J. W. RAPP.

METAL DOOR AND SIMILAR DEVICE.

APPLICATION FILED JULY 5, 1910.

1,124,660.

Patented Jan. 12, 1915.

3 SHEETS—SHEET 1.

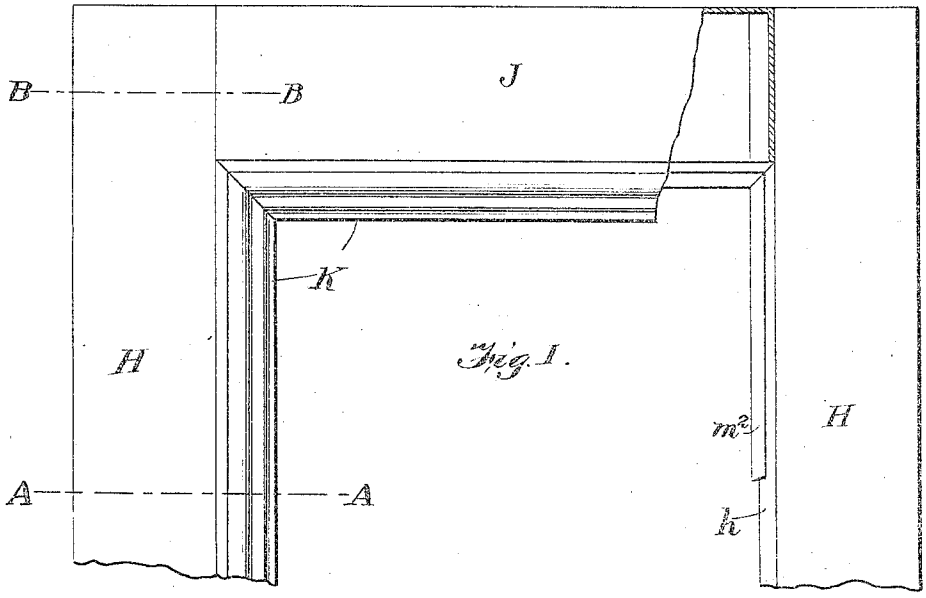


Fig. I.

Fig. III.

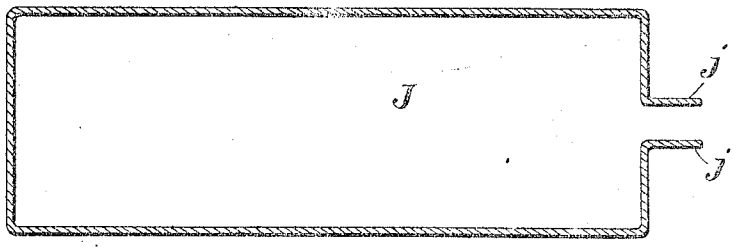


Fig. IV.

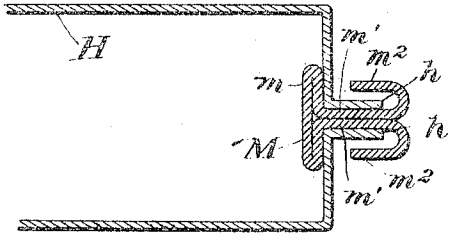
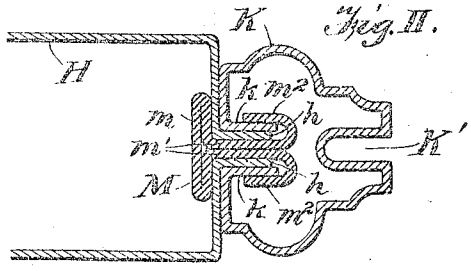


Fig. II.



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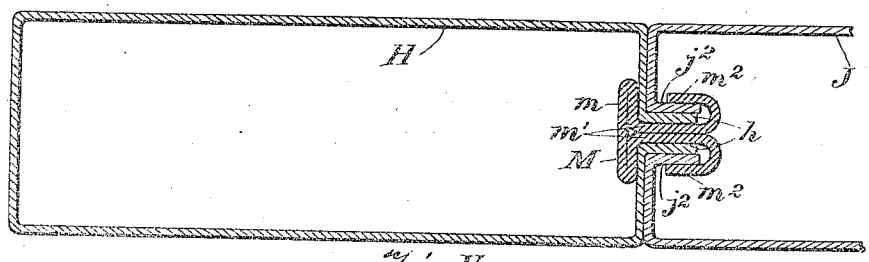


Fig. V.

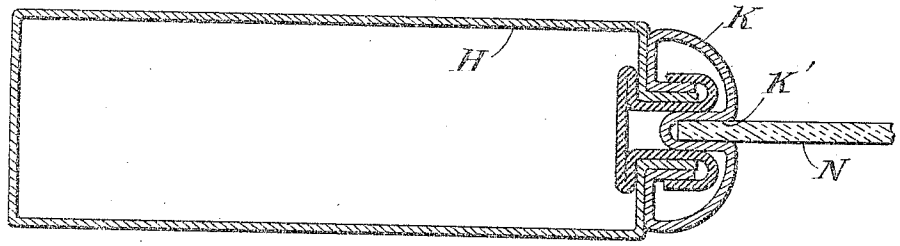


Fig. VI.

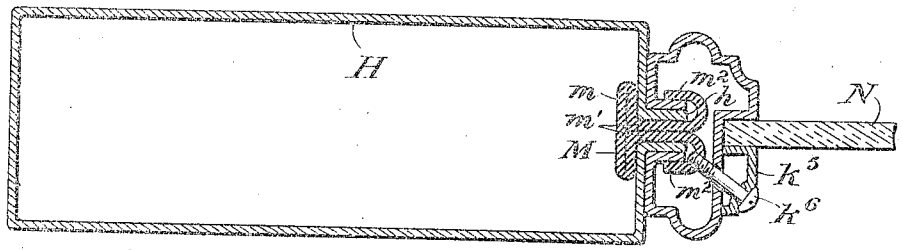


Fig. VII.

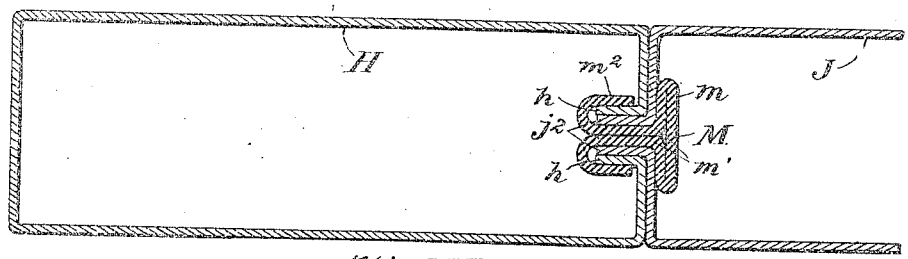


Fig. VIII.

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3 SHEETS—SHEET 3.

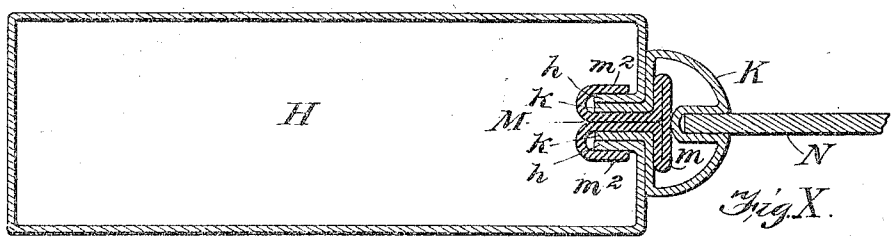


Fig. X.

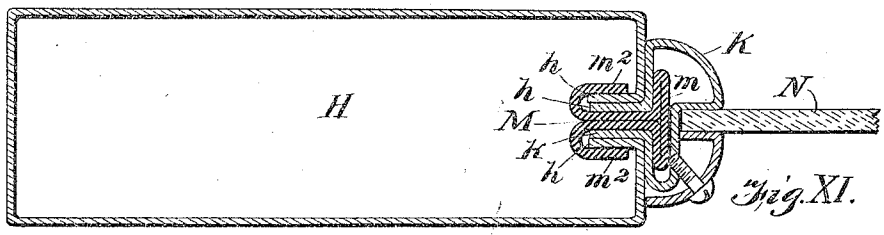


Fig. XI.

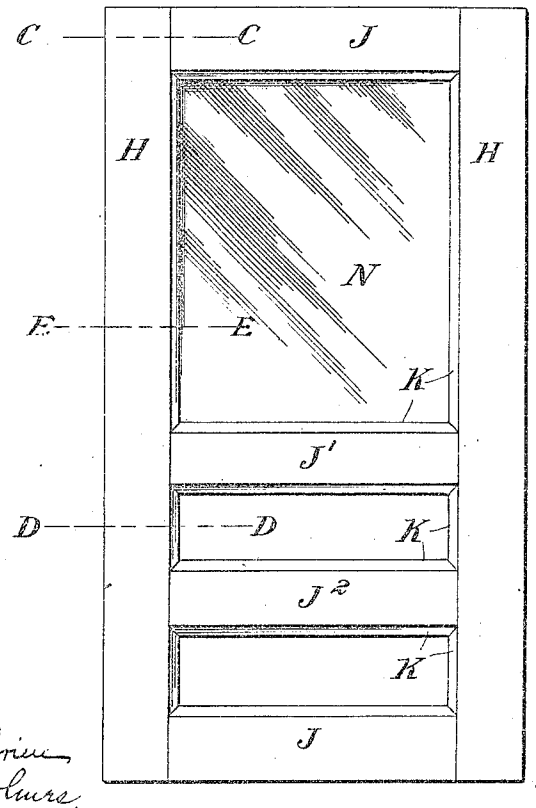


Fig. IX.

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UNITED STATES PATENT OFFICE.

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METAL DOOR AND SIMILAR DEVICE.

1,124,660. Specification of Letters Patent. **Patented Jan. 12, 1915.**

Application filed July 5, 1910. Serial No. 570,289.

To all whom it may concern:

Be it known that I, JOHN W. RAPP, a citizen of the United States, and a resident of Flushing, borough of Queens, city and State of New York, have invented certain new and useful Improvements in Metal Doors and Similar Devices, of which the following is a specification.

My invention relates to improvements in metal doors and similar devices and is especially well adapted for what are commonly known as doors of the hollow metal type.

In the accompanying drawings Figure I is a front view of the top portion of a door embodying the improved form of my invention, and partly broken away; Fig. II is a horizontal cross section on the line A—A of Fig. I; Fig. III is an enlarged view in cross section of a top or bottom rail or stile; Fig. IV the same as Fig. III, showing my preferred form of locking key in position; Fig. V is a horizontal cross section view on line B—B of Fig. I; Fig. VI illustrates my preferred method of securing a molding to a rail or stile and also for retaining in position a panel; Fig. VII illustrates a similar construction, but modified to permit of the ready removal of the panel, and especially adapted where the panel is of glass or other material so readily destructible, which it might be desired to move or change; Fig. VIII is a cross section on the line C—C of Fig. IX; Fig. IX is a front view of a door embodying my invention in a modified form; Fig. X is a cross section on the line D—D of Fig. IX, and Fig. XI is a cross section on the line E—E of Fig. IX, where again the panel is shown to be of glass and easily removable.

In these drawings similar reference characters designate corresponding parts.

Referring now to the preferred form of my invention illustrated in these drawings, H—H, designate the stiles of the door, and J, J, the top and bottom rails. Obviously the construction of the top and bottom rails is the same and the construction of the two stiles is the same, and the construction of the stiles is the same as that of the top and bottom rails excepting at the junction point of a stile with a rail.

Each rail and each stile is preferably hollow and substantially rectangular in cross section, having parallel side plates, an integral edge or end plate and provided at its inner edge with two lips or flanges designated h—h in the case of stiles and j—j in the case of top and bottom rails. The lips or flanges are also preferably integral with and arranged to project from cross plates or inwardly bent portions integral with side plates and extending toward each other so as to bridge a part of the distance between the side plates, and to provide a slot or groove in the lengthwise edge opposite to the outer edge or end plate of the rail or stile. In the case of the stiles these projecting lips h—h are used in conjunction with a key to secure a molding to the inner edge of the stiles, and also to effect the junction between the stiles and the top and bottom rails. For example, as illustrated in Fig. II, the lips or flanges h—h of the stile H are inserted between the inwardly projecting lips or flanges k—k of a molding K.

M designates what I call a key, shown as made of one piece of metal bent to form a back plate m, and two tongues m^1 projecting therefrom, and bent over and backward at their outer ends to form securing clips m^2 m^2.

The lips or flanges k—k of the molding K having been slipped over the lips or flanges h—h of the stile H, and arranged to the desired position, my key M is then inserted as indicated in Figs. II and IV with the tongues m^1—m^1 intermediate the flanges or lips h—h of the stile H, with the back plate m in contact with the inner surface of the inner end of the stile, and with the bent over retaining clips m^2—m^2 of the key surrounding and in contact with the flanges or lips k—k of the molding K. This key is then driven in any suitable manner throughout the length of the stile or at least throughout that portion of the stile to which it is desired to secure a molding. The molding is secured to the top and bottom rails in a precisely similar manner.

Fig. V illustrates my preferred method of securing the stiles and rails together, where the flanges or lips h—h on the inner edge of the stile continue throughout the entire length of the latter, and the key M also continues throughout the entire length of the stile or at least substantially the entire length thereof. The respective ends of the top and bottom rails are each provided with inwardly extending lips or flanges j^2—j^2, between which are inserted the outwardly projecting lips or flanges h—h of the stile H. The key K is then inserted in

the same manner as already described with regard to Fig. II and driven through first to secure one rail to the stile, and second to secure the molding to the stile, and finally to secure the other rail to the stile. As the molding has already been secured to the inner edge of the top and bottom rails and cut at the corners at the desired angle, the molding on the rails will be forced into proper position with regard to the molding of the stiles as the key is driven home. The corners of the molding may then be welded together by electric welding or any other suitable method, or be treated in any other way to give a smooth and finished appearance. After the parts have been secured in place as already described, a top plate may be welded over the open end of the stile, if the same, has been left open to permit of the driving of the key, or if a hole has been made or left for this purpose, the same may be closed by welding a piece of metal over the same or in any other suitable manner.

In Fig. IV the inner edge of the molding K, which molding may be made in any desired shape, is shown as provided with a slot or groove K^1. This is intended for the reception of a panel which may be of metal, glass or other material. Fig. VI illustrates such a panel N in position with its side arranged within the groove K^1 of a molding K. As the metal of the molding is preferably rather thin and resilient the driving home of the key M should result in the panel being gripped by the walls of the groove K^1.

Where glass or other destructible material is used as the panel or where for any other reason it may be necessary or desirable to make the panel removable, I prefer to use a construction such as is illustrated in Fig. VII, which is the same in all respects as that illustrated in Figs. II and VI with the exception that the molding is bent to form only one side and the back wall of the groove K^1 integral with the molding. The other side wall of the groove is formed of a separate piece of metal designated in Fig. VII by k^5 and removably secured to the rest of the molding in any suitable manner as by a screw k^6.

In Figs. VIII—IX—X and XI, I have illustrated what may be called an inversion or reversal of the construction and method employed in the figures so far described. Fig. VIII shows the joining of a rail to a stile where the lips or flanges j^2—j^2 of the rail J project outwardly and those h—h of the stile H project inwardly, and where the key M has its back m arranged within the rail and its securing clips m^2—m^2 projecting into the interior of the stile. Figs. X and XI illustrate respectively the inverted method of securing a molding and a non-removable panel (Fig. X) and a removable panel such as glass Fig. XI). In these figures the stile H has its lips or flanges h—h projecting inwardly, whereas the lips or flanges k—k of the molding K project outwardly. Obviously the key M is inserted as described with regard to Fig. VIII, and then driven down throughout the length of the stile to secure the top and bottom rail and the molding and the various panels thereto. This inverted form is peculiarly adapted to cases where the molding is small or where there is insufficient space in the molding to permit of the ready insertion of the tongues and securing clips of the key.

If intermediate rails, such as those designated J^1 and J^2 of Fig. IX are used, their ends are provided with lips or flanges projecting either inwardly or outwardly, and secured in the same manner as the top and bottom rails.

What I claim as new is:—

1. In metal doors and similar devices, the combination with one part having projecting flanges, another part adapted to be connected thereto having flanges projecting in the same direction as the first mentioned flanges and adapted to fit within the first mentioned flanges, and a key adapted to be driven between the inner set of flanges to hold the parts together.

2. In metal doors and similar devices, the combination with one part having inwardly projecting flanges, another part adapted to be connected thereto having outwardly projecting flanges adapted to fit within the first mentioned flanges, and a key adapted to be driven between the inner set of flanges to hold the parts together.

3. In metal doors and similar devices, the combination with one part having inwardly projecting flanges, another part adapted to be connected thereto and having outwardly projecting flanges fitting within the first mentioned set of flanges, and a key comprising one portion adapted to be driven between the second set of flanges to force the same apart, and another portion impinging against the inner surface of the part provided with the outwardly extending flanges.

4. In metal doors and similar devices, the combination of one part provided with inwardly extending flanges, another part adapted to be secured thereto and provided with outwardly extending flanges adapted to fit within the first set of flanges, and a key comprising one part adapted to be driven between the second set of flanges, another part impinging against the inner surface of the part provided with the outwardly extending flanges and other parts bearing against the surfaces of the first set of flanges.

5. For use in metal doors and similar devices a key formed of one piece of metal and

bent to comprise a back plate, and two tongues projecting therefrom and bent over and backward at their outer ends to form securing clips.

6. In metal doors and similar devices, one part provided with inwardly projecting flanges, another part adapted to be secured thereto, and provided with outwardly extending flanges, fitting within the first mentioned set of flanges, and a key made of one piece of metal and bent to form a back plate and two tongues projecting therefrom and bent over and backward at their outer ends to form securing clips—the tongues of the said key being driven between the second set of flanges to force them apart, the back plate impinging against the inner surface of the part provided with the outwardly extending flanges, and the securing clips bearing against the surfaces of the first set of flanges.

7. A metal door construction of the character described, comprising two stiles, each having two parallel arranged side plates; an integral end plate; a groove formed in the edge lengthwise of each of the stiles opposite to the end plate, said groove being provided by arranging two cross-plates between the side plates adjacent to the edges thereof; a top rail and a bottom rail, each having two parallel arranged side plates; a tongue formed upon each crosswise end of the rails and adapted to fit in the grooves of the stiles; a groove formed in one lengthwise edge of each of the rails, said groove being provided by arranging two cross-plates between the side plates adjacent to the edges thereof; a panel bracket adapted to be fitted in the groove of each stile and each rail; a locking element adapted to lock the panel brackets and the stiles and tongues of the rails together; and a panel carried by the panel brackets, substantially as set forth.

8. A metal door construction of the character described, comprising two stiles, each having two parallel arranged side plates; an integral end plate; a groove formed in the lengthwise edge of each of the stiles opposite to the end plate, said groove being provided by arranging a bridge between the side plates adjacent to the edges thereof; a top rail and a bottom rail, each having two parallel arranged side plates; a tongue formed of two angularly bent cross-plates provided upon each crosswise end of the rails and adapted to fit in the grooves of the stiles; a groove formed in one lengthwise edge of each of the rails, said groove being provided by arranging a bridge between the side plates adjacent to the edges thereof; a cross rail having two parallel arranged side plates; a groove formed in each lengthwise edge of the cross rail, each of said grooves being provided by arranging a bridge between the side plates adjacent to the edges thereof; a tongue formed of two angularly bent cross-plates provided upon each crosswise end of the cross rail and adapted to fit in the grooves of the stiles; a panel bracket adapted to fit in the groove of each stile and each of said rails; a locking element adapted to lock the panel brackets and the stiles and tongues of the rails together; and a panel carried by the panel brackets, substantially as set forth.

9. In a metal door construction, a substantially T-shaped locking element formed by bending a single piece of material to provide a cross-plate and an arm disposed at a right angle to the cross-plate, said arm and cross-plate consisting of two contacting layers of the material; and two oppositely curved fingers, each of which is formed by bending the free end of each of the layers of said arm.

10. A sheet metal structure composed of a plurality of parts connected together edgewise, one part provided with a slot formed lengthwise thereof, an adjacent part provided with a portion abutting against the first mentioned part and a key for locking said parts together comprising a base portion impinging against the inner surface of the part with the slot, an intermediate portion extending through said slot and an end portion adapted to impinge against the inner surface of the abutting portion of said adjacent part.

In witness whereof, I have signed my name to the foregoing specification in the presence of two subscribing witnesses.

JOHN W. RAPP.

Witnesses:

FREDERICK P. RANDOLPH,

JOS. F. O'BRIEN.