

(12) UK Patent Application (19) GB (11) 2 274 866 (13) A

(43) Date of A Publication 10.08.1994

(21) Application No 9302193.9

(22) Date of Filing 04.02.1993

(71) Applicant(s)

BKL Extrusions Limited

(Incorporated in the United Kingdom)

**Kings Norton Business Centre, Kings Norton,
BIRMINGHAM, B30 3HF, United Kingdom**

(72) Inventor(s)

John Thomas Rogers

(74) Agent and/or Address for Service

**Forrester Ketley & Co
Chamberlain House, Paradise Place, BIRMINGHAM,
B3 3HP, United Kingdom**

(51) INT CL⁵

E06B 3/96

(52) UK CL (Edition M)

E1J JGA

(56) Documents Cited

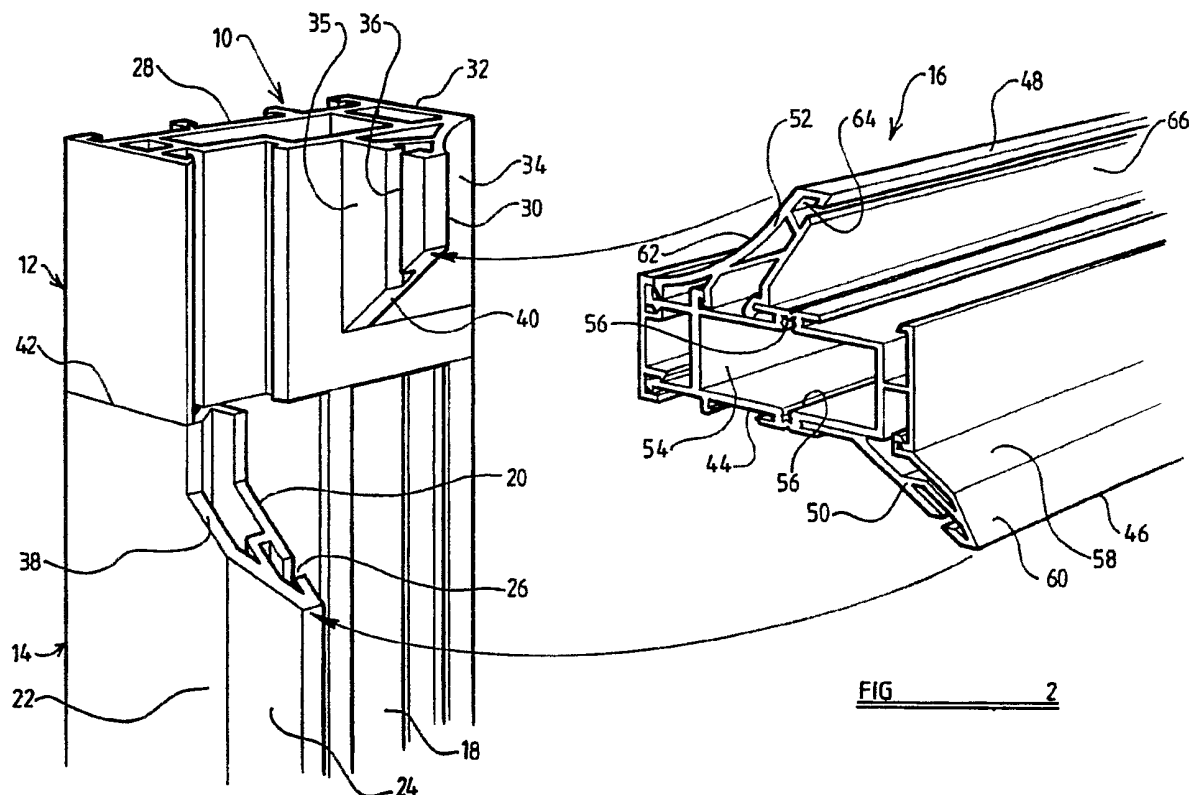
None

(58) Field of Search

UK CL (Edition M) **E1J JGA JM**
INT CL⁵ **E06B 3/96**

(54) Window or door frame structure

(57) A window or door frame structure comprises a cross member (16) connected between opposed frame elements (10). Each element (10) comprises two parts (12 and 14) joined together end-to-end to provide respective flanges (30 and 20) disposed in parallel and axially offset relationship with one another. A respective end of the cross member (16) is connected such as by screws to each frame element (10) between the axially offset flanges (20 and 30).



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

GB 2 274 866 A

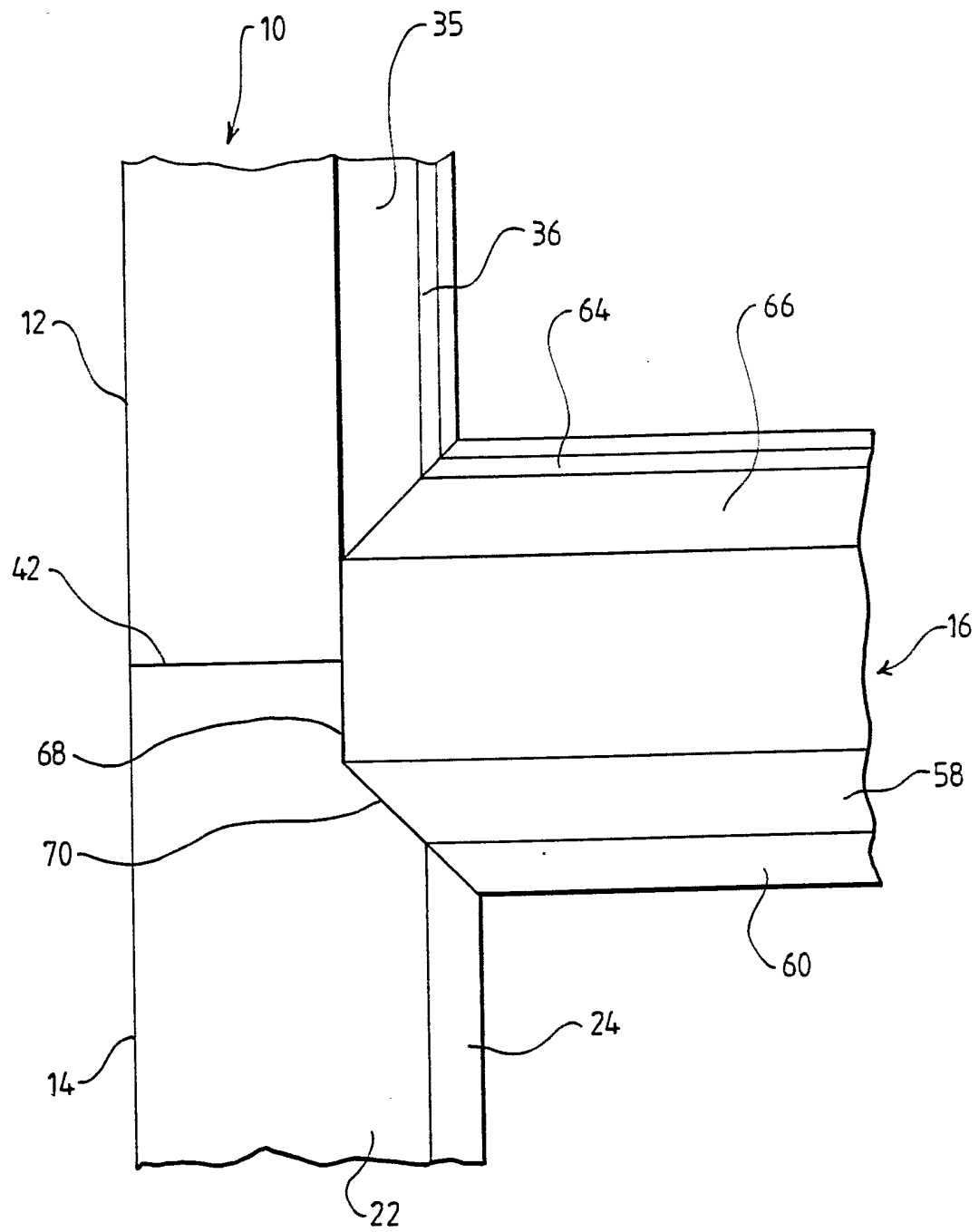


FIG 1

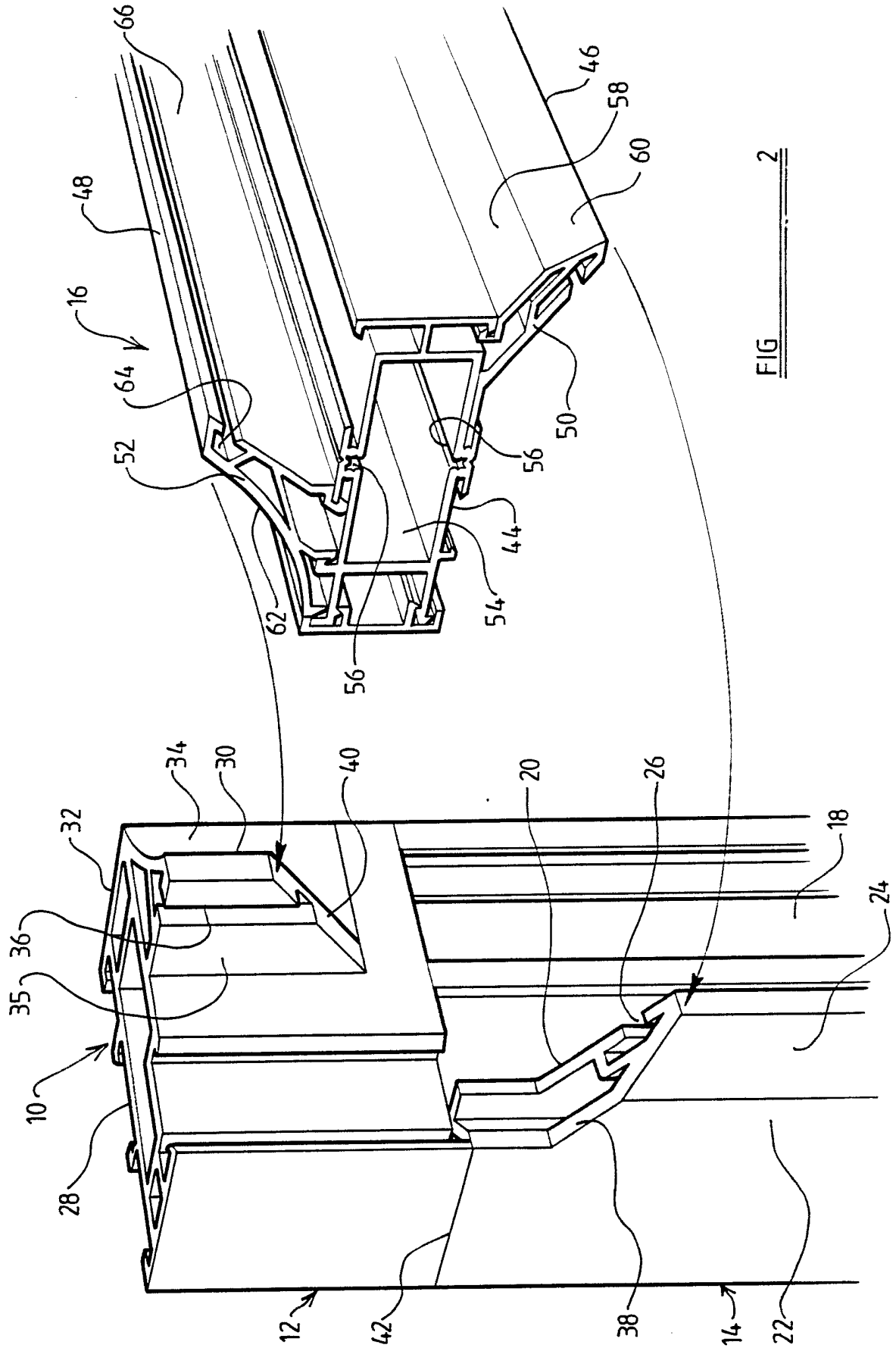


FIG 2

PATENTS ACT 1977

TITLE: Window or Door Frame Structure

This invention relates to a window or door frame structure comprising elongate frame elements connected together to form the frame and one or more cross members connected between opposed frame elements of the frame.

Window frames made of a plastics material, typically PVCu, are well known and typically comprise four frame elements arranged to provide a rectilinear structure with mitred corners. The corner joints may be welds produced by a known method comprising assembling a pair of adjacent frame elements with their ends which are to be joined in close proximity with one another, inserting a heated blade between said ends, pressing the elements towards one another to melt the plastics material at said ends where they contact the heated blade, removing the heated blade and further pressing the elements towards one another and retaining them under pressure to bond the adjoining ends together.

Each frame element of such a frame may be produced as a hollow box section extrusion which can be then provided with a metal insert secured within the box section to stiffen the element and hence the frame as a whole. Each such extruded element may typically also include a flange providing an abutment for one face of a glazing panel and means for receiving a glazing bead providing an abutment for the other face of the glazing panel. An elastomeric sealing gasket may typically be provided on the flange, the gasket being compressed to seal to the one face of the glazing panel when the panel is located in the frame and retained in place by the glazing bead.

It has been the practice to install such frames in buildings with the said abutment flanges on the interior side of the frame i.e. on the inside of the building and the glazing beads on the exterior. This arrangement is known to present a security problem in that, in the absence of any counter-measures, one or more of the glazing beads may be prized off the frame from the exterior of the

building whereby the glazing panel may then be removed from the frame. Various security measures have been proposed to overcome this problem but many of these measures have been too complex and hence unduly expensive to incorporate or have suffered from lack of reliability. Thus it has become a more recent requirement of the building industry that window frames should be installed with the said abutment flanges on the exterior of the frame i.e. on the outside of the building and the glazing beads on the interior. With such an arrangement there is nothing accessible for removal on the exterior of the building and thus security is enhanced.

Such an installation with its flanges on the exterior is extremely satisfactory for a fixed glazing installation but, where an outwardly opening window is to be provided, the adjacent flanges must be provided on the interior of the frame to permit the window to be opened and to provide abutment flanges against which the window may be closed.

Thus, in a typical multi-panel window frame structure, there could be a requirement for exterior flanges on one part of a frame element for fixed glazing panels and for interior flanges on an adjacent part of the same length of frame element to accommodate opening glazing panels. A mullion or transom would extend perpendicularly from the frame element at the transition from the interior to the exterior flange with the mullion or transom providing an exterior flange on one side thereof and an interior flange on the other side thereof. To accomplish such a structure in a window frame having plastics frame elements and plastics mullions or transoms it has been the practice, when assembling the frame, to cut a frame element perpendicular to its length, reverse one cut length relative to the other, and then weld the two lengths together again to provide a frame element wherein one part thereof will have a flange presentable exteriorly of the assembled frame and the other part thereof will have a flange presentable interiorly of the frame.

A V-cut is then made into the flanged surfaces of the frame element with one cut of the V being made in each of the two said parts and a mullion or

transom then being assembled into the V. The end of the mullion or transom is suitably cut to provide a profile to mate to the corresponding profiles of the frame element at the join between the two parts. The mullion or transom is then itself welded into the V-cut whereby, at the welded joint, there will be visible on both interior and exterior surfaces of the frame a generally Y-shaped weld line comprising the single weld line between the abutted ends of the two welded-together parts of the frame element and the two weld lines where the end of the mullion or transom is welded into the V-cut.

It is an object of the present invention to provide a new and improved window or door frame structure wherein a cross member is connected between opposed frame elements of the frame structure and wherein the cross member and the frame elements may each be formed of a plastics material or of a metal or may comprise a composite structure or a fabrication of plastics and metal.

In accordance with one aspect of the invention there is provided a window or door frame structure including a cross member connected between opposed elongate frame elements, each frame element comprising a base portion containing a base plane and an upstanding abutment flange containing an abutment plane normal to said base plane and each frame element comprising first and second elongate frame element parts joined together in end-to-end relationship with one another along a joint plane normal to said base plane, each said frame element part comprising a said base portion and a said abutment flange and the two said parts being joined together in such manner that the flange on the first said frame element part is disposed at one side of the frame element and the flange on the second said frame element part is disposed at the other side of the frame element in parallel and axially offset relationship with the flange on said first frame element part, the flange on each respective frame element part providing a flange end face adjacent said joint plane which is inclined to said base plane wherein an uninterrupted part of said base portion extends longitudinally of the frame element across said joint plane between the adjacent said end faces of the flanges; the cross member having elongate parallel spaced apart abutment

flanges thereon, an end of the crossmember and inclined end faces of the flanges of the crossmember being complementarily engageable respectively with said uninterrupted part of the base portion of a frame element and with said end faces of said abutment flanges of said frame element, said cross member being secured to said frame element at the joint between said frame element parts thereof by bonding or by mechanical fastening means.

Conveniently the mechanical fastening means comprises threaded members extending through the said uninterrupted part of the base portion of the frame element into engagement with the cross member.

The cross member may include a metal or a plastics material provided with screw-receiving means extending longitudinally thereof within which said threaded members are engageable. Preferably that part of the cross member providing said screw receiving means comprises a metal member, for example an extrusion, wherein a plurality of screw-receiving flutes or channels extend longitudinally of said member and are disposable normal to the base plane of the frame element to receive screws extending through said uninterrupted part of the base portion of the frame element normal to said base plane.

The cross member may comprise an elongate metal or plastics core section within which the screw receiving means is provided, and elongate flange elements of a different material secured to said core section.

The said frame element parts of the frame element may each be of a plastics material or of a metal or of a composite structure or fabrication of metal and a plastics material. Where the said frame element parts are provided of a plastics material they may be joined together in end-to-end relationship by welding or by an adhesive. Where the said frame element parts are provided of a metal they may be joined together by mechanical fastening means.

Each of the frame element parts of a frame element may be of identical cross-sectional profile or they may be of differing cross-sectional profiles.

Other features of the invention will become apparent from the following description given herein solely by way of example with reference to the accompanying drawings wherein:-

Figure 1 is a front view of part of an assembled vertically disposed frame element and horizontally disposed cross member (or transom) providing frame structure in accordance with the invention, the view being taken in a direction from what would be, in use, the exterior of a building in which the frame structure is installed, that part of the frame structure above the transom being adapted to receive an outwardly opening transom window and that part of the frame structure below the transom being adapted to receive a fixed glazing panel glazed thereto from the interior of the building; and

Figure 2 is a perspective view of those parts of the frame element and transom shown in Figure 1 showing two frame element parts of the frame element joined together in end-to-end relationship to receive the end of the transom to be secured to the frame element at the join between the frame element parts thereof.

In Figure 1 of the drawings there is shown a vertically disposed frame element 10 comprising two frame element parts 12 and 14 joined together in end-to-end relationship, and a horizontally disposed transom 16 connected at its end to the frame element at the join between said frame element parts. It will be appreciated that the construction illustrated in Figure 1 comprises part of a frame structure in accordance with the invention wherein, in a typical window frame arrangement, two vertical frame elements and two horizontal frame elements will be assembled to form a rectilinear frame structure with a horizontal transom extending between opposed vertical frame elements. The view shown in Figure 1 is taken from what, in use, would be the exterior of a building in which such a frame structure is installed whereby that part of the structure below the transom 16 is adapted to receive a fixed glazing panel (not illustrated) glazed to the structure from the interior of the building and that part of the structure above the

transom is adapted to receive an outwardly opening pivotal transom window (not illustrated).

Referring to Figure 2 of the drawings it will be seen that the frame element 10 comprises the two frame element parts 12 and 14 as each having a differing cross-sectional profile from the other. That frame element part 14 which is to be disposed below the transom 10 to provide a frame structure for an internally glazed fixed glazing panel comprises a box section base portion 18 containing a base plane and an upstanding abutment flange 20 containing an abutment plane disposed normal to the base plane. As illustrated in Figure 2, said lower frame element part 14 comprises an extruded member which may be of metal or plastics or a composite structure or fabrication of metal and plastics materials wherein the flange 20 is extruded integral with the base portion 18. The, in use, exterior face of the flange 20 comprises a planar face 22 disposed normal to the base plane of the base portion 18, and a tapered or bevelled face 24 inclined inwardly of the face 22. The inwardly directed side of the face 24 is provided with an elongate T-shaped groove 26 for receiving an elastomeric sealing strip (not illustrated) to abut against a fixed glazing panel glazed to the frame structure from the interior of the building.

The upper frame element part 12 shown in Figure 2 comprises a box section base portion 28 containing a base plane and an upstanding abutment flange 30 which is of a different cross sectional profile to that of the flange 20 of the lower frame element part 14. Said upper frame element part 12 is conveniently formed as an extrusion of a plastics or metal material or a composite structure or fabrication of metal and plastics materials including a planar internal face 32 from which extends an arcuate face 34 of the flange 30. The, in use, outer face 35 of the flange 30 includes a longitudinally extending T-shaped groove 36 for receiving a sealing strip of elastomeric material against which part of the frame of an outwardly opening transom window may abut.

The two frame element parts 12 and 14 of the frame element illustrated are joined together in end-to-end relationship with the flange 20 and

30 on each respective frame element part 14 and 12 providing a respective flange end face 38 and 40. Each face 38 and 40 is inclined to the base plane of the base portions 18 and 28 at an equal angle, typically around 45° . When the frame element parts are joined together as illustrated, the flanges 20 and 30 are dispersed in parallel and axially offset relationship with one another whereby a transversely uninterrupted part of the base portion of the frame element 10 extends longitudinally thereof across the joint 42 between the adjacent end faces of the parts 12 and 14. The joint 42 lies in a plane normal to the base plane and normal to the abutment planes whereby, as will be clearly seen from Figures 1 and 2, a joint line is visible from the, in use, exterior side of the frame element 10 which is horizontally disposed in the example illustrated i.e. the joint line 42 is normal to the base plane of the frame element 10. Although not illustrated, it should be appreciated that the joint 42 may be in a plane which is normal to the base plane but inclined to the abutment planes whereby the joint line which is visible from the, in use, exterior side of the frame element 10 which is horizontally disposed in the example illustrated will still be normal to the base plane of the frame element 10.

The two frame element parts 12 and 14 may be joined in their end-to-end relationship by welding, by an adhesive or by a mechanical fastening.

As mentioned above, each of the frame element parts 12 and 14 may be formed as a plastics or metal extrusion or as a composite structure or fabrication of metal and plastics material in which case, to provide the axial offset between the flanges and said uninterrupted part of the base portions, the inclined end faces 38 and 40 of the flanges are machined after extrusion. In the embodiment described and illustrated herein each frame element part 12 and 14 is of a differing cross-sectional profile but it should be appreciated that each of the frame element parts may be of identical cross-sectional profile and may for example be cut from a single length of the same extrusion. Alternatively one or each of the frame element parts may comprise a metal and plastics fabrication.

The transom 16 is provided with an end 44 engageable with the uninterrupted part of the base portions of the frame element across the joint line 42 between the frame element parts thereof. The transom includes flanges 46 and 48 each of which has an inclined end face 50 and 52 respectively which is complementary to the respective end face 38 and 40 of the frame element part against which it abuts when the transom is connected to the frame element.

In the embodiment illustrated, the transom includes a metal box section extruded core 54 and the two flanges 46 and 48 formed as plastics extrusions. The core 54 has interior opposed screw-receiving flutes 56 whereby the transom 16 may be connected to the frame element 10 by screws (not shown) extending through a respective frame element part 12 and 14 into the flutes 56. The box section core 54 of the transom includes additional flanges and grooves defining receiving means for co-operating parts of each flange 46 and 48 whereby each flange may be rigidly clipped to the core 54. That flange 46 of the transom which, in use, will be the exterior flange is of complementary appearance to the flange 20 of the frame element part 14 below the transom and comprises a planar face 58 and an inclined tapered or bevelled face 60 to provide, as will be clearly seen from Figure 1, continuous external faces 22 - 58 and 24 - 60 to the structure when the transom is connected between opposed frame elements. Said flange 48 of the transom includes a T-shaped groove 62 for receiving a sealing strip whereby the lower fixed glazing panel may be abutted against said sealing strips in the respective flanges 20 and 48 of the frame element and the transom and secured in position by a glazing bead clipped onto other parts of the respective frame element and transom from the interior of the building.

On the opposite side of the core 54 there is provided the other flange 48 of a shape complementary to that of the flange 30 of the frame element part 12 and having an arcuate outer face 62 of the same profile as that of the face 34 of the flange 30. A T-shaped groove 64 for receiving a sealing strip is provided on an inner planar face 66 of the flange 48. As will be seen from Figure 1, said face 66 of the flange 48 of the transom together with the, in use, outwardly facing

face 35 of the flange 30 of the frame element 12 define part of a planar abutment frame against which a frame of an outwardly opening transom window may be sealed.

It will be appreciated that, in use, the transom window frame will overlies the flange faces 35 and 66 which are visible in Figure 1 whereby the only joint lines between the frame element parts and the transom which will be visible from the exterior of the building will comprise the horizontal joint line 42 where the frame element parts 12 and 14 are joined together, a vertical joint line 68 where the transom end 44 is connected to the frame element parts 12 and 14 (which vertical line 68 will be in general alignment with a vertical edge of the transom window frame) and a 45° inclined joint line 70 comprising the mitre line between the flange end faces 38 and 50 respectively of the flanges 20 and 46.

It will be appreciated that the transom need not be formed as a fabrication of metal and plastics materials but may comprise an all metal or an all plastics material or a composite structure or fabrication of metal and plastics material. If the transom comprises an all plastics material it may be necessary to provide it with an internal reinforcement of metal or plastics material at least at that position where it is connected to the frame element so as to provide secure keying for a mechanical connection of the transom to the frame element.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS

1. A window or door frame structure including a cross member connected between opposed elongate frame elements, each frame element comprising a base portion containing a base plane and an upstanding abutment flange containing an abutment plane normal to said base plane and each frame element comprising first and second elongate frame element parts joined together in end-to-end relationship with one another along a joint plane normal to said base plane, each said frame element part comprising a said base portion and a said abutment flange and the two said parts being joined together in such manner that the flange on the first said frame element part is disposed at one side of the frame element and the flange on the second said frame element part is disposed at the other side of the frame element in parallel and axially offset relationship with the flange on said first frame element part, the flange on each respective frame element part providing a flange end face adjacent said joint plane which is inclined to said base plane wherein an uninterrupted part of said base portion extends longitudinally of the frame element across said joint plane between the adjacent said end faces of the flanges; the cross member having elongate parallel spaced apart abutment flanges thereon, an end of the cross member and inclined end faces of the flanges of the cross member being complementarily engageable respectively with said uninterrupted part of the base portion of a frame element and with said end faces of said abutment flanges of said frame element, said cross member being secured to said frame element at the joint between said frame element parts thereof by bonding or by mechanical fastening means.

2. A structure as claimed in claim 1 wherein said mechanical fastening means comprises threaded members extending through the said uninterrupted part of the base portion of the frame element into engagement with the cross member.

3. A structure as claimed in claim 2 wherein said cross member comprises a metal or a plastics member provided with screw-receiving means extending longitudinally thereof within which said threaded members are engageable.

4. A structure as claimed in claim 3 wherein a part of said cross member providing said screw-receiving means comprises a plurality of screw-receiving flutes or channels extending longitudinally of said member and being disposable normal to the base plane of the frame element to receive screws extending through said uninterrupted part of the base portion of the frame element normal to said base plane.

5. A structure as claimed in either one of claims 3 or 4 wherein said cross member comprises an elongate metal or plastics core section within which said screw-receiving means is provided, and elongate flange elements of a different material secured to said core section.

6. A structure as claimed in any one of the preceding claims wherein the said frame element parts of the frame element are each formed of a plastics material.

7. A structure as claimed in any one of claims 1 to 5 wherein the said frame element parts of the frame element are each formed of a metal.

8. A structure as claimed in any one of claims 1 to 5 wherein the said frame element parts of the frame element are each formed as a fabrication of metal and plastics materials.

9. A structure as claimed in claim 6 wherein the said frame element parts are joined together in end-to-end relationship by welding or by an adhesive.

10. A structure as claimed in claim 7 wherein the said frame element parts are joined together in end-to-end relationship by mechanical fastening means.

11. A structure as claimed in any one of the preceding claims wherein each of the frame element parts of the frame element are of identical cross-sectional profile.

12. A structure as claimed in any one of claims 1 to 10 wherein each of the frame element parts of the frame element are of differing cross-sectional profiles.

13. A window or door frame structure constructed and arranged substantially as hereinbefore described with reference to the drawings.

14. Any novel feature or novel combination of features described herein and/or in the accompanying drawings.

Relevant Technical Fields

- (i) UK Cl (Ed.M) E1J (JGA, JM)
(ii) Int Cl (Ed.5) E06B 3/96

Search Examiner
J E FULCHER

Date of completion of Search
24 FEBRUARY 1994

Databases (see below)

- (i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-
1-13

(ii)

Categories of documents

- X:** Document indicating lack of novelty or of inventive step. **P:** Document published on or after the declared priority date but before the filing date of the present application.
- Y:** Document indicating lack of inventive step if combined with one or more other documents of the same category. **E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A:** Document indicating technological background and/or state of the art. **&:** Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

Databases:The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).