June 28, 1932. G. S. GOODWIN 1,865,246

HOUSE CAR END CONSTRUCTION

Filed April 16, 1927 4 Sheets-Sheet 1

FIG-1

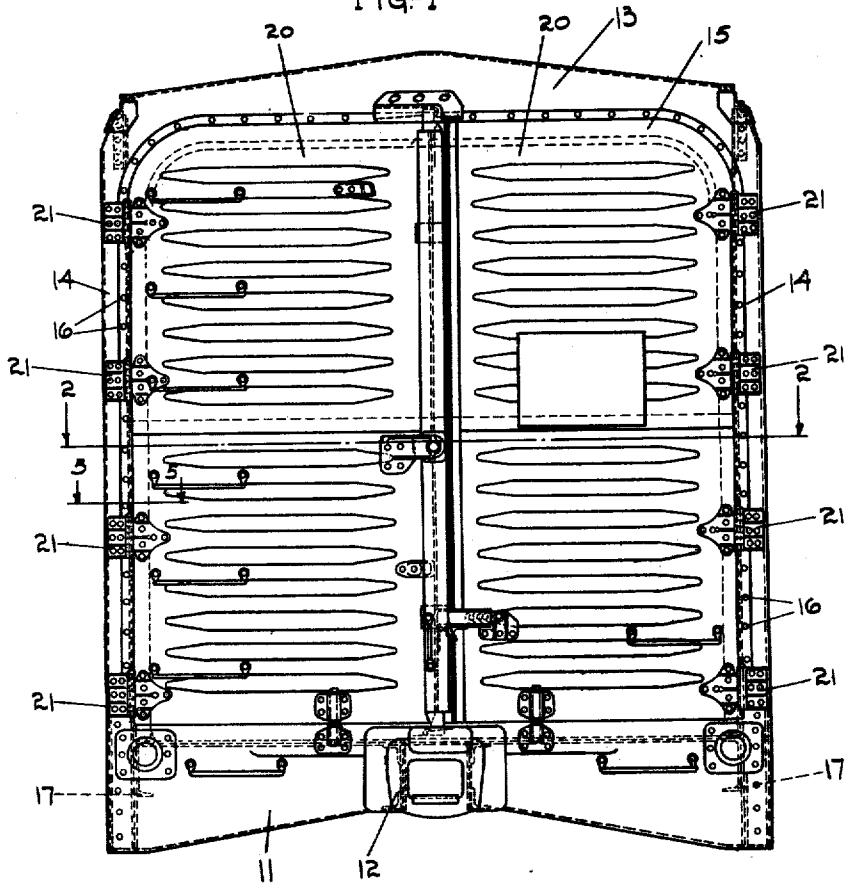
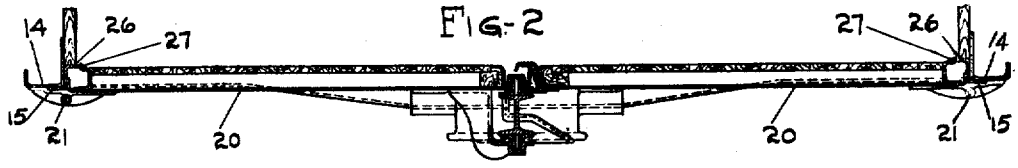


FIG-2



~ INVENTOR ~

GEORGE S. GOODWIN

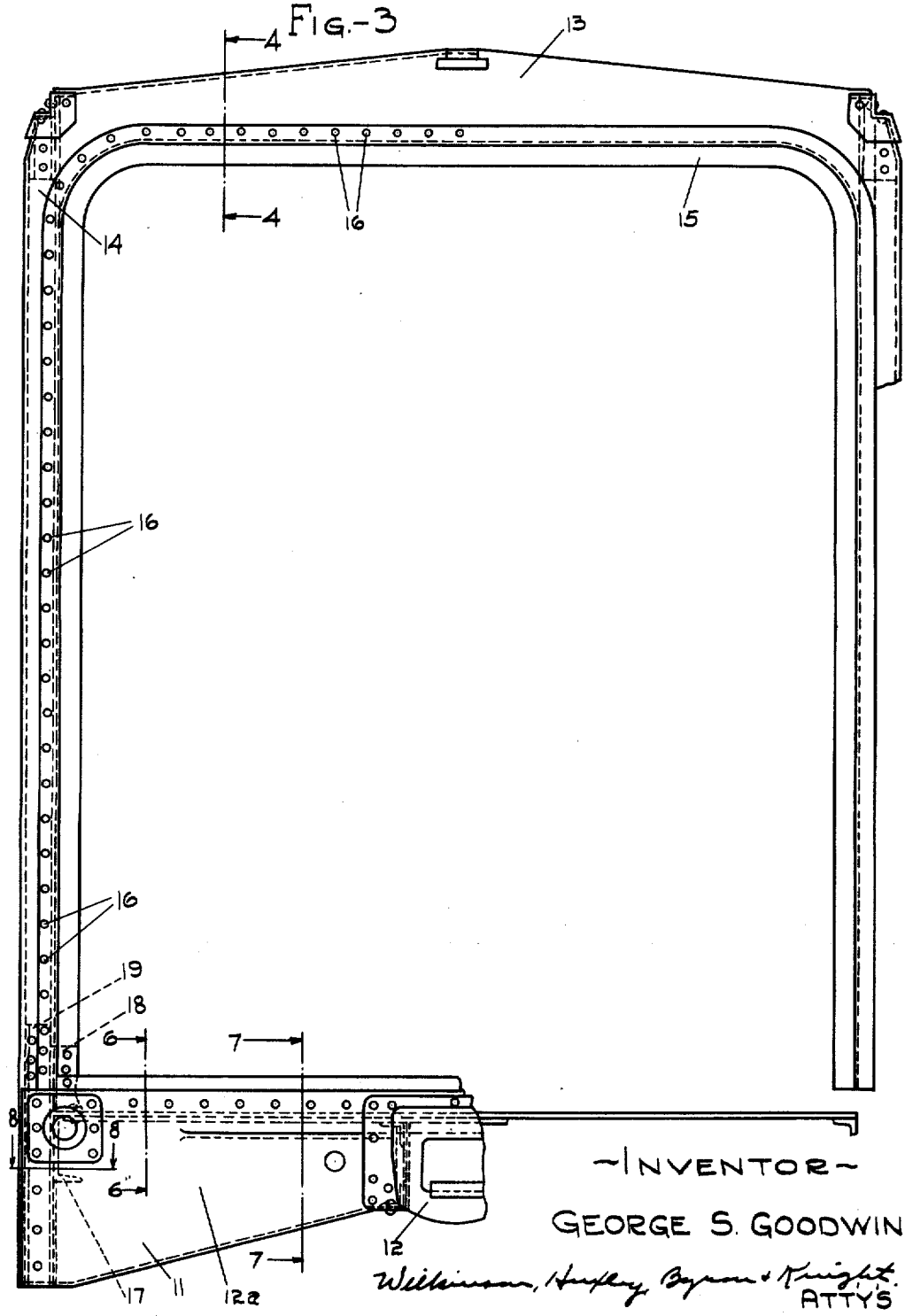
BY Wilkinson, Huxley, Byron & Knight ATTYS

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HOUSE CAR END CONSTRUCTION

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FIG.-3



-INVENTOR-

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June 28, 1932. G. S. GOODWIN 1,865,246

HOUSE CAR END CONSTRUCTION

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FIG-4

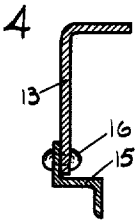


FIG-5

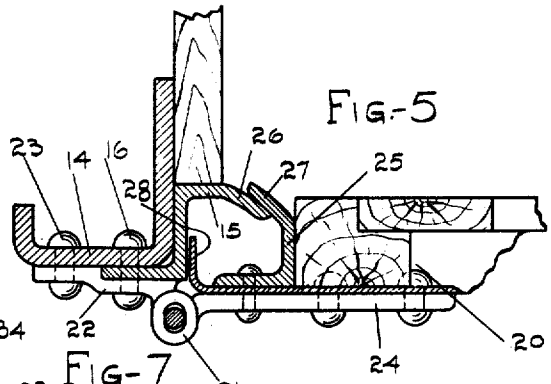


FIG-6

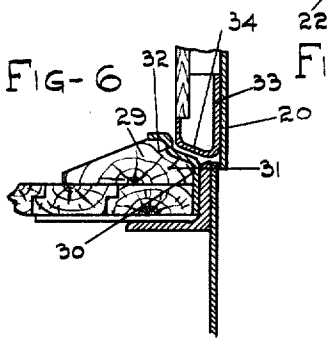


FIG-7

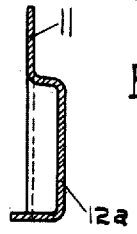


FIG-8

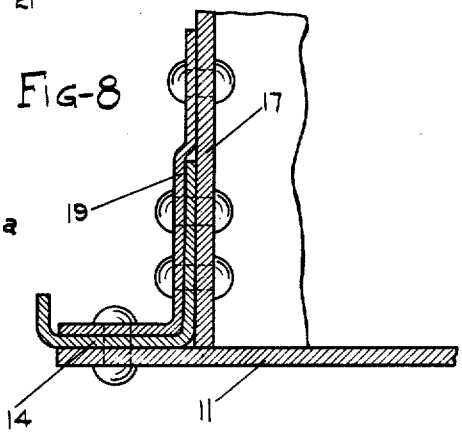


FIG-9

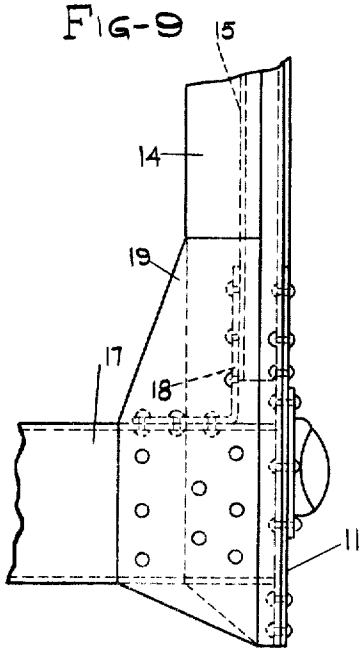
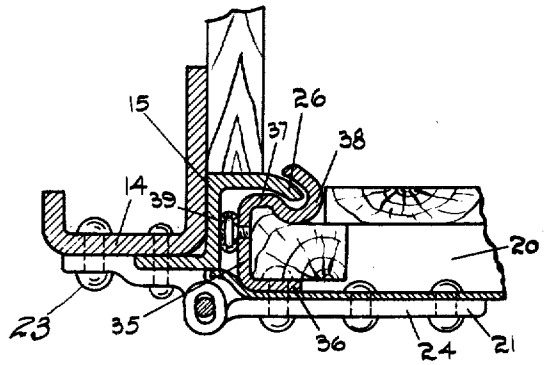


FIG-10



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HOUSE CAR END CONSTRUCTION

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FIG-11

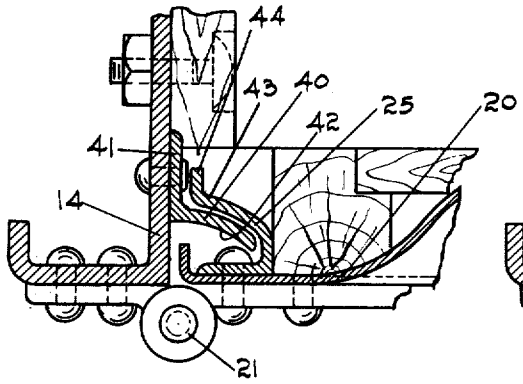


FIG-12

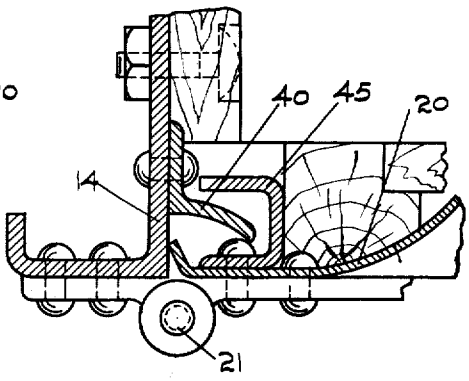


FIG-13

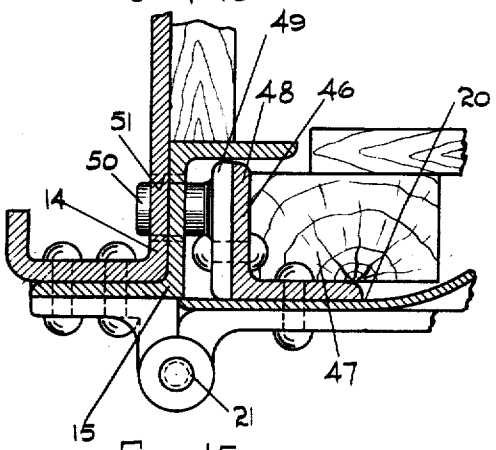


FIG-14

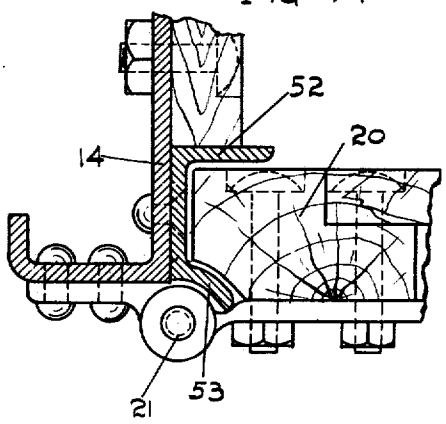


FIG-15

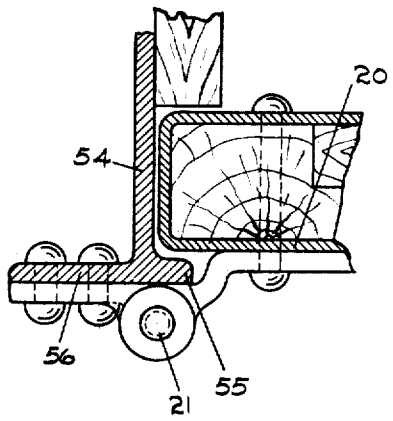


FIG-16

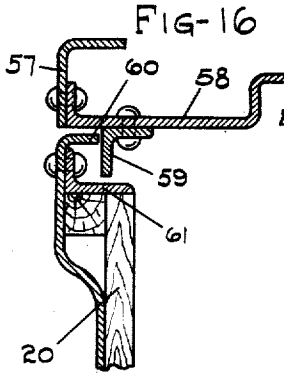
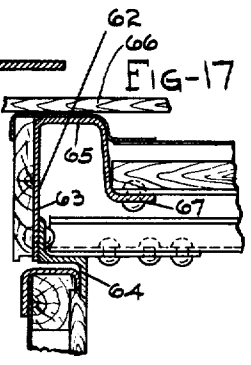


FIG-17



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ATTY'S

Patented June 28, 1932 1,865,246

UNITED STATES PATENT OFFICE

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HOUSE CAR END CONSTRUCTION

Application filed April 16, 1927. Serial No. 184,228.

The present invention relates to house car end construction.

More particularly the present invention relates to the construction of house cars having end doors. A problem which has confronted the designers of the end construction for house cars has been to provide the necessary strength to resist the sidewise racking which is found in cars having large end doors.

An object of the present invention is to provide an end construction which is simple, which may be manufactured at relatively low cost, and which provides relatively great strength.

A further object is to provide an end construction for a house car in which the number of parts is reduced to a minimum and in which those portions which are subject to the most severe stresses are very well adapted to withstand said stresses.

A further object is to provide a house car end construction which provides particularly sturdy means for supporting swinging end doors and which is adapted to cooperate with said doors in novel manner to provide weathering features.

Further objects will appear as the description proceeds.

Referring to the drawings—

Figure 1 is a view in end elevation of a house car embodying the principles of the present invention;

Figure 2 is a sectional view taken along the plane indicated by the arrows 2—2 of Figure 1;

Figure 3 is a view similar to Figure 1, but on an enlarged scale, parts being broken away and other parts being removed for clarity of illustration;

Figure 4 is a sectional view taken along the plane indicated by the arrows 4—4 of Figure 3;

Figure 5 is a sectional view taken along the plane indicated by the arrows 5—5 of Figure 1;

Figure 6 is a sectional view taken along the plane indicated by the arrows 6—6 of Figure 3;

Figure 7 is a sectional view taken along the plane indicated by the arrows 7—7 of Figure 3;

Figure 8 is a sectional view taken along the plane indicated by the arrows 8—8 of Figure 3;

Figure 9 is a fragmentary view taken sidewise of the house car showing a lower corner construction;

Figure 10 is a view similar to Figure 5 but showing a modification of the weathering features shown in Figure 5;

Figures 11 to 15, inclusive, are views similar to Figure 5 but showing modified constructions;

Figure 16 is a view similar to Figure 4 but showing a modification; and

Figure 17 is a section taken along the same plane as Figure 4 but showing a further modification.

Referring first to Figure 1, the numeral 11 indicates the end sill of a house car, which end sill is provided with the coupler housing 12. Said end sill 11, which may be of either plate or built up construction, is preferably deeper than has been usual practice heretofore, for the purpose of providing a rigid structure for cooperation with the other features of the end construction, which will be referred to presently. A plate construction of end sill 11 is illustrated, said end sill being swedged outwardly as indicated by the numeral 12*a* for strengthening purposes. The numeral 13 indicates an end plate of the car, and the numerals 14—14 indicate the corner posts which connect the end sill 11 and the end plate 13 at the two sides of the car.

The numeral 15 indicates a continuous structural steel member (shown more clearly in Figure 3) extending from one side of the end sill 11 up the side of the car, along the end plate 13 and down the opposite side of the car to the opposite end of the end sill. As illustrated, the structural steel member 15 takes the form of a Z-bar having its web disposed lengthwise of the car, its outer flange disposed adjacent to the end of the car and its inner flange disposed inwardly of the end of the car. It will be obvious, of course, that other rolled or pressed shapes may be

used if preferred. It is also obvious, of course, that a casting may be used if preferred, in which case the knuckles for hinges may be cast integral therewith. Said Z-bar 15 is secured to the corner posts 14—14 and end plate 13 by means of rivets or other holding means, certain of said rivets being indicated by the numerals 16—16. Said Z-bar is secured to the side sills 17 by angles 18 (see Figure 9), said angles being riveted or otherwise secured to said side sills and to said Z-bar. Gusset plates 19 (see Figure 9) are provided for rigidly securing together the side sills, corner posts 14—14 and the Z-bar 15.

The Z-bar 15, which as explained above takes the form of an inverted U, provides a doorway adapted to be closed by the swinging doors 20—20, which doors are mounted upon hinges 21—21 arranged along the corner posts 14—14. As shown in Figures 5 and 10, the hinges include the plates 22, which plates are held in position by certain rivets 16, which as above mentioned secure the Z-bar 15 to the corner posts 14. Other rivets 23 may be provided for uniting the plates 22 to the corner posts 14. Each hinge 21 also includes the plate 24 adapted to be riveted or otherwise secured to the corresponding door 20. The doors 20—20 may be provided with any preferred means at their meeting edges to provide a tight joint, and any preferred means may be provided for locking said doors in closed position. Such means do not form any part of the present invention and need not be described herein.

Each door 20 is provided near its hinged edge with the angle 25, which angle is secured to the metal of the door 20 and to the plates 24—24 of the hinges 21—21. The innermost flange of the Z-bar 15 has its edge swedged toward the end of the car, as indicated by the numeral 26, and the angle 25 has its edge 27 swedged in conformity with the edge 26, whereby when the corresponding door 20 is in closed position, the edge portion 26 of the Z-bar 15 and the edge portion 27 of the angle 25 will overlie one another for weathering purposes. The weathering features of the construction are also improved by reason of the fact that the inner edge portion 28 of the metal door 20 is inwardly swedged, whereby when the door 20 is in closed position said edge portion 28 lies in substantially parallel relationship with and in proximity to the web of the adjacent vertical portion of the Z-bar 15. The structure for weathering the swinging doors 20—20 at the bottom is illustrated in Figure 6, in which the threshold 29 is provided with a reinforcing metal member 30, which has an intermediate portion 31 sloping outwardly of the car and a shouldered portion 32 presented toward the extremity of the car. The bottom edge of each of the doors 20—20 is provided with the reinforcing metal member 33 having the intermediate sloping portion 34 adapted to cooperate with the sloping portion 31 above mentioned.

Figure 10 illustrates a modification of the weathering features at the hinged edges of the doors. According to the structure shown in Figure 10, the inner edge of the door is provided with the steel member 35, which steel member has a flange 36 secured to the metal of the door 20 and to the plate 24 forming part of each hinge 21. The cooperating flange 37 of said steel member 35 has its edge portion swedged to form a groove 38 adapted when the corresponding door 20 is in closed position to embrace the edge portion 26 of the Z-bar 15. Figure 10 also shows a compressible member 39 secured by screws or other preferred means to the web portion 37 of the steel member 25, which compressible member 39 is adapted to closely engage the web of the Z-bar 15 when the corresponding door 20 is in closed position, whereby to protect the car against ingress of moisture.

The present invention has the advantage that stresses which may be set up by lading within the car, instead of being communicated directly to the hinges of the door will be taken by sturdy parts better adapted to withstand said stresses. By reference to Figure 5 it will be noted that the flanges 27 and 26 cooperate with one another to transmit such stresses to the adjacent corner post. In Figure 10 the flanges 38 and 26 cooperate to communicate said stresses to the adjacent corner post. To permit this transmittal of stresses through the flanges referred to instead of through the hinges, said hinges, it will be noted from Figures 5 and 10 of the drawings, are so constructed that the strap member or plate 24 has a loose connection with the butt member or plate 22 in a direction normal to the plane of the door 20.

Figures 11 to 15, inclusive, illustrate modified constructions relating to the weathering features at the hinged edges of the doors, which modified constructions present certain practical advantages. According to the structure shown in Figure 11, the U-shaped member which is indicated by the numeral 15 in the preceding figures takes the form, in cross section, of an angle, indicated by the numeral 40, one flange 41 of which (along the vertically disposed portions of said U-shaped member) is secured to the adjacent corner posts 14 and the other flange 42 of which is curved about the axes of the hinges 21 at the two sides of the car. The angle 25 at the edge of each door has its flange 43 curved to conform to the curvature of the flange 42, the edge portion of the flange 43 being inturned, as indicated by the numeral 44, for strengthening purposes. The structure shown in Figures 11 to 15 has the advantages referred to above in connection with the pre-

ceding figures; for example, the structure as shown in Figure 11 has the advantage that effective weather-proofing is provided, and has the further advantage that the parts are not likely to be distorted in service in a manner to interfere with the closing of the door. Said structure has the still further advantage that forces communicated to the door from within the car due to shifting lading or from any other causes, instead of being communicated entirely to the hinges, are taken by the angles 40 and 25, it being understood that in practice the parts of said hinges will have sufficient play to permit contact between angles 25 and 40 before said forces to any destructive extent can be communicated to said hinges.

In the structure shown in Figure 12, a channel member 45 is secured to each of the doors at the hinged edge thereof for cooperating with the angle member 40. The structure shown in Figure 12 presents the advantages referred to in connection with Figure 11.

In Figure 13 the hinged edge of each of the doors is provided with the angle 46, so disposed that the wood portion 47 of said door is mounted within the reentrant portion of said angle 46. Secured to the flange 48 of the angle 46 is the member 49 provided with the stud 50. Studs 50 of each of the swinging doors 20 are adapted to seat themselves within apertures 51 in the web of the Z-bar 15 and in the adjacent corner post 14. The inner flange of the Z-bar 15, together with the flange 48 of the angle 46, provide weathering features. The studs 50, being secured to the angle 46, tend to take the forces which may be set up within the car, thereby protecting the hinges 21.

In the structure shown in Figure 14 a channel 52 is provided in place of the Z-bar 15. Said channel 52 has its outer flange 53 curved about the axis of the hinges 21. The material of the adjacent door 20 is formed to conform to the curved shape of the flange 53, whereby to provide weathering features and whereby stresses due to the shifting of lading or other causes within the car are taken by the channel 52.

Figure 15 shows a slightly different shape of corner post. The corner post, which is indicated by the numeral 54 in Figure 15, is in the shape of a T-bar, one flange, indicated by the numeral 55, being shorter than the other flange, indicated by the numeral 56. The flange 55 provides an abutment outwardly of the swinging door 20 and provides weathering features as well as serving to take blows communicated to said door 20 from within the car, thereby relieving the hinges 21 of said blows.

Referring now to Figure 16, a construction of end plate is shown which has the advantage that water will tend to drip outwardly of the car instead of inwardly thereof. In Figure 16 the end plate is indicated by the numeral 57 and is riveted to the steel member 58 forming part of the structure of the car. The U-shaped member providing the doorway for the doors 20—20 takes the form of an angle 59 set inwardly from the outer extremity of the end plate 57. The doors 20 have their upper extremities swedged inwardly, as indicated by the numeral 60, for cooperation with the angle 59, the adjacent portion of the door being reinforced by the angle 61.

The present invention contemplates the securing of as much depth in the end plate as possible, and to that end the end plate preferably extends up against the roof, instead of stopping below the ridge pole as in certain prior constructions. At the sides where the end plate attaches to the corner posts, maximum depth has been secured by introducing a relatively long radius at the upper corners of the inverted U-shaped member 15. Said radius may be chosen of a dimension as great as the nature of the commodity to be loaded will permit. It will be understood, of course, that the radius referred to may be chosen within wide limits, the longer radius having the advantage of strength and the shorter radius having the advantage that the door will accommodate commodities having square upper corners. Though the shorter radius will ordinarily sacrifice strength, it will be understood that this fact may be compensated for by any preferred reinforcement. It will be understood, of course, that the radius referred to need not be a uniform radius, but may slope according to any preferred contour. In like manner the corner posts are extended downwardly below the upper extremity of the end sill much farther than is the usual practice. Said corner posts are rigidly secured to the relatively deep side edge portions of said end sill.

Figure 17 illustrates a modified end plate which may be used in the practice of the present invention. In said figure the end plate, indicated by the numeral 62, takes a cross sectional form which may be termed an inverted "U" with one leg laterally flanged as indicated by the numeral 67. The forward wall 63 of the end plate 62 is riveted or otherwise secured to the Z-bar 64. By the use of the construction illustrated in Figure 17 an increased height of door opening is obtained, inasmuch as the roof construction need not be above the upper boundary of the end plate as in certain prior constructions with which applicant is familiar. With the construction shown in Figure 17 the height of roof is maintained, a deeper end plate is obtained, and the height of door opening is increased relative to prior constructions. The base 65 of said inverted U-shaped end plate 62 is sub-

stantially flat and may form a support for the usual running board 66. The flange 67 of the end plate 62 may be secured to the roof structure of the car.

Though the inverted U-shaped member has been referred to herein as a continuous member, it will be understood that said member may be spliced if preferred, but the spliced portion should have equal strength with the remainder of the section. Moreover, though a Z-bar is preferred in said member 15, other structural forms may be used if desired. Moreover, the Z-bar section illustrated may be made up of two angle sections secured together, this structure being so obvious as not to require illustration.

Many modifications of the present invention will occur to those skilled in the art. It is intended to cover all such modifications that fall within the scope of the appended claims.

What is claimed is—

1. House car end construction comprising an end sill member, an end plate member, corner post members connecting said end sill member and end plate member, and an inverted U-shaped member disposed within and secured to all of said members.

2. House car end construction comprising an end sill member, an end plate member, corner post members connecting said end sill member and end plate member, an inverted U-shaped member disposed within and secured to all of said members, and swinging doors fitting within said U-shaped member and hinged thereto.

3. In a house car, in combination, an inverted U-shaped member forming a doorway, said member comprising a continuous member having a portion extending longitudinally of the car and an inwardly extending flange disposed in spaced relationship with the corresponding end of the car, a swinging door disposed adjacent to said U-shaped member, said door being provided with a steel member adjacent to its hinged edge, said steel member having a swedged edge portion overlapping said flange of said U-shaped member for weathering purposes.

4. A house car including an inverted U-shaped member forming a doorway in the end of said car, a pair of swinging doors hinged adjacent to the vertical portions of said U-shaped member, said U-shaped member having a flange disposed inwardly of said U-shaped member, said flange being disposed in spaced relationship with the corresponding end of said car and being swedged toward said end of said car, each of said doors being provided with a steel member adjacent to its swinging edge, each of said steel members having its edge disposed in position to have overlapping relationship with the swedged portion of said U-shaped member when said door is closed.

5. In a house car, in combination, an end sill, an end plate, corner posts connecting said end sill and end plate, and an inverted U-shaped member disposed within and secured to said end sill, end plate and corner posts, the extremities of said U-shaped member being disposed in proximity to said end sill.

6. House car construction comprising vertical corner posts comprising angular members, an inverted U-shaped member fitted within said corner posts and forming a doorway, swinging doors for said doorway, and hinges for said doors riveted to said corner posts and to the leg portions of said U-shaped member.

7. In a house car, in combination, an inverted U-shaped member forming a doorway, a swinging door for said doorway, said door having a portion positioned to abut said U-shaped member when forces are communicated to said door from the inside of said car and hinges for said door secured to said U-shaped member, said hinges having sufficient play to permit engagement of said abutting portions before destructive stresses from within said car can be communicated to said hinges.

8. In a house car, in combination, an inverted U-shaped member forming a doorway, a swinging door for said doorway, said door having a portion positioned to abut said U-shaped member when forces are communicated to said door from the inside of said car and hinges for said door secured to said U-shaped member, said hinges having sufficient play to permit engagement of said abutting portions before destructive stresses from within said car can be communicated to said hinges, said U-shaped member and said portion of said door being overlapped when said door is in closed position for weathering purposes.

9. House car end construction comprising an end still, an end plate, corner posts, a continuous inverted U-shaped member having its extremities united to said end sill and having rounded portions between the legs and the base of said inverted U-shaped member, said end plate being secured to the base of said inverted U-shaped member and to the rounded portions thereof, said U-shaped member having its leg portions secured to said corner posts.

10. House car end construction comprising an end sill, an end plate, a continuous inverted U-shaped member having its extremities united to said end sill and having rounded portions between the legs and the base of said inverted U-shaped member, said end plate being secured to the base of said inverted U-shaped member and to the rounded portions thereof, and corner posts connected to the extremities of said end sill and end plate and to said inverted U-shaped member.

11. In combination, an end sill having greater depth at its side edge portions than at its central portion, corner posts secured to said end sill at the side edge portions thereof, a continuous inverted U-shaped member connected to the side edge portions of said end sill and to said corner posts, an end plate secured to the upper extremities of said corner posts and to the upper portion of said inverted U-shaped member.

12. In combination, an end sill having greater depth at its side edge portions than at its central portion, corner posts secured to said end sill at the side edge portions thereof, a continuous inverted U-shaped member connected to the side edge portions of said end sill and to said corner posts, an end plate secured to the upper extremities of said corner posts and to the upper portion of said inverted U-shaped member, the portions between the legs and the base of said inverted U-shaped member being rounded, said end plate being shaped to conform to said rounded portions.

13. House car end construction comprising an end sill member, an end plate member, corner post members, and an inverted U-shaped member secured to the two extremities of said end sill member and to said corner post members.

14. House car end construction comprising an end sill, corner posts and an end plate, said sill, posts and end plate forming a frame, and a continuous inverted U-shaped member disposed within and secured to said frame.

15. A house car, including end construction comprising an end sill, corner posts and an end plate, said sill, posts and end plate forming a frame, and an inverted U-shaped member disposed within and secured to said frame, said end plate extending upwardly from said member to a region adjacent to the top of said car and having a cross sectional U-shaped conformation, one leg of said U-shaped conformation being secured to said member, the other leg of said U-shaped conformation being connected to adjacent roof structure of said car.

16. A house car, including end construction comprising an end sill member, an end plate member, corner post members, and an inverted U-shaped member secured to the two extremities of said end sill member and to said corner post members, said end plate member having a U-shaped cross sectional contour, one leg of said U being secured to the base of said inverted U-shaped member, the other leg of said U being formed for the reception of adjacent roof structure, said end plate extending upwardly from said member to a region adjacent to the top of said car.

17. House car end construction including an end sill, an end plate, corner posts connecting said end sill and end plate, said corner posts and end plate being provided with a continuous flange, and door means, said door means being adapted to cooperate with said continuous flange for weatherproofing purposes.

18. House car end construction including an end sill, an end plate and corner posts connecting said end sill and end plate, said corner posts and end plate being provided with flange means disposed in substantially a single plane, and door means cooperating with said flange means for weatherproofing purposes.

19. House car end construction including an end sill, an end plate and corner posts connecting said end sill and end plate, said corner posts and end plate being provided with a continuous flange, and door means, said door means being adapted to cooperate with said continuous flange for weatherproofing purposes, said flange adjacent to the junctures between said corner posts and said end plate being disposed in sloping relationship with said corner posts and said end plate.

20. House car end construction including an end sill, an end plate and corner posts connecting said end sill and end plate, said corner posts and end plate being provided with flange means having their inner portions disposed in substantially a single plane, and door means cooperating with said flange means for weatherproofing purposes, said flange means, adjacent to the junctures between said corner posts and said end plate, being disposed in sloping relationship with said corner posts and end plate.

21. A house car including end construction comprising a frame, which frame includes an end plate having an inverted U-shaped conformation forming part of said frame, said end plate extending upwardly to a region adjacent to the top of said car, one leg of the U-shaped conformation of said end plate being secured to the remainder of said frame, the other leg of said U-shaped conformation of said end plate being connected to adjacent roof structure of said car.

22. A house car including end construction comprising a frame, which frame includes an end plate having an inverted U-shaped conformation forming part of said frame, said end plate extending upwardly to a region adjacent to the top of said car, one leg of the U-shaped conformation of said end plate being secured to the remainder of said frame, the other leg of said U-shaped conformation of said end plate being flanged, the flanged portion of said other leg being connected to adjacent roof structure of said car.

23. A house car including end construction comprising a frame, said frame including an end plate member, said end plate member having a U-shaped cross sectional contour, one leg of said U being secured to the remainder of said frame, the other leg of said U

being formed for the reception of adjacent roof structure, said end plate extending upwardly to a region adjacent to the top of said car.

24. In a house car, in combination, an end frame, said frame comprising an end plate, an end sill and corner posts connecting said end plate and end sill, said corner posts being provided with members positioned within the end frame and extending inwardly and transversely of said car, swinging doors disposed adjacent to said corner posts, each of said doors being provided with a metallic member adjacent to its hinged edge, said metallic members having swedged edge portions overlapping said members provided on said posts on the inside of said members, hinges for said doors, said hinges having a sufficiently loose connection between the butt and strap members thereof in a direction normal to the plane of its corresponding door to permit stresses applied to said door from within said car to be carried by said swedged edge portions and said members provided on said posts, the hinges for said doors and the swedged edge portions of the members provided on said doors lying on opposite sides of the post members.

Signed at Chicago, Illinois, this 8th day of April, 1927.

GEORGE S. GOODWIN.

CERTIFICATE OF CORRECTION.

Patent No. 1,865,246. **June 28, 1932.**

GEORGE S. GOODWIN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 119, beginning, with the words "By the use of" strike out all to and including "constructions." in line 129; page 4, line 4, after "car." insert the words By the use of the construction illustrated in Figure 17 an increased height of door opening is obtained, inasmuch as the roof construction need not be above the upper boundary of the end plate as in certain prior constructions with which applicant is familiar. With the construction shown in Figure 17 the height of the roof is maintained, a deeper end plate is obtained, and the height of door opening is increased relative to prior constructions.; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of November, A. D. 1932.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)

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