

May 16, 1933.

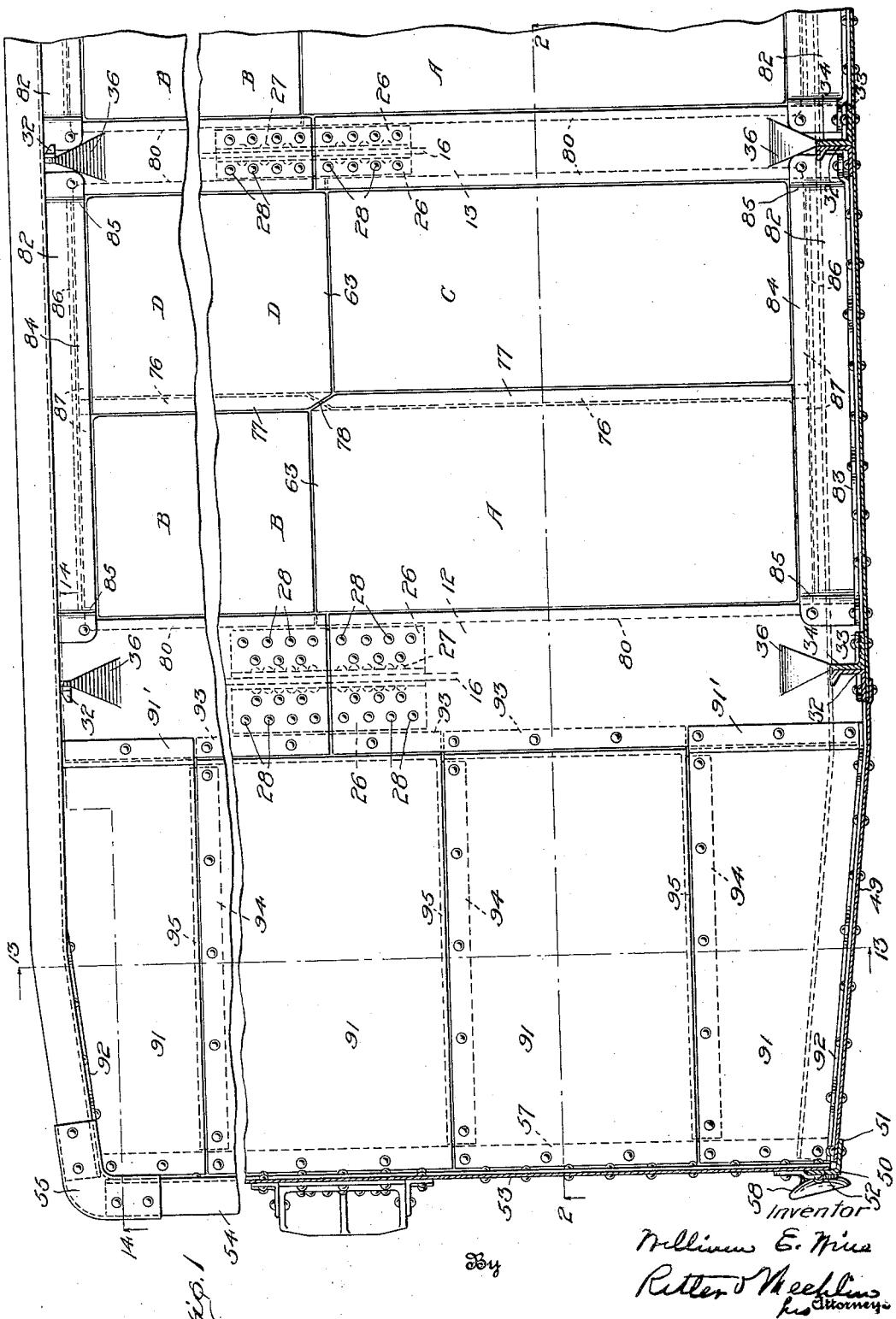
W. E. WINE

1,908,720

RAILWAY CAR

Original Filed Nov. 5, 1929

8 Sheets-Sheet 1



William E. Nine
Ritter & Wechlin
Attorneys

May 16, 1933.

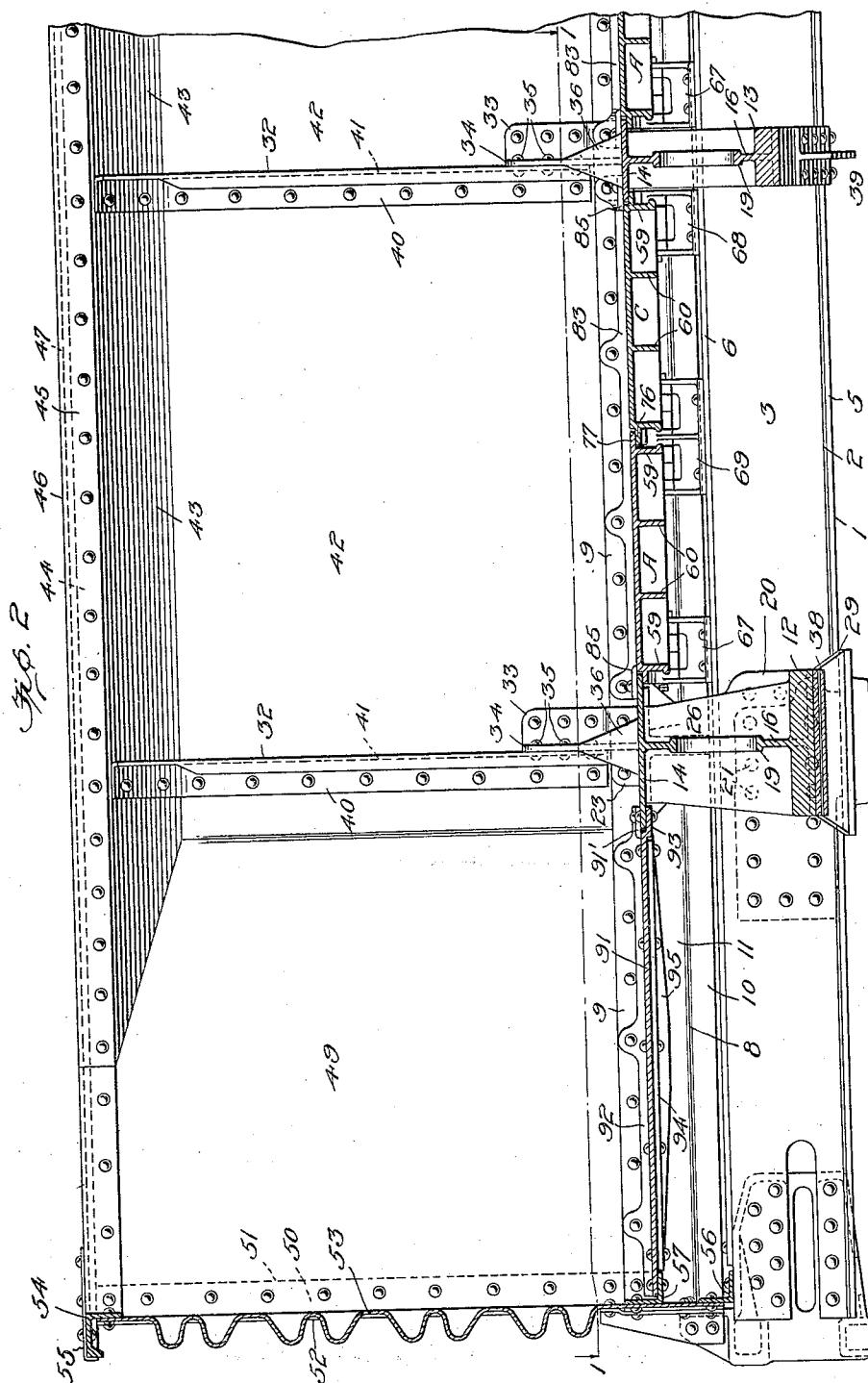
W. E. WINE

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RAILWAY CAR

Original Filed Nov. 5, 1929

8 Sheets-Sheet 2



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Ritter & Meeklin
Attorneys

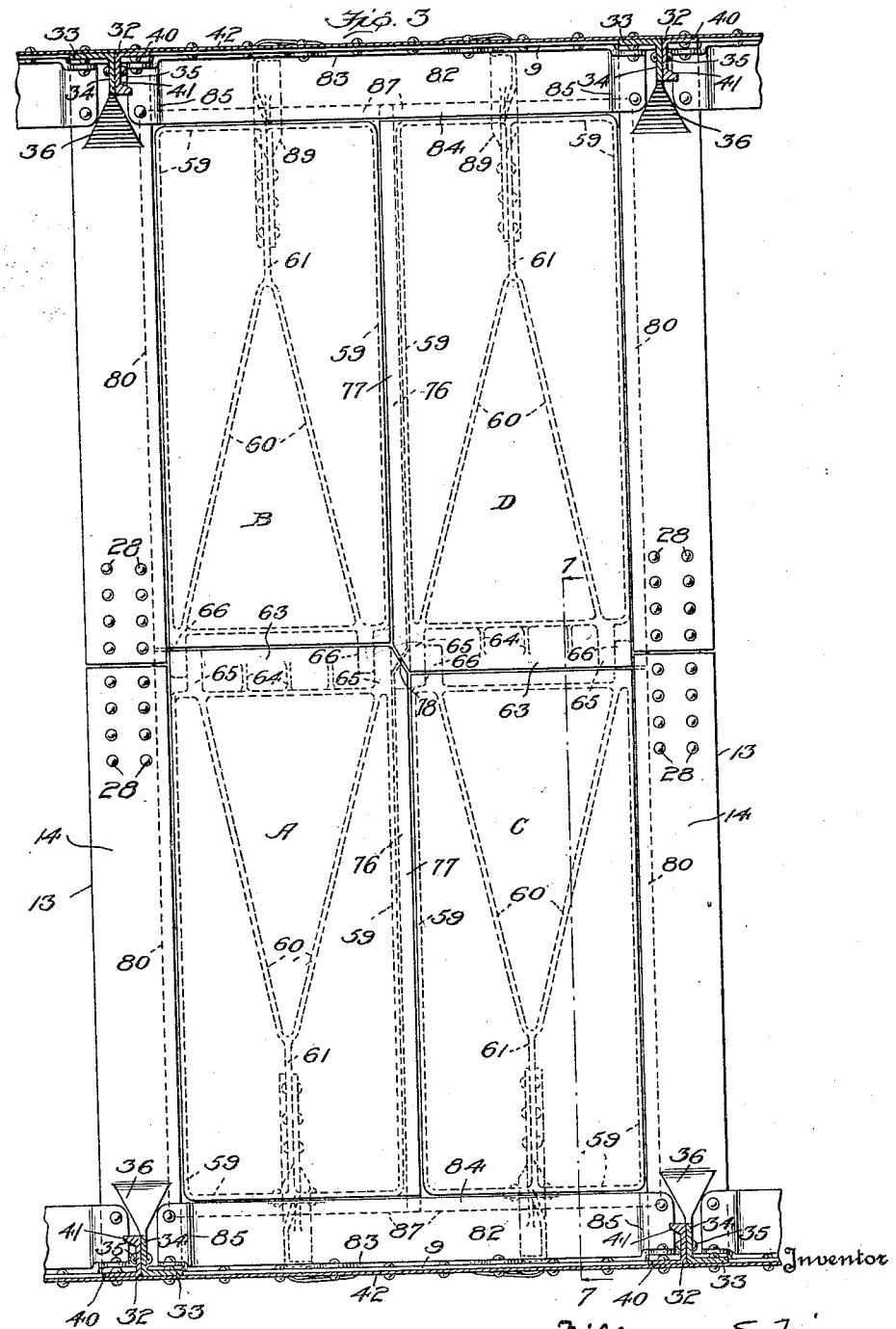
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W. E. WINE

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RAILWAY CAR

Original Filed Nov. 5, 1929 8 Sheets-Sheet 3



William E. Nine

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Ritter & Needham
his Attorney⁵

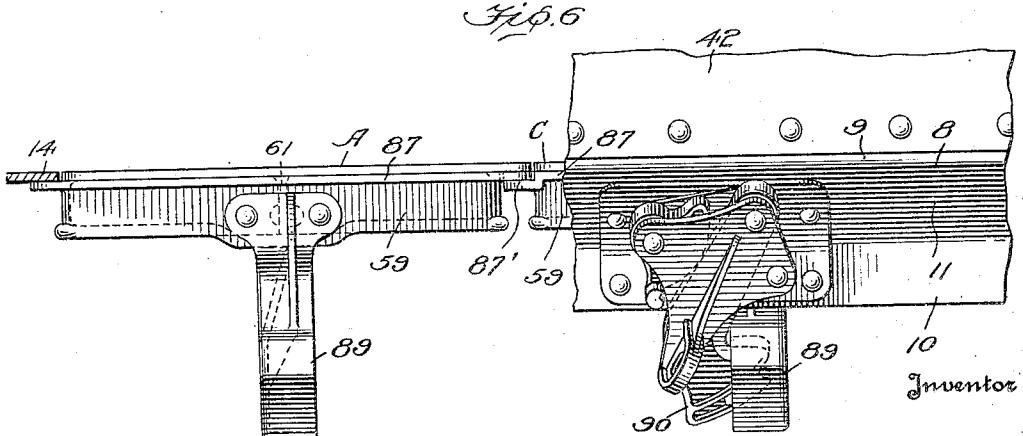
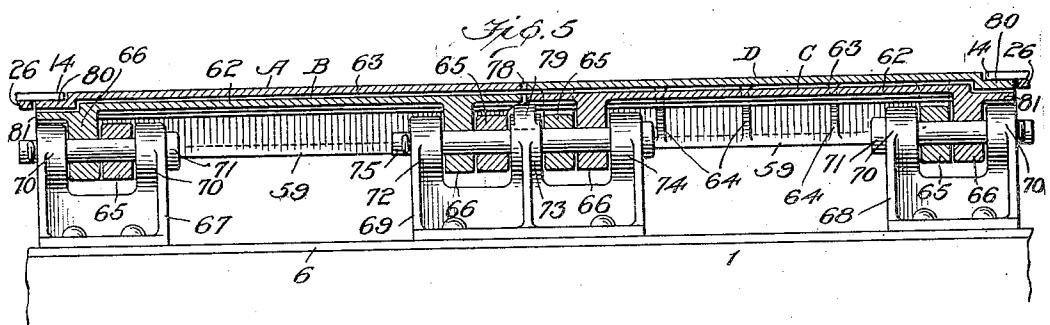
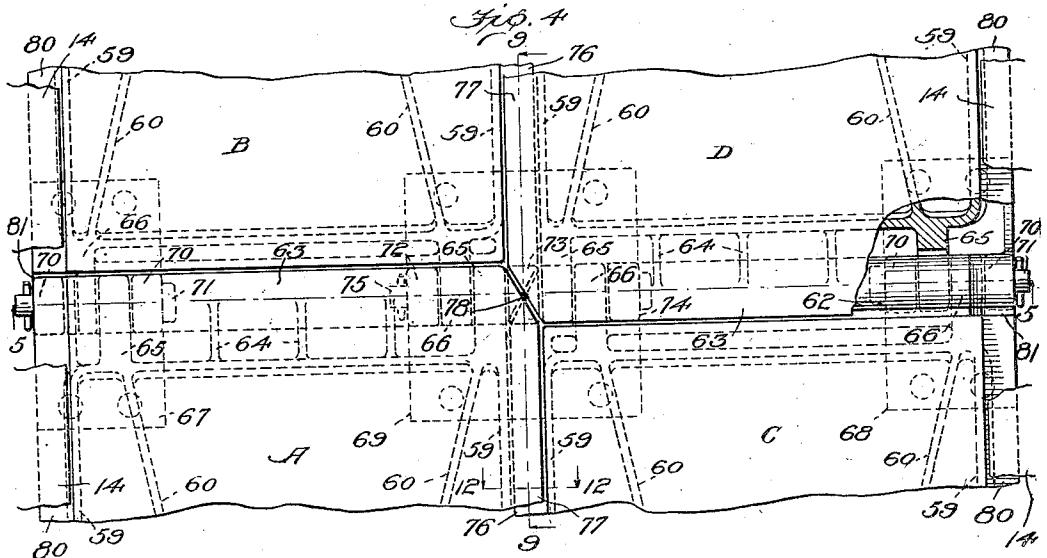
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W. E. WINE

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RAILWAY CAR

Original Filed Nov. 5, 1929 8 Sheets-Sheet 4



William E. Nine

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Ritter & Meeklin
Attorneys

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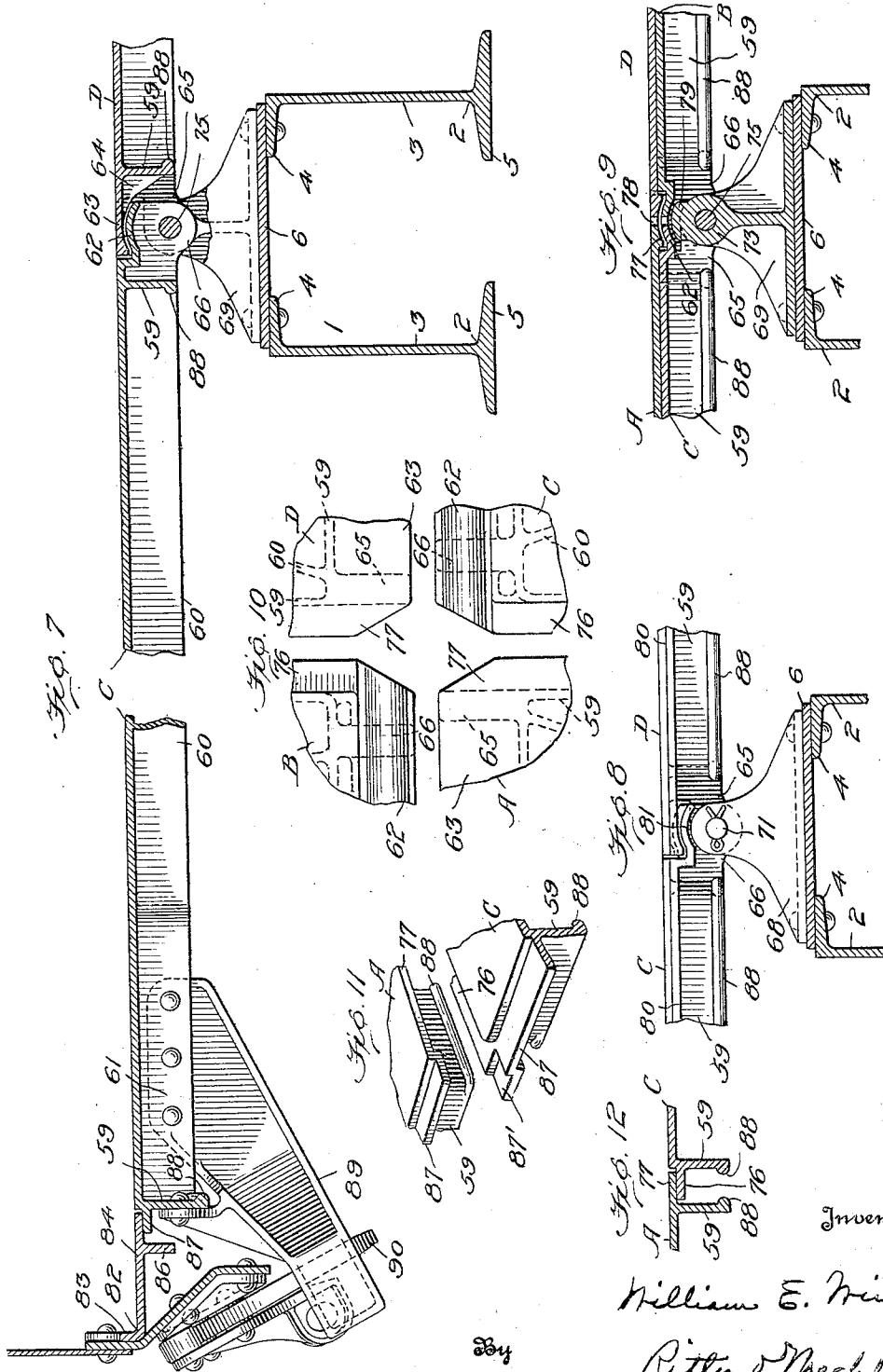
W. E. WINE

1,908,720

RAILWAY CAR

Original Filed Nov. 5, 1929

8 Sheets-Sheet 5



Inventor.

William E. Nine

Ritter & Meekins
Attorneys

May 16, 1933.

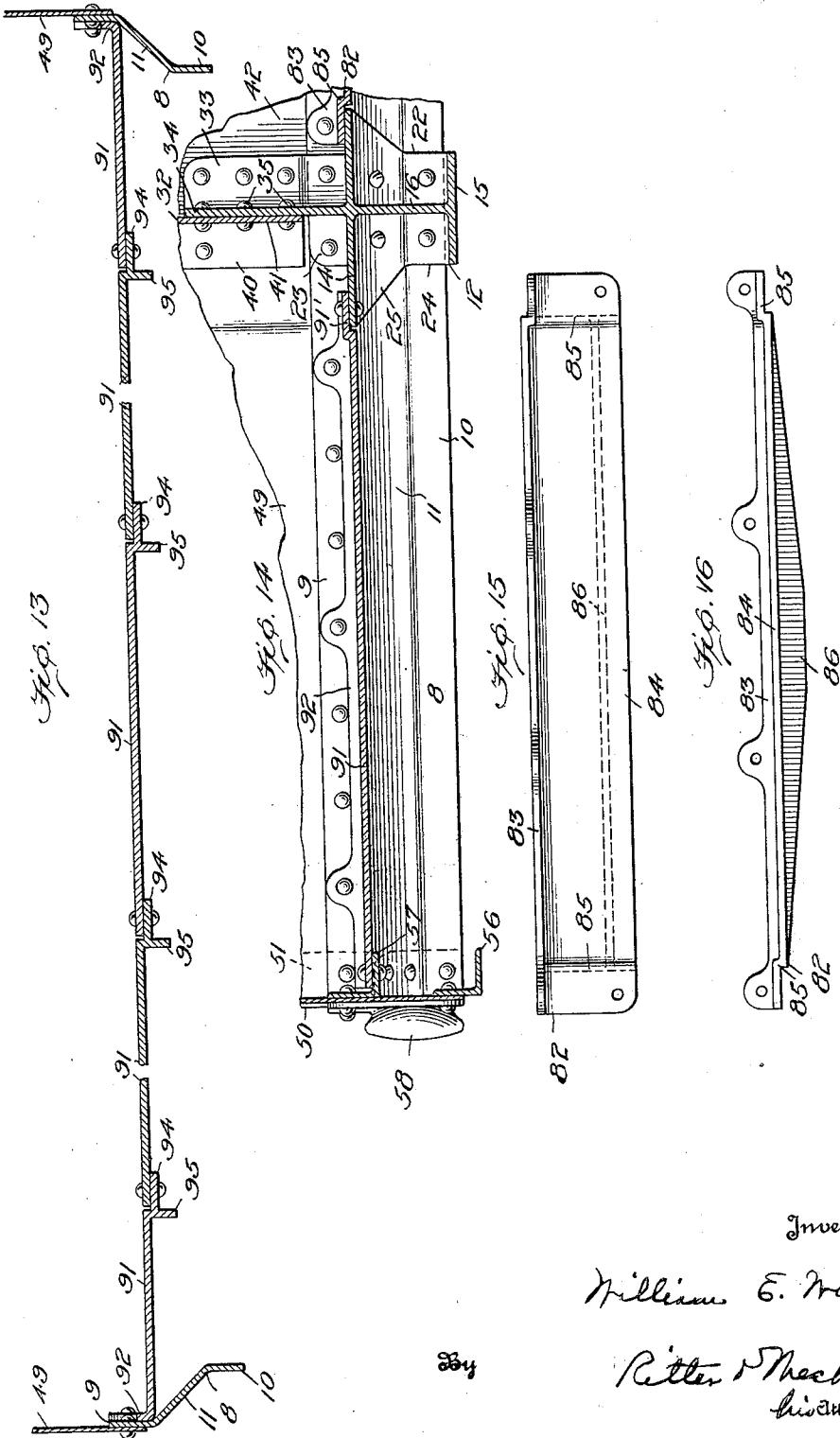
W. E. WINE

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RAILWAY CAR

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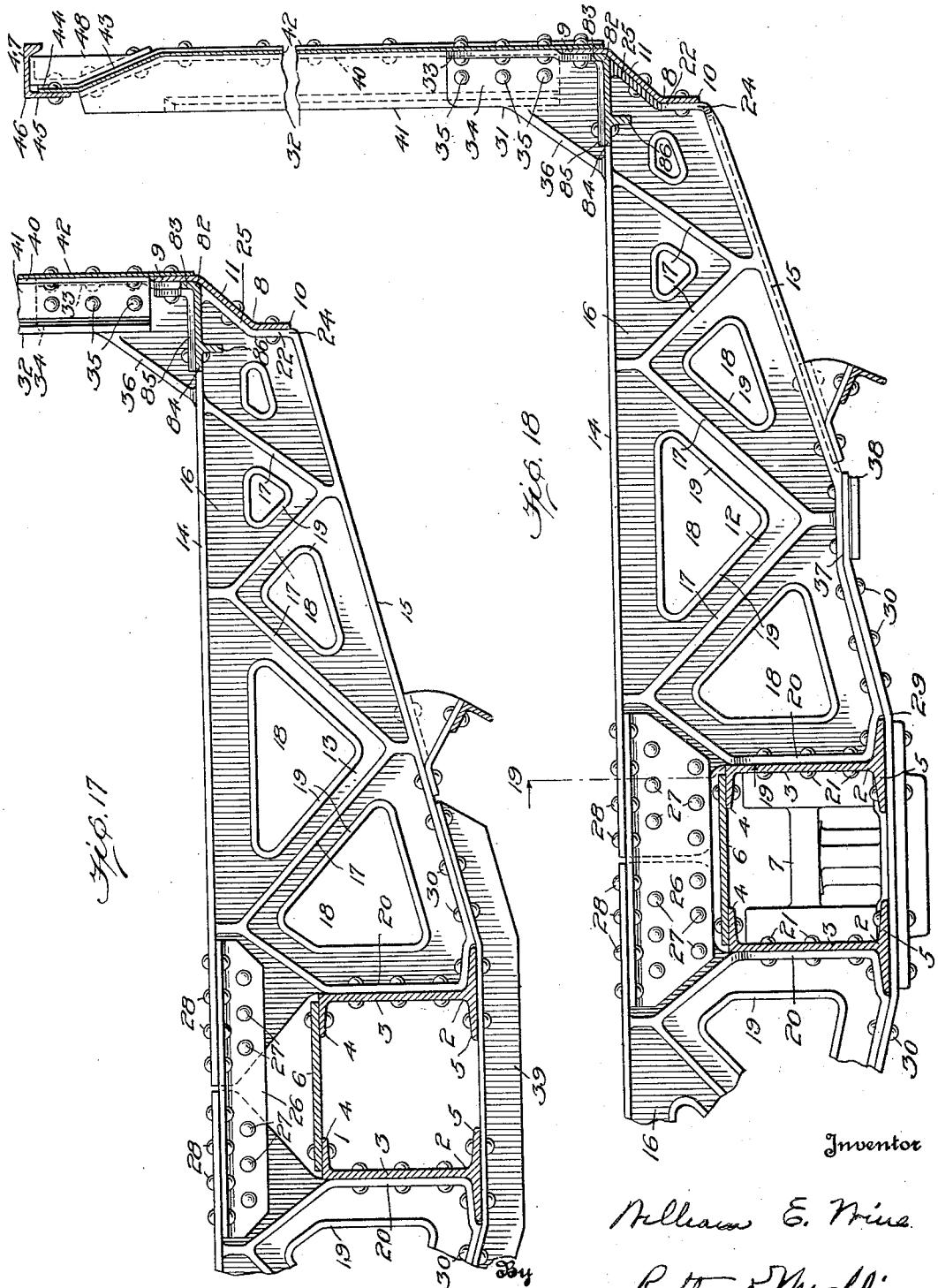
W. E. WINE

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RAILWAY CAR

Original Filed Nov. 5, 1929

8 Sheets-Sheet 7



Inventor

William E. Wine

Ritter & Macklin
his attorneys

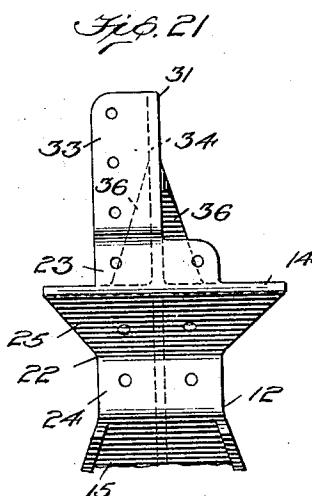
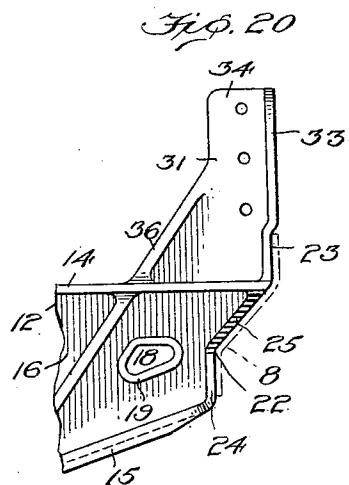
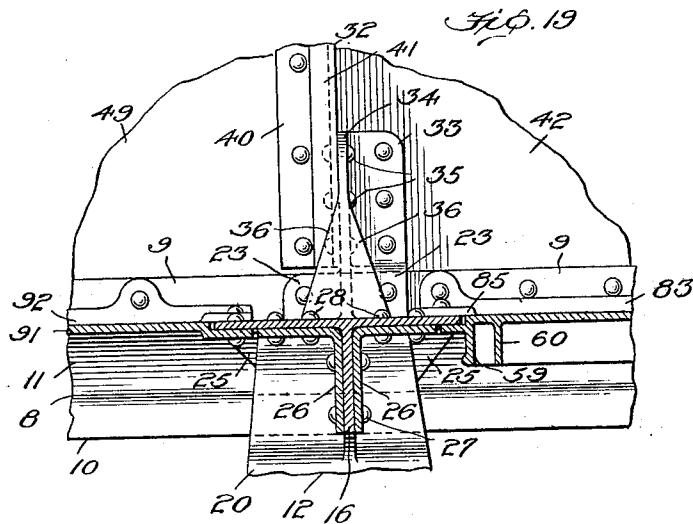
May 16, 1933.

W. E. WINE

1,908,720

RAILWAY CAR

Original Filed Nov. 5, 1929 8 Sheets-Sheet 8



Inventor

William E. Nine

234 Ritter & Mechlin
his attorneys

UNITED STATES PATENT OFFICE

WILLIAM E. WINE, OF TOLEDO, OHIO

RAILWAY CAR

Application filed November 5, 1929, Serial No. 404,964. Renewed May 11, 1932.

My invention relates to railway cars and more particularly to cars of the flat bottom gondola type.

A primary object of the invention is to provide the car with lading discharge openings of maximum size.

Another object of the invention is to so construct the underframe members of the car that portions thereof constitute parts or sections of the car floor.

Another object of the invention is to provide the car with a floor formed substantially entirely of cast metal parts whereby a more durable and rigid floor construction is produced. By forming the floor with cast steel parts or sections a more economical construction and one which may be more quickly assembled is produced due to the elimination of many of the rivets employed in floors of sheet metal construction.

A primary feature of the invention consists in providing the car with a substantially rectangular floor unit involving a plurality of doors hingedly connected to the car center sill and respectively disposed on opposite sides thereof, the hinged edges of the doors being disposed in overlapping relation.

A further feature of the invention resides in providing a substantially rectangular floor unit involving two pairs of doors hingedly connected to the car center sill, one door of each pair being disposed on opposite sides of the center sill and respectively having portions overlapping the other door of its pair and the adjoining door of the other pair.

Another feature of the invention consists in providing a transverse underframe member with a substantially horizontally disposed flange spaced above the top of the center sill and forming a portion of the car floor.

A further feature of the invention resides in providing the car with angle shaped members adapted to be disposed between the car sides and the free edges of the door.

A still further feature of the invention consists in providing the opposite ends of the transverse underframe members with

upwardly projecting extensions respectively having portions disposed in planes normal to the longitudinal axis of the car to which car side stakes may be secured, said portions being fashioned with rigidifying flanges.

A still further feature of the invention consists in associating with the top flanges of the underframe members a plurality of hingedly mounted doors adapted to span the spaces between the flanges, the hinge axes of the doors extending longitudinally of the car and being coincident.

Other and more specific features of the invention residing in advantageous forms and combinations and relation of parts will hereinafter appear and be pointed out in the claims.

In the drawings illustrating a preferred embodiment of the invention:

Figure 1 is a top view of a portion of the car, partly in elevation and partly in section.

Figure 2 is a longitudinal sectional view taken on line 2—2, Figure 1.

Figure 3 is a plan view of one of the door units and the portions of the car adjacent thereto.

Figure 4 is an enlarged detailed view of the doors adjacent the center of the car.

Figure 5 is a sectional view taken on line 5—5, Figure 4.

Figure 6 is a fragmentary side view of the car, portions of the car side being broken away.

Figure 7 is a sectional view taken on line 7—7, Figure 3.

Figure 8 is a transverse sectional view adjacent the center of the car, the doors being in elevation and the adjacent portions of the underframe member being omitted.

Figure 9 is a sectional view taken on line 9—9, Figure 4.

Figure 10 is a fragmentary plan view showing the doors in disassociated positions.

Figure 11 is a fragmentary perspective view of the inner edges of the doors adjacent the sides of the car.

Figure 12 is a sectional view taken on line 12—12, Figure 4.

Figure 13 is a fragmentary sectional view taken on line 13—13, Figure 1.

Figure 14 is a fragmentary sectional view taken on line 14—14, Figure 1.

5 Figure 15 is a plan view of one of the angle members.

Figure 16 is a side elevational view of the construction illustrated in Figure 15.

10 Figure 17 is a fragmentary transverse sectional view of the car showing one of the transverse underframe members in side elevation and omitting the doors and their hinge brackets.

15 Figure 18 is a transverse sectional view of the car illustrating another of the transverse underframe members of the car and also omitting the doors and their hinge brackets.

20 Figure 19 is a fragmentary sectional view taken on line 19—19, Figure 18.

25 Figure 20 is a fragmentary side elevational view of the end construction of the underframe member illustrated in Figure 18.

Figure 21 is an end elevational view of the construction illustrated in Figure 20.

30 Inasmuch as the construction of the end portions of the car is the same and since, between these end portions, the car may be considered as being made up of a plurality of identical sections, each section being defined by vertical planes passing through adjacent underframe members, only enough of the car has been illustrated in the drawings to include two of the underframe members and the adjacent end of the car.

35 Referring more particularly to the drawings 1 indicates the box-like center sill having two beam members 2, each of which is provided with a web 3 and top and bottom flanges 4 and 5, respectively, the top flanges being preferably connected by a top cover plate 6. Interposed between the beam members adjacent the body bolsters of the car, to be hereinafter described, are the usual center castings or filler members 7. The side sills of 40 the car which are designated by the reference numeral 8 are of a modified Z-shape having upper and lower substantially vertically disposed flanges 9 and 10, respectively, connected by an inclined web 11. The center sill and 45 side sills are rigidly connected by the underframe members 12 and 13, 12 indicating the body bolster and 13 the cross bearers.

50 Each of the body bolsters comprises top and bottom plate-like members or flanges 14 and 15, respectively, the former being spaced above the top of the center sill and constituting a portion of the floor of the car. These plate-like members are connected by a longitudinally extending substantially 55 centrally disposed web portion 16 and by transversely extending truss-like portions or flanges 17. The web portions may be suitably apertured, as at 18, so as to reduce the weight of the bolsters, the portions of the web bounding the openings or apertures being fashioned

with rigidifying beads or ribs 19. Adjacent its central portion the bolster is provided with substantially vertical flanges 20 which are rigidly secured to opposite sides of the center sill by rivets 21 passing through the webs 3 of the center beams. At its opposite ends the bolster is integrally formed with walls or flanges 22 having relatively offset portions 23 and 24 adapted to be respectively secured to the flanges 9 and 10 of the side 70 sills and with an inclined portion 25 adapted to be secured to the web 11 thereof.

Instead of constructing the bolster as an integral casting it may advantageously be cast in two similarly formed sections which 80 may be conveniently connected by angle shaped splice plates 26 overlappingly secured by rivets 27 to opposite faces of the web portions which overlie the center sill and by rivets 28 to the undersides of the top 85 plate members or flanges 14. At their lower portions the bolster sections may be conveniently connected by a strap or plate 29 which passes under the center sill and is secured to the bottom plate members or flanges 15 by 90 rivets 30. Thus it will be seen that the body bolsters while made in two sections are of such construction that they may be rigidly and firmly connected to adjoining portions 95 of the car underframe.

To brace the car sides and to afford convenient means to which inside side stakes 32 may be rigidly secured the bolsters are preferably formed with extensions 31 which project above the top flanges 14 thereof. Each 100 of the extensions is formed with a flange 33 which constitutes a continuation of the end wall or flange 22 of the bolster and with a portion 34 disposed substantially in the plane of the central web 16 thereof to which 105 the side stakes may be secured by rivets 35. The extensions may be stiffened or reinforced by flanges 36 of gradually decreasing width and which are disposed in substantially the plane of and constitute continuations of the truss flanges 17 adjacent the ends 110 of the bolsters.

As the cross bearers 13 are in all major respects of substantially the same construction as the body bolsters, the same reference 115 numerals are used to designate corresponding parts of these two underframe members. However, since the cross bearers do not cooperate with the car trucks (not shown) they are, of course, not provided, as are the bolsters, with horizontal portions 37 to which side bearing wear plates 38 may be secured. Furthermore the sections of the cross bearer instead of being connected at their lower portions by a strap similar to that employed 120 for connecting the body bolster sections are connected by a T-shaped member 39.

The car side stakes may advantageously be of modified bulb angle shape having flanges 40 and 41, the latter being the one se- 125

cured to the upwardly projecting extensions 31 of the underframe members. The flanges 40 afford convenient means to which the side sheets 42 of the car may be attached. At 5 their lower edges the side sheets are also overlappingly secured to the upper vertical flanges 9 of the side sills and the flanges 23 and 33 of the underframe members. At 10 their upper edges the side sheets incline upwardly and inwardly, as at 43, and terminate in substantially vertically disposed flanges 44 secured to the depending legs 45 of the angle shaped side top rails 46. The other leg 47 of each of the side top rails projects 15 outwardly, and overlies the inclined portions 43 of the side sheets, terminating in substantially the plane of the body portions of the side sheets. Any suitable bracket members 48 may be employed for rigidifying 20 this top construction of the car, the brackets being secured to the inclined portions of the side sheets, the upper portions of the side stakes and the top rails.

In order that safety appliances such as 25 ladders (not shown) may be secured to the sides of the car adjacent the ends thereof the end side sheets 49 converge inwardly from adjacent the body bolsters to the car ends, being rigidly secured at the latter points to 30 the corner posts 50. The corner posts are preferably of angle shape having legs 51 to which the end side sheets are secured and legs 52 to which corrugated end sheets 53 are secured. At their upper edges the end 35 sheets are secured to the end top rails 54 which are attached to the side top rails by angle brackets 55.

Secured to the lower portions of the end 40 sheets 54 are angle members 56 and 57 which, together with the lower portion of the end sheets, constitute the end sills of the car. The angle member 56 has one leg which rests upon and is secured to the top flanges of the center sill and another leg which is secured to the 45 lower edge of the end sheet. The angle member 57 has one leg which is also secured to the end sheet above the point to which the angle member 56 is secured and another leg disposed in substantially the same horizontal 50 plane as the top plate members or flanges 14 of the transverse underframe members. At their ends the angle members 56 and 57 are rigidly connected to the side sills by bracket members 58 which may be conveniently 55 formed with push pole pockets. From the foregoing description it will be seen that all portions of the car construction such as the transverse underframe members, the longitudinal underframe members, the side stakes and the side and end sheets are secured together in a manner to produce a 60 most rigid construction.

Disposed between each of the underframe 65 members is a substantially rectangular floor unit comprising a plurality of doors which

are hingedly connected to the car adjacent the center sill having their free edges disposed adjacent the car sides. As it is desirable to use cast metal doors on account of their durability and inherent rigidity, instead of employing one door on each side of the center sill to span or close the space between adjacent underframe members two doors are preferably employed because, should only one door be employed it would have to be of such size as to make it cumbersome and difficult to operate. Thus, the floor unit between adjacent underframe members comprises two pairs of hinged doors, one door of each pair being disposed on opposite sides of the center sill. The doors of one pair are designated by the letters A and B and the doors of the other pair by the letters C and D. Although for purposes of description the doors A and B and the doors C and D have been considered as respectively constituting pairs it will, of course, be appreciated that the doors A and C and the doors B and D may likewise be considered as respectively constituting pairs. As the doors A and D are identical and as B and C are also identical, for a purpose to be herein-after described, corresponding parts of the doors A and D will be designated by similar reference numerals as also will the corresponding parts of the doors B and C.

All of the doors are provided with plate-like portions, the major part of the upper surfaces of which are, when the doors are in closed position, disposed in the same plane as the upper surfaces of the top plate or flange portions of the underframe members. On its underside each door is preferably reinforced by rectangularly arranged flanges 59 disposed slightly inwardly of the marginal edges of the plate portion thereof. Each door may be also reinforced by flanges 60 which converge from adjacent the corners at its hinged edge and intersect inwardly of its free edge. Between the point of intersection of these flanges to the flange 59 at the free edge of the door the latter is formed with a flange 61 substantially normal to its hinge axis which affords convenient means to which a portion of the door supporting mechanism, to be herein-after described, may be secured.

Adjacent their hinged edges the doors B and C are fashioned with downwardly offset portions 62 adapted to be overlapped by adjacent portions 63 of the doors A and D respectively. In order that these overlapping portions will not interfere with free opening and closing of the doors, the upper surfaces of the offsets 62 may be conveniently cylindrically curved, the axes of curvature being coincident with the pivotal axes of the doors. The portions 63 of the doors may advantageously be reinforced by a plurality of ribs or flanges 64 which are connected to the adjacent flange 59.

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In order to pivotally connect the doors to the car body they are provided with a plurality of apertured lugs, the lugs of the doors A and D being designated by the reference numeral 65 and those of B and C by the reference numeral 66. The doors are so proportioned and their hinge lugs arranged in such a manner that they preferably have a common hinge axis which extends longitudinally of the car. The lugs of each door are integrally connected to the plate portion thereof and the adjacent flange 59, but in order to permit the offset portions 62 of the doors B and C to be overlapped by the portions 63 of the doors A and D the lugs of the latter doors are spaced below their plate portions.

Resting upon the top of the center sill and rigidly secured thereto are a plurality of brackets 67, 68 and 69 for respectively cooperating with the hinge lugs of the doors. The bracket 67 cooperates with the outer two hinge lugs on the doors A and B, the bracket 68 cooperates with the outer hinge lugs on the doors C and D and the bracket 69 cooperates with the inner hinge lugs of all of the doors. Each of the brackets 67 and 68 is provided with upwardly projecting bosses 70 between which the cooperating lugs of the doors are disposed, the bosses being provided with aligned apertures for receiving hinge pins 71 adapted to extend through the apertures of the hinge lugs. The central bracket 69 is provided with upwardly projecting bosses 72, 73 and 74, the inner lugs of the doors A and B being disposed between the bosses 72 and 73 and the inner lugs of the doors C and D being disposed between the bosses 73 and 74. As with the bosses of the brackets 67 and 68 those of the brackets 69 are also formed with aligned apertures for receiving a hinge pin 75 which extends through corresponding apertures in the inner lugs of all of the doors. As may be clearly seen from the drawings it is preferred that the hinge lugs of the doors on one side of the car center sill alternate with the hinge lugs of the doors on the opposite side.

The doors A and D, in addition to having portions adapted to respectively overlap the other doors of their pairs, have portions adapted to respectively overlap adjacent portions of the adjoining doors of the other pair. This is preferably accomplished by offsetting downwardly, as at 76, the plate portions of the doors B and C respectively adjacent their inner marginal edges so as to be overlapped by adjacent portions 77 of the doors A and D. Thus it will be seen that one door of each pair is disposed in overlapping relation to portions of the other door of its pair and to portions of the adjoining door of the other pair. By arranging the doors having overlapping and overlapped portions diagonally opposite each other the meeting edges of these

respective portions are disposed in planes forming oblique angles with the hinge axes of the doors. This construction is particularly desirable because instead of having an opening of a substantial extent at the meeting edges of all of the doors only a very small opening such as at 78 occurs. In order to prevent the escape of fine lading through this opening the central boss 73 of the bracket 69 may be enlarged as at 79, so as to lie in close proximity to the adjacent overlapped portions of the doors B and C.

Each of the doors A, B, C and D are fashioned with downwardly offset portions 80 adjacent their outer side marginal edges so as to underlie adjoining portions of the top flanges or plate members 14 of the adjacent underframe members. Adjacent the hinged edges of the doors B and C the portions 80 thereof are further offset downwardly, as at 81, so that these portions, in addition to underlying the top flanges of the adjacent underframe members, may also respectively underlie the adjacent portions of the doors A and D.

Disposed between the free edges of the doors and the sides of the car and extending continuously between adjacent underframe members are angle members 82. Each of these members is provided with a substantially vertically disposed leg 83 which may be secured to the upper flange 9 of the adjoining side sill by rivets employed for connecting the side sheets thereto and with a substantially horizontally disposed leg 84 which projects inwardly into the car, the upper surface of the latter being disposed in the same plane as the upper surfaces of the closed doors and the flanges 14 of the underframe members. Adjacent their opposite ends each of the angle members 82 is fashioned with offset portions 85 adapted to be overlappingly secured to the top flanges of the adjacent underframe members. The horizontal leg of the angle members may be advantageously reinforced by flanges or ribs 86.

In order that the free edges of the doors may be disposed in overlapping relation to the horizontal flanges 84 of the angle members they are each provided with downwardly offset portions 87 adapted to underlie the latter. These offset portions 87 are disposed in the same planes as the offset portions of the doors which underlie the top flanges of the underframe members. In order that the inner corners of the doors B and C at their free edges may, in addition to underlying the horizontal flanges of the angle members 82, underlie adjacent portions of the doors A and D, the former are provided with further downwardly offset portions 87'. By arranging these offset portions 76, 80 and 87 in substantially the same plane the doors may be more easily cast and it is to be noted that the

marginal flanges 59 are arranged at the point of juncture of the offset portions and the main body of the plate-like portions of the doors so as to strengthen the doors at these 5 points. Furthermore, the marginal flanges may be conveniently formed with rigidifying beads or ribs 88. From the manner in which the doors overlap each other and the adjacent members of the car it will be perceived that 10 fine lading is effectually prevented from accidentally escaping from the car. Furthermore, since the doors overlap each other at their hinged edges the necessity of employing separate means to bridge or span the spaces 15 between the doors at these points, is eliminated whereby the lading within the car adjacent the hinged edges of the door will be automatically discharged upon the opening of the doors. It will also be noted that the 20 various parts of the car construction of the car floor are disposed in the same horizontal plane.

Any suitable mechanisms may be employed for supporting the doors in closed position. 25 Each of the mechanisms chosen for purposes of illustration comprises an arm 89 having portions adapted to be rigidly secured to the flange 61 and the marginal flange 59 adjacent the free edge of the associated door. The outer end of the arm projects beneath the side sill for cooperating with a hook 90 pivotally mounted in any suitable manner upon the side sill.

Instead of closing the spaces between the 30 top flanges of the body bolster and the car ends with the door units heretofore described these spaces are preferably closed by a plurality of plate-like members 91. The plate-like members at the sides of the car respectively rest upon and are secured to adjacent portions of the top flange 14 of the body bolster and the horizontal leg of the angle member 57 of the end sill. In order that the upper 35 surface of the main body portion of the plate members adjacent the sides of the car may be disposed in substantially the same plane as the upper surfaces of the doors and under-frame members the portions secured to the latter are preferably offset upwardly as at 91'. These plate-members are also formed with upwardly projecting flanges 92 adapted to be rigidly secured to the upper flanges of the adjacent side sills. The other plate members, that is, those which do not adjoin the sides 40 of the car, are also secured to the horizontal leg of the angle member 57 and to the top flange 14 of the body bolster but instead of overlapping the latter as do the plates adjoining the sides of the car they are fashioned with downwardly offset portions 93 to underlie the flanges 14. In order that all of the 45 plate members may be overlappingly secured together and yet have their upper surfaces disposed in the same plane, each, with the exception of one of the side plates, is fashioned

with a downwardly offset portion 94 to underlie the adjoining portion of the adjacent plate. To rigidify the plate members at their offset portions each may be conveniently formed with a downwardly extending flange 70 or rib 95.

The foregoing construction results in a car having a floor made entirely of cast metal sections and one in which the immovable parts of the floor are so formed and related that they may be connected and tied together in a most rigid manner. Furthermore, the doors are so associated with these parts and with each other that the escape of fine lading from the car is effectually prevented. Also, 75 since the underframe members constitute portions of the car floor and the spaces between them are spanned by door units a fewer number of parts are employed to form the floor.

I claim:

1. In a railway car, the combination with a center sill, of two doors arranged on opposite sides of the latter and respectively having their free edges disposed adjacent opposite sides of the car, lugs on said doors for hingedly connecting them to the car, said doors having plate-like portions adjacent their hinge axes disposed in overlapping relation with each other, and reinforcing flanges on said doors adjacent their hinge lugs and substantially parallel to their hinge axes.

2. In a railway car, the combination with a center sill, of two hinged doors arranged on opposite sides of the latter and having their free edges respectively disposed adjacent opposite sides of the car, one of said doors having a portion overlying the other of said doors and said first-named door being integrally formed on its underside adjacent said overlying portion with a plurality of reinforcing ribs.

3. In a railway car, the combination with a center sill, of a floor unit involving two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the center sill, the adjoining side edges of said pairs of doors being adapted to be disposed in overlapping relation and the hinged edges of the doors of each pair being also adapted to be disposed in overlapping relation.

4. In a railway car, the combination with a center sill, of a floor unit involving two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the center sill, one door of each pair having portions respectively adapted to overlap adjacent portions of the other door of said pair and adjacent portions of the adjoining door of the other pair.

5. In a railway car, the combination with a center sill, of a floor unit involving two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the cen-

ter sill, a portion of a door of one pair overlying an adjacent portion of the other door of said pair and a portion of the door of the other pair adjoining said last-named door 5 overlying an adjacent portion of the other door of said other pair.

6. In a railway car, the combination with a center sill, of a floor unit involving two pairs of hinged doors, the doors of each pair 10 being disposed on opposite sides of the center sill, one door of each pair having portions adapted to overlie adjacent portions of the adjoining door of the other pair.

7. In a railway car, the combination with 15 a center sill, of a floor unit involving two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the center sill, the hinged edges of the doors of each pair being disposed in contiguous relation 20 and the inner side edges of the doors of one pair being respectively contiguous to the inner side edges of the doors of the other pair.

8. A railway car having two pairs of 25 hinged doors comprising a substantially rectangular floor unit, one door of each pair having portions adapted to be respectively disposed in overlapping relation to the other door of its pair and to one of the doors of the other pair.

30 9. In a railway car, the combination with a center sill, of a floor unit involving two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the center sill, one door of each pair having portions 35 adapted to respectively overlie portions of the other door of its pair and adjacent portions of the adjoining door of the other pair, the meeting edges of the overlying portions of said doors being in planes forming oblique 40 angles with the hinge axes of said doors.

10. In a railway car, the combination with 45 a center sill, of two pairs of hinged doors comprising a substantially rectangular floor unit, one door of each pair having portions respectively adapted to be disposed in overlapping relation to adjacent portions of the other door of said pair and adjacent portions of the adjoining door of the other pair, the portions of all of said doors which are 50 adapted to be disposed in overlapping relation adjoining each other adjacent the central portion of said rectangular floor unit and the adjoining edges of the said overlapping 55 portions being disposed in planes forming oblique angles with the hinge axes of said doors.

11. In a railway car, the combination with 60 a center sill, of two pairs of hinged doors comprising a substantially rectangular floor unit, the doors of each pair being disposed on opposite sides of the center sill, a plurality of brackets secured to the center sill, and hinge lugs formed on each of said doors 65 adapted to be pivotally connected to said

brackets, one lug of each door being pivotally connected to one of said brackets.

12. In a railway car, the combination with a center sill, of two pairs of hinged doors comprising a substantially rectangular floor unit, the doors of each pair being disposed on opposite sides of the center sill, three brackets rigidly secured to said center sill, a plurality of lugs formed on each of said doors adapted to receive means for pivotally connecting the latter to the brackets, one lug of each door being pivotally connected to the central one of said brackets and the other lugs of each pair of doors being respectively pivotally connected to the other brackets. 70

13. A railway car having a plurality of hinged doors comprising a substantially rectangular floor unit, each of said doors being fashioned with a reinforcing flange substantially normal to its hinge axis and with portions extending beyond said reinforcing flange, the said portions of the doors being adapted to be disposed in overlapping relation. 80

14. In a flat bottom gondola car, the combination with a plurality of transverse underframe members, respectively provided with substantially horizontal top flanges forming portions of the car floor, of a substantially rectangular floor unit disposed between each of the said underframe members for spanning the spaces between the top flanges thereof, each of said floor units comprising a plurality of doors hingedly connected to the car adjacent the center thereof, and having plate-like portions adjacent their hinged edges disposed in overlapping relation. 90

15. In a flat bottom gondola car, the combination with a plurality of transverse underframe members respectively provided with substantially horizontally disposed top flanges forming portions of the car floor, of a plurality of hinged doors comprising a substantially rectangular floor unit disposed between said underframe members, each of said doors having a top plate-like portion, the side marginal edges of the floor units and adjoining portions of the top flanges of the underframe members being disposed in overlapping relation and the plate-like portions of the doors being disposed in overlapping relation with each other adjacent the hinge axes of the doors. 100

16. In a flat bottom gondola car, the combination with a plurality of transverse underframe members respectively provided with substantially horizontally disposed top flanges forming portions of the car floor, of a substantially rectangular floor unit disposed between each of the said underframe members, the side marginal edges of the floor unit being offset to underlie adjoining portions of the top flanges of adjacent underframe members and at least one door of the unit being offset adjacent its hinge axis to 110 120 125 130

underlie the portion adjacent the hinge axis of an adjoining door.

17. In a flat bottom gondola car, the combination with a center sill, of a plurality of transverse underframe members respectively provided with substantially horizontally disposed top flanges forming portions of the car floor, and a substantially rectangular floor unit disposed between each of said underframe members and cooperable with the top flanges thereof, each of said floor units comprising two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the center sill and having portions adapted to be disposed in overlapping relation.

18. In a flat bottom gondola car, the combination with a center sill, of a plurality of transverse underframe members respectively provided with substantially horizontally disposed top flanges forming portions of the car floor, and a substantially rectangular floor unit disposed between each of said underframe members and cooperable with the top flanges thereof, each of said floor units comprising two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the center sill and respectively having portions adapted to be disposed in overlapping relation to the adjoining doors of the other pair.

19. In a flat bottom gondola car, the combination with a center sill, of a plurality of transverse underframe members respectively provided with substantially horizontally disposed top flanges forming portions of the car floor, and a substantially rectangular floor unit disposed between each of said underframe members and cooperable with the top flanges thereof, each of said floor units comprising two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the center sill, one door of each pair having portions adapted to overlap adjacent portions of the other door of its pair and adjacent portions of the adjoining door of the other pair.

20. In a flat bottom gondola car, the combination with a center sill, of a plurality of transverse underframe members respectively provided with substantially horizontally disposed top flanges forming portions of the car floor, and a substantially rectangular floor unit disposed between each of said underframe members and cooperable with the top flanges thereof, each of said floor units comprising two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the center sill and having their free edges disposed adjacent opposite sides of the car, the hinged edges of the doors on one side of the center sill being adapted to be disposed in overlapping relation to the hinged edges of the doors on the other side of the center sill.

21. In a flat bottom gondola car, the combination with a center sill, of a plurality of transverse underframe members respectively provided with substantially horizontally disposed top flanges forming portions of the car floor, and a substantially rectangular floor unit disposed between each of said underframe members and cooperable with the top flanges thereof, each of said floor units comprising two pairs of hinged doors, the hinge axes of the doors of both pairs being coincident and the hinged edge of one door of each pair being disposed in overlapping relation to the hinged edge of the other door of its pair.

22. In a flat bottom gondola car, the combination with a center sill, of a plurality of transverse underframe members respectively provided with substantially horizontal top flanges spaced above the center sill and forming portions of the car floor, a substantially rectangular floor unit disposed between each of said underframe members above the center sill, each of said units involving a plurality of hinged doors having portions adapted to be disposed in overlapping relation to the top flanges of adjacent underframe members, and a plurality of plate-like members spaced above the center sill and rigidly secured to the car ends and to the underframe members respectively adjacent the latter.

23. In a flat bottom gondola car, the combination with a plurality of transverse underframe members respectively provided with substantially horizontally disposed top flanges forming portions of the car floor, of a plurality of hinged doors disposed between each of said underframe members, and plate-like members rigidly secured to the car ends and to the underframe members respectively adjacent thereto, the plate-like members adjacent the sides of the car having portions overlapping portions of the top flanges of the adjacent underframe members and the plate-like members adjacent the center of the car having portions underlying adjoining portions of the said flanges.

24. In a flat bottom gondola car, the combination with end sills and a center sill, of a plurality of transverse underframe members respectively provided with substantially horizontal top flanges spaced above the center sill and forming portions of the car floor, a plurality of hinged doors disposed between each of said underframe members, the hinge axes of said doors being above the center sill, and a plurality of plate-like members spaced above the center sill and extending between the car ends and the underframe members adjacent the latter, said plate-like members being respectively disposed in overlapping relation to each other and secured to the said end sills and the flanges of the underframe members adjacent thereto.

25. In a flat bottom gondola car, the combination with a plurality of transverse underframe members respectively provided with substantially horizontally disposed top flanges forming portions of the car floor, of a plurality of hinged doors disposed between each of said underframe members, and plate-like members rigidly secured to the car ends and to the underframe members respectively adjacent thereto, each of said plate-like members being provided with an offset portion adapted to be overlapped by the adjoining portion of the adjacent plate member and being also provided with a rigidifying flange adjacent the offset thereof.

26. In a flat bottom gondola car, the combination with a center sill, of a plurality of transverse underframe members respectively provided with substantially horizontal top flanges spaced above the center sill and forming portions of the car floor, a plurality of doors spanning the space between the top flanges of adjacent underframe members and hingedly connected to the car adjacent its longitudinal axis, said doors when in closed positions being disposed in horizontal planes above the center sill, and members interposed between the free edges of the doors and the car sides, each of said members being secured to adjacent underframe members.

27. In a flat bottom gondola car, the combination with a side sill, of a plurality of lading discharge openings, doors for closing said openings, and means interposed between the free edges of the doors and the car sides, each of said means involving an angle-shaped member having one leg secured to the side sill and the other leg projecting inwardly from the latter in a substantially horizontal plane for overlappingly cooperating with the free edge of the adjacent door.

28. In a flat bottom gondola car, the combination with a center sill and side sills, of a plurality of transverse underframe members respectively secured to said center sill and side sills, a plurality of doors, each of said doors being hingedly connected to the car adjacent the center sill and having its free edge disposed adjacent the car side, and a plurality of angle-shaped members rigidly secured to the side sills, each of said members having a horizontally disposed leg projecting inwardly into the car provided with a substantially vertical reinforcing flange, said legs being adapted to be disposed in overlapping relation with the free edges of adjoining doors, said members being also respectively secured to adjacent underframe members.

29. In a flat bottom gondola car, the combination with a center sill and side sills, of a plurality of transverse underframe members respectively secured to said center sill and side sills, a plurality of doors for closing the

lading discharge openings of the car, each of said doors being hingedly connected to the car adjacent the center sill and having its free edge disposed adjacent the car side, and angle-shaped members interposed between the free edges of the door and car sides, one leg of each of said members being secured to the adjacent side sill and the other leg thereof being adapted to be disposed in overlapping relation to the free edge of the adjacent door, said last-named leg having a longitudinally extending reinforcing flange.

30. In a flat bottom gondola car, the combination with a center sill and side sills, of a plurality of transverse underframe members respectively rigidly secured to the center sill and side sills, each of said underframe members having a substantially horizontally disposed top flange spaced above the center sill and forming a portion of the car floor, substantially rectangular floor units respectively disposed between the underframe members in a plane above the center sill, each of said floor units comprising a plurality of doors hingedly connected to the center sill and cooperating with the top flanges of adjacent underframe members, the free edges of said doors being disposed adjacent the car sides, and angle-shaped members interposed between the free edges of the door and car sides, said members being respectively secured to the adjacent side sill and underframe members and each being provided with a substantially horizontal flange for overlappingly cooperating with the free edge of an adjacent door.

31. In a flat bottom gondola car, the combination with a center sill, of a plurality of cast metal transverse underframe members having portions secured to opposite sides of the center sill, each of said members having a substantially horizontally disposed flange spaced above the top of the center sill, and a plurality of substantially rectangular floor units disposed between adjacent underframe members, each of said floor units comprising a plurality of cast metal doors hingedly connected to the center sill and cooperating with the top flanges of the adjacent underframe members for spanning the spaces between them.

32. A cast metal sectional floor for a flat bottom gondola car comprising members constituting integral portions of transverse underframe members of the car, hinged doors having their free edges disposed adjacent the car sides, and members interposed between the free edges of the doors and car sides.

33. A cast metal floor for a flat bottom gondola car comprising members constituting integral portions of transverse underframe members of the car, a plurality of hinged doors cooperating with said members having their free edges disposed adjacent the car sides, and a plurality of plate-like mem-

bers rigidly secured to the car ends and the underframe members adjacent thereto.

34. In a flat bottom gondola car, the combination with a center sill and side sills, of a transverse underframe member involving two sections respectively secured to opposite sides of the center sill and the adjacent side sill, each of said sections having a plate-like upper portion spaced above the center sill and forming a portion of the car floor. 10

35. In a flat bottom gondola car, the combination with a center sill and side sills, of a transverse underframe member having portions rigidly secured to the center sill and side sills and provided with top and bottom plate-like members, said plate members being connected by a longitudinally substantially centrally disposed web and a plurality of transverse flanges, the opposite ends of 20 said underframe member being integrally formed with upwardly projecting extensions, each of said extensions having a portion disposed in a plane substantially parallel with the said longitudinal web and a rigidifying 25 flange constituting a continuation of one of the said transverse flanges, the said portions of said extensions respectively affording means to which car side stakes may be secured. 30

36. In a flat bottom gondola car, the combination with a center sill and side sills, of a transverse underframe member having portions rigidly secured to the center sill and side sills, said underframe member involving a top plate-like member constituting a 35 portion of the car floor, a bottom plate-like member, said plate-like members being connected by a longitudinally extending substantially centrally disposed web and a plurality of transversely extending truss-like 40 flanges, the opposite ends of said underframe member being integrally formed with portions projecting above said top plate-like member and disposed in substantially the same plane as said longitudinal web affording means to which car side stakes may be secured, each of said portions being provided with a flange disposed in a plane substantially parallel with the adjacent transversely 45 extending flange. 50

37. In a railway car, the combination with a center sill, of a substantially rectangular floor unit involving two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the center sill and one door of each pair having a load supporting surface of greater area than the other door of its pair, the doors of greater load supporting area being arranged on different sides 55 of the center sill.

38. In a railway car, the combination with a center sill, of a substantially rectangular floor unit involving two pairs of hinged doors, the doors of each pair being disposed 60 on opposite sides of the center sill and one door of each pair having a load supporting surface of greater length than the other door of its pair, the doors of greater length being arranged on different sides of the center sill. 65

39. In a railway car, the combination with a center sill, of a substantially rectangular floor unit involving two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the center sill, one door of each pair being identical with one door of the other pair and said identical doors being arranged on different sides of the center sill. 70

40. A railway car having a substantially rectangular floor unit involving two pairs of hinged doors, the doors of each pair being disposed on opposite sides of the longitudinal axis of the car and being arranged with their hinged edges adjacent each other, one door of each pair having a portion projecting beyond its hinged axis adapted to overlap the adjacent portion of the other door of its pair, the doors provided with said projecting portions being arranged on different sides of the longitudinal axis of the car. 75

41. A railway car having a plurality of hinged doors for closing a lading discharge opening thereof, said doors being arranged with their hinged edges adjacent each other and one of said doors being provided adjacent its hinged edge with a projecting portion adapted to overlap the adjacent portion of the other door, said projecting portion being integrally provided with a plurality of reinforcing ribs extending at an angle to the hinge axis of the door. 80

42. A railway car having a plurality of hinged doors for closing a lading discharge opening thereof, said doors being arranged with their hinged edges adjacent each other and one of said doors being provided adjacent its hinged edge with a projecting portion adapted to overlap the adjacent portion of the other door, the underside of said projecting portion being provided with a plurality of reinforcing ribs disposed substantially normal to the hinge axis of the door. 85

43. A railway car having a plurality of hinged doors for closing a lading discharge opening thereof, said doors being arranged with their hinged edges adjacent each other, one of said doors being provided on its underside with a reinforcing flange substantially parallel with its hinge axis and having a plate portion projecting beyond the latter for overlapping the adjacent portion of the other of said doors, said plate portion being provided with rigidifying ribs extending at an angle to and formed integrally with said flange. 90

44. A cast metal sectional floor for a flat bottom gondola car including members constituting integral portions of transverse underframe members of the car, a plurality of hinged doors disposed between said members, and members extending longitudinally of the 100

car intermediate the sides thereof and the portions of said doors adjacent the latter.

45. A cast metal sectional floor for a flat bottom gondola car including members constituting integral portions of transverse underframe members of the car, hinged doors disposed between said members, members secured to the car sides and respectively interposed between the latter and the portions of the doors adjacent thereto, and plate-like members extending between the ends of the car and the underframe members adjacent thereto.

46. In a flat bottom gondola car the combination with a center sill and side sills, of a transverse underframe member rigidly secured to said sills and being integrally provided with a plate-like upper portion spaced above the center sill and forming a portion of the car floor, the outer ends of said member being integrally provided with extensions projecting upwardly within the car affording means for the attachment of car side stakes.

47. In a flat bottom gondola car, the combination with a center sill and side sills, of a transverse underframe member comprising two cast metal sections respectively disposed on opposite sides of the center sill and rigidly secured to the latter and to the adjacent side sill, each of said sections being integrally provided with a plate-like upper portion spaced above the center sill and forming a portion of the car floor, each of said sections also being integrally provided adjacent its outer end with an extension projecting upwardly within the car affording means for the attachment of a car side stake.

48. In a flat bottom gondola car, the combination with a center sill and side sills, of a transverse underframe member comprising two cast metal sections respectively disposed on opposite sides of the center sill and respectively secured to the latter and to the side sills, each of said sections being provided with a plate-like portion spaced above the center sill and forming a portion of the car floor, the inner ends of said plate-like portions respectively terminating adjacent the longitudinal axis of the car, and means disposed above the center sill for rigidly connecting said plate-like portions.

49. In a flat bottom gondola car, the combination with a center sill, of a side sill having a downwardly and inwardly inclined portion, of a transverse underframe member having a plate-like portion forming a portion of the car floor, said member having end portions extending downwardly and inwardly from adjacent said plate-like portion respectively secured to the inclined portions of the side sills, side wall bracing members formed integrally with said underframe members and projecting upwardly from said plate portion adjacent the ends thereof, and

side stakes respectively secured to said bracing members.

50. A flat bottom gondola car having a cast metal underframe member integrally provided with a plate-like upper portion forming a portion of the car floor, said member being rigidly secured to the sides of the car and being integrally provided with extensions projecting upwardly from said plate-like portions adjacent the ends thereof for bracing the car sides, and side stakes respectively secured to said extensions and to the car side.

In testimony whereof I affix my signature.

WILLIAM E. WINE. 80

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