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PANEL DOOR CONSTRUCTION

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Fig. 1

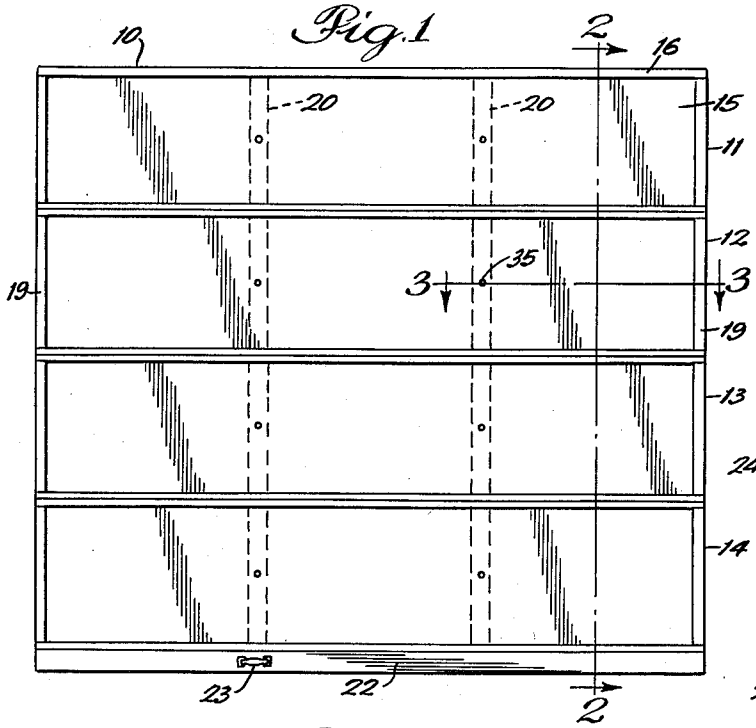


Fig. 2

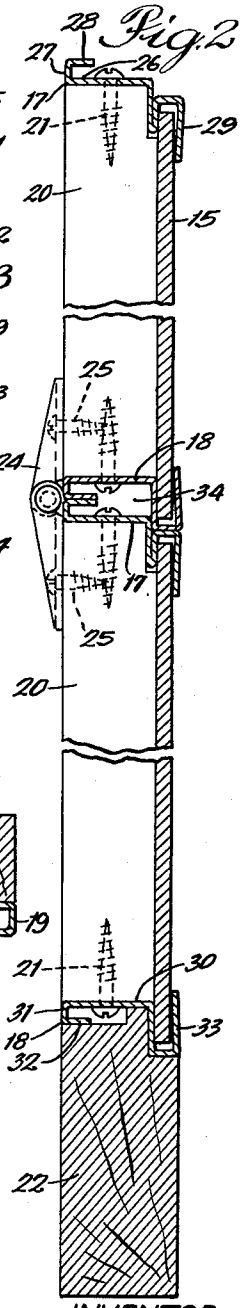
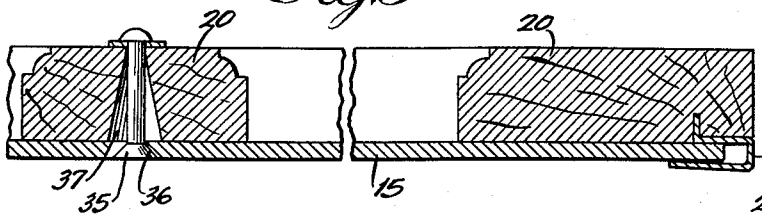


Fig. 3



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PANEL DOOR CONSTRUCTION

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This invention relates to a panel door construction, and more specifically, to a door having a metal frame and having an inner panel formed of board material.

A principal object of the present invention is to provide a panel door having a metal frame and being equipped with means for suspending a panel capable of expansion and contraction in all directions within the frame so that one of the side edges thereof abut the frame members. Another object is to provide a panel door section in which a panel formed of fiber board, hardboard, plastic or even metal is suspended within a metal frame so that it is free to expand and to contract in all directions without bending or distorting the frame members, and without dislocating the hinges connecting the door section to adjacent sections of a vertical series. In this connection, it is a specific object to provide a sectional overhead door in which the meeting rails of the adjacent sections sealingly engage each other along narrow contact areas to insure a proper seal between successive sections when the door is closed. A further object is to provide an overhead panel door having frame members which frictionally and sealingly engage a fiber board panel by reason of the spring action of the metal members and which, at the same time, permit expansion and contraction of the floating panel.

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

Figure 1 is a front elevational view of a sectional overhead door embodying the present invention;

Figure 2 is an enlarged and broken vertical section taken along line 2—2 of Figure 1 and showing a pair of adjacent door sections of the vertical series; and

Figure 3 is an enlarged and broken horizontal sectional view of the door taken along the line 3—3 of Figure 1.

In the embodiment of the invention illustrated in the drawings, the numeral 10 generally designates a sectional overhead door having a vertical series of hinged door sections 11, 12, 13 and 14. Each door section comprises a rectangular and horizontally elongated panel 15 formed of board material and a metal frame 16 extending about the periphery of that panel. Preferably, the panel is formed from a hard fiber board material, although it will be understood that other suitable sheet materials may be used.

Each frame 16 is composed of a plurality of vertical and horizontal frame members which define a continuous channel for receiving the peripheral edge portions of the panel. Thus, each door section has an upper frame member 17, a lower frame member 18, and a pair of side frame members 19. These frame members may be formed or rolled from sheet steel or aluminum or from any other suitable material.

In the illustration given, each door section is provided with a plurality of vertical wooden support members 20 disposed behind the fiber board panel and connected at their upper and lower ends to the horizontal frame members 17 and 18 by means of screws 21. A pair of these support members extend along the sides of each door section and the vertical side frame members 19 are embedded therein or otherwise fixed thereto. As shown in Figure 1, each section of the door also has a pair of intermediate support members, each of which is spaced equidistant between the other intermediate support member and one of the side edges of the door section. While two intermediate support members 20 are shown in the drawings, it will be understood that a different number may be provided depending upon the horizontal length of each rectangular section and the fiber board panel provided thereby.

If desired, the lowermost section of the overhead door may be provided with a wooden bottom rail 22 to which is affixed a handle 23 for moving the door between open and closed position. Since the mechanism for supporting such a door as it is moved between open and closed positions is well known in the art, and since it forms no part of the present invention, a detailed description of such structure is believed unnecessary herein.

The adjacent door sections of the vertical series are connected by hinges 24 (Figure 2) which are secured by screws 25 to the rear faces of the wooden support members 20 adjacent the meeting rails or frame members 17 and 18 of the successive sections.

As shown in Figure 2, the upper horizontal frame member 17 of each door section is provided with a flat intermediate portion 26 which covers the upper ends of the support members 20 and which is apertured to receive screw connections 21. The upper frame member is also provided with an integral rear portion 27 which turns upwardly and then forwardly, terminating in a horizontal flange or lip 28 spaced above the intermediate portion 26. At the front of the intermediate portion, the upper frame member turns downwardly, then upwardly and forwardly, and finally downwardly again to define an inverted U-shaped front portion 29. In Figure 2 it will be seen that the highest point or base of the inverted U-shaped front portion 29 is disposed below the plane of the intermediate portion 26.

Similarly, the lower frame member 18 of each door section has an intermediate portion 30, a downwardly and forwardly turned rear portion 31 which terminates in a forwardly extending lip or flange 32 spaced below the intermediate portion, and a U-shaped front portion 33. Thus, when the overhead door is closed, the adjacent horizontal frame members of successive door sections engage each other along the forwardly turned flanges 28 and 32 of their respective rear portions and along the bases of the oppositely directed U-shaped front portions 29 and 33. The intermediate portions 26 and 30 of the adjacent frame members are spaced apart and define a horizontal chamber 34 therebetween. Therefore, even if particles of dirt or foreign matter should lodge between the frame members of adjacent door sections, they will not impair or otherwise interfere with proper operation of the hinges or the formation of an effective seal between the closed sections of the door. Furthermore, since the front portions of the adjacent metal frame members engage each other below the level of the intermediate portion 26 and below the line of pivotal connection provided by hinges 24, water, snow, etc. cannot readily enter the chamber 34 or pass through that chamber to the hinges therebehind.

From Figures 2 and 3 it will be noted that the walls of the metal frame members which define the vertical sides of the channels (for receiving the fiber board panel) are not strictly parallel, but that the outermost wall slopes inwardly and rearwardly. The channels at their widest points are wider than the thickness of the panel 15, and

the angled front walls of the frame members contact the face of the panel only at the free edges of those walls. Therefore, should the thickness of the fiber board panel **15** increase in response to variations in weather conditions, the peripheral edge portions of that panel will still be free to slide within the channels defined by the metal frame members. Under such conditions, the angled front walls of the frame members will simply spring outwardly to accommodate the greater thickness of the door panel.

The fiber board panel of each door section is suspended within the metal frame by connecting means secured to the intermediate support members **20** and to the panel at spaced points along its horizontal midline. In the illustration given, the connecting means comprises a pair of rivets **35** which project through apertures **36** in the face of the panel, and which extend rearwardly through openings **37** in the intermediate support members. The openings **37** are rearwardly tapered (Figure 3) to permit lateral pivotal movement of the rivets upon expansion and contraction of the panel.

As shown in the drawings, spaces are provided about the periphery of each board panel within the channels defined by the vertical and horizontal frame members to accommodate expansion of those panels. The connecting rivets **35** suspend each panel within its metal frame so that the spacing about the periphery of those panels within the channels is substantially uniform. Therefore, the fiber panel is firmly supported in place while, at the same time, is free to expand and contract as humidity and temperature conditions vary without buckling and without bending or distorting the metal frame members.

While in the foregoing I have disclosed an embodiment of the present invention in considerable detail for purposes of illustration, it will be understood by those skilled in the art that many of these details may be varied without departing from the spirit and scope of the invention.

I claim:

1. In an overhead door having a vertical series of hinged door sections, each of said sections comprising a rectangular panel formed of sheet material and a metal frame extending thereabout, said frame of each of said sections including an upper horizontally elongated frame member having a flat intermediate portion, an upwardly and forwardly turned rear portion, and an inverted U-shaped front portion, said frame of each of said sections also including a lower horizontally elongated frame member having a flat intermediate portion, a downwardly and forwardly turned rear portion, and a U-shaped front portion, the U-shaped front portions of said upper and lower frame members defining opposing channels for receiving the upper and lower edge portions of a panel, the adjacent lower and upper frame members of sucessive sections in said vertical series being in limited surface engagement with each other along said rear and front portions and defining a chamber between the adjacent intermediate portions when said overhead door is closed.

2. The structure of claim 1 in which said frame of each of said sections also includes a pair of vertical side frame members having vertical channels therein continuous with the channels of said upper and lower members for receiving the side edge portions of a panel.

3. The structure of claim 1 in which the U-shaped front portion of said lower frame member extends below the intermediate portion of the upper frame member of the adjacent door section disposed directly therebelow when said overhead door is closed.

4. The structure of claim 2 in which said channel frame members define a panel-receiving opening of greater vertical and horizontal dimensions than the rectangular panel received therein, and means provided by each of said sections for suspending the panel thereof within said frame to provide a continuous and substantially uniform space about the periphery of said panel within the channels of said frame members.

5. In an overhead door having a vertical series of hinged door sections, each of said sections comprising a rectangular panel formed of sheet material and a metal frame extending thereabout, said frame of each of said sections including an upper horizontally elongated frame member having a front portion defining a downwardly opening longitudinal channel and having an upwardly projecting rear portion, said frame of each of said sections also including a lower horizontally elongated frame member having a front portion defining an upwardly opening longitudinal channel and having a downwardly projecting rear portion, said panel having the horizontal upper and lower edges thereof received within the opposing channels of said upper and lower frame members, the adjacent upper and lower frame members of successive sections in said vertical series being in limited surface engagement with each other along said rear and front portions and defining a space intermediate said surface engaging portions when said overhead door is closed.

6. The structure of claim 5 in which said frame of each of said sections also includes a pair of vertical side frame members having vertical channels therein continuous with the channels of said upper and lower frame members for receiving the side edge portions of a panel.

7. The structure of claim 6 in which said channel frame members define a panel-receiving opening of greater vertical and horizontal dimensions than the rectangular panel received therein, and means provided by each of said sections for suspending the panel thereof within said frame to provide a continuous and substantially uniform space about the periphery of said panel within the channels of said frame members.

8. The structure of claim 5 in which the front portions of said upper and lower frame members are generally U-shaped, each of said front portions having inwardly sloping sides in limited surface contact with the sides of a panel adjacent the periphery thereof, the sides of said U-shaped portions being adapted to flex outwardly to accommodate expansion and contraction of said panel.

9. In a panel door, the combination of a rectangular panel formed of expandible and contractable sheet material, a metal frame defining an opening and comprising vertical and horizontal channel frame members extending about and receiving in the channels thereof the peripheral edge portions of said panel, said panel being smaller than the maximum dimensions of the opening defined by the channel members, a pair of vertical support members secured to and extending between said horizontal channel frame members behind said panel, each of said vertical support members being spaced substantially equidistant between the other support member and one of the side edges of said panel, said support members being provided with horizontal openings therethrough disposed intermediate the upper and lower edges of said panel, and means connecting said vertical support members to said panel at points along the panel's horizontal midline and spaced from the vertical side edges thereof, said connecting means comprising a pair of members extending through said horizontal openings and secured at their forward ends to said panel, said horizontal openings having greater lateral dimensions than said connecting members to accommodate lateral movement of said connecting members upon expansion and contraction of said panel, said connecting means suspending said panel within said opening to provide spacing about the periphery of said panel within the channels defined by said channel members.

10. The structure of claim 9 in which said openings are rearwardly tapered, said connecting members being pivotally supported upon said support members for lateral pivotal movement of said connecting members upon expansion and contraction of said panel.

11. In a panel door, the combination of a rectangular panel formed of expandible and contractable sheet material, a metal frame defining an opening and comprising

vertical and horizontal channel frame members extending about and receiving in the channels thereof the peripheral edge portions of said panel, said panel having smaller vertical and horizontal dimensions than the maximum vertical and horizontal dimensions of the opening defined by the channel frame members, and at least one vertical support member secured to and extending between said horizontal channel frame members behind said panel and being spaced from both of said vertical channel frame members, said panel being attached to and suspended by said vertical support member at a point intermediate the upper and lower edges of said panel and having its horizontal and vertical edges spaced from the respective horizontal and vertical frame members within the channels provided thereby to provide spacing about the periphery of said panel for expansion and contraction thereof.

12. In an overhead door having a vertical series of hinged door sections, each of said sections comprising a rectangular panel formed of sheet material and a metal frame extending thereabout, said frame of each of said

sections including an upper horizontally elongated frame member having a flat intermediate portion, an upwardly turned rear portion, and an inverted U-shaped front portion, said frame of each of said sections also including a lower horizontally elongated frame member having a flat intermediate portion, a downwardly turned rear portion, and a U-shaped front portion, the U-shaped front portions of said upper and lower frame members defining opposing channels for receiving the upper and lower edge portions of a panel, the adjacent lower and upper frame members of successive sections in said vertical series being in limited surface engagement with each other along said rear and front portions and defining a chamber between the adjacent intermediate portions when said overhead door is closed.

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