Sept. 9, 1924. 1,507,793

J. A. RAPPAPORT ET AL

FIREPROOF DOOR

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Fig. 3.

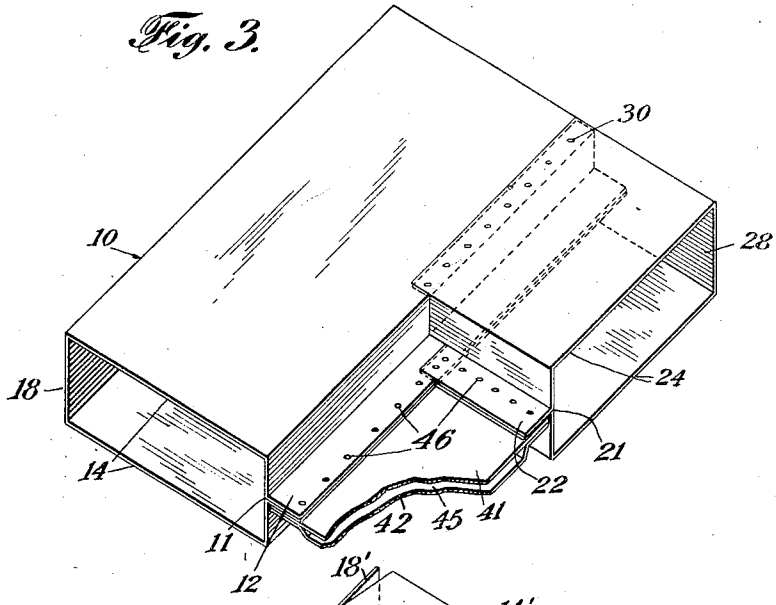



Fig. 1.

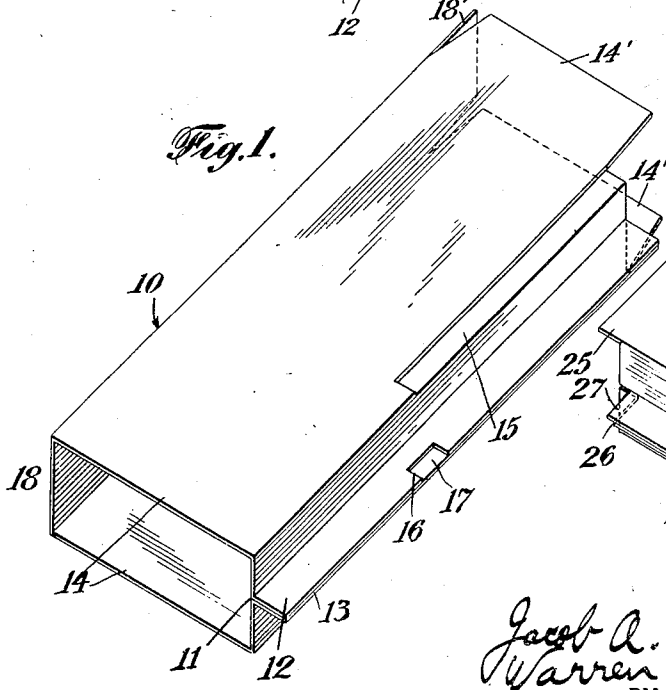
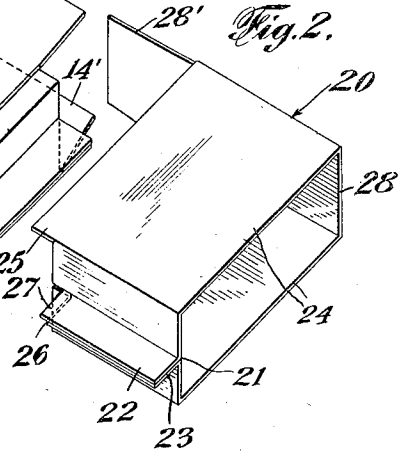



Fig. 2.




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Fig. 5.

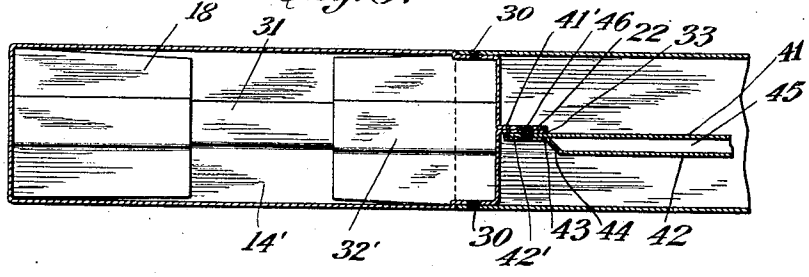



Fig. 4

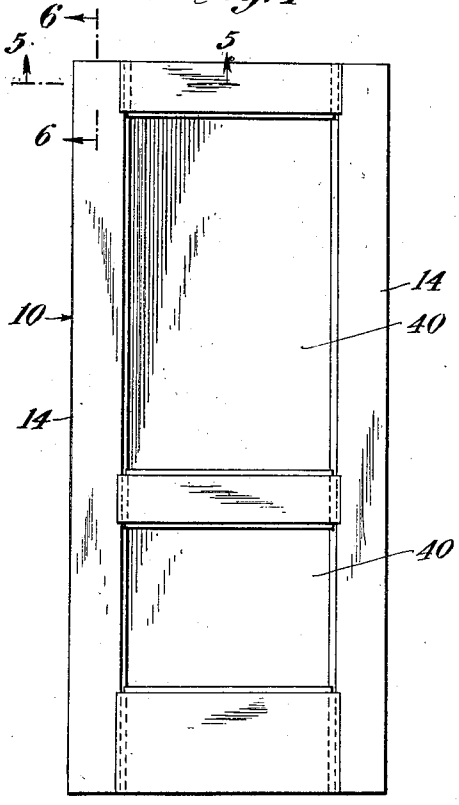
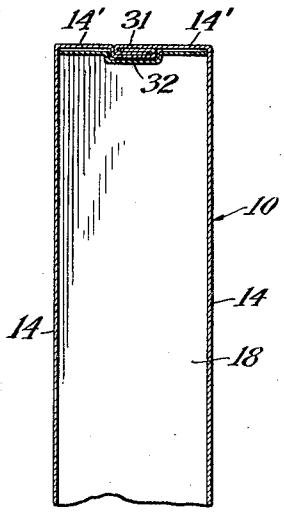



Fig. 6




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# UNITED STATES PATENT OFFICE.

JACOB A. RAPPAPORT AND WARREN J. WILLIAMS, OF NEW YORK, N. Y., ASSIGNORS TO RELIANCE FIREPROOF DOOR CO., OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

## FIREPROOF DOOR.

Application filed April 11, 1923. Serial No. 631,298.

*To all whom it may concern:*

Be it known that we, JACOB A. RAPPAPORT and WARREN J. WILLIAMS, citizens of the United States, residing, respectively, in the county of Kings, city and State of New York, and in the county of Queens, city and State of New York, have invented an Improvement in Fireproof Doors, of which the following is a specification.

Our present invention relates to fireproof doors or the like, particularly such as are made up of hollow steel or other metal stiles and rails, and aims to provide articles of the character designated which shall be simple in construction, avoiding the use of complicated forms and parts for this purpose, particularly complicated corner-joining means; which shall be easy to assemble; and which, when assembled, shall yield a strong, rigid structure not liable to distortion, and which shall be so constructed as to prevent the door or the like from becoming warped or otherwise injured by flames or other fire or other hazards.

In the accompanying specification we shall describe, and in the annexed drawing show, an illustrative embodiment of our present invention. It is, however, to be clearly understood that our invention is not limited to the illustrative embodiment thereof herein shown and described for purposes of illustration only.

Referring to the drawings, wherein we have shown the aforesaid illustrative embodiment of the present invention:

Fig. 1 is a sectional perspective view of a hollow door stile made in accordance with the principles of the present invention, before the same has been assembled;

Fig. 2 is a sectional perspective view of a hollow door rail made in accordance with the principles of the present invention, before the same has been assembled;

Fig. 3 is a sectional perspective view of one corner of a door made in accordance with the principles of the present invention and showing the hollow stile and rail of Figs. 1 and 2, respectively, assembled together with a panel, in accordance with the principles of the present invention;

Fig. 4 is a plan view of the door assembled;

Fig. 5 is a fragmentary sectional view of the door shown in Fig. 4, the section being taken along line 5—5 of Fig. 4; and

Fig. 6 is a fragmentary sectional view of the assembled door shown in Fig. 4, the section being taken along the line 6—6 of Fig. 4.

Referring now to the aforesaid illustrative embodiment of the present invention, and more particularly to the drawing illustrating the same, 10 indicates generally a hollow steel or other metal door stile, shown more clearly in Fig. 1 of the drawing. The stile 10 at the inner split edge 11 thereof is provided with a plurality of integral cooperating flanges 12 and 13. Adjacent at least one end of the stile, but preferably adjacent both the upper and lower ends of the stile, each face of the stile, here designated by reference character 14, is provided with a longitudinally disposed depression 15. It will be noted that the depression 15 is formed and disposed in that portion of the face 14 of the stile which is adjacent one end of the inner edge of said face.

One of the cooperating integral flanges 12 and 13, in this case the flange 12, is provided with a cut-out portion 16 which, as more clearly shown in Fig. 1 of the drawing, is positioned adjacent the inner end of the corresponding depression 15. The cut-out portion 16 of the integral flange 12 provides, immediately under the same, an uncut portion 17 in the remaining flange 13. At least one end of the stile, but preferably both the upper and lower ends of the same, is provided with the integral foldable portions 14′ forming extensions of the faces 14, and also with the integral edge end portion or extension 18′ forming an extension of the edge 18 of the stile 10.

Turning now to the rails, of which any suitable number, such as two or more, here shown as three (see Fig. 4 of the drawing) may be employed, and turning more particularly to Fig. 2 of the drawing where an end portion of one of the rails is shown, the rail, generally designated by reference character 20, is provided at the inner edge 21 of the same with the integral cooperating flanges 22 and 23. The faces 24 of the hollow stile or other metal rail 20 are provided with the spaced integral flange portions 25 for the reception of and cooperation with the corresponding depressions 15 of the hollow stile 10. For this purpose the flange portions 25 are so shaped and proportioned as to fit accurately and tightly into the corresponding depressions 15.

One of the integral cooperating flanges 22 and 23, such as the flange 23, is provided with a cut-out portion 26, thus leaving the remaining flange 22 with an uncut portion 27 immediately over the cut-out portion 26 of the first-mentioned flange 23. The uncut portion 27 of the flange 22 is so arranged and proportioned as to fit tightly into the cut-out portion 16 of the flange 12 immediately over the uncut portion 17 of the flange 13 of the hollow stile 10. The outer edge 28 of the hollow rail 20 is provided with an outwardly extending portion 28′ preferably integral with the lower edge 28 and forming an extension thereof.

In assembling the door, the stiles and rails are so arranged with respect to each other that the flange portions 25 at the end of a rail will fit into the corresponding depressions 15 at the end of a stile, with the uncut portion 27 of the rail flange fitting into the cut-out portion 17 of the stile flange. The flange portions 25 and the uncut portion 27 of each rail are now suitably fastened in the corresponding depressions 15 and cut-out portion 17 of the stile, respectively. For this purpose we may use brazing or other suitable or convenient metal joining process. We prefer, however, to weld the designated parts together by electric welding, such as electric spot welding. We have found that this process of metal joining yields a very strong and rigid structure highly desirable for the intended purpose. The spots at which the designated parts have been electrically welded have been indicated by reference character 30.

The end of the hollow stile may now be closed and the stile more effectively joined to the rail by folding over the extensions 14′ of the faces 14 of the stile about and over the extension 18′ of the edge 18 of the stile and the outwardly extending portion 28′ of the edge 28 of the rail. The portions 14′ may now be fastened together, as by means of a folded lock seam 31, more clearly shown in Fig. 6 of the drawing. By the exercise of suitable pressure, the inner portion of the folded lock seam 31 will be forced into and form a depression within the extension 18′ of the edge 18 of the stile or in the extension 28′ of the edge 28 of the rail, as the case may be, this depression being indicated by reference character 32.

The panels, of which two are here shown, have been indicated by reference character 40 and are more clearly illustrated in Figs. 3, 4 and 5 of the drawing. Each panel 40 may consist of two layers of steel or other sheet metal, of which one, such as the layer 41, may be flat, while the other, designated by reference character 42, is hollowed out by being provided with a flange portion 43 and the inclined intermediate portion 44, thus providing a sealed air space or chamber 45. The edges 41′ and 42′ of the members 41 and 42, respectively, of each panel 40, are now joined to the pairs of cooperating flanges 12 and 13 of the stile, and to the cooperating flanges 22 and 23 of the rail, as more clearly shown in Figs. 3 and 5 of the drawing. For this purpose we may use any suitable metal joining process, such as brazing, but preferably welding, such as electric welding, particularly electric spot welding. The spots at which the panel sheets 41 and 42 have been joined to the cooperating flanges of the stile and rail have been indicated by reference character 46 (see Figs. 3 and 4 of the drawing).

The door forming the aforesaid illustrative embodiment of our present invention possesses many practically valuable features of construction and of usefulness which may be briefly summarized as follows: While yielding a strong, rigid construction, admirably adapted to withstand warping or other injury by flames or other fire or other hazards, the door is exceedingly simple in construction, avoiding the use of complicated forms and parts, particularly complicated corner-joining means. The door is exceedingly easy to assemble, thus effecting substantially economies in time, labor and materials needed for this purpose. While possessing the superiorities of construction and of usefulness specified above, it may be very economically manufactured, thus highly recommending it to architects, builders and like users of such devices.

What we claim as our invention is:

1. A fireproof door comprising a tubular stile having a plurality of cooperating flanges at the inner edge thereof, a depression being provided in each of the faces of the stile adjacent one end of the inner edge of each face at spaced distances from the flange, one of said flanges being provided with a cut-out portion adjacent the inner ends of said depressions.

2. A fireproof door comprising a tubular stile having a plurality of cooperating integral flanges at the inner split edge thereof, a depression being provided in each of the faces of the stile adjacent one end of the inner edge of each face at spaced distances from the flanges, one of said flanges being provided with a cut-out portion adjacent the inner ends of depressions.

3. A fireproof door comprising a tubular stile having a plurality of cooperating integral flanges at the inner split edge thereof, a depression being provided in each of the faces of the stile adjacent each end of the inner edge of each face at spaced distances from the flanges, one of said flanges being provided with a cut-out portion adjacent the inner ends of said depressions.

4. A fireproof door comprising a tubular stile having a plurality of cooperating

flanges at the inner edge thereof, a depression being provided in each of the faces of the stile adjacent one end of the inner edge of each face, one of said flanges being provided with a cut-out portion adjacent the inner ends of said pair of depressions, in combination with a tubular rail having a plurality of cooperating flanges at the inner edge thereof and a plurality of spaced flange portions at the outer longitudinal edges thereof, said flange portions fitting into said depressions and being fastened therein, one of said last-mentioned cooperating flanges being cut away to provide the other of said last-mentioned cooperating flanges with an outwardly extending portion for fitting into said cut-out portion and being fastened therein to the uncut opposed portion of the remaining one of the first-mentioned cooperating flanges.

5. A fireproof door comprising a tubular stile having a plurality of cooperating integral flanges at the inner split edge thereof, a depression being provided in each of the faces of the stile adjacent one end of the inner edge of each face, one of said flanges being provided with a cut-out portion adjacent the inner ends of said pair of depressions, in combination with a tubular rail having a plurality of cooperating flanges at the inner edge thereof and a plurality of spaced flange portions at the outer longitudinal edges thereof, said flange portions fitting into said depressions and being fastened therein, one of said last-mentioned cooperating flanges being cut away to provide the other of said last-mentioned cooperating flanges with an outwardly extending portion for fitting into said cut-out portion and being fastened therein to the uncut opposed portion of the remaining one of the first-mentioned cooperating flanges.

6. A fireproof door comprising a tubular stile having a plurality of cooperating integral flanges at the inner split edge thereof, a depression being provided in each of the faces of the stile adjacent each end of the inner edge of each face, one of said flanges being provided with a cut-out portion adjacent the inner ends of each pair of said depressions, in combination with a tubular rail having a plurality of cooperating flanges at the inner edge thereof and a plurality of spaced flange portions at the outer longitudinal edges thereof, said flange portions fitting into said depressions and being fastened therein, one of said last-mentioned cooperating flanges being cut away to provide the other of said last-mentioned cooperating flanges with an outwardly extending portion for fitting into said cut-out portion and being fastened therein to the uncut opposed portion of the remaining one of the first-mentioned cooperating flanges.

7. A fireproof door comprising a tubular stile having a plurality of cooperating flanges at the inner edge thereof, a depression being provided in each of the faces of the stile adjacent one end of the inner edge of each face, one of said flanges being provided with a cut-out portion adjacent the inner ends of said pair of depressions, in combination with a tubular rail having a plurality of cooperating flanges at the inner edge thereof and a plurality of spaced flange portions at the outer longitudinal edges thereof, said flange portions fitting into said depressions and being fastened therein by welding, one of said last-mentioned cooperating flanges being cut away to provide the other of said last-mentioned cooperating flanges with an outwardly extending portion for fitting into said cut-out portion and being fastened therein by welding to the uncut opposed portion of the remaining one of the first-mentioned cooperating flanges.

8. A fireproof door comprising a tubular stile having a plurality of cooperating integral flanges at the inner split edge thereof, a depression being provided in each of the faces of the stile adjacent one end of the inner edge of each face, one of said flanges being provided with a cut-out portion adjacent the inner ends of said pair of depressions, in combination with a tubular rail having a plurality of cooperating flanges at the inner edge thereof and a plurality of spaced flange portions at the outer longitudinal edges thereof, said flange portions fitting into said depressions and being fastened therein by electric welding, one of said last-mentioned cooperating flanges being cut away to provide the other of said last-mentioned cooperating flanges with an outwardly extending portion for fitting into said cut-out portion and being fastened therein by electric welding to the uncut opposed portion of the remaining one of the first-mentioned cooperating flanges.

9. A fireproof door comprising a tubular stile having a plurality of cooperating integral flanges at the inner split edge thereof, a depression being provided in each of the faces of the stile adjacent each end of the inner edge of each face, one of said flanges being provided with a cut-out portion adjacent the inner ends of each pair of said depressions, in combination with a tubular rail having a plurality of cooperating flanges at the inner edge thereof and a plurality of spaced flange portions at the outer longitudinal edges thereof, said flange portions fitting into said depressions and being fastened therein by electric spot welding, one of said last-mentioned cooperating flanges

being cut away to provide the other of said last-mentioned cooperating flanges with an outwardly extending portion for fitting into said cut-out portion and being fastened therein by electric spot welding to the uncut opposed portion of the remaining one of the first-mentioned cooperating flanges.

10. A fireproof door comprising a tubular rail having a plurality of cooperating flanges at the inner edge thereof and a plurality of spaced flanged portions at the outer longitudinal edges thereof, one of said cooperating flanges being cut away to provide the remaining one of said cooperating flanges with an outwardly extending portion.

11. A fireproof door comprising a tubular rail having a plurality of cooperating flanges at the inner edge thereof, a plurality of spaced flanged portions at the outer longitudinal edges thereof, one of said cooperating flanges being cut away to provide the remaining one of said cooperating flanges with an outwardly extending portion, and an outwardly extending portion at the lower edge thereof.

12. A fireproof door comprising a tubular stile having a plurality of cooperating integral flanges at the inner split edge thereof, a depression being provided in each of the faces of the stile adjacent each end of the inner edge of each face, one of said flanges being provided with a cut-out portion adjacent the inner ends of each pair of said depressions, in combination with a tubular rail having a plurality of cooperating flanges at the inner edge thereof and a plurality of spaced flange portions at the outer longitudinal edges thereof, said flange portions fitting into said depressions and being fastened therein, one of said last-mentioned cooperating flanges being cut away to provide the other of said last-mentioned cooperating flanges with an outwardly extending portion for fitting into said cut-out portion and being fastened therein to the uncut opposed portion of the remaining one of the first mentioned cooperating flanges, together with a metal panel fixedly attached to the pairs of cooperating flanges of said stile and rail.

13. A fireproof door comprising a tubular stile having a plurality of cooperating integral flanges at the inner split edge thereof, a depression being provided in each of the faces of the stile adjacent each end of the inner edge of each face, one of said flanges being provided with a cut-out portion adjacent the inner ends of each pair of said depressions, in combination with a tubular rail having a plurality of cooperating flanges at the inner edge thereof and a plurality of spaced flange portions at the outer longitudinal edges thereof, said flange portions fitting into said depressions and being fastened therein, one of said last-mentioned cooperating flanges being cut away to provide the other of said last-mentioned cooperating flanges with an outwardly extending portion for fitting into said cut-out portion and being fastened therein to the uncut opposed portion of the remaining one of the first-mentioned cooperating flanges, together with a metal panel fixedly attached by welding to the pairs of cooperating flanges of said stile and rail.

14. A fireproof door comprising a tubular stile having a plurality of cooperating integral flanges at the inner split edge thereof, a depression being provided in each of the faces of the stile adjacent each end of the inner edge of each face, one of said flanges being provided with a cut-out portion adjacent the inner ends of each pair of said depressions, in combination with a tubular rail having a plurailty of cooperating flanges at the inner edge thereof and a plurality of spaced flange portions at the outer longitudinal edges thereof, said flange portions fitting into said depressions and being fastened therein, one of said last-mentioned cooperating flanges being cut away to provide the other of said last-mentioned cooperating flanges with an outwardly extending portion for fitting into said cut-out portion and being fastened therein to the uncut opposed portion of the remaining one of the first-mentioned cooperating flanges, together with a metal panel fixedly attached by electric welding to the pairs of cooperating flanges of said stile and rail.

15. A fireproof door comprising a tubular stile having a plurality of cooperating integral flanges at the inner split edge thereof, a depression being provided in each of the faces of the stile adjacent each end of the inner edge of each face, one of said flanges being provided with a cut-out portion adjacent the inner ends of each pair of said depressions, in combination with a tubular rail having a plurality of cooperating flanges at the inner edge thereof and a plurality of spaced flange portions at the outer longitudinal edges thereof, said flange portions fitting into said depressions and being fastened therein, one of said last-mentioned cooperating flanges being cut away to provide the other of said last-mentioned cooperating flanges with an outwardly extending portion for fitting into said cut-out portion and being fastened therein to the uncut opposed portion of the remaining one of the first-mentioned cooperating flanges, together with a metal panel fixedly attached by electric spot welding to the pairs of cooperating flanges of said stile and rail.

In testimony, whereof, we have signed our names to this specification this 21st day of March, 1923.

JACOB A. RAPPAPORT.
WARREN J. WILLIAMS.