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[54] ROLL FORMED ALUMINUM BOX FRAME CONSTRUCTION AND PANEL

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52/629, 52/656, 52/737

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[58] Field of Search 52/656-658, 475,
52/623, 629, 475-477, 622, 726, 627, 737

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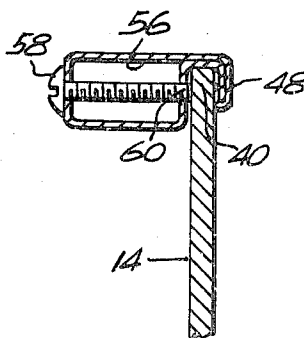
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[57]

ABSTRACT

A roll formed, aluminum, box frame strut for use in making a panel which includes such struts, which struts are made of roll formed sheet aluminum material of a uniform thickness of between 0.025 inch and 0.032 inch. The struts comprise a hollow body with an elongate socket extending from one edge to receive the marginal edge of a pane with the struts being circumposed about the pane to define a building panel. The struts are of a closed or box frame configuration.

2 Claims, 7 Drawing Figures



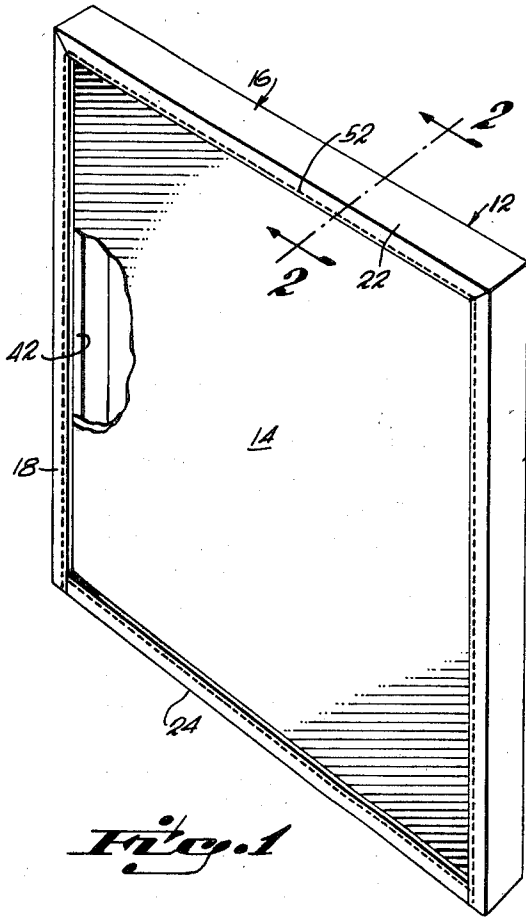


Fig. 1

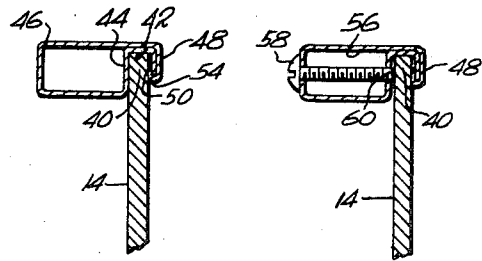


Fig. 2 Fig. 3

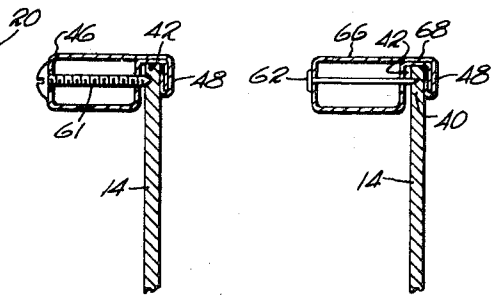


Fig. 4 Fig. 5

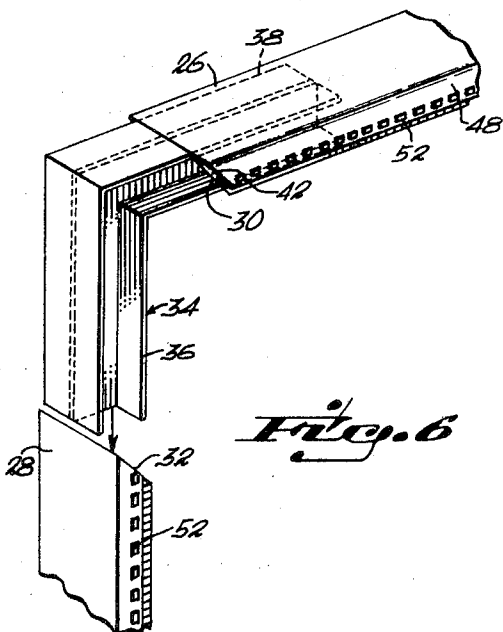


Fig. 6

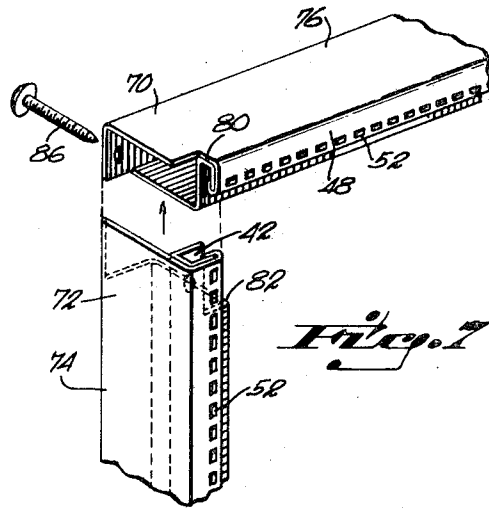


Fig. 7

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ROLL FORMED ALUMINUM BOX FRAME CONSTRUCTION AND PANEL

This invention relates to an improved construction material and more particularly to a roll-formed aluminum box frame.

It has been learned that a box frame configuration for a construction member is a preferred configuration for high rigidity of structure in relation to weight per unit of length in contrast to an open sided or C-shaped member. However, it has also been learned that extrusion of box form or frame members is relatively expensive in relation to the cost of roll formed material because, among other things, more expensive equipment is necessary for extrusion mills than for rolling machines to form metal, and, because in extruding aluminum of a box form cross section, a relatively low production rate of aluminum from billets is achieved because of the particular shape being extruded. The result is that the desirable features of aluminum, including the fact that it does not corrode and is adapted to be preenameled and is highly ductile and light in weight, have not been employed in inexpensive lightweight structures.

This invention has an object the provision of a roll-formed aluminum box frame member having a receiving pocket defined by a flange parallel to one of the sides and connected to the box of the unit by an extension arm, the members of the frame being interconnected and being composed of roll-formed aluminum which may be preenameled so as to be in any desirable color.

It is another object of this invention to provide an improved, inexpensive structural member highly useful in making decorative assemblies of panels and which is inexpensive to manufacture and which is composed of interconnected roll-formed aluminum box frame-type members interconnected into a frame about a pane to form an improved, lightweight decorative panel, which is adapted to receive either a wooden, plastic, glass or other type of central pane within a receiving socket to embrace the margin of the pane.

It is another object of this invention to provide an inexpensive aluminum roll-formed structural member having a receiving socket and which is formed of sheet aluminum which may be preenameled and which is in the range of thickness of between 0.025 and 0.032 inches which may be anodized if desired and which includes a pocket to receive the margin of the pane which is preferably of a double-walled thickness and which is parallel to one of the sides of the box form configuration to provide an inexpensive lightweight strong durable and decorative structural member for use in making panels, from inexpensive rolling equipment in relation to the relatively high cost dies required for extruding aluminum box form members.

It is a general object of this invention to provide an improved, inexpensive aluminum structural member of roll-formed sheet material which is formed into a box frame having an arm extending from the intersection of two of the sides of the box frame and a flange extending from the arm parallel to and uniformly spaced from one of the sides of the box frame defining a receiving socket for the margin of a pane to be held; and the means to secure the aluminum members together in a frame configuration to define a panel when in combination with a pane received therein.

FIG. 1 is a perspective view of a panel including the roll-formed aluminum members of the instant invention;

FIGS. 2, 3, 4 and 5 alternative cross sections for the aluminum members seen in FIG. 1 and shown in cross section taken along the plane indicated by the line 2-2 of FIG. 1 and looking in the direction of the arrows;

FIG. 6 is a fragmentary view partially exploded and which illustrates a corner bracket for use in assembling the aluminum members into the panel form shown in FIG. 1; and

FIG. 7 is an alternative corner securing means for the ends of adjacent aluminum members constructed in accordance with this invention.

Referring to the drawings wherein like referenced characters designate like or corresponding parts throughout the several views, it is seen in FIG. 1 that a panel 12 is provided

which is composed of a central pane 14 which is bounded by a frame 16 which is composed of side members 18 and 20 of roll formed aluminum which are constructed in accordance with this invention and which are spanned by upper and lower members 22 and 24 also of roll formed aluminum.

As seen in FIGS. 6 and 7 securement means are provided to connect the ends 26 and 28 of the upper member 22 to the member 18, the ends being mitered as indicated at 30 and 32 and receiving therein a corner bracket or insert 34 having legs 36 and 38 which are sized for snug receipt in telescoping fashion within the hollow of the roll formed members.

Referring to FIG. 2, it is seen that in each of these embodiments the periphery 40 of the pane 14 or margin is received within a pocket 42 which is formed on one side 44 of a box form shape 46 between a flange 48 which is provided. The margin of the panel is preferably sized for a snug receipt within the pocket 42 and the flange is provided with a slightly irregular interior surface 50 which is in part the result of the crimp line 52 caused by the folding over of the terminal end 54 of the flange to secure the box form together in the configuration seen in FIGS. 2, 3, 4 and 5.

Additional holding means to that of the teeth or irregular surface of the interior of the flange may comprise a member receivable through the opposing sides of the hollow 56 which are generally parallel to that of the plane of the flange 48. A holding member such as the screw 58 is passed therethrough with the end 60 urging the margin 40 of the pane against the inside surface of the flange. In addition to the screw the holding means may constitute a screw 61 having a sharpened tip or a nail 62 as shown in FIGS. 4 and 5 respectively.

It has been found that the use of the roll-formed aluminum is a preferred less expensive and desirable construction material for making panels instead of extruded aluminum lengths. A length of roll-formed aluminum sheet material is formed into the closed or box-shaped body 66 seen, for instance, in FIG. 5, defining the four sidewalls and an extension arm 68 extending outwardly of the intersection of two of the walls and terminating in the flange 48, the terminal end of which is preferably folded back upon itself to define the nest between the flange and the adjacent wall plane. The aluminum of the preferred construction does not corrode, is lightweight, and is capable of being preenameled or colored. It has been found that aluminum is sufficiently ductile to provide a yieldable pocket for receiving the margin of the pane and deformable sufficiently in response to the crimping so as to define grip teeth or irregularities along the inner surface thereof with the crests along the inner surface tending to bite into the margin of the pane to hold it in position. Aluminum is less expensive when roll-formed than is extruded aluminum and can be of a relatively thin thickness in a limited range of between 0.025 and 0.032 inch and by reason of the box type or closed configuration with the extension arm 68 and the flange 48 defining the pocket to receive the margin of the panes, it is of sufficient rigidity to withstand considerable loads.

An alternative securement means for the corner is shown in FIG. 7 in which the ends 70 and 72 of members 74 and 76 are slotted and notched as at 80 and 82 so as to fit together with respect to one another and secured in the nested relation indicated in FIG. 7 by a fastener such as indicated by the numeral 86.

It is thus seen that there has been provided a roll formed aluminum construction member which is adapted to be preenameled and which includes a receiving socket in combination with a box-type columnar member to receive the marginal edge of a pane and which is adapted to be secured together in a frame 16 to hold a panel therein which provides for a variety of construction requirements.

Often times because of labor problems and other construction difficulties, it is found that building openings are not of such a standard size that the panels to span such openings can be preassembled at a plant, with assurance that the same will sit in the opening snugly, but, on the contrary, quite often the panels delivered to a job site must be modified most often

requiring that the same be returned to the plant of manufacture to be tailored and modified for acceptance by the particular building opening. It will be readily appreciated that with the construction disclosed herein, the elongate members may be disassembled from the panel and cut at the job site to size, when the embodiment of FIG. 6 is employed by reason of the fact that panes are assembled in panel form with the elongate members by self-tapping screws in the construction made possible by the roll-formed aluminum box frame construction.

I claim:

1. In combination, a frame comprising a plurality of elongated hollow members, means terminally connecting adjacent ends of successive members, and a substantially rigid panel member peripherally surrounded by said frame of hollow members, the improvement in which said hollow members have a box-shaped cross section including inner, outer and opposed sidewalls, the outer wall including an integral, laterally extending extension arm terminating at its outer edge in an integral, depending flange spaced from one sidewall and forming therewith a longitudinally extending, inwardly opening recess coextensive with said one sidewall and substantially receiving the peripheral margin of the panel therein, the

recesses of the respective hollow members extending substantially from the outer walls inwardly toward an opposed portion of said frame, the box-shaped body cross section being juxtaposed at one side of the panel and immediately reinforcing the peripheral margin of said panel thereat, the depending flange being juxtaposed on the opposite side of the panel immediately at the margin thereof, and said extension arm extending transversely across the outer peripheral margin of said panel, said tubular members being generally rectangular in cross section and opposite sidewalls being coplanar with said depending flange; and driven fasteners extending through said opposite sidewalls and including a terminal portion engaging the inner surface of said panel member within said recess and driving it into firm engagement with the inner surface of said depending flange.

2. The combination as set forth in claim 1 in which said flange comprises a reversely-folded inner portion parallel to a juxtaposed outer portion, said inner and outer portion being crimped and including a plurality of longitudinally spaced gripping teeth bordering said recesses.

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