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(54) **Section member and fixture assembly for making continuous building faces**

Satz von Profil- und Befestigungselementen zur Herstellung von durchgehenden Bauwerksfassaden

Ensemble de profilés et de dispositifs de fixation pour réaliser des façades de bâtiments continues

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Description

The present invention relates to a section member and fixture assembly for making continuous building facades.

As is known, there are at present constructed buildings which are provided with structurally continuous facades, which are obtained by mutually horizontally and vertically coupling glass panels either of the single or double type.

Also known is the fact that the glass panels must be usually restrained to a bearing frame, which is made by mutually and firmly coupling uprights and cross-members, which are advantageously formed by cooperating section members.

For such a construction purpose, there are conventionally used a lot of modular component portions the assembling of which, on the other hand, is rather dfficult and requires a lot of labour.

The document DE-U-90 04 368 discloses a section member and fixture assembly having substantially the features of the pre-characterizing part of the main claim.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to provide an assembly or set of section members which, by cooperating with suitable fixtures or fittings therefor, can greatly accelerate and facilitate the assembling operations of the building facades.

Within the above mentioned aim, a main object of the present invention is to provide an assembly or set of section members and fixtures therefor which are specifically designed to simplify the proper assembling, that is a firm and coplanar assembling, of said section members.

Another object of. the present invention is to provide a section member and fixture assembly which allows to construct very reliable supporting or bearing structures.

According to one aspect of the present invention, the above mentioned aim and objects, which will become more apparent hereinafter, are achieved by a section member and fixture assembly, for making continuous building facades, having the features of the characterizing part of the main claim.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the section member and fixture assembly, for making continuous building facades, according to the present invention, will become more apparent hereinafter from the following detailed disclosure of some preferred, though not exclusive, embodiments thereof, which are schematically illustrated, by way of a merely indicative but not limitative example, in the figures of the accompanying drawings, where:

Figures 1 and 1a are respective horizontal cross-sectional views showing possible combinations of section members specifically designed for restraining a glass panel or plate, on a so-called blind panel, and a box-like glass panel on a window opening;

Figure 2 shows, by a vertical cross-sectional view, the same combination of section members and fixtures;

Figure 3 is a further vertical cross-sectional view illustrating a like section member combination, provided with thermal cut characteristics, and further showing fixtures therefor, for restraining a box-like glass panel provided with an inner glass plate of less size;

Figures 4 and 5 are respective horizontal cross-sectional views illustrating combinations of section members for respectively restraining two glass plates with a back blind panel and two box-like glass panels;

Figures 6 and 7 are respective vertical cross-sectional views illustrating other combinations of section members and fixtures for restraining box-like glass panels constructed by using structural sealing materials and with different width gaps;

Figures 8 and 9 illustrate two further section members which can be used as framing uprights;

Figures 10 to 13 illustrate further section members provided for cooperating with the above mentioned upright section members;

Figures 14 and 15 illustrate a locking device for quick locking a window wing;

and

Figures 16 and 17 illustrate a possible operation of the locking device shown in figures 14 and 15.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the figures of the accompanying drawings, the section member and fixture assembly for making continuous building facades according to the present invention comprises a hollow section member 1, having preferably a square cross-section and provided, on a side thereof, with mushroom longitudinal ridges which define two perimetrical seats 2, as well as a pair of contoured legs which define two side restraing seats 3 and 3' and a front restraining seat 4.

This section member can be used as an upright and cross-section member and it can also be formed by the upright section member 1' shown in figure 8 which has contoured legs of greater extension.

With the above mentioned section member, a further section member 5, for restraining a glass plate 6 on a blind panel 7, and a further section member 8 for restraining a box-like glass panel 9 cooperate, said box-like glass panel being provided for forming fixed glass panels and for defining window openings.

The cooperating section members, are substantially provided, respectively, with a reduced width longitudinal seat 10 for restraining a single glass plate, and with a further seat, having a greater width, indicated at the reference number 11, for restraining or housing the box-like glass panel.

It should moreover be pointed out that, as the mentioned box-like glass panel is provided with a smaller size inner glass plate 9', then further section members 12 and 13 can be used, in which the longitudinal seat 10, of reduced width, is formed by a second section member 14 restrained to said section members by means of polyamide interconnecting elements 15, preferably of double-T shape.

The section member 8 is specifically designed for operating as a window wing, and this wing will be formed by restraining in the seat 11 the box-like glass panel 8 through the interposition of suitable seals or gaskets 16 or 17 and the wing will be closed on a resilient controured fixture or fitting 18 which is connected to the section member 1 through screws 19 and on an inner abutment gasket 20 in turn restrained in its corresponding perimetrical seat 2 of said section member 1.

To the section member 5, in turn, there is firmly connected a blind panel 7, by using a small braket 21 affixed to the hollow body of the section member 5 by means of screws 22.

Said section member 5, moreover, is also provided, in addition to an inner gasket 16, with an outer perimetrical gasket or seal 23.

The section member 5, as shown, is supported or bears on an inner abutment gasket 20, and is so designed as to define, between the glass plate 6 and blind panel 7, an anti-condensate gap 24.

In this connection it should be moreover pointed out that in the front seat of the section member 1 there are engaged a pair of gaskets 25, a further or second cooperating gasket pair 26 being restrained in corresponding seats of the section members 5 and 8 or 12 and 13.

In the side seats 27 of the latter, in particular, there is engaged a C section member 28, provided with outer lugs for firmly restraining this section member in said seats.

To said C section members a locking device can be vertically applied in order to lock and unlock the window wings, said locking device substantially comprising a contoured body 29 which is provided with open opposite hollows 30 and 30' which are respectively upwardly and downwardly opened.

The mentioned body is restrained, by means of screws and a small plate 40, in the side hollow 3 of the section member 1, whereas, on the section member 28 for locking the window wing, there is applied, at any desired height,a locking screw 41.

Thus, owing to the disclosed means, the mentioned section member for locking the window wing, will slide in contact with the hollow 29, so as to be automatically locked, at the set height, owing to the interference of the screw 41 and the contoured body 29.

As shown, there are moreover provided a contoured small plate 31, of reduced width, and a further small plate 32 which extends by a doubly bent portion 32' of less height.

These small plates are specifically designed for obtaining the vertical displacement of the C-shape section member 28.

In particular, said small plates are provided with throughgoing holes and are affixed, by means of screws 33, at a set position on said C section member.

Between the two glass plates of the box-like glass panel (as shown in figures 6 and 7) it is possible to locate a spacer element 34, as well as a layer of a structural sealing material 35, and a not-structural sealing material 36, and, in order to provide a mechanically firm coupling of the outer glass plate of the box-like glass panel, a further suitably contoured fixture 37 can be provided, adapted to press on a hard rubber band 38.

From the above disclosure and the figures of the accompanying drawings, the great functionality and facility of use characterizing the section member and fixture assembly according to the present invention will be self evident.

Claims

1. A section member and fixture assembly, for making continuous building facades, comprising a hollow section member (1) provided, at one side thereof, with a pair of contoured lugs delimiting a front restraining seat (4) and at least a further hollow section member (5,8,12,13) cooperating with said hollow section member (1) and adapted to support a glass plate (6) or a box-like glass panel (9), said assembly further comprising quick intercoupling and locking means, finishing section members and sealing and/or abutment gaskets (16), (17), the said hollow section member (1) being provided as well with a pair of contoured legs defining two side restraining seats (3,3') facing a side seat (27) defined in said further hollow section member (5,8,12,13), in said side restraining seats (3,3') and in said side seat (27) there being adapted to be housed a device (28), (29) for locking and unlocking said further hollow section member (5,8,12,13) bearing said glass plate (6) or box-like glass panel (9), said hollow section member (1) being provided, laterally of said pair of contoured legs, with longitudinal ridges defining two perimetrical seats (2), said further hollow section member (5,8,12,13) engaging against a pair of gaskets (25) housed in said front restraining seat (4) and an inner abutment gasket (20) housed in one of said perimetrical seats (2), characterized in that said hollow section member (1) is adapted to operate both as an upright and as a crossmember, in that said locking device is vertically applied to C-shape sec-

tion members (28) engaged in said seats (27), said device including a contoured body (29) provided with opposite hollow (30,30') respectively upwardly and downwardly opened, said body being locked, by means of screws and a plate (40) in said side seat (3,3') of said upright section member (1), whereas, on the section member (28) for locking said wing, there is applied a locking screw (41), and that said assembly further comprises a contoured plate (31) of reduced width and a further plate (32) extending with a double bent portion (32'), of less height than the bend portion (32), said plates (31,32) being provided with throughgoing holes and being locked to said C-shape section member (28) by screws (33) or the like.

2. A section member and fixture assembly, according to Claim 1, characterized in that said at least a further hollow section member (5,8,12,13) comprises a first section member (15) adapted to affix a glass plate (6) on a blind panel (7) and a second section member for restraining a box-like glass panel (9) provided at window openings, said section members (5,9) being respectively provided with a longitudinal seat (10) of reduced width for restraining a single glass panel (6) and a greater width seat adapted to house said box-like panel (9).

3. A section member and fixture assembly according to the preceding claims, characterized in that it further comprises two section members (12,13) similar to said further hollow section members (5,8) in which said reduced width longitudinal seat (10) is defined by a further section member (14) connected to said section members (12,13) by double T shaped polyamide interconnecting elements (15).

4. A section member and fixture assembly, according to one or more of the preceding claims, characterized in that said further hollow section member (8) housing said box-like glass panel (9) operates as a wing and restrain said box-like glass panel through the interposition of gaskets (17,23), said section member (8) bearing, in its closure condition, on a contoured resilient fixture (18) fixed to said upright hollow section member (1) by screws, and on said inner abutment gasket (20) engaged in the corresponding perimetrical seat (2) provided on said upright section member (1).

5. A section member and fixture assembly, according to one or more of the preceding claims, characterized in that it further includes a bracket (21) for anchoring that further hollow section member (5) to a blind panel (7) the bracket (21) being affixed to the hollow body (5) by screws (22), in that the further hollow section member (5) bears, in addition to an inner gasket (16), a perimetrical outer gasket (23), said further hollow section member (5) bearing moreover on said inner abutment gasket (20) and being so designed as to define, between said glass plate (6) and blind panel (7) an anticondensate gap (24).

6. A section member and fixture assembly, according to one or more of the preceding claims, characterized in that it further comprises a first pair of gaskets (25) which are engaged in the front seat (4) of said upright section member (1) and a second pair of gaskets (26) engaged in corresponding seats of the further hollow section members (5,8,12,13) for restraining said glass panel (6) or box-like glass panel (9).

7. A section member and fixture assembly, according to one or more of the preceding claims, characterized in that it further comprises spacer elements (34) to be arranged between the two glass panels of a box-like glass panel (9) through the interposition of a structural sealing layer (35) and a not structural sealing layer (36) as well as a fixture pressing on a hard rubber band (38).

Patentansprüche

1. Eine Montage von Profilteilen und Halterungen zum Erstellen durchgehender Gebäudefassaden, umfassend ein hohles Profilteil (1), daß an einer Seite davon mit einem Paar geformter Ansätze bereitgestellt ist, die eine vordere Aufnahme (4) abgrenzen, und mindestens ein weiteres hohles Profilteil (5, 8, 12, 13), das mit diesem hohlen Profilteil (1) zusammenwirkt und angepaßt ist, eine Glasplatte (6) oder eine blockförmige Glasfüllung (9) zu tragen, wobei diese Montage weiterhin eine Vorrichtung für die rasche Verbindung und Arretierung umfaßt, verzierende Profilteile und Dichtungen und/oder Stoßdichtungen (16), (17), wobei dieses hohle Profilteil (1) ebenso mit einem Paar geformter Ansätze bereitgestellt ist, die zwei seitliche Aufnahmen (3, 3') gegenüber von einer seitlichen Aufnahme (27) bilden, die in diesem weiteren hohlen Profilteil (5, 8, 12, 13) gebildet ist, wobei diese seitlichen Aufnahmen (3, 3') und diese seitlichen Aufnahme (27) dahingehend angepaßt sind, um eine Vorrichtung (28), (29) zum Arretieren und Entriegeln dieses weiteren hohlen Profilteiles (5, 8, 12, 13) aufzunehmen, das diese Glasplatte (6) oder blockförmige Glasfüllung (9) trägt, wobei dieses hohle Profilteil (1) seitlich von diesem Paar von geformten Ansätzen mit längsseitigen Graten bereitgestellt ist, die zwei Aufnahmen (2) entlang dem Umfang festlegen, wobei dieses weitere hohle Profilteil (5, 8, 12, 13) gegen ein Dichtungspaar (25) stößt, das sich in dieser vorderen Aufnahme (4) befindet, und eine

innere Stoßdichtung (20), die sich in einer dieser Aufnahmen (2) entlang dem Umfang befindet, dadurch gekennzeichnet, daß dieses hohle Profilteil (1) angepaßt ist, um sowohl als Ständer als auch als Querträger zu wirken, daß diese Arretiervorrichtung vertikal an den C-förmigen Profilteilen (28) angebracht ist, die in diese Aufnahmen (27) eingefügt sind, wobei diese Vorrichtung einen geformten Körper (29) umfaßt, der mit entgegengesetzten Vertiefungen (30, 30') bereitgestellt ist, die jeweils nach oben und nach unten geöffnet sind, wobei dieser Körper mittels Schrauben und einer Platte (40) in dieser seitlichen Aufnahme (3, 3') dieses aufrechten Profilteiles (1) arretiert ist, während auf dem Profilteil (28) zum Arretieren dieses Flügels eine Arretierschraube (41) angebracht ist, und daß diese Montage weiterhin eine geformte Platte (31) von geringerer Weite umfaßt und eine weitere Platte (32), die sich über einen doppelt geknickten Abschnitt (32') erstreckt, der von geringerer Höhe als der geknickte Abschnitt (32) ist, wobei diese Platten (31, 32) mit durchgehenden Löchern bereitgestellt und an diesem C-förmigen Profilteil (28) mittels Schrauben (33) oder dergleichen befestigt sind.

2. Eine Montage von Profilteilen und Halterungen nach Anspruch 1, dadurch gekennzeichnet, daß dieses weitere hohle Profilteil (5, 8, 12, 13) ein erstes Profilteil (15) umfaßt, das angepaßt ist, eine Glasplatte (6) auf einer Blindplatte (7) zu befestigen, und ein zweites Profilteil zum Halten einer blockförmigen Glasfüllung (9), die an den Fensteröffnungen bereitgestellt ist, wobei diese Profilteile (5, 9) jeweils mit einem Längssitz (10) geringerer Weite zum Halten einer einzelnen Glasplatte (6) bereitgestellt sind und mit einem Sitz größerer Weite, der angepaßt ist, diese blockförmige Platte (9) aufzunehmen.

3. Eine Montage von Profilteilen und Halterungen nach den vorhergehenden Ansprüchen, dadurch gekennzeichnet, daß sie weiterhin zwei Profilteile (12, 13) umfaßt, die diesen weiteren hohlen Profilteile (5, 8) ähnlich sind, in denen dieser Längssitz (10) geringerer Weite durch ein weiteres Profilteil (14) festgelegt ist, das mit diesen Profilteilen (12, 13) durch doppelt T-förmige Verbindungselemente (15) aus Polyamid verbunden ist.

4. Eine Montage von Profilteilen und Halterungen nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß dieses weitere hohle Profilteil (8), das diese blockförmige Glasfüllung (9) aufnimmt, als Flügel wirkt und diese blockförmige Glasfüllung durch das Einfügen von Dichtungen (17, 23) hält, wobei sich dieses Profilteil (8) in seinem Schließzustand auf eine geformte elastische Halterung (18) stützt, die mittels Schrauben fest mit diesem aufrechten hohlen Profilteil (1) verbunden ist, und auf diese innere Stoßdichtung (20), die in dem entsprechenden Sitz (2) entlang dem Umfang eingelassen ist,. der auf diesem aufrechten Profilteil (1) bereitgestellt ist.

5. Eine Montage von Profilteilen und Halterungen nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß sie weiterhin einen Bügel (21) umfaßt, um dieses weitere hohle Profilteil (5) an einer Blindplatte (7) zu befestigen, wobei der Bügel (21) am hohlen Körper (5) mittels Schrauben (22) befestigt ist, daß das weitere hohle Profilteil (5), zusätzlich zu einer Innendichtung (16), eine Außendichtung (23) entlang dem Umfang trägt, wobei sich dieses weitere hohle Profilteil (5) überdies auf diese innere Stoßdichtung (20) stützt und so entworfen ist, daß es zwischen dieser Glasplatte (6) und dieser Blindplatte (7) einen Anti-Kondensationsspalt festlegt.

6. Eine Montage von Profilteilen und Halterungen nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß sie weiterhin ein erstes Dichtungspaar (25) umfaßt, das in der vorderen Aufnahme (4) dieses aufrechten Profilteiles (1) eingelassen ist, und ein zweites Dichtungspaar (26), das in entsprechenden Sitzen der weiteren hohlen Profilteile (5, 8, 12, 13) zum Halten dieser Glasplatte (6) oder blockförmigen Glasfüllung (9) eingelassen ist.

7. Eine Montage von Profilteilen und Halterungen nach einem oder mehreren der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß es weiterhin Abstandhalter (34) umfaßt, die zwischen den zwei Glasplatten einer blocktörmigen Glasplatte (9) unter Einfügung einer strukturellen Dichtungsschicht (35) und einer nicht-strukturellen Dichtungsschicht (36) sowie einer Halterung, die auf ein hartes Gummiband (38) drückt, angeordnet werden.

Revendications

1. Un assemblage d'éléments profilés et de dispositifs de serrage pour fabriquer des façades continues de bâtiment, comprenant un élément profilé creux (1) pourvu, sur l'un de ses côtés, d'une paire d'oreilles profilées délimitant un siège de fixation frontal (4) et au moins un ultérieur élément profilé creux (5, 8, 12, 13) concourant avec ledit élément profilé (1) creux et adapté à supporter une plaque de verre (6) ou un pan de verre en forme de boîte (9), ledit assemblage comprenant aussi un dispositif de couplage et de verrouillage rapide, des éléments profilés de finissage et des joints (16), (17) scellants et/ou d'aboutissement, ledit élément profilé creux (1) étant aussi pourvu d'une paire de talons profilés définissant

deux sièges latéraux de fixation (3, 3') faisant face à un siège latéral (27) défini dans ledit ultérieur élément profilé creux (5, 8, 12, 13), dans lesdits sièges latéraux de fixation (3, 3') et dans ledit siège latéral (27) étant possible d'insérer un dispositif (28, 29) pour le verrouillage et le déverrouillage dudit élément profilé creux (5, 8, 12, 13) supplémentaire portant ladite plaque de verre (6) ou le pan de verre en forme de boîte (9), ledit élément profilé creux (1) étant pourvu, latéralement de ladite paire de bras profilés, de nervures de montage longitudinales définissant deux sièges périmétriques (2), ledit autre élément profilé creux (5, 8, 12, 13) butant contre une paire de joints d'étanchéité (25), situés dans ledit siège frontal de fixation (4), et un joint d'aboutissement intérieur (20) situé dans un desdits sièges périmétriques (2), caractérisé en ce que ledit élément profilé creux (1) est adapté à opérer à la fois comme montant et comme élément transversal, en ce que ledit dispositif de verrouillage est appliqué verticalement aux éléments profilés (28) en forme de C engagés dans lesdits sièges (27), ledit dispositif incluant un corps profilé (29) pourvu de creux dirigés en sens inverse (30, 30') respectivement ouverts en ascendant et en descendant, ledit corps étant verrouillé, au moyen de vis et d'une plaque (40) dans ledit siège latéral (3, 3') dudit élément profilé ascendant (1), tandis que sur l'élément profilé (28) pour verrouiller ledit battant est appliquée une vis verrouillante (41), et en ce que ledit assemblage comprend aussi une plaque profilée (31) d'une largeur réduite et une autre plaque (32) s'étendant avec une partie doublement repliée (32') d'une hauteur inférieure à la partie repliée (32), lesdites plaques (31, 32) étant pourvues de perçages traversants et étant verrouillées audit élément profilé en forme de C (28) au moyen de vis ou similaires.

2. Un assemblage d'éléments profilés et de dispositifs de serrage selon la revendication 1, caractérisé en ce que ledit autre élément profilé creux (5, 8, 12, 13) comprend un premier élément profilé (15) adapté à attacher une plaque de verre (6) à une paroi aveugle (7) et un second élément profilé pour retenir un pan de verre en forme de boîte (9) mis en oeuvre dans les baies de fenêtre, lesdits éléments profilés (5,9) étant respectivement pourvus d'un siège longitudinal (10) d'une largeur réduite pour retenir une simple plaque de verre (6) et d'un siège d'une plus grande largeur adapté à accueillir ledit pan de verre en forme de boîte (9).

3. Un assemblage d'éléments profilés et de dispositifs de serrage selon les revendications précédentes, caractérisé en ce qu'il comprend de plus deux éléments profilés (12, 13) similaires auxdits autres éléments profilés creux (5, 8) dans lesquels ledit siège longitudinal (10) d'une largeur réduite est défini par un autre élément profilé (14) relié auxdits éléments profilés (12, 13) par des éléments de jonction (15) en polyamide disposés en forme d'un double T.

4. Un assemblage d'éléments profilés et de dispositifs de serrage selon une ou plusieurs des revendications précédentes, caractérisé en ce que ledit autre élément profilé creux (8) accueillant ledit pan de verre en forme de boîte (9) opère comme battant et retient ledit pan de verre en forme de boîte par l'interposition de joints d'étanchéité (17, 23), ledit élément profilé (8) portant, dans son état de fermeture, sur un dispositif de serrage résilient profilé (18) fixé audit élément profilé (1) creux montant par des vis, et sur ledit joint intérieur (20) d'aboutissement engagé dans le siège périmétrique correspondant (2) pourvu sur ledit élément profilé (1) montant.

5. Un assemblage d'éléments profilés et de dispositifs de serrage selon une ou plusieurs des revendications précédentes, caractérisé en ce qu'il comprend de plus un crochet (21) pour ancrer l'autre élément profilé creux (5) à une paroi aveugle (7), le crochet (21) étant fixé au corps creux (5) par des vis (22), en ce que l'autre élément profilé creux (5) porte, outre un joint d'étanchéité intérieur (16), un joint d'étanchéité extérieur périmétrique (23), ledit autre élément profilé creux (5) portant de plus sur ledit joint d'étanchéité intérieur (20) d'aboutissement et étant conçu de manière à définir, entre ladite plaque de verre (6) et la paroi aveugle (7), un écartement anti-condensat (24).

6. Un assemblage d'éléments profilés et de dispositifs de serrage selon une ou plusieurs des revendications précédentes, caractérisé en ce qu'il comprend de plus une première paire de joints d'étanchéité (25) qui sont engagés dans le siège (4) frontal dudit élément profilé (1) montant, et une seconde paire de joints d'étanchéité (26) engagés dans les sièges correspondants des autres éléments profilés creux (5, 8, 12, 13) pour retenir ledit pan de verre (6) ou pan de verre en forme de boîte (9).

7. Un assemblage d'éléments profilés et de dispositifs de serrage selon une ou plusieurs des revendications précédentes, caractérisé en ce qu'il comprend de plus des éléments d'intercalation (34) conçus pour être arrangés entre les deux pans de verre du pan de verre en forme de boîte (9) moyennant l'interposition d'une couche de scellement structurelle (35) et d'une couche de scellement non structurelle (36) comme aussi d'un dispositif de serrage pressant sur un ruban en caoutchouc dur (38).

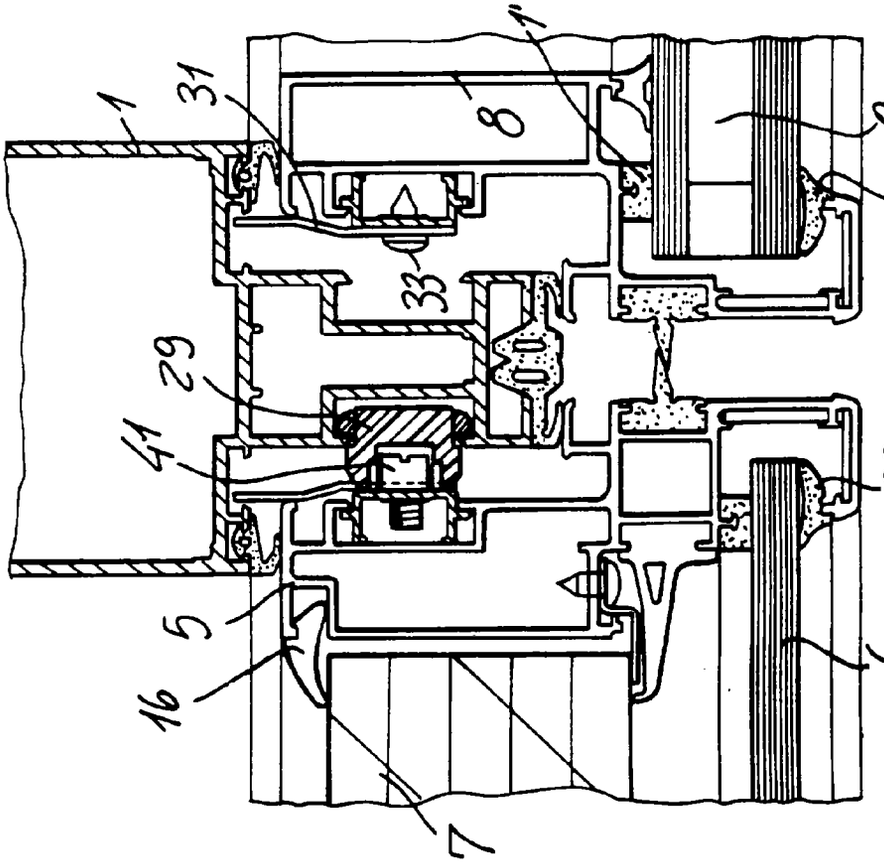


FIG. 1a

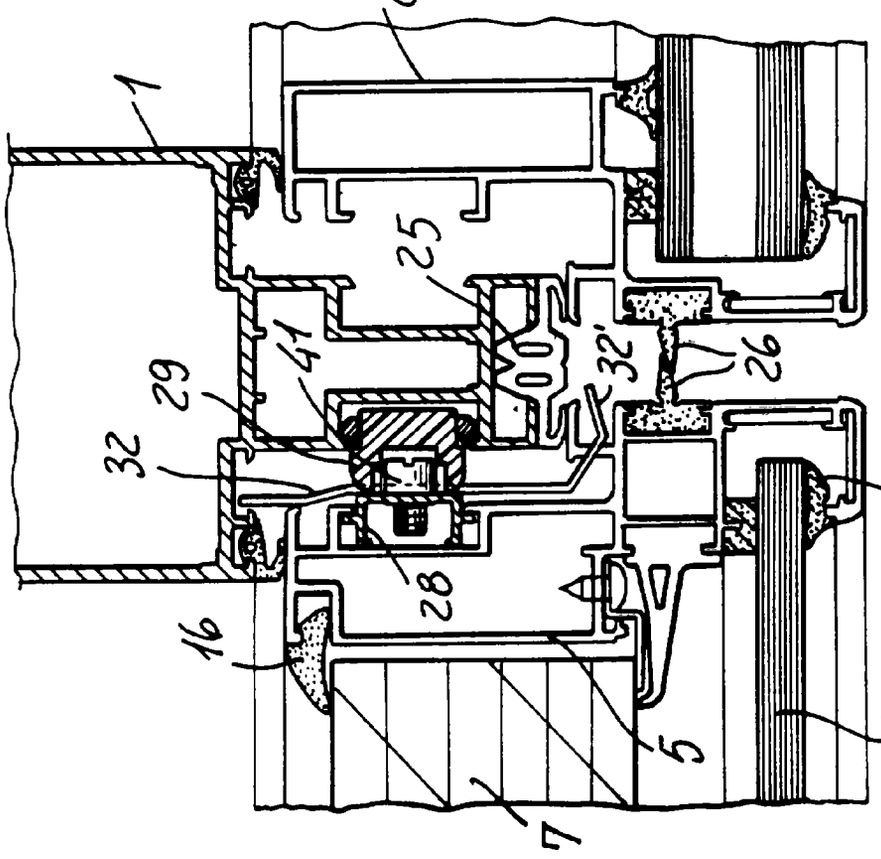
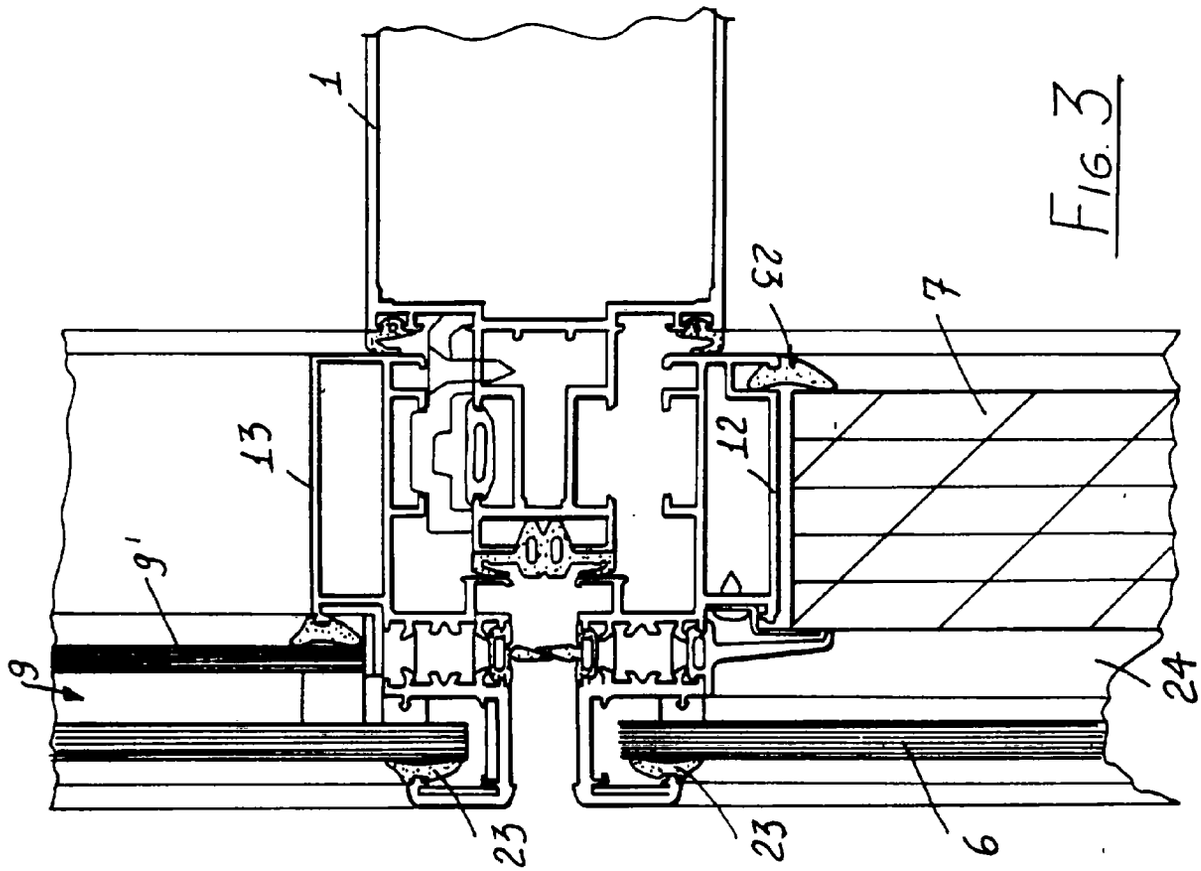


FIG. 1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13
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9'
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FIG. 3

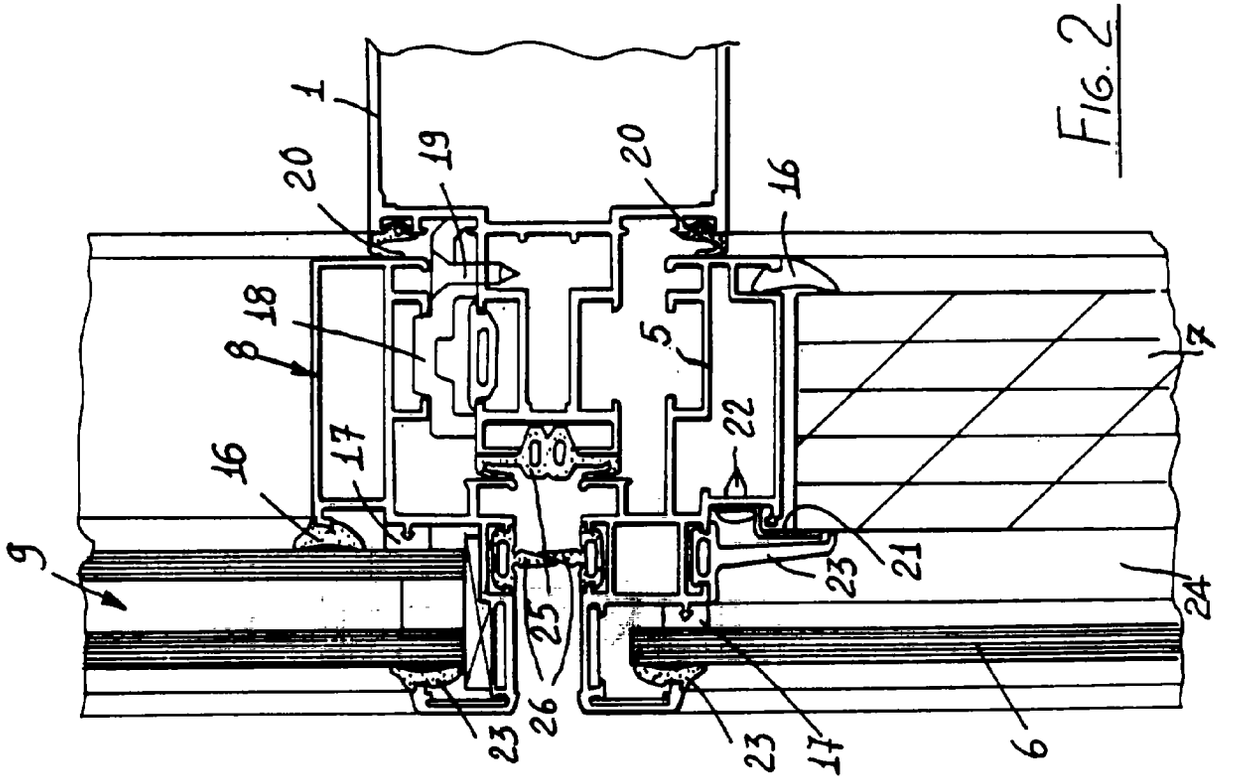
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FIG. 2

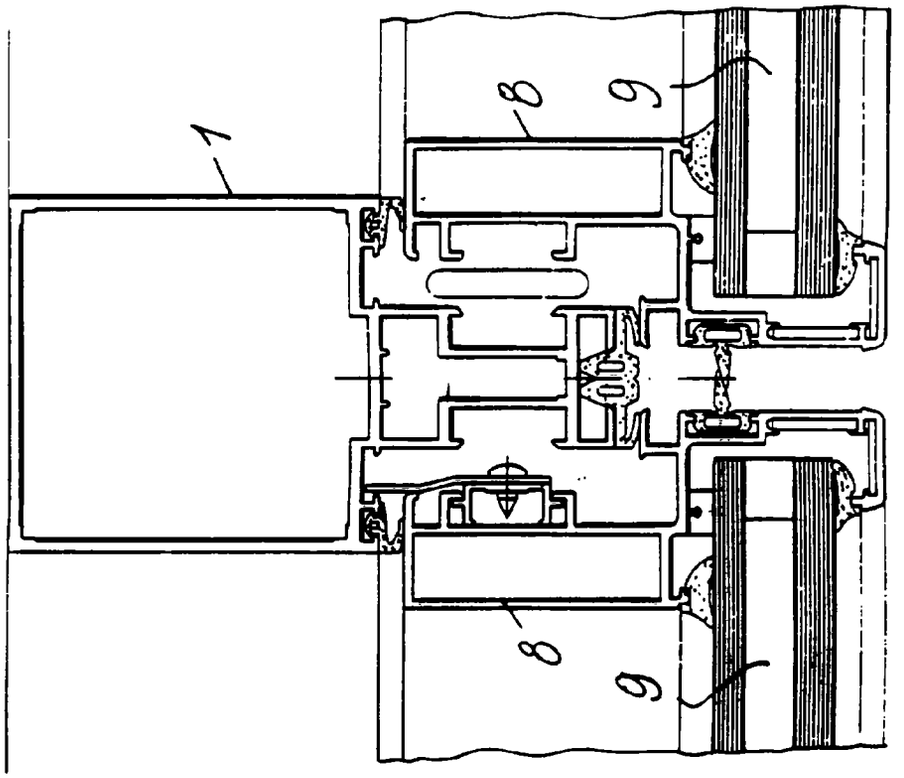

FIG. 5

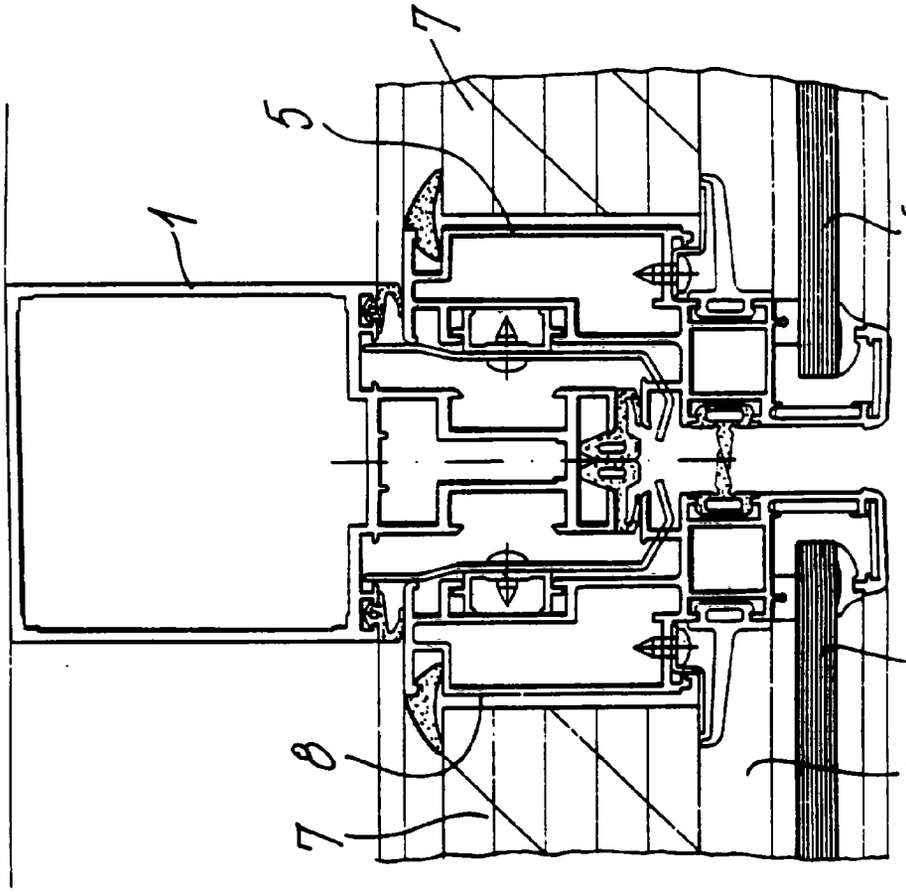

FIG. 4

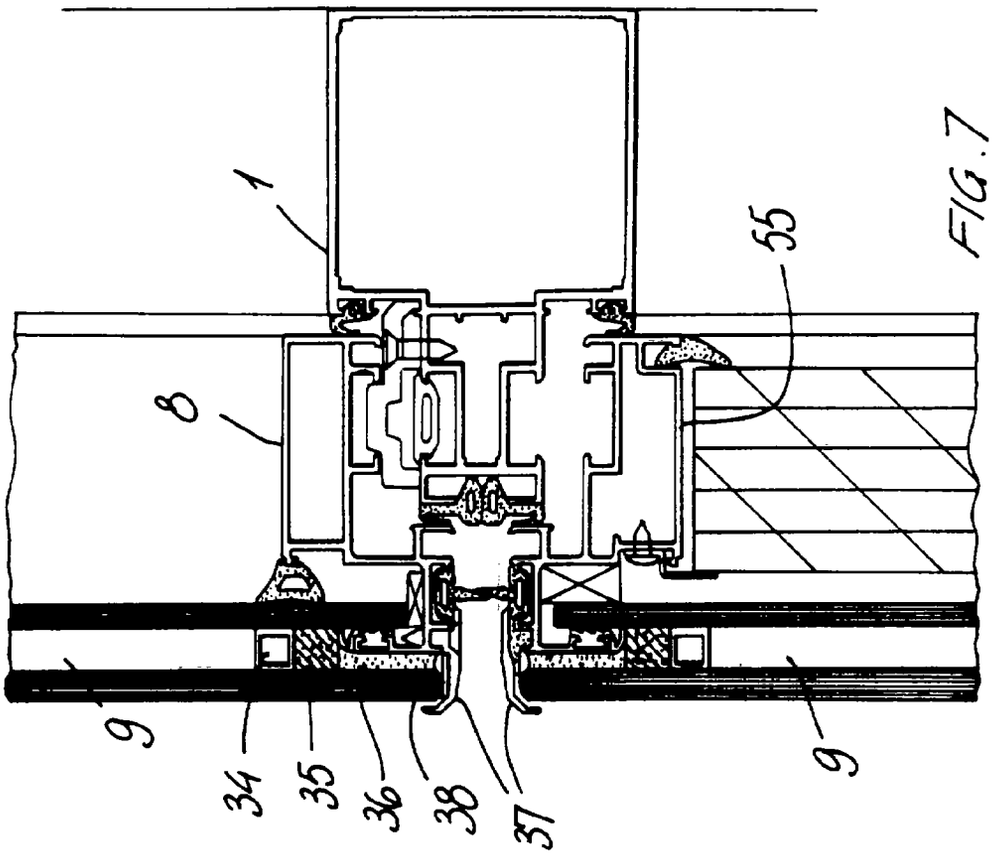

FIG.7

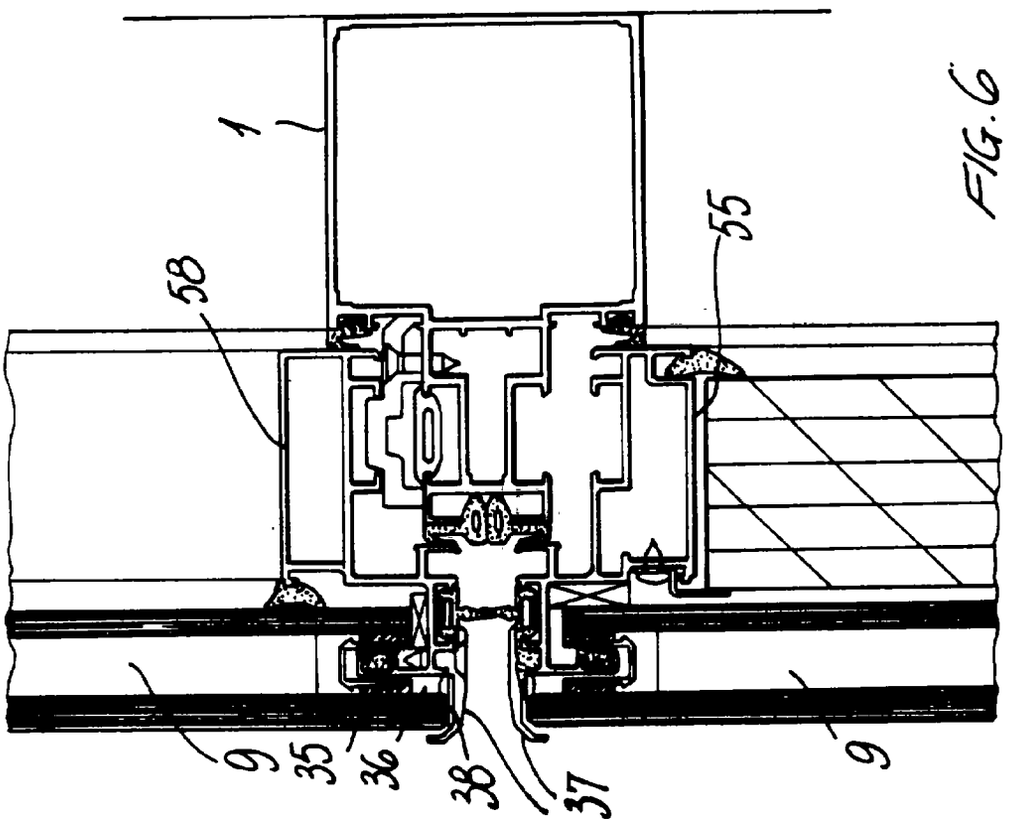

FIG.6

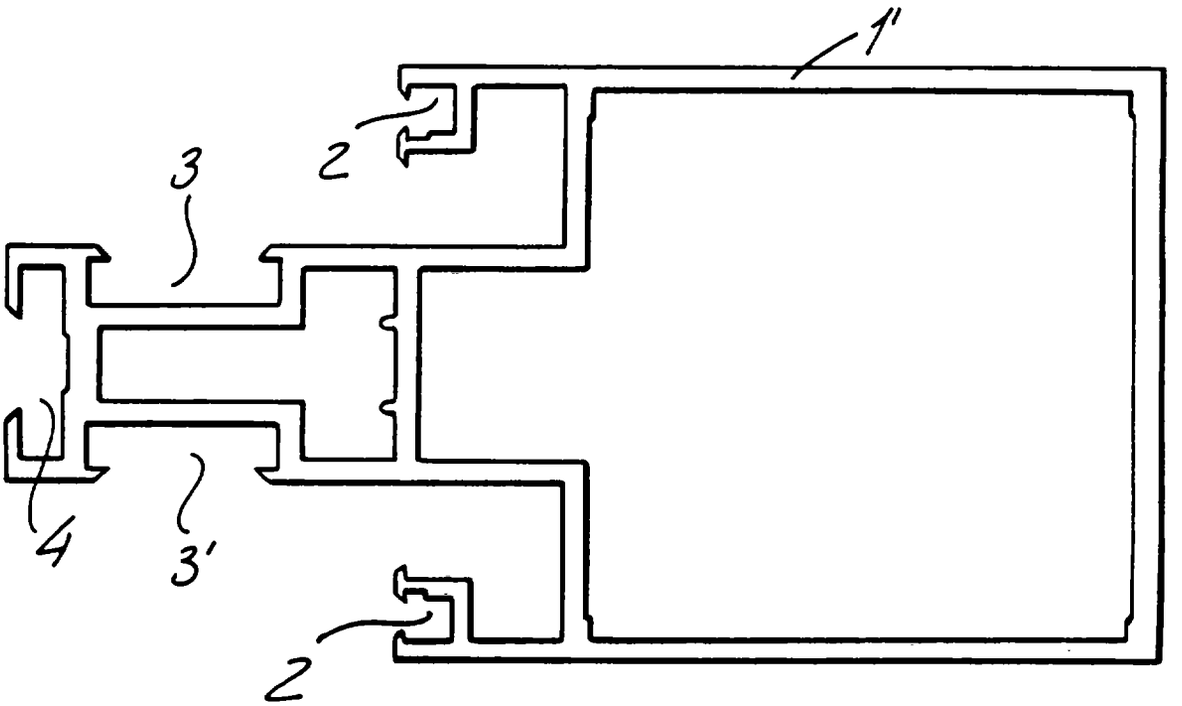

FIG. 8

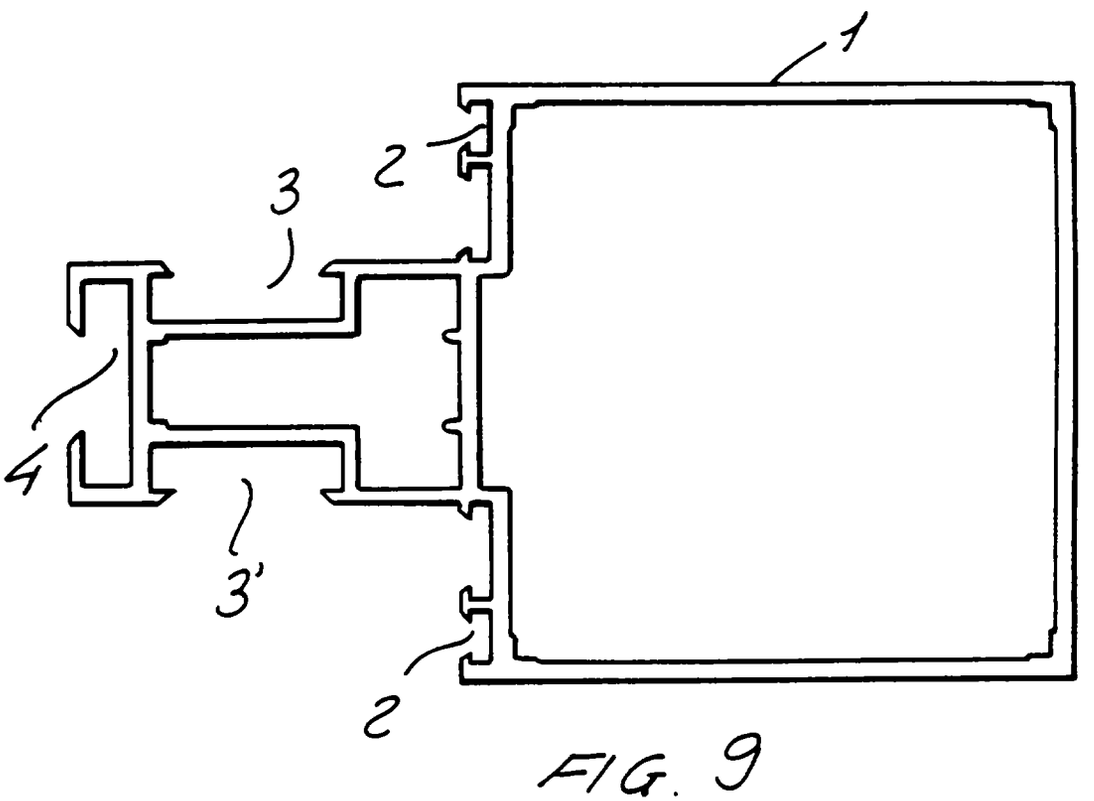

FIG. 9

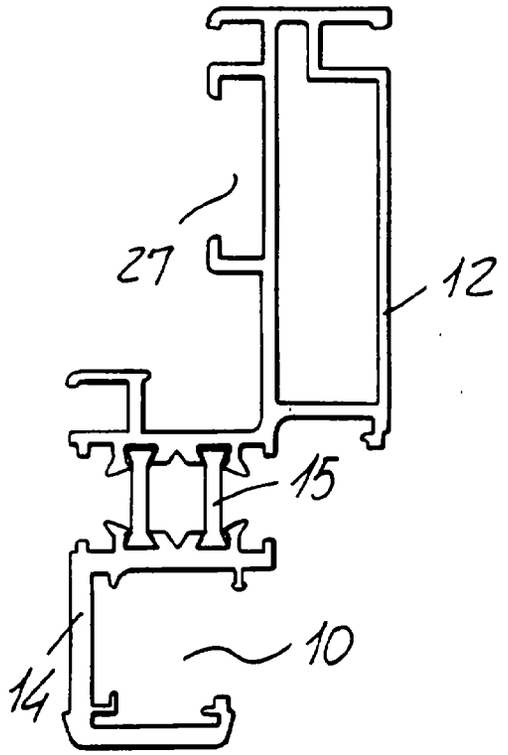

FIG. 10

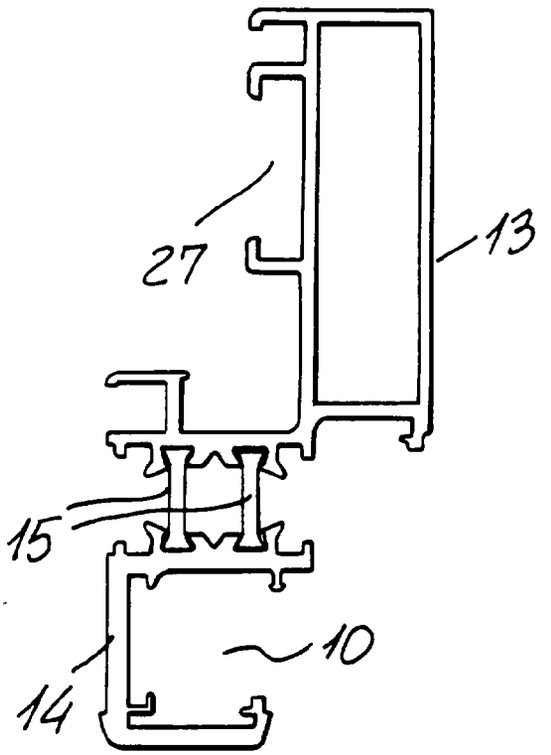

FIG. 11

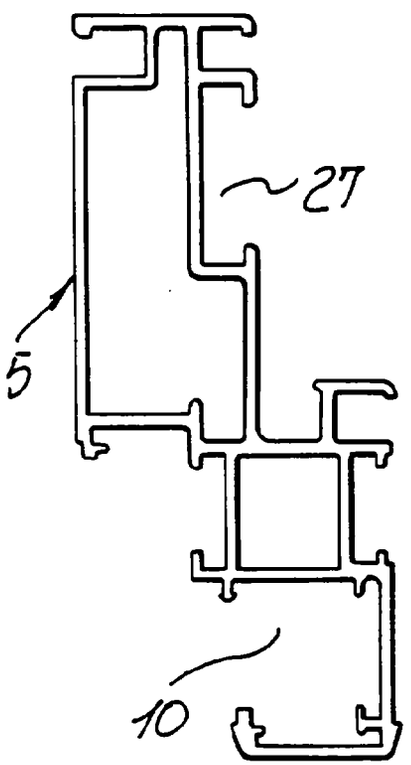

FIG. 12

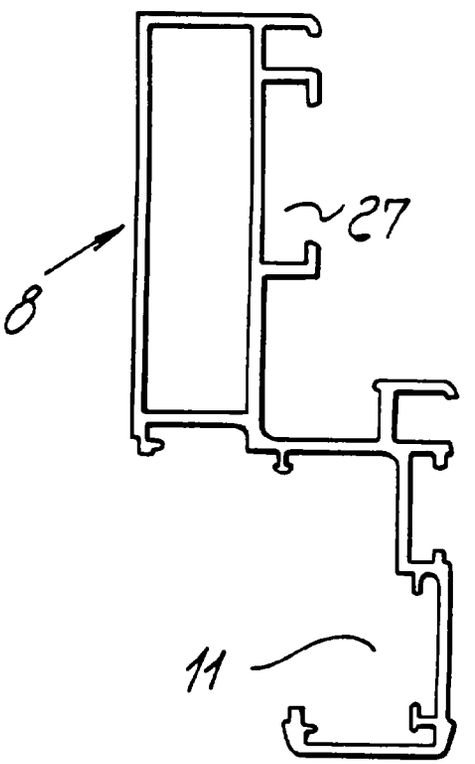

FIG. 13

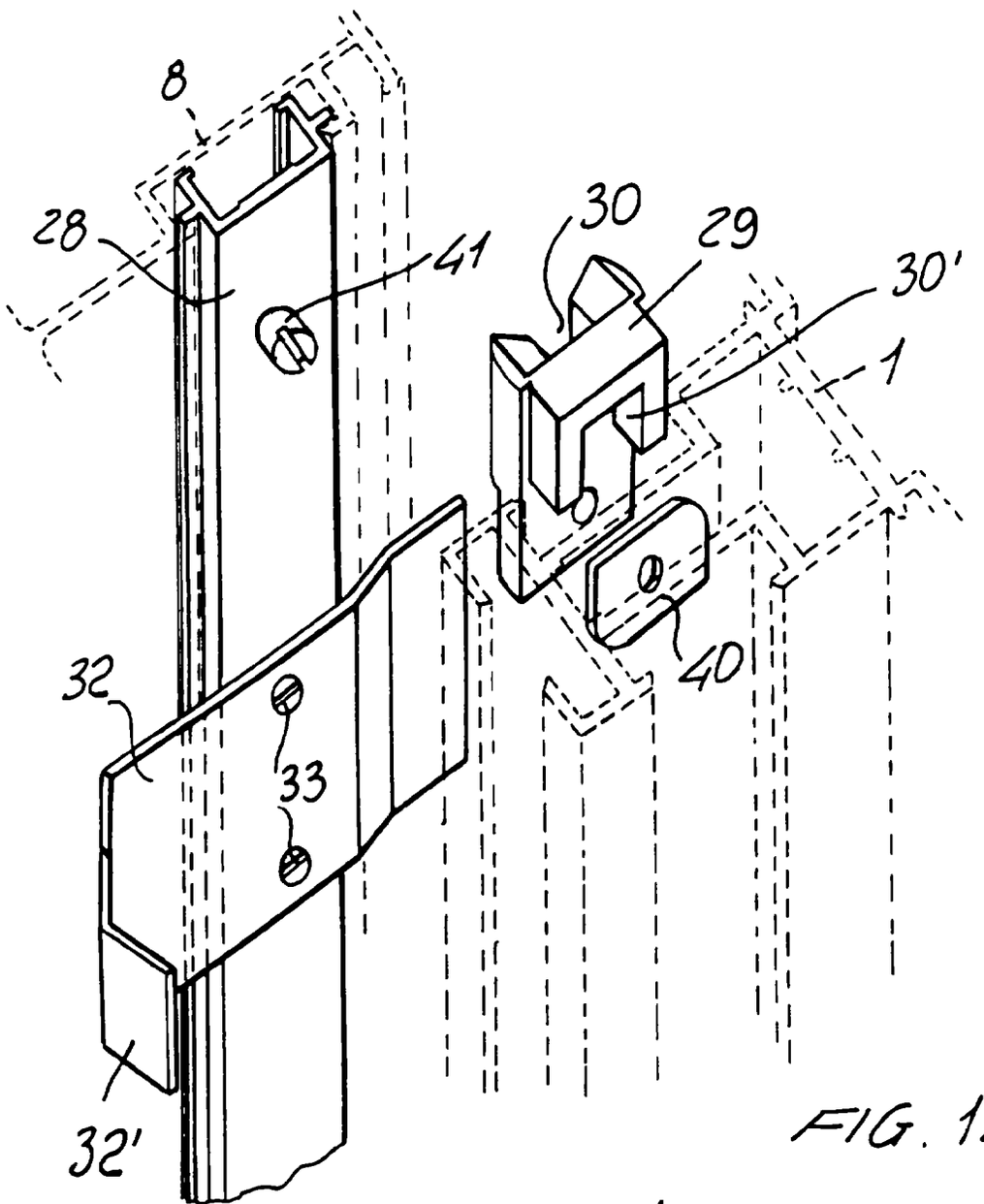

FIG. 14

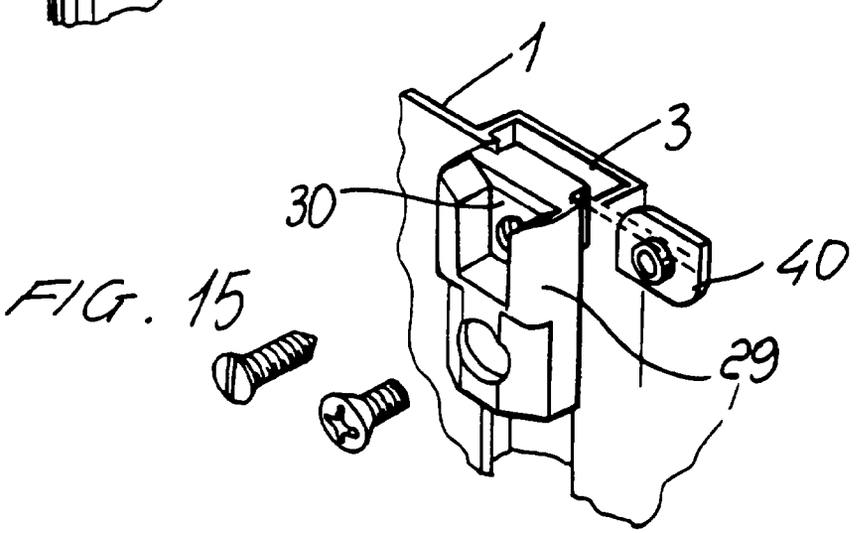

FIG. 15

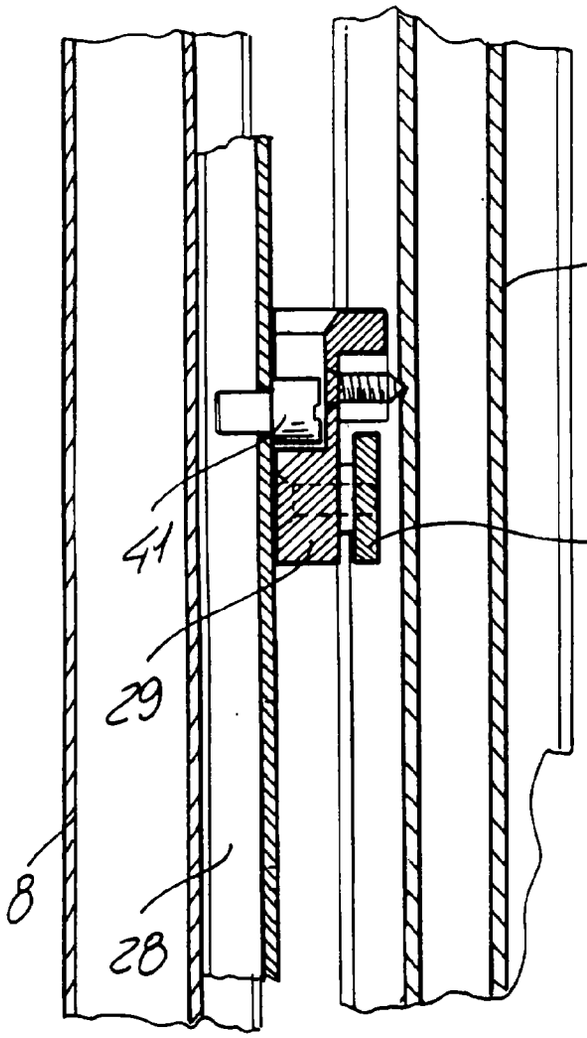

FIG. 17

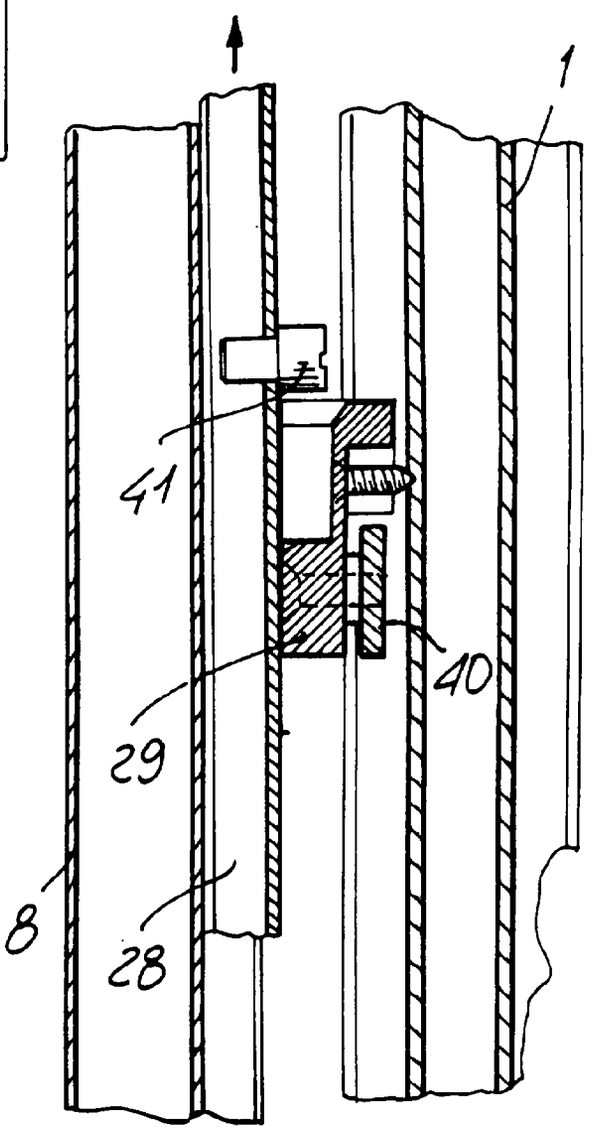

FIG. 16