

Feb. 21, 1933.

H. G. WOEHLE

1,898,417

METHOD OF MANUFACTURING METALLIC DOORS

Filed Dec. 6, 1929

3 Sheets-Sheet 1

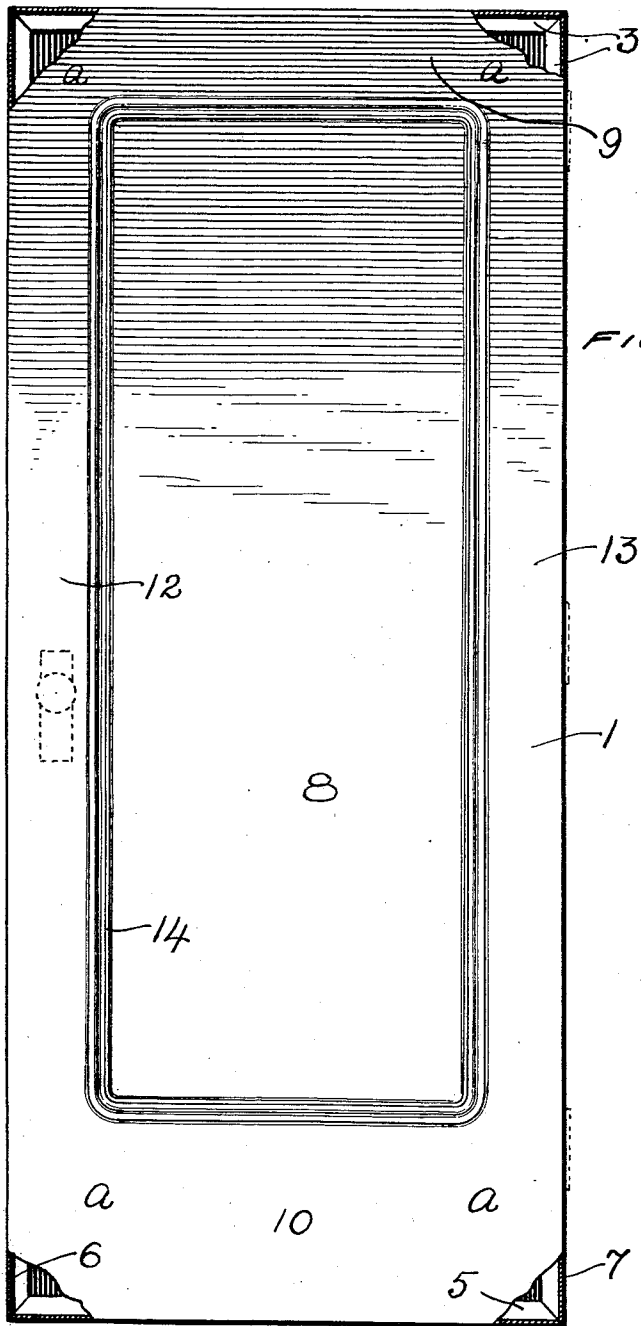


FIG. 1.

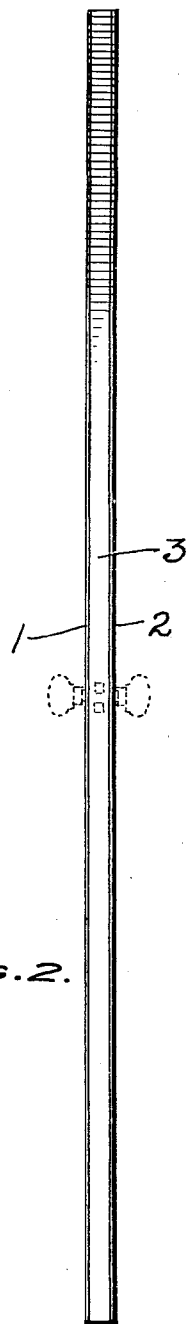


FIG. 2.

INVENTOR.
Henry G. Woehler
BY Fred'k J. Larson,
ATTORNEY.

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H. G. WOEHLER

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3 Sheets-Sheet 2

FIG. 3.

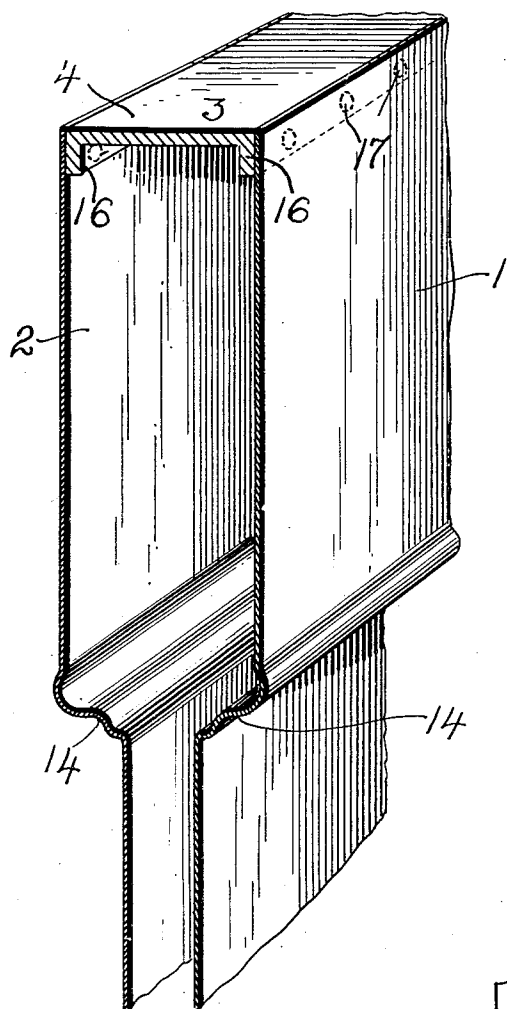


FIG. 4.

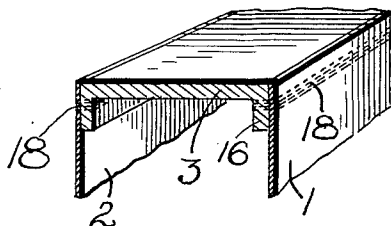


FIG. 5.

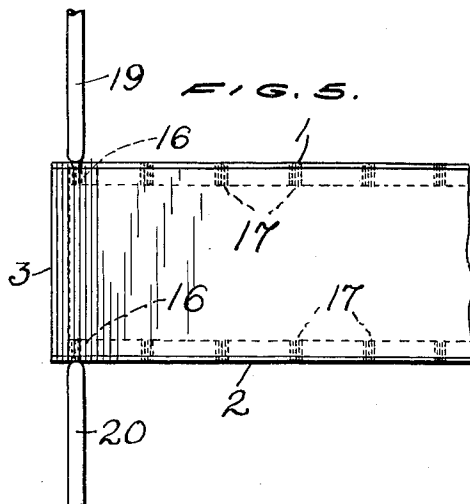


FIG. 7.

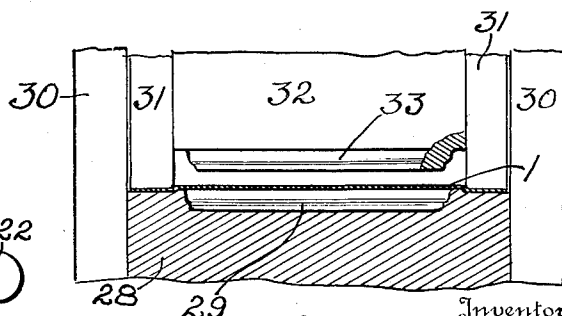
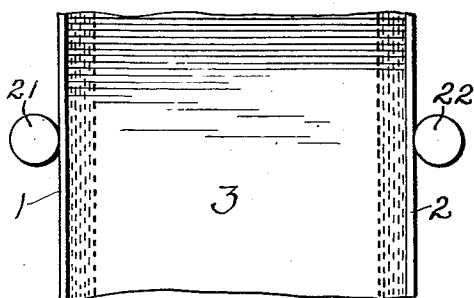


FIG. 6.

Inventor
Henry G. Woehler
By Fred'k J. Larson
Attorney

Feb. 21, 1933.

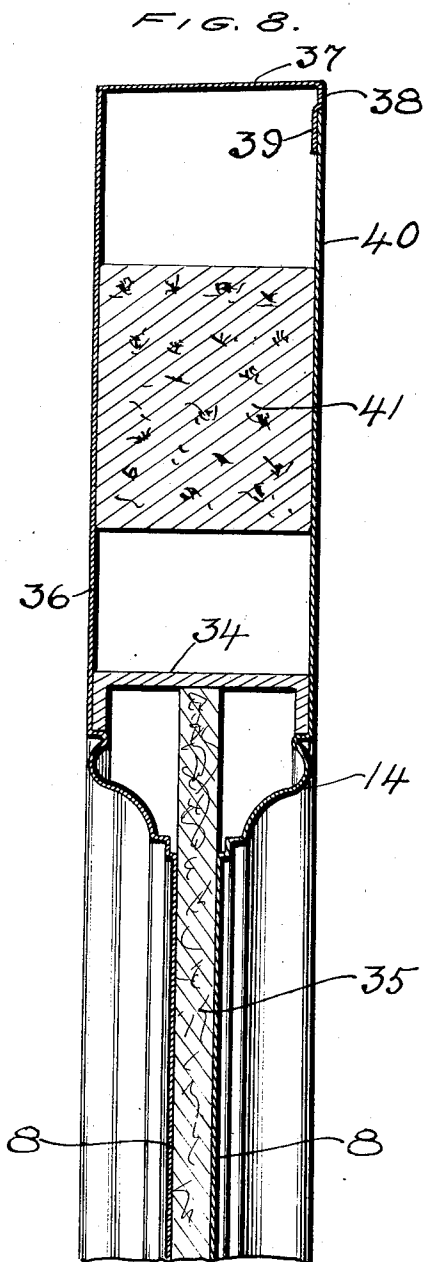
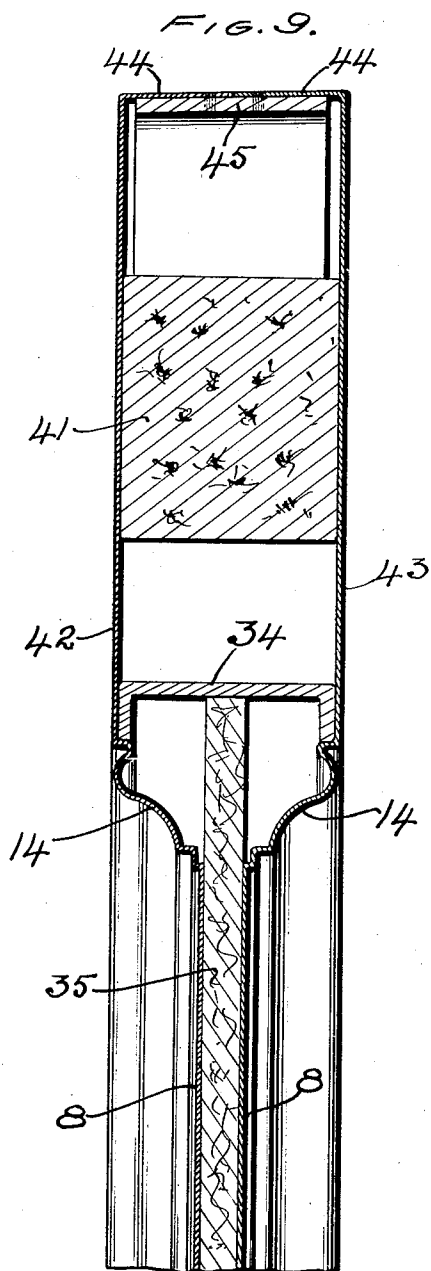
H. G. WOEHLE

1,898,417

METHOD OF MANUFACTURING METALLIC DOORS

Filed Dec. 6, 1929

3 Sheets-Sheet 3



INVENTOR
Henry G. Woehler
BY Fred'k J. Larson
ATTORNEY

UNITED STATES PATENT OFFICE

HENRY G. WOEHLE, OF ST. LOUIS, MISSOURI, ASSIGNOR TO NIEDRINGHAUS, INC., OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI

METHOD OF MANUFACTURING METALLIC DOORS

Application filed December 6, 1929. Serial No. 412,230.

This invention relates to the method of manufacturing metallic doors and similar structures and the main object is to provide a simplified and practical method of constructing metallic doors.

This application is a continuation in part of application Ser. No. 259,192 filed March 5, 1928.

Metallic doors as at present constructed are objectionable because of the plurality of joints therein which become loose, thereby removing the coating adjacent thereto, and permitting rusting. An important object of this invention is, therefore, to construct a door with a minimum number of joints therein, thereby maintaining the beauty and finish of the door for a far longer period than heretofore and at the same time providing a door necessitating a minimum up-keep expense and having a much longer life than ordinary doors.

Furthermore, in constructing and manufacturing a metallic door in which the entire front or the entire back thereof consists of a single integral sheet of metal with a panel stamped, pressed or drawn therein, serious problems are encountered. If a sheet metal of the requisite size and weight were used heretofore, then upon forming the panel therein, the outer periphery of the sheet would be buckled and deformed and if the periphery were forced back into shape, this would cause another portion of the sheet to buckle and to become deformed. If a sheet metal of a lighter gauge and weight were used, then upon forming the panel therein, there would be caused a splitting and cracking of the sheet metal at the molding of said panel. It is a major object of this invention to overcome and solve both of these problems.

It is a principal object of this invention to set forth a method by which the panel or panels can be formed in a sheet metal of requisite weight and size in one operation without buckling or deforming the periphery and without splitting or cracking the molding of the panel.

A further object of the invention is to provide a process by which the front and back

of the door can be connected to the spacing members quickly and efficiently by electro-welding.

A still further object is to provide an improved method of reducing the cost of manufacturing metallic doors and similar structures while at the same time increasing the durability and strength thereof and also greatly enhancing the beauty and esthetic appearance of the doors.

Other objects and features of the invention will appear from the following detailed description which is to be considered in conjunction with the accompanying drawings, in which:

Fig. 1 is a front elevation of a completely assembled door with parts broken away to show the construction thereof with greater clearness.

Fig. 2 is a front edge elevation thereof,

Fig. 3 is a detail in perspective of a portion of a door, the several members being shown as joined by spot welding,

Fig. 4 is a detail in perspective of a portion of a door, the several parts being shown united by roll welding.

Fig. 5 is a view showing the method of spot welding, electrically, edge portions of the door side members to an edging member along their contacting surfaces,

Fig. 6 is a view showing the method of roll welding, electrically, the edge portions of the door side plates to an edging member,

Fig. 7 is a partial sectional and elevational view of a draw press with a sheet metal plate held in position to be operated upon,

Fig. 8 is a detail partial cross sectional view of a portion of a door showing a modified construction, and

Fig. 9 is a partial cross sectional view of a door showing a further modification.

Referring to the drawings, the reference characters 1 and 2 designate preferably, although not necessarily, two like metallic sheets, panels, sheathings, or side plates of a door, or similar structure. It will be noted that the structure is made up of two sheet metal plates spaced apart any desired distance, preferably, although not necessarily, by edging members 3, which members 3 form

the top 4, bottom 5, and side edge face sections 6 and 7 of the door, while the sheet metal members 1 and 2 form the front and back sides, or faces of the door, as will be apparent from Fig. 1.

The two sheet metal members 1 and 2 which form the inner and outer side faces of a door or like structure, are each formed from a single metal stamping and each plate is so formed as to include one or more depressed panel sections 8, a top cross-rail section 9, a lower cross-rail section 10 and when desired an intermediate cross-rail section not shown where more than one depressed panel section is desired, the two vertical stile sections 12 and 13 and the molding sections 14, which molding sections are disposed between the cross-rail sections, the stile sections and the panel sections, as clearly shown in Fig. 1. The panel section or sections 8 may be cut out without exercising invention, to receive a glass section, or sections, not shown, if so desired.

The top 4, bottom 5 and the sides 6 and 7 forming the edging or spacing members 3 are preferably independent strips of channel shaped metal having flanges 16 as shown clearly in Fig. 3 but if desired the edging members may be made from a single member bent to form a rectangle. If desired also the flanges 16 may project outwardly to allow for any adjustments necessary.

The edge portions of the plates 1 and 2 which are in surface contact with the edging member 3, are welded to the outer faces of the flanges 16 of the channel member 3, by a number of spot welds 17, as shown in Fig. 3, or by roll welds 18, as shown in Fig. 4, which welds are disposed, preferably, near the four edges of the door side plates 1 and 2. As will be understood, in the electrical metal working art, the two door side plates 1 and 2 with the channel edging member 3 therebetween are assembled and suitably held between two current carrying spot weld electrodes 19 and 20, see Fig. 5, or the two current carrying roll weld electrodes 21 and 22, see Fig. 9, and an electrical current passed from one electrode to the other through the two plates 1 and 2 and intermediate edging member 3 located between either spot weld electrodes 19 and 20, or the roll weld electrodes 21 and 22, which effects the welding of the two door side plates 1 and 2 simultaneously to the flanges 16 of the door edging member 3. The spot welding process is repeated the desired number of times and the spots made, which are designated 17 are spaced the desired distance apart to provide a metallic door, or similar metallic structure, which will be practical, durable and comparatively inexpensive, light and neat in appearance.

The roll welding process is repeated along each edge of the door, as is manifest. It will be noted that I do not spot or roll weld

one door side plate to the channel door edging member 3 and then the other, but spot or roll weld the edge portions of both door side plates 1 and 2 to the channel door edging member 3 simultaneously.

The method by which the panel is formed in the front and back plates 1 and 2 will now be described. A plate of sheet metal of heavy gauge, about No. 19, is first cut roughly to size. This plate is then placed upon the bed 28, see Fig. 7 of a draw press having the female die 29 therein. The frame 30 has movable therein the holding members 31 and the plunger 32 carrying the male die 33.

The plate 1 which is being operated upon is held dead at substantially the four corner positions indicated at *a* in Fig. 1 by the holding elements 31 while the remainder of the top, bottom and sides are held so that the metal may flow to a slight extent therefrom for forming the molding 14. The major portion of the metal constituting the molding is drawn from the panel section itself. By drawing the panel according to this method it has been found that the top, bottom and side portions can be maintained absolutely flat without any buckling whatever. This is exceedingly important since now the front or back of the door can be practically finished in one operation.

The plate 1 and the plate 2 which is generally identical are then spaced apart by the spacing and edging members 3 and welded together as above described with the electrodes acting upon opposite points upon plates 1 and 2 simultaneously. The door is then substantially finished and can be given any desired finish such as mahogany, oak etc. and the hardware applied thereto.

It is of course apparent that the spacing members 3 may be located in from the periphery and such a construction is shown in Fig. 8 where the spacing members 34 are located adjacent the molding 14. When placed in this position they also serve as limiting members for the asbestos sheet 35 located between the panel members 8 and prevent any relative movement of the asbestos sheet with relation to the door members.

In this modification one of the plates 36 constituting either the front or back is formed with a peripheral integral flange 37 and flange 37 in turn has formed thereon an integral flange 38 which has an offset portion 39 to which is welded or otherwise secured the other plate 40. In this modification the spacing members 34 serve a double function while an integral portion of one of the plates serves as the edging member. The members 34 are of course secured to the panels 36 and 40 by welding or otherwise. Cork blocks 41 are inserted between the front and backplates to deaden the metallic ring

of the door which purpose the asbestos 35 will also serve.

In this modification there is only one joint in the entire door which is highly advantageous. 5

In the construction shown in Fig. 9 we have substantially the same structure as shown in Fig. 8 but the method of forming the edging is different. In this modification 10 plates 42 and 43 are provided with integral peripheral flanges 44 which are preferably formed at the same time as the panel 8. These flanges 44 abut one another and are welded to a strip of heavy reinforcement 45. 15 This construction gives an extremely attractive and practical edging and eliminates any joints at the edges where joints are far more liable to spring. This last modification provides an exceedingly sturdy and practical 20 construction and the entire front or back can be drawn in one operation which permits economical construction which is of the highest moment.

It is of course apparent that a plurality 25 of spacing elements may be used in any of the above forms if a great degree of stability and rigidity are required. Any type of packing between the plates also may be used.

From the foregoing description it is evident that an extremely simple and practical 30 method of forming panels in substantially heavy sheet metal has been disclosed and at the same time an exceedingly quick and efficient method has been set out for assembling and securing the various elements of 35 a metallic door together and therefore it is distinctly to be understood that the method and forms described above are for illustrative purposes only and are not to be construed in a limiting sense in any way whatever since various changes may be made 40 without departing from the spirit and scope of the following claims.

I claim:

45 1. The method of manufacturing a metallic door comprising cutting a pair of sheet metal members of substantially the area of said door, drawing panels in said members to thereby form moldings constituting reinforcing and decorative elements by placing 50 the sheet metal members in a form, then positioning a securing member on each of the four corners thereof, then compressing the said sheet metal members so that the major portion of the metal constituting the molding is drawn from the interior of said members and then securing said sheet metal members to edging and spacing means by welding 55 simultaneously oppositely disposed points upon said sheet metal members to said edging and spacing means.

2. The method of manufacturing metallic doors comprising cutting a pair of sheet metal members of substantially the area of 65 said door, drawing panels in said members

to thereby form moldings constituting reinforcing and decorative elements by placing the sheet metal members in a form, holding the sheet metal members dead at substantially the four corners, then compressing 70 the said sheet metal members so that the major portion of the metal constituting the molding is drawn from the interior of said members, and then securing said sheet metal members to edging and spacing means by 75 welding simultaneously oppositely disposed points upon said sheet metal members to said edging and spacing means.

HENRY G. WOEHLEK.

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