

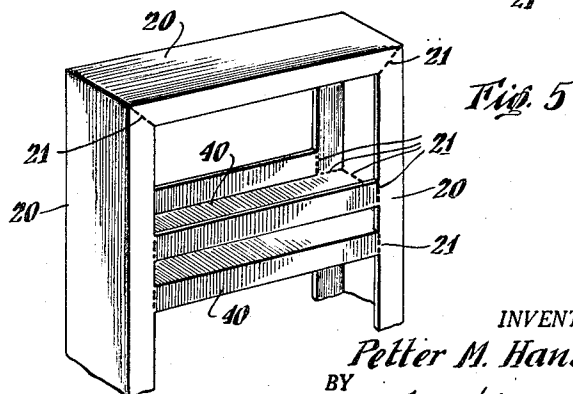
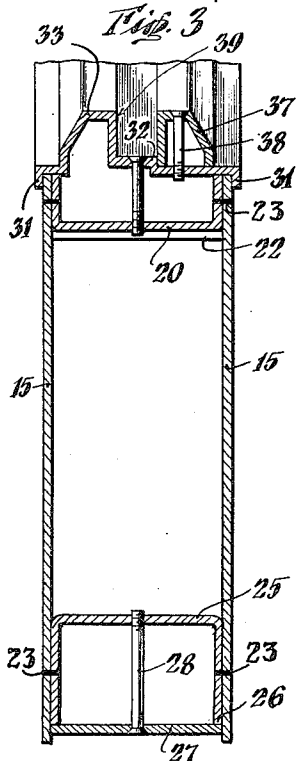
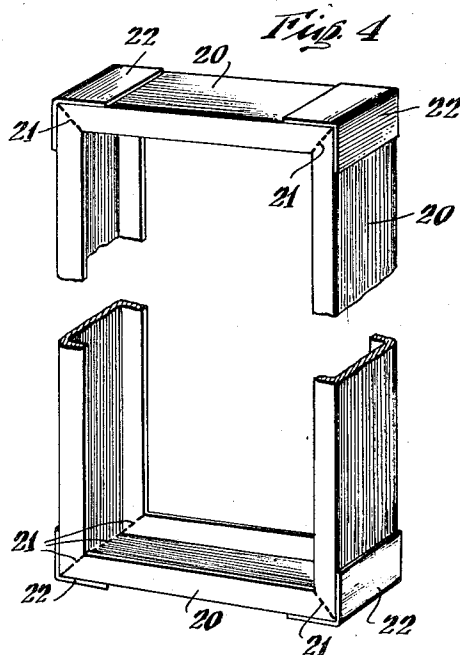
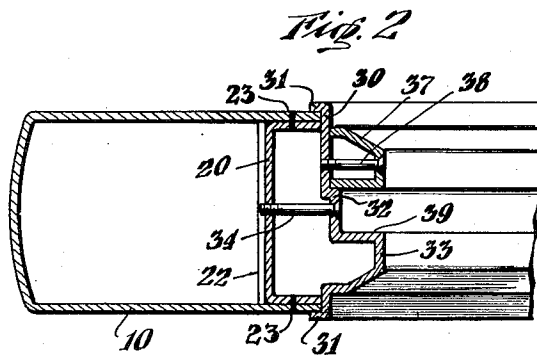
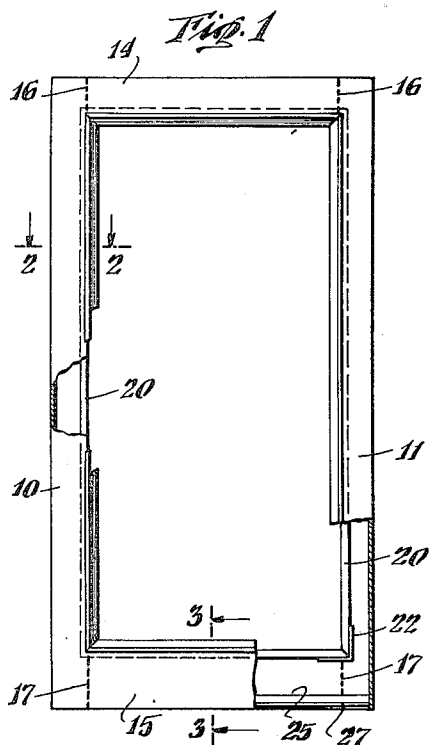
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METAL DOOR CONSTRUCTION AND METHOD

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## METAL DOOR CONSTRUCTION AND METHOD

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The invention relates to a metal door construction which has a reinforcing frame at the inner edge of the door frame and between the side walls thereof. Heretofore it has been difficult to reinforce the inner edges and inner corners of a metal door frame with the result that many times fractures occurred at the inner corners. This is avoided in the construction to be described and the reinforced door is secured with a construction which is simple and inexpensive to manufacture.

It is an object of the invention to construct a metal door which is reinforced at the inner edges of the frame thereof and which reinforcement is secured in a simple and efficient manner.

Another object is to provide a metal door with a reinforcing frame of U-shaped channel members with the open end of the channel facing inwardly thereby enabling easy access to secure or weld the door frame and reinforcing frame together.

Another object is to provide a simple method of constructing a reinforced metal door.

A still further object is to provide a simple method of constructing a reinforced metal door in which the door frame and reinforcing frame can be welded together.

Other objects of the invention will be more apparent from the following description when taken in connection with the accompanying drawings in which:

Figure 1 is a side elevation of a metal door embodying the invention;

Figure 2 is an enlarged partial cross section of the door taken on line 2—2 of Figure 1;

Figure 3 is a vertical cross section taken on line 3—3 of Figure 1;

Figure 4 is a partial perspective view of the inner reinforcing frame; and

Figure 5 is a partial perspective view of the inner reinforcing frame for a door having a rail intermediate the top and bottom rails of the door.

The metal door includes a frame which usually is made of brass, aluminum, steel and similar metals. The frame includes stiles 10 and 11 which are U-shaped channel members having their open ends directed inwardly. The channel member is formed from a sheet bent to the U-shaped channel form which is an inexpensive form of channel. The sides or legs of the U-shaped members are shown as being of a uniform dimension or straight although it is to be understood there may be contraction therein, if desired, to present a narrower opening at the open end of the stiles.

At least an upper rail 14 and a lower rail 15 are provided. One of these rails may be made of a U-shaped channel member with the open end thereof facing inwardly. It is preferred, however, that both rails be constructed similarly, and therefore, the upper rail is formed from a pair of plates which are secured to the stiles preferably by welding along the edge 16 thereof to form an integral part with the side walls of the stiles. The lower rail 15 is also a pair of plates one of which is welded at 17 to each edge of the side wall of the U-shaped channel stiles.

A reinforcing frame is constructed, as illustrated in Figure 4 which is formed of U-shaped channel members 20 which are secured together at the corners thereof preferably by welding to form a rectangular frame with the open end of the channel facing inwardly. This frame is constructed of such size or width that it fits within the side walls of the U-shaped stiles and within the spaced plates forming the horizontal top rail 14 and bottom rail

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15 and has a rectangular size so that the inner rectangular opening of the reinforcing frame is the same as the inner rectangular opening of the door frame itself formed by the stiles and rails. There may be considerable variation in this respect so long as enough side wall of the reinforcing frame overlaps the side walls of the door frame so that the two frames may be effectively secured together and the inner frame effectively reinforce the door frame. Preferably too, the corners of the reinforcing frame may have reinforcing plates 22 secured thereto such as by welding in order to further strengthen the reinforcing frame and hence the door frame at this point.

The reinforcing frame is inserted into the door frame between the rail plates either at the top or at the bottom and within the side walls of the U-shaped stiles until the inner reinforcing frame opening corresponds or is in alignment with the inner opening of the door frame. The side walls of the reinforcing frame are then secured to the inner face of the side walls of the U-shaped members and the rail or rail plates of the door frame, preferably by welding them together as at 23. Because the reinforcing frame has the open end of the channel facing inwardly, it is easy to insert the electrodes of a welder therein and the reinforcing frame is welded in position to the door frame around all four sides thereof. With this construction the door frame is strongly reinforced and in particular the inner corners thereof.

When the rail either at the top or bottom of the door frame or both is formed from flat plates, the outer edge thereof may be reinforced by welding such as at 23, a channel or edge member 25 at the outer edge thereof with the open end of the channel facing outwardly. The welding electrodes can, therefore, be easily inserted into the channel to effect the welding of the U-shaped channel to the plates of the rail and to the side walls of the stiles. This channel may be deep enough to receive hinge or door check mechanism as desired. Preferably the channel is inserted so that there is a space between the edge 26 of the channel 25 and the edge of the side plates 15. A plate 27 for dust and decorative purposes may be inserted between the plates 15 and rest upon the edges of the reinforcing channel 25, the plate being held in position by screws 28.

Means are provided to secure a panel to the door frame. Any such means may be provided that shown being a plate 30 which may have down turned edges 31 to fit outside of the sides of the stiles 10 and a raised portion 32 forming a panel seat as well as a projection 33 to provide one side of a panel channel. This plate is secured over the inner edge of the door frame such as by screws 34 which are threaded into the channel 20. A second panel channel member 37 is secured to the edge plate such as by screws 38 thereby providing a channel 39 for receiving a center panel of glass, metal or other material.

It may be that a door is desired having rails intermediate the upper and lower rails. In such case the reinforcing frame is constructed as illustrated in Figure 5 in which the channels 40 may be provided between the upper and lower horizontally extending channels and welded to the side channels 12 and 20 of the reinforcing frame. In such case the intermediate rail is formed of plates welded to the stiles in exactly the same manner as the plates 14 and 15 are welded thereto. Multiple paneled doors would be constructed in the same manner.

This invention is presented to fill a need for improvements in a metal door construction and method. It is understood that various modifications in structure, as well as changes in mode of operation, assembly, and manner of use, may and often do occur to those skilled in the art, especially after benefiting from the teachings of an invention. Hence it will be understood that this disclosure is illustrative of preferred means of embodying the invention in useful form by explaining the construction, operations and advantages thereof.

What is claimed is:

1. A metal door construction comprising a frame of U-shaped stiles forming each side thereof with the open end facing inwardly, the inner faces of the stiles at the open end edge thereof being flat and unobstructed, cross members including at least an upper rail and a lower rail, at least one rail being formed of a pair of plates which are flat and unobstructed on the inner face at the inner

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edge thereof, one plate being secured to one side wall of the two U-shaped stiles and the other plate being secured to the other side wall of the two U-shaped stiles, and a reinforcing frame of rectangular form and having an outer dimension greater than the inner dimension of the door frame sufficient to form an overlap therewith, the reinforcing frame being of U-shaped channel members secured together at the corners with the open side of the channel members facing inwardly and the reinforcing frame having a thickness corresponding with the dimension between the inner faces of the stiles and at least one rail, and the reinforcing frame being secured to the stiles and rails at the overlap.

2. A metal door construction as in claim 1 including an edge member of a U-shaped channel form insertable between the plates of a rail and the side walls of the stiles with the open end thereof facing outwardly and secured to the rail plates and stiles at the outer edge of the frame.

3. A metal door construction as in claim 2 in which the edge member of U-shaped form member is secured to the stiles and rail plates recessed below the edge thereof, and a trim plate secured to the channel and engaging the edges of the U-shaped channel edge member.

4. A metal door construction as in claim 1 and including means secured at the inner edges of the frame to hold a panel therein.

5. A metal door construction as in claim 1 including each rail being formed of a pair of plates, and a U-shaped channel edge member between the plates of both rails and the side walls of the stiles at the top and bottom of the door with the open end thereof facing outwardly and secured to the stiles and rails.

6. A metal door as in claim 5 including cover plates secured at the upper and lower edges of the door.

7. A metal door as in claim 1 including reinforcing corner plates secured at each corner of the reinforcing frame.

8. A method of constructing a metal door comprising forming a door frame of U-shaped stiles with their open

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end directed inwardly and at least one rail of spaced plates to provide a clear passage thereinto, forming a rectangular shaped reinforcing frame having at least a width dimension greater than the inside dimension of the door frame, inserting the reinforcing frame between the plates and within the stiles of U-shaped members with their open end directed inwardly, and securing the contacting side walls of door frame and side walls of the reinforcing frame together.

9. A method of constructing a metal door as in claim 8 in which the contacting side walls of the door frame and the reinforcing frame are welded together.

10. A method of constructing a metal door as in claim 8 including securing a U-shaped member to the spaced plates of the rail at the open outer edge thereof with the open edge of the U-shaped member facing outwardly.

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