To all whom it may concern:

Be it known that I, WILLIAM EBASTUS WILLIAMS, a citizen of the United States, residing at Chicago, in the county of Cook
and State of Illinois, with a post-office address at 5331 South Clinton street, have invented a new and useful improvement in Railway-Car Doors, of which the following is a specification.

The object of my invention is to produce a metal door as light as a wooden door, and at about the same cost, and one that will withstand the abuse that car doors get in service.

My door may be used for many other purposes as well as railway car doors.

In general terms my door consists in a sheet of metal that is corrugated, or formed with stiffening depression as desired, and bound on its edges with heavier sections and stiffened crosswise by suitable cross-strips, all of which binding and cross-strips are arranged to give great strength and rigidity.

Reference will be had to the accompanying drawings in which,

Figure 1 is a vertical elevation of my door, as it appears on the side of the car.

Fig. 2, is a section through one of the stiffening cross beams, or rails.

Fig. 3, is a view similar to that of Fig. 2, showing an alternative construction.

Fig. 4, shows a section of the back stile, or vertical edge of the door.

Fig. 5, is the same as Fig. 4, with a reinforcing plate added on the inside.

Fig. 6, is the same view as Fig. 4, showing in section a stile made of two pieces.

Fig. 7, is a section of the door just above the upper cross rail.

Fig. 8, is a sectional detail, showing the back edge of the door when a stop different from that shown by Figs. 4, 5 and 6 is used.

Fig. 9, shows a section of the lower right-hand corner of the door when no lip or flange is used on the back stile.

Fig. 10, is a view similar to that of Fig. 8, differing only in the form of section used for the back stile.

Fig. 11, is the same as Fig. 8 only with a different form of section for the back stile.

Fig. 12, is a vertical sectional view through the door when same is fixed to the car.

Fig. 13, is a vertical elevation of one of the door hangers showing its fastenings securing it to the door.

Fig. 14, is an elevation of one of the stiffening, or intermediate rails showing its fastenings securing it to the door sheet.

Fig. 15, is an alternative form for the top rail of the door and its hanger.

Fig. 16, shows an alternative form for the top rail of the door.

Fig. 17, shows a section of a form of intermediate cross rail.

Fig. 18, is a section through an intermediate cross rail.

Fig. 19, is a vertical sectional detail of one of the corners of the door.

Fig. 20, is a detail showing in dotted lines the union of the corrugated sheet with the top and bottom rails.

In the drawing, 1 indicates the ordinary 75 car body to which my door is applied. I make the main sheet of the door of corrugated iron 2, which is bound on its back edge with a vertical stile-piece 3, made of a special section having a flange 4, which abuts against a door cleat, or stop 5, ordinarily made of wood, but sometimes made of a curved strip of metal 6; see Figs. 8 and 10. When the metal strip 6 is used, the flange 4 is bent, as is shown by Fig. 10. The front edge, or stile of the door is an ordinary channel section 8, Fig. 7.

Instead of the special section 3, I may use an extra piece 9, in order to produce the desired flange shown at 4. See Figs. 4, 6 and 8.

In Fig. 11, I provide for the same result secured in employing the flange 4 by using a curved strip 10, secured to the back stile of the door.

Some doors do not require the flange 4 and then the back stile of the door will appear as a simple channel 11, Fig. 7.

The corrugated sheet 2, is bent at its vertical edges to form the flanges 12, which fit into the channel sections of the stiles 8 and 3 and these flanges are spot welded to the webs of the channels, as is shown at 13.

In the construction shown in Fig. 5, I use a reinforcing plate 14 and weld it and the 105 flange 12 and the web of section 3 all together as is shown at 15. I also weld through the sheet 2, and flanges of channels as is shown at 45.

When the strips 9 or 10 are used, they are spot welded to the channel sections as is indicated at 13 and 16, Figs. 6, 8 and 11,
The top and bottom rails of the door may be ordinary channel sections 17 and 18, as is shown by Figs. 12, 13, 19, and 20 or the top rail may be of a special section 19, Fig. 16, where there is provided a flange 20. This flange may be the built up section shown in Fig. 15, where to the channel 17 the angle 21 is secured by welds 47.

The corrugated sheet 2, is embraced at each end at the top and bottom by the channel sections overlapping it on each side, the summits of the corrugations on each side touching the inside of the flange of the channel are welded thereto by spot welds. See Fig. 20 where 22 indicates the spot welds.

By this means the bottom rail, or channel 18, is similarly spot welded to the corrugated sheet.

The corners of the top and bottom rails channels 17 and 18 and the vertical stile channels 8, 3 or 11, are connected together at the corners in any suitable manner, but I prefer to connect them as is shown by Figs. 9 and 19, wherein I have made indentations 23 in the ends of the webs of the channels, wherein I seat an angle piece 24, which is spot welded by welds 25, to the channels.

The door is supported on any suitable track rail 26 by means of the rollers 27 held in hanger blocks 28. The latter are bolted or riveted at 29 to the corrugated sheet at summits of the corrugations. Projections, or arms 30, on the hanger blocks 28 extend around the summits of the corrugations to which they are attached and reach up in the valleys of the corrugations and bear on the inside of the web of the top channel rail at 31.

Rivets 32, are shown as fastening the arms 31 to the web of channel top rail. The ends 33 of arms 30 carry the load of the door independently of the fastenings 29 and should fastenings 29 give way, the hanger would still carry the door safely, as the hanger 28, cannot move horizontally in relation to the door, owing to its embrace of the summit of the corrugation, and the ends 31 of arms 30, support the door in the vertical plane of its center of gravity.

The intermediate, or cross-stiffening rails 35, and 36, Fig. 1, may be made in various ways, but I prefer the construction shown in Figs. 1, 9, 14, 17 and 18, where these are shown on the outside of the door as angle bars 35, having their flanges 36, projecting outward and on the inside there are angles 37, with their flanges 38, projecting inward. The flanges 38 are cut away to fit the contour of the corrugations, (see Figs. 2 and 17) in order to fill the spaces 39 Fig. 7, that otherwise would appear open and would make possible the undesirable attachment of the tackle while loading the car through opposite door when one door is closed. The angles 35 and 37 are spot welded at 40 to the summits of the corrugations of the main sheet 2, and a truss construction is thus obtained.

In Figs. 1, 2, 14, 17 and 18, the angles 35 and 37 are directly opposite each other and to facilitate the welding, I punch holes 41 in the angles on the “valley” side of the corrugations in order to allow the entry of the electrode on that side to contact with the sheet at the bottom of the corrugation, or what is the summit on the other side. Thus I may make the spot welds 40 with great despatch.

In Fig. 3, the angles 42 and 43 which may form the intermediate cross rails are placed 80 slightly assunder to permit the welding 44 without the holes 41. In the bottom rail, or channel 18, I provide holes 45 for the escape of water, dust or other accumulations. Where I have shown spot welds, rivets, bolts or other suitable fastening devices may be used, but I prefer to use welds.

What I claim is:

1. The combination with a corrugated metal sheet forming a door body, of channel 90 members covering the edges of the sheet, respectively, spot welded thereto, and forming the edge faces of the door, and a cross rail on one face of the sheet, and an approximately registering cross rail located upon the opposite face of the sheet and fitting its corrugations, said rails being provided with perforations for allowing the passage of the electrode through the rail to facilitate the welding.

2. A door composed of a sheet of metal corrugated for stiffening ribs in one direction and stiffened transversely of the corrugations by cross rails on each side of the sheet and adjacent to each other and welded to the summits of the corrugations, said rails being provided with perforations for allowing the passage of the electrode through the rail to facilitate the welding.

3. A door consisting of a metal sheet provided with vertical corrugations, channel members embracing the edges of the sheet, respectively, a cross rail on one face of the sheet, and an approximately registering cross rail located upon the opposite face of the sheet and fitting its corrugations, said channel members and rails being spot welded to the corrugations of the sheet.

4. A door composed of a sheet of metal provided with vertically arranged inden turations or corrugations for stiffness and with flanges turned at right angles on its vertical edges, with a channel section binding forming stiles on the edges with internally extending flanges embracing the sheet, said stile welded to the sheet both at the web and flange of the channel stile.

5. A freight car door composed of a sheet of metal corrugated to form on each face a series of equal vertical ribs, a channel member closely fitting over the upper end of the corrugated plane sheet, and a similar channel member fitting in like manner over the lower end of the sheet, each channel mem...
ber having a plane central web perpendicular to the plane of the door and provided with marginal flanges fitting, respectively, against the summits of all the corresponding ribs and spot welded thereto at each point of contact.

In witness whereof I have hereunto subscribed my name on this 29th day of August 1913 in the presence of two subscribing witnesses.  

WILLIAM ERASTUS WILLIAMS.  
Witnesses:  
JULIUS JENSEN,  
M. JENSEN.