

R. E. FRAME & C. G. HARRINGTON.

STEEL BOX CAR.

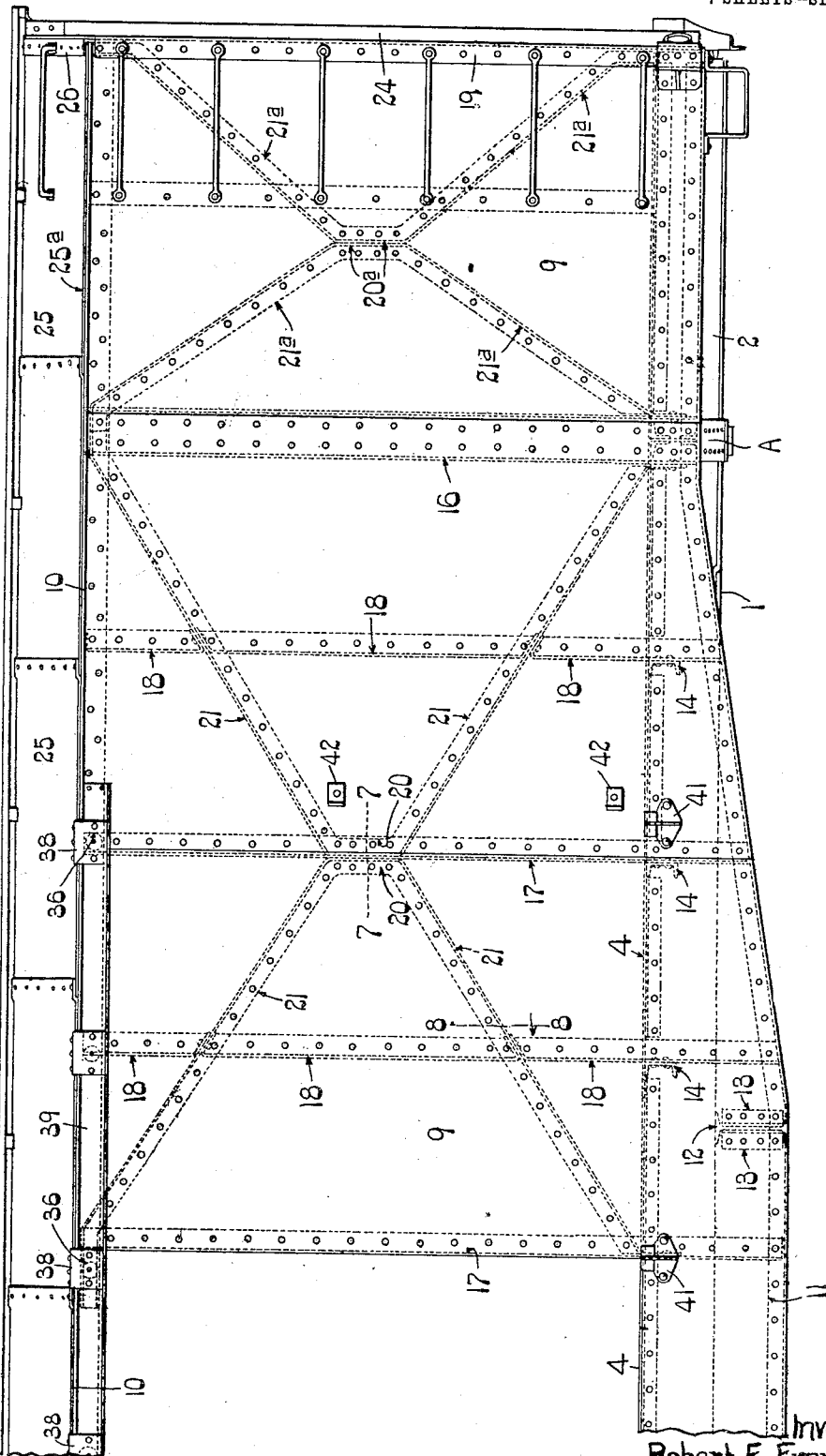
APPLICATION FILED JAN. 31, 1908.

941,067.

Patented Nov. 23, 1909.

7 SHEETS—SHEET 1.

Fig. 1.



Witnesses

J. M. Bayley
Wells L. Church

Inventors
Robert E. Frame
Clement G. Harrington
by B. K. Farnall Atty.

R. E. FRAME & C. G. HARRINGTON.

STEEL BOX CAR.

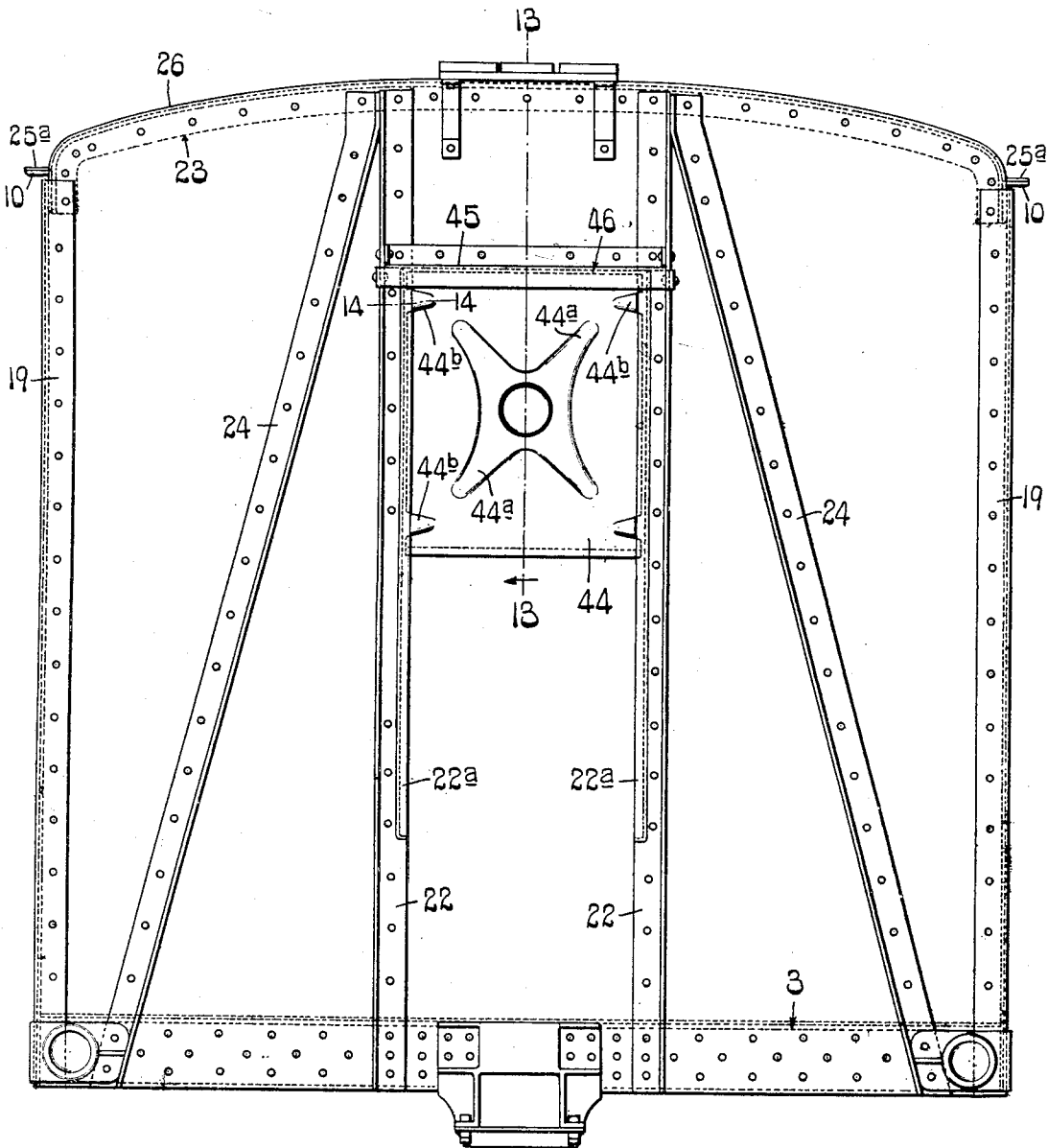
APPLICATION FILED JAN. 31, 1908.

941,067.

Patented Nov. 23, 1909.

7 SHEETS—SHEET 2.

Fig. 2.



Witnesses
A. J. McCauley.
Wells L. Church.

Inventors
Robert E. Frame
Clement G. Harrington
by Bakewell & Russell
ATTYS.

R. E. FRAME & C. G. HARRINGTON.

STEEL BOX CAR.

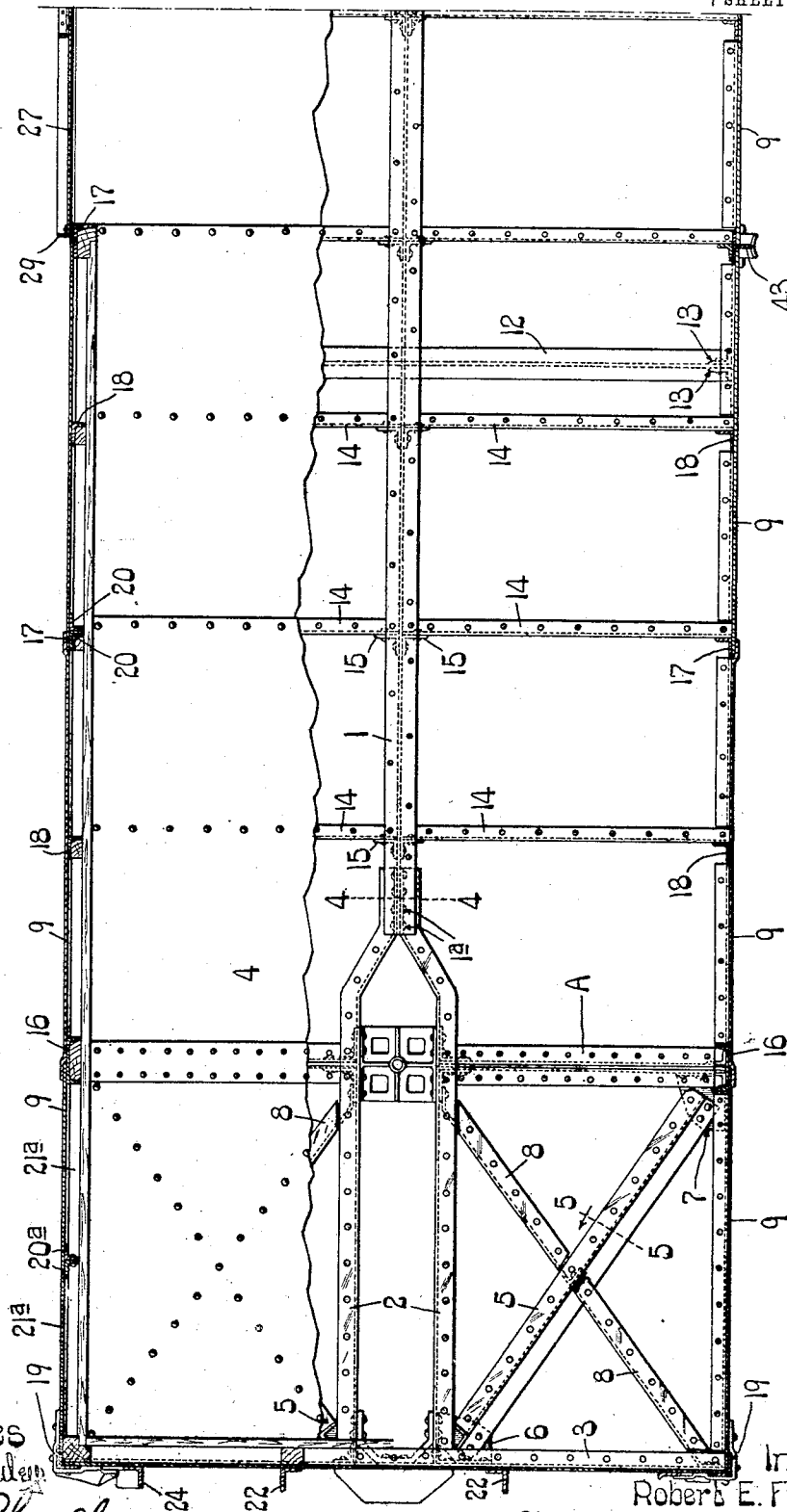
APPLICATION FILED JAN. 31, 1908.

Patented Nov. 23, 1909.

941,067.

7 SHEETS—SHEET 3.

Fig. 3.



Witnesses
C. J. McCauley
W. L. Church

Inventors
 Robert E. Frame
 Clement G. Harrington
 by *Bakerwell Cornwall* Attys.

R. E. FRAME & C. G. HARRINGTON.

STEEL BOX CAR.

APPLICATION FILED JAN. 31, 1908.

941,067.

Patented Nov. 23, 1909.

7 SHEETS—SHEET 4.

Fig. 4.

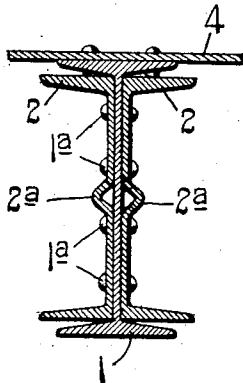


Fig. 5.

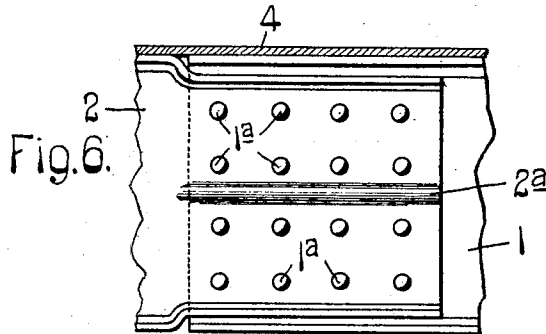
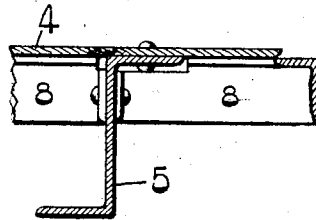


Fig. 7.

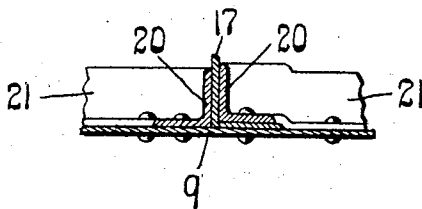
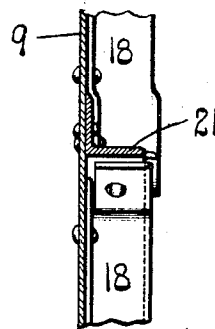


Fig. 8.



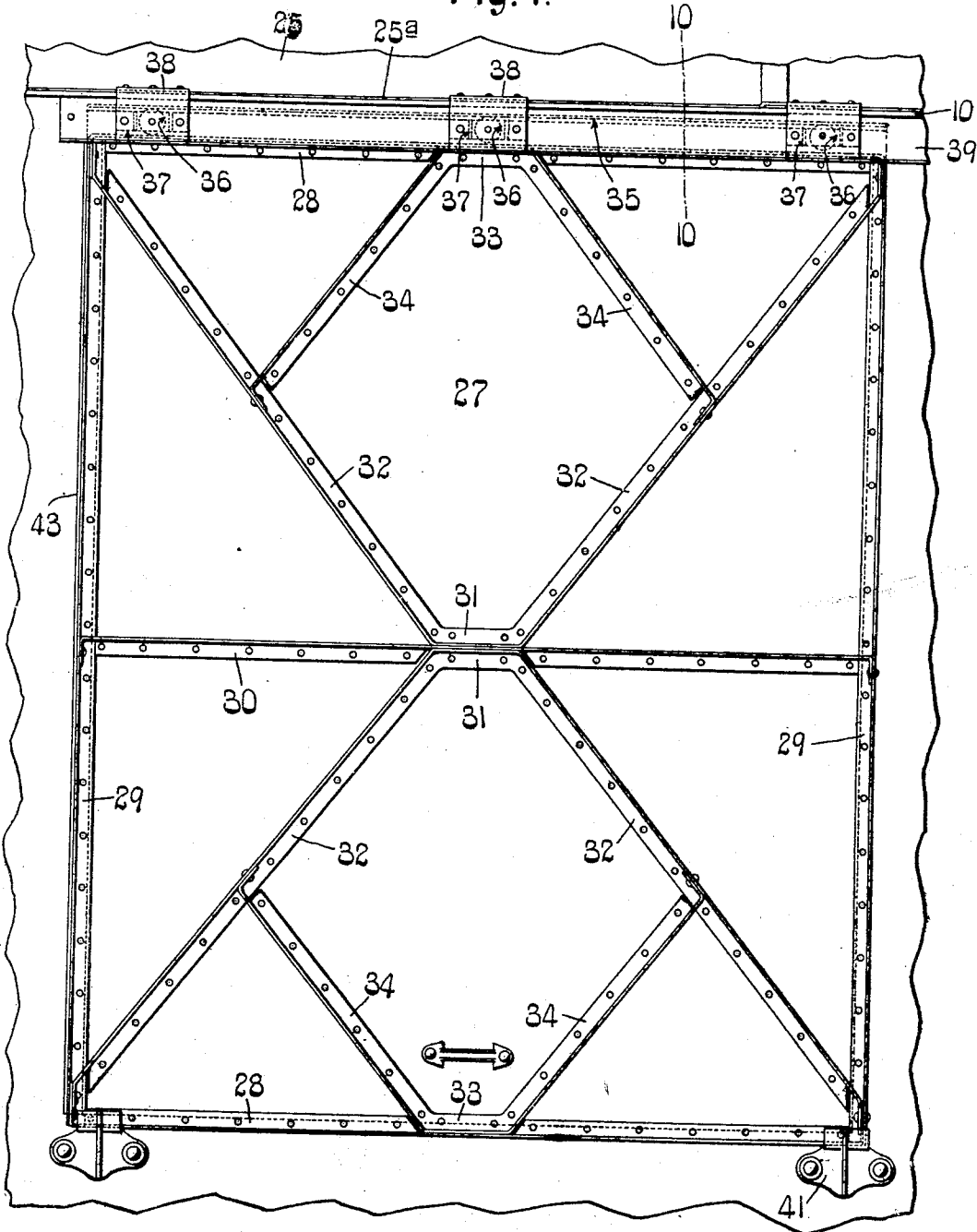
Witnesses
A. J. M. Cauley
Wells L. Church.

Inventors:
Robert E. Frame
Clement G. Harrington
by *W. H. W. Cornwall*
ATTYS.

APPLICATION FILED JAN. 31, 1908.

7 SHEETS--SHEET 6.

Fig. 9.



Wells L. Church.

by *Bakerwell Cornwall*
Abb's.

R. E. FRAME & C. G. HARRINGTON.

STEEL BOX CAR.

APPLICATION FILED JAN. 31, 1908.

941,067.

Patented Nov. 23, 1909.

7 SHEETS—SHEET 6.

Fig.10.

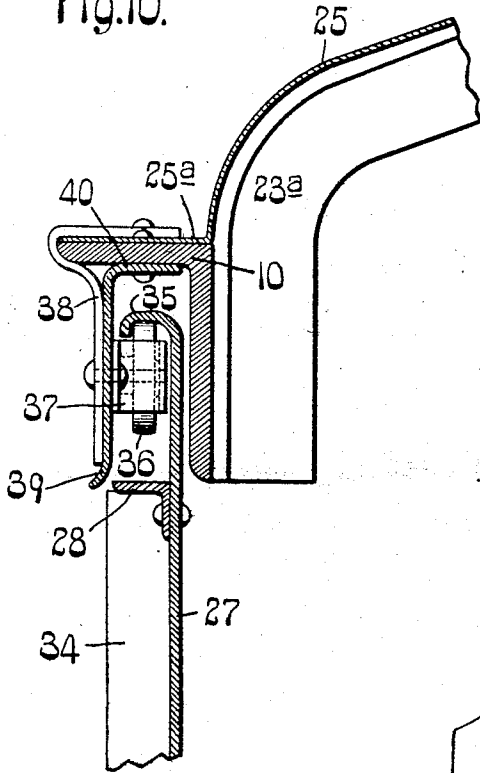


Fig.11.

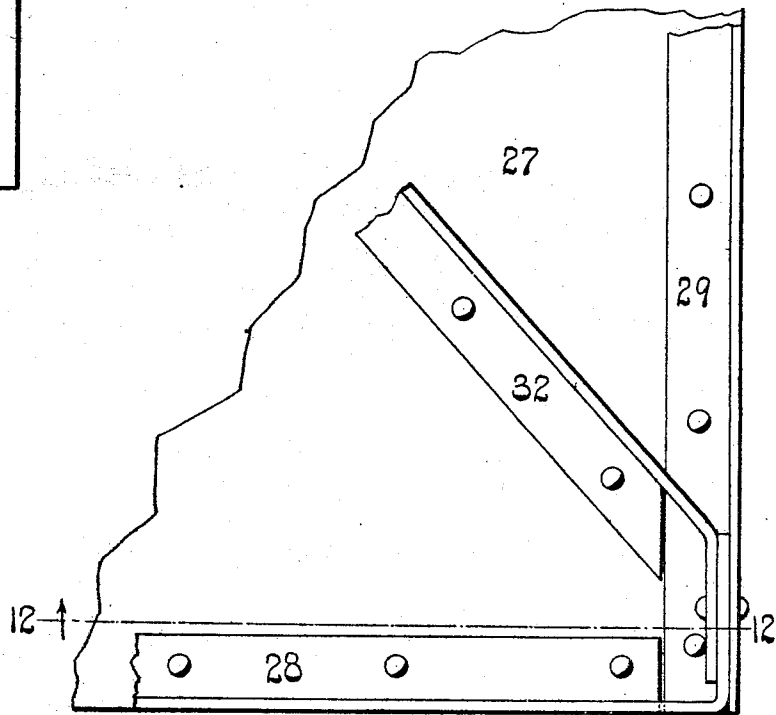
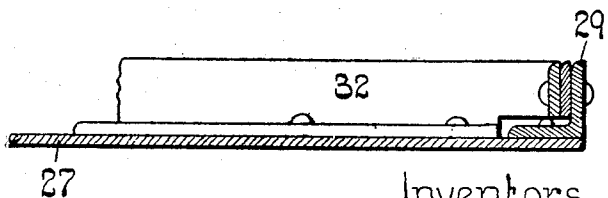


Fig.12.



Witnesses

A. J. M. Caulley

Nells L. Church

Inventors

Robert E. Frame

Clement G. Harrington

by *Bakerwell & Cornwall* Att'ys.

R. E. FRAME & C. G. HARRINGTON.
STEEL BOX CAR.

APPLICATION FILED JAN. 31, 1908.

Patented Nov. 23, 1909.

7 SHEETS—SHEET 7.

941,067.

Fig. 13.

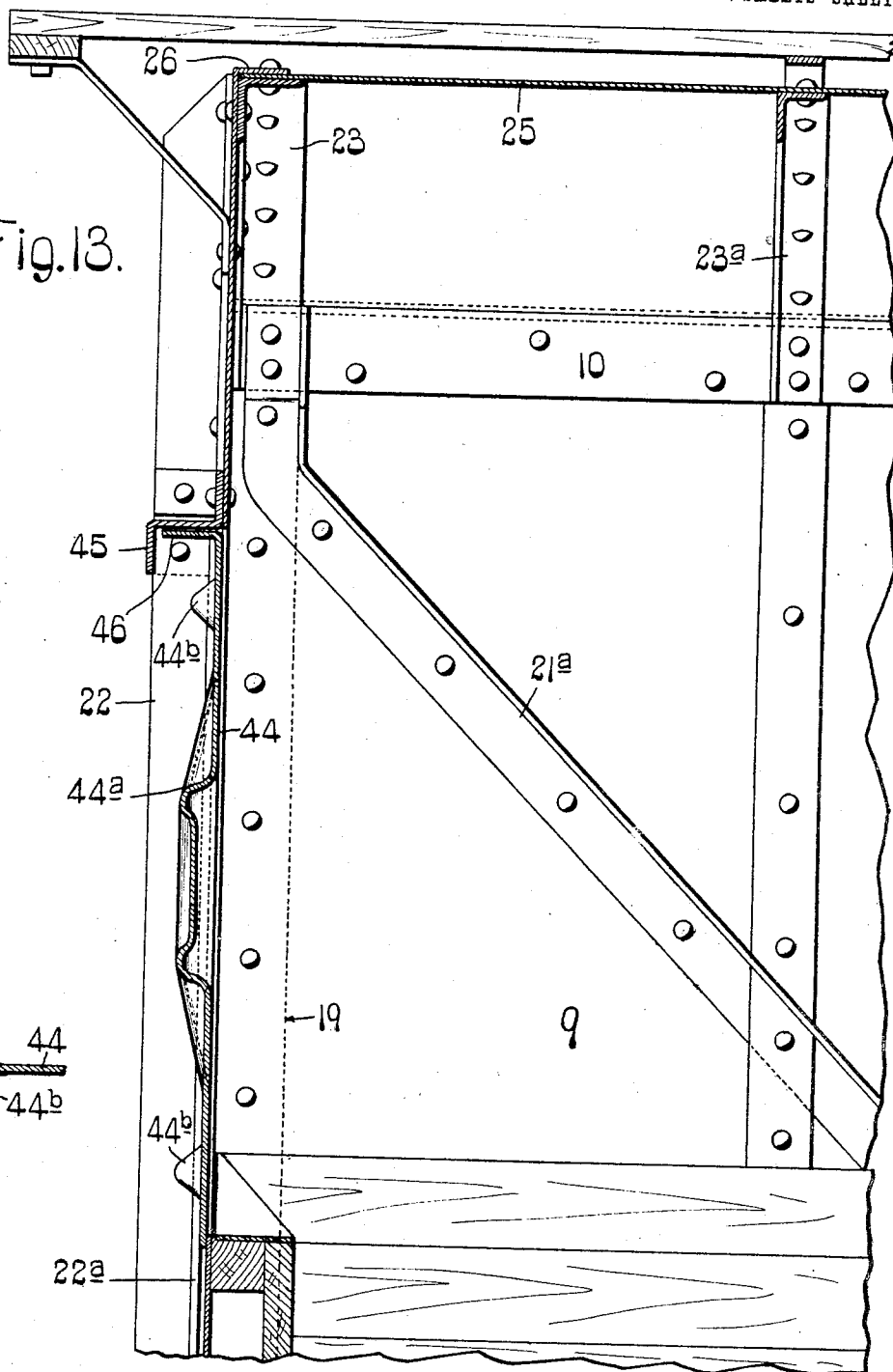
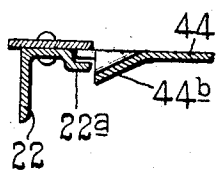


Fig. 14.



Witnesses
A. J. M. Cauley
Wells L. Church

Inventors
Robert E. Frame
Clement G. Harrington
by *Baker & Remond* Attys.

UNITED STATES PATENT OFFICE.

ROBERT E. FRAME, OF ST. LOUIS, AND CLEMENT G. HARRINGTON, OF MAPLEWOOD, MISSOURI, ASSIGNORS TO AMERICAN CAR & FOUNDRY COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF NEW JERSEY.

STEEL BOX-CAR.

941,067.

Specification of Letters Patent.

Patented Nov. 23, 1909.

Application filed January 31, 1908. Serial No. 413,641.

To all whom it may concern:

Be it known that we, ROBERT E. FRAME and CLEMENT G. HARRINGTON, both citizens of the United States, residing at St. Louis, Missouri, and Maplewood, St. Louis county, Missouri, respectively, have invented a certain new and useful Improvement in Steel Box-Cars, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of one-half of a car constructed in accordance with our invention; Fig. 2 is an end elevation of said car; Fig. 3 is a horizontal sectional view taken through the body of the car, a portion of the floor being broken away to show the underframing; Fig. 4 is an enlarged sectional view taken on the line 4—4 of Fig. 3; Fig. 5 is an enlarged sectional view taken on the line 5—5 of Fig. 3, looking in the direction of the arrow; Fig. 6 is an enlarged side elevation of a portion the center sill showing the way in which the draft sills are connected to said center sill; Fig. 7 is an enlarged sectional view taken on the line 7—7 of Fig. 1; Fig. 8 is an enlarged sectional view taken on the line 8—8 of Fig. 1, looking in the direction of the arrow; Fig. 9 is an enlarged side elevation of a portion of the side wall of the car showing the sliding door closed; Fig. 10 is a sectional view taken on the line 10—10 of Fig. 9; Fig. 11 is an enlarged detail view of a portion of the sliding side door; Fig. 12 is a sectional view taken on the line 12—12 of Fig. 11; Fig. 13 is an enlarged sectional view taken on the line 13—13 of Fig. 2, looking in the direction of the arrow; and Fig. 14 is a detail sectional view taken on the line 14—14 of Fig. 2.

This invention relates to cars, and particularly to cars that are constructed of metal.

We have herein shown a box car constructed in accordance with our invention but we wish to have it understood that various features of the structure herein shown could be embodied in other types of cars without departing from the spirit of our invention.

The main object of our invention is to provide a metallic car that is light and strong and which can be manufactured at a low cost.

One novel feature of our invention consists in the construction of the center sill and draft sills and also the braces between the bolsters and end sills of the underframe.

Another novel feature consists in the construction of the side walls of the car.

Another novel feature consists in the construction of the sliding side door and the means for supporting said door in position. And still another feature consists in a door of novel construction that covers an opening in the end wall of the car.

Referring to the drawings which illustrate the preferred form of our invention, 1 designates the intermediate member of the center sill which preferably consists of a continuous I-beam that terminates adjacent the bolsters A. The draft sills at each end of the car consist of a pair of channels 2 spaced away from each other and arranged with their horizontal legs or flanges projecting outwardly, the outer ends of said draft sills being connected to the end sill 3 which preferably consists of a commercially rolled channel. The draft sills 2 extend through the bolster A and have their inner ends bent inwardly, as shown in Fig. 3, so that they will embrace the vertical web of the I-beam center sill member 1 to which they are secured by fastening devices 1^a, as shown in Fig. 6. The draft sills are preferably of the same depth as the center sill so that the upper flanges of said members will lie in the same horizontal plane and thus form a flush support for the floor plates 4 of the car, and the inner ends of said draft sills are contracted by bending ribs 2^a in the vertical webs thereof so that their flanges will telescope inside of the flanges of the I-beam member of the center sill, as shown in Figs. 4 and 6.

A pair of diagonal braces 5 of Z-shape in cross section are arranged between the end sill 3 and bolster A at each end of the underframe, and said braces are connected at their outer ends to gusset plates 6 secured to the end sill and draft sills and at their inner ends to gusset plates 7 which are secured to the bolster and to the side walls of the car. Auxiliary diagonal braces are arranged op-

positely to the braces 5 and each of said auxiliary braces consists of two short pieces 8 of angle iron which are connected at their inner ends to the vertical web of the diagonal brace 5, one of said pieces 8 being connected at its outer end to the end sill and the other being connected to one of the draft sills. Instead of using separate brackets or connecting irons for securing the auxiliary brace in position, we prefer to cut off portions of the horizontal legs or flanges of the pieces 8 of angle iron which form said auxiliary brace, and bend the vertical legs of said angles so as to produce integral attaching flanges that lie against the end sill, draft sill and vertical web of the diagonal brace 5 to which parts they are riveted, as shown in Fig. 3.

The side walls of the car consist of metal plates 9 having their vertical side edges lapped and riveted together, said plates extending down below the floor of the car, as shown in Fig. 1. The side walls are deepest adjacent the center of the car and the lower edges of the side wall plates 9 are sheared off so that the side walls diminish gradually in depth from a point adjacent the center of the car to the bolsters. At the upper edge of each side wall is a continuous side plate angle 10 arranged with its horizontal leg projecting outwardly over the upper edges of the side wall plates 9 and at the lower edge of each side wall is a continuous angle 11 arranged with its horizontal leg projecting inwardly, thus producing a deep plate girder in which the angles 10 and 11, respectively, form the top and bottom chords.

A pair of continuous I-beams 12 pass underneath the center sill 1 on opposite sides of the transverse center of the car, and the outer ends of said I-beams are secured to the side walls by means of connecting irons or brackets 13, as shown in dotted lines in Figs. 1 and 3, said beams resting upon the horizontal legs of the angles 11 at the lower edges of the side walls and forming supports for the continuous center sill.

The cross bearers upon which the floor plates rest, consist of channels 14 interposed between the center sill and side walls, the inner ends of said channels being secured to the vertical web of the center sill by connecting members 15, shown in dotted lines in Fig. 3, and the outer ends of said channels being secured to the vertically disposed side posts of the side walls. The side walls are also provided on their inner sides with short pieces of angle iron that support the floor plates, said floor plates being riveted to said angles.

The side wall posts consist of channels 16 located at the bolsters A and arranged with their legs or flanges projecting inwardly, continuous angles 17 arranged at the sides of the door opening and intermediate said

door opening and the channels 16, and auxiliary side posts formed by short pieces 18 of angle iron; hereinafter more fully described. The corner posts 19 consist of angles that overlap or embrace the side and end walls of the car and the upper ends of said corner posts and vertical side posts are offset or bent inwardly to receive the vertical leg of the side plate angle 10 to which they are connected. The side walls are reinforced and strengthened by a number of approximately X-shaped braces which will now be described.

In the drawings we have illustrated only one-half of the car, but it will, of course, be understood that the other half of the car is of the same construction as that shown. The portion of the side wall between the door opening and the channel-shaped side post 16 at the bolster, is strengthened by means of an approximately X-shaped brace which consists of two continuous angles, each of which is bent to form a vertically disposed portion 20 and two inclined portions 21 diverging in opposite directions therefrom, the two vertical portions 20 being arranged adjacent each other so that the inclined portions 21 cooperate to produce an approximately X-shaped brace. The vertical legs of the angles which form said X-shaped brace are secured to the inside face of the side wall, and the inwardly projecting legs on the vertically disposed portions 20 of said brace are arranged on opposite sides of the inwardly projecting leg of the intermediate side post 17, as shown in Fig. 7, the vertically disposed portion 20 of one member of the brace being offset or bent inwardly to receive the outer leg of the side post 17 so that a flush surface will be provided for the side wall plates. The ends of the inclined portions 21 of said brace are connected to the side post 17 at the door opening and to the channel-shaped side post 16 in the following manner.

The inwardly projecting flanges of two of the inclined portions 21 project over the upper ends of the side posts, and the vertical legs of said inclined portions are riveted to the posts and also to the side plate angle 10, the upper ends of the side posts being offset or bent inwardly to receive the vertical flanges of said inclined portions and said inclined portions being offset inwardly to receive the vertical leg of the side plate angle 10, so that the outside faces of the side posts will be flush with the outside faces of said inclined portions 21. The vertical flanges at the lower ends of the other two inclined portions 21 of said brace are sheared off and their inwardly projecting flanges are bent downwardly to produce integral attaching flanges that are riveted to the inwardly projecting flanges of the side posts 16 and 17, as shown in dotted lines in Fig.

1. The short pieces 18 of angle iron of each auxiliary side post are also connected to the inclined portions 21 of the X-shaped brace by shearing off one leg of the angle and bending the inwardly projecting leg thereof so that it will lie upon the inwardly projecting leg of the adjacent inclined portion 21 of the brace, as shown in dotted lines in Fig. 1, said parts being secured together by rivets.

An X-shaped brace of similar construction to that just described is arranged between the channel-shaped side post 16 and the corner post 19. The ends of two of the inclined portions 21^a of said second X-shaped brace are connected to the channel-shaped side post 16 in the same manner as described in connection with the X-shaped brace first referred to but the other two inclined portions 21^a of the second X-shaped brace are merely bent to produce vertically disposed portions which lie parallel to the corner post to which they are secured by rivets, as shown in Figs. 1 and 13. No side posts are located between the corner post 19 and channel-shaped side post 16 so that the two angles which form the second X-shaped brace have the inwardly projecting flanges of their vertically disposed portions 20^a riveted together. The end wall posts consist of two vertically disposed angles 22 connected to the end sill and to the end roof carline 23 and also two diagonally extending angles 24 arranged between the corner posts and the angles 22, the angles 22 and 24 being secured to the outside face of the end wall, as shown in Fig. 2.

The roof of the car is made up of plates 25 having their edges lapped and extending continuously from side wall to side wall of the car, said plates being provided at the outer ends with integral flanges 25^a that lie upon the outwardly projecting legs of the side plate angles 10 and are riveted thereto, as shown in Fig. 10. The end roof carlines 23 and also the intermediate carlines 23^a consist of continuous angles that are connected to the inside faces of the vertical legs of the side plate angles 10 and the lapped edges of the roof plates 25 are preferably riveted to the horizontal legs of said intermediate carlines.

As shown in Fig. 13, the end wall is provided at its upper edge with a flange 26 that extends over the roof plate at the end of the car, said flange being riveted to the end carline 23 and to the roof plate.

Sliding doors cover the door openings in the side walls of the car and each of said doors consists of a plate 27 having angles 28 secured to its outer face along the upper and lower edges thereof and angles 29 along the side edges thereof. The meeting ends of said angles are connected together by shearing off portions of the vertical legs of the

angles 28 and then bending the remaining portions of the outwardly projecting legs so as to produce integral attaching flanges that lie against the outwardly projecting legs of the angles 29 and securing said legs together, as shown in Fig. 11. The plate 27 is strengthened by a transversely extending angle 30 and an approximately X-shaped brace of similar construction to those on the side wall of the car, said brace consisting of two continuous angles bent to produce horizontally disposed portions 31 which lie on opposite sides of the horizontal leg of the angle 30 and inclined portions 32 diverging in opposite directions from the portions 31. The outer ends of the inclined portions 32 of said brace are connected to the angles 29 on the side edges of the door by shearing off the vertical flanges of said inclined portions 32 and riveting the outwardly projecting legs or flanges thereof to the outstanding flanges or legs of the angles 29 and to the attaching flanges on the angles 28, as shown in Fig. 11. The members which form said X-shaped brace are riveted to the outer face of the plate 27 and the transversely extending angle 30 is also riveted to said plate and to the side angles 29, portions of the vertical leg of said angle 30 being sheared off so that the remaining horizontal leg can be bent to produce attaching flanges.

As shown in Fig. 9, a portion of the vertical leg of the angle 30 is cut away to receive the horizontal portion 31 of one member of the X-shaped brace. The door is also provided with additional braces which reinforce and strengthen the inclined portions 32 of the X-shaped brace, each of said additional braces consisting of an angle that is bent to form a horizontally disposed portion 33 and inclined portions 34 diverging in opposite directions therefrom. The horizontal portions 33 of said additional braces bear upon the horizontal flanges of the angles 28 and the outer ends of the inclined portions 34 are connected to the inclined portions 32 of the X-shaped brace, as shown in Fig. 9. The vertical flanges of the angles 28 are preferably cut away to receive the horizontal portions 33 of said additional braces and the vertical flanges at the outer ends of the inclined portions 34 are cut away so that the outwardly projecting flanges of said inclined portions 34 can be used as attaching flanges.

Instead of providing the side doors with rollers that travel on tracks carried by the side walls of the car we provide each door at its upper edge with an outwardly projecting flange 35 that rests on rollers 36 carried by the side wall of the car. The flange 35 is preferably formed by bending the upper edge of the door plate 27 outwardly and also deflecting the outer edge of said flange, as shown in Fig. 10, and the rollers 36 are journaled in bearings 37 secured to brackets

38 which are carried by the upper side plate angle 10 of the side wall. A hood 39 extends across the door opening to prevent water from beating in over the upper edge of the door, said hood consisting of a plate connected to the inside faces of the brackets 38 and provided with a laterally projecting flange 40 that is secured to the underneath side of the outwardly projecting leg of the side plate angle 10, as shown in Fig. 10.

The lower edge of the door travels in guides 41 on the side wall of the car and said side wall is provided with stops 42 that are engaged by the rear edge of the door when it is in its open position. When the door is closed its front edge butts against a stop 43 that projects laterally from the side wall and said stop preferably consists of the outwardly projecting leg or flange of a T-iron that forms one of the side posts of the side wall, as shown in Fig. 3.

An opening is formed in the end wall of the car between the two vertical posts 22, and said opening is closed by a sliding door 44 preferably formed of pressed metal. The vertical posts 22 are provided with pressed-out portions 22^a that form guideways for the side edges of the door 44 and said door is provided with pressed stops or abutments 44^b that cooperate with the side guides 22^a, as shown in Figs. 2 and 14.

A hood 45 is secured to the end wall of the car across said door opening and said hood preferably consists of a Z-bar that has its central web cut away at its ends so that its vertical flanges can be bent into engagement with the outwardly projecting legs of the posts 22 and riveted thereto. The door 44 is provided with pressed ribs 44^a which strengthen same, and at the upper edge of the door is an outwardly projecting flange 46 that engages the central web of the hood 45 when the door is closed, as shown in Fig. 13.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A car provided with a center sill which consists of a continuous member that terminates inside of the bolsters, and draft sills extending through the bolsters and connected to the end portions of said center sill member; substantially as described.

2. A car provided with a center sill which consists of a continuous member that terminates inside of the bolsters, and draft sills consisting of members spaced away from each other and having their inner ends bent into engagement with the center sill and secured thereto; substantially as described.

3. A car provided with a single flanged center sill member, and draft sill members of the same depth as the center sill member and embracing the end portions thereof, the inner ends of said draft sill members being

reduced in depth so that they will telescope inside of the flanges of said center sill member; substantially as described.

4. A car provided with a flanged center sill member that terminates inside of the bolsters, and a pair of draft sill members extending through the bolsters and embracing the end portions of said center sill member, the flanges of said center sill member telescoping over the inner ends of the draft sill members; substantially as described.

5. A car provided with a flanged center sill member, and a pair of channel-shaped draft sill members extending through the bolster and embracing the end portion of the center sill member, the vertical webs of said draft sill members being bent out of their normal planes so that the flanges thereon will telescope inside of the flanges of the center sill member; substantially as described.

6. A car provided with a flanged center sill member, and a pair of channel-shaped draft sills embracing the end of said center sill member and having ribs formed in their vertically disposed webs; substantially as described.

7. A car provided with a flanged center sill member that terminates inside of the bolsters, draft sills consisting of a pair of rolled channel-shaped members extending through the bolster and having their inner ends reduced so that they will telescope inside of the flanges of the center sill member, and fastening devices passing through the webs of said members to secure them together; substantially as described.

8. A car underframe comprising an inclined brace of approximately Z-shape in cross section arranged between the bolster and end sill, and an oppositely inclined brace consisting of pieces of angle iron provided with integral attaching flanges that are secured to the web of said approximately Z-shaped brace; substantially as described.

9. In a car underframe, an inclined brace of approximately Z-shape in cross section, and an oppositely inclined brace consisting of pieces of angle iron having their horizontal legs cut away and their vertical legs bent laterally and secured to the vertical web of the approximately Z-shaped brace; substantially as described.

10. A car provided with a continuous center sill member that terminates inside of the bolsters, a pair of draft sill members extending through one of the bolsters and having their inner ends embracing one end of the center sill and secured thereto, and approximately X-shaped braces arranged between the bolster and end sill on each side of the draft sill; substantially as described.

11. A box-car provided with plate girder side walls having vertically disposed side posts and a number of approximately

X-shaped braces arranged on the inside faces of the walls, a center sill, continuous members passing underneath the center sill and connected at their outer ends to the side walls, and floor supports connected to the center sill and to the posts of the side walls; substantially as described.

12. A box-car provided with a continuous center-sill, side walls consisting of deep plate girders having a number of approximately X-shaped braces arranged on their inner faces, and floor supports projecting laterally from the center sill and connected to the side walls; substantially as described.

13. A box-car having plate girder side walls which are deepest adjacent the transverse center of the car, said side walls having a number of approximately X-shaped braces arranged on their inner faces, a center sill, and floor supports connected to said center sill and to said side walls; substantially as described.

14. A box-car provided with deep plate girder side walls which extend below the floor of the car, vertical side posts connected to the top and bottom chords of said girders, a number of approximately X-shaped braces arranged on the inside faces of said girders, and floor supports connected to said side posts; substantially as described.

15. A box-car provided with a deep plate girder side wall consisting of a continuous side plate angle forming the upper chord of the girder, a continuous angle extending from end sill to end sill and deflected downwardly intermediate the bolsters to form the bottom chord of said girder, web plates connected to said chords and filling the entire space between the chords, and a number of approximately X-shaped braces connected to the inner faces of said web plates; substantially as described.

16. In a car structure, a wall provided with an approximately X-shaped brace consisting of two commercially rolled members bent to form parallel central portions and inclined portions diverging in opposite directions therefrom, and a member connected to said side wall and having a flange to which the parallel central portions of said members are connected; substantially as described.

17. In a car structure, a side wall provided with vertically disposed side posts, an approximately X-shaped brace connected to the side wall plates and having its ends secured to said side posts, and an intermediate side wall post connected to the central portion of said brace; substantially as described.

18. In a car structure, a metallic side wall provided with an approximately X-shaped brace which consists of two commercially rolled angles bent to form parallel vertical portions and inclined portions diverging in

opposite directions therefrom, and a member arranged between the parallel vertical portions of said angles and connected thereto; substantially as described.

19. A car provided with a side wall having side posts and having a door opening formed therein, an approximately X-shaped brace arranged between the side posts at the door opening and at the bolster of the car, an intermediate side post connected to the central portion of the X-shaped brace first referred to, and a second approximately X-shaped brace arranged between the side post at the bolster and the end post of the car; substantially as described.

20. A car having a metallic side wall which comprises side posts, approximately X-shaped braces connected to the inner face of said side wall and also secured to the vertically disposed side posts; and intermediate side posts connected to the central portions of some of said X-shaped braces; substantially as described.

21. A car provided with a side wall which comprises side posts, an approximately X-shaped brace secured to said side wall and having the upper ends of two of its inclined portions connected to the upper ends of two of the side posts, and integral attaching flanges on the lower ends of the other two inclined portions for connecting said portions to the side posts; substantially as described.

22. A car having a side wall comprising side posts, and an approximately X-shaped brace secured to said side wall and formed from commercially rolled members, portions of the legs of which are removed to produce integral attaching flanges which secure the brace in position; substantially as described.

23. A car having a metallic side wall which is provided at its upper edge with a side plate angle, side posts connected to the side wall and having their upper ends secured to said side plate angle, and an approximately X-shaped brace secured to the inner face of the side wall and connected to the side posts and the side plate angle; substantially as described.

24. A car having a metallic side wall provided with a side post at the bolster, at one edge of the door opening and intermediate these points, and an approximately X-shaped brace secured to said side wall and consisting of two continuous angles bent to form vertically disposed portions which engage the intermediate side post and inclined portions diverging in opposite directions from said vertically disposed portions and having their outer ends secured to the side posts at the door opening and at the bolster; substantially as described.

25. In a car structure, a metallic side wall having side posts and provided with an approximately X-shaped brace which consists

of two continuous angles bent to form oppositely diverging inclined portions, the upper ends of two of said inclined portions overlapping the upper ends of two of the side posts, and the lower ends of the other two inclined portions being provided with integral attaching flanges that are connected to the side posts; substantially as described.

26. A car provided with an end roof carline, a metal roof plate resting on said carline and terminating at the outer edge thereof, and an end wall provided at its upper edge with an inverted L-shaped flange that projects over the flat edge portion of said roof plate; substantially as described.

27. A car provided with an end roof carline consisting of a commercially rolled angle having its vertical leg projecting downwardly, a metallic roof plate resting on the horizontal leg of said carline and terminating flush with the outside face of the vertical leg thereof, an end wall provided at its upper edge with an integral flange that projects over the outside face of said plate, and fastening devices passing through said flange, plate and carline to connect them together; substantially as described.

28. A car provided with side walls having side plate angles extending along their upper edges, angle-shaped roof carlines having their opposite ends secured to the depending legs of said side plate angles, and metallic roof plates extending continuously from side wall to side wall of the car and provided at their ends with integral flanges that are secured to the outwardly projecting legs of the side plate angles; substantially as described.

29. A car provided with an end wall having a door opening formed therein, vertically disposed posts secured to said end wall and to the end sill of the car, and a sliding door covering said opening and having its edge portions arranged underneath said vertical posts; substantially as described.

30. A car provided with an end wall having an opening formed therein, flanged posts secured to said end wall and to the end sill of the car and having off-set portions which form guideways, and a sliding door arranged in said guideways to cover the opening in the end wall; substantially as described.

31. A car provided with an end wall having an opening formed therein, vertical posts secured to said end wall, and a hood extending across said opening and consisting of a Z-shaped member having portions of its web removed and its vertical flanges bent into engagement with and secured to said vertical posts; substantially as described.

32. A car provided with an end wall having a door opening formed therein, vertical

posts connected to the end wall and having pressed-out portions which form guideways for the sliding door, a hood connected to the end wall at the upper edge of said opening and provided with a depending flange, and a sliding door arranged between the guides on the end wall and provided at its upper edge with a flange that engages the hood when the door is in its closed position; substantially as described.

33. A car provided with an end wall having an opening formed therein, guides on said end wall, a door covering said opening and having its edge portions arranged underneath said guides, and stops on said door arranged between said guides; substantially as described.

34. A car provided with an end wall having an opening formed therein, guides on said end wall, a metal door covering said opening and arranged between said guides, and pressed-out portions on said door that form lugs or stops which engage the edge portions of said guides; substantially as described.

35. In a car comprising plate girder sides, a flanged side plate, and a door hanger supporting member carried by the outwardly, extending flange of said side plate.

36. In a car comprising plate girder sides, a flanged side plate member forming an element of said plate girder, and a housing for sliding door fixtures secured to said side plate.

37. In a metallic car, the combination comprising an outwardly flanged side plate, cooperating housing members carried thereby, door supporting means within the housing thus provided, and a sliding door having an extension projecting into said housing.

38. In a metallic car, the combination comprising an outwardly flanged side plate, cooperating housing members carried thereby, door supporting rollers within the housing thus provided, and a sliding door having an extension projecting into said housing.

39. In a car having an outwardly flanged side plate extending beyond the side wall thereof, door-hanger housing members secured to said flanged side plate, door supporting means within the housing thus provided, and a sliding door suspended on said door supporting means.

40. In a car construction, the combination of an outwardly flanged side plate and sliding door fixtures supported thereby.

41. In a car construction, the combination of an outwardly flanged side plate and sliding door fixtures supported by the outwardly extending flange of said plate.

42. In a car construction, the combination of an outwardly flanged side plate and sup-

porting members for a sliding door carried by the outwardly extending flange of said side plate.

43. In a car, a plate girder side wall provided adjacent its upper edge with an outwardly extending flange, and a housing for door hanger fixtures supported by said flange.

44. In a car, the combination comprising an outwardly flanged side plate, and a door hanger housing suspended from the out-

wardly extending flange of said plate, said housing comprising a plurality of members.

In testimony whereof, we hereunto affix our signatures in the presence of two witnesses, this 29th day of January, 1908.

ROBERT E. FRAME.

CLEMENT G. HARRINGTON.

Witnesses:

WELLS L. CHURCH,
GEORGE BAKEWELL.