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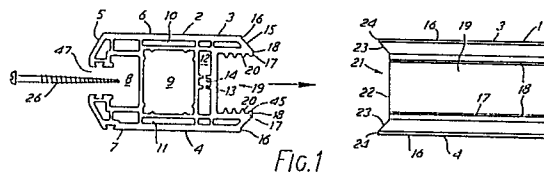
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54 Demountable corner joint for a panel frame and kit of parts for making same.

57 A demountable corner joint for a panel frame made from a synthetic plastics material comprising two frame elements (1, 2) of substantially the same cross section connected together at an acute angle, the inner side edges (15) of each frame element being adapted to locate and retain the edges of a panel and each side of the element having an abutment surface (16) set back and outwardly from the part of the frame element which engages the panel to provide an upstanding portion (17) between the spaced apart abutment surfaces (16), and in which an end portion (21) of one element (1) is shaped to closely engage the shaped inner side edge (15) of the other (2) with parts (24) of said end portion (21) engaging the said abutment surfaces (16), and removable retaining means (26) extending from one element (2) into the other (1) to hold the elements together.



Description**DEMOUNTABLE CORNER JOINT FOR A PANEL FRAME AND KIT OF PARTS FOR MAKING SAME**

This invention relates to a demountable corner joint for a panel frame and a kit of parts for assembling such a frame.

The term "panel" used herein is intended to include not only opaque panels made, for example, from wood or metal, but also glass panels, for example, double glazed glass panels located by window and door frames.

It is known to make aluminium frames which are wrapped around the panel. This is usually achieved by securing the ends of each side frame element by some form of removable attachment, for example, a bolt. It is not necessary to provide a glazing bead with such a construction as the frame can be taken apart to replace the panel if it is damaged.

Up to the present time it has not been possible to construct this type of wrap-around frame from a synthetic plastics material due to the inherent flexibility of such material, and the usual way of making such frames is to weld the frame profiles together at the corners, for example, by a mitre joint. This causes difficulties however because the frame cannot be taken apart and it is therefore necessary to provide a glazing bead which immediately produces difficulties with regard to security. It also adds to the cost of the product.

Moreover, it is often necessary to provide frame profiles of different cross-section. This occurs in patio doors where the upright frame elements are usually of greater cross-section than the upper and lower elements although and the lower element may be of a different profile to enable rollers to be carried. With frame elements of different cross-section it is of course difficult to mate them at the joints.

The difficulties of securing profiles of different cross-section together can be overcome however by producing a frame profile which would be suitable for all sides of the panel if there was some way of securing the sides together at the corners so that they could be demounted to allow pane replacement. In the past this has not proved possible because of the difficulties of providing rigid corner joints.

The present invention is intended to overcome some of the difficulties referred to above and to provide a demountable corner joint for a panel frame which will be rigid and which can be taken apart to allow replacement of the panel, at the same time to enable the frame elements to be made from a synthetic plastics material.

According to the present invention a demountable corner joint for a panel frame made from synthetic plastics material comprises two frame elements of substantially the same cross-section connected together at an acute angle, the inner side edge of each frame element being adapted to locate and retain the edges of a panel and each side of the element having an abutment surface set back and outwardly from the part of the frame element which engages the panel to provide an upstanding portion between the spaced apart abutment surfaces, and in

which an end portion of one element is shaped to closely engage the shaped inner side edge of the other with parts of said end portion engaging the same abutment surfaces, and removable retaining means extending from one element into the other to hold the two elements together.

Thus the retaining element can be in the form of a simple screw, the action of which holds the two parts together and the engaging end portions of one frame element bearing against the abutment surfaces of the other to provide a substantially rigid joint which can be taken apart.

Preferably the inner side edge of each frame element is formed with chamfered corners to provide the upstanding portion, and the outer edge of each chamfer is rebated to provide continuous substantially parallel abutment surfaces on both sides of the element.

A substantially flat portion substantially normal to the plane of the panel can also be provided on each side of the edge adjacent the panel to provide further location.

In one preferred construction the end portion of one element is integral with the element but in another preferred arrangement the end portion of one element can be provided as an extension, one end of which is adapted for connection to one end of an element and the other end of which is shaped to engage the shaped side and abutment surfaces of the other element.

With the constructions set forth above one of the frame elements, which extends across the end of the other has a bare end and if the outer edge of the other element is profiled, for example to carry some other fitting, then the bare end, the edge of which is aligned with the outer side referred to, has to be shaped accordingly, usually by machining. The problem particularly arises in door and window frames, for example, if a door frame for a sliding door is provided with channels in its lower side edge, for example to take sealing strips or rollers, then the bare end has to be shaped accordingly. Thus the lower end of the upright frame member may be substantially straight and not of the same lower cross-section as the lower edge of the other frame element. In certain circumstances this does not matter but if it is desired to provide, for example, sealing means in a groove this will have to be machined into the lower end of the upright frame element.

In order to meet the above requirements an end fitting can be provided having a first side adapted to engage the exposed end of one frame element at a corner of the frame and a first end adapted to engage the end of the other adjacent frame element or extension provided thereon, the second side and second end of said fitting being dimensions to align themselves with the edges of the frame elements.

If desired the cross-sections of the second side and second end of the end fitting can be substantially the same as the corresponding cross-sections

of the frame elements with which they are to be aligned, alternatively the cross-sections may be slightly different if, for example, some fitting is required at the end corner of the frame.

In one preferred embodiment the first end of the end fitting is provided as the same frame element extension one end of which is adapted for connection to one end of a frame element and the other end of which is shaped to engage the shaped side and abutment surfaces of the other element, thus disposing of the separate extension referred to above.

As mentioned above the retaining means can be provided by a bolt or screw which passes through one element and into the shaped end of the other.

Preferably the parts of the frame elements adapted to locate and retain the edges of the panel are integral or permanently secured to the same frame element and if desired these parts can be in the form of panel retainers between which is a panel receiving groove the inner side edges of which are provided with sealing lips which can be co-extruded integral with the frame but from a softer material.

The outer side edges of the frame elements can be adapted to receive ancillary fittings, for example, to allow them to receive rollers or other fittings associated with windows and doors.

The invention also includes an assembly comprising a frame and panel made with corner joints as set forth above.

Also included in the invention is a frame element for use in a frame having corner joints as set forth and having an inside edge adapted to locate and retain the edges of a panel, each side of the element having an abutment surface set back and outwardly from the part which engages the panel to provide an upstanding portion between the spaced apart abutment surfaces.

If the end of one of the frame elements has to be shaped to fit then a kit of parts can be provided to enable the frames to be assembled and according to another aspect of the invention therefore a kit of parts for assembling a panel frame made from a synthetic plastics material with demountable corner joints as set forth above comprises one or more lengths of frame element, the inner side of each length being adapted to locate and retain the edges of a panel and having an abutment surface set back and outwardly from the part of the frame element which engages the panel to provide an upstanding portion between the spaced apart abutment surfaces, a mullion router or cutter shaped to produce the cross-section of the shape of the frame element including the abutment surfaces adjacent the panel to enable the end of the frame element to be shaped to closely engage the shaped inner side of a portion cut from the length of the frame element, or another length thereof, and removable retaining means which can extend from one element into the other to hold the elements together, for example a screw.

The invention can be performed in many ways and some embodiments will now be described by way of example and with reference to the accompanying drawings in which :

Figure 1 is an exploded plan view showing

how the frame elements can be joined together;

Figure 2 is an exploded plan view of an alternative construction;

Figure 3 is a diagrammatic view showing the assembly of the parts as shown in Figure 2;

Figure 4 is a part cross-sectional plan view of a patio door construction incorporating the invention;

Figure 5 is a cross-sectional side elevation on the line V-V of Figure 4;

Figure 6 is an end view in the direction of the arrow 1 shown in Figure 7 of an end fitting;

Figure 7 is a side elevation of the fitting shown in Figure 6;

Figure 8 is an end elevation in the direction of the arrow 3 shown in Figure 7;

Figure 9 is a plan view of the fitting shown in Figure 7;

Figure 10 is a cross-sectional part plan view on the lines VII-VII shown in Figure 7;

Figure 11 is a cross-sectional end view on the lines VI-VI shown in Figure 7;

Figure 12 is a perspective view of the end fitting;

Figure 13 is an exploded view showing how the end fitting is used to construct a corner;

Figure 14 is an exploded view showing the construction of a door utilising end fittings; and,

Figure 15 is an exploded view showing how the invention can be applied to a panel frame which has intermediate cross rails.

The demountable corner joint shown in Figure 1 is for a panel frame, for example a patio door window, and the panel is intended to be a double glazed glass panel.

The corner joint is made up from two lengths of frame element formed from a synthetic plastics material, for example polyvinylchloride. In the arrangement shown in Figure 1 the frame element, indicated by reference numeral 1, is a horizontally extending lower frame member and the element indicated by reference numeral 2 is a vertically extending member. As the frame elements are identical they can be cut from suitable lengths of identical material.

As will be seen from the end view of element 2 the synthetic plastics material profile has external sides 3 and 4 which are substantially parallel and flat and the outer side edge 5 is formed on the ends of rails 6 and 7 which between them provide a longitudinally extending channel 8. The interior portion of the profile has a longitudinally extending bore 9 and side bores 10 and 11 are provided adjacent the respective sides 2 and 4. A third central bore 12 is formed with upstanding ridges 13 to provide a screw port 14.

The inner side edge indicated by reference numeral 15 of the profile is provided with a pair of continuous abutment surfaces 16 set back and outwardly from the part of the frame element which closely engages the window panel to provide an upstanding portion 17. This is produced by chamfering the corners on the inner side edge 15 and the spaced apart abutment surfaces are formed by rebatting the lower part of each chamfer. The

terminal end of each of the upstanding portions has a flat surface 18 which are each side of the edge adjacent the glass panel and a panel receiving groove 19 is provided between them. Thus the two end portions of the side walls 3 and 4 act as panel retainers on each side of the receiving groove 19. The inner side edges of the groove are provided with sealing lips 20 which are co-extruded integral with the profile but from a softer plastics material. The technique of moulding two plastics material together is known. The lips 20 act to closely seal the double glazed panel into position.

As shown in Figure 1, when a corner joint is to be made the abutting end of the joining frame element which, in this case is the horizontal element 1, is cut by a suitable mullion router or cutter to provide the shape shown. It will be seen that this shape is in the form of a channel 21, the lower surface of which is substantially flat, the edges of which are chamfered at 23, and each outer rim 24 of which is substantially flat and parallel with the base 22. The cutter is designed so that the groove 22 is an exact and close fit against the inner side edge 15 of the profile 2.

When the joint is to be made the double glazed glass panel (not shown in Figure 1) is placed in the panel receiving groove 19 of, for example, the profile 1, and the second profile, for example that indicated by reference numeral 2, is pushed into position over the other side edge of the glass, the groove 22 enabling the side edge 15 to be pushed closely into position with the rims 24 abutting the abutment surfaces 16. A single hole is now drilled through the vertical profile 2 using an appropriate indicator or jig to ensure that it is lined up with the screw port 14 in the profile 1. A screw, as indicated by reference numeral 26, is now driven through the hole and into the screw port to securely hold the parts together.

Due to the abutments 16 closely engaging the parallel side rims 24 and the flat portions 18 engaging the base of the groove 22 together with the chamfered portions of the inner side edge of the profile 2 a secure and closely fitting joint is achieved which cannot twist due to the upstanding portion 17 being located in the groove 22. The abutment surfaces 16 prevent any rocking movement.

The frame is made up around the double glazed glass panel in the manner set forth above but the corner joints can be demounted if the glass is broken or needs replacement.

It will be appreciated that in the construction described above no glazing beads are required and a rigid construction is achieved. Alternatively however in certain circumstances it might be desirable to form the panel holding portion from separate members which can be locked into position. This might produce a profile which is easier to manufacture, especially in large sizes, but the general construction can be substantially the same as that described above.

The assembly can be provided as a kit of parts consisting of one or more lengths of frame element of the kind described above together with a mullion router or cutter shaped to produce the necessary cross-section at the end of the cross piece of the frame and suitable screws could also be included. If

desired a simple jig or marker for drilling the hole to receive the screw in one of the frame elements could also be included. Thus, any competent workman could assemble the frame to any desired size of panel.

A patio door construction utilizing the demountable corner joint described above will be described hereafter with regard to Figures 4 and 5.

In the construction described with regard to Figure 1 the end of one of the members which is to be joined is integral with the frame element and this does of course require shaping of that end.

Figures 2 and 3 show an alternative construction in which end shaping of the profile is unnecessary, the end of the profile merely being cut off square.

As shown in Figures 2 and 3 the same reference numerals are used to indicate similar parts and the cross-section of the synthetic plastics material frame element profile is identical, in this arrangement however a frame element extension 30 is used to provide the shaped portion of the end of the element 1. This extension 30 is also made from a synthetic plastics material compatible with the frame elements 1 and 2 and comprises a platform portion 31 the sides of which have upstanding walls 32, 33. The platform portion 31 is provided with openings 34 and 35 which can be aligned with the groove 8 and bore 8 of the frame element. The platform portion also has a channel groove 36 which aligns with the groove 19. Projecting from the platform portion 31 are a number of tongues indicated by reference numeral 37 which are shaped to fit closely into the various bores 10 and 11 so that the extension can be pushed into the end of the element 1 with a close fitting engagement, the tongues 37 being sufficiently strong to rigidly hold the extension in place and prevent any relative movement between the parts. The inner sides of the walls 32 and 33 are reinforced by knees 38 and these have an inner shape which is identical with the shape of the chamfer 23 in the groove 22 of the shaped end of the frame element 1, as shown in Figure 1. The outer end surfaces of the walls 32 and 33, indicated by reference numeral 39, provide engagement surfaces similar to those provided by outer surfaces 24 of the shaped end, and the wall of the platform portion 31 is dimensioned so that it provides the equivalent of the flat base 22 of the groove 21. The platform portion 31 also has a screw hole opening 40 which will align with the screw port 14 when the extension is in position.

To construct this assembly therefore it is merely necessary to cut the end of the frame element 1 appropriately at right angles to its length, insert the extension 30, and again bolt the parts together in the manner described with regard to Figure 1.

Once again a kit of parts can be provided but in this case the router or cutter is not required, the kit containing instead a number of extensions 30. Thus once again any competent workman can easily assemble the frame or take it to pieces to replace the panel, the frame being rigid when assembled.

As will most clearly be seen from Figure 3 a metal or plastics material reinforcing channel or member can be introduced into the bore 9 to provide

additional reinforcement.

As the frame elements are identical in cross-section they are a common section which can be produced from a single tool and can be supplied in long lengths to be cut up as required to make a complete frame.

In the arrangement shown in Figures 1, 2 and 3 an additional lip 45 is provided on each of the retainers to assist in further locating the double glazed glass panel which is indicated by reference numeral 46 in Figure 3. The channel 8 can be used for various ancillary fittings and if desired a closure strip (not shown) can be included which can be pushed into place to seal the openings 47.

Figures 4 and 5 show a patio door frame assembly with a sliding door indicated by reference numeral 50 in Figure 4 having a double glazed glass panel 51. The panel is carried in upright frame elements 52, 53 and horizontally extending frame elements 54. The construction of these frame elements is similar to that shown in Figures 1, 2 and 3 but only one central channel 55 is incorporated and this carries a metal stiffener 56. A roller element 57 which is provided with suitable rollers 58 is fitted within the stiffener 56 in the lower frame element. As shown in Figure 5 the sliding door 50 is provided with the rollers 58 and can move from a closed position in which it is shown in Figure 4 to an open position towards the bottom of the drawing. The door is carried on a door sill track section 59 (see Figure 5) which is supported on a door sill 60. The door sill is suitably connected to upright door frame members 61 and an upper door frame head 62. All these members are of the same cross-section and carry protruding rails which receive covers where they are exposed. Thus as will be seen from Figure 4 there is a cover 63 on frame member 61 which the moving door will engage when it is fully opened. It will also be seen from Figure 4 that the outer side edge 5 of the upright frame element 53 is provided with a sealing strip 64 to close the open mouth of the channel 8.

A second door panel 65 (shown in light lines in Figure 5) of similar construction to the door 50 and for which the same reference numbers are used to indicate similar parts is also carried on the door sill track 59 but this door is not provided with rollers and rests in a fixed position on a rear track the two doors overlapping. With this second door the appropriate part of the upright door frame member 61 extends into the channel 8 of the appropriate upright frame element 53. Covers 66 and 67 are secured on the sill track section 59 and head 62 which act to not only cover the exposed track but also maintain the door against horizontal movement. As will be seen from Figure 4 a further cover 67 is also carried on the upright door member 61 to cover the track in the opening. A strip 64 is again provided over the open channel 8 of the upright frame element.

In the event of damage to the glass panels of such a patio door construction the doors themselves can be taken apart in order to replace the glass. Moreover, the precise dimensions of the patio doors can be as desired and the doors can be built on-site, the sizes of the doors being as desired.

In the construction shown in Figures 6 to 13 of the

drawings an end fitting is shown which is constructed so that it can not only replace the frame element extension 30 shown in Figures 2 and 3 but also provides means for closing and shaping the lower end of frame element 2 when assembled as shown in Figure 3.

Thus, the end fitting 101, which is made from high impact synthetic plastics material, has a first side 104 which is adapted to engage the exposed end of the frame element 2 as shown in Figure 3. The end fitting itself is of generally skeletal construction with side walls, the first side 104 consisting of the upper side edges 105 of side walls 106. The cross-section of the moulding provides a groove 108 in which roller fittings can be fitted and which has channels 109 to accept draft excluders. There is a further channel 110 to accept a further draft excluder. The side walls of the channel 108 are connected to the side walls 106 by stiffeners 111 and the upper corners of the stiffeners have projecting lugs 112 to assist in locating the fitting in the end of the frame member.

A first end of the fitting, indicated by reference numeral 115, is shaped to engage the end of the other adjacent frame element, that is frame element 1 as shown in Figure 3. This is also provided with projecting abutments 116 to assist in location. The general construction of this portion of the fitting is similar to that of the extension 30 and is formed as an extension 117 which projects at right angles to the first side 104. As this portion acts as an extension of the frame element 1 the first end surface 115 can be regarded as one end of the extension and the other end of the extension provided by surface 118 is shaped to engage the shaped surface of the side of the frame element 2. Thus it is provided with upstanding walls 119 and 120 which are reinforced by knees 121 which have an inner shape identical with the shape of the chamfer 23 in the groove 22 of the shaped end of the frame element 1 as shown in Figure 1. The walls are connected to a platform 122.

The second side of the fitting, indicated by reference numeral 123, is shaped so that it can be aligned with the outer side edge of the element 1 and is of the same general shape thus enabling roller tracks, seals and other fixings to be applied. It also acts to close the lower end of the frame element 2. Although, in the arrangement being described the cross-section is the same it could be different if it was desired to connect other fittings at the corner of a frame.

The second end 124 of the fitting is also shaped in a similar way so that it aligns with the outside edge of the frame element 2 and has a similar cross-section. As the cross-sections of the frame elements 1 and 2 are the same it will be appreciated that the cross-section of the second end 124 is identical with the cross-section of the second side 123, as is most clearly shown in Figure 9 of the drawings in which the same reference numerals are used to indicate similar parts as in Figure 11.

The end fitting thus provides an extension for the end of one frame element which is shaped to accommodate the inner side edge of the other element and it also provides an end cover for that

second element, the shape corresponding to the shape of the outer edge of the first element referred to and also providing a shaped corner. The open end of the second element is therefore closed and any particular configuration of the outer edges of the corner of the frame are continued.

In use therefore the ends of the frame elements 1 and 2 are merely cut off square, the end fitting located in place and held by the screw indicated by reference numeral 26. The frame element 2 which engages the side 104 of the end fitting will of course be cut slightly shorter to accommodate the thickness of the fitting itself.

Figure 13 shows how the end fitting is used. It will be seen that it closes off the lower end of frame element 2 and fits the lower frame element 1. An insert 150 is shown within the channel 8 of the element 2 to provide a stiffening and seals 151 are shown in position in the grooves 110.

Figure 14 shows the complete assembly for a sliding patio door and the simplicity of the construction. The ease with which one of the frame elements can be removed in order to replace the glass panel 46 will be obvious. In this Figure small mounting blocks 152 are indicated to provide additional support for the glass panel 46.

Figure 15 shows the construction of a door in which there are cross rails which are indicated by reference numerals 155 and 156. The construction of these rails is similar to the other frame elements but between the two rails 155 and 156 a solid panel 157 is used and which seats in the channels 8. Extensions 30 are used at the ends of the rails and an end fitting 101 at each corner of the main frame. Any of the panels 46 or 157 can be easily removed merely by taking off the upright side element 2.

In an alternative construction of end fitting, not shown, the extension 118 can be omitted and this particular construction is for use where the end of the frame element 1 has been shaped to engage the frame element 2 and an extension is not contemplated. With this arrangement therefore the end fitting provides a corner to the frame of the same cross-section and configuration as the rest of the outer edges of the frame or, if desired, the particular configuration of the fitting could be some other shape if this was particularly desired.

Claims

1. A demountable corner joint for a panel frame made from a synthetic plastics material comprising two frame elements of substantially the same cross section connected together at an acute angle, the inner side edges of each frame element being adapted to locate and retain the edges of a panel and each side of the element having an abutment surface set back and outwardly from the part of the frame element which engages the panel to provide an upstanding portion between the spaced apart abutment surfaces, and in which an end portion

of one element is shaped to closely engage the shaped inner side edge of the other with parts of said end portion engaging the said abutment surfaces, and removable retaining means extending from one element into the other to hold the elements together.

2. A demountable corner joint as claimed in claim 1 in which the inner side edge of each frame element is formed with chamfered corners to provide the upstanding portion, the outer edge of each chamfer being rebatted to provide continuous substantially parallel abutment surfaces on both sides of the element.

3. A demountable corner joint as claimed in claim 2 in which each frame element has substantially flat portions substantially normal to the plane of the panel provided on the inner side edge adjacent the panel.

4. A demountable corner joint as claimed in claims 1-3 in which said end portion of one element is integral with the element.

5. A demountable corner joint as claimed in claims 1-3 in which said end portion of one element is provided as an extension, one end of which is adapted for connection to one end of the abutting element and the other end of which is shaped to engage the shaped side edge and abutment surfaces of the other element.

6. A demountable corner joint as claimed in claims 1-4 including an end fitting having a first side adapted to engage the exposed end of one frame element at a corner of the frame and a first end which is adapted to engage the end of the other adjacent frame element an extrusion provided thereon, a second side and second end of said end fitting being dimensioned to align themselves with the edges of the frame elements.

7. A demountable corner joint as claimed in claim 6 in which the cross-sections of the second side and second end of the end fitting are substantially the same as the corresponding cross-sections of the frame elements with which they are aligned.

8. A demountable corner joint as claimed in claim 6 or claim 7 when dependent on claim 5 in which the first end of the end fitting is provided as the said frame element extension.

9. A demountable corner joint as claimed in any one of the preceding claims in which the revolvable retaining means is provided by a bolt or screw which passes through one element and into the end of the other.

10. A demountable corner joint as claimed in any one of the preceding claims in which the part of the frame elements adapted to locate and retain the edges of the panel are integral or permanently secured to the frame element.

11. A demountable corner joint as claimed in any one of the preceding claims in which the outer side edges of the frame elements are adapted to receive ancillary fittings.

12. An assembly comprising a frame and panel made with corner joints as set forth in any one of the preceding claims.

13. A frame element for use in a frame having corner joints as set forth in claim 1 having an inner side edge adapted to locate and retain the edges of a panel, each side of the element having an abutment surface set back and outwardly from the part which engages the panel to provide an upstanding portion between the spaced apart abutment surfaces.

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14. A kit of parts for assembling a panel frame made from a synthetic plastics material with demountable corner joints as set forth in claim 1 comprising one or more lengths of frame element, the inner side edge of each length being adapted to locate and retain the edges of a panel and having an abutment surface set back and outwardly from the part of the frame element which engages the panel to provide an upstanding portion between the spaced apart abutment surfaces, a mullion router or cutter shaped to reproduce the cross-section of the shape of the frame element including the abutment surfaces adjacent the panel to enable the end of the frame element to be shaped to closely engage the shaped inner side edge of a portion cut from the length of frame element, or another length thereof, and removable retaining means which can extend from one element into the other to hold the elements together.

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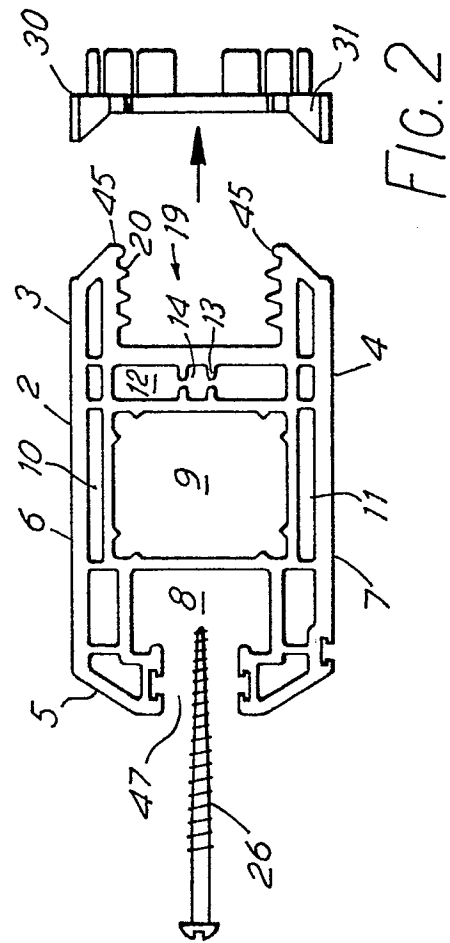
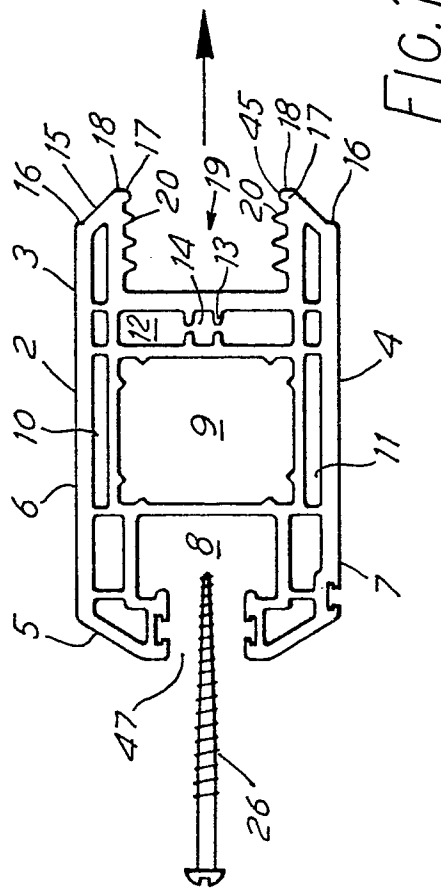
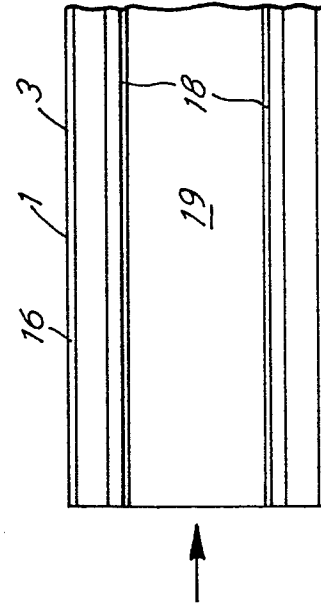
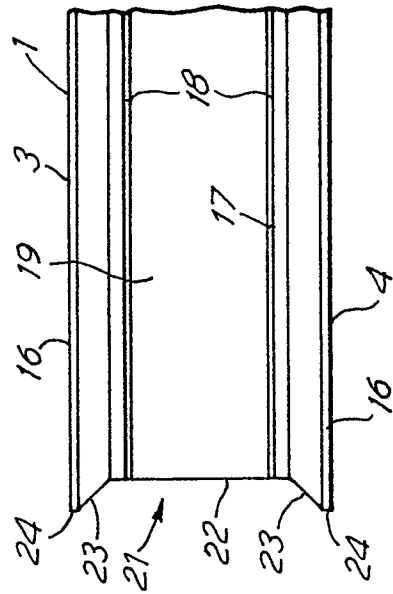
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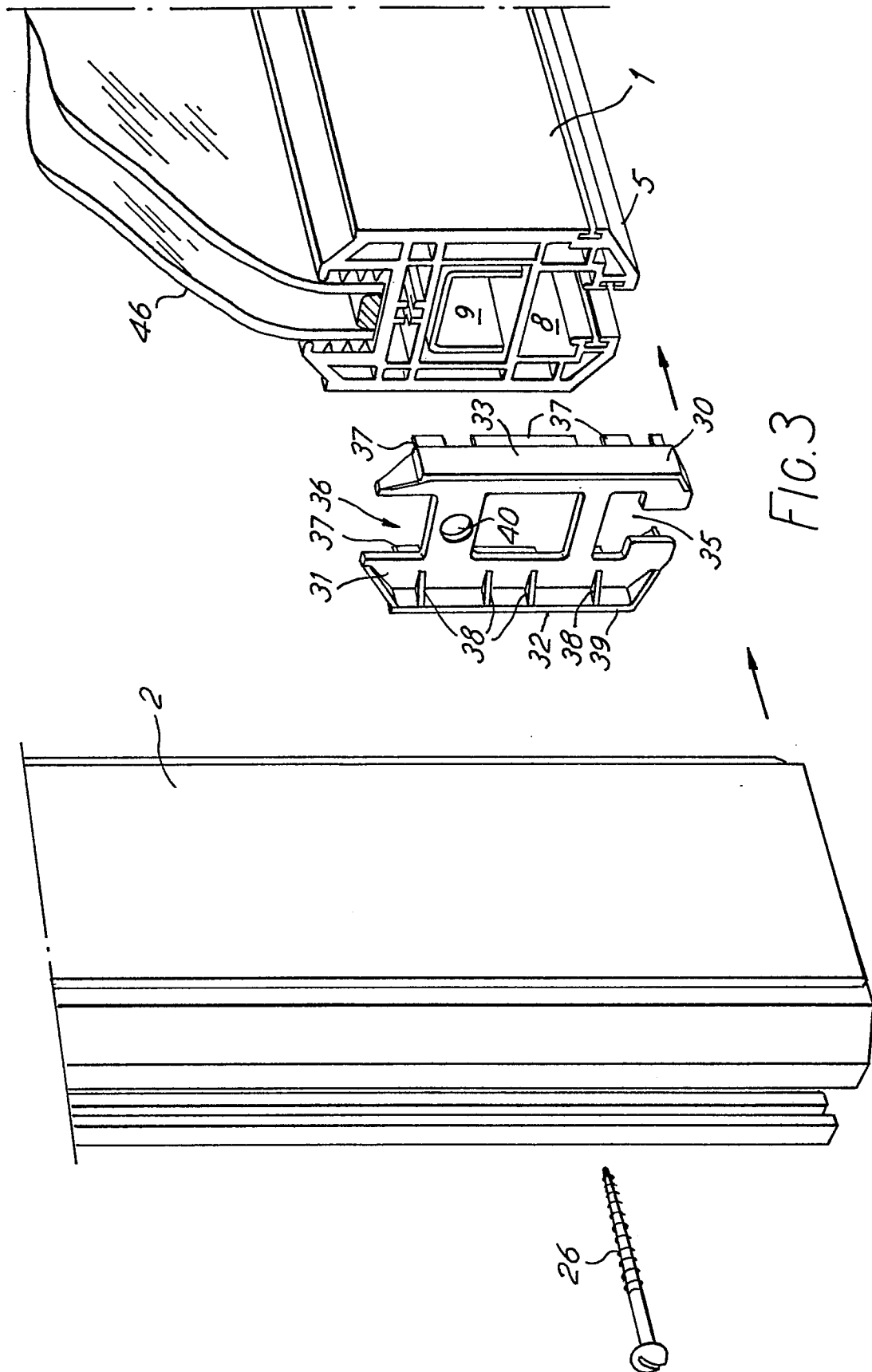
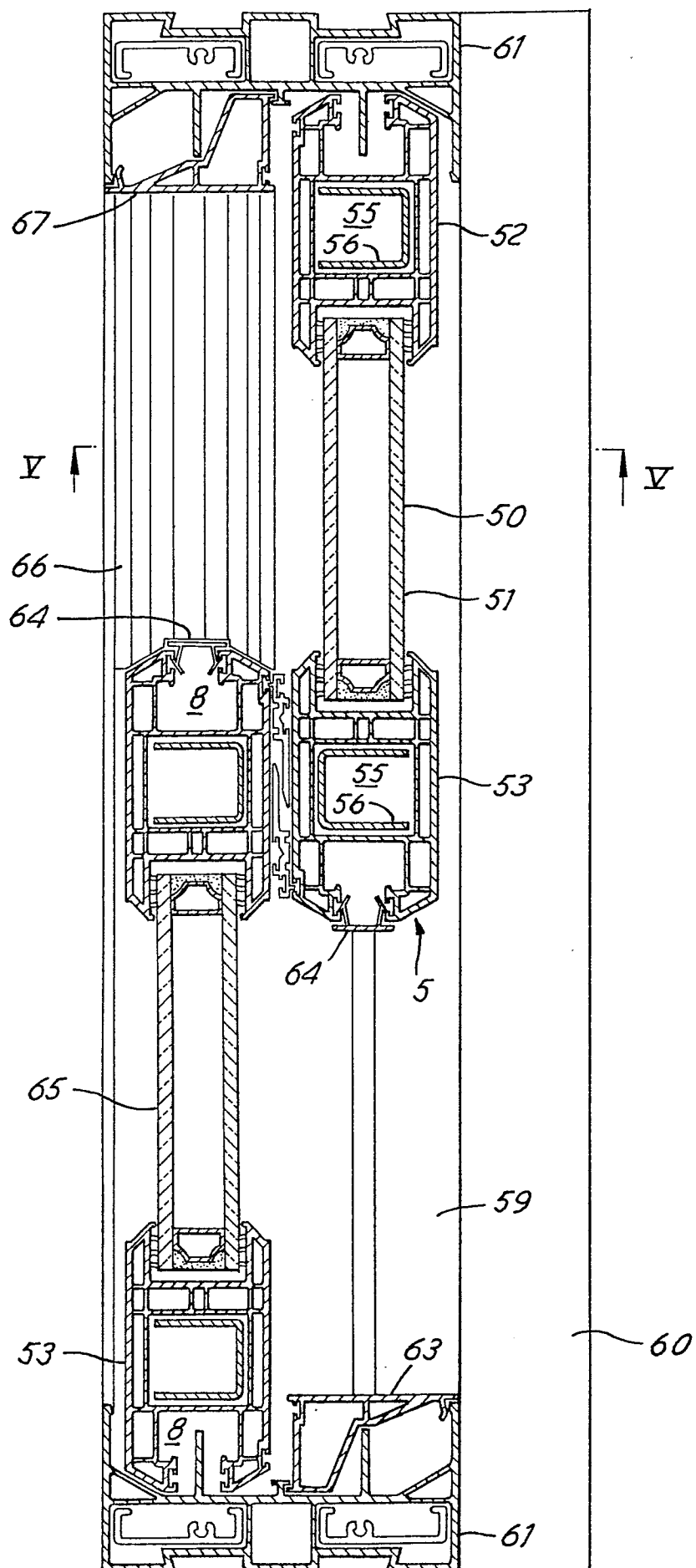
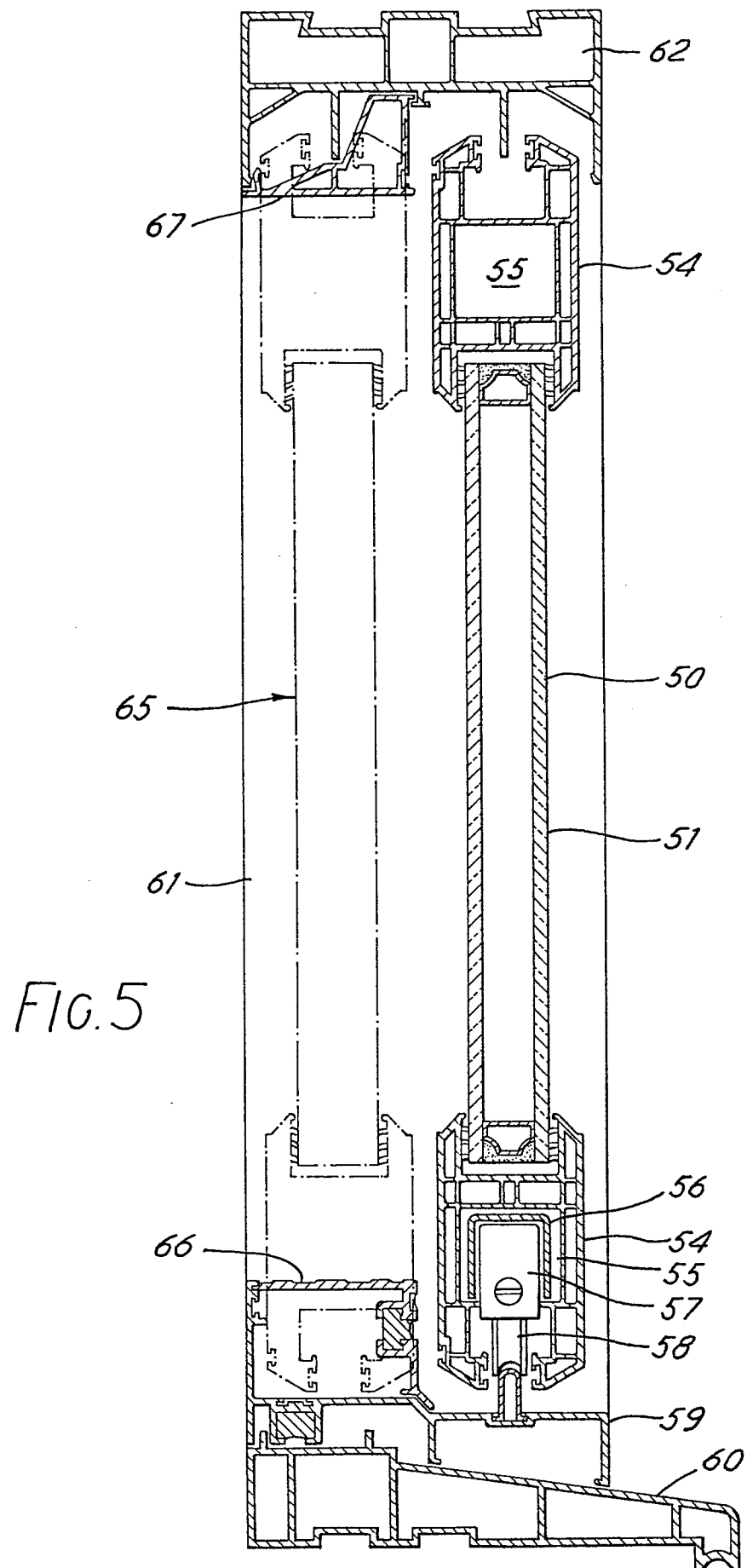
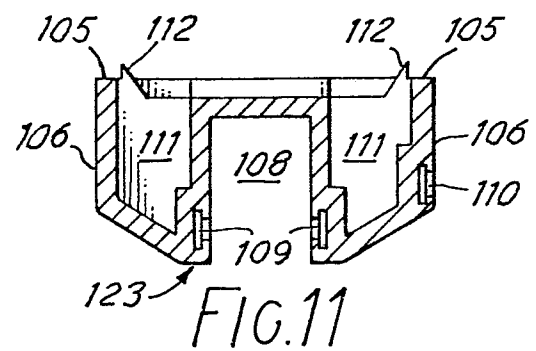
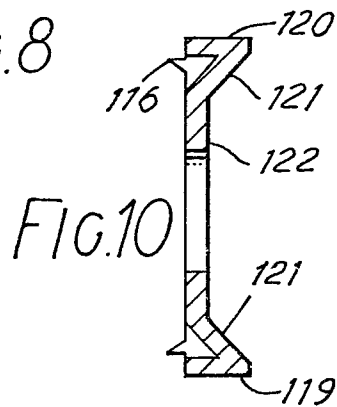
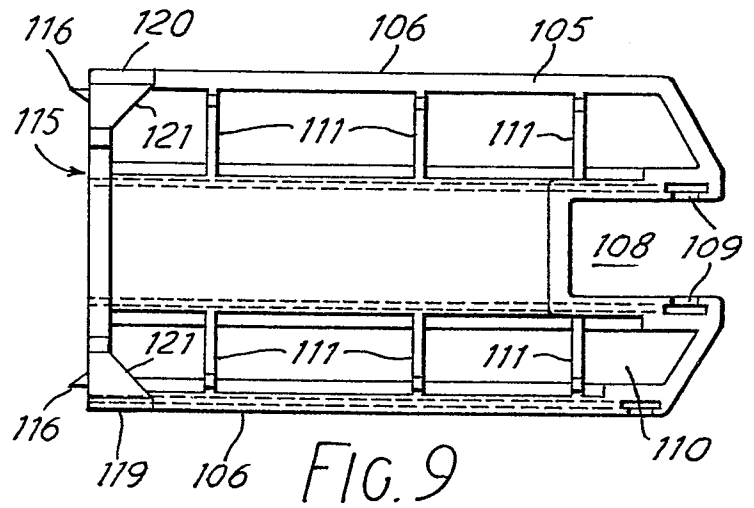
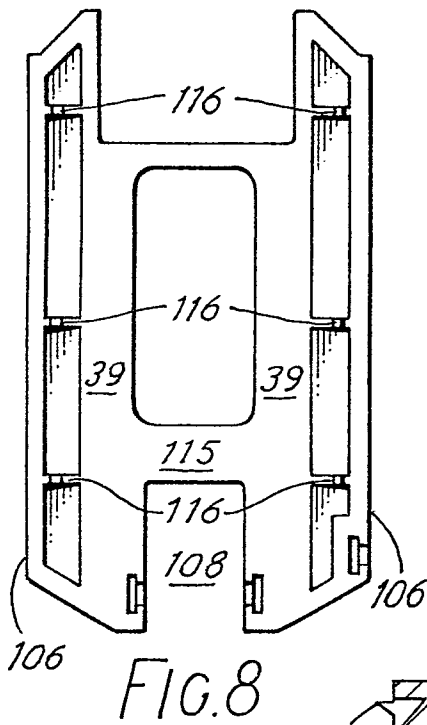
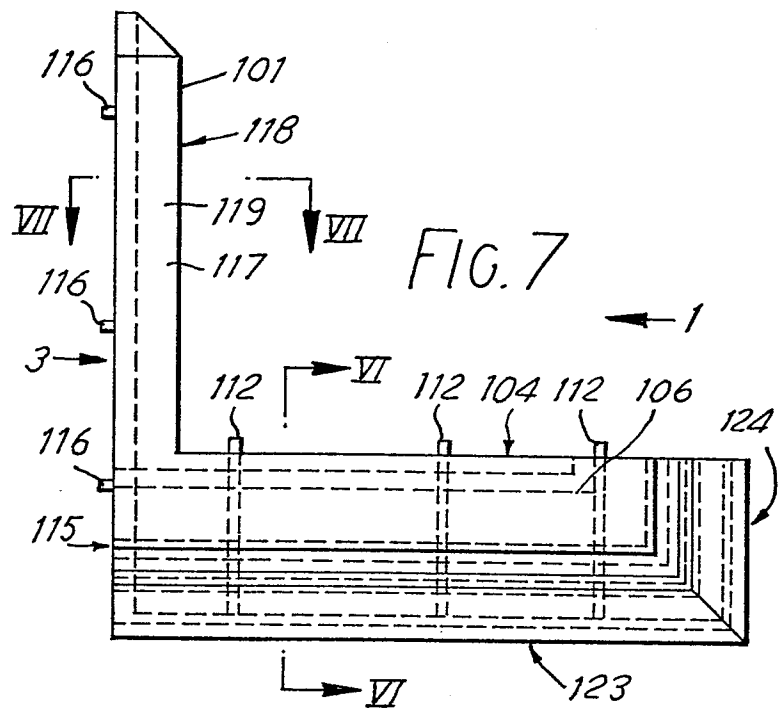
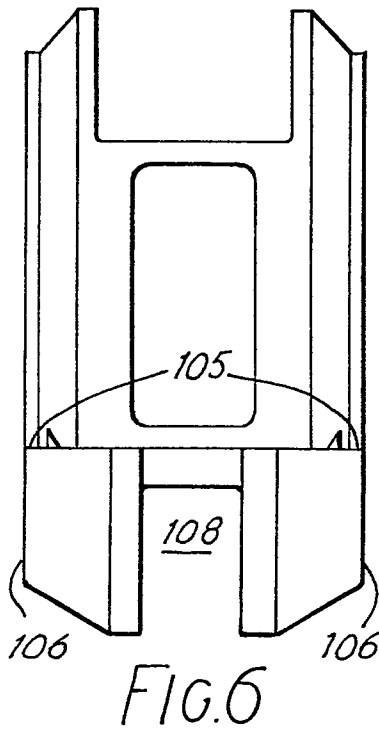


FIG. 4







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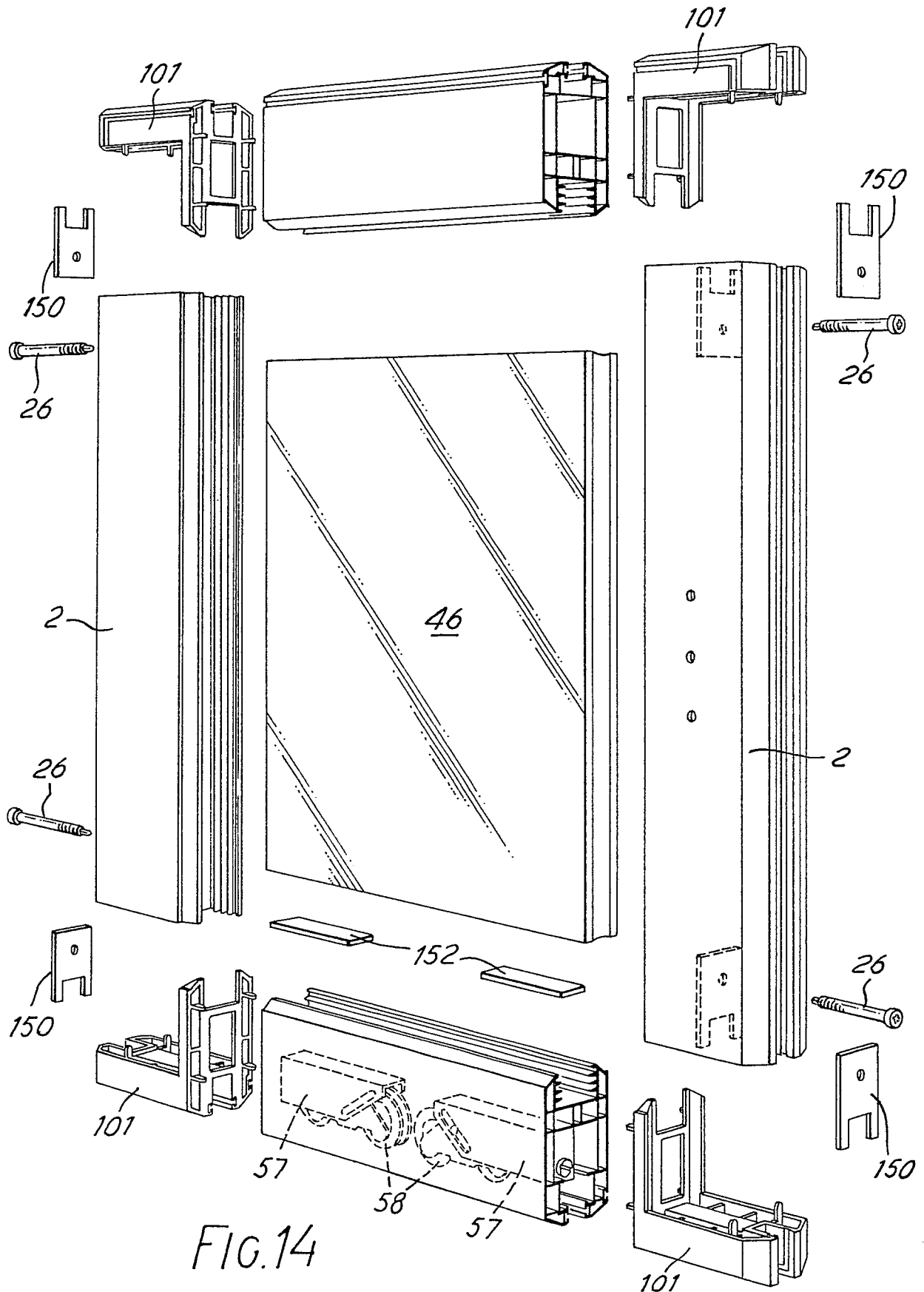
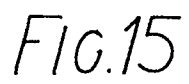


FIG. 14





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-2 309 067 (HEBESTREIT) * Page 1, column 2, line 6 - page 2, column 1, line 5; figures 1-10 *	1-4, 9, 10, 12, 13	E 06 B 3/96
Y	----	5-8, 11	
A		14	
Y	FR-A-2 567 213 (CHANSON) * Page 3, line 14 - page 7, line 20; figures 1-10 *	5-8	
A	----	1, 2, 3, 9, 12, 13, 14	
Y	US-A-3 978 617 (EVENTOFF) * Column 3, line 4 - column 5, line 12; figures 1-7 *	11	
A	----	1, 2, 10, 13	
A	FR-A-1 566 684 (PRIOLO) * Page 2, column 2, lines 1-4; figures 1-4 *	1, 2, 3, 10, 13	

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-09-1988	Examiner DEPOORTER F.
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			