June 22, 1965 E. L. DAVIS ETAL 3,190,239

RAILWAY CARS COMPRISING BODIES HAVING WIDE SIDE ACCESS OPENINGS THEREINTO

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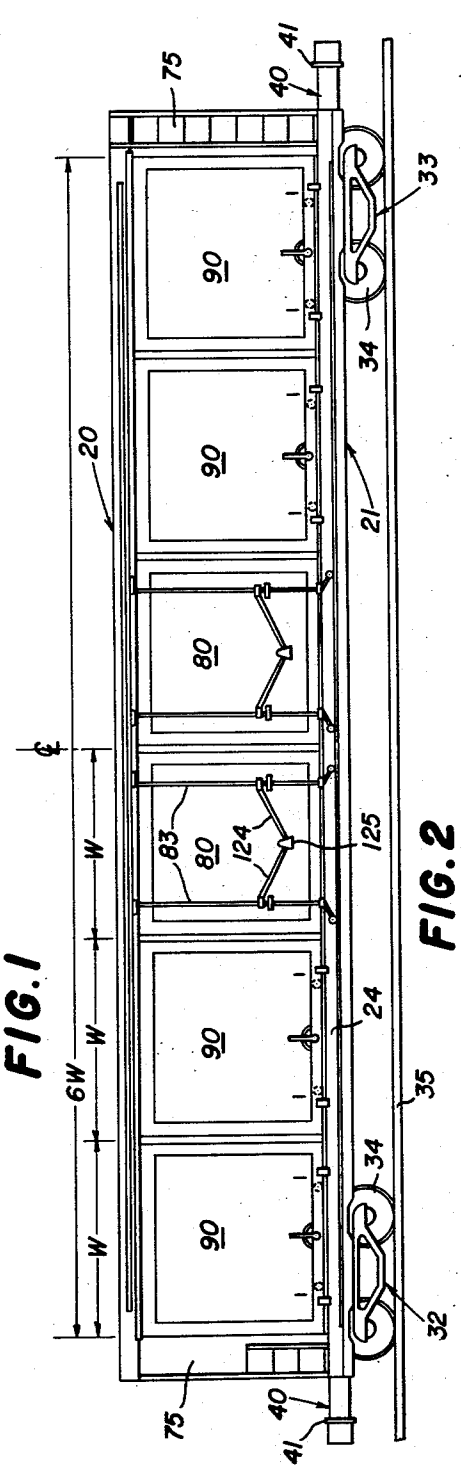


FIG. 1

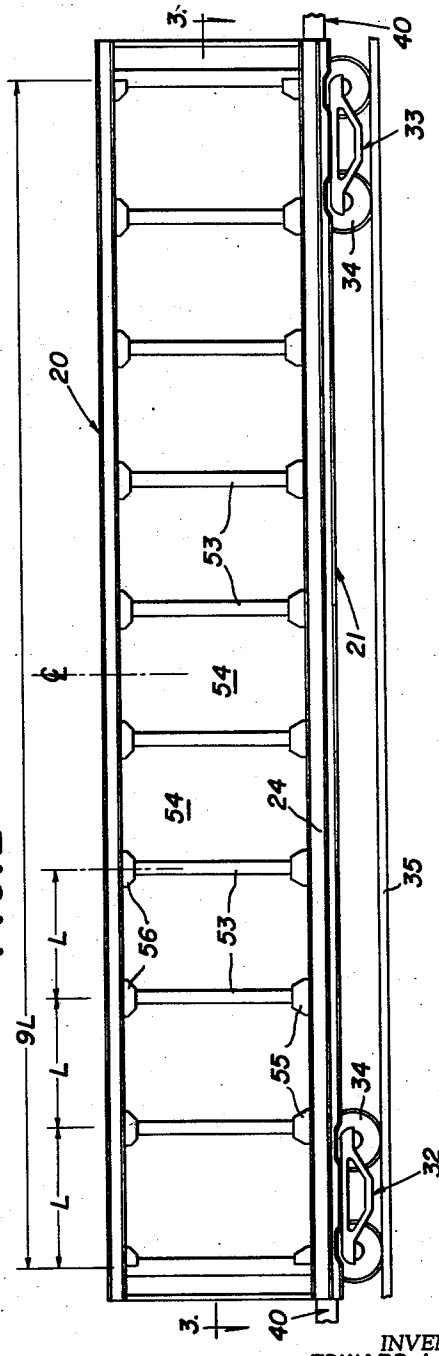


FIG. 2

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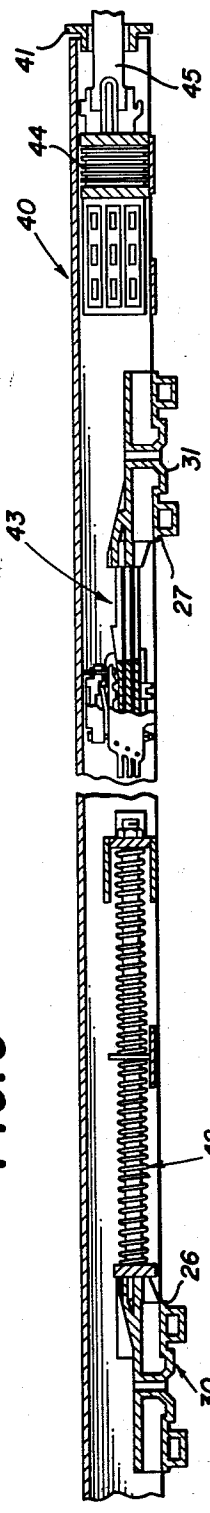


FIG. 5

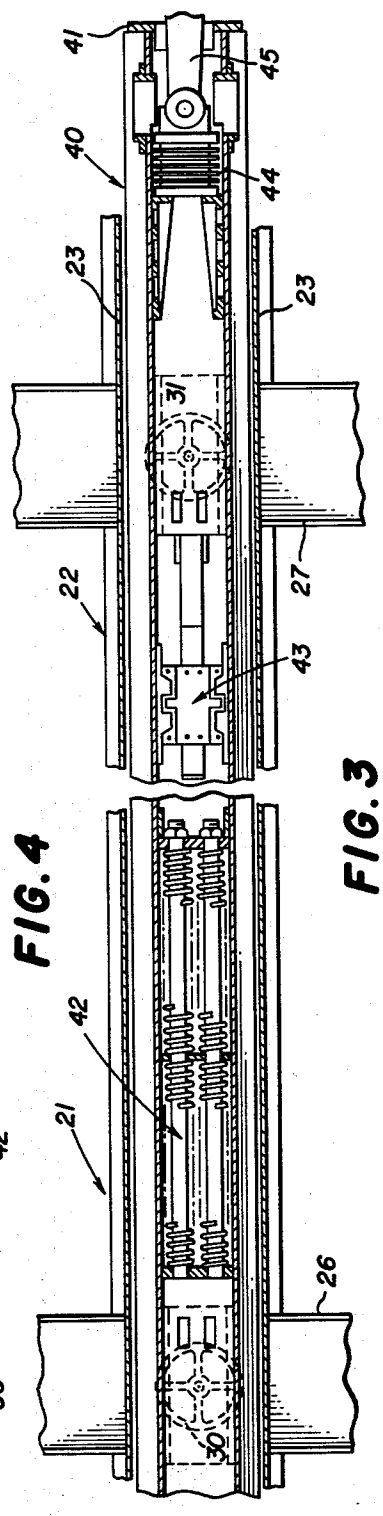


FIG. 4

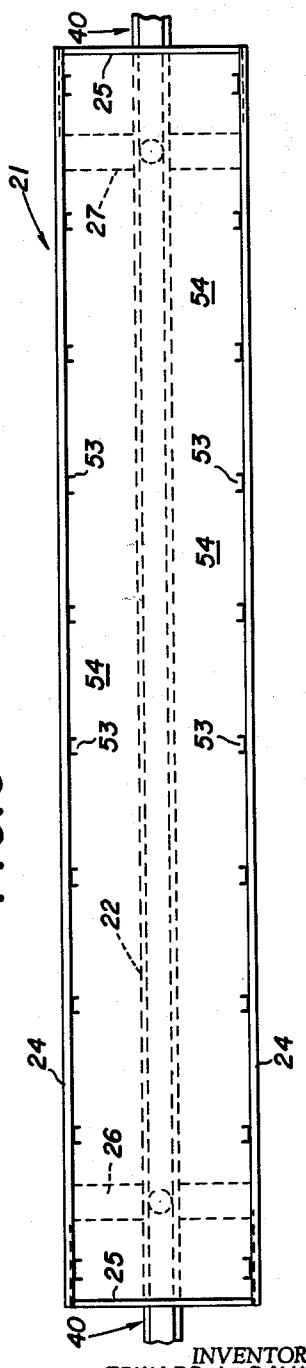


FIG. 3

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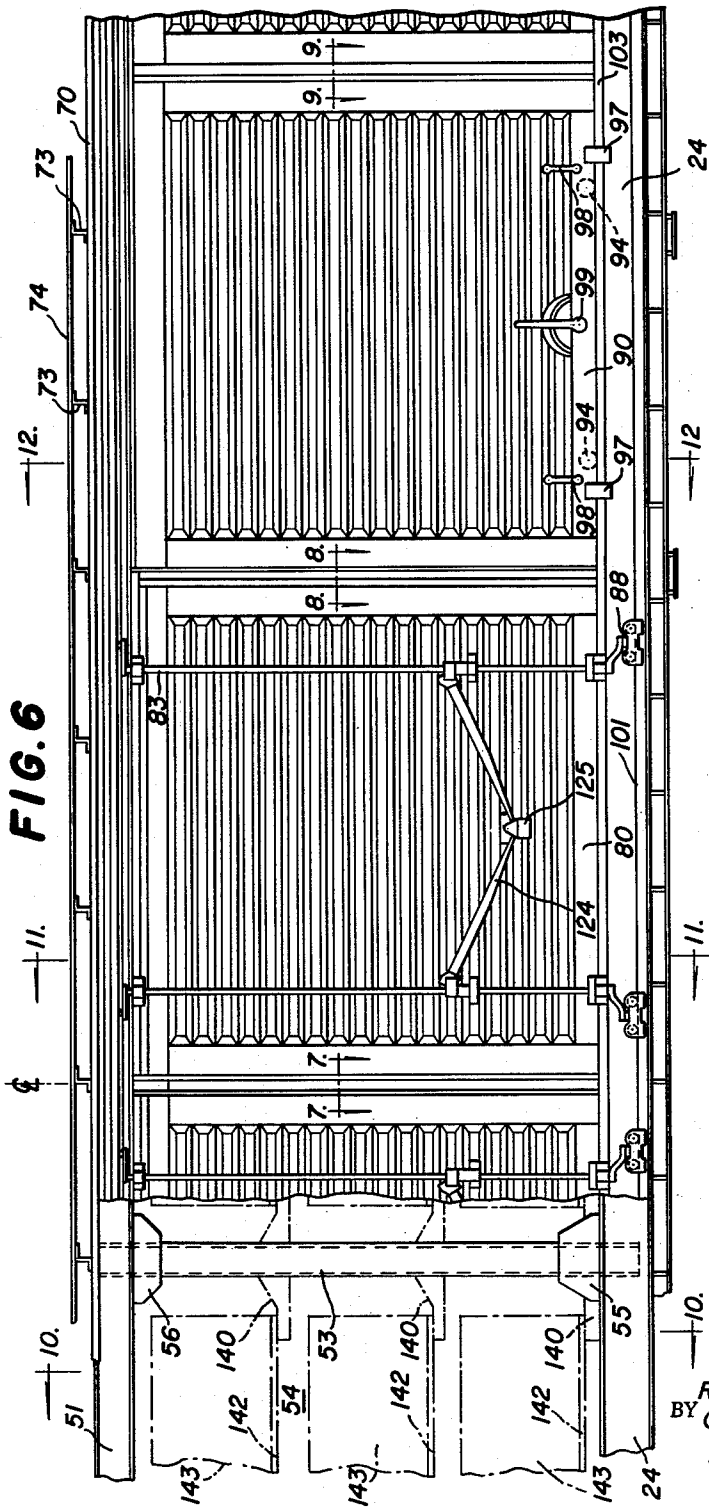


FIG. 6

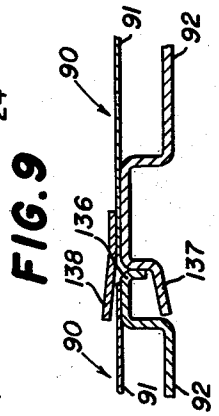


FIG. 9

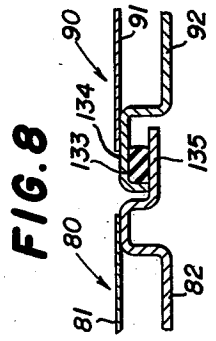


FIG. 8

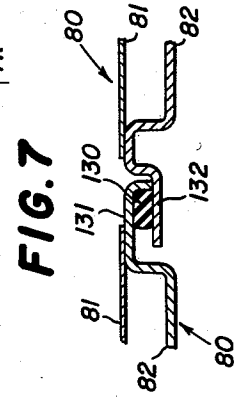


FIG. 7

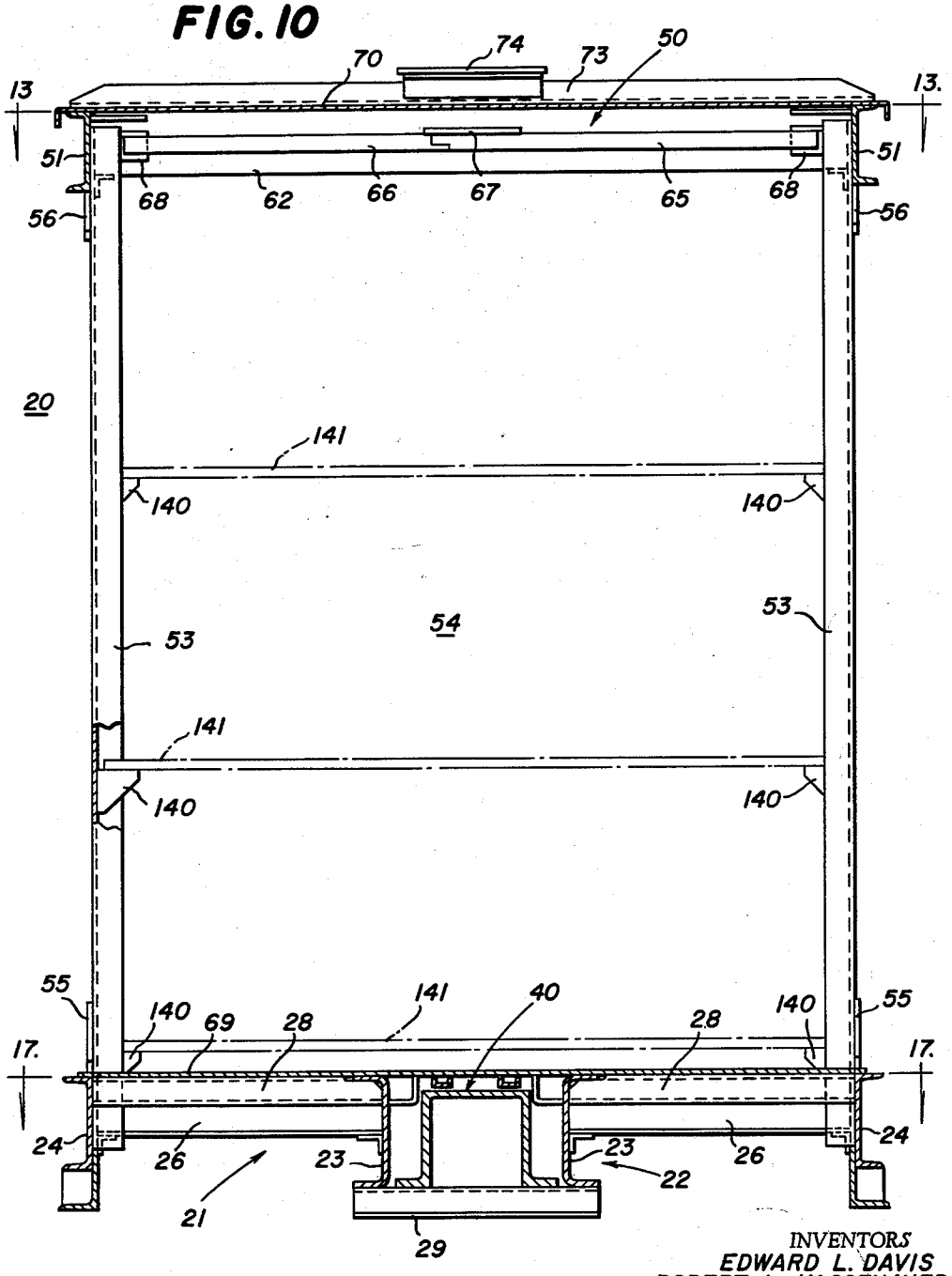
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FIG. 10



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RAILWAY CARS COMPRISING BODIES HAVING WIDE SIDE ACCESS OPENINGS THEREINTO

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FIG. 11

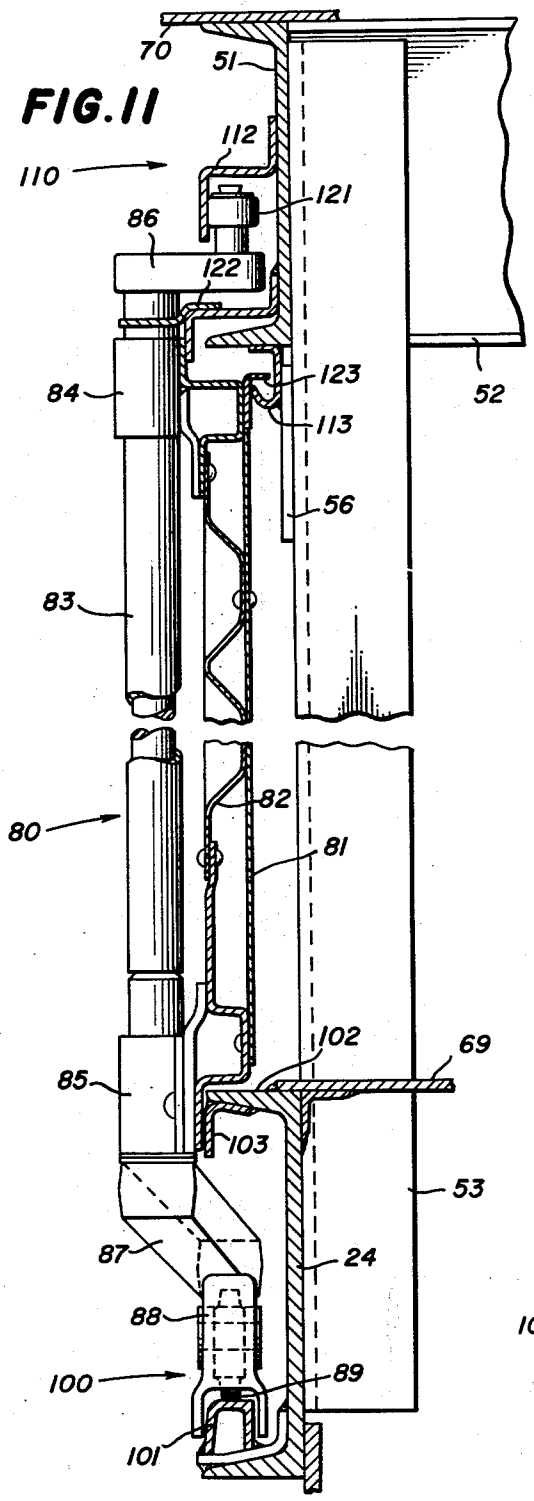
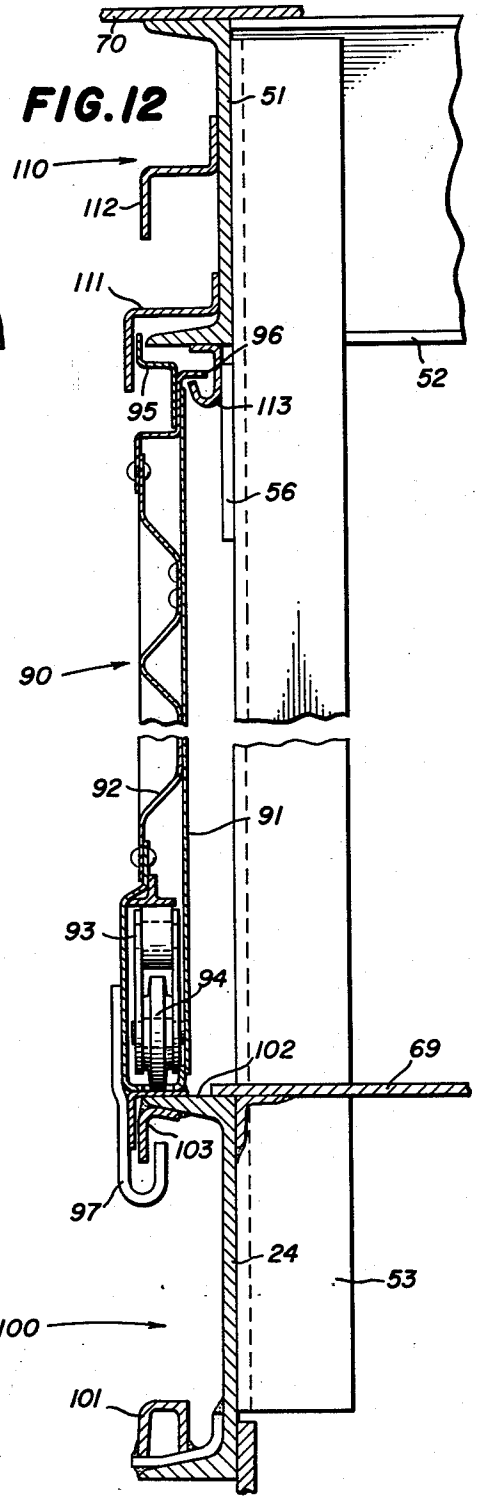


FIG. 12



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RAILWAY CARS COMPRISING BODIES HAVING WIDE SIDE ACCESS OPENINGS THEREINTO

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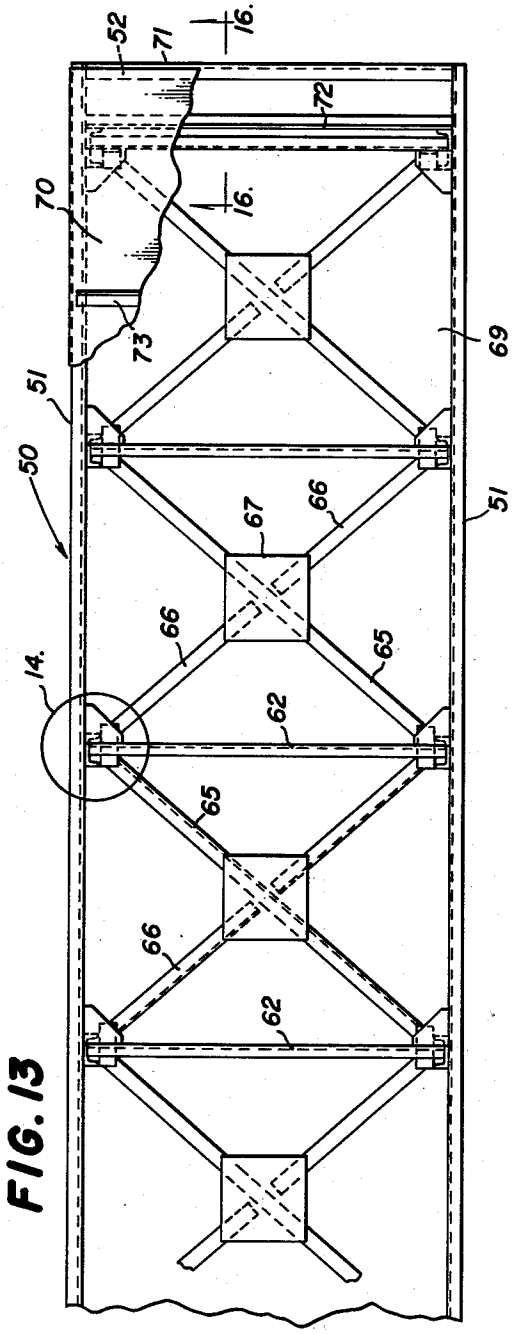


FIG. 13

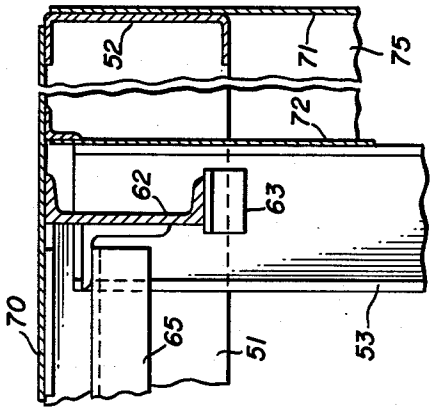


FIG. 16

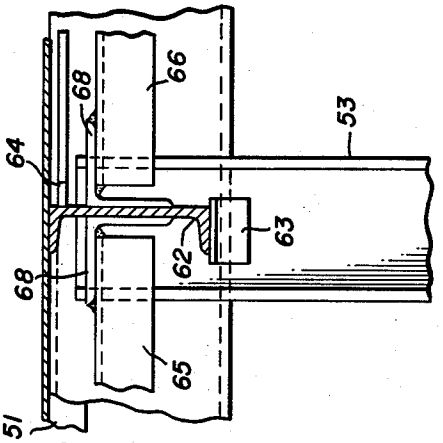


FIG. 15

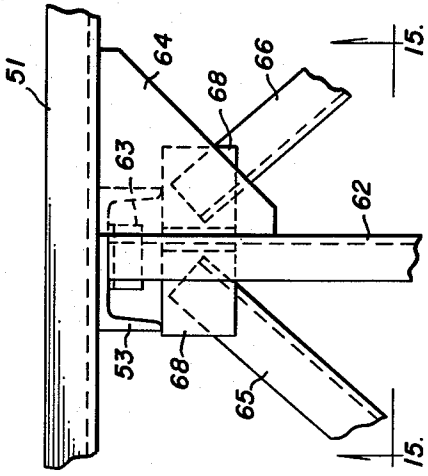


FIG. 14

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RAILWAY CARS COMPRISING BODIES HAVING WIDE SIDE ACCESS OPENINGS THEREINTO

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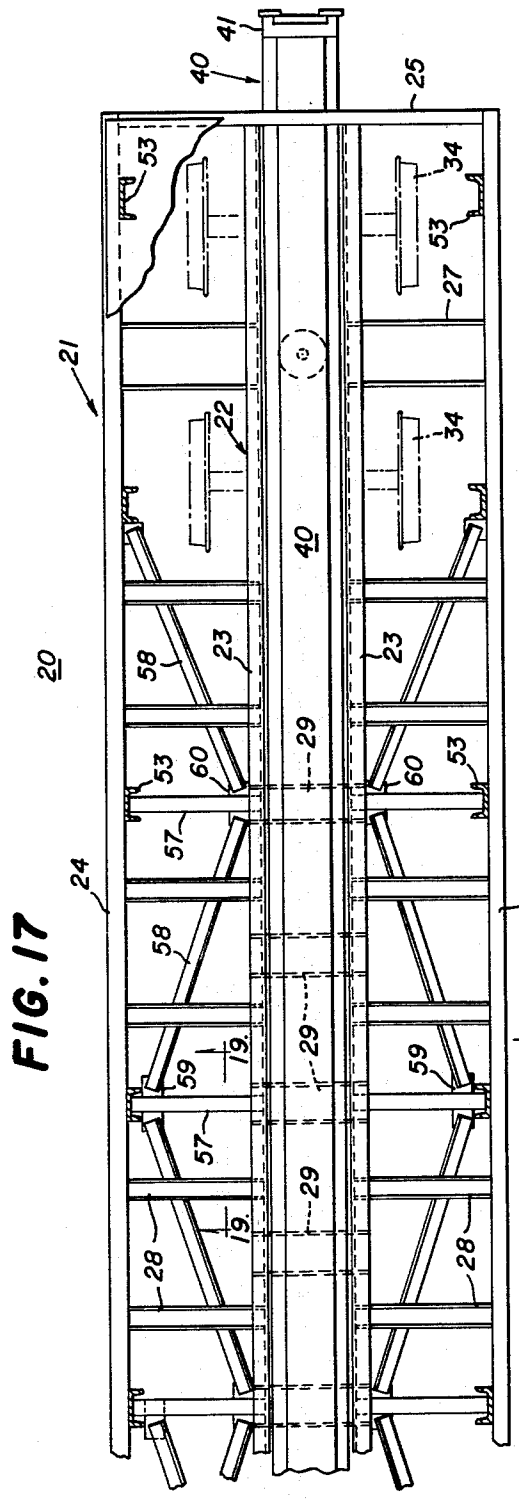


FIG. 17

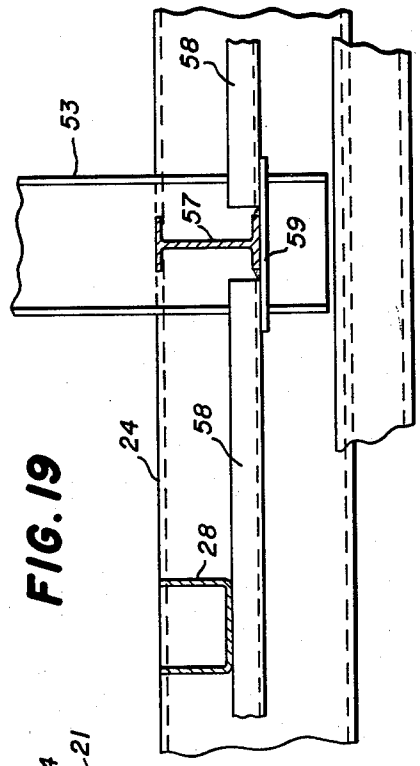


FIG. 19

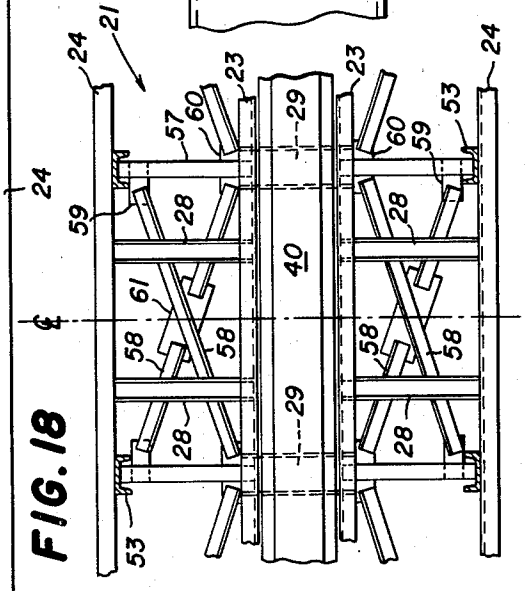


FIG. 18

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United States Patent Office 3,190,239 Patented June 22, 1965

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RAILWAY CARS COMPRISING BODIES HAVING WIDE SIDE ACCESS OPENINGS THEREINTO

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Filed Feb. 7, 1963, Ser. No. 257,037
10 Claims. (Cl. 105—378)

The present invention relates to railway cars comprising bodies having wide side access openings thereinto.

It is a general object of the invention to provide a railway car comprising a strong rigid hollow elongated box-like framework, floor and roof and end wall sheets carried by the framework and defining an elongated box-like body having open sides, and sets of side doors carried by the opposite sides of the body and arranged selectively to open and to close the open sides thereof.

Another object of the invention is to provide a railway car of the character noted, wherein the framework thereof essentially comprises an elongated substantially rectangular rigid underframe, an elongated substantially rectangular rigid roof frame disposed in superimposed relation with the underframe, and a plurality of longitudinally spaced-apart sets of upstanding rigid side posts arranged between the underframe and the roof frame, wherein each of the sets of side posts includes two laterally spaced-apart individual side posts respectively arranged adjacent to the opposite sides of the underframe and of the roof frame, and wherein the lower end of each of the side posts is rigidly secured to the adjacent side of the underframe and the upper end of each of the side posts is rigidly secured to the adjacent side of the roof frame, whereby the fundamental strength and rigidity of the framework are established substantially independently of the floor and roof and end wall sheets.

Another object of the invention is to provide a railway car of the character described, wherein a plurality of longitudinally spaced-apart bays are thus defined within the body thereof and between the end wall sheets, each bay being arranged between an adjacent pair of the sets of side posts and provided with laterally spaced-apart openings at the opposite open sides of the body.

Another object of the invention is to provide a railway car of the character described, and further comprising a plurality of sets of supports respectively carried by the sets of side posts, each set of supports including a given number of individual supports arranged in a vertical tier and extending laterally between the two individual side posts of the adjacent set of side posts, whereby each of the bays is adapted to receive lading arranged in a vertical tier and supported by the adjacent pair of the sets of supports above the floor.

Another object of the invention is to provide a railway car of the character described, wherein the underframe thereof carries a floating draft-buff beam, the opposite ends of which carry the usual pair of draft gears, whereby the transmission of severe longitudinal shocks to the lading arranged in the vertical tiers in the bays within the body is greatly minimized, rendering the car capable of use in the transporting of delicate ladings, such as synthetic yarns, and the like.

A further object of the invention is to provide a railway car body of elongated box-like configuration and having open sides and carrying sets of side doors on the opposite sides thereof, wherein each of the sets of side doors is carried jointly by lower rail structure adjacent to the lower portion of the adjacent side of the body and by upper rail structure adjacent to the upper portion of the adjacent side of the body, and wherein each of the sets of side

doors includes a plurality of first side doors of the plug-sliding type and a plurality of second side doors of the simple sliding type, whereby each set of side doors is adapted to close the adjacent side of the body and to provide a doorway thereinto that may be located longitudinally therealong at any desired and convenient position between the opposite ends of the body.

A further object of the invention is to provide a railway car body of the character described, wherein each of the sets of side doors includes two of the first side doors and four of the second side doors, whereby the two first side doors in each set are operative to produce a composite doorway into the adjacent side of the body, and wherein each side door in each set has a width substantially equal to W and the composite doorway into the adjacent side of the body has a width substantially equal to 2W, and wherein each open side of the body has a length substantially equal to 6W, with the result that the composite doorway that may be produced into each side of the body has a width substantially equal to ⅓ of the length of the adjacent side opening into the body.

A still further object of the invention is to provide a railway car body of the character described, wherein nine longitudinally spaced-apart bays are arranged in the body between the opposite ends thereof, wherein each of the bays has laterally spaced-apart openings thereinto at the opposite open sides of the body, and wherein each of the bays has a length L that is substantially equal to ⅔ of the width W of each of the side doors, with the result that any adjacent three of the bays are accessible through either side of the body through the doorway produced in the adjacent side of the body when the side doors in the adjacent set occupy their open positions and are selectively adjusted longitudinally along the associated lower and upper track structures properly to locate the doorway into the adjacent side of the body.

Further features of the invention pertain to the particular construction and arrangement of the elements of the railway car, whereby the above-outlined and additional operating features thereof are attained.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification, taken in connection with the accompanying drawings, in which:

FIGURE 1 is a side elevational view of a railway car embodying the present invention and including an elongated box-like body having open sides and carrying sets of side doors on the opposite sides thereof, each side door set including two first side doors each of the plug-sliding type and four second side doors each of the simple sliding type, whereby the side doors on each side of the body may be operated completely to close the associated side of the body, and whereby the side doors on each side of the body may be operated to produce a wide side doorway at any desired longitudinal position along the entire length of the associated side of the body;

FIG. 2 is a side elevational view of the railway car, similar to FIG. 1, but with all of the side doors removed from the body;

FIG. 3 is a horizontal sectional view of the railway car, this view being taken in the direction of the arrows along the line 3—3 in FIG. 2;

FIG. 4 is an enlarged fragmentary horizontal sectional view of the floating draft-buff beam structure incorporated in the underframe of the railway car, as shown in FIG. 1;

FIG. 5 is an enlarged fragmentary vertical sectional view of the floating draft-buff beam structure, as shown in FIG. 4;

FIG. 6 is an enlarged fragmentary side elevational

view of the right central portion of the body of the railway car, as shown in FIG. 1, and illustrating one of the first plug-sliding side doors and the adjacent one of the second simple sliding side doors;

FIG. 7 is a greatly enlarged horizontal sectional view of the overlapped joint between two of the first plug-sliding side doors in their closed positions, this view being taken in the direction of the arrows along the line 7—7 in FIG. 6;

FIG. 8 is a greatly enlarged horizontal sectional view of the overlapped joint between one of the first plug-sliding side doors and one of the second simple sliding side doors in their closed positions, this view being taken in the direction of the arrows along the line 8—8 in FIG. 6;

FIG. 9 is a greatly enlarged horizontal sectional view of the overlapped joint between two of the second simple sliding side doors in their closed positions, this view being taken in the direction of the arrows along the line 9—9 in FIG. 6;

FIG. 10 is an enlarged vertical lateral sectional view of the railway car, this view being taken in the direction of the arrows along the line 10—10 in FIG. 6;

FIG. 11 is a further enlarged fragmentary vertical lateral sectional view of one of the first plug-sliding doors, this view being taken in the direction of the arrows along the line 11—11 in FIG. 6;

FIG. 12 is a further enlarged fragmentary vertical lateral sectional view of one of the second simple sliding doors, this view being taken in the direction of the arrows along the line 12—12 in FIG. 6;

FIG. 13 is a reduced fragmentary horizontal sectional view of the upper portion of the right-hand end of the railway car body, this view being taken in the direction of the arrows along the line 13—13 in FIG. 10;

FIG. 14 is a greatly enlarged plan view of a detail of the railway car body of FIG. 13, this view being taken within the circle designated 14 therein;

FIG. 15 is a greatly enlarged vertical lateral sectional view of this detail, this view being taken in the direction of the arrows along the line 15—15 in FIG. 14;

FIG. 16 is a greatly enlarged vertical lateral sectional view, similar to FIG. 15, of another detail of the railway car body of FIG. 13, this view being taken in the direction of the arrows along the line 16—16 therein;

FIG. 17 is a reduced fragmentary horizontal sectional view of the lower right-hand end portion of the railway car body, this view being taken in the direction of the arrows along the line 17—17 in FIG. 10;

FIG. 18 is a fragmentary horizontal sectional view of the lower central portion of the railway car body, FIG. 18 being similar to FIG. 17; and

FIG. 19 is a greatly enlarged vertical lateral sectional view of another detail of the railway car body, this view being taken in the direction of the arrows along the line 19—19 in FIG. 17.

Referring now to FIGS. 1 and 2, the railway car 20 there illustrated, and embodying the features of the present invention, is especially adapted to transport synthetic yarn or other delicate lading, as explained more fully hereinafter, whereby the same comprises a strong rigid underframe 21, as best shown in FIGS. 3, 4, 5, 10, 17, 18 and 19. The underframe 21 essentially comprises an elongated longitudinally extending center sill 22 that includes a pair of laterally spaced-apart elements 23 in the form of channels, a pair of elongated longitudinally extending side sills 24 each in the form of a channel, a pair of laterally extending end sills 25 each in the form of a channel, and a pair of longitudinally spaced-apart and laterally extending body bolsters 26 and 27, the body bolsters 26 and 27 being respectively arranged longitudinally inwardly with respect to the adjacent end sills 25. The outer ends of the center sill elements 23 are rigidly secured to the adjacent portions of the end sills 25; the outer ends of the body bolsters 26 and 27 are

rigidly secured to the adjacent portions of the side sills 24; the inner ends of the body bolsters 26 and 27 are rigidly secured to the adjacent portions of the center sill elements 23; and the outer ends of the side sills 24 are respectively rigidly secured to the adjacent ends of the end sills 25. The two center sill elements 23 are further rigidly secured to the respectively adjacent side sills 24 by two sets of longitudinally spaced-apart and laterally extending cross bearers 28, each in the form of a channel. Also, the center sill elements 23 are rigidly secured together adjacent to the lower central portions thereof by a plurality of longitudinally spaced-apart and laterally extending ties 29, each in the form of a channel.

As best shown in FIGS. 4 and 5, the body bolsters 26 and 27 respectively carry centrally disposed center bearings 30 and 31 that are adapted to cooperate, in the usual manner, with center pins, not shown, and with corresponding center bearings respectively carried by the truck bolsters, not shown, of a pair of trucks, respectively indicated at 32 and 33 in FIGS. 1 and 2. Each of the trucks 32 and 33 carries flanged wheels 34 of standard gauge supported by track rails, indicated at 35 in FIGS. 1 and 2.

A centrally disposed elongated longitudinally extending opening is provided through the underframe 21, and particularly through the end sills 25 and the body bolsters 26 and 27 and between the elements 23 of the center sill 22; and in this opening there is slidably supported an elongated longitudinally extending rigid draft-buff beam 40, the opposite outer ends of which project outwardly beyond the end sills 25 and respectively carry a pair of striker plates 41. The beam 40 is supported upon the ties 29, as best shown in FIGS. 10 and 17, and is operatively connected to the underframe 22 by cushioning mechanism of any suitable form, whereby the underframe 22 is of the cushioned type. As shown in FIGS. 4 and 5, the illustrated cushioning mechanism is of the Waugh type, but the same may be of the Bendix, or other type, the Waugh type cushioning mechanism being illustrated only for the purpose of the present specification. Specifically, such mechanism essentially comprises a resilient unit 42 operatively connected between the body bolster 26 and the beam 40, and a snubber unit 43 operatively connected between the body bolster 27 and the beam 40; whereby the mechanism accommodates limited longitudinal cushioned and controlled relative movements between the rigid beam 40 and the rigid underframe 21, thereby to prevent the transmission of severe longitudinal draft and buff shocks between the beam 40 and the underframe 21, in the usual manner. Since the units 42 and 43 are of conventional construction and arrangement, the constructional details thereof are not further described herein in the interest of brevity.

The opposite ends of the beam 40 are hollow and carry resilient draft gears 44 of conventional construction and arrangement; and the draft gears 44 are operatively connected to coupler devices 45, also of conventional construction and arrangement; all as illustrated in FIGS. 4 and 5.

The railway car 20 also comprises a strong rigid roof frame 50, as best shown in FIG. 10. The roof frame 50 essentially comprises a pair of elongated longitudinally extending side members 51, each in the form of a channel, and a pair of laterally extending end members 52, each in the form of a channel. The outer ends of the side members 51 are rigidly secured to the adjacent ends of the end members 52. Thus, the underframe 21 and the roof frame 50 are of substantially identical rectangular configuration; and the roof frame 50 is arranged in superimposed relation with the underframe 21.

Further, the railway car 20 comprises a plurality of longitudinally spaced-apart sets of upstanding rigid side posts 53, each set including two laterally spaced-apart individual side posts 53 arranged on opposite sides of the car 20, and each side post 53 being in the form of a

channel; which side posts 53 rigidly join together the underframe 21 and the roof frame 50 to form a rigid hollow skeleton-like framework. As best shown in FIGS. 2 and 3, ten sets of the side posts 53 are arranged in substantially equally longitudinally spaced-apart relation to provide nine longitudinally spaced-apart bays 54 between the underframe 21 and the roof frame 50 and within the framework mentioned.

As best shown in FIGS. 10, 17, 18 and 19, the lower end of each of the side posts 53 is rigidly secured, as by welding, to the adjacent interior portion of the web of the adjacent one of the side sills 24; and as best shown in FIGS. 2 and 10, the pedestal of each side post 53 is rigidly secured to a gusset plate 55 that is, in turn, rigidly secured to the top of the adjacent one of the side sills 24. As best shown in FIGS. 10, 13, 14, 15 and 16, the upper end of each of the side posts 53 is rigidly secured, as by welding, to the adjacent interior portion of the web of the adjacent one of the side members 51; and as best shown in FIGS. 2 and 10, the capital of each side post 53 is rigidly secured to a gusset plate 56 that is, in turn, rigidly secured to the bottom of the adjacent one of the side members 51.

In order further to rigidify the framework, the lower portions of the six central side posts 53 on each side of the underframe 21 are rigidly secured to the adjacent ones of the side sill elements 23 by longitudinally spaced-apart and laterally extending auxiliary side bearers 57, as shown in FIGS. 17, 18 and 19, each auxiliary side bearer 57 being in the form of an I-beam. Also, the underframe 21 is reinforced by a number of diagonal ties 58. Each tie 58 is rigidly secured at the outer end thereof to a gusset plate 59 and at the inner end thereof to a gusset plate 60. The gusset plates 59 and 60 are arranged in staggered relation, each gusset plate 59 being rigidly secured to the lower portion of one of the side posts 53, and each gusset plate 60 being rigidly secured to the adjacent one of the center sill elements 23. In the center of the underframe 21 two of the ties 58 are disposed in crossing relation and are rigidly secured together by a gusset plate 61, as shown in FIG. 18. In the arrangement, the ties 58 are disposed below the cross bearers 28 and are rigidly secured thereto, so as further to unify the underframe 21. In order further to rigidify the framework, the upper portions of the sets of side posts 53 are rigidly secured together by longitudinally spaced-apart and laterally extending rafters or beams 62, as shown in FIGS. 13, 14, 15 and 16, each beam 62 being in the form of a channel. Each end of each beam 62 is footed upon the adjacent one of the side posts 53 by a foot 63 of angle form and rigidly secured thereto. The top end of each side post 53 is rigidly secured mutually to the adjacent portion of the adjacent side member 51 and to the adjacent end of the adjacent beam 62 by an associated gusset plate 64. The opposite ends of adjacent ones of the beams 62 are rigidly secured together by a plurality of ties 65 and 66 arranged in crossing relation with each other. Each tie 65 is continuous, and each tie 66 is in two complementary sections; and a center plate 67 is arranged rigidly to secure together the midportion of each tie 65 and the inner ends of the two sections of each crossing tie 66. The outer ends of the ties 65 and 66 are rigidly secured to the adjacent ends of the beams 62 by angle brackets 68 arranged therebetween.

The top of the underframe 21 carries a floor sheet 69, and the top of the roof frame 50 carries a roof sheet 70, as best shown in FIG. 10. Further, the ends of the framework are closed by two upstanding body end sheets 71. Referring to FIGS. 13 and 16, the bottom of each body end sheet 71 is rigidly secured to the adjacent end sill 25 and the top of each body end sheet 71 is rigidly secured to the adjacent end member 52. Also two upstanding lading chamber end sheets 72 are respectively secured to the outermost sets of side posts 53, as shown in FIG. 16, whereby the total lading chamber defined in the framework by the floor sheet 69, the roof sheet 70 and the lading chamber end sheets 72 is somewhat shorter than the distance between the body end sheets 71; whereby it is this lading chamber that comprises the nine bays 54, as previously described. Further, the top of the roof sheet 70 carries a plurality of longitudinally spaced-apart and laterally extending external carlines 73, as best shown in FIG. 10 and 13; and the central portions of the carlines 73 carry a longitudinally extending catwalk 74 for the usual purpose.

Recapitulating, the composite lading chamber that is defined in the framework by the floor sheet 69, the roof sheet 70 and the end sheets 72 is of elongated box-like configuration and having open sides and including nine longitudinally spaced-apart bays 54, each having openings thereinto at the opposite open sides of the car body thus produced. The end spaces disposed at each end of the car body between the adjacent upstanding end sheets 72 and 71 are closed at the sides thereof by associated side panels 75, as indicated in FIGS. 1 and 16. Each of the bays 54 is disposed between an adjacent pair of the sets of side posts 53; each of the bays has a length L; and the opposite sides of each of the bays 54 opens to the exterior through the opposite open sides of the car body. Thus, the total length of the lading compartment between the end sheets 72 is substantially equal to 9L, as explained more fully hereinafter, and as indicated in FIG. 1.

Referring now to FIGS. 1, 6, 11 and 12, the opposite sides of the car body respectively carry two sets of side doors; and each set of side doors comprises two individual side doors 80, each of the plug-sliding type, and four individual side doors 90, each of the simple sliding type. When each set of side doors occupies its closed position, the six individual side doors therein completely close the adjacent side of the car body, and thus the corresponding adjacent ends of the nine bays 54. In the arrangement, each of the side doors 80 and 90 has a width substantially equal to W; whereby the set of side doors has an overall width substantially equal to 6W; and 6W is substantially equal to 9L, or the overall length of the nine bays 54 of the lading chamber in the car body, as indicated in FIG. 1. Thus, as explained more fully below, when the two plug-sliding side doors 80 of each set occupy their open positions, a composite doorway is formed in the adjacent side of the car body having an overall width substantially equal to 2W; and 2W is substantially equal to 3L, or the composite length of three adjacent ones of the bays 54. By adjustment of the longitudinal positions of the four simple sliding doors 90, this composite doorway may be located at any desired longitudinal position along the length of the adjacent side of the car body, thereby to render readily accessible from the exterior, the adjacent openings into any three adjacent ones of the nine bays 54. These considerations will be better understood from the further descriptions of the individual side doors 80 and 90 appearing below.

Referring now to FIGS. 6, 11 and 12, each side of the car body carries elongated longitudinally extending lower track structure 100 disposed adjacent to the corresponding side of the floor sheet 69, and elongated longitudinally extending upper track structure 110 disposed adjacent to the corresponding side of the roof sheet 70. The lower track structure 100 essentially comprises the side sill 24; and specifically, a bottom rail 101 is rigidly secured to the top surface of the bottom flange of the side sill 24; and the top flange of the side sill 24 constitutes a top rail 102. Further, the lower surface of the top flange of the side sill 24 carries a weather strip 103. The upper track structure 110 essentially comprises the side member 51; a bottom rail-weather-strip 111 is carried by the web of the side member 51 just above the bottom flange thereof; a top rail-weather-strip 112 is carried by the web of the side member 51 just above the bottom rail 111; and a lower weather-strip 113 is carried by the bottom flange of the side member 51. As explained more fully hereinafter,

each side door **80** is mounted upon the rails **101**, **112** and each side door **90** is mounted upon the rails **102**, **111**.

Referirng now to FIGS. 6 and 11, each of the plug-sliding side doors **80** is structurally of a conventional type (Youngstown type), comprising a substantially rectangular body, including a flat inner sheet **81** and a corrugated outer sheet **82** rigidly secured together, and a pair of longitudinally spaced-apart upstanding supporting rods **83**, each mounted for rotation in upper and lower bearing members **84** and **85** carried by the door body respectively adjacent to the upper and lower edges thereof. The upper and lower ends of each rod **83** carry upper and lower bell-crank arms **86** and **87**; the lower arm **87** is pivotally mounted upon a bracket **88** that carries a roller **89** that engages the bottom lower rail **101**; and the upper arm **86** carries a roller **121** that is positioned behind the top upper track **112** and in cooperating relation therewith. In the side door **80**, a weather strip **122** is carried by the top of the outer sheet **82** and disposed in cooperating relation with the bottom upper rail **111**, a weather strip **123** is carried by the top of the inner sheet **81** and disposed in cooperating relation with the weather strip **113**, and the bottom of the outer sheet **82** is disposed in cooperating relation with the weather strip **103**. The two rods **83** carried by each side door **80**, carry two handles **124** that commonly cooperate with a keeper **125** carried by the outer sheet **82**, as indicated in FIG. 1.

It will be understood that each side door **80** of the plug-sliding type is thus mounted for lateral movements between an "in" position, as shown in FIG. 11, and an "out" position, not shown. In its "in" position, the side door **80** is positioned in an inner plane arranged immediately adjacent to the side of the car body; and in its "out" position, the side door **80** is positioned in an outer plane arranged outwardly from the adjacent inner plane mentioned; which inner plane is common to the mounting plane of the simple sliding doors **90**; and which outer plane is outwardly from the mounting plane of the simple sliding doors **90**.

In order to actuate one of the side doors **80** from its "in" position of FIGS. 1 and 11 into its "out" position, the two handles **124** are separated from the keeper **125** and rotated away from each other, causing corresponding rotation of the rods **83** in the bearings **84** and **85** and consequently pivoting or swinging of the arms **86** and **87**, with the result that the side door **80** is moved laterally outwardly from its "in" position into its "out" position, in a conventional manner. Of course, the side door **80** may be actuated from its "out" position back into its "in" position by opposite rotation of the handles **124**. When the handles occupy their "in" positions in the associated keeper **125** they may be sealed in the usual manner, so as to prevent undetected operation thereof into their unlocked or opening positions.

When the two side doors **80** in each set occupy their "out" positions, they are disposed in the adjacent outer plane, so that they may then be slid or rolled longitudinally in either direction over the adjacent simple sliding side doors **90** disposed in the adjacent inner plane, thereby to produce the composite doorway having a width **2W** into the adjacent side of the car body, as previously noted.

Referring now to FIGS. 6 and 12, each of the simple sliding side doors **90** is structurally of a conventional type (Youngstown type) comprising a substantially rectangular body, including a flat inner sheet **91** and a corrugated outer sheet **92** rigidly secured together. The lower edge of the side door **80** is hollow and encloses a pair of longitudinally spaced-apart brackets **93** that carry rollers **94** that engage the top lower rail **102**; and the upper edge of the outer sheet **91** carries a guide-weather-strip **95** that is positioned behind the bottom upper rail **111** and in cooperating relation therewith. In the side door **90**, a weather strip **96** is carried by the top of the inner sheet **91** and disposed in cooperation relation with the weather strip **113**; and a pair of guides **97** are carried by the bottom of the outer sheet **92** in cooperating relation with the weather strip **103**. Further, a pair of hand-grasps **98** are carried by the outer sheet **92** to facilitate movement of the side door **90**; and latch mechanism, not shown, is carried by the side door **90** adjacent to the bottom thereof for restraining the same in any adjusted position thereof; which latch mechanism mentioned is provided with a trip handle **99**, as indicated in FIG. 6.

It will be understood that each side door **90** of the simple sliding type is thus mounted for longitudinal sliding or rolling movements in either direction in the adjacent inner plane at the corresponding side of the car body and under or below the side doors **80** in their "out" positions; whereby the composite doorway produced by the two side doors **80** in the adjacent side of the car body may be located longitudinally therealong at the desired position between the end walls **72**, with the result that the composite doorway may be located immediately adjacent to any three adjacent ones of the bays **54** to facilitate convenient loading and unloading of lading with respect thereto.

As previously noted, each set of side doors is movable into a closed position to close the adjacent side of the car body; whereby the individual pairs of side doors **90**, **80** and **90** occupy the positions, as shown in FIGS. 1 and 6. Thus, the right-hand side of the left side door **80** is overlapped by the left-hand side of the right side door **80**, as shown in FIG. 7; and the joint therebetween is rendered water-tight by a resilient gasket **130** carried by the right-hand flange **131** of the left side door **80** and overlapped by the left-hand flange **132** of the right side door **80**. Similarly, the right-hand side of the right side door **80** overlaps the left-hand side of the adjacent right side door **90**, as shown in FIG. 8; and the joint therebetween is rendered water-tight by a resilient gasket **133** carried by the left-hand flange **134** of the adjacent side door **90** and overlapped by the right-hand flange **135** of the right side door **80**. Similarly, the right-hand side of the left side door **90** is overlapped by the left-hand side of the right side door **90**, as shown in FIG. 9; and the joint therebetween is rendered substantially water-tight by the projection of the right-hand flange **136** of the left side door **90** below the left-hand flange **137** of the right side door **90** and over a weather flange **138** carried by the left-hand flange **137** of the right side door **90**.

Referring now to FIGS. 6 and 10, each set of the side posts **53** carries three vertically spaced-apart and aligned pairs of brackets **140**, between which three laterally extending shelf-like supports **141** are arranged in a vertical tier, thereby to accommodate the support of lading in three layers in each bay **50** and above the floor sheet **69**. As indicated in FIG. 6, the laterally extending shelf-like supports **141** carried by the brackets **140** may carry longitudinally spanning shelf-like supports **142** in each bay **54** for the purpose of supporting lading **143** in three layers in a vertical tier in each bay **54**. Alternatively, the lading **143** itself may be in the form of elongated spool-like objects that may directly span the bay **54** longitudinally with the opposite ends thereof directly supported by the laterally extending supports **141**. In the latter case, three of the spools **143** may be arranged in each of the three layers in each bay **54**, thereby accommodating the transportation of nine spools **143** per bay **54**, or **81** spools **143** in the entire body of the car **20**. The last-mentioned arrangement is very advantageous in transporting spools (referred to as beams) of synthetic organic filaments or yarns, such as nylon.

The arrangement of the sets of side doors carried by the car body is very advantageous, since any three adjacent bays **54** may be readily loaded or unloaded with respect to the spools **143** from either desired side of the car **20** and at each level in each by **54** through a conveniently located and adjacent doorway. The ar-

rangement of the supports of the spools **143** in the three levels mentioned is feasible due to the provision of the strong rigid framework of the car **20**, independently of any support or rigidity therein by side or end walls. In other words, the strong rigid underframe **21** and the strong rigid roof frame **50** are rigidly secured together by the strong rigid side posts or columns **53** to produce the strong rigid framework; whereby the heavy spools **143** may be supported by the adjacent sets of side posts **53** in the adjacent bays **54** and above the floor sheet **69**, without undue strain upon the framework or damage of the yarn carried by the spools **143**. In passing, it is mentioned that a spool **143** of such yarn may have a weight in the general range 1,500 pounds to 2,000 pounds, whereby the support of the total weight of this lading in such "high" position is possible only by virtue of the unitary construction of the entire framework, produced by the complete integration of the underframe **21** and the roof frame **50** into one unit, as previously described. Also, the provision of the cushioned underframe **21** (the Waugh equipment) is very advantageous to minimize relative movements of the spools **143** during transit of the car **20**, since such construction prevents transmission of severe longitudinal draft and buff shocks between the draft-buff beam **40** and the underframe proper **21**, and thus the framework and the car body, in a well-known manner.

In a constructional example of the railway car **20**: the underframe **21** may have a total length over the end sills **25** of 66'-10"; a total length over the striker plates **41** carried by the draft-buff beam **40** of 71'-3¾"; a height between the tops of the rails **35** and the tops of the side sills **24** of 3'-6"; a height between the tops of the rails **35** and the tops of the side members **51** of 14'-3⅛"; and a width between the inner surfaces of the webs of the side sills **24** of 8'-6¼". Each of the bays **54** may have the length L of approximately 7'; and each of the side doors **80** and **90**, may have the width W of approximately 10'-6". The other dimensions of the car **20** may be related to those noted above in the approximate scales of the drawings.

In the construction of the car **20** the component elements thereof are made of steel of required grades in accordance with the necessary strength, rigidity, etc., thereof; and in general, the major components are rigidly secured together utilizing welded joints to maximize strength and rigidity thereof; all in a well-known manner.

In view of the foregoing it is apparent that there has been provided a railway car comprising a unitary framework of an underframe and a roof frame and sets of side posts, whereby the framework is of strong rigid structure independently of wall sheets. Also, the framework carries a floor sheet and a roof sheet and a pair of end sheets, thereby to define a body having open sides. Further, the opposite sides of the framework or body carry two side door sets, each including both a pair of side doors of the plug-sliding type and a plurality of other side doors of the simple sliding type; whereby a doorway may be provided in either side of the body and located at any desired longitudinal position therealong, so as to accommodate ready loading and unloading of lading with respect to any portion of the lading chamber defined in the body through either side thereof and via an immediately adjacent and convenient doorway thereinto.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A railway car body comprising a substantially rectangular floor, a substantially rectangular roof arranged in superimposed relation with said floor, a pair of upstanding end walls respectively arranged at the opposite ends of said body, each of said end walls joining both the adjacent end of said floor and the adjacent end of said roof, whereby said body is of elongated box-like configuration and having a pair of opposed sides that are open substantially between said end walls, a pair of elongated longitudinally extending lower rail structures respectively carried by the opposite lower side portions of said body adjacent to the opposite sides of said floor and respectively extending substantially between said end walls, a pair of elongated longitudinally extending upper rail structures respectively carried by the opposite upper side portions of said body adjacent to the opposite sides of said roof and respectively extending substantially between said end walls, and two sets of upstanding side doors respectively arranged at the opposite open sides of said body and respectively carried by the adjacent ones of said upper and lower rail structures, each of said sets of side doors including a plurality of individual first side doors of the plug-sliding type and a plurality of individual second side doors of the simple sliding type, each of said first side doors being mounted upon the adjacent ones of said upper and lower rail structures for lateral movements between "in" and "out" positions respectively disposed in corresponding inner and outer upstanding planes at the adjacent open side of said body, each of said first side doors in its "out" position also being mounted upon the adjacent ones of said upper and lower rail structures for longitudinal movements therealong in either direction in the adjacent outer plane, each of said second side doors being mounted upon the adjacent ones of said upper and lower rail structures for longitudinal movements therealong in either direction in the adjacent inner plane, in each of said sets the adjacent ones of said first side doors in their "in" positions in the adjacent inner plane cooperating with each other and with the adjacent ones of said second side doors in the adjacent inner plane to close the adjacent open side of said body, said first side doors in their "out" positions being movable longitudinally in the adjacent outer plane into covering relation with corresponding adjacent ones of said second side doors in the adjacent inner plane so as to produce a composite doorway into the adjacent open side of said body, each of said second side doors being selectively movable longitudinally in the adjacent inner plane under the adjacent ones of said first side doors in their "out" positions in the adjacent outer plane so as to locate the composite side doorway into the adjacent open side of said body at any longitudinal position therealong between said end walls, whereby lading may be readily placed and removed with respect to said body at any longitudinal position therealong and from either open side thereof through an immediately adjacent and convenient composite side doorway thereinto.

2. The railway car body set forth in claim **1**, wherein each of said sets of side doors comprises 2 of said first side doors and 4 of said second side doors, each of said side doors in each of said sets has a width that is substantially equal to W, and the length of each open side of said body is substantially equal to 6W, whereby the composite doorway that may be produced in either side of said body has a width substantially equal to 2W and is thus substantially equal to ⅓ of the length of the adjacent open side of said body.

3. A railway car body comprising a substantially rectangular floor, a substantially rectangular roof arranged in superimposed relation with said floor, a pair of upstanding end walls respectively arranged at the opposite ends of said body, each of said end walls joining both the adjacent end of said floor and the adjacent end of said roof, whereby said body is of elongated box-like configuration and having a pair of opposed sides that are open substantially between said end walls, a plurality

of substantially equally longitudinally spaced-apart sets of upstanding rigid side posts arranged between said floor and said roof, each of said sets of side posts including two laterally spaced-apart individual side posts respectively arranged adjacent to the opposite sides of said floor and of said roof, the lower end of each of said side posts being rigidly secured to the adjacent side of said floor and the upper end of each of said side posts being rigidly secured to the adjacent side of said roof, whereby the interior of said body includes a plurality of longitudinally spaced-apart bays respectively disposed between adjacent pairs of said sets of side posts and provided with laterally spaced-apart side openings at the opposite open sides of said body, a pair of elongated longitudinally extending lower rail structures respectively carried by the opposite lower side portions of said body adjacent to the opposite sides of said floor and respectively extending substantially between said end walls, a pair of elongated longitudinally extending upper rail structures respectively carried by the opposite upper side portions of said body adjacent to the opposite sides of said roof and respectively extending substantially between said end walls, and two sets of upstanding side doors respectively arranged at the opposite open sides of said body and respectively carried by the adjacent ones of said upper and lower rail structures, each of said sets of side doors including a plurality of individual first side doors of the plug-sliding type and a plurality of individual second side doors of the simple sliding type, each of said first side doors being mounted upon the adjacent ones of said upper and lower rail structures for lateral movements between "in" and "out" positions respectively disposed in corresponding inner and outer upstanding planes at the adjacent open side of said body, each of said first side doors in its "out" position also being mounted upon the adjacent ones of said upper and lower rail structures for longitudinal movements therealong in either direction in the adjacent outer plane, each of said second side doors being mounted upon the adjacent ones of said upper and lower rail structures for longitudinal movements therealong in either direction in the adjacent inner plane, in each of said sets the adjacent ones of said first side doors in their "in" positions in the adjacent inner plane cooperating with each other and with the adjacent ones of said second side doors in the adjacent inner plane to close the adjacent open side of said body, said first side doors in their "out" positions being movable longitudinally in the adjacent outer plane into covering relation with corresponding adjacent ones of said second side doors in the adjacent inner plane so as to produce a composite doorway into the adjacent open side of said body, each of said second side doors being selectively movable longitudinally in the adjacent inner plane under the adjacent ones of said first side doors in their "out" positions in the adjacent outer plane so as to locate the composite side doorway into the adjacent open side of said body at any longitudinal position therealong between said end walls, each of said side doors having a width that is substantially equal to W, whereby the composite doorway that may be produced in either open side of said body has a width substantially equal to 2W, each of said bays having a length between the adjacent pair of said sets of side posts that is substantially equal to L, wherein 2W is at least as great as L, whereby lading may be readily placed and removed with respect to any one of said bays through an immediately adjacent and convenient composite side doorway thereinto at either open side of said body.

4. The railway car body set forth in claim 3, wherein 2W is substantially equal to 3L, whereby lading may be readily placed and removed with respect to any three adjacent ones of said bays through a common and immediately adjacent and convenient composite side doorway thereinto at either open side of said body.

5. The railway car body set forth in claim 3, wherein said body comprises 9 of said bays, each of said sets of side doors comprises 2 of said first side doors and 4 of said second side doors, and W is substantially equal to 1½L, whereby lading may be readily placed and removed with respect to any three adjacent ones of said bays through a common and immediately adjacent and convenient composite side doorway thereinto at either open side of said body.

6. A railway car body comprising a substantially rectangular floor, a substantially rectangular roof arranged in superimposed relation with said floor, a pair of upstanding end walls respectively arranged at the opposite ends of said body, each of said end walls joining both the adjacent end of said floor and the adjacent end of said roof, whereby said body is of elongated box-like configuration and having a pair of opposed sides that are open substantially between said end walls, a plurality of substantially equally longitudinally spaced-apart sets of upstanding rigid side posts arranged between said floor and said roof, each of said sets of side posts including two laterally spaced-apart individual side posts respectively arranged adjacent to the opposite sides of said floor and of said roof, the lower end of each of said side posts being rigidly secured to the adjacent side of said floor and the upper end of each of said side posts being rigidly secured to the adjacent side of said roof, whereby the interior of said body includes a plurality of longitudinally spaced-apart bays respectively disposed between adjacent pairs of said sets of side posts and provided with laterally spaced-apart side openings at the opposite open sides of said body, a plurality of sets of supports respectively jointly carried by said sets of side posts, each of said sets of supports including a given number of individual supports arranged in a vertical tier and extending laterally between the two side posts of the adjacent set of side posts, whereby each of said bays is adapted to receive lading arranged in a vertical tier and supported by the adjacent pair of said sets of supports and above said floor, a pair of elongated longitudinally extending lower rail structures respectively carried by the opposite lower side portions of said body adjacent to the opposite sides of said floor and respectively extending substantially between said end walls, a pair of elongated longitudinally extending upper rail structures respectively carried by the opposite upper side portions of said body adjacent to the opposite sides of said roof and respectively extending substantially between said end walls, and two sets of upstanding side doors respectively arranged at the opposite open sides of said body and respectively carried by the adjacent ones of said upper and lower rail structures, each of said sets of side doors including a plurality of individual first side doors of the plug-sliding type and a plurality of individual second side doors of the simple sliding type, each of said first side doors being mounted upon the adjacent ones of said upper and lower rail structures for lateral movements between "in" and "out" positions respectively disposed in corresponding inner and outer upstanding planes at the adjacent open side of said body, each of said first side doors in its "out" position also being mounted upon the adjacent ones of said upper and lower rails structures for longitudinal movements therealong in either direction in the adjacent outer plane, each of said second side doors being mounted upon the adjacent ones of said upper and lower rail structures for longitudinal movements therealong in either direction in the adjacent inner plane, in each of said sets the adjacent ones of said first side doors in their "in" positions in the adjacent inner plane cooperating with each other and with the adjacent ones of said second side doors in the adjacent inner plane to close the adjacent open side of said body, said first side doors in their "out" positions being movable longitudinally in the adjacent outer plane into covering relation with corresponding adjacent ones of said second side doors in the adjacent inner plane so

as to produce a composite doorway into the adjacent open side of said body, each of said second side doors being selectively movable longitudinally in the adjacent inner plane under the adjacent ones of said first side doors in their "out" positions in the adjacent outer plane so as to locate the composite side doorway into the adjacent open side of said body at any longitudinal position therealong between said end walls, each of said side doors having a width that is substantially equal to W, whereby the composite doorway that may be produced in either open side of said body has a width substantially equal to 2W, each of said bays having a length between the adjacent pair of said sets of side posts that is substantially equal to L, wherein 2W is at least as great as L, whereby lading may be readily placed and removed with respect to the vertical tier in any one of said bays through an immediately adjacent and convenient composite side doorway thereinto at either open side of said body.

7. A railway car comprising an elongated substantially rectangular rigid underframe including a pair of longitudinally extending side sills and a pair of laterally extending end sills, an elongated substantially rectangular rigid roof frame including a pair of longitudinally extending side members and a pair of laterally extending end members, said roof frame being arranged in superimposed relation with said underframe, a plurality of longitudinally spaced-apart sets of upstanding rigid side posts arranged between said underframe and said roof frame, each of said sets of side posts including two laterally spaced-apart individual side posts respectively arranged adjacent to the opposite sides of said underframe and of said roof frame, the lower end of each of said side posts being rigidly secured to the adjacent one of said side sills and the upper end of each of said side posts being rigidly secured to the adjacent one of said side members, whereby said side posts unify said underframe and said roof frame to produce a strong skeleton-like hollow framework, a floor carried by said underframe, a roof carried by said roof frame, a pair of upstanding end walls respectively arranged at the opposite ends of said framework, each of said end walls being jointly carried by the adjacent one of said end sills and the adjacent one of said end members, whereby said floor and said roof and said end walls cooperate to produce a body carried by said framework, said body being of elongated box-like configuration and having a pair of opposed sides that are open substantially between said end walls, a pair of elongated longitudinally extending lower rail structures respectively carried by said side sills adjacent to the opposite sides of said floor and respectively extending substantially between said end walls, a pair of elongated longitudinally extending upper rail structures respectively carried by said side members adjacent to the opposite sides of said roof and respectively extending substantially between said end walls, and two sets of upstanding side doors respectively arranged at the opposite open sides of said body and respectively carried by the adjacent ones of said upper and lower rail structures, each of said sets of side doors including a plurality of individual first side doors of the plug-sliding type and a plurality of individual second side doors of the simple sliding type, each of said first side doors being mounted upon the adjacent ones of said upper and lower rail structures for lateral movements between "in" and "out" positions respectively disposed in corresponding inner and outer upstanding planes at the adjacent open side of said body, each of said first side doors in its "out" position also being mounted upon the adjacent ones of said upper and lower rail structures for longitudinal movements therealong in either direction in the adjacent outer plane, each of said second side doors being mounted upon the adjacent ones of said upper and lower rail structures for longitudinal movements therealong in either direction in the adjacent inner plane, in each of said sets the adjacent pair of said sets of side posts that is substantially of said body, said first side doors in their "out" positions in the adjacent inner plane cooperating with each other and with the adjacent ones of said second side doors in the adjacent inner plane to close the adjacent open side of said body, said first side doors in their "on" positions being movable longitudinally in the adjacent outer plane into covering relation with corresponding adjacent ones of said second doors in the adjacent inner plane so as to produce a composite side doorway into the adjacent open side of said body, each of said second side doors being selectively movable longitudinally in the adjacent inner plane under the adjacent ones of said first side doors in their "out" positions in the adjacent outer plane so as to locate the composite side doorway into the adjacent open side of said body at any longitudinal position therealong between said end walls, whereby lading may be readily placed and removed with respect to said body at any longitudinal position therealong and from either open side thereof through an immediately adjacent and convenient composite side doorway thereinto.

8. The railway car set forth in claim 7, wherein the interior of said body includes a plurality of longitudinally spaced-apart bays respectively disposed between adjacent pairs of said sets of side posts and provided with laterally spaced-apart openings at the opposite open sides of said body; and further comprising a plurality of sets of supports respectively carried by said sets of side posts, each of said sets of supports including a given number of individual supports arranged in a vertical tier and extending laterally between the two individual side posts of the adjacent one of said sets, of side posts, whereby each of said bays is adapted to receive lading arranged in a vertical tier and supported by the adjacent pair of said sets of supports above said floor.

9. The railway car set forth in claim 7, wherein said underframe further includes a longitudinally extending center sill arranged substantially centrally between said side sills and a plurality of longitudinally spaced-apart and laterally extending cross bearers interconnecting said center sill and said side sills; and further comprising a plurality of lower cross braces interconnecting the lower ends of at least certain of said side posts and said center sill, and a plurality of upper cross braces interconnecting the upper ends of said side posts, whereby said lower cross braces and said upper cross braces assist said side posts in unifying said underframe and said roof frame to produce said strong skeleton-like hollow framework.

10. The railway car set forth in claim 7, wherein said underframe further includes a pair of laterally extending body bolsters arranged in longitudinally spaced-apart relation and respectively positioned longitudinally inwardly with respect to the adjacent ones of said end sills and with the outer ends of said body bolsters rigidly secured to the adjacent portions of said side sills; and further comprising a longitudinally extending and substantially centrally disposed draft-buff beam slidably mounted upon said body bolsters, the outer ends of said beam respectively projecting longitudinally outwardly with respect to the adjacent ones of said end sills and being adapted respectively to carry a pair of draft gears, and mechanism interconnecting said underframe and said beam and accommodating limited cushioned relative longitudinal movements therebetween.

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LEO QUACKENBUSH, *Primary Examiner.*

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,190,239 June 22, 196

Edward L. Davis et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 13, line 75, for "of said body, said first side doors in their "out" positions" read -- cent ones of said firs side doors in their "in" positions --; column 14, line 4, for '"on"' read -- "out" --.

Signed and sealed this 16th day of November 1965.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents