May 3, 1932. O. E. ZENKER 1,857,076

HOLLOW METAL DOOR AND THE LIKE

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Fig.1.

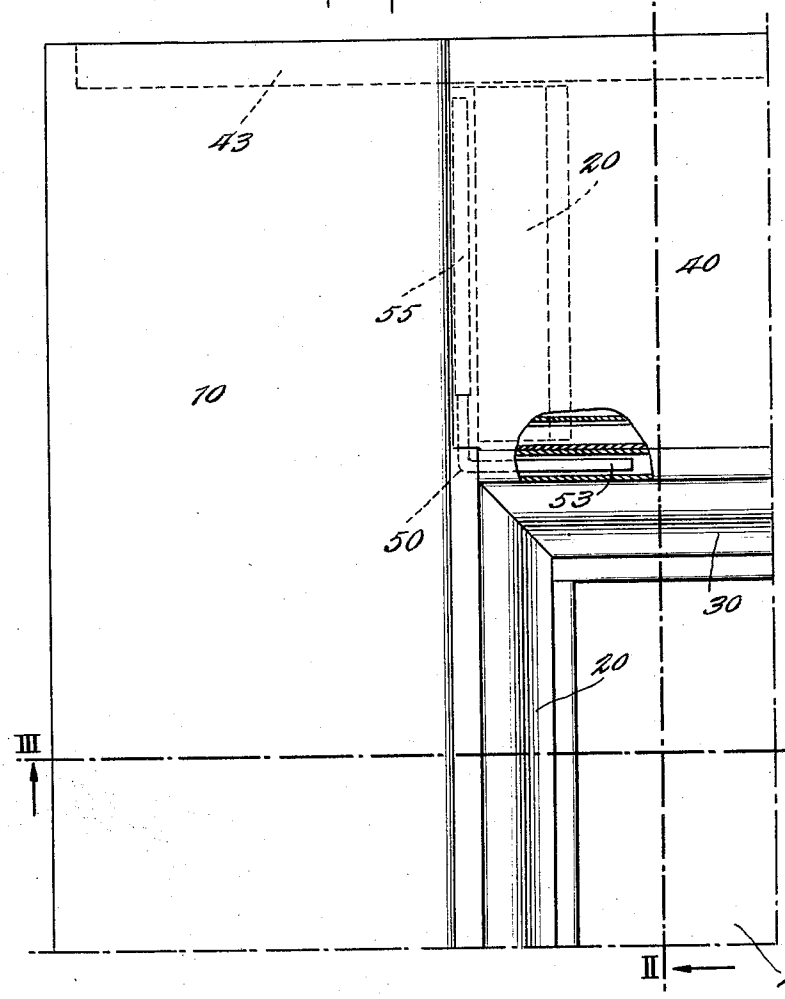
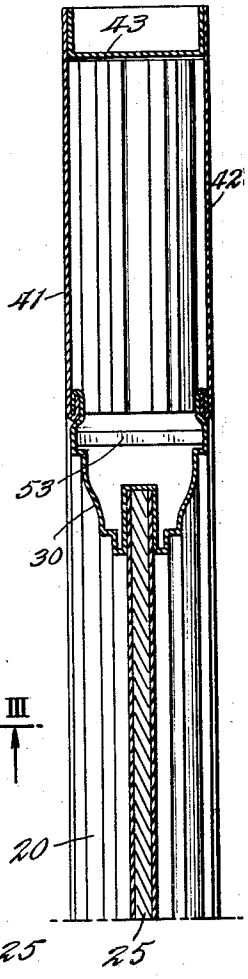


Fig.2.



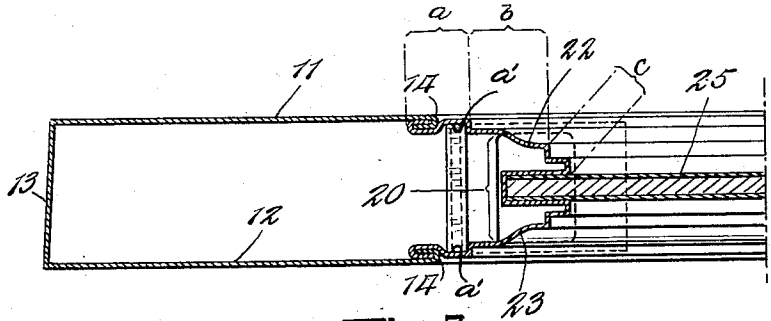


Fig.3.

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Fig. 4.

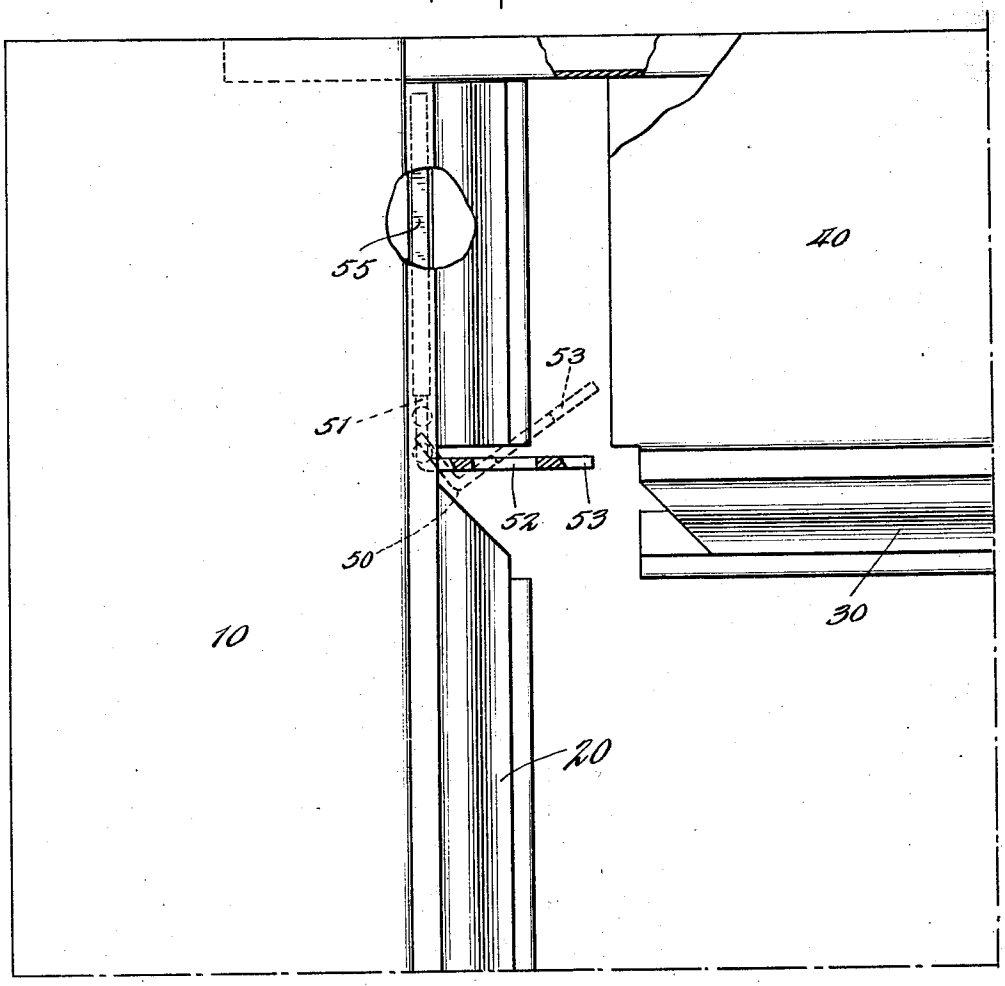

Fig. 9.

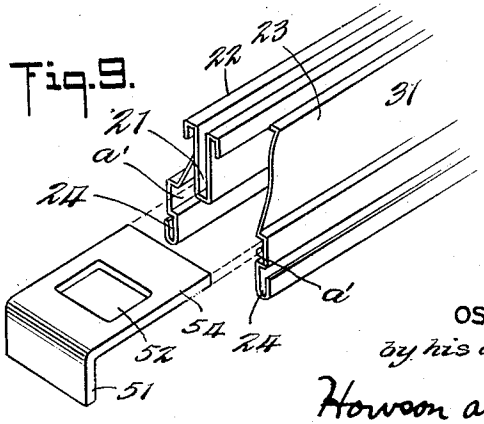

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Fig. 5.

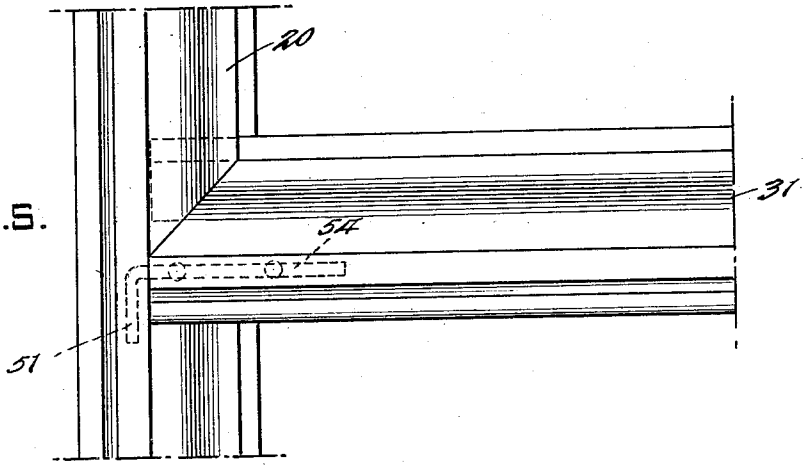


Fig. 6.

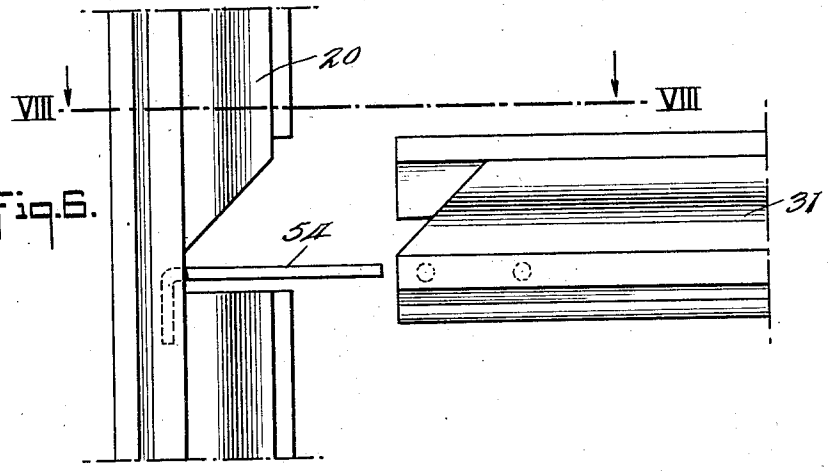


Fig. 7.

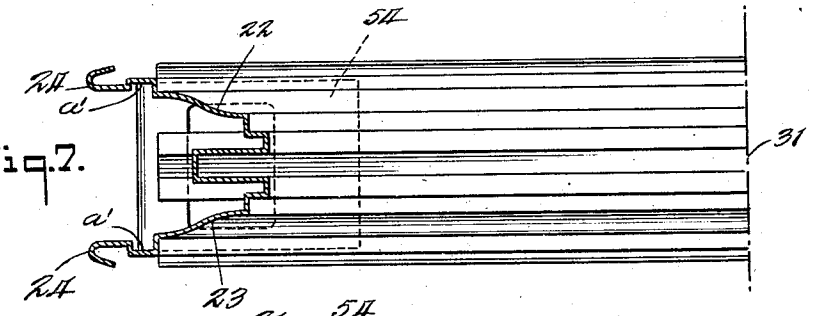
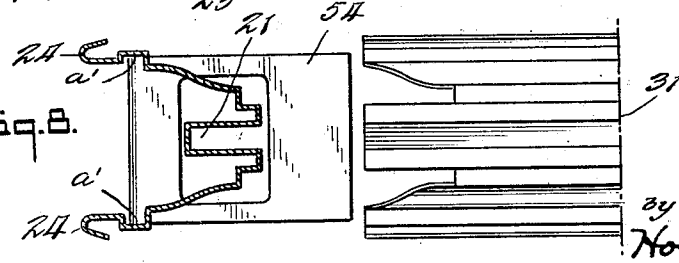


Fig. 8.



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Patented May 3, 1932 1,857,076

UNITED STATES PATENT OFFICE

OSCAR E. ZENKER, OF GLENDALE, NEW YORK

HOLLOW METAL DOOR AND THE LIKE

Application filed November 20, 1929. Serial No. 408,531.

This invention relates particularly to hollow metal doors, but it may be applied to many other hollow metal frame constructions, such as, window sashes and frames and the like.

It is an object of my invention to provide improved means to assemble hollow metal doors and the like having slip-mitered joints between the moldings of the stiles and rails.

Another object of my invention is to provide in articles of the above type, stiffening means which may be spot-welded to reenforce the corners of the door or like construction and which will make the rails of the door self aligning during assembly.

Other objects will appear as my invention is described in connection with the accompanying drawings.

In the drawings:

Figure 1 is a front elevation view of an upper corner of a metal door constructed according to my invention.

Figure 2 is a vertical sectional view through the door corner shown in Figure 1 the section being taken on the line II—II of Figure 1.

Figure 3 is a horizontal sectional view of the door corner shown in Figure 1 the section being taken on the line III—III of Figure 1.

Figure 4 is an elevation view partly in section of the door corner shown in Figure 1. This figure shows the parts during one stage of the assembly.

Figure 5 is a front elevation view of a lower corner joint between the stile molding and rail molding.

Figure 6 is a front elevation view of the construction shown in Figure 5 but with the rail molding pulled apart from the stile molding.

Figure 7 is a top plan view of the construction shown in Figure 5.

Figure 8 is a top plan view of the construction shown in Figure 6.

Figure 9 is a perspective of the rail molding shown in Figure 6 and showing in detail the angle stiffener in position to receive the molding.

Referring to the drawings it will be noted that the door stile 10 is formed of a rectangular sheet of metal folded over in U-shape, the legs 11, 12 of the U being the sides of the door stile and the base 13 of the U being the outside vertical edge of the door. In order that a molding may be secured to the stile, the inner edges of the stile's sides 11, 12 are reversely bent toward the inside of the stile, forming pockets or troughs 14, which extend the height of the stile.

Secured to the stile is a molding 20 formed of a rectangular sheet of metal which is symmetrically pressed so that a panel-receiving trough 21 is formed in its center while each of its sides 22, 23 is folded back from the trough forming the undulating molding surfaces. By making the trough 21 as described, the edges of a panel 25 can be seated in the troughs of the moldings which surround it.

In order to secure the molding 20 to the stile 10 the edges of the molding's sides 22, 23 are reversely bent outwardly to form pockets 24 complemental to the pockets 14 on the stile. The molding and stile can be slid together with the reversely bent edge of the molding lying in pocket 14 of the stile while the reversely bent portion of the stile lies in the pocket 24 of the molding. By rolling this joint between mandrels and spot-welding it, if desired, a permanent connection between the molding and stile can be made.

The top rail 40 of the door is formed of two parallel plates 41, 42 (Figure 2) joined at their upper edges to the sides of a channel member 43 which runs the length of the plates and extends beyond them between the sides 11, 12 of the stile to an extent almost equal to the width of the sides 11, 12. The lower edges of the plates are reversely bent inwardly to form pockets or troughs like the pockets 14.

Moldings 30, 31, which are identical in design and cross section to molding 20, are secured to the horizontal rails of the door by joints like the rolled joint just described. More specifically, the molding 30 is secured to the top rail 40 and molding 31 may be secured either to an intermediate rail, if the door has

several panels, or the bottom rail, if the door has but one panel.

The stile molding 20 extends from just below the top to just above the bottom of the stile. The rail molding is slightly shorter than the rail in order to allow overlapping of the rail plates upon the hereinafter described joint portion *a* of the stile molding so that the rail can be spot-welded to the stile molding and so that the rail plates 41, 42 will abut the stile's sides 11, 12 to present a flat surface around the door. Referring to the moldings in general and molding 20 in particular it will be noted that the side of each molding comprises three main portions, i. e. the joint portion *a*, design portion *b*, and the trough portion *c*. (See Figures 3 and 4.) The design portions of the stile molding are notched or mitered at the corners of the panel or panels to present diagonal edges and form mitered joints with the rail moldings, whose design portions are mitered at their ends complementally to the stile molding. The trough portion of the stile molding is cut away at each notched or mitered place but the trough portion of the rail molding extends to the end of the molding.

Thus the rail can be slid into cooperating relation with the stile, the projecting portion of the channel member 43 sliding between the sides 11, 12 of the stile and on top of the molding 20, while the plates of the rail slide upon the joint portion *a* of the stile molding until they abut the sides 11, 12.

In order to provide a guide for the rails as they are slid into position and to make them self aligning during assembly, and to make a more rigid joint, angle stiffeners or guides 50, 54 are inserted into parallel, narrow, opposed channels *a'* which are pressed out of the joint portions *a*, of the moldings. The angle members are of width equal to the distance between the opposed channels *a'*, but are only about one half the thickness of a channel. One leg 51 of the angle is shorter than the other, the longer leg 53 having a substantially square aperture 52, located centrally thereof into which the corner of the molding can project as the angle is tilted (dotted line position Figure 1) during the insertion of its short leg up into the channels *a'* of the stile. This aperture 52 is essential. If it were not present the angle could not be tilted enough to allow it to be inserted as described. After its insertion the angle is held with its long leg perpendicular to the stile molding while its short leg is spot-welded in position. Thus the angle and channel member 43 serve to guide the rail during assembly and make the parts align themselves, thereby saving time required for assembly, and at the same time making a more rigid joint than was possible heretofore.

All the joints between the rail moldings and the stile moldings are alike except that the moldings on the lower sides of the panel or panels, are inverted relative to the top rail molding and hence the mitering on the portions of the stile molding cooperating with the inverted moldings, is inverted. The angle stiffeners 54 at the lower joints also are inverted on account of the fact the angle must be inserted with the short leg down whenever the stile molding mitering is inverted.

In order that the plates of the rail 40 may be spot-welded to the stile molding without burning through the metal a rectangular steel bar 55 is inserted between the channels *a'* to rest upon the angle 50 and bridge the gap between the channels to carry the welding current and resist the pressure applied during the welding operation.

From the foregoing it will be apparent that no matter whether the joint be between the top rail, bottom rail or an intermediate rail and the molding, the angles which I use may be employed to stiffen the joint between the stile and rail moldings and to guide the rail as it is assembled.

Many modifications may occur to those skilled in the art. Therefore I do not limit myself to the specific embodiment shown. While I have described the joints of the rails and their moldings with only one stile and its molding it will be apparent that the joints of the rails with the other door stile will be identical to the joints described.

I claim:

1. Hollow metal doors or the like, comprising a vertical member, a horizontal member, moldings secured to said members and cooperating with each other, said moldings being cut to form a mitered joint, and an angle member cooperating with said moldings, said angle member having an aperture in one of its legs into which a corner of the molding may project, during assembling of the angle member and said molding.

2. Hollow metal doors or the like, comprising a vertical member, a horizontal member, moldings secured to said members and cooperating with each other, said moldings being cut to form a mitered joint, and an angle member cooperating with said moldings, one leg of said angle member being longer than the other and having an aperture therein into which a corner of the molding may project during assembling of said molding with said angle.

3. The combination of a molding adapted to be joined to a stile or the like, a molding adapted to be joined to a rail or the like, said moldings having opposed parallel channels and being complementally mitered to form a miter joint, and an angle member adapted to have its legs slid into said channels and to be permanently secured therein.

4. The combination of a molding adapted to be joined to a stile or the like, a molding adapted to be joined to a rail or the like.

said moldings having opposed parallel channels and being complementally mitered to form a miter joint, and an angle member adapted to have its legs slid into said channels and permanently secured therein, and a bar inserted in one of said moldings, whereby said rail may be joined to said stile molding without burning the welded parts.

In testimony whereof I have signed my name to this specification.

OSCAR E. ZENKER.