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(56) Documents Cited:
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GB 2321487 A **GB 2223772 A**

(58) Field of Search:
UK CL (Edition X) **E1D, E1J**
INT CL **E04B, E06B**
Other: **On-line: EPODOC, WPI**

(54) Abstract Title: **Wall comprising interconnected window frame members**

(57) A system for forming a wall from window frames (22), particularly for forming a side wall of a conservatory or like structure, has the window frames connected to support posts (28) between their ends by means of connectors (30). Also disclosed is a system for forming a wall from window frames in which the window frames are connected at their ends by connectors or clips.

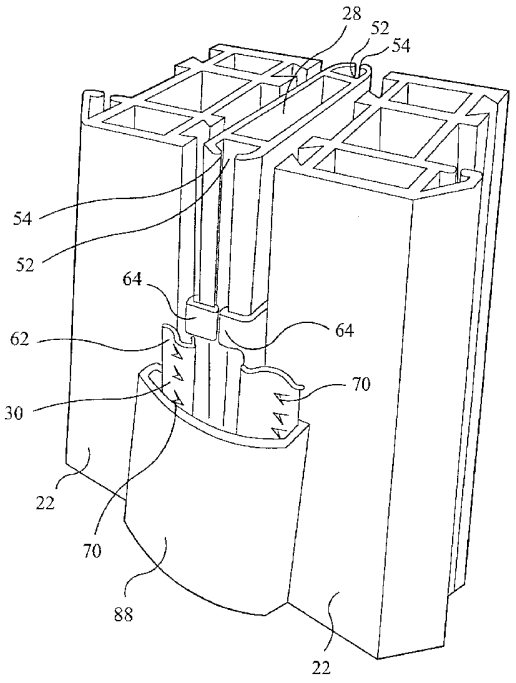

FIG 4

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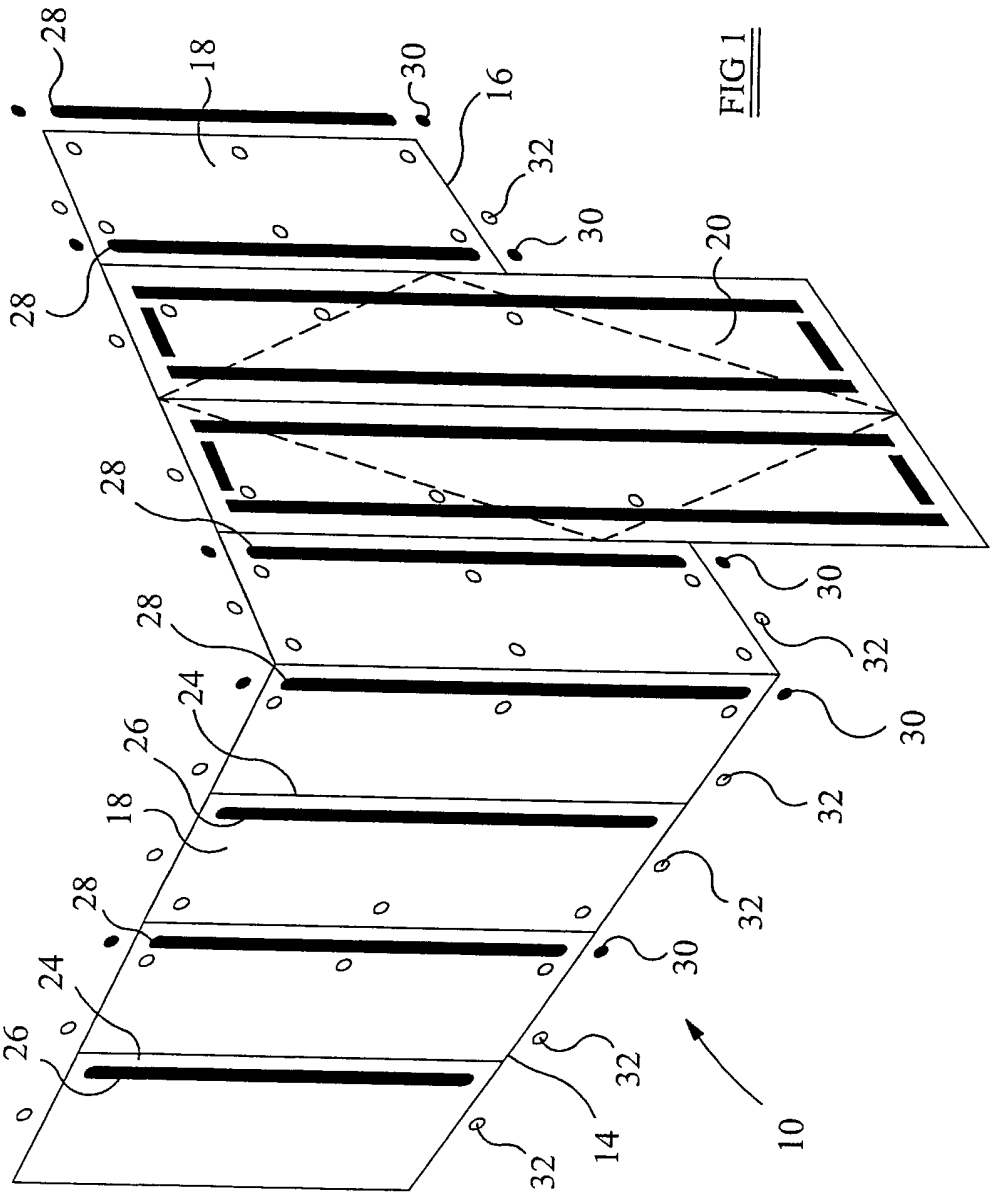
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FIG 1

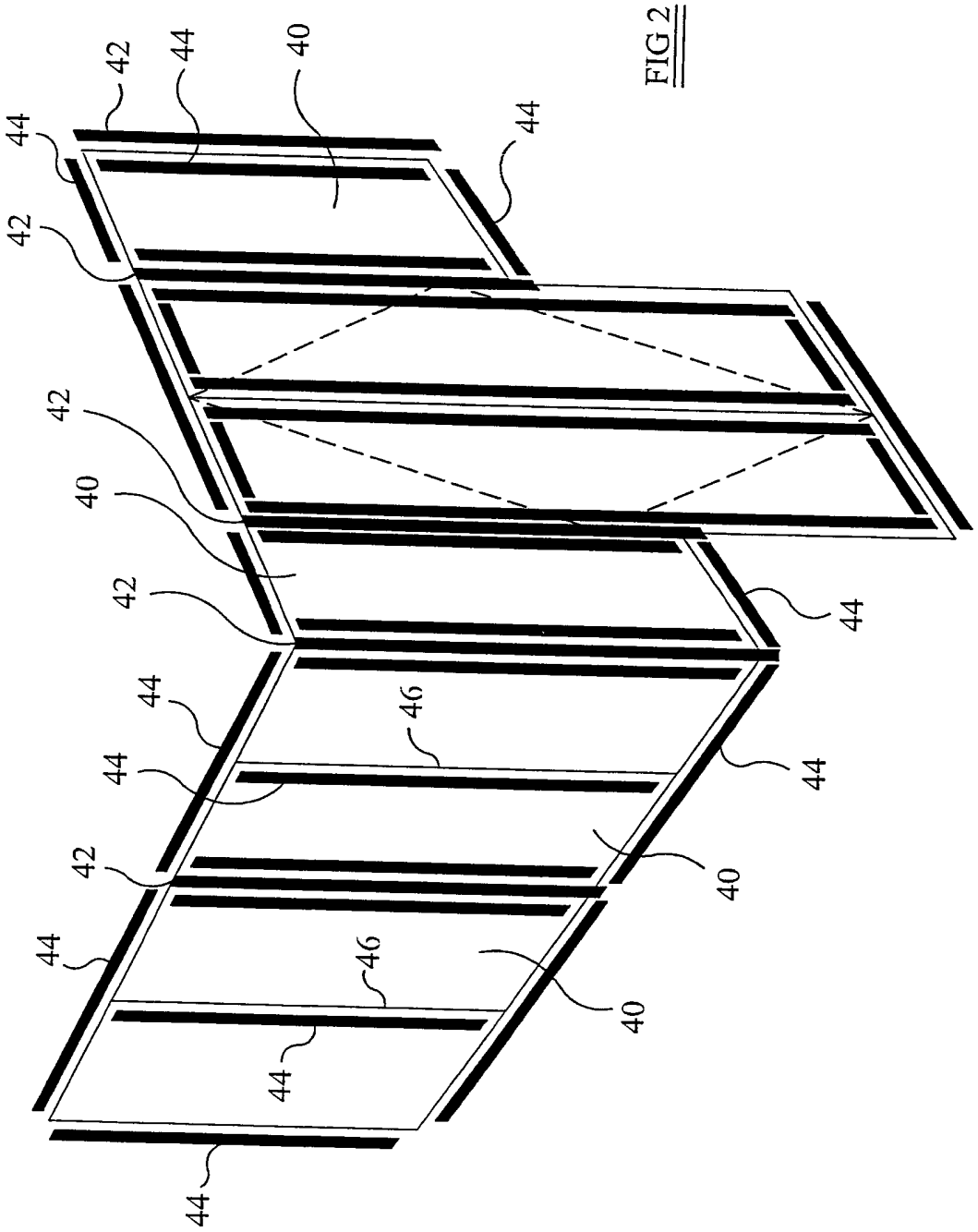

FIG 2

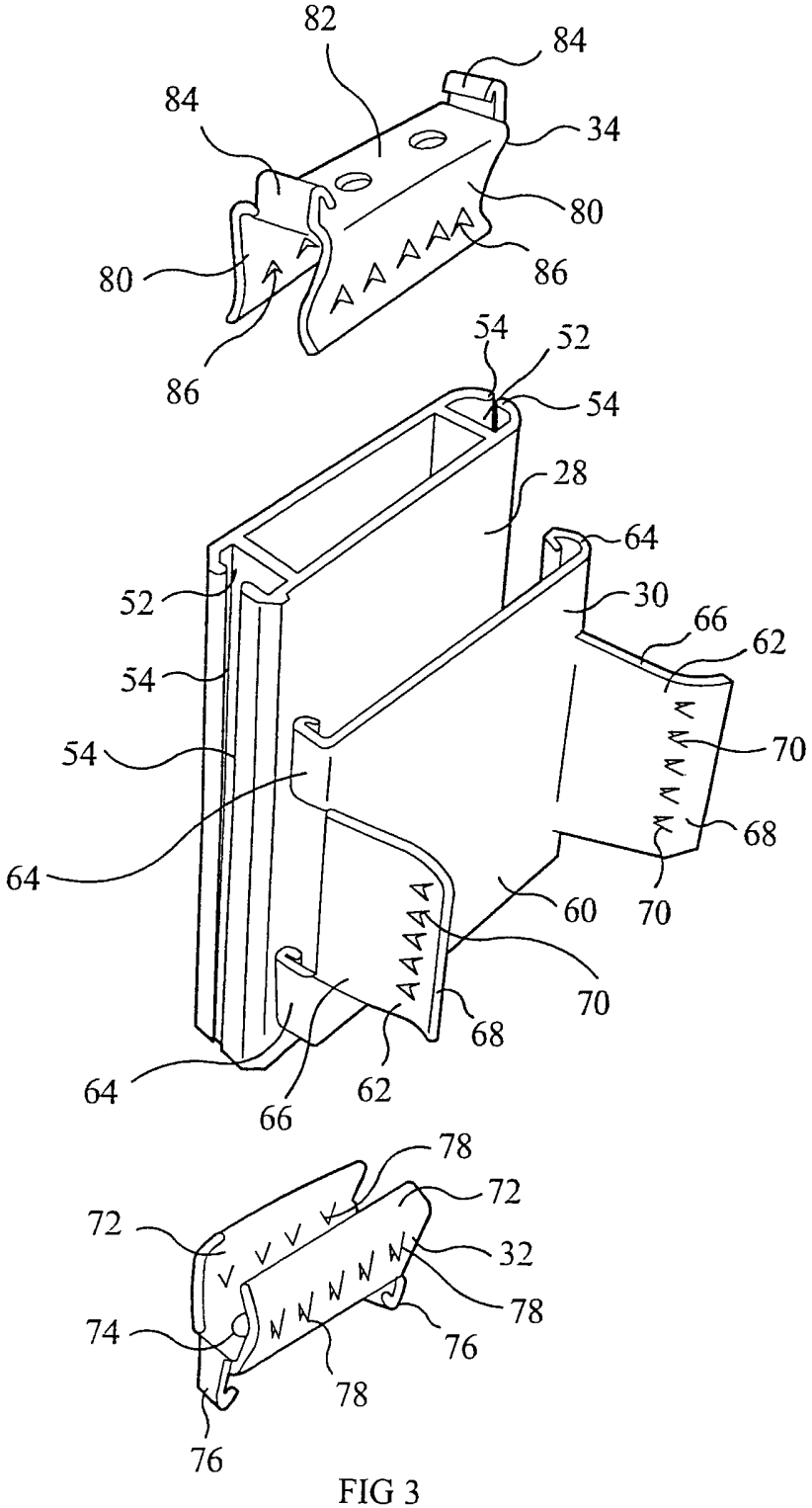
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FIG 3

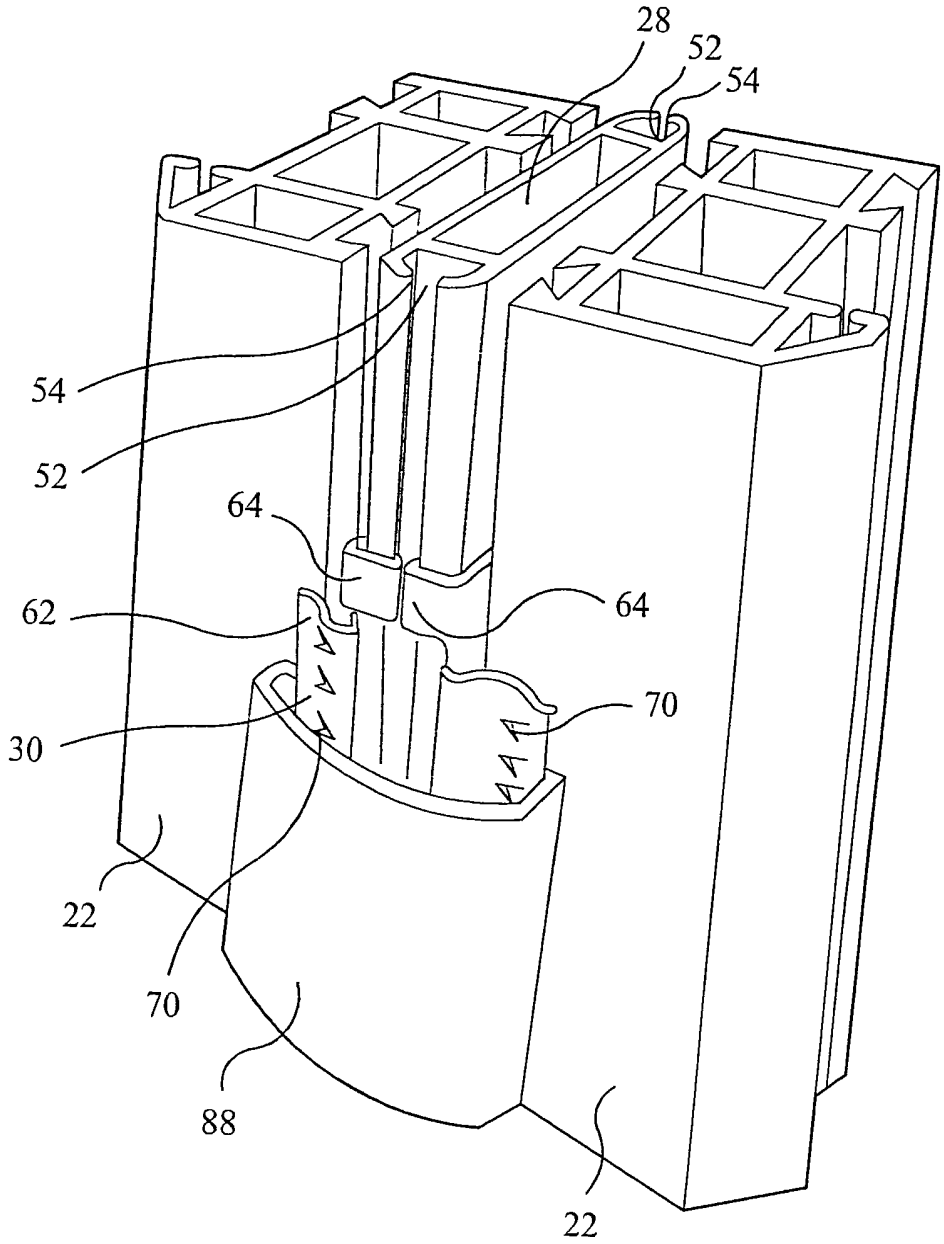

FIG 4

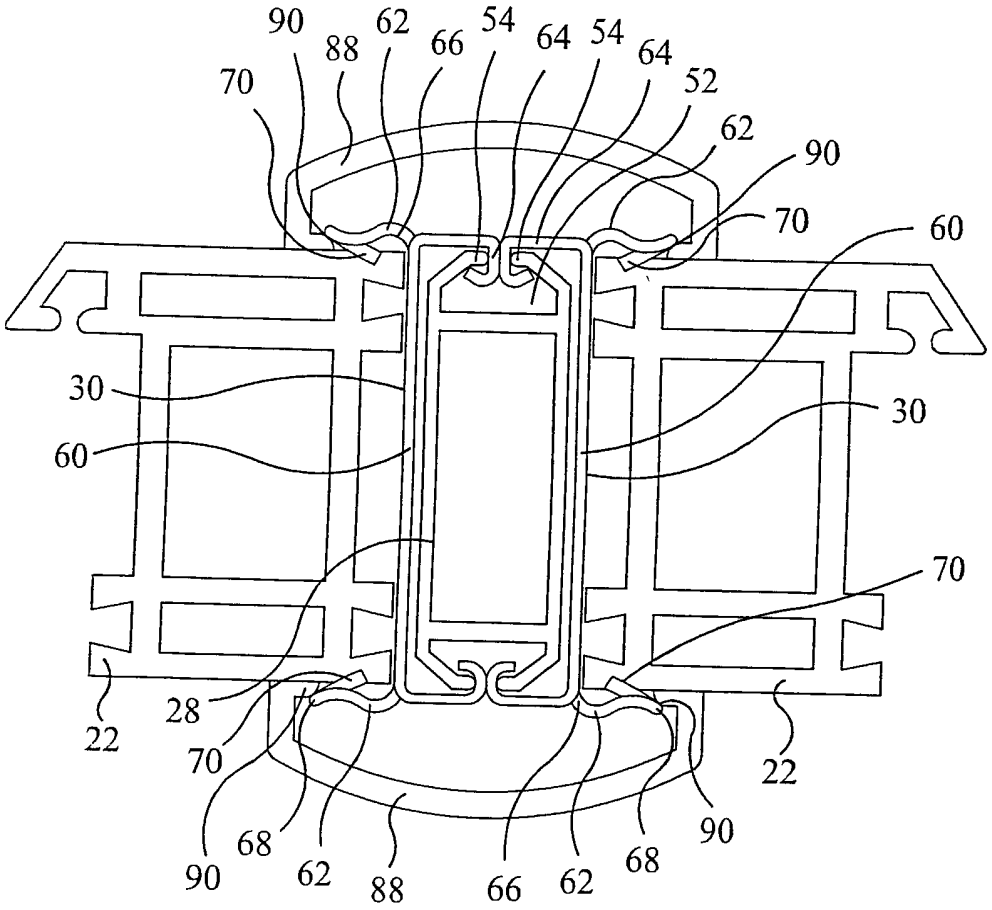
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FIG 5

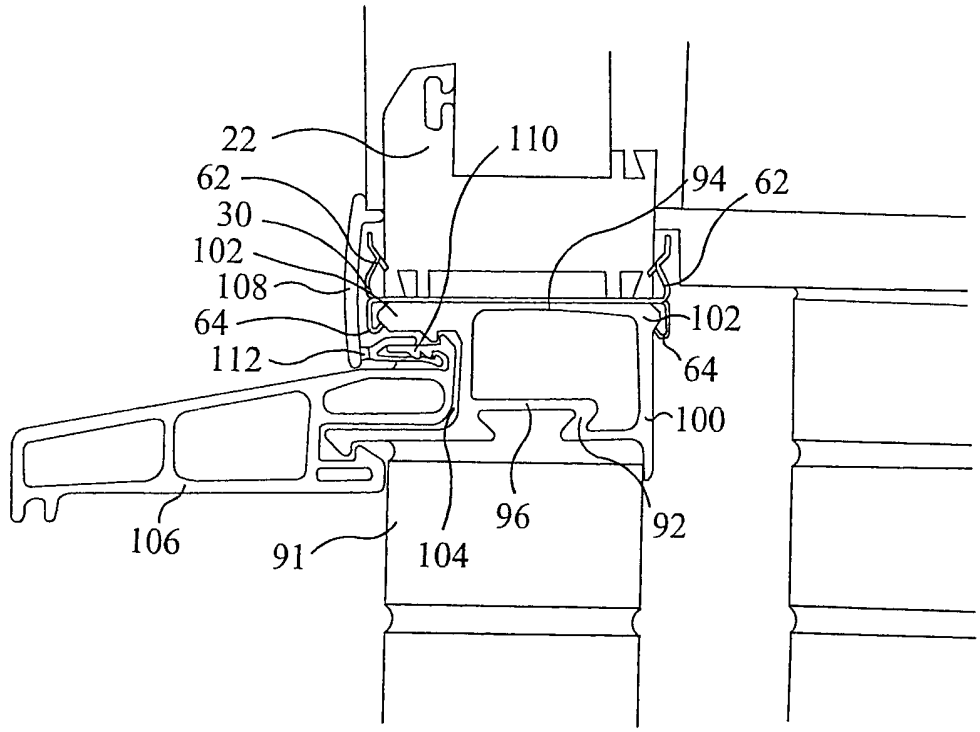
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FIG 6

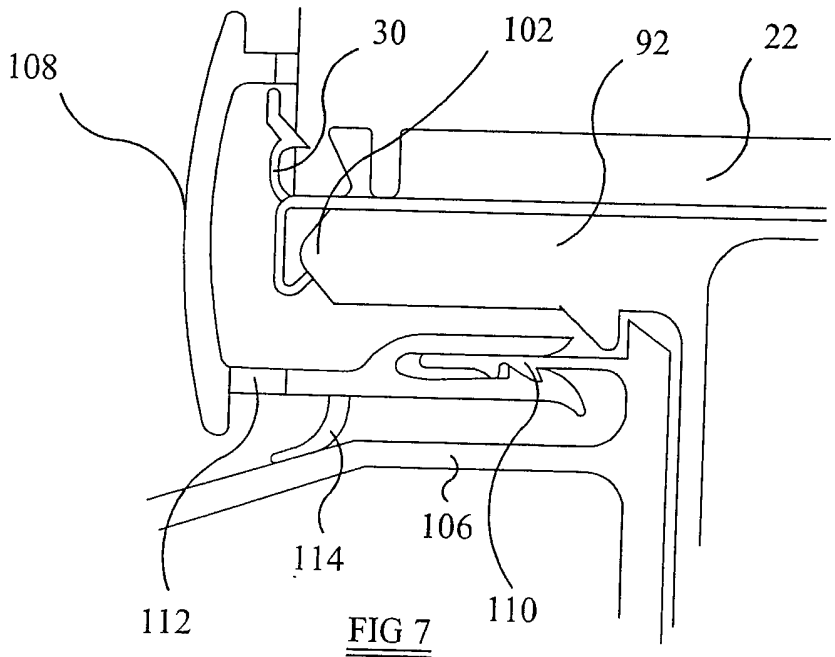
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FIG 7

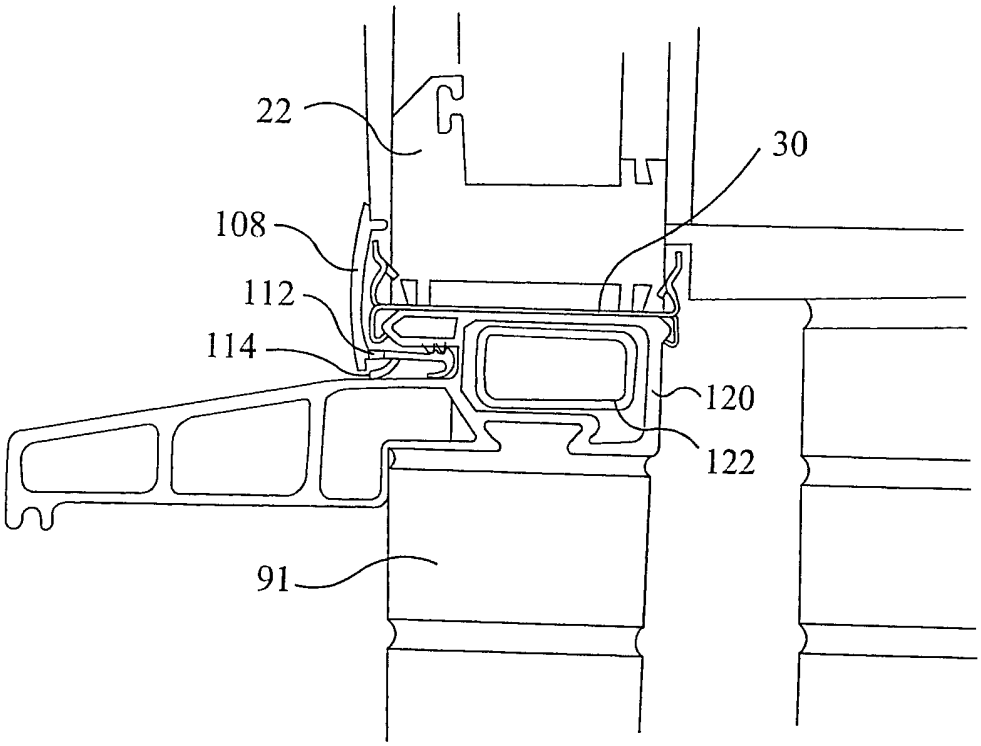


FIG 8

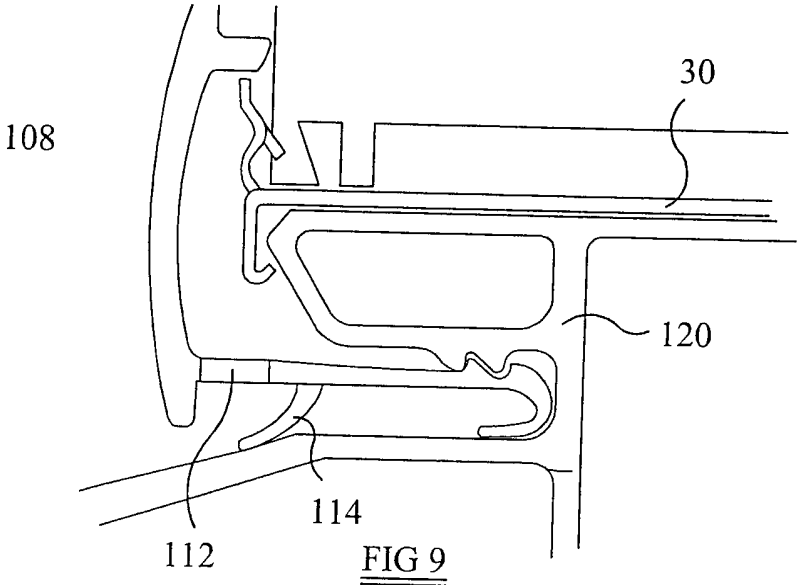
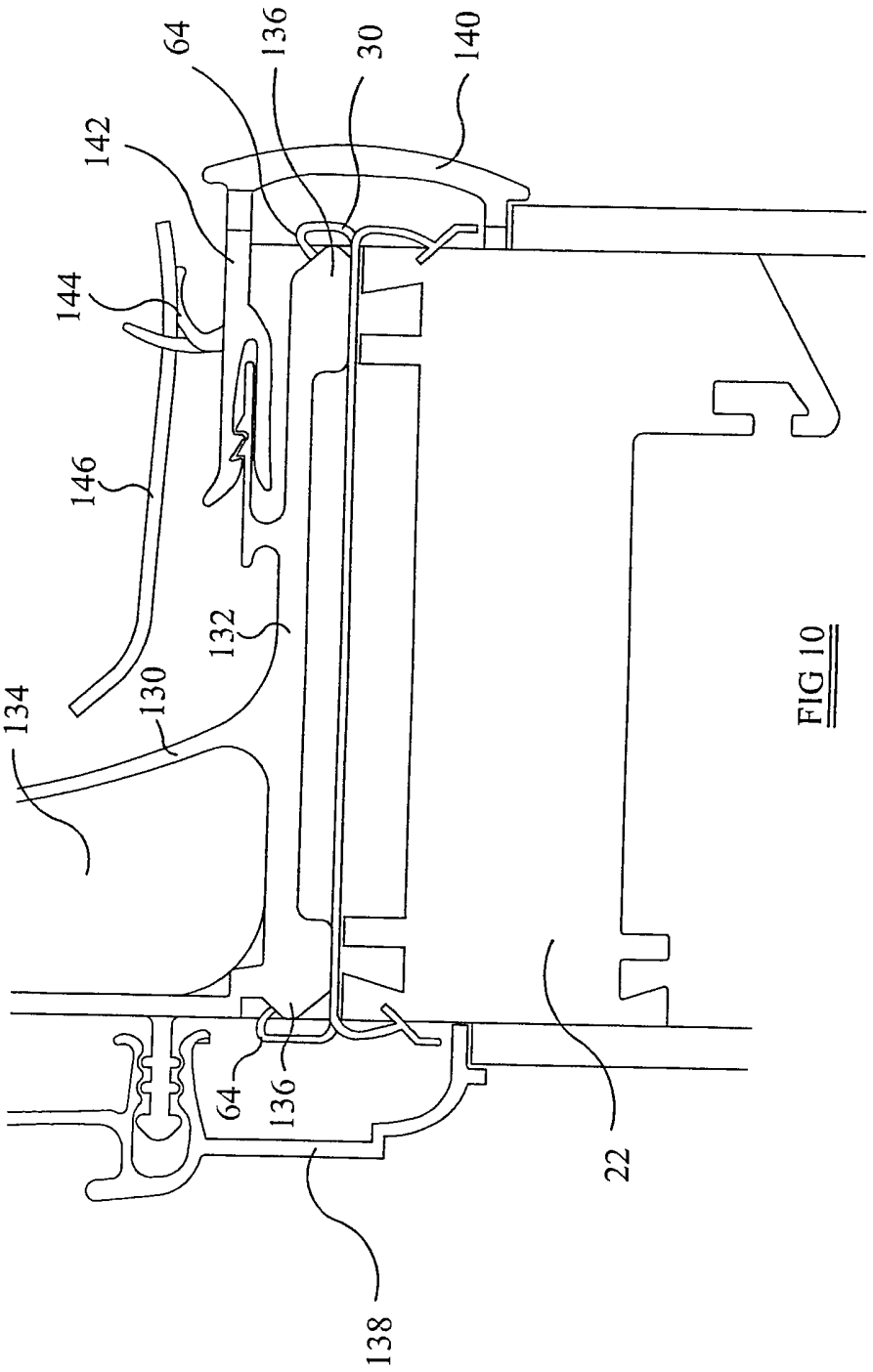


FIG 9



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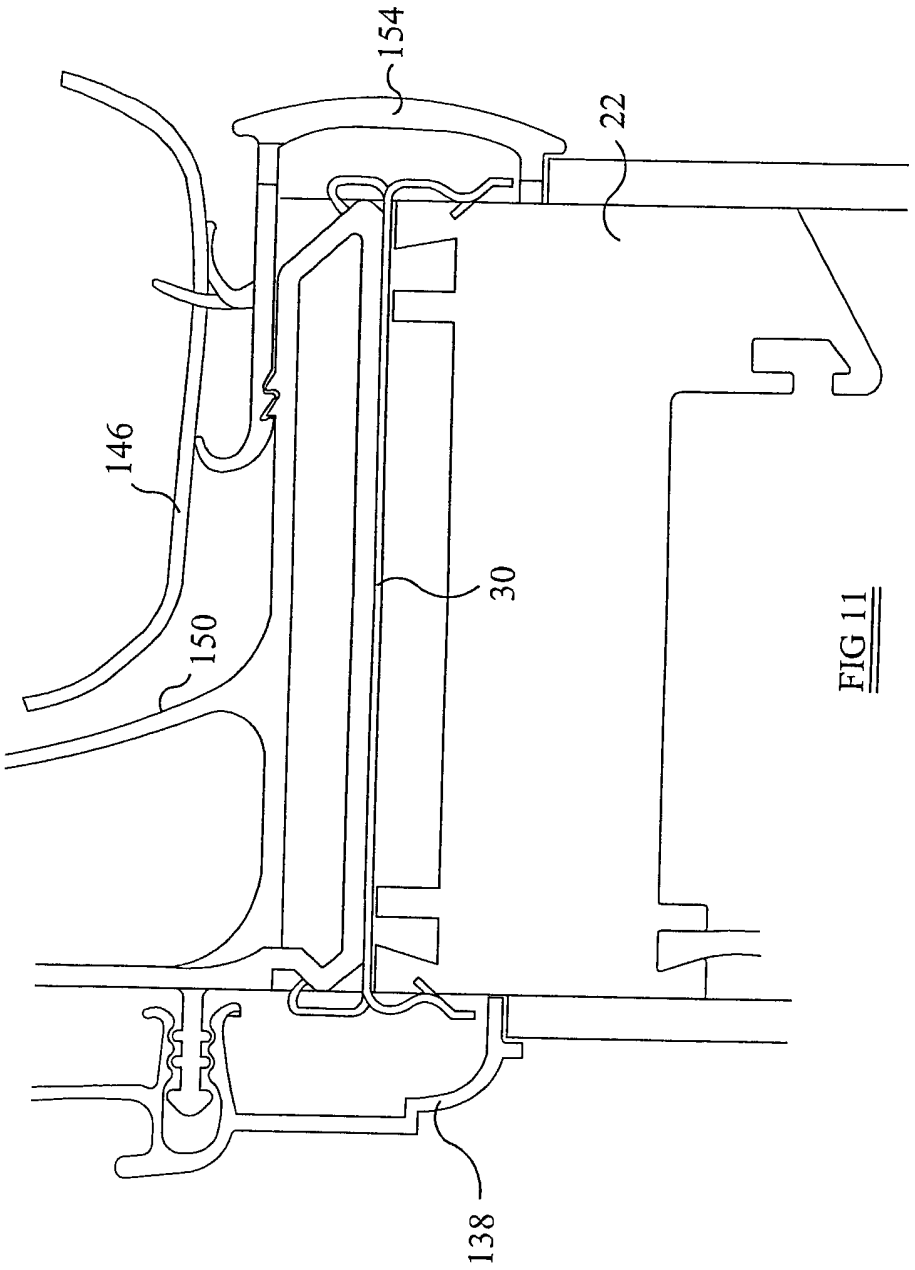

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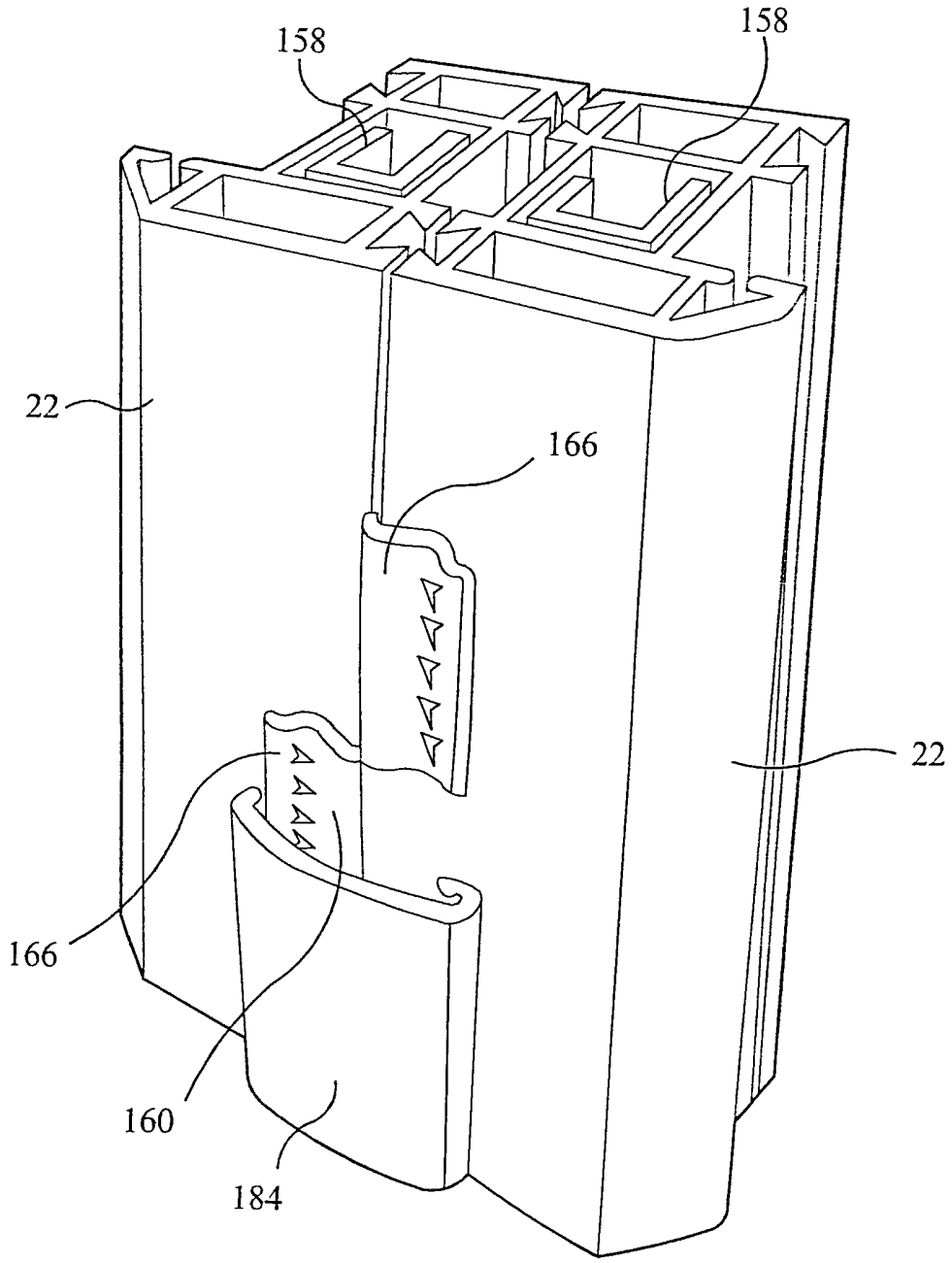

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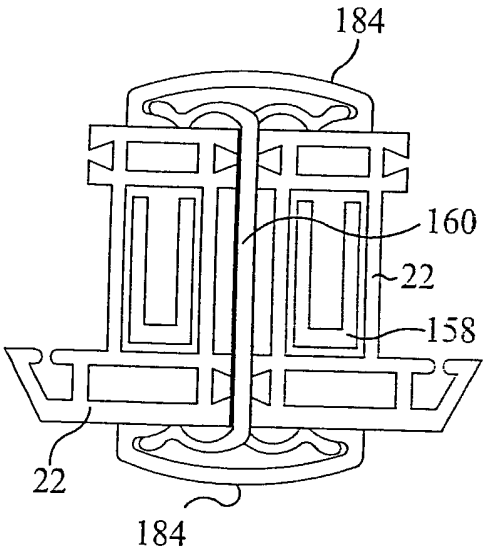

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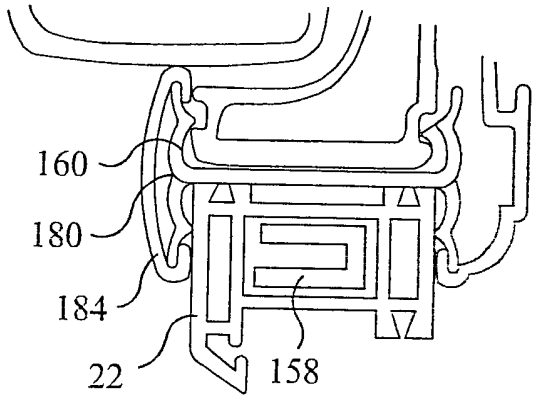

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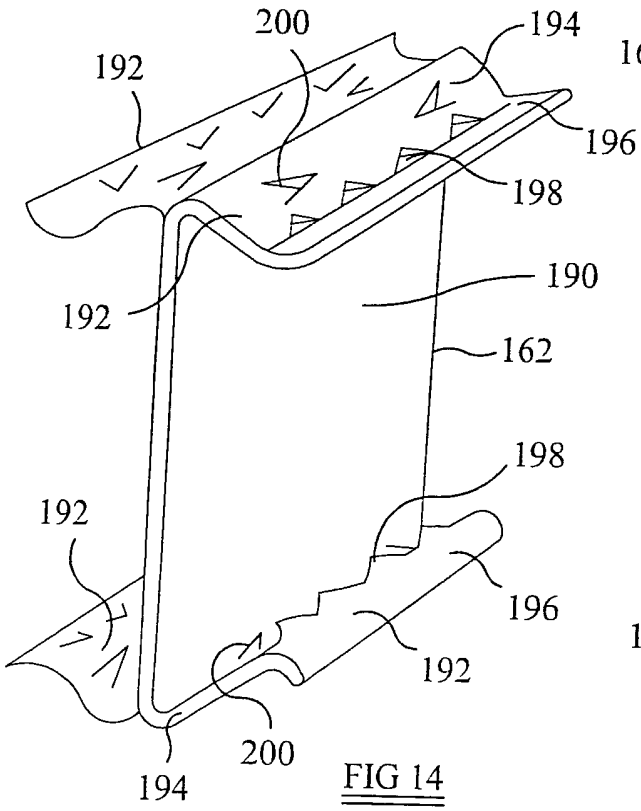

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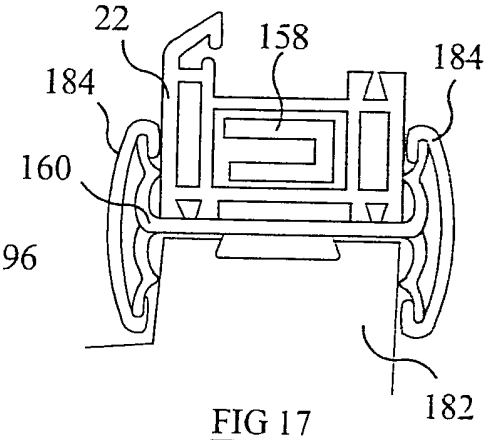

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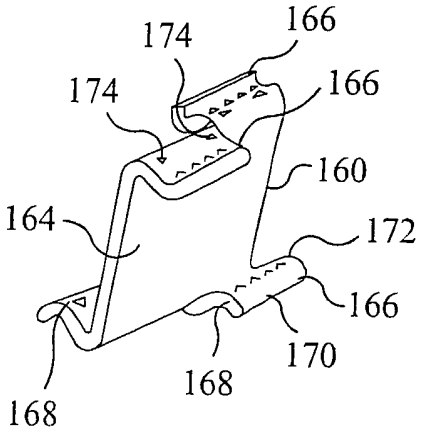

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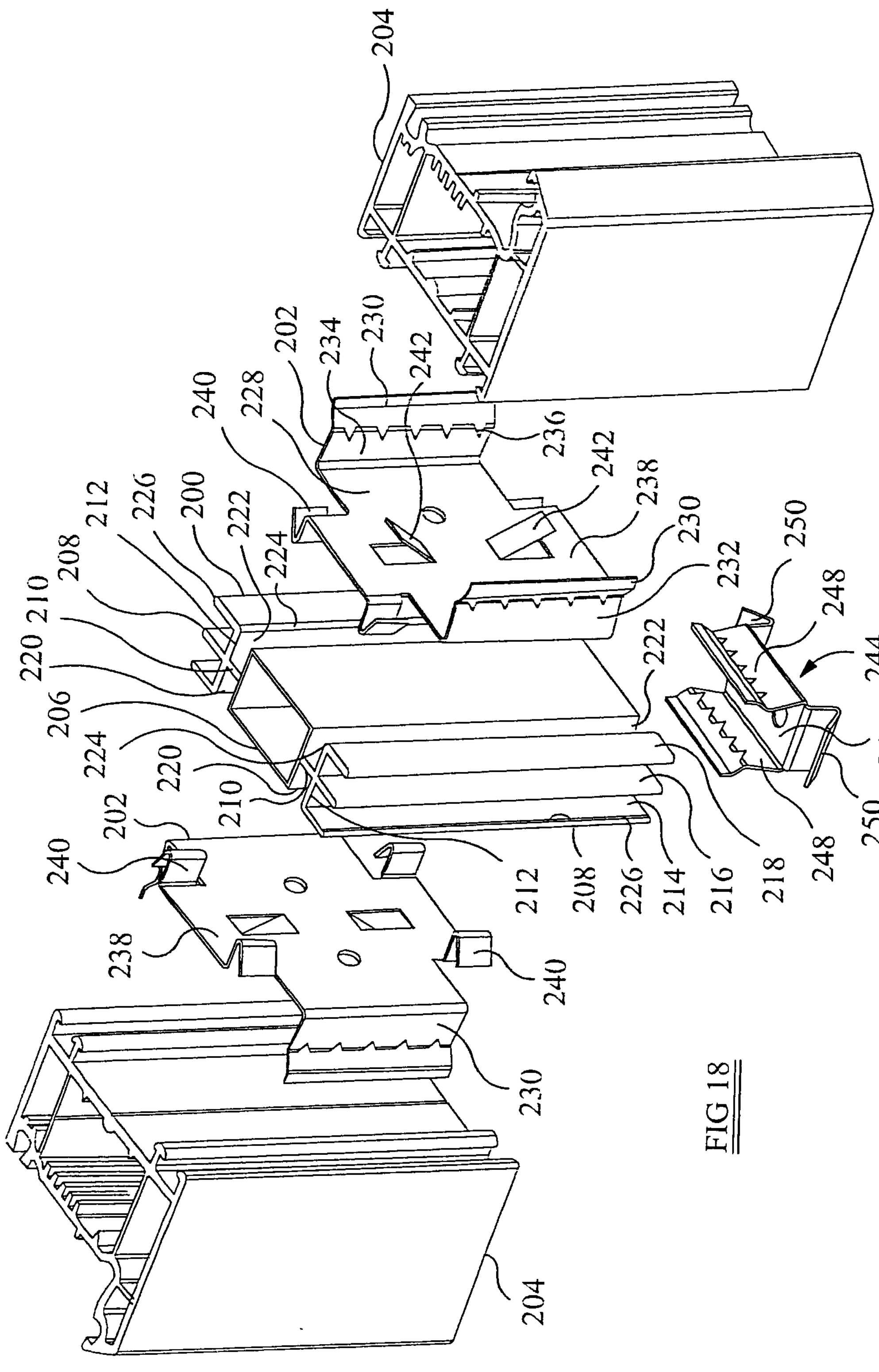
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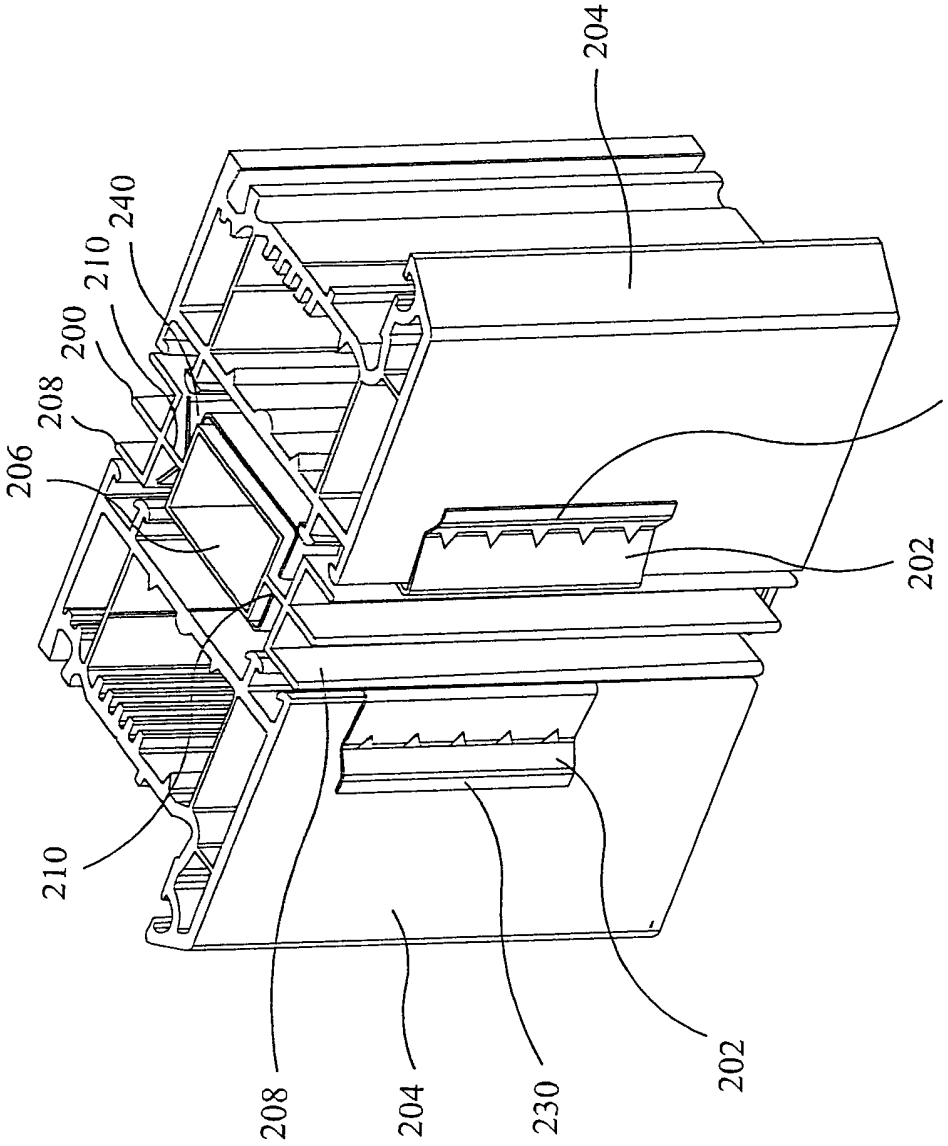
FIG 18



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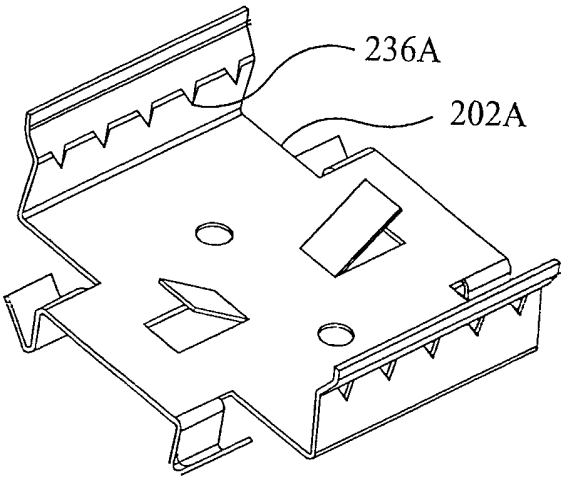

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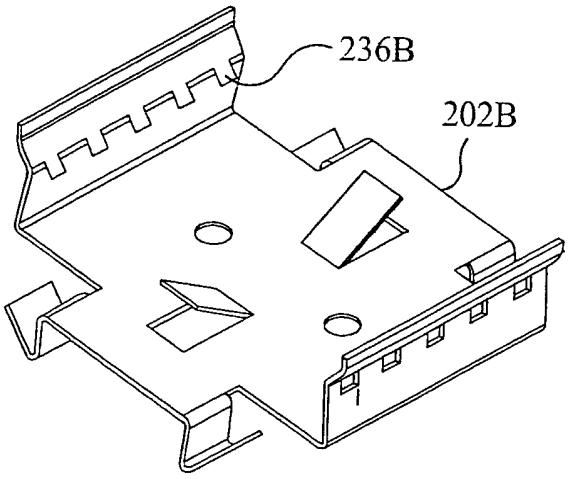

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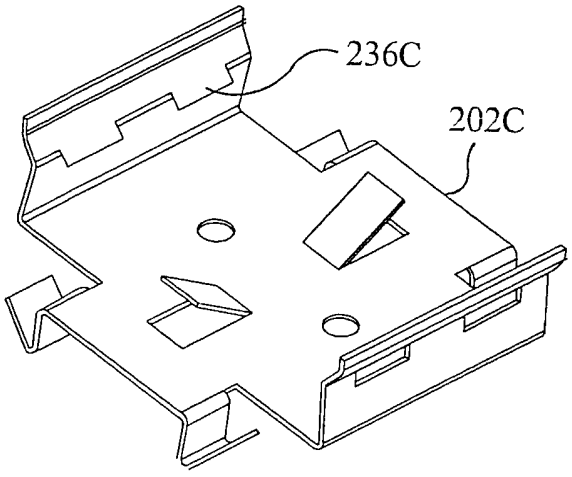

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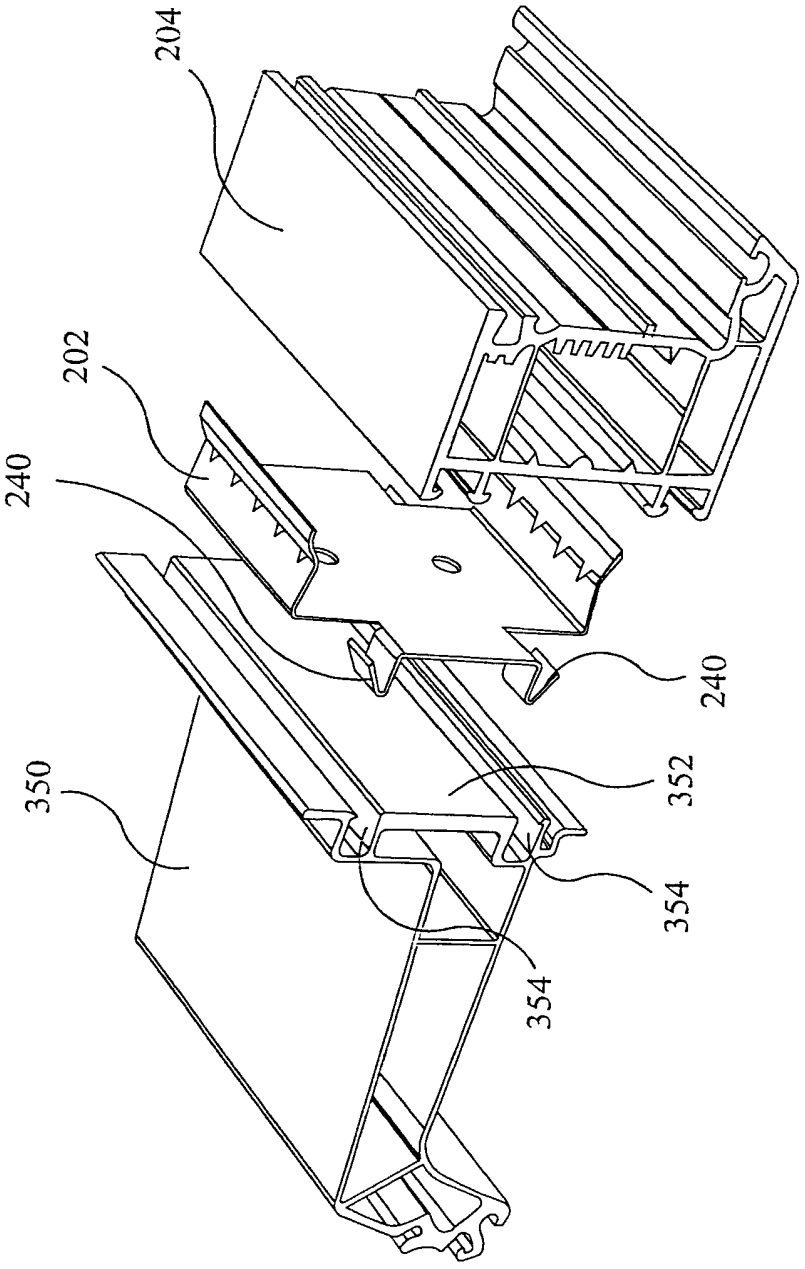

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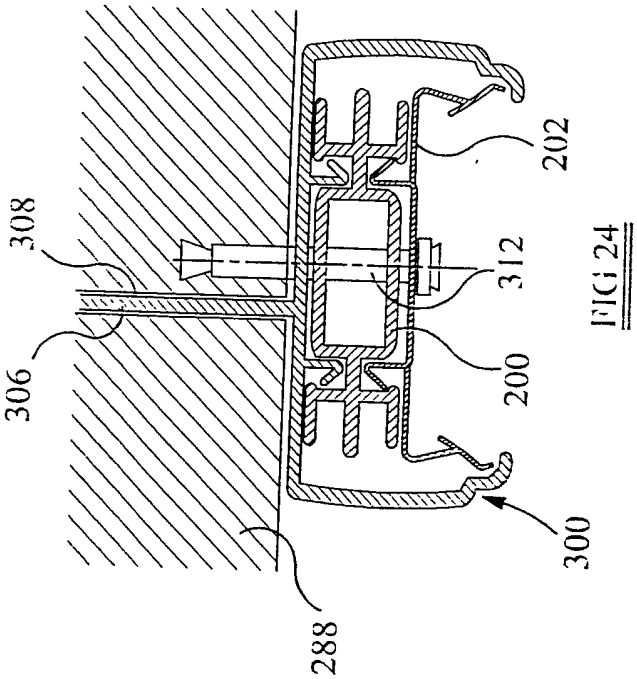

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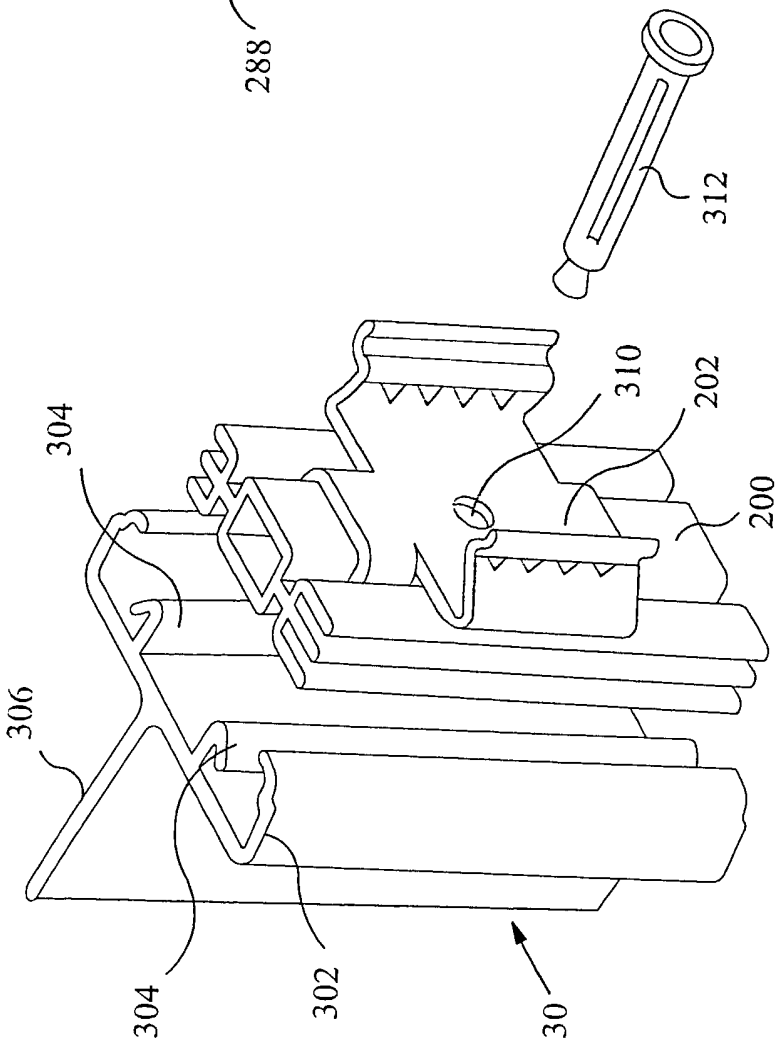
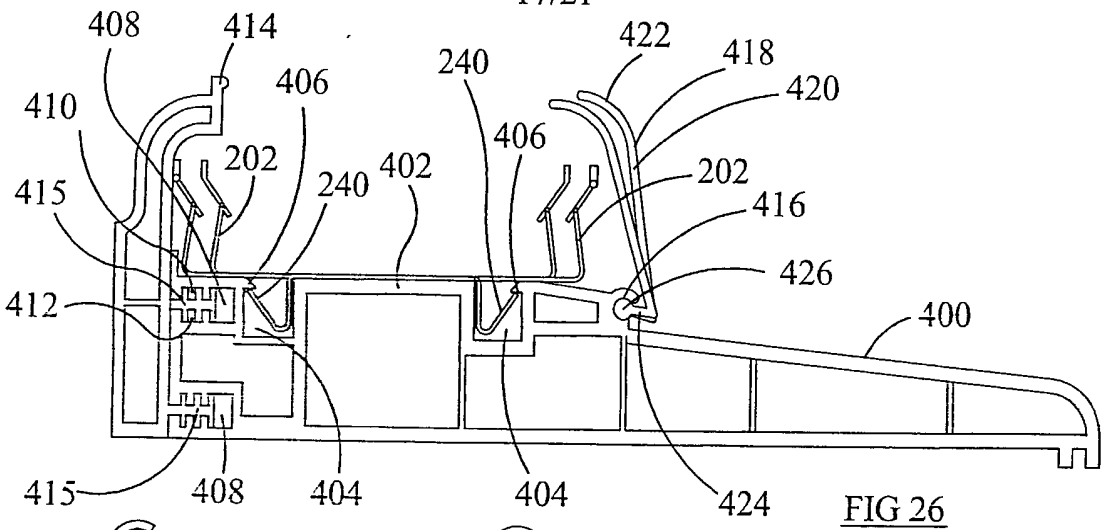


FIG 23



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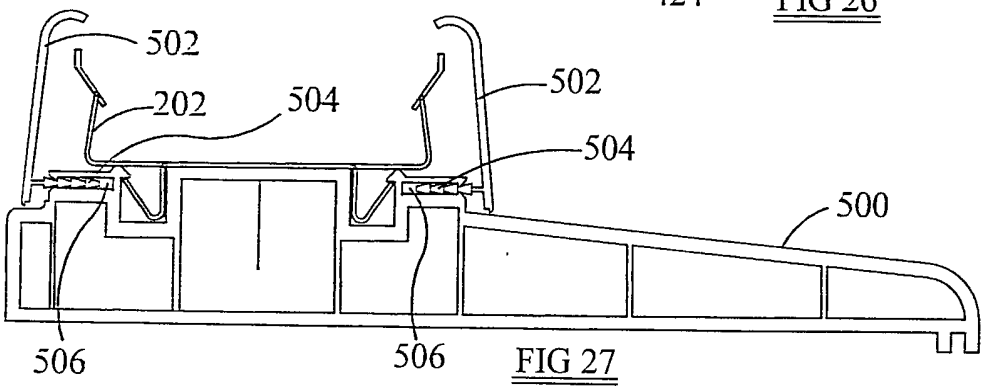

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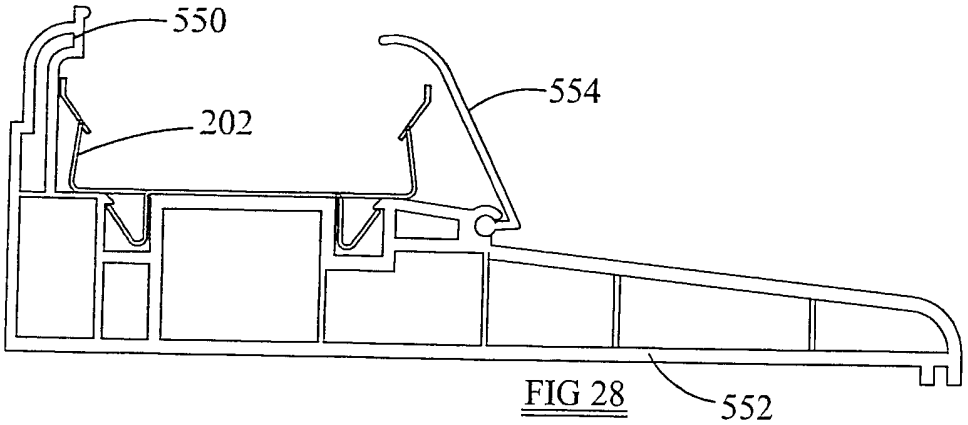
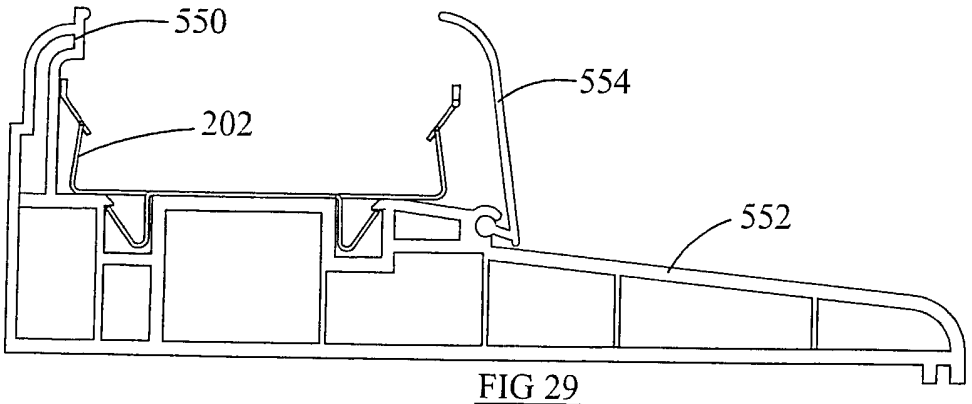


FIG 28



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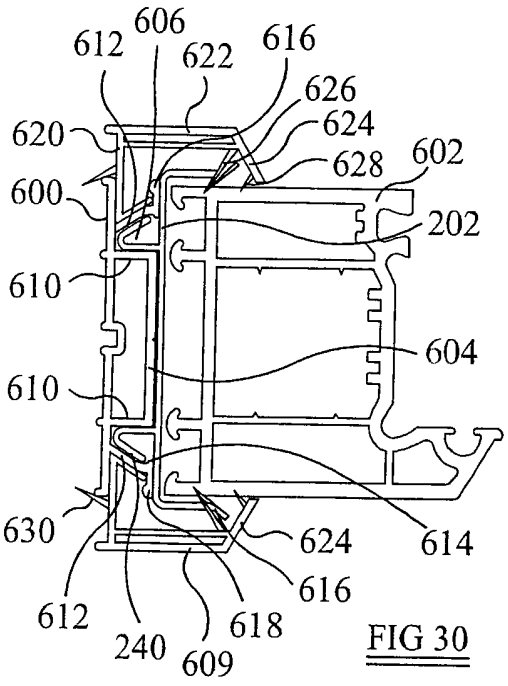
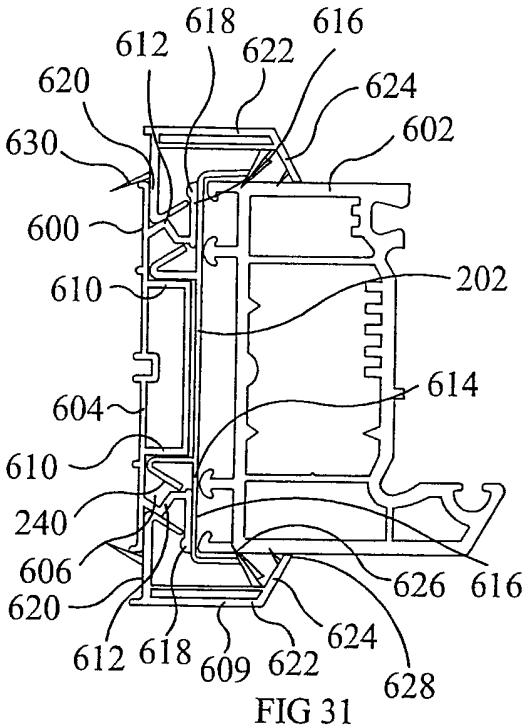


FIG 30



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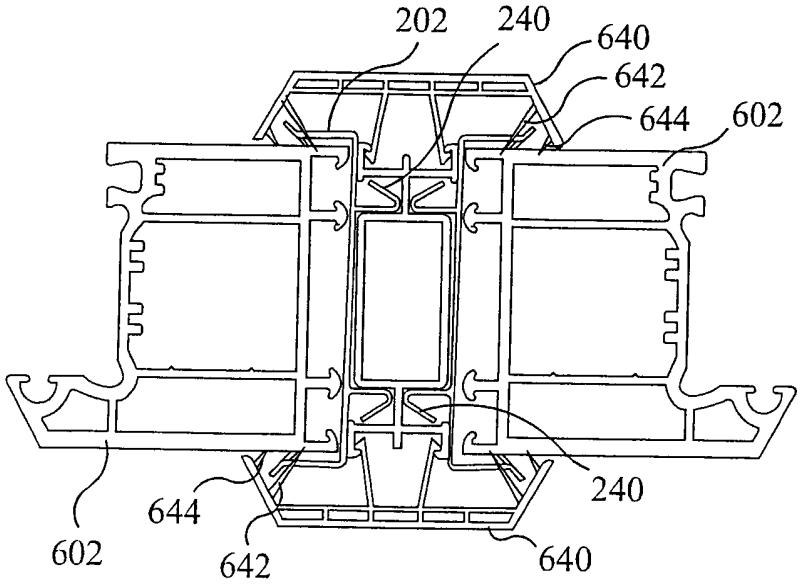

FIG 32

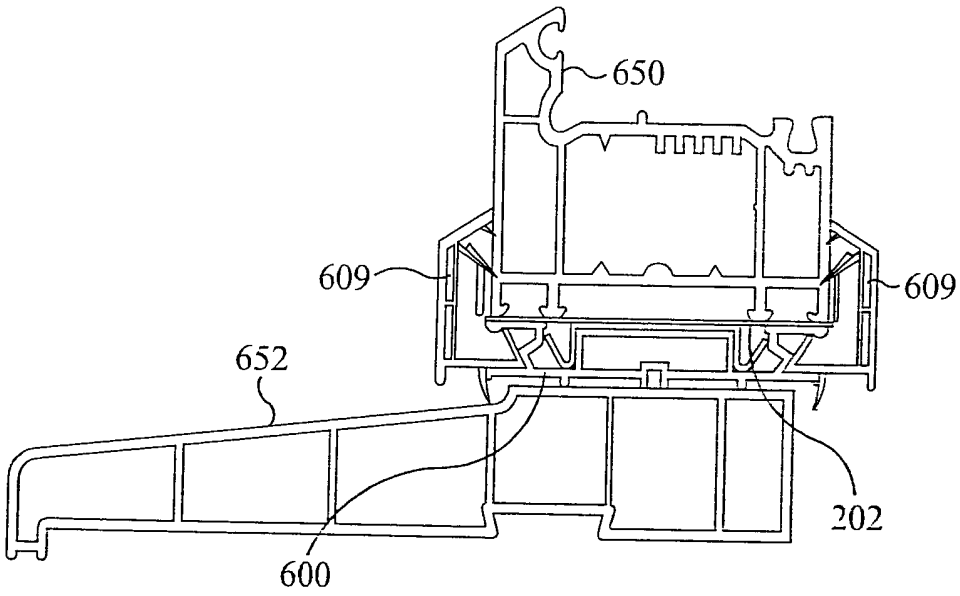
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FIG 33

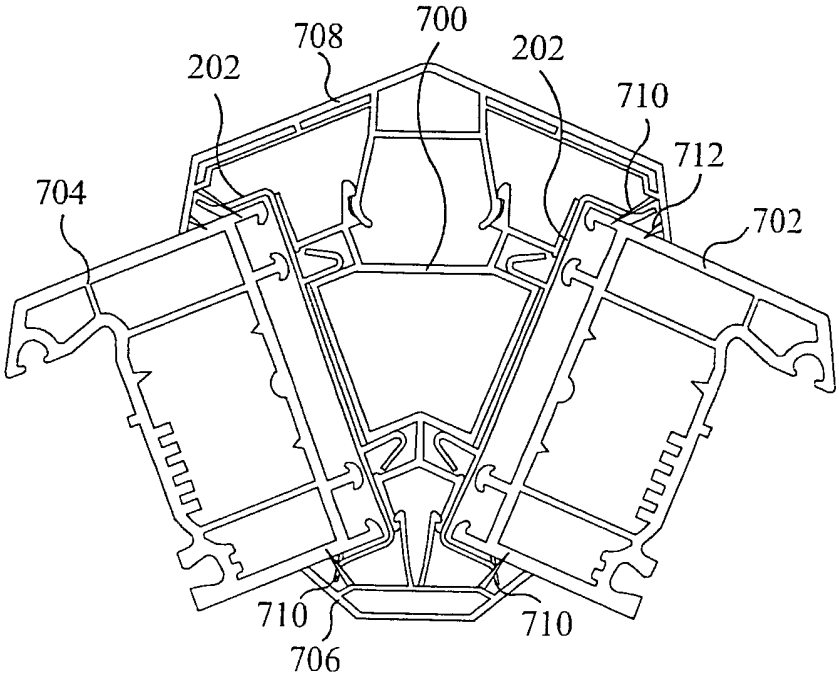
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FIG 34

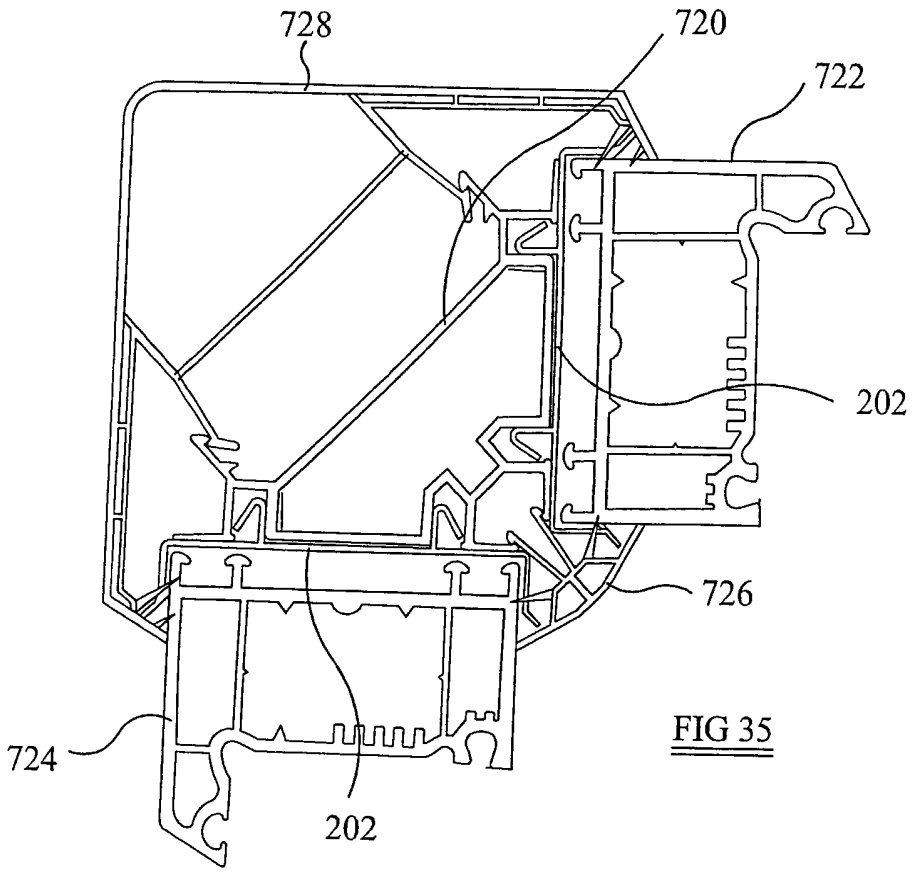

FIG 35

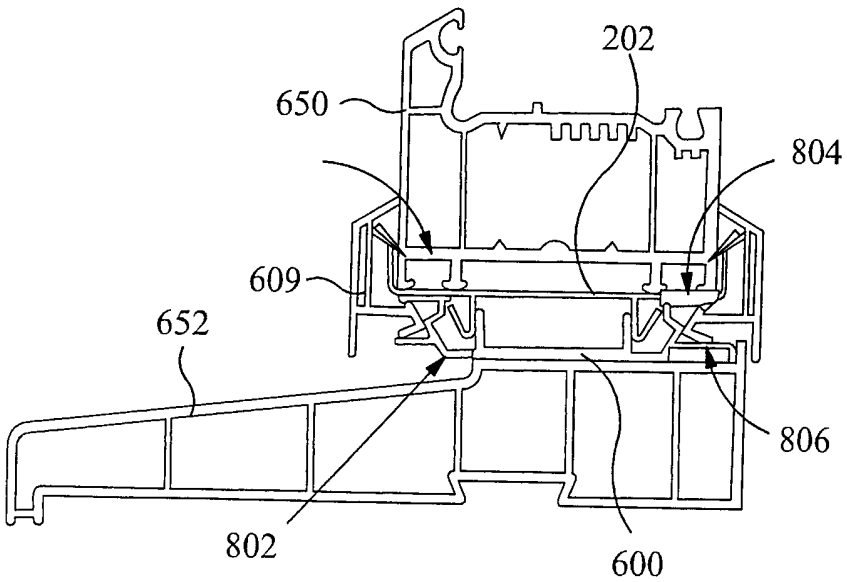

FIG 38

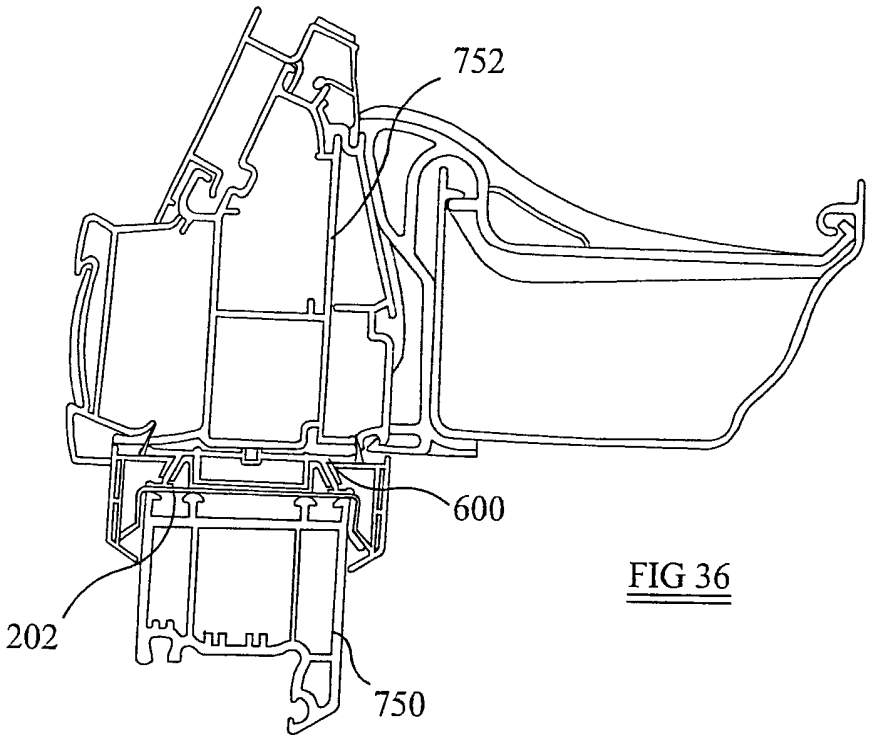

FIG 36

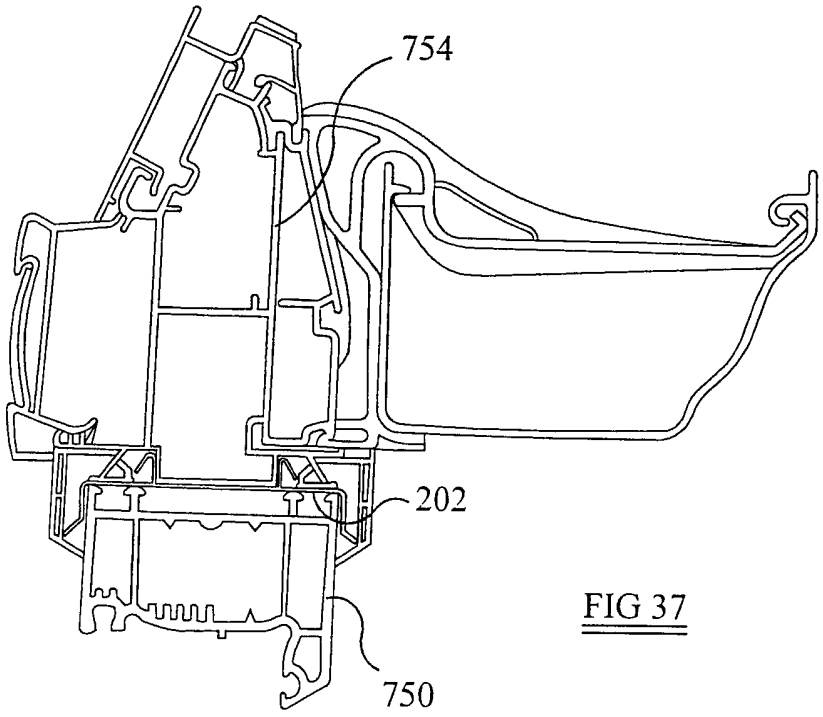

FIG 37

Title: Construction of conservatories and like structures

Description

This invention concerns the construction of window systems, especially window systems that form walls of conservatories and like structures.

When constructing a conservatory roof, it is conventional to form side walls thereof from window frames mounted on a brick or similar low wall. Part of a side wall of a conservatory will probably also include a full height door or doors. The conservatory is completed by adding an eaves beam onto to the tops of the window frames and erecting a roof on the eaves beam. The window frames are usually fixed together by means of screws through one frame into the next before glazed units are fitted into the frames. When uPVC window frames are used, to provide the necessary structural strength, the frames are provided with internal metal reinforcement, not only in outer frame members but also in central mullions for double window frames. It is also known to provide reinforcing posts between window frames.

An object of this invention is to provide means for constructing a window system, especially a window system that forms walls of a conservatory or like structure, which can be structurally compliant with less reinforcement than hitherto.

According to a first aspect of this invention we propose that window frames, particularly for forming a side wall of a conservatory or like structure, be connected to support posts between their ends by means of connectors.

The window frames are preferably connected to the support posts by means of clips. The clips preferably grip the window frames and locate on the support posts. The clips preferably have spaced jaws between which a window frame can be located

or between which formations of a window frame may be gripped. The jaws preferably have means for gripping the window frames. The gripping means may be teeth or the like that are preferably shaped and orientated, so that it is easier to push the window frame into the jaws than to pull it out. The jaws are preferably flared outwards at their free ends to facilitate insertion of a window frame. More preferably, the jaws of the clips have a slightly concave inner profile over a first part before flaring outwards.

The clips are preferably locatable on the support posts at any convenient point. The clips may be slidable into position along a post or may be snap-fit onto a post, possibly with the aid of a suitable tool.

In one preferred embodiment support posts are of rectangular section having a pair of opposed end formations for receiving the clips. Conveniently the end formations are channels with narrower openings than bases. Preferably sides of the channels turn in towards each other to form a narrow opening. The clips correspondingly preferably have hook-like formations to locate around channel sides.

In another preferred embodiment support posts have on opposite faces channels or grooves for receiving and retaining connector clip formations. The connector clips preferably have spring like projections that deflect as they are pushed into a groove or channel and then spring back to grip sides of the groove or channel. Preferably, the grooves or channels have at least one edge with a lip to aid retention of the connector clips. The support posts of this preferred embodiment preferably have end formations for receiving cover strips or the like to conceal the window frame support post connections.

The support posts are preferably secured to upper and lower conservatory components also by means of clips. Preferably the support posts are connected at their

top ends to an eaves component and preferably at their lower ends to a sill component. The clips for connection of the support posts to upper and lower conservatory components preferably comprise spaced jaws, which may either locate on the outside of a support post or may locate within a support post. The jaws of the clips for connection outwardly of a support post preferably converge over a first part before diverging to form a flared opening for ease of fitment thereof to a support post. The jaws preferably have formations for gripping sides of a support post, such as teeth or the like.

The jaws of the clips for location within a support post preferably diverge over a first part before converging to facilitate insertion thereof into a support post.

Both of these clips for the support posts preferably have formations for attachment thereof to a conservatory component. The preferred formations are hook-like to fit over edges of the component. The clips may be slid into position along the component or snap-fit onto the component possibly with the aid of a suitable tool.
As well as on sides of the window frames, clips may also be used to connect the frames top and bottom to conservatory components, especially eaves and sill components.

The sill and eaves components, to which the window frames and support posts may be connected are preferably of or incorporate a metal component. Preferred components provide ledges over which clips locate. In one preferred embodiment, the sill component is of plastics material but with metal reinforcement. The metal reinforcement is preferably in the form of a hollow metal beam within the plastics component. In an alternative embodiment, the sill comprises two parts, the first, to which the clips attach, being of metal and the other part, forming a nose for the sill

being of plastics material. The nose for the sill preferably snap-fits onto the metal component.

Preferably the clips and support posts are concealed behind cover strips. The cover strips may be slidable or snap fit into position. Preferably location of the cover strips is onto ends of the clips or of the support posts.

According to a second aspect of the invention we propose that window frames, particularly for forming a side wall of a conservatory or like structure, be connected end to end by brackets or clips.

In one preferred embodiment the brackets or clips are double sided, so that a window frame can be connected to either side. Alternatively, the brackets or clips may be single sided for attachment to a window frame but are connectable together to join the window frames.

In this second aspect of the invention, reinforcement for structural strength may be provided in the window frames themselves.

Connection of the window frames in the second aspect of the invention to upper and lower conservatory components will preferably be the same as in the first aspect of the invention.

In some situations it may be desirable to provide a structural member to act as a starter bar for connecting window frames to an existing wall or as an intermediate member in window sill and eaves beam arrangement. Such a starter bar is preferably shaped to receive clips of the invention attached to window frames. The starter bar may be attached to a wall or another component by screws or bolts preferably through a central section of the starter bar. Ends of the starter bar may have locations for receiving cladding strips.

This invention will now be further described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows schematically a conservatory construction according to the invention;

Figure 2 shows schematically a conventional conservatory construction;

Figure 3 shows clip and support post components of the construction of Figure 2;

Figure 4 shows part of the construction of Figure 2;

Figure 5 is a section through the part construction shown in Figure 4;

Figure 6 shows a first sill arrangement for the construction of Figure 2;

Figure 7 shows detail of the sill arrangement of Figure 6;

Figure 8 shows a second sill arrangement for the construction of Figure 2;

Figure 9 shows detail of the sill arrangement of Figure 8;

Figure 10 shows a first eaves arrangement for the construction of Figure 2;

Figure 11 shows a second eaves arrangement for the construction of Figure 2;

Figure 12 shows part of a conservatory construction according to a second aspect of the invention;

Figure 13 shows a first clip for the second aspect of the invention;

Figure 14 shows a second clip for the second aspect of the invention;

Figure 15 is a section through the part construction shown in Figure 12;

Figure 16 shows an eaves arrangement for the second aspect of the invention;

Figure 17 shows a sill arrangement for the second aspect of the invention;

Figure 18 is an exploded view of another window frame and support post connecting system of the invention;

Figure 19 shows the system of Figure 18 assembled;

Figure 20 shows a first connector clip for use in the system of Figures 18 and 19;

Figure 21 shows a second connector clip for use in the systems of Figures 18 and 19;

Figure 22 shows a third connector clip for use in the system of Figures 18 and 19;

Figures 23 and 24 are perspective and plan views of connections of the system of Figures 18 and 19 to an existing wall;

Figure 25 shows connection of a window sill for the system of Figures 18 and 19;

Figure 26 shows a first sill system to accommodate window frames of different thickness;

Figure 27 shows a second sill system;

Figures 28 and 29 show a third sill system;

Figures 30 to 38 show modifications to the system of the invention and, in particular;

Figures 30 and 31 show starter post arrangements;

Figure 32 shows a mullion assembly;

Figure 33 shows a window sill arrangement;

Figure 34 shows a 135° post arrangement;

Figure 35 shows a 90° corner post arrangement;

Figures 36 and 37 show eaves beam arrangements; and

Figure 38 shows a modification to the sill arrangement of Figure 33.

Referring to Figure 1 of the accompanying drawings, a schematic representation of part of a conservatory 10 constructed according to the invention

shows two walls 14, 16 of windows 18, one wall 14 including double doors 20. The windows 18 are constructed of uPVC frames 22 and are, in the main, doubles having a central mullion 24 that is reinforced with a steel or aluminium post 26. Where the conservatory joins an existing house wall, the first window frame 22 is secured directly to that wall. Subsequent window frames 22 and those for the doors 20 are joined with aluminium posts 28 therebetween.

The windows 18 are mounted on a sill (not shown) that is usually mounted on a low wall forming the lower part the conservatory side walls except in the region of the doors. The aluminium posts 28 are connected to the window frames by means of clips 30 (to be described in detail later) and the window frames 22 are connected to the sill by means of similar clips 30. The aluminium posts are connected to the sill by means of clips 32. On the top of the window frames 22 an eaves beam is mounted, to which the roof of the conservatory is attached. The window frames 22 and the aluminium posts 28 are connected to the eaves beam by means of clips 34.

The window wall forming system of the present invention represents an improvement over the conventional system as shown in Figure 2 of the drawings, in which window frames 40 are screwed to supporting posts 42 and which require frame reinforcement 44 entirely around each frame 40 as well as of the central mullions 46. The system shown in Figure 1 allows a conservatory to be constructed that is structurally compliant with minimum reinforcement.

Figure 3 of the drawings shows the aluminium support post 28 and the clips 30 used to connect the window frames 22 to the post and to the sill and eaves and clips 32 and 34 to connect the post to the sill and eaves respectively. The aluminium post 28 is formed as an extrusion and has a rectangular section core. At opposite narrow

ends of the core are channels 52 that have narrow openings formed between edges 54 of the channel sides that turn into towards each other.

The clips 30 used for attaching a window frame 22 to a support post 28 are formed from metal sheet. The clips have a main body 60 with jaws 62 extending from opposite edges of the main body to one side thereof and hook formations 64 extending from opposite edges of the main body to the other side thereof. The jaws 62 have a first part 66 with an inner concave profile and a second part 68 that flares outwardly relative to the opposite jaw. Where the two jaw parts meet, triangular teeth 70 are pressed out of the jaws.

The clips 32 for connecting the support posts 28 to a sill have a pair of jaws 72 extending to one side from edges of a main body 74. At ends of the body and extending from the opposite side of the main body 74 and the other pair of edges thereof are hook-like formations 76. The jaws have a concave inner profile converging towards each other at their ends. The jaws also have teeth 78 pressed outwardly thereof.

Clips 34 for connecting the support posts 28 to the eaves have a pair of jaws 80 extending to one side from edges of a main body 82. At ends of the body and extending from the opposite side of the main body and the other pair of edges thereof are hook-like formations 84. The jaws 80 have a similar profile to the jaws of clips 30 including having teeth 86 pressed inwardly of the jaws.

Connection of window frames is shown in Figures 4 and 5, in which window frames 22 are connected to either side of a support post 28 by means of clips 30. The clips are slid into place with the hook formations located around the edges of the channels. Then window frames 22 are pushed into the jaws 62 of the clips 30. This is facilitated by the flared nature of the jaw ends and gripping of the window frames in

the jaws is enhanced by the teeth 70 of the jaws. The teeth 70 are orientated so that window frames can be pushed past them into position but dig into the window frames 22 if they are being pulled out of the jaws.

Once the window frames 22 either side of a post 28 are in position cover strips 88 can be slid or snapped into place over the posts and the clips. The cover strips 88 have inwardly facing edges 90 that locate behind the ends 68 of the jaws 62 of the clips 30.

The support posts 28 and the window frames 22 are mounted on a sill, which is mounted on a low brick wall 91. As shown in Figures 6 and 7 a sill arrangement comprises an extruded metal sill component 92, which has a top 94, a base 96 and opposed side walls 98, 100. The top 94 provides at opposite sides ledges 102. The intended outer side wall 98 includes a channel 104 for receiving a sill nosing 106 of plastics material. This arrangement has the advantage that a damaged sill nosing can be replaced without having to disturb the windows.

The support posts 28 are connected to the sill component 92 by means of clips 32, whose hooks 76 locate over the ledges 102 of the sill component 92. The support posts 28 are then pushed down onto the clips 32 with their jaws 72 fitting within the posts. The window frames 22 are further secured to the sill component 92 by means of clips 30 that also locate over the ledges 102 of the sill component with the window frames 22 being pushed into the jaws 62. Instead of clips 32, clips 34 may be used to connect the support posts 28 to the sill component.

The clips 30, 32 and the junction between the sill component 92 and the sill nosing 106 are covered by cladding strips 108 that are a push fit onto a ledge 110 of the sill nosing. The cladding strips 108 have drainage holes 110 and on their underside co-extruded gasket strips 112 to seal against the top of the sill component.

An alternative sill arrangement is shown in Figures 8 and 9, wherein the sill 120 is of one-piece construction of extruded plastics material but has a hollow tubular metal reinforcement 122 within it. The one-piece component has substantially the same outer profile as the two-piece arrangement of Figures 6 and 7.

Turning to Figure 10 of the drawings, an eaves beam 130 is mounted on the window frames 22 and the support posts 28 using clips 30 and 34 respectively. The eaves beam is generally L-shaped having a base 132 and an upstanding wall 134, which is to the inside of the conservatory. The base 132 provides at opposite sides ledges 136 for receiving the hooks 64 and 76 of the clips 30 and 34. Inner and outer cladding strips 138, 140 respectively are provided to cover the clips and the area where the eaves beam 130 is connected to the window frames 22 and the support posts 28. The outer cladding strip 140 has a top wall 142 provided with a strip 144 of co-extruded gasket material to seal against the underside of a gutter 146 mounted to the eaves beam. The outer cladding strip 140 can be the same as the cladding strip 108 used on the sill but turned over.

Figure 11 shows a slightly different eaves beam 150, which has a hollow base 152. Also, outer cladding strip 154 locates on the eaves beam in a different way to that shown in Figure 10.

Generally, the steps to construct a conservatory side wall as illustrated include the steps of providing preset position on the sill for the support posts, taking into account window size tolerances. The clips 32 are positioned on the sill component at the point of fabrication, so that they are in place when delivered to site. The first window is put against the wall against which the conservatory is being constructed and secured in place with screws into the wall. The first window is also pushed down onto clips 30 on the sill. In this situation it is envisaged that the window frames 22

used will in the main be double window frames and will have frame reinforcement only in central mullions.

Then, a support post 28 is offered onto a clip 32 on the sill, moved into an upright position and driven down onto the clip to secure it in position. The post already has on it window frame securing clips 30, so that it when it is moved into an upright position, the post is also secured to the window frame. The next window can then be secured in position by pushing it into the clips 30 on the support post 28 and on the sill and so on with subsequent support posts and window frames.

The cover strips 88 for the support posts 28 are preferably attached before the eaves beam 130 is fitted on top of the window frames 22 and the support posts by means of clips on top of the window frames and the support posts. Eaves and sill cladding strips 108, 138 and 140 can then be added to complete the window arrangement.

Turning to Figures 12 to 17, an alternative window arrangement according to the invention uses window frames 22 with more frame reinforcement 158 than proposed for the previous embodiment but without the use of support posts between the frames. In this arrangement, double sided clips may be used or clips that are single sided but which may be connected back to back. The reinforcement 158 is in the form of profiled metal bars.

The clip 160 used in the arrangement shown in Figures 12 and 15 to 16 is that shown in Figure 13. The clip 162 shown in Figure 14 is an alternative. The clip of Figure 13 has a main body 164, which is cut and folded to provide a pair of gripping jaws 166 from each of a pair of opposed sides but each jaw of a pair extends oppositely to the other. Thus from each side of the body of the clip a pair of jaws extend that are offset relative to each other. The jaws 166 are shaped so as to present

concave inner profiles 168 from the main body before diverging at their free ends 170. Where the transition is made the jaws have inwards teeth 172 with their points towards the main body. Additional inner teeth 174 are provided on the concave parts of the jaws but with their points facing each other. The first teeth 172 are to provide lateral grip on a window frame and the second teeth are to provide grip along a window frame.

As shown in Figures 15, 16 and 17, the clips are used to connect window frames together and to an eaves beam 180 and to a sill 182 respectively in a similar manner to that shown in the first illustrated arrangement. As before cover strips 184 are provided that fix over the free ends of the jaws of the clips.

The clips 162 of Figure 14 have a main body 190 with full width pairs of jaws 192 from both sides. The jaws of a pair converge for a first part 194 before diverging for a second part 196. Two sets of teeth 198 and 200 for gripping window frames against lateral movement and slippage respectively extend inwardly from each jaw. The clips of Figure 14 may be used in place of the clips of Figure 13.

Turning to Figures 18 to 22, an alternative window frame connection system according to the invention uses support posts 200 and connecting clips 202 to connect window frames 204. The support posts 200 have a central rectangular section part 206 with triple web formations 208 joined to the central section 206 by single webs 210. The triple web formations each have a base 212 and webs 214, 216 and 218 extending perpendicularly therefrom. Between the base 212 and the central section 206 of the support post on opposite sides thereof are pairs of channels 220 and 222. The base 212 at each end has a lip 224 extending into the channels. The outer webs 214, 218 also have lips 226 along their edges facing inwardly towards each other for aiding location and retention of cover strips (not shown).

The clips 202 have a generally rectangular main body 228 with jaws 230 extending from opposite edges of the body to one side thereof. The jaws 230 have inner parts 232 that converge and outer parts 234 that diverge from each other. Where the two parts meet, teeth 236 are pressed out of the jaws inwardly thereof.

From the other two opposed edges of the body of the clip there are narrower extensions 238 of the body that have on opposite ends spring tabs 240 that are spaced apart by the distance between a pair of channels 220 or 222 on the sides of the support posts.

Pressed out of the main body 228 on the same side as the jaws are a pair of spring tabs 242 when a window frame is pressed into the jaws these tabs exert a contrary force that causes the teeth of the jaws to dig into the window frames 204 to improve the grip

Also shown is a clip 244 for connecting the support post to a sill component (not shown). This clip has a rectangular body 246 with a pair of jaws 248 similar to those of connector clip 202, which can grip the outside of the support post 200 and on the other pair of opposed sides spring tabs 250 for locating and retaining the clip in a sill component.

Figures 20, 21 and 22 show three slightly different connector clips 202A, 202B and 202C, the difference lying in the shape of the teeth 236A, 236B and 236C respectively for gripping the window frames. In Figure 20, the teeth 236A are triangular and in Figures 21 and 22, the teeth 236B and 236C are rectangular but wider in Figure 22.

When constructing a window system for a conservatory, in accordance with the invention, it is usual to start where the conservatory is joined to an existing wall 288. In order to provide a damp proof course at that junction a damp proof

component 300 of the type shown in Figures 23 and 24 may be used. The damp proof component 300 is of plastics material and comprises a channel part 302 with spaced spring ribs 304 extending therefrom within the channel for location of a support post 200 therein, the spring ribs locating in the channels 220 or 222 of the support post. Extending from the opposite side of the channel part is a flange 306, which forms the damp proof membrane. A channel 308 is cut into the brickwork of the wall 288 to accommodate the flange. The flange is offset from a centre line of the channel part 308.

On the opposite side of the support post connector clips 202 for attaching a window frame 204 are added. The clips have one or more holes 310 for guiding fixing bolts or screws 312 and one of those is used to direct a drill bit to form a hole through the support post and damp proof component into the brickwork for receiving the fixing bolt.

Figure 25 shows how a sill component 350 may be added to a window frame 204 using connector clips 202 of the type show in Figures 18 and 19. The sill component 350 has a rear face 352 with a pair of longitudinal spaced channels 354 to receive spring tabs 240 of a connector clip 202. The connector clip connects to the window frame in the same manner as in Figures 18 and 19 of the drawings.

Turning to Figure 26, a sill component 400 is shown onto which support posts may be mounted and which may accommodate window frames of different thickness, e.g. 60, 65 and 70 mm thickness frames. The sill component 400 has in its top 402 a pair of spaced longitudinal channels 404 having lips 406 along one top edge to receive and retain spring tabs 240 of a connector 202 of the type shown in Figures 18 and 19. Connectors with different jaw spacing will be provided according to the window frame structure.

To cover the connector 202 at its intended inner end, the sill component 400 has a pair of parallel slots 408 that have notched top and bottom walls 410 and 412 respectively. A cover trim 414 is slidably locatable in the notched slots at different positions depending on the window frame thickness by means of its ribbed projections 415.

To cover the connection at the opposite side, the sill component 400 has a longitudinal slot 416 that is of part-circular section and that has parallel grooves therealong. A cover trim 418 has a main flat section 420 with a curved top part 422 and a bottom flange 424 ending in a circular section splined bead 426. The bead 426 is slidably locatable in the slot 416. The cover trim can be pivoted around its connection to the sill component until the top contacts the window frame. The grooves of the slot and the splines of the bead will then hold it in position.

Figure 27 of the drawings shows another sill system 500 in which the window frame connectors 202 are fitted in the same ways as in the Figure 26 embodiment. However, to cover the connectors, the same cover trims 502 are used on both sides of the frame. These cover trims have fir tree ribs 504 extending therefrom that are push-fits into horizontal slots 506 of the sill either side of the window frame mounting position.

In Figures 28 and 29 the cover 550 for the inner side of the window frame is an integral part of the sill component 552 and the outer cover trim 554 is the same as 418 in Figure 26.

Figures 30 and 31 of the accompanying drawings show use of an aluminium starter bar 600 for connecting window frames 602 directly to a wall (not shown). The starter bar has a double wall central section 604 for receiving a securing screws or bolts into the wall. The starter bar further has end formations providing channels 606

for retaining spring tabs 240 of a connector 202 and outwardly thereof end channels 608 for receiving cladding strips 609.

The channels 606 are between end walls 610 of the central section 604 and diverging flanges 612 that have retaining lips 614 facing the walls 610 and outwardly feedt616 against which the connectors 202 abut. The feet 616 on the opposite side have retaining lips 618 for receiving spring limbs 620 of the cladding strips 609.

The cladding strips 609 have a main wall 622 extending from the limb 620 and a sloping sealing wall 624 at the opposite end of the main wall. Internally of the cladding strip are a pair of co-extruded gaskets 626 and 628 and externally on the limb 620 a further co-extruded gasket 630.

As with previous embodiments, the connectors 202 receive the window frame in jaws 230 and then the connector can be snap fitted into the starter bar.

Figure 32 shows a mullion assembly similar to that shown in Figures 18 and 19 but with inner and outer cladding strips 640 shown that are snap fitted to the support post 200. The cladding strips 640 have a pair of co-extruded gaskets 642, 644 internally along opposite sides.

Figure 33 of the drawings shows a window sill arrangement using a starter bar 600 between window frame 650 and sill 652. Cladding strips 609 are provided internally and externally of the window frame similarly to the arrangements shown in Figures 30 and 31.

Figures 34 and 35 show corner post arrangements using the system of the invention. Figure 34 shows a 135° corner using a post 700 to which window frames 702 and 704 are connected using clips 202. Internal and external cladding strips 706 and 708 with co-extruded sealing beads 710, 712 snap-fit to the corner post 700.

Similarly in Figure 35 a 90° corner post 720 has window frames 722, 724 connected thereto by clips 202 with internal and external cladding strips 726 and 728.

Finally, Figures 36 and 37 show two different eaves beam arrangements. In Figure 36 a starter bar 600 is used between window frame 750 and eaves beam 752 and the clips 202 connect to the starter bar. In Figure 37, the clips 202 connect directly to the eaves beam 754.

In the modification shown in Figure 38, in order to alleviate leaking of window frames caused by poor drainage due to pressure differential across drainage holes in bottom window frame members 650, a drainage hole 802 is provided in the starter bar 600, no additional sealing of the exterior cladding strips 609 is provided and ends of the cladding strips are left open to atmosphere. The drainage hole in the starter bar is then free to drain without requiring a head of water. The internal cladding strips are sealed top and bottom to effect an airtight seal. In addition, to limit use of silicone foamed sealing tape strips 804 and 806 are used on both sides of the starter bar and foam blocks are used at corners where the starter bar meets a wall.

The frame joining system according to the invention provides for a degree of float for the frames, which allows for variation in frame sizes. Such variations may be as much as +5mm due to the welding process for making PVC window frames. Known frame joining systems do not provide for such a wide tolerance range.

Claims:

1. A system for forming a wall from window frames, particularly for forming a side wall of a conservatory or like structure, wherein the window frames are connected to support posts between their ends by means of connectors.

2. A system as claimed in claim 1, wherein the connectors are clips.

3. A system as claimed in claim 2, wherein the clips grip the window frames and locate on the support posts.

4. A system as claimed in claim 2 or 3, wherein the clips have spaced jaws between which a window frame can be located.

5. A system as claimed in claim 2 or 3, wherein the clips grip the window frames between their edges.

6. A system as claimed in claim 4 or 5, wherein the jaws have means for gripping the window frames.

7. A system as claimed in claim 6, wherein the gripping means are teeth.

8. A system as claimed in claim 7, wherein the teeth are shaped and orientated, so that it is easier to push the window frame into the jaws than to pull it out.

9. A system as claimed in any one of claims 4 to 8, wherein the jaws are flared outwards at their free ends to facilitate insertion of a window frame.

10. A system as claimed in any one of claims 4 to 9, wherein the jaws of the clips have a slightly concave inner profile over a first part before flaring outwards.

11. A system as claimed in any one of claims 2 to 10, wherein the clips are locatable on the support posts at any convenient point.

12. A system as claimed in claim 11, wherein the clips are slidable into position along a post or are a snap-fit onto a post.

13. A system as claimed in any one of claims 2 to 12, wherein the support posts are of rectangular section having a pair of opposed end formations for receiving the clips.

14. A system as claimed in claim 13, wherein the end formations are channels with narrower openings than bases.

15. A system as claimed in claim 14, wherein sides of the channels turn in towards each other to form a narrow opening.

16. A system as claimed in claim 14, wherein the clips have hook-like formations to locate around the channel sides.

17. A system as claimed in any one of claims 2 to 12, wherein the support posts have channels therein for receiving spring elements of connectors.

18. A system as claimed in any one of claims 1 to 17, wherein the support posts are secured to upper and lower conservatory components also by means of clips.

19. A system as claimed in claim 17, wherein the support posts are connected at their top ends to an eaves component.

20. A system as claimed in claim 18 or 19, wherein the support posts are connected at their lower ends to a sill component.

21. A system as claimed in claim 18, 19 or 20, wherein the clips for connection of the support posts to upper and lower conservatory components comprise spaced jaws, which may either locate on the outside of a support post or may locate within a support post.

22. A system as claimed in claim 21, wherein the jaws of the clips for connection outwardly of a support post converge over a first part before diverging to form a flared opening for ease of fitment thereof to a support post.

23. A system as claimed in claim 21 or 22, wherein the jaws have formations for gripping sides of a support post.

24. A system as claimed in claim 23, wherein the gripping means is teeth or the like.

25. A system as claimed in claim 21, wherein the jaws of the clips for location within a support post diverge over a first part before converging to facilitate insertion thereof into a support post.

26. A system as claimed in any one of claims 21 to 25, wherein clips for connecting the support posts have formations for attachment thereof to a conservatory component.

27. A system as claimed in claim 26, wherein the formations are hook-like to fit over edges of the component.

28. A system as claimed in any one of claims 2 to 27, wherein as well as on sides of the window frames, clips are used to connect the frames top and bottom to conservatory components.

29. A system as claimed in any one of claims 19 to 28, wherein sill and/or eaves components, to which the window frames and support posts are connected, are of or incorporate a metal component.

30. A system as claimed in any one of claims 19 to 2, wherein the sill and/or eaves components provide ledges over which clips locate.

31. A system as claimed in any one of claims 19 to 29, wherein the sill and/or eaves components have channels for receiving spring elements of connecting clips.

32. A system as claimed in any one of claims 19 to 31, wherein the sill component is of plastics material but with metal reinforcement.

33. A system as claimed in claim 32, wherein the metal reinforcement is in the form of a hollow metal beam within the plastics component.

34. A system as claimed in any one of claims 19 to 31, wherein the sill comprises two parts, the first, to which the clips attach, being of metal and the other part, forming a nose for the sill being of plastics material.

35. A system as claimed in claim 34, wherein the nose for the sill snap fits onto the metal component.

36. A system as claimed in any one of claims 2 to 35, wherein the clips and support posts are concealed behind cover strips.

37. A system as claimed in claim 36, wherein the cover strips are slidable or snap fit into position.

38. A system as claimed in claim 37, wherein location of the cover strips is onto ends of the clips.

39. A system for forming a wall from window frames, particularly for forming a side wall of a conservatory or like structure, wherein the window frames are connected end to end by brackets or clips.

40. A system as claimed in claim 39, wherein the brackets or clips are double sided, so that a window frame can be connected to either side.

41. A system as claimed in claim 39, wherein the brackets or clips are single sided for attachment to a window frame but are connectable together to join the window frames.

42. A system as claimed in claim 39, 40 or 41, wherein reinforcement for structural strength is provided in the window frames themselves.

43. A system for forming a wall from window frames, particularly for forming a side wall of a conservatory or like structure system substantially as hereinbefore

described with reference to and as illustrated in any of Figures 1 and 3 to 11, Figures 12 to 17 or Figures 18 to 38 of the accompanying drawings.

44. A system for forming a wall from window frames, wherein the window frames are connected to a wall forming component by means of connectors.

45. A system as claimed in claim 44, wherein the connectors have jaws for receiving a window frame.

46. A system as claimed in claim 44 or 45, wherein the connectors have spring elements for location in said wall forming component.

47. A system as claimed in claim 44, 45 or 46, wherein the component is selected from window sills, eaves beams, starter bars and support posts.

For Innovation

Application No:	GB0605083.5	**Examiner:**	Mr Alastair Kelly
Claims searched:	1-38	**Date of search:**	3 July 2006

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-3, 18-20, 29, 32, 33, 36, 37 and 39	GB 2363155 A (HW PLASTIC LTD) See abstract and note page 11, lines 20-23 and figure 10(E) especially
X	1	GB 2353318 A (ULTRAFRAME) See abstract and figures
X	1	GB 2321487 A (BRIGGS) See abstract and figures
X	1	GB 2223772 A (FLUX) See abstract and figures

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

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E1D; E1J

Worldwide search of patent documents classified in the following areas of the IPC

E04B; E06B

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI