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(54) **CONNECTION PIECE FOR CONNECTING A POST WITH A FRAME MEMBER AND WINDOW OR DOOR FRAME COMPRISING SUCH CONNECTION PIECE**

(57) A connection piece for connecting a post with either a frame member; a sash member or one or more other posts, the connection piece comprising:
-a tubular body defining a through hole, the tubular body extending along an axis X-X and having a proximal end and a distal end;
-a shoulder portion provided at the proximal end of the tubular body configured to abut a sidewall of a first post or frame member, said shoulder portion defining an abutment extending in a plane askew from the X-X axis;
-a pen or protrusion provided at or near the distal end of the tubular body and extending in a direction Y askew to the X-X axis; and
-a screw extending through the tubular body, with a screw head seated next to the proximal end of the tubular body and a screw tip extending through the tubular body next to, yet askew in view of the pen or protrusion.

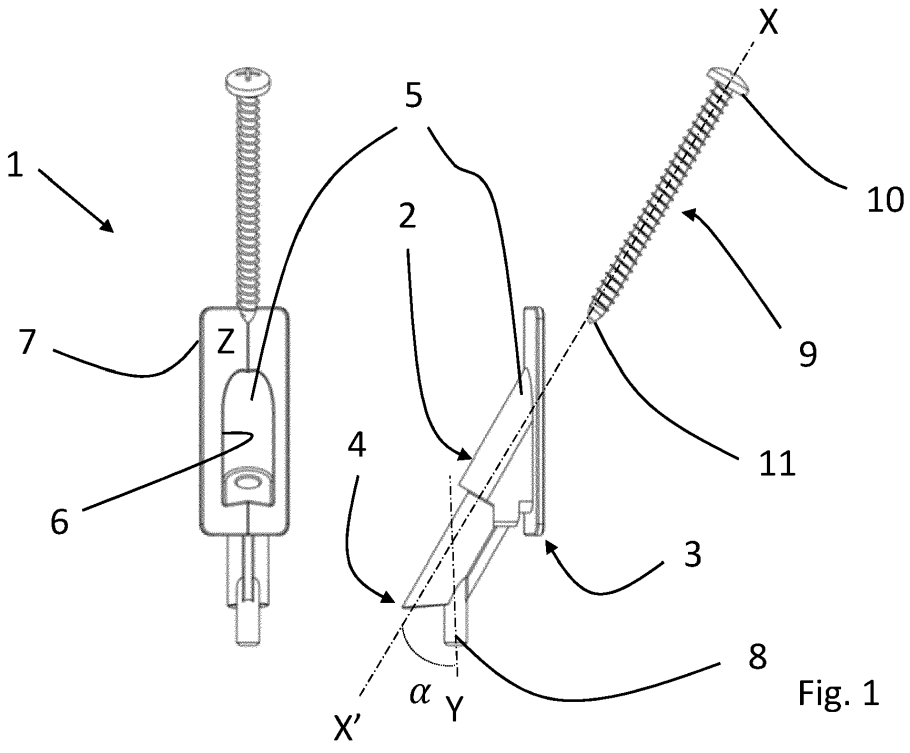

Fig. 1

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Description

Field of the Invention

[0001] The present invention concerns window frames or door frames that are subdivided by posts mechanically attached to the frame, wherein the frame and posts are configured as hollow profiles defining one or more inner chambers and wherein the at least the frames have a somewhat T-like cross section.

Background to the Invention

[0002] It is known to subdivide window frames or door frames with posts that extend to the front of the window or door frame and that support different glass panel sections provided in the window or door frame. Such posts can be fixed to the window or door frame by either welding or by a mechanical connection such as by screws. It is known that in case of mechanical connections, a small gap occurs at the interface between the posts and frame members of the frame, partially due to cyclical thermal expansion and contraction of the material. Such gap results in water ingress between the posts and frame members, strongly reduces the thermal insulation properties of the window or door and is visually unappealing.

[0003] In the past several solutions have been proposed to alleviate the above problem. One example hereof is disclosed in the German patent document No. DE 42 44 128, wherein posts are mechanically attached to frame members by means of a connection piece configured to be partially inserted in a reinforcement chamber of the post and that is screwed at several locations to both the post and the frame member. Seals are provided at the position of each screw.

[0004] Insertion of a connection piece in the reinforcement chamber of a profile (post or frame member) and screwing through a reinforcing element provided in the reinforcement chamber potentially weakens the reinforcement but also creates a hole through which water can enter the reinforcement chamber of the profile. As reinforcing members are usually manufactured in steel, water ingress is considered highly problematic.

[0005] The larger the depth of the posts, defined as the distance between the opposed outer surfaces of the posts at the in- and outside of the door or window, the higher the risk of occurrence of the gap between posts and frame members. In frames with a large depth of the posts and the frames measured between a glass pane and a nose of the posts-defined as an outer surface of the posts, extending in a plane parallel to plane defined by the frame - such as typical in for example The Netherlands, the risk of occurrence of the gap is even bigger. In such cases, the solution provided in DE 42 44 128 is inadequate as the mechanical connection disclosed therein is positioned distant from the nose of the posts.

[0006] Therefore there remains a market need for a mechanical connection between posts and frame members that alleviates the problem of the occurrence of a gap between posts and frame members that is functional and effective for posts and frame members with large depths and that does not require disrupting the integrity of a reinforcement chamber in one of the concerned posts or frame members.

Summary of the Invention

[0007] The present invention addresses the above problem and provides A connection piece for connecting a post with either a frame member; a sash member or one or more other posts, the connection piece comprising:

- a tubular body defining a through hole, the tubular body extending along an axis X-X and having a proximal end and a distal end;
- a shoulder portion provided at the proximal end of the tubular body configured to abut a sidewall of a first post or frame member, said shoulder portion defining an abutment extending in a plane askew from the X-X axis;
- a pen or protrusion provided at or near the distal end of the tubular body and extending in a direction Y askew to the X-X axis; and
- a screw extending through the tubular body, with a screw head seated next to the proximal end of the tubular body and a screw tip extending through the tubular body next to, yet askew in view of the pen or protrusion.

[0008] The present invention also concerns a window or door frame defined frame members and subdivided by at least one post extending between two opposed frame members of the window or door frame, characterised in that said post is mechanically connected to at least one of said frame members by a connection piece of the invention.

Brief Description of the Figures

[0009]

Figure 1 shows a connection piece according to the present invention in a perspective view;
Figure 2 illustrates a perspective view of a post and frame member connected to one another by means of a connection piece of the invention;
Figure 3 illustrates the same perspective view as Figure 2, but with partial cut-out of the post;
Figure 4 illustrates an exploded view of the post and frame connected to one another as illustrated in Figure 2;
Figure 5 illustrates a perspective view of a cross-

connection of three posts by means of connection pieces of the invention;

Figure 6 illustrates the same perspective view as Figure 5, but with partial cut-out of two of the posts;

Figure 7 shows a view on a side wall of a frame member that is prepared for connection to a post with a connection piece of the invention.

Detailed Description of a Preferred Embodiment

[0010] In a preferred embodiment of a connection piece 1 according to the present invention as shown in figure 1, the connection piece comprises a tubular body 2 defining a channel extending along an X-X-axis and having a proximal end 3 and a distal end 4. At the proximal end 3 a screw reception zone is defined by in this case a box like structure 5 having an open end at the distal side of the connection piece and that provides access to the channel at its opposed side.

[0011] The side walls 6 of the box like structure extending between the open side and the opposed side thereof are provided with outwardly extending rims 7 that together define a shoulder portion extending in a plane Z parallel to a Y-direction.

[0012] At the distal end 4, the tubular body 2 is open, while in accordance with the present invention, at or near to the proximal end 4, a pen or protrusion 8 is provided on the tubular body. This pen or protrusion extends in the Y-direction under an angle □ with the X-X axis, wherein □ preferably ranges between 45° and 1°. The pen or protrusion is oriented such that its free end extends in a direction wherein it is positioned next to a tip of a screw 9 inserted in the tubular body, with the tip of the screw protruding from the open distal end of the tubular body.

[0013] The screw 9 is preferably configured for use with polymer materials such as polyethylene terephthalate (PET) and when inserted in the tubular body, abuts with its head 10 on said opposed side wall of the box like structure, while the tip 11 of screw protrudes from the open distal end of the tubular body.

[0014] The tubular body 2, box like structure 5 and pen or protrusion 8 are preferably manufactured in a polymeric material such as polyethylene (PE); polypropylene (PP); polyamide (eg. PA6 or PA12); or in a metallic material such as aluminum, stainless steel or zamac. The tubular body 2 is preferably manufactured in one single piece.

[0015] The screw 9 is preferably made in metal, preferably a non-corrosive metal such as stainless steel or aluminum.

[0016] Application of a connection piece 1 as described above is easy and allows precise alignment of a post 12 on a frame member 13 of a window frame or door frame and prevent occurrence of a gap at the interface of the post and the frame member.

[0017] As shown in figures 2 and 3 a post 12 and frame member 13 are mechanically connected with one another by means of two connection pieces according to the present invention.

[0018] The frame member 13 and post 12 are in this case manufactured in a polymeric material and define an inner cavity subdivided in longitudinal chambers by inner walls. The post 12 in this case has a generally T-shaped cross section and a central cavity 12.1, further also referred to as the reinforcement chamber, wherein a reinforcement element is provided. The central cavity is in this case positioned between two side cavities 12.2 & 12.3 situated in the top leg of the T-shape together with a front cavity 12.4. This top leg of the shape, comprising the two side cavities, the front cavity and part of the reinforcing chamber together are referred to as the nose of the post 12 and define side walls, the exterior of which define an exterior (also exterior oriented) surface of the post 12 when installed in a wall of a building. The central cavity 12.1 is further flanked by a back (interior side) cavity 12.5.

[0019] The frame member 13 in this case has a generally L-shaped cross-section, with a main leg defined by a reinforcement chamber 13.1 comprising a reinforcement member, a front side chamber 13.2 located at one side of the reinforcement chamber 13.1 and a back side chamber 13.3 located at an opposed side of the reinforcement chamber 13.1. A traverse leg of the L-shaped cross section is in this case defined by a single chamber 13.4, a side wall 13.5 of which faces the back side of the frame member 13 and is configured as a glass bead, while the opposed side wall 13.6 of the single chamber defines part of the front surface (exterior side) of the frame member 13.

[0020] Upon assembly, the post 12 contacts the frame member 13, whereby the nose of the post abuts the said single chamber 13.4 of the frame member, with the exterior oriented surface of the post 12 precisely fluently extends into the exterior surface of the frame member 13. The connection between both exterior surfaces being such that the connection is water tight, optionally by application of a foam at the interface of post and frame member, which foam is compacted at tightening of the screw 9 of the connection piece 1.

[0021] Such water tight position is obtained by use of the connection piece 1, preferably two connection pieces 1 according to the present invention.

[0022] As illustrated in Figures 2 and 3, two openings 14 are provided in back oriented side walls 15 of the side cavities 12.2 & 12.3. Through each opening a connection piece 1 is inserted in the corresponding side cavity 12.2 & 12.3 of the post, with the shoulder portion 7 at the proximal end of the connection piece, abutting the side wall 15 of the corresponding side cavity 12.2 & 12.3.

[0023] At the distal end of the connection piece, the tip 11 of the screw grips into a side wall 16 of the said single chamber, while the pen or protrusion 8 tightly fits into a dedicated pre-made hole 17 in the side wall of the single chamber.

[0024] The screw allows for tightening the connection

between the post and frame member as a tightening force pulls the post towards the frame member, while the pen allows preventing a sliding motion of the post in view of the frame member, such that the exterior oriented surface of the post 12 precisely and fluently extends into the exterior surface of the frame member 13 and is maintained in that position.

[0025] The above connection between post and frame member, using two connection pieces according to the present invention, provides a connection that is firstly secure and long-lasting, with a guaranteed water tight connection and correct positioning between the post and the frame member; and secondly allows the connection being made without breaking the integrity of the side walls of the reinforcing chambers of both the frame member and post.

[0026] As the two different and separate pre-made holes wherein the pens or protrusions 8 of the connection pieces 1 fit - that are provided in the side wall of the single chamber of the frame member - are situated at a distance B of less than 30% of the width A of the frame member measured from an outer surface of said frame member (see fig. 7), which outer surface extends in a direction parallel to the concerned frame and that is configured as an exterior surface of the frame, the connection pieces act on the frame member very next to the exterior surface of the frame member and post, where the water tight connection between both needs to be guaranteed. This minimises the momentum of forces acting on the connection piece, and increases the effectiveness of the connection obtained.

[0027] Figures 5 and 6 illustrate a connection of two separate posts to a third post in a cross configuration. In this case, two posts, extending along a same longitudinal axis are connected to a single perpendicularly extending third post to define a cross of posts. Both first posts are connected to the third, perpendicularly extending post by two connection pieces according to the present invention. The connection is herein similar as the connection described supra in relation to figures 1 to 4. As will be appreciated from Fig. 6 the connections between the two first posts and the third, perpendicularly extending post are established independent from one another.

Claims

1. A connection piece for connecting a post with either a frame member; a sash member or one or more other posts, the connection piece comprising:

   - a tubular body defining a through hole, the tubular body extending along an axis X-X and having a proximal end and a distal end;
   - a shoulder portion provided at the proximal end of the tubular body configured to abut a sidewall of a first post or frame member, said shoulder portion defining an abutment extending in a plane askew from the X-X axis;
   - a pen or protrusion provided at or near the distal end of the tubular body and extending in a direction Y askew to the X-X axis; and
   - a screw extending through the tubular body, with a screw head seated next to the proximal end of the tubular body and a screw tip extending through the tubular body next to, yet askew in view of the pen or protrusion.

2. The connection piece according to claim 1, wherein the angle defined between the Y-direction and the X-X axis ranges between 45° and 1°.

3. The connection piece according to any of the preceding claims, wherein the shoulder portion at the proximal end of the tubular body extends in a plane parallel to a Y-direction under an angle ranging between 45° and 1° in view of the X-X axis.

4. The connection piece according to any of the preceding claims, manufactured in a polymeric material.

5. A window or door frame defined frame members and subdivided by at least one post extending between two opposed frame members of the window or door frame, **characterised in that** said post is mechanically connected to at least one of said frame members by a connection piece as identified in any of claims 1 to 4.

6. A window or door frame defined frame members and subdivided by several posts extending between two opposed frame members of the window or door frame, **characterised in that** at least two of said posts are mechanically connected to one another by a connection piece as identified in any of claims 1 to 4.

7. The window or door frame according to claim 6, wherein two posts are connected to a third post by a connection piece as identified in any of claims 1 to 4, defining a cross of posts.

8. The window or door frame according to any of claims 5 to 7, wherein the frame members and posts are manufactured in a polymeric material and define an inner cavity subdivided in longitudinal chambers by inner walls.

9. The window or door frame according to claim 8, wherein at least one of said chambers houses a reinforcing element.

10. The window or door frame according to claim 8, wherein the connection piece extends through a chamber of a concerning frame member or post, which chamber does not comprise the reinforcing

element.

11. The window or door frame according to any of claims 8 to 10, the connection piece extending through a chamber of the concerning post, the shoulder portion at the proximal end of the connection piece abutting an inner wall of the post, and the screw and pen or protrusion extending through two different and separate holes in an inner wall of the concerning frame member.

12. The window or door frame according to any of claim 8 to 11, wherein the two different and separate holes in the inner wall of the frame member are situated at a distance of less than 30% of the width of the frame member measured from an outer surface of said frame member, which outer surface extends in a direction parallel to the concerned frame and that is configured as an exterior surface of the frame.

13. The window or door frame according to claim 12, wherein the proximal end of the tubular body of the connection piece is situated further from an exterior side of the window or door frame than the distal end of said tubular body.

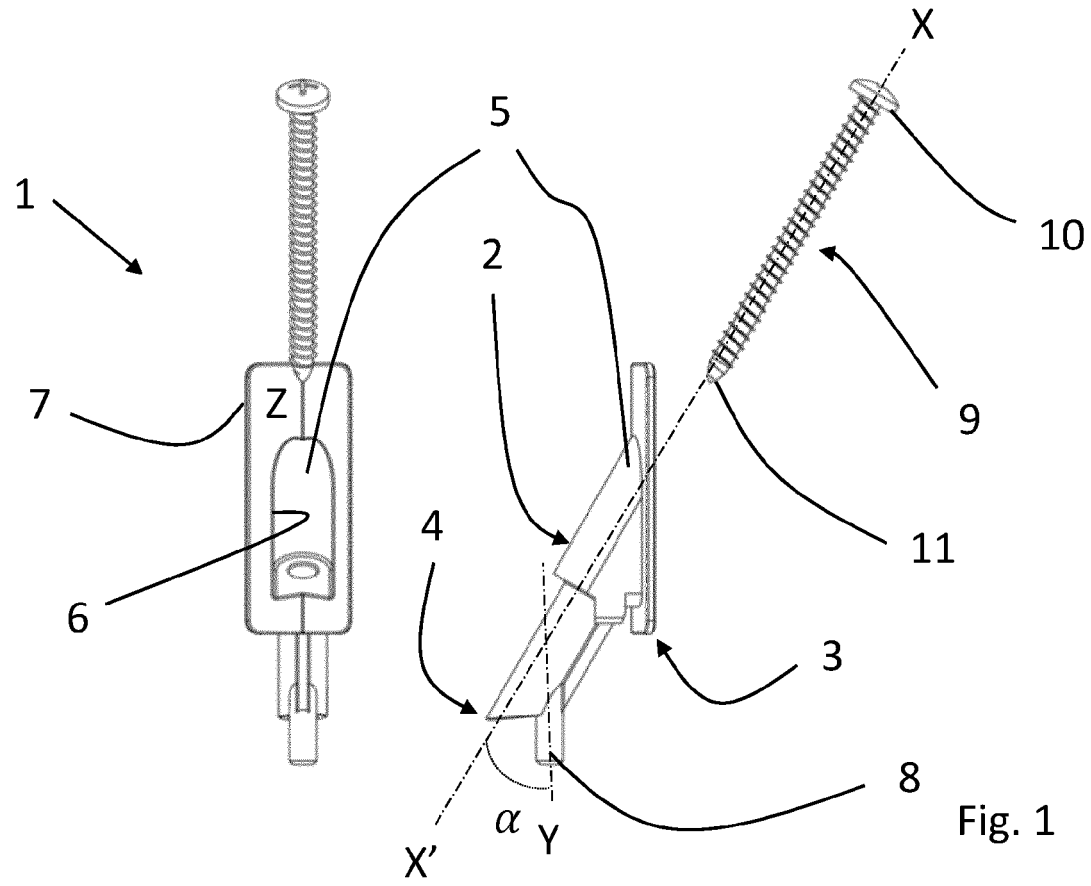
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Fig. 1

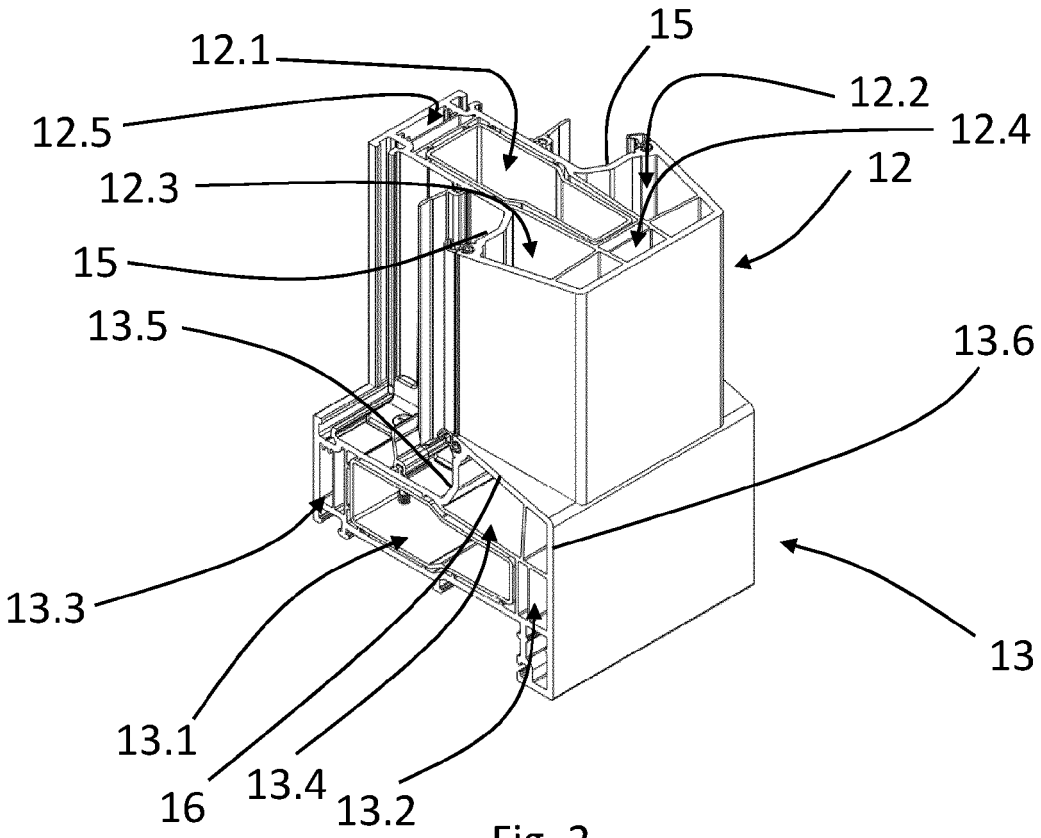
12.1
15
12.5
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Fig. 2

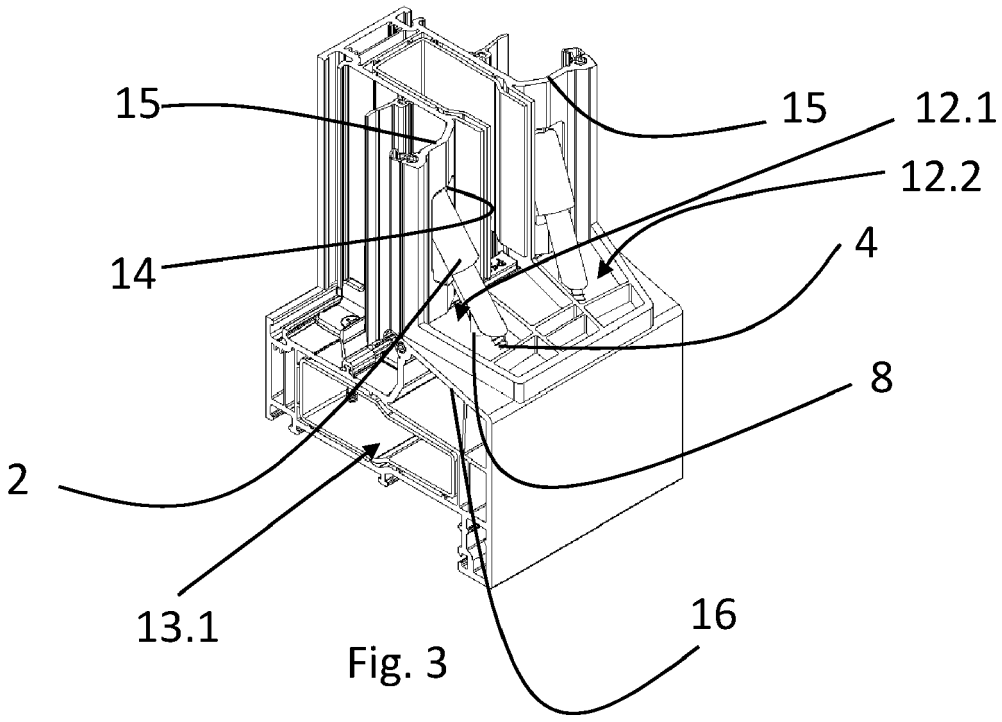

Fig. 3

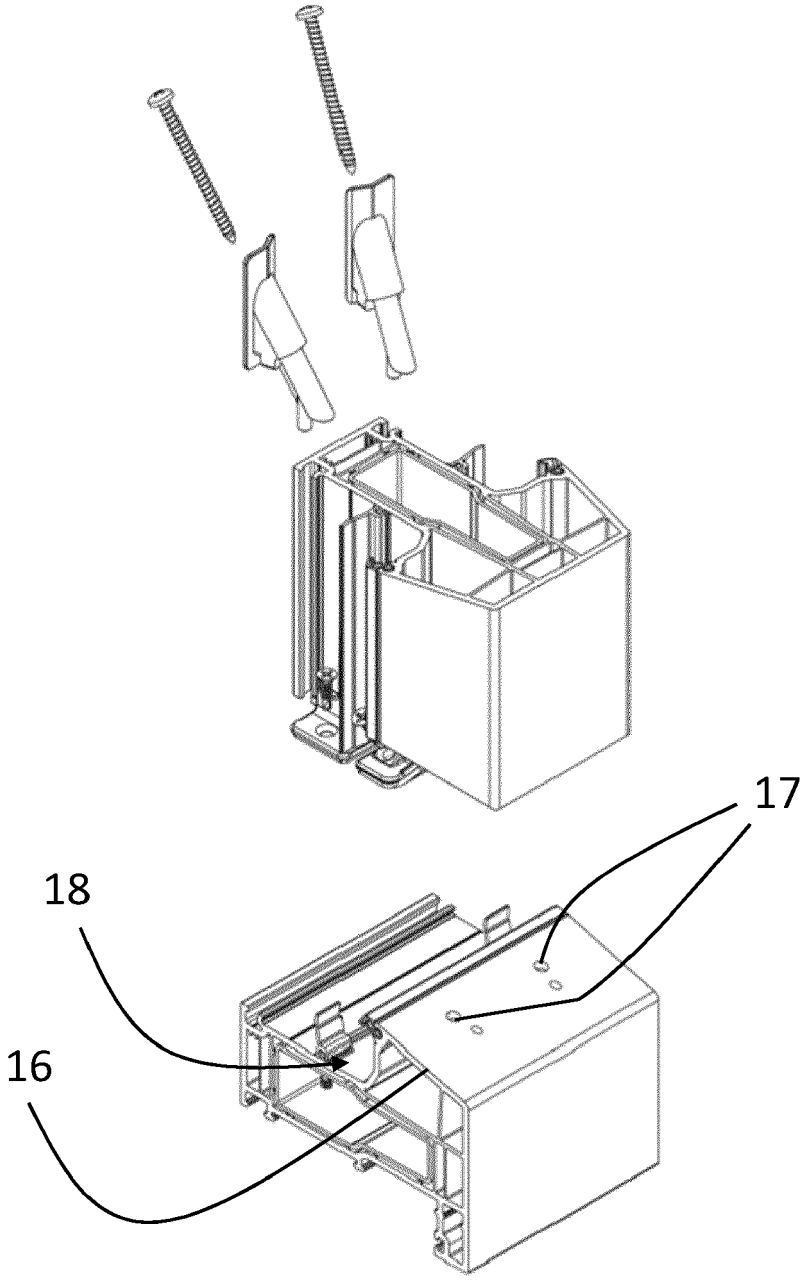

Fig. 4

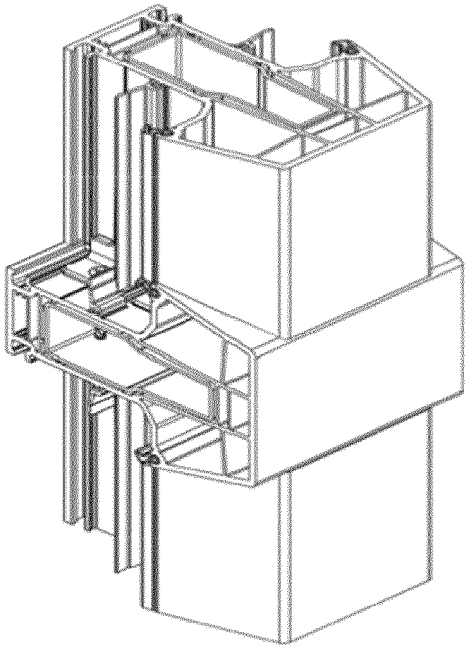

Fig. 5

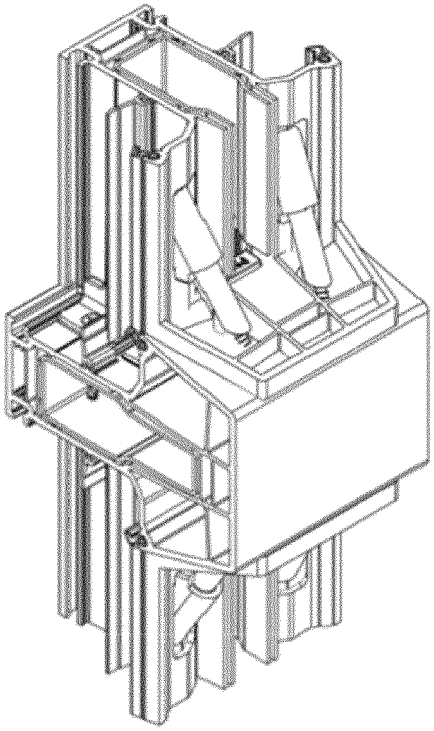

Fig. 6

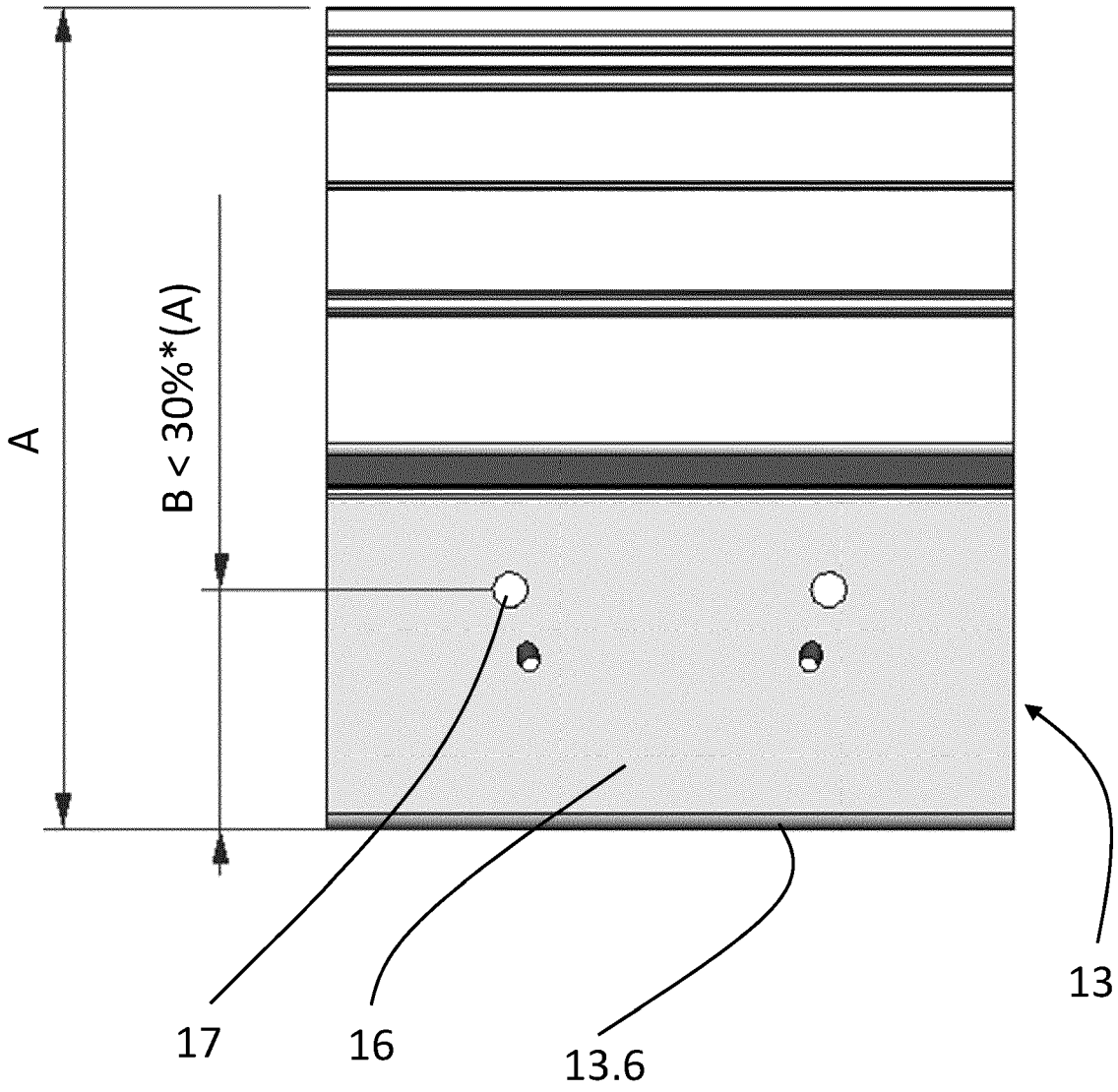

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 19 21 7803

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 108 266 088 A (TIANJIN RESIDENTIAL GROUP BUILDING MATERIAL TECH CO LTD) 10 July 2018 (2018-07-10) * figures 5,8 *	1,4-13	INV. E06B3/96 E06B3/964 E06B3/968
X	US 2011/091269 A1 (SOLLY DAVID KENNING [NZ] ET AL) 21 April 2011 (2011-04-21) * figure 4 *	1,2,4-13	

TECHNICAL FIELDS SEARCHED (IPC)

E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	2 June 2020	Verdonck, Benoit

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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02-06-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 108266088 A	10-07-2018	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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Patent documents cited in the description

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