

Jan. 10, 1967

XA D. JOHNSON ETAL

3,296,745

COMPOSITE DOOR FOR CABINETS AND THE LIKE

Filed March 2, 1964

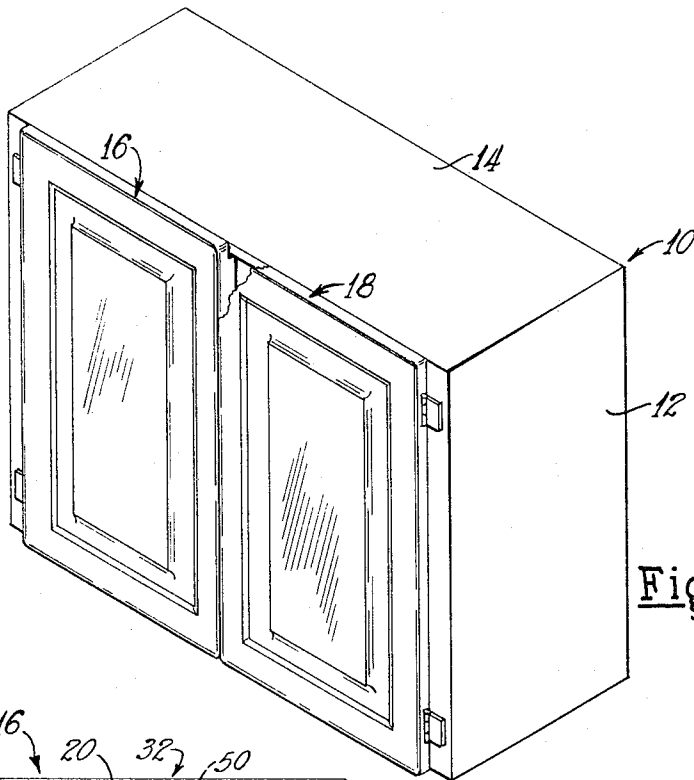


Fig. 1

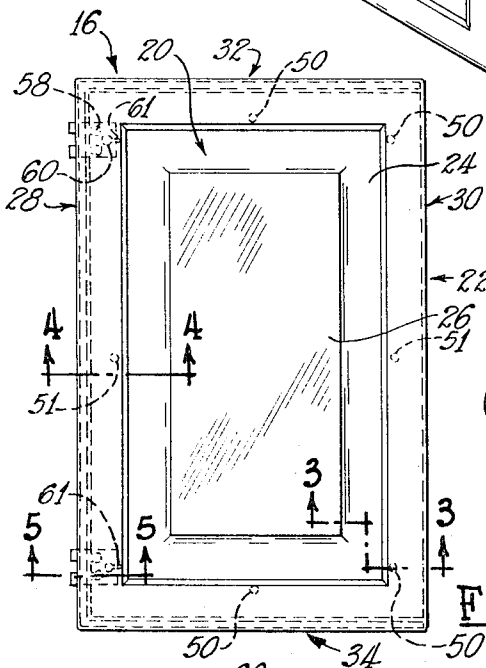


Fig. 2

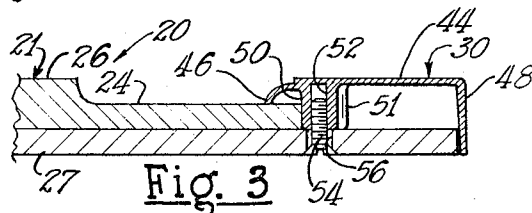


Fig. 3

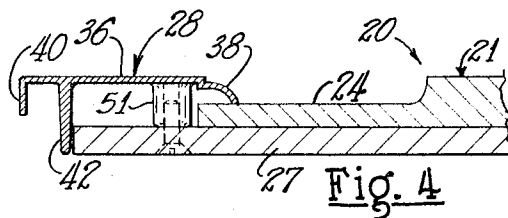


Fig. 4

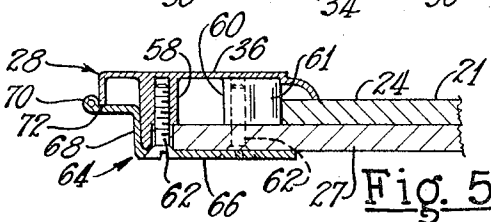


Fig. 5

INVENTORS
XA D. JOHNSON
GEORGE C. HILFINGER
BY
Owen + Owen
ATTORNEYS

1

3,296,745

COMPOSITE DOOR FOR CABINETS AND THE LIKE

Xa D. Johnson and George C. Hilfinger, Toledo, Ohio,
assignors, by mesne assignments, to Roy C. Fisher and
George C. Hilfinger, Toledo, Ohio

Filed Mar. 2, 1964, Ser. No. 348,696

4 Claims. (Cl. 49—501)

This invention relates to a composite door for cabinets or the like and more particularly to a door comprising a metal frame and a central, separate panel, usually made of other material.

A door according to the invention primarily is designed for smaller applications such as for cupboards rather than for full size interior or exterior doors. The new door includes a central panel, usually of wood, and an outer metal frame extending around the entire panel and over the edges thereof. The new composite door has many advantages over conventional wooden ones. For example, it is stronger, not only because the frame is of metal, but also because it is of one-piece construction, rather than four joined pieces of wood used in most wooden doors. The one-piece metal construction of the frame also eliminates the chance for seams or joints to expand, contract, and dry out because of temperature and humidity changes from season to season. With the new door, the central panel is allowed to float relative to the frame to accommodate expansion and contraction of the panel without setting up stresses or opening seams. The composite construction also virtually eliminates warping because any tendency for the wood panel to warp is resisted by the metal frame. The central panel in the new door is held by only a few fasteners so as to be easily removable and capable of being replaced by another panel to enable doors of many designs and colors to be achieved. The panel also can be made to be reversible, if desired, so that two different color schemes can be obtained from a single frame and panel.

The new composite door provides increased resistance to nicking and scratching, particularly at the edges thereof which, in the case of the usual wooden doors, are quite susceptible to such damage. The die-cast metal frame also enables closer tolerances to be achieved to provide better fit between the door and the cabinet frame. Further, the die-cast frame has provisions for positively locating hinges to simplify installation and reduce labor costs. The frame also is provided with notches for the hinges to enable the door to fit against the frame.

It is, therefore, a principal object of the invention to provide a composite door with a metal frame and a separable central panel, which door has the advantages outlined above.

Other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment thereof, reference being made to the accompanying drawing, in which:

FIG. 1 is a view in perspective of a cabinet and two cabinet doors embodying the invention, with part of one of the doors being broken away;

FIG. 2 is a front view in elevation of the left-hand door of FIG. 1;

FIG. 3 is a fragmentary view in cross section taken along the line 3—3 of FIG. 2;

FIG. 4 is a fragmentary view in cross section taken along the line 4—4 of FIG. 2; and

FIG. 5 is a fragmentary view in cross section taken along the line 5—5 of FIG. 2.

Referring to the drawing, and more particularly to FIG. 1, a cabinet indicated at 10 includes a side wall 12 and an upper wall 14 of any suitable construction and

2

design, and also may include a back wall and shelves (not shown). The front of the cabinet 10 is closed by two substantially identical composite doors 16 and 18, each embodying the invention. The composite doors of the present invention are not limited to use with any particular type of cabinet construction or construction materials.

Referring more particularly to FIG. 2, the composite door 16 includes a central panel indicated at 20 and a metal frame indicated at 22. The panel 20 preferably is made of wood although other materials such as plastics can be employed. The panel 20 includes, in this instance, a front board or layer 21 of hardboard, for example, having an outer flat margin 24 of uniform thickness extending around the entire board, and a central raised portion 26 which provides strength and stiffness as well as a pleasing design to the overall composite door 16. Of course, the number of designs of the panel 20 and the raised portion 26 are almost unlimited and the specific panel shown is only for purposes of illustration. Behind the front layer 21 is a backing board or layer 27 of plywood, for example, which extends beyond the edges of the front layer 21 to provide greater stiffness for the door 16. This arrangement also provides greater accommodation for differences in expansion than does a one-piece panel.

The metal frame 22 is of one-piece, die-cast construction so as to eliminate all joints between side frame members 28 and 30 and upper and lower end frame members 32 and 34. This provides increased strength not available for the usual door made with four wooden frame members connected together at their ends by joints which may become loose and eventually dry out. As the joints contract and expand, the paint also may crack, thereby marring the overall appearance of the door.

The upper and lower end frame members 32 and 34 and the left side frame member 28 are of substantially similar configuration in cross section as shown in FIG. 4. Each of the members 28, 32, and 34 basically includes a main web 36 extending between an inner flange 38 and an outer flange 40. The inner flange 38 extends a predetermined distance from the web 36 toward the panel 20 and contacts the margin 24 of the panel to hold the web 36 spaced therefrom. The flange 38 can be of many suitable configurations and, as shown, is in the shape of a quarter-round molding to render the appearance of the composite door similar to that of many wooden doors. Of course, the flange 38 can equally well be perpendicular to the margin 24, slanted, or even concave. From a functional standpoint, it is only important that the inner flange 38 be designed to contact and cooperate with the margin 24 to position the web 36 a predetermined distance from the margin 24.

The outer flange 40, while shown to be perpendicular to the web 36, can also be of other configurations, if desired. The free edge of the outer flange 40 similarly is uniformly spaced from the web 36 to enable the flange 40 to contact the face of the cabinet 10 when the door 16 is closed. For this purpose, the flange 40 preferably is not wide enough to extend to the plane of the back of the panel 20 so that the panel 20 will extend slightly into the cabinet when the door is closed. This arrangement of the flange 40 thus provides a lip-type or overlapping type door, with the door cooperating with the cabinet frame as shown in the broken away portion of FIG. 1. If the flange 40 extends to the plane of the back of the panel, then the entire door will lie in front of the plane of the cabinet opening and thus be of the overlay-type or slab-type construction.

A third, intermediate flange 42 extends from the web 36 intermediate the inner flange 38 and the outer flange 40. The flange 42 is always wider than the flange 38

3

and usually wider than the outer flange 40, at least in the case of a lip-type door. The flange 42 in any event is long enough to extend to the back of the panel 20 or the back layer 27 when the inner flange 38 is in contact with the margin 24. The intermediate flange 42 thereby serves to position the back layer 27 with respect to the frame 22 when the two are first assembled and also serves to protect the edge of the panel 20 when the cabinet is in use. The entire back of the panel 20 is left exposed, which enables a latch to be attached anywhere thereon to cooperate with a latch member suitably positioned in the cabinet.

The cross section of the latch side member 30 of the door 16 differs slightly from the cross section of the other door frame members 28, 32, and 34. Referring to FIG. 3, the side frame member 30 includes a main web 44 which is similar to but slightly narrower than the webs 36, and an inner flange 46 which is, at least in this instance, substantially identical to the inner flanges 38 of the frame members 28, 32, and 34. The side frame member 30 also has an outer flange 48 which is wider than the flange 46 and preferably extends to the back of the back layer 27 in order to more fully protect it and improve the appearance of the door. The outer flange 48 also cooperates with the intermediate flanges 42 of the frame members 28, 32, and 34 to help locate the panel 20 when the frame and panel are assembled. The flange 48, in the case of a lip-type door, extends slightly into the cabinet 10 when the door is closed, similarly to the intermediate flanges 42.

To fasten the panel 20 to the frame 22, the latch side frame member 30 has spaced bosses 50 and 51 cast therein, preferably being integral with the web 44. The bosses 50 are positioned inwardly slightly with respect to the bosses 51 and contact the edges of the front layer 21 to help center it with respect to the door frame. The front layer 21 is not actually affixed to the frame at any point. The bosses 50 and 51 have suitable bores 52 to receive machine screws 54 extending through suitable drilled passages 56 in the back layer 27. The passages 56 are preferably slightly larger than the shanks of the machine screws 54 to enable the back layer to expand and contract slightly relative to the frame.

The hinge side frame member 28 has four bosses 58 (FIG. 5) and two additional bosses 60 to help hold the panel 20 in addition to the boss 51. The bosses 60 have inwardly extending ribs 61 which abut the edge of the front layer 21 to help position it in cooperation with the bosses 50. The bosses 58 and 60 are tapped to receive slightly longer machine screws 62 which hold both the panel 20 and an offset hinge 64. The hinge 64 includes a back hinge plate 66 through which the screws 62 extend to hold the hinge 64 in place and to further clamp the panel 20. The hinge 64 also includes an L-shaped flange 68 which extends alongside the intermediate flange 42 and outwardly past the outer flange 40 to a hinge pin receiver 70. For this purpose, the outer flange 40 has a notch 72 to enable the L-shaped flange 68 of the hinge 64 to be flush with the edge of the outer flange 40 so that the flange 40 can still contact the outer face of the cabinet 10 even though the hinge extends beyond it. The positioning of the bosses 50, 58, and 60 preferably is symmetrical about a horizontal plane through the center of the cabinet door 16 so that the panel 20 can be reversed if desired to provide an additional color combination.

As shown, the doors 16 and 18 can be opened by grasping the lower edges thereof or suitable handles can be fastened to the frame 22 or the panel 20.

Particularly with baked-on epoxy paints now available, the cabinet doors can be finished in many attractive colors. The frame and panel can be of the same color or of contrasting colors. The back surface of the panel also can be of a different color to provide two color combinations for the door, if the panel is reversible.

4

Various modifications of the above described embodiment of the invention will be apparent to those skilled in the art, and it is to be understood that such modifications can be made without departing from the scope of the invention, if they are within the spirit and the tenor of the accompanying claims.

What we claim is:

1. A composite cabinet door comprising a rectangular center panel having a margin extending around the entire periphery of said panel, said margin being of uniform width and of predetermined thickness, a die-cast metal frame extending around said margin and over the edges of said panel, said frame comprising four integral frame members including a latch side frame member, a hinge side frame member, an upper end frame member, and a lower end frame member, each of said frame members having a web of substantially uniform width and an inner flange integral with said web and in contact with the margin of said panel, said hinge side frame member and said end frame members each also having an intermediate flange extending from said web along the edges of said panel substantially to the back surface of said panel and an outer flange integral with said web and extending in the same direction from said web as said intermediate and inner flanges, said outer flange being of uniform width which is less than the width of said intermediate flange, said outer flange being spaced from said intermediate flange and adapted to contact the front surface of the cabinet when the door is closed, said latch side frame member also having an outer flange integral with the associated web and extending along the edge of said panel to the back surface, said latch side outer flange being substantially the same width as said intermediate flanges, at least two hinges, said hinge side outer flange having at least two notches to receive said hinges to be flush with the edge of said outer flange, said hinge side frame member having at least one boss for each hinge to threadedly receive a machine screw, said bosses being located between said intermediate and said inner flanges and generally in alignment with said notches, said bosses being integral with the web of said hinge side frame member, and at least one boss integral with the web of said latch side frame member to receive a machine screw to fasten said latch side frame member to said panel.

2. A composite cabinet door comprising a rectangular center panel having a margin extending around the entire periphery of said panel, said margin being of predetermined thickness, a die-cast metal frame extending around said margin and over the edges of said panel, said frame comprising four integral frame members including a latch side frame member, a hinge side frame member, an upper end frame member, and a lower end frame member, each of said frame members having a web of substantially uniform width and an inner flange integral with said web and in contact with the margin of said panel, said hinge side frame member and said end frame members each also having an intermediate flange extending from said web along the edges of said panel substantially to the back surface of said panel and an outer flange integral with said web and extending in the same direction from said web as said intermediate and inner flanges, said outer flange being of uniform width which is less than the width of said intermediate flange, said outer flange being spaced from said intermediate flange and adapted to contact the front surface of the cabinet when the door is closed, said latch side frame member also having an outer flange integral with the associated web and extending along the edge of said panel to the back surface, said latch side outer flange being substantially the same width as said intermediate flanges, said hinge side frame member having at least one boss for a hinge to threadedly receive a machine screw, said boss being located between said intermediate and said inner flanges, said boss being integral with the web of said hinge side frame member, and at least one boss integral with the web of said latch side

5

frame member to receive a machine screw to fasten said latch side frame member to said panel.

3. A composite cabinet door comprising a rectangular center panel having a margin extending around the entire periphery of said panel, said margin being of predetermined thickness, a die-cast metal frame extending around said margin and over the edges of said panel, said frame comprising four integral frame members including a latch side frame member, a hinge side frame member, an upper end frame member, and a lower end frame member, each of said frame members having a web of substantially uniform width and an inner flange integral with said web and in contact with the margin of said panel, said hinge side frame member and said end frame members each also having an intermediate flange extending from said web along the edges of said panel substantially to the back surface of said panel and an outer flange integral with said web and extending in the same direction from said web as said intermediate and inner flanges, said outer flange being of uniform width which is less than the width of said intermediate flange, said outer flange being spaced from said intermediate flange and adapted to contact the front surface of the cabinet when the door is closed, said latch side frame member also having an outer flange integral with the web and extending along the edge of said panel to the back surface, said latch side outer flange being substantially the same width as said intermediate flanges, said hinge side frame member having means for fastening the panel and a hinge thereto, and said latch side frame member having means to fasten said panel thereto.

4. A composite cabinet door comprising a rectangular center panel having a front, decorative layer and a rear, supporting layer extending beyond the periphery of said front, decorative layer, said layers being separate and independently movable, said front layer having a margin around the entire periphery of predetermined thickness,

6

a metal frame extending around said margin and over the edges of said panel, said frame comprising four frame members including a latch side frame member, a hinge side frame member, an upper end frame member, and a lower end frame member, each of said frame members having a web and an inner flange integral with said web and in contact with the margin of said front, decorative layer, said hinge side frame member and said end frame members each also having an intermediate flange integral with said web and extending in the same direction from said web as said inner flanges, said hinge side frame member and said end frame members each also having an outer flange integral with said web and extending in the same direction from said web as said inner flanges, said outer flanges being of uniform width and adapted to contact the front surface of the cabinet when the door is closed, said latch side frame member also having an outer flange integral with the web and extending along the edge of said panel, said frame members having means to receive a fastener to hold a hinge and said panel with respect to said hinge side frame member, said frame members also having means to receive a fastener for holding said panel with respect to said latch side frame member.

References Cited by the Examiner

UNITED STATES PATENTS

906,777	12/1908	Crooke	52—623
1,916,189	7/1933	Bales	189—46
2,166,430	7/1939	Green	189—46

FOREIGN PATENTS

382,384	10/1932	Great Britain.
484,248	6/1952	Canada.

HARRISON R. MOSELEY, *Primary Examiner*,
KENNETH DOWNEY, *Examiner*,