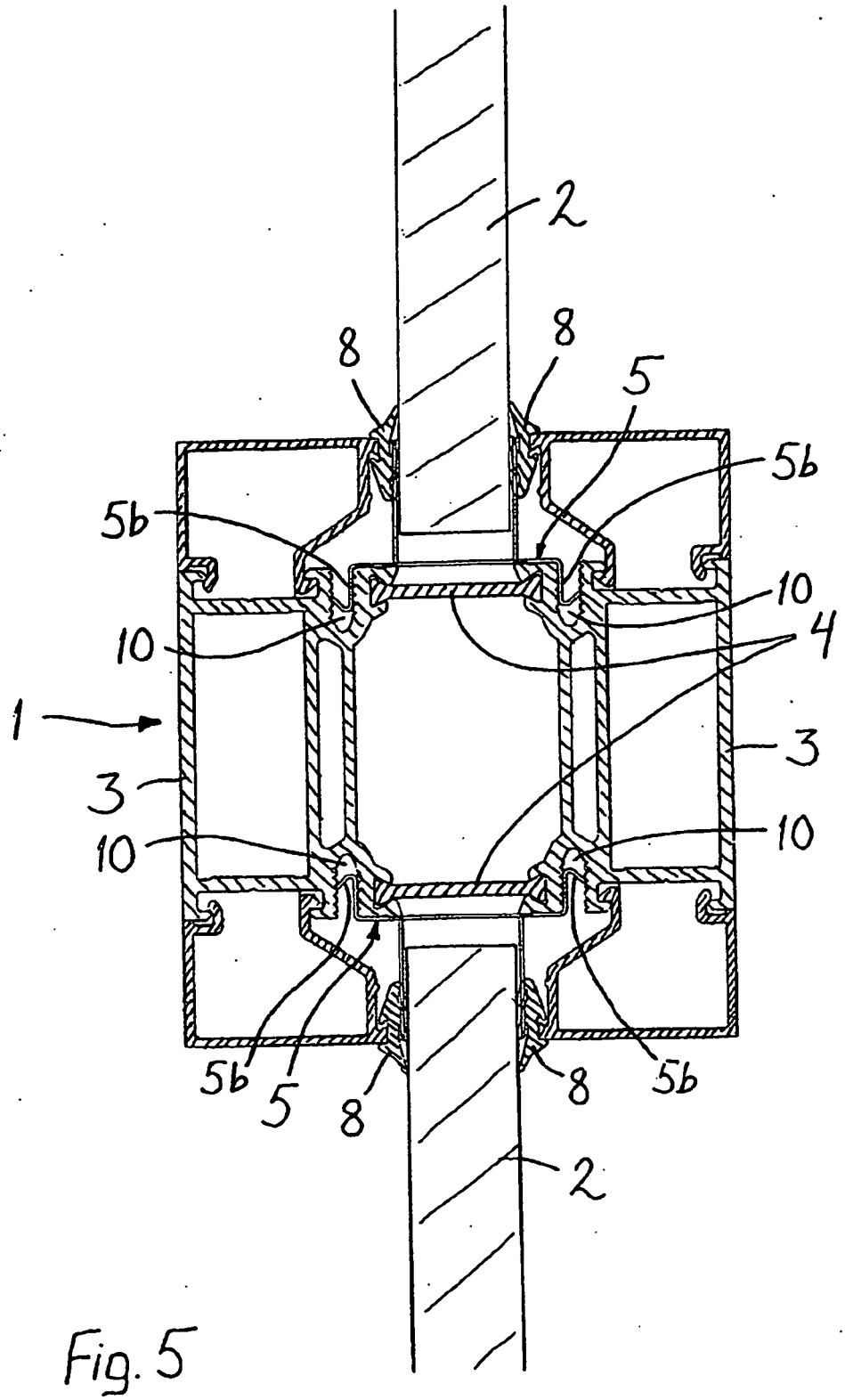

Fig. 5

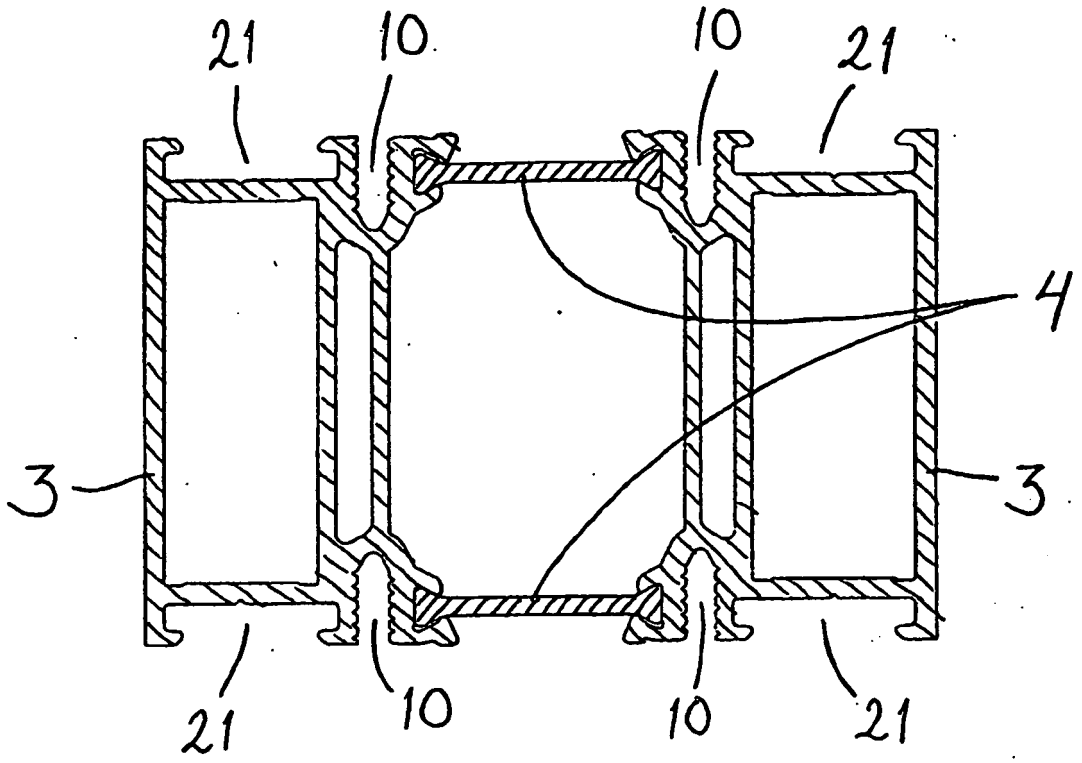

Fig. 6

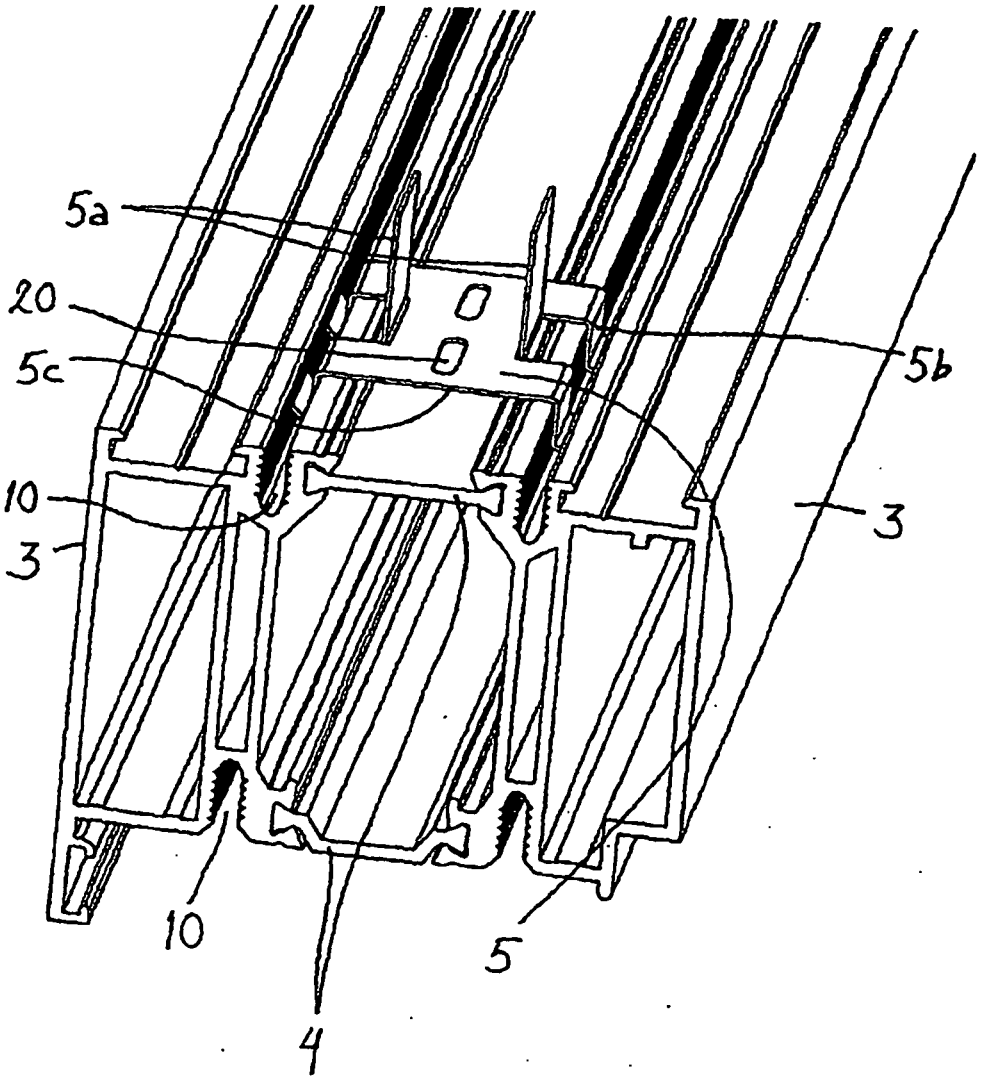

Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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