United States Patent

[11] **3,571,997**

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[54] **WING FOR AT LEAST PARTLY CLOSING A WALL OPENING**
10 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **52/309,** 52/439, 52/475, 52/496, 52/615, 52/629
[51] **Int. Cl.** **E04c 7/34,** E04c 2/38, E06b 3/24
[50] **Field of Search** 52/475, 476, 479, 457, 615, 616, 620, 627, 628, 629, 496, 498, 309, 439, 429, 425, 404

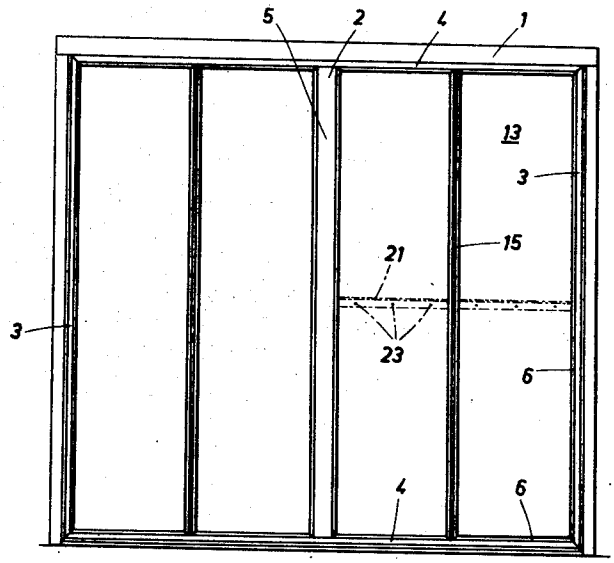
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ABSTRACT: A metal frame is composed of frame members consisting of extruded sections and connected by plug connections. The frame members have inner side portions which define a frame opening. Each of said side portions carries at least two edge lips projecting into said frame opening. The wing also comprises paneling which covers said frame opening and is held in position between and by said edge lips.

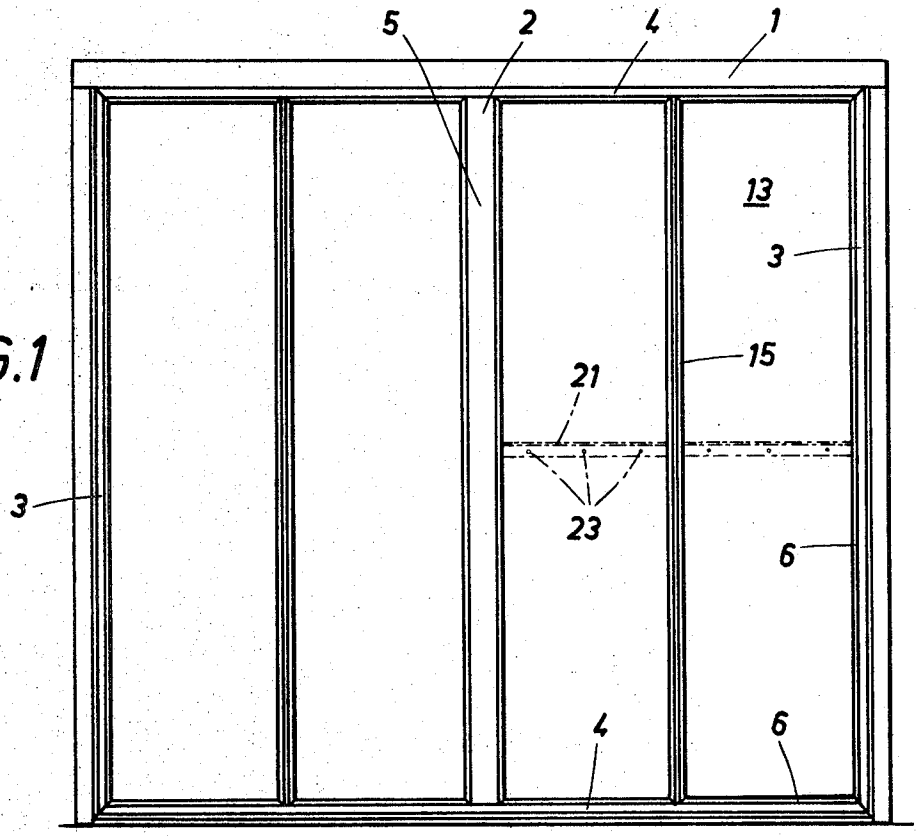


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SHEET 1 OF 2

FIG.1



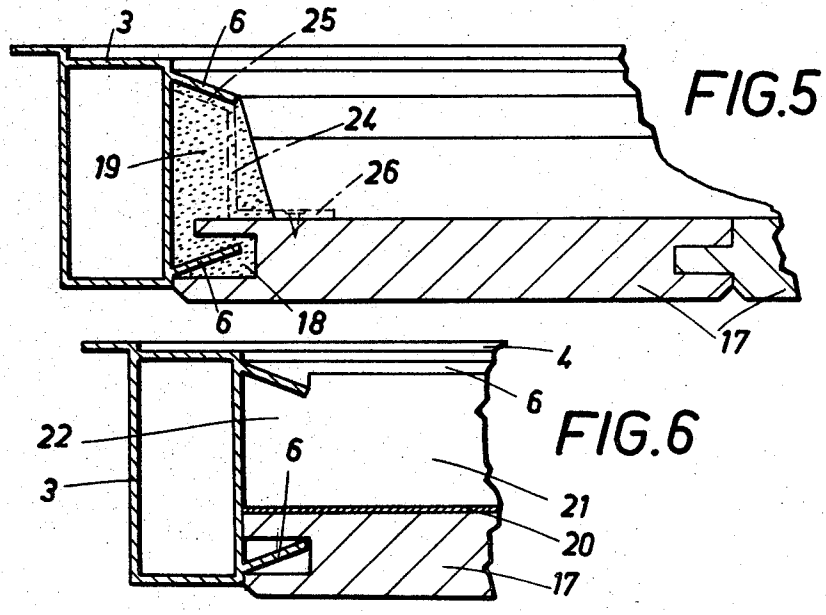


FIG.5

FIG.6

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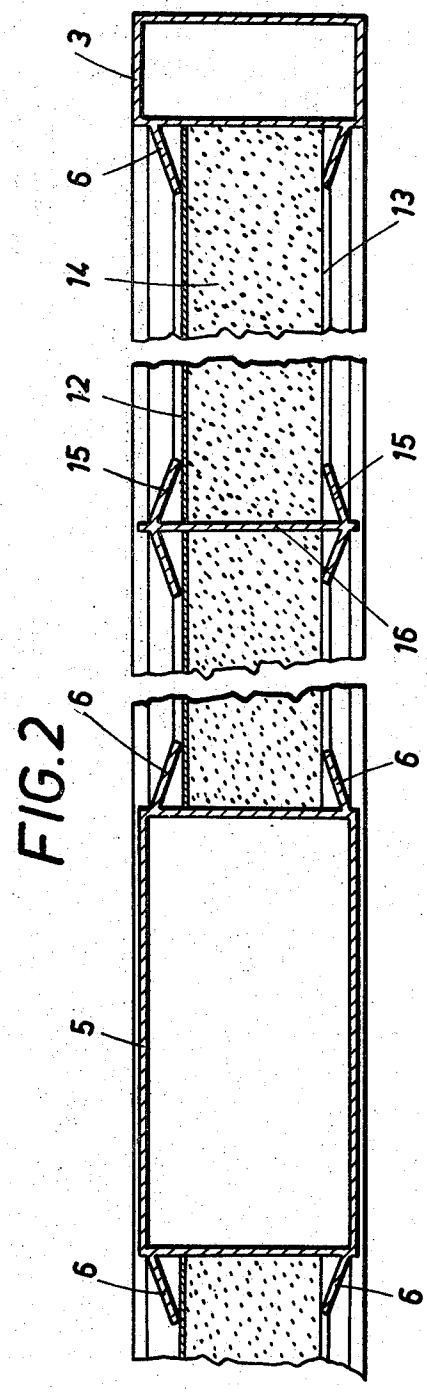


FIG.2

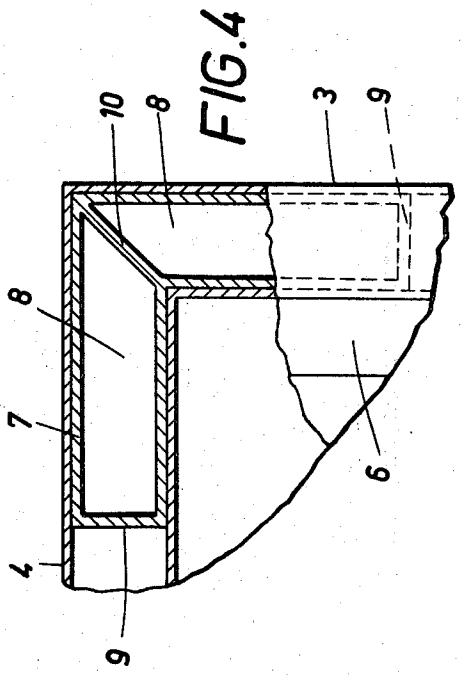


FIG.4

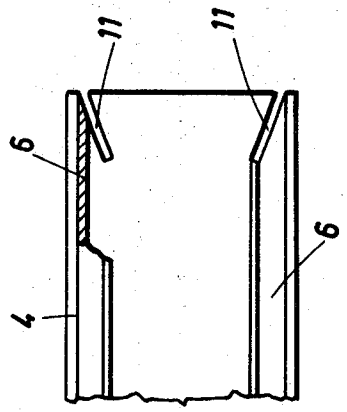


FIG.3

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WING FOR AT LEAST PARTLY CLOSING A WALL OPENING

This invention relates to a wing for a door or gate or window, preferably a garage gate wing, which comprises a metal frame, which holds glass or other paneling, which is stiffened, if desired.

The metal frame of gate wings has previously been made from rolled sections, preferably angle sections, which were welded together, and the basic structure of the frame has been designed to conform to the paneling to be received by the frame. For instance, different frames are used for doors or gates having a single-ply metal paneling, metal doors or gates having two spaced apart sheet meal facings and an insulating lining, and doors or gates intended to carry wood paneling. Sheet metal paneling is secured to the frame in most cases by spot welding or riveting. Where wood paneling is used, crossbars are usually provided in the frame and the paneling boards are secured to these crossbars with screws. In this case, an important problem resides in that wood tends to expand and contract under the influence of the weather and of sunrays so that the frames must be sufficiently strong to take up the forces produced by the wood without suffering an appreciable distortion. Even if the wood paneling has been properly impregnated, the wood of external doors or gates tends to become discolored or prematurely weathered in the areas through which the fixing screws extend and at the ends of the boards, where the end grain is exposed in most cases. Whereas doors and gates of equal size are often made in large quantities, it has not been possible before to make numerous manufacturing steps more economically than when making individual units. For instance, the sections are usually welded together to form the frame. After the welding operation, the frame must be straightened and the welded joints must be smoothened. The surface of the frame is not finished until the frame has been completed; the surface of the frame and the surface of any sheet metal paneling are then coated with a surface-protecting paint. In the making of double-walled doors or gates, one sheet metal facing is first joined to the frame; then the insulation is inserted and finally the second sheet metal facing is joined to the frame. Slabs of foamed plastics are often used as insulation. Because these slabs are not heat resisting, at least those sheet metal elements which are applied after the insulation has been placed must be secured with the aid of screws or rivets so as to preclude damage to the insulation. Whereas it would be desirable also with units produced in large quantities to make at least the frame of corrosion-resisting material, such as light metal, the previous processing involved excessively high costs where such materials were used.

A wing of the above-mentioned kind for a door, gate or window is essentially characterized according to the invention in that the frame consists of extruded sections, which on their side which faces glass or other paneling have at least two projecting edge lips, which are preferably skewed toward each other, and said sections are interconnected by plug connections, said edge lips holding the paneling in position.

The design according to the invention enables the use of identical extruded sections with frames having different sizes and for the holding different glass or other paneling so that sections of one or two types can be used to make frames for all conceivable doors, gates and windows of the above-mentioned kind. Because the frame members are held together by plug connections and the paneling is secured by projecting edge lips so that the frame members need not be connected to each other and to the paneling by welded joints or other joints which require subsequent surface treatment, the extruded sections may be surface-treated before they are processed. Similarly, the paneling for doors and gates may be completely surface-treated before it is applied to the frames so that the door or gate wing is finished as soon as it has been assembled. It will be obvious that the surface treatment before the assembling is much faster, simpler and less expensive than the surface treatment of the completely assembled wing. It is another advantage of the design according to the invention that relatively large doors or gates comprising plug connections which can easily be established may be supplied in a knocked down condition from the factory. In this condition they require only little space so that the freight costs are much reduced. The final assembly may be carried out by the user or by a distributor. Most kinds of paneling which are employed can be held in position by two edge lips formed on the extruded sections. Only in exceptional cases will it sometimes be desirable to provide three or more lips. To simplify the stocking, special retaining sections may be provided in such exceptional cases, which retaining sections are slidable between the edge lips formed on the main section and are provided with web or claw means, which are suitable for the respective exceptional case.

A particularly simple plug connection will be obtained in that adjacent to frame parts which are joined together the edge lips of one section extend as far as to the end of the section and into slots formed in the other section at least in that wall thereof which faces the paneling. Simple machines may be used to cut the frame members in proper length from the continuous extruded material and to form the slots. Extruded sections of aluminum are preferably made and may be surface-treated in known manner by anodizing or the like.

Another development of the invention calls for the provision of corner pieces, which are inserted into the hollow extruded sections at the corners of the frames and have openings extending normal to the main plane of the wing, and for connecting the sections to the corner pieces by depressions or the like, which are formed in the sections from the outside adjacent to the openings thereof when the sections have been fitted together. This design results in a dual advantage. The corner pieces may be cut from extruded hollow angle sections and the frame members may be permanently connected with extremely simple means to the corner pieces and thus to each other. The corner pieces ensure that the frame will be assembled so that its members extend at right angles to each other so that they need not be subsequently trued. Instead of the corner pieces described above, other corner pieces may be used which have wedge faces, longitudinal grooves or the like so that they positively or frictionally join the frame members when fitted together.

As has been mentioned, a frame designed according to the invention may be used to hold different kinds of glass or other paneling. In insulating doors or gates, each paneling may consist of two thin sheet metal elements, sheet plastics elements or the like, which are supported by edge lips and together with the frame members on the outside define a space, which is filled with foamed plastics material bonded to the sheet metal elements, sheet plastics elements or the like. Such units may be manufactured in that slabs of foamed plastics are bonded on their broadsides to the sheet metal elements or sheet plastics elements and fill the space between such sheet elements. To enable a bonding of the plastics material to sheet metal elements, the latter are treated in most cases by pickling, sandblasting or the like. On that side of sheet plastics elements which faces the foamed plastics, a fabric layer may be provided, which is partly embedded in or laminated to the sheet plastics element. The manufacture will be even more simplified if the plastics material foam is introduced between the sheet metal or sheet plastics elements when they have been assembled. In this case, the frames of the door or gate wings may be arranged in a horizontal position and the paneling may be inserted, whereafter the upper sheet metal element or the upper sheet plastics element is lifted with the aid of vacuum cups until end portion of the sheet element engages the upper edge lip, and the foamable plastics material is subsequently injected. In this manufacturing process, openings may be provided in the hollow sections between the edge lips so that the hollow sections are also filled by the foamed plastics material. Because the sheet plastics or sheet metal elements are connected by the foamed plastics material, the paneling will have a high overall strength even if the sheet plastics or sheet metal elements are thin-walled. Within the scope of the invention, reinforcements consisting, e.g., of nets

or the like, may be incorporated in the foamed plastics material. The paneling may alternatively consist of boards, building slabs made of wood or asbestos cement, veneers etc. rather than of sheet metal and sheet plastics elements.

In a further development of the invention the paneling, which may consist of a plurality of individual boards, is provided with peripheral grooves, which are engaged by one of the two sectional edge lips, and the groove space left between the inside of the paneling and the second edge lip is filled with sealing material, preferably foamed material. This design will be selected if the outside surface of the wood paneling is to protrude beyond the outside plane of the frame. The filling of foamed material will protect the end grain of the boards and will ensure a satisfactory fixation of the boards in the frame. Paneling may also be secured with the aid of sectional retaining members, which engage the grooves left between the sectional edge lips and the paneling, and which clamp the paneling and/or are connected to the paneling by screws. To increase the strength and to provide garage gates meeting the legal requirements the paneling may be provided on the inside with a sheet metal covering, which is held in position by the sealing material in the groove.

Embodiments of the invention will now be described by way of example with reference to the drawing, in which:

FIG. 1 shows a garage gate in elevation as viewed from the inside of the garage;

FIG. 2 is an enlarged sectional view showing the gate wing;

FIG. 3 is a top plan view showing one member of the frame with one edge lip end portion being shown in section;

FIG. 4 is a fragmentary sectional view, showing a corner of the frame;

FIG. 5 is a fragmentary view showing in transverse section a portion of a gate wing provided with a wood paneling; and

FIG. 6 shows a modification of fig. 5.

The gate shown in FIG. 1 comprises a fixed frame 1 and a gate wing 2, which consists of a tilting gate. Means for guiding and locking the gate wing are not shown for the sake of clearness.

The gate wing 2 consists of a metal frame, which is composed of longitudinal members 3 and crossmembers 4 and comprises a central cross bar 5. The members 3, 4 and the central crossbar 5 consist of hollow or solid extruded sections, preferably of aluminum. The members 3, 4 are made from identical, extruded sections and the central crossbar 5 preferably carries a locking bar mechanism for the gate.

The sectional material from which the members 3, 4 are made is integrally formed on one side with projecting edge lips 6, which are skewed toward each other. Identical edge lips are provided on both end faces of the central crossbar. The member 3, 4 and the central crossbar 5 are interconnected by plug joints. To this end, the members 3, 4 are cut for a miter joint, and a corner piece 7 is inserted into each corner. As is apparent from FIG. 4, the corner piece comprises openings 8, which extend transversely to the main plane of the gate wing, and its end protruding into the sectional members 3, 4 is provided with end walls 9. As a stiffening member, a diagonal web 10 is provided, which separates the openings 8. The corner pieces 7 are preferably cut off from an extruded section which has the cross-sectional shape that is apparent from FIG. 4. When the members have been plugged together, the tube walls of the sectional frame members 3, 4 are provided with depressions immediately before the walls 9 so that the wall material which has been forced inwardly protrudes at the wall 9 into the opening 8 to lock the respective frame against being pulled from the corner piece 7. As is shown in FIG. 3, the sectional members 4 are provided at their ends and in midportion on the side which faces the frame opening with oblique slots 11, which receive the continuous edge lips 6 of the sectional members 3, 5 so that these edge lips also provide for a plug connection between the frame members.

According to FIGS. 1 to 4, paneling is inserted into the frame defined by the frame members 3, 4 and the central crossbar 5. This paneling comprises a sheet metal plate 12 on the outside of the gate and a plastic sheet element 13 on the inside of the gate. The edges of the sheet metal plate 12 and of the sheet element 13 bear on the edge lips 6. The space between the sheet metal plates 12 and the sheet elements 13 is filled with foamed plastics material 14, which is bonded to the sheet elements 12, 13. When three outer members of the frame have been plugged together, the sheet elements 12, 13 are inserted and fixed to the subsequently fitted fourth outer member of the frame. In FIGS. 1 and 2, reinforcing ribs 15 are indicated, which extend parallel to the frame members 3 and engage the outside of the sheet elements 12, 13 and are interconnected by screws, rivets or the like, which are spaced apart and extend through the sheet elements 12, 13, or by a continuous bar 16. In the latter case, the bar 16 may be provided in its end portions with slots, which are similar to the slots 11 and can receive the edge lips to form plug connections holding the bar 16. The dovetail portion between the slots fills the groove which is defined by the bars 16. Such reinforcing ribs are required in most cases only where the panels are very large.

According to FIG. 5, the paneling consists of boards 17, which have tongue-and-groove joints and are assembled to form the gate panels. Each gate panel is formed at its periphery with a continuous groove 18, by which the panel is slidably fitted on one edge lip 6 of the frame members 3, 4 and of the cross bar 5. The groove 18 and the groove space which remains free between the inside of the paneling, the second edge lip and the inner wall of the sectional member is filled with foamed plastics material 19.

In the embodiment shown by way of example in FIG. 6, a sheet metal plate 20 is inserted in the rear side of the panel 17. At least one retaining bar consisting of an angle section 21 is provided for each gate panel and has suitably cut end portions 22 engaging the groove space which has been left open between the sheet metal plate 20 and the free bar 16 and may be connected to the boards 27 by screws 23 (indicated by dash-dot lines in FIG. 1).

In FIG. 5, dash-dot lines indicate a sectional bar 24 used to mount the panel and being, e.g., Z-shaped in cross section. One flange 25 of the bar 24 bears on the inside on the free edge lip 6, whereas the second flange 26 contacts the boards 17 and is screwed to them.

Whereas only a garage door is shown on the drawing, the invention is not restricted to tilting gates. Gates turning on vertical hinges, doors and window wings may be similarly made. In window wings, the edge lips hold the glass panes directly or with gaskets interposed.

I claim:

1. A wing for at least partly closing a wall opening, said wing comprising:

a metal frame composed of frame members consisting of extruded sections and said frame members being plugged together;

said frame members having inner side portions defining a frame opening;

each of said side portions having at least two edge lips projecting into said frame opening, the two edge lips of each side portion being skewed towards each other to define a dovetailed groove;

stiffening means extending across the frame opening between opposite ones of said frame members, the respective ends of the stiffening means abutting the inner side portions of the opposite frame members, and the edge lips of said opposite frame members defining two skewed slots in alignment with the stiffening means and receiving the ends thereof whereby the stiffening means may be inserted into the slots and held by the edge lips; and

paneling covering said frame opening and held in position between and by said edge lips in the dove-tailed grooves of the frame members, the stiffening means extending through the paneling.

2. A wing as set forth in claim 1, wherein the stiffening means consist of extruded sections having opposite side por-

tions, each of said side portions having two edge lips projecting into said frame opening, and the ends of the two edge lips being in alignment with and received by corresponding ones of the skewed slots.

3. A wing as set forth in claim 2, wherein the extruded sections constituting the frame members and at least some of the extruded sections constituting the stiffening means are tubes of rectangular cross section, and the edge lips projecting from the side portions thereof extend from points inwardly spaced from the corners of the rectangular tubes.

4. A wing as set forth in claim 1, in which:

said extruded sections are hollow;

said frame members form corner joints and define a main plane;

a corner piece is inserted in each corner joint;

said corner pieces are formed with openings extending normal to said main plane; and

said frame members are formed with depressions engaging said openings of adjacent corner pieces.

said frame members are formed with depressions engaging said openings of adjacent corner pieces.

5. A wing as set forth in claim 1, in which:

said paneling comprises two sheet elements which bear on said edge lips and define a space, filled with foamed plastics material bonded to said sheet elements.

6. A wing for at least partly closing a wall opening, said wing comprising:

a metal frame composed of frame member consisting of extruded sections and connected by plug connection;

said frame members having inner side portions which define a frame opening:

each of said side portions carrying at least two edge lips projecting into said frame opening; and

paneling which covers said frame opening and held in position between and by said edge lips, the paneling being formed with a peripheral groove receiving one of said edge lips carried by said frame members and having an inside surface defining a space with the other of said edge lips carried by each of said frame members, and with said space being filled by a sealing material.

7. A wing as set forth in claim 6, in which said sealing material consist of foamed material.

8. A wing as set forth in claim 6, which comprises a sheet metal covering on said inside surface of said paneling;

said covering being held in position by said sealing material.

9. A wing as set forth in claim 6, which comprises:

a sheet metal covering on said inside surface of said paneling; and

at least one sectional member disposed between said two edge lips carried by each of said frame members;

said sectional members holding said covering in position

10. A wing as set forth in claim 6, in which said paneling consists of a plurality of panel elements.