Sept. 17, 1940. W. A. BEAUCHAMP 2,215,315

CAR DOOR

Filed June 4, 1938 3 Sheets-Sheet 1

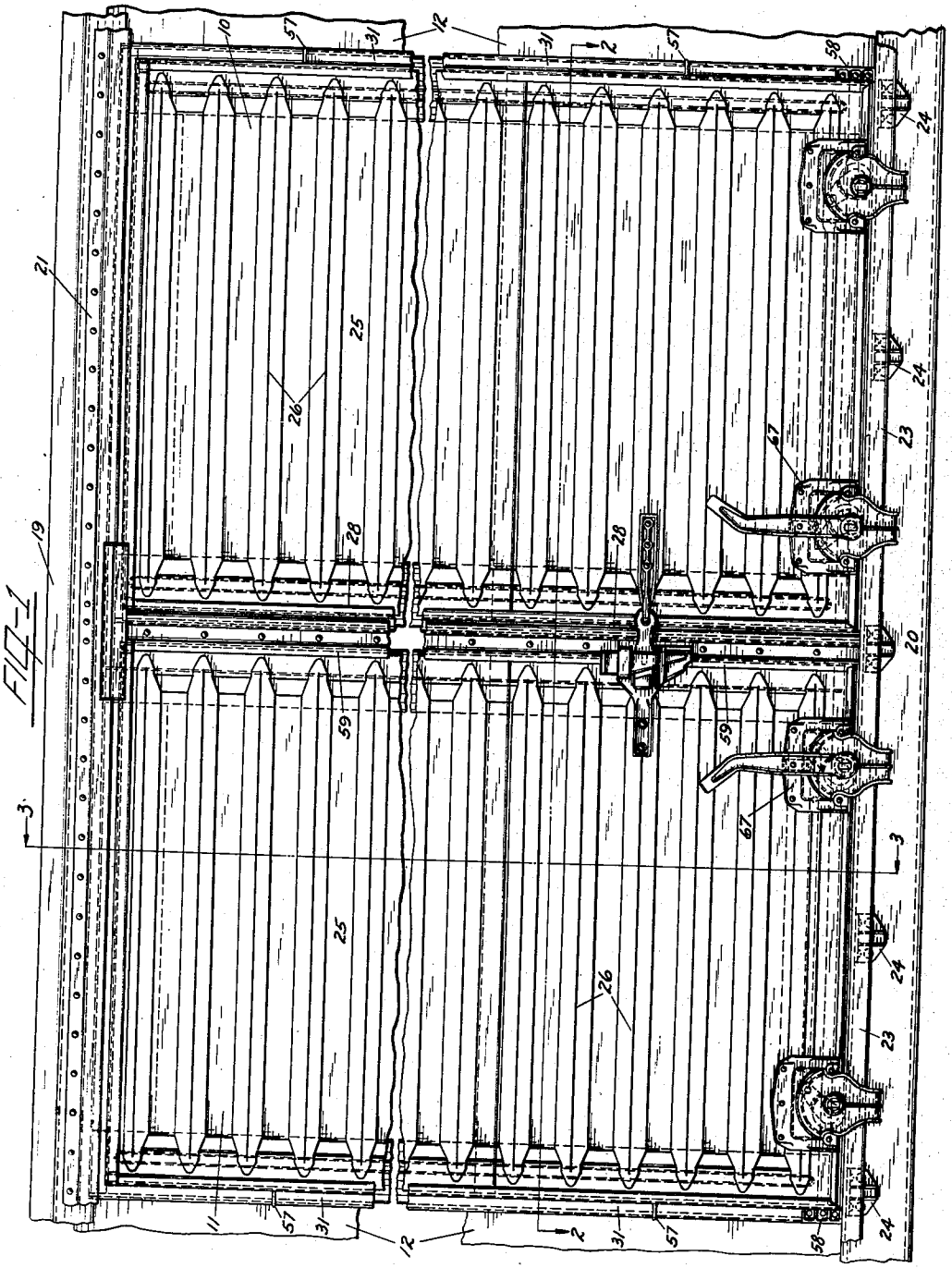


FIG-1

—INVENTOR—

WILFRED A. BEAUCHAMP

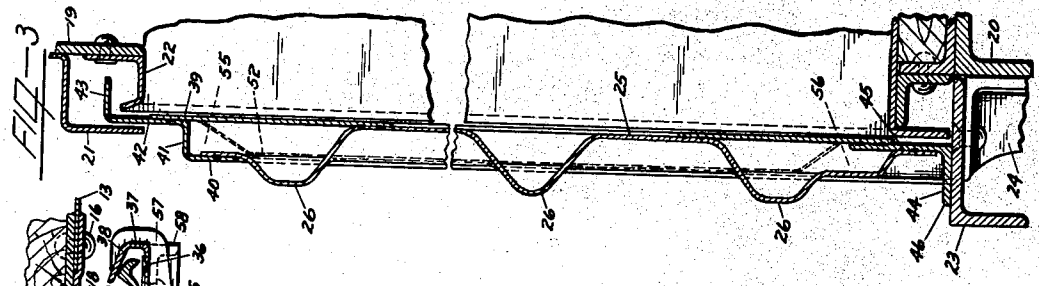
BY—Samuel Reese

—ATTY.—

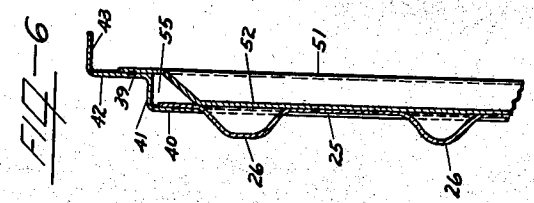
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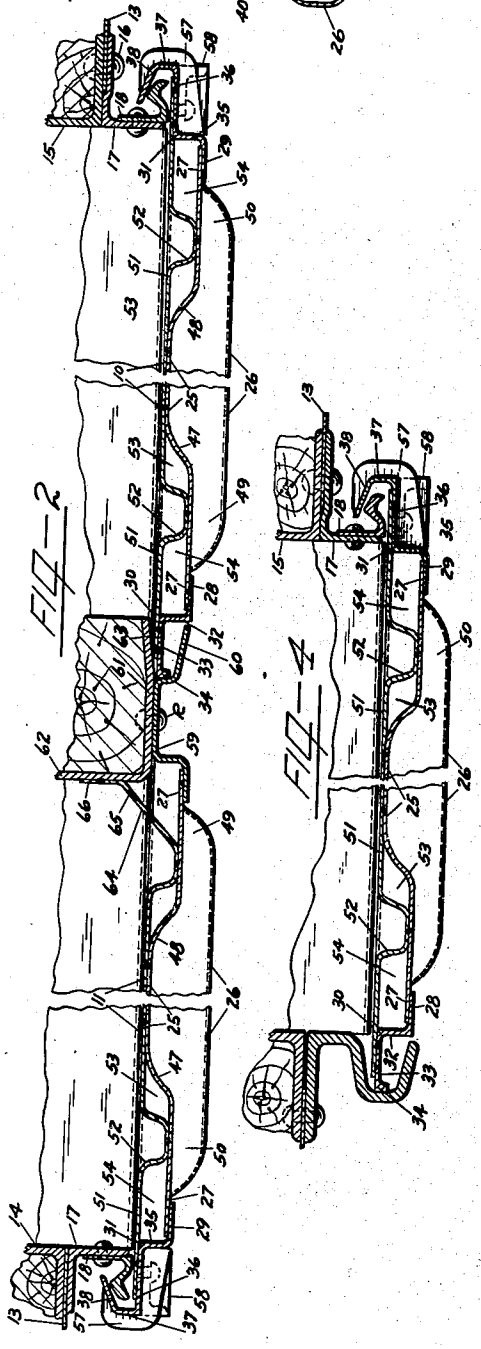
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FIG—3

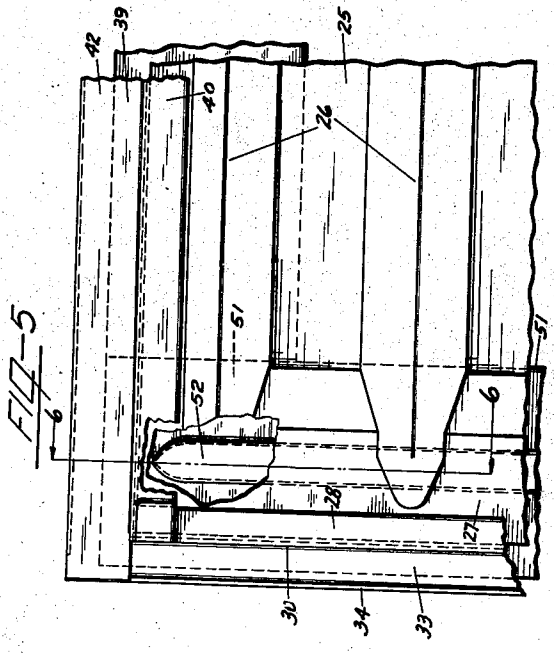


FIG—6



FIG—2

FIG—4



FIG—5

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CAR DOOR

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FIG-10

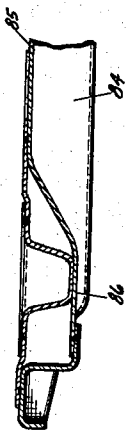


FIG-11

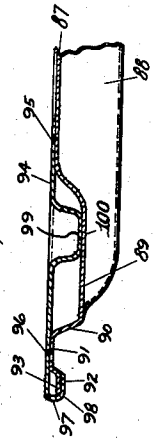


FIG-9

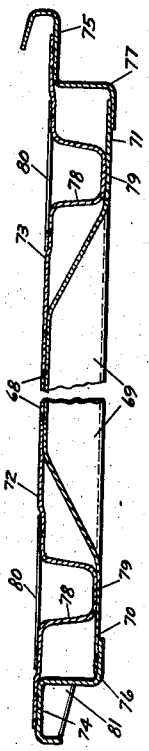


FIG-8

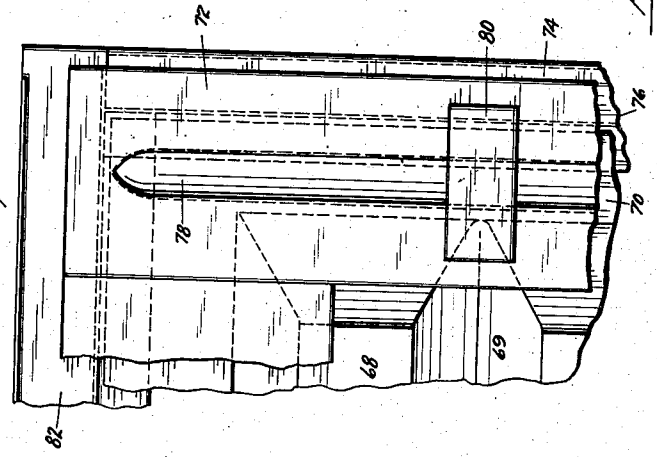
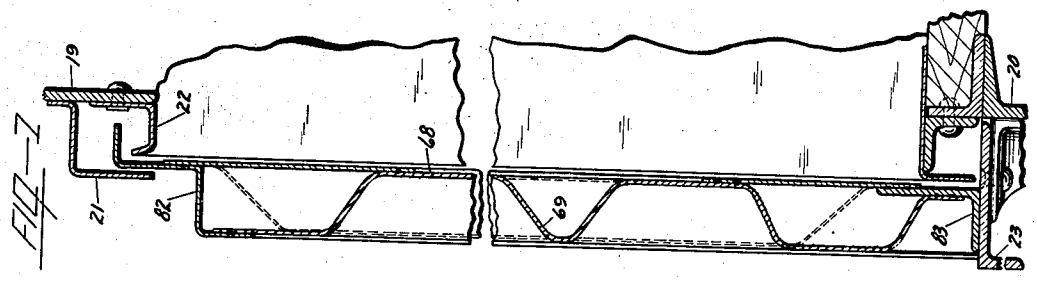


FIG-7



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Patented Sept. 17, 1940 2,215,315

UNITED STATES PATENT OFFICE

2,215,315

CAR DOOR

Wilfred A. Beauchamp, Chicago, Ill., assignor to The Youngstown Steel Door Company, Cleveland, Ohio, a corporation of Ohio

Application June 4, 1938, Serial No. 211,933

10 Claims. (Cl. 189—46)

This invention relates to car doors and more particularly to sliding doors for railway house cars.

It is an object of this invention to provide metallic car doors of such construction that a substantial savings in weight is effected while requisite strength is maintained.

A further object is to provide metallic car doors having panels and reinforcements including marginal reinforcing members, the design and association of the parts of the door being such as to permit a material reduction in the weight of the marginal reinforcing members without an attendant sacrifice in the requisite strength of the doors.

A further object is to provide metallic car doors of such design that a substantial reduction in the thickness of the parts of the door may be made, thereby facilitating welding of the parts in assembly.

A further object is to provide metallic car doors wherein backing plates and marginal reinforcing members are so associated with the vertical margins of the metallic panels of the doors as to form a plurality of box sections along each margin capable of supplying the necessary strength to the doors and by virtue of which a reduction in the thickness of the panel, backing plates and reinforcing members may be obtained.

Other objects of the invention will become clear as the description thereof proceeds.

In the drawings forming part of this specification:

Figure 1 is an elevation of a portion of the side of a railway house car of the automobile type embodying doors constructed according to one form of the invention, parts being broken away.

Figure 2 is a horizontal section taken on line 2—2 of Figure 1.

Figure 3 is a vertical section taken on line 3—3 of Figure 1.

Figure 4 is a horizontal section similar to Figure 2 showing a box car door.

Figure 5 is an enlarged elevation of the upper left hand corner of the right hand door shown in Figure 1 or of the box car door shown in Figure 4, a portion being broken away for the sake of clarity.

Figure 6 is a vertical section taken on line 6—6 of Figure 5.

Figure 7 is a vertical section showing a modified form of the invention.

Figure 8 is an enlarged elevation of the upper left hand corner of the door shown in Figure 7 looking at the inside of the door.

Figure 9 is a horizontal section of the door shown in Figure 7.

Figure 10 is a partial horizontal section showing a modified marginal door construction.

Figure 11 is a partial horizontal section showing a further form of marginal construction.

In Figures 1 to 3 inclusive, 5 and 6, the invention is illustrated embodied in a double door construction commonly utilized in railway house cars employed for the shipment of bulky commodities such as automobiles, furniture and the like. The double door construction includes a main door 10 and an auxiliary door 11 mounted upon a railway house car, one side of which is shown partially at 12.

The car side 12 embodies metallic sheathing 13 attached to door posts 14 and 15 by means of rivets 16 utilized additionally for the attachment of angle members 17—17 which carry spark strips 18—18. The car side includes additionally a side plate 19 and a side sill 20. The side plate 19 has secured thereto a retaining member 21 and a substantially J-shaped header 22. A track 23 is connected to the side sill 20 by means of a plurality of track supporting brackets 24.

The disposition of the doors 10 and 11 upon the car side is more clearly illustrated in Figure 3 of the drawings. The main door 10 embodies a metallic panel 25 formed with spaced horizontal corrugations 26. The panel 25 is preferably formed of a plurality of overlapping metallic sheets. The horizontal corrugations 26 terminate, as more clearly appears in Figure 2 of the drawings, short of the vertical edges of the panel so as to provide flat portions 27—27 which are secured as by means of welding to the inwardly directed flanges 28 and 29 of the front and rear vertical marginal stiffeners 30 and 31.

The front marginal stiffener 30 is formed with an inwardly directed flange 32 from which a flange 33 disposed substantially in the inner plane of the panel projects forwardly. The flange 33 is provided with an outwardly extending sealing flange 34.

The rear vertical marginal stiffener is provided with an inwardly extending flange 35 and a rearwardly directed flange 36 disposed in substantially the inner plane of the panel. A flange 37 is directed inwardly from the flange 36 and is deformed to provide a sealing flange 38 adapted to cooperate with a spark strip 18 in order to

provide a weather tight construction at the rear edge of the door.

The upper horizontal margin of the metallic panel 25 is reinforced by means of a member 39 having a downwardly directed flange 40 secured in overlapping relationship to the upper margin of the panel. The member 39 has an inwardly directed flange 41 from which an upwardly extending flange 42 projects. The flange 42 is turned inwardly to provide a horizontal flange 43. The flange 42 is disposed between the J-shaped header 22 and the retaining bar 21 so that the horizontal flange 43 is disposed in overlapping relationship with the J-shaped header 22 in order to effectively seal the upper margin of the door.

At its lower horizontal margin the metallic panel 25 is reinforced by means of an angle member 44. This margin of the panel is secured in overlapping relationship to the upwardly extending flange 45 of the angle member. The flange 46 of this member extends outwardly and provides for frictionally seating of the door upon the track 23.

Substantial reinforcement by the construction now to be described is afforded the front and rear vertical margins of the door so that a material decrease in the thickness of the door elements may be had while desired strength of the door is obtained. Moreover, by the decrease in the thickness of the door elements, the door lends itself with greater facility than heretofore possible to welding as the securing means for these elements. By this construction, moreover, it will be observed that with the exception of the overlapping portions of the panel sheets the number of overlapping elements is restricted to two. It thus becomes possible to utilize metallic panel sheets of 16 to 18 gage rather than 13 gage sheets now in common use. Also the thickness and consequently the weight of the marginal stiffeners may be reduced by one-third to one-half of that in common use.

The metallic panel 25 is accordingly offset outwardly from the inner plane of the panel as indicated at 47 and 48. There results the front and rear marginal portions 49 and 50 disposed in outwardly offset relationship to the inner plane of the panel. Metallic backing plates 51—51 extend between the panel 25 and the front and rear vertical marginal stiffeners 30 and 31 and are secured to the panel and the flanges 33 and 36 of said stiffeners which lie in substantially the inner plane of the panel. The backing plates 51—51 are formed with the corrugations 52—52 which are pressed outwardly so that their crests engage the offset marginal portions of the panel 49 and 50. These crests are secured to the panel 25 intermediate the outwardly extending horizontal corrugations 26 thereby reinforcing the door against outward bulging stresses. In addition the character of the backing plates and their association with the metallic panel provides box sections 53—53 and 54—54 which further greatly enhance the strength of the door.

With reference to Figure 3 of the drawings, it will be observed that the outwardly extending corrugations 52—52 formed in the backing plates 51 extend continuously between the upper and lower marginal stiffeners 39 and 44. Moreover, these backing plates are secured at their upper ends to the upwardly extending flange 42 of the stiffener 39 and at their lower ends to the upstanding flange 45 of the bottom reinforcing angle 44. Thus the box sections 55 and 56 are provided at the upper and lower corners of the door.

The rear vertical marginal stiffener 31 may be reinforced by means of a plurality of plates 57 secured as by means of welding to the flanges 35, 36, 37, and 38 of the stiffener. At its lower right hand corner the door carries a striking casting 58 which is adapted to engage a stop mounted on the car to limit opening movement of the door.

The construction of the auxiliary door 11 is essentially the same as that of the main door 10 with the exceptions now indicated. The front vertical marginal stiffener 59 is provided with an outwardly offset forwardly extending sealing flange 60 forming with the leg 61 of a reinforcing door post 62 a recess 63 for the reception of the front vertical marginal stiffener 30 of the main door when the doors are in closed position. The leg 61 of the reinforcing post 62 is secured to the stiffener 59 as by means of rivets R. The post 62 is braced against rotation about a vertical axis by means of the backing plate 64 which is consequently extended at an angle from its securement to the offset marginal portion of the door to the post to which it is secured as by welding. The backing plate 64 is formed with a flange 65 which terminates in a flange 66 welded to the post. It will be observed, however, that the above described construction maintains the box sections at the forward margin of the auxiliary door.

As illustrated in Figures 1 and 3 of the drawings, the door is adapted to be frictionally supported upon the track 23. Lift mechanism indicated in its entirety by the reference numeral 67 is carried by the doors whereby the doors may be elevated and supported upon rollers of the mechanism for ready anti-friction movement between closed and open positions. The lift mechanism permits the door to automatically seat itself by the action of gravity upon release of the mechanism. This mechanism is not disclosed in detail inasmuch as it forms no part of the instant invention.

A modified form of the invention is illustrated in Figures 7 to 9 inclusive of the drawings. In the previously described embodiment of the invention the outwardly extending horizontal corrugations 26 of the metallic panel were offset outwardly in order to provide outwardly offset marginal portions of the panel. In the embodiment of the invention illustrated in Figures 7 to 9 inclusive the metallic panel 68 is formed with horizontal corrugations 69 confined between outwardly offset flat marginal portions 70 and 71. By this construction the backing plates 72 and 73 which extend between and are welded to the panel and to flanges 74 and 75 of the front and rear vertical stiffeners 76 and 77 are formed with outwardly pressed corrugations 78 which are of substantially the same depth as the metallic panel. The corrugations 78—78 are welded at their crests to the offset marginal portions 70 and 71 of the panel as indicated at 79—79. By this construction all of the attributes set forth in connection with the description of the first embodiment of the invention are obtained. In addition bridging plates 80—80 extending across the corrugations 78—78 and welded to the backing plates on opposite sides thereof are utilized. Additional strength is thus provided. It is to be observed that bridging plates such as 80—80 may also be utilized in connection with the corrugations 52—52 formed in the backing plates 51—51.

Where a plurality of such bridging strips are to be utilized, four will be found to be sufficient. However, continuous bridging strips may be used if desired.

The front and rear vertical marginal stiffeners are of substantially the same construction as the corresponding stiffeners shown in the first embodiment of the invention being modified only as to dimensions. In addition, reinforcing plates 81 may be utilized to brace the front marginal stiffener as shown in Figure 9 of the drawings. Similarly the relationship between the backing plates 72 and 73 and the upper and lower marginal stiffeners 82 and 83 is the same as in the first embodiment of the invention.

As clearly appears from Figures 6 and 8 of the drawings, the corrugations formed in the backing plates of both embodiments of the invention terminate short of the upper and lower edges of the backing plates thereby providing for the welding of these plates to the upper and lower marginal stiffeners.

In the embodiment illustrated in Figure 10 of the drawings the horizontal corrugations 84 of the metallic panel 85 are carried into the outwardly offset marginal portion 86. This form of the invention is distinguished from the two previously described forms in that the depth of the horizontal corrugations in the outwardly offset marginal portion 86 is less than that shown in the first embodiment of the invention while no part of the horizontal corrugations is carried in to the outwardly offset marginal portions of the metallic panel of the embodiment illustrated in Figures 7 to 9 inclusive of the drawings. With the exception of the difference in the form of the marginal stiffener, the construction at the rear marginal portion of the door is the same as that illustrated in Figure 10 for the front marginal portion of the door.

A further embodiment of the invention is illustrated in Figure 11 of the drawings. The metallic panel 87 is corrugated and the corrugations 88 are carried into the offset marginal portion 89 of the panel. In addition the panel 87 is provided with an integral inwardly extending flange 90 which is bent to provide a flange 91 disposed substantially in the inner plane of the panel 87. The flange 91 is directed outwardly to provide a flange 92 which in turn is extended forwardly as flange 93 which lies outwardly of the inner plane of the panel.

A reinforcing backing plate 94 is secured to the metallic panel 87 in the inner plane thereof as indicated at 95. The backing plate 94 abuts the flange 91 and is welded thereto as indicated at 96. The backing plate extends forwardly beyond its securement to the flange 91, is flanged outwardly as indicated at 97 and then rearwardly to provide a flange 98 which overlaps and is secured to the panel flange 93 thus providing a box section at the forward edge of the door. The backing plate 94 is formed with an outwardly extending corrugation 99, the crest of which is welded to the offset marginal portion 89 of the panel as indicated at 100.

It will be apparent that the embodiments of the invention illustrated in Figures 10 and 11 also maintain the characteristics of the previously described forms of the invention.

While the construction of the doors shown in the several embodiments of the invention lends itself particularly to the employment of light weight sections and to welding as securing means, it will be apparent that the described construction may be utilized as well in doors where weight is not a desideratum.

It will be apparent that numerous changes and modifications in the details of the invention will be clear to those skilled in the art. It is intended, therefore, that all such modifications and changes be comprehended within this invention which is to be limited only by the scope of the claims appended hereto.

I claim:

1. A light weight sliding metallic car door of requisite strength for railway house cars comprising a panel formed of sheet metal having a gage within the range of sixteen to eighteen, both inclusive, said panel having outwardly offset vertical margins and horizontally extending channel reinforcements terminating short of the vertical edges thereof to provide flat attaching portions, light weight vertical stiffening members secured to said attaching portions, said stiffening members having flanges disposed substantially in the inner plane of said panel, and vertical backing plates having a gage within the range of the panel gage secured to said panel in the inner plane thereof and to said flanges of said stiffening members, said backing plates having vertical channel reinforcements extending outwardly therefrom secured to said offset vertical margins, said backing plates cooperating with said vertical margins, panel and stiffening members to provide spaced vertically extending tubular formations.

2. A sliding metallic car door comprising a panel having outwardly offset vertical margins, vertical stiffeners secured to said vertical margins and vertical backing plates extending between and secured to said panel and said stiffeners, said backing plates including vertical outwardly extending channel reinforcing members secured to said offset vertical margins, said backing plates cooperating with said vertical margins, panel and stiffeners to provide spaced vertically extending tubular formations.

3. A sliding metallic car door comprising a panel having outwardly offset vertical margins, vertical stiffeners secured to said vertical margins and vertical backing plates extending between and secured to said panel and said stiffeners, said backing plates including vertical outwardly extending channel reinforcing members, and means securing the crests of said channel reinforcing members to said offset vertical margins, said backing plates cooperating with said vertical margins, panel and stiffeners to provide spaced vertically extending tubular formations.

4. A sliding metallic car door comprising a panel having outwardly offset vertical margins, said panel and said offset margins having horizontal corrugations formed therein, vertical stiffeners secured to said offset margins, vertical backing plates secured to said panel beyond said offset margins and to said stiffeners, said backing plates having integral vertical corrugations, and means securing the crests of said vertical corrugations to said offset margins intermediate the corrugations therein, said backing plates cooperating with said vertical margins, panel and stiffeners to provide spaced vertically extending tubular formations.

5. A sliding metallic car door comprising a panel having outwardly offset vertical margins, vertical stiffeners secured to said offset margins, vertical backing plates extending between and secured to said panel and said stiffeners, said

backing plates including vertical channel reinforcing members, means securing the crests of said channel reinforcing members to said offset margins, said backing plates cooperating with said vertical margins, panel and stiffeners to provide spaced vertically extending tubular formations and means extending across said channel reinforcing members and secured on opposite sides thereof to said backing plates.

6. A sliding metallic car door comprising a panel having outwardly offset vertical margins, vertical stiffeners secured to said offset margins, horizontal stiffeners secured to the upper and lower margins of said panel, vertical backing plates extending between and secured to said panel and said vertical stiffeners, said backing plates having vertical corrugations extending continuously between said horizontal stiffeners, means securing said backing plates to said horizontal stiffeners, and means securing the crests of said corrugations to said offset margins of said panel.

7. A sliding metallic car door comprising a panel having vertical margins offset outwardly from the inner plane of said panel, flanged vertical stiffeners having flanges secured to said outwardly offset margins, webs extending inwardly therefrom, and flanges disposed in substantially the inner plane of said panel, vertical backing plates extending between and secured to said panel and said last mentioned stiffener flanges, said backing plates having vertical inwardly opening corrugations, the crests of said corrugations being secured to said offset margins, and means extending across said corrugations and secured on opposite sides thereof to said backing plates, said last mentioned stiffener flanges being deformed to provide sealing means.

8. A metallic auxiliary car door of a double sliding door construction comprising a panel having outwardly offset front and rear vertical margins, front and rear vertical stiffeners secured to said margins, a metallic post secured to said front stiffener and extending inwardly therefrom, and a vertical backing plate secured to said panel, said backing plate having a vertical channel formation secured to said front offset margin and extending inwardly and being fastened to said post.

9. A sliding metallic door comprising a metallic panel having a marginal portion offset outwardly from the inner plane of said panel, a flange extending inwardly from said offset marginal portion, and a flange disposed substantially in the inner plane of said panel, said latter flange being bent outwardly and then forwardly to provide a flange offset from the inner plane of said panel and a backing plate extending between and secured to said panel and said flange in the inner plane of said panel, said backing plate being spaced laterally from said offset flange of said panel and bent outwardly and then rearwardly to provide a flange engaging and secured to said offset flange.

10. A sliding metallic door comprising a metallic panel having a marginal portion offset outwardly from the inner plane of said panel, a flange extending inwardly from said offset marginal portion, and a flange disposed substantially in the inner plane of said panel, said latter flange being bent outwardly and then forwardly to provide a flange offset from the inner plane of said panel, and a backing plate extending between and secured to said panel and said flange in the inner plane of said panel, said backing plate being spaced laterally from said offset flange of said panel and bent outwardly and then rearwardly to provide a flange engaging and secured to said offset flange, said backing plate being formed with a corrugation engaging and secured to said offset marginal portion.

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