April 5, 1960 R. H. NEISEWANDER 2,931,435

PANELED DOOR CONSTRUCTION

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Fig. 1

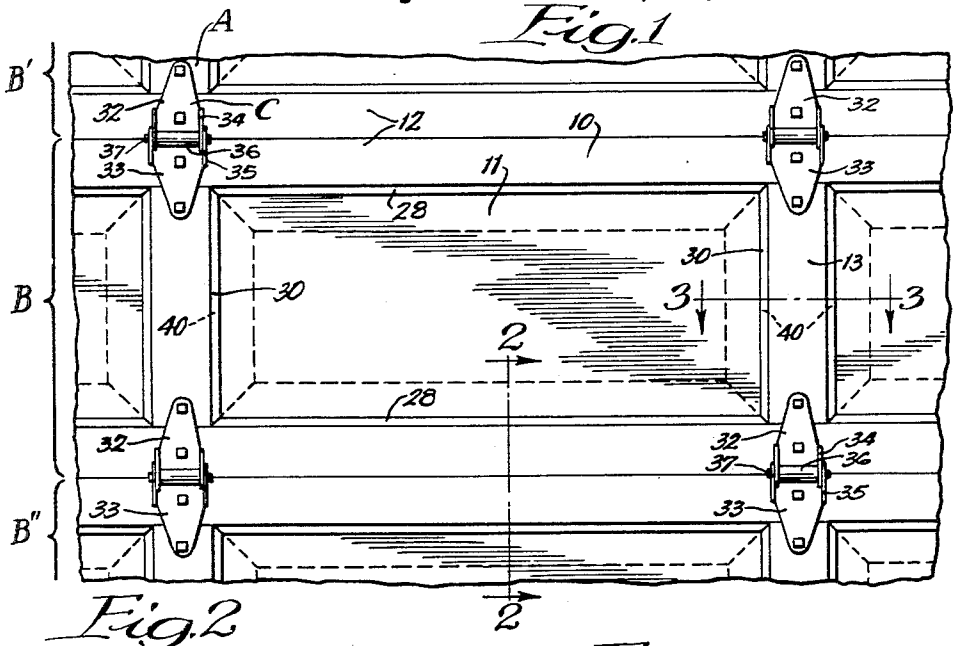


Fig. 2

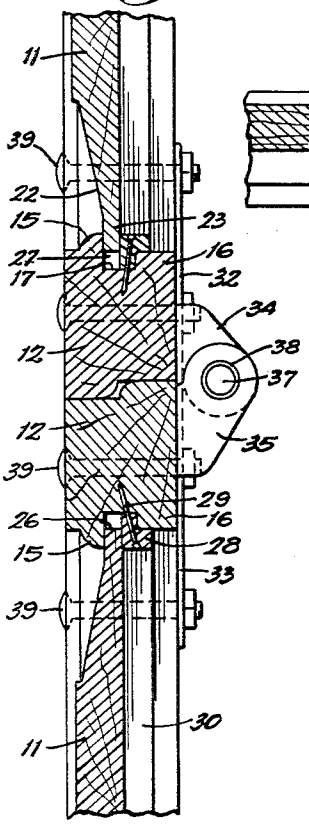
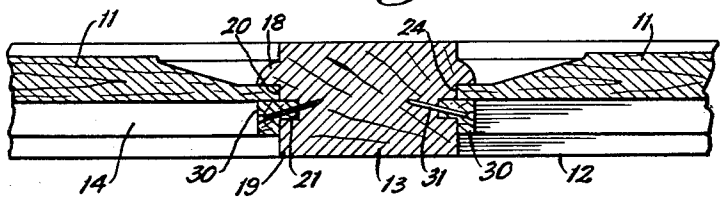


Fig. 3



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PANELED DOOR CONSTRUCTION

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4 Claims. (Cl. 160—229)

This invention relates to paneled doors, and more specifically to a paneled door having a series of hinged sections, such as overhead garage doors and the like.

The present application is a continuation of my copending application, Serial No. 561,194, filed January 25, 1956, now abandoned.

Overhead doors are customarily equipped with a plurality of paneled sections connected together by hinges mounted upon the relatively narrow frame portions bordering each panel. The panels themselves provide the bulk of the exposed surface area of the door, and since they are generally composed of wood, they respond readily to the humidity and temperature conditions of the surrounding air by either contracting or expanding. It is apparent that when the many panels of such a door are swollen, the narrow hinge-carrying frame members may become distorted or bowed, thereby dislocating the hinges connecting the different sections. Furthermore, the swollen panels may cause the door to bind so that opening and closing of that door can be accomplished, if at all, only with considerable difficulty.

Shrinkage of the door panels may occur during dry weather, so that the hinge-supporting border members to which the panels are secured may again become warped or distorted. Consequently, a dislocation of the hinges and cracking or splitting of the panels and frames may result.

Therefore, one of the principal objects of the present invention is to provide a sectional overhead door construction which overcomes the defects and disadvantages mentioned above. Another object is to provide a sectional and paneled overhead door in which the panels may either expand or contract without distorting the hinge-carrying frame members of the door, and without altering the relative positions of the hinges connecting the door sections. A further object is to provide a floating panel structure for segmented overhead doors in which means are provided for securely maintaining a wooden panel in place and, at the same time, for permitting independent expansion or contraction of the panel in accordance with weather conditions.

Other objects will appear from the specification and drawings, in which:

Figure 1 is a broken rear elevation of a sectioned and paneled overhead door embodying the present invention; Figure 2 is a broken sectional side view taken along lines 2—2 of Figure 1; and Figure 3 is a broken top sectional view taken along lines 3—3 of Figure 1.

In the embodiment of my invention illustrated in the drawings, the letter A generally designates a door such as an overhead garage door, and the letters B, B′ and B″ indicate three of the hinged sections of the segmented door. Each of the door sections is pivotally connected to adjacent sections in the series by hinge means C. While Figure 1 shows only three hinged sections, it will be understood that a greater number may be provided depending upon the height of the sections and the size of the door opening.

Each of the hinged sections is essentially composed of an outer frame or border 10 and one or more inner panels 11. It is to be noted that the inner panels 11 provide a relatively large exposed surface area in comparison with the relatively narrow outer frame of each section. The panels of each section are preferably arranged in a horizontal series and, as in the case of the sections themselves, their number is dependent upon the relative size of the panels and the door opening.

Each frame 10 consists of a pair of generally horizontal border members or rails 12, and two or more generally vertical border members or stiles 13. The parallel stiles and the horizontal rails may be tenoned or secured together by any other suitable means, and define at least one rectangular opening 14 in each door section. As shown best in Figure 2, the inner opposing sides of rails 12 adjacent opening 14 are provided with curved front shoulders 15 and smaller rear shoulders 16 defining slots or recesses 17 therebetween. Similarly, the inner opposing sides of the upright stiles 13. The parallel stiles and the horizontal rails may be tenoned or secured together by any other suitable means, and define at least one rectangular opening 14 at each door section. As shown best in Figure 2, the inner opposing sides of rails 12 adjacent opening 14 are provided with curved front shoulders 15 and smaller rear shoulders 16 defining slots or recesses 17 therebetween. Similarly, the inner opposing sides of the upright stiles 13 adjacent the rectangular opening are equipped with curved front shoulders 18 and reduced rear shoulders 19. Unlike the elongated slots provided by the rails, however, the inner slots or recesses of the stiles are stepped and are defined in part by forward inner steps 20 and rearwardly disposed outer steps 21. Therefore, the frames 10 of the hinged door sections provide a continuous slot about each of the rectangular openings 14 for securing inner panels 11 in place, as will presently appear.

Both the outer frame and the elongated inner panels of each door section are formed of wood, the material most commonly used in door construction. Since woods principally expand and contract in directions running transverse to their grain, I prefer to cut each elongated rectangular panel so that the grain extends along its length. Consequently, the door panels will tend to expand and contract towards and away from the upper and lower rails 12 of the door sections. Each panel may be provided with a rearwardly and outwardly inclined front border portion 22 and an untapered peripheral edge portion 23.

The elongated inner panels 11 are adapted to be carried within openings 14 so that their edge portions 23 project into the frame recesses extending about the openings, and so that the front surfaces of those peripheral edge portions lie in contiguous relation with the front shoulders 15 and 18 of the frames. As most clearly illustrated in Figure 3, opposite side edges 24 of each panel tightly abut the front inner steps 20 provided within the elongated vertical recesses of stiles 13. Therefore, the cross-cut surfaces of each panel are sealed and moisture cannot easily penetrate into the grain of the wood. Furthermore, tight engagement between the side edges 24 and the stiles 13 aids in maintaining the panels securely within their respective frames.

Even though the side edges of panels 11 are tightly seated against the vertical stiles 13, moisture will tend to penetrate or escape from the remaining exposed surfaces of the panels as climatic conditions change. In damp weather, for example, the panels will tend to expand or grow in opposite vertical directions; that is, in directions transverse to the grain of the wood. Unless means are provided for accommodating this expansion, the door rails may become distorted, thereby dis-

locating the hinge means C and impairing the operation of the door.

Referring to Figure 2, it will be seen that while the top and bottom edge portions 23 of the panels are in contiguous relation with front shoulders 15, the horizontal edges 26 of the panels do not normally abut rails 12 but are separated therefrom by longitudinally extending spaces 27. As the panels expand or grow, these spaces diminish in size; and when the panels shrink or contract, the horizontal spaces become larger. In either event, frames 10 and hinge means C remain unaffected as the sizes of the panels vary in response to changing weather conditions.

To support the expandable panels 11 uniformly within the door frames, and at the same time permit their free growth and contraction, I secure or fix each vertical edge portion of a panel at an intermediate point between the upper and lower limits thereof to each vertical stile 13. The two points of connection for each panel are represented by numerals 40 in Figure 1, and may consist of spots of glue between the side edges of the panels and the steps 20 of the stiles. It will be understood, of course, that other means of attachment, such as nails, might be used to suspend the panels at intermediate points to the stiles while at the same time permitting vertical expansion or contraction of the panels in opposite directions along the stile grooves and above and below the intermediate attachment points.

Further support for maintaining the panels in the frames is provided by elongated clamping strips or stop members 28 which extend along the back side of each panel adjacent the upper and lower edge portions thereof. As shown in Figure 2, stop members 28 have a generally L-shaped cross section. One leg of each L-shaped member projects into rail recess 17 between shoulder 16 and the peripheral edge portion 23 of the panel. The other leg of each stop member extends along the inner surface of frame rail 12. Therefore, the upper and lower edge portions of the panels are held within horizontal frame recesses 17 and between stop members 28 and front shoulders 15, and are nevertheless free to slide within these recesses when the panels expand and contract. Members 28 may be mounted upon the horizontal frame members by nails 29 or by any other suitable means.

Similar stop members 30 are mounted along vertical stiles 13 to clamp the side edge portions of the panels against front shoulders 18 (Figure 3). One leg of each vertical stop member abuts rear step 21 of a stile recess, while the other leg extends rearwardly along rear shoulder 19. Nails 31 may be used to firmly secure the vertical stop members to the frame. Like the horizontal stop members 28, the vertical stop members hold the panels in place while, at the same time, permit vertical expansion of those panels above and below the points of adhesive connection 40. While the L-shaped mouldings or stop members 28 and 30 are shown in the drawings as being formed from wood, it will be understood that these members may be made from other suitable materials, such as aluminum, steel, etc.

Each hinge C comprises a pair of hinge plates 32 and 33 having rearwardly turned ears 34 and 35, respectively. A sleeve 36 mounted between the ears of upper plate 32 carries a laterally extending shaft 37. Ears 35 of the lower hinge plate are provided with openings 38 adapted to pivotally receive the laterally projecting ends of shaft 37. It is to be noted that each of the hinge plates is secured by bolts 39 or by other connecting means to both a stile and a rail of a single door section, so that the hinges perform the dual function of hingedly connecting the door sections and rigidly securing the vertical and horizontal frame members together. Since the dimensions of the frame members and the exposed surfaces thereof are relatively small in comparison with the exposed surface areas of the relatively large panels, contraction or expansion of the frame members will not be sufficient to interfere with the proper operation of the hinges.

As described above, the panels are supported against rearward displacement by the L-shaped mouldings or stop members, and specifically by those legs of the mouldings 28 and 30 which project into the peripheral recesses or grooves of the rectangular frames. Since the top and bottom edges of each panel are uniformly spaced from the rails, and are frictionally but slidably secured in the upper and lower grooves by L-shaped mouldings 28, it is apparent that the "floating" panels are free to expand or contract independently above and below their intermediate points of adhesive connection 40 without disturbing the alignment and relation of the frame members. Consequently, proper positioning and operation of the hinges mounted upon the frame members are insured even when weather conditions cause the inner panels to shrink or swell.

While I have disclosed one embodiment of my invention in considerable detail for purposes of illustration, it will be understood by those skilled in the art that many of these details might be varied without departing from the spirit and principles of this invention.

I claim:

1. An overhead door structure comprising a door having a vertical series of hinged door sections, each of said sections comprising a generally rectangular wooden panel having inner and outer faces and a frame formed of interlocking vertical and horizontal frame members, said frame members defining a generally rectangular opening and being equipped with grooves extending along the sides of said members adjacent said opening for receiving the peripheral edges of said panel therein, said rectangular panel having vertical side edges abutting said vertical frame members within said grooves and having horizontal top and bottom edges equally spaced from said horizontal frame members within the grooves provided thereby, said panel having its outer face adjacent the periphery thereof in slidable surface engagement with said frame members within said grooves and being expandable and contractible in vertical directions, said rectangular panel having its vertical side edges each fixed at a point substantially equidistant the top and bottom ends thereof to the vertical members of said frame, clamping members rigidly fixed to said frame members and partially disposed within the grooves thereof, said clamping members slidably engaging the inner face of said panel adjacent the periphery thereof, and a plurality of hinges connecting the adjacent sections of said vertical series, whereby, said wooden panel may expand and contract in vertical directions above and below said points of fixation without dislocating the hinges connecting the adjacent door sections.

2. An overhead door structure comprising a door having a plurality of door sections each providing a frame and a wooden panel suspended therein, said panels each being rectangular in shape with the grain thereof extending horizontally and being capable of expanding and contracting in vertical directions in response to changes in weather conditions, hinge means mounted upon said frames to provide a series of hingedly connected door sections, said frames each having a rectangular opening therein and a slot extending about said opening, said panels each having a pair of vertical edge portions extending across the grain of the panel and abutting said frame within said slot, said vertical edge portions each being fixed at a single intermediate point to said frame to suspend said panel therein for vertical expansion and contraction in opposite vertical directions from said point of fixation, said panels also each having a pair of horizontal edge portions extending along the grain of the panel and carried within said slot, said horizontal edge portions being adapted to abut said frame only when said panel is fully expanded.

3. A garage door structure comprising a door having a plurality of hinged door sections, each of said sections providing a horizontally elongated rectangular frame and a horizontally elongated rectangular panel suspended therein, said frames each defining a horizontally elongated rectangular opening therein and having a slot extending along the inner side of said frame adjacent said opening, said panels having the grain thereof extending horizontally and being capable of expanding and contracting in vertical directions in response to changes in weather conditions, said panels each having a pair of vertical edges abutting said frame within said slot and having a pair of horizontal edges substantially equally spaced from the frame for accommodating vertical expansion and contraction of the panel, said vertical edges each being fixed at a single intermediate point therealong to said frame, whereby, said panels are each suspended for expansion and contraction in vertical directions across the grain thereof and in opposite vertical directions from the intermediate points of fixation to the respective frames.

4. The structure of claim 3 in which the peripheral portions of said panels are clamped within said slots for sliding movement therein by elongated stop members mounted upon said frames and having portions thereof extending between the rear surfaces of said panels and said frames.

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