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Remarks:
Amended claims in accordance with Rule 137(2) EPC.

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(54) **Joint structure**

(57) The invention relates to a joint structure for interconnecting adjacent ends of first and second framing members each member having a substantially identical cross-sectional profile, comprising (a) first (10) and a second (11) side walls provided with at least one reinforcing

element (13),.

The invention further relates to sash or a window or doorframe, comprising a glass assembly with four members joint to form a frame, with a joint structure according to the invention.

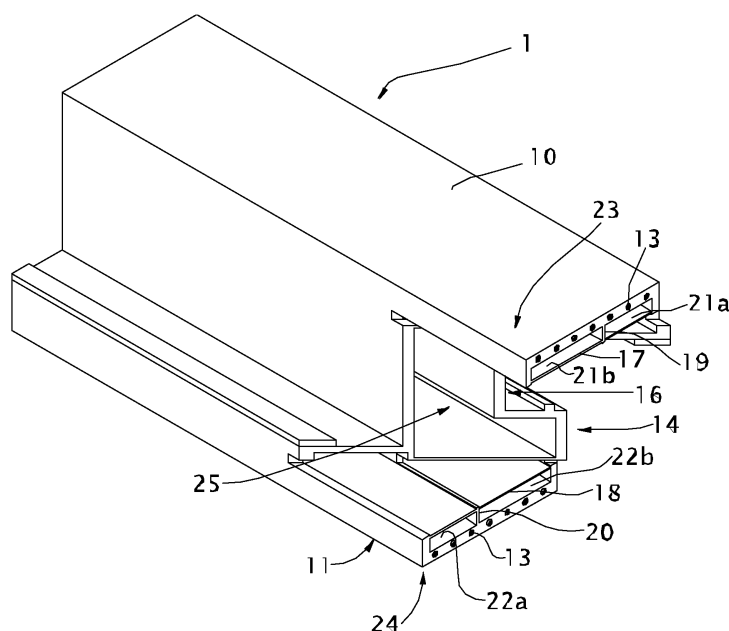


Fig. 1

Description

[0001] The invention relates to a joint structure for interconnecting adjacent ends of framing members for a sash or a window or doorframe. Framing members are typically extruded thermoplastic profiles each member having a substantially identical cross-sectional profile. A sash or a window or doorframe is generally made from the framing members by welding mitered members with one another at the frame corners.

[0002] For several reasons it is desirable to reinforce the framing members. This can be done by a steel or composite insert a e.g. described in EP-A-1043472.

[0003] Another type of reinforcement is described in US4492063A, which relates to a glass fibre-reinforced, extruded plastics material hollow profiled strip for the production of window frames, glass doors, or the like.

[0004] The framing members described in US4492063A comprise:

- (a) first and a second side walls provided with at least one reinforcing element, the side walls spaced by
- (b) first and second connecting walls, and
- (c) optionally one or more webs connecting the support walls with the side walls,

[0005] In order to be able to weld the proved strips described in US4492063A together when producing the frame and to ensure a reliable bonding between the glass fibers and the plastics material of the proved strips, a synthetic resin is used as the bonding agent which causes this bonding, which synthetic resin has thermoplastic or thermoplastic properties and thus enables the glass fibers to be deflected during welding and pressing together of the ends of the frame pieces.

[0006] The reinforcing element in US4492063A is therefore restricted to glass fiber roving, that can be deflected during welding.

[0007] The present invention provides a joint structure in the manner as described in claim 1 that can be used for reinforcements like e.g. steel wires that do not require the above mentioned deflection during welding.

[0008] The joint structure for interconnecting adjacent ends of said members according to the invention includes:

- (i) two flanges disposed at the end of the first member comprising the side walls, the support walls and part of the connecting walls, the flanges having a first squared end surface extending substantially orthogonal to the longitudinal axis of the first member;
- (ii) a first mitered portion disposed at the end of the first member, the first mitered portion spanning between said flanges and having a first mating surface defined thereon, wherein the first mitered portion has a width defined along a direction extending between the first and second side wall of the first member;
- (iii) a second mitered portion disposed at the end of

the second member, the second mitered portion having a width substantially the same as the width of the first mitered portion, and the second mitered portion spanning from the first side wall of the second member toward the second side wall of the second member, wherein the second mitered portion has a second mating surface defined thereon for abutting the first mating surface on the first mitered portion, and wherein the second mitered portion defines recessed surfaces proximate the intermediate support walls of the second member;

(iv) two second squared end surfaces extending substantially orthogonal to the longitudinal axis of the second member between the side walls of the second member and the recessed surfaces of the second mitered portion, wherein two recesses are defined by the recessed surfaces and the second squared end surfaces; and

(v) connecting means for connecting the first and second members through the first and second mating surfaces, with the flanges on the first member received in the recesses defined in the second member; whereby the flanges and the second squared end surfaces define a squared edge on the side walls of the members.

[0009] Connecting means can be friction welding, ultrasonic welding or hot plate welding. Preferably hot plate welding is used.

[0010] Each member is preferably formed of a hot plate weldable material, and wherein the connecting means comprises means for heat welding the first and second mitered portions through the first and second mating surfaces.

[0011] Hot plate weldable materials are typically thermoplastic materials, like polyvinylchloride, polypropylene or polyethylene.

[0012] An advantage of the present invention is that an anti-sticking layer, generally polytetrafluoroethylene (PTFE), on the welding plate that is used to heat the surfaces to be weld, is not damaged by the reinforcing elements.

[0013] The joint structure of the invention preferably comprises intermediate support walls parallel to the first and second side walls. The side walls, support walls and part of the connecting walls forming one, optionally more tubes and the recessed surfaces proximate the intermediate support walls of the second member.

[0014] The reinforcing elements in the joint structures of the invention can be fibers or fiber reinforced strips. The fibers include mono and multifilament fibers. The multifilament fibers are preferably glass, aramid or carbon fibers; the monofilament fibers are typically steel wires, but also roving of said materials as well as metal strips can be used.

[0015] Each member may include a euro groove for a closing mechanism.

[0016] Each member may also include a glass receive-

ing channel formed in the first connecting wall, the glass receiving channel for supporting the interior and exterior sides of the window glass assembly.

[0017] The invention further relates to a sash or a window or doorframe, comprising a glass assembly with four members joint to form a frame, with a joint structure according to the invention.

[0018] The invention will now be explained in greater detail by means of the enclosed drawing, wherein the drawing depicts:

Fig. 1 shows the joint structure of a first framing member reinforced with steel wires prior to the welding operation with the second framing member.

Fig. 2 shows the joint structure of a second framing member reinforced with steel wires prior to the welding operation with the first framing member.

Fig. 3 shows the joint structure of a first framing member reinforced with glass roving prior to the welding operation with the second framing member.

Fig. 4 shows the joint structure of a second framing member reinforced with glass roving prior to the welding operation with the first framing member

Fig. 5 shows a window constructed with the joint structures of the present invention.

Fig. 6 shows a cross section of framing members 1 and 2.

[0019] Fig. 1 shows a joint structure for a first (1) framing member comprising first (10) and a second (11) side walls provided with steel wires (13), the side walls spaced by first (14) and second connecting walls, and intermediate support walls (17, 18) parallel to the first (10) and second (11) side walls, the side walls, support walls and part of the connecting walls forming tubes (21 a/b, 22a/b) and webs (19, 20) connecting the support walls with the side walls, wherein the joint structure for interconnecting the first framing member with a second framing member (Fig. 2 (2)) includes two flanges (23, 24) disposed at the end of the first member comprising the side walls (10, 11), the support walls (17, 18) and part of the connecting walls, the flange having a first squared end surface extending substantially orthogonal to the longitudinal axis of the first member (1); a first mitered portion (25) disposed at the end of the first member, the first mitered portion spanning between said flanges and having a first mating surface defined thereon, wherein the first mitered portion (25) has a width defined along a direction extending between the first (10) and second (11) side wall of the first member. An additional advantage of the tubes 21a/b and 22a/b is an increased stiffness of the flanges (23, 24). Said additional stiffness prevents the flanges (23, 24) from warping when subjected to sunshine. To avoid oxidation of the steel wires, the first squared end surface is preferably provided with an injection moulded cover plate. Said cover plate further ensures the water tightness of the window. The member of Fig. 1 includes a euro groove (16) for a closing mechanism.

nism.

[0020] Fig 2 shows a joint structure for a second framing member comprising first (10) and a second (11) side walls provided with steel wires (13), a second mitered portion (26) disposed at the end of the second member (2), the second mitered portion (26) having a width substantially the same as the width of the first mitered portion (25), and the second mitered portion (26) spanning from the first side wall (10) of the second member (2) toward the second side wall (11) of the second member (2), wherein the second mitered portion (26) has a second mating surface defined thereon for abutting the first mating surface on the first mitered portion (25), and wherein the second mitered portion defines recessed surfaces (27, 28) proximate the intermediate support walls (17, 18) of the second member (2); two second squared end surfaces (29, 30) extending substantially orthogonal to the longitudinal axis of the second member between the side walls of the second member and the recessed surfaces (27, 28) of the second mitered portion, wherein two recesses (31, 32) are defined by the recessed surfaces (27, 28) and the second squared end surfaces (29, 30); The member of Fig. 2 further includes a euro groove (16) for a closing mechanism

[0021] The joint structure of the invention is obtained by connecting the members shown in Fig. 1 and Fig. 2 with connecting means through the first and second mating surfaces, with the flanges (23, 24) on the first member (1) received in the recesses (31, 32) defined in the second member (2); whereby the flanges (23, 24) and the second squared end surfaces (27, 28) define a squared edge on the side walls of the members.

[0022] The wall thickness of the walls to be welded (14, 15) is preferably between 2 and 7 mm, thus obtaining sufficient weld strength.

[0023] Fig. 3 shows a joint structure for a first (1) framing member comprising first (10) and a second (11) side walls provided with a glass roving (13).

[0024] Fig 4 shows a joint structure for a second (2) framing member comprising first (10) and a second (11) side walls provided with a glass roving (13).

[0025] The joint structure of the invention is obtained by connecting the members shown in Fig. 3 and Fig. 4 with connecting means through the first and second mating surfaces, with the flanges (23, 24) on the first member (1) received in the recesses (31, 32) defined in the second member (2); whereby the flanges (23, 24) and the second squared end surfaces (27, 28) define a squared edge on the side walls of the members

[0026] Fig. 5 shows a window constructed with the joint structures of the present invention with two first framing members (1) and two second framing members (2).

[0027] Fig. 6 shows a cross section of framing members 1 and 2 with first (10) and second (11) side walls, steel wires (13), the side walls spaced by first (14) and second (15) connecting walls, and intermediate support walls (17, 18) parallel to the first (10) and second (11) side walls, the side walls, support walls and part of the

connecting walls forming tubes (21a/b, 22a/b) and webs (19, 20) .

Claims

1. A joint structure for interconnecting adjacent ends of first (1) and second (2) framing members each member having a substantially identical cross-sectional profile, comprising

- (a) first (10) and a second (11) side walls provided with at least one reinforcing element (13) , the side walls spaced by
- (b) first (14) and second (15) connecting walls, and
- (c) optionally one or more webs (19, 20) connecting the support walls with the side walls,

wherein the joint structure for interconnecting adjacent ends of said members includes:

- (i) two flanges (23, 24) disposed at the end of the first member comprising the side walls (10, 11), the support walls (17, 18) and part of the connecting walls, the flanges (23, 24) having a first squared end surface extending substantially orthogonal to the longitudinal axis of the first member (1);
- (ii) a first mitered portion (25) disposed at the end of the first member, the first mitered portion spanning between said flanges and having a first mating surface defined thereon, wherein the first mitered portion (25) has a width defined along a direction extending between the first (10) and second (11) side wall of the first member;
- (iii) a second mitered portion (26) disposed at the end of the second member (2), the second mitered portion having a width substantially the same as the width of the first mitered portion, and the second mitered portion spanning from the first side wall (10) of the second member (2) toward the second side wall (11) of the second member (2), wherein the second mitered portion (26) has a second mating surface defined thereon for abutting the first mating surface on the first mitered portion (25), and wherein the second mitered portion defines recessed surfaces (27, 28);
- (iv) two second squared end surfaces (29, 30) extending substantially orthogonal to the longitudinal axis of the second member between the side walls of the second member and the recessed surfaces (27, 28) of the second mitered portion, wherein two recesses (31, 32) are defined by the recessed surfaces (27, 28) and the second squared end surfaces (29, 30); and
- (v) connecting means for connecting the first (1)

and second (2) members through the first and second mating surfaces, with the flanges (23, 24) on the first member (1) received in the recesses (31, 32) defined in the second member (2); whereby the flanges (23, 24) and the second squared end surfaces (27, 28) define a squared edge on the side walls of the members.

2. Joint structure of claim 1 further comprising intermediate support walls (17, 18) parallel to the first (10) and second (11) side walls, the side walls, support walls and part of the connecting walls forming one, optionally more tubes (21 a/b, 22a/b) and the recessed surfaces (27, 28) proximate the intermediate support walls (17, 18) of the second member (2).
3. The joint structure of claim 1 or claim 2, wherein each member is formed of a hot plate weldable material, and wherein the connecting means comprises means for heat welding the first and second mitered portions through the first and second mating surfaces.
4. A sash or a window or doorframe, comprising a glass assembly with four members joint to form a frame, with a joint structure according to claim 1.

Amended claims in accordance with Rule 137(2) EPC.

1. A method for interconnecting adjacent ends of first (1) and second (2) framing members each member having a substantially identical cross-sectional profile, comprising

- (a) first (10) and a second (11) side walls provided with at least one reinforcing element (13), the side walls spaced by
- (b) first (14) and second (15) connecting walls, and
- (c) optionally one or more webs (19, 20) connecting the support walls with the side walls,

wherein the ends of said members include:

- (i) two flanges (23, 24) disposed at the end of the first member comprising the side walls (10, 11), the support walls (17, 18) and part of the connecting walls, the flanges (23, 24) having a first squared end surface extending substantially orthogonal to the longitudinal axis of the first member (1);
- (ii) a first mitered portion (25) disposed at the end of the first member, the first mitered portion spanning between said flanges and having a first mating surface defined thereon, wherein the first mitered portion (25) has a width defined along

a direction extending between the first (10) and second (11) side wall of the first member;

(iii) a second mitered portion (26) disposed at the end of the second member (2), the second mitered portion having a width substantially the same as the width of the first mitered portion, and the second mitered portion spanning from the first side wall (10) of the second member (2) toward the second side wall (11) of the second member (2), wherein the second mitered portion (26) has a second mating surface defined thereon for abutting the first mating surface on the first mitered portion (25), and wherein the second mitered portion defines recessed surfaces (27, 28);

(iv) two second squared end surfaces (29, 30) extending substantially orthogonal to the longitudinal axis of the second member between the side walls of the second member and the recessed surfaces (27, 28) of the second mitered portion, wherein two recesses (31, 32) are defined by the recessed surfaces (27, 28) and the second squared end surfaces (29, 30); and the method comprises the step of connecting the first (1) and second (2) members through the first and second mating surfaces with connection means, with the flanges (23, 24) on the first member (1) received in the recesses (31, 32) defined in the second member (2); whereby the flanges (23, 24) and the second squared end surfaces (27, 28) define a squared edge on the side walls of the members.

2. Method of claim 1 further comprising intermediate support walls (17, 18) parallel to the first (10) and second (11) side walls, the side walls, support walls and part of the connecting walls forming one, optionally more tubes (21a/b, 22a/b) and the recessed surfaces (27, 28) proximate the intermediate support walls (17, 18) of the second member (2).

3. Method of claim 1 or claim 2, wherein each member is formed of a hot plate weldable material, and wherein the connecting means comprises means for heat welding the first and second mitered portions through the first and second mating surfaces.

4. A sash window, or doorframe, comprising a glass assembly with four members joint to form a frame, with the method according to claim 1.

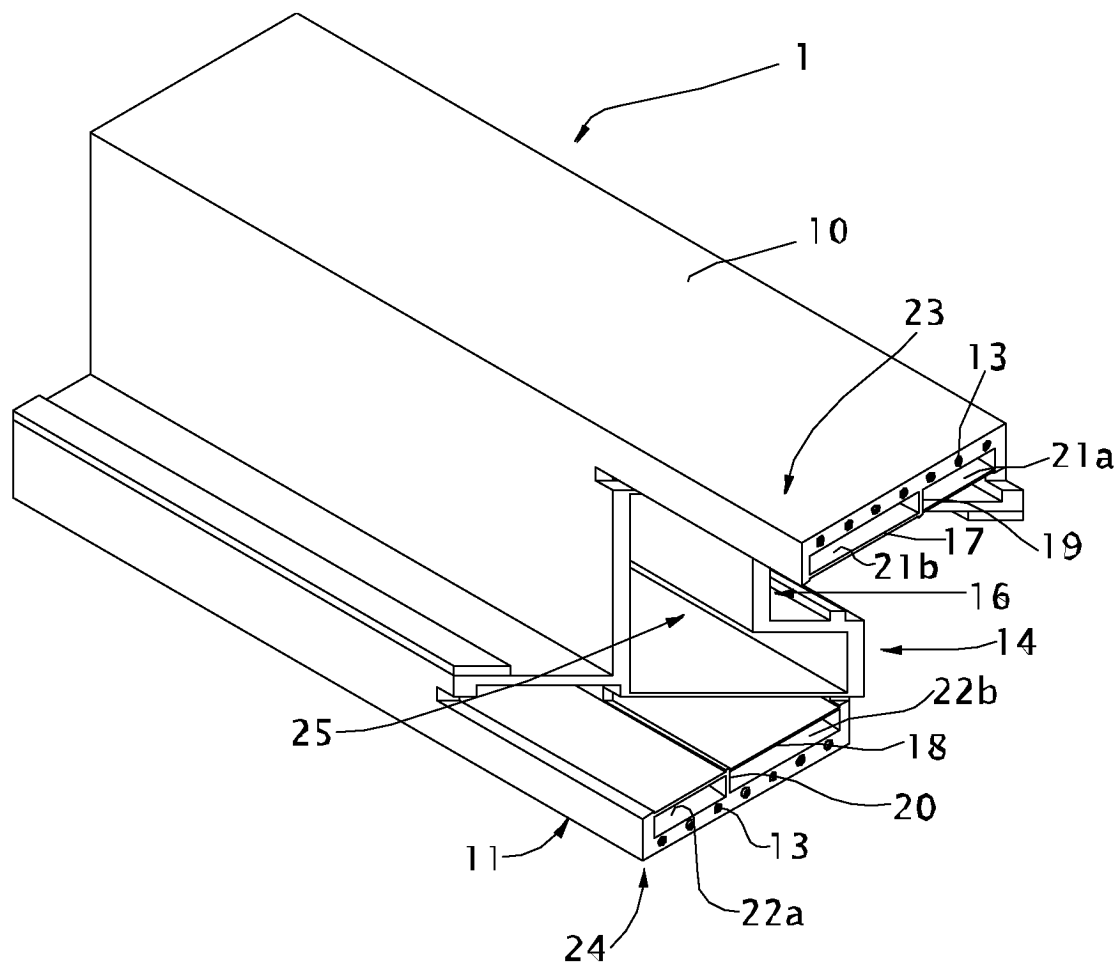


Fig. 1

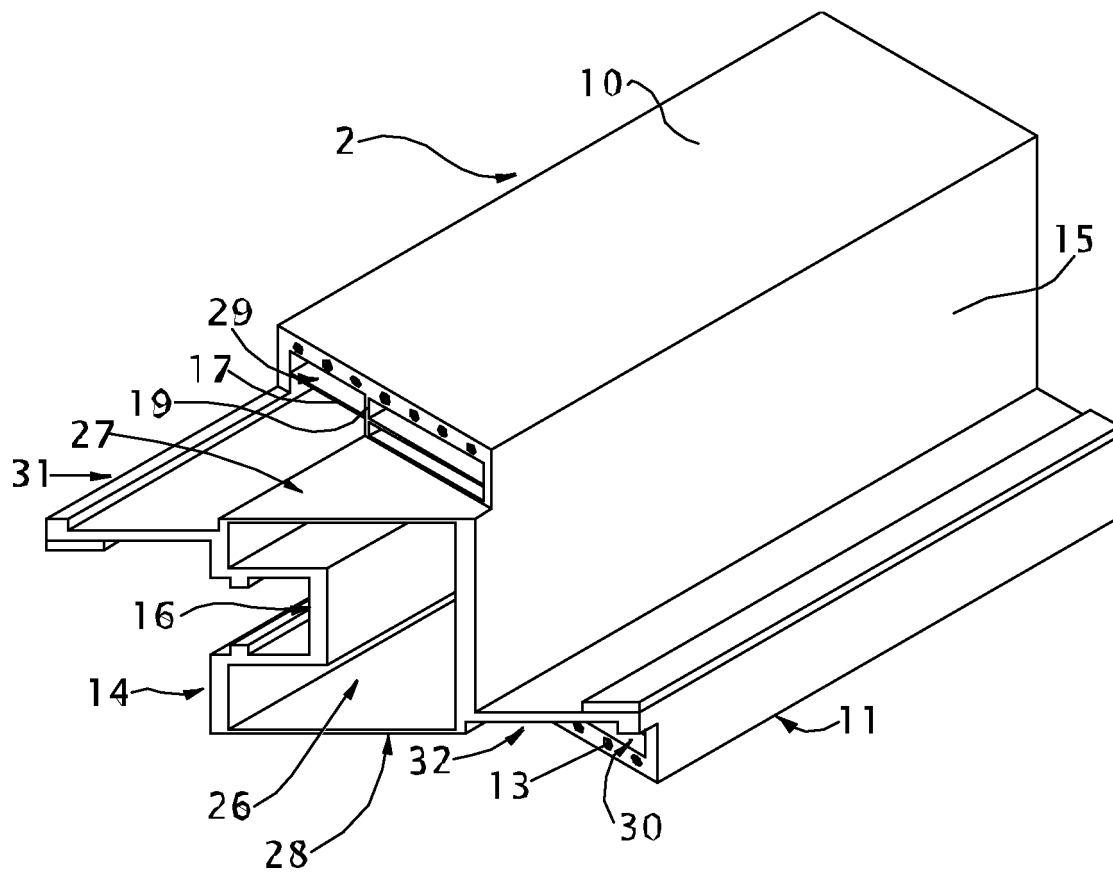


Fig. 2

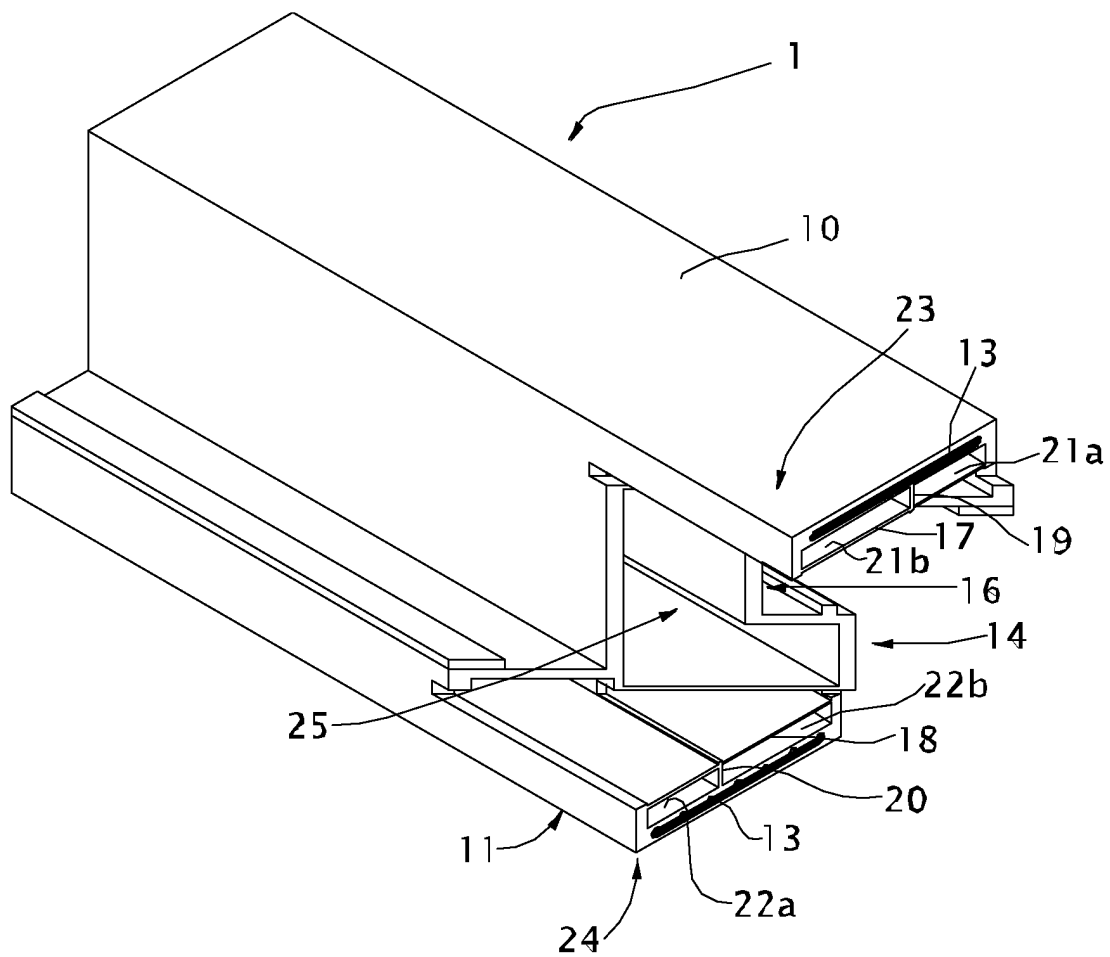


FIG. 3

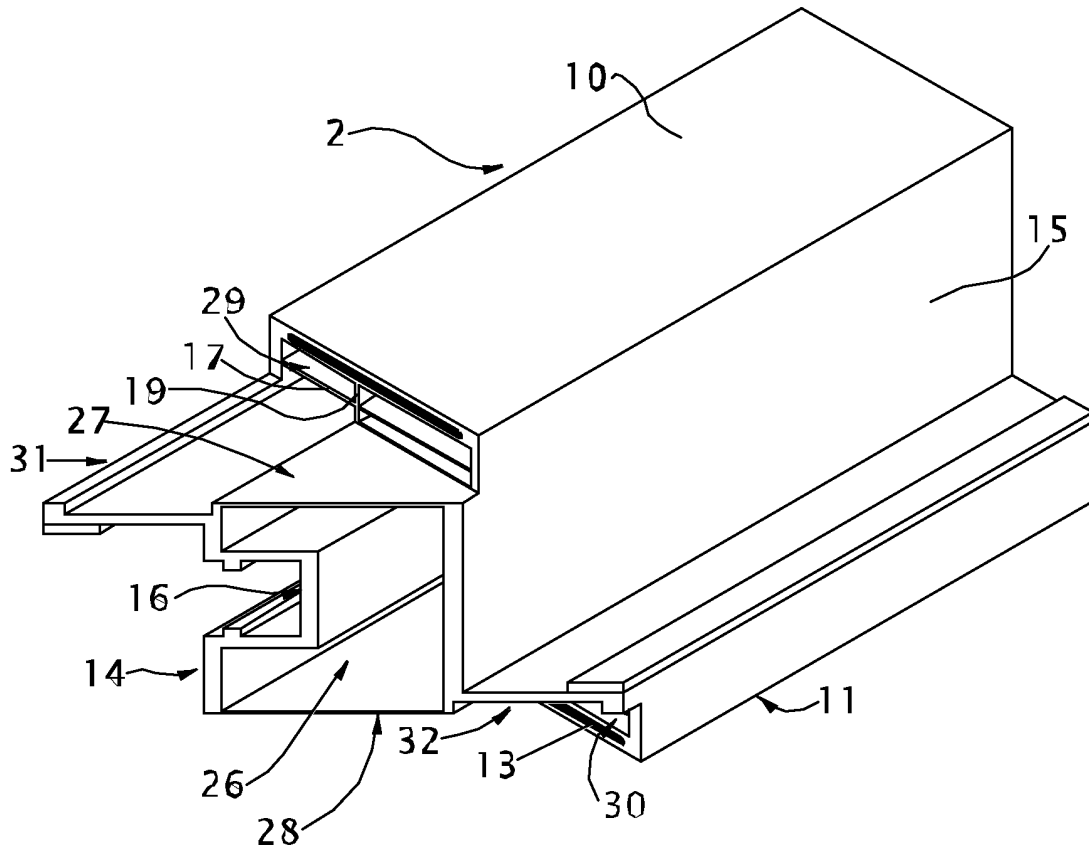


FIG. 4

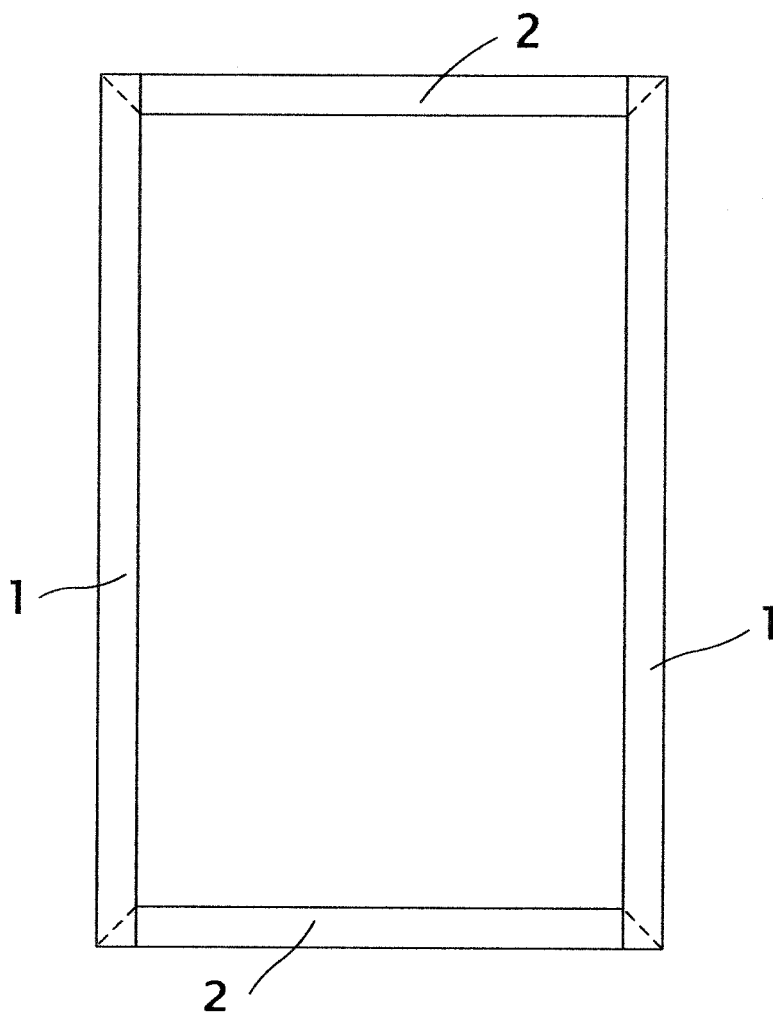


Fig. 5

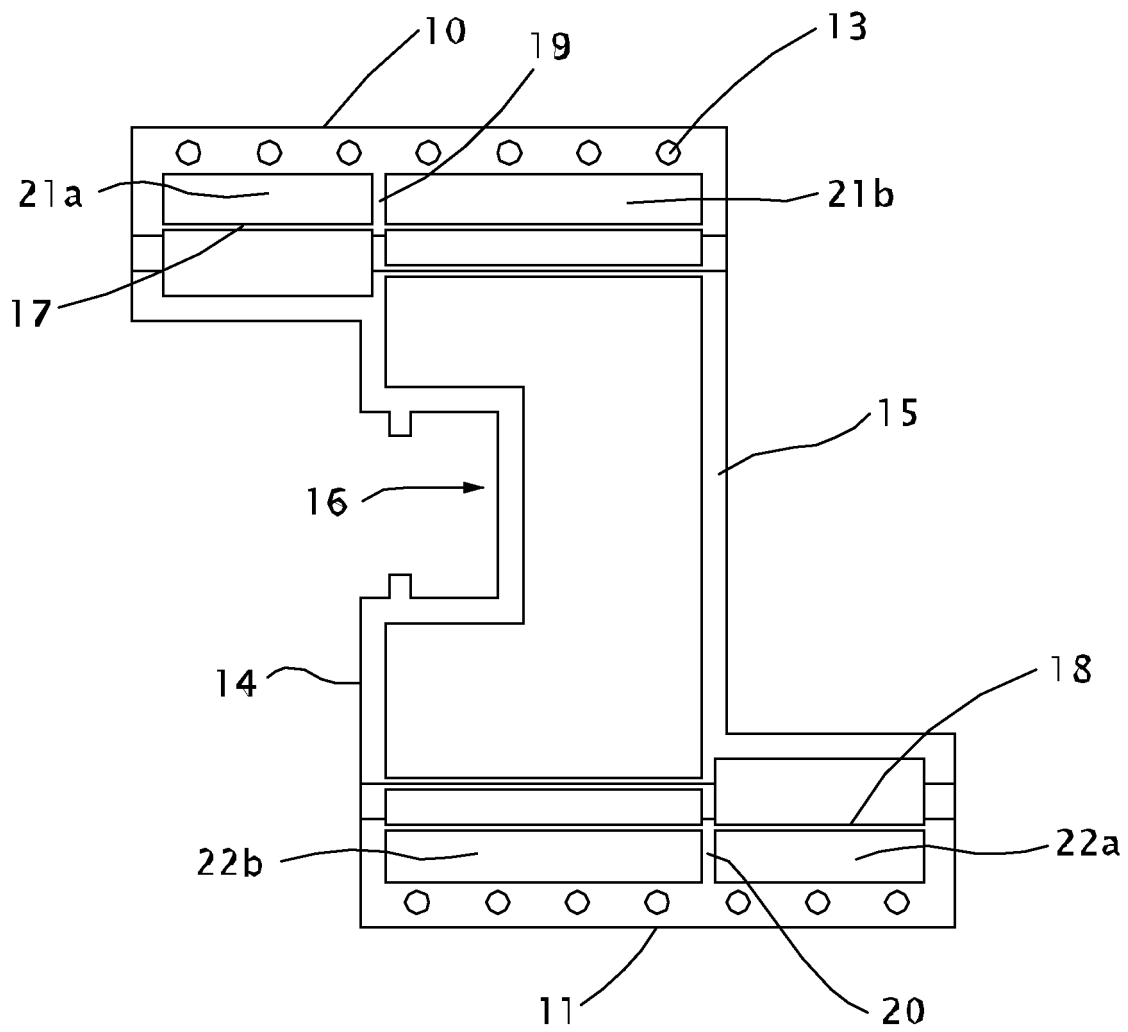


Fig. 6



EUROPEAN SEARCH REPORT

Application Number
EP 10 17 5617

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	DE 20 2007 001236 U1 (GEALAN FENSTER SYSTEME GMBH [DE]) 10 May 2007 (2007-05-10) * the whole document *	1-4	INV. E06B3/96 E06B3/22
A,D	US 4 492 063 A (SCHOCK KARL [DE] ET AL) 8 January 1985 (1985-01-08) * figures 1,,6,7 * * column 1, line 9 - column 2, line 16 * * column 4, line 14 - line 23 * * column 4, line 50 - column 5, line 39 *	1-4	
			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		11 February 2011	Blancquaert, Katleen
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 17 5617

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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11-02-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202007001236 U1	10-05-2007	NONE	

US 4492063	A	DE 3136863 A1	04-11-1982
		EP 0063234 A1	27-10-1982

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1043472 A [0002]
- US 4492063 A [0003] [0004] [0005] [0006]