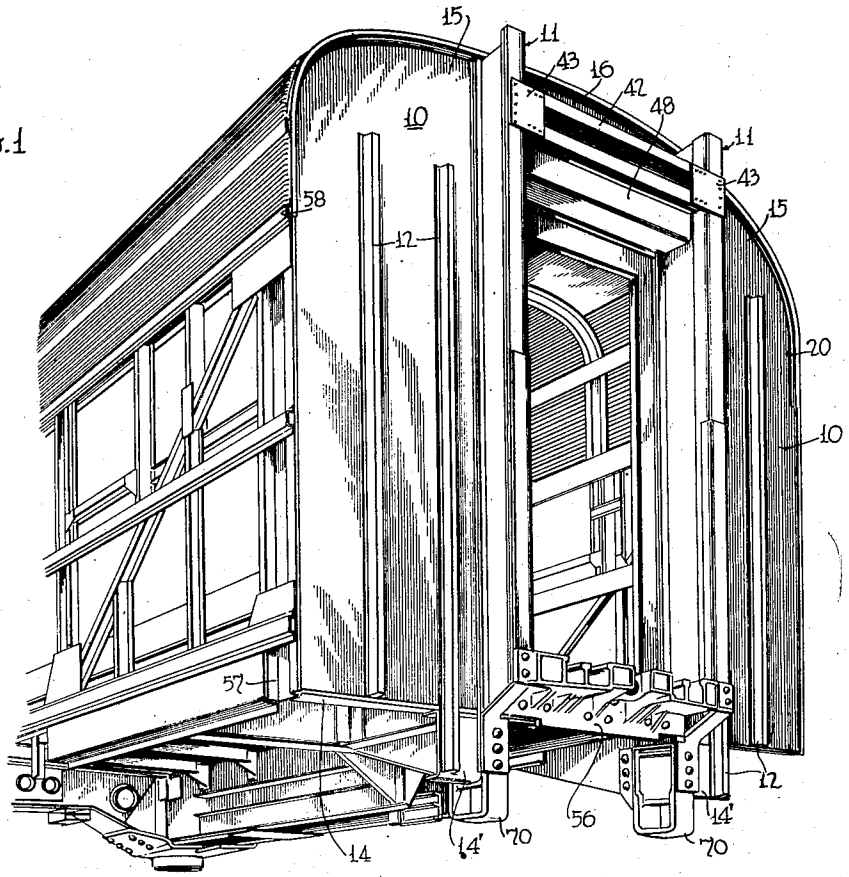
Sept. 23, 1941. A. G. DEAN 2,257,084

END CONSTRUCTION FOR RAIL CARS

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FIG. 1



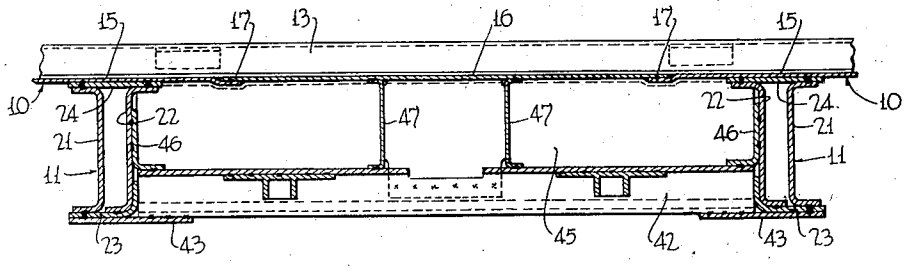


FIG. 14.

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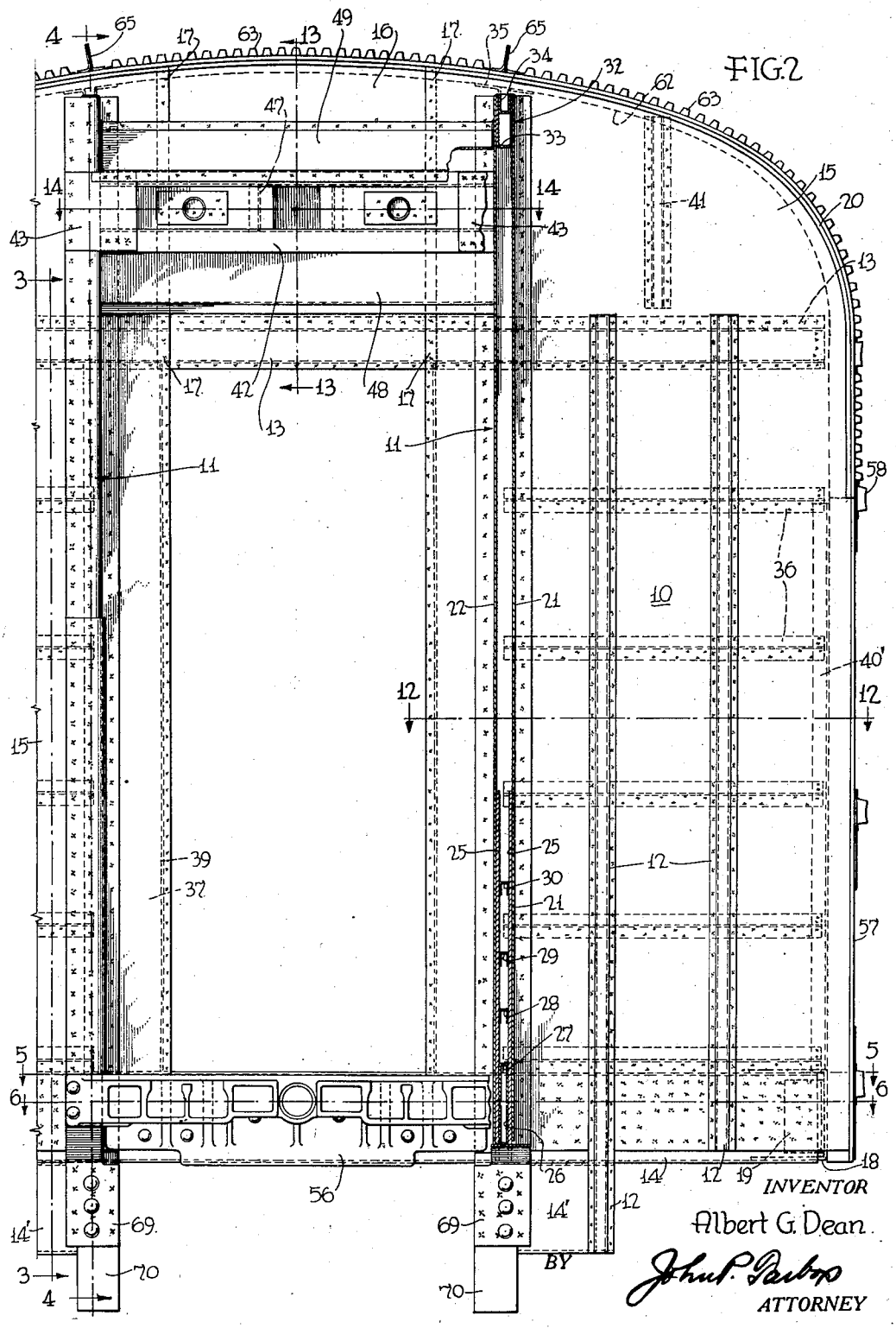
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FIG. 2



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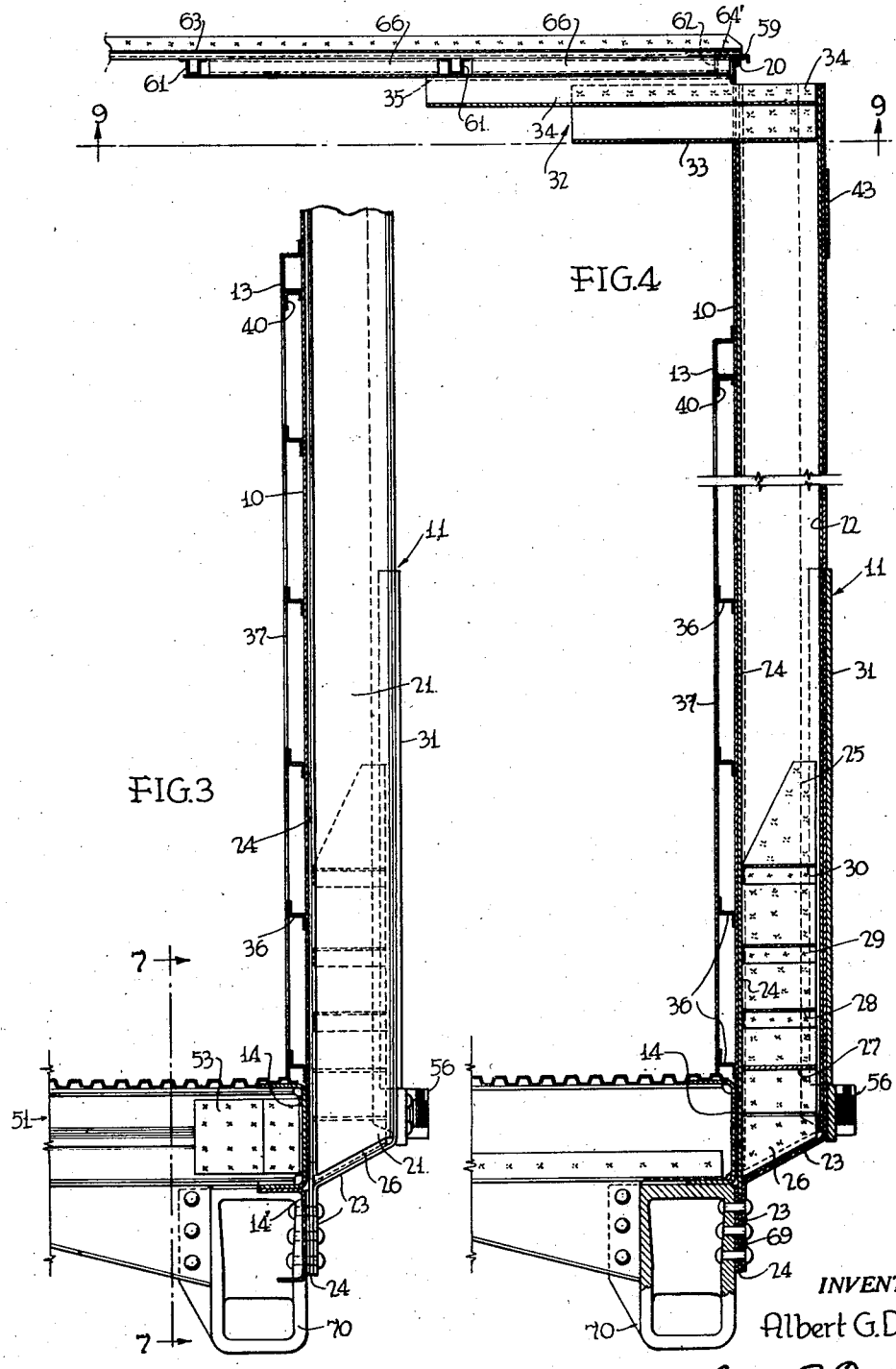
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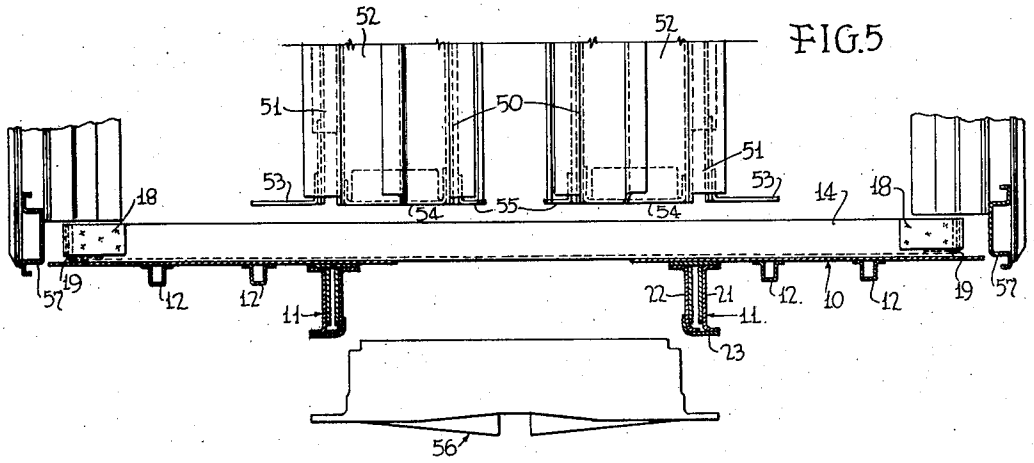
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FIG.5



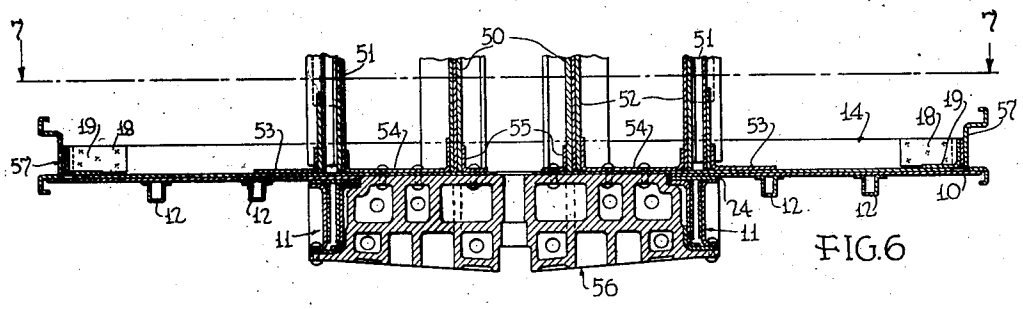


FIG.6

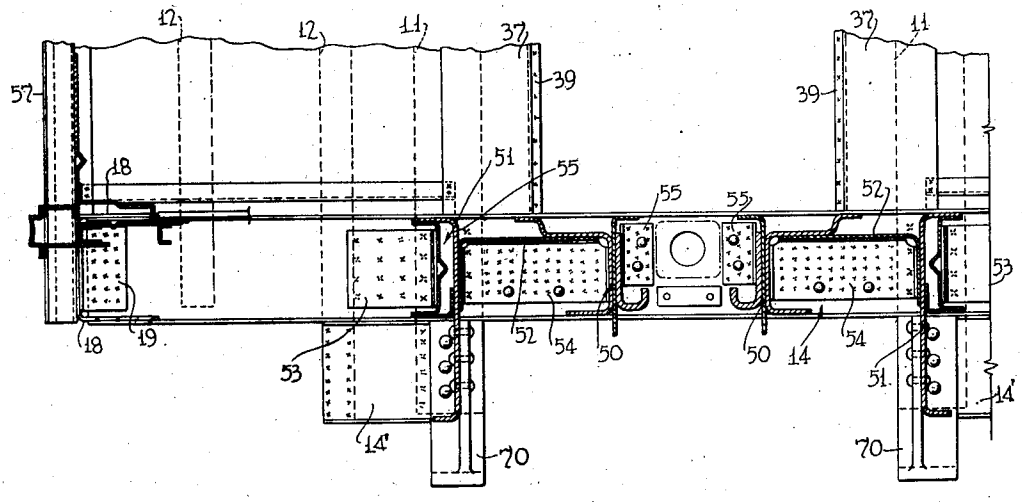


FIG.7

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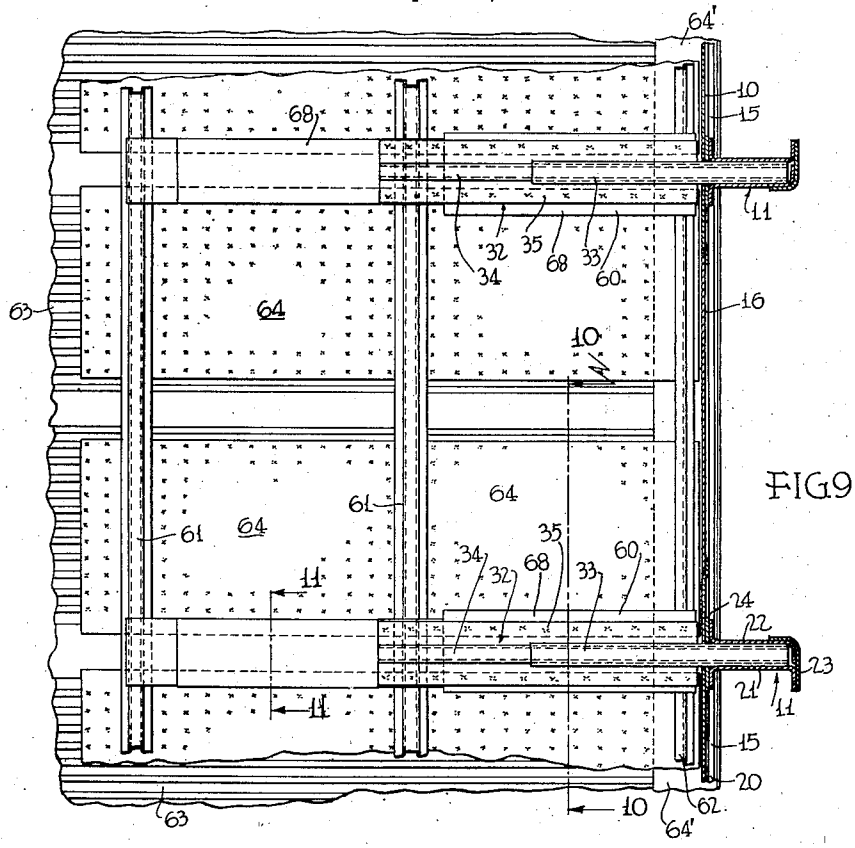


FIG.9

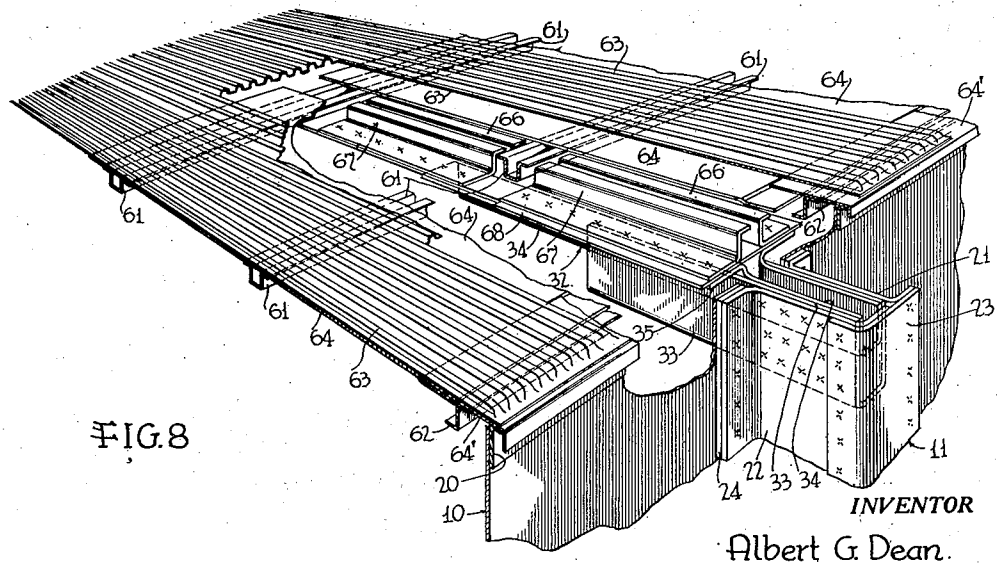


FIG.8

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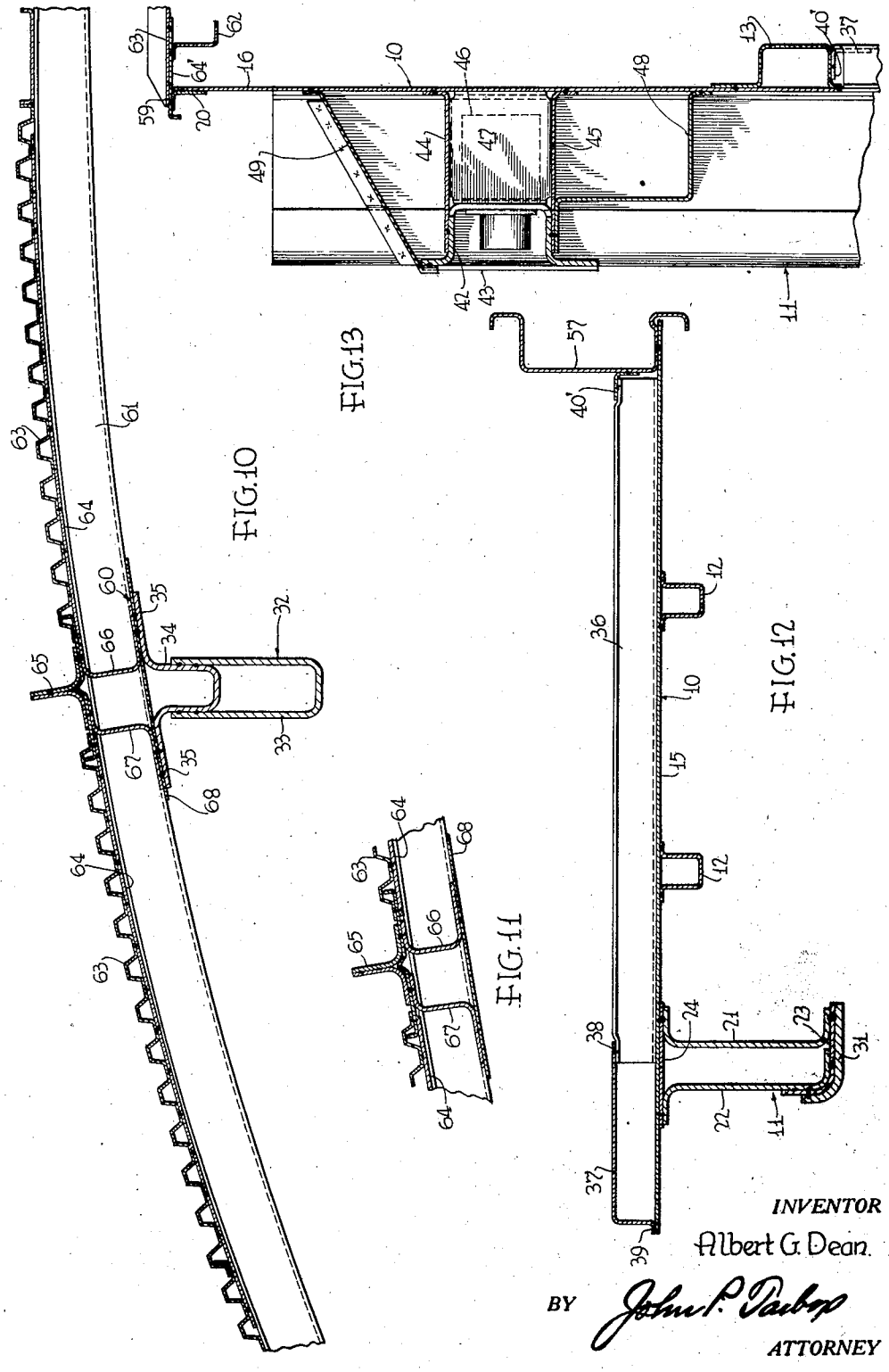


FIG. 13

FIG. 10

FIG. 11

FIG. 12

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FIG. 17

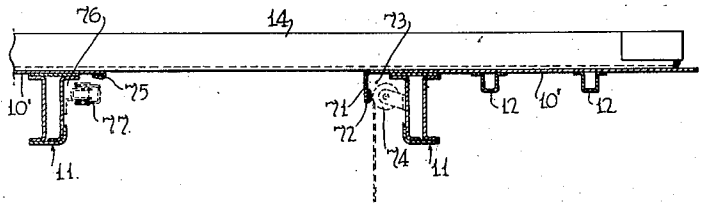


FIG. 16

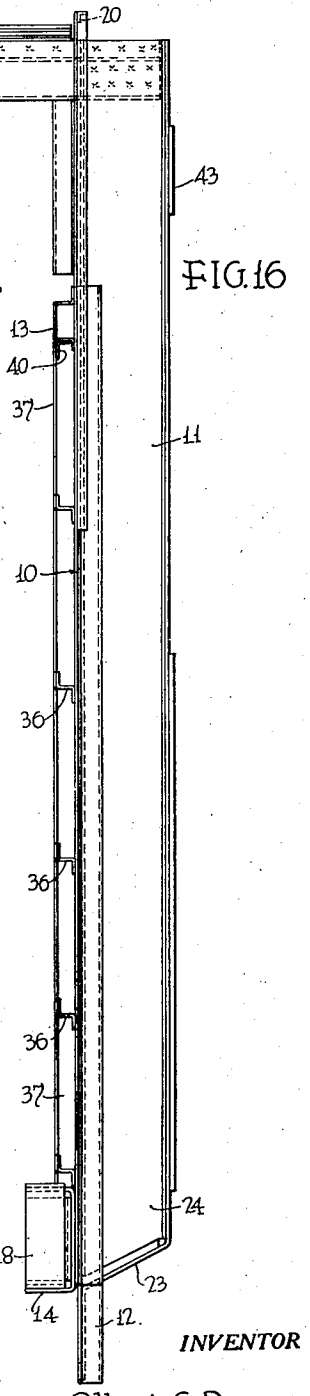
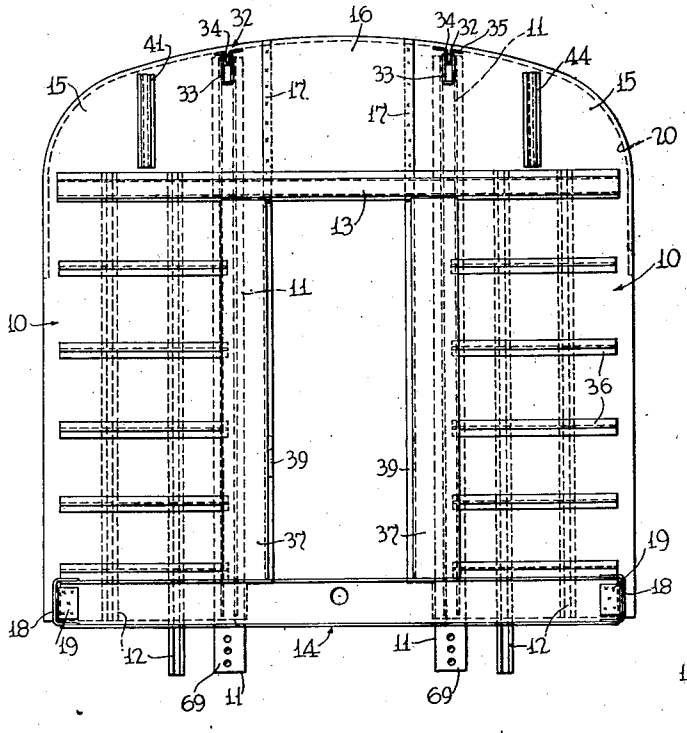


FIG. 15



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Patented Sept. 23, 1941 2,257,084

UNITED STATES PATENT OFFICE

2,257,084

END CONSTRUCTION FOR RAIL CARS

Albert G. Dean, Narberth, Pa., assignor to Edward G. Budd Manufacturing Company, Philadelphia, Pa., a corporation of Pennsylvania

Application September 22, 1939, Serial No. 296,027

22 Claims. (Cl. 105—402)

The invention relates to rail cars and more particularly the end wall structure of such cars.

It is an object of the invention to provide an end wall structure of this class which is of light weight, which is readily fabricated of sheet metal as a subassembly unit, and provided in subassembly with marginal conformations and final assembly joint structures readily adapting it for strong joinder in final assembly to the underframe, side walls and roof of the car body.

It is a further object of the invention to provide an end wall structure of this class which fully meets A. A. R. requirements for protection against telescoping in case of collision and which achieves this object with a minimum of weight.

Other and further objects and advantages will become apparent from the following detailed description when read in connection with the drawings forming a part hereof.

Fig. 1 is a perspective view of a portion of the end of a rail car to which the invention has been applied.

Fig. 2 is an elevation view of the end of the car, part of the left-hand side being broken away and part shown in section.

Figs. 3, 4, 5, and 6 are fragmentary sections, Figures 3 and 4 being on an enlarged scale, the sections being taken substantially along the lines 3—3, 4—4, 5—5 and 6—6 of Fig. 2, and Fig. 5 being an exploded view showing the end, side and bottom unit assemblies separated.

Fig. 7 is a fragmentary transverse sectional view showing the connection of the end subassembly to the underframe, the section being taken substantially along the line 7—7 of Fig. 6 and showing also a portion of the left-hand side wall.

Fig. 8 is a perspective view, parts being shown broken away and in section showing the connection of the end subassembly to the roof.

Fig. 9 is a horizontal sectional view taken substantially on the line 9—9 of Fig. 4, also showing the connection of the end subassembly to the roof.

Figs. 10 and 11 are enlarged fragmentary sectional views taken respectively on the lines 10—10 and 11—11 of Fig. 9.

Figs. 12, 13 and 14 are enlarged fragmentary sectional views taken substantially on the line 12—12, 13—13, and 14—14 of Fig. 2.

Fig. 15 shows the end subassembly unit in an inside elevational view, and

Fig. 16 shows on an enlarged scale said subassembly in a side elevational view.

Fig. 17 is a horizontal sectional view through the doorway opening of a slightly modified construction adapted for use at the vestibule end of a rail car.

The main structural members of the end wall unit subassembly comprise an end plate 10 as a foundation structure upon which are assembled the main vertical members or collision posts 11 and the auxiliary vertical reinforcements, such as spaced flanged channels 12, all welded to the outside face of the plate as clearly appears in Figs. 1 and 2.

In addition to these main vertical members, the inner face of the plate is provided with top and bottom transverse reinforcements secured thereto. The top reinforcement comprises a flanged channel 13, welded through its flanges, to the plate 10 and the bottom transverse member comprises the end sill 14 which may comprise an inwardly facing vertically deep channel secured through its bottom wall to the plate 10 and, where it overlaps them, to the reinforcing outside members.

As shown in Figs. 1, 2 and 15, the end plate 10 conforms in outer configuration to the end of the car body extending from side to side and from top to bottom and having a curved top portion. For convenience of manufacture this end plate is shown built up of three sections, two lateral sections 15 which are substantially identical and arranged symmetrically in opposite sides of the center line of the car and extend from the central door opening laterally each across the adjacent collision posts 11 out to the side of the car body and from top to bottom. Each of the lateral sections 15 and their associated posts 11 and reinforcements 12 may conveniently be assembled as separate subassemblies prior to joining them by the transverse members 13 and 14. Above the door opening across the top of which the member 13 extends, a separate section 16 connects the lateral sections 15 and is joined thereto by lap joints indicated at 17, Fig. 14, in which the overlapping sections are welded together.

The collision posts 11 are extended down below the end sill 14 as clearly appears in Fig. 15 and this is also true of the vertical reinforcements 12 next to the collision posts. The location of the collision posts 11 and stiffeners 12 on the outside of the car and end sill provides a clean appearance and maximum space in the vestibule.

To provide final assembly joint structures and to strengthen the subassembly end unit, the end sill 14, which forms an important final assembly joint structure between the end subassembly and the rest of the body is reinforced at its ends by

channels 18 having their side walls spot welded to the top and bottom side walls of the sill channel 14 and their bottom walls extending in a vertical plane. These channels are further reinforced by angles 19 welded to the vertical wall of the sill 14 and to the bottom walls of the channels 18. The vertical faces formed by the bottoms of the channel 18 are located inwardly of the lateral edges of the plate 10, see Fig. 15, to provide with said plate, angle section final assembly joint structures through which the end sill is joined into the side wall structures in the final assembly.

At the curved top and for some distance downwardly at each side, the plate 10 is reinforced on its outer face by an angle 20 having one arm thereof secured, as by welding, to the curved margin of the top of the plate and its other arm laterally extended to form a final assembly joint structure for securing the end subassembly to the roof and the upper portions of the side walls of the body.

The main vertical collision posts 11 each comprise a longitudinally deep box section structure of great strength. As clearly appears in Figs. 2, 3, 4, 12 and 14 each post is built up of an outer laterally facing channel 21, an inner Z-section member 22, an angle section closing plate 23 for its outer face and an inner flat closing plate 24. All of these parts are strongly joined together by spot welding in their overlapped regions and the posts are secured to the plate 10 by spot welding its double thickness inner laterally extending flanges formed by closing plate 24 and the adjacent members to which it is welded, to the plate 10. In their lower portions extending below the end sill, the posts are of less depth longitudinally, the outer closing plate 23 may be bent rearwardly and downwardly and flattened out to overlap the inner closing plate 24 and the parts welded together in this overlap region, as indicated in Figs. 2 and 4.

In the lower portion, namely from the bottom of the end sill 14 upwardly a substantial distance above the end sill, the post is strongly reinforced to take the heavy collision shocks to which it may be subjected in this region.

As shown in Figs. 2 and 4, each of the lateral members 21 and 22 of the posts are reinforced in this region by plates 25 spot welded thereto and the posts are additionally strengthened and stabilized in this region by a series of longitudinally extending vertical spaced channels 26, 27, 28, 29 and 30. The lower of these channels 26 and 27 opposite the end sill are inverted with respect to each other with their side walls almost in contact with each other and their side walls are widened as compared with the other channels, and in each case the side walls of these channels are strongly spot welded to the side walls of the posts. The bottom channel 26 has an inclined bottom wall overlapping the inwardly and downwardly inclined portion of the front cover plate 23 and is secured thereto by spot welding.

The end subassembly is still further provided with final assembly joint structures for joining it to the roof, indicated in Figs. 2, 4, 8, 9, 15 and 16, by a horizontally extending inward extension from the top of each collision post, this extension being designated generally by the numeral 32. This inward extension may comprise the deep channel 33 facing upwardly and having its side walls overlap the sides of the lateral faces 21 and 22 of a post 11 and strongly secured thereto by spot welding in the overlap. The inner cover plate 24 of the post and the end plate 10 are cut away to receive this channel. Within this deep channel is telescoped a shallower and narrower but longer channel 34, the side walls of which are spot welded to the side walls of the post and the channel 33.

Inwardly of the plate 10 this shallower channel 34 is provided with lateral flanges 35 which form final assembly joint parts for strongly securing the end wall subassembly to the roof structure.

The structure so far described is in condition for final assembly to the remainder of the body structure and forms a unit which can be readily subassembled in one part of the shop and transported to another part for final assembly.

The following additional structures may be assembled with this end subassembly although they do not necessarily form a part of the subassembly and may be assembled therewith at final assembly. As shown in Figs. 3, 4 and 15, the inside of the plate 10 from the posts laterally to points adjacent the side end of the plate but terminating short thereof may be reinforced by a plurality of horizontally extending vertically spaced members 36 of Z-section, these members serving primarily to secure the inner facing, where such inner facing is provided. In other cases, they may be dispensed with. They are secured by spot welding one of the arms of the Z to the plate 10. As shown in Fig. 12 the inner ends of these Z-section members 36 overlap the posts 11 and a vertical extending angle section finish panel 37 extends along the side of the doorway opening; this panel has one arm of the angle overlap the offset inner ends of the members 36 and is spot welded thereto as shown at 38, while the other arm is formed with a short lateral flange at 39, this flange being spot welded to the vertical margin of the plate 10, at the doorway opening. The upper edge of the vertical angle 37 may be secured to the channel member 13 by an angle 40, see Fig. 16.

At their outer ends the members 36 are interconnected by a vertical angle 40', one arm of which is connected to said members and the other arm being in the vertical plane of the bottom wall of the channel 18 at the adjacent end of the end sill and forming with the edge of the plate 10 an angular final assembly joint structure in vertical extension of the similar joint structure at each end of the end sill.

The lateral upper portions of the plate 10 above the upper main transverse member 13 may also be provided with short vertical reinforcements 41 which may comprise, as shown, flanged channel members spot welded to the plate 10.

Between the posts 11 at the top and secured to them and to the plate 10 may be provided a generally box section structure for supporting the diaphragm face plate in this region. This box section structure, as indicated in Fig. 13, may comprise the flanged channel member 42 facing outwardly and having its flanges in the plane of the outer faces of the posts 11. At the ends, this channel is connected to the posts by plates 43 which are welded to the flanges of the channel and to the flanges of the posts. The other elements of the box section comprise top and bottom angles 44 and 45 which are welded respectively to the top and bottom walls of the channel 42 and through lateral arms to the plate 10, the plate 10 itself forming the inner face of the box. The channel 42 of this box as shown

in Fig. 14 is further secured to the inner sides of the posts by angles 46 and the box section structure is reinforced adjacent the central portion by two spaced diaphragms 47 flanged in their margins and secured through these flanges to the four sides of the box, see Figs. 13 and 14.

Below the box formed by the members 42, 44 and 10 may be provided another transversely extending box section structure formed by an angle 48 having its arms flanged laterally and secured respectively to the bottom of the channel 42 and the plate 10. This second box may be utilized for housing some of the equipment.

To avoid the collection of dust and dirt above the top member 44 of the box, an inclined plate 49 may extend between the posts 11 above the box, the margin of this plate being flanged as shown and secured to the inner faces of the posts, to the plate 10 and to the upper flange of the channel member 42.

As shown in Figs. 1, 2 and 7, the portion of each collision post 11 extending below the end sill and the similar downwardly extending portion of the adjacent flanged channel reinforcing member 12 and the bottom wall of the end sill are interbraced in the final assembly by an inwardly facing vertically deep channel 14'. This channel has the ends of its bottom wall overlap the post and the adjacent member 12 and its top side wall overlaps the bottom side wall of the channel sill 14 and is joined to these parts in the overlaps as by spot welding.

The end subassembly unit is strongly tied into the longitudinal members of the underframe in the final assembly as shown in Figures 5, 6 and 7 so as to transmit collision shocks from the end structure into the underframe. To this end the underframe may be provided with two spaced central main composite longitudinal columnar members 50 and two composite box section lateral auxiliary columnar members 51. The main members 50 are connected to the auxiliary members 51 by transverse shear panels 52. The ends of these members 50 and 51 directly abut the bottom of the end sill in the final assembly and are strongly secured thereto by angles 53, channels 54 and angles 55, as by spot welding parts of the angles and channels to the longitudinal members and the end sill, respectively, as is clearly shown in Figures 6 and 7. After this connection has been made, a buffer casting 56 extending between the posts 11 and having a flat face overlapping the end sill between the posts and lateral extensions extending over the outer faces of the posts is strongly secured to the end sill and to the posts by riveting as shown in Figures 6 and 7.

In the final assembly to the side wall and roof structures, the side walls which are truss structures, as is shown in Figure 1, are brought in so that each of their outwardly facing flanged channel end posts 57 nests within the angle formed by a lateral margin of the plate 10 and the bottom wall of the channel 18 at the end of the end sill and the arm of the angle 48' connecting the outer end of the Z-section members 36, and the parts are strongly secured together in this region of overlap by welding the margin of the plate 10 of the end subassembly to the front side wall of the channel 57 and by welding the bottom wall of the channel 18 and said arm of the angle 48' to the bottom wall of the post channel 57.

In the region of the roof subassembly which extends from the top chord at 58 of the side wall trusses (Figures 1 and 2), the end of the roof paneling as 59 (Figures 14 and 13) overlaps the outwardly extending arm of the angle 20 extending around the top margin of the end subassembly in the roof overlap region and is secured thereto by spot welding.

At the same time, the tops of the collision posts are strongly tied into the roof structure by having the lateral flanges 35 of the channels 34 of the end subassembly overlap lateral flanges 60 formed on a reinforced section of the roof structure adjacent the end of the roof. This joint is shown in detail in Figures 4, 8, 9, 10 and 11.

From these figures, it will be seen that the roof is built-up of transverse carlines 61 of flanged channel cross-section and an end carline 62 of Z-section, these carlines being strongly connected through plates 64 and 64' to a longitudinally corrugated roof sheathing 63 spot welded thereto between the corrugations. By reference to Figures 8, 9 and 10 it will be seen that the corrugated sheathing is reinforced for some distance inwardly from the end in regions on both sides of the posts 11 by plates 64 extending inwardly over several carlines and strongly spot welded to the corrugations and to the carlines. All of these plates are connected to a longitudinally short plate 64' extending from side to side of the roof structure and forming with the end margin of the corrugated sheathing the double thickness flange 59 through which the angle 20 of the end wall subassembly is secured in final assembly to the roof.

In addition, the roof is reinforced in the region of the end collision posts 11 by longitudinal outer purlines 65 extending inwardly from the end of the roof at least over several carlines, as in the case of the plates 64. An inner purline structure forming a box section with the outer purline structure 65 also extends inwardly from the end of the roof over several carlines, this structure comprising spaced longitudinal members, one of channel-section numbered 66 and another of Z-section numbered 67, and a flat plate 68 which is spot welded to the lower side wall of the channel 66 and the lower laterally extending arm of the Z-section member 67, while the upper arms of the members 67 and 66 are spot welded to the outer purline structure. The plate 68 is shown in Figure 9 as made of several sections which abut each other longitudinally but this is merely done for convenience of manufacture. It is obvious that the plate could be one continuous plate extending in from the end of the roof over several carlines as shown in Figure 9. The members 66 and 67 are discontinuous to allow the passage of the first channel-section carline 61 without a break from side to side.

It is to the double thickness flanges formed by the members 66 and 67 and plate 68, which form the inner purline structure, that the flanges 35 of the end subassembly are firmly secured in final assembly.

It is seen that the end structure so described is very readily assembled in subassembly and to the rest of the car structure in final assembly and that it is fabricated substantially in whole by light-gauge sheet metal members which are joined together by spot welding. The heavy posts of the end subassembly are strongly tied into the reinforced central portion of the underframe and into the heavily reinforced central portion of the roof so that the end structure as

described forms a very strong anti-telescoping structure.

This anti-telescoping feature of the structure is further enhanced by extending the end collision posts 11 downwardly below the end sill by the extensions designated 69 and tying these extensions into the longitudinal columnar members 51 of the underframe through the coupler carrying castings 70 which are riveted, respectively, to the extensions of the posts and to the underframe members 51 against both of which these castings abut.

In Fig. 17 is shown a slightly modified construction of car and wall. Similar elements are referred to by similar reference characters. The end sill 14, posts 11 and reinforcing channels 12 correspond to the preferred form. The end plate 10' has no inner reinforcements from the end sill 14 to the height of the doorway opening, making this construction particularly desirable at the vestibule end of a car to give a roomy vestibule.

At one side of the doorway opening, the end plate 10' is formed with an outwardly extending flange 71, which is stiffened and smoothed in its margin by a Dutch bend 72. Between this outwardly extending flange and the adjacent post 11, there is thus provided a pocket or recess 73 which may conveniently house a curtain roll 74 carrying the curtain for closing the space between the side of the end door in one car and the end door on the next adjacent car.

On the other side of the doorway, the edge of the plate 10' is extended inwardly beyond the adjacent post 11 some distance and is also provided in its margin with a Dutch bend 75. This provides a smooth reinforced margin and a space 76 in the angle between the adjacent post 10' and the inwardly extended portion of the plate 10' for receiving the end gate 77 shown in dotted lines in collapsed condition. When extended in a usual manner it closes the door way opening.

The underframe, including the connections to the end wall construction claimed herein, whereby collision shocks against the end of the car are transmitted into the underframe structure and the car body in general is not claimed herein but is fully disclosed and claimed in applicant's copending application Serial No. 296,026, filed of even date.

While the specific embodiment of the invention which has been described herein has proved very efficient in practice, it will be understood by those skilled in this art that changes and modifications may be made without departing from the spirit and scope of the invention as expressed in the claims appended hereto.

What I claim is:

1. An end wall construction for rail cars comprising a flat plate extending from side to side and from top to bottom of the car body, a transverse end sill of inwardly facing channel section secured to the bottom of said plate, a door opening in the central lower portion of said plate, a transverse reinforcement for said plate above the doorway opening, and vertical collision posts secured to the outside face of the plate for the full height thereof.

2. An end wall subassembly for rail cars comprising a flat plate of the full height of the car reinforced on its outer side by vertical collision posts secured thereto on opposite sides of a doorway opening and extending the full height of the plate and additional stiffening members secured to the outside face of the plate laterally of said posts, and on its inner side, in its lower region, by an end sill extending transversely of the lower portion of the plate and secured thereto and in its upper region, by a transverse member secured thereto above the doorway opening.

3. An end wall subassembly for rail cars comprising a flat plate reinforced on its outer side by spaced longitudinally deep vertical collision posts and by additional members of shallower section welded to the plate to form box sections therewith, and on its inner side by an end sill of channel section secured to the plate through its bottom wall and in its upper region by a transverse flanged channel member secured to the plate through its flanges.

4. An end wall subassembly for rail cars, comprising a flat plate extending from side to side and from top to bottom of the car body, an end sill secured to the inside face of said plate and having an end wall terminating short of the side edge of the plate to form therewith an angle section final assembly joint to receive an end post of the side subassembly for securement thereto.

5. An end wall subassembly unit for rail cars comprising a flat plate forming a main shear member of said end wall extending from side to side and from top to bottom of the car body and having a transversely rounded top margin, said plate having secured to one face thereof vertical door posts extending from top to bottom and provided at the top and bottom with final assembly joint formations for securement to the roof and underframe, respectively, said plate having secured to its rounded top margin and continuing downwardly into the vertical side margin an angle section member having an arm thereof extending longitudinally to overlap and form a final assembly joint with a roof structure.

6. An end wall construction for rail cars comprising a flat end wall plate forming a main shear member of said end wall reinforced by vertical and horizontal members secured, respectively, to the opposite faces of said plate and said plate having its flat margin at the top curved to conform to the roof curvature, this curved margin being reinforced by an angular member having one arm secured to the plate and the other arm extending laterally, and a roof structure including reinforced longitudinally corrugated sheathing overlapping said other arm and secured thereto.

7. An end wall subassembly comprising a flat plate extending from side to side and top to bottom of the car body, an inwardly facing channel section end sill secured to the lower margin of said plate, and forming a final assembly joint structure for securing the end wall to the underframe, the end sill terminating short of the sides of the plate and forming therewith an angle section final assembly joint to receive an end post of a side subassembly for securement thereto.

8. An end wall subassembly unit comprising a flat plate extending from a central door opening laterally to the side of the car body and from top to bottom of the car body, and a longitudinally deep collision post having opposed lateral flanges and extending from top to bottom of said plate adjacent its inner margin, overlapping a face thereof and secured thereto in subassembly through both said flanges.

9. An end subassembly unit comprising a flat plate extending from a central door opening laterally to the side of the car body and from top to bottom, a longitudinally deep collision post

having opposed lateral flanges and extending at least the height of said plate and secured thereto in subassembly adjacent its inner margin through both said flanges and at least one vertical reinforcing member secured to said plate laterally of said post.

10. An end wall construction for rail cars comprising a flat end wall plate extending from top to bottom and side to side of the car body, the bottom of said plate being reinforced by an inwardly facing channel secured thereto and to the longitudinal members of an underframe, the side margins of said plate forming with reinforcements attached thereto including said channel, angular section joint structures for securement to the side walls of the body in two planes, and the top margin of the plate being reinforced by an angle section member extending from side to side and terminating substantially at the angular formations at the sides, said angle section member overlapping and being secured to the roof structure.

11. An end wall subassembly unit for rail cars, comprising a collision post, and an end plate overlapping the inner face of said post and secured thereto and extending laterally to the adjacent side and roof portions and formed in its lateral margins with final assembly joint formations for securement in final assembly to the side and roof structures.

12. An end wall construction for rail cars including a flat end wall plate extending from side to side and from top to bottom of the car body and having a doorway opening in the central portion thereof, vertical door posts secured to the outer face of said plate and extending from top to bottom thereof, vertically spaced angular members secured to the inner face of said plate and extending horizontally from adjacent the doorway opening, where they are in overlapping relation to said door posts, to substantially to the adjacent side margin of the plate, and an angular finish panel connecting the inner ends of said members and the vertical margin of the plate in the doorway opening.

13. An end wall construction for rail cars including a flat end wall plate extending from top to bottom and from side to side of the car body and having a doorway opening in its central portion, longitudinally deep collision posts flanking said opening and secured to the outer face of the plate and extending above the doorway opening, and an angular member extending between the outer portions of said posts above the doorway opening and secured thereto to form a part of a diaphragm face plate supporting structure.

14. An end wall construction for rail cars including a flat end wall plate extending from top to bottom and from side to side of the body and having a doorway opening in its central portion, longitudinally deep collision posts flanking said opening and secured to the outer face of said plate and extending above the doorway opening, a reinforcing structure extending between the posts above the doorway opening and secured thereto and to the outer face of the plate and a downwardly and outwardly inclined plate interconnecting the posts and plate above said reinforcing structure.

15. An end wall construction for rail cars including a flat end wall plate forming a main shear member of said end wall and vertical longitudinally deep collision posts secured to the outer face of said plate on opposite sides of a doorway opening therethrough, an end sill secured to the inside face of the plate and posts, connections between the end sill and the main longitudinal members of the underframe in the region of the posts and between the posts, a reinforced roof end structure, and inward extensions having one end thereof telescoped within the tops of the posts and secured thereto and the other end thereof overlapping a longitudinal member of said reinforced roof and secured thereto.

16. An end wall structure for rail cars including an end sill, a longitudinally deep, as compared with its width, vertically extending collision post of box cross section overlapping the outer face of the end sill and secured thereto, the lower end portion of said post overlapping the outer face of the end sill and extending from said end sill upwardly a distance well above said sill and being provided in this region with vertical reinforcing members overlapping and secured to the longitudinally deep side walls and spaced longitudinally extending members bridging and secured to the side walls of the box cross-section.

17. In a rail car, a vertical end collision post built up into longitudinally deep box cross section by flanged side members and inner and outer cover plates overlapping the flanges of said side members and secured thereto, the lower end of the side members being cut away to incline inwardly and downwardly and the outer cover being extended along said incline to direct overlapping engagement with the inner cover plate and secured thereto in said overlap.

18. In a rail car end structure, a post according to claim 17 in which a channel section reinforcing member extending longitudinally of the post has a bottom inclined wall lapping the inclined wall of the outer cover plate and secured thereto and its side walls lapping the side members of the posts and secured thereto.

19. A rail car end construction, including a flat end plate extending from side to side and from top to bottom of the car body and having a doorway opening in the central portion thereof, collision posts secured to the outside face of the plate at opposite sides of the doorway opening, the margin of the plate on one side of the doorway opening being flanged outwardly to form a pocket between the post and said marginal flange arranged to receive a curtain roll.

20. A rail car end construction according to claim 19 in which the edge of said flange is formed with a Dutch bend to stiffen it and provide a smooth edge.

21. A rail car construction according to claim 19 in which the vertical margin of the plate on the opposite side of the doorway opening extends in the plane of the body of the plate beyond the adjacent post a distance sufficient to receive, in the angle between its outer face and the post, the collapsed end gate, and is provided with a Dutch bend in its margin.

22. A rail car end construction, including a flat end plate extending from side to side and from top to bottom of the body, the plate formed centrally with a doorway opening, vertical collision posts flanking the doorway opening and secured to said plate, the vertical margins of the plate extending beyond the door posts to form the margins of the doorway opening and being bent back flat upon themselves to form smooth reinforced margins.

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