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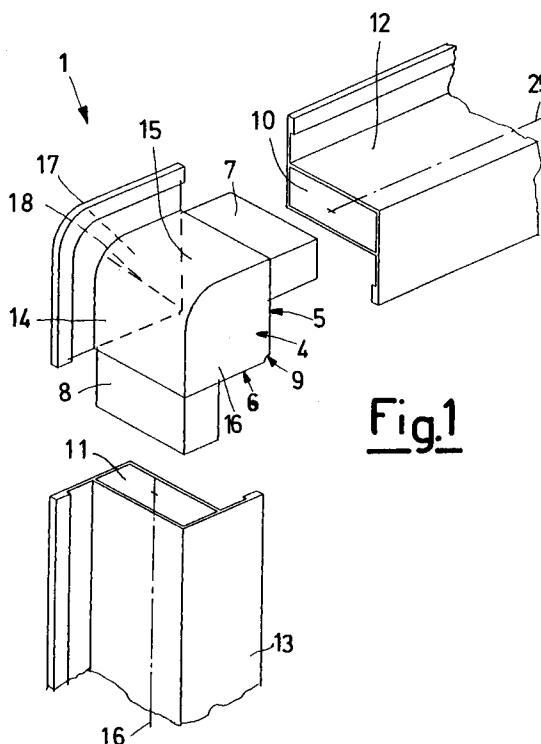
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I-20121 Milano (IT)(54) **Joint for angularly connecting mutually converging linear elements together.**

(57) To overcome the problems involved in angularly connecting together (at 45°) converging section elements (12, 13) of the frame (2) of a door or window (3), the joint (1) according to the invention comprises a central element (4) provided with two perpendicular contact surfaces (5, 6) for the cross-sections (10, 11) of the incident section elements (12, 13) and perpendicular male portions (7, 8) arranged to penetrate into and be securely retained within the cavity of the incident section elements (12, 13).

**Fig.1****EP 0 555 929 A1**

This invention relates to a joint for connecting two mutually converging linear elements together angularly in the direction of their length, in particular converging section elements of a door or window frame.

Two converging section elements of a door or window frame are currently joined together by various joining elements, all of which operate in such a manner as to maintain the section elements joined together along incident surfaces usually at 45°.

These joining methods are problematic for various reasons well known to the expert of the art.

Basically, any angularity or coplanarity errors in the surfaces to be brought into contact affect the strength and appearance of the connection, and are reflected to an amplified extent in the symmetry of the door or window frame.

For the aforesaid reasons it is apparent that the cutting and joining of the section elements along surfaces usually at 45° can be critical.

The object of the present invention is to obviate the aforesaid drawback by providing a joint which is able to simplify the angular connection of converging linear elements and in particular section elements for door or window frames, such that the frame is more simple to construct than in the current state of the art.

This object is attained by a joint in accordance with the first claim.

The joint no longer requires oblique cutting of the converging linear (section) elements and is simple to install in that it is necessary merely to insert the male portions into the cavities, and then to lock them in position if the insertion is not of forced-fit type.

The frame reliably respects tolerances and in addition the joint is tendentially strong and can be further reinforced by lengthening the male portions and by increasing the contact areas.

The invention is illustrated by way of non-limiting example in the figures of the accompanying drawings.

Figure 1 is a perspective view of a first embodiment of the joint during the joining of the end portions of two incident section elements;

Figure 2 is a schematic side elevation of a window frame comprising the joints of Figure 1;

Figure 3 is a perspective view of a second embodiment of the joint during the joining of the end portions of two incident section elements; in this the joint elements corresponding to those shown in Figures 1 and 2 are indicated by the same reference numeral plus the letter "A".

With particular reference to Figure 1, the joint of the invention, indicated overall by 1, is of the type used for angularly connecting two linear elements together in the direction of their length, and

in particular two converging section elements of the frame 2 of a door or window, for example a window 3. In the illustrated example, which is the most common, the convergence is of 90°.

Other convergence angles for forming frames and hence windows or doors of shape other than square or rectangular are however not excluded.

The joint 1 comprises a central element 4 and two male portions 7 and 8. In the illustrated example the central element 4 is substantially a parallelepiped and therefore has all its opposing surfaces parallel.

Said surfaces consist of two contact surfaces 5 and 6, two surfaces 14 and 15 opposite the contact surfaces 5 and 6, and two lateral surfaces 16 and 17.

The respective male portions 7 and 8 extend perpendicularly from the contact surfaces 5 and 6. Said contact surfaces converge at a corner 9, defined as the inner corner, and are arranged to make contact with respective cross-sections 10 and 11 of section elements 12 and 13 perpendicular to the axes 25 and 26 of said section elements.

The surfaces 14 and 15 converge at a corner 18, defined as the outer corner and rounded to satisfy both accident prevention and appearance requirements.

Again for accident prevention and appearance requirements the lateral surfaces 14-17 of the central element 4 are coplanar with the outer surfaces of the section elements 12 and 13.

The male portions 7 and 8, which in the illustrated example are of parallelepiped shape, penetrate into the cavities which open at the cross-sections 10 and 11 of the section elements 12 and 13 so that the outer surfaces of the male portions 7 and 8 make contact with the inner surfaces of the cavity.

The male portions 7 and 8 are fixed by a fixing means chosen from glue, pins, screws, welding, rivets and forced insertion.

In the second embodiment shown in Figure 3, the joint 1A is provided with a thermally insulating element 22 to interrupt, when in operation, the thermal bridge between the lateral surfaces 16A and 17A of the central element 4A and that between the corresponding lateral surfaces 20A and 21A of the relative male portions 7A and 8A. The thermally insulating element 22 is positioned parallel to the plane of symmetry of the joint 1A and preferably coplanar with said plane. In this manner the two metal elements into which the joint is divided by the thermally insulating element 22 (which is a thermal insulant and hence not of metal) can in certain cases be made identical, with consequent reduction in the overall constructional cost of the joint.

Various fixing means can be used to fix together the three component elements of the joint 1A. These can for example be chosen from those suggested for fixing the male portions 7, 8 and 7A, 8A to the relative section elements 12, 13 and 12A, 13A.

In order not to undermine the insulating action of the joint 1A the section elements 12A and 13A also have to be provided with thermally insulating elements 23 and 24.

Claims

1. A joint (1; 1A) for connecting two mutually converging linear elements together angularly in the direction of their length, in particular converging section elements (12, 13; 12A, 13A) of the frame (2; 2A) of a door or window (3; 3A), characterised by comprising a central element (4; 4A) provided with two contact surfaces (5, 6; 5A, 6A) from which two male portions (7, 8; 7A, 8A) project, in which:
 - the contact surfaces (5, 6; 5A, 6A) lie in two converging planes and are arranged to make contact with the cross-section (10, 11; 10A, 11A) through the respective section elements (12, 13; 12A, 13A);
 - the male portions (7, 8; 7A, 8A) are arranged to penetrate into and be securely retained within the cavities which open at said cross-sections (10, 11; 10A, 11A) of the section elements (12, 13; 12A, 13A).
2. A joint as claimed in claim 1, characterised in that the contact surfaces (5, 6; 5A, 6A) and the male portions (7, 8; 7A, 8A) are mutually perpendicular.
3. A joint as claimed in claim 1, characterised in that the central element (4; 4A) comprises parallel opposite surfaces, (14-17; 14A-17A) which are coplanar with the outer surfaces of the converging section elements 12,13; 12A, 13A).
4. A joint as claimed in claim 1, characterised in that those surfaces (14, 15; 14A, 15A) of the central element (4; 4A) which are opposite and parallel to the contact surfaces (5, 6; 5A, 6A) meet along a rounded corner (18; 18A).
5. A joint as claimed in claim 1, characterised in that the male portions (7, 8; 7A, 8A) are of parallelepiped shape.
6. A joint as claimed in claim 5, characterised in that the male portions (7, 8; 7A, 8A) are of rectangular cross-section.
7. A joint as claimed in claim 1, characterised in that one or more fixing means chosen from glue, pins, screws, welding, rivets and forced insertion are interposed between the male portions (7, 8; 7A, 8A) and the linear elements (12, 13; 12A, 13A).
8. A joint as claimed in claim 1, characterised by comprising a thermally insulating element (22) positioned parallel to the plane of symmetry of the joint (1A) to interrupt the thermal bridge.
9. A joint as claimed in claim 8, characterised in that the element (22) for interrupting the thermal bridge is positioned coplanar with the plane of symmetry of the joint (1A).
10. A window frame, characterised by comprising at least one joint (1; 1A) formed as claimed in one or more of the preceding claims.

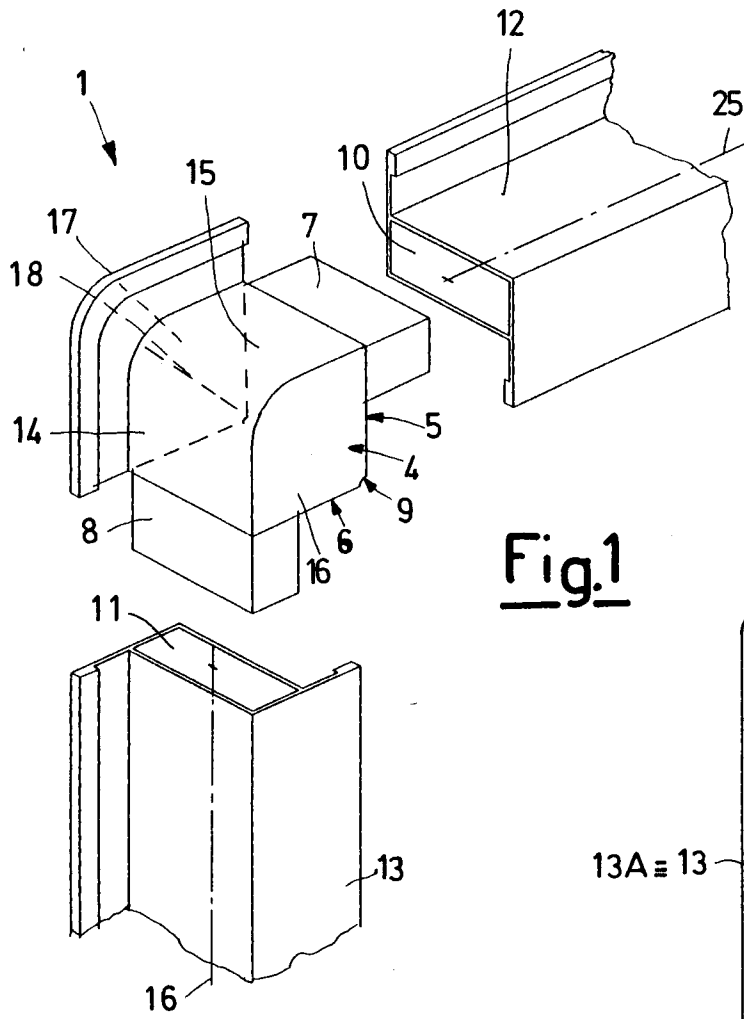


Fig.1

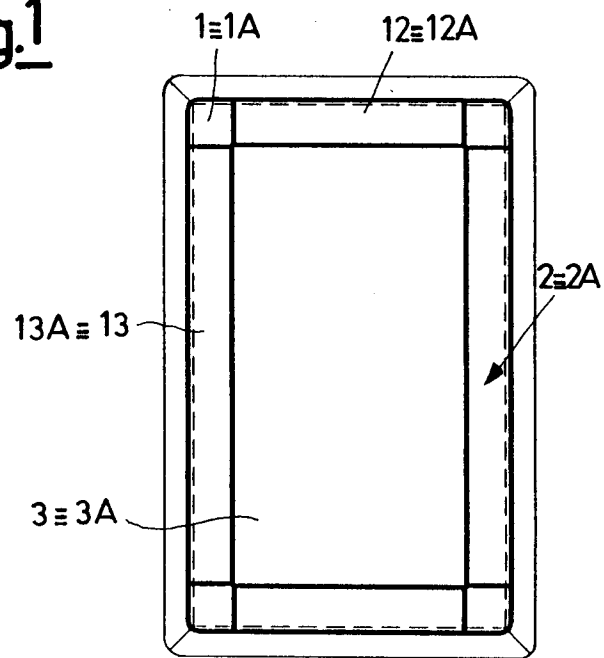


Fig.2

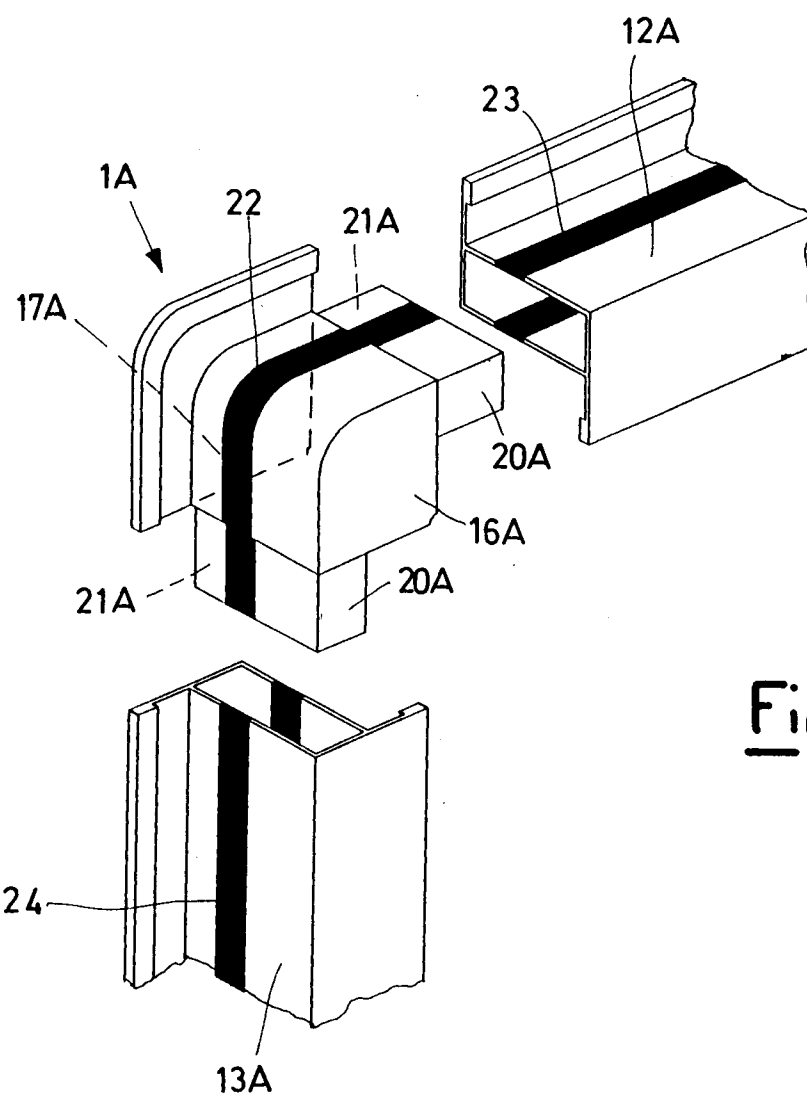


Fig.3



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EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 93200370.0
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 5)
X	<u>DE - A - 3 401 106</u> (NAAMLOZE VENNOOTSCHAP HÖRMANN - BELGIE) * Totality * --	1-7, 10	E 06 B 3/964
X	<u>GB - A - 1 585 718</u> (MOLYNEUX) * Totality * --	1-3, 5 7, 10	
X	<u>GB - A - 2 161 193</u> (ASPEC LIMITED) * Totality * --	1-3, 5 7, 10	
X	<u>FR - A - 2 550 577</u> (CARL FREUDENBERG) * Totality * --	1-3, 5 7, 10	
X	<u>DE - A - 2 213 816</u> (GEMÜNDEN) * Totality * --	1-3, 5 7, 10	
X	<u>DE - A - 3 738 358</u> (NEHER) * Totality * -----	1-3, 5 7, 10	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 5)
			E 06 B 3/00
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 21-04-1993	Examiner KRUMPSCHMID
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	