

**Sept. 30, 1952**

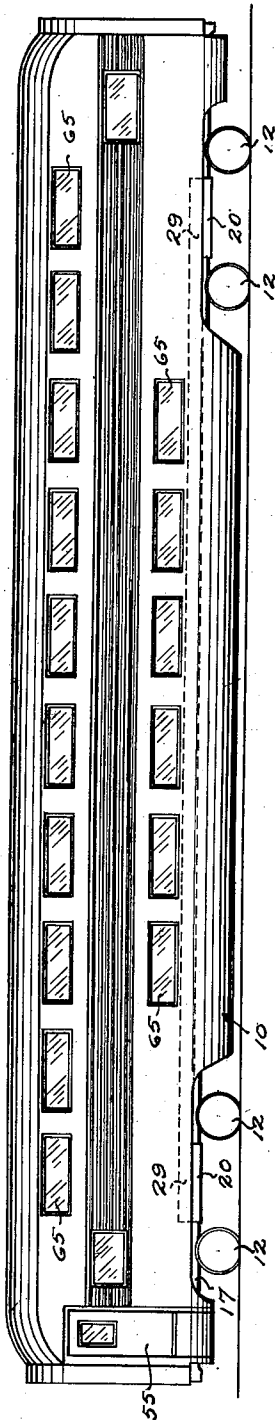
G. A. KUHLE ET AL

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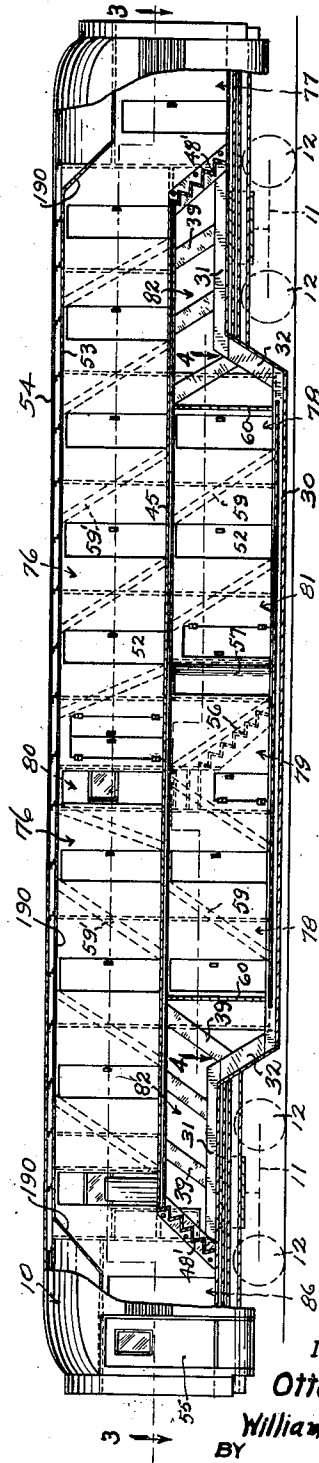
RAIL CAR

Filed Dec. 30, 1947

6 Sheets-Sheet 1



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RAIL CAR

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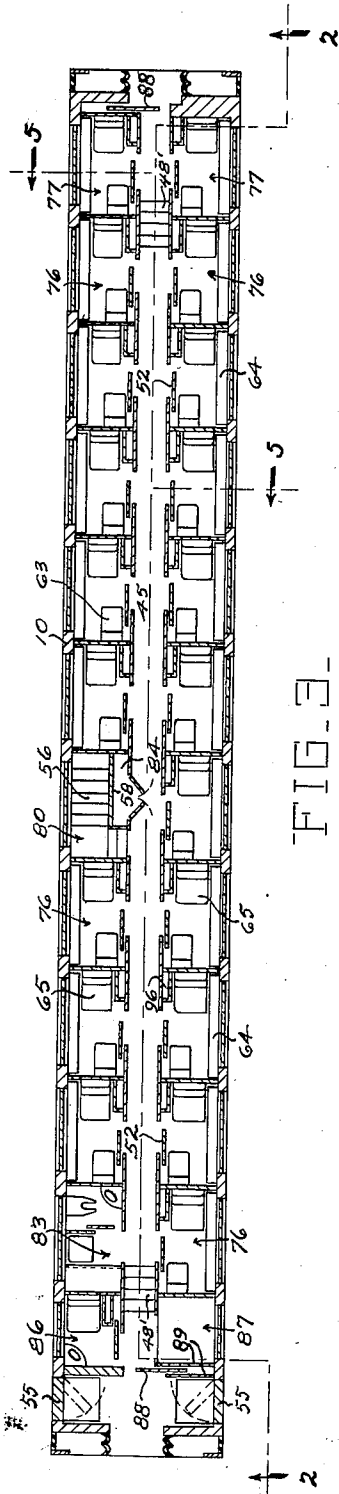


FIG. 3

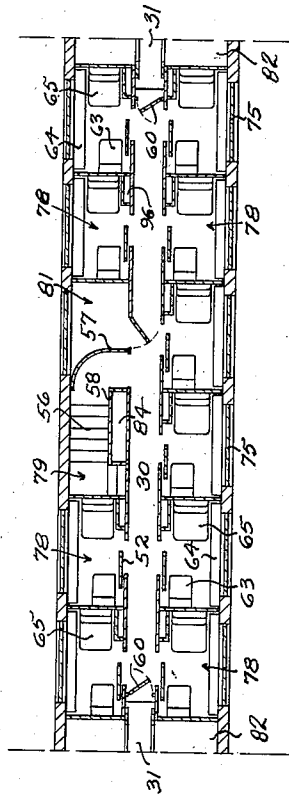


FIG. 4

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RAIL CAR

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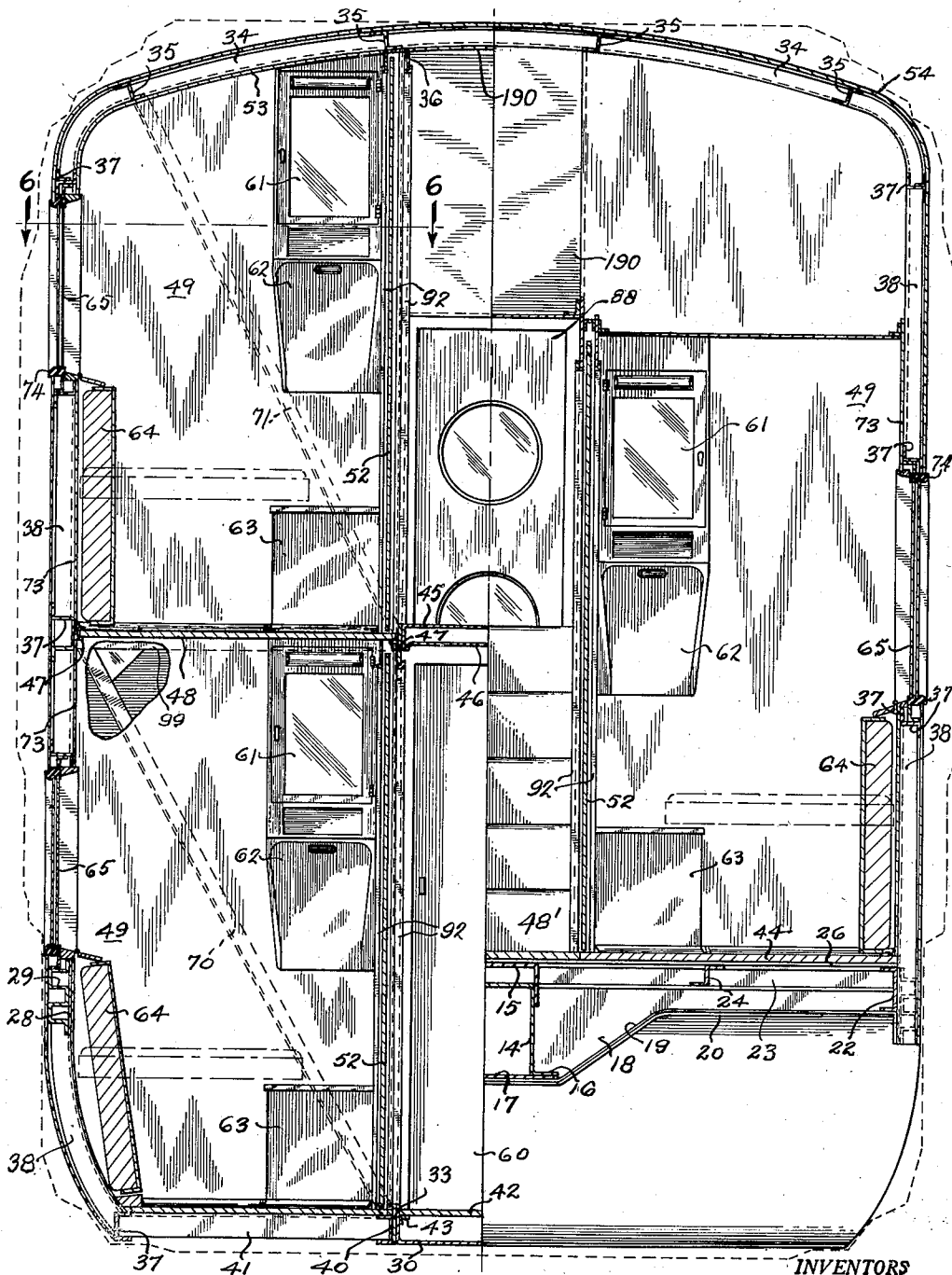


FIG. 5.

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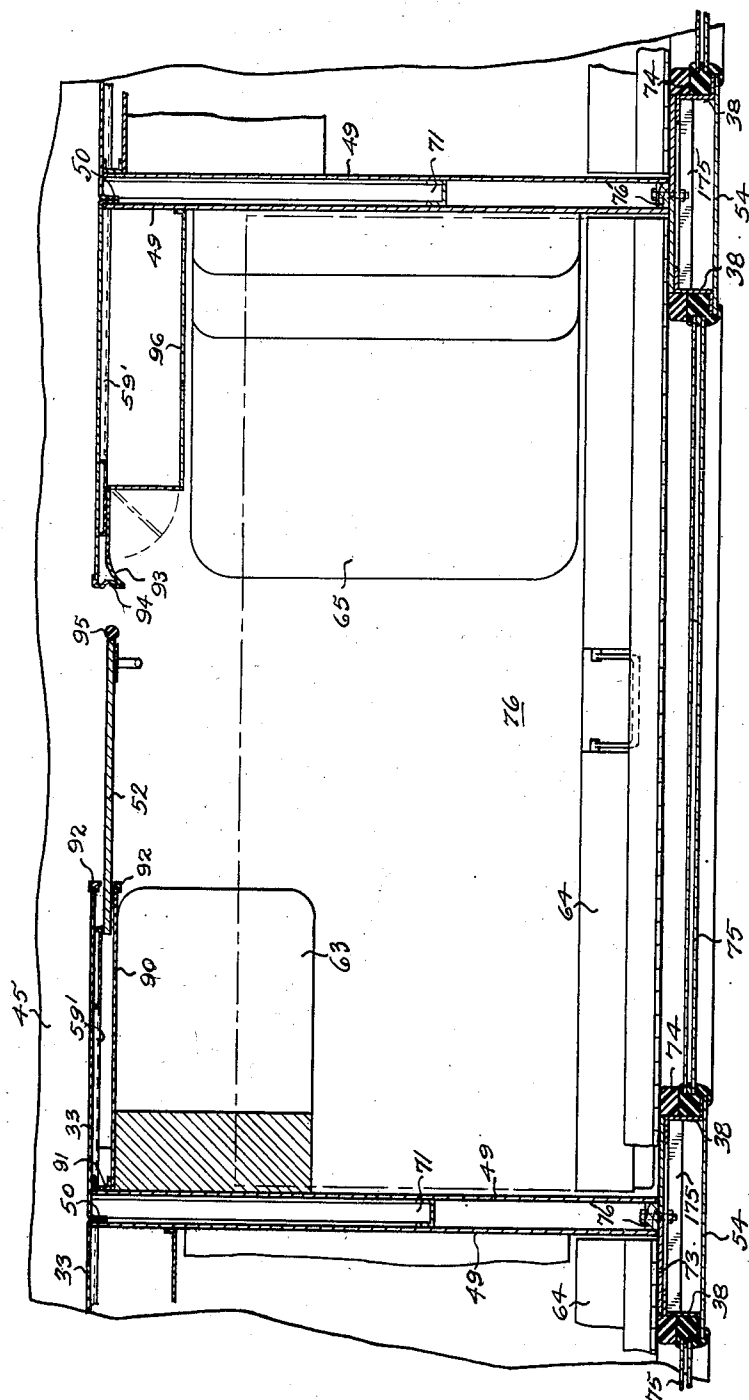
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RAIL CAR

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RAIL CAR

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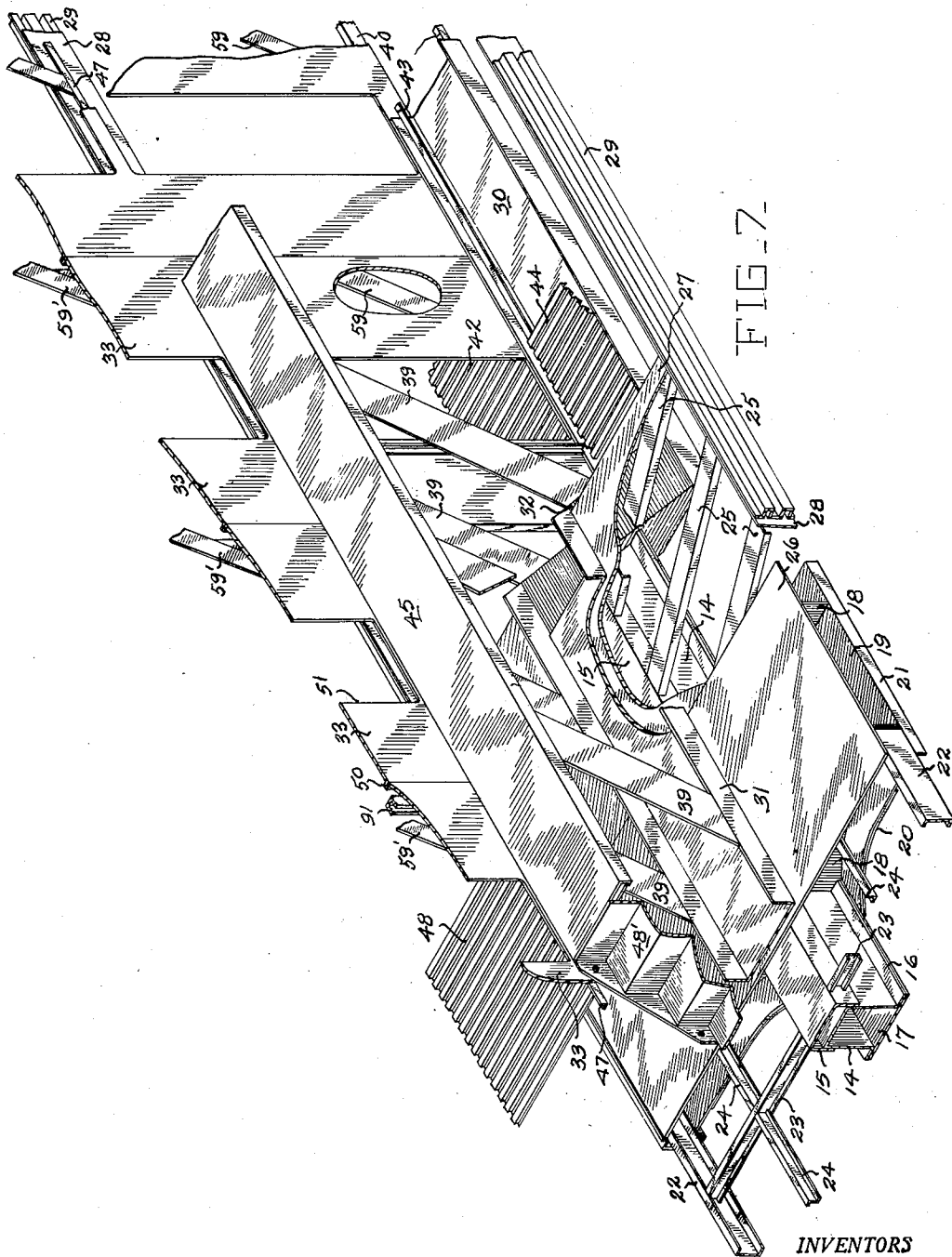


FIG. 7

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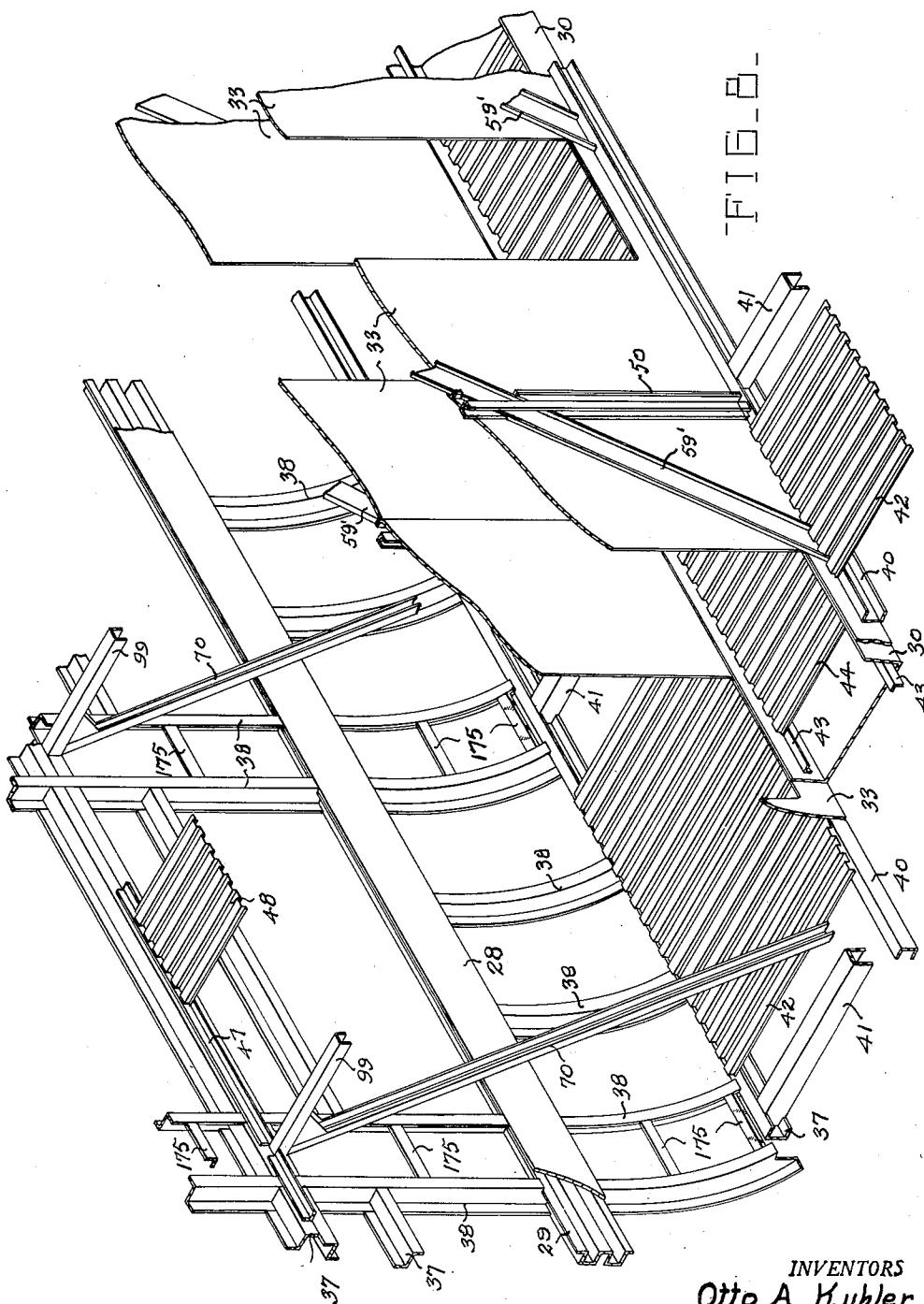
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RAIL CAR

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## UNITED STATES PATENT OFFICE

2,612,121

## RAIL CAR

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Application December 30, 1947, Serial No. 794,674

18 Claims. (Cl. 105—340)

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This invention relates to rail cars and more particularly to sleeping car framing.

Rail cars are usually provided with a center sill that forms the backbone for the major portion of the car framing. Heretofore the center sill employed in commercial production of rail cars has been continuous and has taken all of the fore and aft compression forces to which the car is subjected. Consequently, it has been necessary to make the center sill heavy and strong in order to withstand these forces and to perform the function of carrying the load of the car.

It is an object of this invention to provide a light weight framing for a sleeping car in which the center sill weight is materially less than that usually employed.

Another object of my invention is to eliminate a central portion of the usual continuous center sill and to utilize in place thereof necessary elements of the framing structure including an aisle base structure, aisle walls and the roof.

Another object of the invention is to provide a two-deck sleeping car with framing elements forming a connecting chordal structure between underframe and structures capable of resisting all longitudinal compression forces.

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

Figure 1 is a side elevation of a two-deck sleeping car incorporating the invention.

Figure 2 is a longitudinal sectional view of the sleeping car taken on line 2—2 of Figure 3.

Figure 3 is a sectional view of the sleeping car taken on line 3—3 of Figure 2.

Figure 4 is a sectional view of the lower deck of the sleeping car taken on line 4—4 of Figure 2.

Figure 5 is a sectional view of the sleeping car taken on line 5—5 of Figure 3.

Figure 6 is a sectional view of one of the rooms in the upper deck of the sleeping car taken on line 6—6 of Figure 5.

Figure 7 is a fragmentary perspective view of the car framing.

Figure 8 is another fragmentary perspective view of the car framing.

A double deck sleeping car incorporating the invention is indicated generally by numeral 10 and has at each end a conventional truck structure 11 carrying suitably mounted wheels 12. Immediately above the truck structures at each end of the car is arranged underframe end structures which include bolster means and a center sill. Such underframe end structures are simi-

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lar and the same numerals will be used for similar parts thereof as the description proceeds.

The center sill of such structure is of built-up box formation and includes a pair of inverted sheet metal channels 14 and 15 telescopically assembled and suitably secured together by welding or other similar means. The lower center sill channel has outwardly extending flanges 16 at its lower ends across which a bottom plate 17 extends and is secured.

Each bolster means includes transversely extending web members 18 on each side of the center sill and spaced longitudinally of the car, plate 19 extending under the center sill, top plate 26 extending over the center sill and a bottom plate 20. The web members are welded at their inner ends to the center sill and along their top and bottom edges to plates 19 and 26, such plates also being welded at their inner ends to the center sill.

The center sill projects beyond the front and rear of the bolster means and carries the other portions of the end underframe structure. Longitudinally extending side frame channels 22 have one end welded between plates 19 and 26 outside of the end bolster web member and transverse channel frame members 23 are welded at their ends to the channels 22 and the center sill. Z-frame members 24 extending longitudinally of the car are welded at their ends to frame members 23 and the adjacent bolster web 18 and similar members 24 extend between frame members 23 and are welded thereto at their ends.

The underframe structure extending from the bolster structures toward the middle of the car consists of the center sill, diagonally extending frame members 25, welded at one end to the center sill, and plate 27 extending across the members 25 and the center sill. Instead of forming plates 26 and 27 separately they could be formed of a single sheet of material. The frame members 25, adjacent the bolster structures at opposite ends of the car, extend from the sides of the center sill diagonally toward the middle of the car and are welded at their outer ends to side plates 28, such plates being continuous and welded to the sides of the bolster structures and with channels 22 forming car side frame means. Plates 19 have their side edges 21 turned down for this anchorage with the side plates. Corrugated reinforcing plates 29 are secured to the exterior of the side plates and are coextensive therewith.

The inner end of the sill and bolster structures at each end of the car terminate a short distance beyond the most centrally located truck wheels

and the medial portion of the framing therebetween is underslung so that the flooring for the lower deck of the car will lie a short distance above the rails thereby providing sufficient vertical dimension to accommodate two decks while remaining within height limits allowable in the building of a car. The underframe end structures occupy only a minor portion of the car length and a chordal structure consisting of framing parts is utilized to receive longitudinal compression forces instead of the usual intermediate portion of the center sill. As a result, the heavy weight of the intermediate portion of the center sill is eliminated without sacrificing longitudinal strength of rigidity required to absorb fore and aft compression forces to which the car is subjected when in use.

A channel shaped sheet metal structure having a medial underslung portion forms the base portion of a lower center aisle and extends longitudinally of the car between the end underframe structures. The end portions 31 of the structure are supported by and secured on plates 26 and 27 and are joined to a lower horizontal base portion 30 by angularly disposed portions 32. The base portion 30, the angularly extending portions 32 and the end portions 31 are suitably secured together, as by welding, or can be formed as a single unit. Aisle walls 33 extend vertically along each upturned side flange of the channel structure and are secured thereto at their lower ends by suitable means, such as welding. These aisle walls continue upwardly and are secured to the roof structure. The roof frame structure consists of a plurality of carlines 34 and purlines 35. Channel members 36 to which the upper ends of the aisle walls are secured, extend longitudinally of the car below the two central purlines and are welded thereto.

An upper inverted channel shaped structure 45 having a bottom closure plate 46 extends longitudinally of the car above the lower aisle base structure and forms the upper aisle base. The aisle walls 33 are welded or otherwise fixed to the sides of the upper aisle base structure. Diagonal supporting and brace members 39 extend between the flanges of sections 31 and 32 of the lower aisle base structure and the upper aisle base structure outside of the aisle panels and are welded to the panels and the sides of the aisle base structures. Similar members 59 extend outside of the aisle panels 33 between the flanges of section 30 of the lower aisle base structure and the upper aisle base structure and they are welded to the panels and the sides of the structures. Diagonal brace members 59' extend outside of panels 33 between the upper aisle base structure and the roof structure, such members being welded to the panels 33 and having their lower ends welded on angle brackets 47 fixed to and extending longitudinally of the aisle walls and their upper ends fixed to channels 36. These brace members 39, 59 and 59' stiffen the panels, support the aisle base structures and distribute longitudinal compression forces. They are inclined with their base ends closer to the adjacent end of the car than their top ends. Thus, such members on each side of the car center are inclined oppositely.

The side framing of the car consists of sills 28, longitudinally extending angle members 37 and vertically extending members 38 joined together in a suitable manner.

Inclined brace members 70 extend transversely in the lower section of the car between the aisle

walls and the side frames and are secured at their upper ends to one of the longitudinally extending framing members 37 and at their lower ends to channel members 40 secured to the sides of the aisle base structure 30 against the aisle panels. The lower side sill members 37 lie spaced from and parallel to members 40 and transverse inverted channel members 41 extend therebetween to provide a support for corrugated side flooring 42, such flooring also resting on the top flanges of the lower members 37 and members 40 and cross members 41. Angle irons 43 extend longitudinally of the car and are secured to the inside face of the flanges of the aisle base structure 30 for the purpose of supporting a corrugated flooring 44. It will be seen that the aisle base structure 30 entirely supports the aisle flooring 44 and supports one edge of the floorings 42 along the outside of the aisle partition walls. Floorings 42 and 44 are preferably welded into fixed relation with the associated elements and provide the flooring for the lower deck.

Brace members 71 extend transversely of the spaces between the aisle walls and the side frames and are welded at their lower ends to the aisle panels and at their upper ends to purlines 35 adjacent the sides of the car. Angle brackets 47 are secured along the aisle walls, in a plane with the upper aisle base structures, and to longitudinal side frame members 37. Upper deck floorings 48 extend longitudinally of the car sections between each aisle wall and car side and are supported on such angle brackets 47 and transverse frame members 99 between side frame members 37 and the sides of upper aisle base structure 45. The end portions of the aisle base structure 45 overlie bolster plate 26 and steps 48' extend between plates 26 and the ends of such aisle base structure. The steps are formed of sheet metal and the sides are suitably detachably secured to the adjacent aisle walls 33.

The longitudinal spaces between the center aisle base structures and the side framing in each deck of the car are divided into rooms by transversely extending panels 49. The aisle panels may extend from the floor of the lower deck to the roof as a single sheet or they may be divided horizontally so that their adjacent ends are secured to the aisle base structure 45. These panels are preferably divided longitudinally so that there is one section for each of the rooms and the adjacent edges of such panel sections are flanged, as indicated at 50, and fixed together by suitable means such as welding. The aisle panel section for each room is cut out to provide a doorway 51 and a slidable door 52 is associated with each doorway. The floors 48 of the upper deck sections provide a ceiling for the rooms on the lower deck and a ceiling 53 is applied to the roof structure to extend over the upper deck rooms and over the center aisle. A suitable outer cover 54 extends over the roof and sides of the car and one end of the car has entrance doors 55. The rooms are provided with inside side wall panels 73 cut out to receive window frames 74 and the outside wall is cut out for the same purpose. Windows 75 are mounted between the frames 74 and side frame members 37 and 38. The transverse panels 49 at the ends of adjacent rooms are spaced and brace members 70 and 71 extend therebetween and are secured thereto. Brace members 39, 59 and 59' are suitably secured to and support aisle panels 33. Between the side frame members 38 at adjacent ends of the win-

dows are fixed longitudinally extending angle members 175 and the inside side wall panels for the rooms are secured to such angle members and to spacer members 76' between the adjacent panels 49.

The arrangement is such that the upper deck will contain rooms 76 the full length of the upper aisle structure and adjacent the end rooms 76 there will be a room 77 on opposite sides of one end section of the car and opposite rooms 86 and 87 at the other end of the car. Rooms 77, 86 and 87 are above the end portions of the underframing. The rooms 78 in the lower deck will terminate substantially at the ends of the lower level portion 30 of the lower channel structure. Access is had to the upper deck rooms from aisle base structure 45 to the ends of which access is had by steps 48' leading on to the bolster plate. The space in a lower deck room 79 and in an upper deck room 80 thereabove is utilized to receive steps 56 by means of which entrance is had between the upper aisle and the lower aisle. Lower room 81 adjacent room 79 receive a transverse partition 57 providing a hallway leading to steps 56 and as such partition takes up a part of the space in room 81. Room 81 is utilized as a storage room. Within the stairway rooms 79 and 80 is a step enclosure wall 58 providing storage spaces 84 accessible from the aisles. The storage spaces 82 beneath the upper aisle ends may be entered from the ends of the lower aisle portion 30 through doors 60 and access can also be had thereto by removing steps 48'.

Room 86 will accommodate the porter and room 87 is utilized as a baggage or storage space. Room 83 next to the porter's room serves as a general toilet and storage space. The other rooms except 79, 80 and 81 are bedrooms and on one transverse wall of each is mounted a medicine cabinet 61 and folding washbasin 62. Each bedroom also contains a hopper 63, seat 65, bed 64 mounted for storage on its side adjacent the outside wall and movable to a horizontal prone position and clothes closet 96. A mounting for such bed forms the subject matter of application Serial Number 750,788, filed May 27, 1947.

Doors 88 at the end of the center aisle on the end underframe structures are slidable in bulkheads 89. Ceilings 190 are secured between the top portions of panels 33 above the upper aisle, the bottom of pan 45 serving as the ceiling for the lower aisle. Adjacent the aisle panel at one end of each room is an interior longitudinally extending wall 90 secured at one end to an upright channel member 91 which channel is also secured to the partitions 49 and panel 33. Walls 90 extend parallel with the aisle panels adjacent the lower portion of frame members 59 and 59' and provide spaces into which doors 52 can slide to open the entrance to the rooms. Trim 92 is provided on walls 33 and 90 on one side and at the top of the door opening for each bedroom and trim 93 is provided on panels 33 at the other side of such sliding door openings. Trims 93 have a recess 94 into which a rubber door bead 95 fits when the doors 52 are closed.

There is a brace member 70 between each of the lower rooms and a brace member 71 between each of the upper rooms. Except for rooms 77, 86 and 87 there is a brace member 59 on the panel 33 along each pair of lower rooms and a brace member 59' on the panel 33 along each pair of upper rooms.

The framing is such that a chordal structure is formed between the end structures for resisting

longitudinal compression forces to which the car is subjected. In this chordal structure the lower aisle base structure is the base or backbone from which the longitudinal compression forces are distributed by frame members 39 and 59 and aisle panels 33 to the upper aisle base structure from which they are further distributed to the roof structure through frame members 59' and aisle panels 33. The compression forces are further distributed to the side frame members from the end structures by frame members 25. Angle irons 43 and channels 40 and the floors 42 and 44 secured thereon also assist the lower aisle base structure in resisting compressive forces and distribute them to the side frame members. Such structure is essential to the car framing and is arranged to adequately withstand the compression forces usually received by a continuous center sill structure. Framing members 70 and 71 serve to prevent twisting or bending of the side wall structure which is supported from the aisle base structures intermediate the end underframe structures.

The invention may be modified in various respects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

What is claimed is:

1. In a rail car, underframe end structures including a center sill and bolster means, a roof structure, a longitudinally extending medial channel shaped aisle base structure having a medial underslung portion and its ends fixed on the end structures, and aisle panel means secured to the upstanding sides of said channel shaped structure and to the roof structure.

2. In a rail car, end structures including bolster means and a center sill, a longitudinally extending channel shaped aisle base structure having a medial underslung portion and ends overlying and secured on said end structures, side frame members spaced from each side of said channel structure, and frame members secured at one end to the sides of said channel structure and at the other end to the adjacent side frame member.

3. In a two-deck rail car, underframe end structures including a center sill and bolster means, a roof structure, a longitudinally extending underslung channel aisle base structure having its ends fixed on the end structures and upper inverted channel aisle base structure co-extensive with the lower aisle base structure, and aisle panels secured to the sides of said aisle base structures and said roof structure.

4. In a rail car, underframe end structures each including bolster means and a center sill, a longitudinally extending channel shaped aisle base structure having a medial underslung portion and its ends secured on said end structures, a channel shaped aisle base structure spaced above the underslung structure forming an upper deck center aisle base, and frame members secured between the adjacent sides of said aisle base structures.

5. In a rail car, a roof structure, underframe end structures including a bolster and a center sill, a longitudinally extending channel shaped aisle base structure having a medial underslung portion and its ends secured on said end structures, an upper channel shaped structure spaced above the underslung aisle structure and co-extensive therewith, said upper structure forming an upper deck center aisle base, frame members

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between the aisle base structures and secured to the sides thereof, frame members secured between the upper aisle base structure and the roof, said frame members extending at an angle longitudinally of the car with the base portion of the members on each side of the center of the car being disposed nearest the adjacent car end.

6. In a rail car, underframe end structures including a bolster and a center sill, a longitudinally extending channel shaped structure having its ends secured on said end structures and forming a lower deck center aisle base, an upper channel shaped structure spaced above the underslung pan forming an upper deck center aisle base, frame members extending between and fixed to the sides of said aisle base structures, said frame members extending at an angle with the top portions from the center of the car to each end sloping upwardly toward the adjacent car end, and panels secured to the sides of the aisle base structures and the aisle faces of the frame members.

7. In a rail car, an underframe end structure comprising bolster means, a center sill attached to the bolster means and projecting beyond each side thereof, transverse frame members adjacent the inner side of the bolster means and extending diagonally and outwardly from the center sill sides in a direction toward the longitudinal central portion of the car, transverse frame members attached to those portions of the center sill that project beyond the outer side of the bolster means, and longitudinally extending car side frame means attached to the outer ends of the diagonal and transverse members.

8. In a two-deck rail car, a roof structure, a channel shaped upper aisle base structure extending longitudinally of the car, and frame members secured at their lower ends to the sides of the upper aisle base structure and at their upper ends to the roof structure thereabove, said frame members at each side of the center of the car extending upwardly at an angle away from their adjacent car end.

9. In a two-deck rail car, a roof structure, an upper aisle base structure extending longitudinally of the car, a lower aisle base structure beneath the upper aisle structure, supporting members secured at their ends to the sides of the aisle base structures, aisle panels secured to the aisle base structures and the supporting members, and supporting members secured at one end to the sides of the upper aisle base structure and to the roof structure thereabove, said supporting members at each side of the center of the car extending at an angle with the base portions thereof on each side of the center of the car being closer to the adjacent car end than are the top portions of said members.

10. In a rail car, underframe end structures including a center sill and bolster means, a roof structure, a longitudinally extending channel shaped aisle base structure having a medial underslung portion and ends fixed on the end structures, an upper aisle base structure above the lower aisle base structure, vertically extending supporting members secured between the sides of said aisle base structures, car frame side members, and transverse frame members extending outwardly from the sides of the aisle base structures to the adjacent side frame members.

11. In a rail car, underframe end structures including a center sill and bolster means, a roof structure, a longitudinally extending channel shaped aisle base structure having a medial un-

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derslung portion and ends fixed on the end structures, aisle panels secured at their base to the upstanding flanges of said aisle base structure and at their tops to the roof structure, an upper aisle channel shaped base structure over the lower aisle base structure to which the aisle panels are secured, supporting members between the sides of the upper aisle base structure and the roof, said supporting members being secured to the panels, a plurality of longitudinally extending superposed side frame members, transverse brace members extending from the portions of the panels adjacent the aisle base structure to the adjacent side frame member thereabove, and transverse panels on each side of said transverse brace members forming walls dividing the spaces at each side of the aisle base structures into rooms.

12. In a rail car, underframe end structures including a center sill and bolster means, a channel shaped aisle base structure extending longitudinally of the car having a medial underslung portion and the ends mounted on and secured to the end structures, side frame members longitudinally coextensive with said aisle base structure and the inner end portion of the end structures to which they are secured, and transverse frame members connecting the sides of the aisle base structure with the longitudinally extending side frame members, said transverse frame members providing side flooring supports.

13. In a rail car, side frame structures, underframe end structures including a center sill, diagonally extending underframe members connecting the sill sides with the side frame structures, a channel shaped aisle base structure having a medial underslung portion and ends secured on the underframe structures, frame members connecting the sides of the channel shaped aisle base structure with the adjacent side frame structures, and aisle panels secured to the sides of said aisle base structure.

14. In a rail car, longitudinally spaced underframe structures including a center sill and a bolster, an aisle base structure having an underslung medial portion and ends secured on the underframe end structures, supporting members fixed to the outside portions of said base structure, longitudinally extending side frame members, supporting members fixed to said longitudinal members opposite the supporting members on the base structure, flooring carried by the adjacent supporting members on the base structure and longitudinal side frame members, and aisle panels secured at their base to the sides of the aisle structure.

15. In a rail car, underframe end structures, a channel shaped lower aisle base structure between the end structures and having its ends mounted on said end structures, an upper aisle base structure spaced above the lower aisle base structure, supporting means between the aisle base structures, panels secured to the sides of the aisle base structures, and steps between the panels leading from the underframe end structures and the ends of the upper aisle base structure.

16. In a two-deck rail car framing, underframe end structures, a channel shaped aisle base structure having a medial underslung portion and ends secured on the end structures, an upper aisle base structure coextensive with the lower aisle base structure, supporting means secured between the sides of the aisle base structures, longitudinally extending side frame members ad-

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jacent aisle base structure sides, flooring mounted on and secured to the adjacent supporting means on said base structure and said side frame members, and aisle panels secured to the sides of said aisle base structures and said supporting means.

17. In a two-deck rail car framing, underframe end structures, a lower channel shaped aisle base structure having an underslung medial portion and ends secured on the end structures, an upper channel shaped aisle base structure co-extensive with the lower base structure, supporting means between the base structures, supporting means secured to the sides of the upper aisle base structure, longitudinally extending side frame members parallel with the flanges of said upper base structure, supporting means fixed to said longitudinally extending side frame members, transverse braces secured between the sides of said upper base structure and the longitudinally extending side frame members, and flooring mounted on the transverse braces and the supporting means on the base structure sides and the longitudinally extending frame members.

18. In a rail car framing, longitudinally spaced underframe end structures, a channel shaped aisle base structure having its ends secured on said underframe end structures, aisle panels secured

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to the flanges of said base structure, side wall frame structures, means connecting the base structure with the side wall frame structures, transverse walls between the panels and the side wall structures, vertical channel members at the junction of the transverse walls and the panels, a wall in each room parallel with the adjacent panel secured at one end to the vertical channel, said panels having door openings for each room, and a door slidable in the space between said wall and said panel.

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