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H. W. KOTTICK
DOOR CONSTRUCTION

2,677,443

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2 Sheets-Sheet 1

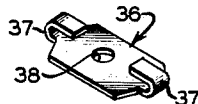
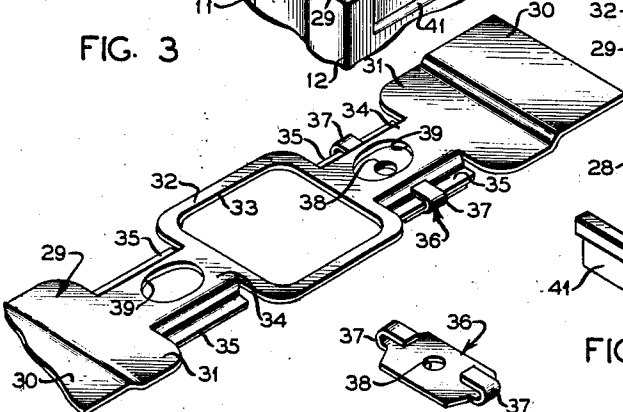
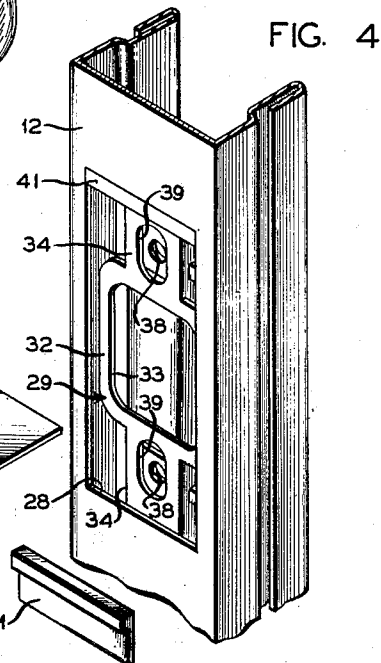
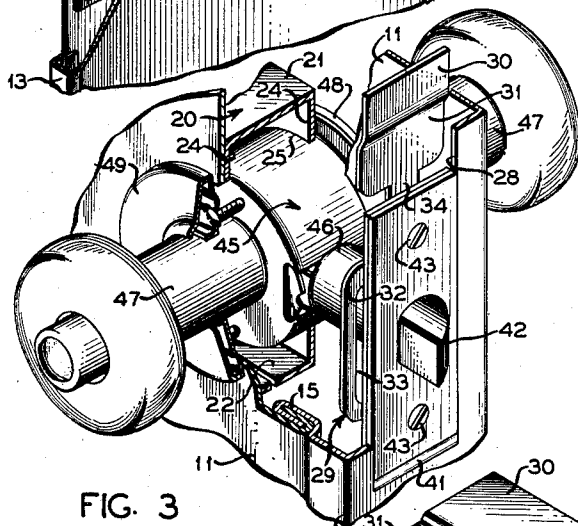
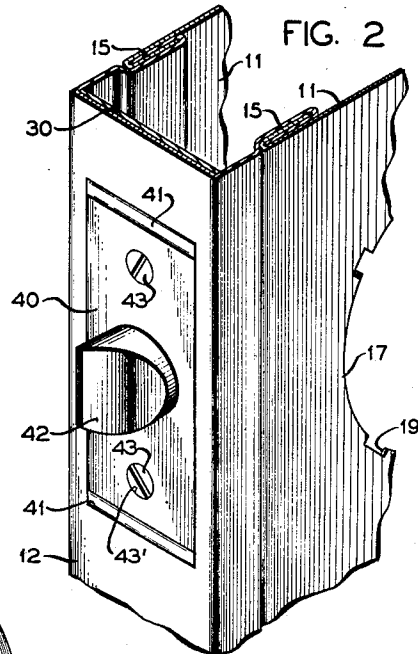
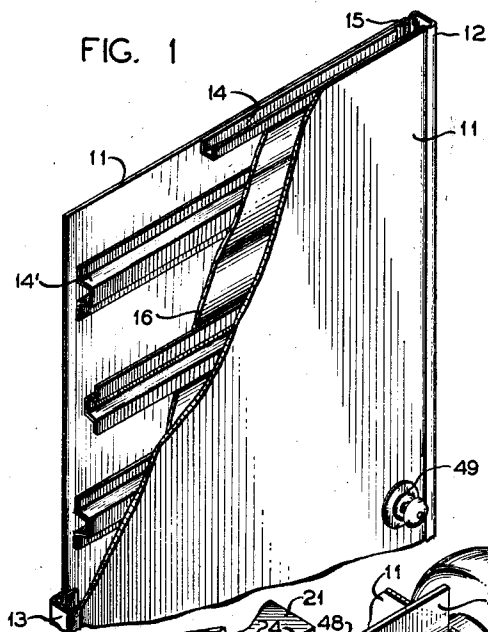


FIG. 7

INVENTOR.
H. W. KOTTICK

BY

Hyatt Dowell
ATTORNEY

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H. W. KOTTICK
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2 Sheets-Sheet 2

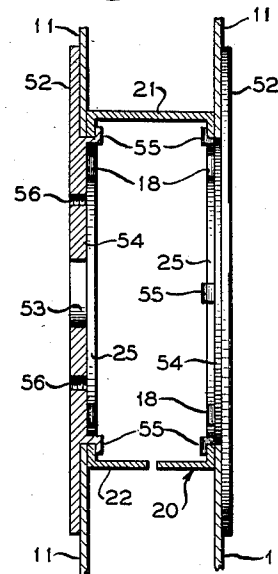
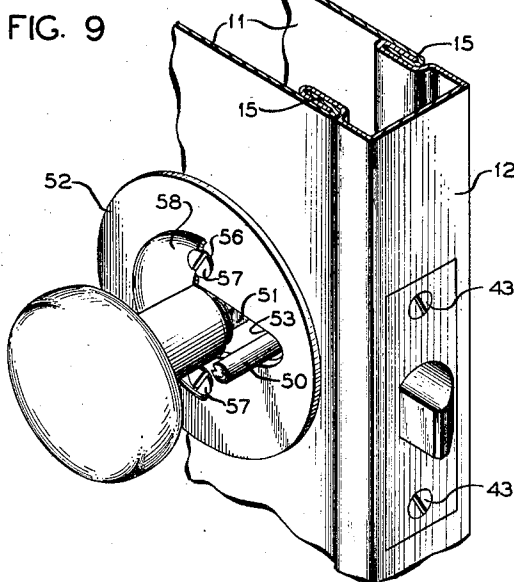
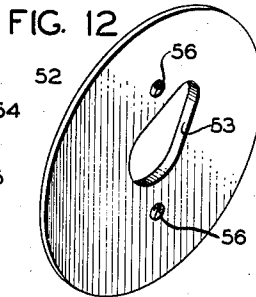
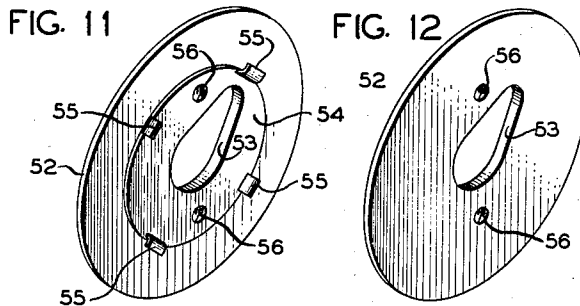
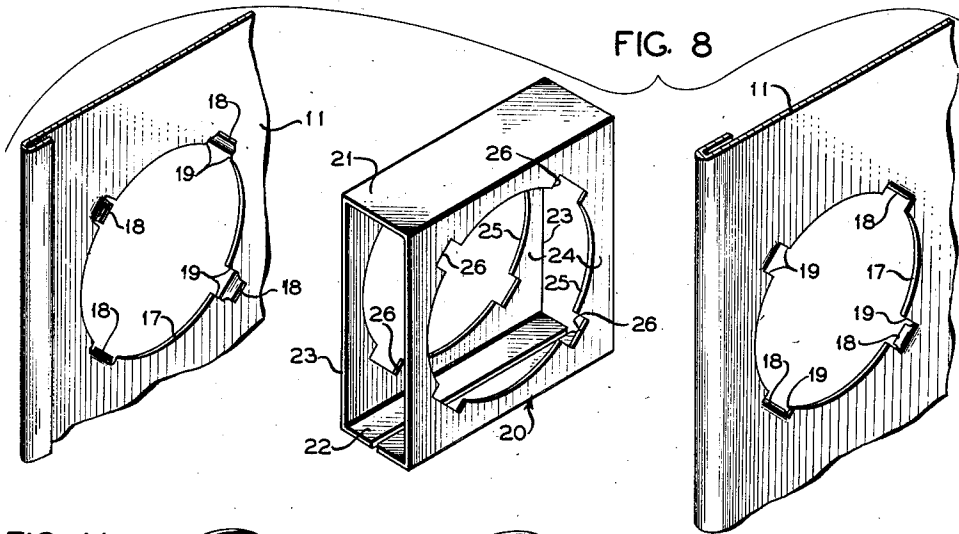


FIG. 10

INVENTOR.
H. W. KOTTICK

BY

Ayatt Dowell
ATTORNEY

UNITED STATES PATENT OFFICE

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DOOR CONSTRUCTION

Hyman William Kottick, Orange, Va., assignor,
by mesne assignments, to Virginia Metal Prod-
ucts, Inc., a corporation of Delaware

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3 Claims. (Cl. 189—46)

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This invention relates to building construction and more particularly to that of doors and similar closure members, which are usually constructed for the accommodation of various locks of the general type including a latch bolt actuating unit and a latch bolt unit.

It is frequently desirable in modern building construction to manufacture the doors of sheet metal, usually sheet steel and known to the trade as hollow metal doors. In the manufacture of a door of this nature, openings must be formed in the side panels and in one edge to permit installation of locks and other hardware. Difficulty has been encountered in rigidly securing the locks in place, as sometimes the sheet steel is too thin to provide a proper fastening base for bolts or screws and if these are passed completely through the panels the metal merely draws up or yields as they are tightened. Furthermore, the thin sheet metal is usually inadequate by itself to provide a proper support for a lock which must undergo rugged use.

Another difficulty encountered has resulted from the fact that there are numerous manufacturers of locks which vary in construction and dimensions and it has often proved difficult to obtain a lock of the type which will fit a particular closure member. Consequently much construction work has been delayed and additional expense incurred in altering the closure member to receive an off-size lock or to provide substitute structure.

Certain manufacturers have formed hollow metal doors with lock housings rigidly attached within the door to provide a support for a particular brand of lock. With this practice, it is necessary that the lock for which the door was built be provided or the door cannot be used. Difficulties have also been encountered in obtaining sufficient quantities of the desired locks and in affixing the lock supporting members within the door at the time of manufacture and of modifying doors after they have been built to receive a different type of lock.

It is an object of the invention to provide a hollow metal door or closure member which will overcome the difficulties set forth above and having apertures and supporting means adapted to utilize the locks of the larger manufacturers, in which provision is made for the reception of lock mechanisms having different dimensions.

A further object of the invention is the provision of a hollow metal door having the side panels stamped or otherwise formed of identical size and shape with latch actuating unit open-

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ings, escutcheon adaptor plate, a lock supporting frame and an edge plate interlockingly attached thereto having adjustable face plate mounting means.

It is a further object of the invention to provide a door capable of using almost any brand of lock of the same general type to be found on the market without modifying either the door or the lock.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a fragmentary detailed perspective of a door constructed in accordance with the present invention;

Fig. 2, a fragmentary perspective of a door stile according to the present invention showing a latch bolt unit in place;

Fig. 3, a perspective, partly in section, of a door with one standard type of lock mounted therein;

Fig. 4, a perspective of a door stile with the face plate mounting of the present invention in place;

Fig. 5, a perspective of the face plate mounting shown in Fig. 4;

Fig. 6, a perspective of the anchor lug;

Fig. 7, a perspective of the spacer member;

Fig. 8, an exploded view showing the positioning of the lock supporting frame in the opposite sides of the stile;

Fig. 9, a perspective of a door with another standard type of lock mounted therein;

Fig. 10, a view, partly in section, through the stile of the door with the lock mechanism removed;

Fig. 11, a perspective showing the inside face of an escutcheon adaptor plate of the present invention; and,

Fig. 12, a perspective of the reverse side of the face.

Referring to the drawings and particularly to Fig. 1, a metal door in accordance with the present invention may have side panels 11 interlockingly attached to end or edge plates 12 and 13, commonly known as stile mouldings. The door may also have a top plate or reinforcing channel 14, a similar bottom plate or channel, not shown, and strengthening ribs or reinforcements 14'. The panels and plates are comprised of relatively thin gauge sheet metal, such as aluminum, steel or other available material.

Although the invention may be utilized with a door in which the side panels and end or edge

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plates are integral or formed in one piece, certain advantages are gained if a separate end or edge plate is employed, as shown, and this may be attached by an interlocking joint 15 which is well known in the art. The door may also be provided with transverse ribs attached in a suitable manner in order to provide extra rigidity for the panels. A layer of sound absorbing vibration dampening material 16 may be placed between the opposed panels to reduce the transmission of sound through the door.

In forming the door panels, lock receiving openings 17 as shown in Figs. 2, 8 and 10, are provided for the reception of lock actuating mechanism. These openings are of a size suitable to snugly seat the latch actuating unit housing of a standard brand, such as a "Schlage," and which is adapted to fit a number of other popular makes. The lock receiving openings have a plurality of spaced fingers 18 struck inwardly from the apertures providing corresponding notches 19 on the periphery of the aperture.

A frame or strengthening member 20 which may be stamped out of sheet material is of rectangular form, having top and bottom webs 21 and 22, open ends 23, and side members 24 spaced to snugly fit between the door panels with lock receiving openings 25 corresponding in size to the lock receiving openings 17 of the panels. The rim of the lock receiving openings 25 is also provided with cut-out portions or notches 26 spaced in accordance with the spacing of the fingers of the panel openings.

The frame 20 is adapted to be positioned between the door panels in order to strengthen and reinforce the portion of the door adapted for containing the lock, commonly known as the door stile. It is anticipated that the door panels 11 may be formed identically and the frame member 20 positioned between a pair of them followed by sliding on the interlocking end plate, thus making a substantially integral rigid unit.

In the manufacture of the end plate 12 a rectangular aperture 28 is provided to receive the latch bolt unit and face plate of a standard lock.

Figs. 4 and 5 show the face plate mounting member 29 and the manner of positioning it in the door behind the aperture 28. The face plate mounting comprises offset end portions 30, intermediate web portions 31, and a central bolt receiving portion 32 having a substantially rectangular aperture 33. The intermediate web portions 31 have a reduced portion 34 with flange members or guides 35 offset therefrom. Anchor lugs 36 having guide receiving members 37 and a threaded aperture 38 are slidably attached to the guide members 35 of the web portion 31. The web portion 31 is also provided with an elongated aperture 39 to provide an opening through the web portion for the reception of suitable fastening members for cooperation with the anchor lugs. The face plate mountings are adapted to be rigidly attached to the end plate 12 by means of the offset portions 30 positioned equidistantly beyond the extremities of the aperture 28 in the end plate. The mounting is offset in order to permit a face plate such as that shown at 40 to have its outer face substantially flush with the outer surface of the end plate.

Spacer members 41 which are substantially L-shaped are adapted to have a leg thereof positioned between the end plate 12 and the web portion 31 of the face plate mounting, the other leg filling in a portion of the aperture 28 to reduce its effective size. With certain makes of locks

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the longest dimension of the face plate is substantially equal to that of the aperture 28 of the end plate in which case the spacing members are not employed. With other makes of locks, however, the face plate members longest dimension may be shorter than that of the aperture 28 in which case spacing members 41 may fill the gap. It is contemplated that the face plate mounting will be rigidly attached to the end plate of the door prior to the door's being assembled after which a rigid unit may be formed.

The face plate 40 of the lock shown in Fig. 2 having a lock bolt 42, is positioned within the aperture 28 of the end plate and spacer members 41 are employed at either end of the face plate to close the gaps at either end of the face plate which would otherwise exist. Fasteners 43 pass through the apertures 43' in the face plate and are threaded into the apertures 38 of the anchor lugs 36. In order to provide for the employment of lock face plates in which the fastener apertures are spaced at various intervals, the anchor lugs 36 may be spaced on the guide members 35 of the face plate mounting in accordance with the spacing of said apertures.

Fig. 3 discloses a conventional lock mechanism of standard make positioned in a door constructed in accordance with the present invention. The lock shown is of the "Schlage" type and includes a lock actuating unit housing 45 and a lock bolt unit 46. The actuating unit housing 45 has reduced housings 47 and a hub 48. In positioning this type of lock in the door the hub 48 is first positioned against one face of the door panel with the housing of the lock between the panels. The latch bolt unit may then be attached to the latch actuating unit following which the escutcheon plate 49 provided with this type lock may be installed and the face plate fasteners secured.

For the reception of another type of lock such as the "Sargent," which does not have a lock actuating unit housing of the type shown in Fig. 3, but which includes a dead locking member 50 and a spindle 51 of small size as compared to the housing 47 of the "Schlage" mechanism, the invention contemplates the employment of escutcheon adaptor plates 52 shown in Figs. 9 through 12. Each of these escutcheon adaptor plates comprises a substantially circular plate having a "teardrop" shaped or elongated aperture 53, and has a reinforcing plate 54 rigidly attached to one side thereof with an aligned aperture of the same dimensions as that of the plate. The reinforcing plate 54 also has spaced fingers 55 which are employed to fasten the escutcheon adaptor plate to the door panels.

In practice the escutcheon adaptor plates are located facing the door panels with the fingers 55 positioned according to the notches 19 of the panels and 26 of the frame 20. The plates may then be placed against the frame with the fingers 55 overlying the rim of the frame within the door, thus forming a rigid interlocked assembly of the door panels, frame, and escutcheon adaptor plates. After initial placement they may be rotated to any desired position. Spaced threaded openings 56 in the escutcheon adaptor plates may receive fasteners 57 employed to attach the escutcheon plate 58 of a conventional door lock mechanism.

The escutcheon adaptor plates 52 are of relatively thick material in order to provide a strong support for the spindle of the lock and to provide a strong retaining aperture for the reception of the fasteners 57. The elongated portion of the

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aperture 53 is provided for the reception of the dead locking member 50 of the lock actuating mechanism employed with this type of lock.

It has been found in practice that a door construction and lock mounting means constructed in accordance with the present invention is adapted to rigidly and properly mount substantially all of the more popular tubular or bore-in types of door locks now commonly in use. Among these are those manufactured by Schlage Lock Company, National Brass Company, Allied Hardware Company, Technical Glass Company, Pacific Plastic & Manufacturing Co., Russell & Erwin, Lockwood Hardware Manufacturing Co., Sargent & Company, Earle Hardware Manufacturing Co., Yale & Towne Manufacturing Co., P. & F. Corbin, Norwalk Lock Company, Best Universal Lock Company, Inc., Pennsylvania Hardware Company, and Reading Hardware Corporation.

Although the invention is described as including a particular door panel construction including identical facing panels and separate end plates or stiles, it is apparent that the invention is not limited to use with this type door but might well be employed with the more conventional door in which the side panels are integral with the end plate or stile. It is also apparent that the invention is not limited to the specific locking means of the various portions of the device but that other equivalent expedients might likewise be used.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawings and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. A frame member for strengthening the stile of a closure member having spaced panels with lock receiving openings therein, comprising top,

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bottom, and side portions and open ends, the side portions being spaced to fit between the closure panels and having notched lock receiving openings whereby the frame member may be attached to the stile by means of projections thereon being received in the notches.

2. A door construction comprising a pair of spaced panels, said panels being provided with aligned openings, a plurality of lugs provided on each of said panels adjacent the openings extending toward the other panel, a frame positioned between the panels and having its sides abutting against the inner faces of the panels, the sides of said frame having recesses for receiving the lugs for fixing the frame relative to the panels and aligned openings in said frame aligned with the openings in said panels whereby a lock may be supported by said frame with actuating means extending through said openings.

3. A frame for supporting a lock comprising a top member, a pair of side members extending downwardly from said top member, a bottom flange secured to the bottom of each side member and extending inwardly therefrom, at least one side member having a lock receiving opening and lug receiving recesses formed in said one side member.

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