

- [54] **RAILROAD FLAT CAR**
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- [73] Assignee: **Pullman Incorporated, Chicago, Ill.**
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Related U.S. Application Data

- [62] Division of Ser. No. 39,683, May 20, 1970, Pat. No. 3,659,724.
- [52] U.S. Cl. **105/420, 105/368 B, 105/414, 105/422**
- [51] Int. Cl. **B61f 1/02**
- [58] Field of Search **105/368 B, 414, 416, 105/419, 420, 422**

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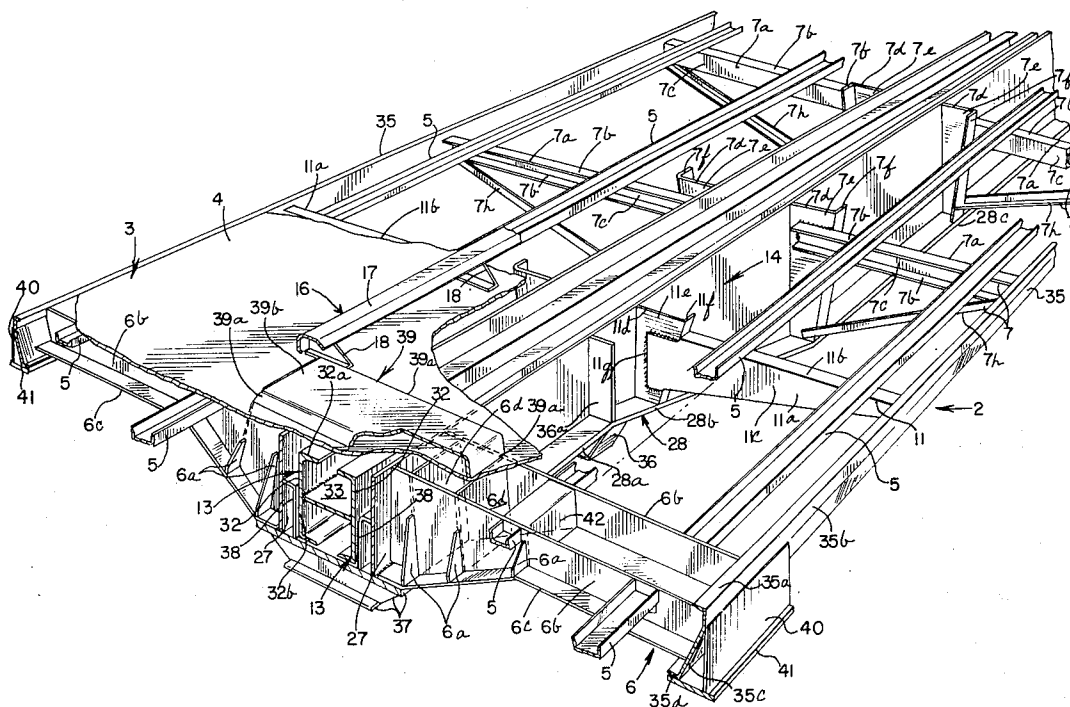
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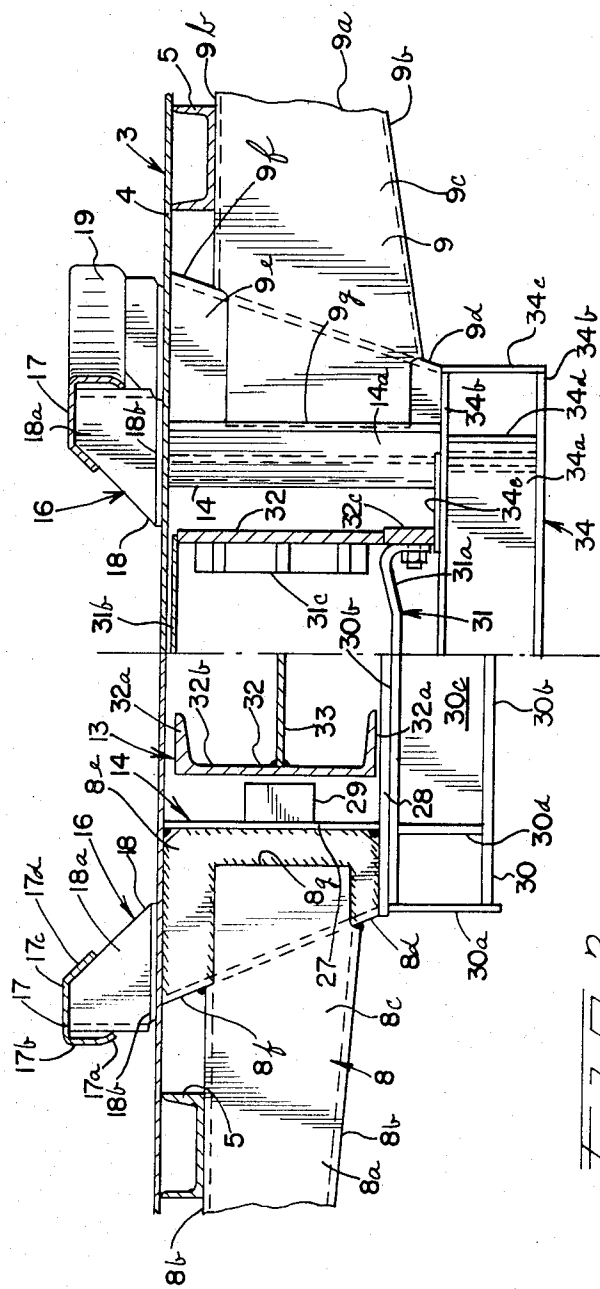
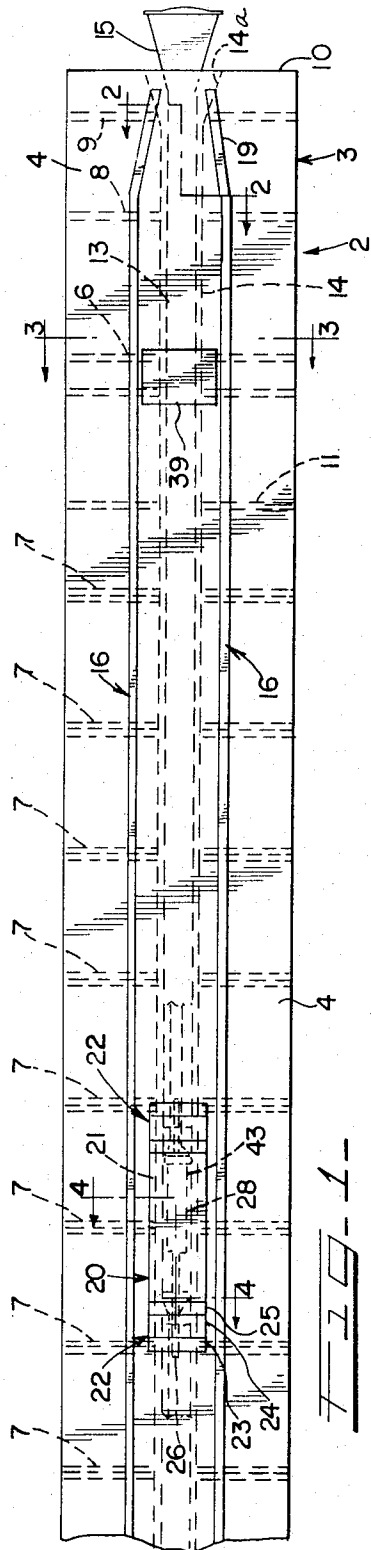
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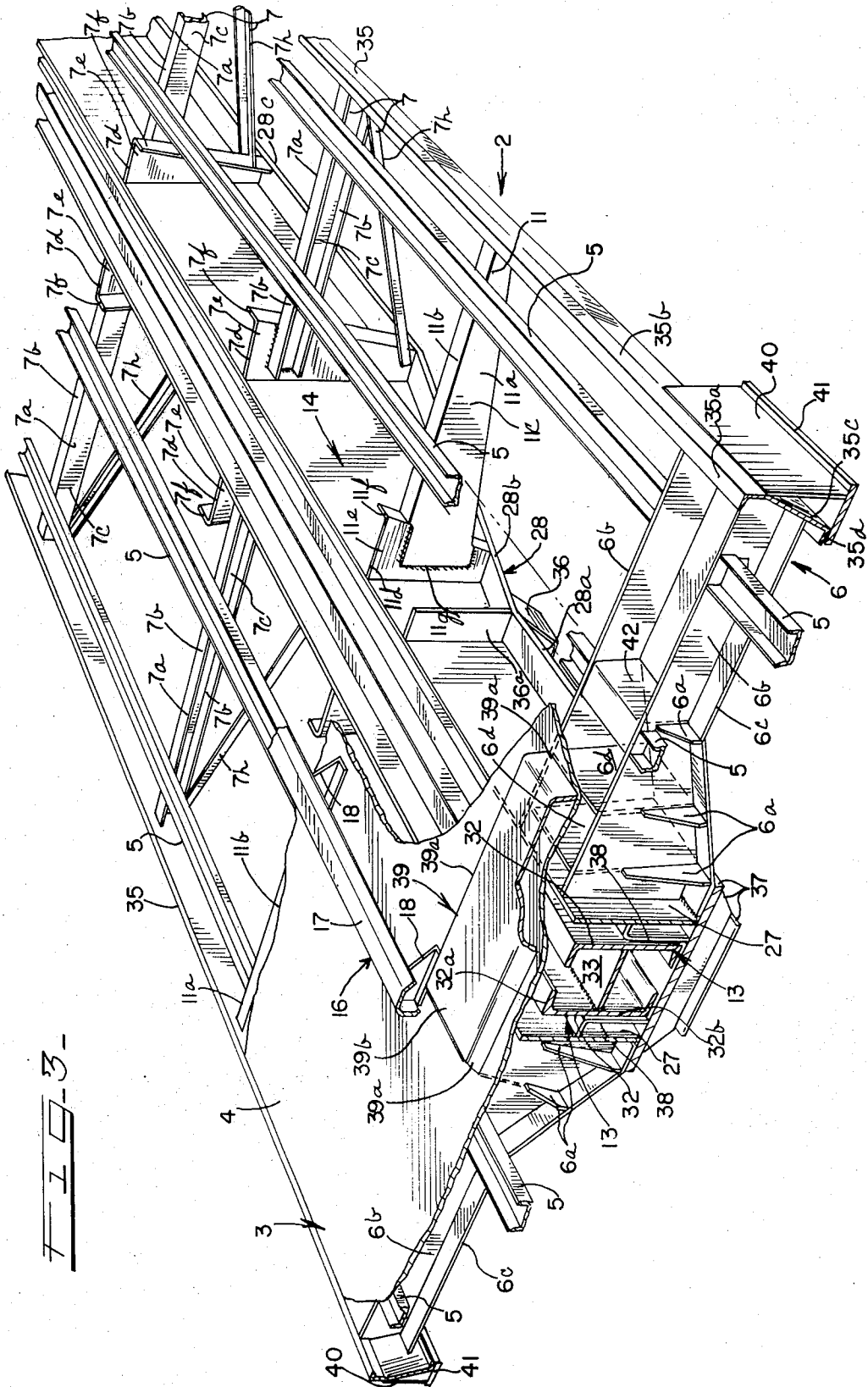
[57] **ABSTRACT**

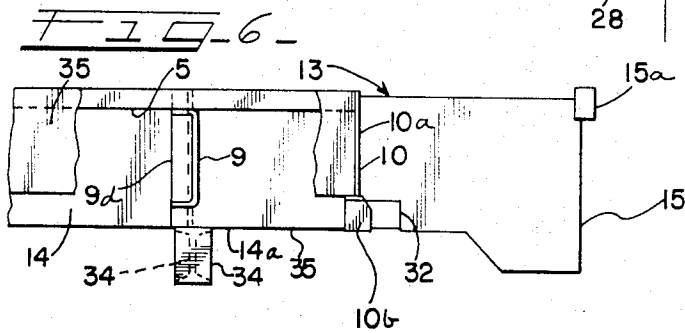
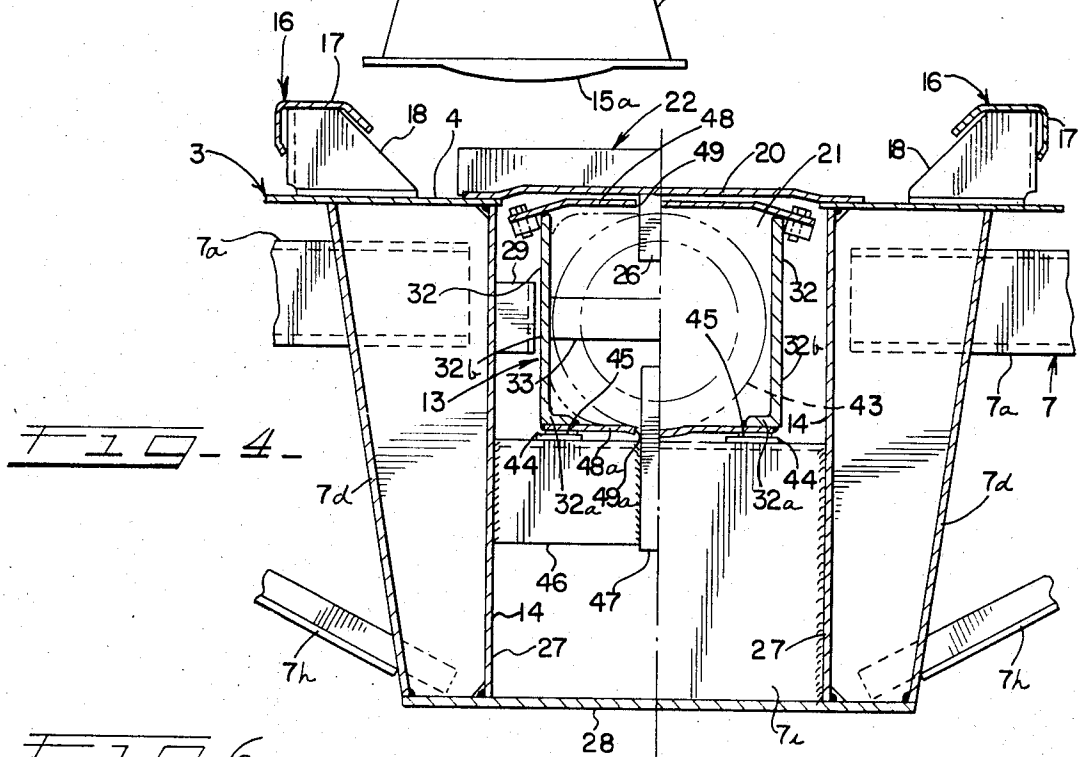
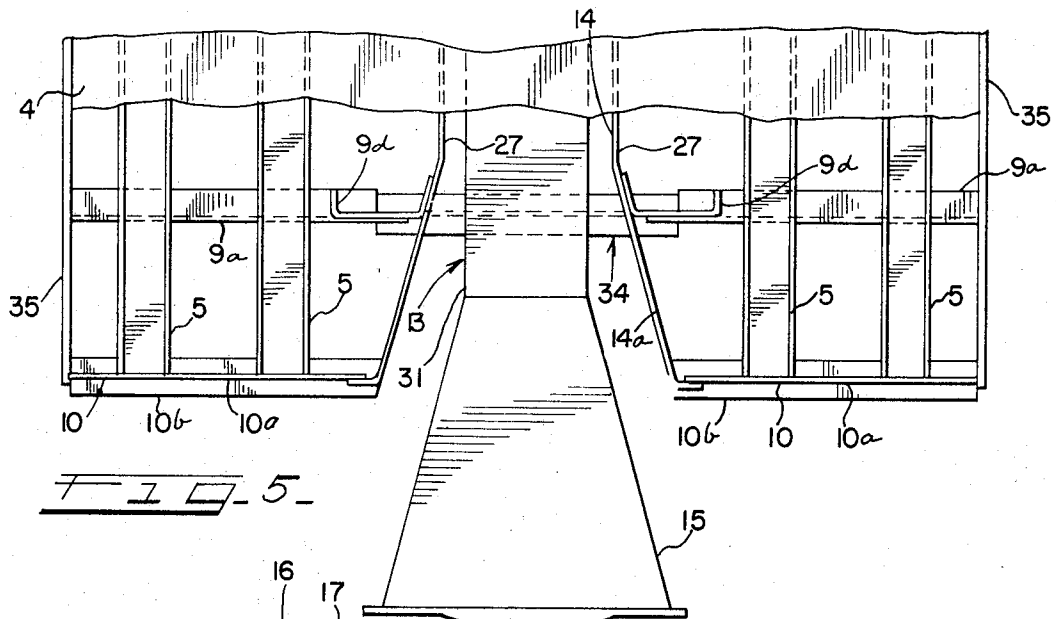
In a cushioned underframe railroad flat deck car, a bolster and crossbearer construction of cross elements extending between each side sill and the fixed center sill and having vertical truss means on the sides of the fixed sill tying the cross elements to the fixed sill, a center plate under the fixed sill tying the bolster cross elements together and a transverse transfer channel member forming a shear box with the deck and tying the bolster cross elements together, sub-cross means under the fixed sill tying the outboard bolster cross elements together, reinforcement about the fixed sill at the fish belly transition section of the fixed sill, and fixed longitudinally vertical cushion key stops on the top and bottom inside portions of the fixed sill and sliding key stop means in the form of horizontal cross-head means on the sliding insert sill acting as cushion stop means at the cushion pocket.

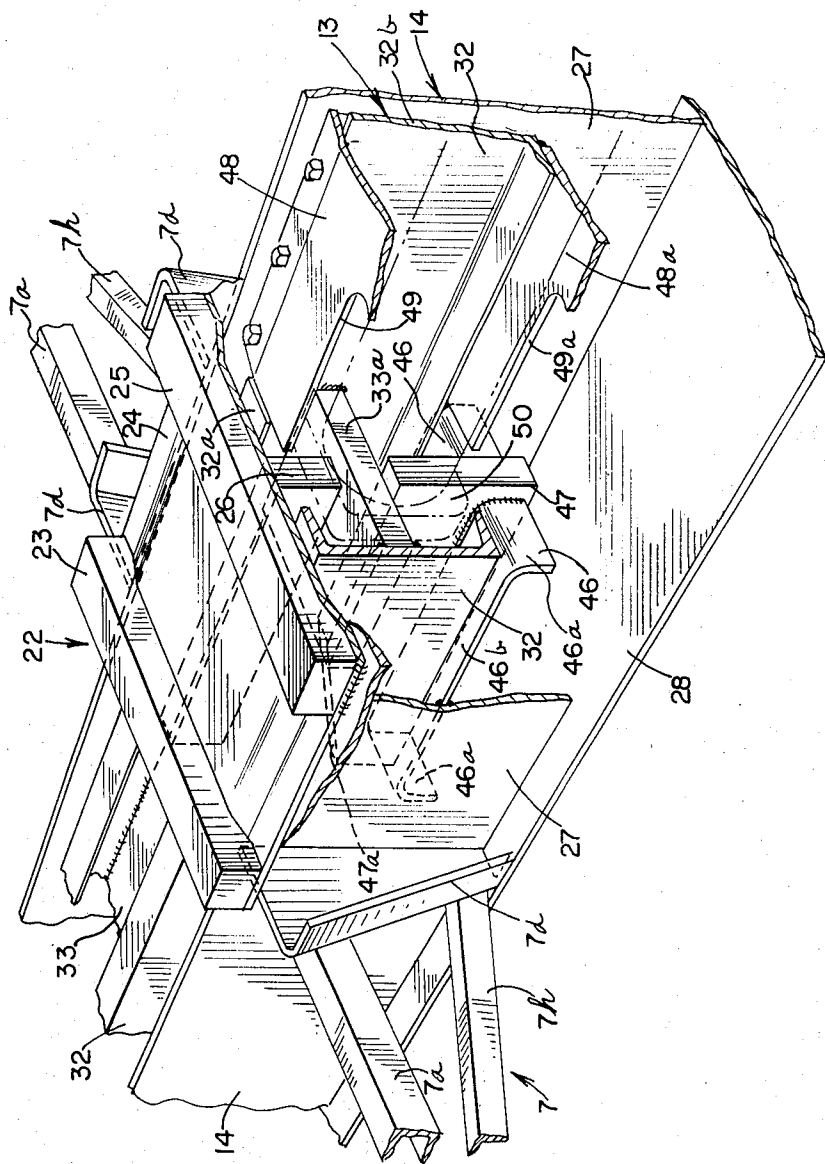
1 Claim, 7 Drawing Figures











RAILROAD FLAT CAR

This is a division of co-pending patent application, Ser. No. 39,683 filed May 20, 1970, now U.S. Pat. No. 3,659,724, of Roy W. Miller, Marvin Stark, and William R. Shaver.

SUMMARY OF THE INVENTION

This invention relates to improvements in railroad flat deck cars of the cushioned underframe type and in particular relates to a novel car construction of improved strengthened structural design to accommodate a sliding center sill.

A general object of this invention, therefore, is to provide for a cushioned underframe railroad flat deck car having a bolster and crossbearer construction of cross elements on each side of the fixed center sill and extendable between each respective side sill and the fixed center sill wherein there is provided vertical truss means on the sides of the fixed sill tying the cross elements to the fixed sill and a center plate under the fixed sill tying the bolster cross elements together and a transverse channel member forming a shear box with the deck and tying the bolster cross elements together.

Another object of this invention is to provide for sub-cross means under the fixed sill tying the outboard bolster cross elements together.

Still another object of this invention is to provide for a reinforcement about the fixed sill at the fish belly transition section of the fixed sill.

Still another object is to provide for fixed longitudinally vertically extending cushion key stop means on the top and bottom inside portions of the fixed sill and sliding key stop means in the form of horizontal cross-head means on the sliding sill insert acting as cushion stop means at the cushion pocket, the key stop means being in lateral alignment with reinforcing crossbearers.

These and other objects will become more apparent from reference to the following description, appended claims and attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan sectional view of the novel flat deck railroad car;

FIG. 2 is a partial sectional view taken along line 2 — 2 of FIG. 1;

FIG. 3 is a perspective view of the flat deck car taken generally at the bolster and fish belly transition section and the crossbearer section;

FIG. 4 is a partial cross-sectional view taken along line 4 — 4 of FIG. 1;

FIG. 5 is an end top plan sectional view of the flat deck car;

FIG. 6 is a side elevational sectional view at the end of the flat deck car; and

FIG. 7 is a perspective view of the key stops of the fixed and sliding sills at the cushion pocket area.

DETAILED DESCRIPTION

With reference now to FIGS. 1 and 2, there is shown a flat deck railroad car 2 having a flat deck structure 3 including a deck plate 4 and underdeck-plate stringers or longitudinal deck stringers 5 of U-shaped or channel type. Over the area of the railroad trucks is located the underframe bolsters 6 which run transversely of the car. Outwardly of the bolster 6 is found the outboard of bolster crossbearer 8 and outwardly of that, at

each end of the car, is the end frame crossbearer 9. The cross structure located at each end of the car is the end sill structure 10. With reference to FIG. 3, the fish belly transition crossbearers 11 may be seen. The bolsters 6, the intermediate or between-the-bolster crossbearers 7, the outboard bolster crossbearers 8, the end frame crossbearers 9, and the fish belly transition crossbearers 11 are all attached to the fixed sill structure 14 which may be best seen in FIGS. 2 — 5. Reciprocally extendable through the fixed sill structure 14 is the sliding or insert sill structure 13 which, at each of its outer ends, has a widened end portion or bell-shaped portion 15 with striker 15a that is accommodated by the flared-out end portion 14a of the fixed sill structure 14 at each end of the car.

On top of the deck plate 4 is provided a pair of longitudinally extending deck rub rails for guiding the tires of a trailer vehicle along the deck. Each rub rail 16 includes a tire curbing angular plate structure 17 that is supported by a gusset 18. The longitudinal ends of the rub rail 16 are turned or sloped toward one another to provide for initial leading in or guiding portions for the trailer or vehicle. Each tire curbing angular plate structure 17 comprises an outer lower curved-in end flange portion 17a connecting with an upwardly extending vertical or side flange portion 17b which in turn connects with the horizontal portion 17c that connects with an inwardly downwardly directed portion 17d. The gusset structure 18 includes the vertical web 18a and the horizontal flange portion 18b. The ends 19 of the rub rails 16 are tapered inward to accommodate entrance of the vehicle wheels onto the deck.

With reference to FIG. 3, it is seen that each intermediate crossbearer 7 that is located between the bolsters 6 includes a cross channel-shaped element 7a on each side of the fixed sill and connecting with a respective side sill 35 and with a truss plate or member 7d which is attached to the side wall of the fixed sill. The cross element 7a includes upper and lower flanges 7b and a vertical web 7c which is attached as by welding to the flat transverse vertical plate portion 7e of the truss member 7d. The truss member 7d is also provided with an upwardly extending, outwardly diverging, longitudinally extending end flange 7f. The crossbearer 7 is also provided with a transverse diagonally upwardly outwardly extending angular plate 7h connecting with the outer end of the channel member and the side sill and with the lower end of the truss member 7d. The corresponding crossbearer member 7a on the other side with its respective truss element and diagonal element form the completed crossbearer 7. Each of the crossbearers 7 includes a transverse diaphragm plate 7i between and connecting with insides of the fixed sill 14 for transference of loads through the lengths of the crossbearers and into the fixed sill. These diaphragm plates are below the sliding insert sill as, for instance, will be seen in FIG. 4.

The construction of the outboard bolster crossbearer 8 is best seen in FIG. 2 and includes a crossbearer channel member 8a on each side of the fixed sill that is attached to a respective truss member 8d attached to a respective side or upright longitudinally extending vertical fixed sill side plate 27. The outer end of each crossbearer channel member 8a is attached to respective side sill structure 35. Crossbearer channel member 8a includes flanges 8b and web 8c and the truss 8d includes the plate 8e and flanges 8f to which is attached

the reduced end portion 8g of the crossbearer member 8a. As also seen in FIG. 2, the end frame crossbearer 9 is similarly constructed to the outboard bolster crossbearer 8 and includes complementary parts 9 in the form of part of channel member 9a having flanges 9b and web 9c and is provided with a truss structure 9d and having flanges 9f and the crossbearer reduced end portion 9g. The crossbearer 8 and the crossbearer 9 each are comprised of their respective channel member and truss member structures on each side of the fixed sill and are attached thereto in a manner similar to the attachment of the crossbearer 7 as explained above. Similarly, FIG. 3 discloses the fish belly transition crossbearer which is similar in construction to the crossbearer members 8 or 9 and, therefore, is provided with tapered channel sections 11a which, similar to members 8a and 9a, taper inwardly toward the fixed sill and the transition crossbearer 11 has its channel member 11a composed of flanges 11b and web 11c and is attached to the respective side sill 35 and to the truss element 11d which is composed of plate 11e and flanges 11f. The truss element is attached to the reduced inner end 11g of the channel member 11a as is the case with channel members 9a and 8a of the other crossbearers 9 and 8. The end sill structure 10, as best seen in FIGS. 5 and 6, includes a vertical or upright plate portion 10a on each side of the car and a horizontal lower flange portion 10b attached thereto on each side of the car and on opposite sides of the sliding sill bell housing 15 (see FIG. 5).

The flat deck car is provided with a cushion unit 43 for permitting cushioned movement of the fixed sill structure 14 with respect to the sliding sill structure 13. The cushion unit is best shown and illustrated in U.S. Pat. Nos. 3,035,714 and 3,035,827, both issued to William H. Peterson on May 22, 1962, which are hereby incorporated herein by reference. This cushion unit is located in a cushion unit pocket 21 in the sliding sill as, for instance, shown generally in FIG. 1. The cushion pocket 21 is covered by the cushion access plate structure 20 at which are located a pair of top keys or stops 22 attached to the fixed sill. The fixed stops are provided with fixed stop reinforcement parts 23, 24 and 25, namely, transverse reinforcement bar 23, flat horizontal plate structure 24 and transverse bar structure 25 from which depends the upper fixed stop or key 26 of the fixed sill. The fixed sill, in addition to having the side plates 27, is provided with a fixed sill bottom cover plate 28 as seen in FIG. 3, and includes a bottom cover plate portion 28a adjacent the bolster 6, a downwardly sloping cover plate portion 28b in the transitional or fish belly section and a lower or horizontal cover plate portion 28c in the intermediate crossbearer section of the car. With reference now to FIG. 2, it is seen that the sliding sill 13 is spaced inwardly from the fixed sill which has provided thereon sliding sill guides 29 which consist of a longitudinally extending member mounted on the inner vertical surface of each vertical wall 27 of the fixed sill 14.

FIG. 2 is further directed to the crossbearer bottom support I-beam structure or shear connector 30 which ties the sections of the outboard bolster crossbearer together. The I-beam structure 30 is provided with a vertical end cap 30a, upper and lower flanges 30b, vertical transversely extending web 30c and a reinforcing plate or gusset 30d. Also shown on the right hand portion of FIG. 2 is the draft sill 31 of the sliding sill and includes

the bottom support plate 31a, the draft sill top cover plate 31b and the draft stop assembly 31c. The sliding sill assembly 13 comprises the opposed pair of sliding sill side channels 32 having flanges 32a, web 32b and extension plate 32c to which is attached the draft stop assembly 31c. The channels 32 are connected by the sliding sill web 33. The laterally spaced sections of the end crossbearer 9 are tied to one another by the end crossbearer bottom support I-beam structure 34 as seen in the right hand half of FIG. 2, the I-beam structure 34 comprising a web 34a, flanges 34b, end caps 34c, gussets 34d, and end crossbearer wear plate 34e.

With reference now to FIG. 3, there is shown in the foreground of the view the bolster arrangement and rearwardly of the bolster and underneath the fixed sill is provided the transition reinforcement structure 36 for reinforcing and strengthening the fish belly transition area. The bottom cover plate 28a at the transition section is connected with the deck plate and the outside of the fixed sill by the vertical gusset 36a. Underneath the bolster structure 6 is the center plate structure 37 which is of the construction as shown in U.S. Pat. No. 3,422,772 to Marvin Stark, which patent is hereby incorporated herein by reference. The center plate structure 37 is attached to the underside of the upright vertical web portions or sides 27 of the fixed sill and outboard of each of said side walls 27 of the fixed sill is the L-shaped guide and center plate reinforcement structure 38 which forms part of the center plate structure 37. It is noted that the bolster structure 6 is comprised of bolster external gussets 6a located vertically above and attached to the ends of the center plate structure and also attached to the bolster bottom plate 6c in the upwardly, outwardly diverging, sloping plate portion of each of the bolster bottom plates 6c. The bolster structure 6 is further provided with bolster web plates 6b which are rectangular and are located laterally outwardly and diverge downwardly toward the sides of the fixed sill to provide a deep web section at the fixed sill. There are two such longitudinally spaced web plates 6b spaced apart from one another by internal gusset plates 6d for transferring vertical forces from side bearing to top beam and L-shaped reinforcement means 42 on each side of the fixed sill. At the outer ends of each of the webs and attached to the respective side sill structure is the jack pad reinforcement 40 for the jack pad 41 for lifting of the flat deck off of the trucks for servicing. Each side sill structure 35 includes a top horizontal flange 35a, a downwardly extending vertical portion 35b, an inwardly downwardly diagonal plate portion 35c and a lower inwardly directed horizontal flanged portion 35d to which is attached the respective jack pad horizontal plate 41. The transfer member or shear box section 39 on top of the bolster 6 comprises four vertical walls 39a and a top wall 39b, the walls 39a forming with the deck plate 4 the shear box section which acts as the bolster top reinforcement structure and cooperates with the center plate structure for transferring loads around the sill structure from each of the bolster sections.

With reference now to FIGS. 4 and 7, the construction of the cushion pocket with respect to the sliding sill, the fixed sill and the cushion unit shows fixed wear plates 44 on the fixed sill fixedly engaging the sliding sill wear plates 45 on the bottom of the sliding sill. In addition to the top stop or keys of the cushion pocket 21 which retain the cushion unit there is provided the

bottom key or fixed block on the fixed sill, the left end as viewed in FIG. 4 of the bottom key 47 being provided with a beveled portion 47a. The top cushion cover plate 48, provided with a slot 49 for movement of the top key 26 therein and the sliding sill in the area of the cushion pocket is provided with a bottom cushion cover plate 48a provided with a slot 49a for movement of the sliding sill with respect to the fixed stop 47. The cushion end plates 50 engage these fixed stops 26 and 47 on the fixed sill. The fixed stop is attached to the side walls 27 of the fixed sill by bottom key channel members 46 which include an upper horizontal web portion 46b and downwardly depending transversely spaced end flange portions 46a. The channel members 46 transfer the shock loads of the cushion unit on the lower fixed stops into the side walls of the fixed sill.

Thus, what is provided by this invention is a novel reinforced bolster and crossbearer structure which is split by the fixed sill for accommodating movement of a sliding sill within the fixed sill wherein the reinforcement provides for tying means over and/or under the fixed sill for providing a transversely continuous bolster or crossbearer structure. Similar reinforcement is found around the box portion of the fixed sill in the fish belly transitional area of the car. The fixed keys or stops for retaining the cushion unit consist of the longitudinally extending vertically depending members which are reinforced by the fixed sill attaching means such as the channel members for the lower stops and the reinforcement structure for the top stops. The insert sill crossweb 33 of the sliding sill defines an open portion which presents a pair of stops or enlarged crossheads 33a at the ends of the open portion for engaging the cushion unit in the case of the sliding sill, as best seen in FIG. 7. Thus, in buff or draft, the fixed stops on the fixed sill and the end stops 33a of the open portion in the crossweb 33 of the sliding sill engage the cushion unit for permitting cushioned sliding movement of the sliding sill with respect to the fixed sill. The crossheads 33a are located vertically midway between the upper and lower portions of the sliding sill and the depending stops of the fixed sill are spaced vertically from one another to permit movement of the crossheads in between the fixed stops or keys. It is to be noted, as best seen in FIG. 7, that there is provided a pair of intermediate crossbearers 7 spaced longitudinally of one another and in lateral alignment with the respective reinforcing structures or means 23 and 25 and in alignment with the vertical webs 46a of the bottom reinforcement members or key channels 46 for transferring loads imposed on

the upper and lower fixed keys or stops into the crossbearers and into the side sills of the car. The structure for the transfer of loads between the bolster sections and opposite sides of the fixed sill include the transverse transfer channel member on top of the deck and the center plate structure underneath the fixed sill.

The foregoing description and drawings merely explain and illustrate the invention and the invention is not limited thereto, except insofar as the appended claims are so limited, as those skilled in the art who have the disclosure before them will be able to make modifications and variations therein without departing from the scope of the invention.

We claim:

1. A cushion underframe railroad flat deck car, a longitudinally extending through car fixed center sill, a sliding sill reciprocally disposed within said fixed center sill, said fixed sill having an upright side plate on each side of said sliding sill, a center plate structure underneath said sliding sill and said fixed sill and connecting with the undersides of said upright center sill plates, a top cover plate extending over said fixed sill and said sliding sill in the form of a deck plate being attached to the top portions of said center sill side plates, a bolster including a pair of bolster sections, one on each side of said fixed sill and having an inner end portion connecting with a respective upright center sill side plate and with a respective outer portion of the center plate structure, each bolster section inner portion including an upward outwardly sloping bolster bottom plate portion and an upright gusset plate spaced outwardly of a respective center sill side plate and extending between the sloped bolster bottom plate portion to the deck plate, and a transfer shear box section mounted on top of said deck plate above said fixed sill and said sliding sill and having fore-and-aft transverse generally vertical sections and laterally spaced upright longitudinal sections and a generally horizontal top plate forming with the deck a shear and bending absorbing box unit, the upright lateral sections each being in generally vertical alignment with a respective sloping bolster bottom plate portion for transferring loads therefrom into the shear box section.

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