Nov. 21, 1939. A. KASSLER ET AL 2,180,530

DROP BOTTON RAILWAY CAR

Filed July 7, 1937 3 Sheets-Sheet 1

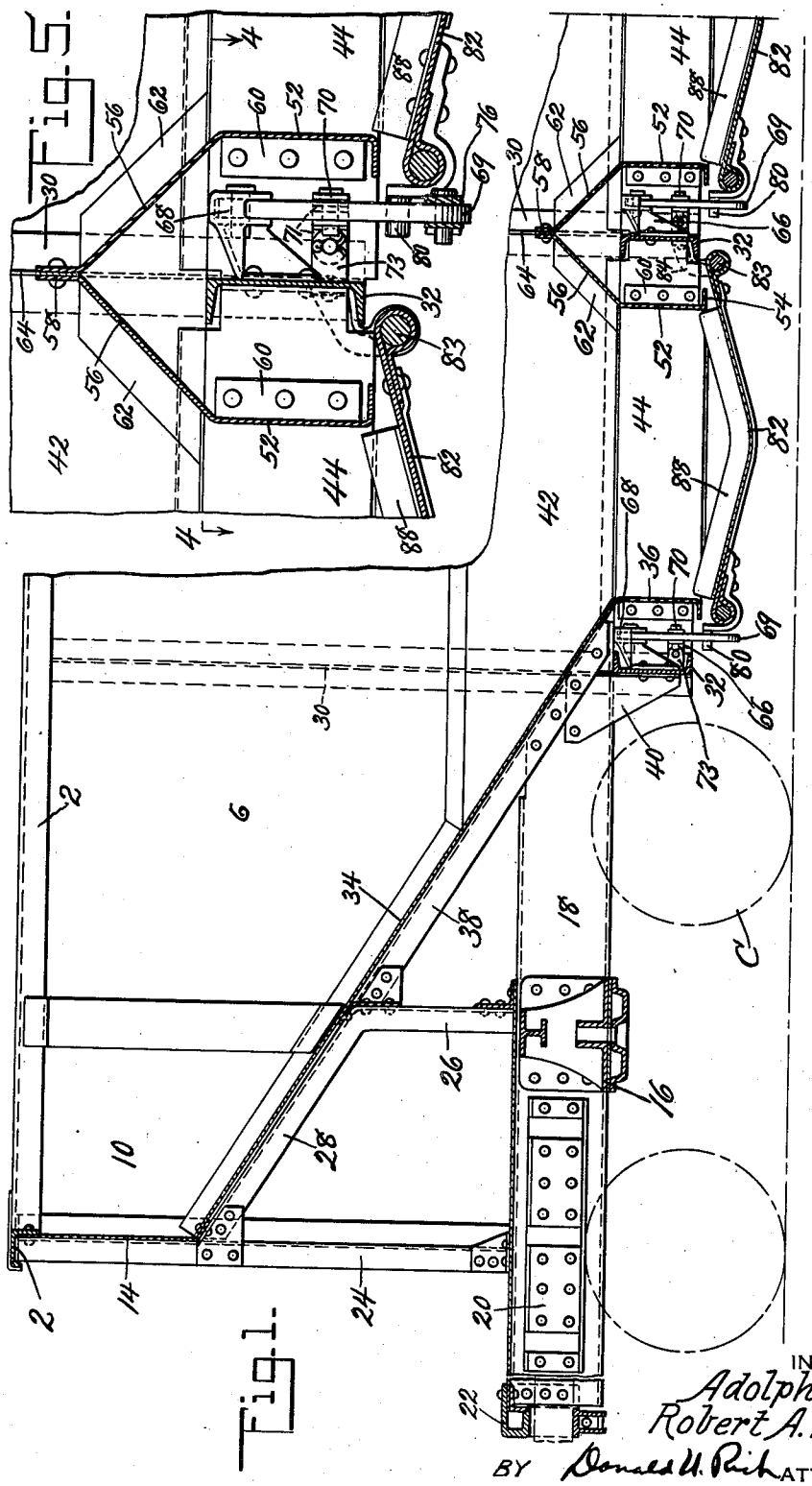


Fig. 1.

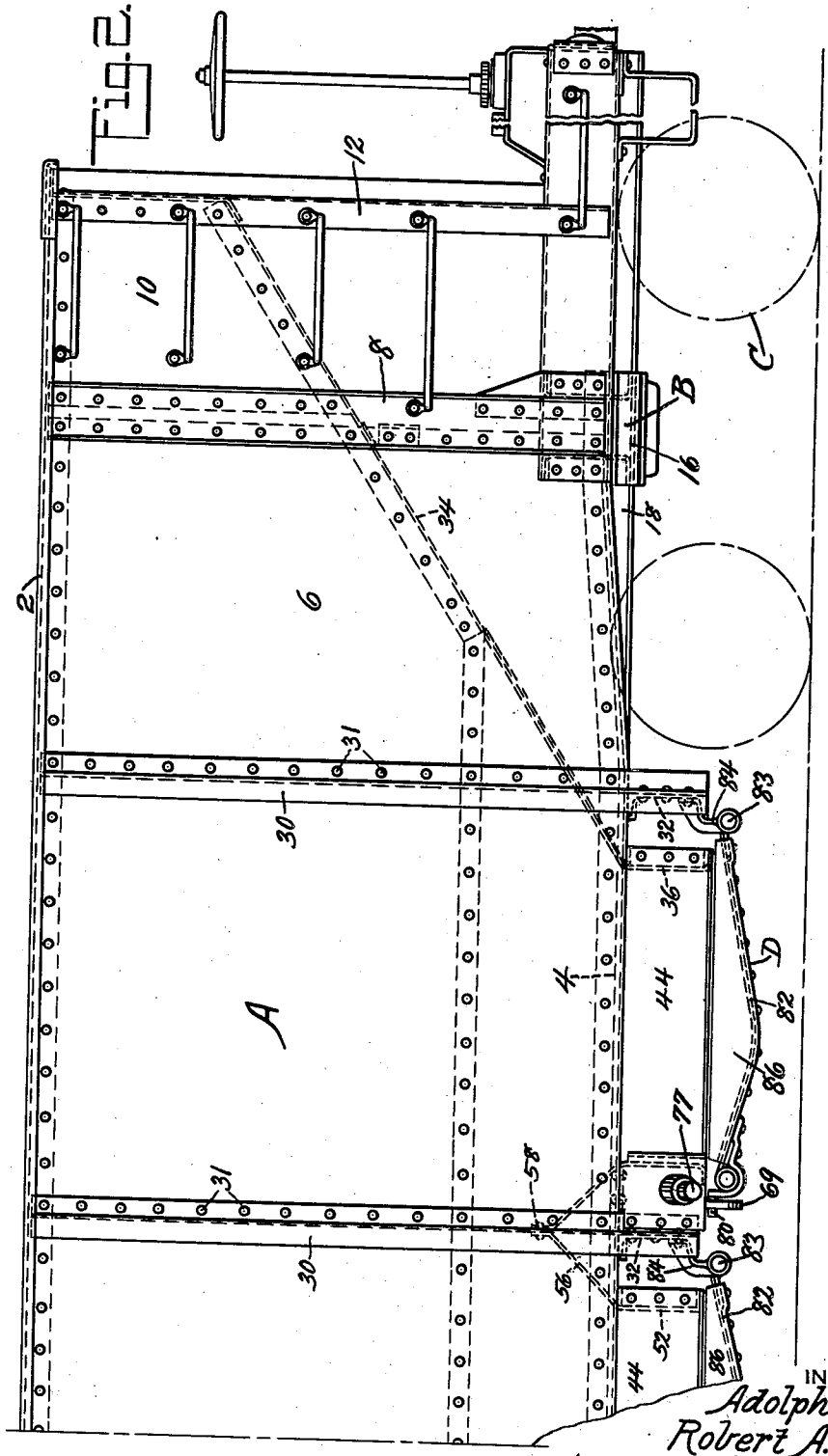
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Fig. 2.




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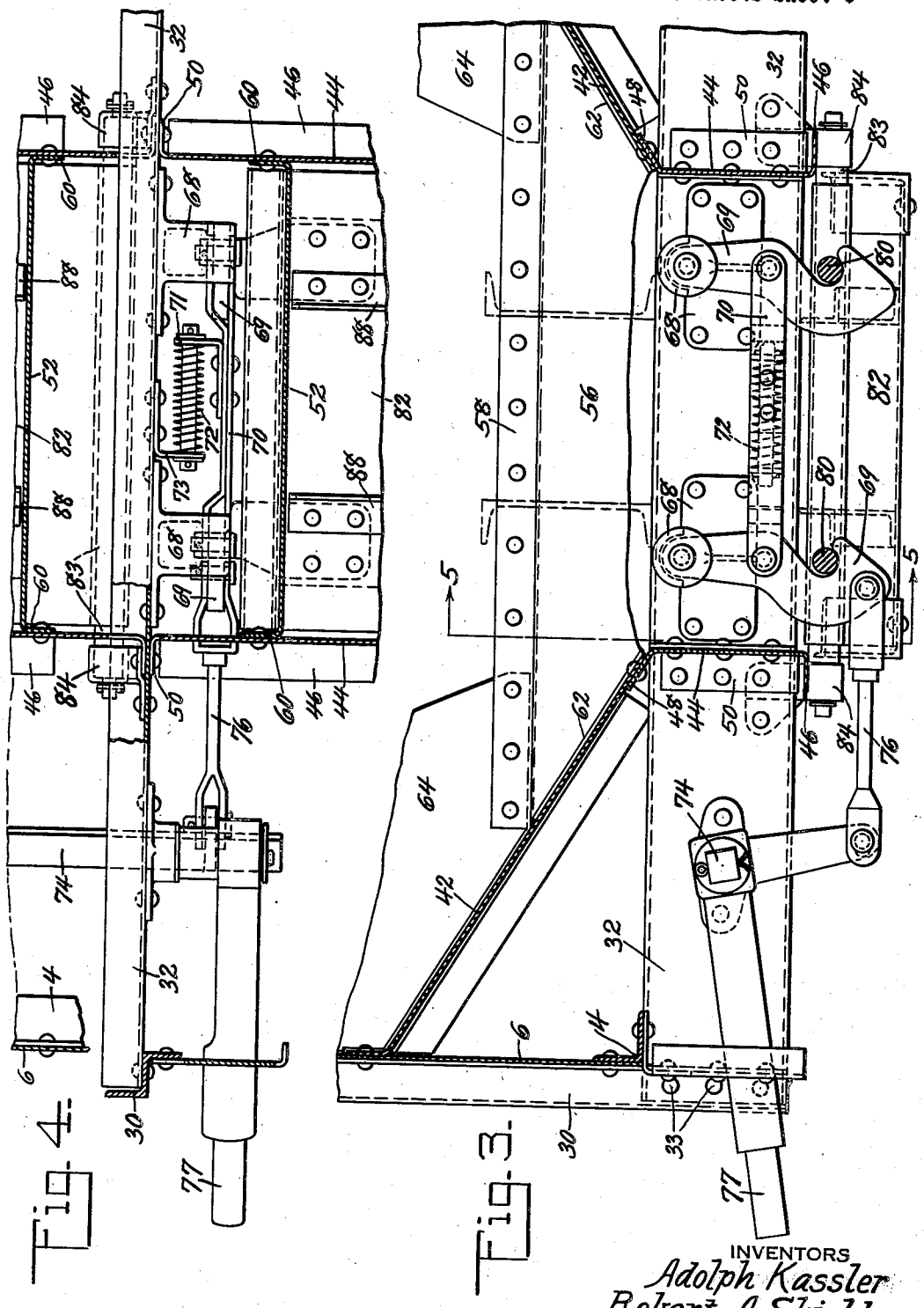


Fig. 4.



Fig. 3.

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# UNITED STATES PATENT OFFICE

2,180,530

## DROP BOTTOM RAILWAY CAR

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Application July 7, 1937, Serial No. 152,438

16 Claims. (Cl. 105—253)

This invention relates in general to railway cars and in particular to railway cars of the drop bottom type which may be dumped automatically by continuous passage over a specially constructed tipple. As previously constructed cars of this type have had the doors hinged either directly to the side sills or to the hopper sheets, but in cases where large capacity cars are desired it is impossible to hinge the doors to the side sills and impractical to hinge them to the hopper sheets since to do so requires the use of hopper sheets of a thickness greater than would be necessary to support the load alone; also with cars in which the doors were hinged to the hopper sheets corrosion has set in at the rivets and it has been necessary to frequently repair the cars at a considerable expense both in material and labor. It is an object, therefore, of the present invention to provide a drop bottom car of large capacity in which the doors are carried by plate girder side walls independently of the hopper sheets.

A further object of the invention is the provision of a drop bottom car of large capacity in which the hinge and latch mechanisms are completely protected from contact with the lading.

A still further object of the invention is the provision of a large capacity drop bottom car in which the bottom doors are directly supported by the plate girder sides, thus permitting the use of light hopper sheets which may be readily replaced without disturbance of the car skeleton.

These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawings, in which:

Figure 1 is a central sectional view of substantially one-half the car;

Fig. 2 is a side elevation of substantially the other half of the car;

Fig. 3 is a transverse sectional view showing the latch mechanism and hopper arrangement;

Fig. 4 is a sectional view taken substantially on line 4—4 of Fig. 5 and showing the relation of the latch and hinge mechanisms, and

Fig. 5 is a sectional view taken substantially on line 5—5 of Fig. 3 and clearly showing the support of the doors by the cross beam.

Referring now to the drawings in detail, it will be seen that the car is formed of plate girder sides A joined together at the bottom to form a skeleton frame supported by bolsters B upon a wheel and axle assembly C indicated by line and dash. The girder side walls have hopper sheets attached thereto and sloping downwardly to form discharge openings which are closed by doors D supported entirely by the cross beams. Each plate girder side wall consists of a bulb angle upper chord 2 and an angle lower chord 4 joined together by rectangular side or web plate 6. The girder web plate has its ends securely attached to bolster stakes 8 which in the present instance are of channel formation and carry at their upper ends the side end extensions 10 which connect the bolster stakes with the corner stake 12 and end wall 14. The bolster stakes as well as the web plate and bottom chord are supported upon and directly attached to the ends of bolster 16, the central part of which is attached to draft sills 18 carrying the draft lugs 20 and striker 22. These draft sills also provide support for the central end stakes 24 and intermediate support members 26 located above the bolster and extending outwardly as at 28 for attachment to the end stakes, thus supporting the end slope sheet later to be referred to. Each of the plate girder sides has a plurality of Z-bar web stiffeners 30 attached thereto and extending downwardly below the bottom chord. These Z-bar web stiffeners have one flange attached to the top and bottom chord and web plate by means of rivets 31, while the web thereof extends outwardly at right angles to the girder web plate and provides an admirable support for the attachment of cross beams 32 below the bottom chord of the girder. These cross beams are of channel formation with the web located against the web of the Z-bar web stiffener extension to which they are joined by means of rivets 33, while the flanges thereof extend outwardly and are preferably welded or otherwise secured to the outer flange of the Z-bar stakes or web stiffeners. It is thus seen that an extremely rigid skeleton frame is provided formed by plate girder sides supported at the ends upon wheel and axle assemblies and joined together at their lower intermediate parts by cross beams rigidly attached to the extensions of the girder web stiffeners.

The car will be completed by securing hopper sheets to the girder side walls, and in the present instance these sheets comprise in part end slope sheets 34 secured to the end walls and extending downwardly to a point adjacent the lower edge of the girder sides where they are attached to cross plates 36. These end plates will be supported intermediate the side walls by means of the stakes 26 previously referred to and by the braces 38 attached to the intermediate stakes and the inner extensions of the draft sills which are also braced and supported from the end cross beam by means of gussets 40 (Fig. 1). Longi-

tudinally extending slope sheets 42 are secured to the plate girder side walls above their lower edges and extend downwardly to substantially the plane of the lower edge of the girder side walls where they are attached to side hopper opening members 44. These side members are of deformed channel shape having a lower outwardly directed flange 46 and an upper inclined flange 48 which underlies and is rigidly secured to the longitudinal slope sheets. The side members have their ends flanged as at 50 for attachment to the web of the cross beams 32 previously referred to. Intermediate slope sheets are provided having a vertically extending hopper defining portion 52 terminating at the lower edge in an outwardly directed flange 54 and at the upper edge an inclined portion 56 adapted to be joined as at 58 to the inclined portion of the adjacent intermediate slope sheet. The ends of the portion 52 are flanged as at 60 for attachment to the plates 44, while the slope portions are flanged as at 62 for attachment to the longitudinal slope sheets 42. It is thus seen that transverse housings are provided by these intermediate slope sheets, which housings will extend over and completely protect the cross beams from contact with any lading. It will also be seen that a plurality of discharge openings have been formed by means of relatively light hopper sheets attached to the plate girder sides and that these sheets serve only to support their share of the load and transfer their share immediately to the plate girder side walls. If desired and necessary to stiffen the transverse extending slope sheets or hoods gussets 64 (Fig. 3) may be provided extending between and secured to the girder side walls, longitudinal slope sheets and transverse slope sheets or hoods.

It will be seen that a substantially box-like space is formed on either side of the cross beams due to the peculiar placement and spacing of discharge defining plates 44 and 52. Within one of these spaces latch mechanism 66 is located and consists of hook supporting castings 68 riveted or otherwise secured to the cross beam web. Each of these hook castings has pivotally mounted thereon a hook 69 and the adjacent hooks are connected together by means of a bar 70 for movement in unison. The connecting bar is formed with a projection 71 adapted to bear upon one end of a spring 72, the other end of which bears upon a bracket 73 secured to the web of the cross beam. In order to operate these latches a longitudinally extending shaft 74 is journaled in each of the cross beams and connected by means of a crank arm and rod 76 to one of the hooks, while an operating handle 77 is rigidly fixed to the shaft at some point and extends outwardly beyond the car line for contact with track side mechanism (not shown). The latches engage projecting lugs 80 attached to the free end of the doors 82, the opposite end of which is carried upon rod 83 journaled in hinge butts 84 attached to the cross beam web above the flanges thereof. Each of the doors is formed of a single sheet of metal to which is attached relatively deep side members 86 and intermediate stiffening members 88, the latter of which are substantially in alignment with the latch engaging lugs 80. It is thus seen that a skeleton frame has been provided from which the doors are hung by means of hinges and latches wholly independent of the slope sheets which form the hopper proper.

It will be obvious that with a car constructed as described the doors are supported upon heavy cross beams directly secured to the girder side thus relieving the hopper sheets of the door load and permitting the use of light hopper sheets. In case of injury to either a door, hinge or latch the damaged part may be replaced without in any way affecting the hopper sheets, while in case of injury to hopper sheets they may be replaced without affecting the load carrying or skeleton frame.

While the car has been described more or less in detail, it is obvious that various modifications and rearrangements of parts will be apparent to persons skilled in the art and all such modifications and rearrangements of parts are contemplated as fall within the scope of the following claims.

What is claimed is:

1. In a railway car of the drop bottom type the combination of plate girder side walls supported at their ends by wheel and axle assemblies, hopper sheets connected to the side walls and sloping downwardly to form a discharge opening between the side walls, and a door for closing the opening and hinged to rotate downwardly about an axis extending transversely of the car, said door being supported by the girder side walls independently of the hopper sheets.

2. In a railway car of the drop bottom type the combination of plate girder side walls supported at their ends by wheel and axle assemblies, hopper sheets connected to the side walls and sloping inwardly and downwardly, transversely extending slope sheets connecting the hopper sheets to form a plurality of discharge openings between the side walls, and a plurality of doors for closing the opening and hinged to swing downwardly about an axis extending transversely of the car, said doors being supported by the girder side walls intermediate thereof but independently of the hopper sheets.

3. In a railway car of the drop bottom type the combination of plate girder side walls supported at their ends by wheel and axle assemblies, hopper sheets connected to the side walls and sloping inwardly and downwardly, transversely extending slope sheets connecting the hopper sheets to form a plurality of discharge openings between the side walls, said slope sheets being spaced apart and housing transversely extending means connected to the girder walls, and a plurality of hinged doors carried by said transversely extending means and closing said discharge openings.

4. In a railway car of the drop bottom type the combination of plate girder side walls supported at their ends by wheel and axle assemblies, hopper sheets connected to the side walls and sloping inwardly and downwardly, transversely extending slope sheets connecting the hopper sheets to form a plurality of discharge openings between the side walls, said slope sheets being spaced apart and housing transversely extending means connected to the girder walls, and a plurality of hinged doors carried by said transversely extending means and closing said discharge openings, at least one of said transversely extending means providing a hinge support for an end of one door and a releasable support for an end of the adjacent door.

5. In a railway car of the drop bottom type the combination of plate girder side walls formed by top and bottom chords secured to a metal web plate and supported at their ends by wheel and axle assemblies, girder stiffeners secured to the

web plates and extending below the bottom chords, cross beams secured to the stiffener extensions on either side of the car, hopper sheets connected to the side walls and sloping downwardly to form discharge openings between the side walls, and doors closing the openings, said doors being hingedly connected to the cross beams and arranged therebelow when in closed position.

6. In a railway car of the drop bottom type the combination of plate girder side walls formed by top and bottom chords secured to a metal web plate and supported at their ends by wheel and axle assemblies, girder stiffeners secured to the web plates and extending below the bottom chords, continuous cross beams secured to the stiffener extensions on either side of the car, hopper sheets connected to the side walls above the bottom chord and sloping downwardly toward the center of the car, transversely extending slope sheets connecting the hopper sheets to form a plurality of discharge openings between the side walls, and a plurality of doors for closing the openings and hinged directly to the cross beams.

7. In a railway car of the drop bottom type the combination of plate girder side walls formed by top and bottom chords secured to a metal web plate and supported at their ends by wheel and axle assemblies, girder stiffeners secured to the web plates and extending below the bottom chords, cross beams secured to the stiffener extensions on either side of the car, hopper sheets connected to the side walls above the bottom chord and sloping downwardly toward the center of the car, transversely extending slope sheets connecting the hopper sheets to form a plurality of discharge openings between the side walls, and a plurality of doors for closing the openings, each hingedly supported at one end directly to a cross beam and releasably supported at the opposite end by the next adjacent cross beam, said doors when in closed position being arranged below said cross beams.

8. In a railway car of the drop bottom type the combination of plate girder side walls formed by top and bottom chords secured to a metal web plate and supported at their ends by wheel and axle assemblies, girder stiffeners secured to the web plates and extending below the bottom chords, cross beams secured to the stiffener extensions on either side of the car, hopper sheets connected to the side walls above the bottom chord and sloping downwardly toward the center of the car, transversely extending slope sheets connecting the hopper sheets to form a plurality of discharge openings between the side walls, and a plurality of doors for closing the openings, each hingedly supported at one end directly to a cross beam and releasably supported at the opposite end by the next adjacent cross beam, said transversely extending slope sheets being spaced apart sufficiently to house certain of the cross beams and the door supports.

9. In a railway car of the drop bottom type the combination of plate girder side walls formed by top and bottom chords secured to a metal web plate and supported at their ends by wheel and axle assemblies, Z-bar girder stiffeners secured to the web plates and extending below the bottom chords, channel cross-beams secured to the Z-bar stiffener extensions on either side of the car, hopper sheets connected to the side walls and sloping downwardly to form discharge openings between the side walls, and doors for closing said openings, said doors being hingedly connected to the cross beams in such a manner as to be arranged therebelow when in closed position.

10. In a railway hopper car devoid of center sills but provided with draft sills at the end portions thereof, the combination of plate girder side walls formed by top and bottom chords secured to a metal web plate and supported at their ends by wheel and axle assemblies, Z-bar girder stiffeners secured to the web plates and extending below the bottom chords, channel cross beams extending between and secured to the Z-bar stiffener extensions on either side of the car, hopper sheets connected to the side walls and sloping downwardly to form discharge openings between the side walls, and a plurality of doors for closing the openings, each being hingedly connected at one end directly to a channel cross beam and releasably supported at the other end by the next adjacent channel cross beam.

11. In a railway hopper car devoid of center sills but provided with draft sills at the end portions thereof, the combination of plate girder side walls formed by top and bottom chords secured to a metal web plate and supported at their ends by wheel and axle assemblies, Z-bar girder stiffeners secured to the web plates and extending below the bottom chords, channel cross-beams extending between and secured to the Z-bar stiffener extensions on either side of the car, hopper sheets connected to the side walls and sloping downwardly to form discharge openings between the side walls, and doors supported directly by the channel cross beams for closing said openings, at least certain of said channel cross beams having hinge means and latch means attached thereto for the support of adjacent door edges.

12. In a railway hopper car devoid of center sills but provided with draft sills at the end portions thereof, the combination of plate girder side walls formed by top and bottom chords secured to a metal web plate and supported at their ends by wheel and axle assemblies, Z-bar girder stiffeners secured to the web plates and extending below the bottom chords, channel cross-beams extending between and secured to the Z-bar stiffener extensions on either side of the car, hopper sheets connected to the side walls and sloping downwardly to form discharge openings between the side walls, and doors supported directly by the channel cross beams for closing said openings, at least one of said channel cross beams being located beneath the hopper end sheet and having latch means attached thereto independently of the end sheet for support of the free edge of one of the doors.

13. In a railway hopper car devoid of center sills but provided with draft sills at the end portions thereof, the combination of plate girder side walls formed by top and bottom chords secured to a metal web plate and supported at their ends by wheel and axle assemblies, girder stiffeners secured to the web plates and extending below the bottom chords, cross beams extending between and secured to the stiffener extensions on either side of the car, hopper sheets connected to the side walls above the bottom chord and sloping downwardly toward the center of the car, transversely extending slope sheets connecting the hopper sheets to form a plurality of discharge openings between the side walls, and a plurality of doors for closing the openings, each hingedly supported at one end directly to a

cross beam and releasably supported at the opposite end by the next adjacent cross beam, said releasable supports being controlled by means carried by the cross beam.

14. In a railway hopper car devoid of center sills but provided with draft sills at the end portions thereof, the combination of plate girder side walls formed by top and bottom chords secured to a metal web plate and supported at their ends by wheel and axle assemblies, Z-bar girder stiffeners secured to the web plates and extending below the bottom chords, channel cross-beams extending between and secured to the Z-bar stiffener extensions on either side of the car, hopper sheets connected to the side walls and sloping downwardly to form discharge openings between the side walls, and doors supported directly by the channel cross beams for closing said openings, at least certain of said channel cross beams having hinge means and latch means attached thereto for the support of adjacent door edges, said latch means being controlled by means carried by the channel cross beams and extending longitudinally of the car.

15. In a hopper car devoid of continuous center sills but provided with draft sills, connected side and end walls forming the body portion of the car, said side walls being of plate girder formation and having vertical stakes secured thereto and extending below the bottom chord of the side walls, slope sheets secured to the walls and providing a plurality of discharge openings, cross beams connecting the projecting portions of oppositely disposed stakes and arranged in a plane below the draft sills, and doors for normally closing the discharge openings, said doors being hingedly connected to the cross beams in such a manner as to be arranged therebelow when in closed position.

16. In a railway hopper car, side and end walls, said side walls being of plate girder formation, draft sills at opposite end portions of the car, slope sheets connected with said walls and providing a plurality of discharge openings arranged below the lowermost portions of the draft sills, stakes secured to the side walls projecting below the draft sills, cross beams extending between and secured to the projecting portions of oppositely arranged stakes, and doors normally closing said discharge openings, said doors being hingedly connected to the cross beams and, when in closed position, being arranged below the horizontal plane of the lowermost portion of the draft sills.

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