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(54) Title: SUPPORT AND CONSTRUCTION FOR FACADE PANELS IN A CURTAIN WALL AND CURTAIN WALL

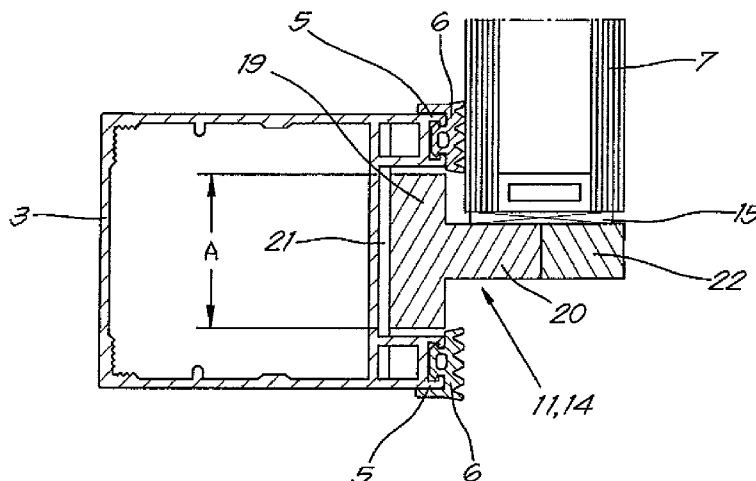


Fig. 5

(57) Abstract: Support (11) for facade panels (7) of a curtain wall (1) that has posts (2) and rails (3), whereby the support (11) comprises a body (12) to fasten the support (11) to a post (2) and comprises at least one wing (14) extending sideways in order to support a facade panel (7), directly or otherwise, whereby the wing (14) is provided with a reinforcing rib (19) against vertical bending, and this reinforcing rib (19) extends in the longitudinal direction (L) of the wing (14) and this reinforcing rib (19) extends upwards and/or downwards.



Support and construction for facade panels in a curtain wall and curtain wall.

5 The present invention relates to a support for facade panels in a curtain wall, a construction for forming a curtain wall and a curtain wall.

10 More specifically the invention relates to curtain walls that primarily consist of glass facade panels that are placed in a construction consisting of vertical elements, called posts, and horizontal elements, called rails.

15 In the case of relatively high weights of the facade panels and/or with fire-resistant curtain walls, the posts and rails are connected together by cruciform supports that are fastened to a post, and of which two wings are fastened to rails, and if need be rest on a nose of the rails, for example in a supporting structure made of aluminium
20 profiles. It goes without saying that such supports can also be constructed with one wing for use with posts that only have rails on one side.

25 The facade panels, for example glass panels that can be relatively heavy, then rest on the supports, which transmit the weight of the facade panels to the posts via the rails.

Such supports are known from DE 19854203, DE29912697 and EP 1460191 for example.

However, such supports and constructions for curtain walls that make use of them have a number of disadvantages.

For example the supports, together with the rails to which they are connected, can bend under the weight of the supported facade panels. This can lead to a rail touching the underlying facade panel, which can be damaged as a result.

A solution for this is to use deeper rails, i.e. rails that extend over a greater horizontal distance, which is aesthetically unattractive and of course is more expensive on account of an increased use of materials.

Deeper rails also only have a limited effect on the rigidity of the rail, because while the dimensions of the rails are indeed larger in the horizontal direction, but they are generally hollow profiles such that the rigidity in the vertical direction only increases to a limited extent, while bending takes place in the vertical direction.

Wings of the traditional supports cannot be made more rigid by giving them a greater height, because the height is limited by the vertical distance between two facade panels, which must be kept small.

The purpose of the present invention is to provide a solution to the aforementioned and other disadvantages, by providing a support for facade panels of a curtain wall that has posts and rails, whereby the support comprises a

body to fasten the support to a post and comprises at least one wing extending sideways in order to support a facade panel, directly or otherwise, whereby the wing is provided with a reinforcing rib against vertical bending, and this
5 reinforcing rib extends in the longitudinal direction of the wing and this reinforcing rib extends upwards and/or downwards.

In this way the wing is made stronger so that it, and any
10 rail connected to it, bends less.

Preferably the wing is essentially T shaped here, viewed in the vertical cross-section, whereby the reinforcing rib is formed by the head of the T.
15

For clarity it is noted here that this is a T turned by 90°.

This thus implies that the reinforcing rib extends both
20 upwards and downwards. In practice this reinforcing rib, after construction of the curtain wall, must be alongside the facade panels, so that a part of the wing can be at a lower height between the facade panels, because the vertical distance between the facade panels must be kept
25 small.

The invention further concerns a construction of posts and rails for installing facade panels therein to form a curtain wall, and this construction comprises at least one
30 support as described above, whereby the construction defines a maximum vertical distance between two facade

panels to be placed above one another, and whereby the height of the wing at the location of the reinforcing rib is greater than the said maximum vertical distance.

5 In a preferred embodiment the components of the construction are designed such that the wing can move with respect to the rail, whereby a movement is possible in the vertical direction over a minimum distance.

10 This thus means that the wing and the rails are not designed to be connected together, for example due to a complementary shape or by facilities for coupling means.

As a result the wings of the supports may possibly bend
15 slightly under the weight of the facade panels, without this bending being passed on to the rails.

In a further preferred embodiment of the construction, the rail is provided with a detail for a seal on the top and/or
20 bottom edge, whereby the detail or details are at least partially above or below and around the reinforcing rib.

As a result standard seals can be used to seal the space between a facade panel and a rail, while there is
25 nevertheless room for the reinforcing rib.

In a further preferred embodiment the construction also comprises a screw profile, whereby the rail and screw profile have a partially complementary shape so that the
30 screw profile can be inserted in the rail.

As a result it is possible to use a rail without a protruding ridge or nose, but which nonetheless has a good grip point for screws of a clamping profile. As a result rails can be made to the desired size more easily, because
5 it is not necessary to remove a part of a nose.

When such a screw profile is made of plastic, it can also act as a screw profile and insulator at the same time.

10 The invention also concerns a curtain wall of facade panels placed in a construction of posts and rails described above, whereby the reinforcing rib of the wing, viewed in the horizontal direction, is at least partly between the rail and at least one of the two facade panels placed above
15 one another, and preferably between the rail and each of the two facade panels located above one another.

Preferably the support is fastened to a post and a facade
20 panel is supported in the vertical direction by a post or posts by means of one or more of the said supports, but not, or not to a significant extent, by means of the rail.

This means in practice that the rail has no supportive
25 function for the vertical forces exerted by a facade panel but that these forces are transferred directly to the posts by means of the supports.

The invention further concerns a method to enable a facade panel, in a construction of posts and rails to form a
30 curtain wall, to be vertically supported by a post, characterised in that use is made of a support as described

above, whereby the support is mounted on the post and whereby the facade panel is placed on the support.

With the intention of better showing the characteristics of the invention, a preferred embodiment of a construction, including a support, for building a curtain wall according to the invention and the use thereof is described hereinafter by way of an example, without any limiting nature, with reference to the accompanying drawings, wherein:

Figure 1 shows an exploded view of a traditional construction of a post with two rails for a curtain wall;

figure 2 shows a cross-section of the construction of figure 1 according to line II-II in a further finished state;

figure 3 shows a perspective view of a part of a construction according to the invention in a situation in which the construction is partially constructed;

figure 4 shows the construction of figure 3 in a further advanced state of construction;

figure 5 shows a cross-section of the construction of figure 4 according to line V-V;

figure 6 shows a support according to the invention;

figure 7 shows an alternative construction according to the invention; and

figure 8 shows the detail indicated by F8 in figure 7 on a larger scale.

The part of a curtain wall 1 shown in figures 1 and 2 primarily consists of a post 2, made from a hollow aluminium post profile, and two rails 3, made of hollow aluminium rail profiles, that are fastened together. It goes without saying that an entire curtain wall 1 comprises a large number of such posts 2 and rails 3.

The post 2 and rails 3 are provided with details 5 at two edges in which seals 6 are affixed that can seal off openings between the post 2 and the rails 3 on the one hand, and a facade panel 7, for example a glass panel, on the other hand.

The rails 3 are provided with a nose 8, which is a double ridge 9 with a narrow groove 10 between them. The nose 8 protrudes out of the rails 3 in the direction of the facade panel 7.

A cruciform support 11 is fastened to the post 2 and rails 3, that primarily consists of a body 12 that is fastened to the post 2 by means of bolts 13 and two wings 14 that are each fastened to a rail 3 by means of bolts 14. In this case, but not necessarily, the support 11 is made of steel, but could also be made of aluminium or another metal.

25

A facade panel rests on a wing 14 of a support 11 via a small supporting block 15, and this wing 14 in turn partly rests on the nose 8 of the rails 3, and partly rests on the post 2 via the body 12.

30

An insulator 16 is affixed in the nose 8 between two facade panels 7 located above one another, which counteracts air circulation in the space between two facade panels 7 and thereby increases the insulating properties of the curtain wall 1.

The transition between two facade panels 7 is covered by a clamping profile 17 of two parts screwed into the insulator 16 and the nose 8. This clamping profile 17 clamps facade panels 7 against the rails 3, so that the facade panels are well secured in the construction of rails 3 and posts.

Because the rails 3 bend under the weight of the facade panels 7, there is a risk of the rails 3 touching the underlying facade panel 7, in the middle between two posts 2, which can lead to damage. Thus when designing the curtain wall 1 particular attention must be paid to the rails 3 being designed with sufficient rigidity.

The maximum vertical distance between two facade panels 7 is defined by the height H of the rails 3 in combination with the overlap, set by standards, between the clamping profile 17 and a facade panel 7 and a small clearance to prevent contact. It is undesirable here to increase the height H of the rails 3 with regard to the undesired visual impact thereof.

It is clear that in this traditional curtain wall the maximum height A of the wing, and thus its rigidity, is limited by the maximum vertical distance between two facade panels 7.

A curtain wall 1 that is composed of a construction according to the invention, as shown in figures 3 to 6, differs as follows from the traditional curtain wall 1
5 described above.

The support 11 is constructed such that only the body 12 contains holes 18 to fasten the support 11 to the post 2. The wings 14 are not designed to be connected to the rails
10 3. The result is that the support 11 is then only fastened to the post 2.

In order to make room for this support 11 a part of the nose 8 is milled away.
15

The wings 14 of the support 11 are provided with a reinforcing rib 19, which extends over the length L of the wing 14 and protrudes both below and above the part 20 of the wing 14 on which the facade panel 7 rests. Due to its
20 height A the reinforcing rib 19 provides effective resistance against vertical bending of the wing 14.

The wings 14 have a cross-section that has the form of a tilted T, whereby the reinforcing rib 19 forms the head of
25 the T.

The rails 3 are constructed with a deepened section 21 that is located between the details 5 for seals 6. This deepened section 21 provides room for the reinforcing rib 19, so
30 that the reinforcing rib 19 has a height A that is greater than the maximum vertical distance between two facade

panels 7, whereby the reinforcing rib 19 is between the rail 3 and the facade panel 7.

As can be seen in figure 5 in particular, the details 5 for seals 6 fit widely around the reinforcing rib 19, so that this reinforcing rib 19 can move freely between the details 5 for seals 6, at least over a certain distance.

As shown in figures 4 and 5, in this case the construction is provided with an extension piece 22 that is mounted on the support 11. To this end this extension piece 22 and the support 11 are provided with holes 23 in which bolts can be affixed. By means of this extension piece 22 an increased supporting surface for a facade panel 7 is obtained.

15

As a result, with one size of support 11 and various sizes of extension pieces, very many different thicknesses of facade panels can be supported. It is thus not necessary to make and keep a stock of a number of sizes of the relatively complex and thus expensive supports 11.

20

The extension piece can, depending on the material from which it is made, also partially act as an insulator.

In this construction the weight of the facade panels 7 is transmitted directly to the posts 2 via the supports 11, without this weight being transmitted to the posts 2 via the rails 3.

25

The construction shown in figures 7 and 8 differs from the construction of figures 3 to 6 because the rail profiles

30

from which the rails 3 are made are not constructed with a nose 8.

5 Instead of this the deepened section 21 is constructed as an undercut groove that enables a complementarily shaped aluminium screw profile 24 to be inserted there, in which the screws with which the clamping profile 17 is fastened can grip. As a result a traditional plastic insulator can be used.

10

Alternatively, for better insulating properties this could also be a combined screw/insulator profile that is entirely or partially made of plastic.

15 As a result no part of a nose 8 needs to be removed, but the space between the facade panels 7 is filled with a separate screw profile 24 over the distance that is necessary, which facilitates making the rails 3 to size from rail profiles.

20

The present invention is by no means limited to the embodiments described as an example and shown in the drawings, but a support, construction and curtain wall according to the invention can be realised in all kinds of
25 forms and dimensions without departing from the scope of the invention.

Claims.

- 1.- Support (11) for facade panels (7) of a curtain wall
5 (1) that has posts (2) and rails (3), whereby the support
(11) comprises a body (12) to fasten the support (11) to a
post (2) and comprises at least one wing (14) extending
sideways in order to support a facade panel (7), directly
or otherwise, whereby the wing (14) is provided with a
10 reinforcing rib (19) against vertical bending, and this
reinforcing rib (19) extends in the longitudinal direction
(L) of the wing (14) and this reinforcing rib (19) extends
upwards and/or downwards.
- 15 2.- Support according to claim 1, characterised in that,
viewed in the vertical cross-section, the wing (14) is
essentially T shaped, whereby the reinforcing rib (19) is
formed by the head of the T.
- 20 3. Support according to any one of the previous claims,
characterised in that it is primarily or entirely made of
steel or aluminium.
- 4.- Support according to any one of the previous claims,
25 characterised in that an extension piece (22) is provided
by or mounted on it to increase the size of a supporting
surface formed by the support (11).
- 5.- Construction of posts (2) and rails (3) for installing
30 facade panels (7) therein to form a curtain wall (1), and
this construction comprises at least one support (11)

according to any one of the previous claims, whereby the construction defines a maximum vertical distance between two facade panels to be placed above one another (7), and whereby the height (A) of the wing (14) at the location of the reinforcing rib (19) is greater than the said maximum vertical distance.

6.- Construction according to claim 5, characterised in that the wing (11) can move with respect to the rail (3), whereby a movement is possible at least in the vertical direction over a minimum distance.

7.- Construction according to claim 6, characterised in that the rail (3) is provided with a detail (5) for a seal (6) near the top and/or bottom edge, whereby the detail (5) or the details (5) are at least partially above or below the reinforcing rib (19).

8.- Construction according to any one of the claims 5 to 7, characterised in that the rail (3) is made of aluminium.

9.- Construction according to any one of the claims 5 to 8, characterised in that it also comprises a screw profile (24), whereby the rail (3) and the screw profile (24) partly have a complementary shape so that the screw profile (24) can be inserted in the rail (3).

10.- Construction according to claim 9, characterised in that the screw profile (24) is made of plastic and/or aluminium.

11.- Curtain wall of facade panels (7) placed in a construction according to any one of the claims 5 to 10, whereby the reinforcing rib (19) of the wing (14), viewed in the horizontal direction, is at least partly between the rail (3) and at least one of the two facade panels (7) placed above one another.

12.- Curtain wall according to claim 11, characterised in that the reinforcing rib (19) of the wing (14), viewed in the horizontal direction, is at least partly between the rail (3) and each of the two facade panels placed above one another (7).

13.- Curtain wall according to claim 11 or 12, characterised in that the support (11) is fastened to a post (12) and that a facade panel (7) is supported in the vertical direction by a post (2) or posts (2) by means of one or more of the said supports (11), but not by means of the rail (3).

14.- Curtain wall according to any one of the claims 11 to 13, characterised in that the facade panels (7) are primarily glass panels.

15.- Method to enable a facade panel (7), in a construction of posts (2) and rails (3) to form a curtain wall, to be vertically supported by a post (2), characterised in that use is made of a support (11) according to any one of the claims 1 to 4, whereby the support (11) is mounted on the post (2) and whereby the facade panel (7) is placed on the support (11).

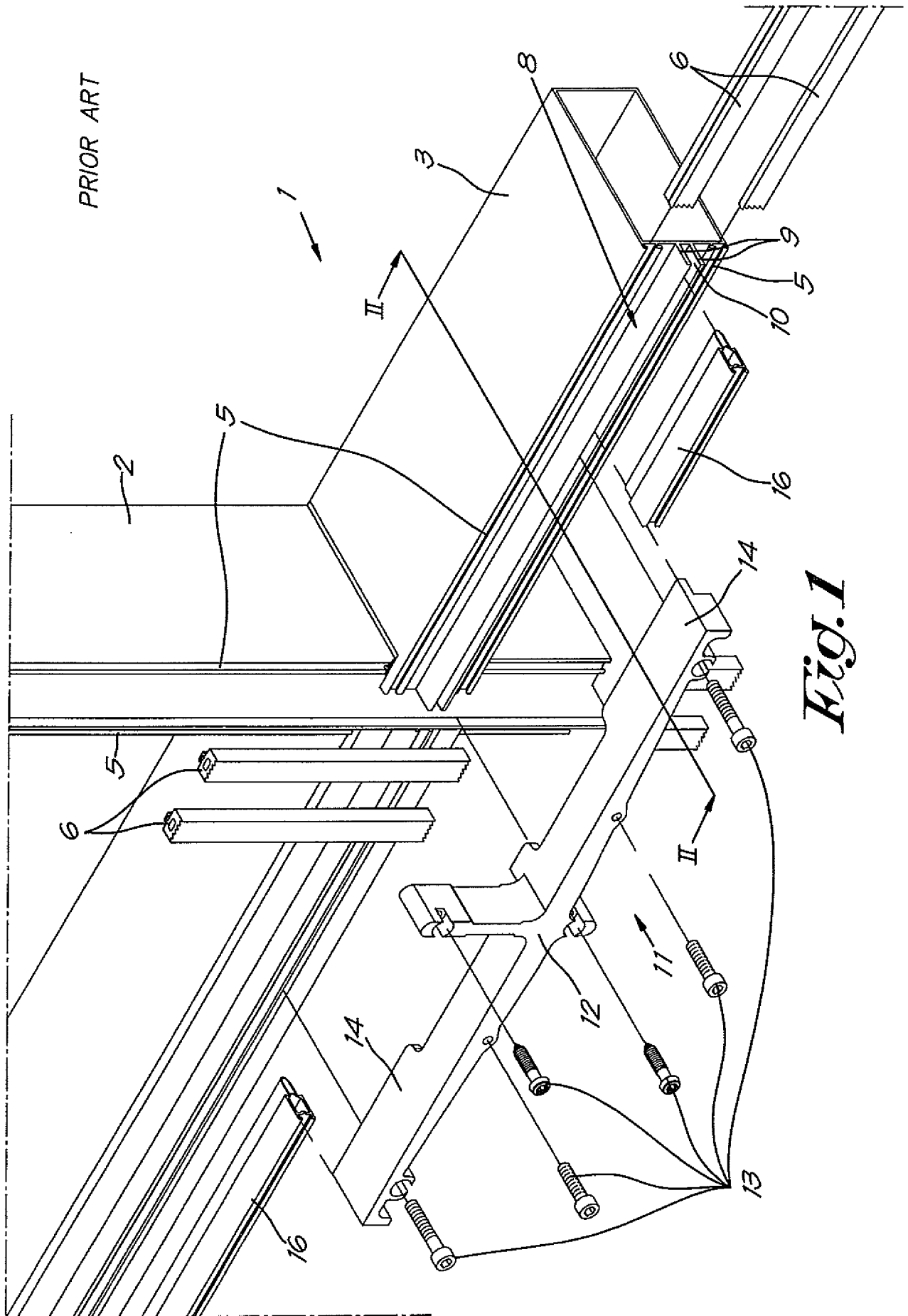


Fig. 1

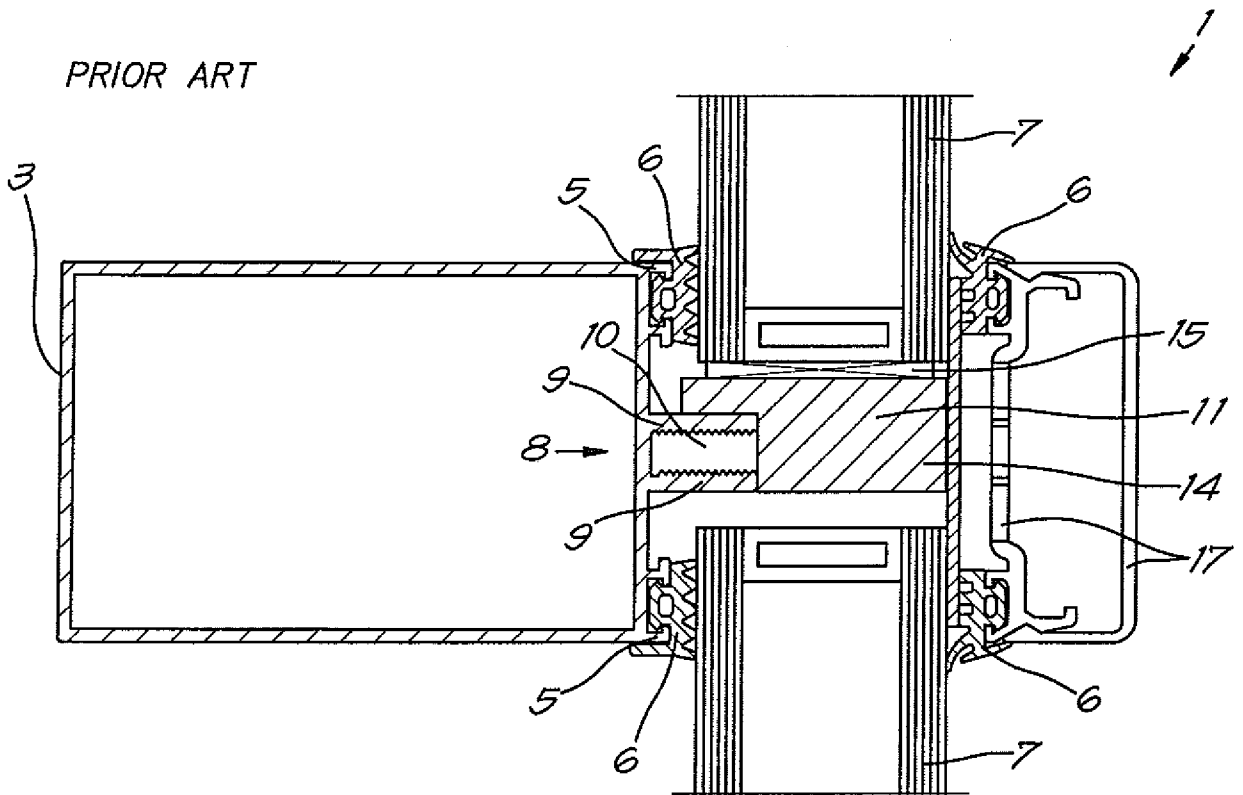


Fig. 2

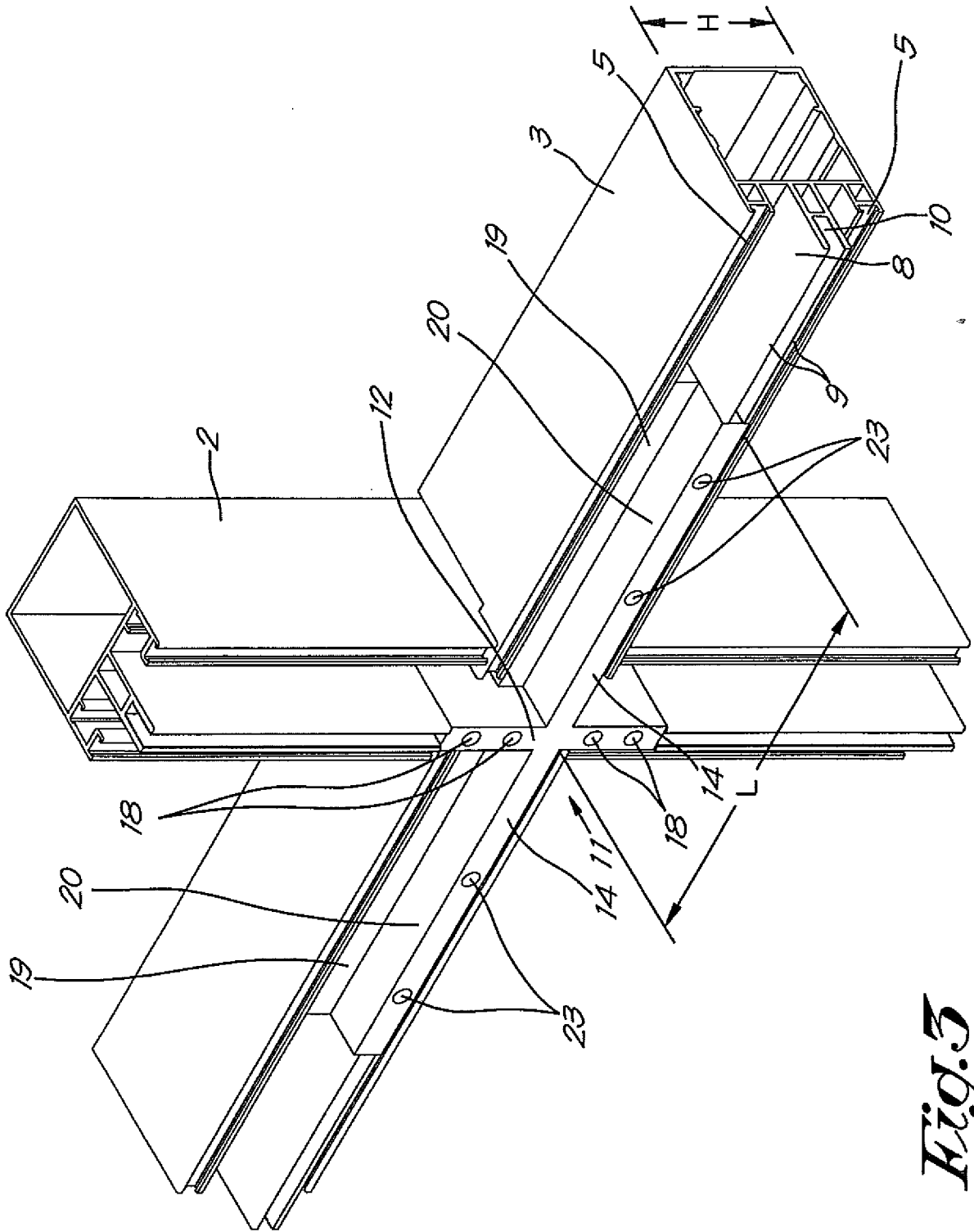


Fig. 5

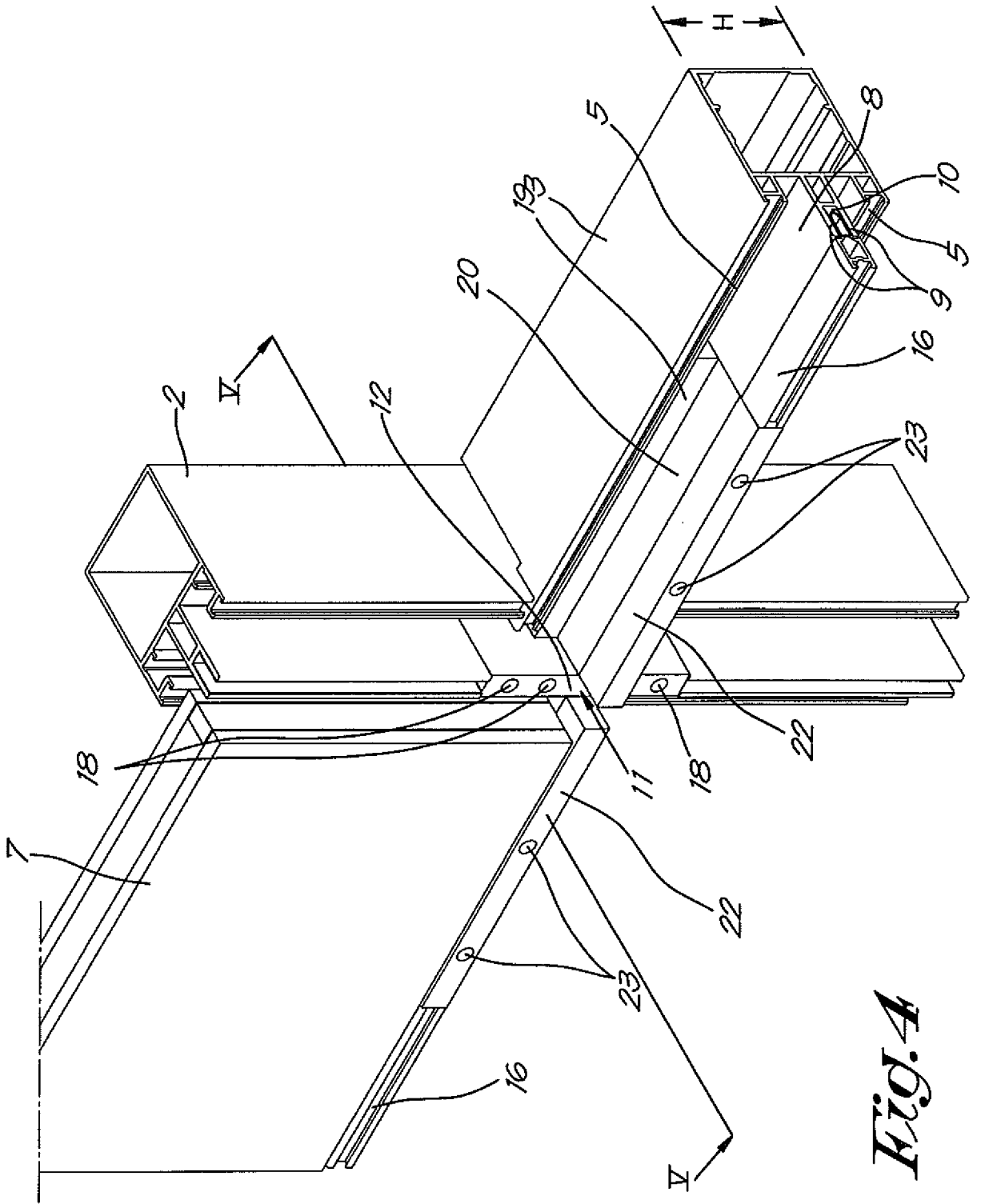


Fig. 4

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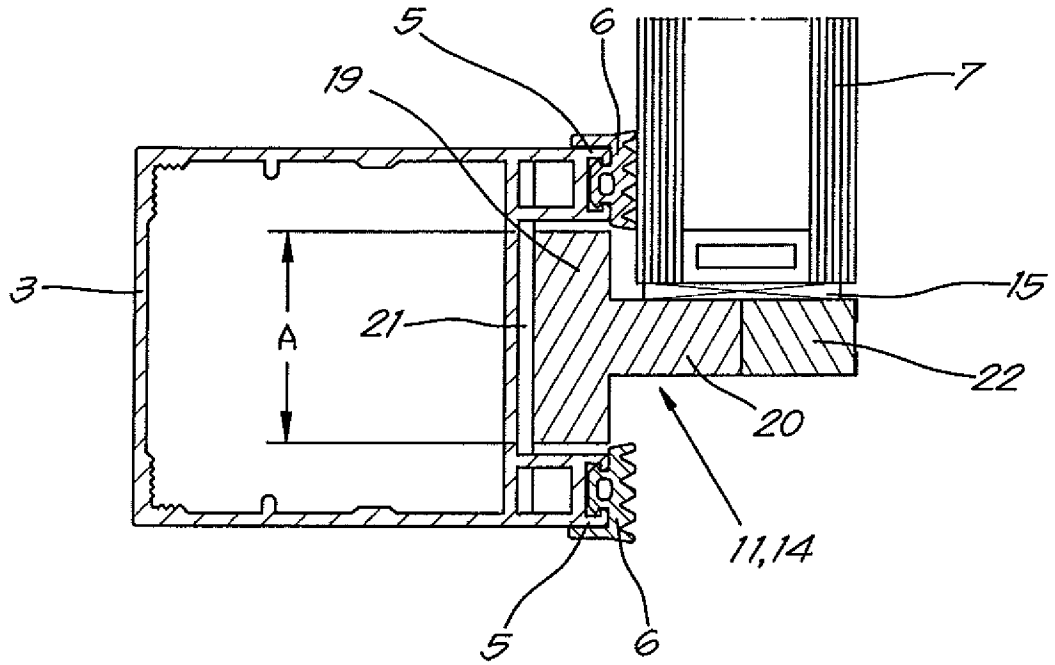


Fig.5

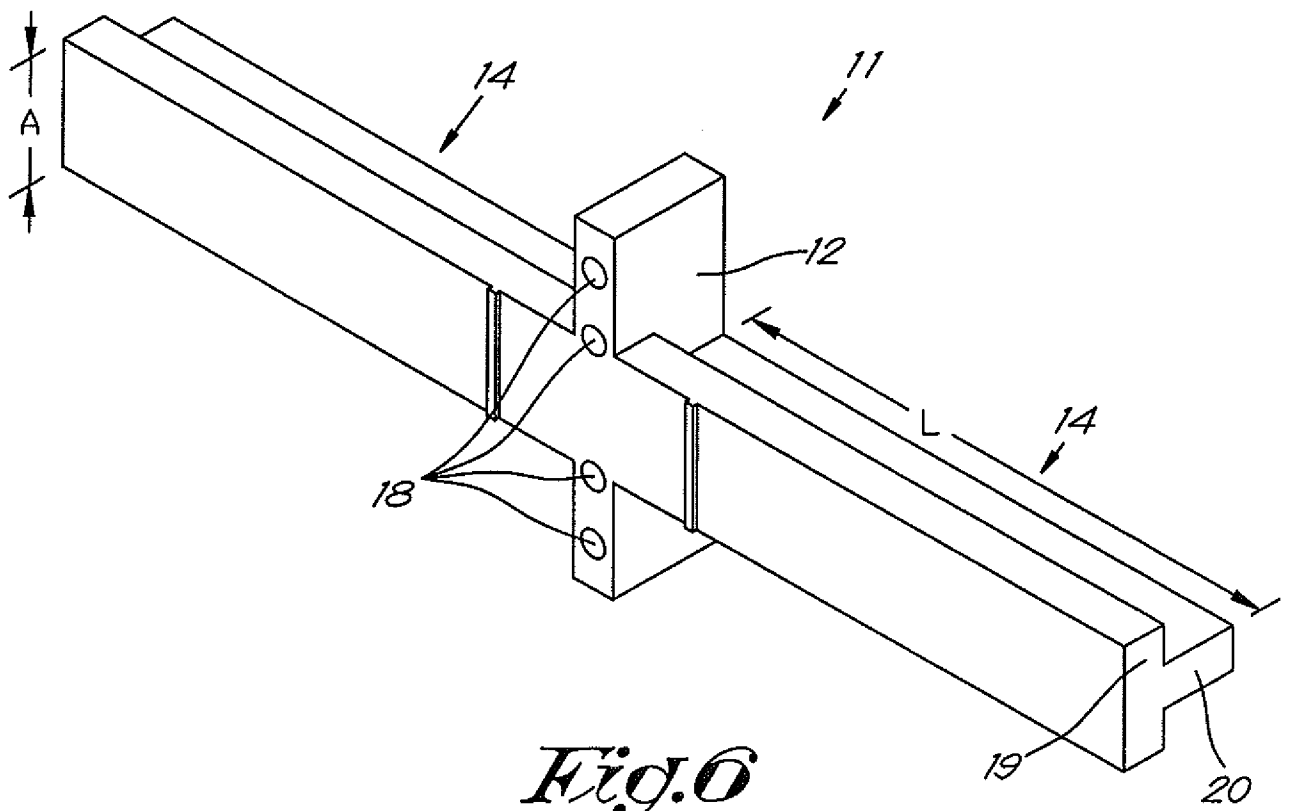
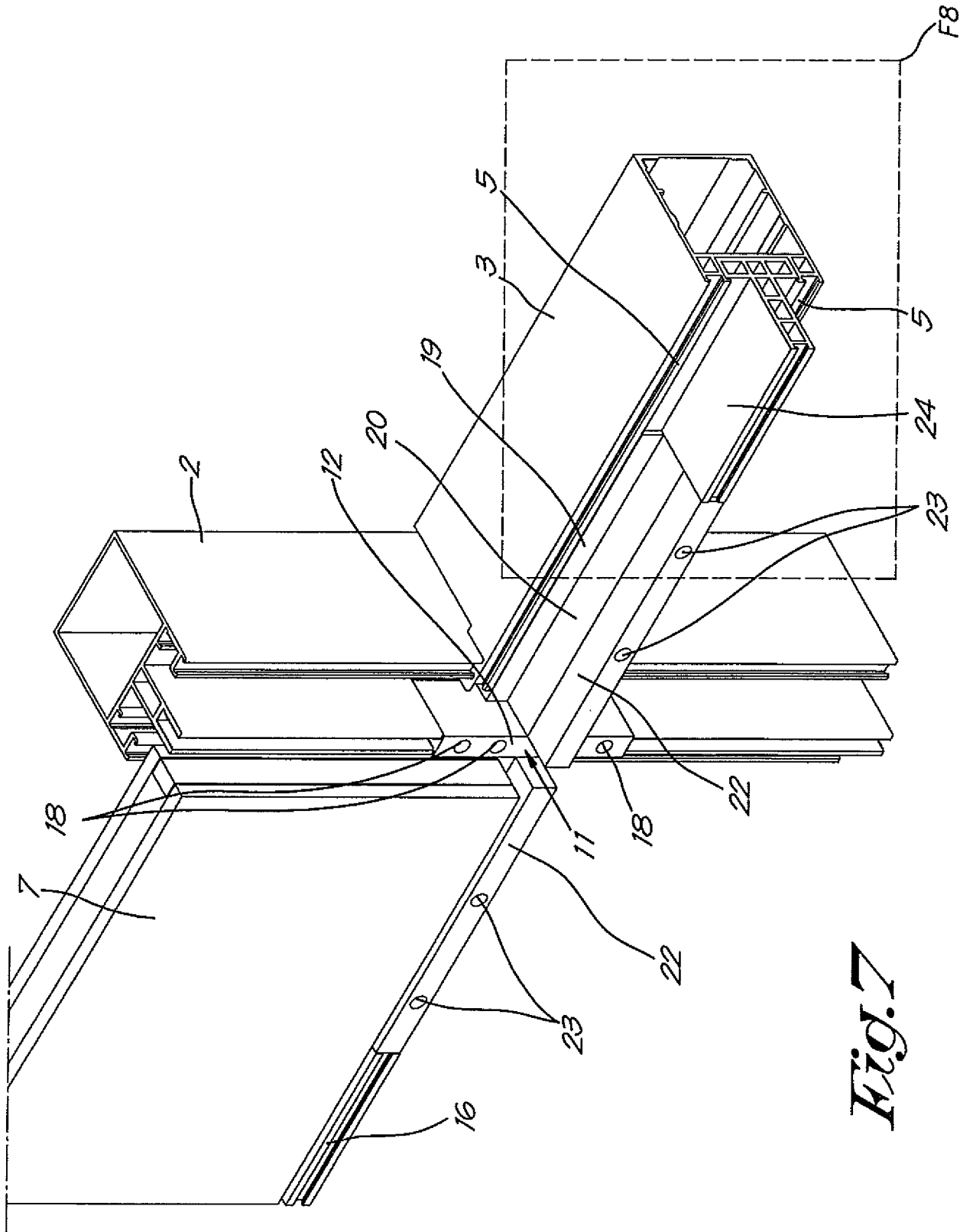


Fig.6



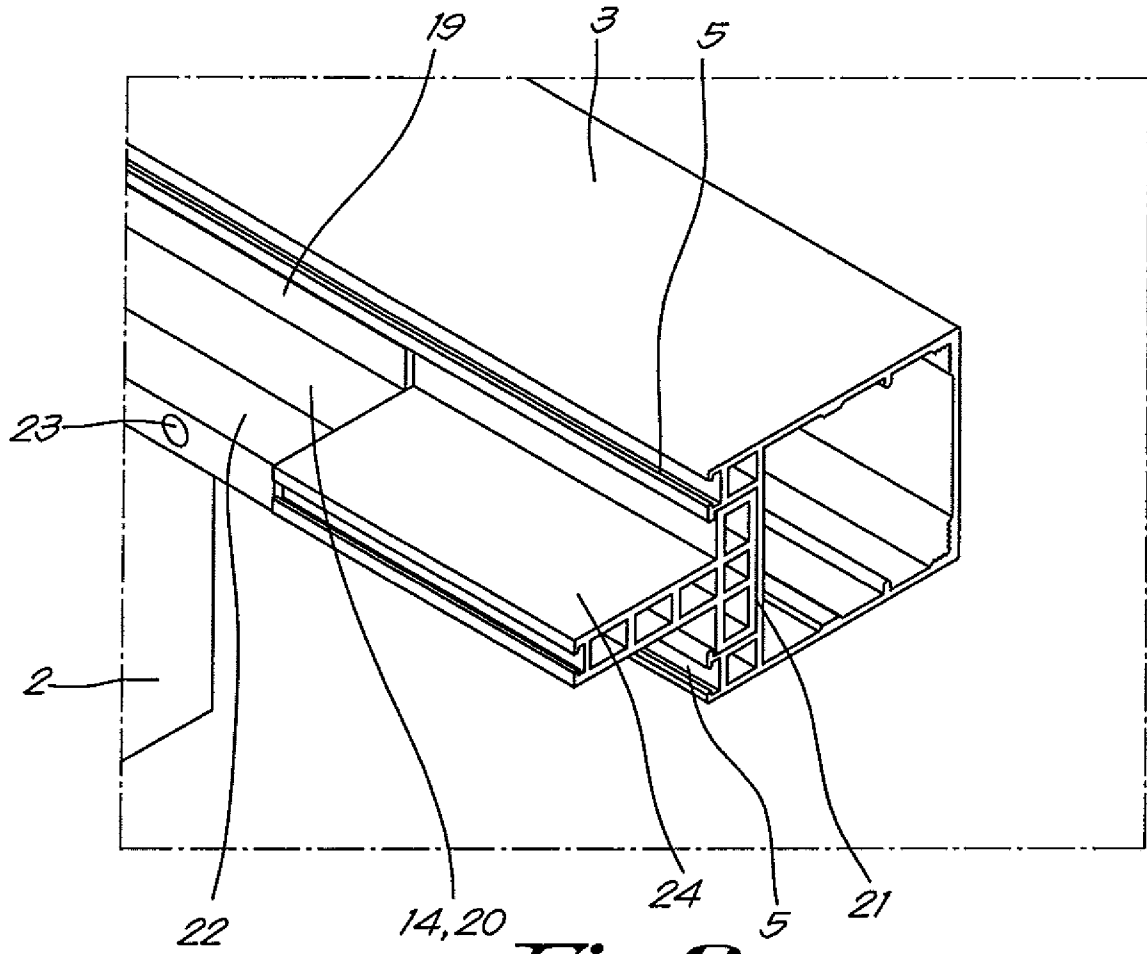


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/BE2013/000057

A. CLASSIFICATION OF SUBJECT MATTER
INV. E04B2/96
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
E04B
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 460 191 A2 (REYNAERS ALUMINIUM NV [BE]) 22 September 2004 (2004-09-22) paragraph [0012] - paragraph [0029]; figures 1-8	1,3,4, 8-10,14, 15
A	DE 196 06 906 A1 (MANNESMANN AG [DE]) 14 August 1997 (1997-08-14) column 4, line 19 - column 6, line 12; figures	1-15
A	DE 198 54 203 A1 (LANCO LANGE FENSTER FASSADEN [DE]) 8 June 2000 (2000-06-08) column 1, line 3 - column 6, line 18; figures 1,4-8	1-15
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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
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Date of the actual completion of the international search 16 January 2014	Date of mailing of the international search report 23/01/2014
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Dieterle, Sibille

INTERNATIONAL SEARCH REPORT

International application No
PCT/BE2013/000057

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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