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(54) **SWELLING SEAL FOR A FIRE-RESISTANT FAÇADE CONSTRUCTION AND FAÇADE CONSTRUCTION EQUIPPED THEREWITH**

QUELLDICHTUNG FÜR EINE FEUERBESTÄNDIGE FASSADENKONSTRUKTION UND DAMIT AUSGESTATTETE FASSADENKONSTRUKTION

JOINT GONFLANT POUR UNE CONSTRUCTION DE FAÇADE RÉSISTANTE AU FEU ET CONSTRUCTION DE FAÇADE AINSI ÉQUIPÉE

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Description

[0001] Fire-resistant façade construction equipped with a swelling seal.

[0002] The present invention relates to a fire-resistant facade construction equipped with a swelling seal.

[0003] In particular the invention relates to a facade construction of the curtain wall type.

[0004] Such curtain walls are known and built around a skeleton of profiles made from aluminium or the like in the form of mullions and transoms which form adjoining frames for façade panels, typically glass panels.

[0005] To this end, the front sides of the mullions and transoms facing the outside of the facade construction are provided with an open screw channel delimited by two parallel protruding ribs of the profiles which define a rebate in which the panels are wedged with a certain play by means of glazing bead supports.

[0006] Using clamping profiles on the outside of the façade, the panels are clamped along the edges against the aforementioned front sides of the mullions and transoms by means of screws which are screwed in the aforementioned screw channels through an insulation profile made from thermal insulation material which has been pushed into the screw channel in advance with an insert edge.

[0007] It is known to apply swelling seals in the form of slat-shaped swelling strips in the rebate, more specifically in the space between the panels and the screw channels.

[0008] Said swelling seals are made of a material which in the event of a fire will swell up under the influence of the heat, with the intention of filling the space around the panels thereby preventing hot air from flowing to the non-burning side such that the flames are at least temporarily prevented from flashing over and no oxygen is supplied to the burning side which could fan the fire.

[0009] Traditionally, said swelling seals are glued separately on the aluminium profiles when building the facade construction, typically on either side of the ribs defining the screw channel.

[0010] This has the disadvantage that the surfaces where the swelling seals need to be glued need to be properly cleaned and degreased.

[0011] Another disadvantage is that when applying the swelling seals at low temperatures and damp weather a bad adhesion of the glue is obtained and glueing in adverse weather conditions is thus not recommended.

[0012] Consequently this becomes time-consuming.

[0013] Furthermore, if the glued swelling seals come loose before the panels are mounted, this makes mounting the panels more difficult.

[0014] DE 20 2006 004 165 U1 provides a solution to one or more of the aforementioned and other disadvantages and discloses

a swelling seal for a fire-resistant facade construction, containing two swelling strips made from a material which in the event of a fire swell up under the influence of heat,

wherein the swelling strips are interconnected by at least one spacer which holds the swelling strips at a distance from each other and preferably essentially parallel to each other.

[0015] According to the invention the spacer of the swelling seal contains a U-shaped profiled section with legs which run essentially parallel with the swelling strips, whereby the form and the dimensions of said U-shaped section are preferably such that upon mounting the swelling seal it fittingly slides in the screw channel.

[0016] Upon mounting, the swelling seal is first slid over said insert edge of the insulation profile with the U-shaped section, after which the assembly can be slid as a whole into the screw channel of the facade profile, such that the swelling seal is affixed.

[0017] This way a facade construction according to the invention is obtained containing a skeleton of profiles made from aluminium or the like in the form of mullions and transoms of adjoining frames for facade panels and which on their front sides facing the outside of the façade construction are provided with an open screw channel delimited by two parallel protruding ribs of the profiles which define a rebate in which the panels are attached with a certain lateral play by means of clamping profiles which cover the edges of the panels and which are clamped against said front sides of the mullions and transoms by means of screws which are screwed in said screw channels, wherein the facade construction is provided with swelling seals containing two swelling strips made of a material which in the event of a fire swell up under the influence of heat, the swelling strips being interconnected by at least one spacer which holds the swelling strips at a distance from each other and containing a U-shaped profiled section with legs that run parallel with the swelling strips, whereby the swelling seals are fittingly slid over the ribs of the screw channels of the mullions and transoms with their swelling strips on either side of the screw channels and are fittingly slid with their U-shaped section the screw channels with the opening of the U-shaped section oriented toward the outside of the facade construction.

[0018] Said type of swelling seal makes it easy to also use insulating parts (Hi-foam) in combination with a swelling seal.

[0019] Upon building the façade construction, the swelling seal according to the invention is slid over the ribs of the screw channel with the swelling strips on either sides of the ribs of the screw channel.

[0020] After mounting the glass panels, the swelling seal is kept in place by the insulation profile and the screws in the screw channel.

[0021] The advantage is that the swelling seal does not necessarily have to be glued.

[0022] Consequently it is also not necessary to clean and degrease the surfaces of the ribs and the swelling strips can be applied very quickly and without special tools or glue.

[0023] Furthermore, the strips can be applied in all

weather conditions, even in cold and damp weather.

[0024] Preferably, the swelling seal is made as an extruded profile or a co-extruded profile if the spacer is made from another material than that of the swelling strips, for example from synthetic material.

[0025] With the intention of better showing the characteristics of the invention, a few preferred embodiments of a swelling seal according to the invention and a facade construction equipped with it are described by way of an example without any limiting nature, with reference to the accompanying drawings, wherein:

figure 1 schematically shows a perspective view of a section of a facade construction according to the invention in exploded view;

figure 2 shows a cross-section according to line II-II in figure 1 on a larger scale;

figure 3 shows the cross-section of figure 2 but in assembled condition;

figure 4 shows a cross-section as that of figure 3 but for an assembled facade construction;

figure 5 shows a cross-section according to line V-V in figure 1 on a larger scale;

figure 6 shows the cross-section of figure 5 but in assembled condition.

[0026] Figure 1 shows the skeleton of a facade construction 1 according to the invention which is constructed from mullions 2 and transoms 3 in the form of profiles made from aluminium or the like.

[0027] The front sides of the profiles 2 and 3 facing the outside 4 of the facade construction 5 are provided with an open screw channel 6 that is delimited by two parallel protruding ribs 7 of the profiles 2 and 3 which define a rebate 8 in which, as shown in figure 4, glass or other panels 9 are attached with a certain play S by means of clamping profiles 10 which clamp the edges of the panels 9 between seals 11 on the front side 5 of the profiles and the underside of the clamping profiles 10.

[0028] The clamping profiles 10 are screwed against the panels 9 by means of screws 12 which are screwed in the screw channels 6 through insulation profiles 13 made from insulation foam or the like which are enclosed in the screw channels 6 in the known way with a longitudinal insert edge 14.

[0029] The clamping profiles 10 and screws 12 are covered by means of finishing profiles 15 which are snapped onto the clamping profiles 10.

[0030] The facade construction 1 is made with swelling seals 16 according to the invention which are made with two parallel tape-shaped swelling strips 17 made from a material which in the event of a fire swell up under the influence of heat.

[0031] As shown in the figures 2 to 4 for the transoms 3, swelling strips 17 are interconnected by at least one spacer 18 made from synthetic material or the like which interconnects the swelling strips 17 and holds them at a distance A from each other which is essentially equal to

the breadth B measured between the outsides of the two ribs 7.

[0032] The spacer 18 contains a U-shaped profiled section 19 with legs 20 which run essentially parallel with the swelling strips 17 at a distance from the swelling strips 17 equal to the breadth B' of the ribs 7 and which at their free end are each connected with a swelling strip 17 by means of a cross member 21 at a distance from both longitudinal edges 22 of the swelling strips 17, respectively at a distance C and D.

[0033] In the example, the form and dimensions of the swelling seals 16 are such that the swelling seals 16 can be fittingly slid over the ribs 7 with the U-shaped section 19 in the screw channels 6 with the opening to the outside 4 of the facade construction 1 and the swelling strips 17 fittingly over the outside of the ribs 7 and over the entire or practically entire length E of the ribs 7.

[0034] The swelling seal 16 is thereby first slid with the U-shaped section 19 over said insert edge 14 of the insulation profile 13 for example, after which the assembly can be slid as a whole into a screw channel 6 of the profiles 2 and 3, such that the swelling seal is affixed as shown in the figures 2 and 3.

[0035] The spacer 18 may be made from another material than the swelling strips 17, in which case the swelling seals 16 may, for example, be co-extruded.

[0036] However, it is not excluded that the entire swelling seal 16 is made from the same material by extrusion or the like.

[0037] It is also not excluded that the swelling strips are glued or co-extruded on a slat-shaped support made from synthetic material or the like which analogously as above are interconnected by a spacer. The support and spacer can also be obtained by injection moulding, for example, and the spacer can also be interrupted lengthways of the swelling seal.

[0038] In figures 2 and 3, the insulation profiles 13 show a beam-shaped body 23, the breadth of which is approximately equal to the breadth on the outside of the ribs 7 of the screw channels 6 and which over a certain length fits on the side of the insert edge 14 between the swelling strips 17.

[0039] In a mounted condition the swelling strips 17 overlap the body 23 over a said distance D and the body 23 protrudes with a section with length F from the swelling seal 16, whereby said section is or can be surrounded by insulating parts 24 with laterally projecting wings 25 from high-grade thermal insulation foam.

[0040] Analogously as for the transoms, figures 5 and 6 show the situation for the mullions 2 with a swelling seal 16 and insulation profile 13 with essentially the same properties as aforementioned but a slightly deviating form and dimensions.

[0041] The present invention is by no means limited to the embodiments described as an example and shown in the drawings, but a swelling seal according to the invention can be realised in all kinds of forms and dimensions, without departing from the scope of the invention which is

defined by the appended claims.

Claims

1. Facade construction, containing a skeleton of profiles made from aluminium or the like in the form of mullions (2) and transoms (3) of adjoining frames for facade panels (9) and which on their front sides (5) facing the outside of the facade construction (1) are provided with an open screw channel (6) delimited by two parallel protruding ribs (7) of the profiles which define a rebate (8) in which the panels (9) are attached with a certain lateral play by means of clamping profiles (10) which cover the edges of the panels (9) and which are clamped against said front sides (5) of the mullions (2) and transoms (3) by means of screws (12) which are screwed in said screw channels (6), wherein the facade construction (1) is provided with swelling seals (16) containing two swelling strips (17) made of a material which in the event of a fire swell up under the influence of heat, the swelling strips (17) being interconnected by at least one spacer (18) which holds the swelling strips (17) at a distance (A) from each other whereby the swelling seals (16) are fittingly slid over the ribs (7) of the screw channels (6) of the mullions (2) and transoms (3) with their swelling strips (17) on either side of the screw channels (6) **characterised in that** the spacer (18) contains a U-shaped profiled section (19) with legs (20) that run parallel with the swelling strips (17) and **in that** the swelling seals (16) are fittingly slid with their U-shaped section (19) in the screw channels (6) with the opening of the U-shaped section (19) oriented toward the outside (4) of the facade construction (1).
2. Facade construction according to claim 1, **characterised in that** the swelling seal (16) is made as an extruded profile or a co-extruded profile.
3. Facade construction according to claim 1 or 2, **characterised in that** the swelling strips (17) are essentially parallel to each other.
4. Facade construction according to any of the previous claims, **characterised in that** the legs (20) of the U-shaped profiled section (19) are located at a distance (B') from the swelling strips (17) equal to the breadth (B) of the ribs (7).
5. Facade construction according to claim 4, **characterised in that** the legs of the U-shaped profiled section (19) are connected with their free ends with the swelling strips (17) by means of a cross member (21) of the spacer (18).
6. Facade construction according to claim 5, **charac-**

terised in that the cross members (21) are connected with the swelling strips (17) at a distance (C, D) from the longitudinal edges (22) of the swelling strips (17).

7. Facade construction according to any of the previous claims, **characterised in that** between the screw channels (6) and the clamping profiles (10) an insulation profile (13) is provided which is made of thermal insulation foam or another insulation material and is fittingly slid with an insert edge (14) in the U-shaped section (19) of the swelling seal (16) up into the screw channel (6).
8. Façade construction according to claim 7, **characterised in that** said screws (12) are screwed through the insulation profiles (13) in screw channels (6).
9. Facade construction according to claim 7 or 8, **characterised in that** the insulation profiles (13) relative to the insert edge (14) show a wider body (23), the breadth of which is approximately equal to the breadth (B) on the outside of the ribs (7) of the screw channels (6).
10. Façade construction according to claim 9, **characterised in that** the swelling seal (16) extends with the swelling strips (17) over a certain length (D) of said body (23) of the insulation profile (13).
11. Facade construction according to claim 9 or 10, **characterised in that** the body (23) extends outwardly with a certain length (F) from the swelling seal (16), said section being surrounded by insulating parts (24) with one or more laterally projecting wings (25) made from thermal insulation material.

Patentansprüche

1. Fassadenstruktur, die ein Skelett aus Profilen enthält, die aus Aluminium oder ähnlichem in der Form von Pfosten (2) und Querbalken (3) von angrenzenden Rahmen für Fassadenpaneele (9) ausgeführt sind und die an ihren vorderen Seiten (5), die in Richtung der Außenseite der Fassadenstruktur (1) ausgerichtet sind, mit einem offenen Schraubenkanal (6) versehen sind, der durch zwei hervorstehende parallele Rippen (7) der Profile begrenzt wird, die einen Falz (8) definieren, in dem die Paneele (9) mit einem gewissen seitlichen Spiel mittels Klemmprofile (10) befestigt sind, die die Kanten der Paneele (9) überbedecken und die an den oben genannten vorderen Seiten (5) der Pfosten (2) und der Querbalken (3) mittels Schrauben (12) befestigt sind, die in die oben genannten Schraubenkanäle (6) eingeschraubt sind; wobei die Fassadenstruktur (1) mit aufquellenden Dichtungen (16) ausgestattet ist, die

- zwei aufquellende Streifen (17) enthalten, die aus einem Material ausgeführt sind, das sich im Brandfall unter Hitzeeinwirkung ausdehnt; wobei die aufquellenden Streifen (17) mittels eines Abstandshalters (18) miteinander verbunden sind, die die aufquellenden Streifen (17) in einem Abstand (A) voneinander hält; wobei die aufquellenden Dichtungen (16) mit ihren aufquellenden Streifen (17) auf beiden Seiten der Schraubenkanäle (6) gleitend über die Rippen (7) der Schraubenkanäle (6) der Pfosten (2) und der Querbalken (3) angebracht werden; **dadurch gekennzeichnet, dass** der Abstandshalter (18) einen U-förmig ausgebildeten Profiltteil (19) besitzt, der Schenkel (20) umfasst, die sich parallel zu den aufquellenden Streifen (17) erstrecken; und dass die aufquellenden Dichtungen (16) gleitend mit ihrem U-förmig ausgebildeten Teil (19) in die Schraubenkanäle (6) passen; wobei die Öffnung des U-förmig ausgebildeten Teils (19) in Richtung der Außenseite (4) der Fassadenstruktur (1) ausgerichtet ist.
2. Fassadenstruktur nach Anspruch 1, **dadurch gekennzeichnet, dass** die aufquellende Dichtung (16) in der Form eines extrudierten oder eines coextrudierten Profils ausgeführt ist.
3. Fassadenstruktur nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die aufquellenden Streifen (17) sich im Wesentlichen parallel zueinander erstrecken.
4. Fassadenstruktur nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** die Schenkel (20) des U-förmig ausgebildeten Profiltteils (19) in einem Abstand (B') von den aufquellenden Streifen (17) angebracht sind, der gleich der Breite (B) der Rippen (7) ist.
5. Fassadenstruktur nach Anspruch 4, **dadurch gekennzeichnet, dass** die Schenkel des U-förmig ausgebildeten Profiltteils (19) mit ihren freien Enden mittels eines kreuzförmigen Elements (21) des Abstandshalters (18) mit den aufquellenden Streifen (17) verbunden sind.
6. Fassadenstruktur nach Anspruch 5, **dadurch gekennzeichnet, dass** die kreuzförmigen Elemente (21) mit den aufquellenden Streifen (17) in einem Abstand (C, D) von den Längskanten (22) der aufquellenden Streifen (17) verbunden sind.
7. Fassadenstruktur nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** zwischen den Schraubenkanälen (6) und den Klemmprofilen (10) ein Isolierprofil (13) vorgesehen ist, das aus einem wärmeisolierenden Schaumstoff oder einem anderen Isoliermaterial ausgeführt ist und mit einer Einsatzkante (14) in den U-förmig ausgebildeten Teil (19) der aufquellende Dichtung (16) bis in den Schneckenkanal (6) hinein gleitend passend angebracht wird.
8. Fassadenstruktur nach Anspruch 7, **dadurch gekennzeichnet, dass** die oben genannten Schrauben (12) durch die Isolationsprofile (13) in Schraubenkanäle (6) eingeschraubt sind.
9. Fassadenstruktur nach Anspruch 7 oder 8, **dadurch gekennzeichnet, dass** die Isolierprofile (13) relativ zur Einsatzkante (14) einen breiteren Körper (23) aufweisen, dessen Breite etwa gleich der Breite (B), an der Außenseite der Rippen (7), der Schraubenkanäle (6) ist.
10. Fassadenstruktur nach Anspruch 9, **dadurch gekennzeichnet, dass** die aufquellende Dichtung (16) mit den aufquellenden Streifen (17) sich über eine bestimmte Länge (D) des oben genannten Körpers (23) des Isolierprofils (13) erstreckt.
11. Fassadenstruktur nach Anspruch 9 oder 10, **dadurch gekennzeichnet, dass** der Körper (23) sich über eine bestimmte Länge (F) in Bezug auf die aufquellende Dichtung (16) nach außen erstreckt; wobei der oben genannte Teil von Isolationselementen (24) umgeben ist, die einen oder mehrere in seitlicher Richtung vorstehende Flügel (25) umfassen, die aus einem Material ausgeführt sind, das eine Wärmeisolierung bereitstellt.

Revendications

1. Structure de façade, qui contient un squelette de profilés qui sont réalisés à partir d'aluminium ou analogue sous la forme de meneaux (2) et de traverses d'imposte (3) de charpentes adjacentes pour des panneaux de façade (9), et qui, sur leurs côtés avant (5) orientés dans la direction du côté externe de la structure de façade (1), sont équipés d'un canal de vis ouvert (6) délimité par deux nervures saillantes parallèles (7) des profilés, qui définissent une feuillure (8) dans laquelle les panneaux (9) sont fixés avec un certain jeu latéral au moyen de profilés de serrage (10) qui recouvrent les bords des panneaux (9) et qui sont fixés contre lesdits côtés avant (5) des meneaux (2) et des traverses d'imposte (3) au moyen de vis (12) qui sont vissées dans lesdits canaux de vis (6) ; dans laquelle la structure de façade (1) est équipée de joints d'étanchéité gonflants (16) qui contiennent deux bandes gonflantes (17) qui sont réalisées à partir d'un matériau qui, dans le cas d'un incendie, gonfle sous l'influence de la chaleur ; dans laquelle les bandes gonflantes (17) sont reliées les unes aux autres au moyen d'une entretoise (18) qui maintient les bandes gonflantes

- (17) à une distance (A) les unes des autres ; dans lequel les joints d'étanchéité gonflants (16) viennent se placer de manière appropriée par glissement par-dessus les nervures (7) des canaux de vis (6) des meneaux (2) et des traverses d'imposte (3), avec leurs bandes gonflantes (17) de chaque côté des canaux de vis (6) ; **caractérisée en ce que** l'entretoise contient une partie profilée (19) possédant une configuration en forme de U, qui comprend des branches (20) qui s'étendent parallèlement aux bandes gonflantes (17) ; et **en ce que** les joints d'étanchéité gonflants (16) viennent se placer de manière appropriée par glissement, avec leur partie (19) possédant une configuration en forme de U, dans les canaux de vis (6) ; dans laquelle l'ouverture de la partie (19) possédant une configuration en forme de U est orientée dans la direction du côté externe (4) de la structure de façade (1).
2. Structure de façade selon la revendication 1, **caractérisée en ce que** le joint d'étanchéité gonflant (16) est réalisé sous la forme d'un profilé qui a été extrudé ou d'un profilé qui a été coextrudé.
3. Structure de façade selon la revendication 1 ou 2, **caractérisée en ce que** les bandes gonflantes (17) sont essentiellement parallèles les unes aux autres.
4. Structure de façade selon l'une quelconque des revendications précédentes, **caractérisée en ce que** les branches (20) de la partie de profilé (19) possédant une configuration en forme de U sont situées à une distance (B') des bandes gonflantes (17) qui est égale à la largeur (B) des nervures (7).
5. Structure de façade selon la revendication 4, **caractérisée en ce que** les branches (20) de la partie de profilé (19) possédant une configuration en forme de U sont reliées, avec leurs extrémités libres, aux bandes gonflantes (17) au moyen d'un élément (21) de l'entretoise (18), en forme de croix.
6. Structure de façade selon la revendication 5, **caractérisée en ce que** les éléments (21) en forme de croix sont reliés aux bandes gonflantes (17) à une distance (C, D) des bords longitudinaux (22) des bandes gonflantes (17).
7. Structure de façade selon l'une quelconque des revendications précédentes, **caractérisée en ce que**, entre les canaux de vis (6) et les profilés de serrage (10), on prévoit un profilé d'isolation (13) qui est réalisé à partir d'une mousse procurant une isolation thermique ou d'un autre matériau isolant et vient se placer de manière appropriée par glissement avec un bord d'insert (14) dans la partie (19) du joint d'étanchéité gonflant (16), qui possède une configuration en forme de U, jusque dans le canal
- de vis (6).
8. Structure de façade selon la revendication 7, **caractérisée en ce que** lesdites vis (12) sont vissées à travers les profilés d'isolation (13) dans des canaux de vis (6).
9. Structure de façade selon la revendication 7 ou 8, **caractérisée en ce que** les profilés d'isolation (13), par rapport au bord d'insert (14), présentent un corps plus large (23) dont la largeur est approximativement égale à la largeur (B) sur le côté externe des nervures (7) des canaux de vis (6).
10. Structure de façade selon la revendication 9, **caractérisée en ce que** le joint d'étanchéité gonflant (16) s'étend, avec les bandes gonflantes (17), sur une certaine longueur (D) dudit corps (23) du profilé d'isolation (13).
11. Structure de façade selon la revendication 9 ou 10, **caractérisée en ce que** le corps (23) s'étend vers l'extérieur sur une certaine longueur (F) par rapport au joint d'étanchéité gonflant (16) ; dans laquelle ladite partie est entourée par des éléments d'isolation (24) qui comprennent une ou plusieurs ailes (25) qui font saillie dans la direction latérale, réalisées à partir d'un matériau procurant une isolation thermique.

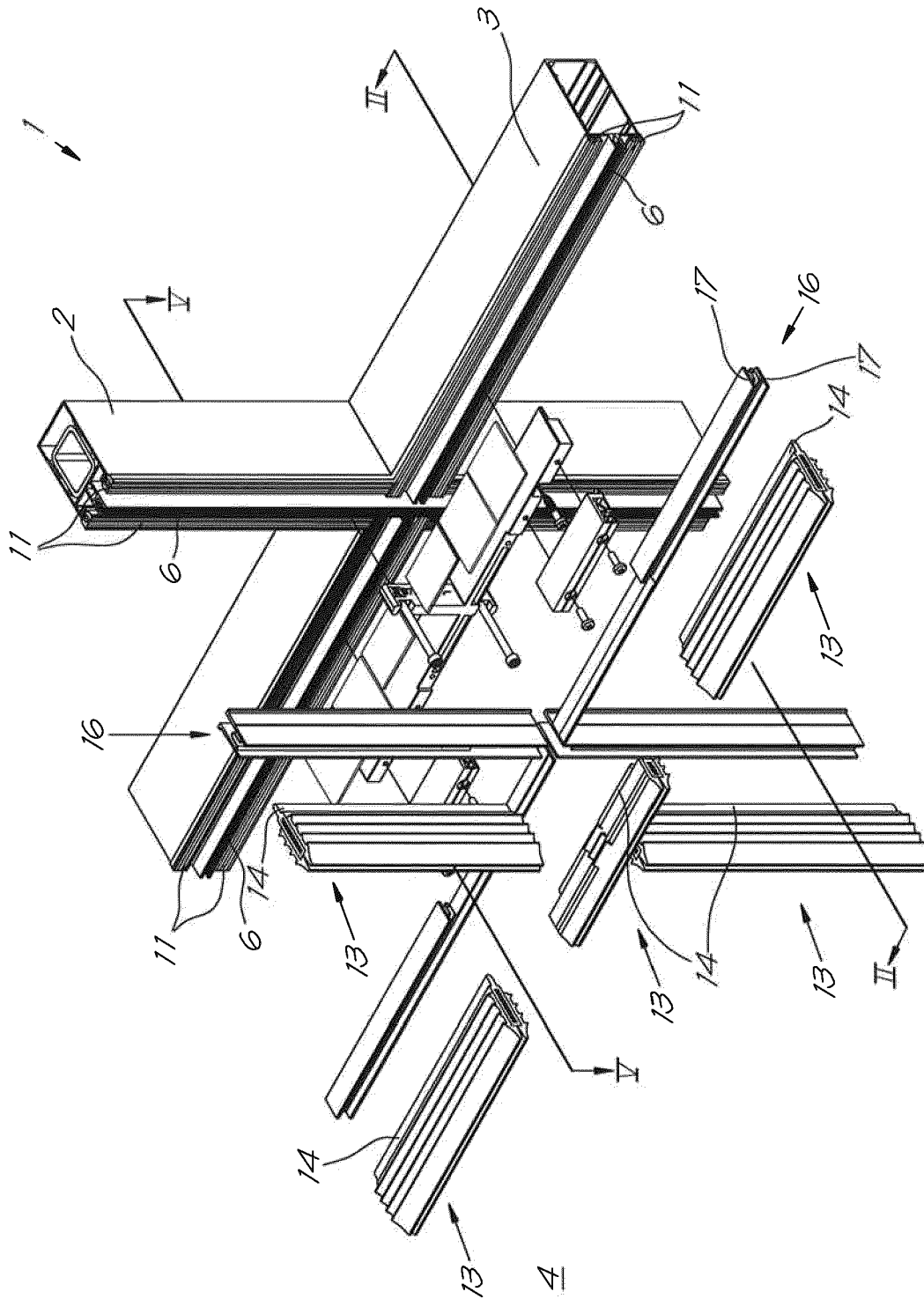


Fig. 1

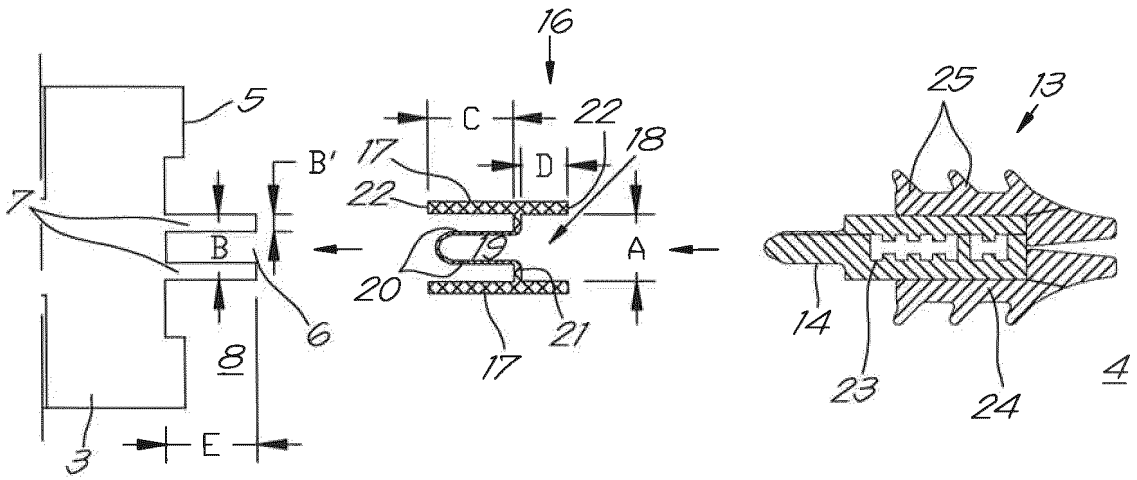


Fig. 2

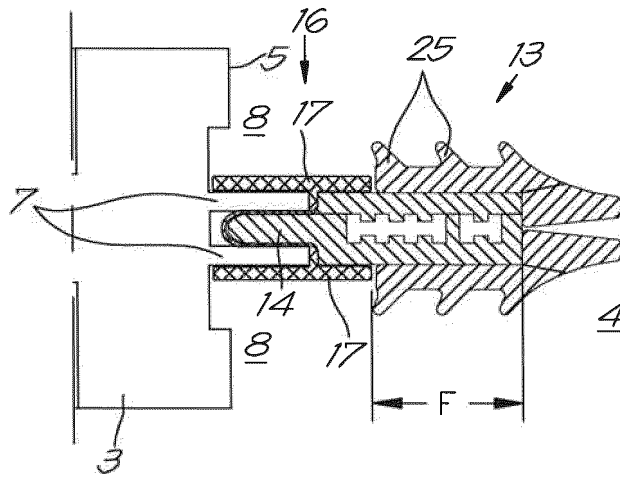


Fig. 3

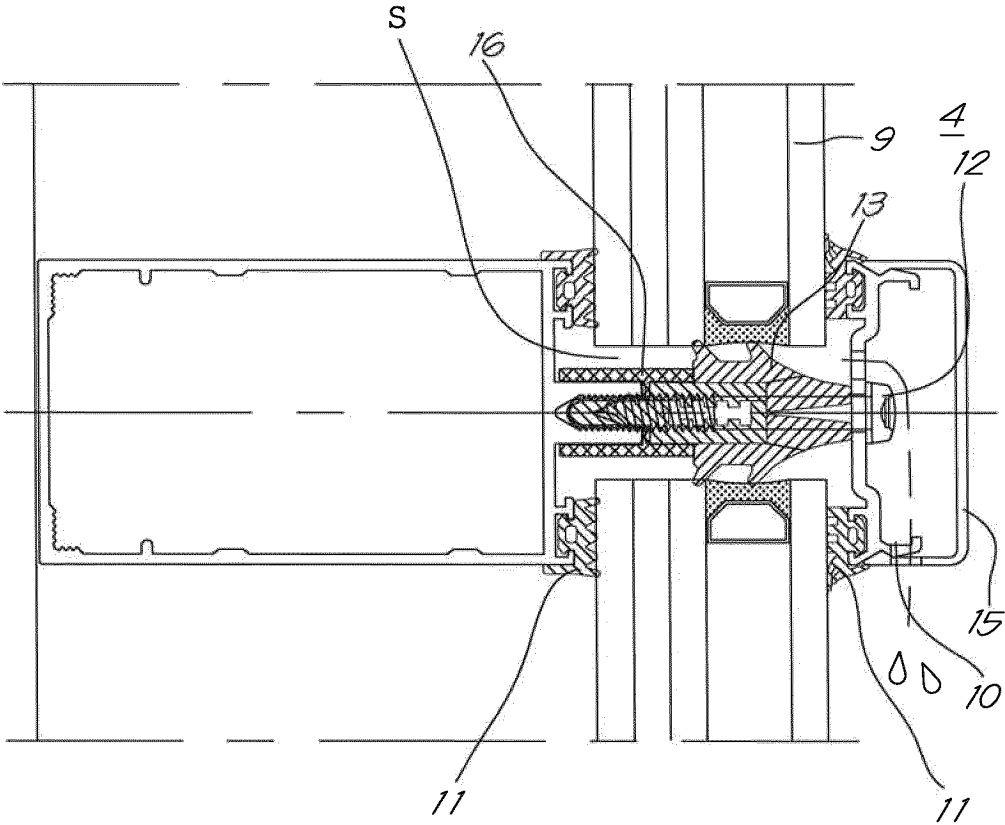


Fig. 4

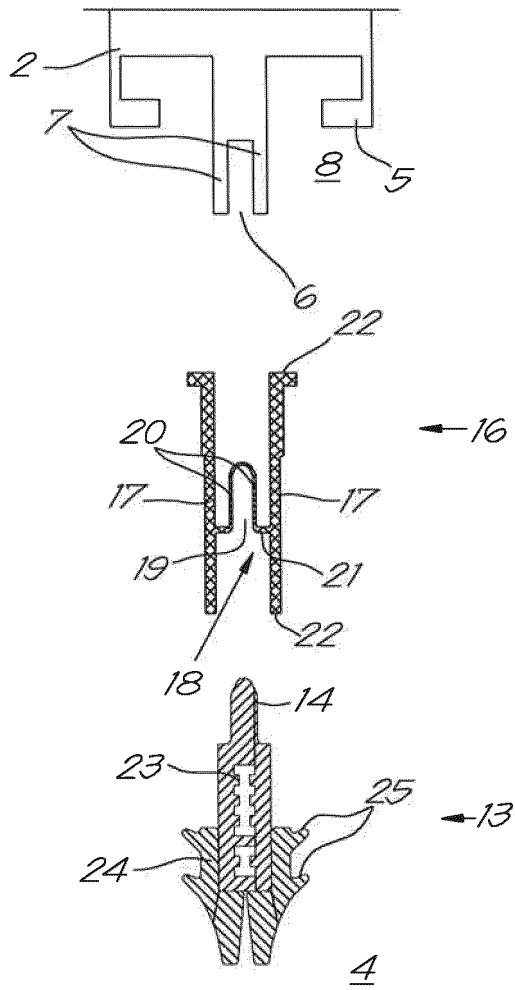


Fig. 5

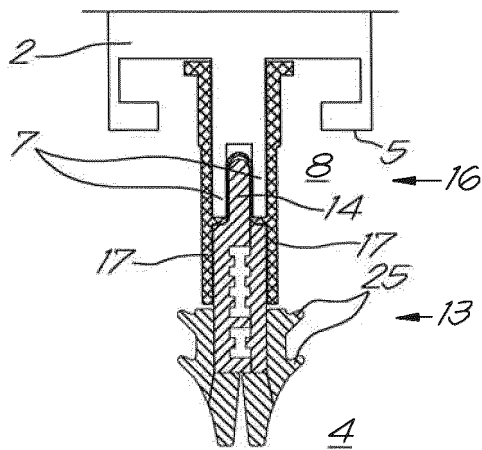


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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