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(54) **Improvements in window-frames.**

(57) A moulded plastics adaptor (16) for securing the end of a transom (14) to a stile (11) of a wooden window frame, has a dovetail joint with the end of the transom whereby the tongue and groove extend in the plane of the window with the groove intersecting the glazing rebates (18a) in the transom (14). The tongue thereby acts as a water barrier to inhibit leakage at the joint.

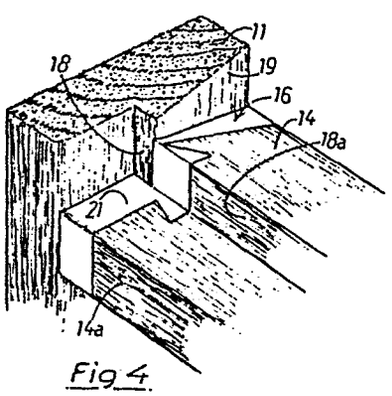

Fig 4

EP 0 167 270 A1

DESCRIPTION

"IMPROVEMENTS IN WINDOW-FRAMES"

The present invention relates to window-frames and more particularly to an improved means and method for securing together glazing bars of wooden window frames. The term "glazing bar" is used herein as a generic term to include transoms, rails, stiles and mullions. The term "window-frame" is used herein to include the frame of a window combined with a door.

A conventional method of securing the ends of a transom to the vertical stiles of a wooden window-frame is by means of mortise and tenon joints. This involves cutting mortises in the stiles and tenons on the transom ends and then slipping the stiles onto the transom before the top and bottom rails are secured to the ends of the stiles to complete the frame. Thereafter the joints are usually dowelled. A similar procedure is adopted for securing the ends of a mullion to the top and bottom rails but, in this case, the rails must be attached to the stiles at the same time as they are secured to the ends of the mullion. These procedures involve many individual steps and the manufacture of window-frames is therefore rendered correspondingly expensive.

In U.K. Patent Specification No.2106969A there are described a means and a method whereby rebated glazing bars can be secured together after the outer frame comprising the stiles and the rails has been assembled and without having to cut mortises or the like in the stiles (or rails). Such means and method involved the use of an adaptor for securing one end of a transom (or mullion) to a corresponding portion of the stile (or rail) which adaptor comprises a shaped part adapted to be secured by screws, nails, dowels or the like fasteners to the said stile (or rail) portion,

the said part having a projection shaped to be received in the glazing rebate of the stile (or rail) and a tongue shaped to be received in a corresponding groove in the end of the transom (or mullion), such that the said projection becomes aligned with the portion of the transom (or mullion) defining the glazing rebates at opposite sides thereof. As described, the tongue and groove are shaped to form a dovetail or similar joint.

As described in U.K. Patent Specification No.2106969A, the tongue and groove extend perpendicularly to the plane of the window. Although the groove does not extend right to the outside of the window, it still provides a path for water to penetrate through to the inside of the window.

Another feature of the adaptor of the above-mentioned patent specification is the provision of a protective shroud which envelopes the end of the transom (or mullion). This shroud complicates the construction and mars the appearance of the window frame.

The present invention resides in an adaptor for securing one end of a transom (or mullion) to a corresponding portion of a stile (or rail), comprising a one-piece shaped part adapted to be secured to said stile (or rail) portion, the said part having a projection shaped to be received in the glazing rebate of the stile (or rail) and a tongue shaped to be received in a corresponding groove which extends across the end of the transom (or mullion) in a direction parallel to the plane of the window, the projection being thereby brought into alignment with the portion of the transom (or mullion) defining the glazing rebates at opposite sides thereof.

According to one embodiment of the present invention, an adaptor for securing one end of a transom (or mullion) to a corresponding portion of a stile (or rail), comprises a one-piece shaped part adapted to be secured to said stile (or rail) portion, the said part having a projection shaped to be received in the glazing rebate of the stile (or rail) and a medial tongue shaped to be received in a corresponding groove which extends across the end of the transom (or mullion) in a direction parallel to the plane of the window, the projection being thereby brought into alignment with the portion of the transom (or mullion) defining the glazing rebates at opposite sides thereof.

According to another embodiment, the said part does not include a portion which extends over that point of the stile (or rail) away from the glazing rebate.

The tongue and groove connection thus extends right across the joint between the end of the transom (or mullion) and the adjoining portion of the stile (or rail) and acts as a barrier to resist the penetration of water to the inside of the window.

A window frame according to the invention comprises vertical stiles, top and bottom rails secured to the stiles, and a glazing bar secured at its ends to the stiles or rails by respective adaptors, each of which is attached by screws, nails, dowels or the like fasteners to the respective portion of the stile or rail and to each of which the respective glazing bar end is fastened by a co-operating projection and recess joint, with the projection and recess extending substantially parallel to the plane of the window.

A window-frame according to another aspect of the invention comprises vertical stiles, top and bottom rails secured to the stiles and a transom (or mullion) secured at its ends to the stiles (or rails) by respective adaptors, each of which is attached by screws, nails, dowels or the like fasteners to the respective portion of the stile (or rail) and to each of which the respective transom (or mullion) end is fastened by a tongue and groove joint with the tongue and groove extending substantially parallel to the plane of the window.

A method of making a window frame according to the invention comprises assembling an outer frame of vertical stiles and top and bottom rails, attaching adaptors to appropriate portions of the stiles (or rails) and attaching a transom (or mullion) by its ends to the adaptors by aligning the ends of the transom (or mullion) with the respective adaptors and then displacing the transom in a direction substantially parallel to the plane of the window until the glazing rebates in the transom are aligned with the glazing rebate in the respective stiles (or rails).

The invention is further described, by way of example, with reference to the drawings, in which:-

Fig.1 is a perspective view of a window-frame made in accordance with the present invention;

Fig.2 is a cross-section through the timber used to make the stiles and rails of the frame;

Fig.3 is a cross-section of the timber used to make the transom and, if required, the mullion of the window;

Fig.4 is a fragmentary perspective view of a joint in accordance with one aspect of the invention, between a transom and a stile;

Fig.5 is an elevation of an adaptor used in the joint of Fig.4;

Fig.6 is a rear view of the adaptor;

Fig.7 is a plan view of the adaptor;

Fig.8 is a fragmentary view showing one end of a transom prepared for securement to the adaptor;

Fig.9 is a fragmentary sectional view showing the adaptor secured to a stile;

Fig.10 is a reverse elevation of the adaptor;

Figs. 11 to 14 are views, similar to Figs. 5, 6, 7 and 10, but showing another embodiment of adaptor;

Fig.15 is a fragmentary sectional view showing the adaptor of Figs. 11 to 14 secured to a stile; and

Fig.16 is a fragmentary sectional view of a joint utilising the adaptor of Figs. 11 to 15.

Fig.1 shows a window-frame comprising vertical stiles 10 and 11, upper and lower rails 12 and 13 and a transom 14. The upper and lower rails 12 and 13 may be secured to the stiles 10 and 11 by conventional mortise and tenon or tongue and groove joints, possibly locked by means of dowels, but in the illustrated embodiment the corner joints and the outer frame formed by the rails and stiles are mitred joints as described in United Kingdom Patent Application No.2076924A. The mitre joint is formed by mitring the adjoining ends of the rails and stiles, forming one or more dovetail grooves in each mitred face and, after placing the mitred faces together preferably with glue therebetween, forcing double-dovetail inserts 15 into the dovetail grooves. Contrary to conventional practice, the outer frame formed by the stiles 10, 11 and the rails 12, 13 is completed before the transom 14 is secured in place by means of adaptors 16, as hereinafter described.

Fig.1 shows the window-frame at its rear side, i.e. the side opposite that from which the window is normally glazed. As shown in Fig.2, the timber 17 from which the stiles and rails are made has a glazing rebate 18 and the body portion of the timber 17 has the face 19 tapered rearwardly of the glazing rebate 18, although this is a matter of design preference and is not essential to the invention. Fig.3 shows the timber 20 from which the transom 14 is made. This timber has two glazing rebates 18a and 18b so that the transom 14 will have a narrow front portion 14a between the glazing rebates. The timber 20 has on its body portion opposed tapered rear faces 19a and 19b matching the face 19 of the timber 17.

Whilst the rebates 18a and 18b are called "glazing rebates" in the present description and claims, it will be appreciated that, in the case of opening windows, the opening frames (not shown) would be received in these rebates instead of glass.

Fig.4 shows the joint between one end of the transom 14 and the stile 11 from the glazing side. Thus, the glazing rebates 18a and 18b can be clearly seen. The adaptor 16 is shown more fully in Figs.5, 6 and 7. This adaptor is preferably an injection-moulded plastics part, e.g. of nylon. The part is formed as one piece having a forward projection 21 which is of a shape conforming to the shape of the front portion 14a of the transom 14 and in the finished joint is aligned with this front portion as can be seen clearly in Fig.4. The glazing rebate is thereby uninterrupted in the finished joint. The main portion 22 of the adaptor 16 has an outer profile generally conforming to the outer profile of the body portion of the transom 14. The outer face 28 of the main portion 22 is angled to conform to the tapered surface 19 of the stile 11.

For the purpose of forming a solid joint, the adaptor 16 is formed with a medial tongue 24 which in the illustrated embodiment, is of dovetail shape. The tongue 24 extends substantially in the plane of the window. The adaptor 16 is advantageously provided with preformed screw holes 25 which, in the illustrated embodiment, are countersunk.

As shown in Fig.8, the corresponding end of the transom 14 is simply cut off straight and merely has to be formed with a dovetail groove 26 adapted to receive the tongue 24. It will be seen from Fig.8 that the dovetail groove 26 is cut across the end of the transom 14 so as to be intersected by the glazing rebates 18a, 18b. Correspondingly, the tongue 24 of the adaptor 16, as shown in Fig.8, extends partially over the main portion 22 and partially over the forward projection 21. The tongue and groove connection 24, 26 is thereby concealed from the glazing side in the finished joint, by the glazing putty, as can be understood from Fig.4, and is only slightly perceptible from the other side, as can be seen from Fig.1.

After the outer frame has been assembled from the stiles 10, 11 and the rails 12, 13 as described above with reference to Fig.1, the adaptors 16 are located in position on the stiles 10, 11 and are secured in place by screws 27 as shown in Fig.9. Glue can be applied to the appropriate face of the adaptor 16 before it is applied to the respective stile and located and screwed in position if a stronger joint is desired. For a cheaper joint, the screws can be replaced by nails and it is even conceivable simply to use dowels if the adaptor 16 is glued in position, since then it merely becomes essential to locate the adaptor in the correct position. Holes for the dowels

could be formed before the outer frame is assembled to facilitate mass production. Likewise, it would be possible to mark screw holes before the outer frame is assembled.

It will be appreciated that, once the outer frame has been assembled and the adaptors 16 have been secured in position, it is a simple matter to cut the transom 14 to the correct length and to cut the grooves 26 in the ends of the transom by means of a conventional dovetailing machine. Glue can then be applied to the ends of the transom and/or to the adaptors and the transom is simply pushed into position upwardly or downwardly to complete the frame. It is possible to make the tongues 24 with a slight taper so that they become wedged in the dovetail grooves 26 to make a firm joint. Thus, it is preferable for the transom to be lightly hammered home.

It can be seen from Fig.5 that the tongue 24 is made hollow but is provided with partitions 30 to stiffen the walls 32 of the tongue. Similarly, the forward projection 21 and the main portion 22 may be hollow-formed and stiffened by partitions 34, 36 as shown in Fig.10. The partitions 34, 36 are intersected by bosses 35, 37 through which the screw holes 25 extend. These hollow constructions facilitate moulding and reduce the amount of plastics material needed to make the adaptor. The hollows in the tongue 24 are closed off by the groove 26 and the hollows in the forward projection 21 and the main portion 22 are closed off by the stile 10 or 11.

Thus it will be seen that the adaptor provides an uninterrupted glazing rebate, the forward projection 21 being flush-finished with the narrow front portion 14a of the transom 14.

The adaptor 56 of Figs. 11 to 15 differs from that (16) of Figs. 4 to 10 principally in that the portion 22 profiled to conform with the outer profile of the transom body portion is absent. It can be seen from Figs. 15 and 16 that the adaptor 56 is designed for a window frame whose members 51, 54 whose faces 59 do not taper rearwardly. The adaptor 56 is preferably an injection-moulded plastics part, e.g. of nylon. It is formed as one piece having a forward projection 21 which is of a shape conforming to the shape of the front portion 54a of the transom 54 and in the finished joint is aligned with this front portion as can be seen clearly in Fig.16. The glazing rebate is thereby uninterrupted in the finished joint.

For the purpose of forming a solid joint, the adaptor 56 is formed with a tongue 64 which in the illustrated embodiment, is of dovetail shape. The tongue 24 extends substantially in the plane of the window. The adaptor 56 is advantageously provided with a preformed screw hole 25 which, in the illustrated embodiment, is countersunk.

As shown in Fig.16, the corresponding end of the transom 54 is simply cut off straight and merely has to be formed with a dovetail groove 26 adapted to receive the tongue 64. It will be seen from Fig.16 that the dovetail groove 26 is cut across the end of the transom 54 so as to be intersected by the glazing rebates 58a. Correspondingly, the tongue 64 of the adaptor 56, as shown in Fig.8, extends partially over the forward projection 21. The tongue and groove connection 64, 26 is thereby concealed from the glazing side in the finished joint, by the glazing putty, as can be understood from Fig.16, and is almost imperceptible from the other side.

After the outer frame has been assembled from the stiles and the rails as can be understood from the above description with reference to Fig.1, the adaptors 56 are located in position on the stiles and are secured in place by screws 27 as shown in Fig.15. Glue can be applied to the appropriate face of the adaptor 56 before it is applied to the respective stile and located and screwed in position if a stronger jont is desired. For a cheaper joint, the screws can be replaced by nails and it is even conceivable simply to use dowels if the adaptor 56 is glued in position, since then it merely becomes essential to locate the adaptor in the correct position. Holes for the dowels could be formed before the outer frame is assembled to facilitate mass production. Likewise, it would be possible to mark screw holes before the outer frame is assembled.

It will be appreciated that, once the outer frame has been assembled and the adaptors 56 have been secured in position, it is a simple matter to cut the transom 54 to the correct length and to cut the grooves 26 in the ends of the transom by means of a conventional dovetailing machine. Glue can then be applied to the ends of the transom and/or to the adaptors and the transom is simply pushed into position upwardly or downwardly to complete the frame. It is possible to make the tongues 64 with a slight taper so that they become wedged in the dovetail grooves 26 to make a firm joint. Thus, it is preferable for the transom to be lightly hammered home.

As can be seen particularly clearly in Figs. 13 and 14, the adaptor 56 has a short lateral tenon 62. This fits into a small groove 63 (or 63a) formed in the side wall of the glazing rebate 58 (or 58a) and helps to lock the adaptor in place. The adaptor 56

also has feather portions 67,69 which lie against the side wall of the glazing rebate when the adaptor is fitted, as shown in Figs.15 and 16. A gap 68 formed between the feather portions 67,69 registers with the groove 63. A thin lip 71 (Fig.13) fills in a gap which would otherwise be formed at the slightly rounded edge 53 of the frame member 51 adjacent the glazing rebate 58.

It can be seen from Fig.11 that the tongue 64 is made hollow but is provided with partitions 30 to stiffen the walls 72 of the tongue. Similarly, the forward projection 21 may be hollow-formed and stiffened by a partition 34, as shown in Fig.14. The partition 34 is intersected by a boss 35 through which the screw hole 25 extends. These hollow constructions facilitate moulding and reduce the amount of plastics material needed to make the adaptor. The hollows in the tongue 64 are closed off by the groove 26 and the hollow in the forward projection 21 is closed off by the stile 51.

Thus it will be seen that the adaptor provides an uninterrupted glazing rebate, the forward projection 21 being flush-finished with the narrow front portion 54a of the transom 54.

Whilst the invention has been described above in relation to the fitting of a transom to a simple frame, the invention is equally applicable to the fitting of a vertical mullion, the mullion being formed from the same timber as the transom and the joints between the mullion and the rails being of identical construction to the joint shown in Fig.4 or 16. The window may, of course, have several mullions and/or transoms and where both a mullion and a transom are provided, the joint between the mullion and the transom would again be constructed identically to the joint of Fig.4 or 16.

The tenon 62 of the adaptor 56 of Figs. 11 to 14 can also be provided on the adaptor 16 of Figs. 5, 6, 7 and 10. In that event, the stiles 10, 11 and rails 12, 13 and the transom 14 (or mullion) of Figs. 1 to 4 and 9 would be provided with a small groove in their glazing rebate 18, 18a, 18b, like the groove 63 or 63a of Fig.16.

It can be appreciated from the drawings, particularly Figs 4, 8, 9, 15 and 16, that the tongue 24 or 64 extends right across the end of the transom 14 or 54. It thus acts as a barrier to inhibit penetration of water across the joint from the outside to the inside of the window. Also, the tongue 24 or 64 and groove 26 prevent any movement of the transom perpendicular to the plane of the window, thereby avoiding the need for the unsightly shroud of the adaptor illustrated in U.K. Patent Specification No.2106969A. Movement of the transom in the plane of the window is prevented by the glass panes themselves, once the window has been glazed.

Although the invention has been described with reference to the construction of a complete window-frame, the joint of the invention is also particularly useful when fitting an existing frame with a transom and/or mullion, it being only necessary to ensure that the adaptor 16 or 56 is designed to conform to the profile of the existing frame.

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CLAIMS

1. An adaptor for securing one end of a transom (14) or mullion to a corresponding portion of a stile (10,11) or rail (12,13), comprising a one-piece shaped part (16,56) adapted to be secured to said stile or rail portion, the said part (16,56) having a projection (21) shaped to be received in the glazing rebate (18) of the stile or rail and a tongue (24,64) shaped to be received in a corresponding groove (26) in the end of the transom (14) or mullion, the projection (21) being thus brought into alignment with the portion of the transom or mullion defining the glazing rebates (18a,18b) at opposite ends thereof, characterised in that the groove (26) extends across the end of the transom (14) or mullion in a direction parallel to the plane of the window.

2. An adaptor as claimed in claim 1, in which the said part (16) includes a portion (22) which extends over that point of the stile or rail away from the glazing rebate (18) and the tongue is a medial tongue (29).

3. An adaptor as claimed in claim 1, in which the said part (56) does not include a portion which extends over that point of the stile or rail away from the glazing rebate (18).

4. An adaptor as claimed in claim 1, 2 or 3, in which the tongue (24,64) and groove (26) connection extends right across the joint between the end of the transom (14) or mullion and the adjoining portion of the stile (10,11) or rail (12,13) and acts as a barrier to resist the penetration of water to the inside of the window.

5. An adaptor as claimed in any preceding claim, in which the tongue (24,64) is dovetail-shaped.

6. An adaptor as claimed in any preceding claim, in which the tongue (24,64) extends partially over said projection (21).

7. An adaptor as claimed in any preceding claim, in which said one-piece shaped part (16,56) is of plastics material.

8. A window-frame comprising vertical stiles (10,11), top and bottom rails (12,13) secured to the stiles and a transom (14) or mullion secured at its ends to the stiles or rails by respective adaptors (16,56), each of which is attached by screws, nails, dowels or the like fasteners to the respective portion of the stile or rail and to each of which the respective transom or mullion end is fastened by a tongue (24,64) and groove (26) joint, characterized in that the tongue (24,64) and groove (26) extend substantially parallel to the plane of the window.

9. A window frame according to claim 8, in which each adaptor (64) does not include a portion which extends over that part of the stile (10,11) or rail (12,13) away from the glazing rebate (18), the end of the transom (14) or mullion thereby coming into direct juxtaposition to such part of the stile or rail.

10. A window frame as claimed in claim 8 or 9, in which the tongue and groove are dovetail-shaped.

11. A window frame as claimed in claim 8, 9 or 10, in which the groove is cut right across the end of the transom or mullion.

12. A window frame as claimed in claim 11, in which the groove intersects the glazing rebates (18a, 18b) in the transom or mullion.

13. A window frame as claimed in any of claims 8 to 12, in which the stiles, rails and transom or mullion are of wood.

14. A method of making a window frame comprising assembling an outer frame of vertical stiles (10,11) and top and bottom rails (12,13), attaching adaptors (16,56) to appropriate portions of the stiles or rails

and attaching a transom (14) or mullion by its ends to the adaptors by engaging the ends of the transom or mullion with the respective adaptors, characterised in that the transom (14) or mullion is displaced in a direction perpendicular to itself and substantially parallel to the plane of the window until the ends of the transom or mullion are aligned with the adaptors.

15. A method as claimed in claim 14, in which the ends of the transom or mullion are attached to the adaptors by tongue-and-groove joints.

16. A method as claimed in claim 15, in which the grooves are cut across the end faces of the transom or mullion.

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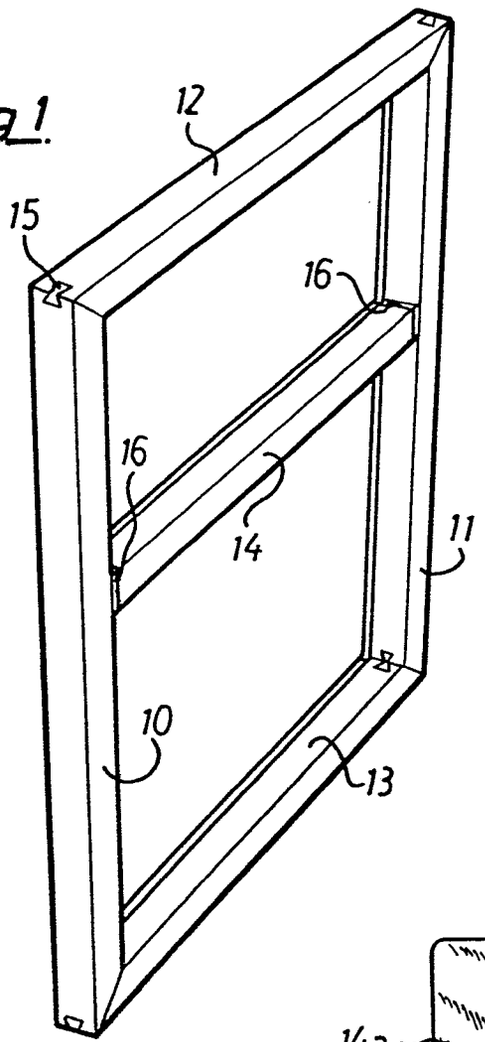
Fig 1



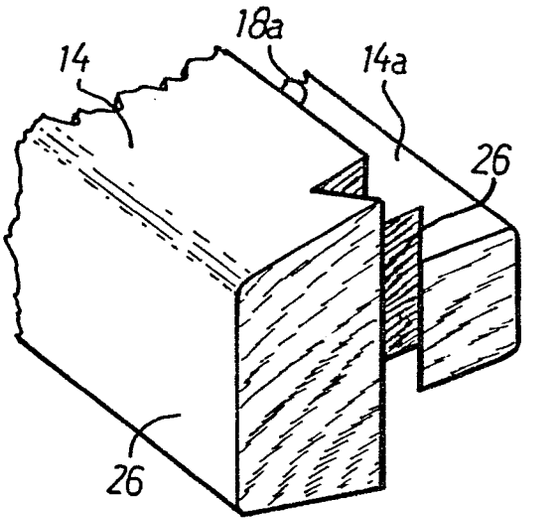


Fig 8

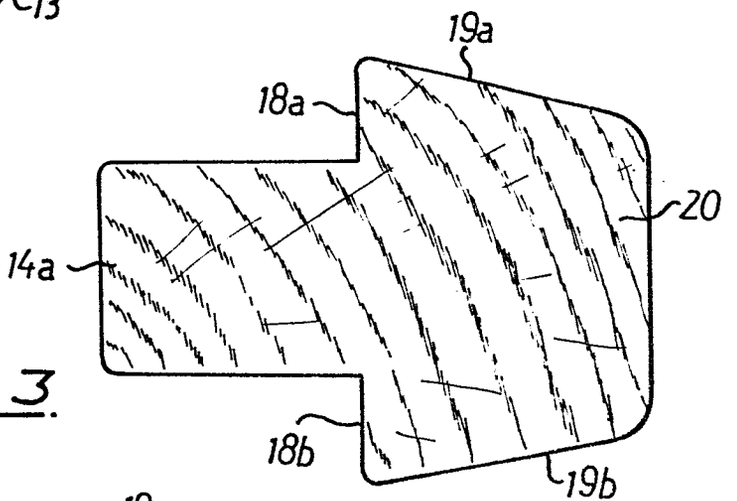


Fig 3

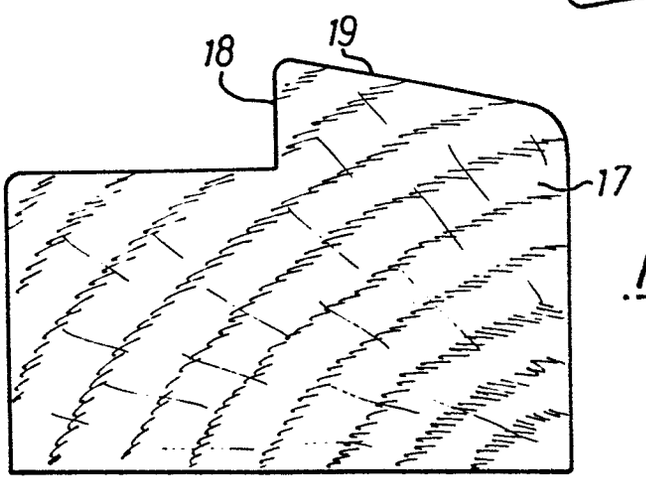


Fig 2

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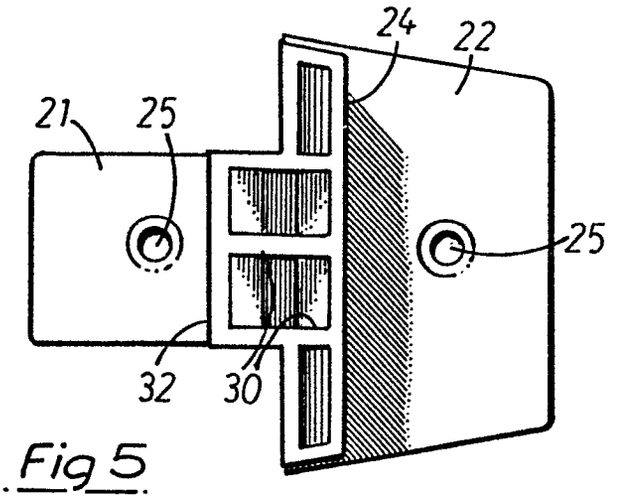

Fig 5

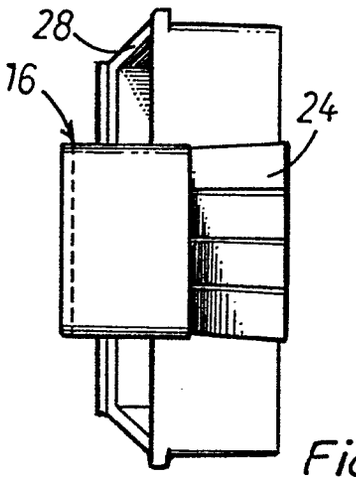

Fig 6

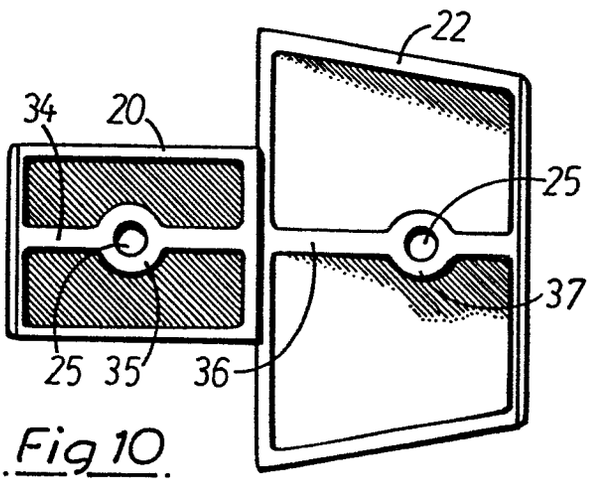

Fig 10

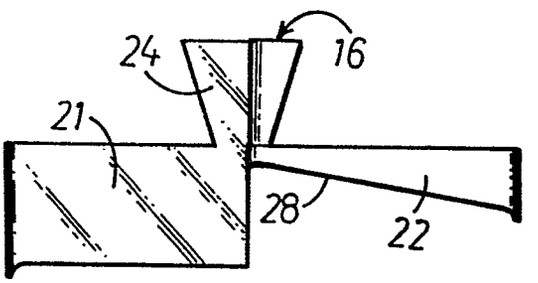

Fig 7

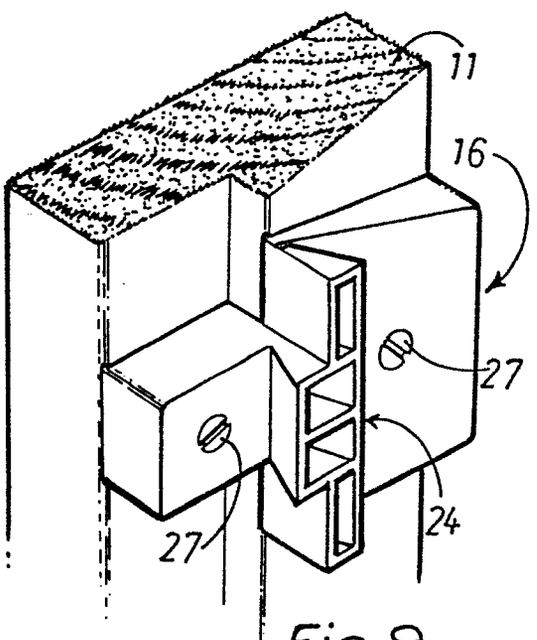

Fig 9

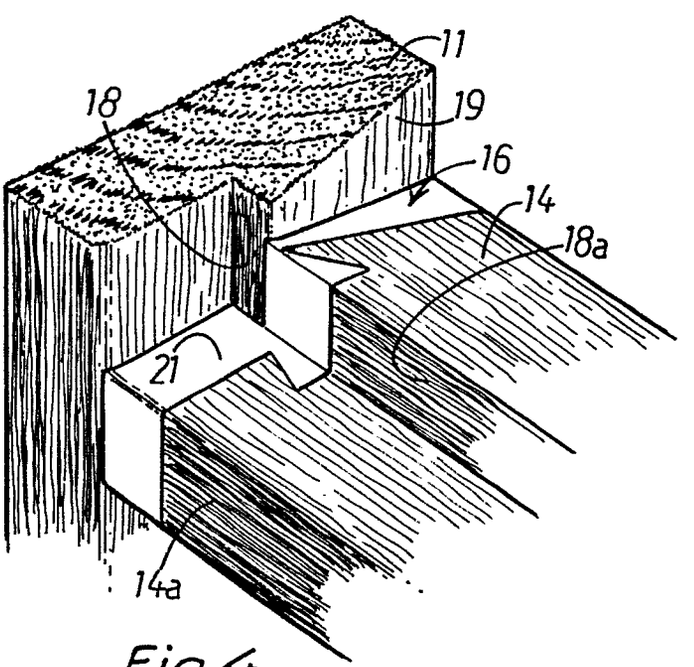

Fig 4

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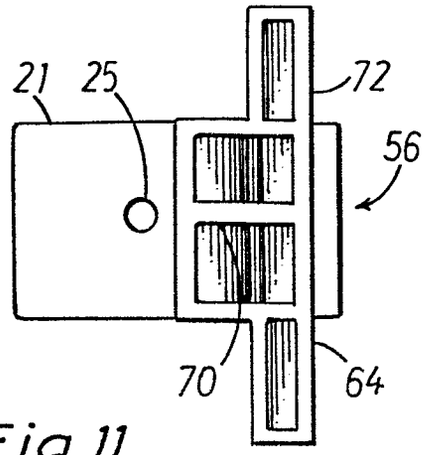

Fig 11

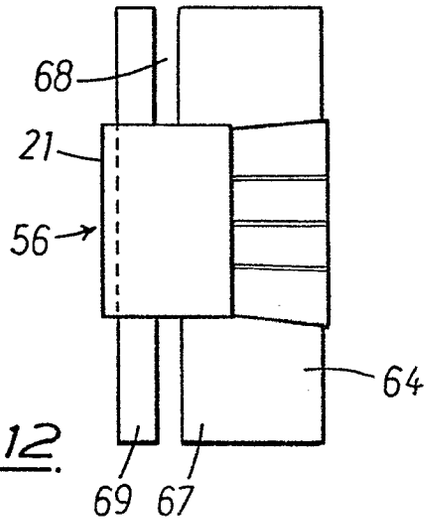

Fig 12

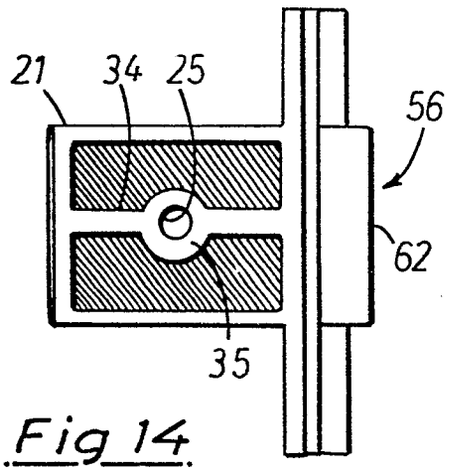

Fig 14

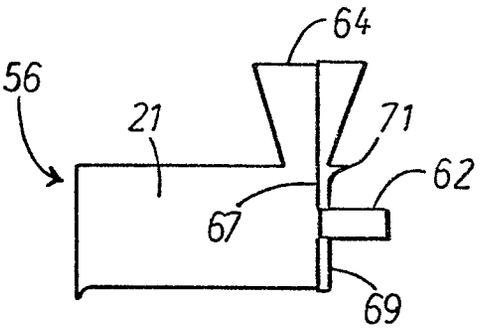

Fig 13

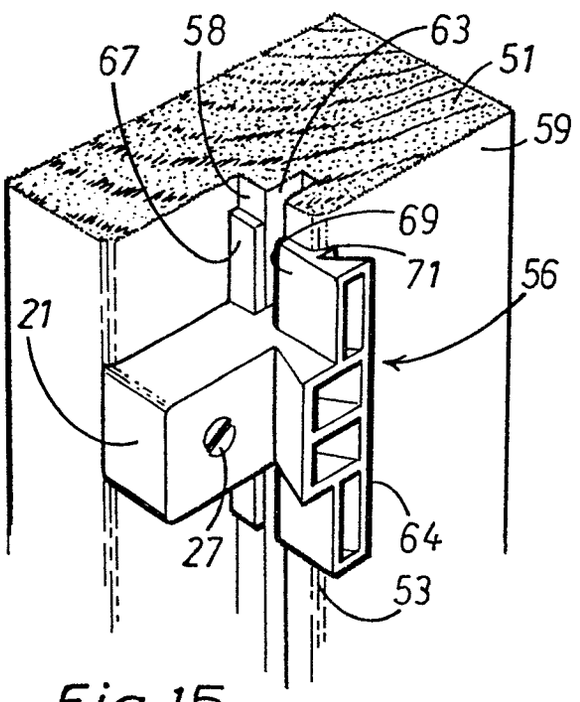

Fig 15

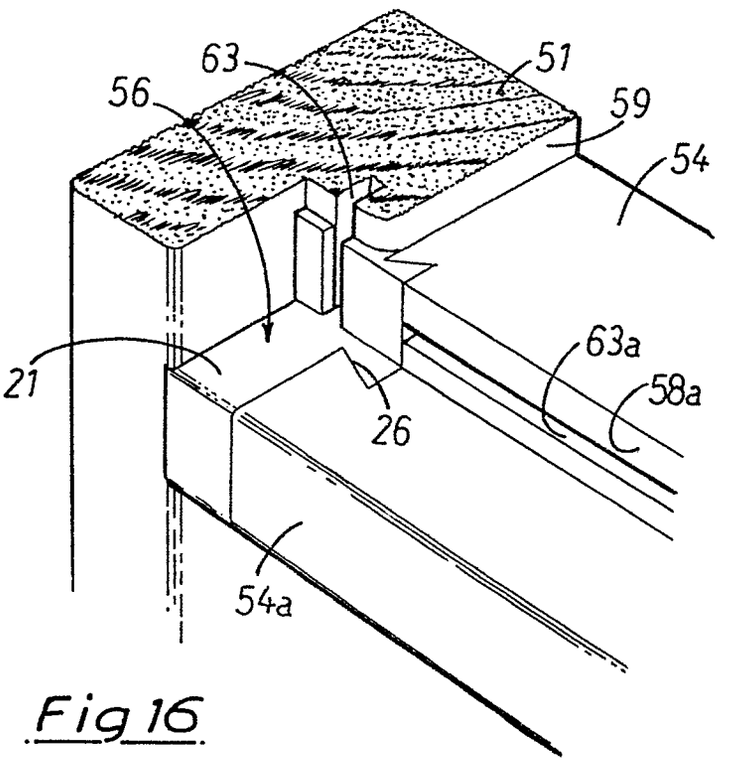

Fig 16

European Patent Office

EUROPEAN SEARCH REPORT

0167270
Application number

EP 85 30 3787

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)
D,Y	GB-A-2 106 969 (FAIRCLOUGH) * Page 2, line 104 - page 3, line 64; figures 1-9 *	1,5,7, 8,10, 13-15	E 06 B 3/96
D,A		2	

Y	NL-A-6 614 322 (HALBERTSMA) * Page 2, lines 14-26; page 3, lines 1-8; figure *	1,5,7, 8,10, 13-15	
A		11,16	
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A	FR-A-1 509 189 (HUYGE) * Page 1, column 2, line 40 - page 2, column 2, line 40; figures 1-9 *	1,4,5, 8,10, 11,14-16	E 06 B

A	FR-A-1 125 403 (BOIS-METAL)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24-09-1985	DEPOORTER F.

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