

G. CROSSLEY.
FIREPROOF DOOR AND THE LIKE.
APPLICATION FILED DEC. 9, 1911.

1,064,293.

Patented June 10, 1913.

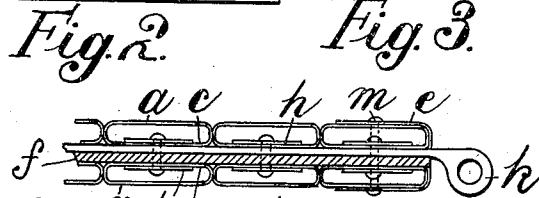
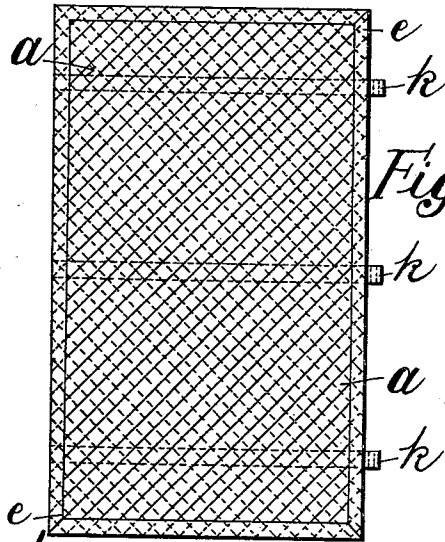
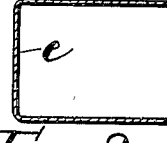
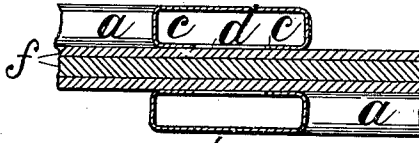
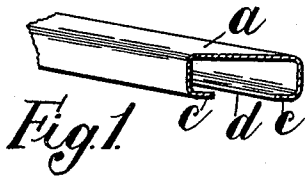


Fig. 4. Fig. 5.

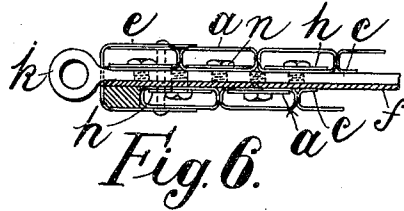


Fig. 6.

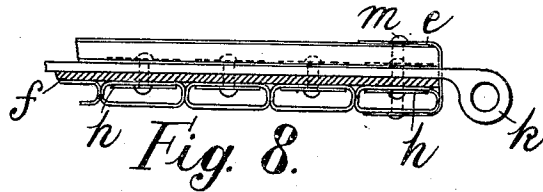


Fig. 8.

Fig. 7.

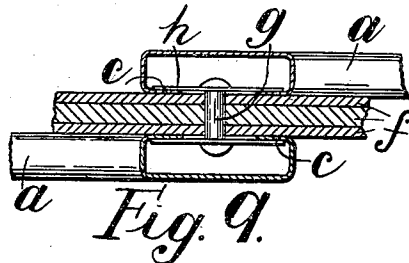
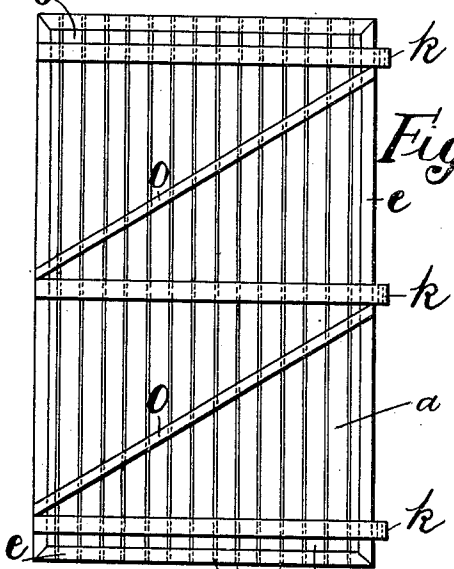


Fig. 9.

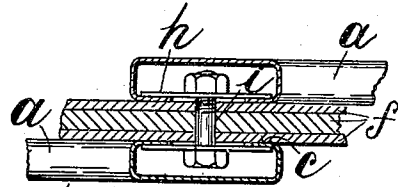


Fig. 10.

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UNITED STATES PATENT OFFICE.

GEORGE CROSSLEY, OF MANCHESTER, ENGLAND.

FIREPROOF DOOR AND THE LIKE.

1,064,293.

Specification of Letters Patent.

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Application filed December 9, 1911. Serial No. 664,885.

To all whom it may concern:

Be it known that I, GEORGE CROSSLEY, subject of the King of Great Britain and Ireland, and resident of Manchester, in the county of Lancaster, England, engineer, have invented certain new and useful Improvements in and Relating to Fireproof Doors and the Like, of which the following is a specification.

My invention relates to improvements in and in connection with fire-resisting doors, shutters and the like, such as are used for closing communication between one room or compartment of a building or other structure and another, and for preventing the spread of fire to the room or rooms or compartment adjacent to that in which the fire originates. Doors of this class when mainly made of large sheets of metal have usually a tendency to bulge or twist out of shape under the great heat of a fire so allowing the latter to pass into the adjacent room or rooms.

My object is to provide a door of improved construction and parts connected therewith, which will allow of expansion of its parts under heat without bulging or warping to a detrimental extent and so largely minimize or entirely prevent the danger of fire passing beyond it to another room or compartment.

To this end my invention consists in the provision of a door or shutter composed of a plurality of metallic members of solid or hollow formation arranged side by side in two or more layers to the required thickness, the members of one layer running parallel to or being arranged opposite to or in staggered formation with those of the remaining layers the edges of such members being disposed at any suitable angle to each other while their plane surfaces remain parallel, one or more layers or series of strips of asbestos or other fire-retarding material located in or between the metallic members, means for inclosing the outer edges of the doors or shutters, means for suspending or hinging and bracing the doors, means for connecting the metallic members to each other or to the frame structure of the door while allowing for adequate expansion under heat, and automatically-acting means for holding the door in position during the progress of a fire.

My invention will be fully described with

reference to the accompanying drawings in which,

Figure 1 is a perspective view of part of one form of metallic member used in the construction of the door or shutter, Fig. 2 a partial sectional plan through a portion of the door, Fig. 3 sectional plan of an inclosing strip for the door edges, Fig. 4 elevation of a complete door, Fig. 5 partial sectional plan to an enlarged scale of the door shown in Fig. 4, Fig. 6 partial sectional plan of a modified arrangement of metallic members of a door, Fig. 7 elevation of a door showing a modified arrangement of the metallic members, Fig. 8 enlarged sectional plan showing a portion of the door in Fig. 7 and Figs. 9 and 10, sectional plans to an enlarged scale showing means of connecting the metallic members together.

In accordance with my invention I construct the main portion of the door of hollow metal members *a* as in Fig. 1 showing a hollow section provided with flanges *c* at its inner side so as to leave a longitudinal slot *d* between their edges. The members *a* are arranged side by side so as to form two or more layers, two such layers being indicated in Fig. 2. The members of one layer are in some cases arranged as shown in Fig. 4 that is to say, at right angles to the members of the other layer and making an angle of 45 degrees with the edges of the door, the front layer being indicated by full lines and the rear layer by broken lines. In Fig. 8 they are also at right angles, the front layer being vertical and the rear layer horizontal, the latter being indicated by broken lines. In Fig. 7 solid members are employed all arranged vertically as to the three layers, the outer layers being opposite to each other while the inner layer is in staggered formation or arranged to break joint with them. The members may be arranged with their longitudinal edges close together as shown in Figs. 4 and 6 and in Fig. 8 though they may be arranged a little distance apart as in Fig. 7.

The ends of the metallic members may be or are usually inclosed by a metal frame *e* preferably of channel formation as shown in Fig. 3 and may be secured thereto by rivets, bolts or the like at each end or in certain cases at one end only, so as to allow for longitudinal expansion of the members under heat and so prevent twisting, warp-

ing or buckling of the door. In the section indicated in Fig. 2 I have shown three layers of asbestos or like fire-retarding material *f* located between the layers or metallic members which are secured thereto by various methods. Thus in Fig. 9 I employ rivets *g* having mushroom or other shaped heads or flanges beneath which are located metal washers *h* of sufficient diameter to span the longitudinal slots *d*. The rivets are placed through the fire-retarding material first with their washers in position and are then riveted over, sufficient length of rivet being allowed to enable the metallic members *a* to be slid into position with their flanges *c* beneath the washers thus fixing the outer layers and inner layers together after which the inclosing frame *e* is fixed in position. Fig. 10 shows a substantially similar arrangement except that bolts *i* are employed.

In Figs. 4, 5 and 6 the bands or hinges *k* are arranged intermediately of the outer metallic members, rivets *g* as in Fig. 9 being passed through the hinges as well as the single asbestos layer *f* to hold the parts together. Longer rivets *m* secure the inclosing frame *e*. In Fig. 6 the metallic members are secured to the hinges *k* by set-screws *n* passing into tapped holes in the hinges, such set-screws and likewise the asbestos layer *f* being placed in position first before the metallic members are assembled in the manner previously mentioned.

In Fig. 7 the metallic members *a* are secured to the hinges *k* in a similar manner to that indicated in Fig. 5 while for further support braces or struts *o* are employed to hold the door in rectangular formation.

If any of the hollow metallic members expand in length under heat, the light metal inclosing frame *e* gives way as this is also subject to practically the same heat and is, therefore, in a somewhat pliable condition. If they expand in width or thickness the metal being light, gives way without seriously affecting the fire-resisting qualities of the door. In the case of doors consisting of three or more layers of metallic members any metallic member may expand without affecting the surrounding members. It will, therefore be seen that by the arrangement of metallic members hereinbefore de-

scribed a door or shutter is provided which will withstand great heat with little or no distortion and thus prevent fire spreading from one room or compartment of a building or structure to another.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a device of the character described, the combination, with a body-portion of fire-resisting material, of a series of hollow metallic facing-members arranged side by side and provided with flanges which rest on the said body-portion, washer-plates bearing on the said flanges, and fastening devices carried by the said body-portion and holding the washer-plates in position, said flanges being slidable under the said washer-plates as the metallic facing-members expand and contract.

2. In a device of the character described, the combination, with a body-portion of fire-resisting material, of two series of hollow metallic facing-members arranged side by side and upon each side of the said body-portion, said facing-members being provided with flanges which rest on the said body-portion, washer-plates bearing on the said flanges, and fastening devices, each carried by the said body-portion and engaging with two washer-plates, said flanges being slidable under the washer-plates.

3. In a device of the character described, the combination, with a body-portion of fire-resisting material, of two series of hollow metallic facing-members arranged side by side and upon each side of the said body-portion, the facing-members on one side being arranged crosswise of the facing-members on the other side, and the said facing-members being provided with flanges which rest on the said body-portion, washer-plates bearing on the said flanges, and fastening devices carried by the said body-portion and holding the washer-plates in position, said flanges being slidable under the said washer-plates.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

GEORGE CROSSLEY.

Witnesses:

JOHN TAYLOR,
WILLIAM HENRY TAYLOR.