June 29, 1965 F. P. ADLER ETAL 3,191,548

RAILWAY CAR CONSTRUCTION

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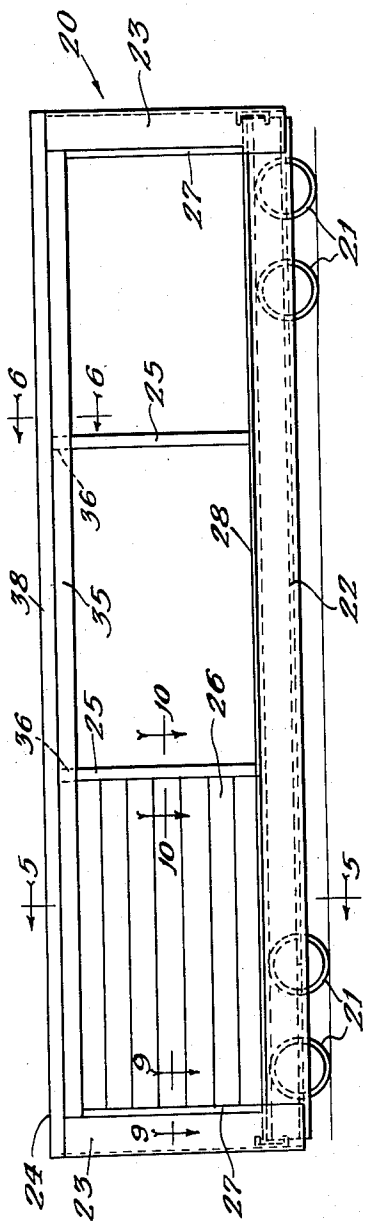


FIG. 1

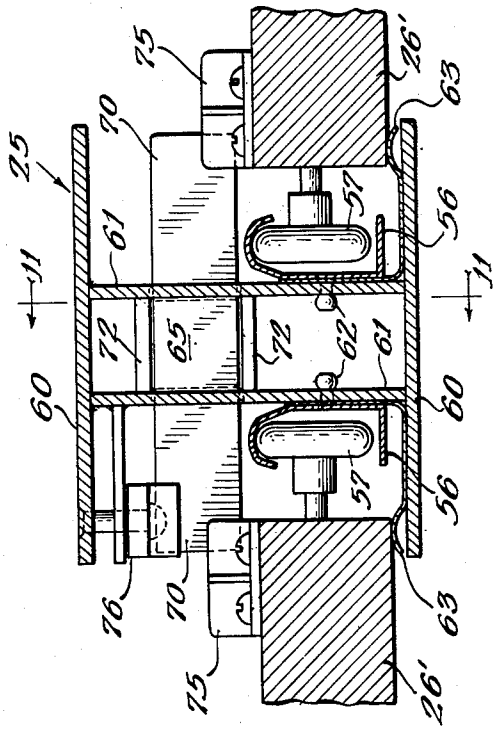


FIG. 10

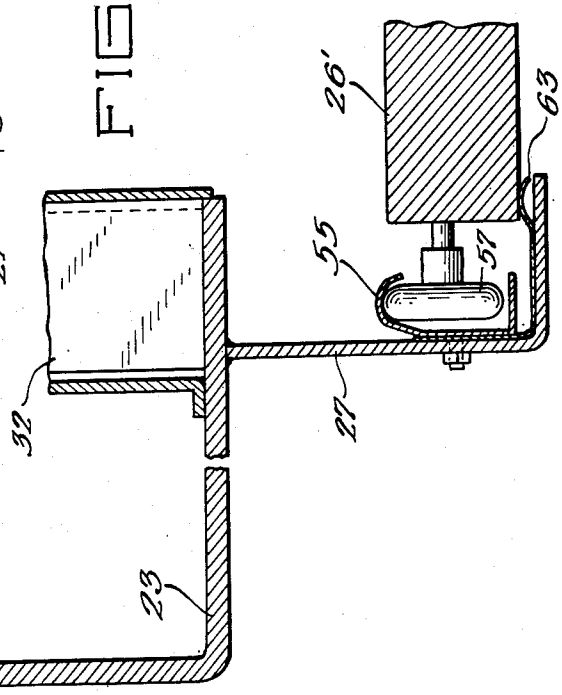


FIG. 9

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FIG. 2

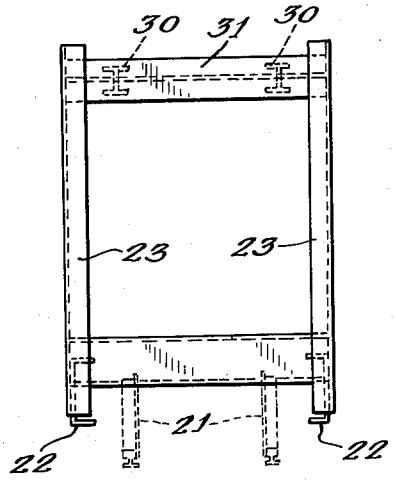


FIG. 3

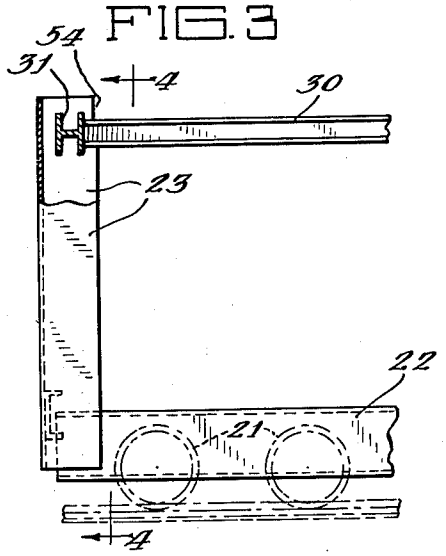
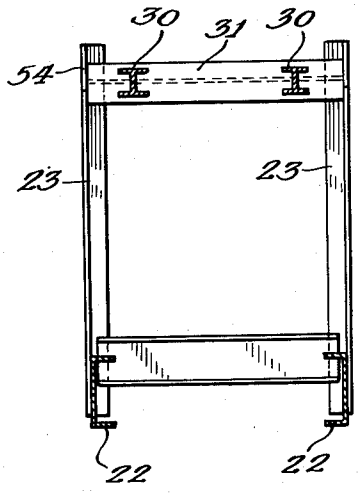


FIG. 4



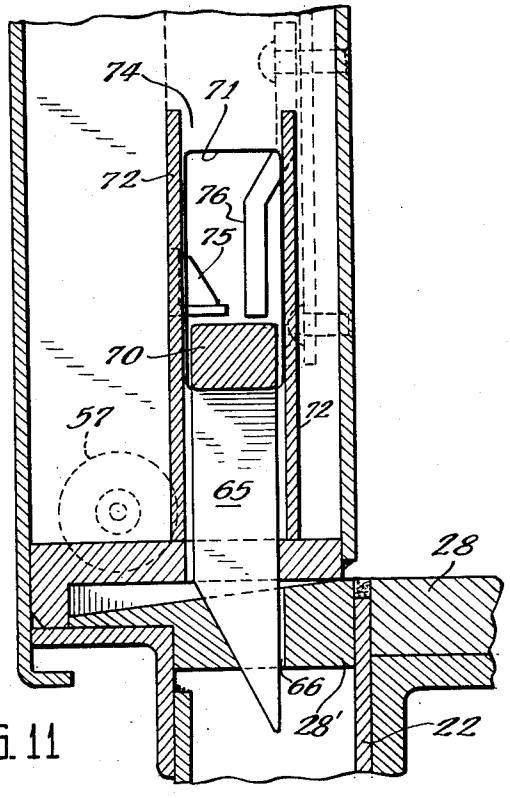


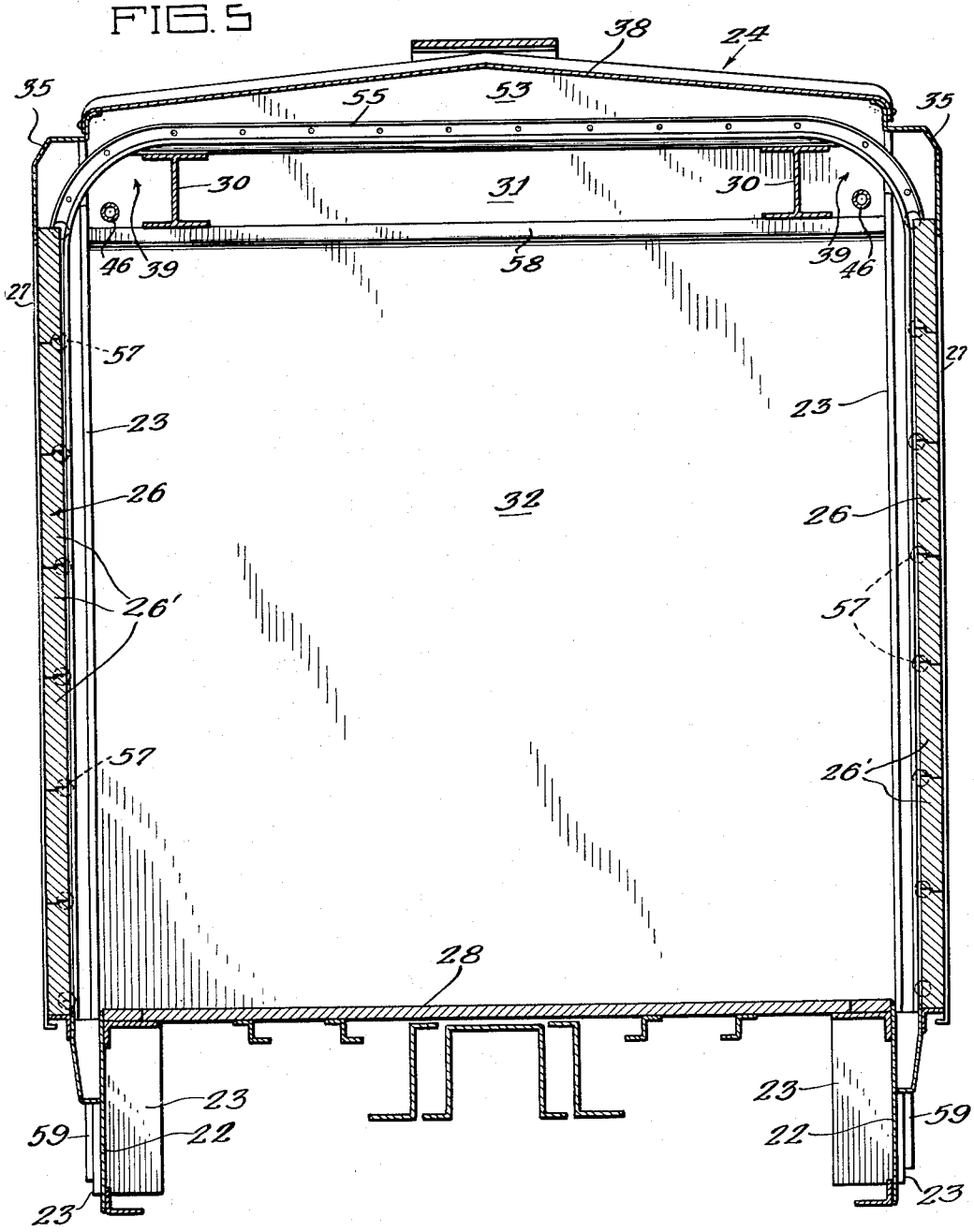
FIG. 11

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FIG. 5



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FIG. 7

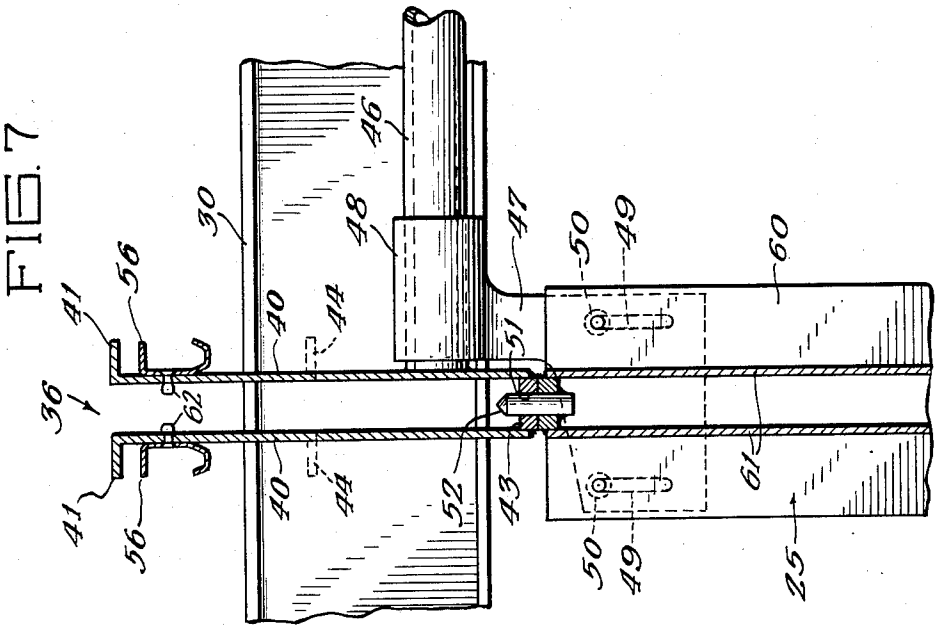


FIG. 8

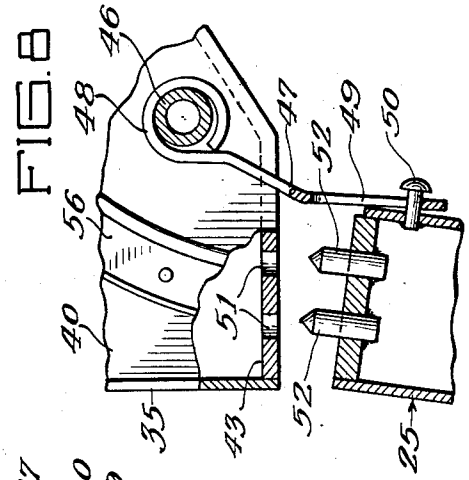


FIG. 6

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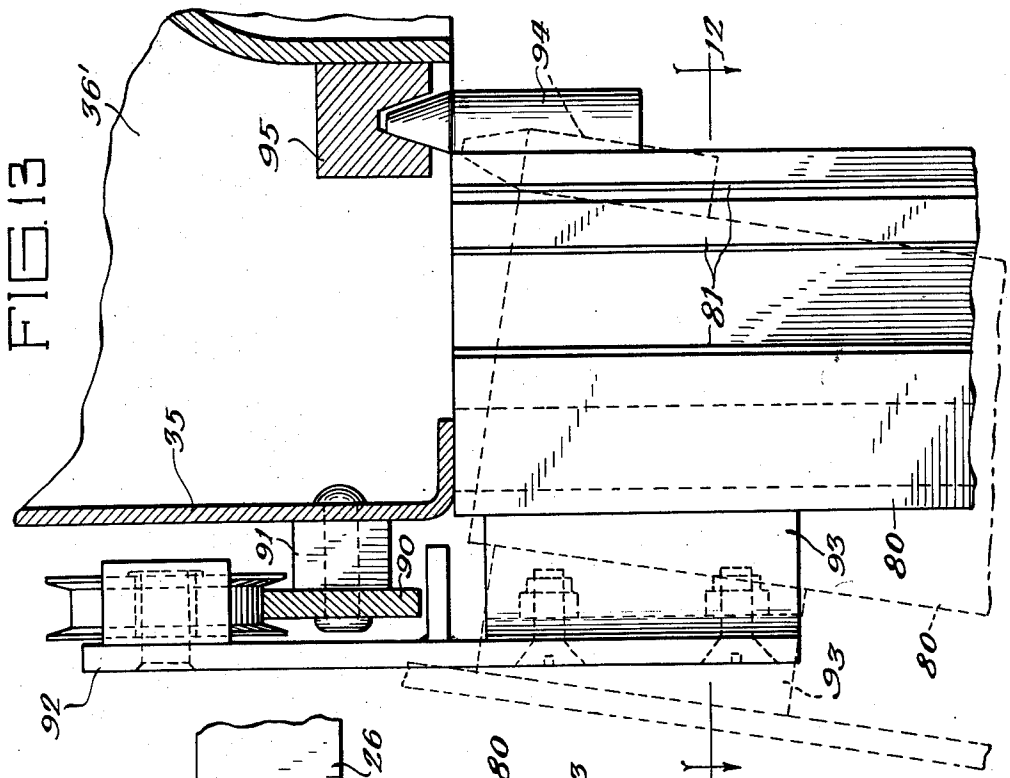


FIG. 13

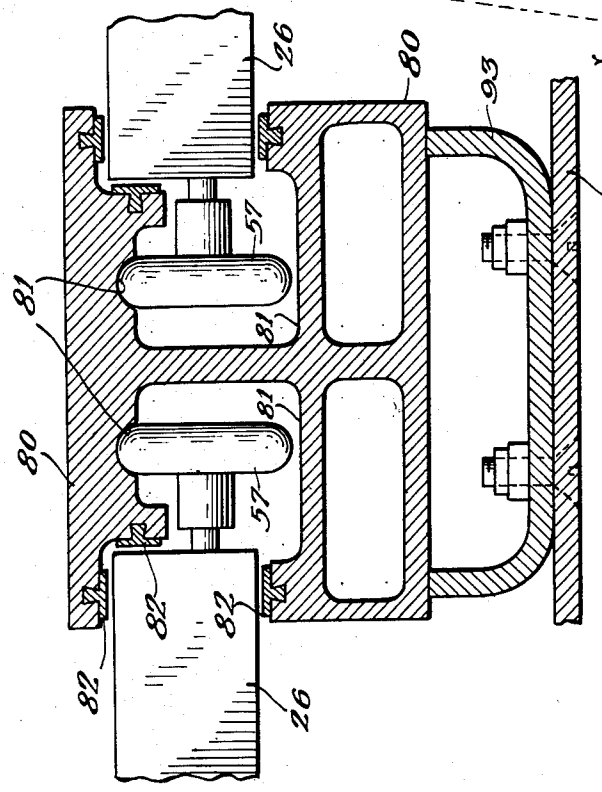


FIG. 12

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3,191,548

RAILWAY CAR CONSTRUCTION

Franklin P. Adler, Michigan City, Ind., William van der Sluys, Homewood, Ill., and James E. Candlin, Jr., deceased, late of Lansing, Ill., by First National Bank of Lansing, administrator, assignors to Pullman Incorporated, Chicago, Ill., a corporation of Delaware

Filed Aug. 2, 1961, Ser. No. 129,937
7 Claims. (Cl. 105—378)

This invention relates to improvements in railway car construction.

As pointed out in copending application of Franklin P. Adler and James E. Candlin, Jr., Serial No. 89,033, filed February 13, 1961, it is possible to eliminate the usual side wall construction of a box car together with the customary vertical structural members which are interposed at points between the car ends, thus providing an open side railway car which can be used for "direct loading." In other words, the lading can be moved into the car transversely at any point along its length as contrasted with the usual arrangement in which a fork lift truck moves the lading into the car through the door and then it must move longitudinally toward the ends of the car in order to stow the lading properly and in an economical manner. Therefore, it will be seen that considerable saving in loading expense is achieved by providing an open side railway car which permits direct loading.

The present invention is directed to an improved open side railway car which is characterized by the use of door means in the form of roll up doors.

One object of this invention is to provide a framing arrangement for the car in combination with a roof structure in which the parts are so located that there is no interference between the frame structure and roof structure on the one hand, and the path of the roll-up door on the other hand.

Another object is to provide an open side car having two or more roll up doors on each side and in which the parts are so arranged that the door means do not interfere with direct loading.

According to this aspect of the invention, we provide a post for the door guides which is not a part of the frame structure, and hence removable so that the entire side of the car will be open and available for direct loading.

Another object of my invention is to provide in an open side railway car, a removable door post which is mounted for sliding movement toward one end of the car.

Still another object is to provide in an open side car of the type described, a sliding door post which can be positively locked to the roof structure and to the side sill so that it will resist transverse forces arising from shifting of the load.

In this connection, it can be pointed out that if one uses a single door which extends for the full length of the car, it must be of a comparatively rigid construction in order to withstand these transverse forces. It is difficult to build such rigidity into an extremely long roll up door construction. However, by making the door means in two or three sections of correspondingly shorter length, and by providing suitable anchoring means for the door posts, it is possible not only to use a lighter and more economical door construction, but also to utilize the convenience and economy of a standard type of roll-up door.

This invention is particularly applicable to the unit frame type of construction shown in the aforesaid copending application in which increased load capacity is developed by the use of a top beam in the form of a compression member which cooperates with the other elements of the unit frame. However, the invention is also applicable to other types of open side cars, such as one in which the side sills or underframe are heavy enough to carry the rated load, and the sole function of the top beam is to provide roof supporting means which is free from intermediate supports, the top beam being supported only at its ends and by suitable car end structures.

According to this invention, we have provided separate side plates, in addition to the top beams, and have spaced the top beams or compression members inwardly of the side plates so as to provide space for the accommodation of the roll up doors. The roof sheets are supported directly from the side plates, the roof sheets and the side plates forming the roof structure as a whole. Then the roof structure is supported at one or more intermediate points by a main transom, and these are so located that they do not interfere with the sliding movement of the door posts.

Other features and advantages will become apparent as the description proceeds.

With reference now to the drawings in which like reference numerals designate like parts:

FIG. 1 is an elevation of a railway car embodying our invention;

FIGS. 2, 3 and 4 are diagrammatic views illustrating the unit frame type of construction, FIG. 2 being an end view, FIG. 3 a fragmentary side elevation, and FIG. 4 a vertical section taken along line 4—4 of FIG. 3;

FIG. 5 is a vertical section taken along line 5—5 of FIG. 1 showing the door path and its relation to the roof structure and the top beams;

FIG. 6 is a vertical section taken along line 6—6 of FIG. 1 showing the transom and the door post hanger;

FIG. 7 is a vertical section taken along line 7—7 of FIG. 6;

FIG. 8 is a detailed view similar to FIG. 6 but showing a changed position of parts;

FIG. 9 is a horizontal section taken along line 9—9 of FIG. 1 showing the door guide channel;

FIG. 10 is a horizontal section taken along line 10—10 of FIG. 1 showing the door post;

FIG. 11 is a vertical transverse section taken along line 11—11 of FIG. 9 showing the securing means for the lower end of the door post;

FIG. 12 is a sectional view showing a modified form of door post; and being taken along line 12—12 of FIG. 13; and

FIG. 13 is a view similar to FIG. 6 but showing a modified post supporting arrangement, a changed position of the parts being shown in broken lines.

With reference now to FIG. 1, the reference numeral 20 designates a car body which is supported on wheels 21 by suitable underframe structure which includes side sills 22. The car body includes two car end structures each comprising a car end 32 and two end piers 23 which may be structurally conected to each other. The car body also includes a roof structure 24, and removable door posts 25. Three roll up doors 26 are provided, one being located between the two door posts 25, and each of the other two being confined between a door post 25 and a door guide channel 27 which is carried on one of the end structures, such as the end pier 23. A suitable floor structure 28 is supported by the side sills 22 and other parts of the underframe.

The car structure is preferably of the unit frame type shown in the aforementioned copending application, in which the load carrying capacity of the car is developed by two transversely spaced unit frames which require no vertical structural members at points between the car ends, as contrasted with the usual side wall construction. This type of construction is diagrammatically illustrated in FIGS. 2, 3 and 4. Suitable means, such as welding or rivets, provide a rigid lower corner connection between

each end pier 23 and a side sill 22. A top beam 30 connects the upper ends of the end piers 23, and serves as a compression member which cooperates with the rigid corner connection to reduce deflection of the side sill 22, and to maintain the end piers in substantial parallelism with each other. In other words, the top beam 30, the two end piers 23 and the side sill 22 provide a unit frame which is much stronger than the side sill alone.

In the arrangement shown, a transverse anchor 31 connects the upper ends of the end piers 23, and the two top beams 30 are secured at either end to the transverse anchors 31. This arrangement permits the top beams 30 to be offset inwardly from the plane of the other elements 22 and 23 of the unit frame.

The top beam also serves as a roof supporting beam, and hence is vertically loaded, although not as heavily as the side sills 22.

The end piers 23 can be considered as fabricated channels, since the end piers themselves are L-shaped, and the web is welded to the car ends 32 so as to provide a more economical section.

The roof structure comprises side plates 35 and roof sheets 38. The side plates 35 are supported at either end by the car end structures, and at intermediate points by two transoms 36. As shown in FIG. 6, each side plate terminates at its upper end in a flange 37 to which the roof sheets are suitably secured as by welding.

The offset arrangement of the top beams or compression members 30 with respect to the side plates 35 is shown in FIG. 5, and this provides a space 39 between the two which serves as a path for the roll up doors 26. This space or recess 39 extends for the full length of the distance between a post 25 and its associated car end 32, or for the full length of the distance between the two door posts 25. In other words, in order to accommodate the three roll up doors, the roof structure can be supported only at points between the different doors, and this intermediate support is provided by the transoms 36.

As shown in FIGS. 6 and 7, the transom 36 comprises two plates 40 which are provided with a top flange 41. Each plate is cut away to accommodate the continuous top beam 30, and the plate is preferably welded to the beam to provide mutual reinforcement. The cut away portions 42 may be filled with suitable patch plates, not shown, also welded to the top beam 30.

The plates 40 are not of uniform vertical dimension because they are shaped, as shown in FIG. 6 to conform generally to the roof line at the upper edge, and are of greater depth at the ends than in the middle. The lower end portions of the plates are reinforced as shown in FIG. 7 by a filler strip 43 which functions in a manner somewhat similar to a flange. The central portion of each plate 40 is provided with a bottom flange 44. Thus, the two flanged plates 40 are comparable to a pair of channels.

The two transoms 36 serve to support the side plates 35, and hence roof structure 24 as a whole, from the top beams 30 at only two intermediate points, in order to provide clearance for the three doors 26. In the case of a two-door car, only one transom is used.

As shown in FIG. 7, a track 46 extends horizontally between the transom 36 and the nearest car end structure. This track is preferably in the form of a steel pipe, and it provides a support for the removable door post 25 both in its operative position, and in its inoperative position. The door post is supported from the track 46 by means of a hanger 47 shown in FIGS. 6 and 7. The hanger has a loop portion 48 which surrounds the track or pipe 46, and is also provided with two slots 49. The door post 25 is provided with horizontally extending headed pins 50 which extend through the slots 49. Thus, the vertical position of the door post can be shifted with respect to the hanger 47, and the hanger itself provides a pivoted support for the door post so that it can be swung outwardly away from the plane of the side plate 35.

It will be observed that the filler plate 43 is provided with two apertures 51 which receive pins 52 projecting upwardly from the upper end of the door post 25. Thus, the upper end of the door post can be locked securely to the transom 36. The swinging and slidable connection provided by the hanger 47 permits the lower end of the door post to be swung outwardly to an extent sufficient to clear the floor structure 28, after which the door post is pulled downwardly to disengage the pins 52 from the openings 51. Then the door post can be slid along the track 46 from its operative position shown in FIGS. 1 and 7 to an inoperative position in which it is located adjacent to the car end 32. Since the door post is maintained in its inoperative position only during loading, similar locking means are not necessary at the inoperative position.

The door guide channel 27 is provided with a track 55 as shown in FIG. 8 which is adapted to receive the rollers 57 of the door sections 26'. Similarly, the door posts 25 are provided with tracks 56 for cooperation with the rollers 57. The roll up doors 26 are of the ordinary type used in garages and the like, and the cooperation between the door sections and the tracks 55, 56, is standard and will not be described in detail.

The door guide channel 27 is in the form of an angle which is welded to the outer web surface of the end pier 23 as shown in FIG. 9. The upper end of the door guide channel 27 supports the end of the side plate 35, as shown in FIG. 5. A transom 53 is disposed in the same vertical plane as the web of the door guide channel 27 to provide an aligned surface on which the upper portion of door track 55 can be mounted. The end pier 23 is cut away at its upper corner, as shown at 54 in FIG. 3, to accommodate the track 55.

The transom 53 extends from the flange of the anchor beam 31 to the roof sheets. The top edge of the car end 32 is provided with an offset flange 58 which is secured to the anchor beam 31, as shown in FIG. 5. The end of the post track 46 is supported by the anchor beam 31.

The door post 25, as shown in FIG. 9 is a fabricated channel which includes a pair of flange plates 60 and a pair of spaced web plates 61. The tracks 56 are secured to the web plates 61 by suitable fasteners 62, as shown in FIG. 9, and the track 55 may be secured to its channel 27 by rivets or welding. A bronze weather strip 63 may be provided for cooperation with the door 26, a portion of the weather strip being confined between the tracks 55, 56, and the channel or web plate to which the same are secured.

The track 56 is made in separate aligned section, one section being mounted on the door post 25, and another on the transom plate 40, as shown in FIGS. 6 and 7. A separate track may be provided for each side of the car, or a single continuous track common to the opposite doors, as shown in FIG. 5, may be used.

Means, shown in FIGS. 10 and 11, are provided to lock the lower end of each door post 25 in its operative position. This means includes a wedge 65 which is slidably received within the door post 25 and which extends into an opening 66 formed in the edge piece 28' of the floor structure 28. It will be observed that the line of contact between the bottom member 67 of the door post 25 and the floor may be inclined as indicated at 68 providing a tapered joint to facilitate rapid release of the parts when the door post 25 is swung outwardly about the track 46.

The wedge 65 is in the form of a T-bar having arms 70 which are accessible to the operator and thus permit manipulation. A suitable locking wedge could be located along either the inner surface of the post or the outer surface of the post, but in the arrangement shown, it is located between the two web plates 61 of the fabricated channel. The web plates are provided with slots 71 through which the horizontal arm 70 extend, and the

web plates are reinforced adjacent to the slots by filler strips **72**. Thus a vertically extending recess **74** (FIG. 11) is provided for reception of the wedge **65**. An advantage of the present arrangement is that a lug **75** may be mounted on the lowermost door section **26'** which will interfere with the arm **70** if the wedge **65** is not pressed home. Thus, improper locking of the door post is indicated to the operator by inability to close the doors **26**.

In the alternative, or in conjunction with the lug **75**, a pivoted keeper **76** can be mounted on the inner flange plate **60** to make sure that the wedge **65** is pressed home, as shown in FIGS. 10 and 11.

A modified door post construction is shown in FIG. 12 in which the door post **80** is in the form of an extrusion which is shaped in such a manner as to provide oppositely disposed door track portions **81**. Suitable bearing strips **82** may be provided in the form of inserts to engage adjacent portions of the door **26**.

According to this modification, the lower end of the door post **80** may be locked to the floor structure **28** by means of a wedge which is located externally of the door post **80** and engages a suitable recess formed in the floor structure **28**.

A modified form of the post track is shown in FIG. 13 in which the door track comprises a rail **90** which is mounted on the external surface of the side plate by spacers **91**. Here the door post **80** is supported by a hanger in the form of a trolley **92** which permits outwardly swinging movement of the door post in the same manner as pointed out in connection with FIG. 6.

The door post **80** is rigidly connected to the trolley **92** by a bracket **93**, and the arrangement is such that the post and trolley assembly may be swung outwardly as a unit to cause disengagement of an interlocking pin **94** from a socket **95** mounted on a portion of the transom **36'**. The disengaged position of the parts is shown in broken lines in FIG. 13. By virtue of this modified arrangement, no slidable connection between the door post and the hanger is required.

According to the unit frame type of construction, a rigid lower corner connection is provided between the end piers **23** and the side sills **22**, and the end piers are of substantial dimensions in cross section so as to embody the stiffness required to render the side sill **22** a fixed end type of beam. when the effect of the compression member **30** is taken into account. As a result, a more economical side sill section can be used for a given amount of deflection or, to express the matter conversely the deflection of the side sill under load can be reduced considerably.

The door guide channels **27**, which are welded to the L-shaped end piers **23** as shown in FIG. 9, contribute the stiffness of the end pier **23**, and cooperate with the car end **32** in this respect. More particularly, they serve as gusset strips which compensate for the discontinuity of the flange effect contributed by the welded connection of the car ends **32** and the end pier **23**, which discontinuity is caused by the termination of the car end at a point below the upper end of the end pier **23**. At the lower end of the end piers **23**, separate gusset strips **59** may be employed, as shown in FIG. 5, or the door guide channels may be extended downwardly below the level of the floor structure, as shown in the above mentioned copending application.

The transoms **36**, in addition to supporting the roof structure, serve as spacers affording lateral support for the compression members or top beams **30**. Additional transverse or diagonal spacing members may be employed, if necessary to provide additional lateral support against possible buckling of the compression members **30** in the lateral direction.

To summarize the operation which has been delineated in detail in connection with the description of the various parts and subassemblies, all three of the doors **26** are first raised so as to clear the door posts **25**. The wedges **65** are then removed, and each door post **25** is swung outwardly so as to clear the floor edge **28'**, and then pulled downwardly so as to disengage the interlocking pins **52**. Then, each door post **25** may be slid along the track **46** to an inoperative position adjacent the car end **32**.

Thus, the entire side of the car is open in order to permit direct loading. After loading, the door posts are slid back to their operative positions, and the lower ends are locked by the wedges **65** after which the door track sections **56** will be aligned with each other so that the doors **26** can be closed.

The invention has been illustrated with respect to the offset type unit frame construction, but it is equally applicable to the coplanar type shown in the aforementioned copending application. In the latter event, the entire coplanar unit frame is offset inwardly from the side of the car so that it will be located in the plane of the top beams **30** of FIG. 5.

The disclosure of the aforementioned copending application, Serial No. 89,033 is incorporated herein by reference insofar as consistent with this application.

Although only preferred embodiments of this invention have been shown and described herein it will be understood that various modifications and changes may be made in the construction shown without departing from the spirit of the invention as pointed out by the appended claims.

We claim:

1. In an open side railway car including an underframe structure, car end structures mounted thereon, and roll up door means for an open side thereof, the combination of a top beam supported solely at the ends thereof by said car end structures, a transom located at an intermediate point along the length of said car and supported by said top beam, a roof structure including a roof sheet and a side plate supported at its ends by said car end structures and at an intermediate point by said transom, at least a portion of said transom overlying the upper surface of said top beam whereby said roof sheet is spaced above said top beam, said side plate being located exteriorly of said top beam, a longitudinally extending post track spaced from that portion of said side plate which extends between said transom and one car end structure, a door post mounted on said track for sliding movement, and door track means mounted on said door post and transom on the one hand, and on said one car end structure on the other hand, for providing a door path for said roll up door means which path is located between said side plate and said top beam, said door post being slidably removable when said door is in open position, said door track means comprising a first door track structure and a second door track structure, said first door track structure including a first track part mounted on said transom and a second track part mounted on said door post, said first track part extending along said transom between said roof sheet and said top beam, and being curved downwardly and extending between said side plate and said top beam and abutting the upper end of said second track part to provide a continuous track structure, and said second track structure being mounted on said car end structure and including a portion which extends horizontally between said roof sheet and said top beam and is curved downwardly between said side plate and said top beam.

2. An open side railway car as claimed in claim **1** in which said door post track is located interiorly of said side plate and between said side plate and said top beam.

3. An open side railway car as claimed in claim **1** which includes a pin projecting upwardly from the upper end of said door post, a recess formed in a downwardly facing surface of said transom and adapted to receive said pin, said pin and recess serving to maintain the upper end of said door post and said transom in interlocking engagement, said door post being mounted for outwardly swinging movement on said post track to permit relative movement between said pin and said recess so that said

door post can be moved between an interlocking position and a position in which it is freed for sliding movement along said post track.

4. An open side railway car as claimed in claim 1 in which said door post track is located between said side plate and said top beam, and having door post mounting means comprising a hanger having a portion engaging said post track for both slidable and rotatable movement and having a door post engaging portion, means for securing said door post to said door post engaging portion and for permitting relative sliding movement in a vertical direction whereby said door post and said hanger may be swung outwardly away from the car, and whereby said door post may be displaced downwardly, and interlocking pin means carried by the upper end of said door post and interlocking with said transom, and adapted to be moved into and out of interlocking engagement with said transom by the swinging and sliding movement of said door post with respect to said post track and said hanger, said door post engaging portion being offset outwardly from said post track engaging portion.

5. An open side railway car comprising an underframe including two side sills, an upstanding end pier for each end of each side sill and rigidly connected thereto in perpendicular relationship, means including a compression member connecting the upper ends of the two end piers associated with each side sill, a side plate offset outwardly of each compression member, a roof sheet connected to said side plate, a transom located between the ends of said car and supported by said compression members and providing intermediate support for said side plates, at least a portion of said transom overlying the upper surface of said compression member whereby said roof sheet is spaced above said compression member, a removable door post extending between one of said side sills and said transom, and a two section door track having one section mounted on said door post and a second section mounted on said transom and aligned with said first track section to provide a continuous door track for a roll up door, said second track section extending along said transom between said roof sheet and said compression member, and being curved downwardly and extending between said side plate and said compression member and abutting the upper end of said first track section.

6. An open side railway car as claimed in claim 5 which includes a post track mounted on and spaced outwardly from said side plate, means for mounting said door post for slidable and outwardly swinging movement on said post track, a pin projecting from the upper end surface of said door post, and a recess formed in a downwardly facing surface of said transom and adapted to receive said pin, said upper end surface of said door post and said downwardly facing surface of said transom being abutting surfaces, and said pin and recess serving to maintain the upper end of said door post and said transom in interlocking engagement.

7. In an open side railway car including an underframe structure, two car end structures, and roll up door means for an open side thereof, the combination of a top beam

supported solely at the ends thereof by said car end structures, two transoms located at intermediate points along the length of said car and supported by said top beam, two post tracks, one extending between one transom and one car end structure, and the other extending between the other transom and the other car end structure, a door post mounted on each post track for sliding movement between an operative position adjacent one of said transoms and an inoperative position adjacent a car end structure, a roof structure including a roof sheet and a side plate supported at its ends by said car end structure and at intermediate points by said two transoms, at least a portion of said transom overlying the upper surface of said top beam whereby said roof sheet is spaced above said top beam, said side plate being located exteriorly of said roof supporting top beam and being free from supporting members extending between said side plate and said top beam at intermediate points between said transoms and said car end structures so as to provide an unimpeded longitudinally extending recess extending from one of said transoms to the adjacent car end structure, said post track being located in said longitudinally extending recess, a first door track mounted on said removable door post, a second door track mounted on the transom, a portion of said second door track extending along said transom member between said roof sheet and said top beam, and being curved downwardly between said side plate and said top beam, the ends of said first and second door tracks registering with each other when said door post is in its operative position to provide a continuous door track, and a third door track mounted on said car end structure in opposed relationship to said first and second door tracks and cooperating therewith to provide a door path which extends upwardly and inwardly through said recess, said third door track including a portion which extends horizontally between said roof sheet and said top beam and is curved downwardly between said side plate and said top beam, said roll up door means including a vertically and horizontally sliding door mounted in said door tracks and movable between a closed position, when said door post is in its operative position, and an open position in which said sliding door is entirely clear of said first door track and is disposed substantially horizontally at the top of said car, thus permitting movement of said door post from its operative to its inoperative position.

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LEO QUACKENBUSH, *Primary Examiner.*