United States Patent

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[54] **RAILWAY CAR CONSTRUCTION**
5 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **105/404,** 105/413, 105/416
[51] **Int. Cl.** **B61f 1/02,** B61f 1/08
[50] **Field of Search** 105/404, 368B, 414, 416, 418, 419, 422

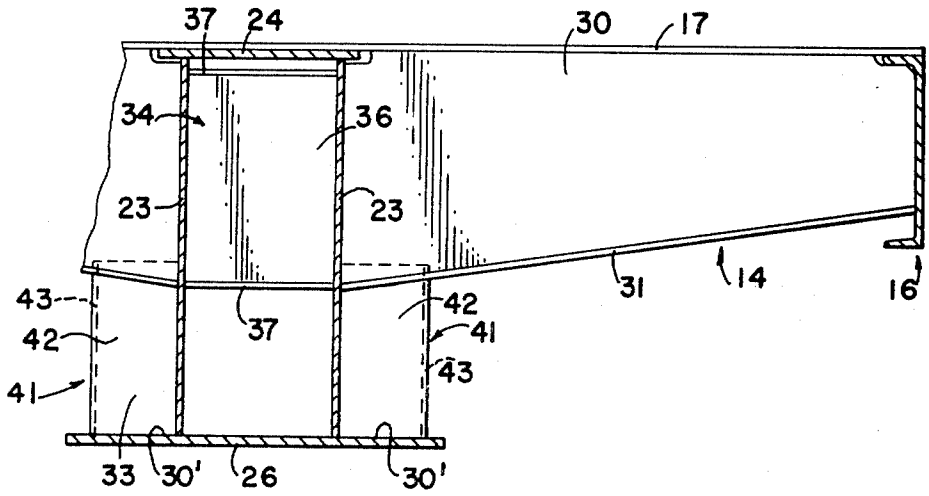
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ABSTRACT: A railway car of the bulkhead flat deck type including an underframe having a center sill of generally fish-belly contour and having bolsters and crossbearers extending transversely from the center sill. The crossbearers are each of substantially identical structure and spaced lengthwise of the car and relative to each other in a manner resulting in distributing the stresses uniformly lengthwise of the vehicle. Fixed to the ends of the crossbearers are side sills and attached directly on the crossbearers and to the side sills is a floor formed from sheet metal. Fixed adjacent to the ends of the vehicle are bulkheads. Mounted on the floor overlying the side sills are cargo supporting structures for retaining lumber or the like spaced above and adjacent the side sills.



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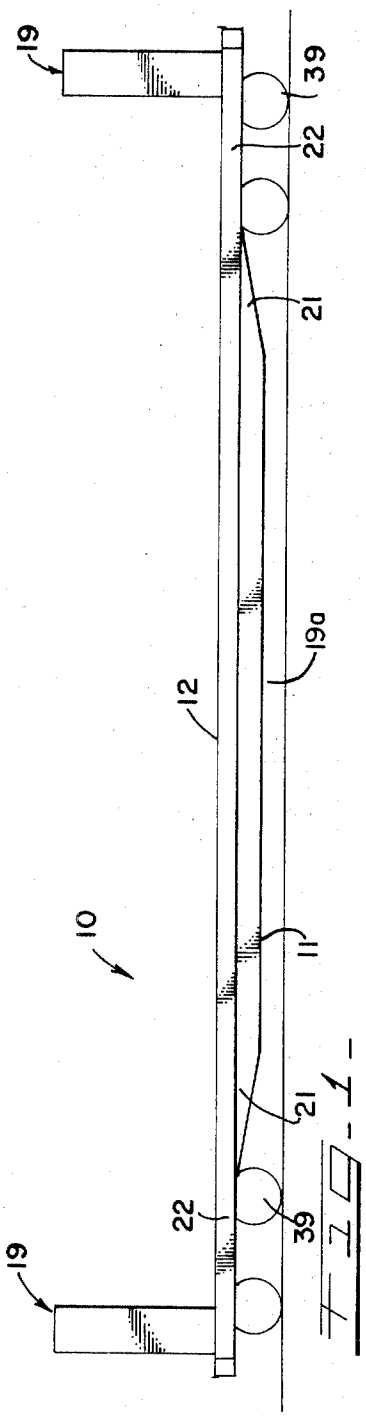


FIG. 1

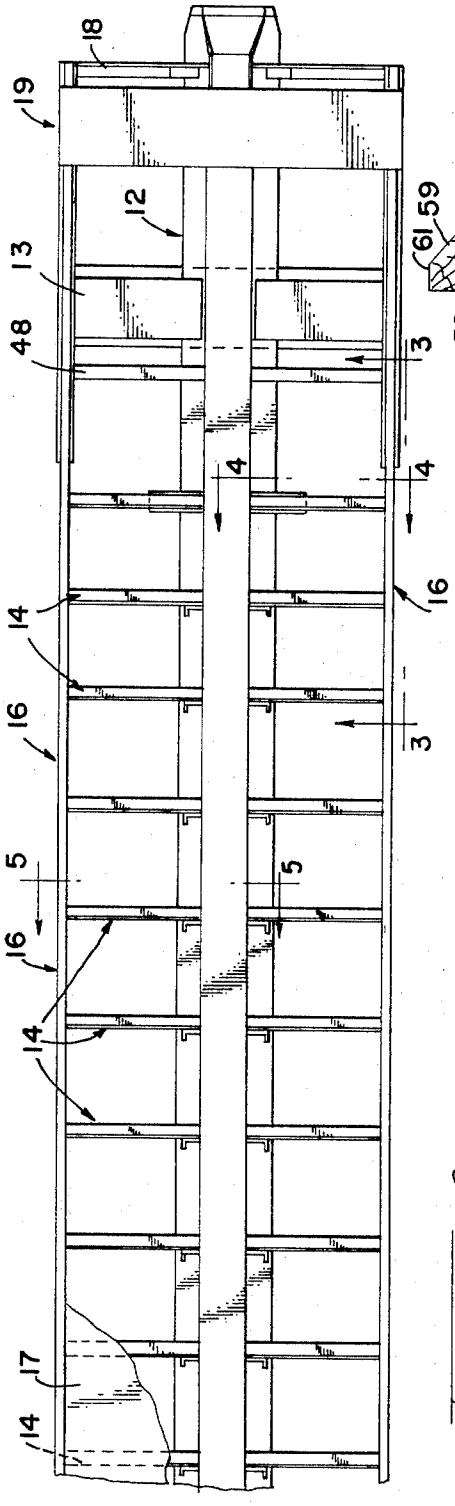


FIG. 2

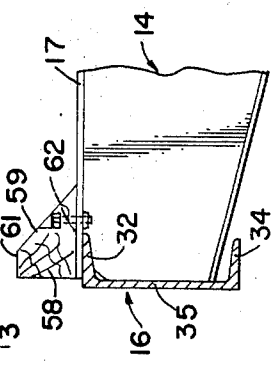


FIG. 8

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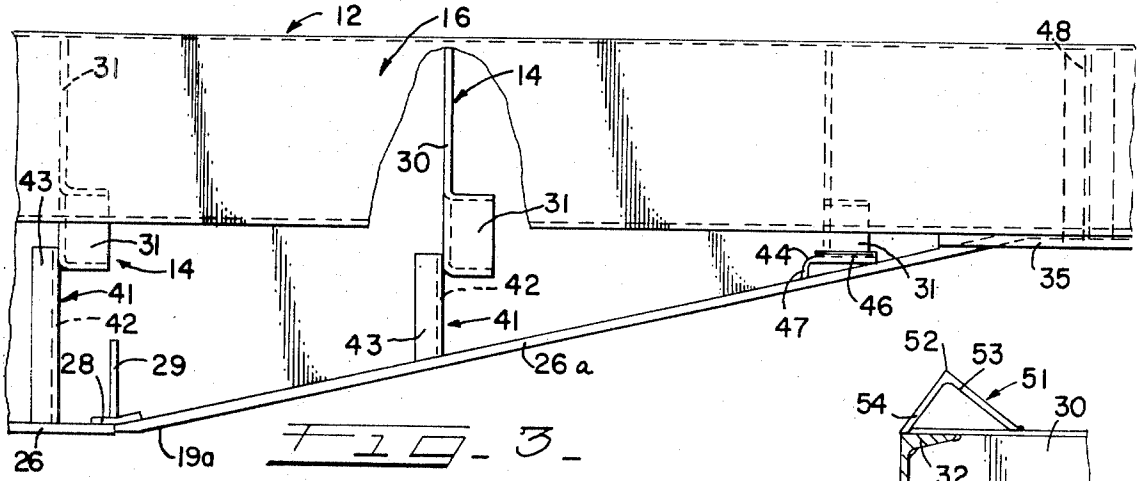


FIG. 3

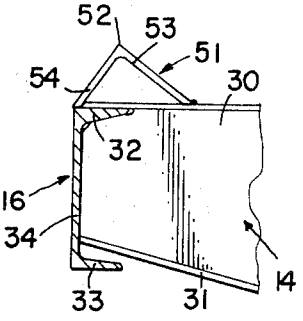


FIG. 6

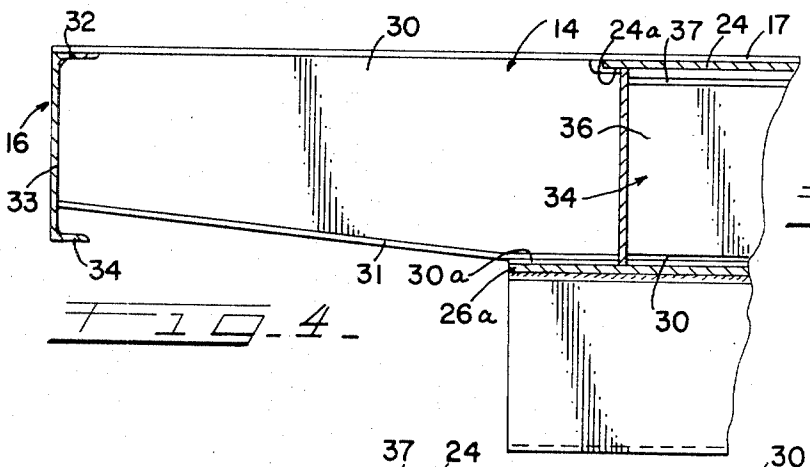


FIG. 4

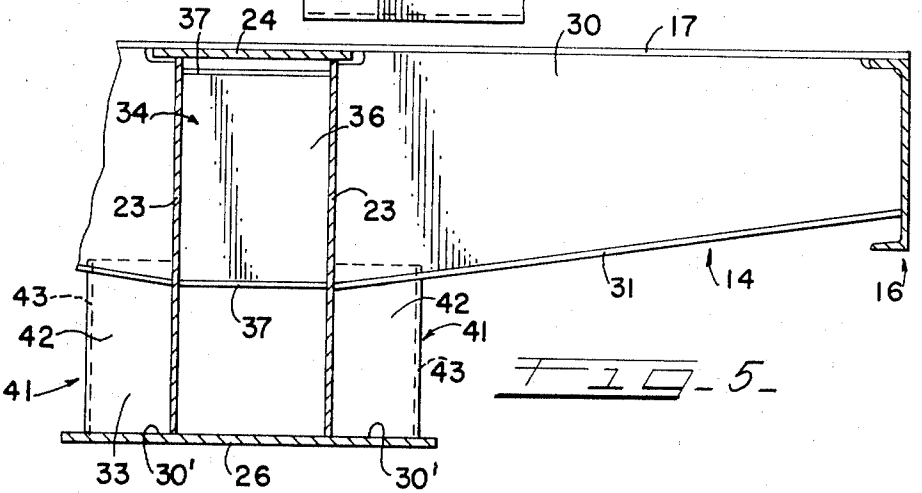


FIG. 5

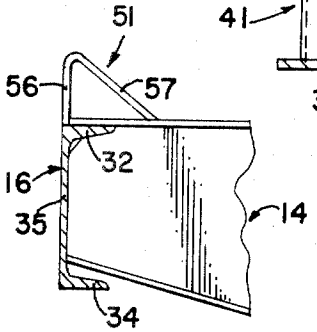


FIG. 7

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RAILWAY CAR CONSTRUCTION

BACKGROUND OF THE INVENTION

Heretofore bulkhead flat deck cars of the type forming the basis for the present invention have been constructed so that the floor structure is supported on lengthwise extending stringers and the like which are fixed to the crossbearers, cross ties and bolsters. This type of construction materially increases the weight of the vehicle so that the load carrying capacity is reduced. Moreover, the prior vehicle structures have required complex welding and tooling procedures resulting in increased manufacturing costs.

SUMMARY OF THE INVENTION

By the present invention there is provided a lightweight flat car of the bulkhead type which is constructed and arranged so as to be of minimum weight and minimum cost. To this end the car construction is substantially monolithic and includes a center sill which is formed of a minimum mass by the provision of a section modulus which produces a maximum stiffness with a minimum weight.

The floor support structure is supported on the crossbearers and the usual stringers are eliminated. The vehicle includes only crossbearers which are of substantially identical structure and are spaced in a manner such that the stress imposed on the vehicle is substantially distributed lengthwise between the bolsters thereof. To achieve the uniform distribution stress, the crossbearers are spaced within practical limitations, substantially equally lengthwise of the vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of a flat car of the bulkhead type incorporating the structure of the present invention.

FIG. 2 is a fragmentary top plan view of the underframe of the railway vehicle, the flooring omitted.

FIG. 3 is a cross sectional view taken generally along the lines 3—3 of FIG. 1 and showing the structure of the transitional section of the center sill of the railway vehicle.

FIG. 4 is a cross sectional view taken generally along the lines of 4—4 of FIG. 1 and showing in particular the attachment of the crossbearers at the transitional sections of the center sill.

FIG. 5 is a cross sectional view taken generally along the lines 5—5 of FIG. 1 and showing in particular the typical attachment of the crossbearers at the fish-belly portion of the center sill.

FIGS. 6, 7 and 8 are fragmentary transverse views of the crossbearer fixed to the side sill and showing in particular the different types of cargo supporting structure mounted thereon.

Referring now to the drawings, there is shown a flat deck railway vehicle of the bulkhead type which is particularly suitable for carrying uniformly distributed loads in the form of pulpwood or the like lengthwise thereof. The vehicle **10** comprises generally an underframe **11** including a center sill **12** to the respective ends of which there is fixed the usual couplers (not shown). Extending from the center sill **12** are bolsters **13** and spaced lengthwise therefrom and from each other are a plurality of crossbearers **14**. Fixed to the outboard ends of the crossbearers **14** are transversely spaced side sills **16** extending lengthwise of the vehicle and supporting and fixed directly on the crossbearers **14** and bolsters **13** there is a floor **17** formed from metal sheets connecting the respective outboard ends of the side sills **14** and an end sill **18**. Fixed inwardly of the respective end sills are bulkheads **19** which are adapted to provide an end barrier for the lumber or the cargo to be carried on the floor **17**.

The center sill **12** includes a fish-belly section **19***a*, transitional sections **21**, and end sections **22** and is constructed so as to provide a maximum stiffness with a minimum weight. The center sill sections **19**, **21** and **22** each includes a pair of transversely spaced side webs **23** to the upper ends of which there is

fixed a top cap or cover plate **24** and to the lower ends of which there is fixed a plate **26** or cap of greater width than the cover top plate **24**. The cross sectional top and bottom plate areas and the height of the side webs **23** in each of the sections **19**, **21** and **22** provide a section modulus having the requisite stiffness. In this connection it is to be noted that the bottom plate **26** in the fish-belly section is of lesser thickness than the bottom plate **26***a*. The bottom plates **26** and **26***a* are spliced at the transitional and end sections **21** and **22** as shown in FIG. **3** by a splice plate **28** and a vertically disposed kicker plate extending transversely between the side webs **23**—**23**.

To provide a substantially monolithic structure in which the stresses imposed by the load are evenly distributed lengthwise of the car, the crossbearers **14** are each of substantially identical structure and are the sole transverse support other than the bolsters **13** spaced inwardly from the ends of the center sill **12**. The bolsters **13** may be formed in accordance with standard fabricated structures. As shown, the crossbearers **14** are formed from a sheet plate having a vertical web **30** and a lower horizontally projecting leg **31**. At the upper edge, the vertical web is cut out to accommodate the overhanging ledge **24***a* of the top cover plate **24** at one end thereof and at its other end, a horizontal leg **32** of the side sill **16**, which is formed from a channel. Along the end sections of the vehicle **10** a stiffening plate **35** may be fixed to the underside of the leg **34**.

The crossbearers **14** each are attached to the respective side webs **23** at their inner vertical edge by way of welding or the like and at their outer edge to a vertical web **33** of the channel side sill **16**. Extending between the side webs **23**—**23** of the center sill **12** and the aligned vertical webs **33** of the crossbearers is a spreader member **34** which may be in the form of a channel having a vertical web **36** and a horizontal upper leg **37** adjacent the top cover plate and a lower horizontal leg **38** in alignment with the crossbearer legs **31**.

As shown, the crossbearers **14** are substantially equally spaced lengthwise of the intermediate fish-belly section **19**. In the transitional section **21** the crossbearers **14**, while also being equally spaced from each other, may be of lesser spacing than the spacing between the crossbearers **14** in the intermediate section **19** because of clearance requirements with the turning radius of the wheels **39** on which the underframe **12** is mounted. However, the spacing of crossbearers **14** in the transitional section **21** is arranged so as to approximate as closely as possible the spacing in the intermediate section. The spacing between the crossbearers **14** is such that the stresses imposed by the load are equally distributed lengthwise of the vehicle **10** and any two adjacent crossbearers are capable of assuming a lengthwise load of 25,000 pounds.

As shown in FIG. **5**, the crossbearers **14**, located in the intermediate section **19** of the underframe, each have fixed to the lower ends and adjacent the side webs a stabilizer plate **41**. The stabilizer plate **41** is in the form of an angle having a vertical transversely extending web **42** of which the free vertical edge abuts against and is fixed to the center sill side web **23** and a longitudinally extending web or leg **43**. The stabilizer plate **41** is of substantially the same width as the projecting ledge **30** and the lower edge of the latter is fixed thereto. The crossbearer **14**, adjacent the respective transitional sections **21** and the end sections **22**, as shown in FIGS. **3** and **4**, is fixed to the projecting ledge of the bottom cover plate **26***a* by means of an angle member **44** having a horizontal leg **46** which underlies and is fixed to the horizontal leg **31** of the crossbearer **14**. A vertical leg **47** of the angle member **44** is fixed at the free end thereof to the bottom cover plate **26***a* along the ledge **30***a*.

Disposed adjacent the inboard side of the bolster **13** is a floor beam **48** which may be of I-section and supports the floor thereon. The floor **17** is formed of metal plates and extends lengthwise of the vehicle between the bulkheads **18**, and is directly supported and fixed to the upper edges of crossbearers **14**. If necessary, a splicing plate, not shown, may be used at the center one of the crossbearers **14**. The splice plate may be fixed to the upper edge of the central crossbearer **14**.

The floor sheet plates are preferably of a width to span the side sills **16** and are fixed thereto along the edges.

The bulkheads at the ends of the vehicle **10** may be of more or less conventional structure and are fixed to the underframe at the center sill **12** and side sills **16**.

For adapting the vehicle for use in the transporting of pulpwood which is normally carried in log lengths extending transversely of the vehicle, there are provided side supports **51** which serve to maintain the logs spaced above the floor **17** to facilitate the loading and unloading by way of lifts or cranes. The side supports **51** may take the forms shown in FIGS. **6**, **7**, and **8**. In FIG. **6** the side support comprises an angle **52** having right angularly disposed legs **53** and **54**. The angle is disposed along the side sill **16** so that the legs **54** are inclined, as shown, and the free end of the leg **54** rests and is fixed on the top side sill flange **32** in abutting relationship with the edge of the floor plate **17**. The other leg **53** is fixed to the floor plate **17** inboard of the side sill **16**.

In the form shown in FIG. **7** the side member **51** includes a vertical leg **56** which is fixed to the top flange **34** adjacent the edge of the floor plate **17**. Integrally extending from the upper edge of the vertical leg **56** is an inclined leg **57** which is fixed at the free end thereof to the floor plate **17**.

FIG. **8** illustrates a further form of side member **51** comprising a wooden block having a downwardly inclined inboard face **59** extending from a top horizontal face **61**. The block **58** is secured to the floor plate **17** as by lengthwise spaced bolts **62**.

I claim:

1. A railway vehicle of the flat deck type comprising a center sill of the fish-belly type including an intermediate portion, end portions of substantially lesser depth than said intermediate portions and transitional portions connecting said end portions to said intermediate portions, said center sill being of substantially box section including transversely spaced side webs, a top cover plate fixed to the upper ends of said side webs, a bottom cover plate fixed to the lower ends of said side webs and being of greater width than the transverse spacing between said side webs providing a ledge on each side of said side webs, a plurality of crossbearers of substantially identical construction each fixed to said center sill at substantially uniformly spaced relationship from one another, said center sill side webs connecting with the crossbearers and extending the height of the intermediate section crossbearers and also extending below the intermediate section crossbearers, stabilizer plate means being fixed to each of said crossbearers located in said intermediate section, and said stabilizer plate means being disposed adjacent respective ones of said side webs, said stabilizer plate means including a pair of vertical webs each being fixed along its side edge to a respective side web and at its upper end to the underside of a respective one of said intermediate section crossbearers and at its lower end to a respective outer end portion of said bottom cover plate.

2. The invention as defined in claim **1** wherein the height of each of said crossbearers is less than the height of said intermediate section of said fish-belly center sill and no greater than the height of said end sections.

3. The invention according to claim **1**, and said crossbearers each having an upper support surface substantially coplanar with said top cover plate, side sills fixed to said crossbearers, and floor plate means fixed to said side sills and supported directly on said support surfaces of said crossbearers and on said top cover plate.

4. The invention according to claim **1**, and a vertical leg extending longitudinally from the other end of each vertical web.

5. The invention according to claim **1**, and side sills being fixed to said crossbearers, said side sills each being provided with a longitudinally extending laterally inwardly sloped lading support member mounted with the floor, each support member having a longitudinally extending transverse inwardly and downwardly extending surface connecting with the floor and substantially spaced apart from the other and supporting a load between each slope surface and the floor.