Jan. 10, 1967 S. GARBUS 3,297,077

FOLDING DOOR STRUCTURE

Filed Sept. 10, 1964 2 Sheets-Sheet 1

Fig. 1

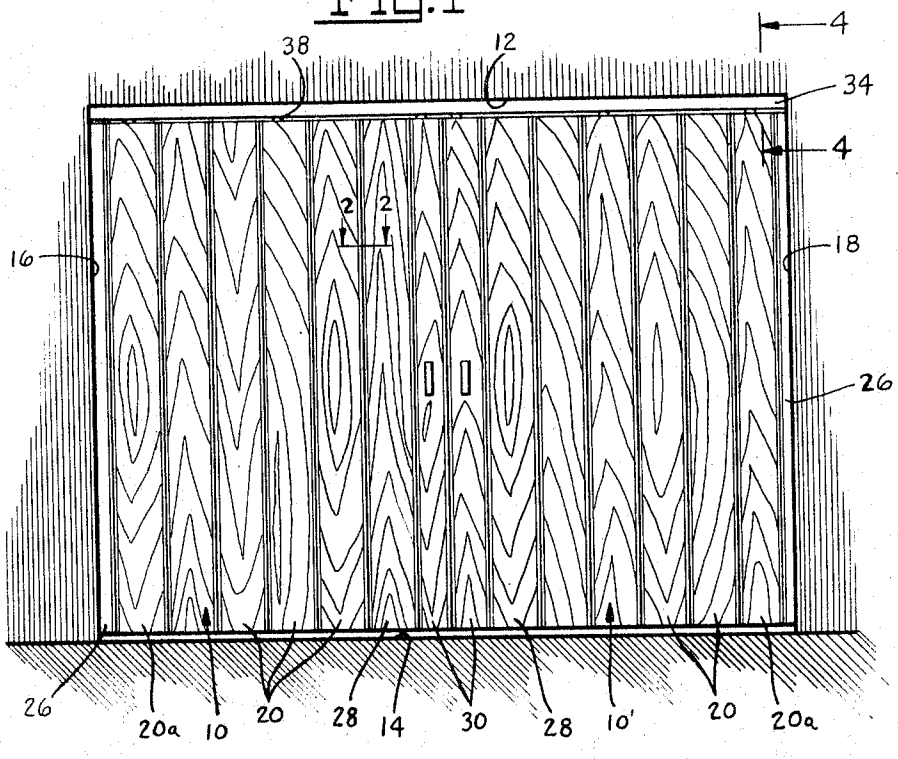
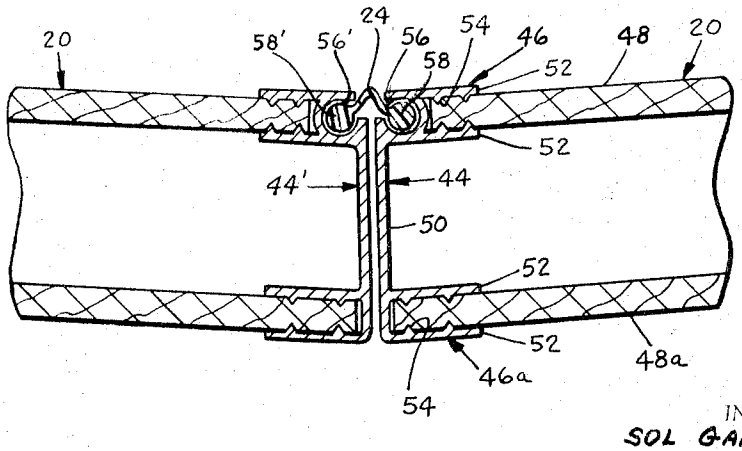


Fig. 2



INVENTOR.
SOL GARBUS

BY

Liteman and Levy

ATTORNEYS

Jan. 10, 1967 S. GARBUS 3,297,077

FOLDING DOOR STRUCTURE

Filed Sept. 10, 1964 2 Sheets-Sheet 2

Fig. 3

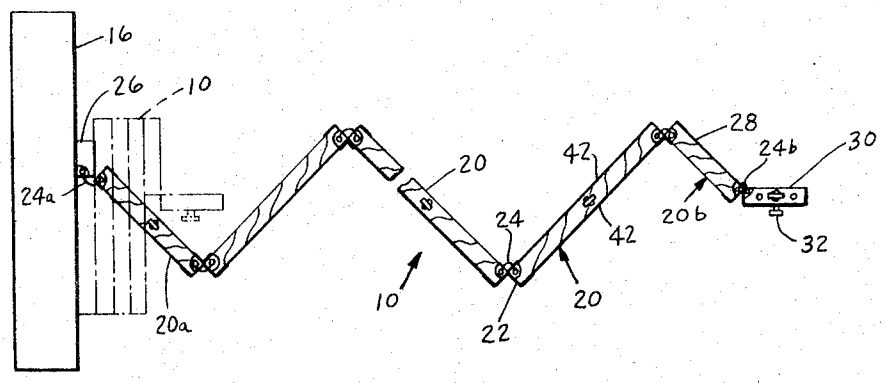


Fig. 4

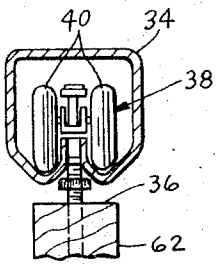


Fig. 5

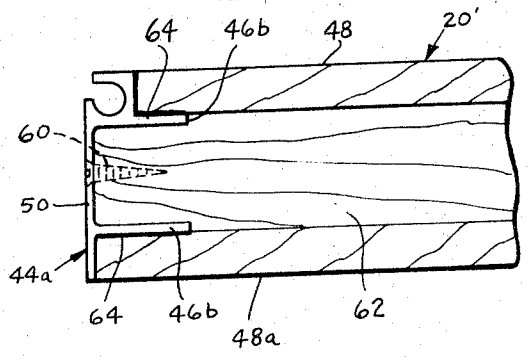
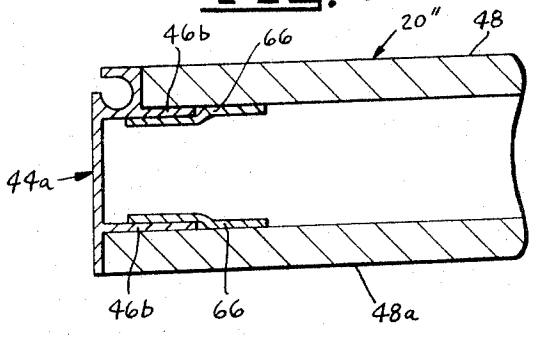


Fig. 6



INVENTOR.
SOL GARBUS

BY Liberman and Levy

ATTORNEYS

United States Patent Office 3,297,077
Patented Jan. 10, 1967

3,297,077

FOLDING DOOR STRUCTURE

Sol Garbus, 63—60 102nd St., Forest Hills, Long Island, N.Y. 11375

Filed Sept. 10, 1964, Ser. No. 395,418
1 Claim. (Cl. 160—231)

This invention relates to partitions or doors of the folding accordion-type wherein a plurality of panels are hinged together along their respective side edges for movement between a folded or closed position, in which the panels are stacked face-to-face against each other, and an unfolded or open position, in which the panels extend widthwise of each other in accordion-like fashion.

An object of the present invention is to provide a folding accordion-type door or partition in which each panel includes a side edge frame member which provides a mount for the hinge connecting adjacent panels to each other.

Another object is to provide a folding accordion-type door or partition in which the panels comprise simple rigid sheet-like panel members which are connected in spaced relation to each other by side edge frame members that include means for providing a mount for hinging adjacent panels to each other.

A further object is to provide a folding accordion-type door or partition which may be readily assembled in a simple manner from an almost limitless assortment of simple sheet-like panel members by the use of side edge panel frame members which provide hinges for hinging the side edges of adjacent panels to each other.

Another object is to provide a unitary frame member having provision for holding a panel member and providing a mount for a hinge for said member.

A still further object of the invention is to provide an improved folding accordion-type door or partition which is simple and inexpensive and yet is especially well suited for its purposes.

The above and other objects, features and advantages of the present invention will be more fully understood from the following description of the invention considered in connection with the accompanying drawings of illustrative embodiments of the invention, in which:

FIG. 1 is a front elevational view of a folding accordion-type pair of doors, in accordance with the invention, in an unfolded or open position;

FIG. 2 is an enlarged section taken along line 2—2 of FIG. 1 and showing a pair of adjacent hinged panels of one of the doors of FIG. 1;

FIG. 3 is a top plan view of the left door of FIG. 1 in a partially unfolded position and illustrates, in dot-dash lines, the stacked condition of the panels of said door in its closed or folded position;

FIG. 4 is a vertical sectional view, on a larger scale, taken on line 4—4 of FIG. 1;

FIG. 5 is a top plan view of part of a modified panel; and

FIG. 6 is an enlarged section similar to FIG. 2, but showing another modified form of panel construction.

Referring now to the drawings in detail, the folding accordion-type doors **10** and **10'** illustrated by FIG. 1 are identical and are movable widthwise toward and away from each other to close and open, respectively, the space defined by the top and bottom edges **12** and **14**, respectively, and the spaced vertical side edges **16** and **18** of an opening, as for example, a closet or door opening or a space in a room for partitioning parts of the room from each other. As best illustrated by FIG. 3, door **10** comprises a series of panels **20** which are hinged to each other along their adjacent vertical side edges **22** by vertically extending strips of flexible material **24**. The

innermost panel **20***a* of each folding door **10** and **10'** is hinged, by flexible strip **24***a*, to a vertically extending frame member **26** that is secured to a respective side edge **16** or **18**. The outermost panel **20***b* of each door is divided into panel sections **28** and **30** which are hinged to each other by strip **24***b*, and section **30** is provided with a handle **32**.

A horizontally extending track **34** of the usual type is suitably secured to top edge **12** of the opening and the top edges **36** (FIG. 4) of the panels are suitably provided with swivelly mounted carriers **38** which extend upwardly. Wheels **40** of the carriers **38** roll on the track **34** to permit the folding and unfolding of the panels. The panels are suspended from the track, and in this regard it is to be noted that the hinge strips **24** are positioned at the opposite side edge of each panel and at the opposite faces **42** thereof to permit the accordion folding and unfolding of the panels. The folded condition of the panels is shown in dot-dash lines in FIG. 3.

In accordance with the invention a channel shaped frame member **44** is provided for each end of the panel, the frame members not only providing hinge means for the panel, but also forming the panel itself by assembling the panel body and constituting the side edge thereof. A preferred embodiment of such frame member **44** is shown in FIG. 2. Each frame member **44** comprises an elongated metallic or plastic member, for example, extruded aluminum or other suitable material, extending the height of the panel and comprising a central sheet metal web **50** terminating at its ends in a pair of substantially perpendicular slotted legs constituting mounting members **46** and **46***a*. The frame members **44** are adapted to mount a pair of sheet-like members **48** and **48***a* in spaced, parallel, face-to-face confronting relationship to form a hollow panel body in which the members **48** and **48***a* define the front and rear side walls. For this purpose, the members **46** and **46***a* each comprise a pair of confronting, spaced, slightly bendable walls **52**, the inner confronting sides of which are provided with sharpened protuberances **54** which grip and hold the marginal side edge portions of the opposite surfaces of members **48** and **48***a*.

From the foregoing description, it will be observed that to assemble the side wall members **48** and **48***a* with the frame member **44**, the marginal side edge portions of the members are inserted edgewise between gripping portions **52** which are initially spaced apart a distance which is greater than the thickness of the companion sidewall member and, thereafter, the gripping portions are bent toward each other so that the protuberances **54** engage and grip the adjacent portions of the members. In this manner the side wall members are readily secured to the frame member without any cutting or other alteration of the members and without the need for measuring or holding the members a predetermined distance apart. In short, no framing is necessary to assemble the panel from the frame and side wall members. In addition, the side wall members may be constructed from an almost limitless assortment of relatively rigid sheet members such as plywood, other woods, fibreboard, pressed board, plastic panels, etc.

Panel mounting member **46** is provided with a hinge mount, as previously indicated, for hinge strip **24**. More particularly a longitudinally extending groove or socket **56** of substantially circular cross-section is provided opposite gripping parts **52** to receive the enlarged beaded circular edge **58** of hinge strip **24** and it will be noted from FIG. 2 that the opposite frame member **44'** is also constructed similar, but opposite to member **44**, so that its groove **56'** is in face-to-face relation with groove **56** to receive the opposite beaded circular edge **58'** of strip **24** for hinging the panels to each other. The resiliency of the

beaded edges of the hinge strip permits them to be pushed into the grooves in which they are resiliently held, although in mounting the beaded portions 58 and 58' are inserted through the top ends of the respective grooves or sockets 56 and 56' and slid downwardly until the ends of strip 24 are flush with the ends of the frame members 44 and 44'.

To complete the panel, the top edge thereof is closed, as illustrated in FIG. 5, by suitably securing, as by screws 60, a horizontal strip or bar of wood or other composition matching the panel walls 62 between the end frame members of each panel. The carriers 38 are suitably secured to members 62. The top edge of each panel is similarly closed by a bar (not shown). If it is desired that the panels not remain hollow but, instead, be filled with fire retardant or sound deadening material, then the panel is filled with such material before sealing off either the top or bottom end. The inner surfaces of the panel members may be lined with such material in lieu of filling or in addition thereto.

It will be observed that the panel mounting members 46, 46*a* of each frame member are arranged parallel to each other and at an angle slightly less than 90° with the respective web 50. Thus, while the adjacent webs 50 are brought together in parallel, confronting relationship in the closed position of the door shown in FIG. 2, the panels 20 are arranged at slight angles with each other, extending in a slightly zig-zag manner for the purpose of minimizing swaying of the door assembly.

FIG. 5 illustrates a modified frame member 44*a* wherein the outer faces of the panel members 48 and 48*a* are flush with the outer ends of the frame member. The panel member holding parts comprise a pair of spaced, flat members 46*b* which extend transversely from web 50 and are spaced inwardly from the outer ends of the frame member a distance equal to the thickness of the panel member. The panel members are secured to parts 46*b* preferably by cementing along surfaces 64 to form panel 20', although other suitable means of attachment may be employed.

In FIG. 6 panel 20'' is similar to panel 20' illustrated in FIG. 5 except that the panel members are not secured to frame members 44*a* directly but, instead elongated stepped holding members 66 are suitably secured, as by cementing or screwing, to the inner faces of the respective panel members 48 and 48*a*, and engage the inner surfaces of holding parts 46*b* of the frame member, in overlapping relation therewith.

It will be appreciated that the metal frame members provide a rigid, non-warping panel assembly, so that panel sheets may be employed of materials which were previously impractical as components in sliding door panels. The thickness of the door panels may, of course, be increased by using wider frame members. Because of the frame member structure employed herein, the panel materials are easily interchangeable and replaceable if worn or damaged. For additional sound retardation, the frame

member facing surfaces may be corrugated or covered with a resilient buffer material.

While I have shown and described preferred embodiments of the invention, it will be understood that numerous additions, changes and omissions may be made in such embodiments without departing from the spirit and scope of the invention.

What I claim is:

A folding door of the character described comprising a plurality of similar vertically disposed panels and a plurality of similar connectors by which adjacent panels are pivotally connected together for swinging movement between end to end closed position and side to side folded open position during the opening and closing of said door; each of said panels comprising a pair of spaced rectangular similar front and rear side walls and a pair of similar channel frame members one of which is connected to the side edges of each of said side walls at one end thereof and the other of which is connected to the side edges of each of said side walls at the other end thereof; each of said channel frame members extending from the top to the bottom of said side walls and comprising an elongated web and a pair of spaced parallel legs which are integral with said web and extend outwardly therefrom one at each side edge thereof, said web constituting an end wall of said panel and said legs being provided with slots for the reception of the adjacent side edges of said front and rear walls and constituting mounting means of said frame members, and each of said frame members being provided with a slotted circular bore which extends from end to end of said frame member at one corner thereof; one of said frame members being connected to said side walls with the said slotted bore thereof disposed adjacent the said rear wall and the other of said frame members being connected to said side walls with the slotted bore thereof disposed adjacent the said front wall; and each of said connectors comprising an elongated narrow flexible strip having an enlarged cylindrical bead secured to each side edge thereof; one of said beads being disposed in the slotted bore in the frame member of one panel and the other of said beads being disposed in the slotted bore in the confronting frame member of an adjacent panel.

References Cited by the Examiner

UNITED STATES PATENTS

2,691,187	10/1954	Lorenz	160—231
2,824,630	2/1958	Tolman	52—620
2,828,842	4/1958	Plumley et al.	52—582
2,997,142	8/1961	Engholm	52—615

FOREIGN PATENTS

808,085	1/1959	Great Britain.

HARRISON R. MOSELEY, *Primary Examiner.*

P. M. CAUN, *Assistant Examiner.*