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MAC MILLAN CLEMENTS

2,557,412

STRUCTURAL PANEL

Filed Feb. 13, 1948

Fig. 1.

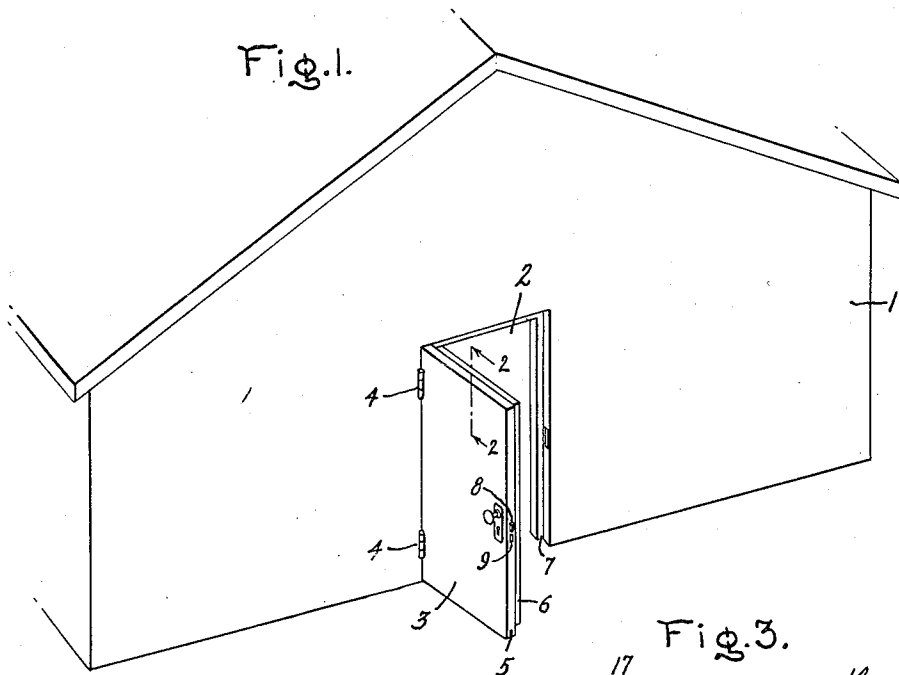


Fig. 2.

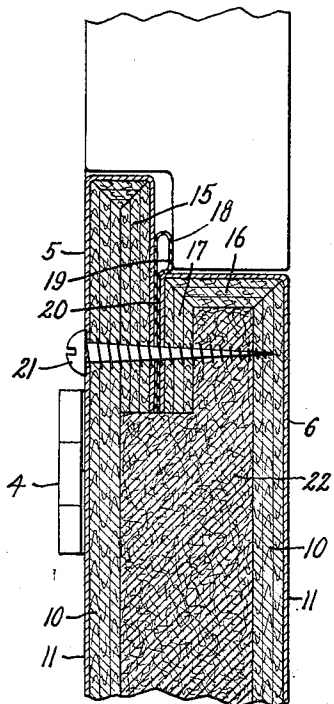


Fig. 4.

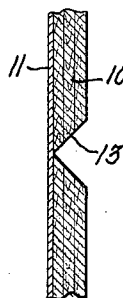
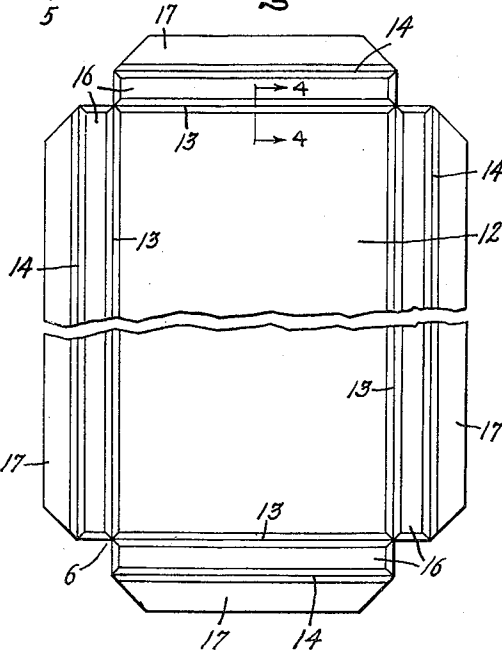


Fig. 3.



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UNITED STATES PATENT OFFICE

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STRUCTURAL PANEL

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Application February 13, 1948, Serial No. 8,102

1 Claim. (Cl. 20—35)

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This invention relates to structural panels and more particularly to improvements in hollow panels for use as doors and to the method of making the same.

The panel is constructed from laminated sheet material having a thin metal or other water-proof, weather and wear resistance skin which is bonded by a suitable adhesive to a relatively thick backing of plywood or the like. The skin is on the outside and one feature of the invention is bringing the skin faces of the panel around the edges and enfolding them so as to provide an uninterrupted vapor seal between the inside and outside of the panel. Another feature is the production of a stable and structurally strong hollow panel without the use of a rigid inner core or filler. Heretofore, metal faced or Kalamain doors have had interrupted surfaces either on their faces or edges and are subject to absorption of moisture. This not only makes it possible for internal rot and corrosion to set in, but in cases where thermal characteristics are important, it reduces the efficiency of the panel over periods of time, through condensation and accumulation of moisture. These are serious drawbacks to the use of such panels in refrigerators.

Suitable skin or surfacing materials include stainless steel, aluminum, copper, Monel metal, galvanized or other flexible corrosion resistant treated steels and also tough flexible plastics such as vinyls, or impregnated fabrics which have substantial tensile characteristics as well as imperviousness to moisture.

An object of the invention is to provide a novel lightweight strong acoustically and thermally insulating inexpensive and long-lasting structural panel suitable for use as a door.

Another object of the invention is to provide an improved door construction.

A further object of the invention is to provide a novel method of making a door.

The invention will be better understood from the following description taken in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

In the drawing, Fig. 1 is a perspective view of the building structure showing a preferred form of the door in its open position; Fig. 2 is a sectional view of the door taken on line 2—2 of Fig. 1 but with the door in closed position; Fig. 3 is a plan view of the development of one of the panel members; and Fig. 4 is a sectional view taken on line 4—4 of Fig. 3.

Referring now to the drawing, and more par-

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ticularly to Fig. 1, there is shown therein a building construction 1 having an opening 2 which is arranged to be closed by a door 3 which is mounted on hinges 4. The door 3 comprises two members 5 and 6 of properly processed and folded sheet material. The member 5 has a larger area than the member 6, so as to provide a stepped edge which fits into a suitable ledge 7 in the periphery of the opening 2. In addition to the hinges 4, the door 3 is provided with any other suitable hardware, such as a latch 8 and lock 9.

As shown most clearly in Fig. 2, both the members 5 and 6 are made of laminated sheet material. The preferred components are a relatively thick sheet of organic material, 10, such as plywood bonded to a relatively thin sheet 11 of metal, such as stainless steel or copper. The two laminated sheets from which the members 5 and 6 are formed have their corners cut away and have parallel grooves cut in the organic material down to the metal layer. There are two parallel grooves adjacent each side of the sheet.

This construction is shown most clearly in Fig. 3 for the member 6 wherein there is a rectangular flat central portion 12 bonded by V-shaped grooves 13 which in cross section look like the grooves shown in Fig. 4. Parallel to each of the grooves 13 and spaced therefrom a distance substantially greater than the thickness of the laminated sheet are additional grooves 14 similar to the grooves 13.

The cutout and grooved sheet shown in Fig. 3 when folded along the groove produces the member 6. The member 5 is generally similar to the member 6 except that it is larger and its grooves corresponding to grooves 13 and 14 of member 5, are separated by a distance which is substantially the thickness of the laminated sheet so that the folded-over edge strip 15 of member 5 lies in contact with the main surface of the central portion of the member 5, whereas the member 6 is thicker than the member 5 due to the separation of the grooves 13 and 14 which produces what may be called inner edge strips 16 which separate the central portion 12 of the member 6, from what may be called its outer edge strips 17.

Fitted into the corner formed between the strips 15 and 16 is a gasket 18 which may run completely around the door. This gasket may comprise a generally circular cross section resilient member 19 of rubber or other suitable material, to which is attached a fastening strip 20 which extends between the abutting or adjoining surfaces of the strips 15 and 17 of the two main

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door-forming members 5 and 6. These two members, when placed face-to-face, as shown in Figs. 1 and 2, may be fastened together in any suitable manner, such as by screws 21.

It will be seen that the tab or extension 20 on the gasket 18 not only serves to hold the main body portion 19 of the gasket in place, but it also acts as a sealing gasket between the surfaces of the strips 15 and 17 and thus prevents moisture from getting inside the door when the door is open and no pressure is applied to the main body portion 19 of the gasket.

It will, of course, be understood that in its broader aspects the invention is not limited to different size or shape front and back members, and that, for example, a hollow panel could be made from two of the members 5 or two of the two members 6. It should also be understood that the members can be joined in any suitable manner and that screws 21 are not essential. For example, if the members 5 and 6 have a metal skin and line of contact can be sealed by solder or by brazing or by welding or even by adhesive means. In such cases, gaskets may be secured adhesively or mechanically to the door flange, or in other instances to the door frame jamb or eliminated entirely.

The hollow interior of the door or panel, may if desired, be filled with any suitable insulating material 22 which will serve as both thermal and acoustical insulation. Such insulation may be mineral wool or various foam or sponge rubber composition.

While the door has been illustrated as being made of two panels which are of varying length, breadth, and thickness, it should be understood that the invention is not limited to this, and the panels may have one or more or all three of these dimensions the same, if desired.

The above-described door is exceptionally strong and light and impervious to variations in humidity, so that it holds its dimensions under extreme changes in climate and hard usage, and will continue to fit tight in its frame.

While there has been shown and described a particular embodiment of the invention, it will be obvious to those skilled in the art that changes and modifications can be made without departing from the invention, and, therefore, it is aimed in the appended claim to cover all such changes and modifications as fall within the true spirit and scope of the invention.

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What I claim as new and desire to secure by Letters Patent of the United States is:

A hollow door comprising, in combination, two members of flat laminated sheet material each having a main body of wood bonded to a substantially thinner layer of metal, each member having a flat central rectangular portion and outer edge strips which are folded over twice through substantially 90 degrees each along two parallel grooves respectively, said grooves being so positioned in the wood that said outer edge strips extend inside said door a relatively short distance from the outside surface of the door, said outer edge strips being parallel to the surface of each of said central portions, said members being parallel to each other with the surfaces of their folded over outer edge strips inside said door in contact with each other, the rectangular central portion of one member being substantially smaller than that of the other one, the parallel grooves of said one member being separated by a substantially greater distance than the parallel grooves of the other member whereby said one member is effectively thicker than said other member, the outer edge strips of said one member being sufficiently narrower than the outer edge strips of said other member so that the outer edge strips of both members are in substantial registration inside said door, said door having a sound insulating space being provided by the said difference in thickness and said short distance said outer edge strips extend inside said door, and means for fastening the contacting outer edge strips together, said fastening means constituting the sole means for retaining the two members in position.

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The following references are of record in the file of this patent:

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