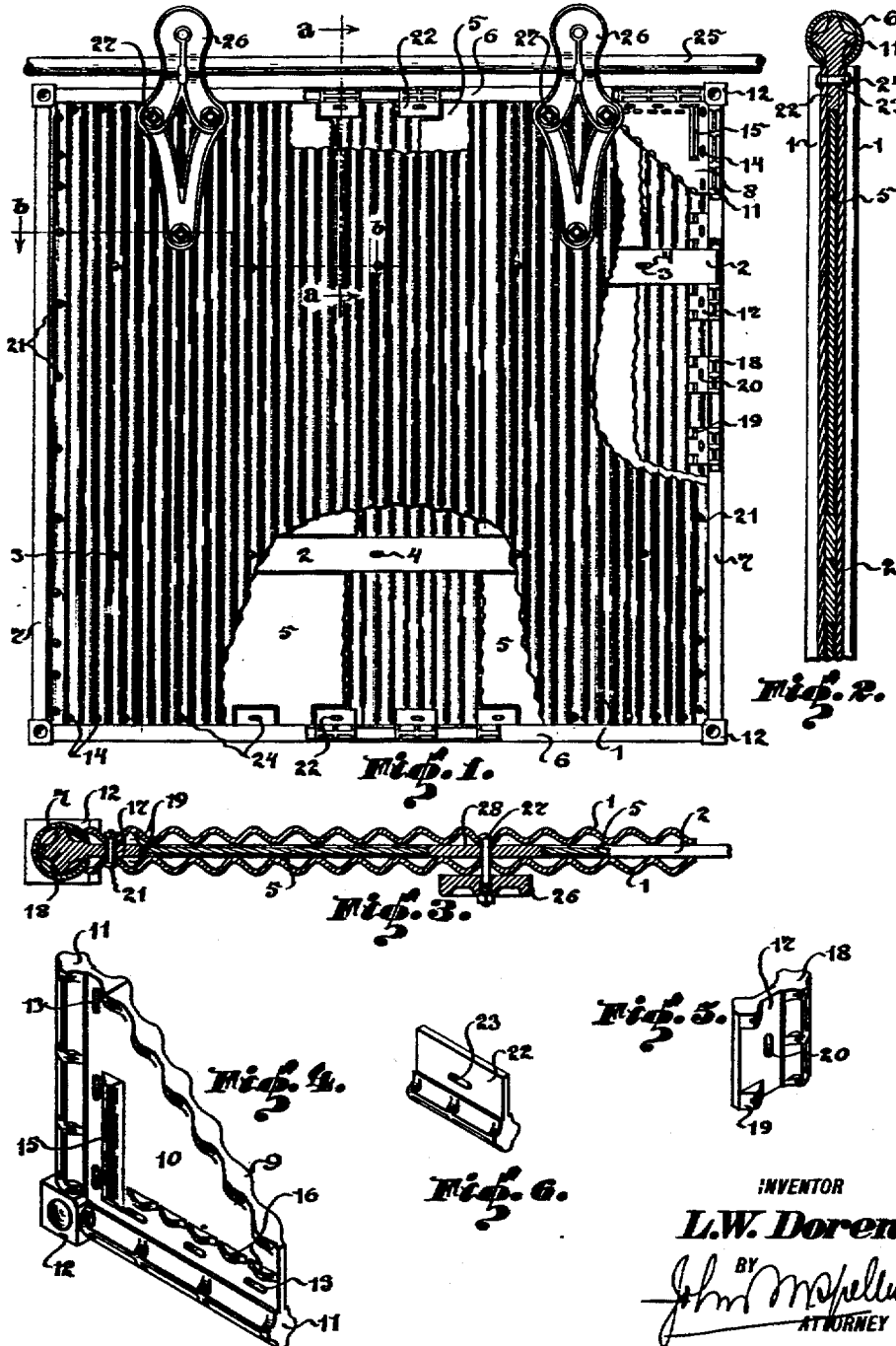


L. W. DOREN.
FIREPROOF DOOR.
APPLICATION FILED MAY 7, 1915.

1,152,011.

Patented Aug. 31, 1915.

2 SHEETS—SHEET 1.



INVENTOR

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1,152,011.

Fig. 2

File 9.



Fig. 8.

Fig. 18.

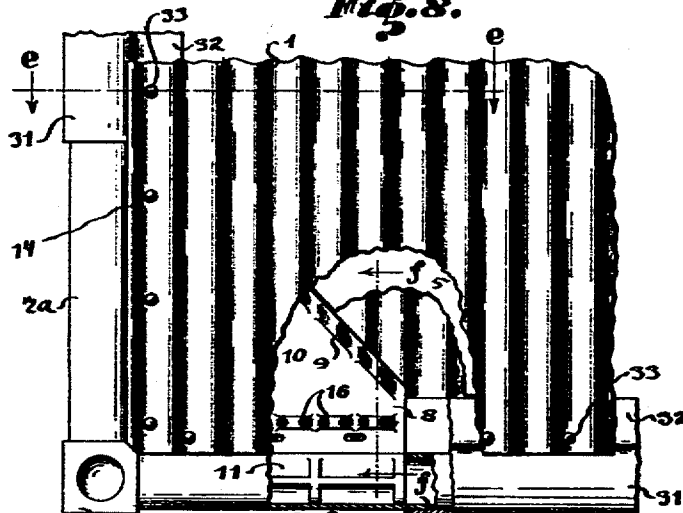
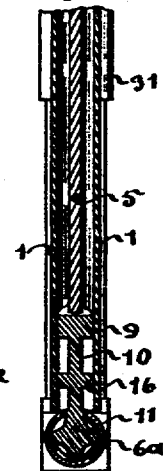


Fig. 10

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Fig. 11.

UNITED STATES PATENT OFFICE.

LEWIS W. DOREN, OF DALLAS, TEXAS, ASSIGNOR OF ONE-FOURTH TO FRANK M. JACKSON, ONE-FOURTH TO GILBERT DURAND, AND ONE-FOURTH TO LOUIS P. DURAND.

FIREPROOF DOOR.

1,152,011.

Specification of Letters Patent.

Patented Aug. 31, 1915.

Application filed May 7, 1915. Serial No. 28,509.

To all whom it may concern:

Be it known that I, LEWIS W. DOREN, a citizen of the United States, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Fireproof Doors, of which the following is a specification.

My invention has relation to an improvement in the construction of fire doors and in such connection it relates more particularly to the arrangement and construction of the parts of such a door.

Heretofore in the construction of fire doors some attempts have been made to secure a substantially all metal door, but so far as I am aware all these prior structures were defective in one or more particulars. Thus in the earlier doors, the structure was a regularly formed wooden door, wholly incased in sheet iron or block tin plate. Such a construction is bulky, heavy and not easily moved on hangers and in case of fire the internal wooden core was destroyed with the creation of internal gases which disrupted and distorted the exterior metal casing.

Again attempts have been made to form the door of corrugated iron or similar sheet metal either without an internal core or with an internal layer or sheet of asbestos or similar fire proofing material. In doors of this construction the corrugated plates were firmly held in a rigid metallic frame and while the extreme edges of the door were firmly held to position on the frame, the remaining portions, if the door was of relatively large size, crinkled or buckled in ordinary use the buckling or warping being due to the relative thinness of the metallic sheets and their relative large size and heavy weight. In such corrugated metal doors, the sheets being firmly and rigidly secured to the frame and to each other, the tendency of the sheets to expand and contract under variations in temperature caused the doors to warp from their required level or plane and in case of excess heat this warping was so great as to render the doors incapable of future use as well as preventing the opening or closing of the doors while they were subjected to such excessive heat.

By my present invention there is provided a fire door of simple construction, the arrangement being such that while the parts of the door are firmly tied transversely and the facings for the door are firmly support-

ed within a rigid frame, the fastenings and supports are such as to permit of expansion and contraction of the plates or facings for the door under ordinary variations in temperature and to permit of uniform expansion of the door faces even under excess heat in which instance the fastenings and supports automatically permit movement of the plates.

In carrying out my invention there are provided side and end metallic pieces of tubular construction, joined at the corners in a frame or frame work, and these tubular pieces constitute supports for webbed plates sliding in or on the tubular frame pieces. The corners of the tubular frame work are joined by angular brackets whereon the tubular pieces may slide, and the corrugated sheet metal faces of the door are united at their edges to the brackets and webbed plates by, preferably, bolts or rivets passing through both of the corrugated faces of the door and slots formed in the body of the brackets and webs of the plates. If desired the metallic faces of the door may inclose a sheet of asbestos or other fire proof packing and, in case the doors are of relatively large area, there may be provided transverse, flat, reinforcing strips or bars between the faces of the door, said strips or bars being secured to the faces by a bolt and slot connection and said strips having a sliding connection at their ends with the sides of the tubular frame work.

The nature and scope of my invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof, in which,—

Figure 1, is a front elevational view partly broken away of a fire door embodying the main features of my invention. Fig. 2, is an enlarged cross-sectional view on the line *a, a* of Fig. 1. Fig. 3, is an enlarged longitudinal sectional view taken on line *b, b* of Fig. 1. Fig. 4, is a perspective view of one of the corner brackets. Figs. 5 and 6 are perspective views of respectively the side and end webbed plates. Fig. 7, is a front view of a portion of a door embodying a modified form of my invention. Fig. 8, is a longitudinal sectional view taken on line *c, c* of Fig. 7. Fig. 9, is a cross-sectional view taken on line *d, d* of Fig. 7. Fig. 10, is a view corresponding to Fig. 7, but illus-

trating a still further modified form of the invention. Fig. 11, is a longitudinal sectional view taken on line *e, e* of Fig. 10, and Fig. 12, is a cross-sectional view taken on line *f, f* of Fig. 10.

Referring to the drawings, 1, 1 represent the front and rear faces of the door formed preferably of corrugated sheet metal. While each face is shown in the drawings to be in one piece it is manifest that the faces may be made up of a plurality of panels or sections if desired. Where doors of relatively large area are employed, suitable transverse stiffening strips or bars 2 are interposed between the faces 1, 1 and united thereto by bolts or rivets 3 passing through both faces 1, 1 and through longitudinally disposed slots 4 in strips 2. If desired a layer 5 of asbestos or other heat insulation material may also be interposed between the faces 1, 1 of the door being held to position therein by said faces when the faces 1, 1 are clamped, bolted or riveted to the strips 2. Inclosing the edges of the two faces of the door is a frame work which, with the auxiliary parts as shown in Figs. 1 to 6 inclusive, consists of the following preferred construction and arrangement of parts. The frame work consists of the top and bottom end tubular rods 6, 6 of any form or shape in cross-section both longitudinally slitted or slotted, with the respective slots facing toward each other and toward an adjacent top or bottom edge of the door faces 1, 1. The frame work further consists of the side tubular slit rods 7, 7 corresponding to tubes 6, 6. The four rods 6, 6, 7, 7, are united into a frame by the corner brackets 8. These brackets 8, made preferably of cast metal, are substantially triangular in outline, and, as illustrated in detail in Fig. 4, have an hypotenuse provided with the semicircular or corrugated edges 9 fitting into corresponding corrugations measured diagonally across the inner side of each face 1, 1, of the door. A web 10 connects the corrugated hypotenuse 9 with the vertical and horizontal edges 11 each of which is substantially star shaped in cross section. The edges 11 meet in a cubical corner piece 12 forming a corner for the door. The web 10 of the bracket adjacent to each edge 11 is of a width small enough to slide in the slot of an adjacent enveloping tube 6 or 7 and the star shaped edges 11 are of a diameter small enough to fit snugly in the interior of a tube 6 or 7 and to slide with relative ease therein. The portion of web 10 adjacent to each edge is provided with one or more elongated openings or slots 13, so as to permit a bolt, or rivet 14 to pass through both faces 1 and the bracket 8 to clamp the faces to each other and to the bracket. To further stiffen the connection between tubes 6, 7, bracket 8,

and faces 1 at the corners and thus to prevent buckling under torsional strain at the corners of the door, each bracket has along its vertical edge 11 an angular or rounded or semi-cylindrical lug 15 fitting longitudinally into a corrugation of each face 1 and along its horizontal edge, one or more semi-circular projections or lugs 16 fitting transversely into one or more corrugations of faces 1.

In each vertical side tube 7 is arranged to slide a series of webbed plates 17 (see Fig. 5) constituting with the brackets 8 a means for securing the vertical edges of faces 1 to the tubes 7. Each webbed plate 17 has a head 18 of a shape preferably corresponding in outline and in body with a vertical or horizontal edge 11 of the brackets and this head 17 fits snugly and slides with relative ease in tube 7 with the flat web or body of the plate 17 projecting through the slot of said tube. The inner edge of plate 17 has on either face one or more semicircular lugs 19 fitting longitudinally a corrugation of faces 1—1. The body of plate 17 is provided with an elongated slot or opening 20. The edges of the faces 1 of the door are united to the plates 17 by bolts or rivets 21 passing through both faces and through slots 20 of plates 17. In horizontal rods or tubes 6, are arranged to slide webbed plates 22 (see Fig. 6) which correspond in shape and in function with the plates 17 with the single exception that although the body of the plate is slotted as at 23 its edge preferably has no projection or lug to interlock transversely with a corrugation or corrugations in faces 1. The width of plates 22 is preferably sufficient to cover two or more complete corrugations of faces 1. A bolt or rivet 24 passing through both faces 1 and the slot 23 of each plate 22 serves to fasten the faces 1 together and to the plates 22.

In Fig. 1 the door is shown as of rectangular outline but it is manifest that the shape of the door may be varied especially at its uppermost edge. In Fig. 1 the door is illustrated as suspended from a rail 25 by means of hangers 26 of well known construction. The rivets or bolts 27 uniting the door faces to the hanger plates 26 also traverse by preference a stiffening brace plate 28 interposed between the two faces 1 as indicated in Fig. 3.

In Figs. 7 to 9 a modified form of the invention is illustrated wherein the plates 17 of Figs. 1 to 6 are replaced by a single webbed rail or plate 29 of substantially T shape. The head 30 of this plate fits snugly within the tubes 6 or 7 and its flat web projects through a slot of a tube 6 or 7.

In Figs. 10 to 12 a still further modified form of the invention is shown in which the plates 17 or plate 29 are replaced by a split sleeve 31 fitting to slide on the exterior of

tubes 6^a and 7^a which in this instance are unslotted. The sleeves 31 have meeting flanged ends 32 extending into the space between faces 1 of the door and having elongated slots through which pass the bolts or rivets 33 which also traverse the faces 1 of the door as clearly shown in Fig. 11.

In all forms of the door there is a sliding connection between the two faces, brackets and plates and the tubes supporting the same and wherever the faces are united together, or to the supporting plates, the connection is such as to permit of some expansion or contraction of the faces without disrupting their union with the supporting plates and frames.

Having thus described the nature and objects of my invention, what I claim as new and desire to secure by Letters Patent, is,—

1. A frame for a fire door comprising side and end tubes each longitudinally slotted and brackets each having a vertical and a horizontal edge in sliding engagement with said tubes, and a body portion projecting through the slots of said tubes, combined with sheet metal faces for the door, a means in sliding engagement with said tubes and secured to said metal faces to constitute a fastening for the edges of said faces to the tubes, and means for securing the faces adjustably to the body portions of said brackets.

2. In a device of the character described, a frame work comprising slotted tubes and

corner brackets connecting the same, webbed plates having a range of movement within the tubes, the web of the plates traversing the slotted portions of the tube, combined with metallic faces for the door disconnected from the tubes, the edges of said faces being united to the webs of the plates.

3. In a device of the character described, a frame work comprising slotted tubes and corner brackets connecting the same, webbed plates each having a head sliding in a tube and a body portion traversing the slot of the tube, said body provided with elongated openings, combined with metallic faces for the door disconnected from the tubes, the edges of said faces engaging the body portions of the plates, and means traversing said faces and the elongated openings in the plates and arranged to clamp the faces to said plates.

4. In a fire door, a frame work comprising tubes, and corner brackets, combined with two corrugated metallic plates constituting the faces of the door, webbed plates longitudinally adjustable with respect to the tubes, said plates provided with a slotted body portion interlocking with the corrugated faces of the door and fastening means traversing said faces and the slotted body portion of the plates to thereby unite the faces to said plates.

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

LEWIS W. DOREN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."