

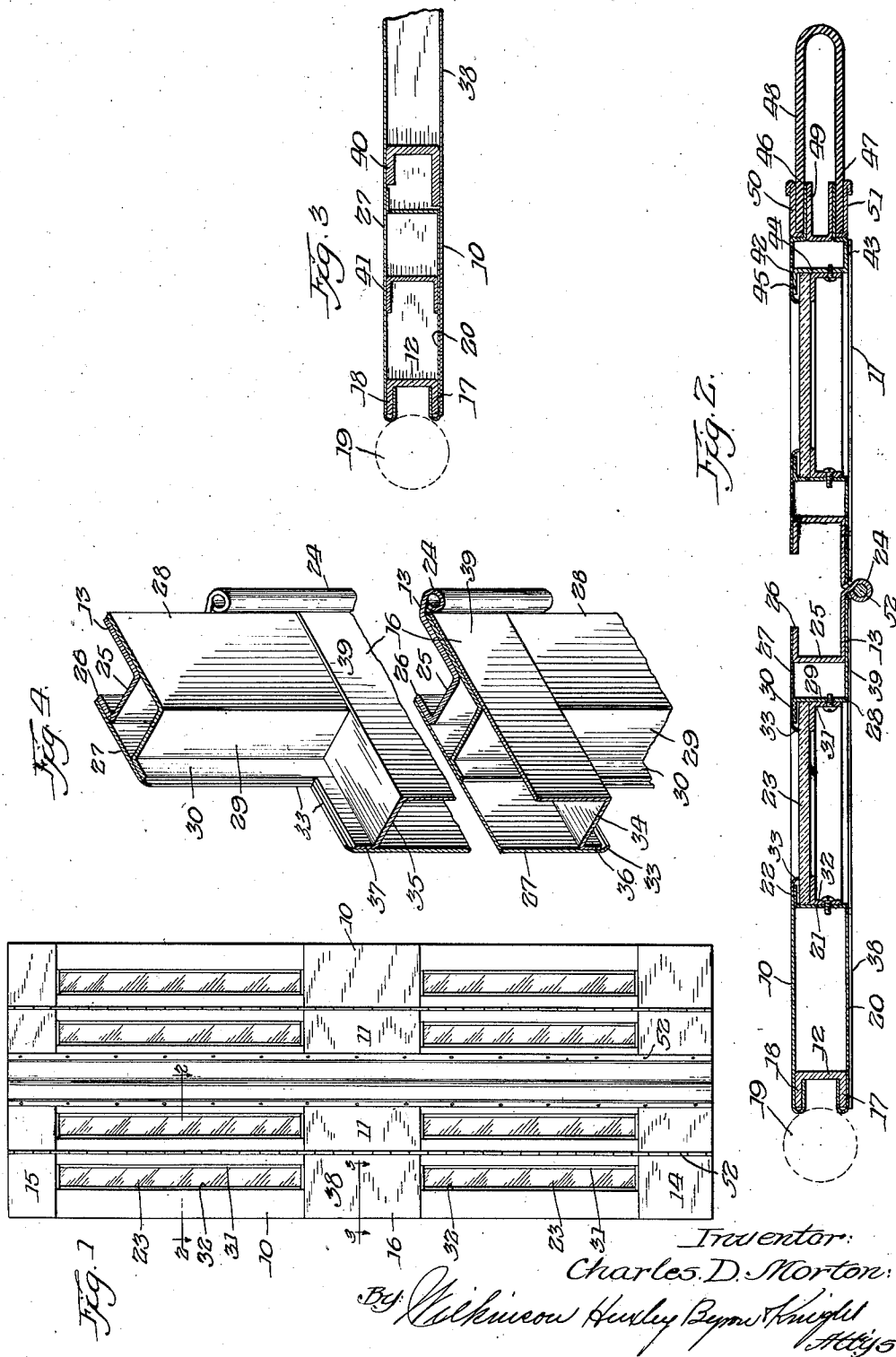
Oct. 27, 1936.

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2,058,711

STEEL DOOR

Filed Sept. 3, 1935



UNITED STATES PATENT OFFICE

2,058,711

STEEL DOOR

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Application September 3, 1935, Serial No. 38,919

6 Claims. (Cl. 189—46)

My invention relates to light-weight steel doors and has particular reference to a door preferably composed of a plurality of sections, each section comprising a plurality of panels hinged together, the outside panel of each section being hinged at their outside edges to appropriate door staffs with the inner edges of the inner panels of each section meeting in a longitudinal line thereby forming a complete closure for the door opening. The doors are particularly adapted for use in motor buses of various kinds, street cars and other places where light weight doors are desired having a maximum of strength and designed for hard usage.

An object of my invention is the provision of a light weight steel door having the panels formed with rails and stiles made up of light gauge metal, these units being formed in such manner that glass inserts may be placed in each of the panels of the door for the purpose of allowing light to pass therethrough and also thereby giving the operator of the car an opportunity to see whether passengers are waiting to board the bus or street car.

Another and further object of my invention is the provision of a light weight steel door so designed that the panels thereof hinged together are adequately supported and which will not sag in service or otherwise be distorted out of shape from usage and which operates satisfactorily under various weather conditions and the like to form proper closure members.

These and other objects of my invention will be understood by reference to the drawing, in which

Figure 1 is an elevational view of my improved invention;

Figure 2 is a cross sectional view through two adjacent panels on lines 2—2 of Figure 1;

Figure 3 is a cross sectional view partially through the center rail along the line 2—2 of Figure 1, and

Figure 4 is a perspective view of the end portions of the center rail provided along the center line of the center rail.

Referring now specifically to the drawing and in which like reference characters refer to like parts throughout, the door, as a whole, is composed of two sections opening along a vertical median line, each section being composed of outer panels 10, 10 and inner panels 11, 11, each of these panels 10, 10 being substantial duplicates of each other, and each of the inner panels 11, 11 being substantial duplicates of each other, except that the parts are reversed for right and left-

hand operation, but which will be easily understood by those skilled in the art.

The section 10 is composed of inner and outer panels, the inner panel being made up of a door stile 12, a hinged stile 13 at the opposite side of the section, a bottom rail 14, a top rail 15, an intermediate rail 16, and face plates as hereinafter described in detail. The door stile 12 is preferably a U-shaped member, the legs 17 and 18 of which extend towards the door staff 19, with an inner vertically extending face plate 20 substantially Z-shaped in cross section being provided having an elongated portion which forms the inner face of the door adjacent the door staff 19 and is turned back upon itself along its marginal edge over the legs 17 of the stile 12 and spot-welded thereto, both on the inner and outer sides, and having a transversely extending portion 21 which forms one side wall of the glass openings in the upper and lower portions of this particular panel. The outer portion 22 of the member 20 is turned at a right angle to the portion 21 and forms a retaining member in the outer side of the door for the upper and lower glass panes 23, 23 along one of their sides.

The hinge stile 13 is located at the opposite edge of the said panel, the hinge stile being generally U-shaped in cross section and having an elongated leg portion at one side which is turned in circular form to form a hinge portion 24 with a transversely extending portion 25 and an outer portion 26 which is turned at right angles to the transversely extending portion 25 and forms a base for the outer door plate 27. Another stile 28 is provided adjacent the hinge stile 13, the said stile 28 having an elongated leg portion which is fitted against the elongated leg portion of the hinge stile 13 and is spot-welded thereto in a plurality of places over the surfaces of these two stiles, with the free edge of this stile 28 extending up adjacent the hinge portion 24 of the hinge stile 13. The stile 28 is a transversely extending portion 29 which forms the side wall of the window opening within which the pane 23 is placed with its outer edge 30 being turned at right angles to the portion 25 to form a retaining member for the upper and lower glass panes 23 in the said section at the opposite side of this pane from the retaining member 22.

An angle member 31 is provided which is secured to the transversely extending portion 29 of the stile 28 and forms an inner retaining member for the glass pane 23, the angle 31 being secured to the stile 28 by means of screws or other appropriate fastening means. At the oppo-

site side of the window opening another angle member 32 is secured to the transversely extending portion 21 of the member 20, these two angle members together forming retaining means for retaining the glass panes 23, 23 in position in the said panel at the sides.

The outer door plate 27 is spot-welded to the leg 26 of the stile 25; also the portion 30 of the stile 28 is spot-welded to the portion 22 of the member 20 and at its portion adjacent the door staff 19 is bent around over the U-shaped formation and around the leg 18 of the stile 12 and is spot-welded thereto on its outer and inner sides, as will be desired. Transversely extending openings are provided in the outer plate 27 which correspond to the posts occupied by the glass panes 23, having inturned edges 33 which are pressed inwardly against the glass pane to form a neat appearing surface around the glass pane 23.

The center rail construction is illustrated in Figure 4 and illustrates a member generally U-shaped in cross section having transversely extending members 34 and 35, the portion 34 having an outwardly turned flange 36 thereon with the portion 35 also having a flange 37 formed thereon, these flanges having the outer face plate 27 fitting thereover and spot-welded thereto with the side plate having the inturned edges 33 extending over these edges to form upper and lower members for engaging the ends of the upper glass pane 23 and the upper end of the lower glass pane 23 to assist in holding the glass pane in position and also to prevent water from draining in to the glass pane, as otherwise it might do. Appropriate angle sections are mounted on the transversely extending portions of the rails on the inner side to retain the glass pane members at their ends. The ends of the portions 34 and 35 of the rail 16 are cut away at each of their ends to abut against the transversely extending portion 21 of the vertical member 20 and at its end adjacent the hinge stile 23 is cut away to abut against the transversely extending portion 29 of the member 28. Extensions 38 are fitted over the portion of the member 20 and spot-welded thereto at appropriate places to hold the two plates together while the inner end portion 39 extends over the elongated portion of the member 28 and terminates adjacent the hinge portion 24, which is spot-welded to the member 28, thereby holding the device substantially in integral relation and forming a door panel which is solid and yet which is strong in service. The upper and lower rails 14 and 15 are duplicates of the center rail described in detail hereinabove and conform to the same form and arrangement of parts as shown in Figure 4.

In the door rails are provided munnions 40 and 41 which are spot-welded in position and serve to strengthen the door rails against crushing pressure applied to the door rails from either side. The adjacent panel 11 of the door section is constructed in exactly the same manner as the panel described in detail hereinabove with the parts reversed so as to provide a left-hand location to be joined together; for instance, the hinge stile 13 has a similar stile placed adjacent thereto except that the hinge portion is formed at the opposite side of the hinge stile and the construction of the outer panel is slightly different in that instead of the stile 12, a built-up stile of somewhat the same channel form is provided which comprises a Z-shaped plate 42 and another Z-shaped plate 43. The plate 43 has a transversely extend-

ing portion 44 which forms the side of the window opening with a flange 45 formed thereon, which is spot-welded to the member 42 with the rails extending over this member and also being spot-welded thereto. The member 42 has a leg portion 46 extending along side its marginal edge, the member 43 having a portion 47 formed thereagainst over which a U-shaped rubber finger piece 48 is applied with a U-shaped channel member 49 being inserted and extending between the portions 46 and 47 with an outer member 50 having an inturned edge which is secured to the member 42 in any approved manner serving to grip one side of the leg of the U-shaped member 48 with a similar member 51 being provided at the opposite side for the purpose of gripping the opposite free edge of the U-shaped member 48, this being the usual cushioning device applied in doors of this type to prevent injury to a person's hands or fingers should they be caught between the door. It is made preferably of rubber or other flexible material which serves as a part of the door with the abutting edges being formed in close contact with each other to prevent an opening being left between the two door sections.

In operation it will be understood that, as herein described, the various sections which are all formed of comparatively light thin gauge metal are fashioned to form and are to be placed in position as described herein and illustrated in the drawing with each other and spot-welded, appropriate hinges being secured to stile 12 for fastening the doors to the door staff 19 with the door panels being secured together by means of separable hinge pins 52 extending through the hinge formed on flange 25, or by continuous pins which are formed to be pressed through these portions as may be desired.

Where I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form and the proportion of parts as circumstances may suggest or render expedient without departing from the spirit or scope of my invention.

I claim:

1. A steel door comprising in combination, a plurality of panels hinged together, each panel comprising a door staff stile, a longitudinally extending plate secured thereto having a transversely extending portion with a flange formed thereon, a hinge stile, a reinforcing longitudinally extending member secured to said hinge stile having a transversely extending portion with a flange formed thereon, U-shaped rails having their ends secured to the said reinforcing member at one side and to the said longitudinally extending plate at the other side, and an outer plate secured to the said stiles and to the flanges of said longitudinally extending plate and to the reinforcing member secured to the said hinge stile.

2. A steel door comprising in combination, a plurality of panels hinged together, each panel comprising a door staff stile, a longitudinal plate secured to said door staff stile having a transversely extending portion with a flange formed thereon, a hinge stile, a reinforcing longitudinally extending member secured to said hinge stile, a Z-shaped member secured to said hinge stile, U-shaped rails having flanges formed on the leg portions thereof secured to said reinforcing member at one side of said door and to the longitudinally extending plate at the opposite side of said door and a plate secured to the said

door staff stile, the hinge stile and to the reinforcing member.

3. A steel door comprising in combination, a plurality of panels, each panel comprising a U-shaped door staff stile, a reinforcing plate of Z-form fashioned around one leg of the door staff stile, a hinge stile of U-shape, a reinforcing Z-shaped member secured thereto, door rails of U-shape having portions cut away and their ends secured to the longitudinal plate at one side of the door and to the reinforcing member at the opposite side of the door and an outer plate extending around one leg of the U-shaped door stile and welded to the hinge stile at the opposite side and to each of said reinforcing members intermediate its sides.

4. A steel door panel comprising in combination, a U-shaped door staff stile, a U-shaped hinge stile, one leg of which is longer than the other, Z-shaped reinforcing members secured to the said door staff stile and the said hinge stile, U-shaped rails having flanges formed on the leg portions thereof and cut away at their ends, secured at each of their ends to said reinforcing members and an outer plate having one of its edges turned around one of the legs of the door staff stile and welded thereto and secured at its opposite side to the short leg of the U-shaped hinge stile and being welded to the flange portions of the said rails and to the said reinforcing members.

5. A steel door panel comprising in combination, a U-shaped door staff stile, a U-shaped hinge stile, one leg of which is longer than the other, Z-shaped reinforcing members secured to the said door staff stile and the said hinge stile, U-shaped rails having flanges formed on the leg portions thereof and cut away at their ends, secured at each of their ends to said reinforcing members and an outer plate having one of its edges turned around one of the legs of the door staff stile and welded thereto and secured at its opposite side to the short leg of the U-shaped hinge stile and being welded to the flange portions of the said rails and to the said reinforcing members, and vertically extending munnions in said rails.

6. A panel for doors comprising in combination, a U-shaped door staff stile, a Z-shaped member secured thereto and welded to one leg of said door staff stile, a U-shaped hinge stile, a reinforcing Z-shaped member secured thereto, an outer plate secured to said stiles and to said reinforcing members, door rails of U-shaped form having their ends cut away and secured to said reinforcing members at each of their ends, the said reinforcing members and the said rails forming window openings and a plate having a window opening therein secured to the outer face of said door.

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