

Sept. 3, 1935.

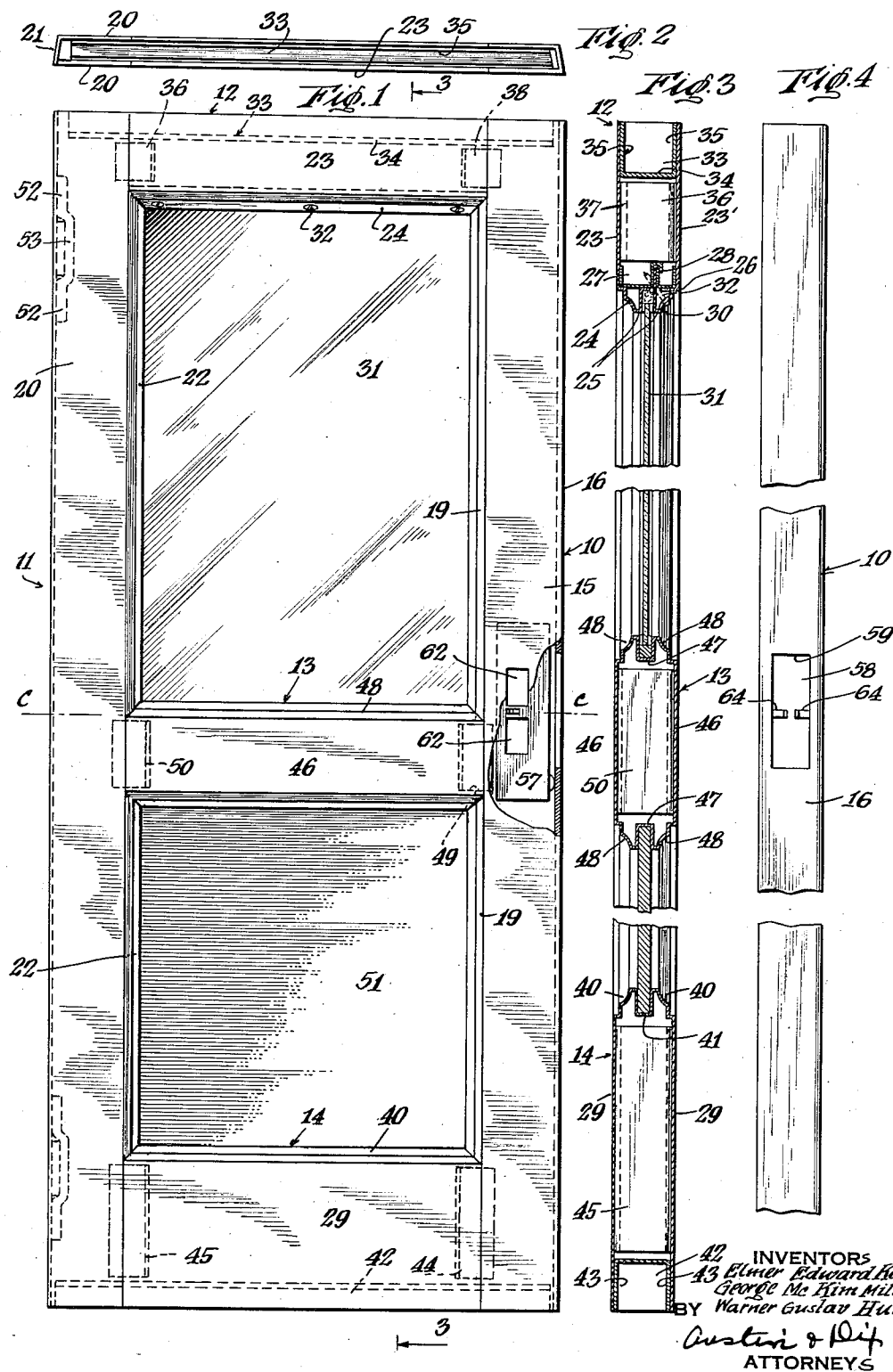
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2,013,412

DOOR CONSTRUCTION

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2 Sheets-Sheet 1



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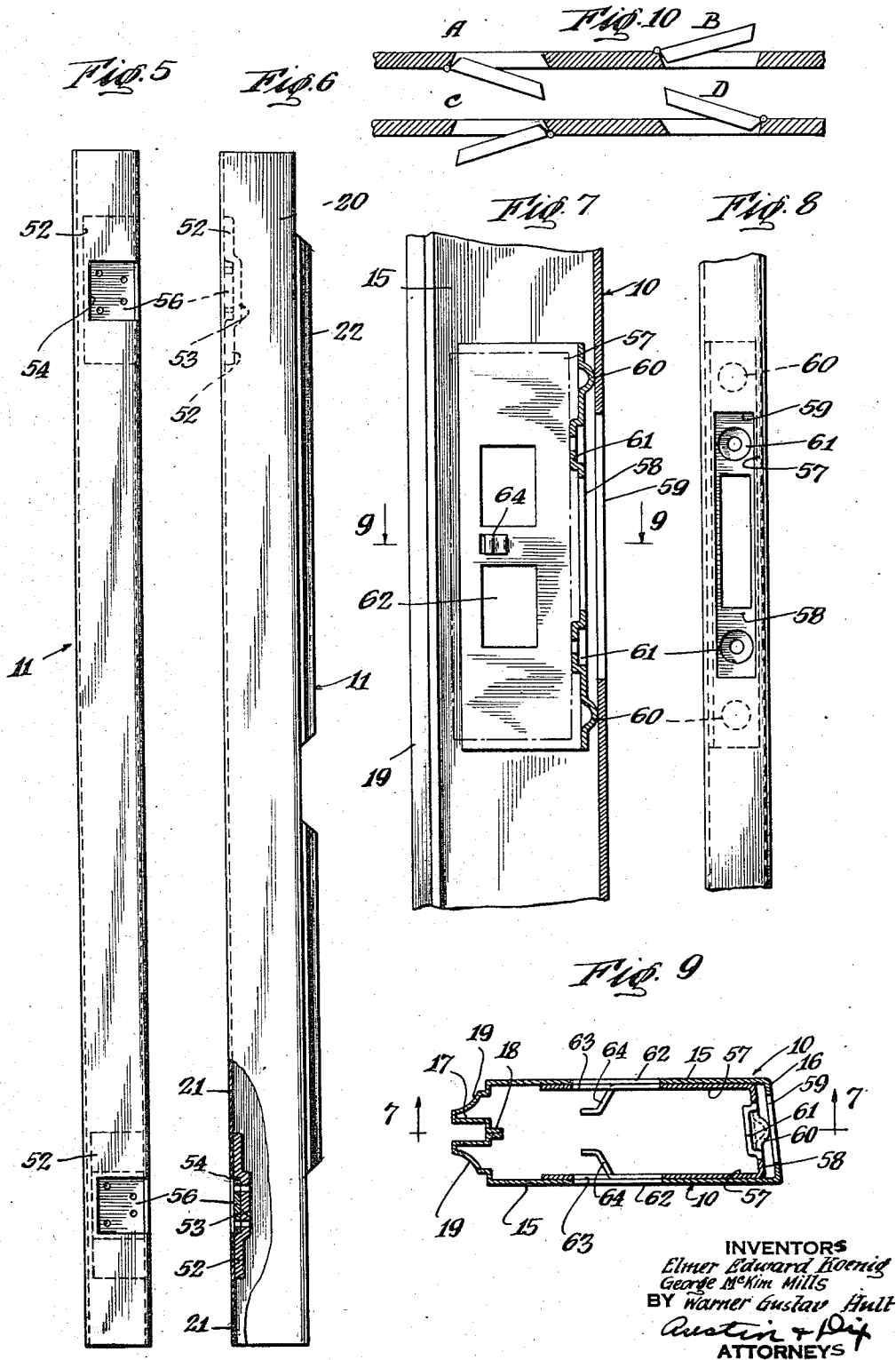
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DOOR CONSTRUCTION

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7 Claims. (Cl. 189—46)

This invention relates to door construction and more particularly to a sheet metal door especially adapted for use in connection with interior walls and partitions.

Doors for building structures must be constantly furnished which when set up in the wall will swing in either direction and from either side of the door frame. This problem has heretofore been met only by making up a distinct door and door parts for each of these many requirements. Large stocks of stamped and rolled material must consequently be carried.

Furthermore, sheet metal doors made up in stock always present field problems of erection and installation. Irregularities in the floor, or the wall in which the door is to be installed, are often encountered. Metallic doors as made heretofore cannot be cut or changed in size or shape in the field without either substantially weakening the door or sadly marring its appearance. To compete in price with doors made of other material, metallic doors must be so designed as to permit economy in manufacture and use of materials. The door should be especially strong at the joints between stile and rail members and adequately braced at the hinge and lock portions of the door.

An object of my invention is to provide sheet metal door parts which are interchangeable and reversible in position and from which assembled doors may be set up which will swing in either direction and from either side of the door frame as desired.

Another object of my invention is to provide a door which can be fitted in the field to accommodate the door to building irregularities without difficulty and with little labor and which permits performance of the fitting operation without in any way defacing the same or weakening the construction.

Still another object of my invention is to provide a door construction which is of unusual strength at points where the greatest strain occurs, which can be economically manufactured in stock sizes, which is easy to erect in the field, and which can be made up in numerous pleasing and attractive designs.

Various other features and advantages of the invention will be apparent from the following particular description and from an inspection of the accompanying drawings, in which:

Fig. 1 is a face view of the assembled door, certain parts being broken away to show the interior construction;

Fig. 2 is a horizontal view looking down upon the top edge of the door;

Fig. 3 is a vertical cross sectional view of the door, taken on line 3—3 of Fig. 1;

Fig. 4 is a vertical face view of the free edge of the door;

Fig. 5 is a vertical face view of the hinged edge of the door;

Fig. 6 is a face view of the rear stile member forming part of the door;

Fig. 7 is an enlarged cross sectional view through the lock supporting structure, taken on line 7—7 of Fig. 9;

Fig. 8 is a fragmentary vertical face view of the front edge of the door showing the lock supporting structure;

Fig. 9 is an enlarged horizontal cross sectional view through the front stile member, showing the lock supporting structure, this view being taken on the line 9—9 of Fig. 7; and

Fig. 10 is a diagrammatic view illustrating the various positions in which the door may be hinged when assembled from the various parts as herein described.

Like reference characters denote like parts in the several figures of the drawings.

My door assembly as shown in the drawings comprises generally a front stile member 10, a rear stile member 11, top rail member 12, an intermediate rail member 13 and a bottom rail member 14. The front stile member 10 is formed or drawn from a one-piece sheet metal blank into the shape shown in Fig. 9, comprising the face portions 15, a beveled jam portion 16 and a panel receiving recess portion 17. The ends of the blank forming the stile member may be intumed as at 18 and welded together to form a complete enclosed member, except at the bottom and top where the panel recessing portion 17 is cut away, as suggested in Figure 6. The inside edge of the face portions 15 of the stile member may be stamped or rolled into a variety of artistic designs to form a molding portion 19.

The rear stile member is formed similarly to the front stile member and comprises the side face portions 20 and the beveled jam portion 21. The inner edge of the side face portion is stamped to form molding portions 22 to receive the edge of the door panel. Both the front stile member and rear stile member may be cut to the proper length from a continuous rolled section. The molding portions 22 are then cut away as shown in Fig. 6 to receive bracing members hereafter described.

The top rail member 12 as shown more particularly in Fig. 3 extends between the front and rear stile members and comprises side face portions 23 and 23'. The side face portion 23 is provided with a molding portion 24 at the inner edge thereof, the molding portion being provided with an intumed flange 25 which forms a seat for the upper edge of the door panel 31. The face portion 23' is provided with an intumed flange 26 along the inner edge thereof. A double U-shaped channel member 27 seats within the rail member and between the face portions 23

and 23' and is welded or otherwise secured thereto. A recess provided by an inwardly re-bent portion 28 in the web portion of the channel member 27 is adapted to receive the leg portion 29 of a molding strip 30. The leg portion 29 is inserted into the recess 28 after the door panel 31 has been put in place, maintaining the molding strip 30 abutted against the panel and retaining the panel in place. Screws 32 may be sunk at an angle through the molding strip 30 and into the channel member 27 to more firmly retain the molding strip in place, if desired.

A U-shaped channel member 33 is inserted to fit between the side face portions 23 and 23' of the upper rail member and preferably extend to within one inch of outside dimensions of overall door width. Web portion 34 of the channel member extends between the side face portions 23 and 23' and the flange portions 35 extend outwardly and are welded or otherwise secured to the side face portions 23 and 23'. The channel member 33 strengthens the rail member 12 and the upper ends of stile members 10 and 11 at the very points where the stress is greatest. Furthermore, the upper edge of the door can now be easily filed or sawed off in the field, if necessary, to get the proper fit without in any way defacing the door or weakening its construction.

The rail member 12 is further secured to the stile member 11 by means of a vertically extending channel piece 36, as shown in Figs. 1 and 3. The flange portions 37 of the channel piece are welded or otherwise secured to the side faces 23 and 23' of the rail member 12 and the side faces 20 of the rear stile member 21. Similarly, the other end of the rail member 12 is secured to the front stile member 10 by means of a channel piece 38 having its flange portions welded to the side faces 23 and 23' of the rail member 12 and to the side face portions 15 of the stile member 10. The flange portions of the channel pieces 36 and 38 also provide a foundation for arc welding the exposed joints between the rail member 12 and rear stile member 11 and front stile member 10 respectively. A sturdy and strong construction is thus obtained.

The bottom rail member 14 of the door may be made from a single piece of metal in the form shown in Fig. 3, comprising side face portions 29 having parallel molding portions 40 formed at the upper edge thereof with a panel receiving recess 41 therebetween. The lower edge of the rail member 14 is preferably closed by an inverted channel member 42 which extends through the rail member 14 and into the stile members 10 and 11 and substantially the entire width of the door. The side flanges 43 of the channel member seat closely against the side face portions 29 of the base rail member, the side face portions 15 of the front stile member, and the side face portions 20 of the rear stile member 11, all secured together to form a strong assembled unit. As above pointed out it is seen that by turning the flanges 43 outwardly, the lower edge of the door can be filed or sawed off if necessary to obtain the proper fit without in any way reducing the structural strength or appearance of the door. Channel shaped sections 44 and 45 may be provided as above described to further strengthen the construction along the rail and stile joints, the side flanges of the channel members 44 and 45 being suitably welded to the side faces 29 of the rail member 14 and respectively to the side faces 15 of the front stile member 10 and the side faces 20 of the rear stile

member 11. The joints between the rail member 14 and front and rear stile members are then arc welded and ground to present seamless joints.

The intermediate rail member 13 may be formed or rolled from either one or two pieces of sheet metal, and comprises generally side face portions 46, panel receiving recesses 47 at the upper and the lower edge thereof, and molding portions 48 stamped from the side portions 46 to form an ornamental design. If the rail member 13 is formed from stamped halves of sheet metal, these halves may be welded together at the bottom of the recess 47. If formed from one piece, the ends may be also welded together at the bottom of the recess in a manner similar to stile member 10 as shown in Fig. 9. Channel pieces 49 and 50 are inserted within the intermediate rail member 13 and between the side faces 46 thereof. The side flanges of the channel piece 49 are welded to the side face 46 of the rail member 13 and to the side faces 15 the stile member 10 and similarly the side flanges of the channel piece 50 are welded to the side faces 46 of the rail member 13 of the side flanges 20 of the stile member 11. The joint between the rail member 13 and front and rear stile members are arc welded and ground to present seamless joints. The door panel 51 which may be formed of metal, glass, wood, composition, or laminated material, and is retained in position by panel recesses in the stile member 10, in the base member 14, and in the rear stile member 11. The panel 51 is locked in place during manufacture by intermediate rail member 13.

The molding portions 48 of the intermediate rail member 13 are suitably coped at the ends thereof as shown in Fig. 1 to meet the molding portions 19 of the stile member 10, and the molding portion 22 of the stile member 11 at an obtuse angle. The joint thus formed can then be welded together and ground to provide a smooth joint. The molding portions 19 of the stile member 10 and the molding portions 22 of the stile member 11 extend some distance below the molding portions 40 of the base board 14 to effect a smooth joint. The ends of the molding portions 40 are suitably coped to smoothly fit the respective molding portions 19 and 22 of the stile members, and the joint thus formed is welded and ground together. The molding portions 24 and 30 of the top rail member 12 are similarly treated so as to form smooth and even joints at the stile member intersections.

In order to obtain an accurately adjusted and well hung door it is essential that means be provided for securing the hinges to the door in a sturdy and immovable manner. To this end I provide a heavy metallic bracket secured to the inside face of the beveled jam portion 21 at the points where the hinges are to be secured to the door. As shown more particularly in Figs. 1, 5 and 6, the flange portions 52 of the bracket are welded to the inside face of the beveled jam portion 21. An opening 54 is cut in the jam portion 21 opposite a pocket portion 53 provided in the bracket. A heavy metal plate 56 seats within the opening 54 and rests in the pocket portion 53 of the bracket and may be secured thereto by countersunk screws or rivets. The hinge, not shown, is then placed over the plate 56 and within the opening 54 to lie flush with the jam portion 21. The hinge may be secured to the plate 53 by means of screws or other means. The construction above described distributes the great strain at the hinged portion of the door so that the door will never sag or become distorted in hung position.

Means are also provided in the front stile mem-

ber 10 to suitably support the lock unit. Generally a U-shaped channel member having side flanged portions 57 and a web portion 58 is inserted within and welded to the stile member at the point where the lock unit is attached, as shown more particularly in Figs. 7, 8 and 9. An opening 59 is cut in the beveled jam portion 16 in the stile member 10 to receive the face plate, not shown, of the lock structure. The web portion 58 of the U-shaped member is provided with a pair of blisters 60 which abut the inner surface of the jam portion 16 and maintain the web portion 58 spaced a fixed distance therefrom. The web portion 58 is also provided with a pair of inwardly stamped portions 61 to which the face plate securing means are fastened. The side face portions 15 are each provided with a pair of spaced openings 62 through which the lock mechanism extends. This opening may be covered with an escutcheon plate, not shown. A pair of openings 63 which line up with the openings 62 are cut in the side flanges 57 of the lock supporting channel member. A pair of inwardly extending tabs 64 struck out from the side flange portions 57 extend inwardly into the stile member to support the lock mechanism. The lock supporting structure as above described is economical to assemble within the stile member 10, firmly supports the lock unit and greatly strengthens the door at this point.

Both sides of our door are identical in exterior appearance, as is evident by an examination of the figures shown in the drawings. This feature permits the door to be hung in either the A or D position shown in Figure 10. Now it will be noticed that the ends of the rear stile member 11, shown in Figure 6, are identical in appearance, and that the hinge brackets 53 are spaced an equal distance from the ends. This stile member is thus made reversible end for end so as to fit the door jamb as arranged in positions C and B of Figure 10. Similarly, the front stile member 10 is reversible end for end without changing its appearance, the spaced openings 62 being disposed on opposite ends of the center line C—C of the door, as shown in Figure 1. The front door stile member when reversed end for end would likewise fit the door jamb as arranged in positions C and B of Figure 10. The rail members 12, 13 and 14, as well as the panels 31 and 51, are identical on both sides, and would fit the front and rear stile members if arranged in any of the positions shown in Figure 10. This feature of interchangeability permits of a great reduction in bent shapes which must be carried in stock since only one set of shapes need be carried to meet all the conditions shown in Figure 10, which are constantly occurring.

The door when assembled is also extremely flexible to adjustment for floor or door jamb irregularities. The length of the door can be quickly cut down considerably without in any way marring its appearance or reducing its strength. All joints and parts receiving the greatest strain are strongly reinforced and the door as a whole represents a sturdy and economical assembly.

While certain novel features of the invention have been disclosed and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. A door construction of the character described, comprising a channel shaped stile member having the legs thereof directed inwardly, a hollow rail member abutted against said stile member, and a channel shaped bracing piece, extending vertically between said stile member and rail member, said bracing piece being secured to said rail member and to the legs of said stile member.

2. A door construction of the character described, comprising stile members, a one-piece channel shaped rail member connecting said stile members, the legs of said channel shaped rail member extending downwardly with the free edges thereof forming the bottom of the door, a channel shaped bracing member seated within said rail member and extending horizontally into said stile members, and channel shaped bracing pieces extending vertically between said rail member and stile members, said bracing pieces being secured to the legs of said rail member.

3. In a door construction, the combination of a hollow stile member, a channel shaped stiffening piece enclosed within said stile member, and a struck out tab portion extending inwardly from one of the flange portions of said channel shaped stiffening piece for supporting a lock unit.

4. In a door construction, the combination of a hollow stile member, and a channel shaped stiffening piece seated within said stile member and shaped to conform to the interior contour thereof, said channel shaped stiffening piece having openings in the flange portions thereof through which the door handle may extend, and an opening in the web portion thereof through which the locking bolt of the lock unit may extend.

5. In a door construction, the combination of a hollow stile member, and a channel shaped stiffening piece enclosed within said stile member, said channel shaped stiffening piece having openings in the flange portions thereof through which the door handle may extend, struck out tabs extending inwardly from the flange portions for supporting a lock unit, and an opening in the web portion thereof through which the locking bolt of the lock unit may extend.

6. In a door construction, the combination of a hollow stile member, and a channel shaped stiffening piece enclosed within said stile member, said channel shaped stiffening piece having struck out tabs extending inwardly from the flange portions thereof for supporting a lock unit, and means on the web portion thereof for supporting the face plate of the lock unit.

7. A door construction of the character described comprising a channel shaped stile member having inturned flanges and having an opening cut in the web portion thereof, a hinge portion seated within said opening and being flush with the outer web surface of the stile member, and a bracket positioned within said stile member and extending over said opening, said bracket having flange portions secured to the inner face of the web portion of the stile member and a depressed portion forming a pocket within which said hinge portion is retained.

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